```
000001                  TITLE DIMS3,'REV E'
000002  *       DISKETTE TEST
000003  *       PART NO.
000004  * DIMX3       60133765-005
000005  * DIMS3       60129824-005
000006  * DIML3       60133766-005
000007  *
000008  * DESCRIPTION
000009  * -----------
000010  *  THIS T & V PROGRAM VERIFIES PROPER OPERATION OF THE LEVEL-6
000011  *  DISKETTE SUBSYSTEM.  PROVIDES A FIRST LEVEL OF DIAGNOSIS WHEN FAILURES
000012  *  ARE DETECTED, AND MAKES FACILITIES AVAILABLE TO SUPPORT EXTENSIVE PROBLEM
000013  *  INVESTIGATIONS.
000014  *
000015  *       THE SUBSYSTEM OPTIONS SUPPORTED BY THIS PROGRAM ARE:
000016  *
000017  *       DIM9301   DISKETTE CONTROLLER (SINGLE DENSITY) 6/20
000018  *       DIM9101   DISKETTE CONTROLLER
000019  *       DIU9101   SINGLE DISKETTE
000020  *       DIU9102   DUAL DISKETTE
000021  *
000022  * REVISION HISTORY
000023  * -------- -------
000024  *       001     NOV  1975     DIMT1           ORIGINAL RELEASE
000025  *       002     DEC  1976     DIMS1           SAF
000026  *       003     APR  1977     DIMS1-DIML1     LAF
000027  *       004     JUL 1977      DIMS1-DIML1     W/ MLCP LIBRARY
000028  *       005     FEB  1978     DIMS3-DIML3     (SAF AND LAF)  6/20
000029  *
000030  *       THIS DOCUMENT AND THE INFORMATION CONTAINED THEREIN IS CONFIDENTIAL AND
000031  *  PROPRIETARY TO AND THE EXCLUSIVE PROPERTY OF HONEYWELL INFORMATION SYSTEMS
000032  *  INC.   IT  IS MADE AVAILABLE ONLY  TO  HONEYWELL AUTHORIZED RECIPIENTS FOR
000033  *  THEIR USE SOLELY  IN  THE MAINTENANCE AND OPERATION OF HONEYWELL PRODUCTS.
000034  *  THIS DOCUMENT AND INFORMATION MUST BE MAINTAINED  IN STRICTEST CONFIDENCE;
000035  *  IT MUST NOT BE REPRODUCED IN  WHOLE OR IN PART;  AND IT SHALL NOT BE DIS-
000036  *  CLOSED TO ANY OTHER PARTY WITHOUT THE PRIOR WRITTEN CONSENT OF HONEYWELL.
000037  ************************************************************************
```

```
000038                  / PROGRAM PREPARATION:
000039                  * ------- -----------
000040                  *     THE ROUT SOURCE OF THIS PROGRAM, AFTER THE ADDITION OF THE APPROPRIATE
000041                  *     TITLE AND END STATEMENTS, WAS PROCESSED BY THE HOST RESIDENT ASSEMBLER
000042                  *     TO CREATE EITHER SHORT OR LONG ADDRESS FORM ( SAF OR LAF ) OBJECT TEXT
000043                  *     AND LISTING.   THE  OBJECT TEXT  WAS  FURTHER PROCESSED  BY  THE  HOST
000044                  *     RESIDENT LINKER USING THE APPROPRIATE CONSOLE ZV$LIB LIBRARY TO CREATE
000045                  *     A PUNCH SEGMENT CONTAINING AN EXECUTABLE MODULE.  THE ASSEMBLY LISTING
000046                  *     WAS AUGMENTED WITH CROSS REFERENCE DATA,  PLUS  THE LOAD MAP FROM  THE
000047                  *     LINKER TO CREATE A LIST SEGMENT.
000048                  *              ROUT              SAF               LAF
000049                  *              ----              ---               ---
000050                  *     NAME     DIMX3             DIMS3             DIML3
000051                  *     DOCUMENT 60133765-005      60129824-005      60133766-005
000052                  *
000053                  * DISTRIBUTION
000054                  * ------------
000055                  *     THE ELEMENTARY ITEMS SUBMITTED TO THE T & V PROGRAM DISTRIBUTION CENTER
000056                  *     WERE THE EXECUTABLE LINKED IMAGES, ON DISKETTE, OF DIMS3 AND DIML3, AND
000057                  *     MAGNETIC TAPE IMAGES OF THE AUGMENTED LISTINGS.
000058                  *
000059                  *     REPRODUCTIONS OF THE EXECUTABLE LINKED IMAGES MAY BE  AS DUPLICATE CARD
000060                  *     DECKS OR  AS A MEMBER OF A MULTIPLE MEMBER FILE.   IN THE MOST FREQUENT
000061                  *     CASE, IT WILL BE FOUND  AS  MEMBER "SJ" (SAF) OR "LJ" (LAF) WITHIN FILE
000062                  *     "PROGFILE" OF A DISKETTE VOLUME ENTITLED "DIAGS".
000063                  *
000064                  *     DISTRIBUTION OF THE LISTINGS,  WHICH SHOULD BE AVAILABLE IF ANY COMPLEX
000065                  *     MAINTENANCE OR REPAIR IS TO BE PERFORMED, IS NORMALLY AS A PRINTED COPY.
000066                  *
000067                  * ROUTINE DEMONSTRATION
000068                  * ------- -------------
000069                  *     A MINIMUM SATISFACTORY TEST FOR NORMAL OPERATION MAY BE ACCOMPLISHED
000070                  *     BY RESPONDING WITH "A" TO THE QUESTION "NEXT ?:" AND LET THE PROGRAM
000071                  *     COMPLETE ONE PASS.
000072                  *
000073                  * STORAGE
000074                  * -------
000075                  *     THIS PROGRAM REQUIRES AT LEAST  16 K  WORDS OF MAIN MEMORY .
000076                  *
000077                  * DISCRIPTION
000078                  * -----------
000079                  *     THIS PROGRAM WILL RUN ON MOST OF THE LEVEL-6 SYSTEMS.  THE USER
000080                  *     SHOULD KNOW THE FACT THAT, DUE TO HARDWARE AND FIRMWARE DIFFERENCES
000081                  *     EXIST ON CONTROLLERS AND ADAPTERS ATTACHED TO DIFFERENT SYSTEMS,
000082                  *     THE EXECUTION TIME OF THE PROGRAM WILL BE DIFFERENT FOR DIFFERENT
000083                  *     SYSTEMS.  BOTH 6/30 AND 6/40 SYSTEMS DO ALL TESTS, WHILE 6/20
000084                  *     SYSTEM BYPASSES FOLLOWING TESTS:
000085                  *
000086                  *     TEST B.  WRAPAROUND TEST
000087                  *
000088                  *     TEST F.  DIAGNOSTIC WRITE-READ TEST
000089                  *
000090                  *     TEST E.  TRACK CAPACITY TEST
000091                  *
000092                  *     TEST W.  WRITE DELETED DATA FIELD TEST
000093                  *
000094                  *     TEST X.  READ AROUND DELETED DATA FIELD TEST
000095                  *
000096                  *     TEST Y.  READ DELETED DATA FIELD TEST
000097                  *
000098                  * OPERATION
000099                  * ---------
000100                  *
000101                  *     LOAD THE PROGRAM.  THE PROGRAM WILL START BY ITSELF. THE NAME OF THE
000102                  *     PROGRAM AND THE DATE OF RELEASE WILL BE DISPLAYED ON THE CONSOLE.
000103                  *     THE INITIAL START WILL ALSO DISPLAY:
000104                  *
000105                  *       THE ZV$LIB REVISION NUMBER
000106                  *       THE ADDRESS FORM (SAF OR LAF)
000107                  *       I/O  EQUIPMENT DETECTED IN THE SYSTEM
000108                  *       MEMORY SIZE
000109                  *
000110                  *     THIS DISPLAY MUST BE VERIFIED BY THE OPERATOR.   THIS DISPLAY IS OMITTED
000111                  *     ON RESTARTS.
000112                  *
000113                  *     THE CONSOLE SEARCH RULES ARE:  FIND THE CONSOLE WITH THE LOWEST  CHANNEL
000114                  *     NUMBER CONNECTED THROUGH A  CONTROLLER.  IF THERE IS NO CONSOLE,
000115                  *     THEN SEARCH FOR A TERMINAL WITH THE HIGHEST CHANNEL NUMBER ASSIGNED
000116                  *     TO AN ACLA ADAPTER ON AN MLC (NOT DLC) PROCESSOR.  IF NO ASYNC ADAPTER
000117                  *     IS FOUND, THEN GO TO THE FULL CONTROL PANEL.
000118                  *
000119                  *     THERE ARE THREE CONSOLE CHANNEL OPTIONS DETERMINED BY THE VALUE  OF  LO-
000120                  *     CATION "ZV$TTY".
000121                  *
000122                  *     IF ZV$TTY EQUALS (0000), SEARCH FOR A CONSOLE.
000123                  *     IF ZV$TTY EQUALS (FFFF), ASSUME THERE IS NO CONSOLE.
000124                  *     IF ZV$TTY EQUALS NEITHER (0000), NOR (FFFF), THEN IT IS THE CONSOLE CHAN-
000125                  *     NEL NUMBER.   NOTE:  DEFAULT IS TO SEARCH FOR A CONSOLE.
000126                  *
000127                  *     ALL CONSOLE I/O IS EVEN PARITY.  IF CONSOLE IS ON MLC,  IT MUST BE ASYNC
000128                  *     AND THE BAUD RATE SET AT 1200 TO MATCH THE PROGRAM SUPPLIED RATE.  IF IT
000129                  *     IS NECESSARY TO CHANGE THE PROGRAM BAUD RATE,   THEN THE  NEW  BAUD RATE
000130                  *     CODE SHOULD BE PUT INTO LOCATION "ZV$BUD" IN HEX. THE TERMINAL BAUD RATE
000131                  *     MUST BE  SET  TO MATCH THIS NEW BAUD RATE.  THE CORRECT HEX VALUE MAY BE
000132                  *     OBTAINED FROM THE FOLLOWING TABLE.
000133                  *
000134                  *-----------------------------------------*
000135                  *                                         *
000136                  *        BAUD  RATE  TABLE                *
000137                  *                                         *
000138                  *-----------------------------------------*
000139                  * ACLA I.D.          (2118)(2110)      (2108)
000140                  * BAUD-RATE
000141                  *    50                 0                1
000142                  *    75                 1                2
000143                  *   110                 2                3
000144                  *   134                 3                4
000145                  *   150                 4                5
000146                  *   200                 5               ---
000147                  *   300                 6                6
000148                  *   600                 7                7
000149                  *   900                ---               8
000150                  *  1050                 8               ---
```

```
000151                  *  1200              9                 9
000152                  *  1800             10 (A)            10 (A)
000153                  *  2000             11 (B)            ---
000154                  *  2400             12 (C)            11 (B)
000155                  *  3600             ---               12 (C)
000156                  *  4800             13 (D)            13 (D)
000157                  *  7200             ---               14 (E)
000158                  *  9600             14 (E)            15 (F)
000159                  * 19200             15 (F)            ---
000160                  *
000161                  *     TO MAKE ANY OF THE ABOVE CHANGES, LOAD AND HALT THE PROGRAM BEFORE EX-
000162                  *     ECUTION.  INSERT CHANGE THEN EXECUTE.  MEMORY LOCATIONS OF "ZV$TTY" AND
000163                  *     "ZV$BUD" MAY BE FOUND IN MAP AT END OF LISTING.
000164                  *     CONSULT LEVEL-6 T&V MANUAL "AW94" FOR DETAILS ON HOW TO LOAD THE TESTS.
000165                  *
000166                  *     THE FOLLOWING IS A TYPICAL RESULT OF LOADING  AND  STARTING TO  RUN THE
000167                  *     PROGRAM.
000168                  *
000169                  *     DISKETTE TEST  DIMS3   FEB 16, 1978  REV. E
000170                  *     ZV$LIB REV. 6.0
000171                  *     WDT
000172                  *     CHAN  DEVC  ID
000173                  *     0400  DSKT  2010
000174                  *     0480  DSKT  2010
000175                  *     0580  CDR   2008
000176                  *     1200  DISC  2330
000177                  *     1280  DISC  2330
000178                  *     1300  LPT   2000
000179                  *     1380  CONS  2019
000180                  *     MEMORY LOW  00002B2D
000181                  *     MEMORY HIGH 00003FFF  16K
000182                  *
000183                  *    THE CONSOLE WILL THEN DISPLAY THE MESSAGE
000184                  *
000185                  *      "PLEASE REMOVE THE PROGRAM DISKETTE FROM THE DRIVE"
000186                  *
000187                  *    THE USER SHOULD REMOVE THE PROGRAM DISKETTE FROM THE DISKETTE DRIVE
000188                  *    BEFORE PROCEEDING ANY FURTHER.
000189                  *
000190                  *
000191                  *    THE CONSOLE WILL THEN ASK THE QUESTION  "CHANNEL(S) ?: "
000192                  *    THE OPERATOR SHOULD RESPOND WITH ONE OF THE FOLLOWING FORMATS:
000193                  *
000194                  *      XXXX,YYYY          TEST BOTH CHANNEL XXXX AND CHANNEL YYYY
000195                  *
000196                  *      XXXX               TEST CHANNEL XXXX ONLY
000197                  *
000198                  *      YYYY               TEST CHANNEL YYYY ONLY
000199                  *
000200                  *    WHERE XXXX AND YYYY ARE CHANNEL NUMBERS IN HEX
000201                  *
000202                  *    DO NOT SELECT A CHANNEL, IF THERE IS NO DEVICE ATTACHED TO IT
000203                  *
000204                  *    THE CONSOLE WILL THEN ASK THE QUESTION  "POWER FREQUENCY ?:"
000205                  *
000206                  *    RESPOND BY TYPING THE FREQUENCY OF THE POWER LINE (60 IN USA).
000207                  *    IF IT IS A 6/40 SYSTEM, THE QUESTION WILL NOT BE ASKED.
000208                  *
000209                  *    THE CONSOLE WILL THEN ASK THE QUESTION  "NEXT ?:"
000210                  *
000211                  *    THE OPERATOR SHOULD RESPOND WITH ONE OF THE THREE FORMATS:
000212                  *
000213                  *      A            TEST BOTH CONTROLLER ELECTRONICS AND DEVICE
000214                  *
000215                  *
000216                  *      E            TEST CONTROLLER ELECTRONICS ONLY
000217                  *
000218                  *
000219                  *      R            READ THE ENTIRE DISKETTE VOLUME(S) IN THE SPECIFIED
000220                  *                   CHANNEL(S) AND REPORT ERROR IF ANY
000221                  *
000222                  *    IF THE RESPONSE IS "R", FORMAT OF THE DISKETTE VOLUME USED MUST BE
000223                  *    COMPARABLE TO HONEYWELL STANDARD.  THE PROGRAM WILL READ THE ENTIRE
000224                  *    VOLUME (HEADERS AND DATA FIELDS ON ALL TRACKS AND ALL SECTORS).
000225                  *    IF THE OPERATOR RESPONSE IS "A", THE PROGRAM WILL TEST THE CONTROLLER
000226                  *    ELECTRONICS FIRST AND THEN PROCEEDS TO THE DEVICE TEST.  AT THIS
000227                  *    POINT, THE CONSOLE WILL ISSUE FOLLOWING MESSAGES:
000228                  *
000229                  *      "OPEN DOOR ON DRIVE:"
000230                  *
000231                  *      "PUT WORK DISKETTE AND CLOSE THE DOOR ON;"
000232                  *
000233                  *    IF THE DOOR IS ALREADY OPEN, THE FIRST QUESTION WON'T BE ASKED.
000234                  *
000235                  *    THE PROGRAM WILL THEN RUN FOR A PERIOD (13 MINUTES MAX.) UNTIL
000236                  *    THE TEST IS COMPLETED.
000237                  *
000238                  *    IF THE RESPONSE IS "E" OR "R", THE PROGRAM RUNS WITHOUT THE OPERATOR
000239                  *    INTERVENTION UNTIL THE TEST IS COMPLETED. THE END OF ALL THREE TESTS
000240                  *    ARE INDICATED BY A COMPLETION MESSAGE "END-OF-TEST" DISPLAYED ON THE
000241                  *    CONSOLE AND THE PROGRAM WILL RETURN TO THE QUESTION "CHANNEL(S) ?:".
000242                  *
000243                  *  ERROR REPORTING
000244                  *---------------
000245                  *
000246                  *    THE PROGRAM REPORTS THREE KINDS OF ERRORS.  THEY ARE: UNRECOVERABLE
000247                  *    ERRORS, RECOVERABLE ERRORS, AND MAJOR ERRORS.
000248                  *
000249                  *    A RECOVERABLE ERROR IS IDENTIFIED BY THE CONSOLE ERROR MESSAGE
000250                  *    APPEARING NOT MORE THAN TWICE INDICATING THE SAME TYPE OF ERROR
000251                  *    AT THE SAME LOCATION (SAME CHANNEL, SAME TRACK, SAME SECTOR).
000252                  *
000253                  *    AN UNRECOVERABLE ERROR IS IDENTIFIED BY THE CONSOLE ERROR MESSAGE
000254                  *    APPEARING THREE TIMES INDICATING THE SAME ERROR AT THE SAME
000255                  *    LOCATION (SAME CHANNEL, SAME TRACK, SAME SECTOR).
000256                  *
000257                  *    BOTH RECOVERABLE AND UNRECOVERABLE ERRORS ARE REPORTED AS FOLLOWS:
000258                  *
000259                  *       TEST TYPE       ERROR TYPE
000260                  *
000261                  *       TRACK;        SECTOR;        CHANNEL:
000262                  *
000263                  *    A MAJOR ERROR IS DISPLAYED ON THE CONSOLE AS FOLLOWS:
```

```
000264                  *
000265                  *       ERR  ERCODE          AT        AAAA
000266                  *
000267                  *     WHERE:
000268                  *
000269                  *        ERCODE  = ERROR CODE WITH FOUR CHARACTERS
000270                  *        AAAA    = LOCATION OF TEST IN PROGRAM WHERE ERROR WAS
000271                  *
000272                  *     IF THERE IS NO CONSOLE PRESENT, THE OPERATOR CAN DETERMINE THE
000273                  *     ERROR CODE BY EXAMINING THE REGISTERS D1 AND D2. SEE ERROR MESSAGE
000274                  *     TABLE BELOW. CONSULT LEVEL-6 T&V MANUAL "Aw94" FOR FURTHER DETAILS.
000275                  *
000276                  *     A PASS IS CONSIDERED SUCCESSFUL ONLY IF THERE ARE A MAXIMUM
000277                  *     OF THREE RECOVERABLE ERRORS, AND NO UNRECOVERABLE AND MAJOR ERRORS.
000278                  *
```

```
                        /                    ERROR MESSAGE TABLE
                        *
                        *
                        *-------------------------------------------------------------------------------
                        *
                        *  CONTROL      DISPLAYED
                        *PANEL CODED      TEXT          MEANING                    MOST PROBABLE DIAGNOSIS
                        *    HLT
                        *
                        *  R1     R2                                               6/20        6/30 OR 6/40
                        *-------------------------------------------------------------------------------
                        * 6572   3031    ER01   PANEL CHECK LIGHT IS ON
                        * 6572   3032    ER02   ILLEGAL TEST NAME                 OPERATOR      OPERATOR
                        *                       ENTERED
                        * 6572   3033    ER03   ILLEGAL CHANNEL ENTERED          OPERATOR      OPERATOR
                        * 6572   3034    ER04   CAN'T READ DEVICE ID              CONTROLLER    MDC
                        * 6572   3035    ER05   ILLEGAL CHANNEL ENTERED          OPERATOR      OPERATOR
                        * 6572   3036    ER06   CP CAN'T CHANGE LEVEL 0          CP            CP
                        * 6572   3037    ER07   WRONG CONFG. WORD A.             CONTROLLER    MDC
                        *                       FROM CHAN A.
                        * 6572   3038    ER08   WRONG CONFG. WORD B.             CONTROLLER    MDC
                        *                       FROM CHAN A.
                        * 6572   3039    ER09   WRONG COMFG. WORD A.             CONTROLLER    MDC
                        *                       FROM CHAN. A.
                        * 6572   3130    ER10   WRONG CONFG. WORD B.             CONTROLLER    MDC
                        *                       FROM CHAN A.
                        * 6572   3131    ER11   WRONG RESIDUAL RANGE             CONTROLLER    MDC
                        *                       AFTER AN IOLD CHAN A.
                        * 6572   3132    ER12   WRONG RESIDUAL RANGE             CONTROLLER    MDC
                        *                       AFTER AN IOLD CHAN A.
                        * 6572   3133    ER13   WRONG ID FROM CHAN B.            CONTROLLER    MDC
                        * 6572   3134    ER14   WRONG ID FROM CHAN B.            CONTROLLER    MDC
                        * 6572   3135    ER15   WRONG CONFG. WORD A.             CONTROLLER    MDC
                        *                       FROM CHAN B.
                        * 6572   3136    ER16   WRONG CONFG. WORD B.             CONTROLLER    MDC
                        *                       FROM CHAN B.
                        * 6572   3137    ER17   WRONG CONFG. WORD A.             CONTROLLER    MDC
                        *                       FROM CHAN B
                        * 6572   3138    ER18   WRONG CONFG. WORD B.             CONTROLLER    MDC
                        *                       FROM CHAN B.
                        * 6572   3139    ER19   WRONG RESIDUAL RANGE             CONTROLLER    MDC
                        *                       FROM CHAN B.
                        * 6572   3230    ER20   WRONG RESIDUAL RANGE             CONTROLLER    MDC
                        *                       FROM CHAN B.
                        * 6572   3231    ER21   WRONG RESIDUAL  RANGE            N/A           ADAPTER
                        *                       WHILE WRAPAROUND
                        * 6572   3232    ER22   DEVICE SHOULD INTERRUPT
                        *                       BUT DIDN'T
                        * 6572   3233    ER33   DEVICE SHOULDN'T INTE-
                        *                       RRUPT BUT DID
                        * 6572   3234    ER24   PENDING INTERRUPT
                        *                       DIDN'T COME
                        * 6572   3235    ER25   WRONG DEVICE INTE
                        *                       RRUPTED CP
                        * 6572   3236    ER26   S-REGISTER WRONG IN
                        *                       INTERRUPT SAVE AREA
                        * 6572   3237    ER27   PROGRAM LEVEL FLAG IS ON
                        *                       IT SHOULDN'T BE
                        * 6572   3238    ER28   PROGRAM LEVEL FLAG IS
                        *                       OFF, IT SHOULDN'T
                        * 6572   3239    ER29   CP CAN'T CHANGE LEVEL
                        * 6572   3330    ER30   WRONG STATUS FROM CHAN A       DEVICE OR     DEVICE OR
                        *                       WHILE DOOR TEST                CONTROLLER    ADAPTER
                        * 6572   3331    ER31   WRONG STATUS FROM CHAN B       DEVICE OR     DEVICE OR
                        *                       WHILE DOOR TEST                CONTROLLER    ADAPTER
                        * 6572   3332    ER32   WRONG STATUS WHILE             CONTROLLER    MDC
                        *                       TRACK CAPACITY TEST
                        * 6572   3333    ER33   SEEK ERROR BIT NOT SET          CONTROLLER    MDC
                        * 6572   3334    ER34   TRACK CAPACITY OUT OF           CONTROLLER    MDC
                        *                       TOLERANCE
                        * 6572   3335    ER35   SUSPECT BAD MEDIA               MEDIA         MEDIA
                        *                       RERUN WITH NEW MEDIA
                        * 6572   3336    ER36   DIAGNOSTIC WRITE/READ           N/A           MDC
                        *                       FAILED.
                        * 6572   3337    ER37   SUSPECT BAD MEDIA               N/A           MEDIA
                        *                       RERUN WITH NEW MEDIA
                        * 6572   3338    ER38   SUSPECT BAD MEDIA               N/A           MEDIA
                        *                       RERUN WITH NEW MEDIA
                        * 6572   3339    ER39   DIAGNOSTIC READ/WRITE           N/A           MDC
                        *                       FAILED
                        * 6572   3430    ER40   DATA MISCOMPARE WHILE           CONTROLLER    MDC
                        *                       BYTE ADDRESSING
                        * 6572   3431    ER41   DATA  MISCOMPARE WHILE          CONTROLLER    MDC
                        *                       BYTE ADDRESSING TEST
                        * 6572   3432    ER42   DATA MISCOMPARE WHILE           CONTROLLER    MDC
                        *                       BYTE ADDRESSING TEST
                        * 6572   3433    ER43   WRONG EDC CHARA WHILE           CONTROLLER    MDC
                        *                       FORCED ERROR TEST
                        * 6572   3434    ER44   READ ERROR BIT NOT SET          CONTROLLER    MDC
                        * 6572   3435    ER45   UNSUCCESSFUL SEARCH             CONTROLLER    MDC
                        *                       BIT NOT SET
                        * 6572   3436    ER46   SEEEK ERROR BIT NOT SET         CONTROLLER    MDC
                        * 6572   3437    ER47   FORMAT READ/WRITE               CONTROLLER    MDC
                        *                       FAILED
                        * 6572   3438    ER48   DELETED DATA BIT NOT SET        CONTROLLER    MDC
                        * 6572   3439    ER49   READ DELETED DATA               N/A           MDC
                        *                       FIELD TEST FAILED
                        * 6572   3530    ER50   NO INTERRUPT WHILE              DEVICE OR     DEVICE OR
                        *                       DOOR TEST                      CONTROLLER    ADAPTER
                        * 6572   3531    ER51   TRACK CAPACITY OUT              N/A           MDC
                        *                       OF TOLERANCE
                        * 6572   3532    ER52   UNRECOVERABLE ERROR             CONTROLLER    MDC
                        * 6572   3533    ER53   DEVICE NOT READY                DEVICE        DEVICE
                        * 6572   3534    ER54   WRONG FORMAT ON                 CONTROLLER    MDC
                        *                       DISKETTE MEDIA
                        * 6572   3535    ER55   DATA MISCOMPARE                 CONTROLLER    MDC
                        * 6572   3536    ER56   DELETED DATA BIT NOT SET        N/A           ADAPTER
                        * 6572   3537    ER57   I/O TIME OUT                    CONTROLLER    MDC
                        * 6572   3538    ER58   CHANNEL ALWAYS BUSY             CONTROLLER    MDC
                        * 6572   3539    ER59   RECOVERABLE ERROR
                        * 6572   3630    ER60   WRONG RESISDUAL RANGE           N/A           MDC
                        *                       WHILE DELETED DATA READ
                        *
```

```
000392                          *-------------------------------------------------------------------------
000393                          *
000394                          *          TEST DEFINITIONS
000395                          *          ----------------
000396                          *
000397                          *   TEST A:  BASIC CONTROLLER FUNCTIONS TEST
000398                          *
000399                          *   TEST B:  WRAPAROUND WRITE-READ TEST
000400                          *
000401                          *   TEST C:  INTERRUPT TEST
000402                          *
000403                          *   TEST D:  DISKETTE DRIVE DOOR TEST
000404                          *
000405                          *   TEST E:  TRACK CAPACITY TEST
000406                          *
000407                          *   TEST F:  DIAGNOSTIC WRITE-READ TEST
000408                          *
000409                          *   TEST G:  BYTE ADDRESSING TEST
000410                          *
000411                          *   TEST H:  SHORT RANGE TEST
000412                          *
000413                          *   TEST I:  FORCED ERROR TEST
000414                          *
000415                          *   TEST J:  FORMAT WRITE-ALL SECTORS, ALL TRACKS
000416                          *
000417                          *   TEST K:  FORMAT READ-ALL SECTORS ALL TRACKS
000418                          *
000419                          *   TEST L:  WRITE DATA (00000000) ALL SECTORS, ALL TRACKS
000420                          *
000421                          *   TEST M:  READ DATA ALL SECTORS, ALL TRACKS
000422                          *
000423                          *   TEST N:  WRITE DATA (11111111) ALL SECTORS, ALL TRACKS
000424                          *
000425                          *   TEST O:  READ DATA ALL SECTORS ALL TRACKS
000426                          *
000427                          *   TEST P:  WRITE DATA (10101010) ALL SECTORS, ALL TRACKS
000428                          *
000429                          *   TEST Q:  READ DATA ALL SECTORS, ALL TRACKS
000430                          *
000431                          *   TEST R:  WRITE DATA (RANDOM) ALL SECTORS, ALL TRACKS
000432                          *
000433                          *   TEST S:  READ DATA ALL SECTORS, ALL TRACKS
000434                          *
000435                          *   TEST T:  RANDOM SEEKS AND READS
000436                          *
000437                          *   TEST U:  UPDATES WRITES (6 RECORDS)
000438                          *
000439                          *   TEST V:  READ AND VERIFY UPDATED RECORDS
000440                          *
000441                          *   TEST W:  WRITE DELETED DATA FIELDS
000442                          *
000443                          *   TEST X:  READ AROUND DELETED DATA FIELD
000444                          *
000445                          *   TEST Y:  READ DELETED DATA FIELDS
000446                          *
000447                          *
000448                          ****************************
000449  0000                    ZERO    EQU     $
000450                                  XLOC    ZHISAZ,ZHRTCL,ZHRTCI,ZHRTCC
000451                                  XLOC    ZHCOMM,ZV$TTY
000452  0100                            ORG     ZERO+X'0100'
000453                          *
000454                          *
000455                          *
000456  0100  9800 1929                START   LDR     $R1,<STATUS             GET STATUS
000457  0102  9970 0000                        CMR     $R1,=0                  IS IT A RESTART
000458  0104  0981 0029                        BNE     RERUN                   DONT SAVE STATUS IF RERUN
000459  0106  6C51                             STS     =$R1                    GET CURRENT STATUS
000460  0107  82D1                             LB      =$R1,=Z'8000'           SEE CHECK LIGHT BIT IS ON
        0108  8000
000461  0109  0581 000A                        BBF     NOTLIT                  CONTINUE IF NOT ON
000462                                  *       CALL    ZV$ER,E01,ER01          SEND ERROR MESSAGE
        010B  FBC0 0003
        010D  0380 0000         X
        010F  0F80
        0110  0112
        0111  1F02
000463  0112  0F01 FFFF          E01     NOP     $                       PANEL CHECK LIGH IS ON
000464  0114  9570 63FF          NOTLIT  AND     $R1,=Z'63FF'            STRIP OFF UNUSED BITS ANC CHECK LIGHT BIT
000465  0116  9F00 1929                        STR     $R1,<STATUS             SAVE IT
000466  0118  9F40 052A                        STR     $R1,ISATP+$AF           SAVE STATUS ON RUPT SAVE AREA
000467  011A  9F40 053E                        STR     $R1,ISARP+$AF
000468  011C  9F40 1E9E                        STR     $R1,L20P+$AF
000469  011E  9F40 1EB2                        STR     $R1,L21P+$AF
000470  0120  9F40 1EC6                        STR     $R1,L22P+$AF
000471                          *
000472                                  *       CALL    ZV$RD,MESGA             DETERMINE RESOURCES
        0122  FBC0 0003
        0124  0380 0000         X
        0126  0F80
        0127  1BF9
000473                                  *       CALL    ZV$I,ZV$TC,REMOVE       REMOVE PROGRAM DISKETTE FROM DRIVE
        0128  FBC0 0003
        012A  0380 0000         X
        012C  0F80
        012D  1C29
000474                          *
000475                          *          HERE PROGRAM ASK FOR CHANNEL NUMBER(S) AND POWER FREQUENCY
000476  012E  8740 17E4         RERUN   CL      RRR
000477  0130  8740 17E3                 CL      RRR+1
000478  0132  8700 1927                 CL      <DRIVA                  DRIVE A FLAG
000479  0134  8700 1928                 CL      <DRIVB                  DRIVE B FLAG
000480  0136  9B80 024E                 LAB     $B1,<INCCA
000481  0138  9F80 024B                 STB     $B1,<INCCD+1
000482  013A  8740 17E0                 CL      CHN
000483  013C  1C02                      LDV     $R1,=2                  RANGE FOR TWO CHANNELS
000484  013D  9F40 17D7                 STR     $R1,RNG
000485                                  CALL    ZV$I,ZV$QC,IDRNO        INPUT CHANNELS A CHANNELS B
        013F  FBC0 0003
        0141  0380 0000         X
        0143  0F80
        0144  1627
000486                                  CALL    ZV$IH,RRR,RNG
```

```
                0145  FBC0 0003
                0147  D380 0000      X
                0149  0F80
                014A  1913
                014B  1915
000487                          *
000488  014C  9800 1926                LDR   $R1,<RSTRT          SEE IF IT A RESTART
000489  014E  9970 0000                CMR   $R1,=0
000490  0150  0981 001F                BNE   ICNG                DONT ASK FREQUENCY IF RESTART PROGRAM
000491  0152  8A80 1926                INC   <RSTRT              SET FLAG FOR RESTART
000492  0154  8280 1929                LB    <STATUS,=Z'2000'    IS IT 6/40
                0156  2000
000493  0157  0501 0014                BBT   ASK1                DONT ASK FREQUENCY IF 6/40
000494                                  CALL  ZV$I,ZV$QC,MPOWER   ASK POWER FREQUENCY
                0159  FBC0 0003
                015B  D380 0000      X
                015D  0F80
                015E  1CE5
000495                                  CALL  ZV$IH,ZV$ID,HERTZ   SAVE FREQUENCY
                015F  FBC0 0003
                0161  D380 0000      X
                0163  0F80
                0164  1940
000496  0165  9800 1940                LDR   $R1,<HERTZ          GET FREQUENCY
000497  0167  9870 0002                MUL   $R1,=2              CHANGE TO TICKS PER SECOND
000498  0169  9F00 1940                STR   $R1,<HERTZ          SAVE IT
000499  016B  0F85                     B     >ICNG               GO ON
000500                          *
000501  016C  9870 0078         ASK1    LDR   $R1,=120            GET CRYSTAL CLOCK TICKS/S
000502  016E  9F00 1940                STR   $R1,<HERTZ          SAVE IT FOR 6/40
000503                          *
000504  0170  9800 1913         ICNG    LDR   $R1,<RRR            GET  CHANNEL A
000505  0172  A800 1914                LDR   $R2,<RRR+1          GET CHANNEL B
000506  0174  82D1                     LB    =$R1,=Z'0001'       SEE IF DRIVE A. IS PRESENT
                0175  0001
000507  0176  0561 000B                BBF   ICNG1               BRANCH IF IT IS PRESENT
000508  0178  A970 0000                CMR   $R2,=0              SEE IF DRIVE B IS PRESENT
000509  017A  0981 000E                BNE   ICNG2               BRANCH IF PRESENT
000510  017C  8900 1927                LBT   <DRIVA,=Z'0001'     OR ELSE SET NO DRIVE A FLAG
                017E  0001
000511  017F  9E52                     SWR   $R1,=$R2            SWAP TWO CHANNELS
000512  0180  0F81 0008                B     ICNG2               GO AND SAVE CHANNEL NUMBERS FOR A. AND B.
000513  0182  A970 0000         ICNG1   CMR   $R2,=0              SEE IF CHAN B IS PRESENT
000514  0184  0981 0004                BNE   ICNG2               BRANCH IF PRESENT
000515  0186  8900 1928                LBT   <DRIVB,=Z'0001'     OR ELSE SET NO DRIVE B. FLAG
                0188  0001
000516  0189  9F00 1918         ICNG2   STR   $R1,<CHA1           SAVE CHANNEL NUMBERS
000517  018B  AF00 191A                STR   $R2,<CHB1
000518                                  * HERE PROGRAM REQUESTS FOR THE TEST
000519                          *
000520                          NEXT    CALL  ZV$RD,ZV$IZ         (PART OF ZV$RD)
                018D  FBF0 0001
                018F  D380 0000      X
000521                                  CALL  ZV$I,ZV$QC,MNEXT    NEXT ?;
                0191  FBC0 0003
                0193  D380 0000      X
                0195  0F80
                0196  1B20
000522  0197  9870 0002                LDR   $R1,=2              EXPECTING TWO CHARA
000523  0199  9F00 1942                STR   $R1,<RANGE
000524                          *
000525                          NEXTA   CALL  ZV$IA,STATA,ANSR,RANGE READ THE TEST
                019B  FBC0 0003
                019D  D380 0000      X
                019F  0F80
                01A0  07D2
                01A1  1943
                01A2  1942
000526  01A3  8700 193F                CL    <PFL                CLEAR INDIVIDUAL TEST FLAG
000527  01A5  8700 1941                CL    <ELFL               CLEAR PROGRAM FLAG
000528  01A7  9800 1943                LDR   $R1,<ANSR
000529  01A9  1048                     SUR   $R1,8               MOVE ANSWER TO LOWER BYTES
000530  01AA  9F00 1946                STR   $R1,<SAVEB          SAVE IT
000531  01AC  9970 0045                CMR   $R1,=X'0045'        IS IT ELECTRONICS TEST?
000532  01AE  0981 0008                BNE   ICNA                BRANCH IF NOT
000533  01B0  8900 1941                LBT   <ELFL,=Z'0001'      OR ELSE SET ELECTRONICS FLAG
                01B2  0001
000534  01B3  8700 193F                CL    <PFL                CLEAR INDIVIDUAL TEST FLAG
000535  01B5  0F81 0046                B     ICNF                CREAT COMMAND TABLE FOR ELECTRONICS TEST
000536                          *
000537  01B7  9970 0041         ICNA    CMR   $R1,=X'0041'        IS IT ALL TEST
000538  01B9  0901 0014                BE    ICANA               BRANCH IF TRUE
000539  01BB  9970 0052                CMR   $R1,=X'0052'        IS IT READ VOLUME TEST
000540  01BD  0901 0010                BE    ICANA               BARNCH IF TRUE
000541                                  CALL  ZV$T,ZV$TC,NOTST    OR ELSE SAY NO SUCH TEST
                01BF  FBC0 0003
                01C1  D380 0000      X
                01C3  0F80
                01C4  192D
000542                                  CALL  ZV$ER,E02,ER02      SEND ERROR MESSAGE
                01C5  FBC0 0003
                01C7  D380 0000      X
                01C9  0F80
                01CA  01CC
                01CB  1F05
000543  01CC  0F81 FFC0         E02     B     NEXT                USER ENTERED UNAVAILABLE TEST NAME
000544                          *
000545                          *          HERE PROGRAM DETERMINE WHICH DRIVE IS ATTACHED TO THE SYSTEM
000546                          *
000547                          *
000548  01CE  8280 1927         ICANA   LB    <DRIVA,=Z'0001'     SEE IF DRIVE A IS PRESENT
                01D0  0001
000549  01D1  0501 000C                BBT   ICNB                BRANCH IF NOT PRESENT
000550  01D3  8280 1928         ICNC    LB    <DRIVB,=Z'0001'     SEE IF DRIVE B IS PRESENT
                01D5  0001
000551  01D6  0501 0003                BBT   ICND                BRANCH IF NOT PRESENT
000552  01D8  0F81 0051                B     INC                 GO CREAT COMMAND TABLE FOR ALL AND READ VOLUM
000553  01DA  8740 173F         ICND    CL    CHB1                CLEAR CHAN B. SPINDLE FLAG
000554  01DC  0F81 004D                B     INC                 GO CREAT COMMAND TABLE FOR "ALL" AND "READ VO
000555                          *
000556  01DE  8740 1739         ICNB    CL    CHA1                CLEAR CHAN A. SPINDLE FLAG
000557  01E0  8280 1928                LB    <DRIVB,=Z'0001'     SEE IF DRIVE B IS PRESENT
                01E2  0001
```

```
000558 01E3 0581 0010          BBF   ICNR                BRANCH IF PRESENT
000559                         CALL  ZV$I,ZV$TC,WRONG    ERROR MESSAGE FOR ILLEGAL CHAN
       01E5 FBC0 0003
       01E7 D380 0000      X
       01E9 0F80
       01EA 1D7C
000560                         CALL  ZV$ER,E03,ER03
       01EB FBC0 0003
       01ED D380 0000      X
       01EF 0F80
       01F0 01F2
       01F1 1F08
000561 01F2 0F81 FF3B    E03   B     RERUN               ILLEGAL CHANNEL ENTERED, TRY AGAIN
000562 01F4 9840 1725    ICNR  LDR   $R1,CHBI
000563 01F6 9F40 1721          STR   $R1,CHAI
000564 01F8 8740 1721          CL    CHBI
000565 01FA 0F81 002F          B     INC                 ONLY ONE DRIVE - BRANCH
000566                         *
000567                         *     CREAT CONFIGURE FOR ELECTRONICS TEST
000568                         *
000569 01FC 8280 1927    ICNF  LB    <DRIVA,=Z'0001'     SEE IF DRIVE A IS PRESENT
       01FE 0001
000570 01FF 0501 0014          BBT   ICNF1               BRANCH IF NOT PRESENT
000571 0201 9800 1918          LDR   $R1,<CHAI           GET CHAN A
000572 0203 9A70 0040          ADD   $R1,=X'0040'        CREAT OUTPUT CHANNEL
000573 0205 9F00 1917          STR   $R1,<CHAO           SAVE IT
000574 0207 8280 1928          LB    <DRIVB,=Z'0001'     SEE IF DRIVE B IS PRESENT
       0209 0001
000575 020A 0501 0013          BBT   ICNF2               BRANCH IF NOT PRESENT
000576                         *
000577 020C 9800 191A    ICNF4 LDR   $R1,<CHBI           GET CHAN B
000578 020E 9A70 0040          ADD   $R1,=X'0040'        CREAT OUTPUT FOR CHAN B
000579 0210 9F00 1919          STR   $R1,<CHBO           SAVE IT
000580 0212 0F81 0013          B     ICNF3               GO CREAT COMMAND TABLE
000581                         *
000582 0214 9800 191A    ICNF1 LDR   $R1,<CHBI           GET CHAN B
000583 0216 9F00 1918          STR   $R1,<CHAI           SAVE IT IN CHAN A
000584 0218 9A70 0040          ADD   $R1,=X'0040'        CREAT OUTPUT
000585 021A 9F00 1917          STR   $R1,<CHAO           SAVE IT
000586 021C 0F81 FFEF          B     ICNF4               GO AND CREATCONFG TABLE
000587 021E 9800 1918    ICNF2 LDR   $R1,<CHAI           GET CHAN A
000588 0220 9F00 191A          STR   $R1,<CHBI           SAVE IT CHAN B
000589 0222 9A70 0040          ADD   $R1,=X'0040'        CREAT OUTPUT CHAN FOR B
000590 0224 9F00 1919          STR   $R1,<CHBO           SAVE IT
000591                         *
000592 0226 B3C0 1635    ICNF3 LNJ   $B3,TCGA            GENERATE COMMAND TABLE FOR CHAN A
000593 0228 0F81 0025          B     INCCA               GO AND SEE ID IS RIGHT
000594                         *
000595 022A 9840 16ED    INC   LDR   $R1,CHAI
000596 022C 9A70 0040          ADD   $R1,=X'40'          CHANNEL A FOR OUTPUT
000597 022E 9F40 16E8          STR   $R1,CHAO
000598 0230 A840 16E9          LDR   $R2,CHBI
000599 0232 2901 0009          BEZ   $R2,INCA            ONLY ONE DRIVE - BRANCH
000600 0234 AF40 16E5          STR   $R2,CHBI            CHN B FOR INPUT
000601 0236 AA70 0040          ADD   $R2,=X'40'
000602 0238 AF40 16E0          STR   $R2,CHBO            CHN B FOR OUTPUT
000603 023A 0F81 0005          B     INCB
000604                         *
000605 023C A670 8000    INCA  LDR   $R2,=Z'80'          FLAG SAYING ONE DRIVE ONLY
000606 023E AF40 16DC          STR   $R2,CHN             STORE IT
000607 0240 B3C0 161B    INCB  LNJ   $B3,TCGA            GENERATE COMMAND TABLE FOR CHAN A.
000608 0242 9840 16D8          LDR   $R1,CHN
000609 0244 1881 0007          BGEZ  $R1,INCC            TWO DRIVERS - BRANCH
000610 0246 D3C0 1C13          LNJ   $B5,CTD
000611 0248 D3C0 1B68          LNJ   $B5,CFG             CONFIGURE FOR ONE DRIVE ONLY
000612 024A 0F80 024E    INCD  B     <INCCA
000613                         *
000614                         *
000615 024C D3C0 1C0D    INCC  LNJ   $B5,CTD             CONFIGURE FOR TWO DRIVES
000616 024E 8055         INCCA IO    =$R5,CAIID            ASK FOR CHAN A. ID
       024F 0040 1696
000617 0251 0701 0000    T     BIOT  +$A
000618 0253 93C0 196A          LNJ   $B1,IOFA            IO BUSY
000619                         *
000620 0255 D570 FFF8    $A    AND   $R5,=Z'FFF8'
000621 0257 D970 2010          CMR   $R5,=Z'2010'        COMPARE TO DISKETTE ID
000622 0259 0901 0000    T     BE    +$A
000623 025B 0F81 0014          B     INCCB
000624 025D 9840 16BD    $A    LDR   $R1,CHN             LOAD FLAG
000625 025F 9840 16BB          LDR   $R1,CHN             LOAD FLAG
000626 0261 1801 001D          BLZ   $R1,BCC             ONE DRIVE ONLY
000627 0263 8055               IO    =$R5,CBIID          ASK CHAN B. ID
       0264 0040 168F
000628 0266 0701 0000    T     BIOT  +$B
000629 0268 93C0 198A          LNJ   $B1,IOFB            IO BUSY
000630                         *
000631 026A D570 FFF8    $B    AND   $R5,=Z'FFF8'        MASK OFF THREE LOW BITS
000632 026C D970 2010          CMR   $R5,=Z'2010'        COMPARE TO DISKETTE
000633 026E 0901 0010          BE    BCC                 BRANCH - IF ID IS RIGHT
000634                         *
000635                         INCCB CALL  ZV$I,ZV$TC,CCN      CHECK CHANNEL NUMBERS
       0270 FBC0 0003
       0272 D380 0000      X
       0274 0F80
       0275 1D97
000636                         CALL  ZV$ER,E04,ER04
       0276 FBC0 0003
       0278 D380 0000      X
       027A 0F80
       027B 027D
       027C 1F0B
000637 027D 0F81 FEB0    E04   B     RERUN               CAN'T READ DEVICE ID
000638                         *
000639                         *          HERE PROGRAM READS FIRMWARE REV. AND RECOGNIZE CP TYPE
000640                         *
000641 027F 8700 1924    BCC   CL    <CPFL               CLEAR CP FLAG
000642 0281 9800 1918          LDR   $R1,<CHAI
000643 0283 9470 0004          OR    $R1,=Z'0004'
000644 0285 8052               IO    =$R2,=$R1           READ FROM LOC. 04
       0286 0051
000645 0287 0700 028B          BIOT  <BC1
000646 0289 93C0 1934          LNJ   $B1,IOFA
000647 028B AF00 190C    BC1   STR   $R2,<SAVEA
```

```
000648  028D  A570 00FF            AND   $R2,=Z'00FF'
000649  028F  A970 0020            CMR   $R2,=Z'0020'        LOOK FOR 6/20 CP CODE
000650  0291  0904                 BE    >CP20
000651  0292  8900 1924            LDT   <CPFL,=Z'0001'      , SET FLAG IF NOT 6-20
        0294  0001
000652  0295  A800 190C      CP20  LDR   $R2,<SAVEA
000653  0297  A570 FF00            AND   $R2,=Z'FF00'        GET THE FIRMWARE REV.
