```
000001                  TITLE SMDS2,'REV C', STORAGE MODULE T&D, FEB 18, 1978
000002                 ********************************************************************
000003                 *
000004                 *
000005                 *
000006                 *
000007                 * DESCRIPTION:
000008                 *
000009                 *
000010                 *     THIS T&D PROGRAM TESTS THE MASS STORAGE DEVICES LISTED BELOW
000011                 *     ON A LEVEL 6 SYSTEM.  IT ASSUMES THAT PREVIOUS TESTS HAVE
000012                 *     INDICATED THE FAILURE IS LOCATED IN THE MSD.  THE TEST IS
000013                 *     DESIGNED TO RUN SEQUENTIALLY FROM START TO FINISH OR UNTIL
000014                 *     A FAILURE IS DETECTED.
000015                 *
000016                 *     THE SUBSYSTEM ITEMS SUPPORTED BY THIS PROGRAM ARE:
000017                 *
000018                 *        MSU9101  40 MB STORAGE MODULE DRIVE
000019                 *        MSU9102  80 MB STORAGE MODULE DRIVE
000020                 *        MSU9103 150 MB STORAGE MODULE DRIVE
000021                 *        MSU9104 300 MB STORAGE MODULE DRIVE
000022                 *        MSU9105  40 MB STORAGE MODULE DRIVE(2ND UNIT)
000023                 *        MSU9106  80 MB STORAGE MODULE DRIVE(2ND UNIT)
000024                 *
000025                 *
000026                 *
000027                 * REVISION HISTORY:
000028                 *
000029                 *        REV      DATE
000030                 *         A       NOV  77     PRERELEASE(SMTDS1)
000031                 *         B       DEC  77     ORIGINAL RELEASE
000032                 *         C       FEB  78
000033                 *
000034                 ********************************************************************
000035                 *
000036                 *     THIS  DOCUMENT  AND  THE  INFORMATION  CONTAINED
000037                 *     THEREIN IS CONFIDENTIAL AND PROPRIETARY TO AND THE
000038                 *     EXCLUSIVE  PROPERTY  OF  HONEYWELL INFORMATION
000039                 *     SYSTEMS INC.  IT  IS MADE AVAILABLE ONLY TO HONEY-
000040                 *     WELL AUTHORIZED RECIPIENTS FOR THEIR USE SOLELY IN
000041                 *     THE  MAINTENANCE  AND  OPERATION  OF  HONEYWELL
000042                 *     PRODUCTS.  THIS  DOCUMENT  AND INFORMATION MUST BE
000043                 *     MAINTAINED IN STRICTEST CONFIDENCE;  IT  MUST  NOT
000044                 *     BE  REPRODUCED  IN  WHOLE OR IN PART; AND IT SHALL
000045                 *     NOT BE DISCLOSED TO ANY OTHER  PARTY  WITHOUT  THE
000046                 *     PRIOR WRITTEN CONSENT OF HONEYWELL.
000047                 *
000048                 ********************************************************************
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000049                  /*****************************************************************
000050                  *
000051                  * PROGRAM PREPARATION:
000052                  *
000053                  *     THE ROOT SOURCE OF THIS PROGRAM, AFTER THE ADDITION OF APPROPRIATE
000054                  *     TITLE AND END STATEMENTS, WAS PROCESSED BY THE HOST RESIDENT ASSEMBLER
000055                  *     TO CREATE EITHER SHORT OR LONG ADDRESS FORM (SAF OR LAF) OBJECT TEXT
000056                  *     AND LISTING. THE OBJECT TEXT WAS FURTHER PROCESSED BY THE HOST RESIDENT
000057                  *     LINKER USING THE APPROPRIATE CONSOLE ZV$LIB LIBRARY TO CREATE A PUNCH
000058                  *     SEGMENT CONTAINING AN EXECUTABLE MODULE. THE ASSEMBLY LISTING WAS
000059                  *     AUGMENTED WITH CROSS REFERENCE DATA PLUS THE LOAD MAP FROM THE LINKER
000060                  *     TO CREATE A LIST SEGMENT.
000061                  *
000062                  *                  ROOT            SAF             LAF
000063                  *                  ----            ---             ---
000064                  *         NAME     SMDX2           SMDS2           SMDL2
000065                  *         DOCUMENT 60134667-002    60134668-002    60134669-002
000066                  *
000067                  *
000068                  * PROGRAM DISTRIBUTION:
000069                  *
000070                  *     THE ELEMENTARY ITEMS SUBMITTED TO THE T&V PROGRAM DISTRIBUTION CENTER
000071                  *     WERE THE EXECUTABLE LINKED IMAGES ON DISKETTE OF SMDS2 AND SMDL2,
000072                  *     AND MAGNETIC TAPE IMAGES OF THE AUGMENTED LISTINGS.
000073                  *
000074                  *     REPRODUCTIONS OF THE EXECUTABLE LINKED IMAGES MAY BE AS CARD DECKS
000075                  *     OR AS MEMBER "SW"/"LW" OF A MULTIPLE MEMBER FILE. MOST FREQUENTLY
000076                  *     IT WILL BE FOUND AS MEMBER "SW"/"LW" WITHIN FILE "PROGFILE" OF A DISK-
000077                  *     ETTE VOLUME ENTITLED "DIAGS".
000078                  *
000079                  *     DISTRIBUTION OF THE LISTINGS, WHICH SHOULD BE AVAILABLE IF ANY COMPLEX
000080                  *     MAINTENANCE OR REPAIR IS TO BE PERFORMED, IS NORMALLY MADE AS A
000081                  *     PRINTED COPY.
000082                  *
000083                  *
000084                  * MAIN MEMORY REQUIREMENT:
000085                  *
000086                  *     THIS PROGRAM REQUIRES 8K WORDS OF MAIN MEMORY IN SAF MODE OR 12K WORDS
000087                  *     IN LAF MODE.
000088                  *
000089                  *****************************************************************
000090                  *
000091                  *
000092                  * OPERATION:
000093                  *     LOAD THE PROGRAM AND START (OR RESTART) AT LOCATION
000094                  *     0100 HEX.  IF A CONSOLE IS PRESENT, VERIFY CORRECT
000095                  *     PROGRAM IDENTIFICATION FROM THE LISTING OF THE I/O
000096                  *     EQUIPMENT BY CHANNEL NUMBER AND ID-CODE. THIS LISTING WILL
000097                  *     BE OMITTED ON RESTARTS.
000098                  *
000099                  *     THE CONSOLE SEARCH RULES ARE:  FIND THE CONSOLE WITH THE LOWEST  CHANNEL
000100                  *     NUMBER CONNECTED THRU AN  MDC  CONTROLLER.  IF THERE IS NO CONSOLE ON AN
000101                  *     MDC, THEN SEARCH FOR A TERMINAL WITH THE HIGHEST CHANNEL NUMBER ASSIGNED
000102                  *     TO AN ACLA ADAPTER ON AN MLC CONTROLLER.  IF NO ASYNC ADAPTER  IS FOUND,
000103                  *     THEN GO TO THE FULL CONTROL PANEL.
000104                  *
000105                  *     THERE ARE THREE CONSOLE CHANNEL OPTIONS DETERMINED BY THE VALUE  OF  LO-
000106                  *     CATION "ZV$TTY".
000107                  *
000108                  *     IF ZV$TTY EQUALS (0000), SEARCH FOR A CONSOLE.
000109                  *     IF ZV$TTY EQUALS (FFFF), ASSUME THERE IS NO CONSOLE.
000110                  *     IF ZV$TTY EQUALS NEITHER (0000), NOR (FFFF), THEN IT IS THE CONSOLE CHAN-
000111                  *     NEL NUMBER.    NOTE:  DEFAULT IS TO SEARCH FOR A CONSOLE.
000112                  *
000113                  *     ALL CONSOLE I/O IS EVEN PARITY.  IF CONSOLE IS ON MLC,  IT MUST BE ASYNC
000114                  *     AND THE BAUD RATE SET AT 1200 TO MATCH THE PROGRAM SUPPLIED RATE.  IF IT
000115                  *     IS NECESSARY TO CHANGE THE PROGRAM BAUD RATE,  THEN THE  NEW  BAUD RATE
000116                  *     CODE SHOULD BE PUT INTO LOCATION "ZV$BUD" IN HEX.  THE TERMINAL BAUD RATE
000117                  *     MUST BE  SET  TO MATCH THIS NEW BAUD RATE.  THE CORRECT HEX VALUE MAY BE
000118                  *     OBTAINED FROM THE FOLLOWING TABLE.
000119                  *
000120                  *-------------------------------------------------*
000121                  *                                                 *
000122                  *                BAUD  RATE  TABLE                *
000123                  *                                                 *
000124                  *-------------------------------------------------*
000125                  *       ACLA I.D.  (2118)(2110)        (2108)
000126                  *       BAUD-RATE
000127                  *          50          0                 1
000128                  *          75          1                 2
000129                  *         110          2                 3
000130                  *         134          3                 4
000131                  *         150          4                 5
000132                  *         200          5                ---
000133                  *         300          6                 6
000134                  *         600          7                 7
000135                  *         900         ---                8
000136                  *        1050          8                ---
000137                  *        1200          9                 9
000138                  *        1800         10 (A)            10 (A)
000139                  *        2000         11 (B)            ---
000140                  *        2400         12 (C)            11 (B)
000141                  *        3600         ---               12 (C)
000142                  *        4800         13 (D)            13 (D)
000143                  *        7200         ---               14 (E)
000144                  *        9600         14 (E)            15 (F)
000145                  *       19200         15 (F)            ---
000146                  *
000147                  *     TO MAKE ANY OF THE ABOVE CHANGES,  LOAD AND HALT THE PROGRAM BEFORE EX-
000148                  *     ECUTION.  INSERT CHANGE THEN EXECUTE.  MEMORY LOCATIONS OF "ZV$TTY" AND
000149                  *     "ZV$BUD" MAY BE FOUND IN MAP AT END OF LISTING.
000150                  *     CONSULT LEVEL-6 T&V MANUAL "AW94" FOR DETAILS ON HOW TO LOAD THE TESTS.
000151                  *
000152                  *     THE FOLLOWING IS A TYPICAL RESULT OF LOADING THE PROGRAM
000153                  *     AND STARTING TO RUN.
000154                  *
000155                  *             SMDX2 REV X, STORAGE MODULE T&D, MM DD YY
000156                  *             ZV$LIB  REV. X.X
000157                  *
000158                  *             WDT
000159                  *             CHAN  DEVC  ID
000160                  *             0400  DSKT  2010
000161                  *             0480  DSKT  2010
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000162                          *             0500  CONS  2018
000163                          *             1200  DISK  2361
000164                          *             1280  DISK  2363
000165                          *             0580  CDR   2008
000166                          *             MEMORY LOW  0000XXXX
000167                          *             MEMORY HIGH 00007FFF  32K
000168                          *
000169                          *             READ  BUFF ADDR(HEX): XXXX
000170                          *             WRITE BUFF ADDR(HEX): XXXX
000171                          *
000172                          *
000173                          *    THE FIRST EXECUTION OF THE PROGRAM WILL ASK THE QUESTION:
000174                          *
000175                          *             POWER FREQ, HZ ?: 60 C/R  (ON A 6/30 SYSTEM ONLY)
000176                          *
000177                          *    RESPOND WITH THE POWER LINE FREQUENCY IN HERTZ,
000178                          *    USUALLY 60 IN THE UNITED STATES AND 50 ELSEWHERE.  THE
000179                          *    PROGRAM WILL THEN CALIBRATE THE CPU CLOCK AGAINST THE
000180                          *    REAL-TIME-CLOCK. DEFAULT VALUE IS 60 HZ. WITH A 6/40,
000181                          *    THIS QUESTION WILL NOT BE ASKED.
000182                          *
000183                          *    THE PROGRAM WILL THEN ASK:
000184                          *
000185                          *             CHANNEL ?: 1200 C/R
000186                          *
000187                          *
000188                          *             FIRMWARE REV    XX
000189                          *
000190                          *    THE RESPONSE SHOULD BE THE FOUR DIGIT HEX CHANNEL NUMBER ASSIGNED
000191                          *    TO ANY DEVICE IN THE SUBSYSTEM.  THE PROGRAM WILL USE
000192                          *    THE CONTROLLER PORTION OF THE CHANNEL NUMBER TO ADDRESS
000193                          *    ALL DEVICES. DEFAULT VALUE IS HEX 1200.
000194                          *
000195                          *    THE ABOVE SEQUENCE WILL ONLY OCCUR ON THE FIRST START AFTER
000196                          *    A FRESH LOAD OF THE PROGRAM.  SUBSEQUENT RESTARTS WILL START
000197                          *    AT TEST 0101.
000198                          *
000199                          ************************************************************
000200                          *
000201                          * TEST DESCRIPTION:
000202                          *
000203                          * TEST 0101:  LOGIC PLUG "0" IS INSTALLED IN THE DEVICE TO BE TESTED.
000204                          *             IF THIS DEVICE IS OTHER THAN "0" SWAP SELECTION PLUGS
000205                          *             WITH DEVICE "0".
000206                          *             THE DEVICE IS SELECTED AT LOGICAL ADDRESS "0", THEN ATTEMPT
000207                          *             TO SELECT WITH ADDRESS PLUG REMOVED.
000208                          *
000209                          * TEST 0102:  REINSTALL NORMAL LOGIC PLUG IN DEVICE AND SELECT AT THIS
000210                          *             ADDRESS.
000211                          *
000212                          * TEST 0200:  ALL COMBINATIONS OF BUS-OUT INFORMATION ARE WRAPPED
000213                          *             BACK ON BUS-IN.  SOLID ERROR PRINTOUTS ARE TERMINATED
000214                          *             BY THE "BREAK" KEY.
000215                          *
000216                          * TEST 0300:  CYCLE UP AND CYCLE DOWN SEQUENCES ARE EXERCISED.
000217                          *
000218                          * TEST 0400:  RFU
000219                          *
000220                          * TEST 0500:  RTZ SEQUENCES ARE TESTED.
000221                          *
000222                          * TEST 0601:  OFFSETS (+&-),ZERO SEEK AND ILLEGAL SEEK OPERATIONS
000223                          *             ARE TESTED.
000224                          *
000225                          * TEST 0602:  SINGLE TRACK SEEKS FROM 0 TO MAX. CYLINDER AND
000226                          *             RETURN ARE MONITORED.
000227                          *
000228                          * TEST 0603:  RANDOM SEEKS ARE TIMED FOR A MAXIMUM OF 10,000
000229                          *             OPERATIONS.  THE SEQUENCE MAY BE TERMINATED AT
000230                          *             ANY TIME BY HITTING THE "BREAK" KEY.  THE AVER-
000231                          *             AGE SEEK TIME IS THEN CALCULATED.
000232                          *
000233                          * TEST 0604:  A DIRECT SEEK FROM 0 TO AN OPERATOR SELECTED CYL-
000234                          *             INDER(DECIMAL) AND RETURN IS MONITORED.  THE TEST
000235                          *             MAY BE LOOPED AT THE OPERATORS DISCRETION AND TERM-
000236                          *             INATED BY THE "BREAK" KEY.
000237                          *
000238                          * TEST 0700:  MAXIMUM CYLINDER SEEKS ARE PERFORMED FOR THE NUMBER
000239                          *             OF OPERATOR SPECIFIED CYCLES(32K DECIMAL MAX.) OR UNTIL
000240                          *             TERMINATED BY THE "BREAK" KEY.  MAX. FWD, REV AND
000241                          *             AVERAGE SEEK TIMES ARE DISPLAYED AS AN AID TO COURSE
000242                          *             VELOCITY GAIN ADJUSTMENT.
000243                          *
000244                          * TEST 0800:  THIS TEST IS NOT PERFORMED ON LEVL 6.
000245                          *
000246                          * TEST 0900:  THE SECTOR COUNTER IS TESTED SEQUENTIALLY FROM
000247                          *             SECTOR 0 TO SECTOR 63.
000248                          *
000249                          * TEST 1000:  WRITE PROTECT FUNCTION IS CHECKED.
000250                          *
000251                          * TEST 1001:  IF WRITE OPERATIONS ARE PERMITTED ALL TRACKS ARE
000252                          *             FORMATTED ON AN OPERATOR SELECTED CYLINDER.  AFTER
000253                          *             CHECKING THE FORMAT INFORMATION, A WORSE CASE PATT-
000254                          *             ERN IS WRITTEN ON AN OPERATOR SELECTED RECORD ON ALL
000255                          *             TRACKS AND THEN READ.  ALL OPERATOR INPUTS ARE DECIMAL.