000654  0299  2048                 SOR   $R2,8
000655  029A  AF00 1922            STR   $R2,<FRMW
000656                             CALL  ZV$I,ZV$TC,MFRMW    PRINT OUT FIRMWARE REVISION
        029C  FBC0 0003
        029E  D380 0000      X
        02A0  0F80
        02A1  194A
000657                             CALL  ZV$TH,FRMW
        02A2  FBC0 0003
        02A4  D380 0000      X
        02A6  0F80
        02A7  1922
000658                       ****
000659  02A8  8280 1941            LB    <ELFL,=Z'0001'      LOOK FOR ELECTRONICS TEST
        02AA  0001
000660  02AB  0501 0033            BBT   INITZ               BRANCH IF TRUE
000661                       *
000662  02AD  9800 1946            LDR   $R1,<SAVEB          GET TEST TYPE
000663  02AF  9970 0041            CMR   $R1,=X'0041'        IS IT ALL TEST
000664  02B1  0981 0007            BNE   RDV1                BRANCH IF NOT
000665  02B3  8700 193F            CL    <PFL                CLEAR TEST FLAG
000666  02B5  8700 1941            CL    <ELFL               CLEAR ELECTRONICS FLAG
000667  02B7  0F81 0027            B     INITZ               GO AND DO ELECTRONICS TEST
000668                       *
000669  02B9  9970 0052      RDV1  CMR   $R1,=X'0052'        IS IT READ VOLUME
000670  02BB  0901 0010            BE    RDV2                BRANCH IF TRUE
000671                             CALL  ZV$T,ZV$TC,NOTST    OR ELSE NO SUCH TEST
        02BD  FBC0 0003
        02BF  D380 0000      X
        02C1  0F80
        02C2  192D
000672                             CALL  ZV$ER,E05,ER05      SEND ERROR MESSAGE
        02C3  FBC0 0003
        02C5  D380 0000      X
        02C7  0F80
        02C8  02CA
        02C9  1F0E
000673  02CA  0F81 FE63      E05   B     RERUN               WRONG ENTRY OF TEST NAME
000674  02CC  8900 193F      RDV2  LDT   <PFL,=Z'0001'       SET TEST FLAG
        02CE  0001
000675                             CALL  ZV$T,ZV$TC,READ     READ VOLUME MESSAGE
        02CF  FBC0 0003
        02D1  D380 0000      X
        02D3  0F80
        02D4  1C49
000676  02D5  B3C0 14E7            LNJ   $B3,RPD             GO READ THE DISKETTE VOLUME
000677                             CALL  ZV$I,ZV$TC,MESGN    END-OF-TEST MESSAGE
        02D7  FBC0 0003
        02D9  D380 0000      X
        02DB  0F80
        02DC  1C43
000678  02DD  0F81 FE50            B     RERUN               ASK FOR NEXT TEST AFTER READING
000679                       *
000680                       *          INITIALIZATION
000681                       *
000682  02DF  1C14           INITZ LDV   $R1,=20             START WITH LEVEL 20 ISA
000683  02E0  AB80 0000      X     LAB   $B2,<ZHISAZ
000684  02E2  DBC0 1CD4             LAB   $B5,L20D            LOAD ADDRESS OF LEV 20 ISA
000685  02E4  DFDE                  STB   $B5,$B2.+$R1        SET IV FOR LEVE 20
000686  02E5  DBC0 1CE7             LAB   $B5,L21D            LOAD ADDRESS OF LEVFL 21 ISA
000687  02E7  DFDE                  STB   $B5,$B2.+$R1        SET IV FOR LEVEL 21
000688  02E8  DBC0 1CFA             LAB   $B5,L22D            LOAD ADDRESS OF LEV 22 ISA
000689  02EA  DF92                  STB   $B5,$B2.$R1         SET IV FOR LEVEL 22
000690  02EB  9870 0014             LDR   $R1,=20
000691  02ED  9F00 0000      X     STR   $R1,<ZHRTCL         SET CLOCK INTERRUPT LEVEL
000692  02EF  9BC0 1D08             LAB   $B1,LEV20           SET ENTRY POINT OF LEV 20
000693  02F1  9FC0 1CC8             STB   $B1,L20P            FOR CLOCK TIME OUT ENTRY
000694  02F3  DBC0 0017             LAB   $B5,BAS             SET P REGISTER FOR LEVEL 22
000695  02F5  DFC0 1CF0             STB   $B5,L22P            STORE IT
000696  02F7  9BC0 1D08             LAB   $B1,LEV21           GET ADDRESS OF LEVFL 21 P-REGISTER
000697  02F9  9FC0 1CD6             STB   $B1,L21P            PUT IT IN LEVEL 21 P-REG.
000698  02FB  8700 0000      X     CL    <ZHIAFB             BE SURE NOTHING IS SET TO RUN
000699  02FD  9840 1D0A             LDR   $R1,A4              A4 LEV ACTION
000700  02FF  9470 0016             OR    $R1,=22             LOAD IT WITH LEVEL 22
000701  0301  8E51                  LEV   =$R1                PROCEED TO LEVEL 22
000702                             CALL  ZV$ER,E06,ER06      CAN'T CHANGE LEVEL 0
        0302  FBC0 0003
        0304  D380 0000      X
        0306  0F80
        0307  0309
        0308  1F11
000703  0309  0F81 FDF6      E06   B     START               RUN CP TEST BEFORE PROCEED
000704                       *
000705                       *
000706                       *
000707                       *-------------------------------------------------------
000708                       *
000709                       *        B A S I C   C O N T R O L L E R   F U N C T I O N S   T E S T
000710                       *
000711                       *-------------------------------------------------------
000712                       *
000713  030D  8740 15FA      BAS   CL    TRNO                ZERO OUT TRACK
000714  030D  8740 15FB             CL    SECI                ZERO OUT SECTOR
000715                             CALL  ZV$I,ZV$TC,TSTA
        030F  FBC0 0003
        0311  D380 0000      X
        0313  0F80
        0314  1965
000716  0315  C3C0 1196            LNJ   $B4,FCWA            FORM CONFIGURATION WORDS
000717                       *
000718  0317  8040 15F0            IO    CWAD,CAOWA          SEND OUT WORD A TO CHAN A
        0319  0040 15C4
000719  031B  0701 0000      T     BIOT  +$A
000720  031D  93C0 18A0            LNJ   $B1,IOFA
000721                       *
000722  031F  8040 15EA      $A    IO    CWBD,CAOWB          OUTPUT CONFG WRD.B TO CHAN A
```

```
                0321  0040 15BD
000723          0323  0701 0000      T          BIOT   +$B
000724          0325  93C0 1898                 LNJ    $B1,IOFA
000725                                *
000726          0327  8055            $E       IO     =$R5,CAIWA          INPUT CONFG WRD. A FROM CHAN A
                0328  0040 15BA
000727          032A  0701 0000      T          BIOT   +$C
000728          032C  93C0 1891                 LNJ    $B1,IOFA
000729                                *
000730          032E  5901 0000      T          BEZ    $R5,+$D             BRANCH - IF CONFG A. IS RIGHT
000731                                           CALL   ZV$ER,E07,ER07      REPORT ERROR
                0330  FBC0 0003
                0332  D380 0000      X
                0334  0FB0
                0335  0337
                0336  1F14
000732          0337  0F01 FFFF      E07        NOP    $                   GO AND REPORT ERROR IF WRONG
000733                                *
000734          0339  8055            $D       IO     =$R5,CAIWB          INPUT CONF. WRD B FROM CHAN A
                033A  0040 15A9
000735          033C  0701 0000      T          BIOT   +$E
000736          033E  93C0 187F                 LNJ    $B1,IOFA
000737                                *
000738          0340  5901 0000      T          BEZ    $R5,+$A             BRANCH - IF CONFG A. IS RIGHT
000739                                           CALL   ZV$ER,E08,ER08
                0342  FBC0 0003
                0344  D380 0000      X
                0346  0FB0
                0347  0349
                0348  1F17
000740          0349  0F01 FFFF      E08        NOP    $                   WRONG CONFG. WORD FROM CHAN A.
000741                                *
000742          034B  9870 004C      $A         LDR    $R1,=Z'004C'        TRACK NUMBER NUMBER
000743          034D  9F40 15B8                 STR    $R1,TRNO
000744          034F  9870 0019                 LDR    $R1,=Z'0019'        SECTOR NUMBER
000745          0351  9F40 15B7                 STR    $R1,SECT
000746          0353  C3C0 1158                 LNJ    $B4,FCWA            FORM CONFIG WORDS
000747                                *
000748          0355  8040 15B2                 IO     CWAD,CAOWA          OUTPUT CONFIG WORD A TO CHAN A
                0357  0040 1586
000749          0359  0701 0000      T          BIOT   +$C
000750          035B  93C0 1862                 LNJ    $B1,IOFA
000751                                *
000752          035D  8000 190A      $C         IO     <CWBD,<CAOWB        OUTPUT WORD B TO CHAN A
                035F  0000 18DF
000753          0361  0701 0000      T          BIOT   +$C
000754          0363  93C0 185A                 LNJ    $B1,IOFA
000755                                *
000756          0365  8055            $C       IO     =$R5,<CAIWA         INPUT WORD A FROM CHAN A
                0366  0000 18E3
000757          0368  0701 0000      T          BIOT   +$D
000758          036A  93C0 1853                 LNJ    $B1,IOFA
000759                                *
000760          036C  D970 4C00      $D         CMR    $R5,=Z'4C00'        COMPARE OUTPUT TO INPUT
000761          036E  0901 0000      T          BE     +$E                 BRANCH- IF RIGHT
000762                                           CALL   ZV$ER,E09,ER09
                0370  FBC0 0003
                0372  D380 0000      X
                0374  0FB0
                0375  0377
                0376  1F1A
000763          0377  0F01 FFFF      E09        NOP    $                   WRONG CONFG. WORD A. FROM CHAN A
000764                                *
000765          0379  8055            $E       IO     =$R5,CAIWB          INPUT WORD B FROM CHAN A
                037A  0040 1569
000766          037C  0701 0000      T          BIOT   +$F
000767          037E  93C0 183F                 LNJ    $B1,IOFA
000768                                *
000769          0380  D970 1900      $F         CMR    $R5,=Z'1900'        COMPARE INPUT TO OUTPUT
000770          0382  0901 000A                 BE     BCCB                BRANCH-IF RIGHT
000771                                           CALL   ZV$ER,E10,ER10      REPORT ERROR
                0384  FBC0 0003
                0386  D380 0000      X
                0388  0FB0
                0389  038B
                038A  1F1D
000772          038B  0F01 FFFF      E10        NOP    $                   GO AND REPORT ERROR IF WRONG
000773                                *
000774                                *
000775          038D  81C8 1580      BCCB       IOLD   *BFAD,CAOLD,BRDT    OUTPUT ADDRESS AND RANGE
                038F  0040 154C
                0391  0040 1796
000776                                *    BRDT CONTAINS BYTES FOR DIGNOSTIC READ TRACK
000777          0393  0701 0000      T          BIOT   +$A
000778          0395  93C0 1828                 LNJ    $B1,IOFA
000779                                *
000780          0397  8055            $A       IO     =$R5,CAIIR          INPUT RANGE FROM CHAN A.
                0398  0040 1549
000781          039A  0701 0000      T          BIOT   +$B
000782          039C  93C0 1821                 LNJ    $B1,IOFA
000783                                *
000784          039E  D970 1318      $B         CMR    $R5,=Z'1318'        COMPARE INPUT TO OUTPUT
000785          03A0  0901 0000      T          BE     +$C                 BRANCH-IF RANGE IS RIGHT
000786                                           CALL   ZV$ER,E11,ER11      REPORT ERROR
                03A2  FBC0 0003
                03A4  D380 0000      X
                03A6  0FB0
                03A7  03A9
                03A8  1F20
000787          03A9  0F01 FFFF      E11        NOP    $                   WRONG RESIDUAL RANGE AFTER IOLD
000788                                *
000789          03AB  8755            $C       CL     =$R5
000790          03AC  81C8 1561                 IOLD   *BFAD,CAOLD,=$R5    OUTPUT ADDRESS AND RANGE TO CHAN A
                03AE  0040 152D
                03B0  0055
000791          03B1  0701 0000      T          BIOT   +$D
000792          03B3  93C0 180A                 LNJ    $B1,IOFA
000793                                *
000794          03B5  8055            $D       IO     =$R5,CAIIR          INPUT RANGE
                03B6  0040 152B
000795          03B8  0701 0000      T          BIOT   +$E
000796          03BA  93C0 1803                 LNJ    $B1,IOFA
000797                                *
```

```
000796  03BC  5901 000A          $E    BEZ   $R5,INCBX          BRANCH - IF RANGE IS ZERO
000799                             CALL  ZV$ER,E12,ER12        REPORT ERROR
        03BE  FBC0 0003
        03C0  D380 0000    X
        03C2  0F80
        03C3  03C5
        03C4  1F23
000800  03C5  0F01 FFFF          E12   NOP   $                 WRONG RESIDUAL RANGE AFTER IOLD
000801                             *
000802                             *
000803  03C7  8055               INCBX IO    =$R5,<CBIID       ASK FOR CHAN B. ID
        03C8  0000 18F4
000804  03CA  0701 0000    T            BIOT  +$F
000805  03CC  93C0 17F1              LNJ   $B1,IOFA
000806                             *
000807  03CE  D570 FFF8          $F    AND   $R5,=Z'FFF8'        MASK OFF LOW 3 BITS
000808  03D0  D970 2010              CMR   $R5,=Z'2010'        COMPARE TO DISKETTE ID
000809  03D2  0901 0000    T         BE    +$A                 BRANCH - IF EQUAL
000810                             CALL  ZV$I,ZV$TC,CCN        CHECK CHANNEL NUMBER
        03D4  FBC0 0003
        03D6  D380 0000    X
        03D8  0F80
        03D9  1D97
000811                             CALL  ZV$ER,E13,ER13        REPORT ERROR
        03DA  FBC0 0003
        03DC  D380 0000    X
        03DE  0F80
        03DF  03E1
        03E0  1F26
000812  03E1  0F81 FE8E          E13   B     INCCB             WRONG ID FROM CHAN B..
000813                             *
000814  03E3  9840 1537          $A    LDR   $R1,CHN           LOAD FLAG
000815  03E5  1801 00D8              BLZ   $R1,BASC            ONE DRIVE ONLY - BRANCH
000816  03E7  8055                   IO    =$R5,CBIID          ASK FOR CHAN B ID
        03E8  0040 150B
000817  03EA  0701 0000    T            BIOT  +$B
000818  03EC  93C0 17D1              LNJ   $B1,IOFA
000819                             *
000820  03EE  D570 FFF8          $B    AND   $R5,=Z'FFF8'        MASK OFF THREE LOW BITS
000821  03F0  D970 2010              CMR   $R5,=Z'2010'        COMAPRE TO DISKETTE ID
000822  03F2  0901 000A              BE    BCCX                BRANCH -IF ID IS RIGHT
000823                             CALL  ZV$ER,E14,ER14        REPORT ERROR
        03F4  FBC0 0003
        03F6  D380 0000    X
        03F8  0F80
        03F9  03FB
        03FA  1F29
000824  03FB  0F81 FE74          E14   B     INCCB             GO AND ASK CHANNEL AGAIN
000825                             *
000826  03FD  8740 1508          BCCX  CL    TRNO              ZERO OUT TRACK
000827  03FF  8740 1509              CL    SECT              ZERO OUT SECTOR
000828  0401  C3C0 10AA              LNJ   $B4,FCWA            FORM CONFIGURATION WORDS
000829                             *
000830  0403  8040 1504              IO    CWAD,CBOWA          SEND OUT WORD A TO CHAN B
        0405  0040 14E6
000831  0407  0701 0000    T            BIOT  +$C
000832  0409  93C0 17B4              LNJ   $B1,IOFA
000833                             *
000834  040B  8040 14FE          $C    IO    CWBD,CBOWB          OUTPUT WORD B TO CHAN B
        040D  0040 14DF
000835  040F  0701 0000    T            BIOT  +$D
000836  0411  93C0 17AC              LNJ   $B1,IOFA
000837                             *
000838  0413  8055               $D    IO    =$R5,CBIWA          INPUT CONFIG. WORD A FROM CHAN B
        0414  0040 14DC
000839  0416  0701 0000    T            BIOT  +$E
000840  0418  93C0 17A5              LNJ   $B1,IOFA
000841                             *
000842  041A  5901 0000    T     $E    BEZ   $R5,+$A              BRANCH IF WORD A IS RIGHT
000843                             CALL  ZV$ER,E15,ER15        SEND ERROR MESSAGE
        041C  FBC0 0003
        041E  D380 0000    X
        0420  0F80
        0421  0423
        0422  1F2C
000844  0423  0F01 FFFF          E15   NOP   $                 OR ELSE WRONG CONFG WORD A. FROM CHAN B.
000845                             *
000846  0425  8055               $A    IO    =$R5,CBIWB          INPUT CONFIG WORD B FROM CHAN B
        0426  0040 14CB
000847  0428  0701 0000    T            BIOT  +$F
000848  042A  93C0 1793              LNJ   $B1,IOFA
000849                             *
000850  042C  5901 0000    T     $F    BEZ   $R5,+$A              BRANCH IF WORD B IS RIGHT
000851                             CALL  ZV$ER,E16,ER16        SEND ERROR MESSAGE
        042E  FBC0 0003
        0430  D380 0000    X
        0432  0F80
        0433  0435
        0434  1F2F
000852  0435  0F01 FFFF          E16   NOP   $                 OR ELSE WRONG COFG. WORD B. FROM CHAN B
000853                             *
000854  0437  9870 004C          $A    LDR   $R1,=Z'004C'        TRACK
000855  0439  9F40 14CC              STR   $R1,TRNO
000856  043B  9870 0019              LDR   $R1,=Z'0019'        SECTOR
000857  043D  9F40 14CB              STR   $R1,SECT
000858  043F  C3C0 106C              LNJ   $B4,FCWA            FORM CONFIG WORDS
000859                             *
000860  0441  8040 14C6              IO    CWAD,CBOWA          OUTPUT CONFIG WORD A TO CHAN B
        0443  0040 14A8
000861  0445  0701 0000    T            BIOT  +$A
000862  0447  93C0 1776              LNJ   $B1,IOFA
000863                             *
000864  0449  8040 14C0          $A    IO    CWBD,CBOWB          OUTPUT WORD B TO CHAN B
        044B  0040 14A1
000865  044D  0701 0000    T            BIOT  +$B
000866  044F  93C0 176E              LNJ   $B1,IOFA
000867                             *
000868  0451  8055               $B    IO    =$R5,CBIWA          INPUT WORD A FROM CHAN B
        0452  0040 149E
000869  0454  0701 0000    T            BIOT  +$C
000870  0456  93C0 1767              LNJ   $B1,IOFA
000871                             *
000872  0458  D970 4C00          $C    CMR   $R5,=Z'4C00'        COMPARE OUTPUT TO INPUT
```

```
000873 045A 0901 0000      T          BE      +$D                 BRANCH - IF RIGHT
000874                                CALL    ZV$ER,E17,ER17      REPORT ERROR
       045C FBC0 0003
       045E D380 0000      X
       0460 0F80
       0461 0463
       0462 1F32
000875 0463 0F01 FFFF      E17        NOP     $                   OR ELSE WRONG CONFG. WORD FROM CHAN B
000876                     *
000877 0465 8055           $D         IO      =$R5,CBIWB          INPUT WORD B FROM CHAN B
       0466 0040 148B
000878 0468 0701 0000      T          BIOT    +$E
000879 046A 93C0 1753                 LNJ     $B1,IOFA
000880                     *
000881 046C D970 1900      $E         CMR     $R5,=Z'1900'        COMPARE INPUT TO OUTPUT
000882 046E 0901 000A                 BE      BCCBX               BRANCH-IF RIGHT
000883                                CALL    ZV$ER,E18,ER18      REPORT ERROR
       0470 FBC0 0003
       0472 D380 0000      X
       0474 0F80
       0475 0477
       0476 1F35
000884 0477 0F01 FFFF      E18        NOP     $                   OR ELSE WRONG CONFG. WORD B FROM CHAN B.
000885                     *
000886                     *
000887 0479 81C8 1494      BCCBX      IOLD    *BFAD,CBOLD,BRDT    OUTPUT ADDRESS AND RANGE
       047B 0040 146F
       047D 0040 16AA
000888                     *    BDT CONTAINS BYTES FOR DIAGNOSTIC READ TRACK
000889 047F 0701 0000      T          BIOT    +$F
000890 0481 93C0 173C                 LNJ     $B1,IOFA
000891                     *
000892 0483 8055           $F         IO      =$R5,CBIIR          INPUT RANGE FROM CHAN B
       0484 0040 146B
000893 0486 0701 0000      T          BIOT    +$A
000894 0488 93C0 1735                 LNJ     $B1,IOFA
000895                     *
000896 048A D970 1318      $A         CMR     $R5,=Z'1318'        COMPARE INPUT TO OUTPUT
000897 048C 0901 0000      T          BE      +$B                 BRANCH - IF RIGHT
000898                                CALL    ZV$ER,E19,ER19      REPORT ERROR
       048E FBC0 0003
       0490 D380 0000      X
       0492 0F80
       0493 0495
       0494 1F36
000899 0495 0F01 FFFF      E19        NOP     $                   WRONG RESIDUAL RANGE FROM CHAN B
000900                     *
000901 0497 8755           $B         CL      =$R5
000902 0498 81C8 1475                 IOLD    *BFAD,CBOLD,=$R5    OUTPUT ADDRESS AND RANGE  TO CHAN B
       049A 0040 1450
       049C 0055
000903 049D 0701 0000      T          BIOT    +$C
000904 049F 93C0 171E                 LNJ     $B1,IOFA
000905                     *
000906 04A1 8055           $C         IO      =$R5,CBIIR          INPUT RANGE FROM CHAN B
       04A2 0040 144D
000907 04A4 0701 0000      T          BIOT    +$D
000908 04A6 93C0 1717                 LNJ     $B1,IOFA
000909                     *
000910 04A8 5901 0015      $D         BEZ     $R5,BASC            BRANCH-IF RANGE IS RIGHT
000911                                CALL    ZV$ER,E20,ER20      OR ELSE REPORT ERROR
       04AA FBC0 0003
       04AC D380 0000      X
       04AE 0F80
       04AF 04B1
       04B0 1F3B
000912 04B1 0F81 000C      E20        B       BASC                OR ELSE WRONG RESIDUAL RANGE FROM CHAN B.
000913                     *
000914                     *
000915                     *          TIMEOUT ROUTINE
000916                     *
000917 04B3 1701 0002      TMO        BDEC    $R1,TMOA            IF R1=1, DELAY IS 1 MILLISECOND
000918 04B5 8381                      JMP     $B1
000919 04B6 A870 00B2      TMOA       LDR     $R2,=178
000920 04B8 2701 0003      TMOB       BDEC    $R2,TMOC
000921 04BA 0F81 FFF8                 B       TMO
000922 04BC 0F81 FFFB      TMOC       B       TMOB
000923                     *
000924                     *
000925 04BE 8280 193F      BASC       LB      <PFL,=Z'0001'
       04C0 0001
000926 04C1 0500 018D                 BBT     <NEXT
000927 04C3 8280 1924                 LB      <CPFL,=Z'0001'      IS IT 6/20
       04C5 0001
000928 04C6 0581 00AC                 BBF     INT                 DONT DO WRAPAROUND IF 6/20
000929                     *
000930                     *-------------------------------------------------------------
000931                     *
000932                     *          W R A P A R O U N D   R E A D / W R I T E
000933                     *
000934                     *-------------------------------------------------------------
000935                     *
000936 04C8 9B80 1C5E      WAW        LAB     $B1,<IMB
000937 04CA 9F80 1573                 STB     $B1,<DEXB
000938                                CALL    ZV$T.ZV$TC,TSTB
       04CC FBC0 0003
       04CE D380 0000      X
       04D0 0F80
       04D1 1978
000939                     *
000940 04D2 9B80 1C59                 LAB     $B1,<IMA
000941 04D4 9F80 1573                 STB     $B1,<DEXB
000942 04D6 F870 0200                 LDR     $R7,=X'0200'
000943 04D8 8751           WAWR       CL      =$R1
000944 04D9 8740 143C                 CL      TEMP
000945 04DB 9F48 1433                 STR     $R1,*RBUF           CLEAR INPUT BUFFER
000946 04DD 9870 F800                 LDR     $R1,=Z'F800'        DATA PATTERN IN HEX
000947 04DF 9F48 142E                 STR     $R1,*BFAD           PUT IN WRITE BUFFER
000948 04E1 9870 0001                 LDR     $R1,=X'01'          RANGE
000949 04E3 9F40 1431                 STR     $R1,RNG
000950                     *
000951 04E5 81C8 1428      WAWRA      IOLD    *BFAD,CAOLD,RNG     OUTPUT ADDRESS AND RANGE
       04E7 0040 13F4
```

```
                04E9  0040 142B
000952          04EB  0781 FFF9                 BIOF    WAWRA
000953                                  *
000954          04ED  8040 1413                 IO      WARW,CAOTW              OUTPUT TASK WORD FOR WRAPAROUND
                04EF  0040 13EB
000955          04F1  0701 0000         T       BIOT    +$C
000956          04F3  93C0 16CA                 LNJ     $B1,IOFA
000957                                  *
000958          04F5  9870 0004         $C      LDR     $R1,=4                  DELAY A LITTLE
000959          04F7  93C0 FFBB                 LNJ     $B1,TMO
000960          04F9  8055              WAWRD   IO      =$R5,CAIIR              INPUT RANGE
                04FA  0040 13E7
000961          04FC  0781 0005                 BIOF    WAWRE
000962          04FE  5981 0052                 BNEZ    $R5,WAF                 BRANCH - IF RANGE NOT ZERO
000963          0500  0F81 0015                 B       WAWRC
000964          0502  8AC0 1413         WAWRE   INC     TEMP
000965          0504  C840 1411                 LDR     $R4,TEMP
000966          0506  C970 0003                 CMR     $R4,=3
000967          0508  0381 FFF0                 BLE     WAWRD
000968          050A  0F81 005A                 B       WAFMB
000969          050C  8AC0 1409         WAWRF   INC     TEMP
000970          050E  C840 1407                 LDR     $R4,TEMP
000971          0510  C970 0003                 CMR     $R4,=3
000972          0512  0381 0019                 BLE     WAWRCA
000973          0514  0F81 0050                 B       WAFMB                   REPORT ERROR
000974                                  *
000975                                  *       AT THIS POINT THE BYTE IS IN THE CONTROLLER WITH
000976                                  *       CLOCK BITS INSERTED. NOW TO TRY AND READ IT.
000977                                  *
000978          0516  81C8 13F8         WAWRC   IOLD    *RBUF,CAILD,RNG         OUTPUT ADDRESS AND RANGE
                0518  0040 13C4
                051A  0040 13FA
000979          051C  0781 FFF9                 BIOF    WAWRC
000980          051E  8740 13F7                 CL      TEMP
000981                                  *
000982          0520  8040 13E0                 IO      WARW,CAOTW              OUTPUT TASK WORD FOR WRAPAROUND
                0522  0040 13B8
000983          0524  0701 0000         T       BIOT    +$D
000984          0526  93C0 1697                 LNJ     $B1,IOFA
000985                                  *
000986          0528  9870 0004         $D      LDR     $R1,=4                  DELAY A LITTLE
000987          052A  93C0 FF88                 LNJ     $B1,TMO
000988                                  *
000989          052C  8055              WAWRCA  IO      =$R5,CAIIR              INPUT RANGE
                052D  0040 13B4
000990          052F  0781 FFDC                 BIOF    WAWRF
000991                                  *
000992          0531  5981 001F                 BNEZ    $R5,WAF                 RANGE NOT ZERO, OPERATION FAILED
000993                                  *
000994          0533  9848 13DB                 LDR     $R1,*RBUF               LOAD THE BYTE 'READ'
000995          0535  9970 F800                 CMR     $R1,=Z'F800'            COMPARE WITH DATA
000996          0537  0901 0007                 BE      WAC                     BRANCH - IF EQUAL
000997          0539  9970 FF00                 CMR     $R1,=Z'FF00'
000998          053B  0901 0003                 BE      WAC
000999          053D  83C0 001D                 JMP     WAFM                    BYTES DO NOT COMPARE
001000                                  *
001001          053F  9840 13CB         WAC     LDR     $R1,SAVE
001002          0541  1A01 000B                 BGZ     $R1,WAD                 CONTINUE WITH TEST
001003          0543  9A70 0001                 ADD     $R1,=1
001004          0545  9F40 13C5                 STR     $R1,SAVE                USE AS INDICATOR
001005          0547  9870 FFFF                 LDR     $R1,=Z'FFFF'            PATTERN OF ALL ONES
001006          0549  9F48 13C4                 STR     $R1,*BFAD               STORE THE PATTERN
001007          054B  0F81 FF99                 B       WAWRA                   DO IT AGAIN
001008                                  *
001009          054D  7701 FF8A         WAD     BDEC    $R7,WAWR
001010          054F  0F80 056E                 B       <WAWC                   GO AND CHECK TRACK CAPACITY
001011                                  *
001012                                  *       PROGRAM COMES HERE IF RANGE DOES NOT GO TO
001013                                  *       ZERO AFTER WRAPAROUND READ OR WRITE
001014                                  *
001015          0551  8040 13B1         WAF     IO      SIO,CAOCW               OUTPUT STOP IO COMMAND
                0553  0040 1385
001016          0555  0701 0000         T       BIOT    +$E
001017          0557  93C0 1666                 LNJ     $B1,IOFA
001018                                  *
001019          0559  0F81 000B         $E      B       WAFMB                   WRAPAROUND READ FAILED TO
001020                                  *                                       DECREMENT RANGE, INDICATING
001021                                  *                                       FAILURE TO COMPLETE OPERATION.
001022                                  *
001023                                  *       PROGRAM COMES HERE IF READ OPERATION "WORKS"
001024                                  *       BUT BYTES MISCOMPARE
001025                                  *
001026          055B  9840 13B0         WAFM    LDR     $R1,SAVEA               LOAD INDICATOR
001027          055D  1A01 0007                 BGZ     $R1,WAFMB
001028          055F  9A70 0001                 ADD     $R1,=X'01'
001029          0561  9F40 13AA                 STR     $R1,SAVEA
001030          0563  0F81 FF74                 B       WAWR                    RETRY EVERYTHING ONCE
001031                                  *                                       WRAPAROUND READ/WRITE
001032                                  *                                       OPERATION FAILED TO RETURN
001033                                  *                                       THE CORRECT BYTE AFTER
001034                                  *                                       TWO CONSECUTIVE TRYS.
001035                                  *
001036                                  WAFMB   CALL    ZV$ER,E21,ER21          REPORT ERROR
                0565  FBC0 0003
                0567  D380 0000         A
                0569  0F80
                056A  056C
                056B  1F3E
001037          056C  0F01 FFFF         E21     NOP     $                       WRONG RESIDUAL RANGE WHILE WRAPAROUND
001038          056E  6280 193F         WAWC    LB      <PFL,=Z'0001'
                0570  0001
001039          0571  0500 018D                 BBT     <NEXT
001040                                  *
001041                                  *
001042                                  *
001043                                  * ---------------------------------------------------------------
001044                                  *
001045                                  *               I N T E R R U P T   T E S T
001046                                  *
001047                                  *---------------------------------------------------------------
001048                                  *
001049                                  * THIS TEST CHECKS THAT AN INTERRUPT DOES
001050                                  * OR DOES NOT HAPPEN FOR ALL POSSIBLE COMBINATIONS
```

```
001051                                  * OF PROGRAM AND DEVICE INTERRUPT LEVELS.
001052                                  *
001053  0573  9B80 1C63                INT     LAB     $B1,<IMC
001054  0575  9F80 1573                        STB     $B1,<DEXB
001055                                  *       CALL    ZV$T.ZV$TC,TSTC
        0577  FBC0 0003
        0579  D380 0000         X
        057B  0F80
        057C  19B5
001056  057D  8700 1923                        CL      <INCNT
001057  057F  AB80 0000         X              LAB     $B2,<ZHISAZ
001058  0581  BB80 0655                        LAB     $B3,<ISARD              SAVE AREA FOR ALL LEVELS
001059  0583  BFF2                RUPTA   STB     $B3,+$B2                SET UP ALL LEVELS
001060  0584  AB80 063D                    CMB     $B2,<H00BF              DONE YET?
001061  0586  0AFB                        BALE    >RUPTA                  NO - KEEP GOING
001062  0587  9B80 066A                    LAB     $B1,<DEVIH              ADDRESS OF RUPT HANDLER
001063  0589  9F80 0658                    STB     $B1,<ISARP              PUT INTO SAVE AREA
001064  058B  6C3F                        LDV     $R6,=63                 STARTING LEVEL FOR PROGRAM
001065  058C  8700 0000         X      RUPTB   CL      <ZHIAFB                 RESET ALL ACTIVITY FLAGS
001066  058E  8700 0001         X              CL      <ZHIAFB+1
001067  0590  8700 0002         X              CL      <ZHIAFB+2
001068  0592  8700 0003         X              CL      <ZHIAFB+3
001069  0594  9870 0080                        LDR     $R1,=Z'0080'            QUICK LEVEL CHANGE
001070  0596  9456                            OR      $R1,=$R6                GET READY FOR LEVEL CHANGE
001071  0597  8E51                            LEV     =$R1                    MAKE THE CHANGE
001072  0598  9570 003F                        AND     $R1,=Z'003F'            LOOK AT LEVEL ONLY
001073  059A  8AD1                            INC     =$R1                    GO BACK TO OLD LEVEL
001074  059B  8810 0000         X              LDF     <ZHIAFB,$R1             AND RESET ACTIVITY FLAG FOR THAT LVL
001075  059D  9656                            LDR     $R1,=$R6                GET CURRENT LEVEL BACK
001076  059E  9270 003F                        SUB     $R1,=63                 IS THIS FIRST TIME THRU?
001077  05A0  1986                            BNEZ    $R1,>RUPTC              NO - BRANCH
001078  05A1  9B80 063F                        LAB     $B1,<ISATD
001079  05A3  9F80 003F         X              STB     $B1,<ZHISAZ+63*$AF      SETUP SAVE AREA AFTER LEV INSTR
001080  05A5  0F87                            B       >RUPTE                  SKIP THIS CODE NOW
001081  05A6  9656                    RUPTC   LDR     $R1,=$R6                RESTORE CURRENT LEVEL
001082  05A7  8AD1                            INC     =$R1                    LOOK AT OLD LEVEL
001083  05A8  9B80 0655                        LAB     $B1,<ISARD
001084  05AA  9F90 0000         X              STB     $B1,<ZHISAZ,$R1
001085  05AC  D870 003F                RUPTE   LDR     $R5,=63                 INITIAL LEVEL FOR DISK
001086  05AE  8700 1916                RUPTF   CL      <TEMP                   RESET SEMAPHORE
001087  05B0  D400 06D4                        OR      $R5,<CPID               STICK IN CP CHANNEL NUMBER
001088  05B2  8055                    $A      IO      =$R5,<CAOIC
        05B3  0000 18DA
001089  05B5  0781 FFFC                        BIOF    -$A                     WAIT FOR I/O
001090  05B7  D570 003F                        AND     $R5,=Z'003F'            DELETE CPCHAN
001091  05B9  DF00 063A                        STR     $R5,<DLVL               STORE DEVICE LEVEL AWAY
001092  05BB  EF00 063C                        STR     $R6,<PLVL               STORE PROGRAM LEVEL
001093  05BD  EF00 063D                        STR     $R6,<CLVL               STORE INTO CURRENT LEVEL
001094                                  *
001095                                  *       NOW AN ATTEMPT IS MADE TO GET AN INTERRUPT VIA A STOP I/O
001096                                  *
001097  05BF  F870 0150                        LDR     $R7,=X'150'             SETUP FOR TIME DELAY
001098  05C1  8070 4000                $B      IO      =Z'4000',<CAOCW
        05C3  0000 18D9
001099  05C5  0781 FFFB                        BIOF    -$B
001100  05C7  7701 FFFF                        BDEC    $R7,$                   WAIT HERE FOR A WHILE FOR RUPT
001101  05C9  0F01 FFFF                        NOP     $                       MAY COME HERE AFTER RUPT
001102  05CB  D570 003F                        AND     $R5,=Z'003F'            LOOK AT DEVICE LEVEL ONLY
001103  05CD  9655                            LDR     $R1,=$R5                PUT DEVICE LEVEL INTO R1
001104  05CE  1901 0010                        BEZ     $R1,RUPTG               LEVEL ZERO CANT RUPT
001105  05D0  9256                            SUB     $R1,=$R6                SEE WHICH LEVEL WAS HIGHEST
001106  05D1  188E                            BGEZ    $R1,>RUPTG              DEVICE SHOULDN'T HAVE RUPTED - BRANCH
001107  05D2  8980 1916                        CMZ     <TEMP                   DID A RUPT HAPPEN?
001108  05D4  0980 0634                        BNE     <RUPTN                  YES - EVERYTHINGS OK
001109                                          CALL    ZV$ER,E22,ER22          SEND ERROR MESSAGE
        05D6  FBC0 0003
        05D8  D380 0000         X
        05DA  0F80
        05DB  05DD
        05DC  1F41
001110  05DD  0F81 00F7                E22     B       IRUPC                   INTERRUPT DIDN'T HAPPENED WHEN IT SHOULD BE
001111  05DF  8980 1916                RUPTG   CMZ     <TEMP                   HAS RUPT HAPPENED?
001112  05E1  090A                            BE      >RUPTH                  NO - ITS OK
001113                                          CALL    ZV$ER,E23,ER23          SEND ERROR MESSAGE
        05E2  FBC0 0003
        05E4  D380 0000         X
        05E6  0F80
        05E7  05E9
        05E8  1F44
001114  05E9  0F81 00EB                E23     B       IRUPC                   INTERRUPT HAPPENED WHEN IT SHOULDN'T BE
001115  05EB  5901 0043                RUPTH   BEZ     $R5,RUPTM               SKIP THIS LEVEL ZERO CAN'T RUPT
001116  05ED  D970 003F                        CMR     $R5,=63                 IS DEVICE AT LEVEL 63?
001117  05EF  0901 003F                        BE      RUPTM                   YES - SKIP SINCE 63 CANT RUPT
001118  05F1  EF00 063B                        STR     $R6,<CLVL               CURRENT PROGRAM LEVEL
001119  05F3  9870 003F                        LDR     $R1,=63                 SET FUTURE LEVEL
001120  05F5  9F00 063C                        STR     $R1,<PLVL               STORE IN PROGRAM LEVEL
001121  05F7  9470 8000                        OR      $R1,=Z'8000'            ACTION FOR LEV INSTR
001122  05F9  9B80 05FE                        LAB     $B1,<RUPTI              CCHANGE ADDRESS IN ISA
001123  05FB  9F80 0658                        STB     $B1,<ISARP              STORE IN P COUNTER
001124  05FD  8E51                            LEV     =$R1                    DROP TO 63 TO ENABLE PENDING RUPT
001125  05FE  0F01 FFFF                RUPTI   NOP     $                       RETURN TO HERE
001126  0600  F870 006E                        LDR     $R7,=110                SET UP FOR DELAY
001127  0602  7701 FFFF                        BDEC    $R7,$                   WAIT HERE FOR RUPT
001128  0604  D800 063A                        LDR     $R5,<DLVL               RESTORE DEVICE LEVEL TO R5
001129  0606  8800 0003         X              LDF     <ZHIAFB+3,=Z'0001'      SHUT OFF LEVEL 63 BIT
        0608  0001
001130  0609  8C52                            STS     =$R2                    GO GET THE "S" REGISTER
001131  060A  A570 C3FF                        AND     $R2,=Z'C3FF'
001132  060C  8955                            LDT     =$R5,=Z'4000'           SET PRIVILEGE BIT
        060D  4000
001133  060E  A955                            CMR     $R2,=$R5                IS "S" REGISTER CORRECT?
001134  060F  090A                            BE      >RUPTJ                  YES - GO ON
001135                                          CALL    ZV$ER,E24,ER24          SEND ERROR MESSAGE
        0610  FBC0 0003
        0612  D380 0000         X
        0614  0F80
        0615  0617
        0616  1F47
001136  0617  0F81 00BD                E24     B       IRUPC                   PENDING INTERRUPT DIDN'T HAPPENED
001137  0619  8855                    RUPTJ   LBF     =$R5,=Z'4000'           SHUT OFF PRIVILEGE BIT
        061A  4000
001138  061B  D900 063B                        CMR     $R5,<CLVL               ARE THE PROG AND DEV AT SAME LVL?
001139  061D  0906                            BE      >RUPTK                  YES - NO NEED FOR LEV
```

```
001140  061E  C870 8080          LDR   $R4,=Z'8080'      ACTION FOR NEXT LEV
001141  0620  C400 063B          OR    $R4,<CLVL         GET CURRENT LEVEL
001142  0622  8E54               LEV   =$R4              BRING CP BACK FROM 63
001143  0623  9B80 066A    RUPTR  LAB   $B1,<DEVIH       RESTORE POINTER TO HANDLER
001144  0625  9FC0 0032          STB   $B1,ISARP
001145  0627  E800 063B          LDR   $R6,<CLVL         RESTORE PROG LEVEL TO R6
001146  0629  9856               LDR   $R1,=$R6          PUT INTO R1
001147  062A  9B80 063F          LAB   $B1,<ISATD        ISA FOR PROGRAM
001148  062C  9F90 0000    A     STB   $B1,<ZHISAZ.$R1   RESTORE INTERRUPT VECTOR
001149  062E  0F86               B     >RUPTN            SKIP AROUND INITIALIZE
001150  062F  8070 8000    RUPTM  IO    =Z'8000',<CAOCW
        0631  0000 1869
001151  0633  07FC               BIOF  >RUPTM
001152  0634  5700 05AE    RUPTN  BDEC  $R5,<RUPTF        CHANGE DEVICE LEVEL AND BRANCH
001153  0636  6700 058C          BDEC  $R6,<RUPTB        CHANGE PROGRAM LEVEL AND BRANCH
001154  0638  0F80 0605          B     <IRUPC            ALL DONE - GO ON
001155                           *
001156                           *
001157  063A  003F               DLVL  DC    =63         DEVICE LEVEL
001158  063B  003F               CLVL  DC    =63         CURRENT LEVEL
001159  063C  003F               PLVL  DC    =63         PROGRAM LEVEL
001160  063D        003F   A     HOOBF DC    <ZHISAZ+(63*$AF)  ADDRESS OF LAST RUPT VECTOR
001161                           *
001162                           *
001163                           *
001164  063E  0000               ISAT  RESV  $AF,0       ISA FOR BACKGROUND PROGRAM
001165  063F  0000               ISATD DC    X'0000'
001166  0640  FFFF                     DC    Z'FFFF'
001167  0641  0000                     DC    Z'0000'
001168  0642  0605                     DC    <IRUPC
001169        0642               ISATP EQU   $-1
001170  0643  0000                     DC    X'0000'
001171  0644  0000                     RESV  7*$AF+9,0
001172                           *
001173                           *
001174  0654  0000               ISAR  RESV  $AF,0       ISA FOR DEVICE LEVEL
001175  0655  0000               ISARD DC    X'0000'
001176  0656  FFFF                     DC    Z'FFFF'
001177  0657  0000                     DC    Z'0000'
001178  0658  0000               ISARP RESV  $AF,0
001179  0659  0000                     DC    X'0000'
001180  065A  0000                     RESV  7*$AF+9,0
001181                           *
001182                           *
001183  065A  8A80 0642          DEVIH  INC   <ISATP      RESET RETURN LOCATION
001184  065C  8A80 0642                 INC   <ISATP
001185  065E  8A80 1923                 INC   <INCNT
001186  0660  8A80 1916                 INC   <TEMP       SET SEMAPHORE
001187  0662  D800 063A                 LDR   $R5,<DLVL   DEVICE LEVEL TO R5
001188  0664  E800 063C                 LDR   $R6,<PLVL   PROGRAM LEVEL TO R6
001189  0666  D400 1918                 OR    $R5,<CHAI   STICK IN CHANNEL NUMBER
001190  0668  A800 0655                 LDR   $R2,<ISARD  LOOK AT RUPTING DEVICE
001191  066A  8852                     LDF   =$R2,=Z'0040'  SHUT OFF I/O BIT
        066B  0040
001192  066C  A955                     CMR   $R2,=$R5    WAS IT THE DISK?
001193  066D  090A                     BE    >DEVIH1     YES - OK
001194                                 CALL  ZV$ER,E25,ER25  SEND ERROR MESSAGE
        066E  FBC0 0003
        0670  D380 0000    A
        0672  0F80
        0673  0685
        0674  1F4A
001195  0675  0F81 004F          E25    B     IRUPC       WRONG DEVICE INTERRUPTED
001196  0677  D800 063A          DEVIH1 LDR   $R5,<DLVL   DEVICE LEVEL TO R5
001197  0679  8C52                     STS   =$R2        STORE THE "S" REGISTER
001198  067A  D400 1929                 OR    $R5,<STATUS  SET CHECKLIGHT CPID, PREV BITS
001199  067C  A570 63FF                 AND   $R2,=Z'63FF'
001200  067E  A955                     CMR   $R2,=$R5    IS IT RIGHT?
001201  067F  090A                     BE    >DEVIH2     YES - GO ON
001202                                 CALL  ZV$ER,E26,ER26  SEND ERROR MESSAGE
        0680  FBC0 0003
        0682  D380 0000    A
        0684  0F80
        0685  0697
        0686  1F4D
001203  0687  0F81 003D          E26    B     IRUPC       S-REG WRONG IN ISA
001204  0689  D570 003F          DEVIH2 AND   $R5,=Z'003F'  LOOK AT DEVICE LEVEL
001205  068B  8752                     CL    =$R2        RESET INDEX
001206  068C  82A0 0000    A     DEVIH3 LB    <ZHIAFB.$R2 LOOK AT NEXT FLAG
001207  068E  A955                     CMR   $R2,=$R5    IS THIS FLAG THE DEVICE LEVEL?
001208  068F  090E                     BE    >DEVIH5     YES-BRANCH
001209  0690  A956                     CMR   $R2,=$R6    IS THIS THE PROGRAM LEVEL FLAG
001210  0691  090C                     BE    >DEVIH5     YES-BRANCH
001211  0692  0502                     BDT   >DEVIH4     IF FLAG IS ON- BRANCH (SHOULDN'T BE)
001212  0693  0F99                     B     >DEVIH7     OK IF FLAG IS OFF
001213                           DEVIH4 CALL  ZV$ER,E27,ER27  SEND ERROR MESSAGE
        0694  FBC0 0003
        0696  D380 0000    A
        0698  0F80
        0699  06AB
        069A  1F50
001214  069B  0F81 0029          E27    B     IRUPC       PROGRAM LEVEL FLAG IS ON
001215                           *
001216  069D  0586               DEVIH5 BDF   >DEVIH6     FLAG IS OFF (IT SHOULDN'T BE)
001217  069E  A956                     CMR   $R2,=$R6    IS THIS THE PROGRAM LEVEL?
001218  069F  090D                     BE    >DEVIH7     YES-BRANCH
001219  06A0  8820 0000    A           LBF   <ZHIAFB.$R2 NO-RESET DEVICE LEVEL FLAG
001220  06A2  0F8A               *     B     >DEVIH7     CONTINUE
001221                           DEVIH6 CALL  ZV$ER,E28,ER28  SEND ERROR MESSAGE
        06A3  FBC0 0003
        06A5  D380 0000    A
        06A7  0F80
        06A8  06BA
        06A9  1F53
001222  06AA  0F81 001A          E28    B     IRUPC       PROGRAM LEVEL FLAG IS ON, IT SHOULDN'T BE
001223  06AC  A970 003F          DEVIH7 CMR   $R2,=63     IS THAT ALL THE FLAGS?
001224  06AE  0282                     BGE   >DEVIH8     YES - BRANCH
001225  06AF  27DD                     BINC  $R2,>DEVIH3  NO BUMP AND BRANCH
001226  06C0  C870 8000          DEVIH8 LDR   $R4,=Z'8000'  GET READY FOR LEV
001227  06C2  C400 063B                 OR    $R4,<CLVL   INSERT CURRENT LEVEL
001228  06C4  D900 063B                 CMR   $R5,<CLVL   ARE LEVELS EQUAL?
001229  06C6  0900 05FE                 BE    <RUPTI      YES - DONT LEV
001230  06C8  8E54                     LEV   =$R4        GO BACK TO PROGRAM
```

```
001231  06C9  0F80 066A              B     <DEVIH                BRANCH TO START OF HANDLER
001232                               CALL  ZV$ER,E29,ER29        SEND ERROR MESSAGE
        06CB  FBC0 0003
        06CD  D380 0000      X
        06CF  0F80
        06D0  06D2
        06D1  1F56
001233  06D2  0F81 0002_            E29   B     IRUPC                 CAN'T CHANGE THE LEVEL
001234                               *
001235                               *
001236  06D4  0000                   CPID  DC    =0
001237                               *
001238                               IRUPC CALL  ZV$RD,ZV$IZ
        06D5  FBF0 0001
        06D7  D380 0000      X
001239  06D9  8280 1941              LB    <ELFL,=Z'0001'
        06DB  0001
001240  06DC  0581 0016              BBF   DOR
001241                               CALL  ZV$T,ZV$TC,MESGN      END OF TEST MESSAGE
        06DE  FBC0 0003
        06E0  D380 0000      X
        06E2  0F80
        06E3  1C43
001242  06E4  0F81 FA1B              B     START                 LB <PFL,=Z'0001'
001243  06E6  8280 193F              LB    <PFL,=Z'0001'         SEE IF TEST FLAG IS SET
        06E8  0001
001244  06E9  0581 0009              BBF   DOR
001245                               CALL  ZV$T,ZV$TC,MESGN      END OF TEST MESSSAGE
        06EB  FBC0 0003
        06ED  D380 0000      X
        06EF  0F80
        06F0  1C43
001246  06F1  0F81 FA3C              B     REKUN
001247                               *
001248                               *-------------------------------------------------------------
001249                               *
001250                               *            D I S K E T T   D R I V E   D O O R   T E S T
001251                               *
001252                               *-------------------------------------------------------------
001253                               *
001254                               *    FOLLOWING TEST CHECKS THE DOOR ON THE DISKETT DRIVE. MAKE SURE
001255                               *    THE SWITCH SET THE STATUS OF DEVICE READY AND ATTENTION
001256                               *    BITS DURING THE OPENNING AND CLOSURE OF THE DOOR.
001257                               *
001258                               *
001259  06F3  9B80 1C68              DOR   LAB   $B1,<IMD
001260  06F5  9F80 1573                    STB   $B1,<DEXB
001261                               CALL  ZV$T,ZV$TC,TSTD
        06F7  FBC0 0003
        06F9  D380 0000      X
        06FB  0F80
        06FC  19A6
001262  06FD  8700 0000      X            CL    <ZHIAFB               RESET ALL LEVELS
001263  06FF  9800 2009                    LDR   $R1,<A5               ACTION FOR COMING LEVEL
001264  0701  9470 0016                    OR    $R1,=22               GET CP LEVEL
001265  0703  8E51                        LEV   =$R1                  RESTORE CP LEVEL TO 22:
001266  0704  1C14                        LDV   $R1,=20
001267  0705  AB80 0000      X            LAB   $B2,<ZHISAZ
001268  0707  DB80 1FB7                    LAB   $B5,<L20D             ISA FOR LEVEL 20
001269  0709  DFDE                        STB   $B5,$B2.+$R1          SET VECTOR
001270  070A  DB80 1FCD                    LAB   $B5,<L21D             ISA FOR LEVEL 20
001271  070C  DFDE                        STB   $B5,$B2.+$R1
001272  070D  DB80 1FE3                    LAB   $B5,<L22D             ISA FOR LEVEL 22
001273  070F  DF92                        STB   $B5,$B2.$R1           SET VECTOR
001274                               *
001275  0710  9870 0015                    LDR   $R1,=21
001276  0712  9400 06D4                    OR    $R1,<CPID             CREAT INTERRUPT CONTROL WORD
001277  0714  9F00 192B                    STR   $R1,<DRIN             SAVE IT
001278                               *
001279  0716  8700 07D0                    CL    <DCHAN
001280  0718  9800 1918                    LDR   $R1,<CHAI
001281  071A  9970 0000                    CMR   $R1,=0
001282  071C  0901 0076                    BE    DORB1                 ONLY CHAN B IS PRESENT
001283  071E  9F00 07D1                    STR   $R1,<CHNL
001284  0720  9800 18E5                    LDR   $R1,<CAISW
001285  0722  9F00 07AF                    STR   $R1,<CAIST            MAKE INPUT STATUS FUNCTION CODE
001286  0724  9800 18DA                    LDR   $R1,<CAOIC            PREPARE INTERRUPT CONTROL WORD
001287  0726  9F00 192A                    STR   $R1,<DORIS            SAVE IT
001288  0728  8700 07CF              DORA  CL    <DCNT
001289  072A  8000 07D2                    IO    <STATA,<CAIST         CHECK THE DOOR IS OPEN
        072C  0000 07AF
001290  072E  0701 0003                    BIOT  DORA1
001291  0730  9380 1BBE                    LNJ   $B1,<IOFA
001292  0732  8280 07D2              DORA1 LB    <STATA,=Z'8000'       CHECK STATUS
        0734  8000
001293  0735  0580 0764                    BBF   <DORA2                DOOR IS OPEN - BRANCH
001294                               CALL  ZV$T,ZV$TC,OPEN1      OR ELSE ASK TO OPEN
        0737  FBC0 0003
        0739  D380 0000      X
        073B  0F80
        073C  07B0
001295                               CALL  ZV$TH,CHNL
        073D  FBC0 0003
        073F  D380 0000      X
        0741  0F80
        0742  07D1
001296  0743  8040 11E7              IO    DRIN,<DORIS           ENABLE INTERRUPT
        0745  0000 192A
001297  0747  0701 0003                    BIOT  DORA8                 WAIT FOR I/O
001298  0749  9380 1BBE                    LNJ   $B1,<IOFA
001299  074B  9380 1486              DORA8 LNJ   $B1,<DORIN            CHECKINTERRUPT CAME WHILE OPENED
001300  074D  8000 07D2                    IO    <STATA,<CAIST         READ STATUS AFTER RETURN
        074F  0000 07AF
001301  0751  0700 0755                    BIOT  <DORA3
001302  0753  9380 1BBE                    LNJ   $B1,<IOFA
001303                               *
001304  0755  9800 07D2              DORA3 LDR   $R1,<STATA            CHECK THE STATUS
001305  0757  9970 4000                    CMR   $R1,=Z'4000'          CHECK DEVREADY=0, ATTNTION=1
001306  0759  0901 000A                    BE    DORA2                 BRANVH IF OK
001307                               CALL  ZV$ER,E30,ER30        SEND ERROR MESSAGE
        075B  FBC0 0003
        075D  D380 0000      X
        075F  0F80
```

```
                0760  0762
                0761  1F59
001308          0762  0F81 0070              E30     B       DORC                    WRONG STATUS WHILE DDOOR TEST
001309                                       *
001310                                       DORA2   CALL    ZV$T,ZV$TC,CLOS1        ASK TO CLOSE DOOR
                0764  FBC0 0003
                0766  D380 0000        A
                0768  0F80
                0769  07BA
001311                                               CALL    ZV$TH,CHNL
                076A  FBC0 0003
                076C  D380 0000        A
                076E  0F80
                076F  07D1
001312          0770  8040 11BA                    IO      DRIN,<DORIS             ENABLE INTERRUPT
                0772  0000 192A
001313          0774  0701 0003                    BIOT    DORA9
001314          0776  9380 1BBE                    LNJ     $B1,<IOFA
001315          0778  9380 1486        DORA9       LNJ     $B1,<DORIN              CHECK INTERRUPT CAME WHILE CLOSED
001316          077A  8000 07D2                    IO      <STATA,<CAIST           READ STATUS ON RETURN
                077C  0000 07AF
001317          077E  0700 0782                    BIOT    <DORA4
001318          0780  9380 1BBE                    LNJ     $B1,<IOFA
001319                                       *
001320          0782  9800 07D2        DORA4       LDR     $R1,<STATA              GET THE STATUS
001321          0784  9570 F000                    AND     $R1,=Z'F000'            STRIP TO DEVREADY AND ATTENTION
001322          0786  9970 C000                    CMR     $R1,=Z'C000'            CHECK DEVREADY=1, ATTENTION=1
001323          0788  0901 000A                    BE      DORB1                   PROCEED IF OK
001324                                               CALL    ZV$ER,E31,ER31          SEND ERROR MESSAGE
                078A  FBC0 0003
                078C  D380 0000        A
                078E  0F80
                078F  0791
                0790  1F5C
001325          0791  0F81 0041              E31     B       DORC                    WRONG STATUS WHILE OPEN AND CLOSE DOOR
001326                                       *
001327          0793  9800 1928        DORB1       LDR     $R1,<DRIVB
001328          0795  9970 0001                    CMR     $R1,=1                  CHECK SECOND CHANNEL
001329          0797  0901 003B                    BE      DORC                    GO TO NEXT TEST IF NOT
001330          0799  9800 191A                    LDR     $R1,<CHBI               GET CHANNEL B.
001331          079B  9F00 07D1                    STR     $R1,<CHNL
001332          079D  9800 18F3                    LDR     $R1,<CBISW              PREPARE INPUT STATUS FUNTION CODE
001333          079F  9F00 07AF                    STR     $R1,<CAIST
001334          07A1  9800 18E8                    LDR     $R1,<CBOIC              PREPARE INTERRUPT CONTROL FUNCTION
001335          07A3  9F00 192A                    STR     $R1,<DORIS              SAVE IT
001336          07A5  9800 07D0                    LDR     $R1,<DCHAN
001337          07A7  9970 0001                    CMR     $R1,=1
001338          07A9  0901 0029                    BE      DORC                    GO TO NEXT TEST
001339          07AB  8A80 07D0                    INC     <DCHAN
001340          07AD  0F81 FF7A                    B       DORA                    GO AND CHECK SECOND CHANNEL
001341                                       *
001342          07AF  0000                 CAIST   DC      0
001343          07B0  4F50 454E 2044       OPEN1   TEXT    'OPEN DOOR ON DRIVE:$'
                07B3  4F4F 5220 4F4E
                      2044 5249 5645
                      3A24
001344          07BA  5055 5420 574F       CLOS1   TEXT    'PUT WORK DISKETTE AND CLOSE THE DOOR ON:$'
                07BD  524B 2044 4953
                      4B45 5454 4520
                      414E 4420 434C
                      4F53 4520 5448
                      4520 444F 4F52
                      204F 4E3A 2400
001345          07CF  0000                 DCNT    DC      0                       COUNTER
001346          07D0  0000                 DCHAN   DC      0                       CHAN B. INDICATOR
001347          07D1  0000                 CHNL    DC      0                       SAVE CHANNEL NUMBER
001348          07D2  0000                 STATA   DC      0                       SAVE STATUS
001349                                       *
001350          07D3  8280 193F                    LB      <PFL,=Z'0001'           IS ALL FLAG CLEAR
                07D5  0001
001351          07D6  0500 018D                    BDT     <NEXT                   IF NOT ASK FOR NEXT TEST
001352                                       *
001353                                       * ------------------------------------------------------------
001354                                       *
001355                                       *               T R A C K   C A P A C I T Y   T E S T
001356                                       *
001357                                       *------------------------------------------------------------
001358                                       *
001359                                       *
001360                                       *     COME HERE IF THERE IS ONLY ONE CHANNEL
001361                                       *
001362                                       *       NOW TO SEE IF THE DRIVE AND CONTROLLER ARE
001363                                       *       READY TO GO TO WORK
001364                                       *
001365          07D8  8055                 BCCC    IO      =$R5,CAISW              INPUT STATUS FROM CHAN A
                07D9  0040 110B
001366          07DB  0701 0000        T           BIOT    +$E
001367          07DD  93C0 13E0                    LNJ     $B1,IOFA
001368                                       *
001369          07DF  5801 0000        T   $E      BLZ     $R5,+$A                 BRANCH - IF CHAN A IS READY
001370          07E1  0F81 0004                    B       BCCD                    DEVICE NOT READY
001371                                       *
001372          07E3  5001                 $A      SUL     $R5,1                   DROP THE CAN A READY BIT
001373          07E4  5901 008A                    BLZ     $R5,CABS                GO AND TEST SLEW ERROR
001374                                       *
001375          07E6  8755                 BCCD    CL      =$R5
001376          07E7  8055                         IO      =$R5,CAOIC              OUTPUT RUPT CONTROL TO CHAN A
                07E8  0040 10F1
001377          07EA  0701 0000        T           BIOT    +$F
001378          07EC  93C0 13D1                    LNJ     $B1,IOFA
001379                                       *
001380          07EE  8040 1113            $F      IO      INIT,CAOTW              INITIALIZE
                07F0  0040 10EA
001381          07F2  0701 0000        T           BIOT    +$A
001382          07F4  93C0 13C9                    LNJ     $B1,IOFA
001383                                       *
001384          07F6  8055                 $A      IO      =$R5,CAISW              INPUT STATUS OF CHAN A.
                07F7  0040 10ED
001385          07F9  0781 FFFC                    BIOF    -$A
001386                                       *
001387          07FB  5801 0005                    BLZ     $R5,BCCCX               BRANCH - IF CAN A IS READY
001388          07FD  B3C0 0030                    LNJ     $B3,INDW                OR ELSE FIND OUT WHY NOT
001389          07FF  0F81 0L48                    B       COA                     THEN REPORT ERROR
```

```
001390                                  *
001391                                  *
001392  0801  9800 191B                 BCCCX   LDR     $R1,<CHN
001393  0803  1801 006B                         BLZ     $R1,CABS                BRANCH - IF ONLY ONE DRIVE
001394  0805  8055                              IO      =$R5,CBISW              OR ELSE INPUT STATUS OF CHAN B
        0806  0040 10EC
001395  0808  0701 0000             T           BIOT    +$B
001396  080A  93C0 13B3                         LNJ     $B1,IOFA
001397                                  *
001398  080C  5801 0000             T   $B      BLZ     $R5,+$A                 BRANCH - IF CHAN B READY
001399  080E  0F81 FFD7                         B       BCCD                    CHAN B NOT READY
001400                                  *
001401  0810  5001                      $A      SOL     $R5,1                   DROP THE DEVICE READY BIT
001402  0811  5901 005D                         BEZ     $R5,CABS                GO AND CHECK ILLEGAL OPERATION
001403                                  *
001404  0813  8755                              CL      =$R5
001405  0814  8055                              IO      =$R5,CBOIC              OUTPUT RUPT CONTROL TO CHAN B
        0815  0040 10D2
001406  0817  0701 0000             T           BIOT    +$C
001407  0819  93C0 13A4                         LNJ     $B1,IOFA
001408                                  *
001409  081B  8040 10E6                  $C      IO      INIT,CBOTW              INTIALIZE CHAN B
        081D  0040 10CB
001410  081F  0701 0000             T           BIOT    +$D
001411  0821  93C0 139C                         LNJ     $B1,IOFA
001412                                  *
001413  0823  8055                      $D      IO      =$R5,CBISW              INPUT STATUS FROM CHAN B
        0824  0040 10CE
001414  0826  0781 FFFC                         BIOF    -$D
001415                                  *
001416  0828  5801 0046                         BLZ     $R5,CABS                DO AN ILLEGAL TRACK OPERATION
001417  082A  B3C0 0003                         LNJ     $B3,INDW                OR ELSE FIND OUT WHY NOT
001418  082C  0F81 0E42                         B       COBA                    THEN REPORT ERROR
001419                                  *
001420                                  *       INITIALIZE DID NOT PUT DEVICE IN READY STATE
001421                                  *       FIND OUT WHY
001422                                  *
001423  082E  5002                      INDW    SOL     $R5,2                   POSITION UNDERRUN/OVERRUN BIT
001424  082F  5881 0000             T           BGEZ    $R5,+$E
001425  0831  0F81 0034                         B       INDWA                   BIT TWO NOT CLEARED BY INIT
001426                                  *
001427  0833  5001                      $E      SOL     $R5,1                   DELETED FIELD
001428  0834  5881 0000             T           BGEZ    $R5,+$F
001429  0836  0F81 002F                         B       INDWA                   BIT THREE NOT CLEARED BY INIT
001430                                  *
001431  0838  5001                      $F      SOL     $R5,1                   READ ERROR
001432  0839  5881 0000             T           BGEZ    $R5,+$A
001433  083B  0F81 002A                         B       INDWA                   BIT FOUR NOT CLEARED BY INIT
001434                                  *
001435  083D  5001                      $A      SOL     $R5,1                   DEVICE FAULT
001436  083E  5881 0000             T           BGEZ    $R5,+$B
001437  0840  0F81 0025                         B       INDWA                   BIT FIVE NOT CLEARED BY INIT
001438                                  *
001439  0842  5001                      $B      SOL     $R5,1                   MISSED DATA SYNC
001440  0843  5881 0000             T           BGEZ    $R5,+$C
001441  0845  0F81 0020                         B       INDWA                   BIT SIX NOT CLEARED BY INIT
001442                                  *
001443  0847  5001                      $C      SOL     $R5,1                   FMT ERROR OR UNSUCCESSFUL SEARCH
001444  0848  5881 0000             T           BGEZ    $R5,+$D
001445  084A  0F81 001B                         B       INDWA                   BIT SEVEN NOT CLEARED BY INIT
001446                                  *
001447  084C  5003                      $D      SOL     $R5,3                   SEEK ERROR
001448  084D  5881 0000             T           BGEZ    $R5,+$E
001449  084F  0F81 0016                         B       INDWA                   BIT TEN NOT CLEARED BY INIT
001450                                  *
001451  0851  5002                      $E      SOL     $R5,2                   CORRECTED MEMORY ERROR
001452  0852  5881 0000             T           BGEZ    $R5,+$F
001453  0854  0F81 0011                         B       INDWA                   BIT TWELVE NOT CLEARED BY INIT
001454                                  *
001455  0856  5001                      $F      SOL     $R5,1                   NON-EXISTANT RESOURCE
001456  0857  5881 0000             T           BGEZ    $R5,+$A
001457  0859  0F81 000C                         B       INDWA                   BIT THIRTEEN NOT CLEARED BY INIT
001458                                  *
001459  085B  5001                      $A      SOL     $R5,1                   BUS PARITY ERROR
001460  085C  5881 0000             T           BGEZ    $R5,+$B
001461  085E  0F81 0007                         B       INDWA                   BIT FOURTEEN NOT CLEARED BY INIT
001462                                  *
001463  0860  5001                      $B      SOL     $R5,1                   UNCORRECTED MEMORY ERROR
001464  0861  5881 0003                         BGEZ    $R5,DNRA
001465  0863  0F81 0002                         B       INDWA                   BIT FIFTEEN NOT CLEARED BY INIT
001466                                  *
001467  0865  8383                      DNRA    JMP     *B3
001468                                  *
001469                                  INDWA   CALL    ZV$ER,E32,ER32          SEND ERROR MESSAGE
        0866  FBC0 0003
        0868  D380 0000             X
        086A  0F80
        086B  086D
        086C  1F5F
001470  086D  0F81 00CF                 E32     B       TRKC                    STATUS NOT CLEARED BY INITIALIZE
001471                                  *
001472                                  *
001473                                  *       CHECK THAT ERROR BIT GETS SET WHEN
001474                                  *       OPERATION COMPLETED THAT SHOULD CAUSE ERROR
001475                                  *
001476  086F  9870 0099                 CABS    LDR     $R1,=X'99'              CYLINDER OVER MAX
001477  0871  9F40 1094                         STR     $R1,TRNO                CONTAINS ILLEGAL TRACK NUMBER
001478  0873  C3C0 0C38                         LNJ     $B4,FCWA                MAKE CONFG WORD
001479  0875  8000 1908                  $A      IO      <CWAD,CAOWA             OUTPUT CONFIG WORD A
        0877  0040 1066
001480  0879  0781 FFFB                         BIOF    -$A
001481  087B  8040 107F                         IO      SEEK,CAOTW              OUTPUT TASK WORD TO SEEK
        087D  0040 105D
001482  087F  0701 0000             I           BIOT    +$B
001483  0881  93C0 133C                         LNJ     $B1,IOFA
001484                                  *
001485  0883  9870 0050                  $B      LDR     $R1,=Z'0050'
001486  0885  93C0 FC2D                         LNJ     $B1,TMO                 DELAY FOR 50 MILLISECONDS
001487                                  *
001488  0887  8055                      CABSA   IO      =$R5,CAISW              INPUT STATUS WORD FROM CHAN A
        0888  0040 105C
001489  088A  0781 FFFC                         BIOF    CABSA
001490                                  *
```

```
001491  088C  500A                    SUL   $R5,10          POSITION SEEK ERROR BIT
001492  088D  5801 000A                BLZ   $R5,CABSB       CONTINUE IF SET
001493                                 CALL  ZV$ER,E33,ER33   SEND ERROR MESSAGE
        088F  FBC0 0003
        0891  D380 0000          X
        0893  0F80
        0894  0896
        0895  1F62
001494  0896  0F01 FFFF         E33   NOP   $               SEEK ERROR BIT IS NOT SET
001495                         *                           UPON COMPLETION OF TASK
001496                         *                           WHICH NORMALLY WOULD
001497                         *                           CAUSE AN ERROR
001498  0898  8040 1069         CABSB IO    INIT,CAOCW
        089A  0040 103E
001499  089C  0781 FFFB                BIOF  CABSB
001500  089E  8280 1924         TRK   LB    <CPFL,=Z'0001'  SEE IF 6/20
        08A0  0001
001501  08A1  0581 02C2                BBF   BYT             DONT DO TRACK CAPACITY AND DIAGNOSTIC READ/WR
001502  08A3  9B80 1C6D                LAB   $B1,<IME
001503  08A5  9F80 1573                STB   $B1,<DEXB
001504                                 CALL  ZV$I,ZV$TC,TSTE
        08A7  FBC0 0003
        08A9  D380 0000          X
        08AB  0F80
        08AC  1989
001505  08AD  C3C0 0D90                LNJ   $B4,C0          CHECK DRIVE READY
001506  08AF  8040 1052         $B    IO    INIT,CAOCW      PUT DRIVES ON TRACK ZERO
        08B1  0040 1027
001507  08B3  0781 FFFB                BIOF  -$B
001508  08B5  81C8 1058         $A    IOLD  *BFAD,CAOLD,BRWH  OUTPUT ADDRESS AND RANGE
        08B7  0040 1024
        08B9  0040 126B
001509  08BB  0781 FFF9                BIOF  -$A
001510  08BD  8040 103E         $B    IO    FMAT,CAOTW      OUTPUT READ WITE TASK
        08BF  0040 101B
001511  08C1  0781 FFFB                BIOF  -$B
001512  08C3  A3C0 1267                LNJ   $B2,WAIT        WIT TILL OPERATION DONE
001513                         *
001514  08C5  9870 1770                LDR   $R1,=6000
001515  08C7  81C8 1047         $C    IOLD  *RBUF,CAILD,=$R1  OUTPUT ADDRESS AND RANGE
        08C9  0040 1013
        08CB  0051
001516  08CC  0781 FFFA                BIOF  -$C
001517  08CE  8040 1031         $D    IO    DIAGN,CAOTW     DIAGNOSTIC READ WRITRE TASK
        08D0  0040 100A
001518  08D2  0781 FFFB                BIOF  -$D
001519                         *
001520  08D4  8055              $E    IO    =$R5,CAISW      INPUT STATUS FOR CHAN A.
        08D5  0040 100F
001521  08D7  0781 FFFC                BIOF  -$E
001522  08D9  9840 103E                LDR   $R1,CHAI
001523  08DB  9F00 191F                STR   $R1,<TOUTA
001524  08DD  A3C0 002F                LNJ   $B2,CRPMC       GO FIGURE CAPACITY
001525                         *
001526  08DF  C380 1665         CRPMA LNJ   $B4,<C0B          CHECK DRIVE READY
001527  08E1  8188 190E         $F    IOLD  *<BFAD,CBOLD,BRWH
        08E3  0040 1007
        08E5  0040 123F
001528  08E7  0781 FFF9                BIOF  -$F
001529  08E9  8040 1012         $A    IO    FMAT,CBOTW      OUTPUT READ WRITE TASK
        08EB  0040 0FFD
001530  08ED  0781 FFFB                BIOF  -$A
001531  08EF  A3C0 124F                LNJ   $B2,WAITB
001532                         *
001533  08F1  9870 1770                LDR   $R1,=6000
001534  08F3  81C8 101B         $B    IOLD  *RBUF,CBILD,=$R1  OUTPUT ADDRESS AND RANGE
        08F5  0040 0FF4
        08F7  0051
001535  08F8  0781 FFFA                BIOF  -$B
001536  08FA  8040 1005         $C    IO    DIAGN,CBOTW     DIAGNOSTIC READ WRITE TASK
        08FC  0040 0FEC
001537  08FE  0781 FFFB                BIOF  -$C
001538                         *
001539  0900  8055              $C    IO    =$R5,CBISW      INPUT STATUS FOR CHAN B
        0901  0040 0FF1
001540  0903  0781 FFFC                BIOF  -$C
001541  0905  9840 1014                LDR   $R1,CHBI
001542  0907  9F40 1017                STR   $R1,TOUTA
001543  0909  A3C0 000A                LNJ   $B2,CRPMD       GO FIGURE CAPACITY
001544  090B  0F81 0031         CRPMB B     TRKC            CONTINUE
001545                         *
001546                         *
001547                         *       IS TRACK CAPACITY WITHIN LIMITS?
001548                         *
001549  090D  8055              CRPMC IO    =$R5,CAIIR      INPUT RANGE FOR CHAN A.
        090E  0040 0FD3
001550  0910  0781 FFFC                BIOF  CRPMC
001551  0912  0F81 0006                B     CRPME
001552  0914  8055              CRPMD IO    =$R5,CBIIR      INPUT RANGE FOR CHANNEL B
        0915  0040 0FDA
001553  0917  0781 FFFC                BIOF  CRPMD
001554  0919  0970 02AD         CRPME CMR   $R5,=685        CAPACITY WITHIN LOWERLIMIT
001555  091B  0201 0006                BL    CRPMF
001556  091D  0970 0415                CMR   $R5,=1045       CAPACITY WITHIN UPPER LIMIT
001557  091F  0301 0002                BG    CRPMF
001558  0921  8382                    JMP   $B2             WITHIN LIMITS,RETURN
001559                         *
001560                         CRPMF CALL  ZV$I,ZV$TC,CONE
        0922  FBC0 0003
        0924  D380 0000          X
        0926  0F80
        0927  1D46
001561                                 CALL  ZV$TH,TOUTA
        0928  FBC0 0003
        092A  D380 0000          X
        092C  0F80
        092D  191F
001562                                 CALL  ZV$I,ZV$TC,SPOUT  TRACK CAPACITY OUT OF TOLERANCE
        092E  FBC0 0003
        0930  D380 0000          X
        0932  0F80
        0933  1D19
001563                                 CALL  ZV$ER,E34,ER34    SEND ERROR MESSAGE
```

```
          0934  FBC0 0003
          0936  D380 0000      X
          0938  0F80
          0939  093B
          093A  1F65
001564    093B  0F01 FFFF       E34    NOP   $                    TRACK CAPACITY OUT OF TOLERANCE
001565                        *
001566    093D  8280 193F       TRKC   LB    <PFL,=Z'0001'
          093F  0001
001567    0940  0501 F84C-            BBT   NEXT
001568                        *
001569                        *
001570                        * ------------------------------------------------------------
001571                        *
001572                        *            D I A G N O S T I C   W R I T E / R E A D   T E S T
001573                        *
001574                        *------------------------------------------------------------
001575                        *      WRITE PACK FOR DIAGNOSTIC READ
001576                        *            HEADERS ARE ALL ZEROS
001577                        *            DATA IS ALL ZEROS
001578    0942  9B80 1C72       DAG    LAB   $B1,<IMF
001579    0944  9F80 1573             STB   $B1,<DEXB
001580                              CALL  ZV$T,ZV$TC,TSTF
          0946  FBC0 0003
          0948  D380 0000      X
          094A  0F80
          094B  1996
001581    094C  8740 0FB8             CL    RTYCT
001582    094E  8751                  CL    =$R1
001583    094F  8752                  CL    =$R2
001584    0950  9CC0 0FBD             LDB   $B1,BFAD             WRITE BUFFER STARTING ADDRES
001585    0952  B870 0068             LDR   $R3,=Z'0068'
001586    0954  AF5D            DWW   STR   $R2,$B1,+$R1         STORE WORD OF ZEROS ON 68 LOCS
001587    0955  3701 FFFE             BDEC  $R3,DWW
001588    0957  AF40 0FAE             STR   $R2,TRNO             ZERO TRACK
001589    0959  C3C0 0CE4             LNJ   $B4,CO               CHECK FOR DEVICE READY
001590    095B  A840 0FBF             LDR   $R2,CHN
001591    095D  2601 0003             BLZ   $R2,DWX              BRANCH - IF ONE DRIVE ONLY
001592    095F  C3C0 0D05             LNJ   $B4,COB              CHECK - CHAN B IS READY
001593                        *
001594    0961  8755            DWX   CL    =$R5                 COME HERE - IF ONLY ONE DRIVE
001595    0962  8055                  IO    =$R5,<CAOIC          CHAN A. INTRPT CONTROL WORD
          0963  0000 18DA
001596    0965  0701 0003             BIOT  DWXA
001597    0967  93C0 1256             LNJ   $B1,IOFA
001598    0969  A840 0FB1       DWXA  LDR   $R2,CHN
001599    096B  2601 0008             BLZ   $R2,DWAC             BRANCH - IF ONLY ONE DRIVE
001600                        *
001601    096D  8055                  IO    =$R5,CBOIC           CHAN B. INRPT CONTROL
          096E  0040 0F79
001602    0970  0701 0007             BIOT  DWAB
001603    0972  93C0 124B             LNJ   $B1,IOFA
001604                        *
001605    0974  E870 8000       DWAC  LDR   $R6,=Z'8000'
001606    0976  EF40 0F9A             STR   $R6,FLAG             INDICATES DIAGNOSTIC
001607                        *
001608    0978  8740 0F8F       DWAB  CL    CWAD                 CLEAR WORD TO BE OUTPUT
001609    097A  8000 1908       DWB   IO    <CWAD,<CBOWA          CONFG WORD A TO CHAN B
          097C  0000 18EC
001610    097E  0781 FFFB             BIOF  DWB
001611    0980  8040 0F7A       DWC   IO    SEEK,CBOTW           SEEK CHAN B
          0982  0040 0F66
001612    0984  0781 FFFB             BIOF  DWC
001613    0986  8740 0F70             CL    CRTRY
001614                        *
001615    0988  81C8 0F85       DWD   IOLD  *BFAD,CAOLD,BRWH     ADDRESS AND RANGE TO CHAN A
          098A  0040 0F51
          098C  0040 1198
001616    098E  0781 FFF9             BIOF  DWD
001617    0990  8040 0F6B       DWE   IO    FMAT,CAOTW            CHAN A READ-WRITE TASK
          0992  0040 0F48
001618    0994  0781 FFFB             BIOF  DWE
001619    0996  CBC0 FFF1             LAB   $B4,DWD
001620    0998  A3C0 1192             LNJ   $B2,WAIT             WAIT 'TIL DONE
001621    099A  8052            DWEA  IO    =$R2,CAIIR           INPUT RESIDUA RANGE FROM CHAN A.
          099B  0040 0F46
001622    099D  0781 FFFC             BIOF  DWEA
001623    099F  A970 0000             CMR   $R2,=0
001624    09A1  0901 000A             BE    DWEB                 BRANCH - IF RANGE IS ZERO
001625    09A3  A840 0F53             LDR   $R2,CRTRY
001626    09A5  A970 0003             CMR   $R2,=3
001627    09A7  0901 0AC7             BE    RRDRVE
001628    09A9  8AC0 0F4D             INC   CRTRY
001629    09AB  8384                  JMP   $B4
001630                        *
001631    09AC  8AC0 0F59       DWEB  INC   TRNO
001632    09AE  A840 0F57             LDR   $R2,TRNO
001633    09B0  A970 004D             CMR   $R2,=X'4D'           OVER MAX?
001634    09B2  0900 09C4       DWK   BE    <DWH
001635    09B4  C3C0 0AF7             LNJ   $B4,FCWA             FORM WORDS
001636    09B6  8040 0F51       DWF,  IO    CWAD,CAOWA           WORD A TO A
          09B8  0040 0F25
001637    09BA  0781 FFFB             BIOF  DWF
001638                        *
001639    09BC  8000 18FB       DWG   IO    <SEEK,CAOTW          SEEK A
          09BE  0040 0F1C
001640    09C0  0781 FFFB             BIOF  DWG
001641    09C2  8740 0F34             CL    CRTRY
001642                        *
001643    09C4  8188 190E       DWH   IOLD  *<BFAD,<CBOLD,BRWH   OUTPUT ADDRESS AND RANGE
          09C6  0000 18EB
          09C8  0040 115C
001644    09CA  0781 FFF9             BIOF  DWH
001645    09CC  8040 0F2F       DWI   IO    FMAT,CBOTW            WRITE CHAN B TASK
          09CE  0040 0F1A
001646    09D0  0781 FFFB             BIOF  DWI
001647    09D2  9BC0 FFF1             LAB   $B1,DWH
001648    09D4  A3C0 116A             LNJ   $B2,WAITB            WAIT 'TIL DONE
001649    09D6  8052            DWIA  IO    =$R2,CBIIR           GET RESIDUAL RANGE
          09D7  0040 0F18
001650    09D9  0781 FFFC             BIOF  DWIA
001651    09DB  A970 0000             CMR   $R2,=0
001652    09DD  0901 000A             BE    DWIB                 BRANCH - IF RANGE IS ZERO
```

```
001653  09DF  A840 0F17          LDR   $R2,CRTRY
001654  09E1  A970 0003          CMR   $R2,=3
001655  09E3  0901 0A8B          BE    RRDRVE
001656  09E5  8AC0 0F11          INC   CRTRY
001657  09E7  8384               JMP   $B4
001658                *
001659  09E8  A840 0F1D  DW1B     LDR   $R2,TRNO
001660  09EA  A970 004D          CMR   $R2,=X'4D'
001661  09EC  0901 0003  DWJ     BE    DR                  DONE - GO READ AND COMPARE
001662  09EE  0F81 FF8D          B     DWB                 DO ANOTHER TRACK
001663                *
001664                *
001665                *       DIAGNOSTIC READ - BOTH DRIVES
001666                *
001667  09F0  8040 0F11  DR      IO    INIT,CAOCW          CHAN B CONTROL WORD
      09F2  0040 0EE6
001668  09F4  0781 FFFB          BIOF  DR
001669  09F6  8740 0F0F          CL    TRNO                CLEAR TRACK
001670  09F8  8740 0EFF          CL    ERCA                CLEAR DRIVE A ERROR COUNTER
001671  09FA  8740 0EFE          CL    ERCB                CLEAR DRIVE B ERROR COUNTER
001672  09FC  8740 0F0B          CL    CWAD                CLEAR WORD A TO BE OUTPUT
001673  09FE  8740 0F12          CL    FLAG                CLEAR READ-WRITE FLAG
001674  0A00  8000 1908  DRB     IO    <CWAD,<CBOWA        WORD A TO B
      0A02  0000 18EC
001675  0A04  0781 FFFB          BIOF  DRB
001676  0A06  8040 0EF4  DRC     IO    SEEK,CBOTW          SEEK B
      0A08  0040 0EE0
001677  0A0A  0781 FFFB          BIOF  DRC
001678  0A0C  8740 0EEA          CL    CRTRY
001679  0A0E  B840 0EE9          LDR   $R3,ERCA            GET CHAN A ERROR COUNT
001680  0A10  BF40 0EF4          STR   $R3,RTYCT
001681                *
001682  0A12  81C8 0EFC  DRD     IOLD  *RBUF,CAILD,BRDT     OUTPUT ADDRESS AND RANGE
      0A14  0040 0EC6
      0A16  0040 1111
001683  0A18  0781 FFF9          BIOF  DRD
001684  0A1A  8740 0EF1          CL    SAVEA               CLEAR SAVE LOCATION
001685  0A1C  8040 0EE3  DRE     IO    DIAGN,CAOTW         READ DIAGNOSTIC CHAN A
      0A1E  0040 0EBC
001686  0A20  0781 FFFB          BIOF  DRE
001687  0A22  A3C0 1108          LNJ   $B2,WAIT
001688  0A24  AB80 0A12          LAB   $B2,<DRD
001689  0A26  B840 0ED1          LDR   $R3,ERCA
001690  0A28  BF40 0EDC          STR   $R3,RTYCT
001691  0A2A  B3C0 00F6          LNJ   $B3,SM              AM'S OK?
001692  0A2C  B840 0ED8          LDR   $R3,RTYCT
001693  0A2E  BF40 0EC9          STR   $R3,ERCA
001694                *
001695  0A30  8AC0 0ED5          INC   TRNO                INC TRACK NUMBER
001696  0A32  A840 0ED3          LDR   $R2,TRNO
001697  0A34  A970 004D          CMR   $R2,=X'4D'          OVER MAX?
001698  0A36  0900 0A56  DRLA    BE    <DRI
001699  0A38  C3C0 0A73          LNJ   $B4,FCWA
001700  0A3A  8040 0EC0  DRF     IO    CWAD,CAOWA          WORD A TO A
      0A3C  0040 0EA1
001701  0A3E  0781 FFFB          BIOF  DRF
001702                *
001703  0A40  8040 0EBA  DRG     IO    SEEK,CAOTW          SEEK A
      0A42  0040 0E98
001704  0A44  0781 FFFB          BIOF  DRG
001705  0A46  8740 0EB0          CL    CRTRY
001706  0A48  B800 18F9  DRGA    LDR   $R3,<ERCB
001707  0A4A  BF40 0EBA          STR   $R3,RTYCT
001708                *
001709  0A4C  8188 190F  DRH     IOLD  *<RBUF,CBILD,BRDT
      0A4E  0040 0E9D
      0A50  0040 10D7
001710  0A52  0781 FFF9          BIOF  DRH
001711  0A54  8740 0EB7          CL    SAVEA
001712  0A56  8040 0EA9  DRI     IO    DIAGN,CBOTW         READ B
      0A58  0040 0E90
001713  0A5A  0781 FFFB          BIOF  DRI
001714  0A5C  A3C0 10E2          LNJ   $B2,WAITB
001715  0A5E  AB80 FFED          LAB   $B2,DRH
001716  0A60  B840 0E98          LDR   $R3,ERCB
001717  0A62  BF40 0EA2          STR   $R3,RTYCT
001718  0A64  B3C0 00BC          LNJ   $B3,SM              AM'S ALL OK?
001719  0A66  B840 0E9E          LDR   $R3,RTYCT
001720  0A68  BF40 0E90          STR   $R3,ERCB
001721                *
001722  0A6A  A840 0E9D          LDR   $R2,TRNO
001723  0A6C  A970 004D          CMR   $R2,=X'4D'          OVER MAX?
001724  0A6E  0901 0003          BE    DRAA                DONE - DO NEXT TEST
001725  0A70  0F81 FF8F          B     DRB
001726                *
001727                *       DAIGNOSTIC READ ANALYSIS
001728                *
001729  0A72  9840 0EAA  DRAA    LDR   $R1,PCNT
001730  0A74  A840 0E83          LDR   $R2,ERCA
001731  0A76  B840 0E82          LDR   $R3,ERCB
001732  0A78  1A01 0050          BGZ   $R1,DRAH
001733  0A7A  2A01 0013          BGZ   $R2,DRAC
001734  0A7C  3A01 0003          BGZ   $R3,DRAB
001735  0A7E  0F81 00E0          B     DAGC
001736                *
001737  0A80  BF40 0E9E  DRAB    STR   $R3,TOUTA
001738  0A82  A840 0E97          LDR   $R2,CHBI
001739  0A84  AF40 0E9B          STR   $R2,TOUTB
001740  0A86  93C0 10F1          LNJ   $B1,RTYMSG
001741                *
001742  0A88  9840 0E91  DRAG    LDR   $R1,CHBI
001743  0A8A  9F40 0E6B          STR   $R1,BMED
001744  0A8C  0F81 0029          B     DRAE
001745                *
001746  0A8E  AF40 0E90  DRAC    STR   $R2,TOUTA
001747  0A90  9840 0E87          LDR   $R1,CHAI
001748  0A92  9F40 0E8D          STR   $R1,TOUTB
001749  0A94  93C0 10E3          LNJ   $B1,RTYMSG
001750  0A96  3901 001B          BEZ   $R3,DRAD
001751  0A98  BF40 0E86          STR   $R3,TOUTA
001752  0A9A  9840 0E7F          LDR   $R1,CHBI
001753  0A9C  9F40 0E83          STR   $R1,TOUTB
001754  0A9E  93C0 10D9          LNJ   $B1,RTYMSG
```

```
001755  0AA0  A970 0006            CMR   $R2,=X'06'
001756  0AA2  0281 0022            BGE   DRAF
001757  0AA4  B970 0006            CMR   $R3,=X'06'
001758  0AA6  0281 FFE1            BGE   DRAG
001759  0AA8  8AC0 0E74            INC   PCNT
001760                             CALL  ZV$T.ZV$TC,RTYING     RETRYING MESSAGE
        0AAA  FBC0 0003
        0AAC  D380 0000      X
        0AAE  0F80
        0AAF  1CD5
001761  0AB0  0F81 FE91            B     DAG
001762                       *
001763  0AB2  9840 0E65      DRAD  LDR   $R1,CHAI
001764  0AB4  9F40 0E41            STR   $R1,BMED
001765                       *
001766  0AB6  8AC0 0E66      DRAE  INC   PCNT
001767  0AB8  93C0 10D8            LNJ   $B1,SWPMSG
001768                             CALL  ZV$ER,E35,ER35        SEND ERROR MESSAGE
        0ABA  FBC0 0003
        0ABC  D380 0000      X
        0ABE  0F80
        0ABF  0AC1
        0AC0  1F66
001769  0AC1  0F81 009D      E35   B     DAGC                  DIAGNOSTIC READ FAILED
001770  0AC3  0F81 FE7E            B     DAG
001771                       *
001772  0AC5  B970 0006      DRAF  CMR   $R3,=X'06'
001773  0AC7  0381 003B            BLE   DRAL
001774                       *
001775  0AC9  A970 0004      DRAH  CMR   $R2,=X'04'
001776  0ACB  0281 0007            BGE   DRAI
001777  0ACD  B970 0004            CMR   $R3,=X'04'
001778  0ACF  0281 001D            BGE   DRAM
001779  0AD1  0F81 008D            B     DAGC
001780                       *
001781  0AD3  B970 0004      DRAI  CMR   $R3,=X'04'
001782  0AD5  0281 000C            BGE   DRAJ
001783  0AD7  D840 0E1E            LDR   $R5,BMED
001784  0AD9  C840 0E3E            LDR   $R4,CHAI
001785  0ADB  C955                 CMR   $R4,=$R5
001786  0ADC  0901 0035            BE    DRAN
001787  0ADE  CF40 0E41            STR   $R4,TOUTB
001788  0AE0  0F81 0015            B     DRAK
001789                       *
001790  0AE2  93C0 10D4      DRAJ  LNJ   $B1,SOLONG
001791                             CALL  ZV$ER,E36,ER36        SEND ERROR MESSAGE
        0AE4  FBC0 0003
        0AE6  D380 0000      X
        0AE8  0F80
        0AE9  0AEB
        0AEA  1F6B
001792  0AEB  0F81 0073      E36   B     DAGC                  GO TO NEXT TEST
001793                       *
001794  0AED  D840 0E08      DRAM  LDR   $R5,BMED
001795  0AEF  C840 0E2A            LDR   $R4,CHBI
001796  0AF1  C955                 CMR   $R4,=$R5
001797  0AF2  0901 001F            BE    DRAN
001798  0AF4  CF40 0E2B            STR   $R4,TOUTB
001799                       *
001800  0AF6  93C0 10AD      DRAK  LNJ   $B1,REMMED
001801  0AF8  8740 0E24            CL    PCNT
001802                             CALL  ZV$ER,E37,ER37        SEND ERROR MESSAGE
        0AFA  FBC0 0003
        0AFC  D380 0000      X
        0AFE  0F80
        0AFF  0B01
        0B00  1F6E
001803  0B01  0F81 005D      E37   B     DAGC
001804                       DRAL  CALL  ZV$T.ZV$TC,RRMED
        0B03  FBC0 0003
        0B05  D380 0000      X
        0B07  0F80
        0B08  1D0C
001805                             CALL  ZV$ER,E38,ER38        SEND ERROR MESSAGE
        0B09  FBC0 0003
        0B0B  D380 0000      X
        0B0D  0F80
        0B0E  0B10
        0B0F  1F71
001806  0B10  0F81 0053      E38   B     BYT                   GO TO NEXT TEST
001807                       *
001808                       DRAN  CALL  ZV$T.ZV$TC,ABT
        0B12  FBC0 0003
        0B14  D380 0000      X
        0B16  0F80
        0B17  1D75
001809                             CALL  ZV$ER,E39,ER39        SEND ERROR MESSAGE
        0B18  FBC0 0003
        0B1A  D380 0000      X
        0B1C  0F80
        0B1D  0B1F
        0B1E  1F74
001810  0B1F  0F81 0044      E39   B     BYT
001811                       *
001812                       *
001813                       *
001814                       *
001815                       *     SCAN MEMORY FOR AM'S AFTER DIAGN READ
001816                       *
001817                       *FC=INDEX  FE=HDR  FB=DATA  F8=DELETED DATA
001818                       *
001819  0B21  8751           SM    CL    =$R1
001820  0B22  8757                 CL    =$R7
001821  0B23  9CC0 0DEB            LDB   $B1,RBUF              READ BUFFER STARTING ADDRESS
001822  0B25  A85D                 LDR   $R2,$B1.+$R1          LOAD FIRST WORD
001823  0B26  89D2                 CMZ   =$R2
001824  0B27  0981 0009            BNE   SMAA
001825  0B29  9970 098C      SMA   CMR   $R1,=Z'098C'          ALL DONE?
001826  0B2B  0281 001E            BGE   SME
001827  0B2D  A85D                 LDR   $R2,$B1.+$R1          LOAD NEXT WORD
001828  0B2E  89D2                 CMZ   =$R2                  IS IT ZERO?
001829  0B2F  0901 FFF9            BE    SMA
001830  0B31  A970 FE00      SMAA  CMR   $R2,=Z'FE00'
```

```
001831  0B33  0981 0003          BNE   SMB
001832  0B35  0F81 0011          B     SMD                 BUMP COUNT AND CONTINUE
001833  0B37  A970 00FE    SMB   CMR   $R2,=Z'00FE'
001834  0B39  0901 0000          BE    SMD                 BUMP COUNT AND CONTINUE
001835  0B3B  A970 FB00          CMR   $R2,=Z'FB00'
001836  0B3D  0981 0003          BNE   SMC
001837  0B3F  0F81 0007          B     SMD                 BUMP CONT AND CONTINUE
001838  0B41  A970 00FB    SMC   CMR   $R2,=Z'00FB'
001839  0B43  0901 0003          BE    SMD                 BUMP COUNT AND CONTINUE
001840  0B45  0F81 FFE3          B     SMA                 NO MATCH FOUND - MUST BE AN EDC CHAR
001841  0B47  8AD7       SMD   INC   =$R7                  BUMP COUNT
001842  0B48  0F81 FFE0          B     SMA                 CONTINUE
001843  0B4A  F970 0034    SME   CMR   $R7,=Z'0034'        CORRECT NO. OF AM'S?