000256                          *             SOLID ERROR PRINTOUTS ARE TERMINATED BY THE "BREAK" KEY.
000257                          *             THE LAST TRACK NUMBER PRINTED IS THE CURRENT TRACK.
000258                          ************************************************************
000259                          * ERROR REPORTING:
000260                          *    DETECTED ERRORS ARE REPORTED AS FOLLOWS:
000261                          *
000262                          *             ERROR DICTIONARY ENTRY XXXX  <TAG XX  IS YY,  SB ZZ>
000263                          *             YYYY TEST FAILED **********
000264                          *
000265                          *             REGISTER DUMP:
000266                          *             B7   B6   B5   B4
000267                          *             B3   B2   B1    I
000268                          *             R7   R6   R5   R4
000269                          *             R3   R2   R1    M
000270                          *
000271                          *    THESE REGISTERS WERE SAVED PRIOR TO ENTRY TO THE REPORTING ROUTINE.
000272                          *    THE ERROR REPORTING RETURN LOCATION IS CONTAINED IN B5.
000273                          *
000274                          *    THE PROGRAM WILL THEN ASK THE QUESTION "RESTART ?".  REPLY (Y) OR (N).
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000275                          *
000276                          *    THE TROUBLE SHOOTING AND REPAIR GUIDE (AV-0026-015-N) CONTAINS
000277                          *    THE FAULT DICTIONARY.  REFERENCE TO THE DICTIONARY ENTRY
000278                          *    INDICATES THE FAILED ORU(S) AND AN EXTENDED PROCEDURE
000279                          *    WHERE APPLICABLE.
000280                          *
000281                          *
000282                          *
000283                          ********************************************************************
```

```
000284                  /*****************************************************************
000285                  * STATUS WORDS:
000286                  *     THE TWO STATUS WORDS HAVE THE FOLLOWING SIGNIFICANCE:
000287                  *
000288                  *     FIRST STATUS WORD
000289                  *       BIT  STATUS
000290                  *       -------------------------
000291                  *        0     READY
000292                  *        1     ATTENTION
000293                  *        2     OVERRUN@UNDERRUN
000294                  *        3     DEVICE FAULT
000295                  *       -------------------------
000296                  *        4     READ ERROR
000297                  *        5     ILLEGAL SEEK
000298                  *        6     MISSED DATA SYNCH
000299                  *        7     UNSUCCESSFUL SEARCH
000300                  *       -------------------------
000301                  *        8     MISSING CLOCK PULSE
000302                  *        9     SUCCESSFUL RECOVERY
000303                  *       10     RFU
000304                  *       11     RFU
000305                  *       -------------------------
000306                  *       12     CORRECTED MEMORY ERROR
000307                  *       13     NON-EXISTANT RESOURCE ERROR
000308                  *       14     BUS PARITY ERROR
000309                  *       15     UNCORRECTED MEMORY ERROR
000310                  *
000311                  *
000312                  *     SECOND STATUS WORD
000313                  *       BIT  STATUS
000314                  *       -------------------------
000315                  *        0     CORRECTED READ ERROR
000316                  *        1     SUCCESSFUL RETRY
000317                  *        2     OVERRUN/UNDERRUN RECOVERY
000318                  *        3     DEVICE SEIZED
000319                  *       -------------------------
000320                  *        4     DEVICE RESERVED
000321                  *        5     RFU
000322                  *        6     RFU
000323                  *        7     RFU
000324                  *       -------------------------
000325                  *        8     NO HEAD SELECT
000326                  *        9     WRITE FAULT
000327                  *       10     (W+R)OFF CYL
000328                  *       11     W.R FAULT
000329                  *       -------------------------
000330                  *       12     VOLTAGE FAULT
000331                  *       13     HEAD SELECT FAULT
000332                  *       14     SEEK ERROR
000333                  *       15     WRITE PROTECTED
000334                  *
```

```
000335                  /*****************************************************************
000336                  * BUS-IN BYTES REPORTED AS "IS" / "SB".
000337                  *    THE  BUS IN BYTES HAVE THE FOLLOWING SIGNIFICANCE:
000338                  *
000339                  *    TAG 1 BYTE
000340                  *      BIT    STATUS
000341                  *      ------------------------
000342                  *      0-7   BUS-OUT BITS WRAPPED ON BUS-IN
000343                  *
000344                  *    TAG 2 BYTE
000345                  *      BIT    STATUS
000346                  *      ------------------------
000347                  *       0     NO HEAD SELECT
000348                  *       1     WRITE FAULT
000349                  *       2     (W+R) OFF CYL.
000350                  *       3     W.R FAULT
000351                  *      ------------------------
000352                  *       4     VOLTAGE FAULT
000353                  *       5     HEAD SELECT FAULT
000354                  *       6     SEEK ERROR
000355                  *       7     WRITE PROTECTED
000356                  *
000357                  *    TAG 3 BYTE
000358                  *      BIT    STATUS
000359                  *      ------------------------
000360                  *       0     START
000361                  *       1     SPEED
000362                  *       2     LOAD*+RTZ*
000363                  *       3     DIBIT FAULT
000364                  *      ------------------------
000365                  *       4     HEADS LOADED
000366                  *       5     SLOPE
000367                  *       6     FINE
000368                  *       7     RFU
000369                  *
000370                  *    TAG 5 BYTE
000371                  *      BIT    STATUS
000372                  *      ------------------------
000373                  *      0-7   RPS COUNTER
000374                  *
000375                  *
000376                  *
000377                  *****************************************************************
000378                  *
000379                  * FLAG  BIT 15 - PASS INDICATOR
000380                  *       BIT 14 - BYPASS INDICATOR
000381                  *       BIT 13 - 10 MS TIME INDICATOR
000382                  *       BIT 12 - SLOW SEEK INDICATOR
000383                  *       BIT 11 - TIMER OVERFLOW
```

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000384                                  /*****************************************************************
000385          0000                    ZERO    EQU     $
000386                                          XLOC    ZHISAZ,ZHRTCI,ZHRTCC,ZHRTCL,ZHNTSA,ZV$HR,ZHTH15,ZHCOMM,ZV$BKF
000387                                          XLOC    ZV$SV1,ZV$SV2,ZV$FRB,ZHIAFB,ZV$LR
000388                                  *****************************************************************
000389          0100                    START   EQU     ZERO+X'100'
000390  0100                                    ORG     START
000391                                  *
000392  0100  8753                             CL      =$R3
000393                                          CALL    ZV$RD,MSNAME            PRINT TITLE AND RESOURCES
        0101  FBC0 0003
        0103  D380 0000         X
        0105  0F80
        0106  0FF0
000394  0107  8280 0FC3                         LB      <GOFLAG,=Z'0002'        DEVICE ON LINE YET ?
        0109  0002
000395  010A  0500 011E                         BBT     <MODE1H                 RESTART TEST
000396  010C  8280 0FC3                         LB      <GOFLAG,=Z'0001'
        010E  0001
000397  010F  0500 017A                         BBT     <MODE1G                 BYPASS THE FOLLOWING, DONE ALREADY
000398  0111  CC80 0000         X               LDB     $B4,<ZV$LR              LOAD LOW MEMORY ADDRESS
000399  0113  CF80 0FC7                         STB     $B4,<KKPT               RBUFF PTR
000400                                  RBUF    EQU     $B4
000401  0115  8756                             CL      =$R6
000402  0116  F800 0FC7                         LDR     $R7,<KKPT+$AF-1         LOW MEMORY
000403  0118  FA00 0FC9                         ADD     $R7,<LENGTH             ADD BUFF LENGTH
000404  011A  8ED6                             CAD     =$R6
000405  011B  EA00 0FC7                         ADD     $R6,<KKPT
000406  011D  EF00 0FC6                         STR     $R6,<JJPT
000407  011F  FF00 0FC6                         STR     $R7,<JJPT+$AF-1         LOAD WBUFF ADDRESS
000408  0121  EC80 0FC6                         LDB     $B6,<JJPT
000409                                  WBUF    EQU     $B6
000410  0123  FCD4                             LDB     $B7,=$B4                GET RBUF ADDRESS
000411  0124  D380 0EE2                         LNJ     $B5,<LNGASC             ASCII CONVERSION
000412                                          CALL    ZV$T,ZV$TC,MSRBUF       READ BUFFER
        0126  FBC0 0003
        0128  D380 0000         X
        012A  0F80
        012B  11B8
000413                                          CALL    ZV$T,LNGAD+$AF-1        ADDRESS
        012C  FBC0 0003
        012E  D380 0000         X
        0130  0F80
        0131  0FCA
000414  0132  FCD6                             LDB     $B7,=$B6                GET WBUF ADDRESS
000415  0133  D380 0EE2                         LNJ     $B5,<LNGASC             ASCII CONVERSION
000416                                          CALL    ZV$T,ZV$TC,MSWBUF       WRITE BUFFER
        0135  FBC0 0003
        0137  D380 0000         X
        0139  0F80
        013A  11C9
000417                                          CALL    ZV$T,LNGAD+$AF-1        ADDRESS
        013B  FBC0 0003
        013D  D380 0000         X
        013F  0F80
        0140  0FCA
000418  0141  8C51                             STS     =$R1
000419  0142  82D1                             LB      =$R1,=Z'2000'           XTAL CLOCK ?
        0143  2000
000420  0144  0500 0152                         BBT     <LEVX
000421                                          CALL    ZV$T,ZV$QC,MSRTC        PRINT RTC QUESTION
        0146  FBC0 0003
        0148  D380 0000         X
        014A  0F80
        014B  11B0
000422                                          CALL    ZV$ID,RTCHZ             GET RTC FREQUENCY (DEFAULT = 60)
        014C  FBC0 0003
        014E  D380 0000         X
        0150  0F80
        0151  0FD1
000423                                  *- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
000424                                  * SET UP FOR NORMAL RUNNING AT LEVEL 15
000425                                  *
000426  0152  9B80 015D                 LEVX    LAB     $B1,<LEV-15             CONTINUE AFTER SUSPEND TO LEV 15
000427  0154  9F80 121A                         STB     $B1,<SA15P
000428  0156  9B80 1217                         LAB     $B1,<SA15DV             NORMAL SAVE AREA
000429  0158  9F80 000F         X               STB     $B1,<ZHISAZ+15*$AF      ISA15
000430  015A  8E70 800F                         LEV     =Z'8000'+15             SUSPEND TO LEVEL 15
000431  015C  0000                             HLT
000432                                  *
000433                                  * NOW AT LVL 15, SET UP FOR RTC RUPT TO LVL 5
000434                                  *
000435  015D  9B80 0E0F                 LEV-15  LAB     $B1,<RTCFC
000436  015F  9F80 120E                         STB     $B1,<SA5P
000437  0161  9B80 120B                         LAB     $B1,<SA5DV
000438  0163  9F80 0005         X               STB     $B1,<ZHISAZ+5*$AF
000439                                  *- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
000440                                  * CALIBRATE CPU CLOCK AGAINST RTC
000441                                  *
000442  0165  9800 0FD1                         LDR     $R1,<RTCHZ              GET RTC FREQ
000443  0167  1F02                             MLV     $R1,=2
000444  0168  1E01                             ADV     $R1,=1
000445  0169  9F00 0000         X               STR     $R1,<ZHRTCI             INITIAL VALUE OF RTC
000446  016B  9F00 0000         X               STR     $R1,<ZHRTCC             CURRENT VALUE OF RTC
000447  016D  88D1                             DEC     =$R1                    SET $R1 FOR NEXT TICK
000448  016E  2C05                             LDV     $R2,=5
000449  016F  AF00 0000         X               STR     $R2,<ZHRTCL             SET RTC TO RUPT AT LVL 5
000450  0171  D380 0E26                         LNJ     $B5,<SYNCH              CALIBRATE
000451  0173  0005                             RTCF                            RTC DIDN'T RUPT
000452  0174  0000                             HLT                             RESTART
000453  0175  0F80 0174                         B       <$-1
000454                                  *****************************************************************
000455                                  * TIMING LOOP SHOULD NOW BE CALIBRATED
000456                                  *
000457  0177  8900 0FC3                 RESUME  LBT     <GOFLAG,=Z'0001'        SET RESTART FLAG
        0179  0001
000458                                  *
000459                                  * NOW DO MODE I, CONFIGURE CHANNEL NUMBERS
000460                                  *
000461                                  MODE1G  CALL    ZV$T,ZV$QC,MSCHAN       ASK QUESTION "CHAN ?:"
        017A  FBC0 0003
        017C  D380 0000         X
        017E  0F80
```

```
                017F  1194
000462                                      CALL    ZV$IH,CHAN          GET CHANNEL (DEFAULT = 1200)
                0180  FBC0 0003
                0182  D380 0000      X
                0184  0F80
                0185  11F5
000463          0186  9800 11F5            LDR     $R1,<CHAN           GET CHAN NO.
000464          0188  9B80 11F6            LAB     $B1,<IOREAD         START OF CHANNELS TABLE
000465          018A  AB80 120A            LAB     $B2,<CHANZ          END OF CHANNELS TABLE
000466          018C  9AF1          MODEIA SRM     $R1,+$B1,=Z'FE00'   CONFIGURE CHAN
                018D  FE00
000467          018E  9DD2                 CMB     $B1,=$B2            CHECK IF END OF TABLE
000468          018F  0200 018C            BL      <MODEIA             LOOP BACK, NOT DONE
000469                                *
000470                                *
000471                                * NOW CHECK THAT DEVICE ADAPTER IS ON LINE BY
000472                                * CHECKING ID CODES, BUT FIRST SET UP FOR NON-EXISTANT DEVICE
000473                                * TRAP.
000474                                *
000475          0191  9B80 121C            LAB     $B1,<TSA1
000476          0193  9F80 0000      X     STB     $B1,<ZHNTSA
000477          0195  9F80 121C            STB     $B1,<TSA1           SO WE DON'T GET TSA FULL RUPT
000478          0197  8800 0FC3            LBF     <GOFLAG,=Z'0002'    WILL SET IF GOOD ID FOUND
                0199  0002
000479          019A  AB80 01DD            LAB     $B2,<MODEIF         TRAP HANDLER
000480          019C  AF80 0000      X     STB     $B2,<ZHTH15         STORE IN TRAP 15 VECTOR
000481                                *
000482          019E  1CFC                 LDV     $R1,=-4
000483          019F  A810 0FB9    MODEIB LDR     $R2,<DRIVE0+4,$R1   GET DEVICE ADDRESS
000484          01A1  AA80 1201            SRM     $R2,<INIDEN,=Z'0180' SET UP INPUT ID
                01A3  0180
000485          01A4  8755                 CL      =$R5
000486          01A5  8055         MODEIC IO      =$R5,<INIDEN        GET ID IN R5
                01A6  0000 1201
000487          01A8  0780 01A5            BIOF    <MODEIC
000488          01AA  DF10 0FB4            STR     $R5,<DEVID+4,$R1    STORE DEVICE ID
000489          01AC  D570 FFF0            AND     $R5,=Z'FFF0'        CHECK ID (R5)
000490          01AE  D970 2360            CMR     $R5,=Z'2360'
000491          01B0  0980 01B5            BNE     <MODEIE
000492          01B2  8900 0FC3            LBT     <GOFLAG,=Z'0002'    SET FLAG, ID OK
                01B4  0002
000493          01B5  1780 019F    MODEIE BINC    $R1,<MODEIB         TRY NEXT ADDRESS
000494                                *- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
000495                                * ALL FOUR DEVICE ADDRESSES CHECKED, TEST THE FLAG
000496                                *
000497          01B7  9B80 0E01            LAB     $B1,<TH15           SET UP FOR FUTURE...
000498          01B9  9F80 0000      X     STB     $B1,<ZHTH15         ...MISSING RESOURCE TRAPS.