001844  0B4C  0901 0003          BE    SMF
001845  0B4E  0F81 0002          B     SMR                 COUNT WRONG
001846  0B50  8383       SMF   JMP   $B3                   RETURN TO CALLER
001847                    *
001848  0B51  8AC0 0DB3    SMR   INC   RTYCT               BUMP TOTAL COUNT
001849  0B53  8AC0 0DA3          INC   CRTRY               BUMP CURRENT COUNT
001850  0B55  A840 0DA1          LDR   $R2,CRTRY
001851  0B57  A970 0004          CMR   $R2,=X'04'
001852  0B59  0281 0002          BGE   SMS
001853  0B5B  8382               JMP   $B2                 GO RETRY
001854  0B5C  8740 0D9A    SMS   CL    CRTRY
001855  0B5E  8383               JMP   $B3                 ABORT THIS TRACK - TRY NEXT
001856                    *
001857  0B5F  8280 193F    DAGC  LB    <PFL,=Z'0001'
        0B61  0001
001858  0B62  0500 018D          BBT   <NEXT
001859                    *
001860                    *
001861                    *-----------------------------------------------------------
001862                    *
001863                    *          B Y T E   A D D R E S S I N G   T E S T
001864                    *
001865                    *-----------------------------------------------------------
001866                    *
001867  0B64  8755       BYT   CL    =$R5
001868                          CALL  ZV$T,ZV$TC,TSTG
        0B65  FBC0 0003
        0B67  D380 0000     X
        0B69  0F80
        0B6A  19C0
001869  0B6B  8055       $A    IO    =$R5,<CAOIC           INTERRUPT CONTROL TO CHAN A
        0B6C  0000 18DA
001870  0B6E  0781 FFFC          BIOF  -$A
001871  0B70  8040 0D91    $B    IO    INIT,CAOCW          INITIALIZE CHAN A
        0B72  0040 0D66
001872  0B74  0781 FFFB          BIOF  -$B
001873  0B76  8740 0D92          CL    SECT
001874  0B78  8740 0D8D          CL    TRNO
001875  0B7A  8740 0D8D          CL    CWAD                CLEAR CONFG. WORD A
001876  0B7C  8740 0D8D          CL    CWBD                CLEAR CONFG. WORD B
001877  0B7E  A3C0 0947          LNJ   $B2,FP              FILL BUFFER FOR FORMAT WRITE
001878  0B80  81C8 0D8D    $C    IOLD  *BFAD,CAOLD,BRWH    SEND ADDRESS AND RANGE
        0B82  0040 0D59
        0B84  0040 0FA0
001879  0B86  0781 FFF9          BIOF  -$C
001880  0B88  8040 0D73    $D    IO    FMAT,CAOTW          FORMAT READ-WRITE TASK
        0B8A  0040 0D50
001881  0B8C  0781 FFFB          BIOF  -$D
001882  0B8E  A3C0 0F9C          LNJ   $B2,WAIT
001883  0B90  9B80 1C0D          LAB   $B1,<IME            'TEST E'
001884  0B92  9F80 1573          STB   $B1,<DEXB
001885  0B94  8740 0D75          CL    CWBD                CLEAR WORD B
001886  0B96  C870 1234          LDR   $R4,=X'1234'        DATA PATTERN
001887  0B98  CF40 0D6B          STR   $R4,DP
001888                          CALL  ZV$F,BUFW,DP,RLW    FILL BUFFER WITH DATA PATERN
        0B9A  FBC0 0003
        0B9C  D380 0000     X
        0B9E  0F80
        0B9F  3000
        0BA0  1904
        0BA1  1B24
001889  0BA2  8040 0D67    $E    IO    CWBD,CAOWB          SEND OUT  WORD B TO CHAN A
        0BA4  0040 0D3A
001890  0BA6  0781 FFFB          BIOF  -$E
001891  0BA8  1C01               LDV   $R1,=1
001892  0BA9  9CC0 0D64          LDB   $B1,BFAD
001893  0BAB  8191       $F    IOLD  $B1.$R1,CAOLD,RLB
        0BAC  0040 0D2F
        0BAE  0040 0F74
001894  0BB0  0781 FFFA          BIOF  -$F
001895  0BB2  8040 0D4B    $A    IO    DATA,CAOTW          TASK WORD TO WRITE
        0BB4  0040 0D26
001896  0BB6  0781 FFFB          BIOF  -$A
001897  0BB8  A3C0 0F72          LNJ   $B2,WAIT
001898                    *
001899  0BBA  8040 0D4F    $B    IO    CWBD,CAOWB          CONF. WORD B TO CHAN A
        0BBC  0040 0D22
001900  0BBE  0781 FFFB          BIOF  -$B
001901  0BC0  81C8 0D4E    $C    IOLD  *RBUF,CAILD,RLB
        0BC2  0040 0D1A
        0BC4  0040 0F5E
001902  0BC6  0781 FFF9          BIOF  -$C
001903  0BC8  8040 0D35    $D    IO    DATA,CAOTW          DATA READ-WRITE TASK
        0BCA  0040 0D10
001904  0BCC  0781 FFFB          BIOF  -$D
001905  0BCE  A3C0 0F5C          LNJ   $B2,WAIT
001906                    *
001907  0BD0  9848 0D3E          LDR   $R1,*RBUF           LOAD FIRST WORD READ
001908  0BD2  9970 3412          CMR   $R1,=X'3412'        COMPARE TO EXPECTED
001909  0BD4  0901 000A          BE    BATA                CONTINUE IF EQUAL
001910                          CALL  ZV$ER,E40,ER40      SEND ERROR MESSAGE
        0BD6  FBC0 0003
        0BD8  D380 0000     X
        0BDA  0F80
        0BDB  0BDD
        0BDC  1F77
001911  0BDD  0F01 FFFF    E40   NOP   $                   OR ELSE REPORT ERROR
001912  0BDF  8040 0D2A    BATA  IO    CWBD,CAOWB          CONF. WORD B TO CHAN A
        0BE1  0040 0CFD
001913  0BE3  0781 FFFB          BIOF  BATA
```

```
001914  0BE5  1C01                    LDV     $R1,=1
001915  0BE6  9CC0 0D28               LDB     $B1,RBUF
001916  0BE8  8191                $E  IOLD    $B1,$R1,CAILD,RLB
        0BE9  0040 0CF3
        0BEB  0040 0F37
001917  0BED  0781 FFFA              BIOF    -$E
001918  0BEF  8040 0D0E           $F  IO      DATA,CAOTW          DATA READ-WRITE TASK
        0BF1  0040 0CE9
001919  0BF3  0781 FFFB              BIOF    -$F
001920  0BF5  A3C0 0F35              LNJ     $B2,WAIT
001921                        *
001922  0BF7  9848 0D17              LDR     $R1,*RBUF
001923  0BF9  9970 3434              CMR     $R1,=X'3434'        COMPARE WITH EXPECTED
001924  0BFB  0901 000A              BE      BATB                BRANCH IF EQUAL
001925                               CALL    ZV$ER,E41,ER41      SEND ERROR MESSAGE
        0BFD  FBC0 0003
        0BFF  D380 0000          X
        0C01  0F80
        0C02  0C04
        0C03  1F7A
001926  0C04  0F01 FFFF          E41 NOP     $                   OR ELSE-REPORT ERROR
001927                        *
001928  0C06  8040 0D03          BATB IO     CWBD,CAOWB          CONFG. WORD TO CHAN A
        0C08  0040 0CD6
001929  0C0A  0781 FFFB              BIOF    BATB
001930  0C0C  8751                   CL      =$R1
001931  0C0D  9CC0 0D01              LDB     $B1,RBUF
001932  0C0F  8191                $A  IOLD    $B1,$R1,CAILD,RLB
        0C10  0040 0CCC
        0C12  0040 0F10
001933  0C14  0781 FFFA              BIOF    -$A
001934  0C16  8040 0CE7           $B  IO      DATA,CAOTW          DATA READ-WRITE TASK TO CHAN A
        0C18  0040 0CC2
001935  0C1A  0781 FFFB              BIOF    -$B
001936  0C1C  A3C0 0F0E              LNJ     $B2,WAIT
001937                        *
001938  0C1E  9848 0CF0              LDR     $R1,*RBUF
001939  0C20  9970 3412              CMR     $R1,=X'3412'        COMPARE WITH EXPECTED
001940  0C22  0901 000A              BE      BYTC                NEXT TEST IF EQUAL
001941                               CALL    ZV$ER,E42,ER42
        0C24  FBC0 0003
        0C26  D380 0000          X
        0C28  0F80
        0C29  0C2B
        0C2A  1F7D
001942  0C2B  0F01 FFFF          E42 NOP     $
001943                        *
001944                        *
001945  0C2D  8280 193F          BYTC LB     <PFL,=Z'0001'
        0C2F  0001
001946  0C30  0500 018D              BBT     <NEXT
001947                        *
001948                        *-------------------------------------------------------------
001949                        *
001950                        *                  S H O R T   R A N G E   T E S T
001951                        *
001952                        *-------------------------------------------------------------
```

```
001953                          *       WRITE/READ WITH RANGE OF LESS THAN 128 BYTES
001954                          *
001955  0C32  9B80 1C7C        SRT     LAB     $B1,<IMH                'TEST F'
001956  0C34  9F80 1573                STB     $B1,<DEXB
001957                                  CALL    ZV$1.ZV$TC,TSTH
        0C36  FBC0 0003
        0C38  D380 0000         X
        0C3A  0F80
        0C3B  19CD
001958  0C3C  8740 0CCB                CL      CWAD                    CLEAR CONFG. WORD A
001959  0C3E  8740 0CCB                CL      CWBD                    CLEAR CONFG. WORD B
001960  0C40  C3C0 0AC3                LNJ     $B4,CIB                 CLEAR INPUT BUFFER (ONE TRACK)
001961  0C42  8740 0CC1                CL      DP
001962                                  CALL    ZV$F,BUFW,DP,RLW        FILL BUFFER WITH ZEROS
        0C44  FBC0 0003
        0C46  D380 0000         X
        0C48  0F80
        0C49  3000
        0C4A  1904
        0C4B  1B24
001963  0C4C  9870 ABCD                LDR     $R1,=Z'ABCD'            TWO BYTE DATA
001964  0C4E  9F40 0CB5                STR     $R1,DP
001965  0C50  1C02                    LDV     $R1,=2
001966  0C51  9F40 0CC3                STR     $R1,RNG
001967                                  CALL    ZV$F,BUFW,DP,RNG        STORE TWO BYTES IN BUFFER
        0C53  FBC0 0003
        0C55  D380 0000         X
        0C57  0F80
        0C58  3000
        0C59  1904
        0C5A  1915
001968  0C5B  8040 0CAC        $A      IO      CWAD,CAOWA              SEND CONFG A. (TRACK 0  )/
        0C5D  0040 0C80
001969  0C5F  0781 FFFB                BIOF    -$A
001970  0C61  8040 0CA8        $B      IO      CWBD,CAOWB              SEND CONFG. B (SECTOR 0)
        0C63  0040 0C7B
001971  0C65  0781 FFFB                BIOF    -$B
001972  0C67  8040 0C93        $C      IO      SEEK,CAOTW              DO A SEEK
        0C69  0040 0C71
001973  0C6B  0781 FFFB                BIOF    -$C
001974  0C6D  6C02                    LDV     $R6,=2
001975  0C6E  81C8 0C9F        $E      IOLD    *BFAD,CAOLD,=$R6        WRITE TWO BYTES
        0C70  0040 0C6B
        0C72  0056
001976  0C73  0781 FFFA                BIOF    -$E
001977  0C75  8040 0C88        $F      IO      DATA,CAOTW              SEND DATA WRITE TASK
        0C77  0040 0C63
001978  0C79  0781 FFFB                BIOF    -$F
001979  0C7B  A3C0 0EAF                LNJ     $B2,WAIT                WAIT TILL DONE
001980                          *
001981  0C7D  8751                    CL      =$R1
001982  0C7E  9F48 0C90                STR     $R1,*BFAD+1
001983  0C80  8040 0C89        $A      IO      CWBD,CAOWB              CONFG B (SECT. NUMBER)
        0C82  0040 0C5C
001984  0C84  0781 FFFB                BIOF    -$A
001985  0C86  6C02                    LDV     $R6,=2
001986  0C87  81C8 0C87        $B      IOLD    *RBUF,CAILD,=$R6        READ TWO BYTES
        0C89  0040 0C53
        0C8B  0056
001987  0C8C  0781 FFFA                BIOF    -$B
001988  0C8E  8040 0C6F        $C      IO      DATA,CAOTW              DATA READ TASK
        0C90  0040 0C4A
001989  0C92  0781 FFFB                BIOF    -$C
001990  0C94  A3C0 0E96                LNJ     $B2,WAIT                WAIT TILL IT IS DONE
001991                          *
001992  0C96  8756                    CL      =$R6
001993  0C97  F3C0 0BAE                LNJ     $B7,CB                  COMPARE READ AND WRITE BUFFERS
001994                          *
001995  0C99  8260 193F        SRTC    LB      <PFL,=Z'0001'
        0C9B  0001
001996  0C9C  0500 018D                BBT     <NEXT
001997                          *
001998                          *
001999                          *---------------------------------------------------------------
002000                          *
002001                          *                       F O R C E D   E R R O R   T E S T
002002                          *
002003                          *---------------------------------------------------------------
002004                          *
002005  0C9E  9B80 1C81        FET     LAB     $B1,<IMI                'TEST G'
002006  0CA0  9F80 1573                STB     $B1,<DEXB
002007                                  CALL    ZV$1.ZV$TC,TSTI
        0CA2  FBC0 0003
        0CA4  D380 0000         X
        0CA6  0F80
        0CA7  19D8
002008  0CA8  8740 0C5F                CL      CWAD                    CLEAR CONFG. A
002009  0CAA  8740 0C5F                CL      CWBD                    CLEAR CONFG. B
002010                                  CALL    ZV$FR,BUFW,RLW          FILL OUTPUT BUFFER
        0CAC  FBC0 0003
        0CAE  D380 0000         X
        0CB0  0F80
        0CB1  3000
        0CB2  1B24
002011  0CB3  8040 0C54        $D      IO      CWAD,CAOWA              CONFG A. TO CHAN A.
        0CB5  0040 0C28
002012  0CB7  0781 FFFB                BIOF    -$D
002013  0CB9  8040 0C50        $E      IO      CWBD,CAOWB              CONFG. B TO CHAN A
        0CBB  0040 0C23
002014  0CBD  0781 FFFB                BIOF    -$E
002015  0CBF  8040 0C3B        $F      IO      SEEK,CAOTW              SEEK TO TRACK 0
        0CC1  0040 0C19
002016  0CC3  0781 FFFB                BIOF    -$F
002017  0CC5  8260 1924                LB      <CPFL,=Z'0001'          6/20 OR 6/30
        0CC7  0001
002018  0CC8  0580 0CFF                BBF     <FETB                   BRANCH-IF 6-20
002019  0CCA  81C8 0C43        $A      IOLD    *BFAD,CAOLD,RLB
        0CCC  0040 0C0F
        0CCE  0040 0E54
002020  0CD0  0781 FFF9                BIOF    -$A
002021  0CD2  8040 0C2D        $B      IO      DIAGN,CAOTW             DIAGN WRITE
        0CD4  0040 0C06
002022  0CD6  0781 FFFB                BIOF    -$B
```

```
002023  0CD8  A3C0 0E52            LNJ   $B2,WAIT              WAIT TILL IS DONE
002024                        *
002025  0CDA  8040 0C2F      FETA  IO    CWBD,CAOWB            ----READ ERROR----
        0CDC  0040 0C02
002026  0CDE  0781 FFFB            BIOF  FETA
002027  0CE0  81C8 0C2E      $A .  IOLD  *RBUF,CAILD,RLB
        0CE2  0040 0BFA
        0CE4  0040 0E3E
002028  0CE6  0781 FFF9            BIOF  -$A
002029  0CE8  8040 0C15      $B    IO    DATA,CAOTW            DATA READ TASK
        0CEA  0040 0BF0
002030  0CEC  0781 FFFB            BIOF  -$B
002031  0CEE  8055            $C    IO    =$R5,CAISW            INPUT STATUS WORD
        0CEF  0040 0BF5
002032  0CF1  0781 FFFC            BIOF  -$C
002033                        *
002034  0CF3  5004                  SOL   $R5,4                 LOOK AT READ ERROR BIT ONLY
002035  0CF4  5801 000A            BLZ   $R5,FETB              READ ERROR BIT SET, IT'S OK
002036                              CALL  ZV$ER,E44,ER44        SEND ERROR MESSAGE
        0CF6  FBC0 0003
        0CF8  D380 0000      X
        0CFA  0F80
        0CFB  0CFD
        0CFC  1F83
002037  0CFD  0F01 FFFF      E44   NOP   $                     READ ERROR BIT  NOT SET, REPORT ERROR
002038                        *
002039  0CFF  9870 2000      FETB  LDR   $R1,=Z'2000'          ----UNSUCC SEARCH----
002040  0D01  8051            $A    IO    =$R1,CAOWB
        0D02  0040 0BDC
002041  0D04  0781 FFFC            BIOF  -$A
002042  0D06  81C8 0C08      $D    IOLD  *RBUF,CAILD,RLB
        0D08  0040 0BD4
        0D0A  0040 0E18
002043  0D0C  0781 FFF9            BIOF  -$D
002044  0D0E  8040 0BEF      $E    IO    DATA,CAOTW            DATA READ TASK
        0D10  0040 0BCA
002045  0D12  0781 FFFB            BIOF  -$E
002046  0D14  8055            $F    IO    =$R5,CAISW            INPUT STATUS
        0D15  0040 0BCF
002047  0D17  0781 FFFC            BIOF  -$F
002048                        *
002049  0D19  5007                  SOL   $R5,7
002050  0D1A  5801 000A            BLZ   $R5,FETT              UNSUCCESSFUL SEARCH, IT'S OK.
002051                              CALL  ZV$ER,E45,ER45        SEND ERROR MESSAGE
        0D1C  FBC0 0003
        0D1E  D380 0000      X
        0D20  0F80
        0D21  0D23
        0D22  1F86
002052  0D23  0F01 FFFF      E45   NOP   $                     OR ELSE REPORT ERROR
002053                        *
002054  0D25  8040 0BDC      FETT  IO    INIT,CAOCW            INITIALIZE CHAN A
        0D27  0040 0BB1
002055  0D29  0781 001F            BIOF  FETC
002056  0D2B  9870 9000            LDR   $R1,=Z'9000'          ----SEEK ERROR----
002057  0D2D  8051            $A    IO    =$R1,CAOWA            SENT CONFG A FOR TRACK 9000
        0D2E  0040 0BAF
002058  0D30  0781 FFFC            BIOF  -$A
002059  0D32  8040 0BC8      $B    IO    SEEK,CAOTW            SEEK THE TRACK
        0D34  0040 0BA6
002060  0D36  0781 FFFB            BIOF  -$B
002061  0D38  8055            $C    IO    =$R5,CAISW            INPUT STATUS
        0D39  0040 0BAB
002062  0D3B  0781 FFFC            BIOF  -$C
002063  0D3D  500A                  SOL   $R5,10
002064  0D3E  5801 000F            BLZ   $R5,FMT               SEEK ERROR, IT'S OK
002065                              CALL  ZV$ER,E46,ER46        SEND AN ERROR MESSAGE
        0D40  FBC0 0003
        0D42  D380 0000      X
        0D44  0F80
        0D45  0D47
        0D46  1F89
002066  0D47  0F01 FFFF      E46   NOP   $                     OR ELSE REPORT ERROR
002067                        *
002068  0D49  8280 193F      FETC  LB    <PFL,=Z'0001'
        0D4B  0001
002069  0D4C  0500 018D            BBT   <NEXT
002070                        *
002071                        *
002072                        *----------------------------------------------------------------
002073                        *
002074                        *                F O R M A T   W R I T E / R E A D
002075                        *
002076                        *----------------------------------------------------------------
002077                        *       MULTIPLE DRIVE FORMATTER
002078                        *
002079  0D4E  9B80 1C86      FMT   LAB   $B1,<IMJ              'TESTJ'
002080  0D50  9F80 1573            STB   $B1,<DEXB
002081                              CALL  ZV$T,ZV$TC,TSTJ
        0D52  FBC0 0003
        0D54  D380 0000      X
        0D56  0F80
        0D57  19E4
002082  0D58  8040 0BA9      MDFA  IO    INIT,CAOCW            INITIALIZE CHAN A
        0D5A  0040 0B7E
002083  0D5C  0781 FFFB            BIOF  MDFA
002084                        *
002085  0D5E  8740 0BA9            CL    CWAD                  CLEAR CONFG A
002086  0D60  8740 0BA5            CL    TRNO
002087  0D62  8740 0BA6            CL    SECT
002088                        *
002089  0D64  E870 8000            LDR   $R6,=Z'8000'          INDICATE MULTIPLE DRIVE
002090  0D66  EF40 0BAA            STR   $R6,FLAG
002091                        *
002092  0D68  C3C0 0743      MDFB  LNJ   $B4,FCWA              FORM CONFG. A
002093  0D6A  A3C0 075B            LNJ   $B2,FP                FILLOUT BUFFER FOR FORMAT ONE TRACK
002094                        *
002095  0D6C  8000 1908      MDFBA IO    <CWAD,<CBOWA          CONFG. A TO CHAN B
        0D6E  0000 18EC
002096  0D70  0781 FFFB            BIOF  MDFBA
002097                        *
002098  0D72  8040 0B88      MDFBB IO    SEEK,CBOTW            SEEK B
        0D74  0040 0B74
```

```
002099  0D76  0781 FFFB          BIOF   MDFBB
002100  0D78  8740 0B7E          CL     CRTRY
002101  0D7A  81C8 0B93  MDFC    IOLD   *BFAD,CAOLD,BRWH      SEND ADDR AND RANGE
        0D7C  0040 0B5F
        0D7E  0040 0DA6
002102  0D80  0781 FFF9          BIOF   MDFC
002103                     *
002104  0D82  8000 18FC  MDFD    IO     <FMAT,CAOTW           DO FORMAT WRITE ON CHAN A
        0D84  0040 0B56
002105  0D86  0781 FFFB          BIOF   MDFD
002106  0D88  CBC0 FFF1          LAB    $B4,MDFC              GET IOLD ADDRESS
002107                     *
002108  0D8A  A3C0 0DA0          LNJ    $B2,WAIT              TO FINISH FORMAT READ
002109  0D8C  8052  MDFDB   IO     =$R2,CAIIR            INPUT RANGE FROM CHAN A
        0D8D  0040 0B54
002110  0D8F  0781 FFFC          BIOF   MDFDB
002111  0D91  A970 0000          CMR    $R2,=0
002112  0D93  0901 000A          BE     MDFDC                 BRANCH - IF RANGE ZERO
002113  0D95  A840 0B61          LDR    $R2,CRTRY
002114  0D97  A970 0003          CMR    $R2,=3
002115  0D99  0901 06D5          BE     RRDRVE                REPORT ERROR IF FAILED THRICE
002116  0D9B  8AC0 0B5B          INC    CRTRY
002117  0D9D  8384                JMP    $B4                   GO BACK AND TRY AGAIN
002118  0D9E  8AC0 0B67  MDFDC   INC    TRNO                  GET NEXT TRACK
002119  0DA0  A840 0B65          LDR    $R2,TRNO
002120  0DA2  A970 004D          CMR    $R2,=X'4D'
002121  0DA4  0900 0DB6  MDFDA   BE     <MDFG                 BRANCH-IF LAST TRACK
002122  0DA6  C3C0 0705          LNJ    $B4,FCWA              OR ELSE FORM LONG WORDS
002123                     *
002124  0DA8  8040 0B5F  MDFE    IO     CWAD,CAOWA            SEND CONFG. A TO CHAN A
        0DAA  0040 0B33
002125  0DAC  0781 FFFB          BIOF   MDFE
002126                     *
002127  0DAE  8040 0B4C  MDFF    IO     SEEK,CAOTW            SEEK CHAN A. FOR THAT TRACK
        0DB0  0040 0B2A
002128  0DB2  0781 FFFB          BIOF   MDFF
002129  0DB4  8740 0B42          CL     CRTRY
002130                     *
002131  0DB6  8188 190E  MDFG    IOLD   *<BFAD,<CBOLD,<BRWH    SEND ADDR AND RANGE TO CHAN B.
        0DB8  0000 18EB
        0DBA  0000 1B25
002132  0DBC  0781 FFF9          BIOF   MDFG
002133                     *
002134  0DBE  8000 18FC  MDFH    IO     <FMAT,CBOTW           DO FORMAT WRITE TO CHAN B
        0DC0  0040 0B28
002135  0DC2  0781 FFFB          BIOF   MDFH
002136  0DC4  CB80 0DB6          LAB    $B4,<MDFG             GET IOLD ADDRESS
002137                     *
002138  0DC6  A3C0 0D78          LNJ    $B2,WAITB
002139  0DC8  8052  MDFHA   IO     =$R2,CBIIR            INPUT RANGE FROM CHAN B
        0DC9  0040 0B26
002140  0DCB  0781 FFFC          BIOF   MDFHA
002141  0DCD  A970 0000          CMR    $R2,=0
002142  0DCF  0901 000A          BE     MDFHB                 BRANCH IF RANGE ZERO
002143  0DD1  A840 0B25          LDR    $R2,CRTRY
002144  0DD3  A970 0003          CMR    $R2,=3
002145  0DD5  0901 0699          BE     RRDRVE                REPORT ERROR IF FAILED THRICE
002146  0DD7  8AC0 0B1F          INC    CRTRY                 OR ELSE TRY AGAIN
002147  0DD9  8384                JMP    $B4
002148                     *
002149  0DDA  C840 0B2B  MDFHB   LDR    $R4,TRNO              GET TRACK NUMBER
002150  0DDC  C970 004D          CMR    $R4,=X'4D'
002151  0DDE  0901 0003          BE     NTSTA                 BRANCH -IF LAST TRACK
002152  0DE0  0F81 FF87          B      MDFD                  OR ELSE START ALL OVER
002153                     *
002154                     *
002155                     *-------------------------------------------------------------------
002156                     *                  FORMAT READ BOTH DRIVES
002157                     *
002158                     *   ---------------------------------------------------------
002159                     *
002160  0DE2  9B80 1C8B  NTSTA   LAB    $B1,<IMK              'TEST I'
002161  0DE4  9F80 1573          STB    $B1,<DEXB
002162                           CALL   ZV$I,ZV$TC,TSTK
        0DE6  FBC0 0003
        0DE8  D380 0000      X
        0DEA  0F80
        0DEB  19F9
002163  0DEC  8040 0B15  NTSTAA  IO     INIT,CAOCW            POSITION DRIVES ON TRACK 0
        0DEE  0040 0AEA
002164  0DF0  0781 FFFB          BIOF   NTSTAA
002165  0DF2  8740 0B1E          CL     FLAG
002166  0DF4  8740 0B2C          CL     HERR                  CLEAR HARD ERROR
002167  0DF6  8740 0B01          CL     ERCA
002168  0DF8  8740 0B00          CL     ERCB                  CLEAR CHAN B ERROR COUNTER
002169  0DFA  8740 0B0B          CL     TRNO
002170  0DFC  8740 0B0B          CL     CWAD
002171  0DFE  9B80 15A7          LAB    $B1,<DEJA
002172  0E00  9F80 158E          STB    $B1,<DEKA+1
002173                     *
002174  0E02  8000 1908  NA      IO     <CWAD,<CBOWA          WORD A TO CHAN B
        0E04  0000 18EC
002175  0E06  0781 FFFB          BIOF   NA
002176                     *
002177  0E08  8040 0AF2  NB      IO     SEEK,CBOTW            SEEK CHAN B
        0E0A  0040 0ADE
002178  0E0C  0781 FFFB          BIOF   NB
002179  0E0E  8740 0AE8  NC      CL     CRTRY
002180  0E10  8280 1924          LD     <CPFL,=Z'0001'
        0E12  0001
002181  0E13  0500 0E21          BBT    <NC1                  BRANCH IF 6/30
002182                     *
002183  0E15  81C8 0AF9  NBC     IOLD   *RBUF,CAILD,BFRT      ADDRESS AND RANGE TO CHAN A
        0E17  0040 0AC5
        0E19  0040 0D0F
002184  0E1B  0781 FFF9          BIOF   NBC
002185  0E1D  CB80 0E15          LAB    $B4,<NBC
002186  0E1F  0F81 000B          B      NC2
002187  0E21  81C8 0AED  NC1     IOLD   *RBUF,CAILD,BFRT1     SEND ADDRESS AND RANGE
        0E23  0040 0AB9
        0E25  0040 0D04
002188  0E27  0781 FFF9          BIOF   NC1
002189  0E29  CB80 0E21          LAB    $B4,<NC1
```

```
002190  0E2B  B840 0ACC          NC2   LDR   $R3,ERCA
002191  0E2D  BF40 0AD7                STR   $R3,RTYCT
002192  0E2F  8000 18FC          ND    IO    <FMAT,CAOTW          READ FORMAT FROM CHAN A
        0E31  0040 0AA9
002193  0E33  0781 FFFB                BIOF  ND
002194  0E35  A3C0 0CF5                LNJ   $B2,WAIT             WAIT 'TIL DONE
002195  0E37  B840 0ACD                LDR   $R3,RTYCT
002196  0E39  BF40 0ABE                STR   $R3,ERCA
002197  0E3B  9800 1918                LDR   $R1,<CHAI
002198  0E3D  9F00 07D1                STR   $R1,<CHNL
002199                           *
002200  0E3F  B3C0 0854                LNJ   $B3,VH               GO VERIFY THEM
002201                           *
002202  0E41  8AC0 0AC4                INC   TRNO                 BUMP TRACK NUMBER
002203  0E43  E840 0AC2                LDR   $R6,TRNO
002204  0E45  EF40 0AE6                STR   $R6,TRNOA            SAVE IT
002205  0E47  E970 004D                CMR   $R6,=X'4D'           OVER MAX???
002206  0E49  0900 0E5B          NDA   BE    <NF1
002207  0E4B  C3C0 0660                LNJ   $B4,FCWA             FORM NEW WORDS
002208                           *
002209  0E4D  8040 0ABA          NE    IO    CWAD,CAOWA           WORD A  TO CHAN A
        0E4F  0040 0A8E
002210  0E51  0781 FFFB                BIOF  NE
002211  0E53  8040 0AA7          NF    IO    SEEK,CAOTW           SEEK A
        0E55  0040 0A85
002212  0E57  0781 FFFB                BIOF  NF
002213  0E59  8740 0A9D                CL    CRTRY
002214                           *
002215  0E5B  8280 1924          NF1   LB    <CPFL,=Z'0001'
        0E5D  0001
002216  0E5E  0501 000D                BBT   NG1
002217  0E60  8188 190F          NG    IOLD  *<RBUF,<CBILD,BFRT   ADDRESS AND RANGE TO CHAN B
        0E62  0000 18EA
        0E64  0040 0CC4
002218  0E66  0780 0E60                BIOF  <NG
002219  0E68  CB80 0E60                LAB   $B4,<NG
002220  0E6A  0F81 000B                B     NG2
002221  0E6C  8188 190F          NG1   IOLD  *<RBUF,<CBILD,BFRT1
        0E6E  0000 18EA
        0E70  0040 0CB9
002222  0E72  0781 FFF9                BIOF  NG1
002223  0E74  CB80 0E6C                LAB   $B4,<NG1
002224  0E76  B840 0A82          NG2   LDR   $R3,ERCB
002225  0E78  BF40 0A8C                STR   $R3,RTYCT
002226  0E7A  8000 18FC          NH    IO    <FMAT,CBOTW          FORMAT READ FROM CHAN B
        0E7C  0040 0A6C
002227  0E7E  0781 FFFB                BIOF  NH
002228  0E80  A3C0 0CBE                LNJ   $B2,WAITB            WAIT 'TIL DONE
002229                           *
002230  0E82  B840 0A83                LDR   $R5,TRNO
002231  0E84  D270 0001                SUB   $R5,=X'01'
002232  0E86  BF40 0AA5                STR   $R5,TRNOA            SAVE TRACK NUMBER
002233  0E88  8751                     CL    =$R1
002234  0E89  A800 191A                LDR   $R2,<CHBI
002235  0E8B  AF00 07D1                STR   $R2,<CHNL
002236  0E8D  B3C0 0809                LNJ   $B3,VHH              GO VERIFY THEY
002237  0E8F  B840 0A75                LDR   $R3,RTYCT
002238  0E91  BF40 0A67                STR   $R3,ERCB
002239                           *
002240  0E93  E840 0A72                LDR   $R6,TRNO
002241  0E95  E970 004D                CMR   $R6,=X'4D'           OVER MAX??
002242  0E97  0901 0003                BE    NI                   GO TO READ ANALYSIS
002243  0E99  0F81 FF68                B     NA                   DO ANOTHER TRACK
002244                           *
002245                           *
002246                           *
002247                           *       FORMAT READ ANALYSIS
002248                           *  ------------------------
002249                           *
002250  0E9B  9B80 158F          NI    LAB   $B1,<DEKB
002251  0E9D  9F80 158E                STB   $B1,<DEKA+1
002252  0E9F  C840 0A58                LDR   $R4,ERCA             LOOK AT CHAN A ERROR COUNTER
002253  0EA1  C970 0000                CMR   $R4,=X'00'
002254  0EA3  0981 0009                BNE   NL                   REPORT ERROR IF NOT EQUAL
002255  0EA5  C840 0A53                LDR   $R4,ERCB             LOOK AT CHAN B ERROR COUNTER
002256  0EA7  C970 0000                CMR   $R4,=X'00'
002257  0EA9  0981 0003                BNE   NL                   REPORT ERROR IF NOT EQUAL
002258  0EAB  0F81 0027                B     DZZ
002259                           *
002260                           *
002261  0EAD  C840 0A73          NL    LDR   $R4,HERR             LOOK AT HARD ERROR COUNTER
002262  0EAF  C970 0000                CMR   $R4,=X'00'
002263                                 CALL  ZV$I,ZV$TC,UNREC     UNREADABLE RECORDS
        0EB1  FBC0 0003
        0EB3  D380 0000          X
        0EB5  0F80
        0EB6  1D8D
002264                                 CALL  ZV$TH,HERR           RECORD NUMBER
        0EB7  FBC0 0003
        0EB9  D380 0000          X
        0EBB  0F80
        0EBC  1921
002265                           ABTT  CALL  ZV$I,ZV$TC,ABT       TEST ABORTED
        0EBD  FBC0 0003
        0EBF  D380 0000          X
        0EC1  0F80
        0EC2  1D75
002266                                 CALL  ZV$ER,E47,ER47       SEND ERROR MESSAGE
        0EC3  FBC0 0003
        0EC5  D380 0000          X
        0EC7  0F80
        0EC8  0ECA
        0EC9  1F8C
002267  0ECA  0F81 0008          E47   B     DZZ                  ERROR HALT
002268  0ECC  8280 193F          FMTC  LB    <PFL,=Z'0001'
        0ECE  0001
002269  0ECF  0580 0ED3                BBF   <DZZ                 GO TO NEXT TEST
002270  0ED1  0F81 F2BB                B     NEXT                 GO AND ASK FOR NEXT TEST
002271                           *
002272                           *
002273                           *
002274                           *-------------------------------------------------------------------
002275                           *
```

```
002276                                  *                ALL ZEROES  (00000000)
002277                                  *
002278  0ED3  9BC0 0DBC                DZZ     LAB     $B1,IML                 'TEST J'
002279  0ED5  9FC0 069D                        STB     $B1,DEXB
002280                                         CALL    ZV$I.ZV$TC,TSTL
        0ED7  FBC0 0003
        0ED9  D380 0000         X
        0EDB  0F80
        0EDC  1A0A
002281  0EDD  8751                            CL      =$R1
002282  0EDE  9F40 0A25                        STR     $R1,DP                  DATA PATTERN OF ZEROES
002283  0EE0  B3C0 0832                        LNJ     $B3,WPD                 WRITE TO BOTH PACKS
002284                                  *
002285  0EE2  9BC0 0DB2                        LAB     $B1,IMM                 'TEST K'
002286  0EE4  9FC0 068E                        STB     $B1,DEXB
002287                                         CALL    ZV$I.ZV$TC,TSTM
        0EE6  FBC0 0003
        0EE8  D380 0000         X
        0EEA  0F80
        0EEB  1A23
002288  0EEC  B3C0 08D0                        LNJ     $B3,RPD                 READ  FROM BOTH PACKS
002289  0EEE  8280 193F                DZZC    LB      <PFL,=Z'0001'
        0EF0  0001
002290  0EF1  0500 018D                        BBT     <NEXT
002291                                  *
002292                                  *-----------------------------------------------------------------------
002293                                  *
002294                                  *                ALL ONES  (11111111)
002295                                  *
002296  0EF3  9BC0 0DA6                DNN     LAB     $B1,IMN                 'TEST L'
002297  0EF5  9FC0 067D                        STB     $B1,DEXB
002298                                         CALL    ZV$I.ZV$TC,TSTN
        0EF7  FBC0 0003
        0EF9  D380 0000         X
        0EFB  0F80
        0EFC  1A37
002299  0EFD  9870 FFFF                        LDR     $R1,=Z'FFFF'            DATA PATTERN OF ALL ONES
002300  0EFF  9F40 0A04                        STR     $R1,DP
002301  0F01  B3C0 0811                        LNJ     $B3,WPD                 WRITE TO BOTH PACKS
002302                                  *
002303  0F03  9BC0 0D9B                        LAB     $B1,IMO                 'TEST M'
002304  0F05  9FC0 066D                        STB     $B1,DEXB
002305                                         CALL    ZV$I.ZV$TC,TSTO
        0F07  FBC0 0003
        0F09  D380 0000         X
        0F0B  0F80
        0F0C  1A51
002306  0F0D  B3C0 08AF                        LNJ     $B3,RPD                 READ PACK
002307  0F0F  8280 193F                DNNC    LB      <PFL,=Z'0001'
        0F11  0001
002308  0F12  0500 018D                        BBT     <NEXT
002309                                  *
002310                                  *-----------------------------------------------------------------------
002311                                  *
002312                                  *              ALTERNATE ONES AND ZEROES (10101010)
002313                                  *
002314  0F14  9BC0 0D8F                DZN     LAB     $B1,IMP                 'TEST N'
002315  0F16  9FC0 065C                        STB     $B1,DEXB
002316                                         CALL    ZV$I.ZV$TC,TSTP
        0F18  FBC0 0003
        0F1A  D380 0000         X
        0F1C  0F80
        0F1D  1A65
002317  0F1E  9870 AAAA                        LDR     $R1,=Z'AAAA'            DATA PATTERN OF
002318  0F20  9F40 09E3                        STR     $R1,DP                  ALTERNATING ONES AND ZEROS
002319  0F22  B3C0 07F0                        LNJ     $B3,WPD                 WRITE PACK
002320                                  *
002321  0F24  9BC0 0D84                        LAB     $B1,IMQ                 'TEST O'
002322  0F26  9FC0 064C                        STB     $B1,DEXB
002323                                         CALL    ZV$I.ZV$TC,TSTQ
        0F28  FBC0 0003
        0F2A  D380 0000         X
        0F2C  0F80
        0F2D  1A7F
002324  0F2E  B3C0 088E                        LNJ     $B3,RPD                 READ PACK
002325  0F30  8280 193F                DZNC    LB      <PFL,=Z'0001'
        0F32  0001
002326  0F33  0500 018D                        BBT     <NEXT
002327                                  *
002328                                  *  -------------------------------------------------------------------
002329                                  *
002330                                  *              WRITE RANDOM DATA ALL TRACKS ALL SECTORS
002331                                  *
002332  0F35  9BC0 0D78                        LAB     $B1,IMR                 'TEST P'
002333  0F37  9FC0 063B                        STB     $B1,DEXB
002334                                         CALL    ZV$I.ZV$TC,TSTR
        0F39  FBC0 0003
        0F3B  D380 0000         X
        0F3D  0F80
        0F3E  1A93
002335  0F3F  B3C0 07E7                        LNJ     $B3,WPDR                WRITE PACK WITH RANDOM DATA
002336                                  *
002337                                  *
002338                                  *
002339  0F41  9BC0 0D71                DRDD    LAB     $B1,IMS                 'TEST Q'
002340  0F43  9FC0 062F                        STB     $B1,DEXB
002341                                         CALL    ZV$I.ZV$TC,TSTS
        0F45  FBC0 0003
        0F47  D380 0000         X
        0F49  0F80
        0F4A  1AAB
002342  0F4B  B3C0 0871                        LNJ     $B3,RPD                 READ PACK
002343  0F4D  8280 193F                DRDC    LB      <PFL,=Z'0001'
        0F4F  0001
002344  0F50  0500 018D                        BBT     <NEXT
002345                                  *
002346                                  *-----------------------------------------------------------------------
002347                                  *
002348                                  *    R A N D O M   S E E K S   A N D   R E A D S  -  B O T H   D R I V E S
002349                                  *
002350                                  *-----------------------------------------------------------------------
002351                                  *
002352                                  *
```

```
002353  0F52  9BC0 0D65          RND     LAB     $B1,IMT
002354  0F54  9FC0 061E                  STB     $B1,DEXB
002355                                   CALL    ZV$I,ZV$TC,TSTT
        0F56  FBC0 0003
        0F58  D380 0000      X
        0F5A  0F80
        0F5B  1ABF
002356  0F5C  8756                      CL      =$R6                    RECORD COUNTER
002357  0F5D  8740 099A                  CL      ERCA
002358  0F5F  8740 0999                  CL      ERCB
002359  0F61  C3C0 06DC                  LNJ     $B4,CO                  DRIVE A READY?
002360  0F63  C380 1665          RSRAA   LNJ     $B4,<COB                DRIVE B READY?
002361                           *
002362  0F65  D3C0 0785          RSRA    LNJ     $B5,GRW                 GENERATE RANDOM WORDS
002363                           *
002364  0F67  8040 09A0          RSRB    IO      CWAD,CBOWA              WORD A TO B
        0F69  0040 0982
002365  0F6B  0781 FFFB                  BIOF    RSRB
002366                           *
002367  0F6D  8040 099C          RSRC    IO      CWBD,CBOWB              WORD B TO B
        0F6F  0040 097D
002368  0F71  0781 FFFB                  BIOF    RSRC
002369                           *
002370  0F73  8040 0987          RSRD    IO      SEEK,CBOTW              SEEK B
        0F75  0040 0973
002371  0F77  0781 FFFB                  BIOF    RSRD
002372                           *
002373  0F79  D3C0 0771          RSRDA   LNJ     $B5,GRW                 GENERATE SOME RANDOM WORDS
002374  0F7B  8040 098C          RSRE    IO      CWAD,CAOWA              WORD A TO A
        0F7D  0040 0960
002375  0F7F  0781 FFFB                  BIOF    RSRE
002376                           *
002377  0F81  8040 0988          RSRF    IO      CWBD,CAOWB              WORD B TO A
        0F83  0040 095B
002378  0F85  0781 FFFB                  BIOF    RSRF
002379                           *
002380  0F87  8040 0973          RSRG    IO      SEEK,CAOTW              SEEK A
        0F89  0040 0951
002381  0F8B  0781 FFFB                  BIOF    RSRG
002382                           *
002383  0F8D  8188 190F          RSRH    IOLD    *<RBUF,<CBILD,RLB       SEND ADDR AND RANGE
        0F8F  0000 18EA
        0F91  0040 0B91
002384  0F93  0781 FFF9                  BIOF    RSRH
002385                           *
002386  0F95  8040 0968          RSRI    IO      DATA,CBOTW              READ FROM CHANB.
        0F97  0040 0951
002387  0F99  0781 FFFB                  BIOF    RSRI
002388                           *
002389  0F9B  81C8 0973          RSRJ    IOLD    *RBUF,CAILD,RLB         SEND ADDR AND RANGE
        0F9D  0040 093F
        0F9F  0040 0B83
002390  0FA1  0781 FFF9                  BIOF    RSRJ
002391                           *
002392  0FA3  8040 095A          RSRK    IO      DATA,CAOTW              READ FROM CHAN A.
        0FA5  0040 0935
002393  0FA7  0781 FFFB                  BIOF    RSRK
002394                           *
002395  0FA9  CBC0 0003                  LAB     $B4,RSRLA
002396  0FAB  A380 1B3F          RSRL    LNJ     $B2,<WAITB              B DONE? ANY ERRORS?
002397                           *
002398  0FAD  8AD6               RSRLA   INC     =$R6                    BUMP COUNTER
002399  0FAE  CBC0 0003                  LAB     $B4,RSRMA
002400  0FB0  A3C0 0B7A          RSRM    LNJ     $B2,WAIT                A DONE? ANY ERRORS?
002401                           *
002402  0FB2  8AD6               RSRMA   INC     =$R6                    BUMP COUNTER
002403  0FB3  E970 0100                  CMR     $R6,=X'0100'
002404  0FB5  0281 0003                  BGE     RSRO
002405  0FB7  0F80 0F65          RSRN    B       <RSRA                   DO IT AGAIN
002406  0FB9  C840 093E          RSRO    LDR     $R4,ERCA
002407  0FBB  4901 0019                  BEZ     $R4,RSRP
002408                                   CALL    ZV$TH,ERCA
        0FBD  FBC0 0003
        0FBF  D380 0000      X
        0FC1  0F80
        0FC2  18F8
002409                                   CALL    ZV$T,RETRY              RETRYING
        0FC3  FBC0 0003
        0FC5  D380 0000      X
        0FC7  0F80
        0FC8  1CD1
002410                                   CALL    ZV$T,DRNO
        0FC9  FBC0 0003
        0FCB  D380 0000      X
        0FCD  0F80
        0FCE  1638
002411                                   CALL    ZV$TH,CHAI              CHANNEL A.
        0FCF  FBC0 0003
        0FD1  D380 0000      X
        0FD3  0F80
        0FD4  1918
002412  0FD5  C840 0923          RSRP    LDR     $R4,ERCB
002413  0FD7  4901 0015                  BEZ     $R4,RSRQ
002414                                   CALL    ZV$TH,ERCB
        0FD9  FBC0 0003
        0FDB  D380 0000      X
        0FDD  0F80
        0FDE  18F9
002415                                   CALL    ZV$T,RETRY              RETRYING
        0FDF  FBC0 0003
        0FE1  D380 0000      X
        0FE3  0F80
        0FE4  1CD1
002416                                   CALL    ZV$TH,CHBI              CHANNEL B.
        0FE5  FBC0 0003
        0FE7  D380 0000      X
        0FE9  0F80
        0FEA  191A
002417  0FEB  0F81 0003                  B       RNDC
002418  0FED  0F81 0001          RSRQ    B       RNDC
002419                           *
002420                           *
002421  0FEF  8280 193F          RNDC    LB      <PFL,=Z'0001'
```

```
                0FF1  0001
002422          0FF2  0500 018D                 BBT     <NEXT
002423                                  *
002424                                  *
002425                                  *---------------------------------------------------------------
002426                                  *
002427                                  *               U P D A T E     ( 6   R E C O R D S )
002428                                  *
002429                                  *---------------------------------------------------------------
002430                                  *         THIS ROUTINE UPDATES SIX RECORDS ON SIX
002431                                  *         DIFFERENT TRACKS.
002432                                  *
002433                                  *
002434          0FF4  9BC0 0CC8         UPD     LAB     $B1,IMU
002435          0FF6  9FC0 057C                 STB     $B1,DEXB
002436                                          CALL    ZV$I.ZV$TC,TSTU
                0FF8  FBC0 0003
                0FFA  D380 0000         X
                0FFC  0F80
                0FFD  1ACD
002437          0FFE  9870 0003                 LDR     $R1,=Z'0003'            TRACK AND SECTOR TO  WRITE
002438          1000  A870 3333                 LDR     $R2,=Z'3333'            DATA PATTERN TO WRITE
002439          1002  B3C0 0021                 LNJ     $B3,UDWX                GO WRITE
002440                                  *
002441          1004  9870 0006                 LDR     $R1,=Z'0006'            TRACK AND SECTOR TO WRITE
002442          1006  A870 6666                 LDR     $R2,=Z'6666'            DATA PATTERN
002443          1008  B3C0 001B                 LNJ     $B3,UDWX                GO WRITE
002444                                  *
002445          100A  9870 0009                 LDR     $R1,=Z'0009'            TRACK AND SECTOR
002446          100C  A870 9999                 LDR     $R2,=Z'9999'            DATA PATTERN
002447          100E  B3C0 0015                 LNJ     $B3,UDWX                GO WRITE
002448                                  *
002449          1010  9870 000A                 LDR     $R1,=Z'000A'            TRACK AND SECTOR
002450          1012  A870 AAAA                 LDR     $R2,=Z'AAAA'            DATA PATTERN
002451          1014  B3C0 000F                 LNJ     $B3,UDWX                GO WRITE
002452                                  *
002453          1016  9870 000B                 LDR     $R1,=Z'000B'            TRACK AND SECTOR
002454          1018  A870 BBBB                 LDR     $R2,=Z'BBBB'            DATA PATTERN
002455          101A  B3C0 0009                 LNJ     $B3,UDWX                GO WRITE
002456                                  *
002457          101C  9870 000C                 LDR     $R1,=Z'000C'            TRACK AND SECTOR
002458          101E  A870 CCCC                 LDR     $R2,=Z'CCCC'            DATA PATTERN
002459          1020  B3C0 0003                 LNJ     $B3,UDWX                GO WRITE
002460                                  *
002461          1022  0F80 104F         UDWA    B       <UDWB                   DO THE OTHER DRIVE
002462                                  *
002463                                  *       UPDATE WRITE EXECUTION
002464                                  *
002465          1024  9F40 08E1         UDWX    STR     $R1,TRNO                STORE TRACK NUMBER
002466          1026  9F40 08E2                 STR     $R1,SECT                STORE SECTOR NUMBER
002467          1028  A3C0 007F                 LNJ     $B2,FBS                 FILL THE BUFFER
002468                                  *
002469          102A  C3C0 0481                 LNJ     $B4,FCWA                FORM WORDS
002470                                  *
002471          102C  E3C0 0652                 LNJ     $B6,ST                  DO A SEEK
002472          102E  81C8 08DF                 IOLD    *BFAD,CAOLD,RLB         OUTPUT ADDRESS AND RANGE
                1030  0040 08AB
                1032  0040 0AF0
002473          1034  0701 0003                 BIOT    UDWXA
002474          1036  93C0 0B87                 LNJ     $B1,IOFA
002475          1038  8040 08D1         UDWXA   IO      CWBD,CAOWB
                103A  0040 08A4
002476          103C  0701 0000         T               BIOT    +$A
002477          103E  93C0 0B7F                 LNJ     $B1,IOFA
002478          1040  8040 08BD         $A      IO      DATA,CAOTW              WRITE COMMAND
                1042  0040 0898
002479          1044  0701 0003                 BIOT    UDWXC
002480          1046  93C0 0B77                 LNJ     $B1,IOFA
002481          1048  E870 8000         UDWXC   LDR     $R6,=Z'8000'
002482          104A  EF40 08C6                 STR     $R6,FLAG
002483          104C  A3C0 0ADE                 LNJ     $B2,WAIT                WAIT UNTIL DONE
002484                                  *
002485          104E  8383                      JMP     $B3                     RETURN TO CALLER
002486                                  *
002487          104F  9870 0003         UDWB    LDR     $R1,=Z'0003'            TRACK AND SECTOR TO WRITE
002488          1051  A870 3333                 LDR     $R2,=Z'3333'            DATA PATTERN TO WRITE
002489          1053  B3C0 0021                 LNJ     $B3,UDWY                GO WRITE
002490                                  *
002491          1055  9870 0006                 LDR     $R1,=Z'0006'            TRACK AND SECTOR TO WRITE
002492          1057  A870 6666                 LDR     $R2,=Z'6666'            DATA PATTERN
002493          1059  B3C0 001B                 LNJ     $B3,UDWY                GO WRITE
002494                                  *
002495          105B  9870 0009                 LDR     $R1,=Z'0009'            TRACK AND SECTOR
002496          105D  A870 9999                 LDR     $R2,=Z'9999'            DATA PATTERN
002497          105F  B3C0 0015                 LNJ     $B3,UDWY                GO WRITE
002498                                  *
002499          1061  9870 000A                 LDR     $R1,=Z'000A'            TRACK AND SECTOR
002500          1063  A870 AAAA                 LDR     $R2,=Z'AAAA'            DATA PATTERN
002501          1065  B3C0 000F                 LNJ     $B3,UDWY                GO WRITE
002502                                  *
002503          1067  9870 000B                 LDR     $R1,=Z'000B'            TRACK AND SECTOR
002504          1069  A870 BBBB                 LDR     $R2,=Z'BBBB'            DATA PATTERN
002505          106B  B3C0 0009                 LNJ     $B3,UDWY                GO WRITE
002506                                  *
002507          106D  9870 000C                 LDR     $R1,=Z'000C'            TRACK AND SECTOR
002508          106F  A870 CCCC                 LDR     $R2,=Z'CCCC'            DATA PATTERN
002509          1071  B3C0 0003                 LNJ     $B3,UDWY                GO WRITE
002510          1073  0F80 10B1         UDWC    B       <RUDR                   GO READ THE UPDATED RECORDS
002511                                  *
002512                                  *       UPDATE WRITE EXECUTION
002513                                  *
002514          1075  9F40 0890         UDWY    STR     $R1,TRNO                STORE TRACK NUMBER
002515          1077  9F40 0891                 STR     $R1,SECT                STORE SECTOR NUMBER
002516          1079  A3C0 002E                 LNJ     $B2,FBS                 FILL THE BUFFER
002517                                  *
002518          107B  C3C0 0430                 LNJ     $B4,FCWA                FORM WORDS
002519                                  *
002520          107D  8040 088A         UDWYAA  IO      CWAD,CBOWA
                107F  0040 086C
002521          1081  0781 FFFB                 BIOF    UDWYAA
002522                                  *
002523          1083  8040 0877         UDWYAB  IO      SEEK,CBOTW
                1085  0040 0863
```

```
002524 1087 0781 FFFB            BIOF   UDWYAB
002525 1089 81C8 0884      UDWYAC IOLD   *BFAD,CBOLD,RLB
       108B 0040 085F
       108D 0040 0A95
002526 108F 0781 FFF9            BIOF   UDWYAC
002527 1091 8040 0878            IO     CWBD,CBOWB
       1093 0040 0859
002528 1095 0701 0000      T     BIOT   +$A
002529 1097 93C0 0B26            LNJ    $B1,IOFA
002530 1099 8040 0864      $A    IO     DATA,CBOTW              WRITE COMMAND
       109B 0040 084D
002531 109D 0701 0003            BIOT   UDWYC
002532 109F 93C0 0B1E            LNJ    $B1,IOFA
002533 10A1 E870 8000      UDWYC LDR    $R6,=Z'8000'
002534 10A3 EF40 086D            STR    $R6,FLAG
002535 10A5 A3C0 0A99            LNJ    $B2,WAITB               WAITB UNTIL DONE
002536                           *
002537 10A7 8383                 JMP    $B3                     RETURN TO CALLER
002538                           *      FILL BUFFER FOR ONE SECTOR (DATA IN R2) (VIA B2)
002539                           *
002540 10A8 8751           FBS   CL     =$R1
002541 10A9 D870 0080            LDR    $R5,=Z'0080'            WORDS TO WRITE
002542 10AB 9CC0 0862            LDB    $B1,BFAD                WRITE BUFFER STARTING ADDRESS
002543 10AD AF5D           FBSA  STR    $R2,$B1,+$R1            STORE IT
002544 10AE 5701 FFFE            BDEC   $R5,FBSA
002545 10B0 8382                 JMP    $B2                     RETURN TO CALLER
002546                           *
002547                           *---------------------------------------------------------------
002548                           *
002549                           *      READ AND COMPARE UPDATED DATA RECORDS
002550                           *
002551                           *---------------------------------------------------------------
002552                           *
002553 10B1 9BC0 0C10      RUDR  LAB    $B1,IMV
002554 10B3 9FC0 04BF            STB    $B1,DEXB
002555                           CALL   ZV$1.ZV$TC,TSTV
       10B5 FBC0 0003
       10B7 D380 0000      X
       10B9 0F80
       10BA 1ADC
002556 10BB 9870 0003            LDR    $R1,=Z'0003'            TRACK AND SECTOR
002557 10BD A870 3333            LDR    $R2,=Z'3333'            DATA PATTERN
002558 10BF B3C0 0021            LNJ    $B3,RUDRX               GO READ AND COMPARE
002559                           *
002560 10C1 9870 0006            LDR    $R1,=Z'0006'            TRACK AND SECTOR
002561 10C3 A870 6666            LDR    $R2,=Z'6666'            DATA PATTERN
002562 10C5 B3C0 001B            LNJ    $B3,RUDRX               GO READ AND COMPARE
002563                           *
002564 10C7 9870 0009            LDR    $R1,=Z'0009'            TRACK AND SECTOR
002565 10C9 A870 9999            LDR    $R2,=Z'9999'            DATA PATTERN
002566 10CB B3C0 0015            LNJ    $B3,RUDRX               GO READ AND COMPARE
002567                           *
002568 10CD 9870 000A            LDR    $R1,=Z'000A'            TRACK AND SECTOR
002569 10CF A870 AAAA            LDR    $R2,=Z'AAAA'            DATA PATTERN
002570 10D1 B3C0 000F            LNJ    $B3,RUDRX               GO READ AND COMPARE
002571                           *
002572 10D3 9870 000B            LDR    $R1,=Z'000B'            TRACK AND SECTOR
002573 10D5 A870 BBBB            LDR    $R2,=Z'BBBB'            DATA PATTERN
002574 10D7 B3C0 0009            LNJ    $B3,RUDRX               GO READ AND COMPARE
002575                           *
002576 10D9 9870 000C            LDR    $R1,=Z'000C'            TRACK AND SECTOR
002577 10DB A870 CCCC            LDR    $R2,=Z'CCCC'            DATA PATTERN
002578 10DD B3C0 0003            LNJ    $B3,RUDRX               GO READ AND COMPARE
002579                           *
002580 10DF 0F80 110E      RUDRA B      <RUDRB                  GO DO THE OTHER DRIVE
002581                           *
002582                           *      READ EXECUTION AND COMPARE
002583                           *
002584 10E1 9F40 0824      RUDRX STR    $R1,TRNO                STORE THE TRACK NUMBER
002585 10E3 9F40 0825            STR    $R1,SECT                AND THE SECTOR NUMBER
002586 10E5 A3C0 FFC2            LNJ    $B2,FBS                 FILL THE BUFFER
002587                           *
002588 10E7 C3C0 03C4            LNJ    $B4,FCWA                FORM WORDS
002589                           *
002590 10E9 E3C0 0595            LNJ    $B6,ST                  DO A SEEK
002591                           *
002592 10EB 8040 081E            IO     CWBD,CAOWB
       10ED 0040 07F1
002593 10EF 0701 0000      T     BIOT   +$A
002594 10F1 93C0 0ACC            LNJ    $B1,IOFA
002595 10F3 81C8 081B      $A    IOLD   *RBUF,CAILD,RLB         OUTPUT ADDRESS AND RANGE
       10F5 0040 07E7
       10F7 0040 0A2B
002596 10F9 0701 0003            BIOT   RUDRXA
002597 10FB 93C0 0AC2            LNJ    $B1,IOFA
002598 10FD 8040 0800      RUDRXA IO    DATA,CAOTW              READ COMMAND
       10FF 0040 07DB
002599 1101 0701 0003            BIOT   RUDRXB
002600 1103 93C0 0ABA            LNJ    $B1,IOFA
002601 1105 8740 080B      RUDRXB CL    FLAG
002602 1107 A3C0 0A23            LNJ    $B2,WAIT                WAIT UNTIL DONE
002603 1109 E870 003F            LDR    $R6,=X'3F'
002604                           *
002605 110B F3C0 073A            LNJ    $B7,CB                  COMPARE THE BUFFERS
002606                           *
002607 110D 8383                 JMP    $B3                     RETURN TO CALLER
002608                           *
002609 110E 9870 0003      RUDRB LDR    $R1,=Z'0003'            TRACK AND SECTOR
002610 1110 A870 3333            LDR    $R2,=Z'3333'            DATA PATTERN
002611 1112 B3C0 0021            LNJ    $B3,RUDRY               GO READ AND COMPARE
002612                           *
002613 1114 9870 0006            LDR    $R1,=Z'0006'            TRACK AND SECTOR
002614 1116 A870 6666            LDR    $R2,=Z'6666'            DATA PATTERN
002615 1118 B3C0 001B            LNJ    $B3,RUDRY               GO READ AND COMPARE
002616                           *
002617 111A 9870 0009            LDR    $R1,=Z'0009'            TRACK AND SECTOR
002618 111C A870 9999            LDR    $R2,=Z'9999'            DATA PATTERN
002619 111E B3C0 0015            LNJ    $B3,RUDRY               GO READ AND COMPARE
002620                           *
002621 1120 9870 000A            LDR    $R1,=Z'000A'            TRACK AND SECTOR
002622 1122 A870 AAAA            LDR    $R2,=Z'AAAA'            DATA PATTERN
002623 1124 B3C0 000F            LNJ    $B3,RUDRY               GO READ AND COMPARE
002624                           *
```

```
002625  1126  9870 000B              LDR   $R1,=Z'000B'        TRACK AND SECTOR
002626  1128  A870 BBBB              LDR   $R2,=Z'BBBB'        DATA PATTERN
002627  112A  B3C0 0009              LNJ   $B3,RUDRY           GO READ AND COMPARE
002628                          *
002629  112C  9870 000C              LDR   $R1,=Z'000C'        TRACK AND SECTOR
002630  112E  A870 CCCC              LDR   $R2,=Z'CCCC'        DATA PATTERN
002631  1130  B3C0 0003              LNJ   $B3,RUDRY           GO READ AND COMPARE
002632  1132  0F80 1169      RUDRC   B     <UPDC               GO WRITE DELETED DATA
002633                          *
002634                          *       READ EXECUTION AND COMPARE
002635                          *
002636  1134  9F40 07D1      RUDRY   STR   $R1,TRNO            STORE THE TRACK NUMBER
002637  1136  9F40 07D2              STR   $R1,SECT            AND THE SECTOR NUMBER
002638  1138  A3C0 FF6F              LNJ   $B2,FBS             FILL THE BUFFER
002639                          *
002640  113A  C3C0 0371              LNJ   $B4,FCWA            FORM WORDS
002641                          *
002642  113C  8040 07CB      RUDRYC  IO    CWAD,CBOWA
      113E  0040 07AD
002643  1140  0781 FFFB              BIOF  RUDRYC
002644                          *
002645  1142  8040 07B8      RUDRYD  IO    SEEK,CBOTW
      1144  0040 07A4
002646  1146  0781 FFFB              BIOF  RUDRYD
002647                          *
002648  1148  8040 07C1      RUDRYE  IO    CWBD,CBOWB
      114A  0040 07A2
002649  114C  0781 FFFB              BIOF  RUDRYE
002650  114E  81C8 07C0              IOLD  *RBUF,CBILD,RLB     OUTPUT ADDRESS AND RANGE
      1150  0040 0799
      1152  0040 09D0
002651  1154  0701 0003              BIOT  RUDRYA
002652  1156  93C0 0A67              LNJ   $B1,IOFA
002653  1158  8040 07A5      RUDRYA  IO    DATA,CBOTW          READ COMMAND
      115A  0040 078E
002654  115C  0701 0003              BIOT  RUDRYB
002655  115E  93C0 0A5F              LNJ   $B1,IOFA
002656  1160  8740 07B0      RUDRYB  CL    FLAG
002657  1162  E870 003F              LDR   $R6,=X'3F'
002658  1164  A3C0 09DA              LNJ   $B2,WAITB           WAITB UNTIL DONE
002659                          *
002660  1166  F3C0 06DF              LNJ   $B7,CB              COMPARE THE BUFFERS
002661                          *
002662  1168  B3B3                   JMP   $B3                 RETURN TO CALLER
002663                          *
002664                          *       WRITE DELETED DATA (6 RECORDS)
002665                          *       THIS ROUTINE WRITES DELETED DATA ADDRESS MARKS
002666                          *       IN SIX RECORDS.
002667                          *
002668                          *
002669  1169  8280 1924      UPDC    LB    <CPFL,=Z'0001'
      116B  0001
002670  116C  0501 0009              BBT   DEL                 CONTINUE IF 6/30 OR 6/40
002671                                CALL  ZV$T.ZV$TC,MESGN    OR ELSE END OF TEST MESSAGE FOR 6/20
      116E  FBC0 0003
      1170  D380 0000       X
      1172  0F80
      1173  1C43
002672  1174  0F81 EF89              B     RERUN               GO AND RESTART
002673                          *
002674                          *
002675                          * ------------------------------------------------------------
002676                          *
002677                          *       D E L E T E D   D A T A   W R I T E / R E A D
002678                          *
002679                          *------------------------------------------------------------
002680                          *
002681  1176  9BC0 0B50      DEL     LAB   $B1,IMW
002682  1178  9FC0 03FA              STB   $B1,DEXB
002683                                CALL  ZV$T.ZV$TC,TSTW
      117A  FBC0 0003
      117C  D380 0000       X
      117E  0F80
      117F  1AEF
002684  1180  9870 0003              LDR   $R1,=Z'0003'        TRACK AND SECTOR TO WRITE
002685  1182  A870 3333              LDR   $R2,=Z'3333'        DATA PATTERN TO WRITE
002686  1184  B3C0 0021              LNJ   $B3,WDDX            GO WRITE
002687                          *
002688  1186  9870 0006              LDR   $R1,=Z'0006'        TRACK AND SECTOR TO WRITE
002689  1188  A870 6666              LDR   $R2,=Z'6666'        DATA PATTERN
002690  118A  B3C0 001B              LNJ   $B3,WDDX            GO WRITE
002691                          *
002692  118C  9870 0009              LDR   $R1,=Z'0009'        TRACK AND SECTOR
002693  118E  A870 9999              LDR   $R2,=Z'9999'        DATA PATTERN
002694  1190  B3C0 0015              LNJ   $B3,WDDX            GO WRITE
002695                          *
002696  1192  9870 000A              LDR   $R1,=Z'000A'        TRACK AND SECTOR
002697  1194  A870 AAAA              LDR   $R2,=Z'AAAA'        DATA PATTERN
002698  1196  B3C0 000F              LNJ   $B3,WDDX            GO WRITE
002699                          *
002700  1198  9870 000B              LDR   $R1,=Z'000B'        TRACK AND SECTOR
002701  119A  A870 BBBB              LDR   $R2,=Z'BBBB'        DATA PATTERN
002702  119C  B3C0 0009              LNJ   $B3,WDDX            GO WRITE
002703                          *
002704  119E  9870 000C              LDR   $R1,=Z'000C'        TRACK AND SECTOR
002705  11A0  A870 CCCC              LDR   $R2,=Z'CCCC'        DATA PATTERN
002706  11A2  B3C0 0003              LNJ   $B3,WDDX            GO WRITE
002707                          *
002708  11A4  0F80 11D1      WDDAB   B     <WDDB               DO THE OTHER DRIVE
002709                          *
002710                          *       WRITE DELETED DATA EXECUTION
002711                          *     ------------------------------
002712                          *
002713  11A6  9F40 075F      WDDX    STR   $R1,TRNO            STORE OFF THE TRACK
002714  11A8  9F40 0760              STR   $R1,SECT            STORE THE SECTOR
002715  11AA  A3C0 FEFD              LNJ   $B2,FBS             FILL THE BUFFER
002716                          *
002717  11AC  C3C0 02FF              LNJ   $B4,FCWA            FORM WORDS
002718                          *
002719  11AE  E3C0 04D0              LNJ   $B6,ST              DO A SEEK
002720                          *
002721  11B0  8040 0759              IO    CWBD,CAOWB
      11B2  0040 072C
```

```
002722  11B4  0701 0000      1          BIOT   +$A
002723  11B6  93C0 0A07                 LNJ    $B1,IOFA
002724  11B8  81C8 0755      $A         IOLD   *BFAD,CAOLD,RLB      OUTPUT ADDRESS AND RANGE
        11BA  0040 0721
        11BC  0040 0966
002725  11BE  0701 0003                 BIOT   WDDXA
002726  11C0  93C0 09FD                 LNJ    $B1,IOFA
002727  11C2  8040 073C      WDDXA      IO     WDLD,CAOTW           WRITE COMMAND
        11C4  0040 0716
002728  11C6  0701 0003                 BIOT   WDDXB
002729  11C8  93C0 09F5                 LNJ    $B1,IOFA
002730  11CA  E870 8000      WDDXB      LDR    $R6,=Z'8000'
002731  11CC  EF40 0744                 STR    $R6,FLAG
002732  11CE  A3C0 095C                 LNJ    $B2,WAIT             WAIT UNTIL DONE
002733                       *
002734  11D0  8383                      JMP    $B3                  RETURN TO CALLER
002735                       *
002736  11D1  9870 0003      WDDB       LDR    $R1,=Z'0003'         TRACK AND SECTOR TO WRITE
002737  11D3  A870 3333                 LDR    $R2,=Z'3333'         DATA PATTERN TO WRITE
002738  11D5  B3C0 0021                 LNJ    $B3,WDDY             GO WRITE
002739                       *
002740  11D7  9870 0006                 LDR    $R1,=Z'0006'         TRACK AND SECTOR TO WRITE
002741  11D9  A870 6666                 LDR    $R2,=Z'6666'         DATA PATTERN
002742  11DB  B3C0 001B                 LNJ    $B3,WDDY             GO WRITE
002743                       *
002744  11DD  9870 0009                 LDR    $R1,=Z'0009'         TRACK AND SECTOR
002745  11DF  A870 9999                 LDR    $R2,=Z'9999'         DATA PATTERN
002746  11E1  B3C0 0015                 LNJ    $B3,WDDY             GO WRITE
002747                       *
002748  11E3  9870 000A                 LDR    $R1,=Z'000A'         TRACK AND SECTOR
002749  11E5  A870 AAAA                 LDR    $R2,=Z'AAAA'         DATA PATTERN
002750  11E7  B3C0 000F                 LNJ    $B3,WDDY             GO WRITE
002751                       *
002752  11E9  9870 000B                 LDR    $R1,=Z'000B'         TRACK AND SECTOR
002753  11EB  A870 BBBB                 LDR    $R2,=Z'BBBB'         DATA PATTERN
002754  11ED  B3C0 0009                 LNJ    $B3,WDDY             GO WRITE
002755                       *
002756  11EF  9870 000C                 LDR    $R1,=Z'000C'         TRACK AND SECTOR
002757  11F1  A870 CCCC                 LDR    $R2,=Z'CCCC'         DATA PATTERN
002758  11F3  B3C0 0003                 LNJ    $B3,WDDY             GO WRITE
002759  11F5  0F81 0034      WDDC       B      RDD                  GO READ IT
002760                       *
002761                       *       WRITE DELETED DATA EXECUTION - DRIVE B
002762                       *     ------------------------------------------
002763                       *
002764  11F7  9F40 070E      WDDY       STR    $R1,TRNO             STORE OFF THE TRACK
002765  11F9  9F40 070F                 STR    $R1,SECT             STORE THE SECTOR
002766  11FB  A3C0 FEAC                 LNJ    $B2,FBS              FILL THE BUFFER
002767                       *
002768  11FD  C3C0 02AE                 LNJ    $B4,FCWA             FORM WORDS
002769                       *
002770  11FF  8040 0708      WDDYAA     IO     CWAD,CBOWA
        1201  0040 06EA
002771  1203  0781 FFFB                 BIOF   WDDYAA
002772                       *
002773  1205  8040 06F5      WDDYAB     IO     SEEK,CBOTW
        1207  0040 06E1
002774  1209  0781 FFFB                 BIOF   WDDYAB
002775                       *
002776  120B  8040 06FE      WDDYAC     IO     CWBD,CBOWB
        120D  0040 06DF
002777  120F  0781 FFFB                 BIOF   WDDYAC
002778  1211  81C8 06FC                 IOLD   *BFAD,CBOLD,RLB      OUTPUT ADDRESS AND RANGE
        1213  0040 06D7
        1215  0040 090D
002779  1217  0701 0003                 BIOT   WDDYA
002780  1219  93C0 09A4                 LNJ    $B1,IOFA
002781  121B  8040 06E3      WDDYA      IO     WDLD,CBOTW           WRITE COMMAND
        121D  0040 06CB
002782  121F  0701 0003                 BIOT   WDDYB
002783  1221  93C0 099C                 LNJ    $B1,IOFA
002784  1223  E870 8000      WDDYB      LDR    $R6,=Z'8000'
002785  1225  EF40 06EB                 STR    $R6,FLAG
002786  1227  A3C0 0903                 LNJ    $B2,WAIT             WAIT UNTIL DONE
002787                       *
002788  1229  8383                      JMP    $B3                  RETURN TO CALLER
002789                       *
002790                       *       READ AROUND DELETED DATA FIELD
002791                       *     ----------------------------------
002792                       *
002793                       *
002794  122A  9BC0 0AA1      RDD        LAB    $B1,TIMX
002795  122C  9FC0 0346                 STB    $B1,DEXB
002796                                  CALL   ZV$1.ZV$TC,TSTX
        122E  FBC0 0003
        1230  D380 0000      X
        1232  0F80
        1233  1AFE
002797  1234  F870 0002                 LDR    $R7,=Z'0002'         STARTING SECTOR FOR READ
002798  1236  FF40 06D2                 STR    $R7,SECT
002799  1238  FA70 0003                 ADD    $R7,=3
002800  123A  FF40 06DB                 STR    $R7,TEMP
002801  123C  F270 0002                 SUB    $R7,=2
002802  123E  FF40 06C7                 STR    $R7,TRNO
002803  1240  B3C0 0049                 LNJ    $B3,RDDX             GO READ
002804                       *
002805  1242  F870 0005                 LDR    $R7,=Z'0005'         STARTING SECTOR
002806  1244  FF40 06C4                 STR    $R7,SECT
002807  1246  FA70 0003                 ADD    $R7,=3
002808  1248  FF40 06CD                 STR    $R7,TEMP
002809  124A  F270 0002                 SUB    $R7,=2
002810  124C  FF40 06B9                 STR    $R7,TRNO             TRACK
002811  124E  B3C0 003B                 LNJ    $B3,RDDX             GO READ
002812                       *
002813  1250  F870 0008                 LDR    $R7,=Z'0008'         STARTING SECTOR
002814  1252  FF40 06B6                 STR    $R7,SECT
002815  1254  FA70 0003                 ADD    $R7,=3
002816  1256  FF40 06BF                 STR    $R7,TEMP
002817  1258  F270 0002                 SUB    $R7,=2
002818  125A  FF40 06AB                 STR    $R7,TRNO             TRACK
002819  125C  B3C0 002D                 LNJ    $B3,RDDX             GO READ
002820                       *
002821  125E  F870 0009                 LDR    $R7,=Z'0009'         STARTING SECTOR
```

```
002822  1260  FF40 06A8          STR   $R7,SECT
002823  1262  FA70 0003          ADD   $R7,=3
002824  1264  FF40 06B1          STR   $R7,TEMP
002825  1266  F270 0002          SUB   $R7,=2
002826  1268  FF40 069D          STR   $R7,TRNO          TRACK
002827  126A  B3C0 001F          LNJ   $B3,RDDX          GO READ
002828                      *
002829  126C  F870 000A          LDR   $R7,=Z'000A'      STARTING SECTOR
002830  126E  FF40 069A          STR   $R7,SECT
002831  1270  FA70 0003          ADD   $R7,=3
002832  1272  FF40 06A3          STR   $R7,TEMP
002833  1274  F270 0002          SUB   $R7,=2
002834  1276  FF40 068F          STR   $R7,TRNO          TRACK
002835  1278  B3C0 0011          LNJ   $B3,RDDX          GO READ
002836                      *
002837  127A  F870 000B          LDR   $R7,=Z'000B'      STARTING SECTOR
002838  127C  FF40 068C          STR   $R7,SECT
002839  127E  FA70 0003          ADD   $R7,=3
002840  1280  FF40 0695          STR   $R7,TEMP
002841  1282  F270 0002          SUB   $R7,=2
002842  1284  FF40 0681          STR   $R7,TRNO          TRACK NUMBER
002843  1286  B3C0 0003          LNJ   $B3,RDDX          GO READ
002844                      *
002845                      *
002846  1288  0F80 1309    RDDA  B     <RDDB             DO OTHER DRIVE
002847                      *
002848                      *     READ AROUND DELETED DATA FIELD EXECUTION
002849                      *     ----------------------------------------
002850                      *
002851  128A  8740 0686    RDDX  CL    FLAG
002852  128C  C3C0 021F          LNJ   $B4,FCWA          FORM WORDS A AND B
002853                      *
002854  128E  E3C0 03F0          LNJ   $B6,ST            DO A SEEK TO THE TRACK
002855                      *
002856                      *
002857  1290  E870 0100          LDR   $R6,=Z'0100'      RECORD LENGTH
002858  1292  81C8 067C          IOLD  *RBUF,CAILD,=$R6  OUTPUT ADDRESS AND RANGE
      1294  0040 0648
      1296  0056
002859  1297  0701 0003          BIOT  RDDXA
002860  1299  93C0 0924          LNJ   $B1,IOFA
002861  129B  8040 066E    RDDXA IO    CWBD,CAOWB
      129D  0040 0641
002862  129F  0781 FFFB          BIOF  RDDXA
002863  12A1  8040 065C          IO    DATA,CAOTW        READ COMMAND
      12A3  0040 0637
002864  12A5  0701 0003          BIOT  DBS
002865  12A7  93C0 0916          LNJ   $B1,IOFA
002866                      *
002867                      *
002868                      *     CHECK THAT DELETED BIT IS SET
002869                      *
002870  12A9  8055          DBS   IO    =$R5,CAISW        ASK FOR STATUS
      12AA  0040 063A
002871  12AC  0781 FFFC          BIOF  DBS
002872  12AE  8052          DBSA  IO    =$R2,CAIIR
      12AF  0040 0632
002873  12B1  0781 FFFC          BIOF  DBSA
002874  12B3  A970 0000          CMR   $R2,=0
002875  12B5  0901 000A          BE    DBSAA
002876                           CALL  ZV$ER,E59,ER59    SEND ERROR MESSAGE
      12B7  FBC0 0003
      12B9  D380 0000     X
      12BB  0F80
      12BC  12BE
      12BD  1FB0
002877  12BE  0F01 FFFF    E59   NOP   $                 RANGE IS NOT ZERO
002878  12C0  8052          DBSAA IO    =$R2,CAIWB
      12C1  0040 0622
002879  12C3  0781 FFFC          BIOF  DBSAA
002880  12C5  B840 0650          LDR   $R3,TEMP
002881  12C7  3008               SUL   $R3,8
002882  12C8  A953               CMR   $R2,=$R3
002883  12C9  0901 0002          BE    DBSAB
002884  12CB  0F84               B     >DBSAC
002885  12CC  5003          DBSAB SUL   $R5,3             POSITION DELETED DATA BIT
002886  12CD  5801 0003          BLZ   $R5,RDDXC
002887  12CF  0F81 00D6    DBSAC B     DBSDD             DELETED FIELD BIT NOT SET
002888                      *
002889                      *     CHECK THAT READ SKIPPED DELETED DATA FIELD
002890                      *
002891  12D1  9CC0 063D    RDDXC LDB   $B1,RBUF          LOAD FIRST WORD
002892  12D3  A801               LDR   $R2,$B1
002893  12D4  A970 3333          CMR   $R2,=Z'3333'
002894  12D6  0981 0003          BNE   RDDXCB
002895  12D8  0F81 0020          B     RDDXCH
002896  12DA  A970 6666    RDDXCB CMR  $R2,=Z'6666'
002897  12DC  0981 0003          BNE   RDDXCC
002898  12DE  0F81 001A          B     RDDXCH
002899  12E0  A970 9999    RDDXCC CMR  $R2,=Z'9999'
002900  12E2  0981 0003          BNE   RDDXCD
002901  12E4  0F81 0014          B     RDDXCH
002902  12E6  A970 AAAA    RDDXCD CMR  $R2,=Z'AAAA'
002903  12E8  0981 0003          BNE   RDDXCE
002904  12EA  0F81 000E          B     RDDXCH
002905  12EC  A970 BBBB    RDDXCE CMR  $R2,=Z'BBBB'
002906  12EE  0981 0003          BNE   RDDXCF
002907  12F0  0F81 0008          B     RDDXCH
002908  12F2  A970 CCCC    RDDXCF CMR  $R2,=Z'CCCC'
002909  12F4  0981 0003          BNE   RDDXCG
002910  12F6  0F81 0002          B     RDDXCH
002911  12F8  8383          RDDXCG JMP  $B3
002912                      *
002913  12F9  93C0 026E    RDDXCH LNJ  $B1,DEXA
002914                           CALL  ZV$T,ZV$TC,DDNS
      12FB  FBC0 0003
      12FD  D380 0000     X
      12FF  0F80
      1300  1618
002915                           CALL  ZV$T,ZV$TC,ABT
      1301  FBC0 0003
      1303  D380 0000     X
      1305  0F80
```

```
                1306  1D75
002916  1307  0F81 EE26                    B       RERUN
002917                                *
002918                                *
002919                                *       READ AROUND DELETED DATA FIELD - DRIVE B
002920                                *       ----------------------------------------
002921                                *
002922                                *
002923  1309  F870 0002                RDDB    LDR     $R7,=Z'0002'            STARTING SECTOR FOR READ
002924  130B  FF40 05FD                        STR     $R7,SECT
002925  130D  8AD7                            INC     =$R7
002926  130E  FF40 05F7                        STR     $R7,TRNO
002927  1310  FA70 0002                        ADD     $R7,=2
002928  1312  FF40 0603                        STR     $R7,TEMP
002929  1314  B3C0 0044                        LNJ     $B3,RDDY                GO READ
002930                                *
002931  1316  F870 0005                        LDR     $R7,=Z'0005'            STARTING SECTOR
002932  1318  FF40 05F0                        STR     $R7,SECT
002933  131A  8AD7                            INC     =$R7
002934  131B  FF40 05EA                        STR     $R7,TRNO                TRACK
002935  131D  FA70 0002                        ADD     $R7,=2
002936  131F  FF40 05F6                        STR     $R7,TEMP
002937  1321  B3C0 0037                        LNJ     $B3,RDDY                GO READ
002938                                *
002939  1323  F870 0008                        LDR     $R7,=Z'0008'            STARTING SECTOR
002940  1325  FF40 05E3                        STR     $R7,SECT
002941  1327  8AD7                            INC     =$R7
002942  1328  FF40 05DD                        STR     $R7,TRNO                TRACK
002943  132A  FA70 0002                        ADD     $R7,=2
002944  132C  FF40 05E9                        STR     $R7,TEMP
002945  132E  B3C0 002A                        LNJ     $B3,RDDY                GO READ
002946                                *
002947  1330  F870 0009                        LDR     $R7,=Z'0009'            STARTING SECTOR
002948  1332  FF40 05D6                        STR     $R7,SECT
002949  1334  8AD7                            INC     =$R7
002950  1335  FF40 05D0                        STR     $R7,TRNO                TRACK
002951  1337  FA70 0002                        ADD     $R7,=2
002952  1339  FF40 05DC                        STR     $R7,TEMP
002953  133B  B3C0 001D                        LNJ     $B3,RDDY                GO READ
002954                                *
002955  133D  F870 000A                        LDR     $R7,=Z'000A'            STARTING SECTOR
002956  133F  FF40 05C9                        STR     $R7,SECT
002957  1341  8AD7                            INC     =$R7
002958  1342  FF40 05C3                        STR     $R7,TRNO                TRACK
002959  1344  FA70 0002                        ADD     $R7,=2
002960  1346  FF40 05CF                        STR     $R7,TEMP
002961  1348  B3C0 0010                        LNJ     $B3,RDDY                GO READ
002962                                *
002963  134A  F870 000B                        LDR     $R7,=Z'000B'            STARTING SECTOR
002964  134C  FF40 05BC                        STR     $R7,SECT
002965  134E  8AD7                            INC     =$R7
002966  134F  FF40 05B6                        STR     $R7,TRNO                TRACK NUMBER
002967  1351  FA70 0002                        ADD     $R7,=2
002968  1353  FF40 05C2                        STR     $R7,TEMP
002969  1355  B3C0 0003                        LNJ     $B3,RDDY                GO READ
002970  1357  0F81 007F                        B       RDF
002971                                *
002972                                *
002973                                *       READ AROUND DELETED DATA FIELD EXECUTION
002974                                *
002975  1359  8740 05B7                RDDY    CL      FLAG
002976  135B  C3C0 0150                        LNJ     $B4,FCWA                FORM WORDS A AND B
002977                                *
002978  135D  8040 05AA                RDDYC   IO      CWAD,CBOWA
        135F  0040 058C
002979  1361  0781 FFFB                        BIOF    RDDYC
002980                                *
002981  1363  8040 0597                RDDYD   IO      SEEK,CBOTW
        1365  0040 0583
002982  1367  0781 FFFB                        BIOF    RDDYD
002983                                *
002984                                *
002985                                *
002986  1369  E870 0100                        LDR     $R6,=Z'0100'            RECORD LENGTH
002987  136B  81C8 05A3                RDDYA   IOLD    *RBUF,CBILD,=$R6        OUTPUT ADDRESS AND RANGE
        136D  0040 057C
        136F  0056
002988  1370  0781 FFFA                        BIOF    RDDYA
002989  1372  8040 0597                        IO      CWBD,CBOWB
        1374  0040 0578
002990  1376  0701 0001                        BIOT    RDDYB
002991  1378  8040 0585                RDDYB   IO      DATA,CBOTW              READ COMMAND
        137A  0040 056E
002992  137C  0701 0003                        BIOT    DBSB
002993  137E  93C0 083F                        LNJ     $B1,IOFA
002994                                *
002995                                *
002996                                *       CHECK THAT DELETED BIT IS SET
002997                                *
002998  1380  8055                    DBSB    IO      =$R5,CB1SW              ASK FOR STATUS
        1381  0040 0571
002999  1383  0781 FFFC                        BIOF    DBSB
003000  1385  8052                    DBSBA   IO      =$R2,CBIIR
        1386  0040 0569
003001  1388  0781 FFFC                        BIOF    DBSBA
003002  138A  A970 0000                        CMR     $R2,=0
003003  138C  0901 000A                        BE      DBSBB
003004                                        CALL    ZV$ER,E60,ER60          SEND ERROR MESSAGE
        138E  FBC0 0003
        1390  D380 0000          X
        1392  0F80
        1393  1395
        1394  1FB3
003005  1395  0F01 FFFF            E60     NOP     $                       RANGE IS NOT ZERO
003006  1397  8052                DBSBB   IO      =$R2,CBIWB
        1398  0040 0559
003007  139A  0781 FFFC                        BIOF    DBSBB
003008  139C  B840 0579                        LDR     $R3,TEMP
003009  139E  3008                            SOL     $R3,8
003010  139F  A953                            CMR     $R2,=$R3
003011  13A0  0901 0002                        BE      DBSBC
003012  13A2  0F84                            B       >DBSBD
003013  13A3  5003                DBSBC   SOL     $R5,3                   POSITION DELETED DATA BIT
```

```
003014  13A4  5801 000A            BLZ   $R5,RDDYCA
003015                        DBSBD CALL  ZV$ER,E48,ER48      SEND ERROR MESSAGE
        13A6  FBC0 0003
        13A8  D380 0000       X
        13AA  0F80
        13AB  13AD
        13AC  1F8F
003016  13AD  0F01 FFFF        E48   NOP   $                   DELETED DATA BIT NOT SET
003017                        *
003018                        *     CHECK THAT READ SKIPPED DELETED DATA FIELD
003019                        *     ------------------------------------------
003020                        *
003021  13AF  9CC0 055F        RDDYCA LDB  $B1,RBUF            LOAD FIRST WORD
003022  13B1  A801                   LDR  $R2,$B1
003023  13B2  A970 3333              CMR  $R2,=Z'3333'
003024  13B4  0981 0003              BNE  RDDYCB
003025  13B6  0F81 FF42              B    RDDXCH             DELETED DATA FIELD READ
003026  13B8  A970 6666        RDDYCB CMR  $R2,=Z'6666'
003027  13BA  0981 0003              BNE  RDDYCC
003028  13BC  0F81 FF3C              B    RDDXCH             DELETED DATA FIELD READ
003029  13BE  A970 9999        RDDYCC CMR  $R2,=Z'9999'
003030  13C0  0981 0003              BNE  RDDYCD
003031  13C2  0F81 FF36              B    RDDXCH             DELETED DATA FIELD READ
003032  13C4  A970 AAAA        RDDYCD CMR  $R2,=Z'AAAA'
003033  13C6  0981 0003              BNE  RDDYCE
003034  13C8  0F81 FF30              B    RDDXCH             DELETED DATA FIELD READ
003035  13CA  A970 BBBB        RDDYCE CMR  $R2,=Z'BBBB'
003036  13CC  0981 0003              BNE  RDDYCF
003037  13CE  0F81 FF2A              B    RDDXCH             DELETED DATA FIELD READ
003038  13D0  A970 CCCC        RDDYCF CMR  $R2,=Z'CCCC'
003039  13D2  0981 0003              BNE  RDDYCG
003040  13D4  0F81 FF24              B    RDDXCH             DELETED DATA FIELD READ
003041  13D6  8383             RDDYCG JMP  $B3
003042                        *
003043                        *
003044                        *     READ DELETED DATA FIELDS
003045                        *     ------------------------
003046                        *
003047  13D7  9BC0 08EF        RDF   LAB   $B1,1MW
003048  13D9  9FC0 0199              STB   $B1,DEXB            STORE TEST ID
003049                               CALL  ZV$I,ZV$TC,TSTY     TEST Y MESSAGE
        13DB  FBC0 0003
        13DD  D380 0000       X
        13DF  0F80
        13E0  1B11
003050  13E1  9870 0003              LDR   $R1,=3
003051  13E3  A870 3333              LDR   $R2,=Z'3333'        DATA PATTERN
003052  13E5  B3C0 002C              LNJ   $B3,RDFX            GO READ AND COMPARE
003053                        *
003054  13E7  9870 0006              LDR   $R1,=6
003055  13E9  A870 6666              LDR   $R2,=Z'6666'        DATA PATTERN
003056  13EB  B3C0 0026              LNJ   $B3,RDFX
003057                        *
003058  13ED  9870 0009              LDR   $R1,=X'09'
003059  13EF  A870 9999              LDR   $R2,=Z'9999'
003060  13F1  B3C0 0020              LNJ   $B3,RDFX
003061                        *
003062  13F3  9870 000A              LDR   $R1,=X'0A'
003063  13F5  A870 AAAA              LDR   $R2,=Z'AAAA'
003064  13F7  B3C0 001A              LNJ   $B3,RDFX
003065                        *
003066  13F9  9870 000B              LDR   $R1,=X'0B'
003067  13FB  A870 BBBB              LDR   $R2,=Z'BBBB'
003068  13FD  B3C0 0014              LNJ   $B3,RDFX
003069                        *
003070  13FF  9870 000C              LDR   $R1,=X'0C'
003071  1401  A870 CCCC              LDR   $R2,=Z'CCCC'
003072  1403  B3C0 000E              LNJ   $B3,RDFX
003073  1405  8280 193F        DELC  LB    <PFL,=Z'0001'
        1407  0001
003074  1408  0500 018D              BBT   <NEXT
003075                        *
003076                        RDFA  CALL  ZV$T,ZV$TC,MESGN
        140A  FBC0 0003
        140C  D380 0000       X
        140E  0F80
        140F  1C43
003077  1410  0F81 ED1D              B     RERUN
003078                        *
003079                        *     READ DELETED DATA FIELD EXECUTION
003080                        *     ---------------------------------
003081                        *
003082  1412  9F40 04F3        RDFX  STR   $R1,TRNO
003083  1414  9F40 04F4              STR   $R1,SECT
003084  1416  AF40 04ED              STR   $R2,DP
003085  1418  C3C0 0093              LNJ   $B4,FCWA
003086                               CALL  ZV$F,BUFW,DP,RLW
        141A  FBC0 0003
        141C  D380 0000       X
        141E  0F80
        141F  3000
        1420  1904
        1421  1B24
003087                        *
003088  1422  8040 04E5        $A    IO    CWAD,CAOWA          WORD A TO A
        1424  0040 04B9
003089  1426  0781 FFFB              BIOF  -$A
003090  1428  8040 04E1        $B    IO    CWBD,CAOWB          WORD B TO A
        142A  0040 04B4
003091  142C  0781 FFFB              BIOF  -$B
003092  142E  8040 04CC        $C    IO    SEEK,CAOTW          SEEK A
        1430  0040 04AA
003093  1432  0781 FFFB              BIOF  -$C
003094  1434  81C8 04DA        RDFXA IOLD  *RBUF,CAILD,RLB
        1436  0040 04A6
        1438  0040 06EA
003095  143A  0781 FFF9              BIOF  RDFXA
003096  143C  8040 04C2        $D    IO    WDLD,CAOTW          READ DELETED DATA
        143E  0040 049C
003097  1440  0781 FFFB              BIOF  -$D
003098  1442  A3C0 06E8              LNJ   $B2,WAIT
003099  1444  E870 003F              LDR   $R6,=X'3F'
003100  1446  F3C0 03FF              LNJ   $B7,CB              GO COMPARE THE DATA
```

```
003101                                  *
003102  1448  8000 1908                  RDFXB   IO      <CWAD,<CBOWA            WORD A TO B
        144A  0000 18EC
003103  144C  0781 FFFB                          BIOF    RDFXB
003104  144E  8040 04BB                  $E      IO      CWBD,CBOWB              WORD B TO B
        1450  0040 049C
003105  1452  0781 FFFB                          BIOF    -$E
003106  1454  8040 04A6                  $F      IO      SEEK,CBOTW              SEEK B
        1456  0040 0492
003107  1458  0781 FFFB                          BIOF    -$F
003108  145A  81C8 04B4                  RDFXC   IOLD    *RBUF,CBILD,RLB
        145C  0040 048D
        145E  0040 08C4
003109  1460  0781 FFF9                          BIOF    RDFXC
003110  1462  8040 049C                  $A      IO      WDLD,CBOTW              READ B
        1464  0040 0484
003111  1466  0781 FFFB                          BIOF    -$A
003112  1468  A3C0 06CE                          LNJ     $B2,WAITA
003113  146A  E870 003F                          LDR     $R6,=X'3F'
003114  146C  F3C0 03D9                          LNJ     $B7,CB                  GO COMPARE THE DATA
003115  146E  8383                      RDFXD   JMP     $B3                     RETURN TO CALLER
003116                                  *
003117                                  *
003118                                  *
003119                                  RRDRVE  CALL    ZV$T,ZV$TC,CONE
        146F  FBC0 0003
        1471  D380 0000        X
        1473  0F80
        1474  1D46
003120                                          CALL    ZV$TH,EMDRNO
        1475  FBC0 0003
        1477  D380 0000        X
        1479  0F80
        147A  191C
003121  147B  9840 04A0                        LDR     $R1,EMDRNO
003122                                          CALL    ZV$ER,E49,ER49          SEND ERROR MESSAGE
        147D  FBC0 0003
        147F  D380 0000        X
        1481  0F80
        1482  1484
        1483  1F92
003123  1484  0F81 ECA9                  E49     B       RERUN                   READ DELETED DATA FAILED
003124                                  *
003125                                  *   ------------------------------------------------
003126                                  *
003127                                  *               DORIN SUBROUTINE
003128                                  *
003129                                  *   DORIN IS A SUBROUTINE USED TO CHECK WHETHER AN INTERRUPT
003130                                  *   IS HAPPENED WHILE OPENING AND CLOSING THE DOOR ON
003131                                  *   THE DISKETT DRIVE.
003132                                  *
003133  1486  8700 200B                  DORIN   CL      <CLKSEM
003134  1488  8700 200A                          CL      <L21SEM
003135  148A  8700 1948                          CL      <STATWD
003136  148C  9800 1940                          LDR     $R1,<HERTZ
003137  148E  9B70 0014                          MUL     $R1,=20
003138  1490  9F00 0000        X               STR     $R1,<ZHRTCI             SET THE REAL TIME CLOCK
003139  1492  9F00 0000        X               STR     $R1,<ZHRTCC
003140  1494  9870 0014                        LDR     $R1,=20
003141  1496  9F00 0000        X               STR     $R1,<ZHRTCL             SET CURRENT CLOCK LEVEL
003142  1498  0004                            RTCN                            START THE CLOCK
003143  1499  8980 200B                  UNBB    CMZ     <CLKSEM                 RAN OUT OF TIME
003144  149B  0981 0007                          BNE     UNBT                    IF SO, GIVE ERROR MESSAGE
003145  149D  8980 200A                          CMZ     <L21SEM                 IS DEVICE INTERRUPTED
003146  149F  0901 FFF9                          BE      UNBB                    IF NOT WAIT FOR IT
003147  14A1  0005                              RTCF                            TURN OFF THE CLOCK
003148  14A2  8381                              JMP     $B1                     OR ELSE RETURN TO CALLER
003149                                  UNBT    CALL    ZV$ER,E50,ER50          SEND ERROR MESSAGE DEVICE DID NOT INTERRUPT
        14A3  FBC0 0003
        14A5  D380 0000        X
        14A7  0F80
        14A8  14AB
        14A9  1F95
003150  14AA  0005                              RTCF                            TURN OFF THE CLOCK
003151  14AB  8381                      E50     JMP     $B1                     NO INTERRUPT WHILE DOOR TEST
003152                                  *
003153                                  *---------------------------------------------------------------
003154                                  *
003155                                  *       FORM CONFIGURATION WORD A
003156                                  *
003157  14AC  9840 0459                  FCWA    LDR     $R1,TRNO                LOAD TRACK NUMBER
003158  14AE  1008                              SOL     $R1,8                   MOVE IT OVER
003159  14AF  9F40 0458                          STR     $R1,CWAD                SAVE IT
003160                                  *
003161                                  *       FORM CONFIGURATION WORD B
003162                                  *
003163  14B1  9840 0457                          LDR     $R1,SECT                LOAD SECTOR NUMBER
003164  14B3  1008                              SOL     $R1,8                   MOVE IT OVER
003165  14B4  9F40 0455                          STR     $R1,CWBD                SAVE IT
003166  14B6  8384                              JMP     $B4                     RETURN TO CALLER
003167                                  *
003168                                  *---------------------------------------------------------------
003169                                  *       CHECK FOR TRACK OVER MAX
003170                                  *
003171  14B7  9840 044E                  CTOM    LDR     $R1,TRNO                LOAD TRACK NUMBER
003172  14B9  9970 004C                          CMR     $R1,=X'4C'              COMPARE TO MAX
003173  14BB  0301 0002                          BG      TOM                     BRANCH ON GREATER
003174  14BD  8385                              JMP     $B5                     RETURN TO CALLER
003175                                  TOM     CALL    ZV$ER,E51,ER51          TRACK CAPACITY OUT OF TOLERANCE
        14BE  FBC0 0003
        14C0  D380 0000        X
        14C2  0F80
        14C3  14C5
        14C4  1F98
003176  14C5  8385                      E51     JMP     $B5                     RETURN TO CALLER
003177                                  *
003178                                  *---------------------------------------------------------------
003179                                  *       FILL OUTPUT BUFFER FOR FORMAT - ONE TRACK
003180                                  *
003181  14C6  9CC0 0447                  FP      LDB     $B1,BFAD                WRITE BUFFER STARTING ADDRESS
003182  14C8  8751                              CL      =$R1
003183  14C9  C840 043C                          LDR     $R4,TRNO                LOAD CURRENT TRACK NUMBER
003184  14CB  4008                              SOL     $R4,8
```

```
003185  14CC  8755                        CL    =$R5                CLEAR SECTOR
003186  14CD  CF5D                  FPA   STR   $R4,$B1.+$R1         STORE TRACK
003187  14CE  DF5D                        STR   $R5,$B1.+$R1         STORE SECTOR
003188  14CF  D970 1900                   CMR   $R5,=X'1900'         MAX SECTOR?