000499          01BB  8280 0FC3            LB      <GOFLAG,=Z'0002'
                01BD  0002
000500          01BE  0500           T     BBT     >+$A                FLAG OK, CONTINUE
000501                                      CALL    ZV$T.ZV$TC,MSND     NO DEVICE THIS CHANNEL
                01BF  FBC0 0003
                01C1  D380 0000      X
                01C3  0F80
                01C4  119C
000502          01C5  0F80 0100            B       <START              WRONG CHANNEL
000503          01C7  8051         $A      IO      =$R1,<INFWRV        GET F/W REV
                01C8  0000 1200
000504          01CA  07FD                 BIOF    >-$A
000505          01CB  9570 00FF            AND     $R1,=X'FF'
000506          01CD  9F00 0FE7            STR     $R1,<TEMPA
000507                                      CALL    ZV$T.ZV$TC,MSFWRV   FIRMWARE REV MSG
                01CF  FBC0 0003
                01D1  D380 0000      X
                01D3  0F80
                01D4  1045
000508                                      CALL    ZV$IH,TEMPA         CONVERT TO PRINT ASCII
                01D5  FBC0 0003
                01D7  D380 0000      X
                01D9  0F80
                01DA  0FE7
000509          01DB  0F80 020D            B       <T0101              GO TO 1ST TEST
000510                                *- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
000511          01DD  9B80 01B5    MODEIF LAB     $B1,<MODEIE         RESUME SCAN AT MODEIE
000512          01DF  9F80 1222            STB     $B1,<TSA1P
000513          01E1  0003                 RTT                         RETURN FROM TRAP
000514                                ********************************************************************;
000515                                *  RESTORE TRAPS
000516                                *
000517          01E2  9B80 0E01    MODE1H LAB     $B1,<TH15           MISSING RESOURCE TRAP
000518          01E4  9F80 0000      X     STB     $B1,<ZHTH15
000519          01E6  8000 11F3    $A      IO      <INZBDC,<OTCONT     INITIALIZED
                01E8  0000 11FB
000520          01EA  07FC                 BIOF    >-$A
000521          01EB  CC80 0FC7            LDB     $B4,<KKPT           RESET RBUFF POINTER
000522          01ED  EC80 0FC6            LDB     $B6,<JJPT           RESET WBUFF POINTER
000523          01EF  9B80 120B            LAB     $B1,<SA5DV          SET RTC LEVEL
000524          01F1  9F80 0005      X     STB     $B1,<ZHISAZ+5*$AF
000525          01F3  9B80 01FF            LAB     $B1,<RESTRT
000526          01F5  9F80 121A            STB     $B1,<SA15P
000527          01F7  9B80 1217            LAB     $B1,<SA15DV         SET NORMAL RUNNING LEVEL
000528          01F9  9F80 000F      X     STB     $B1,<ZHISAZ+15*$AF
000529          01FB  8E70 800F            LEV     =Z'8000'+15
000530          01FD  0000                 HLT
000531          01FE  0FFF                 B       >$-1
000532                                ********************************************************************************
000533                                * ALL NOW INITIALIZED
000534                                *
000535          01FF  FBC0 0003    RESTRT CALL    ZV$I.ZV$QC,MSRSTR
                0201  D380 0000      X
                0203  0F80
                0204  11C5
000536          0205  D380 000B            LNJ     $B5,<YSNO           RESTART ?
000537          0207  0000                 DC      <+$A                'N' REPLY
000538          0208  020D                 DC      <T0101              'Y' REPLY
000539          0209  0000         $A      HLT
000540          020A  0FFF                 B       >-$A                FREEZE HERE
000541          020B  0F80 0F87            B       <PCH                  XXXXXXXXDEBUG TOOL
```

```
000542                                  /*****************************************************************
000543                                  * TEST 0100 SELECTION TEST PART 1
000544                                  *
000545                                  *---------------------------------------------------------------
000546                                  * TEST 0101 DEVICE 0
000547                                  *
000548                                  *
000549  020D  8700 0FC2          T0101  CL    <FLAG
000550  020F  8700 0FC1                 CL    <ERFL                 CLEAR ERROR FLAG
000551  0211  8700 0FAC                 CL    <BITE                 SET DEVICE 0
000552  0213  9870 0101                 LDR   $R1,=Z'0101'
000553  0215  9F00 0FEB                 STR   $R1,<TEST             LOAD TEST NUMB
000554  0217  8280 0FC5                 LB    <IPFL,=X'1'           INHIBIT PRINT ?
        0219  0001
000555  021A  0500 0238                 BBT   <T0101A
000556  021C  D380 0C6D                 LNJ   $B5,<TDST             'START TEST'
000557                                  CALL  ZV$T.ZV$TC,MSILP      INSTALL LOGIC PLUG
        021E  FBC0 0003
        0220  D380 0000           X
        0222  0F80
        0223  109B
000558                                  CALL  ZV$TH,BITE            GET DRIVE NUMBER
        0224  FBC0 0003
        0226  D380 0000           X
        0228  0F80
        0229  0FAC
000559                          T0101B  CALL  ZV$T.ZV$TC,MSDONE     'Y' WHEN DONE
        022A  FBC0 0003
        022C  D380 0000           X
        022E  0F80
        022F  10EA
000560  0230  D380 0D0B                 LNJ   $B5,<YSNO
000561  0232  022A                      DC    <T0101B               'N' REPLY
000562  0233  0234                      DC    <$+$AF                'Y' REPLY
000563  0234  B800 0FAC                 LDR   $R3,<BITE             INDEX SET TO DEVICE NUMBER
000564  0236  D380 0DF5                 LNJ   $B5,<CDCH             SET CHANNELS FOR CURRENT DEVICES
000565  0238  A800 0FEB          T0101A LDR   $R2,<X-FFFF
000566  023A  AF00 0FE7                 STR   $R2,<TEMPA            MAKE TEMPA UNIQUE
000567  023C  D380 0C50                 LNJ   $B5,<TAGI
000568  023E  D000                      DC    Z'D000'               TAG CODE IN
000569  023F  9800 0FE7                 LDR   $R1,<TEMPA            GET BUS IN DATA
000570  0241  8900 0FC2                 LBT   <FLAG,=Z'0001'        1ST PASS DONE
        0243  0001
000571  0244  0500                T     BBT   >+$B                  PLUG MISSING
000572  0245  9952                      CMR   $R1,=$R2              BUS IN CHANGED?
000573  0246  0980                T     BNE   >+$A                  YES- DEVICE WAS SELECTED
000574  0247  D380 0C85                 LNJ   $B5,<TDER             ERROR
000575  0249  0102                      DC    Z'0102'               MODULE NOT SELECTED
000576                            $A    CALL  ZV$T.ZV$TC,MSRLP      REMOVE PLUG
        024A  FBC0 0003
        024C  D380 0000           X
        024E  0F80
        024F  1158
000577                                  CALL  ZV$TH,BITE
        0250  FBC0 0003
        0252  D380 0000           X
        0254  0F80
        0255  0FAC
000578                          T0101C  CALL  ZV$T.ZV$TC,MSDONE     'Y' WHEN DONE
        0256  FBC0 0003
        0258  D380 0000           X
        025A  0F80
        025B  10EA
000579  025C  D380 0D0B                 LNJ   $B5,<YSNO
000580  025E  0256                      DC    <T0101C               'N' REPLY
000581  025F  0260                      DC    <$+$AF                'Y' REPLY
000582  0260  0F80 0238                 B     <T0101A               2ND PASS
000583  0262  9952                $B    CMR   $R1,=$R2              BUS IN CHANGED ?
000584  0263  0900                T     BE    >+$C                  SHOULD NOT CHANGE
000585  0264  D380 0C85                 LNJ   $B5,<TDER
000586  0266  0106                      DC    Z'0106'               MODULE ADDRESS FAULT
000587  0267  D380 0CDD            $C    LNJ   $B5,<TDTE             END TEST
000588  0269  0101                      DC    Z'0101'               NUMB 0101
000589                                  *
000590                                  *
000591                                  *****************************************************************
000592                                  * TEST 0102 SELECTION TEST PART 2
000593                                  *
000594                                  *
000595                                  *---------------------------------------------------------------
000596                                  * TEST 0102 DEVICE N
000597                                  *
000598                                  *
000599  026A  8700 0FC2          T0102  CL    <FLAG
000600  026C  8700 0FC1                 CL    <ERFL                 CLEAR ERROR FLAG
000601  026E  8700 0FAC                 CL    <BITE                 DEFAULT IS DEVICE 0
000602  0270  9870 0102                 LDR   $R1,=Z'0102'
000603  0272  9F00 0FEB                 STR   $R1,<TEST             LOAD TEST NUMB
000604  0274  D380 0C6D                 LNJ   $B5,<TDST             'START TEST'
000605                                  CALL  ZV$T.ZV$GC,MSDVNO     ASK FOR DRIVE NUMB
        0276  FBC0 0003
        0278  D380 0000           X
        027A  0F80
        027B  1038
000606                            $A    CALL  ZV$ID,BITE            INPUT DRIVE NUMB
        027C  FBC0 0003
        027E  D380 0000           X
        0280  0F80
        0281  0FAC
000607  0282  9800 0FAC                 LDR   $R1,<BITE             GET DEV NUMB
000608  0284  1042                      SUR   $R1,2                 DUMP 0->3
000609  0285  1900                T     BEZ   $R1,>+$B              DEV NUMB 0 -> 3
000610                                  CALL  ZV$T.ZV$GC,MSBLNK     ?
        0286  FBC0 0003
        0288  D380 0000           X
        028A  0F80
        028B  1042
000611  028C  0FF0                      B     >-$A                  RETRY
000612                            $B    CALL  ZV$T.ZV$GC,MSDVID
        028D  FBC0 0003
        028F  D380 0000           X
        0291  0F80
        0292  10E1
```

```
000613  0293  0F80          T           B       >+$B
000614                              T0102A CALL    ZV$T.ZV$UC,MSBLNK    ? WRONG INPUT
        0294  FBC0 0003
        0296  D380 0000     X
        0298  0F80
        0299  1042
000615                              $B      CALL    ZV$IH,IDEN          INPUT DEVICE ID
        029A  FBC0 0003
        029C  D380 0000     X
        029E  0F80
        029F  0FC4
000616  02A0  9800 0FC4              LDR     $R1,<IDEN                   GET MODEL
000617  02A2  1A80 0294              BLEZ    $R1,<T0102A                 WRONG MODEL
000618  02A4  9970 2363              CMR     $R1,=Z'2363'
000619  02A6  0300 0294              BG      <T0102A                     TOO BIG
000620  02A8  9970 2360              CMR     $R1,=Z'2360'
000621  02AA  0980          T           BNE     >+$A
000622  02AB  9870 0000              LDR     $R1,=Z'0000'                LOAD DEVICE ID FOR 40 MB
000623  02AD  9970 2361      $A      CMR     $R1,=Z'2361'
000624  02AF  0980          T           BNE     >+$A
000625  02B0  9870 8000              LDR     $R1,=Z'8000'                ID FOR 80 MB
000626  02B2  9970 2362      $A      CMR     $R1,=Z'2362'
000627  02B4  0980          T           BNE     >+$A
000628  02B5  9870 4000              LDR     $R1,=Z'4000'                ID FOR 150 MB
000629  02B7  9970 2363      $A      CMR     $R1,=Z'2363'
000630  02B9  0980          T           BNE     >+$A
000631  02BA  9870 C000              LDR     $R1,=Z'C000'                ID FOR 300 MB
000632  02BC  82D1           $A      LB      =$R1,=Z'3FFF'               INVALID ID
        02BD  3FFF
000633  02BE  0500 0294              BBT     <T0102A
000634  02C0  9F00 0FC4              STR     $R1,<IDEN                   IDEN OK, STORE IT
000635                              CALL    ZV$T.ZV$TC,MSILP            INSTALL LOGIC PLUG
        02C2  FBC0 0003
        02C4  D380 0000     X
        02C6  0F80
        02C7  109B
000636                              CALL    ZV$IH,BITE                  CURRENT DRIVE
        02C8  FBC0 0003
        02CA  D380 0000     X
        02CC  0F80
        02CD  0FAC
000637                              T0102C CALL    ZV$T.ZV$TC,MSDONE    'Y' WHEN DONE
        02CE  FBC0 0003
        02D0  D380 0000     X
        02D2  0F80
        02D3  10EA
000638  02D4  D380 0D0B              LNJ     $B5,<YSNO
000639  02D6  02CE                   DC      <T0102C                     'N' REPLY
000640  02D7  02D8                   DC      <$+$AF                      'Y' REPLY
000641  02D8  B800 0FAC              LDR     $R3,<BITE                   SET INDEX TO DEVICE
000642  02DA  D380 0DF5              LNJ     $B5,<CDCH                   SET CHANS FOR THIS DEV
000643  02DC  BA80 02E5              SRM     $R3,<T0102B,=Z'0003'        IN TAG COMMAND
        02DE  0003
000644  02DF  A800 0FFB      $B      LDR     $R2,<X-FFFF
000645  02E1  AF00 0FE7              STR     $R2,<TEMPA                  INITIALIZE
000646  02E3  D380 0C50              LNJ     $B5,<TAGI
000647  02E5  D000           T0102B DC      Z'D000'                     TAG COMMAND
000648  02E6  9800 0FE7              LDR     $R1,<TEMPA                  GET BUS IN DATA
000649  02E8  9952                   CMR     $R1,=$R2                    ALL F'S MEANS NO TRANSFER
000650  02E9  0980          T           BNE     >+$A                    OK
000651  02EA  D380 0C85              LNJ     $B5,<TDER
000652  02EC  0108                   DC      Z'0108'                     MODULE NOT SELECTED
000653  02ED  9600 0FC4      $A      XOR     $R1,<IDEN
000654  02EF  82D1                   LB      =$R1,=Z'E000'               TEST ID BITS
        02F0  E000
000655  02F1  0580          T           BBF     >+$A                    OK
000656  02F2  D380 0C85              LNJ     $B5,<TDER
000657  02F4  0114                   DC      Z'0114'                     WRONG ID
000658  02F5  9800 0FE7      $A      LDR     $R1,<TEMPA                  GET BUS IN AGAIN
000659  02F7  1048                   SOR     $R1,8                       GET DEV NUMB
000660  02F8  9600 0FAC              XOR     $R1,<BITE                   AND COMPARE WITH SELECTED
000661  02FA  82D1                   LB      =$R1,=Z'000F'
        02FB  000F
000662  02FC  0580          T           BBF     >+$A                    OK
000663  02FD  D380 0C85              LNJ     $B5,<TDER
000664  02FF  0116                   DC      Z'0116'                     ADDRESS ERROR
000665  0300  D380 0CDD      $A      LNJ     $B5,<TDTE                   END OF TEST
000666  0302  0102                   DC      Z'0102'
000667                              *
000668                              *
000669                              ********************************************************************************
000670                              * TEST 0200 WRAP TEST
000671                              *
000672                              *-------------------------------------------------------------------------------
000673  0303  8700 0FC2      T0200   CL      <FLAG
000674  0305  8700 0FC1              CL      <ERFL                       CLEAR ERROR FLAG
000675  0307  9870 0200              LDR     $R1,=Z'0200'
000676  0309  9F00 0FEB              STR     $R1,<TEST                   LOAD TEST NUMB
000677  030B  D380 0C6D              LNJ     $B5,<TDST                   'START TEST'
000678  030D  9870 D100      $A      LDR     $R1,=Z'D100'                INITIAL DATA WRAP
000679  030F  9F00 0313              STR     $R1,<T0200B                 TASK WORD
000680  0311  D380 0C50      T0200A LNJ     $B5,<TAGI                   TAG IN
000681  0313  D100           T0200B DC      Z'D100'                     WRAP TEST
000682  0314  F800 0FE7              LDR     $R7,<TEMPA                  GET 'IS' DATA
000683  0316  7048                   SOR     $R7,8
000684  0317  E800 0313              LDR     $R6,<T0200B                 GET CMD & DATA
000685  0319  E570 00FF              AND     $R6,=X'FF'                  SAVE 'SB' DATA
000686  031B  E957                   CMR     $R6,=$R7
000687  031C  0900 0337              BE      <T0200C                     DATA IS OK
000688  031E  8900 0FC5              LBT     <IPFL,=X'2'                 SET FLAG FOR 'IS'/'SB' PRINT
        0320  0002
000689  0321  4048                   SOR     $R4,8                       GET TAG
000690  0322  C570 000F              AND     $R4,=X'0F'                  GET TAG NUMBER
000691  0324  CF00 0FE9              STR     $R4,<TEMPC
000692  0326  D380 0F7B              LNJ     $B5,<CRLF
000693  0328  D380 0F33              LNJ     $B5,<PISBC                  PRINT "IS" / "SB" DATA
000694  032A  8900 0FC1              LBT     <ERFL,=X'01'                SET ERROR FLAG
        032C  0001
000695  032D  8800 0FC5              LBF     <IPFL,=X'02'                CLR IS/SB FLAG
        032F  0002
000696  0330  D380 0D33              LNJ     $B5,<QUIT                   HIT BREAK TO QUIT
000697  0332  0337                   DC      <T0200C                     CONTINUE
000698  0333  0334                   DC      <$+$AF                      GET OUT
```

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000699  0334  D380 0C85          $B      LNJ     $B5,<TDER
000700  0336  0206                        DC      Z'0206'             DATA WRAP ERROR
000701  0337  8A80 0313          T0200C  INC     <T0200B             NEXT DATA FOR WRAP
000702  0339  8280 0313                  LB      <T0200B,=Z'0100'    CHECK FOR END
        033A  0100
000703  033C  0500 0311                  BBT     <T0200A             NO-GO AGAIN
000704  033E  D3C0 099E                  LNJ     $B5,TDTE
000705  0340  0200                        DC      Z'0200'             END TEST 0200
000706                              *
000707                              *
000708                              *
000709                              *
000710                              ********************************************************************
000711                              * TEST 0300 FIRST SEEK TEST
000712                              *
000713                              *--------------------------------------------------------------------
000714  0341  8700 0FC2          T0300   CL      <FLAG
000715  0343  8700 0FC1                  CL      <ERFL
000716  0345  9870 0300                  LDR     $R1,=Z'0300'
000717  0347  9F00 0FEB                  STR     $R1,<TEST           STORE TEST NUMB
000718  0349  D380 0C6D                  LNJ     $B5,<TDST           'START TEST'
000719  034B  D380 0C50                  LNJ     $B5,<TAGI           TAG IN
000720  034D  D700                        DC      Z'D700'             CONTROL TAG IN
000721  034E  8280 0FE7                  LB      <TEMPA,=Z'0100'     CHECK DIAGNOSTIC BIT
        0350  0100
000722  0351  0580 036E                  BBF     <T0300A             OK DO SOMETHING ELSE
000723  0353  D380 0C52                  LNJ     $B5,<TAGO           TAG OUT
000724  0355  D27C                        DC      Z'D27C'             TRY TO CLEAR DIAG STATUS
000725  0356  D380 0C50                  LNJ     $B5,<TAGI           TAG IN
000726  0358  D200                        DC      Z'D200'             READ DIAG STATUS
000727  0359  8280 0FE7                  LB      <TEMPA,=Z'8'        TEST HEAD SELECT
        035B  8000
000728  035C  0580          T                   BBF     >+$A
000729  035D  D380 0C52                  LNJ     $B5,<TAGO
000730  035F  D300                        DC      Z'D3'               SELECT HEAD 0
000731  0360  D380 0C50                  LNJ     $B5,<TAGI
000732  0362  D200                        DC      Z'D2'
000733  0363  8280 0FE7          $A      LB      <TEMPA,=Z'FE'
        0365  FE00
000734  0366  0580 036E                  BBF     <T0300A             DIAG BITS CLEARED
000735  0368  D380 0D46                  LNJ     $B5,<SBIS           PRINT 'IS/'SB'
000736  036A  0001                        DC      X'01'               BIT 7 DONT CARE
000737  036B  D380 0C85                  LNJ     $B5,<TDER           BAD COMPARE
000738  036D  0308                        DC      Z'0308'             DIAG STATUS FAILED TO CLEAR
000739  036E  D380 0C50          T0300A  LNJ     $B5,<TAGI           INPUT TASK
000740  0370  D300                        DC      Z'D300'             TEST HEADS LOADED
000741  0371  8280 0FE7                  LB      <TEMPA,=Z'08'       TEST HEADS LOADED
        0373  0800
000742  0374  0580 03B7                  BBF     <T0300D             OK, GO ON
000743                                    CALL    ZV$T,ZV$TC,MSIND    OPERATOR MESSAGES
        0376  FBC0 0003
        0378  D380 0000           X
        037A  0F80
        037B  104D
000744                                    CALL    ZV$T,ZV$TC,MSIND1
        037C  FBC0 0003
        037E  D380 0000           X
        0380  0F80
        0381  1062
000745                                    CALL    ZV$T,ZV$TC,MSIND2
        0382  FBC0 0003
        0384  D380 0000           X
        0386  0F80
        0387  1065
000746  0388  D380 0D0B          $A      LNJ     $B5,<YSNO           'Y' OR 'N' RESPONSE
000747  038A  036C                        DC      <T0300B             'N'
000748  038B  0396                        DC      <T0300C             'Y'
000749  038C  8280 0FE7          T0300B  LB      <TEMPA,=Z'80'       CHECK START BIT
        038E  8000
000750  038F  0580          T                   BBF     >+$A                START BIT IS OFF
000751  0390  D380 0C85                  LNJ     $B5,<TDER
000752  0392  0312                        DC      Z'0312'             START LIGHT OFF
000753  0393  D380 0C85          $A      LNJ     $B5,<TDER
000754  0395  0314                        DC      Z'0314'             HEADS LOADED & NO START
000755  0396  D380 0F12          T0300C  LNJ     $B5,<ISTAT1         GET STATUS WORD 1
000756  0398  8280 0FE5                  LB      <STAT1,=Z'8'        TEST READY BIT
        039A  8000
000757  039B  057B                        BBT     >T0300C             WAIT TO CLEAR
000758  039C  D380 0E41                  LNJ     $B5,<T1SEC          TIMEOUT
000759  039E  0019                        DC      25                  FOR 25 SECS
000760  039F  0F80          T       $A      B       >+$B                LOOP WHILE WAITING
000761  03A0  0F80          T               B       >+$C                TIMEOUT FINISHED
000762  03A1  0FFE                  $B      B       >-$A
000763  03A2  D380 0C50          $C      LNJ     $B5,<TAGI           TAG IN
000764  03A4  D300                        DC      Z'D3'               CHECK HEADS LOADED
000765  03A5  9080 0FE7                  LDH     $R1,<TEMPA          INPUT DATA
000766  03A7  9570 4800                  AND     $R1,=Z'48'
000767  03A9  9970 4800                  CMR     $R1,=Z'48'          TEST BITS 1 & 4
000768  03AB  0980          T                   BNE     >+$C
000769  03AC  D380 0C85                  LNJ     $B5,<TDER           1 & 4 ARE SET
000770  03AE  0316                        DC      Z'0316'
000771  03AF  8280 0FE7          $C      LB      <TEMPA,=Z'C8'       TEST 0,1,&4
        03B1  C800
000772  03B2  0580 03B7                  BBF     <T0300D             OK, NONE SET
000773  03B4  D380 0C85                  LNJ     $B5,<TDER
000774  03B6  0310                        DC      Z'0310'             AT LEAST ONE IS SET
000775                            T0300D  CALL    ZV$T,ZV$TC,MSSTR    DEPRESS START SWITCH
        03B7  FBC0 0003
        03B9  D380 0000           X
        03BB  0F80
        03BC  112D
000776                                    CALL    ZV$T,MSTIME         WITHIN 15 SECS
        03BD  FBC0 0003
        03BF  D380 0000           X
        03C1  0F80
        03C2  114E
000777  03C3  D380 0E41                  LNJ     $B5,<T1SEC
000778  03C5  000F                        DC      15                  15 SECOND TIMEOUT
000779  03C6  0F80          T               B       >+$A                TIME THIS PROCESS
000780  03C7  D380 0C85                  LNJ     $B5,<TDER
000781  03C9  0318                        DC      Z'0318'             TIMEOUT ON START BIT
000782  03CA  D380 0C50          $A      LNJ     $B5,<TAGI
000783  03CC  D300                        DC      Z'D3'
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000784  03CD  8280 0FE7                    LB      <TEMPA,=Z'8'        TEST START BIT
        03CF  8000
000785  03D0  05FA                         BBF     >-$A                KEEP TRYING
000786  03D1  0005                         RTCF                        OK-TURN CLOCK OFF
000787  03D2  0380 0E41          T0300E     LNJ     $B5,<T1SEC          RESET CLOCK...
000788  03D4  0023                         DC      35                  ...TO 35 SECS
000789  03D5  0F80               T         B       >+$B                THEN DO THIS
000790  03D6  0380 0C85                     LNJ     $B5,<TDER
000791  03D8  0320                         DC      Z'0320'             SPEED BIT TIMEOUT
000792  03D9  0380 0C50          $B         LNJ     $B5,<TAGI
000793  03DB  0300                         DC      Z'D3'
000794  03DC  8280 0FE7                    LB      <TEMPA,=Z'4'        TEST SPEED ACTIVE
        03DE  4000
000795  03DF  05FA                         BBF     >-$B                KEEP TRYING
000796  03E0  0005                         RTCF                        OK-TURN THE CLOCK OFF
000797  03E1  0380 0E38          T0300F     LNJ     $B5,<TIME           DELAY FOR...
000798  03E3  0001                         DC      1                   ...1 MILLISECOND
000799  03E4  0380 0C50                     LNJ     $B5,<TAGI
000800  03E6  0300                         DC      Z'D3'
000801  03E7  8280 0FE7                    LB      <TEMPA,=Z'2'        TEST BIT 2
        03E9  2000
000802  03EA  0580 0406                     BBF     <T0300G             NOT ACTIVE
000803  03EC  0380 0C50                     LNJ     $B5,<TAGI
000804  03EE  0200                         DC      Z'D2'               DIAGNOSTIC STATUS
000805  03EF  8280 0FE7                    LB      <TEMPA,=Z'FE'
        03F1  FE00
000806  03F2  0580               T         BBF     >+$C
000807  03F3  0380 0D46                     LNJ     $B5,<SBIS           PRINT 'SB'/'IS'
000808  03F5  0001                         DC      X'01'               DONT CARE BIT
000809  03F6  0380 0C85                     LNJ     $B5,<TDER
000810  03F8  0322                         DC      Z'0322'
000811  03F9  0380 0C50          $C         LNJ     $B5,<TAGI
000812  03FB  0300                         DC      Z'D3'
000813  03FC  8280 0FE7                    LB      <TEMPA,=Z'1'        TEST BIT 3
        03FE  1000
000814  03FF  0580               T         BBF     >+$D
000815  0400  0380 0C85                     LNJ     $B5,<TDER
000816  0402  0324                         DC      Z'0324'             BIT 3 IS ON
000817  0403  0380 0C85          $D         LNJ     $B5,<TDER
000818  0405  0326                         DC      Z'0326'             BIT 3 OFF
000819  0406  0380 0E38          T0300G     LNJ     $B5,<TIME           DELAY...
000820  0408  0019                         DC      25                  ...FOR 25 MS
000821  0409  0380 0C50                     LNJ     $B5,<TAGI
000822  040B  0300                         DC      Z'D3'
000823  040C  8280 0FE7                    LB      <TEMPA,=Z'08'       TEST HEADS LOADED
        040E  0800
000824  040F  0500 041E                     BBT     <T0300H
000825  0411  0380 0C50                     LNJ     $B5,<TAGI
000826  0413  0200                         DC      Z'D2'               DIAGNOSTIC STATUS
000827  0414  8280 0FE7                    LB      <TEMPA,=Z'08'       TEST FOR VOLTAGE FAULT
        0416  0800
000828  0417  0580               T         BBF     >+$E
000829  0418  0380 0C85                     LNJ     $B5,<TDER
000830  041A  0328                         DC      Z'0328'             VOLTAGE FAULT
000831  041B  0380 0C85          $E         LNJ     $B5,<TDER
000832  041D  0330                         DC      Z'0330'             NO VOLTAGE FAULT
000833  041E  0380 0E3E          T0300H     LNJ     $B5,<T10MS
000834  0420  0014                         DC      20                  200 MS TIMEOUT
000835  0421  0F80               T         B       >+$A                GO HERE WHILE TIMING
000836  0422  0F80               T         B       >+$B                TIMEOUT
000837  0423  0380 0C50          $A         LNJ     $B5,<TAGI
000838  0425  0300                         DC      Z'D3'
000839  0426  8280 0FE7                    LB      <TEMPA,=Z'2'        LOAD-RTZ BIT
        0428  2000
000840  0429  05FA                         BBF     >-$A                KEEP TRYING
000841  042A  0005                         RTCF                        OK-TURN CLOCK OFF
000842  042B  0F7F                         NOP     >$-1                XXXXXX
000843  042C  0F80 0460                    B       <T0300K
000844  042E  8280 0FE7          $B         LB      <TEMPA,=Z'08'       HEADS LOADED ?
        0430  0800
000845  0431  0580               T         BBF     >+$C
000846  0432  8280 0FE7                    LB      <TEMPA,=Z'20'       LOAD* + RTZ*
        0434  2000
000847  0435  0580               T         BBF     >+$B
000848  0436  0380 0C85                     LNJ     $B5,<TDER
000849  0438  0332                         DC      Z'0332'
000850  0439  0380 0C85          $B         LNJ     $B5,<TDER
000851  043B  0334                         DC      Z'0334'             HEADS NOT LOADED
000852  043C  8280 0FE7          $C         LB      <TEMPA,=Z'1'        DIBIT ?
        043E  1000
000853  043F  0580               T         BBF     >+$D
000854  0440  0380 0C85                     LNJ     $B5,<TDER
000855  0442  0336                         DC      Z'0336'             DIBIT FAULT
000856  0443  0380 0C50          $D         LNJ     $B5,<TAGI
000857  0445  0200                         DC      Z'D2'               DIAGNOSTIC TAG
000858  0446  8280 0FE7                    LB      <TEMPA,=Z'08'       TEST VOLTAGE FAULT
        0448  0800
000859  0449  0580               T         BBF     >+$E
000860  044A  0380 0C85                     LNJ     $B5,<TDER
000861  044C  0338                         DC      Z'0338'             VOLTAGE FAULT
000862  044D  0380 0E41          $E         LNJ     $B5,<T1SEC
000863  044F  0005                         DC      5                   5 SECOND TIMEOUT
000864  0450  0F80               T         B       >+$B                WAIT FOR TIMEOUT
000865  0451  0F80               T         B       >+$C                TIMEOUT
000866  0452  0FFE               $B        B       >-$A
000867  0453  0380 0C50          $C         LNJ     $B5,<TAGI
000868  0455  0300                         DC      Z'D3'
000869  0456  8280 0FE7                    LB      <TEMPA,=Z'4'        TEST SPEED BIT
        0458  4000
000870  0459  0500               T         BBT     >+$F
000871  045A  0380 0C85                     LNJ     $B5,<TDER
000872  045C  0340                         DC      Z'0340'             SPEED NOT ACTIVE
000873  045D  0380 0C85          $F         LNJ     $B5,<TDER
000874  045F  0342                         DC      Z'0342'             SPEED ACTIVE
000875  0460  0380 0E38          T0300K     LNJ     $B5,<TIME
000876  0462  002C                         DC      44                  44MS DELAY
000877  0463  0380 0E3E                    LNJ     $B5,<T10MS
000878  0465  0003                         DC      3                   30 MILLISECS TIMEOUT
000879  0466  0F80               T         B       >+$B                GO HERE WHILE TIMING
000880  0467  0380 0C85                     LNJ     $B5,<TDER           TIMEOUT
000881  0469  0352                         DC      Z'0352'             TIMEOUT ON FINE BIT
000882  046A  0380 0C50          $B         LNJ     $B5,<TAGI
000883  046C  0300                         DC      Z'D300'
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000884  046D  8280 0FE7                LB      <TEMPA,=Z'02'          TEST FINE BIT
        046F  0200
000885  0470  0500            T       BBT     >+$C
000886  0471  0FF9                    B       >-$B
000887  0472  0005            $C      RTCF                           TURN CLOCK OFF
000888  0473  8280 0FE7                LB      <TEMPA,=Z'04'          TEST SLOPE BIT
        0475  0400
000889  0476  0580            T       BBF     >+$D
000890  0477  D380 0C85                LNJ     $B5,<TDER
000891  0479  0354                    DC      Z'0354'                SLOPE ACTIVE
000892  047A  D380 0E38        $D      LNJ     $B5,<TIME
000893  047C  0014                    DC      20                     20MS TIME DLY
000894  047D  D380 0C50                LNJ     $B5,<TAGI
000895  047F  D700                    DC      Z'D7'
000896  0480  8280 0FE7                LB      <TEMPA,=Z'2'           ON CYL ?
        0482  2000
000897  0483  0500            T       BBT     >+$A
000898  0484  8280 0FE7                LB      <TEMPA,=Z'1'           READY ?
        0486  1000
000899  0487  0500            T       BBT     >+$E
000900  0488  D380 0C85                LNJ     $B5,<TDER
000901  048A  0344                    DC      Z'0344'                UNIT NOT READY
000902  048B  D380 0C85        $E      LNJ     $B5,<TDER
000903  048D  0346                    DC      Z'0346'                READY & ONCYL*
000904  048E  8280 0FE7        $A      LB      <TEMPA,=Z'1'           READY ?