003189  14D1  0905                        BE    >FPB                 THIS SECTOR DONE
003190  14D2  DA70 0100                   ADD   $R5,=X'0100'         BUMP SECTOR NUMBER
003191  14D4  0F81 FFF8                   B     FPA                  GO STORE IT
003192  14D6  8382                  FPB   JMP   $B2
003193                                    *
003194                                    *-------------------------------------------------------
003195                                    *
003196                                    *     GENERATE A RANDOM NUMBER
003197                                    *
003198  14D7  B840 043A              GRN   LDR   $R3,RAND             FETCH PREVIOUS RANDOM NUMBER
003199  14D9  BA70 5083                   ADD   $R3,=X'5083'         ADD SOMETHING TO IT
003200  14DB  3018                        SCL   $R3,8                ROTATE IT
003201  14DC  BF40 0435                   STR   $R3,RAND             SAVE IT
003202  14DE  8386                        JMP   $B6                  RETURN TO CALLER
003203                                    *
003204                                    *-------------------------------------------------------
003205                                    *     DETERMINE ERROR FROM STATUS WORD
003206                                    *
003207  14DF  9840 042D              DE    LDR   $R1,STW
003208  14E1  A840 042F                   LDR   $R2,FLAG
003209  14E3  2802                        BLZ   $R2,>DES
003210  14E4  0F84                        B     >DEAA
003211                                    *
003212  14E5  1004                  DES   SOL   $R1,4
003213  14E6  0F81 0010                   B     DEA
003214                                    *
003215  14E8  9840 0424              DEAA  LDR   $R1,STW              LOAD THE STATUS WORD
003216  14EA  1004                        SOL   $R1,4
003217  14EB  1881 000B                   BGEZ  $R1,DEA
003218  14ED  93C0 007A                   LNJ   $B1,DEXA
003219                                    CALL  ZV$I,ERMA            READ ERROR
        14EF  FBC0 0003
        14F1  D380 0000       X
        14F3  0F80
        14F4  15D6
003220  14F5  0F81 007F                   B     DEX
003221  14F7  1001                  DEA   SOL   $R1,1
003222  14F8  1881 0020                   BGEZ  $R1,DEB
003223  14FA  93C0 006D                   LNJ   $B1,DEXA
003224                                    CALL  ZV$I,ERMB            DEVICE FAULT
        14FC  FBC0 0003
        14FE  D380 0000       X
        1500  0F80
        1501  15DE
003225                                    CALL  ZV$I,DRNO
        1502  FBC0 0003
        1504  D380 0000       X
        1506  0F80
        1507  1638
003226                                    CALL  ZV$IH,EMDRNO
        1508  FBC0 0003
        150A  D380 0000       X
        150C  0F80
        150D  191C
003227  150E  E840 040D                   LDR   $R6,EMDRNO
003228  1510  EA70 0007                   ADD   $R6,=X'07'
003229  1512  8040 03E7              DEAB  IO    RCB,=$R6
        1514  0056
003230  1515  0781 FFFC                   BIOF  DEAB
003231  1517  0F81 009C                   B     DEJB
003232  1519  1001                  DEB   SOL   $R1,1
003233  151A  1881 000B                   BGEZ  $R1,DEC
003234  151C  93C0 004B                   LNJ   $B1,DEXA
003235                                    CALL  ZV$I,ERMC            MISSED DATA SYNC
        151E  FBC0 0003
        1520  D380 0000       X
        1522  0F80
        1523  15E5
003236  1524  0F81 0050                   B     DEX
003237  1526  1001                  DEC   SOL   $R1,1
003238  1527  1881 000B                   BGEZ  $R1,DED
003239  1529  93C0 003E                   LNJ   $B1,DEXA
003240                                    CALL  ZV$I,ERMD            UNSUCCESSFUL SEARCH
        152B  FBC0 0003
        152D  D380 0000       X
        152F  0F80
        1530  15EE
003241  1531  0F81 0043                   B     DEX
003242  1533  1003                  DED   SOL   $R1,3
003243  1534  1881 000B                   BGEZ  $R1,DEE
003244  1536  93C0 0031                   LNJ   $B1,DEXA
003245                                    CALL  ZV$I,ERME            SEEK ERROR
        1538  FBC0 0003
        153A  D380 0000       X
        153C  0F80
        153D  15F6
003246  153E  0F81 0036                   B     DEX
003247  1540  1003                  DEE   SOL   $R1,3
003248  1541  1881 000B                   BGEZ  $R1,DEF
003249  1543  93C0 0024                   LNJ   $B1,DEXA
003250                                    CALL  ZV$I,ERMF            NON-EXISTENT RESOURCE ERROR
        1545  FBC0 0003
        1547  D380 0000       X
        1549  0F80
        154A  15FC
003251  154B  0F81 0029                   B     DEX
003252  154D  1001                  DEF   SOL   $R1,1
003253  154E  1881 000B                   BGEZ  $R1,DEG
003254  1550  93C0 0017                   LNJ   $B1,DEXA
003255                                    CALL  ZV$I,ERMG            BUS PARITY ERROR
        1552  FBC0 0003
        1554  D380 0000       X
        1556  0F80
        1557  1606
003256  1558  0F81 001C                   B     DEX
003257  155A  1001                  DEG   SOL   $R1,1
003258  155B  1881 000B                   BGEZ  $R1,DEH
003259  155D  93C0 000A                   LNJ   $B1,DEXA
003260                                    CALL  ZV$I,ERMH            UNCORRECTABLE MEMORY ERROR
```

```
         155F  FBC0 0003
         1561  D380 0000        X
         1563  0F80
         1564  160F
003261   1565  0F81 000F                  B       DEX
003262   1567  8382                  DEH   JMP     $B2                     RETURN TO CALLER
003263                               *
003264                               DEXA  CALL    ZV$T,ZV$TC,CRLF
         1568  FBC0 0003
         156A  D380 0000        X
         156C  0F80
         156D  1625
003265                                     CALL    ZV$T,TESTID
         156E  FBC0 0003
         1570  D380 0000        X
         1572  0F80
         1573  18F5
003266             1573          DEXB  EQU     $-$AF
003267   1574      8381                JMP     $B1
003268                               DEX   CALL    ZV$T,ZV$TC,TRACK        TRACK
         1575  FBC0 0003
         1577  D380 0000        X
         1579  0F80
         157A  162D
003269   157B  E840 03A0                  LDR     $R6,EMDRNO
003270   157D  EA70 0010                  ADD     $R6,=X'10'
003271   157F  8055                DEK   IO      =$R5,=$R6
         1580  0056
003272   1581  0781 FFFD                  BIOF    DEK
003273   1583  5048                       SUR     $R5,8
003274   1584  DF40 0382                  STR     $R5,ETRNO
003275                                     CALL    ZV$TH,ZV$TD,ETRNO,CNTL1 TRACK NUMBER
         1586  FBC0 0003
         1588  D380 0000        X
         158A  0F80
         158B  1907
         158C  1925
003276   158D  0F01 FFFF            DEKA  NOP     $
003277                               DEKB  CALL    ZV$T,SECTOR
         158F  FBC0 0003
         1591  D380 0000        X
         1593  0F80
         1594  1632
003278   1595  E840 03B6                  LDR     $R6,EMDRNO
003279   1597  EA70 0012                  ADD     $R6,=X'12'
003280   1599  8055                DEJ   IO      =$R5,=$R6
         159A  0056
003281   159B  0781 FFFD                  BIOF    DEJ
003282   159D  5048                       SUR     $R5,8                   PUT IN PROPER POSITION
003283   159E  DF40 037F                  STR     $R5,ESECT
003284                                     CALL    ZV$TH,ZV$TD,ESECT,CNTL1 SECTOR NUMBER
         15A0  FBC0 0003
         15A2  D380 0000        X
         15A4  0F80
         15A5  191E
         15A6  1925
003285                               DEJA  CALL    ZV$T,DRNO
         15A7  FBC0 0003
         15A9  D380 0000        X
         15AB  0F80
         15AC  1638
003286                                     CALL    ZV$TH,ZV$TH,EMDRNO,CNTL1 CHANNEL NUMBER
         15AD  FBC0 0003
         15AF  D380 0000        X
         15B1  0F80
         15B2  191C
         15B3  1925
003287   15B4  8AC0 0350            DEJB  INC     RTYCT
003288   15B6  8AC0 035F                  INC     TEMP
003289   15B8  8AC0 033E                  INC     CRTRY
003290   15BA  8980 0000        X         CMZ     <ZV$TTY                 IS CONSOLE PRESENT
003291   15BC  0981 0008                  BNE     DEJD                    CONTINUE IF PRESENT
003292                                     CALL    ZV$ER,E59,ER59          OR ELSE SEND ERROR MESSAGE
         15BE  FBC0 0003
         15C0  D380 0000        X
         15C2  0F80
         15C3  12BE
         15C4  1FB0
003293   15C5  8840 0331            DEJD  LDR     $R3,CRTRY
003294   15C7  8970 0003                  CMR     $R3,=X'03'
003295   15C9  0281 0002                  BGE     DEI
003296   15CB  8384                       JMP     $B4
003297   15CC  8AC0 0354            DEI   INC     HERR
003298                                     CALL    ZV$ER,E52,ER52          SEND ERROR MESSAGE IF THREE
         15CE  FBC0 0003
         15D0  D380 0000        X
         15D2  0F80
         15D3  15D5
         15D4  1F9B
003299   15D5  0F01 FFFF            E52   NOP     $                       UNRECOVERABLE ERROR HAPPENED
003300   15D7  8382                       JMP     $B2                     RETURN TO CALLER
003301                               *
003302                               *     ERROR MESSAGES
003303                               *
003304   15D8  5245 4144 2045       ERMA  TEXT    'READ ERROR:$'
         15DB  5252 4F52 3A24
003305   15DE  4445 5649 4345       ERMB  TEXT    'DEVICE FAULT:$'
         15E1  2046 4155 4C54
               3A24
003306   15E5  4D49 5353 4544       ERMC  TEXT    'MISSED DATA SYNC:$'
         15E8  2044 4154 4120
               5359 4E43 3A24
003307   15EE  554E 5355 4343       ERMD  TEXT    'UNSUCC SEARCH:$'
         15F1  2053 4541 5243
               483A 2400
003308   15F6  5345 4548 2045       ERME  TEXT    'SEEK ERROR:$'
         15F9  5252 4F52 3A24
003309   15FC  4E4F 4E2D 4558       ERMF  TEXT    'NON-EXIS RESOURCE:$'
         15FF  4953 2052 4553
               4F55 5243 453A
               2400
003310   1606  4255 5320 5041       ERMG  TEXT    'BUS PARITY ERROR:$'
         1609  5249 5459 2045
```

```
                  5252 4F52 3A24
003311  160F      554E 434F 5252        ERMH    TEXT    'UNCORR MEM ERROR:$'
        1612      204D 454D 2045
                  5252 4F52 3A24
003312  1618      4445 4C45 5445        DDNS    TEXT    'DELETED FIELD NOT SKIPPED$'
        161B      4420 4649 454C
                  4420 4E4F 5420
                  534B 4950 5045
                  4424
003313  1625      0D0A 2400             CRLF    TEXT    Z'0D0A','$'
003314  1627      2043 4841 4E4E        IDRNO   TEXT    ' CHANNEL(S)$'
        162A      454C 2853 2924
003315  162D      2054 5241 434B        TRACK   TEXT    ' TRACK: $'
        1630      3A20 2400
003316  1632      2020 5345 4354        SECTOR  TEXT    '  SECTOR: $'
        1635      4F52 3A20 2400
003317  1638      2020 4348 414E        DRNO    TEXT    '  CHANNEL: $'
        163B      4E45 4C3A 2024
003318                                  *
003319                                  *
003320                                  *
003321                                  *-----------------------------------------------------------
003322                                  *       CHECK FOR DEVICE READY
003323                                  *
003324  163E  8055                     CO      IO      =$R5,CAISW              INPUT STATUS WORD
        163F  0040 02A5
003325  1641  0781 FFFC                         BIOF    CO
003326  1643  DF40 02C9                         STR     $R5,STW                 SAVE STATUS WORD
003327  1645  5881 0002                         BGEZ    $R5,COA
003328  1647  8384                             JMP     $B4                     RETURN TO CALLER
003329                                  COA     CALL    ZV$T,ZV$TC,CONE
        1648  FBC0 0003
        164A  D380 0000       X
        164C  0F80
        164D  1D46
003330  164E  9840 02C9                         LDR     $R1,CHAI
003331                                          CALL    ZV$TH,CHAI
        1650  FBC0 0003
        1652  D380 0000       X
        1654  0F80
        1655  1918
003332                                  COAB    CALL    ZV$T,NRDY
        1656  FBC0 0003
        1658  D380 0000       X
        165A  0F80
        165B  1D5F
003333                                          CALL    ZV$ER,E53,ER53          SEND ERROR MESSAGE
        165C  FBC0 0003
        165E  D380 0000       X
        1660  0F80
        1661  1663
        1662  1F9E
003334  1663  0F81 EACA                 E53     B       RERUN                   GO AND START ALL OVER
003335                                  *
003336                                  *
003337                                  *       CHECK DEVICE B READY
003338                                  *
003339  1665  8055                     COB     IO      =$R5,CBISW              READ STATUS
        1666  0040 02BC
003340  1668  0781 FFFC                         BIOF    COB
003341  166A  DF40 02A2                         STR     $R5,STW
003342  166C  5881 0002                         BGEZ    $R5,COBA                BRANCH IF DEVICE NOT READY
003343  166E  8384                             JMP     $B4
003344                                  COBA    CALL    ZV$T,ZV$TC,CONE         DEVICE NOT READY MESSAGE
        166F  FBC0 0003
        1671  D380 0000       X
        1673  0F80
        1674  1D46
003345  1675  9840 02A4                         LDR     $R1,CHBI
003346                                          CALL    ZV$TH,CHBI
        1677  FBC0 0003
        1679  D380 0000       X
        167B  0F80
        167C  191A
003347  167D  0F81 FFD8                         B       COAB
003348                                  *       SEEK TRACK ROUTINE
003349                                  *
003350  167F  C840 0286                 ST      LDR     $R4,TRNO                LOAD TRACK NUMBER
003351  1681  D3C0 FE35                         LNJ     $B5,CTOM                CHECK FOR TRACK OVER MAX
003352                                  *
003353  1683  8040 0284                 STC     IO      CWAD,CAOWA
        1685  0040 0258
003354  1687  0781 FFFD                         BIOF    STC
003355  1689  8040 0271                         IO      SEEK,CAOTW              SEEK
        168B  0040 024F
003356  168D  0701 0003                         BIOT    STB                     BRANCH IF IO WORKED
003357  168F  93C0 052E                         LNJ     $B1,IOFA
003358  1691  A3C0 0499                 STB     LNJ     $B2,WAIT                WAIT UNTIL DONE
003359                                  *
003360  1693  8386                             JMP     $B6                     RETURN TO CALLER
003361                                  *
003362                                  *-----------------------------------------------------------
003363                                  *       VERIFY HEADERS FOR ONE TRACK
003364                                  *
003365  1694  8751                     VH      CL      =$R1
003366  1695  D840 0270                         LDR     $R5,TRNO                LOAD TRACK NUMBER
003367  1697  5006                     VHH     SOL     $R5,8
003368  1698  8756                             CL      =$R6                    SET SECTOR TO ZERO
003369  1699  9CC0 0275                         LDB     $B1,RBUF                READ BUFFER STARTING ADDRESS
003370  169B  C85D                     VHA     LDR     $R4,$B1,+$R1            LOAD WORD
003371  169C  C955                             CMR     $R4,=$R5                COMPARE THEM
003372  169D  0903                             BE      >VHB
003373  169E  0F81 0018                         B       VHE
003374  16A0  C85D                     VHB     LDR     $R4,$B1,+$R1            LOAD SECTOR PORTION OF HEADER
003375  16A1  C956                             CMR     $R4,=$R6                COMPARE THEM
003376  16A2  0903                             BE      >VHC
003377  16A3  0F81 0013                         B       VHE
003378  16A5  EA70 0100                 VHC     ADD     $R6,=X'0100'            BUMP SECTOR NUMBER
003379  16A7  E970 1900                         CMR     $R6,=X'1900'            ALL DONE?
003380  16A9  030D                             BG      >VHD
003381  16AA  8280 1924                 VHCA    LB      <CPFL,=Z'0001'
        16AC  0001
003382  16AD  0501 0005                         BBT     VHCB                    BRANCH IF 6/30
```

```
003383  16AF  9A70 0001            ADD   $R1,=X'01'
003384  16B1  0F81 0003            B     VHCC
003385  16B3  9A70 0040    VHCB    ADD   $R1,=X'0040'        MOVE POINTER TO NEXT TRACK
003386  16B5  0FE6          VHCC    B     >VHA                DO NEXT HEADER
003387  16B6  8383          VHD     JMP   $B3                 RETURN TO CALLER
003388                      *
003389  16B7  8AC0 024D      VHE     INC   RTYCT               BUMP TOTAL COUNT
003390  16B9  8AC0 023D             INC   CRTRY               BUMP CURRENT
003391  16BB  C840 023B             LDR   $R4,CRTRY
003392  16BD  C970 0004             CMR   $R4,=X'04'
003393  16BF  0281 0002             BGE   VHF
003394  16C1  8382                  JMP   $B2                 GO RETRY
003395  16C2  8740 0234     VHF     CL    CRTRY
003396                              CALL  ZV$I,ZV$TC,MESG     SEND EROOR MESSAGE
        16C4  FBC0 0003
        16C6  D380 0000       X
        16C8  0F80
        16C9  195D
003397                              CALL  ZV$I,ZV$TC,DRNO     CHANNEL NUMBER
        16CA  FBC0 0003
        16CC  D380 0000       X
        16CE  0F80
        16CF  1638
003398                              CALL  ZV$TH,CHNL
        16D0  FBC0 0003
        16D2  D380 0000       X
        16D4  0F80
        16D5  07D1
003399                              CALL  ZV$T,ZV$TC,TRACK    TRACK NUMBER
        16D6  FBC0 0003
        16D8  D380 0000       X
        16DA  0F80
        16DB  162D
003400                              CALL  ZV$TH,TRNOA
        16DC  FBC0 0003
        16DE  D380 0000       X
        16E0  0F80
        16E1  192C
003401                              CALL  ZV$LR,E54,ER54      SEND ERROR MESSAGE
        16E2  FBC0 0003
        16E4  D380 0000       X
        16E6  0F80
        16E7  16E9
        16E8  1FA1
003402  16E9  0F81 F7E2    E54     B     FMTC                WRONG FORMAT ON MEDIA
003403                      *
003404                      *-------------------------------------------------------------
003405                      *       GENERATE WORDS FOR RANDOM SEEKS, READS
003406                      *
003407  16EB  E3C0 FDEB    GRW     LNJ   $B6,GRN             GENERATE A RANDOM NUMBER
003408                      *
003409  16ED  C840 0224             LDR   $R4,RAND            LOAD THE RANDOM NUMBER
003410  16EF  4049                  SUR   $R4,9               MOVE TO THE RIGHT
003411  16F0  C970 004C     GRWA    CMR   $R4,=X'004C'        COMPARE TO MAX
003412  16F2  0383                  BLE   >GRWB
003413  16F3  4041                  SUR   $R4,1               OVER MAX, MOVE TO RIGHT
003414  16F4  0FFC                  B     >GRWA               COMPARE IT
003415  16F5  4008          GRWB    SUL   $R4,8               PUT IN PROPER POSITION
003416  16F6  CF40 0211             STR   $R4,CWAD            WORD A TO BE OUTPUT (TRACK)
003417  16F8  C840 0219             LDR   $R4,RAND            RELOAD RANDOM NUMBER
003418  16FA  404B                  SUR   $R4,11              MOVE IT OVER
003419  16FB  C970 0019     GRWC    CMR   $R4,=X'0019'        COMPARE TO MAX
003420  16FD  0383                  BLE   >GRWD
003421  16FE  4041                  SUR   $R4,1               OVER MAX, MOVE IT OVER
003422  16FF  0FFC                  B     >GRWC               COMPARE IT
003423  1700  4008          GRWD    SUL   $R4,8               PUT IT PROPER POSITION
003424  1701  CF40 0208             STR   $R4,CWBD            WORD B TO BE OUTPUT (SECTOR)
003425  1703  8385                  JMP   $B5                 RETURN TO CALLER
003426                      *
003427                      *
003428                      *
003429                      *-------------------------------------------------------------
003430                      *
003431                      *       CLEAR INPUT BUFFER(ONE TRACK OF 52C@HEX@WORDS)
003432                      *
003433  1704  8751          CIB     CL    =$R1
003434  1705  8754                  CL    =$R4
003435  1706  8755                  CL    =$R5                WORD COUNTER
003436  1707  9CC0 0207             LDB   $B1,RBUF            READ BUFFER STARTING ADDRESS
003437  1709  CF5D          CIBA    STR   $R4,$B1,+$R1        STORE WORD OF ZEROS
003438  170A  D970 052C             CMR   $R5,=X'52C'         ALL DONE?
003439  170C  0901 0005             BE    CIBB
003440  170E  DA70 0001             ADD   $R5,=X'0001'        BUMP WORD COUNTER
003441  1710  0F81 FFF8             B     CIBA                DO ANOTHER WORD
003442  1712  8384          CIBB    JMP   $B4                 RETURN TO CALLER
003443                      *
003444                      *-------------------------------------------------------------
003445                      *
003446                      *
003447                      *       WRITE BOTH PACKS WITH DATA
003448                      *
003449  1713  8040 01EE      WPD     IO    INIT,CAOCW          PUT DRIVES ON TRACK 0
        1715  0040 01C3
003450  1717  0781 FFFB             BIOF  WPD
003451  1719  8740 01FC             CL    TEMP
003452  171B  8740 0205             CL    HERR
003453  171D  8740 01DA             CL    ERCA
003454  171F  8740 01D9             CL    ERCB
003455  1721  8740 01E3             CL    RTYCT
003456  1723  8740 01D3             CL    CRTRY
003457                      *
003458  1725  0F81 000E             B     WPDDA
003459  1727  C870 8000      WPDR    LDR   $R4,=Z'8000'
003460  1729  CF40 01EC             STR   $R4,TEMP
003461                              CALL  ZV$FR,BUFW,WRWT
        172B  FBC0 0003
        172D  D380 0000       X
        172F  0F80
        1730  3000
        1731  1627
003462  1732  0F81 0009             B     WPDDB
003463                      WPDDA   CALL  ZV$F,BUFW,DP,WRWT
        1734  FBC0 0003
```

```
                1736  0380 0000      X
                1738  0F80
                1739  3000
                173A  1904
                173B  1B27
003464  173C  E870 8000          WPDDB  LDR    $R6,=Z'8000'
003465  173E  EF40 01D2                 STR    $R6,FLAG
003466  1740  8740 01C5                 CL     TRNO                ZERO TRACK
003467  1742  8740 01C6                 CL     SECT                AND SECTOR
003468  1744  C3C0 FD67                 LNJ    $B4,FCWA            FORM WORDS
003469  1746  C840 01CF                 LDR    $R4,TEMP
003470  1748  4881 0008                 BGEZ   $R4,WPDA
003471                          WPDDC  CALL   ZV$FR,BUFW,WRWT
                174A  FBC0 0003
                174C  0380 0000      X
                174E  0F80
                174F  3000
                1750  1B27
003472                          *
003473  1751  8000 1908          WPDA   IO     <CWAD,<CBOWA        WORD A TO B
                1753  0000 18EC
003474  1755  0781 FFFB                 BIOF   WPDA
003475  1757  8040 01B2          WPDB   IO     CWBD,CAOWB          WORD B TO A
                1759  0040 0185
003476  175B  0781 FFFB                 BIOF   WPDB
003477                          *
003478  175D  8000 18FB          WPDC   IO     <SEEK,<CBOTW        <SEEK B
                175F  0000 18E9
003479  1761  0781 FFFB                 BIOF   WPDC
003480                          *
003481  1763  8040 01A6          WPDCA  IO     CWBD,CBOWB          WORD B TO B
                1765  0040 0187
003482  1767  0781 FFFB                 BIOF   WPDCA
003483                          *
003484  1769  81C8 01A4          WPDD   IOLD   *BFAD,CAOLD,BRWT
                176B  0040 0170
                176D  0040 03B8
003485  176F  0781 FFF9                 BIOF   WPDD
003486  1771  8040 018C          WPDE   IO     DATA,CAOTW          WRITE A
                1773  0040 0167
003487  1775  0781 FFFB                 BIOF   WPDE
003488  1777  CBC0 FFDF                 LAB    $B4,WPDB
003489  1779  A3C0 03B1                 LNJ    $B2,WAIT            WAIT 'TIL DONE
003490                          *
003491  177B  8AC0 018A                 INC    TRNO                BUMP TRACK NUMBER
003492  177D  C840 0188                 LDR    $R4,TRNO
003493  177F  C970 004D                 CMR    $R4,=X'4D'          TRACK OVER MAX??
003494  1781  0900 179E          WPDK   BE     <WPDH
003495  1783  C3C0 FD28                 LNJ    $B4,FCWA            FORM NEW WORDS
003496  1785  8040 0182          WPDF   IO     CWAD,CAOWA          WORD A TO A
                1787  0040 0156
003497  1789  0781 FFFB                 BIOF   WPDF
003498                          *
003499  178B  8040 016F          WPDG   IO     SEEK,CAOTW          SEEK A
                178D  0040 014D
003500  178F  0781 FFFB                 BIOF   WPDG
003501  1791  0F81 000C                 B      WPDH
003502  1793  C840 0176          WPDGA  LDR    $R4,CWBD
003503  1795  4901 0003                 BEZ    $R4,WPDGB
003504  1797  C270 0001                 SUB    $R4,=X'01'
003505  1799  8054               WPDGB  IO     =$R4,CBOWB
                179A  0040 0152
003506  179C  0781 FFFC                 BIOF   WPDGB
003507                          *
003508  179E  8188 190E          WPDH   IOLD   *<BFAD,<CBOLD,BRWT
                17A0  0000 18EB
                17A2  0040 0383
003509  17A4  0781 FFF9                 BIOF   WPDH
003510  17A6  8040 0157          WPDI   IO     DATA,CBOTW          WRITE B
                17A8  0040 0140
003511  17AA  0781 FFFB                 BIOF   WPDI
003512  17AC  CBC0 FFE6                 LAB    $B4,WPDGA
003513  17AE  A3C0 0390                 LNJ    $B2,WAITB           WAIT 'TIL DONE
003514                          *
003515  17B0  C840 0155                 LDR    $R4,TRNO
003516  17B2  C970 004D                 CMR    $R4,=X'4D'          OVER MAX???
003517  17B4  0901 0007                 BE     WPDJ
003518  17B6  C840 015F                 LDR    $R4,TEMP
003519  17B8  4881 FF98                 BGEZ   $R4,WPDA
003520  17BA  0F81 FF8F                 B      WPDDC               DO ANOTHER TRACK
003521  17BC  8383               WPDJ   JMP    $B3
003522                          *
003523                          *-------------------------------------------------------------------
003524                          *
003525                          *       READ BOTH PACKS (DATA ONLY)
003526                          *
003527  17BD  8040 0144          RPD    IO     INIT,CAOCW          PUT DRIVES ON TRACK 0
                17BF  0040 0119
003528  17C1  0781 FFFB                 BIOF   RPD
003529  17C3  8740 0152                 CL     TEMP
003530  17C5  8740 0132                 CL     ERCA
003531  17C7  8740 0131                 CL     ERCB
003532  17C9  8740 0147                 CL     FLAG
003533  17CB  8740 013A                 CL     TRNO
003534  17CD  8740 0139                 CL     ETRNO               TRACK IN ERROR
003535  17CF  8740 0151                 CL     HERR                "HARD ERROR COUNTER"
003536  17D1  8740 0137                 CL     SECT
003537  17D3  C3C0 FCD8                 LNJ    $B4,FCWA            FORM WORDS
003538                          *
003539  17D5  C3C0 FF2E          RPDA   LNJ    $B4,CIB             CLEAN THE INPUT BUFFER
003540  17D7  8740 011F                 CL     CRTRY
003541  17D9  8000 1908          RPDB   IO     <CWAD,<CBOWA        WORD A TO B
                17DB  0000 18EC
003542  17DD  0781 FFFB                 BIOF   RPDB
003543  17DF  B840 0118                 LDR    $R3,ERCA
003544  17E1  BF40 0123                 STR    $R3,RTYCT
003545  17E3  8040 0126          RPDC   IO     CWBD,CAOWB          WORD B TO A
                17E5  0040 00F9
003546  17E7  0781 FFFB                 BIOF   RPDC
003547                          *
003548  17E9  8000 18FB          RPDD   IO     <SEEK,<CBOTW        <SEEK B
                17EB  0000 18E9
003549  17ED  0781 FFFB                 BIOF   RPDD
```

```
003550                                  *
003551  17EF  81C8 011F        RPDE    IOLD    *RBUF,CAILD,BRWT
        17F1  0040 00EB
        17F3  0040 0332
003552  17F5  0781 FFF9                BIOF    RPDE
003553  17F7  8040 0106        RPDF    IO      DATA,CAOTW              READ A
        17F9  0040 00E1
003554  17FB  0781 FFFB                BIOF    RPDF
003555  17FD  CBC0 FFE5                LAB     $B4,RPDC                FOR RETRY PURPOSES
003556  17FF  A3C0 032B                LNJ     $B2,WAIT                WAIT 'TIL DONE
003557  1801  B840 0103                LDR     $R3,RTYCT
003558  1803  BF40 00F4                STR     $R3,ERCA
003559  1805  8AC0 0100                INC     TRNO                    BUMP TRACK NUMBER
003560  1807  C840 00FE                LDR     $R4,TRNO
003561  1809  C970 004D                CMR     $R4,=X'4D'              OVER MAX??
003562  180B  0900 181D        RPDL    BE      <RPDGB
003563  180D  C3C0 FC9E                LNJ     $B4,FCWA                FORM WORDS
003564                                  *
003565  180F  8040 00F8        RPDG    IO      CWAD,CAOWA              WORD A TO A
        1811  0040 00CC
003566  1813  0781 FFFB                BIOF    RPDG
003567  1815  8040 00E5        RPDGA   IO      SEEK,CAOTW
        1817  0040 00C3
003568  1819  0781 FFFB                BIOF    RPDGA
003569  181B  8740 00DB                CL      CRTRY
003570  181D  B800 18F9        RPDGB   LDR     $R3,<ERCB
003571  181F  BF40 00E5                STR     $R3,RTYCT
003572  1821  8040 00E8        RPDH    IO      CWBD,CBOWB              WORD B TO B
        1823  0040 00C9
003573  1825  0781 FFFB                BIOF    RPDH
003574                                  *
003575  1827  81C8 00E7        RPDI    IOLD    *RBUF,CBILD,BRWT
        1829  0040 00C0
        182B  0040 02FA
003576  182D  0781 FFF9                BIOF    RPDI
003577                                  *
003578  182F  8040 00CE        RPDJ    IO      DATA,CBOTW              READ B
        1831  0040 00B7
003579  1833  0781 FFFB                BIOF    RPDJ
003580  1835  CBC0 FFEB                LAB     $B4,RPDH
003581  1837  A3C0 0307                LNJ     $B2,WAITB               WAIT 'TIL DONE
003582  1839  B840 00CB                LDR     $R3,RTYCT
003583  183B  BF40 00BD                STR     $R3,ERCB
003584                                  *
003585  183D  C840 00C8                LDR     $R4,TRNO
003586  183F  C970 004D                CMR     $R4,=X'4D'              OVER MAX??
003587  1841  0901 0003                BE      RPDP
003588  1843  0F81 FF91                B       RPDA
003589  1845  8383            RPDP    JMP     $B3
003590                                  *
003591                                  *-------------------------------------------------------------------
003592                                  *
003593                                  *       COMPARE READ AND WRITE BUFFERS
003594                                  *
003595  1846  8751            CB      CL      =$R1
003596  1847  8752                    CL      =$R2
003597  1848  9CC0 00C5                LDB     $B1,BFAD                WRITE BUFFER STARTING ADDRESS
003598  184A  ACC0 00C4                LDB     $B2,RBUF                READ BUFFER STARTING ADDRESS
003599  184C  B85D            CBA     LDR     $R3,$B1.+$R1
003600  184D  C86E                    LDR     $R4,$B2.+$R2
003601  184E  B954                    CMR     $R3,=$R4                COMPARE THEM
003602  184F  0901 0009                BE      CBB
003603                                  CALL    ZV$ER,E55,ER55          SEND ERROR MESSAGE
        1851  FBC0 0003
        1853  D380 0000        X
        1855  0F80
        1856  1858
        1857  1FA4
003604  1858  8387            E55     JMP     $B7                     CONTINUE
003605  1859  6701 FFF2        CBB     BDEC    $R6,CBA
003606  185B  8387                    JMP     $B7                     RETURN TO CALLER
003607                                  *
003608                                  *
003609                                  *
003610                                  *-------------------------------------------------------------------
003611                                  *
003612                                  *       TABLE OF COMMANDS,GENERATION FOR CHANNEL A
003613                                  *
003614  185C  9840 00BA        TCGA    LDR     $R1,CHAO                CHANNEL A FOR OUTPUT
003615  185E  9A70 0001                ADD     $R1,=X'01'
003616  1860  9F40 0078                STR     $R1,CAOCW               OUTPUT CONTROL WORD
003617  1862  9A70 0002                ADD     $R1,=X'02'
003618  1864  9F40 0075                STR     $R1,CAOIC               OUTPUT INTERRUPT CONTROL
003619  1866  9A70 0004                ADD     $R1,=X'04'
003620  1868  9F40 0072                STR     $R1,CAOTW               OUTPUT TASK WORD
003621  186A  9A70 0002                ADD     $R1,=X'02'
003622  186C  9F40 006F                STR     $R1,CAOLD               IOLD
003623  186E  9A70 0006                ADD     $R1,=X'08'
003624  1870  9F40 006D                STR     $R1,CAOWA               OUTPUT WORD A
003625  1872  9A70 0002                ADD     $R1,=X'02'
003626  1874  9F40 006A                STR     $R1,CAOWB
003627                                  *
003628  1876  9840 00A1                LDR     $R1,CHAI                CHANNEL A FOR INPUT
003629  1878  9A70 0002                ADD     $R1,=X'02'
003630  187A  9F40 0065                STR     $R1,CAIIC               INPUT INTERRUPT CONTROL
003631  187C  9A70 0004                ADD     $R1,=X'04'
003632  187E  9F40 0062                STR     $R1,CAITW               INPUT TASK WORD
003633  1880  9A70 0003                ADD     $R1,=X'03'
003634  1882  9F40 005A                STR     $R1,CAILD               IOLD FOR READ
003635  1884  9A70 0003                ADD     $R1,=X'03'
003636  1886  9F40 005B                STR     $R1,CAIIR               INPUT RANGE
003637  1888  9A70 0004                ADD     $R1,=X'04'
003638  188A  9F40 0058                STR     $R1,CAIWA               INPUT CONFIG WORD A
003639  188C  9A70 0002                ADD     $R1,=X'02'
003640  188E  9F40 0055                STR     $R1,CAIWB               INPUT CONFIGURATION WORD B
003641  1890  9A70 0006                ADD     $R1,=X'06'
003642  1892  9F40 0052                STR     $R1,CAISW               INPUT STATUS WORD
003643  1894  9A70 000E                ADD     $R1,=X'0E'
003644  1896  9F40 004F                STR     $R1,CAIID               INPUT ID CODE
003645  1898  9840 0082                LDR     $R1,CHN
003646  189A  1801 003D                BLZ     $R1,TCGBA
003647                                  *
003648                                  *
```

```
003649                          *       TABLE OF COMMANDS,GENERATION FOR CHANNEL B
003650                          *
003651  189C  9840 007C                LDR     $R1,CHBO                CHANNEL B FOR OUTPUT
003652  189E  9A70 0001                ADD     $R1,=X'01'
003653  18A0  9F40 0046                STR     $R1,CBOCW               OUTPUT CONTROL WORD
003654  18A2  9A70 0002                ADD     $R1,=X'02'
003655  18A4  9F40 0043                STR     $R1,CBOIC               OUTPUT INTERRUPT CONTROL
003656  18A6  9A70 0004                ADD     $R1,=X'04'
003657  18A8  9F40 0040                STR     $R1,CBOTW               OUTPUT TASK WORD
003658  18AA  9A70 0002                ADD     $R1,=X'02'
003659  18AC  9F40 003E                STR     $R1,CBOLD               IOLD
003660  18AE  9A70 0008                ADD     $R1,=X'08'
003661  18B0  9F40 003B                STR     $R1,CBOWA               OUTPUT WORD A
003662  18B2  9A70 0002                ADD     $R1,=X'02'
003663  18B4  9F40 0038                STR     $R1,CBOWB
003664                          *
003665  18B6  9840 0063                LDR     $R1,CHBI                CHANNEL B FOR INPUT
003666  18B8  9A70 0002                ADD     $R1,=X'02'
003667  18BA  9F40 0033                STR     $R1,CBIIC               INPUT INTERRUPT CONTROL
003668  18BC  9A70 0004                ADD     $R1,=X'04'
003669  18BE  9F40 0030                STR     $R1,CBITW               INPUT TASK WORD
003670  18C0  9A70 0003                ADD     $R1,=X'03'
003671  18C2  9F40 0027                STR     $R1,CBILD               IOLD FOR READ
003672  18C4  9A70 0003                ADD     $R1,=X'03'
003673  18C6  9F40 0029                STR     $R1,CBIIR               INPUT RANGE
003674  18C8  9A70 0004                ADD     $R1,=X'04'
003675  18CA  9F40 0026                STR     $R1,CBIWA               INPUT CONFIG WORD A
003676  18CC  9A70 0002                ADD     $R1,=X'02'
003677  18CE  9F40 0023                STR     $R1,CBIWB               INPUT CONFIGURATION WORD B
003678  18D0  9A70 0006                ADD     $R1,=X'06'
003679  18D2  9F40 0020                STR     $R1,CBISW               INPUT STATUS WORD
003680  18D4  9A70 000E                ADD     $R1,=X'0E'
003681  18D6  9F40 001D                STR     $R1,CBIID               INPUT ID CODE
003682  18D8  8383              TCGBA   JMP     $B3                     RETURN TO CALLER
003683                          *
003684                          *-----------------------------------------------------------
003685                          *
003686                          *                       FUNCTION CODES
003687                          *
003688  18D9  0000              CAOCW   RESV    1,0                     CHANNEL A OUTPUR CONTROL WORD
003689  18DA  0000              CAOIC   RESV    1,0                     CHANNEL A OUTPUT INTERRUPT CONTROL
003690  18DB  0000              CAOTW   RESV    1,0                     CHANNEL A OUTPUT TASK WORD
003691  18DC  0000              CAOLD   RESV    1,0                     CHANNEL A OUTPUT IOLD FOR WRITE
003692  18DD  0000              CAILD   RESV    1,0                     CHANNEL A OUTPUT IOLD FOR READ
003693  18DE  0000              CAOWA   RESV    1,0                     CHANNEL A OUTPUT WORD A
003694  18DF  0000              CAOWB   RESV    1,0                     CHANNEL A OUTPUT WORD B
003695                          *
003696  18E0  0000              CAIIC   RESV    1,0                     CHANNELA  INPUT INTERRUPT CONTROL
003697  18E1  0000              CAITW   RESV    1,0                     CHANNEL A INPUT TASK WORD
003698  18E2  0000              CAIIR   RESV    1,0                     CHANNEL A INPUT RANGE
003699  18E3  0000              CAIWA   RESV    1,0                     CHANNEL A INPUT WORD A
003700  18E4  0000              CAIWB   RESV    1,0                     CHANNEL A INPUT WORD B
003701  18E5  0000              CAISW   RESV    1,0                     CHANNEL A INPUT STATUS WORD
003702  18E6  0000              CAIID   RESV    1,0                     CHANNEL A INPUT ID CODE
003703                          *
003704  18E7  0000              CBOCW   RESV    1,0                     BHANNEL B OUTPUT CONTROL WORD
003705  18E8  0000              CBOIC   RESV    1,0                     CHANNEL B OUTPUT INTERRUPT CONTROL
003706  18E9  0000              CBOTW   RESV    1,0                     CHANNEL B OUTPUT TASK WORD
003707  18EA  0000              CBILD   RESV    1,0
003708  18EB  0000              CBOLD   RESV    1,0                     CHANNEL B OUTPUT IOLD
003709  18EC  0000              CBOWA   RESV    1,0                     CHANNEL B OUTPUT WORD A
003710  18ED  0000              CBOWB   RESV    1,0                     CHANNEL B OUTPUT WORD B
003711                          *
003712  18EE  0000              CBIIC   RESV    1,0                     CHANNEL B INPUT INTERRUPT CONTROL
003713  18EF  0000              CBITW   RESV    1,0                     CHANNEL B INPUT TASK WORD
003714  18F0  0000              CBIIR   RESV    1,0                     CHANNEL B INPUT RANGE
003715  18F1  0000              CBIWA   RESV    1,0                     CHANNEL B INPUT WORD A
003716  18F2  0000              CBIWB   RESV    1,0                     CHANNEL B INPUT WORD B
003717  18F3  0000              CBISW   RESV    1,0                     CHANNEL B INPUT STATUS WORD
003718  18F4  0000              CBIID   RESV    1,0                     CHANNEL B INPUT ID CODE
003719                          *
003720                          ***
003721                          *
003722                          *
003723                          *       CONSTANTS AND POINTERS
003724                          *
003725  18F5  0000              TESTID  RESV    1,0                     POINTER FOR ERROR TYPEOUT
003726  18F6  0000              BMED    RESV    1,0                     BAD MEDIA CHANNEL
003727  18F7  0000              CRTRY   RESV    1,0                     CURRENT RETRYS
003728  18F8  0000              ERCA    RESV    1,0                     ERROR COUNTER FOR DRIVE A
003729  18F9  0000              ERCB    RESV    1,0                     ERROR COUNTER FOR DRIVE B
003730  18FA  0000              RCB     DC      0                       RECALIBRATE TASK WORD
003731  18FB  0100              SEEK    DC      Z'0100'                 SEEK TASK WORD
003732  18FC  8000              FMAT    DC      Z'8000'                 FORMAT R/W TASK WORD
003733  18FD  8400              SFMT    DC      Z'8400'                 FORMAT READ TASK WORD (HEADERS ONLY)
003734  18FE  8100              DATA    DC      Z'8100'                 DATA R/W TASK WORD
003735  18FF  8500              WDLD    DC      Z'8500'                 WRITE DELETED DATA TASK WORD
003736  1900  8300              DIAGN   DC      Z'8300'                 DIAGNOSTIC R/W TASK WORD
003737  1901  C000              WARW    DC      Z'C000'                 WRAPAROUND READ/WRITE TASK WORD
003738  1902  8000              INIT    DC      Z'8000'                 INITIALIZE CONTROL WORD
003739  1903  4000              SIO     DC      Z'4000'                 STOP I/O CONTROL WORD
003740  1904  0000              DP      RESV    1,0                     DATA PATTERN
003741  1905  0000              RTYCT   RESV    1,0                     RETRY COUNTER
003742  1906  0000              TRNO    RESV    1,0                     TRACK NUMBER
003743  1907  0000              ETRNO   RESV    1,0                     TRACK IN ERROR
003744  1908  0000              CWAD    RESV    1,0                     WORD A TO BE OUTPUT
003745  1909  0000              SECT    RESV    1,0                     SECTOR NUMBER
003746  190A  0000              CWBD    RESV    1,0                     WORD B TO BE OUTPUT
003747  190B  0000              SAVE    RESV    1,0                     GENERAL SAVE LOCATION
003748  190C  0000              SAVEA   RESV    1,0                     GENERAL SAVE LOCATION
003749  190D  0000              STW     RESV    1,0                     STATUS WORD
003750  190E        3000    X     BFAD    DC      <ZHCOMM+X'3000'
003751  190F        2D00    X     RBUF    DC      <ZHCOMM+X'2D00'
003752  1910  0000              EDC     DC      0                       EDC CHARACTERA ADDRESS
003753        1911              HERE    EQU     $
003754  3000                    ZERO    ORG     ZERO+X'3000'
003755  3000  3000              BUFW    DC      <ZERO+X'3000'
003756  1911                    HERE    ORG     HERE
003757  1911  0000              FLAG    RESV    1,0                     HIGH BIT SET SAYS WRITING
003758  1912  0000              RAND    RESV    1,0                     RANDOM NUMBER STORAGE
003759  1913  0000              RKR     RESV    2,0                     RECORD COUNTER