        0490  1000
000905  0491  0500            T       BBT     >+$B
000906  0492  D380 0C85                LNJ     $B5,<TDER
000907  0494  0348                    DC      Z'0348'                UNIT NOT READY
000908                        $B      CALL    ZV$T.ZV$TC,MSSTR       STOP DEVICE
        0495  FBC0 0003
        0497  D380 0000        X
        0499  0F80
        049A  112D
000909  049B  D380 0C50        $A      LNJ     $B5,<TAGI
000910  049D  D700                    DC      Z'D7'
000911  049E  8280 0FE7                LB      <TEMPA,=Z'10'          WAIT FOR READY*
        04A0  1000
000912  04A1  057A                    BBT     >-$A
000913  04A2  D380 0E41                LNJ     $B5,<T1SEC
000914  04A4  000F                    DC      15                     15 SEC TIMEOUT
000915  04A5  0F80            T       B       >+$C
000916  04A6  D380 0C85                LNJ     $B5,<TDER              TIMEOUT FAULT
000917  04A8  0356                    DC      Z'0356'
000918  04A9  D380 0C50        $C      LNJ     $B5,<TAGI
000919  04AB  0000                    DC      Z'D0'
000920  04AC  8280 0FE7                LB      <TEMPA,=Z'4'           40/80 OR 150/300 MBS ?
        04AE  4000
000921  04AF  0500            T       BBT     >+$D
000922  04B0  5C06                    LDV     $R5,=6                 6 SECS FOR 40/80
000923  04B1  A870 0358                LDR     $R2,=Z'0358'           DICT ENTRY FOR 40/80
000924  04B3  0F80            T       B       >+$E
000925  04B4  5C0B        $D      LDV     $R5,=11                    11 SECS FOR 150/300
000926  04B5  A870 0362                LDR     $R2,=Z'0362'           DICT ENTRY FOR 150/300
000927  04B7  8255            $E      NEG     =$R5                   COUNTER FOR 1 SEC TIMER
000928  04B8  AF00 04CF                STR     $R2,<T0300J            STORE DICT ENTRY
000929  04BA  D380 0C50        $F      LNJ     $B5,<TAGI
000930  04BC  D300                    DC      Z'D3'
000931  04BD  8280 0FE7                LB      <TEMPA,=Z'8'           TEST START BIT
        04BF  8000
000932  04C0  057A                    BBT     >-$F                   WAIT FOR IT TO DROP
000933  04C1  0005                    RTCF                           OK TURN CLOCK OFF
000934  04C2  D380 0E38        $A      LNJ     $B5,<TIME
000935  04C4  03E8                    DC      1000                   DELAY 1 SEC
000936  04C5  57FD                    BINC    $R5,>-$A               LOOP FOR 6/11 TIMES
000937  04C6  D380 0C50                LNJ     $B5,<TAGI
000938  04C8  D300                    DC      Z'D3'
000939  04C9  8280 0FE7                LB      <TEMPA,=Z'4'           TEST SPEED
        04CB  4000
000940  04CC  0580            T       BBF     >+$D
000941  04CD  D380 0C85                LNJ     $B5,<TDER
000942  04CF  0000            T0300J  DC      0                      DICTIONARY GOES IN HERE
000943                        $D      CALL    ZV$T.ZV$TC,MSSTR       START DEVICE FOR NEXT TEST
        04D0  FBC0 0003
        04D2  D380 0000        X
        04D4  0F80
        04D5  112D
000944  04D6  D380 0F12        $B      LNJ     $B5,<ISTAT1            GET STATUS WORD 1
000945  04D8  8280 0FE5                LB      <STAT1,=Z'8'           TEST READY
        04DA  8000
000946  04DB  05FB                    BBF     >-$B                   WAIT FOR READY
000947  04DC  D380 0CDD        $C      LNJ     $B5,<TDTE
000948  04DE  0300                    DC      Z'0300'                END TEST 0300
000949                        *
000950                        *
000951                        *
000952                        ********************************************************************************
000953                        * TEST 0500 DYNAMIC RTZ TEST
000954                        *
000955                        *-------------------------------------------------------------------------------
000956  04DF  8700 0FC2        T0500   CL      <FLAG
000957  04E1  8700 0FC1                CL      <ERFL                  CLEAR ERR FLAG
000958  04E3  9870 0500                LDR     $R1,=Z'0500'           LOAD TEST NUMBER
000959  04E5  9F00 0FEB                STR     $R1,<TEST
000960  04E7  D380 0C6D                LNJ     $B5,<TDST              'START TEST'
000961  04E9  D380 0C50                LNJ     $B5,<TAGI
000962  04EB  D700                    DC      Z'D7'
000963  04EC  8280 0FE7                LB      <TEMPA,=Z'01'          CHECK DIAGNOSTIC BIT
        04EE  0100
000964  04EF  0580 04FF                BBF     <T0500A
000965  04F1  D380 0C50                LNJ     $B5,<TAGI
000966  04F3  D200                    DC      Z'D2'
000967  04F4  8280 0FE7                LB      <TEMPA,=Z'FC'          CHECK FAULT BITS
        04F6  FC00
000968  04F7  0580 04FF                BBF     <T0500A                NONE ARE SET
000969  04F9  D380 0D46                LNJ     $B5,<SBIS              GET SB/IS DATA
000970  04FB  0003                    DC      X'03'                  DONT CARE MASK
000971  04FC  D380 0C85                LNJ     $B5,<TDER
000972  04FE  0508                    DC      Z'0508'                CANT CLEAR DIAG BIT
000973  04FF  8280 0FE7        T0500A  LB      <TEMPA,=Z'1'           TEST READY BIT
        0501  1000
000974  0502  0500 052D                BBT     <T0500B                AOK-SO FAR
000975  0504  D380 0C50                LNJ     $B5,<TAGI
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000976  0506  D300                        DC      Z'D3'
000977  0507  8280 0FE7                   LB      <TEMPA,=Z'8'        TEST START BIT
        0509  8000
000978  050A  0500            T           BBT     >+$A                OK
000979  050B  D380 0C85                    LNJ     $B5,<TDER
000980  050D  0510                        DC      Z'0510'             NO START BIT
000981  050E  8280 0FE7          $A        LB      <TEMPA,=Z'1'        TEST DIBIT
        0510  1000
000982  0511  0580            T           BBF     >+$B                OK
000983  0512  D380 0C85                    LNJ     $B5,<TDER
000984  0514  0512                        DC      Z'0512'             DIBIT FAULT
000985  0515  8280 0FE7          $B        LB      <TEMPA,=Z'4'        TEST SPEED BIT
        0517  4000
000986  0518  0500            T           BBT     >+$C                OK
000987  0519  D380 0C85                    LNJ     $B5,<TDER
000988  051B  0514                        DC      Z'0514'
000989  051C  8280 0FE7          $C        LB      <TEMPA,=Z'08'       TEST HEADS LOADED
        051E  0800
000990  051F  0500            T           BBT     >+$D
000991  0520  D380 0C85                    LNJ     $B5,<TDER
000992  0522  0516                        DC      Z'0516'             HEADS NOT LOADED
000993  0523  8280 0FE7          $D        LB      <TEMPA,=Z'2'        TEST BIT 2
        0525  2000
000994  0526  0500            T           BBT     >+$E
000995  0527  D380 0C85                    LNJ     $B5,<TDER
000996  0529  0518                        DC      Z'0518'             LOAD/RTZ ACTIVE
000997  052A  D380 0C85          $E        LNJ     $B5,<TDER
000998  052C  0520                        DC      Z'0520'
000999  052D  D380 0C52          T0500B    LNJ     $B5,<TAGO           TAG OUT
001000  052F  D280                        DC      Z'D280'             RTZ
001001  0530  D380 0C50                    LNJ     $B5,<TAGI
001002  0532  D300                        DC      Z'D3'
001003  0533  8280 0FE7                    LB      <TEMPA,=Z'2'        TEST BIT 2
        0535  2000
001004  0536  0580            T           BBF     >+$A
001005  0537  D380 0C85                    LNJ     $B5,<TDER
001006  0539  0522                        DC      Z'0522'             BIT 2 OFF AFTER I/O CMND
001007  053A  D380 0C50          $A        LNJ     $B5,<TAGI
001008  053C  D700                        DC      Z'D7'
001009  053D  8280 0FE7                    LB      <TEMPA,=Z'2'        TEST ON CYL BIT
        053F  2000
001010  0540  0560            T           BBF     >+$B
001011  0541  D380 0C85                    LNJ     $B5,<TDER
001012  0543  0526                        DC      Z'0526'             ON CYLINDER AFTER RTZ
001013  0544  D380 0E3E          $B        LNJ     $B5,<T10MS          CALL MILLISEC TIMER
001014  0546  0028                        DC      40                  400 MILLISECOND TIMEOUT
001015  0547  0F84                        B       >T0500C             WHILE TIMING
001016  0548  D380 0C85                    LNJ     $B5,<TDER
001017  054A  0546                        DC      Z'0546'             FINE BIT TIMEOUT
001018  054B  D380 0C50          T0500C    LNJ     $B5,<TAGI
001019  054D  D300                        DC      Z'D3'
001020  054E  8280 0FE7                    LB      <TEMPA,=Z'02'       TEST FINE BIT
        0550  0200
001021  0551  05FA                        BBF     >T0500C             WAIT FOR IT
001022  0552  0005                        RTCF                        TURN OFF CLOCK
001023  0553  8280 0FE7                    LB      <TEMPA,=Z'04'       TEST SLOPE BIT
        0555  0400
001024  0556  0580            T           BBF     >+$C
001025  0557  D380 0C85                    LNJ     $B5,<TDER
001026  0559  0548                        DC      Z'0548'             SLOPE SET
001027  055A  D380 0E38          $C        LNJ     $B5,<TIME
001028  055C  0019                        DC      25                  25MS TIMEOUT
001029  055D  D380 0C50                    LNJ     $B5,<TAGI
001030  055F  D700                        DC      Z'D7'
001031  0560  8280 0FE7                    LB      <TEMPA,=Z'2'        ON CYL ?
        0562  2000
001032  0563  0500 0572                    BBT     <T0500G
001033  0565  D380 0C50                    LNJ     $B5,<TAGI           TIMEOUT EXIT
001034  0567  D300                        DC      Z'D3'
001035  0568  8280 0FE7                    LB      <TEMPA,=Z'2'        BIT 2
        056A  2000
001036  056B  0500            T           BBT     >+$C
001037  056C  D380 0C85                    LNJ     $B5,<TDER
001038  056E  0528                        DC      Z'0528'             NO SEEK COMPL AND BIT 2 LOW
001039  056F  D380 0C85          $C        LNJ     $B5,<TDER
001040  0571  0530                        DC      Z'0530'             NO SEEK COMPL WIT BIT 2 HIGH
001041  0572  D380 0C52          T0500G    LNJ     $B5,<TAGO           TAG OUT
001042  0574  D280                        DC      Z'D280'             RTZ
001043  0575  D380 0E38                    LNJ     $B5,<TIME
001044  0577  0007                        DC      7                   WAIT 7 MILLISECS
001045  0578  D380 0C50                    LNJ     $B5,<TAGI
001046  057A  D700                        DC      Z'D7'
001047  057B  8280 0FE7                    LB      <TEMPA,=Z'2'        ON CYLINDER ?
        057D  2000
001048  057E  0580 059E                    BBF     <T0500D
001049  0580  8280 0FE7                    LB      <TEMPA,=Z'01'       DIAGNOSTIC BIT ?
        0582  0100
001050  0583  0500            T           BBT     >+$A
001051  0584  8280 0FE7                    LB      <TEMPA,=Z'2'
        0586  2000
001052  0587  0580            T           BBF     >+$D
001053  0588  D380 0C85                    LNJ     $B5,<TDER
001054  058A  0536                        DC      Z'0536'             ON CYL. NOT CLEARED
001055  058B  D380 0C85          $D        LNJ     $B5,<TDER
001056  058D  0540                        DC      Z'0540'
001057  058E  D380 0C50          $A        LNJ     $B5,<TAGI
001058  0590  D300                        DC      Z'D3'
001059  0591  8280 0FE7                    LB      <TEMPA,=Z'FE'
        0593  FE00
001060  0594  0580            T           BBF     >+$B
001061  0595  D380 0D46                    LNJ     $B5,<SBIS           GET SB/IS DATA
001062  0597  0001                        DC      X'01'               DONT CARE MASK
001063  0598  D380 0C85                    LNJ     $B5,<TDER
001064  059A  0544                        DC      Z'0544'             DIAGNOSTIC BIT SET
001065  059B  D380 0C85          $B        LNJ     $B5,<TDER
001066  059D  0542                        DC      Z'0542'             DIAG STATUS AND NO FAULT BITS
001067  059E  D380 0C50          T0500D    LNJ     $B5,<TAGI
001068  05A0  D300                        DC      Z'D3'
001069  05A1  8280 0FE7                    LB      <TEMPA,=Z'2'        BIT 2 ?
        05A3  2000
001070  05A4  0580            T           BBF     >+$C
001071  05A5  D380 0C85                    LNJ     $B5,<TDER
001072  05A7  0532                        DC      Z'0532'             BIT 2 RESET TOO SOON
```

```
001073  05A8  9870 0005          $C      LDR   $R1,=5              SET 5 MS TIME DELAY
001074  05AA  8280 0FC4                  LB    <IDEN,=Z'4'         19 SURFACE ?
        05AC  4000
001075  05AD  0580           T           BBF   >+$D                NO
001076  05AE  9A70 0002                  ADD   $R1,=2              MAKE 7MS FOR 19 SURFACE
001077  05B0  9F00 05B4          $D      STR   $R1,<T0500E
001078  05B2  D380 0E38                  LNJ   $B5,<TIME
001079  05B4  0000               T0500E DC    0                   FILL IN MILLISECS
001080  05B5  D380 0C50                  LNJ   $B5,<TAGI
001081  05B7  D300                       DC    Z'D3'
001082  05B8  8280 0FE7                  LB    <TEMPA,=Z'2'        BIT 2 ?
        05BA  2000
001083  05BB  0500           T           BBT   >+$E
001084  05BC  D380 0C85                  LNJ   $B5,<TDER
001085  05BE  0534                       DC    Z'0534'             ON CYL NOT RESET BY RTZ
001086  05BF  9870 000A          $E      LDR   $R1,=10             SET 10 MS DELAY
001087  05C1  8280 0FC4                  LB    <IDEN,=Z'4'         19 SURFACE ?
        05C3  4000
001088  05C4  0580           T           BBF   >+$F                NO
001089  05C5  9A70 0003                  ADD   $R1,=3              MAKE 13MS FOR 19 SURF.
001090  05C7  9F00 05CB          $F      STR   $R1,<T0500F
001091  05C9  D380 0E38                  LNJ   $B5,<TIME           DELAY TIMER
001092  05CB  0000               T0500F DC    0                   TIME DELAY
001093  05CC  D380 0C50                  LNJ   $B5,<TAGI
001094  05CE  D700                       DC    Z'D7'
001095  05CF  8280 0FE7                  LB    <TEMPA,=Z'2'        ON CYLINDER ?
        05D1  2000
001096  05D2  0500           T           BBT   >+$A
001097  05D3  D380 0C85                  LNJ   $B5,<TDER
001098  05D5  0538                       DC    Z'0538'             ON CYL TIMEOUT
001099  05D6  D380 0CDD          $A      LNJ   $B5,<TDTE           END TEST 0500
001100  05D8  0500                       DC    Z'0500'             END TEST 0500
001101                                   *
001102                                   *
001103                                   ************************************************************************
001104                                   *
001105                                   * TEST 0600
001106                                   *
001107                                   *
001108                                   *-----------------------------------------------------------------------
001109                                   * TEST 0601 OFFSET,ZERO TRACK AND ILLEGAL SEEKS
001110                                   *
001111                                   *
001112  05D9  8700 0FC2          T0601   CL    <FLAG
001113  05DB  8700 0FC1                  CL    <ERFL
001114  05DD  9870 0601                  LDR   $R1,=Z'0601'        LOAD TEST NUMBER
001115  05DF  9F00 0FEB                  STR   $R1,<TEST
001116  05E1  D380 0C6D                  LNJ   $B5,<TDST           'START TEST'
001117  05E3  D380 0C27                  LNJ   $B5,<FRRC           FAULT RESET/READY CHECK
001118  05E5  5C01                       LDV   $R5,=1              SET LOOP COUNT = 2
001119  05E6  D3C0 066B          T0601A  LNJ   $B5,TAGO            TAG OUT
001120  05E8  D120                       DC    Z'D120'             SET OFFSET +
001121  05E9  D380 0C50          T0601B  LNJ   $B5,<TAGI
001122  05EB  D700                       DC    Z'D7'
001123  05EC  8280 0FE7                  LB    <TEMPA,=Z'20'       ON CYL ?
        05EE  2000
001124  05EF  0580           T           BBF   >+$A                NO
001125  05F0  8900 0FC1                  LBT   <ERFL,=X'02'        SET CONTINUE FLAG
        05F2  0002
001126  05F3  D380 0C85                  LNJ   $B5,<TDER
001127  05F5  0612                       DC    Z'0612'             ON CYL
001128  05F6  D380 0C50          $A      LNJ   $B5,<TAGI
001129  05F8  D700                       DC    Z'D7'
001130  05F9  8280 0FE7                  LB    <TEMPA,=Z'02'       OFFSET ?
        05FB  0200
001131  05FC  0500           T           BBT   >+$B                YES
001132  05FD  D380 0C81                  LNJ   $B5,<TDER1
001133  05FF  0614                       DC    Z'0614'             NO OFFSET
001134  0600  8280 0FE7          $B      LB    <TEMPA,=Z'20'       ON CYL ?
        0602  2000
001135  0603  0580           T           BBF   >+$H                NO
001136  0604  D380 0C81                  LNJ   $B5,<TDER1
001137  0606  0616                       DC    Z'0616'             ONCYL
001138  0607  8800 0FC1          $H      LBF   <ERFL,=X'02'        CLEAR CONT. FLAG
        0609  0002
001139  060A  0580           T           BBF   >+$C                NORMAL PATH
001140  060B  D380 0CDD                  LNJ   $B5,<TDTE
001141  060D  0601                       DC    Z'0601'
001142  060E  0F80 0100                  B     <START
001143  0610  D380 0E38          $C      LNJ   $B5,<TIME
001144  0612  0003                       DC    3                   WAIT 3 MILLISECS
001145  0613  D380 0C50                  LNJ   $B5,<TAGI
001146  0615  D700                       DC    Z'D7'
001147  0616  8280 0FE7                  LB    <TEMPA,=Z'02'       OFFSET ?
        0618  0200
001148  0619  0500           T           BBT   >+$D                YES
001149  061A  D380 0C85                  LNJ   $B5,<TDER
001150  061C  0620                       DC    Z'0620'             NO OFFSET
001151  061D  8280 0FE7          $D      LB    <TEMPA,=Z'20'       ON CYL ?
        061F  2000
001152  0620  0500           T           BBT   >+$E                YES
001153  0621  D380 0C85                  LNJ   $B5,<TDER
001154  0623  0622                       DC    Z'0622'             NOT ON CYL
001155  0624  5700 0000      T   $E      BDEC  $R5,<+$G            COUNT = 2 ?
001156  0626  0F80 063A                  B     <T0601C             LEAVE LOOP
001157  0628  D380 0C52          $G      LNJ   $B5,<TAGO           NO
001158  062A  D208                       DC    Z'D208'             CLR ERROR RECOV LATCHES
001159  062B  D380 0C50                  LNJ   $B5,<TAGI
001160  062D  D700                       DC    Z'D7'
001161  062E  8280 0FE7                  LB    <TEMPA,=Z'02'       OFFSET ?
        0630  0200
001162  0631  0580           T           BBF   >+$F                NO
001163  0632  D380 0C85                  LNJ   $B5,<TDER
001164  0634  0624                       DC    Z'0624'             OFFSET ACTIVE
001165  0635  D380 0C52          $F      LNJ   $B5,<TAGO
001166  0637  D110                       DC    Z'D110'             SET OFFSET-
001167  0638  0F80 05E9                  B     <T0601B             REPEAT WITH - OFFSET
001168  063A  0F7F               T0601C NOP   >$-1
001169  063B  D380 0DC3                  LNJ   $B5,<SKCYS          SEEK
001170  063D  0000                       DC    0                   CYL ZERO
001171  063E  8180 0FE7          $A      IOLD  <TEMPA,<IOREAD,<D-1 SETUP INPUT TASK
        0640  0000 11F6
        0642  0000 0FAF
```

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001172  0644  07FA                        BIOF    >-$A
001173  0645  8070 D600           $B      IO      =Z'D6',<OTTASK          TAG 6
        0647  0000 11FD
001174  0649  07FC                        BIOF    >-$B
001175  064A  D380 0F12                   LNJ     $B5,<ISTAT1             STALL
001176  064C  8280 0FE7                   LB      <TEMPA,=Z'02'           OFFSET ?
        064E  0200
001177  064F  0580               T       BBF     >+$A                    NO
001178  0650  D380 0C85                   LNJ     $B5,<TDER
001179  0652  0626                        DC      Z'0626'                 OFFSET STILL ACTIVE
001180  0653  8280 0FE7-          $A      LB      <TEMPA,=Z'20'           ON CYL ?
        0655  2000
001181  0656  0500               T       BBT     >+$C                    YES
001182  0657  D380 0C85                   LNJ     $B5,<TDER
001183  0659  0632                        DC      Z'0632'                 ON CYL NOT ACTIVE
001184  065A  D380 0C52           $C      LNJ     $B5,<TAGO
001185  065C  D120                        DC      Z'D120'                 SET OFFSET+
001186  065D  D380 0C50                   LNJ     $B5,<TAGI
001187  065F  D700                        DC      Z'D7'                   CONTROL TAG
001188  0660  8280 0FE7                   LB      <TEMPA,=Z'02'           OFFSET ?
        0662  0200
001189  0663  0500               T       BBT     >+$D
001190  0664  D380 0C85                   LNJ     $B5,<TDER
001191  0666  0634                        DC      Z'0634'                 OFFSET NOT ACTIVE
001192  0667  D380 0C52           $D      LNJ     $B5,<TAGO
001193  0669  D280                        DC      Z'D280'                 RTZ
001194  066A  D380 0E38                   LNJ     $B5,<TIME               DELAY
001195  066C  0004                        DC      4                       4MS
001196  066D  D380 0C50                   LNJ     $B5,<TAGI
001197  066F  D700                        DC      Z'D7'                   CONTROL TAG
001198  0670  8280 0FE7                   LB      <TEMPA,=Z'02'           OFFSET ?
        0672  0200
001199  0673  0580               T       BBF     >+$A
001200  0674  D3C0 0610                   LNJ     $B5,TDER
001201  0676  0636                        DC      Z'0636'                 OFFSET STILL ACTIVE
001202  0677  D380 0E38           $A      LNJ     $B5,<TIME
001203  0679  01C2                        DC      450                     450 MS DELAY
001204  067A  D380 0DC3                   LNJ     $B5,<SKCYS              SEEK
001205  067C  0337                        DC      823                     CYL 823 (ILLEGAL)
001206  067D  8180 0FE7           $F      IOLD    <TEMPA,<IOREAD,<D-1     SETUP FOR INPUT
        067F  0000 11F6
        0681  0000 0FAF
001207  0683  07FA                        BIOF    >-$F
001208  0684  8070 D600           $A      IO      =Z'D6',<OTTASK          TAG 6
        0686  0000 11FD
001209  0688  07FC                        BIOF    >-$A
001210  0689  8000 0FE8           $B      IO      <TEMPB,<INSTW1          STALL
        068B  0000 1204
001211  068D  07FC                        BIOF    >-$B
001212  068E  8280 0FE7                   LB      <TEMPA,=Z'01'           CHECK DIAGNOSTIC
        0690  0100
001213  0691  0500               T       BBT     >+$J
001214  0692  D380 0C85                   LNJ     $B5,<TDER
001215  0694  0640                        DC      Z'0640'                 DIAG NOT ACTIVE
001216  0695  D380 0C50           $J      LNJ     $B5,<TAGI
001217  0697  D600                        DC      Z'D6'
001218  0698  8280 0FE7                   LB      <TEMPA,=Z'20'           ON CYL ?
        069A  2000
001219  069B  0500               T       BBT     >+$K
001220  069C  D380 0C85                   LNJ     $B5,<TDER
001221  069E  0644                        DC      Z'0644'                 NOT ON CYL
001222  069F  D380 0C52           $K      LNJ     $B5,<TAGO
001223  06A1  D280                        DC      Z'D280'                 RTZ
001224  06A2  D380 0CDD                   LNJ     $B5,<TDTE               END TEST
001225  06A4  0601                        DC      Z'0601'
001226                            *
001227                            *
001228                            *
001229                            *
001230                            *----------------------------------------------------------
001231                            *
001232                            * TEST 0602 SINGLE TRACK FWD/REV SEEK
001233                            *
001234                            *
001235  06A5  8700 0FC2           T0602   CL      <FLAG
001236  06A7  8700 0FC1                   CL      <ERFL
001237  06A9  9870 0602                   LDR     $R1,=Z'0602'            LOAD TEST NUMBER
001238  06AB  9F00 0FEB                   STR     $R1,<TEST
001239  06AD  D380 0C6D                   LNJ     $B5,<TDST               'START TEST'
001240  06AF  9B80 1211                   LAB     $B1,<SA10DV             PREPARE LV10 RUPT
001241  06B1  9F80 000A           X       STB     $B1,<ZHISAZ+10*$AF
001242  06B3  D380 0C52           T0602A  LNJ     $B5,<TAGO
001243  06B5  D238                        DC      Z'D238'                 CLR DIAG,FAULT,ERR RECOVERY
001244  06B6  D380 0C50                   LNJ     $B5,<TAGI
001245  06B8  D700                        DC      Z'D7'                   CONTROL TAG
001246  06B9  8280 0FE7                   LB      <TEMPA,=Z'10'           UNIT READY ?
        06BB  1000
001247  06BC  0500               T       BBT     >+$A
001248  06BD  D380 0C85                   LNJ     $B5,<TDER
001249  06BF  0608                        DC      Z'0608'                 UNIT NOT READY
001250  06C0  8280 0FE7           $A      LB      <TEMPA,=Z'01'           DIAG CHECK
        06C2  0100
001251  06C3  0580               T       BBF     >+$B                    NO
001252  06C4  D380 0C50                   LNJ     $B5,<TAGI
001253  06C6  D200                        DC      Z'D2'                   GET DIAG DATA
001254  06C7  D380 0D46                   LNJ     $B5,<SBIS               GET IS/SB DATA
001255  06C9  0001                        DC      X'1'                    TEST ALL BITS EXCEPT PROTECT
001256  06CA  D380 0C85                   LNJ     $B5,<TDER
001257  06CC  0610                        DC      Z'0610'                 DIAG FAULTS
001258  06CD  D380 0E91           $B      LNJ     $B5,<LV10SU             SETUP LV10 RUPT
001259  06CF  0E82                        DC      <LV10T1                 TIMING PROCESS
001260  06D0  D380 0C52                   LNJ     $B5,<TAGO
001261  06D2  0000                        DC      Z'0'                    RECALIBRATE
001262  06D3  D380 0E9E                   LNJ     $B5,<TIMDE
001263  06D5  0190                        DC      400                     400MS LIMIT
001264  06D6  0F80               T       B       >+$C
001265  06D7  D380 0C85                   LNJ     $B5,<TDER
001266  06D9  0646                        DC      Z'0646'                 RTZ TIMEOUT >400MS
001267  06DA  D380 0C50           $C      LNJ     $B5,<TAGI
001268  06DC  D700                        DC      Z'D7'
001269  06DD  8280 0FE7                   LB      <TEMPA,=Z'20'           ON CYL ?
        06DF  2000
001270  06E0  0500               T       BBT     >+$A
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001271  06E1  D380 0C85              LNJ   $B5,<TDER
001272  06E3  0648                   DC    Z'0648'           NOT ON CYL
001273  06E4  8280 0FE7        $A    LB    <TEMPA,=Z'01'     DIAG CHECK
        06E6  0100
001274  06E7  0580             T     BBF   >+$D              NO
001275  06E8  D380 0C85              LNJ   $B5,<TDER
001276  06EA  0650                   DC    Z'0650'           DIAG CHECK
001277  06EB  9870 0335        $D    LDR   $R1,=821          CYL 821
001278  06ED  8280 0FC4              LB    <IDEN,=Z'8'       822 CYLS ?
        06EF  8000
001279  06F0  0500             T     BBT   >+$E
001280  06F1  1041                   SOR   $R1,1             DIVIDE BY 2
001281  06F2  9F00 0FAE        $E    STR   $R1,<CYADMX       MAX CYL ADDR
001282  06F4  1C01                   LDV   $R1,=1            INITIAL SEEK TO CYL 1
001283  06F5  9F00 0FAD        T0602B STR  $R1,<CYAD         STORE NEXT CYL ADDRESS
001284  06F7  9F00 0000        T     STR   $R1,<+$D
001285  06F9  D380 0E91              LNJ   $B5,<LV10SU       RUPT SETUP AT LEV 10
001286  06FB  0E82                   DC    <LV10T1           FOR DEV. TIMEOUT
001287  06FC  8755                   CL    =$R5
001288  06FD  8756                   CL    =$R6
001289  06FE  EF57                   STR   $R6,=$R7          CLEAR TIMER
001290  06FF  2C07                   LDV   $R2,=7            IN CASE OF IMMED. RUPT
001291  0700  DB80 070E              LAB   $B5,<T0602D
001292  0702  DF80 0EBD              STB   $B5,<TIMDE5
001293  0704  DB60 0EA5              LAB   $B5,<TIMDE1
001294  0706  DF80 0E7F              STB   $B5,<TIMB5
001295  0708  D380 0DC6              LNJ   $B5,<SKCYF        SEEK CYFL
001296  070A  0000             $D    DC    0                 CYL ADDRESS
001297  070B  D380 0E9E              LNJ   $B5,<TIMDE
001298  070D  0007                   DC    7                 7MS MAX TIME
001299  070E  0F80             T     T0602D B              >+$E
001300  070F  D380 0C85              LNJ   $B5,<TDER
001301  0711  0652                   DC    Z'0652'           TIMEOUT ERROR
001302  0712  5D01             $E    CMV   $R5,=1            R5 HAS TIME IN MS
001303  0713  0F7F                   NOP   >$-1              XXXXXX
001304  0714  0300             T     $A    BG    >+$E
001305  0715  D380 0C50              LNJ   $B5,<TAGI
001306  0717  D300                   DC    Z'D3'
001307  0718  9800 0FAD              LDR   $R1,<CYAD         GET CYL ADDRESS
001308  071A  8280 0FE7              LB    <TEMPA,=Z'04'     TEST SLOPE BIT
        071C  0400
001309  071D  0500             T     BBT   >+$B
001310  071E  1B80             T     BODD  $R1,>+$C          ODD CYL ?
001311  071F  0F80             T     B     >+$D              ITS EVEN
001312  0720  1BFF             T     $B    BODD  $R1,>+$D
001313  0721  D380 0C85        $C    LNJ   $B5,<TDER
001314  0723  0678                   DC    Z'0678'
001315  0724  D380 0C85        $D    LNJ   $B5,<TDER
001316  0726  0680                   DC    Z'0680'
001317  0727  D380 0C50        $E    LNJ   $B5,<TAGI
001318  0729  D700                   DC    Z'D7'
001319  072A  8280 0FE7              LB    <TEMPA,=Z'20'     ON CYL ?
        072C  2000
001320  072D  0500             T     BBT   >+$E              YES
001321  072E  D380 0C85              LNJ   $B5,<TDER
001322  0730  0654                   DC    Z'0654'           NOT ON CYL
001323  0731  8280 0FE7        $E    LB    <TEMPA,=Z'01'     DIAG CHECK ?
        0733  0100
001324  0734  0580             T     BBF   >+$F              NO
001325  0735  D380 0C50              LNJ   $B5,<TAGI         YES
001326  0737  D200                   DC    Z'D2'
001327  0738  D380 0D46              LNJ   $B5,<SBIS         SETUP SB/IS DATA
001328  073A  0001                   DC    X'1'              ALL BITS EXCEPT PROTECT
001329  073B  D380 0C85              LNJ   $B5,<TDER
001330  073D  0656                   DC    Z'0656'           DIAG FAULTS
001331  073E  9800 0FAD        $F    LDR   $R1,<CYAD
001332  0740  8280 0FC2              LB    <FLAG,=X'01'      SECOND PASS ?
        0742  0001
001333  0743  0500             T     BBT   >+$A
001334  0744  8AD1                   INC   =$R1              BUMP CYL ADDRESS
001335  0745  9900 0FAE              CMR   $R1,<CYADMX       MAX CYL ?