003760  1915  0000              RNG     RESV    1,0                     RANGE TO BE OUTPUT
003761  1916  0000              TEMP    RESV    1,0                     GENERAL SAVE LOCATION
```

```
003762 1917 0000                CHA0    RESV    1,0             CHANNEL A OUTPUT
003763 1918 0000                CHAI    RESV    1,0             CHANNEL A INPUT
003764 1919 0000                CHB0    RESV    1,0             CHANNEL B OUTPUT
003765 191A 0000                CHBI    RESV    1,0             CHANNEL B INPUT
003766 191B 0000                CHN     RESV    1,0             WORK AREA
003767 191C 0000                EMDRNO  RESV    1,0
003768 191D 0000                PCNT    RESV    1,0             PASS COUNTER
003769 191E 0000                ESECT   RESV    1,0             SECTOR IN ERROR
00376A 191F 0000                TOUTA   RESV    1,0             NUMBER OF RETRYS FOR TYPEOUT
00376B 1920 0000                TOUTB   RESV    1,0             CHANNEL FOR TYPEOUT
00376C 1921 0000                HERR    RESV    1,0             "HARD ERRORS"
00376D 1922 0000                FRMW    RESV    1,0
00376E 1923 0000                INCNT   RESV    1,0
00376F 1924 0000                CPFL    DC      Z'0000'
003770 1925 005C                CNTL1   DC      X'005C'         CONTROL CHARA FOR SPACE
003771 1926 0000                RSTRT   DC      0               RESTART COUNTER
003772 1927 0000                DRIVA   DC      0               NO DRIVE FALG FOR CHAN A
003773 1928 0000                DRIVB   DC      0               NODRIVE FLAG FOR CHAN B
003774 1929 0000                STATUS  DC      Z'0000'         STATUS REGISTER ENTRY
003775 192A 0000                DORIS   DC      0               INTERRUPT CONTROL FUNCTION CODE
003776 192B 0000                DRIN    DC      0               INTERRUPT CONTROL FUNCTION
003777 192C 0000                TRNOA   DC      0               TRACK NUMBER
003778 192D 2020 2020 4E4F      NOTST   TEXT    '    NO SUCH TEST, PLEASE TRY AGAIN$'
       1930 2053 5543 4820
            5445 5354 2C20
            504C 4541 5345
            2054 5259 2041
            4741 494E 2400
003785 193F 0000                PFL     DC      0
003786 1940 0000                HERTZ   DC      0               POWER FREQUENCY
003787 1941 0000                ELFL    DC      0
003788 1942 0000                RANGE   DC      0
003789 1943 0000                ANSR    RESV    3,0
003790 1946 0000                SAVEB   RESV    1,0
003791 1947 0000                FRM     DC      0
003792 1948 0000                STATWD  DC      0
003793 1949 2424                MCRLF   TEXT    '$$'
003794 194A 4649 524D 5741      MFRMW   TEXT    'FIRMWARE REVISION$'
       194D 5245 2052 4556
            4953 494F 4E24
003795 1953 2020 2020 2054      TED1    TEXT    '     TEST COMPLETED$'
       1956 4553 5420 434F
            4D50 4C45 5445
            4424
003796 195D 5752 4F4E 4720      MESG    TEXT    'WRONG FORMAT ON$'
       1960 464F 524D 4154
            204F 4E24
003797 1965 412E 2020 4241      TSTA    TEXT    'A.  BASIC CONTROLLER FUNCTIONS TEST $'
       1968 5349 4320 434F
            4E54 524F 4C4C
            4552 2046 554E
            4354 494F 4E53
            2054 4553 5420
            2400
003796 1978 422E 2020 5752      TSTB    TEXT    'B.  WRAP AROUND WRITE-READ TEST $'
       197B 4150 2041 524F
            554E 4420 5752
            4954 452D 5245
            4144 2054 4553
            5420 2400
003799 1989 452E 2020 5452      TSTE    TEXT    'E.  TRACK CAPACITY TEST $'
       198C 4143 4B20 4341
            5041 4349 5459
            2054 4553 5420
            2400
003800 1996 462E 2020 4449      TSTF    TEXT    'F.  DIAGNOSTIC WRITE-READ TEST $'
       1999 4147 4E4F 5354
            4943 2057 5249
            5445 2D52 4541
            4420 5445 5354
            2024
003801 19A6 442E 2020 4449      TSTD    TEXT    'D.  DISKETTE DRIVE DOOR TEST$'
       19A9 534B 4554 5445
            2044 5249 5645
            2044 4F4F 5220
            5445 5354 2400
003802 19B5 432E 2020 494E      TSTC    TEXT    'C.  INTERRUPT TEST  $'
       19B8 5445 5252 5550
            5420 5445 5354
            2020 2400
003803 19C0 472E 2020 4259      TSTG    TEXT    'G.  BYTE ADDRESSING TEST$'
       19C3 5445 2041 4444
            5245 5353 494E
            4720 5445 5354
            2400
003804 19CD 482E 2020 5348      TSTH    TEXT    'H.  SHORT RANGE TEST $'
       19D0 4F52 5420 5241
            4E47 4520 5445
            5354 2024
003805 19DB 492E 2020 464F      TSTI    TEXT    'I.  FORCED ERROR TEST  $'
       19DE 5243 4544 2045
            5252 4F52 2054
            4553 5420 2024
003806 19E4 4A2E 2020 5752      TSTJ    TEXT    'J.  WRITE HEADERS,ALL TRACKS,ALL SECTORS $'
       19E7 4954 4520 4845
            4144 4552 532C
            414C 4C20 5452
            4143 4B53 2C41
            4C4C 2053 4543
            544F 5253 2024
003807 19F9 4B2E 2020 5245      TSTK    TEXT    'K.  READ AND VERIFY ALL HEADERS $'
       19FC 4144 2041 4E44
            2056 4552 4946
            5920 414C 4C20
            4845 4144 4552
            5320 2400
003808 1A0A 4C2E 2020 5752      TSTL    TEXT    'L.  WRITE DATA (00000000)ALL SECTORS,ALL TRACKS $'
       1A0D 4954 4520 4441
            5441 2028 3030
            3030 3030 3030
            2941 4C4C 2053
            4543 544F 5253
            2C41 4C4C 2054
```

```
                5241 434B 5320
                2400
003609  1A23    4D2E 2020 5245          TSTM    TEXT    'M.  READ DATA ALL SECTORS, ALL TRACKS $'
        1A26    4144 2044 4154
                4120 414C 4C20
                5345 4354 4F52
                532C 2041 4C4C
                2054 5241 434B
                5320 2400
003610  1A37    4E2E 2020 5752          TSTN    TEXT    'N.  WRITE DATA (11111111) ALL SECTORS, ALL TRACKS $'
        1A3A    4954 4520 4441
                5441 2028 3131
                3131 3131 3131
                2920 414C 4C20
                5345 4354 4F52
                532C 2041 4C4C
                2054 5241 434B
                5320 2400
003611  1A51    4F2E 2020 5245          TSTO    TEXT    'O.  READ DATA ALL SECTORS, ALL TRACKS $'
        1A54    4144 2044 4154
                4120 414C 4C20
                5345 4354 4F52
                532C 2041 4C4C
                2054 5241 434B
                5320 2400
003612  1A65    502E 2020 5752          TSTP    TEXT    'P.  WRITE DATA (10101010) ALL SECTORS, ALL TRACKS $'
        1A68    4954 4520 4441
                5441 2028 3130
                3130 3130 3130
                2920 414C 4C20
                5345 4354 4F52
                532C 2041 4C4C
                2054 5241 434B
                5320 2400
003613  1A7F    512E 2020 5245          TSTQ    TEXT    'Q.  READ DATA ALL SECTORS, ALL TRACKS $'
        1A82    4144 2044 4154
                4120 414C 4C20
                5345 4354 4F52
                532C 2041 4C4C
                2054 5241 434B
                5320 2400
003614  1A93    522E 2020 5752          TSTR    TEXT    'R.  WRITE DATA (RANDOM) ALL SECTORS,ALL TRACKS $'
        1A96    4954 4520 4441
                5441 2028 5241
                4E44 4F4D 2920
                414C 4C20 5345
                4354 4F52 532C
                414C 4C20 5452
                4143 4B53 2024
003615  1AAB    532E 2020 5245          TSTS    TEXT    'S.  READ DATA ALL SECTORS, ALL TRACKS $'
        1AAE    4144 2044 4154
                4120 414C 4C20
                5345 4354 4F52
                532C 2041 4C4C
                2054 5241 434B
                5320 2400
003616  1ABF    542E 2020 5241          TSTT    TEXT    'T.  RANDOM SEEKS AND READS $'
        1AC2    4E44 4F4D 2053
                4545 4B53 2041
                4E44 2052 4541
                4453 2024
003617  1ACD    552E 2020 5550          TSTU    TEXT    'U.  UPDATE WRITES (6 RECORDS)$'
        1AD0    4441 5445 2057
                5249 5445 5320
                2836 2052 4543
                4F52 4453 2924
003618  1ADC    562E 2020 5245          TSTV    TEXT    'V.  READ AND COMPARE UPDATED RECORDS$'
        1ADF    4144 2041 4E44
                2043 4F4D 5041
                5245 2055 5044
                4154 4544 2052
                4543 4F52 4453
                2400
003619  1AEF    572E 2020 5752          TSTW    TEXT    'W.  WRITE DELETED DATA FIELDS$'
        1AF2    4954 4520 4445
                4C45 5445 4420
                4441 5441 2046
                4945 4C44 5324
003620  1AFE    582E 2020 5245          TSTX    TEXT    'X.  READ AROUND DELETED DATA FIELDS $'
        1B01    4144 2041 524F
                554E 4420 4445
                4C45 5445 4420
                4441 5441 2046
                4945 4C44 5320
                2400
003621  1B11    592E 2020 5245          TSTY    TEXT    'Y.  READ DELETED DATA FIELDS $'
        1B14    4144 2044 454C
                4554 4544 2044
                4154 4120 4649
                454C 4453 2024
003622  1B20    204E 4558 5424          MNEXT   TEXT    ' NEXT$'
003623                                  XLOC    ZHIAFB
003624                                  *
003625                                  *
003626                                  *       CONSTANTS AND TRACK INFORMATION
003627                                  *
003628  1B23    0080                    RLB     DC      X'80'           RECORD LENGTH IN BYTES
003629  1B24    0040                    RLW     DC      X'40'           RECORD LENGTH IN WORDS
003630  1B25    0068                    BRWH    DC      X'68'           BYTES TO WRITE HEADERS
003631  1B26    0D00                    BRWT    DC      X'D00'          BYTES TO READ OR WRITE TRACK
003632  1B27    1264                    WRWT    DC      X'1264'         WORDS TO WRITE OR READ TRACK
003633  1B28    1318                    BRDT    DC      X'1318'         BYTES FOR DIAGN. READ TRACK
003634  1B29    009C                    BFRT    DC      X'009C'         BYTES TO FORMAT READ ONE TRACK
003635  1B2A    0D68                    BFRT1   DC      X'0D68'
003636                                  *
003637                                  *
003638                                  *
003639                                  *       WAIT HERE UNTIL OPERATION COMPLETED
003640                                  *
003641  1B2B    D870 FFFF               WAIT    LDR     $R5,=Z'FFFF'
003642  1B2D    DF40 0035                       STR     $R5,IOTRYS
003643  1B2F    D840 FDB5                       LDR     $R5,CAISW
003644  1B31    D270 0018                       SUB     $R5,=X'18'
```

```
003845  1B33  DF40 FDE8            STR   $R5,EMDRNO
003846  1B35  C3C0 FB08            LNJ   $B4,CO          CHECK IF CHAN A. IS READY
003847  1B37  8040 FDD5  WAITA     IO    STW,CAISW
        1B39  0040 FDAB
003848  1B3B  0781 0017            BIOF  WAITAA
003849  1B3D  0F81 F9A1            B     DE
003850                      *
003851  1B3F  D870 FFFF  WAITB     LDR   $R5,=Z'FFFF'
003852  1B41  DF40 0021            STR   $R5,IOTRYS
003853  1B43  D840 FDAF            LDR   $R5,CBISW
003854  1B45  D270 0018            SUB   $R5,=X'18'
003855  1B47  DF40 FDD4            STR   $R5,EMDRNO
003856  1B49  C3C0 FB1B            LNJ   $B4,COB         CHECK IF CHAN B. IS READY
003857  1B4B  8040 FDC1  WAITBA    IO    STW,CBISW
        1B4D  0040 FDA5
003858  1B4F  0781 000B            BIOF  WAITBB
003859  1B51  0F81 F98D            B     DE
003860                      *
003861  1B53  88C0 000F  WAITAA    DEC   IOTRYS
003862  1B55  D840 000D            LDR   $R5,IOTRYS
003863  1B57  5901 000C            BEZ   $R5,WAITC
003864  1B59  0F81 FFDD            B     WAITA
003865                      *
003866  1B5B  88C0 0007  WAITBB    DEC   IOTRYS
003867  1B5D  D840 0005            LDR   $R5,IOTRYS
003868  1B5F  5901 0004            BEZ   $R5,WAITC
003869  1B61  0F81 FFE9            B     WAITBA
003870                      *
003871  1B63  0000        IOTRYS   RESV  1,0
003872                      *
003873  1B64  93C0 FA03  WAITC     LNJ   $B1,DEXA
003874                            CALL  ZV$T,TMOUT      TIME OUT
        1B66  FBC0 0003
        1B68  D380 0000       X
        1B6A  0F80
        1B6B  1B74
003875                            CALL  ZV$ER,E57,ER57  SEND ERROR MESSAGE
        1B6C  FBC0 0003
        1B6E  D380 0000       X
        1B70  0F80
        1B71  1B73
        1B72  1FAA
003876  1B73  8382        E57      JMP   $B2
003877                      *
003878  1B74  5449 4D45 4F55 TMOUT    TEXT  'TIMEOUT$'
        1B77  5424
003879                      *
003880                      *       TYPE OUT ROUTINES
003881                      *
003882                      *
003883                      RTYMSG   CALL  ZV$T,ZV$TC,RETRY  TYPE'RETRYS'
        1B78  FBC0 0003
        1B7A  D380 0000       X
        1B7C  0F80
        1B7D  1CD1
003884                            CALL  ZV$TH,TOUTA     TYPE NUMBER
        1B7E  FBC0 0003
        1B80  D380 0000       X
        1B82  0F80
        1B83  191F
003885                            CALL  ZV$T,DRNO       TYPE 'CHANNEL'
        1B84  FBC0 0003
        1B86  D380 0000       X
        1B88  0F80
        1B89  1638
003886                            CALL  ZV$TH,TOUTB     TYPE CHANNEL NUMBER
        1B8A  FBC0 0003
        1B8C  D380 0000       X
        1B8E  0F80
        1B8F  1920
003887  1B90  8381                JMP   $B1             RETURN TO CALLER
003888                      *
003889                      *
003890                      SWPMSG   CALL  ZV$T,ZV$TC,RMB  TYPE 'SUSPECT MEDIA'
        1B91  FBC0 0003
        1B93  D380 0000       X
        1B95  0F80
        1B96  1CFD
003891                            CALL  ZV$TH,BMED      ON THIS CHANNEL
        1B97  FBC0 0003
        1B99  D380 0000       X
        1B9B  0F80
        1B9C  18F6
003892                            CALL  ZV$T,ZV$TC,SWAP SWAP MEDIA
        1B9D  FBC0 0003
        1B9F  D380 0000       X
        1BA1  0F80
        1BA2  1D31
003893  1BA3  8381                JMP   $B1             RETURN TO CALLER
003894                      *
003895                      REMMED   CALL  ZV$T,ZV$TC,RRMED  REPLACE MEDIA
        1BA4  FBC0 0003
        1BA6  D380 0000       X
        1BA8  0F80
        1BA9  1D0C
003896                            CALL  ZV$T,DRNO       CHANNEL
        1BAA  FBC0 0003
        1BAC  D380 0000       X
        1BAE  0F80
        1BAF  1638
003897                            CALL  ZV$TH,TOUTB
        1BB0  FBC0 0003
        1BB2  D380 0000       X
        1BB4  0F80
        1BB5  1920
003898  1BB6  8381                JMP   $B1
003899                      *
003900                      SOLONG   CALL  ZV$T,ZV$TC,ABORT  ABORT TEST MESSAGE
        1BB7  FBC0 0003
        1BB9  D380 0000       X
        1BBB  0F80
        1BBC  1D4F
003901  1BBD  8381                JMP   $B1
```

```
003902                                          *
003903  1BBE  9F80 1916                 IOFA    STB     $B1,<TEMP
003904  1BC0  9840 FD55                         LDR     $R1,TEMP
003905  1BC2  9270 0007                         SUB     $R1,=X'07'
003906  1BC4  9F40 FD51                         STR     $R1,TEMP
003907                                          CALL    ZV$T,ZV$TC,IOF          IO FAILED
        1BC6  FBC0 0003
        1BC8  D380 0000         X
        1BCA  0F80
        1BCB  1C23
003908                                          CALL    ZV$TH,TEMP
        1BCC  FBC0 0003
        1BCE  D380 0000         X
        1BD0  0F80
        1BD1  1916
003909                                          CALL    ZV$T,DRNO               CHANNEL
        1BD2  FBC0 0003
        1BD4  D380 0000         X
        1BD6  0F80
        1BD7  1638
003910                                          CALL    ZV$TH,CHAI
        1BD8  FBC0 0003
        1BDA  D380 0000         X
        1BDC  0F80
        1BDD  1918
003911  1BDD                      IOFAA   EQU     $-$AF
003912  1BDE  AB80 1918                         LAB     $B2,<CHAI               CHANNEL NUMBER
003913  1BE0  AF80 1BDD                         STB     $B2,<IOFAA
003914                                          CALL    ZV$T,ZV$TC,ABT
        1BE2  FBC0 0003
        1BE4  D380 0000         X
        1BE6  0F80
        1BE7  1D75
003915  1BE8  9C80 1916                         LDB     $B1,<TEMP
003916                                          CALL    ZV$ER,E58,ER58          SEND ERROR MESSAGE
        1BEA  FBC0 0003
        1BEC  D380 0000         X
        1BEE  0F80
        1BEF  1BF1
        1BF0  1FAD
003917  1BF1  0F81 E53C                 E58     B       RERUN
003918                                          *
003919  1BF3  AB80 191A                 IOFB    LAB     $B2,<CHBI
003920  1BF5  AF80 1BDD                         STB     $B2,<IOFAA
003921  1BF7  0F81 FFC6                         B       IOFA
003922                                  *       MESSAGES FOR THE CONSOLE
003923                                  *
003924  1BF9  2044 4953 4B45           MESGA   TEXT    ' DISKETTE TEST  '
        1BFC  5454 4520 5445
              5354 2020
003928  1C01  2044 494D 5333           SLAF    TEXT    ' DIMS3  REV. E  '
        1C04  2020 5245 562E
              2045 2020
003929  1C09  4645 4220 3136           LLAF    TEXT    'FEB 16, 1978$'
        1C0C  2C20 3139 3738
              2400
003930  1C10  434F 5059 5249                    TEXT    'COPYRIGHT1975,76,77,78BYHONEYWELL INC.$'
        1C13  4748 5431 3937
              352C 3736 2C37
              372C 3738 4259
              484F 4E45 5957
              454C 4C49 4E43
              2E24
003931  1C23  494F 2046 4149           IOF     TEXT    'IO FAILED $'
        1C26  4C45 4420 2400
003932  1C29  2020 2020 2050           REMOVE  TEXT    '     PLEASE REMOVE PROGRAM DISKETTE FROM THE DRIVE$'
        1C2C  4C45 4153 4520
              5245 4D4F 5645
              2050 524F 4752
              414D 2044 4953
              4B45 5454 4520
              4652 4F4D 2054
              4845 2044 5249
              5645 2400
003933                                  *
003934                                  *
003935  1C43  454E 442D 4F46           MESGN   TEXT    'END-OF-TEST$'
        1C46  2D54 4553 5424
003936  1C49  5245 4144 2054           READ    TEXT    'READ THE ENTIRE DISKETTE VOLUMES$'
        1C4C  4845 2045 4E54
              4952 4520 4449
              534B 4554 5445
              2056 4F4C 554D
              4524
003937                                  *
003938  1C59  2054 4553 5420            IMA     TEXT    ' TEST A  $'
        1C5C  4120 2024
003939  1C5E  2054 4553 5420            IMB     TEXT    ' TEST B  $'
        1C61  4220 2024
003940  1C63  2054 4553 5420            IMC     TEXT    ' TEST C  $'
        1C66  4320 2024
003941  1C68  2054 4553 5420            IMD     TEXT    ' TEST D  $'
        1C6B  4420 2024
003942  1C6D  2054 4553 5420            IME     TEXT    ' TEST E  $'
        1C70  4520 2024
003943  1C72  2054 4553 5420            IMF     TEXT    ' TEST F  $'
        1C75  4620 2024
003944  1C77  2054 4553 5420            IMG     TEXT    ' TEST G  $'
        1C7A  4720 2024
003945  1C7C  2054 4553 5420            IMH     TEXT    ' TEST H  $'
        1C7F  4820 2024
003946  1C81  2054 4553 5420            IMI     TEXT    ' TEST I  $'
        1C84  4920 2024
003947  1C86  2054 4553 5420            IMJ     TEXT    ' TEST J  $'
        1C89  4A20 2024
003948  1C8B  2054 4553 5420            IMK     TEXT    ' TEST K  $'
        1C8E  4B20 2024
003949  1C90  2054 4553 5420            IML     TEXT    ' TEST L  $'
        1C93  4C20 2024
003950  1C95  2054 4553 5420            IMM     TEXT    ' TEST M  $'
        1C98  4D20 2024
003951  1C9A  2054 4553 5420            IMN     TEXT    ' TEST N  $'
        1C9D  4E20 2024
```

```
003952  1C9F 2054 4553 5420      IMO     TEXT    ' TEST O  $'
        1CA2 4F20 2024
003953  1CA4 2054 4553 5420      IMP     TEXT    ' TEST P  $'
        1CA7 5020 2024
003954  1CA9 2054 4553 5420      IMQ     TEXT    ' TEST Q  $'
        1CAC 5120 2024
003955  1CAE 2054 4553 5420      IMR     TEXT    ' TEST R  $'
        1CB1 5220 2024
003956  1CB3 2054 4553 5420      IMS     TEXT    ' TEST S  $'
        1CB6 5320 2024
003957  1CB8 2054 4553 5420      IMT     TEXT    ' TEST T  $'
        1CBB 5420 2024
003958  1CBD 2054 4553 5420      IMU     TEXT    ' TEST U  $'
        1CC0 5520 2024
003959  1CC2 2054 4553 5420      IMV     TEXT    ' TEST V  $'
        1CC5 5620 2024
003960  1CC7 2054 4553 5420      IMW     TEXT    ' TEST W  $'
        1CCA 5720 2024
003961  1CCC 2054 4553 5420      IMX     TEXT    ' TEST X $'
        1CCF 5820 2400
003962  1CD1 5245 5452 5953      RETRY   TEXT    'RETRYS;$'
        1CD4 3A24
003963  1CD5 5245 5452 5949      RTYING  TEXT    'RETRYING$'
        1CD8 4E47 2400
003964  1CDA 2020 2020 4348      CHECK   TEXT    '    CHECK LIGHT IS ON$'
        1CDD 4543 4B20 4C49
             4748 5420 4953
             204F 4E24
003965  1CE5 2050 4F57 4552      MPOWER  TEXT    ' POWER FREQUENCY$'
        1CE8 2046 5245 5155
             454E 4359 2400
003966                           *
003967                           *       ACTION MESSAGES
003968                           *
003969  1CEE 5752 4150 2041      RMA     TEXT    'WRAP AROUND WRITE/READ FAILED$'
        1CF1 524F 554E 4420
             5752 4954 452F
             5245 4144 2046
             4149 4C45 4424
003970  1CFD 5355 5350 4543      RMB     TEXT    'SUSPECT BAD MEDIA ON CHANNEL$'
        1D00 5420 4241 4420
             4D45 4449 4120
             4F4E 2043 4841
             4E4E 454C 2400
003971  1D0C 5245 4D4F 5645      RRMED   TEXT    'REMOVE AND REPLACE MEDIA$'
        1D0F 2041 4E44 2052
             4550 4C41 4345
             204D 4544 4941
             2400
003972  1D19 5452 4143 4B20      SPOUT   TEXT    'TRACK CAPACITY OUT OF TOLERANCE$'
        1D1C 4341 5041 4349
             5459 204F 5554
             204F 4620 544F
             4C45 5241 4E43
             4524
003973  1D29 5245 5354 4152      RESTRT  TEXT    'RESTART PROGRAM$'
        1D2C 5420 5052 4F47
             5241 4D24
003974  1D31 5357 4150 204D      SWAP    TEXT    'SWAP MEDIA BETWEEN  DRIVES AND TRY AGAIN$'
        1D34 4544 4941 2042
             4554 5745 454E
             2020 4452 4956
             4553 2041 4E44
             2054 5259 2041
             4741 494E 2400
003975  1D46 4452 4956 4520      CONE    TEXT    'DRIVE ON CHANNEL$'
        1D49 4F4E 2043 4841
             4E4E 454C 2400
003976  1D4F 4558 4345 5353      ABORT   TEXT    'EXCESSIVE RETRYS, TEST ABORTED$'
        1D52 4956 4520 5245
             5452 5953 2C20
             5445 5354 2041
             424F 5254 4544
             2400
003977  1D5F 204E 4F54 2052      NRDY    TEXT    ' NOT READY$'
        1D62 4541 4459 2400
003978  1D65 2044 454C 4554      DFBNS   TEXT    ' DELETED DATA FIELD BIT NOT SET$'
        1D68 4544 2044 4154
             4120 4649 454C
             4420 4249 5420
             4E4F 5420 5345
             5424
003979  1D75 5445 5354 2041      ABT     TEXT    'TEST ABORTED$'
        1D78 424F 5254 4544
             2400
003980  1D7C 494C 4C45 4741      WRONG   TEXT    'ILLEGAL CHANNEL ENTRY, TRY AGAIN$'
        1D7F 4C20 4348 414E
             4E45 4C20 454E
             5452 592C 2054
             5259 2041 4741
             494E 2400
003981  1D8D 554E 5245 4144      UNREC   TEXT    'UNREADABLE RECORDS;$'
        1D90 4142 4C45 2052
             4543 4F52 4453
             3A24
003982  1D97 4348 4543 4B20      CCN     TEXT    'CHECK CHANNEL NUMBERS$'
        1D9A 4348 414E 4E45
             4C20 4E55 4D42
             4552 5324
003983  1DA2 4259 5445 2041      BYTBAD  TEXT    'BYTE ADDRESSING MODE BAD$'
        1DA5 4444 5245 5353
             494E 4720 4D4F
             4445 2042 4144
             2400
003984  1DAF 203F 3A24           QUES    TEXT    ' ?;$'
003985                           *
003986                           *
003987                           *       CONFIGURE FOR ONE DRIVE ONLY
003988                           *   ************************************
003989                           *
003990                           *
003991  1DB1 9870 0F80           CFG     LDR     $R1,=Z'0F80'            BRANCH INSTRUCTION
003992  1DB3 9F40 E613                   STR     $R1,INCBX               STORE BRANCH INSTRUCTION
```

```
003993  1DB5  9F40 EA4B          STR   $R1,bCCCX
003994  1DB7  9F40 EBC2          STR   $R1,DWB
003995  1DB9  9F40 EC0A          STR   $R1,DWH
003996  1DBB  9F40 EC44          STR   $R1,DRB
003997  1DBD  9F40 EC8A          STR   $R1,DRGA
003998  1DBF  9F40 EFAC          STR   $R1,MDFBA
003999  1DC1  9F40 EFF4          STR   $R1,MDFG
004000  1DC3  9F40 F03E          STR   $R1,NA
004001  1DC5  9F40 F095          STR   $R1,NF1
004002  1DC7  9F40 F19B          STR   $R1,RSRAA
004003  1DC9  9F40 F1C3          STR   $R1,RSRH
004004  1DCB  9F40 F1DF          STR   $R1,RSRL
004005  1DCD  9F40 F983          STR   $R1,WPDA
004006  1DCF  9F40 F98D          STR   $R1,WPDC
004007  1DD1  9F40 F9CC          STR   $R1,WPDH
004008  1DD3  9F40 FA05          STR   $R1,RPDB
004009  1DD5  9F40 FA13          STR   $R1,RPDD
004010  1DD7  9F40 FA45          STR   $R1,RPDGB
004011  1DD9  9F40 EB05          STR   $R1,CRPMA
004012  1DDB  9F40 F66C          STR   $R1,RDFXB
004013                      *
004014                      *     PUT THE ADDRESSES IN PROPER POSITION
004015                      *
004016  1DDD  9B80 04BE          LAB   $B1,<BASC
004017  1DDF  9F80 03C8          STB   $B1,<INCBX+1
004018  1DE1  9B80 089E          LAB   $B1,<TRK
004019  1DE3  9F80 0802          STB   $B1,<bCCCX+1
004020  1DE5  9B80 0988          LAB   $B1,<DWD
004021  1DE7  9F80 097B          STB   $B1,<DWB+1
004022  1DE9  9F80 09C5          STB   $B1,<DWH+1
004023  1DEB  9B80 09EC          LAB   $B1,<DWJ
004024  1DED  9F80 09B3          STB   $B1,<DWK+1
004025  1DEF  9B80 0A1C          LAB   $B1,<DRE
004026  1DF1  9F80 0A01          STB   $B1,<DRB+1
004027  1DF3  9B80 0A12          LAB   $B1,<DRD
004028  1DF5  9F80 0A49          STB   $B1,<DRGA+1
004029  1DF7  9B80 0D7A          LAB   $B1,<MDFC
004030  1DF9  9F80 0D6D          STB   $B1,<MDFBA+1
004031  1DFB  9B80 0D68          LAB   $B1,<MDFB
004032  1DFD  9F80 0DB7          STB   $B1,<MDFG+1
004033  1DFF  9B80 0E9B          LAB   $B1,<NI
004034  1E01  9F80 0E4A          STB   $B1,<NDA+1
004035  1E03  9B80 0E0E          LAB   $B1,<NC
004036  1E05  9F80 0E03          STB   $B1,<NA+1
004037  1E07  9F80 0E5C          STB   $B1,<NF1+1
004038  1E09  9B80 0F79          LAB   $B1,<RSKDA
004039  1E0B  9F80 0F64          STB   $B1,<RSRAA+1
004040  1E0D  9B80 0F9B          LAB   $B1,<RSRJ
004041  1E0F  9F80 0F8E          STB   $B1,<RSRH+1
004042  1E11  9B80 0FB0          LAB   $B1,<RSRM
004043  1E13  9F80 0FAC          STB   $B1,<RSRL+1
004044  1E15  9B80 0F79          LAB   $B1,<RSKDA
004045  1E17  9F80 0FB8          STB   $B1,<RSRN+1
004046  1E19  9B80 1073          LAB   $B1,<UDWC
004047  1E1B  9F80 1023          STB   $B1,<UDWA+1
004048  1E1D  9B80 1132          LAB   $B1,<RUDRC
004049  1E1F  9F80 10E0          STB   $B1,<RUDRA+1
004050  1E21  9B80 11F5          LAB   $B1,<WDDC
004051  1E23  9F80 11A5          STB   $B1,<WDDAB+1
004052  1E25  9B80 13D7          LAB   $B1,<RDF
004053  1E27  9F80 1289          STB   $B1,<RDDA+1
004054  1E29  9B80 1757          LAB   $B1,<WPDB
004055  1E2B  9F80 1752          STB   $B1,<WPDA+1
004056  1E2D  9B80 17BC          LAB   $B1,<WPDJ
004057  1E2F  9F80 1782          STB   $B1,<WPDK+1
004058  1E31  9B80 1769          LAB   $B1,<WPDD
004059  1E33  9F80 175E          STB   $B1,<WPDC+1
004060  1E35  9B80 1757          LAB   $B1,<WPDB
004061  1E37  9F80 179F          STB   $B1,<WPDH+1
004062  1E39  9B80 17E3          LAB   $B1,<RPDC
004063  1E3B  9F80 17DA          STB   $B1,<RPDB+1
004064  1E3D  9B80 17EF          LAB   $B1,<RPDE
004065  1E3F  9F80 17EA          STB   $B1,<RPDD+1
004066  1E41  9B80 1845          LAB   $B1,<RPDP
004067  1E43  9F80 180C          STB   $B1,<RPDL+1
004068  1E45  9B80 17E3          LAB   $B1,<RPDC
004069  1E47  9F80 181E          STB   $B1,<RPDGB+1
004070  1E49  9B80 0A72          LAB   $B1,<DRAA
004071  1E4B  9F80 0A37          STB   $B1,<DREA+1
004072  1E4D  9B80 0DE2          LAB   $B1,<NTSTA
004073  1E4F  9F80 0DA5          STB   $B1,<MDFDA+1
004074  1E51  9B80 090B          LAB   $B1,<CRPMB
004075  1E53  9F80 08E0          STB   $B1,<CRPMA+1
004076  1E55  9B80 146E          LAB   $B1,<RDFXD
004077  1E57  9F80 1449          STB   $B1,<RDFXB+1
004078  1E59  8385                JMP   $B5                    RETURN TO CALLER
004079                      *
004080                      *
004081                      *     CONFIGURE FOR TWO DRIVE OPERATION
004082                      *  ****************************************
004083                      *
004084  1E5A  9870 8055     CTD   LDR   $R1,=Z'8055'           THIS PUTS THE PROPER
004085  1E5C  9F40 E56A           STR   $R1,INCBX              OP CODES IN POSITION
004086  1E5E  9870 9800           LDR   $R1,=Z'9800'
004087  1E60  9F40 E9A0           STR   $R1,bCCCX
004088  1E62  9870 8000           LDR   $R1,=Z'8000'
004089  1E64  9F40 EB15           STR   $R1,DWB
004090  1E66  9F40 EB99           STR   $R1,DRB
004091  1E68  9F40 EF03           STR   $R1,MDFBA
004092  1E6A  9F40 EF97           STR   $R1,NA
004093  1E6C  9F40 F8E4           STR   $R1,WPDA
004094  1E6E  9F40 F8EE           STR   $R1,WPDC
004095  1E70  9F40 F968           STR   $R1,RPDB
004096  1E72  9F40 F976           STR   $R1,RPDD
004097  1E74  9F40 F5D3           STR   $R1,RDFXB
004098  1E76  9870 8186           LDR   $R1,=Z'8188'
004099  1E78  9F40 EB4B           STR   $R1,DWH
004100  1E7A  9F40 EF3B           STR   $R1,MDFG
004101  1E7C  9F40 EFE3           STR   $R1,NG
004102  1E7E  9F40 F10E           STR   $R1,RSRH
004103  1E80  9F40 F91D           STR   $R1,WPDH
004104  1E82  9870 C380           LDR   $R1,=Z'C380'
004105  1E84  9F40 EA5A           STR   $R1,CRPMA
```

```
004106  1E86  9870 C380            LDR   $R1,=Z'C380'
004107  1E88  9F40 F0DA            STR   $R1,RSRAA
004108  1E8A  9870 A380            LDR   $R1,=Z'A380'
004109  1E8C  9F40 F11E            STR   $R1,RSRL
004110  1E8E  9870 B800            LDR   $R1,=Z'B800'
004111  1E90  9F40 F98C            STR   $R1,RPDGB
004112  1E92  9F40 EBB5            STR   $R1,DRGA
004113                        *
004114                        *
004115  1E94  8751                CL    =$R1
004116  1E95  9F00 03C8            STR   $R1,<INCBX+1
004117  1E97  9B80 191B            LAB   $B1,<CHN
004118  1E99  9F00 0802            STR   $R1,<BCCCX+1
004119  1E9B  9B80 1908            LAB   $B1,<CWAD
004120  1E9D  9F80 097B            STB   $B1,<DWB+1
004121  1E9F  9F80 0A01            STB   $B1,<DRB+1
004122  1EA1  9F80 0D6D            STB   $B1,<MDFBA+1
004123  1EA3  9F80 0E03            STB   $B1,<NA+1
004124  1EA5  9F80 1752            STB   $B1,<WPDA+1
004125  1EA7  9F80 17DA            STB   $B1,<RPDB+1
004126  1EA9  9F80 1449            STB   $B1,<RDFXB+1
004127  1EAB  9B80 18FB            LAB   $B1,<SEEK
004128  1EAD  9F80 09BD            STB   $B1,<DWG+1
004129  1EAF  9F80 175E            STB   $B1,<WPDC+1
004130  1EB1  9F80 17EA            STB   $B1,<RPDD+1
004131  1EB3  9B80 190E            LAB   $B1,<BFAD
004132  1EB5  9F80 09C5            STB   $B1,<DWH+1
004133  1EB7  9F80 0DB7            STB   $B1,<MDFG+1
004134  1EB9  9F80 179F            STB   $B1,<WPDH+1
004135  1EBB  9B80 1665            LAB   $B1,<COB
004136  1EBD  9F80 08E0            STB   $B1,<CRPMA+1
004137  1EBF  9B80 190F            LAB   $B1,<RBUF
004138  1EC1  9F80 0A4D            STB   $B1,<DRH+1
004139  1EC3  9F80 0E61            STB   $B1,<NG+1
004140  1EC5  9F80 0F8E            STB   $B1,<RSRH+1
004141  1EC7  9B80 1665            LAB   $B1,<COB
004142  1EC9  9F80 0F64            STB   $B1,<RSRAA+1
004143  1ECB  9B80 1B3F            LAB   $B1,<WAITB
004144  1ECD  9F80 0FAC            STB   $B1,<RSRL+1
004145  1ECF  9B80 0F65            LAB   $B1,<RSRA
004146  1ED1  9F80 0FB8            STB   $B1,<RSRN+1
004147  1ED3  9B80 104F            LAB   $B1,<UDWB
004148  1ED5  9F80 1023            STB   $B1,<UDWA+1
004149  1ED7  9B80 110E            LAB   $B1,<RUDRB
004150  1ED9  9F80 10E0            STB   $B1,<RUDRA+1
004151  1EDB  9B80 11D1            LAB   $B1,<WDDB
004152  1EDD  9F80 11A5            STB   $B1,<WDDAB+1
004153  1EDF  9B80 1309            LAB   $B1,<RDDB
004154  1EE1  9F80 1289            STB   $B1,<RDDA+1
004155  1EE3  9B80 0A56            LAB   $B1,<DRI
004156  1EE5  9F80 0A37            STB   $B1,<DREA+1
004157  1EE7  9B80 0DB6            LAB   $B1,<MDFG
004158  1EE9  9F80 0DA5            STB   $B1,<MDFDA+1
004159  1EEB  9B80 179E            LAB   $B1,<WPDH
004160  1EED  9F80 17B2            STB   $B1,<WPDK+1
004161  1EEF  9B80 181D            LAB   $B1,<RPDGB
004162  1EF1  9F80 180C            STB   $B1,<RPDL+1
004163  1EF3  9B80 0E60            LAB   $B1,<NG
004164  1EF5  9F80 0E4A            STB   $B1,<NDA+1
004165  1EF7  9B80 18F9            LAB   $B1,<ERCB
004166  1EF9  9F80 0A49            STB   $B1,<DRGA+1
004167  1EFB  9F80 181E            STB   $B1,<RPDGB+1
004168  1EFD  9B80 18F4            LAB   $B1,<CBIID
004169  1EFF  9FC0 E4C9            STB   $B1,INCBX+2
004170  1F01  8385                JMP   $B5                    RETURN TO CALLER
004171                        *
004172                        *
004173  1F02  4552 3031 2400  ER01  TEXT  'ER01$'
004174  1F05  4552 3032 2400  ER02  TEXT  'ER02$'
004175  1F08  4552 3033 2400  ER03  TEXT  'ER03$'
004176  1F0B  4552 3034 2400  ER04  TEXT  'ER04$'
004177  1F0E  4552 3035 2400  ER05  TEXT  'ER05$'
004178  1F11  4552 3036 2400  ER06  TEXT  'ER06$'
004179  1F14  4552 3037 2400  ER07  TEXT  'ER07$'
004180  1F17  4552 3038 2400  ER08  TEXT  'ER08$'
004181  1F1A  4552 3039 2400  ER09  TEXT  'ER09$'
004182  1F1D  4552 3130 2400  ER10  TEXT  'ER10$'
004183  1F20  4552 3131 2400  ER11  TEXT  'ER11$'
004184  1F23  4552 3132 2400  ER12  TEXT  'ER12$'
004185  1F26  4552 3133 2400  ER13  TEXT  'ER13$'
004186  1F29  4552 3134 2400  ER14  TEXT  'ER14$'
004187  1F2C  4552 3135 2400  ER15  TEXT  'ER15$'
004188  1F2F  4552 3136 2400  ER16  TEXT  'ER16$'
004189  1F32  4552 3137 2400  ER17  TEXT  'ER17$'
004190  1F35  4552 3138 2400  ER18  TEXT  'ER18$'
004191  1F38  4552 3139 2400  ER19  TEXT  'ER19$'
004192  1F3B  4552 3230 2400  ER20  TEXT  'ER20$'
004193  1F3E  4552 3231 2400  ER21  TEXT  'ER21$'
004194  1F41  4552 3232 2400  ER22  TEXT  'ER22$'
004195  1F44  4552 3233 2400  ER23  TEXT  'ER23$'
004196  1F47  4552 3234 2400  ER24  TEXT  'ER24$'
004197  1F4A  4552 3235 2400  ER25  TEXT  'ER25$'
004198  1F4D  4552 3236 2400  ER26  TEXT  'ER26$'
004199  1F50  4552 3237 2400  ER27  TEXT  'ER27$'
004200  1F53  4552 3238 2400  ER28  TEXT  'ER28$'
004201  1F56  4552 3239 2400  ER29  TEXT  'ER29$'
004202  1F59  4552 3330 2400  ER30  TEXT  'ER30$'
004203  1F5C  4552 3331 2400  ER31  TEXT  'ER31$'
004204  1F5F  4552 3332 2400  ER32  TEXT  'ER32$'
004205  1F62  4552 3333 2400  ER33  TEXT  'ER33$'
004206  1F65  4552 3334 2400  ER34  TEXT  'ER34$'
004207  1F68  4552 3335 2400  ER35  TEXT  'ER35$'
004208  1F6B  4552 3336 2400  ER36  TEXT  'ER36$'
004209  1F6E  4552 3337 2400  ER37  TEXT  'ER37$'
004210  1F71  4552 3338 2400  ER38  TEXT  'ER38$'
004211  1F74  4552 3339 2400  ER39  TEXT  'ER39$'
004212  1F77  4552 3430 2400  ER40  TEXT  'ER40$'
004213  1F7A  4552 3431 2400  ER41  TEXT  'ER41$'
004214  1F7D  4552 3432 2400  ER42  TEXT  'ER42$'
004215  1F80  4552 3433 2400  ER43  TEXT  'ER43$'
004216  1F83  4552 3434 2400  ER44  TEXT  'ER44$'
004217  1F86  4552 3435 2400  ER45  TEXT  'ER45$'
004218  1F89  4552 3436 2400  ER46  TEXT  'ER46$'
```

```
004219  1F8C  4552 3437 2400        ER47    TEXT    'ER47$'
004220  1F8F  4552 3438 2400        ER48    TEXT    'ER48$'
004221  1F92  4552 3439 2400        ER49    TEXT    'ER49$'
004222  1F95  4552 3530 2400        ER50    TEXT    'ER50$'
004223  1F98  4552 3531 2400        ER51    TEXT    'ER51$'
004224  1F9B  4552 3532 2400        ER52    TEXT    'ER52$'
004225  1F9E  4552 3533 2400        ER53    TEXT    'ER53$'
004226  1FA1  4552 3534 2400        ER54    TEXT    'ER54$'
004227  1FA4  4552 3535 2400        ER55    TEXT    'ER55$'
004228  1FA7  4552 3536 2400        ER56    TEXT    'ER56$'
004229  1FAA  4552 3537 2400        ER57    TEXT    'ER57$'
004230  1FAD  4552 3538 2400        ER58    TEXT    'ER58$'
004231  1FB0  4552 3539 2400        ER59    TEXT    'ER59$'
004232  1FB3  4552 3630 2400        ER60    TEXT    'ER60$'
004233                              *
004234                              *-----------------------------------------------------
004235                              *   THERE FOLLOWS THE ISA FOR LEVEL 20  (CLOCK)
004236                              *
004237  1FB6  0000                  L20D    RESV    $AF,0               TSAP
004238  1FB7  0000                          DC      X'0000'             DEV
004239  1FB8  FFFF                          DC      Z'FFFF'             ISM
004240  1FB9  0000                          DC      Z'0000'             ISM
004241  1FBA  0000                  L20P    RESV    $AF,0               P-REG ENTRY
004242  1FBB  0000                          DC      X'0000'             S-REG
004243  1FBC  0000                          RESV    7*$AF+9,0           ACCUMULATORS AND REGISTERS
004244                              *
004245                              *   THERE FOLLOWS THE ISA FOR LEVEL 21  (DEVICE)
004246                              *
004247  1FCC  0000                          RESV    $AF,0               TSAP
004248  1FCD  0000                  L21D    DC      X'0000'             DEV
004249  1FCE  FFFF                          DC      Z'FFFF'             ISM
004250  1FCF  0000                          DC      Z'0000'             ISM
004251  1FD0  0000                  L21P    RESV    $AF,0               P-REG ENTRY
004252  1FD1  0000                          DC      X'0000'             S-REG
004253  1FD2  0000                          RESV    7*$AF+9,0           ACCUMULATORS AND REGISTERS
004254                              *
004255                              *   THERE FOLLOWS THE ISA FOR LEVEL 22  (CP)
004256                              *
004257  1FE2  0000                          RESV    $AF,0               TSAP
004258  1FE3  0000                  L22D    DC      X'0000'             DEV
004259  1FE4  FFFF                          DC      Z'FFFF'             ISM
004260  1FE5  0000                          DC      Z'0000'             ISM
004261  1FE6  0306                  L22P    DC      <BAS                P-REG ENTRY
004262  1FE7  0000                          DC      X'0000'             S-REG
004263  1FE8  0000                          RESV    7*$AF+9,0           ACCUMULATORS AND REGISTERS
004264                              *
004265                              *-----------------------------------------------------
004266                              * THERE FOLLOWS THE LEVEL 20 INTERRUPT HANDLER ROUTINE
004267                              *
004268                              *   THIS ROUTINE WILLBE ENTERED UPON RECEIPT OF AN
004269                              *   INTERRUPT FROM THE CLOCK
004270                              *
004271  1FF8  8A80 200B             LEV20   INC     <CLKSEM             LET WHERE WE CAME FROM KNOW WE WERE HERE
004273  1FFA  9840 0000                     LDR     $R1,A4
004275  1FFC  9470 003F                     OR      $R1,=63
004277  1FFE  8E51                          LEV     =$R1                SCAN FOR NEXT PRIORITY LEVEL
004278  1FFF  0FF9                          B       >LEV20              START AT THE BEGGINING
004279                              *
004280                              *-----------------------------------------------------
004281                              *
004282                              *   THERE FOLLOWS THE LEVEL 21 INTERRUTP HANDLER ROUTINE
004283                              *   THIS ROUTINE WILL ENTERED UPON RECEIPT OF AN
004284                              *   INTERRUPT FROM DISKETT DRIVE
004285                              *
004286  2000  8A80 200A             LEV21   INC     <L21SEM             LET WHERE WE CAME FROM KNOW WE ARE HERE
004288  2002  9840 0005                     LDR     $R1,A4              ACTION FOR COMING LEVEL
004289  2004  9470 003F                     OR      $R1,=63             SET FOR LEVEL 63
004290  2006  8E51                          LEV     =$R1                SCAN FOR NEXT PRIORITY LEVEL
004291  2007  0FF9                          B       >LEV21              STATRT AT THE BEGINNING
004292                              *
004293                              *   THERE FOLLOWS THE ACTIONS FOR THE LEV INSTRUCTION
004294                              *
004295  2008  8000                  A4      DC      Z'8000'             SCHED LEVEL, SUSPEND, SCAN AND DISPATCH
004296  2009  8080                  A5      DC      Z'8080'             ENABLE TO LEVELL
004297  200A  0000                  L21SEM  DC      0
004298  200B  0000                  CLKSEM  DC      0
004299                              *
004300  200C  0100                          END     DIMS3,START
0000  ERR COUNT
     TITLE DIMS3,'REV E'
620  $A          617B    622B    719B    738B    777B    809B    842B    850B    861B    893B
             1089B   1369B   1381B   1385B   1398B   1432B   1456B   1480B   1509B   1530B
             1870B   1896B   1933B   1969B   1984B   2020B   2028B   2041B   2058B   2476B
             2528B   2593B   2722B   3089B   3111B

624  $A
722  $A
742  $A
760  $A
814  $A
846  $A
854  $A
864  $A
896  $A
1088  $A
1372  $A
1384  $A
1401  $A
1435  $A
1459  $A
1479  $A
1508  $A
1529  $A
1869  $A
1895  $A
1932  $A
1968  $A
1983  $A
2019  $A
2027  $A
2040  $A
2057  $A
2478  $A
2530  $A
```

```
2595  $A
2724  $A
3088  $A
3110  $A
      $AF     466C    467C    468C    469C    470C   1079C   1160    1164    1171    1174
              1178    1180    3266    3911    3925    3927    4237    4241    4243    4247
              4251    4253    4257    4263
 631  $B       628B    723B    781B    817B    865B    897B   1099B   1395B   1436B   1460B
             1482B   1507B   1511B   1535B   1872B   1900B   1935B   1971B   1987B   2022B
             2030B   2060B   3091B
 726  $B
 784  $B
 820  $B
 868  $B
 901  $B
1098  $B
1398  $B
1439  $B
1463  $B
1485  $B
1506  $B
1510  $B
1534  $B
1871  $B
1899  $B
1934  $B
1970  $B
1986  $B
2021  $B
2029  $B
2059  $B
3090  $B
      $B1      480     481C    618B    629B    646B    692     693C    696     697C    720B
               724B    728B    736B    750B    754B    758B    767B    778B    782B    792B
               796B    805B    818B    832B    836B    840B    848B    862B    866B    870B
               879B    890B    894B    904B    908B    918B    936     937C    940     941C
               956B    959B    984B    987B   1017B   1053    1054C   1062    1063C   1078
              1079C   1083    1084C   1122    1123C   1143    1144C   1147    1148C   1259
              1260C   1291B   1298B   1299B   1302B   1314B   1315B   1318B   1367B   1378B
              1382B   1396B   1407B   1411B   1483B   1486B   1502    1503C   1578    1579C
              1584    1586C   1597B   1603B   1647    1740B   1749B   1754B   1767B   1790B
              1800B   1821    1822    1827    1883    1884C   1892    1893    1915    1916
              1931    1932    1955    1956C   2005    2006C   2079    2080C   2160    2161C
              2171    2172C   2250    2251C   2278    2279C   2285    2286C   2296    2297C
              2303    2304C   2314    2315C   2321    2322C   2332    2333C   2339    2340C
              2353    2354C   2434    2435C   2474B   2477B   2480B   2529B   2532B   2542
              2543C   2553    2554C   2594B   2597B   2600B   2652B   2655B   2681    2682C
              2723B   2726B   2729B   2780B   2783B   2794    2795C   2860B   2865B   2891