001336  0747  0380 06F5              BLE   <T0602B           GO AGAIN
001337  0749  8900 0FC2              LBT   <FLAG,=X'01'      SET FLAG FOR SECOND PASS
        074B  0001
001338  074C  1EFF                   ADV   $R1,=-1
001339  074D  1700 06F5        $A    BDEC  $R1,<T0602B       GET NEXT ADDRESS
001340  074F  D380 0CDD        T0602C LNJ  $B5,<TDTE         END TEST
001341  0751  0602                   DC    Z'0602'
001342                         *
001343                         *
001344                         *-----------------------------------------------------------------------
001345                         * TEST 0603 RANDOM SEEK TEST
001346                         *
001347                         *
001348  0752  8700 0FC2        T0603 CL    <FLAG
001349  0754  8700 0FC1              CL    <ERFL
001350  0756  8756                   CL    =$R6
001351  0757  8757                   CL    =$R7
001352  0758  8D00 0FE8              SDI   <TEMPB
001353  075A  9870 0603              LDR   $R1,=Z'0603'      TEST NUMBER
001354  075C  9F00 0FEB              STR   $R1,<TEST
001355  075E  D380 0C6D              LNJ   $B5,<TDST         'START TEST'
001356  0760  D380 0C27              LNJ   $B5,<FRRC         FAULT RESET/READY CHK
001357  0762  D380 0C52              LNJ   $B5,<TAGO
001358  0764  D280                   DC    Z'D280'           RTZ
001359  0765  D380 0E38              LNJ   $B5,<TIME
001360  0767  015E                   DC    350               350 MS DELAY
001361  0768  D380 0C50              LNJ   $B5,<TAGI
001362  076A  D700                   DC    Z'D7'
001363  076B  8280 0FE7              LB    <TEMPA,=Z'20'     ON CYL ?
        076D  2000
001364  076E  0500             T     BBT   >+$A
001365  076F  D380 0C85              LNJ   $B5,<TDER
001366  0771  0660                   DC    Z'0660'           ON CYL NOT SET
001367  0772  8280 0FE7        $A    LB    <TEMPA,=Z'01'     DIAGNOSTIC ?
        0774  0100
001368  0775  0580             T     BBF   >+$B
001369  0776  D380 0C85              LNJ   $B5,<TDER
001370  0778  0662                   DC    Z'0662'           DIAGNOSTIC ACTIVE
001371  0779  9B80 1211        $B    LAB   $B1,<SA10DV       WHEN THE DEVICE RUPTS
001372  077B  9F80 000A        X     STB   $B1,<ZHISAZ+10*$AF
001373  077D  A870 D8F0              LDR   $R2,=-10000       TOTAL SEEKS
001374  077F  AF00 0FCE              STR   $R2,<LPCNT        STORE (-) LOOP COUNTER
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001375  0781  AF00 0FCF          T0603B STR   $R2,<LPCUR          ALSO IN CURRENT COUNTER
001376                             T0603A CALL  ZV$FR,TEMPA,D-1    GET RANDOM NUMBER
        0783  FBC0 0003
        0785  D380 0000      X
        0787  0F80
        0788  0FE7
        0789  0FAF
001377  078A  9800 0FE7                   LDR   $R1,<TEMPA
001378  078C  9570 03FF                   AND   $R1,=X'03FF'        CLEAR HI BITS
001379  078E  9970 0336                   CMR   $R1,=822
001380  0790  0280 0783                   BGE   <T0603A             TOO BIG
001381  0792  8280 0FC4                   LB    <IDEN,=Z'8000'      822 CYL ?
        0794  8000
001382  0795  0500               T       BBT   >+$B                YES
001383  0796  1041                       SUR   $R1,1               CUT IN HALF FOR 410 CYL
001384  0797  9F00 0000           T  $B   STR   $R1,<+$C
001385  0799  D380 0E91                   LNJ   $B5,<LV10SU         SETUP LEV10 RUPT
001386  079B  0E80                       DC    <LV10TM             HERE
001387  079C  D380 0DC6                   LNJ   $B5,<SKCYF          SEEK TO
001388  079E  0000                   $C  DC    0                   THIS CYL ADDRESS
001389  079F  D380 0E9E                   LNJ   $B5,<TIMDE          TIME SEEK
001390  07A1  0064                       DC    100                 100MS MAX.
001391  07A2  0F80               T       B     >+$D                OK
001392  07A3  8900 0FC1                   LBT   <ERFL,=X'02'        SET CONTINUE FLAG
        07A5  0002
001393  07A6  D380 0C85                   LNJ   $B5,<TDER
001394  07A8  0664                       DC    Z'0664'             SEEK TIMEOUT
001395  07A9  D380 0C50               $D  LNJ   $B5,<TAGI
001396  07AB  D700                       DC    Z'D7'
001397  07AC  8280 0FE7                   LB    <TEMPA,=Z'2'        ON CYL ?
        07AE  2000
001398  07AF  0500               T       BBT   >+$E
001399  07B0  D380 0C81                   LNJ   $B5,<TDER1
001400  07B2  0666                       DC    Z'0666'             NOT ON CYL
001401  07B3  8280 0FE7               $E  LB    <TEMPA,=Z'01'       DIAG. BIT ?
        07B5  0100
001402  07B6  0580               T       BBF   >+$H
001403  07B7  D380 0C50                   LNJ   $B5,<TAGI
001404  07B9  D200                       DC    Z'D2'               TEST FAULTS
001405  07BA  D380 0D46                   LNJ   $B5,<SBIS
001406  07BC  0001                       DC    X'01'               DONT CARE BIT
001407  07BD  D380 0C81                   LNJ   $B5,<TDER1
001408  07BF  0668                       DC    Z'0668'             PRINT FAULT BITS
001409  07C0  8800 0FC1               $H  LBF   <ERFL,=X'02'        CLEAR CONTINUE FLAG
        07C2  0002
001410  07C3  0580               T       BBF   >+$F                NORMAL RETURN
001411  07C4  D380 0CDD                   LNJ   $B5,<TDTE           END CONTINUE MODE
001412  07C6  0603                       DC    Z'0603'
001413  07C7  0F80 0100                   B     <START
001414  07C9  D380 0D33               $F  LNJ   $B5,<QUIT           HIT BRK TO STOP
001415  07CB  0000                       DC    <+$G                NO BREAK
001416  07CC  0000                       DC    <+$A                GO HERE ON BRK
001417  07CD  A800 0FCF               $G  LDR   $R2,<LPCUR          GET CURRENT COUNT
001418  07CF  2780 0781                   BINC  $R2,<T0603B         DO NEXT SEEK
001419  07D1  8C80 0FE8               $A  LDI   <TEMPB              GET STORED TIME LOOPS
001420  07D3  D380 0EBE                   LNJ   $B5,<TMAVE          GET AVERAGE TIME
001421  07D5  D380 0F7B                   LNJ   $B5,<CRLF           DO A LINEFEED
001422                                     CALL  ZV$TH,ZV$TD,AVETM   PRINT AVE TIME
        07D7  FBC0 0003
        07D9  D380 0000      X
        07DB  0F80
        07DC  0FA7
001423                                     CALL  ZV$T,MSKTM          SEEK TIME
        07DD  FBC0 0003
        07DF  D380 0000      X
        07E1  0F80
        07E2  10A5
001424  07E3  D380 0CDD                   LNJ   $B5,<TDTE           EMD TEST
001425  07E5  0603                       DC    Z'0603'
001426                             *
001427                             *
001428                             *=============================================================
001429                             *
001430                             * TEST 0604  DIRECT AND REPEAT SEEK TEST
001431                             *
001432                             *
001433  07E6  8700 0FC2            T0604  CL    <FLAG
001434  07E8  8700 0FC1                   CL    <ERFL
001435  07EA  8756                        CL    =$R6
001436  07EB  8757                        CL    =$R7
001437  07EC  8D00 0FE8                   SDI   <TEMPB              CLEAR TEMPB,TEMPC
001438  07EE  9870 0604                   LDR   $R1,=Z'0604'        TEST NUMBER
001439  07F0  9F00 0FEB                   STR   $R1,<TEST
001440  07F2  D380 0C6D                   LNJ   $B5,<TDST           'START TEST'
001441  07F4  9B80 1211                   LAB   $B1,<SA10DV
001442  07F6  9F80 000A               X   STB   $B1,<ZHISAZ+10*$AF
001443  07F8  D380 0D58                   LNJ   $B5,<GETCY          GET CYL ADDRESS
001444  07FA  D380 0E91            T0604D LNJ   $B5,<LV10SU         SETUP LEV10
001445  07FC  0E80                       DC    <LV10TM             FOR THIS PROCESS
001446  07FD  D380 0DC6                   LNJ   $B5,<SKCYF          SEEK
001447  07FF  0000                       DC    0                   TO CYL 0
001448  0800  D380 0E9E                   LNJ   $B5,<TIMDE          TIME TILL DEV RUPT
001449  0802  007D                       DC    125                 MAX TIME = 125 MS
001450  0803  0F80               T       B     >+$C                TIME IS OK
001451  0804  0F7F                       NOP   >$-1                XXXXXX
001452  0805  D380 0C50                   LNJ   $B5,<TAGI           TIMEOUT RTN
001453  0807  D300                       DC    Z'D3'               GET FAULT DATA
001454  0808  D380 0D46                   LNJ   $B5,<SBIS           SB/IS DATA
001455  080A  00F9                       DC    X'F9'               DONT CARE BITS
001456  080B  D380 0C85                   LNJ   $B5,<TDER
001457  080D  0674                       DC    Z'0674'             SEEK TIMEOUT
001458  080E  0F7F                   $C  NOP   >$-1                XXXXXX
001459  080F  D380 0C50                   LNJ   $B5,<TAGI
001460  0811  D600                       DC    Z'D6'
001461  0812  8280 0FE7                   LB    <TEMPA,=Z'20'       ON CYL ?
        0814  2000
001462  0815  0500               T       BBT   >+$D                YES
001463  0816  D380 0C85                   LNJ   $B5,<TDER
001464  0818  0672                       DC    Z'0672'             ON CYL NOT SET
001465  0819  9800 0FAD               $D  LDR   $R1,<CYAD           GET SELECTED CYL
001466  081B  9F00 0000           T       STR   $R1,<+$E
001467  081D  D380 0E91                   LNJ   $B5,<LV10SU         SET UP LV10
001468  081F  0E80                       DC    <LV10TM             FOR THIS PROCESS
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001469  0820  8700 0FE8              CL      <TEMPB              CLEAR TIME ACCUMULATORS
001470  0822  8700 0FE9              CL      <TEMPC
001471  0824  D380 0DC6              LNJ     $B5,<SKCYF          SEEK
001472  0826  0000              $E    DC      0                   SELECTED CYL
001473  0827  D380 0E9E              LNJ     $B5,<TIMDE          TIME SEEK
001474  0829  007D                    DC      125                 MAX TIME
001475  082A  0F80              T     B       >+$F                OK
001476  082B  0F7F                    NOP     >$-1                XXXXX
001477  082C  D380 0C50              LNJ     $B5,<TAGI           TIMEOUT TO HERE
001478  082E  D300                    DC      Z'D3'               GET FAULT DATA
001479  082F  D380 0D46              LNJ     $B5,<SBIS           SB/IS DATA
001480  0831  00F9                    DC      X'F9'               DONT CARE BITS
001481  0832  D380 0C85              LNJ     $B5,<TDER
001482  0834  0674                    DC      Z'0674'             SEEK TIMEOUT
001483  0835  0F7F              $F    NOP     >$-1                XXXXX
001484  0836  D380 0C50              LNJ     $B5,<TAGI
001485  0838  D600                    DC      Z'D6'
001486  0839  8280 0FE7              LB      <TEMPA,=Z'20'       ON CYL
        083B  2000
001487  083C  0500              T     BBT     >+$A                YES
001488  083D  D380 0C85              LNJ     $B5,<TDER
001489  083F  0676                    DC      Z'0676'             ON CYL NOT SET
001490  0840  8260 0FC5              LB      <IPFL,=X'1'         INH PRINT ?
        0842  0001
001491  0843  0500              T     BBT     >+$B                YES
001492                              CALL    ZV$I.ZV$QC,MSLP     LOOP ?
        0844  FBC0 0003
        0846  D380 0000       X
        0848  0F80
        0849  10BC
001493  084A  D380 0D0B              LNJ     $B5,<YSNO           Y OR N ?
001494  084C  0857                    DC      <T0604C             NO
001495  084D  084E                    DC      <$+$AF              YES
001496  084E  8900 0FC5              LBT     <IPFL,=X'1'         TURN ON INH PRINT
        0850  0001
001497  0851  D380 0D33        $B    LNJ     $B5,<QUIT           CHECK FOR BREAK
001498  0853  07FA                    DC      <T0604D             KEEP LOOPING
001499  0854  0855                    DC      <$+$AF              GET OUT
001500  0855  8700 0FC5              CL      <IPFL               RESET INH PRINT
001501  0857  D380 0CDD        T0604C LNJ     $B5,<TDTE           END TEST
001502  0859  0604                    DC      Z'0604'
001503                              *
001504                              *
001505                              ********************************************************************
001506                              * TEST 0700 COURSE VELOCITY GAIN ADJUST
001507                              *
001508                              *
001509  085A  8700 0FC2              T0700   CL      <FLAG
001510  085C  8700 0FC1                      CL      <ERFL
001511  085E  8756                          CL      =$R6
001512  085F  8757                          CL      =$R7
001513  0860  8D00 0FE8                     SDI     <TEMPB              CLEAR TEMPB, TEMPC
001514  0862  8D00 0FEC                     SDI     <TMFWD              CLR TMFWD,TMREV MAX FWD/REV TIME
001515  0864  9870 0700                     LDR     $R1,=Z'0700'        TEST NUMBER
001516  0866  9F00 0FEB                     STR     $R1,<TEST
001517  0868  D380 0C6D                     LNJ     $B5,<TDST           'START TEST'
001518  086A  9B80 1211                     LAB     $B1,<SA10DV         ENB LEV 10
001519  086C  9F80 000A              X      STB     $B1,<ZHISAZ+10*$AF
001520  086E  D380 0C52                     LNJ     $B5,<TAGO
001521  0870  D280                         DC      Z'D280'             RTZ
001522  0871  D380 0E38                     LNJ     $B5,<TIME
001523  0873  0190                         DC      400                 400 MS DELAY
001524  0874  D380 0C50                     LNJ     $B5,<TAGI
001525  0876  D700                         DC      Z'D7'
001526  0877  8280 0FE7                     LB      <TEMPA,=Z'20'       ON CYL ?
        0879  2000
001527  087A  0500              T      BBT     >+$A                YES
001528  087B  D380 0C85                     LNJ     $B5,<TDER
001529  087D  0714                         DC      Z'0714'             ON CYL NOT ACTIVE
001530                              $A     CALL    ZV$I.ZV$TC,MSLCT    ENTER LOOP COUNT
        087E  FBC0 0003
        0880  D380 0000       X
        0882  0F80
        0883  10B0
001531                                      CALL    ZV$ID,LPCNT         INPUT LOOP COUNT
        0884  FBC0 0003
        0886  D380 0000       X
        0888  0F80
        0889  0FCE
001532  088A  8200 0FCE                     NEG     <LPCNT              MAKE IT NEGATIVE
001533  088C  A800 0FCE                     LDR     $R2,<LPCNT
001534  088E  AF00 0FCF              T0700F STR     $R2,<LPCUR          PUT IN CURRENT COUNTER
001535  0890  D380 0C50              T0700A LNJ     $B5,<TAGI
001536  0892  D700                         DC      Z'D7'
001537  0893  8280 0FE7                     LB      <TEMPA,=Z'01'       DIAGNOSTIC ?
        0895  0100
001538  0896  0580              T      BBF     >+$C                NO
001539  0897  D380 0C50                     LNJ     $B5,<TAGI
001540  0899  D200                         DC      Z'D2'
001541  089A  8280 0FE7                     LB      <TEMPA,=Z'FE'       ANY BITS ?
        089C  FE00
001542  089D  0500              T      BBT     >+$B                YES
001543  089E  D380 0C85                     LNJ     $B5,<TDER
001544  08A0  0716                         DC      Z'0716'             NO DIAG BITS SET
001545  08A1  D380 0D46              $B     LNJ     $B5,<SBIS           SB/IS DATA
001546  08A3  0001                         DC      X'01'               CHECK ALL BITS EXCEPT PROTECT
001547  08A4  D380 0C85                     LNJ     $B5,<TDER
001548  08A6  0718                         DC      Z'0718'             DISPLAY FAULT BITS
001549  08A7  8280 0FC4              $C     LB      <IDEN,=Z'80'        822 CYLS ?