              2892    2913B   2993B   3021    3022    3047    3048C   3148B   3151B   3181
              3186C   3187C   3218B   3223B   3234B   3239B   3244B   3249B   3254B   3259B
              3267B   3357B   3369    3370    3374    3436    3437C   3597    3599    3873B
              3887B   3893B   3898B   3901B   3903C   3915    4016    4017C   4018    4019C
              4020    4021C   4022C   4023    4024C   4025    4026C   4027    4028C   4029
              4030C   4031    4032C   4033    4034C   4035    4036C   4037C   4038    4039C
              4040    4041C   4042    4043C   4044    4045C   4046    4047C   4048    4049C
              4050    4051C   4052    4053C   4054    4055C   4056    4057C   4058    4059C
              4060    4061C   4062    4063C   4064    4065C   4066    4067C   4068    4069C
              4070    4071C   4072    4073C   4074    4075C   4076    4077C   4117    4119
              4120C   4121C   4122C   4123C   4124C   4125C   4126C   4127    4128C   4129C
              4130C   4131    4132C   4133C   4134C   4135    4136C   4137    4138C   4139C
              4140C   4141    4142C   4143    4144C   4145    4146C   4147    4148C   4149
              4150C   4151    4152C   4153    4154C   4155    4156C   4157    4158C   4159
              4160C   4161    4162C   4163    4164C   4165    4166C   4167C   4168    4169C
      $B2      683     685C    687C    689C   1057   1059C   1060    1267    1269C   1271C
              1273C   1512B   1524B   1531B   1543B   1558B   1620B   1648B   1687B   1688
              1714B   1715    1853B   1877B   1882B   1897B   1905B   1920B   1936B   1979B
              1990B   2023B   2093B   2108B   2138B   2194B   2228B   2396B   2400B   2467B
              2483B   2516B   2535B   2545B   2586B   2602B   2638B   2658B   2715B   2732B
              2766B   2786B   3098B   3112B   3192B   3262B   3300B   3358B   3394B   3489B
              3513B   3556B   3581B   3598    3600    3876B   3912    3913C   3919    3920C
      $B3      592B    607B    676B    1056    1059C   1388B   1417B   1467B   1691B   1718B
              1846B   1855B   2200B   2236B   2283B   2288B   2301B   2306B   2319B   2324B
              2335B   2342B   2439B   2443B   2447B   2451B   2455B   2459B   2485B   2489B
              2493B   2497B   2501B   2505B   2509B   2537B   2558B   2562B   2566B   2570B
              2574B   2578B   2607B   2611B   2615B   2619B   2623B   2627B   2631B   2662B
              2686B   2690B   2694B   2698B   2702B   2706B   2734B   2738B   2742B   2746B
              2750B   2754B   2758B   2788B   2803B   2811B   2819B   2827B   2835B   2843B
              2911B   2929B   2937B   2945B   2953B   2961B   2969B   3041B   3052B   3056B
              3060B   3064B   3068B   3072B   3115B   3387B   3521B   3589B   3682B
      $B4      716B    746B    828B    858B   1478B   1505B   1526B   1589B   1592B   1619
              1629B   1635B   1657B   1699B   1960B   2092B   2106    2117B   2122B   2136
              2147B   2185    2189    2207B   2219    2223    2359B   2360B   2395    2399
              2469B   2518B   2588B   2640B   2717B   2768B   2852B   2976B   3085B   3166B
              3296B   3328B   3343B   3442B   3468B   3488    3495B   3512    3537B   3539B
              3555    3563B   3580    3846B   3856B
      $B5      610B    611B    615B    684     685C    686     687C    688     689C    694
               695C   1268    1269C   1270    1271C   1272    1273C   2362B   2373B   3174B
              3176B   3351B   3425B   4078B   4170B
      $B6     2471B   2590B   2719B   2854B   3202B   3360B   3407B
      $B7     1993B   2605B   2660B   3100B   3114B   3604B   3606B
 730  $C       727B    749B    753B    785B    831B    869B    903B    955B   1406B   1440B
             1516B   1537B   1540B   1879B   1902B   1973B   1989B   2032B   2062B   3093B
 752  $C
 756  $C
 789  $C
 834  $C
 872  $C
 906  $C
 958  $C
1409  $C
1443  $C
1515  $C
1536  $C
1539  $C
1878  $C
1901  $C
1972  $C
1988  $C
2031  $C
2061  $C
3092  $C
 734  $D       730B    757B    791B    835B    873B    907B    983B   1410B   1414B   1444B
             1518B   1881B   1904B   2012B   2043B   3097B
```

```
 760  $D
 794  $D
 838  $D
 877  $D
 910  $D
 986  $D
1413  $D
1447  $D
1517  $D
1880  $D
1903  $D
2011  $D
2042  $D
3096  $D
 738  $E     735B   761B   795B   839B   878B  1016B  1366B  1424B  1448B  1521B
             1890B  1917B  1976B  2014B  2045B  3105B
 765  $E
 798  $E
 842  $E
 881  $E
1019  $E
1369  $E
1427  $E
1451  $E
1520  $E
1889  $E
1916  $E
1975  $E
2013  $E
2044  $E
3104  $E
 769  $F     766B   804B   847B   889B  1377B  1428B  1452B  1528B  1894B  1919B
             1978B  2016B  2047B  3107B
 807  $F
 850  $F
 892  $F
1360  $F
1431  $F
1455  $F
1527  $F
1893  $F
1918  $F
1977  $F
2015  $F
2046  $F
3106  $F
      $R1     456    457    459    460    464   465C   466C   467C   468C   469C
             470C    483   484C    488    489    496    497   498C    501   502C
              504    506    511C   516C   522   523C    528    529   530C    531
              537    539    562   563C    571    572   573C    577    578   579C
              582   583C    584    585C   587   588C    589   590C    595    596
             597C    608   609B    624    625   626B    642    643    644    662
              663    669    682   685C   687C   689C    690   691C    699    700
              701    742   743C    744   745C    814   815B    854   855C    856
             857C   917B   943C   945C    946   947C    948   949C    958    986
              994    995    997   1001  1002B  1003   1004C  1005  1006C  1026
            1027B  1028   1029C  1069   1070   1071   1072   1073C  1074   1075
            1076   1077B  1081   1082C  1084C  1103   1104B  1105   1106B  1119
            1120C  1121   1124   1146   1148C  1263   1264   1265   1266   1269C
            1271C  1273C  1275   1276   1277C  1280   1281   1283C  1284   1285C
            1286   1287C  1304   1305   1320   1321   1322   1327   1328   1330
            1331C  1332   1333C  1334   1335C  1336   1337   1392   1393B  1476
            1477C  1485   1514   1515   1522   1523C  1533   1534   1541   1542C
            1582C  1586C  1729   1732b  1742   1743C  1747   1748C  1752   1753C
            1763   1764C  1819C  1822   1825   1827   1891   1893   1907   1908
            1914   1916   1922   1923   1930C  1932   1938   1939   1963   1964C
            1965   1966C  1981C  1982C  2039   2040   2056   2057   2197   2198C
            2233C  2281C  2282C  2299   2300C  2317   2318C  2437   2441   2445
            2449   2453   2457   2465C  2466C  2487   2491   2495   2499   2503
            2507   2514C  2515C  2540C  2543C  2556   2560   2564   2568   2572
            2576   2584C  2585C  2609   2613   2617   2621   2625   2629   2636C
            2637C  2684   2688   2692   2696   2700   2704   2713C  2714C  2736
            2740   2744   2748   2752   2756   2764C  2765C  3050   3054   3058
            3062   3066   3070   3082C  3083C  3121   3136   3137   3138C  3139C
            3140   3141C  3157   3158   3159C  3163   3164   3165C  3171   3172
            3182C  3186C  3187C  3207   3212   3215   3216   3217B  3221   3222B
            3232   3233B  3237   3238B  3242   3243B  3247   3248B  3252   3253B
            3257   3258B  3330   3345   3365C  3370   3374   3383   3385   3433C
            3437C  3595C  3599   3614   3615   3616C  3617   3618C  3619   3620C
            3621   3622C  3623   3624C  3625   3626C  3628   3629   3630C  3631
            3632C  3633   3634C  3635   3636C  3637   3638C  3639   3640C  3641
            3642C  3643   3644C  3645   3646B  3651   3652   3653C  3654   3655C
            3656   3657C  3658   3659C  3660   3661C  3662   3663C  3665   3666
            3667C  3668   3669C  3670   3671C  3672   3673C  3674   3675C  3676
            3677C  3678   3679C  3680   3681C  3904   3905   3906C  3991   3992C
            3993C  3994C  3995C  3996C  3997C  3998C  3999C  4000C  4001C  4002C
            4003C  4004C  4005C  4006C  4007C  4008C  4009C  4010C  4011C  4012C
            4084   4085C  4086   4087C  4088   4089C  4090C  4091C  4092C  4093C
            4094C  4095C  4096C  4097C  4098   4099C  4100C  4101C  4102C  4103C
            4104   4105C  4106   4107C  4108   4109C  4110   4111C  4112C  4115C
            4116C  4118C  4272   4273   4274   4284   4285   4286
      $R2     505    508    511C   513    517C   598   599B   600C   601    602C
              605   606C    644    647C   648    649    652    653    654   655C
              919   920B   1130   1131   1133   1190   1191   1192   1197   1199
            1200   1205C  1206   1207   1209   1217   1219   1223   1225B  1583C
            1586C  1588C  1590   1591B  1598   1599B  1621   1623   1625   1626
            1632   1633   1649   1651   1653   1654   1659   1660   1696   1697
            1722   1723   1730   1733B  1738   1739C  1746C  1755   1775   1822
            1823   1827   1828   1830   1833   1835   1838   1850   1851   2109
            2111   2113   2114   2119   2120   2139   2141   2143   2144   2234
            2235C  2438   2442   2446   2450   2454   2458   2488   2492   2496
            2500   2504   2508   2543C  2557   2561   2565   2569   2573   2577
            2610   2614   2618   2622   2626   2630   2685   2689   2693   2697
            2701   2705   2737   2741   2745   2749   2753   2757   2872   2874
            2878   2882   2892   2893   2896   2899   2902   2905   2908   3000
            3002   3006   3010   3022   3023   3026   3029   3032   3035   3038
            3051   3055   3059   3063   3067   3071   3084C  3208   3209B  3596C
            3600
      $R3    1585   1587B  1679   1680C  1689   1690C  1692   1693C  1706   1707C
            1716   1717C  1719   1720C  1731   1734B  1737C  1750B  1751C  1757
            1772   1777   1781   2190   2191C  2195   2196C  2224   2225C  2237
            2238C  2880   2881   2882   3008   3009   3010   3198   3199   3200
            3201C  3293   3294   3543   3544C  3557   3558C  3570   3571C  3582
```

```
                3583C   3599    3601
        $R4      965    966     970     971    1140   1141   1142   1226   1227   1230
                1784   1785    1787C   1795   1796   1798C  1886   1887C  2149   2150
                2252   2253    2255    2256   2261   2262   2406   2407B  2412   2413B
                3183   3184    3186C   3350   3370   3371   3374   3375   3391   3392
                3409   3410    3411    3413   3415   3416C  3417   3418   3419   3421
                3423   3424C   3434C   3437C  3459   3460C  3469   3470B  3492   3493
                3502   3503B   3504    3505   3515   3516   3518   3519B  3560   3561
                3585   3586    3600    3601
        $R5      616    620     621     627    631    632    726    730B   734    738B
                 756    760     765     769    780    784    789C   790    794    798B
                 803    807     808     816    820    821    838    842B   846    850B
                 868    872     877     881    892    896    901C   902    906    910B
                 960    962B    989     992B   1085   1087   1088   1090   1091C  1102
                1103   1115B   1116    1128   1132   1133   1137   1138   1152B  1187
                1189   1192    1196    1198   1200   1204   1207   1228   1365   1369B
                1372   1373B   1375C   1376   1384   1387B  1394   1398B  1401   1402B
                1404C  1405    1413    1416B  1423   1424B  1427   1428B  1431   1432B
                1435   1436B   1439    1440B  1443   1444B  1447   1448B  1451   1452B
                1455   1456B   1459    1460B  1463   1464B  1488   1491   1492B  1520
                1539   1549    1552    1554   1556   1594C  1595   1601   1783   1785
                1794   1796    1867C   1869   2031   2034   2035B  2046   2049   2050B
                2061   2063    2064B   2230   2231   2232C  2541   2544B  2870   2885
                2886B  2998    3013    3014B  3185C  3187C  3188   3190   3271   3273
                3274C  3280    3282    3283C  3324   3326C  3327B  3339   3341C  3342B
                3366   3367    3371    3435C  3438   3440   3841   3842C  3843   3844
                3845C  3851    3852C   3853   3854   3855C  3862   3863B  3867   3868B
        $R6     1064   1070    1075    1081   1092C  1093C  1105   1118C  1145   1146
                1153B  1188    1209    1217   1605   1606C  1974   1975   1985   1986
                1992C  2089    2090C   2203   2204C  2205   2240   2241   2356C  2398C
                2402C  2403    2481    2482C  2533   2534C  2603   2657   2730   2731C
                2784   2785C   2857    2858   2986   2987   3099   3113   3227   3228
                3229   3269    3270    3271   3278   3279   3280   3368C  3375   3378
                3379   3464    3465C   3605B
        $R7      942   1009B   1097    1100B  1126   1127B  1820C  1841C  1843   2797
                2798C  2799    2800C   2801   2802C  2805   2806C  2807   2808C  2809
                2810C  2813    2814C   2815   2816C  2817   2818C  2821   2822C  2823
                2824C  2825    2826C   2829   2830C  2831   2832C  2833   2834C  2837
                2838C  2839    2840C   2841   2842C  2923   2924C  2925C  2926C  2927
                2928C  2931    2932C   2933C  2934C  2935   2936C  2939   2940C  2941C
                2942C  2943    2944C   2947   2948C  2949C  2950C  2951   2952C  2955
                2956C  2957C   2958C   2959   2960C  2963   2964C  2965C  2966C  2967
                2968C
4291    A4       699   4272    4284
4292    A5      1263
3976    ABORT   3900
3979    ABT     1808   2265    2915    3914
2265    ABTT
3789    ANSR     525    528
 501    ASR1     493B
 713    BAS      694   4261
 925    BASC     815B   910B    912B    4016
1912    BATA    1909B  1913B
1928    BATB    1924B  1929B
 647    BC1      645B
 641    BCC      626B   633B
 775    BCCB     770B
 887    BCCBX    882B
1365    BCCC
1392    BCCCX   1387B  3993C   4019C   4087C  4118C
1375    BCCD    1370B  1399B
 826    BCCX     822B
3750    BFAD     775    790     887     902    947C   951   1006C  1508   1527   1584
                1615   1643    1878    1892   1975   1982C  2019   2101   2131   2472
                2525   2542    2724    2778   3181   3484   3508   3597   4131
3834    BFRT    2183   2217
3835    BFRT1   2187   2221
3726    BMEL    1743C  1764C   1783    1794   3891
3633    BRDT     775    887    1682    1709
3630    BRWH    1508   1527    1615    1643   1878   2101   2131
3631    BRWT    3484   3508    3551    3575
3755    BUFW    1888   1962    1967    2010   3086   3461   3463   3471
1867    BYT     1501B  1806B   1810B
3983    BYTBAD
1945    BYTC    1940B
1476    CABS    1373B  1393B   1402B   1416B
1488    CABSA   1489B
1498    CABSB   1492B  1499B
3696    CAIIC   3630C
3702    CAIID    616   3644C
3698    CAIIR    780    794     960     989   1549   1621   2109   2872   3636C
3692    CAIED    978   1515    1682    1901   1916   1932   1986   2027   2042   2183
                2187   2389    2595    2858   3094   3551   3634C
1342    CAIST   1285C  1289    1300    1316   1333C
3701    CAISW   1284   1365    1384    1488   1520   2031   2046   2061   2870   3324
                3642C  3843    3847
3697    CAITW   3632C
3699    CAIWA    726    756    3638C
3700    CAIWB    734    765    2878    3640C
3688    CAOCW   1015   1098    1150    1498   1506   1667   1871   2054   2082   2163
                3449   3527    3616C
3689    CAOIC   1088   1286    1376    1595   1869   3618C
3691    CAOLD    775    790     951    1508   1615   1878   1893   1975   2019   2101
                2472   2724    3484    3622C
3690    CAOTW    954    982    1380    1481   1510   1517   1617   1639   1685   1703
                1880   1895    1903    1918   1934   1972   1977   1988   2015   2021
                2029   2044    2059    2104   2127   2192   2211   2380   2392   2478
                2598   2727    2863    3092   3096   3355   3486   3499   3553   3567
                3620C
3693    CAOWA    718    748    1479    1636   1700   1968   2011   2057   2124   2209
                2374   3088    3353    3496   3565   3624C
3694    CAOWB    722    752    1889    1899   1912   1928   1970   1983   2013   2025
                2040   2377    2475    2592   2721   2861   3090   3475   3545   3626C
3595    CB      1993B  2605B   2660B   3100B  3114B
3599    CBA     3605B
3605    CBB     3602B
3712    CBIIC   3667C
3718    CBIID    627    803     816    3681C  4168
3714    CBIIR    892    906    1552    1649   2139   3000   3673C
3707    CBILD   1534   1709    2217    2221   2383   2650   2987   3108   3575   3671C
3717    CBISW   1332   1394    1413    1539   2998   3339   3679C  3853   3857
3713    CBITW   3669C
3715    CBIWA    838    868    3675C
```

```
                2435C   2554C   2682C   2795C   3048C
3978  DFBNS
3736  DIAGN     1517    1536    1685    1712    2021
      DIMS3        1    4296
1157  DLVL      1091C   1128    1187    1196
2296  DNN
2307  DNNC
1467  DNRA      1464B
1259  DOR       1240B   1244B
1288  DORA      1340B
1292  DORA1     1290B
1310  DORA2     1293B   1306B
1304  DORA3     1301B
1320  DORA4     1317B
1299  DORA8     1297B
1315  DORA9     1313B
1327  DORB1     1282B   1323B
1350  DORC      1308B   1325B   1329B   1338B
3133  DORIN     1299B   1315B
3761  DORIS     1287C   1296    1312    1335C
3740  DP        1887C   1888    1961C   1962    1964C   1967    2282C   2300C   2318C   3084C
                3086    3463
1667  DR        1661B   1668B
1729  DRAA      1724B   4070
1737  DRAB      1734B
1746  DRAC      1733B
1763  DRAD      1750B
1766  DRAE      1744B
1772  DRAF      1756B
1742  DRAG      1758B
1775  DRAH      1732B
1781  DRAI      1776B
1790  DRAJ      1782B
1800  DRAK      1788B
1804  DRAL      1773B
1794  DRAM      1778B
1808  DRAN      1786B   1797B
1674  DRB       1675B   1725B   3996C   4026C   4090C   4121C
1676  DRC       1677B
1682  DRD       1683B   1688    4027
2343  DRDC
2339  DRDD
1685  DRE       1686B   4025
1698  DREA      4071C   4156C
1700  DRF       1701B
1703  DRG       1704B
1706  DRGA      3997C   4028C   4112C   4166C
1709  DRH       1710B   1715    4138C
1712  DRI       1698B   1713B   4155
3782  DRIN      1277C   1296    1312
3778  DRIVA      478C    510     548     569
3779  DRIVB      479C    515     550     557     574    1327
3317  DRNG      2410    3225    3285    3397    3885    3896    3909
1608  DWAB      1602B
1605  DWAC      1599B
1609  DWB       1610B   1662B   3994C   4021C   4089C   4120C
1611  DWC       1612B
1615  DWD       1616B   1619    4020
1617  DWE       1618B
1621  DWEA      1622B
1631  DWEB      1624B
1636  DWF       1637B
1639  DWG       1640B   4128C
1643  DWH       1634B   1644B   1647    3995C   4022C   4099C   4132C
1645  DWI       1646B
1649  DWIA      1650B
1659  DWIB      1652B
1661  DWJ       4023
1634  DWK       4024C
1586  DWW       1587B
1594  DWX       1591B
1598  DWXA      1596B
2314  DZN
2325  DZNC
2278  DZZ       2258B   2267B   2269B
2289  DZZC
 463  E01        462
 543  E02        542
 561  E03        560
 637  E04        636
 673  E05        672
 703  E06        702
 732  E07        731
 740  E08        739
 763  E09        762
 772  E10        771
 787  E11        786
 800  E12        799
 812  E13        811
 824  E14        823
 844  E15        843
 852  E16        851
 875  E17        874
 884  E18        883
 899  E19        898
 912  E20        911
1037  E21       1036
1110  E22       1109
1114  E23       1113
1136  E24       1135
1195  E25       1194
1203  E26       1202
1214  E27       1213
1222  E28       1221
1233  E29       1232
1308  E30       1307
1325  E31       1324
1470  E32       1469
1494  E33       1493
1564  E34       1563
1769  E35       1768
1792  E36       1791
1803  E37       1802
```

```
1806  E38       1805
1810  E39       1809
1911  E40       1910
1926  E41       1925
1942  E42       1941
2037  E44       2036
2052  E45       2051
2066  E46       2065
2267  E47       2266
3016  E48       3015
3123  E49       3122
3151  E50       3149
3176  E51       3175
3299  E52       3298
3334  E53       3333
3402  E54       3401
3604  E55       3603
3876  E57       3875
3917  E58       3916
2877  E59       2876     3292
3005  E60       3004
3752  EDC
3767  ELFL       527C     533      659      666C     1239
3767  EMDRNO    3120     3121     3226     3227     3269     3278     3286     3845C    3855C
4173  ER01       462
4174  ER02       542
4175  ER03       560
4176  ER04       636
4177  ER05       672
4178  ER06       702
4179  ER07       731
4180  ER08       739
4181  ER09       762
4182  ER10       771
4183  ER11       786
4184  ER12       799
4185  ER13       811
4186  ER14       823
4187  ER15       843
4188  ER16       851
4189  ER17       874
4190  ER18       883
4191  ER19       898
4192  ER20       911
4193  ER21      1036
4194  ER22      1109
4195  ER23      1113
4196  ER24      1135
4197  ER25      1194
4198  ER26      1202
4199  ER27      1213
4200  ER28      1221
4201  ER29      1232
4202  ER30      1307
4203  ER31      1324
4204  ER32      1469
4205  ER33      1493
4206  ER34      1563
4207  ER35      1768
4208  ER36      1791
4209  ER37      1802
4210  ER38      1805
4211  ER39      1809
4212  ER40      1910
4213  ER41      1925
4214  ER42      1941
4215  ER43
4216  ER44      2036
4217  ER45      2051
4218  ER46      2065
4219  ER47      2266
4220  ER48      3015
4221  ER49      3122
4222  ER50      3149
4223  ER51      3175
4224  ER52      3298
4225  ER53      3333
4226  ER54      3401
4227  ER55      3603
4228  ER56
4229  ER57      3875
4230  ER58      3916
4231  ER59      2876     3292
4232  ER60      3004
3728  ERCA      1670C    1679     1689     1693C    1730     2167C    2190     2196C    2252     2357C
                2406     2408     3453C    3530C    3543     3558C
3729  ERCB      1671C    1706     1716     1720C    1731     2168C    2224     2238C    2255     2358C
                2412     2414     3454C    3531C    3570     3583C    4165
3304  ERMA      3219
3305  ERMB      3224
3306  ERMC      3235
3307  ERMD      3240
3308  ERME      3245
3309  ERMF      3250
3310  ERMG      3255
3311  ERMH      3260
3769  ESECT     3283C    3284
3743  ETRNO     3274C    3275     3534C
2540  FBS       2467B    2516B    2586B    2638B    2715B    2766B
2543  FBSA      2544B
3157  FCWA       716B     746B     828B     858B    1478B    1635B    1699B    2092B    2122B    2207B
                2469B    2518B    2588B    2640B    2717B    2768B    2852B    2976B    3085B    3468B
                3495B    3537B    3563B
2005  FET
2025  FETA      2026B
2039  FETB      2018B    2035B
2068  FETC      2055B
2054  FETT      2050B
3757  FLAG      1606C    1673C    2090C    2165C    2482C    2534C    2601C    2656C    2731C    2785C
                2851C    2975C    3208     3465C    3532C
3732  FMAT      1510     1529     1617     1645     1880     2104     2134     2192     2226
2079  FMT       2064B
2268  FMTC      3402B
```

```
3181  FP        1877B   2093B
3186  FPA       3191B
3192  FPB       3189B
3791  FRM
3773  FRMW       655C    657
3198  GRN       3407B
3407  GRW       2362B   2373B
3411  GRWA      3414B
3415  GRWB      3412B
3419  GRWC      3422B
3423  GRWD      3420B
1160  HOOBF     1060
3753  HERE      3756
3772  HERR      2166C   2261    2264    3297C   3452C   3535C
3786  HERTZ      495     496     498C    502C    3136
 548  ICANA      538B    540B
 537  ICNA       532B
 550  ICNC
 553  ICND       551B
 556  ICNE       549B
 569  ICNF       535B
 582  ICNF1      570B
 587  ICNF2      575B
 592  ICNF3      580B
 577  ICNF4      586B
 504  ICNG       490B    499B
 513  ICNG1      507B
 516  ICNG2      509B    512B    514B
 562  ICNK       558B
3314  IDRNO      485
3938  IMA        940
3939  IMB        936
3940  IMC       1053
3941  IMD       1259
3942  IME       1502    1883
3943  IMF       1578
3944  IMG
3945  IMH       1955
3946  IMI       2005
3947  IMJ       2079
3948  IMK       2160
3949  IML       2278
3950  IMM       2285
3951  IMN       2296
3952  IMO       2303
3953  IMP       2314
3954  IMQ       2321
3955  IMR       2332
3956  IMS       2339
3957  IMT       2353
3958  IMU       2434
3959  IMV       2553
3960  IMW       2681    3047
3961  IMX       2794
 595  INC        552B    554B    565B
 605  INCA       599B
 607  INCB       603B
 803  INCBX      798B   3992C   4017C   4085C   4116C   4169C
 615  INCC       609B
 616  INCCA      480     593B    612B
 635  INCCB      623B    812B    824B
 612  INCD       481C
3774  INCNT     1056C   1185C
1423  INDW      1388B   1417B
1469  INDWA     1425B   1429B   1433B   1437B   1441B   1445B   1449B   1453B   1457B   1461B
                1465B
3738  INIT      1380    1409    1498    1506    1667    1871    2054    2082    2163    3449
                3527
 682  INITZ      660B    667B
1053  INT        926B
3931  IOF       3907
3903  IOFA       618B    646B    720B    724B    726B    736B    750B    754B    758B    767B
                 778B    782B    792B    796B    805B    818B    832B    836B    840B    848B
                 862B    866B    870B    879B    890B    894B    904B    908B    956B    984B
                1017B   1291B   1298B   1302B   1314B   1318B   1367B   1378B   1382B   1396B
                1407B   1411B   1483B   1597B   1603B   2474B   2477B   2480B   2529B   2532B
                2594B   2597B   2600B   2652B   2655B   2723B   2726B   2729B   2780B   2783B
                2860B   2865B   2993B   3357B   3921B
3911  IOFAA     3913C   3920C
3919  IOFB       629B
3871  IOTRYS    3842C   3852C   3861C   3862    3866C   3867
1238  IRUPC     1110B   1114B   1136B   1154B   1168    1195B   1203B   1214B   1222B   1233B
1174  ISAR
1175  ISARD      105B    1083    1190
1178  ISARP      467C    1063C   1123C   1144C
1164  ISAT
1165  ISATD      107B    1147
1169  ISATP      466C    1183C   1184C
4238  L20D       684     1268
4241  L20P       468C     693C
4248  L21D       686     1270
4251  L21P       469C     697C
4293  L21SEM    3134C   3145    4283C
4256  L22D       688     1272
4261  L22P       470C     695C
4271  LEVZ0      692     4275B
4283  LEVZ1      696     4287B
3929  LLAF      3927
3793  MCRLF
2082  MDFA      2083B
2092  MDFB      2152B   4031
2095  MDFBA     2096B   3998C   4030C   4091C   4122C
2098  MDFBB     2099B
2101  MDFC      2102B   2106    4029
2104  MDFD      2105B
2121  MDFDA     4073C   4158C
2109  MDFDB     2110B
2118  MDFDC     2112B
2124  MDFE      2125B
2127  MDFF      2128B
2131  MDFG      2121B   2132B   2136    3999C   4032C   4100C   4133C   4157
2134  MDFH      2135B
2139  MDFHA     2140B
```

```
2149  MDFHB    2142B
3796  MESG     3396
3924  MESGA     472
3935  MESGN     677    1241   1245   2671   3076
3794  MFRMW     656
3822  MNEXT     521
3965  MPOWER    494
2174  MA       2175B   2243B  4000C  4036C  4092C  4123C
2177  MB       2178B
2183  MBC      2184B   2185
2179  MC       4035
2187  MC1      2181B   2188B  2189
2190  MC2      2186B
2192  MD       2193B
2206  MDA      4034C   4164C
2209  ME       2210B
 520  MEXT      543B    926B  1039B  1351B  1567B  1858B  1946B  1996B  2069B  2270B
                2290B  2308B  2326B  2344B  2422B  3074B
 525  MEXTA
2211  MF       2212B
2215  MF1      2206B   4001C  4037C
2217  MG       2218B   2219   4101C  4139C  4163
2221  MG1      2216B   2222B  2223
2224  MG2      2220B
2226  MH       2227B
2250  MI       2242B   4033
2261  ML       2254B   2257B
 464  MOTLIT    461B
3784  MOTST     541     671
3977  MRDY     3332
2160  MTSTA    2151B   4072
2163  MTSTAA   2164B
1343  OPEN1    1294
3768  PCNT     1729    1759C  1766C  1801C
3785  PFL       526C    534C   665C   674    925   1038   1243   1350   1566   1857
                1945    1995   2068   2268   2289   2307   2325   2343   2421   3073
1159  PLVL     1092C   1120C  1188
3984  QUES
3758  RAND     3198    3201C  3409   3417
3788  RANGE     523C    525
3751  RBUF      945C    978    994   1515   1534   1682   1709   1821   1901   1907
                1915   1922   1931   1938   1986   2027   2042   2183   2187   2217
                2221   2383   2389   2595   2650   2858   2891   2987   3021   3094
                3108   3369   3436   3551   3575   3598   4137
3750  RCB      3229
2794  RDD      2759B
2646  RDDA     4053C   4154C
2923  RDDB     2846B   4153
2851  RDDX     2803B   2811B  2819B  2827B  2835B  2843B
2861  RDDXA    2859B   2862B
2891  RDDXC    2886B
2896  RDDXCB   2894B
2899  RDDXCC   2897B
2902  RDDXCD   2900B
2905  RDDXCE   2903B
2908  RDDXCF   2906B
2911  RDDXCG   2909B
2913  RDDXCH   2895B   2898B  2901B  2904B  2907B  2910B  3025B  3028B  3031B  3034B
                3037B   3040B
2975  RDDY     2929B   2937B  2945B  2953B  2961B  2969B
2987  RDDYA    2988B
2991  RDDYB    2990B
2978  RDDYC    2979B
3021  RDDYCA   3014B
3026  RDDYCB   3024B
3029  RDDYCC   3027B
3032  RDDYCD   3030B
3035  RDDYCE   3033B
3038  RDDYCF   3036B
3041  RDDYCG   3039B
2981  RDDYD    2982B
3047  RDF      2970B   4052
3076  RDFA
3082  RDFX     3052B   3056B  3060B  3064B  3068B  3072B
3094  RDFXA    3095B
3102  RDFXB    3103B   4012C  4077C  4097C  4126C
3108  RDFXC    3109B
3115  RDFXD    4076
 669  RDV1      664B
 674  RDV2      670B
3936  READ      675
3695  REMMED   1800B
3932  REMOVE    473
 476  RERUN     458B    561B   637B   673B   678B  1246B  2672B  2916B  3077B  3123B
                3334B   3917B
3973  RESTRT
3962  RETRY    2409    2415   3883
3828  RLB      1893    1901   1916   1932   2019   2027   2042   2383   2389   2472
                2525    2595   2650   2724   2778   3094   3108
3829  RLW      1888    1962   2010   3086
3969  RMA
3970  RMB      3890
2353  RND
2421  RNDC     2417B   2418B
3760  RNG       484C    486    949C   951    978   1966C  1967
3527  RPB       676B   2288B  2306B  2324B  2342B  3528B
3539  RPBA     3588B
3541  RPBB     3542B   4008C  4063C  4095C  4125C
3545  RPBC     3546B   3555   4062   4068
3546  RPBD     3549B   4009C  4065C  4096C  4130C
3551  RPBE     3552B   4064
3553  RPBF     3554B
3565  RPBG     3566B
3567  RPBGA    3568B
3570  RPBGB    3562B   4010C  4069C  4111C  4161   4167C
3572  RPBH     3573B   3580
3575  RPBI     3576B
3578  RPBJ     3579B
3562  RPBL     4067C   4162C
3569  RPBP     3587B   4066
3119  RRDRVE   1627B   1655B  2115B  2145B
3971  RRMED    1804    3895
3759  RRR       476C    477C   486    504    505
```

```
2362  RSRA      2405B   4145
2360  RSRAA     4002C   4039C   4107C   4142C
2364  RSRB      2365B
2367  RSRC      2368B
2370  RSRD      2371B
2373  RSRDA     4038    4044
2374  RSRE      2375B
2377  RSRF      2378B
2380  RSRG      2381B
2383  RSRH      2384B   4003C   4041C   4102C   4140C
2386  RSRI      2387B
2389  RSRJ      2390B   4040
2392  RSRK      2393B
2396  RSRL      4004C   4043C   4109C   4144C
2398  RSRLA     2395
2400  RSRM      4042
2402  RSRMA     2399
2405  RSRN      4045C   4146C
2406  RSRO      2404B
2412  RSRP      2407B
2416  RSRQ      2413B
3777  RSTRT      488     491C
3741  RTYCT     1581C   1680C   1690C   1692    1707C   1717C   1719    1848C   2191C   2195
                2225C   2237    3287C   3389C   3455C   3544C   3557    3571C   3582
3963  RTYING    1760
3883  RTYMSG    1740B   1749B   1754B
2553  RUDR      2510B
2560  RUDRA     4049C   4150C
2609  RUDRB     2580B   4149
2632  RUDRC     4048
2584  RUDRX     2558B   2562B   2566B   2570B   2574B   2578B
2598  RUDRXA    2596B
2601  RUDRXB    2599B
2636  RUDRY     2611B   2615B   2619B   2623B   2627B   2631B
2653  RUDRYA    2651B
2656  RUDRYB    2654B
2642  RUDRYC    2643B
2645  RUDRYD    2646B
2648  RUDRYE    2649B
1059  RUPTA     1061B
1065  RUPTB     1153B
1081  RUPTC     1077B
1085  RUPTE     1080B
1086  RUPTF     1152B
1111  RUPTG     1104B   1106B
1115  RUPTM     1112B
1125  RUPTT     1122    1229B
1137  RUPTU     1134B
1143  RUPTK     1139B
1150  RUPTM     1115B   1117B   1151B
1152  RUPTN     1108B   1149B
3747  SAVE      1001    1004C
3748  SAVEA      647C    652    1026    1029C   1084C   1711C
3790  SAVEB      530C    662
3745  SECT       714C    745C    827C    857C   1873C   2087C   2466C   2515C   2585C   2637C
                2714C   2765C   2798C   2806C   2814C   2822C   2830C   2838C   2924C   2932C
                2940C   2948C   2956C   2964C   3083C   3163    3467C   3536C
3316  SECTOR    3277
3731  SEEK      1481    1611    1639    1676    1703    1972    2015    2059    2098    2127
                2177    2211    2370    2380    2523    2645    2773    2981    3092    3106
                3355    3478    3499    3548    3567    4127
3733  SFMT
3739  SIO       1015
3928  SLAF      3925
1819  SM        1691B   1718B
1825  SMA       1829B   1840B   1842B
1830  SMAA      1824B
1833  SMB       1831B
1838  SMC       1836B
1841  SMD       1832B   1834B   1837B   1839B
1843  SME       1826B
1846  SMF       1844B
1848  SMK       1845B
1854  SMS       1852B
3900  SOLONG    1790B
3972  SPOOT     1562
1955  SRT
1995  SRTC
3350  ST        2471B   2590B   2719B   2854B
 456  START      703B   1242B   4296
1348  STATA      525    1289    1292    1300    1304    1316    1320
3780  STATUS     456     465C    492    1198
3792  STATWD    3135C
3356  STB       3356B
3353  STC       3354B
3749  STW       3207    3215    3326C   3341C   3647    3857
3974  SWAP      3692
3890  SWPMSG    1767B
3614  TCBA       592B    607B
3682  TCBBA     3646B
3795  TED1
3761  TEMP       944C    964C    965     969C    970     980C   1086C   1107    1111    1186C
                2800C   2808C   2816C   2824C   2832C   2840C   2880    2928C   2936C   2944C
                2952C   2960C   2968C   3008    3288C   3451C   3460C   3469    3518    3529C
                3903C   3904    3906C   3908    3915
3725  TESTID    3265
 917  TMO        921B    959B    987B   1486B
 919  TMOA       917B
 920  TMOB       922B
 922  TMOC       920B
3878  TMOUT     3874
3175  TOM       3173B
3770  TOUTA     1523C   1542C   1561    1737C   1746C   1751C   3884
3771  TOUTB     1739C   1748C   1753C   1787C   1798C   3886    3897
3315  TRACK     3268    3399
1500  TRK       4018
1506  TRKC      1470B   1544B
3742  TRNO       713C    743C    826C    855C   1477C   1588C   1631C   1632    1659    1669C
                1695C   1696    1722    1874C   2086C   2118C   2119    2149    2169C   2202C
                2203    2230    2240    2465C   2514C   2584C   2636C   2713C   2764C   2802C
                2810C   2818C   2826C   2834C   2842C   2926C   2934C   2942C   2950C   2958C
                2966C   3082C   3157    3171    3183    3350    3366    3466C   3491C   3492
                3515    3533C   3559C   3560    3585
```

```
3763  IRNGA    2204C   2232C   3400
3797  ISIA      715
3796  ISIB      938
3802  ISIC     1055
3801  ISID     1261
3799  ISIL     1504
3800  ISIF     1580
3803  ISIG     1868
3804  ISIH     1957
3805  ISII     2007
3806  ISIJ     2081
3807  ISIK     2162
3808  ISIL     2280
3809  ISIM     2287
3810  ISIN     2298
3811  ISIO     2305
3812  ISIP     2316
3813  ISIQ     2323
3814  ISIR     2334
3815  ISIS     2341
3816  ISIT     2355
3817  ISIU     2436
3818  ISIV     2555
3819  ISIW     2683
3820  ISIX     2796
3821  ISIY     3049
2461  UDWA     4047C   4148C
2467  UDWB     2461B   4147
2510  UDWC     4046
2465  UDWX     2439B   2443B   2447B   2451B   2455B   2459B
2475  UDWXA    2473B
2481  UDWXC    2479B
2514  UDWY     2469B   2493B   2497B   2501B   2505B   2509B
2520  UDWYAA   2521B
2523  UDWYAB   2524B
2525  UDWYAC   2526B
2533  UDWYC    2531B
3143  UNBB     3146B
3149  UNBT     3144B
3981  UNREC    2263
2434  UPD
2669  UPDC     2632B
3365  VH       2200B
3370  VHA      3386B
3374  VHB      3372B
3378  VHC      3376B
3381  VHCA
3385  VHCB     3382B
3386  VHCC     3384B
3387  VHD      3380B
3389  VHE      3373B   3377B
3395  VHF      3393B
3367  VHH      2236B
1001  WAC       996B    998B
1009  WAD      1002B
1015  WAE       962B    992B
1026  WAFN      999B
1036  WAFNB     968B    973B   1019B   1027B
3841  WAII     1512B   1620B   1687B   1882B   1897B   1905B   1920B   1936B   1979B   1990B
               2023B   2108B   2194B   2400B   2483B   2602B   2732B   2786B   3098B   3358B
               3489B   3556B
3847  WAIIA    3112B   3864B
3861  WAIIAA   3848B
3851  WAIIB    1531B   1648B   1714B   2138B   2228B   2396B   2535B   2658B   3513B   3581B
               4143
3857  WAIIBA   3869B
3866  WAIIBB   3858B
3873  WAIIC    3863B   3868B
3737  WAKW      954     982
 936  WAW
1038  WAWC     1010B
 943  WAWK     1009B   1030B
 951  WAWKA     952B   1007B
 978  WAWKC     963B    979B
 989  WAWKCA    972B
 960  WAWKD     967B
 964  WAWKE     961B
 969  WAWKF     990B
2708  WDDAB    4051C   4152C
2736  WDDL     2708B   4151
2759  WDDC     4050
2713  WDDX     2686B   2690B   2694B   2698B   2702B   2706B
2727  WDDXA    2725B
2730  WDDXB    2728B
2764  WDDY     2738B   2742B   2746B   2750B   2754B   2758B
2781  WDDYA    2779B
2770  WDDYAA   2771B
2773  WDDYAB   2774B
2776  WDDYAC   2777B
2784  WDDYB    2782B
3735  WDLD     2727    2781    3096    3110
3449  WPD      2283B   2301B   2319B   3450B
3473  WPDA     3470B   3474B   3519B   4005C   4055C   4093C   4124C
3475  WPDB     3476B   3488    4054    4060
3478  WPDC     3479B   4006C   4059C   4094C   4129C
3481  WPDCA    3482B
3484  WPDD     3485B   4058
3463  WPDDA    3458B
3464  WPDDB    3462B
3471  WPDDC    3520B
3486  WPDE     3487B
3496  WPDF     3497B
3499  WPDG     3500B
3502  WPDGA    3512
3505  WPDGB    3503B   3506B
3508  WPDH     3494B   3501B   3509B   4007C   4061C   4103C   4134C   4159
3510  WPDI     3511B
3521  WPDJ     3517B   4056
3494  WPDK     4057C   4160C
3459  WPDR     2335B
3980  WRONG     559
3832  WRWT     3461    3463    3471
 449  ZERO      452    3754    3755
```

```
        ZHCOMM    451    3750   3751
        ZHIAFB    698C   1065C  1066C  1067C  1068C  1074   1129   1206   1219   1262C
                  3823
        ZHISAZ    450     683   1057   1079C  1084C  1148C  1160   1267
        ZHRTCC    450    3139C
        ZHRTCI    450    3138C
        ZHRTCL    450     691C  3141C
        ZVSER     462B    542B   560B   636B   672B   702B   731B   739B   762B   771B
                  786B    799B   811B   823B   843B   851B   874B   883B   898B   911B
                 1036B   1109B  1113B  1135B  1194B  1202B  1213B  1221B  1232B  1307B
                 1324B   1469B  1493B  1563B  1768B  1791B  1802B  1805B  1809B  1910B
                 1925B   1941B  2036B  2051B  2065B  2266B  2876B  3004B  3015B  3122B
                 3149B   3175B  3292B  3298B  3333B  3401B  3603B  3875B  3916B
        ZVSF      1886B   1962B  1967B  3086B  3463B
        ZVSFR     2010B   3461B  3471B
        ZVSIA      525B
        ZVSID      495B
        ZVSIH      486B    495B
        ZVSIZ      520B   1238B
        ZVSWC      485B    494B   521B
        ZVSRD      472B    520B  1238B
        ZVSI       473B    485B   494B   521B   541B   559B   635B   656B   671B   675B
                   677B    715B   810B   938B  1055B  1241B  1245B  1261B  1294B  1310B
                  1504B   1560B  1562B  1580B  1760B  1804B  1808B  1868B  1957B  2007B
                  2061B   2162B  2263B  2265B  2280B  2287B  2298B  2305B  2316B  2323B
                  2334B   2341B  2355B  2409B  2410B  2415B  2436B  2555B  2671B  2683B
                  2796B   2914B  2915B  3049B  3076B  3119B  3219B  3224B  3225B  3235B
                  3240B   3245B  3250B  3255B  3260B  3264B  3265B  3268B  3277B  3285B
                  3329B   3332B  3344B  3396B  3397B  3399B  3874B  3883B  3885B  3890B
                  3892B   3895B  3896B  3900B  3907B  3909B  3914B
        ZVSIC      473B    541B   559B   635B   656B   671B   675B   677B   715B   810B
                   938B   1055B  1241B  1245B  1261B  1294B  1310B  1504B  1560B  1562B
                  1580B   1760B  1804B  1808B  1868B  1957B  2007B  2081B  2162B  2263B
                  2265B   2280B  2287B  2298B  2305B  2316B  2323B  2334B  2341B  2355B
                  2436B   2555B  2671B  2683B  2796B  2914B  2915B  3049B  3076B  3119B
                  3264B   3268B  3329B  3344B  3396B  3397B  3399B  3883B  3890B  3892B
                  3895B   3900B  3907B  3914B
        ZVSID     3275B   3284B
        ZVSIH      657B   1295B  1311B  1561B  2264B  2408B  2411B  2414B  2416B  3120B
                  3226B   3275B  3284B  3286B  3286B  3331B  3346B  3398B  3400B  3884B
                  3886B   3891B  3897B  3908B  3910B
        ZVSTIY     451    3290
 948 LABELS
4318 REFERENCES
4296 RECORDS
   0 U FLAGS
   0 M FLAGS
 152 N FLAGS
6 CROSS REF VERSION L - 24 SEPT, 1976
RS LINKER VERSION 5.00 02/15/78  2211.0 EST WED
LINK MAP FOR DIMS3
 START          0100
 LOW            0000
 HIGH           2FFF
 CURRENT        2734
*LOC DEFS
  ZHCOMM        0000
 *DIMS3         0000  REV E
  ZHPFR         0000
  ZHTSA         0002
  ZHNTSA        0010
  ZHRTCI        0014
  ZHRTCC        0015
  ZHRTCL        0016
  ZHWDTC        0017
  ZHMERC        001F
  ZHIAFB        0020
  ZHIH29        0063
  ZHIH28        0064
  ZHIH27        0065
  ZHIH26        0066
  ZHIH25        0067
  ZHIH24        0068
  ZHIH23        0069
  ZHIH22        006A
  ZHIH21        006B
  ZHIH20        006C
  ZHIH19        006D
  ZHIH18        006E
  ZHIH17        006F
  ZHMEMP        006F
  ZHTH16        0070
  ZHLERR        0070
  ZHTH15        0071
  ZHNRES        0071
  ZHIH14        0072
  ZHPMEM        0072
  ZHIH13        0073
  ZHP-OP        0073
  ZHIH12        0074
  ZHIH11        0075
  ZHIH10        0076
  ZHIH9         0077
  ZHIH8         0078
  ZHIH7         0079
  ZHIH6         007A
  ZHOVFL        007A
  ZHIH5         007B
  ZHOP-N        007B
  ZHIH4         007C
  ZHIH3         007D
  ZHSC-N        007D
  ZHIH2         007E
  ZHTRC         007E
  ZHIH1         007F
  ZHMCL         007F
  ZHISAZ        0080
  ZHIVBS        0080
  ZHTVBS        0080
 *ZVSER         200C  REV. 5.0
  ZVSER         200C
  ZVSIA         2038
  ZVS--U        201F
```

```
*ZVS1          207C  REV. 5.0
 ZVS1C         2085
 ZVSWC         2099
 ZVS1          207C
 ZVSW          208E
*ZVS1H         20AD
 ZVS1H         20AD
 ZVS1D         20B2
 ZVS1AD        20B7
 ZVS---2       20CF
 ZVS---3       20E1
*ZVS1A         2146  REV. 6.0
 ZVS1A         2147
 ZVSARG        21EC
 ZVSADF        21EE
 ZVS---1       21D1
 ZVS1AV        221A
*ZVS1H         221E
 ZVS1H         221E
 ZVS1D         2253
 ZVS1M2        2246
*ZVSF          226E
 ZVSF          226E
*ZVSFR         227C
 ZVSFR         227C
 ZVSF1         229E
 ZVSF5         22C1
 ZVSFRA        22CE
 ZVSFRA        22CF
 ZVSFRR        2293
 ZVSFRD        22D0
 ZVSFRM        22C0
*ZVSUP         22D3
 ZVSUP         22D3
 ZVS---4       22F3
*ZVSHA         22FF
 ZVSH2         2309
 ZVSHA         22FF
 ZVSH5         2304
*ZVSHLW        2338  REV. 0
 ZVSHLW        2338
 ZVSHLR        2367
*ZVSHD         237F
 ZVSHD         237F
*ZVSRD         23B1  REV. 6.0
 ZVSRD         23B1
 ZVS1Z         23E9
 ZVS1TY        23C4
 ZVS5V1        2525
 ZVSAF         23C2
 ZVS5V2        2535
 ZVSUTP        2456
 ZVS5V3        2545
 ZVS1LD        23C3
 ZVSCF2        23CB
 ZVS1K         23C7
 ZVSRAR        23C8
 ZVSSTI        23CC
 ZVSDUD        23C5
 ZVSULD        23CF
 ZVSRCD        23D0
 ZVSRCC        23CD
 ZVSNSR        23D4
 ZVSSTR        23D2
 ZVSHR         23DE
 ZVSLR         23DB
 ZVSDAI        23C0
 ZVSHM         2425
 ZVSHRU        23D8
 ZVSHRL        23D9
 ZVSLRU        23DA
 ZVSLRL        23DB
 ZVSHDD        23DC
 ZVSCFI        23CA
 ZVSDRS        23D6
 ZVSDRF        23D7
 ZVS---5       23E1
 ZVSRMD        23C1
 ZVSMCP        23DD
 H1BAUD        23DC
 ZVSRAW        23C9
 ZVSRDI        2581
 ZVSCTL        23C6
 ZVSD1         24F4
 ZVS1S1        25D1
 ZVSMDC        2592
 ZVSR99        272F
 ZVS1SA        23E4
 ZVSUIN        23DF
 ZVSZRU        2403
 ZVSDSM        2405
```