        08A9  8000
001550  08AA  0580              T      BBF     >+$D                NO
001551  08AB  9870 0336                     LDR     $R1,=822            YES
001552  08AD  0F80              T      B       >+$E
001553  08AE  9870 019A              $D     LDR     $R1,=410            410 CYLS
001554  08B0  9F00 08B7              $E     STR     $R1,<T0700B         PUT IN SEEK CMD
001555  08B2  D380 0E91                     LNJ     $B5,<LV10SU         SET LV10 RUPT
001556  08B4  0E80                         DC      <LV10TM             LV10 TIMER
001557  08B5  D380 0DC6                     LNJ     $B5,<SKCYF          SEEK TO
001558  08B7  0000              T0700B DC      0                   THIS CYL
001559  08B8  D380 0E9E                     LNJ     $B5,<TIMDE          TIME DEVICE EVENT
001560  08BA  0064                         DC      100                 100 MS MAX TIME
001561  08BB  0F80              T      B       >+$A                OK
001562  08BC  D380 0C50              T0700C LNJ     $B5,<TAGI
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001563  08BE  D200                          DC      Z'D2'
001564  08BF  8280 0FE7                     LB      <TEMPA,=Z'FE'       CHECK DIAG BITS
      1 08C1  FE00
001565  08C2  0500              T           BBT     >+$F                SOME ARE SET
001566  08C3  D380 0C85                     LNJ     $B5,<TDER           NONE ARE SET
001567  08C5  0722                          DC      Z'0722'
001568  08C6  D380 0D46          $F         LNJ     $B5,<SBIS           SB/IS DATA
001569  08C8  0001                          DC      X'01'               TEST ALL BITS EXCEPT PROTECT
001570  08C9  D380 0C85                     LNJ     $B5,<TDER
001571  08CB  0724                          DC      Z'0724'             DISPLAY ERROR BITS
001572  08CC  D900 0FEC          $A         CMR     $R5,<TMFWD          MAX FWD ?
001573  08CE  0380              T           BLE     >+$B                NO
001574  08CF  DF00 0FEC                     STR     $R5,<TMFWD          STORE MAX FWD TIME
001575  08D1  D380 0E91          $B         LNJ     $B5,<LV10SU         SET LEV 10 AGAIN
001576  08D3  0E80                          DC      <LV10TM
001577  08D4  D380 0DC6                     LNJ     $B5,<SKCYF          SEEK TO
001578  08D6  0000                          DC      0                   CYL 0
001579  08D7  D380 0E9E                     LNJ     $B5,<TIMDE          TIME DEVICE EVENT
001580  08D9  0064                          DC      100                 100MS MAX
001581  08DA  0F80              T           B       >+$C                OK
001582  08DB  0F80 08BC                     B       <T0700C             REPORT ERROR
001583  08DD  D900 0FED          $C         CMR     $R5,<TMREV          MAX REV ?
001584  08DF  0380              T           BLE     >+$D                NO
001585  08E0  DF00 0FED                     STR     $R5,<TMREV          STORE MAX REV TIME
001586  08E2  D380 0D33          $D         LNJ     $B5,<QUIT           HIT BREAK TO QUIT
001587  08E4  0000                          DC      <+$E                CONTINUE
001588  08E5  0000                          DC      <+$F                EXIT
001589  08E6  A800 0FCF          $E         LDR     $R2,<LPCUR          GET CURRENT COUNTER
001590  08E8  2780 088E                     BINC    $R2,<T0700F         LOOP BACK AGAIN
001591  08EA  D380 0EBE          $F         LNJ     $B5,<TMAVE          GET AVE TIME
001592  08EC  6041                          SOR     $R6,1               DIVIDE BY 2
001593  08ED  8ED6                          CAD     =$R6                ROUND RESULT
001594  08EE  EF00 0FA7                     STR     $R6,<AVETM          FOR 2 SEEKS/LOOP
001595  08F0  D380 0F7B                     LNJ     $B5,<CRLF           DO A LINE FEED
001596                                      CALL    ZV$TH.ZV$TD,TMFWD   PRINT FWD TIME
        08F2  FBC0 0003
        08F4  D380 0000           X
        08F6  0F80
        08F7  0FEC
001597                                      CALL    ZV$T,MSMXF          MAX FWD TIME
        08F8  FBC0 0003
        08FA  D380 0000           X
        08FC  0F80
        08FD  10CB
001598  08FE  D380 0F7B                     LNJ     $B5,<CRLF
001599                                      CALL    ZV$TH.ZV$TD,TMREV   PRINT REV TIME
        0900  FBC0 0003
        0902  D380 0000           X
        0904  0F80
        0905  0FED
001600                                      CALL    ZV$T,MSMXR          MAX REV TIME
        0906  FBC0 0003
        0908  D380 0000           X
        090A  0F80
        090B  10D6
001601  090C  D380 0F7B                     LNJ     $B5,<CRLF
001602                                      CALL    ZV$TH.ZV$TD,AVETM   PRINTAVE TIME
        090E  FBC0 0003
        0910  D380 0000           X
        0912  0F80
        0913  0FA7
001603                                      CALL    ZV$T,MSKTM          AVE SEEK TIME
        0914  FBC0 0003
        0916  D380 0000           X
        0918  0F80
        0919  10A5
001604  091A  8280 0FC4                     LB      <IDEN,=Z'C0'        CHECK DEVICE TYPE
      1 091C  C000
001605  091D  0500              T           BBT     >+$E
001606  091E  E970 0024                     CMR     $R6,=36             IT'S 40 MBS
001607  0920  0200 094C                     BL      <T0700D             <36 MS
001608  0922  E970 0028                     CMR     $R6,=40
001609  0924  0300 094C                     BG      <T0700D             >40 MS
001610  0926  0F80 094F                     B       <T0700E             WITHIN LIMITS
001611  0928  8280 0FC4          $E         LB      <IDEN,=Z'80'
      1 092A  8000
001612  092B  0500              T           BBT     >+$F
001613  092C  E970 0021                     CMR     $R6,=33             IT'S 150 MBS
001614  092E  0200 094C                     BL      <T0700D             <33 MS
001615  0930  E970 0025                     CMR     $R6,=37
001616  0932  0300 094C                     BG      <T0700D             >37MS
001617  0934  0F80 094F                     B       <T0700E
001618  0936  8280 0FC4          $F         LB      <IDEN,=Z'40'
      1 0938  4000
001619  0939  0500              I           BBT     >+$A
001620  093A  E970 0032                     CMR     $R6,=50             IT'S 80 MBS
001621  093C  0200 094C                     BL      <T0700D             <50MS
001622  093E  E970 0038                     CMR     $R6,=56
001623  0940  0300 094C                     BG      <T0700D             >56MS
001624  0942  0F80 094F                     B       <T0700E
001625  0944  E970 0032          $A         CMR     $R6,=50             IT'S 300 MBS
001626  0946  0200 094C                     BL      <T0700D             <50MS
001627  0948  E970 0038                     CMR     $R6,=56
001628  094A  0380 094F                     BLE     <T0700E             =<56MS
001629  094C  D380 0C85          T0700D     LNJ     $B5,<TDER
001630  094E  0728                          DC      Z'0728'             AVE TIME FAILED
001631  094F  D380 0CDD          T0700E     LNJ     $B5,<TDTE           TEST END
001632  0951  0700                          DC      Z'0700'
001633                           *
001634                           *
001635                           ********************************************************************
001636                           * TEST 0900 RPS TEST
001637                           *
001638                           *
001639  0952  8700 0FC2          T0900      CL      <FLAG
001640  0954  8700 0FC1                     CL      <ERFL
001641  0956  9870 0900                     LDR     $R1,=Z'0900'        TEST NO
001642  0958  9F00 0FEB                     STR     $R1,<TEST
001643  095A  D380 0C6D                     LNJ     $B5,<TDST           'START TEST'
001644  095C  D380 0C27                     LNJ     $B5,<FRRC           FAULT RESET/READY CHECK
001645  095E  D380 0C52                     LNJ     $B5,<TAGO
001646  0960  D580                          DC      Z'D580'             LOAD TARGET REG
001647  0961  D380 0C50                     LNJ     $B5,<TAGI
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001648  0963  D580                      DC      Z'D580'
001649  0964  9800 0FE7                 LDR     $R1,<TEMPA          GET TARGET REG
001650  0966  1048                      SOR     $R1,8
001651  0967  9670 0080                 XOR     $R1,=X'80'          TEST IF = '80'
001652  0969  1900              T       BEZ     $R1,>+$A            IT DOES
001653  096A  D380 0C85                 LNJ     $B5,<TDER
001654  096C  0912                      DC      Z'0912'             TARGET NOT = '80'
001655  096D  D380 0C52           $A    LNJ     $B5,<TAGO
001656  096F  D5FF                      DC      Z'D5FF'             LOAD TARGET REG ='7F'
001657  0970  D380 0C50                 LNJ     $B5,<TAGI
001658  0972  D5FF                      DC      Z'D5FF'             READ IT BACK
001659  0973  9800 0FE7                 LDR     $R1,<TEMPA          GET BUS IN
001660  0975  1048                      SOR     $R1,8
001661  0976  9670 00FF                 XOR     $R1,=X'FF'          TEST FOR 'FF'
001662  0978  1900              T       BEZ     $R1,>+$B            IT IS
001663  0979  D380 0C85                 LNJ     $B5,<TDER
001664  097B  0924                      DC      Z'0924'             TARGET NOT ='FF'
001665  097C  CF80 0000           T     STB     $B4,<+$C            GET RBUF ADDRESS
001666  097E  D380 0F23                 LNJ     $B5,<FLBF           FILL BUFF WITH STREAM
001667  0980  0FFB                      DC      <X-FFFF             OF F'S
001668  0981  0001                      DC      1                   STRING LENGTH
001669  0982  0000                $C    RESV    $AF,0               READ BUFF ADDRESS
001670  0983  0080                      DC      128                 BUFFER LNGTH
001671  0984  2C01                      LDV     $R2,=1              SET 1 BYTE RANGE
001672  0985  B800 11FD                 LDR     $R3,<OTTASK
001673  0987  D870 D500                 LDR     $R5,=Z'D5'          READ CURRENT SECTOR COMMAND
001674  0989  F870 FFFF                 LDR     $R7,=-1             INITIAL BUFF PATTERN
001675  098B  AC80 0FC7                 LDB     $B2,<KKPT           GET READ BUFFER ADDR
001676  098D  9B60 09B1                 LAB     $B1,<T09LV5         SETUP RUPT PROCESS TO LV5
001677  098F  9F80 120E                 STB     $B1,<SA5P
001678  0991  1C09                      LDV     $R1,=9              9 TICKS OF 8.3 MS
001679  0992  9F00 0000           X     STR     $R1,<ZHRTCI         SET RTC FOR 75 MS
001680  0994  9F00 0000           X     STR     $R1,<ZHRTCC         ALSO CURRENT
001681  0996  88D1                      DEC     =$R1                SET $R1 FOR 66.7MS
001682  0997  4C05                      LDV     $R4,=5
001683  0998  CF00 0000           X     STR     $R4,<ZHRTCL         SET RTC TO LEV 5
001684  099A  0004                      RTCN                        TURN RTC ON
001685  099B  9900 0000           X     CMR     $R1,<ZHRTCC         WAIT FOR NEXT TICK
001686  099D  027E                      BL      >-$A
001687  099E  9800 11F6                 LDR     $R1,<IOREAD
001688  09A0  4C3F                      LDV     $R4,=63             LAST SECT COUNT
001689                                *
001690                                * MUST GO FAST HERE TO GET SECTORS ON FLY
001691                                *
001692  09A1  FF02                $A    STR     $R7,$B2             INITIALIZE BUFF
001693  09A2  8182                $B    IOLD    $B2,=$R1,=$R2       SET UP INPUT
        09A3  0051
        09A4  0052
001694  09A5  07FD                      BIOF    >-$B
001695  09A6  8055                $C    IO      =$R5,=$R3           READ CURRENT SECTOR
        09A7  0053
001696  09A8  07FE                      BIOF    >-$C
001697  09A9  F902                $D    CMR     $R7,$B2             WAIT FOR BUFF CHANGE
001698  09AA  097F                      BE      >-$D
001699  09AB  E082                      LDH     $R6,$B2             GET SECTOR ADDRESS
001700  09AC  69F5                      BNEZ    $R6,>-$A
001701  09AD  0005                      RTCF                        RTC OFF AT SECT 0
001702  09AE  FF02                      STR     $R7,$B2             INITIALIZE BUFF
001703  09AF  0F80 09CC                 B       <T0900B             NO RUPT SO GO ON
001704                                *-------------------------------------------------------------------
001705                                * RTC RUPT BRINGS US HERE
001706                                *
001707  09B1  0005                T09LV5 RTCF                        NO SECT 0 IN 67MS
001708  09B2  9B60 09BA                 LAB     $B1,<T0900A         SETUP FOR
001709  09B4  9F80 121A                 STB     $B1,<SA15P          ERROR REPORT
001710  09B6  8E70 800F                 LEV     =Z'8000'+15         AT LEV 15
001711  09B8  0000                      HLT
001712  09B9  0FFF                      B       >$-1
001713                                *
001714                                *-------------------------------------------------------------------
001715  09BA  82D6                T0900A LB      =$R6,=X'C0'         ANY OTHER BITS ?
        09BB  00C0
001716  09BC  0580              T       BBF     >+$A                NO
001717  09BD  70D0                      DOR     $R7,16              'IS' DATA TO $R7
001718  09BE  8900 0FC5                 LBT     <IPFL,=X'2'         ENABLE 'IS'/'SB' PRINT
        09C0  0002
001719  09C1  5048                      SOR     $R5,8               GET TAG
001720  09C2  D570 000F                 AND     $R5,=X'0F'          GET TAG NO.
001721  09C4  DF00 0FE9                 STR     $R5,<TEMPC
001722  09C6  D380 0C85                 LNJ     $B5,<TDER
001723  09C8  0994                      DC      Z'0994'             BIT 1 NOT RESET BY INDEX
001724  09C9  D380 0C85           $A    LNJ     $B5,<TDER
001725  09CB  0990                      DC      Z'0990'             NO SECTOR 0 IN 67 MS
001726        09CC                T0900B EQU     $
001727  09CC  8182                $A    IOLD    $B2,=$R1,=$R2
        09CD  0051
        09CE  0052
001728  09CF  07FD                      BIOF    >-$A
001729  09D0  8055                $B    IO      =$R5,=$R3           GET CURRENT SECTOR
        09D1  0053
001730  09D2  07FE                      BIOF    >-$B
001731  09D3  F902                $C    CMR     $R7,$B2             DID BUFF CHANGE ?
001732  09D4  097F                      BE      >-$C
001733  09D5  C1F2                      CMH     $R4,+$B2            RECORD 63 ?
001734  09D6  0376                      BG      >-$A                NO, SO TRY AGAIN
001735                                **********************************
001736                                *
001737                                * SHOULD BE FINISHED BY NOW
001738                                *
001739                                **********************************:
001740  09D7  1C01                $D    LDV     $R1,=1              INITIAL SECTOR COUNT
001741  09D8  AC80 0FC7                 LDB     $B2,<KKPT           ADDRESS OF RETURNED DATA
001742  09DA  A0F2                $E    LDH     $R2,+$B2            GET STORED DATA
001743  09DB  A951                      CMR     $R2,=$R1            NEW DATA ?
001744  09DC  027E                      BL      >-$E                TRY SOME MORE
001745  09DD  0300              T       BG      >+$F                MUST HAVE SKIPPED ONE
001746  09DE  8AD1                      INC     =$R1                NEXT SEQ DATA
001747  09DF  1D3F                      CMV     $R1,=63             LAST DATA ?
001748  09E0  027A                      BL      >-$E                GO AGAIN
001749  09E1  0F80 09F0                 B       <T0900C             ALL FINISHED
001750  09E3  9F56                $F    STR     $R1,=$R6            'SB' DATA
001751  09E4  AF57                      STR     $R2,=$R7            'IS' DATA
001752  09E5  8900 0FC5                 LBT     <IPFL,=X'2'         ENABLE 'IS'/'SB' PRINTOUT
```

```
                09E7  0002
001753          09E8  5048                        SOR     $R5,8                   GET TAG
001754          09E9  B570  000F                  AND     $R5,=X'0F'              GET TAG NO.
001755          09EB  DF00  0FE9                  STR     $R5,<TEMPC
001756          09ED  D380  0C85                  LNJ     $B5,<TDER
001757          09EF  0992                        DC      Z'0992'                 WRONG SECTOR
001758          09F0  D380  0CDD          T0900C  LNJ     $B5,<TDTE               END TEST
001759          09F2  0900                        DC      Z'0900'
001760                                    *
001761                                    *
001762                                    ************************************************************;
001763                                    * TEST 1000
001764                                    *
001765                                    *-----------------------------------------------------------------
001766                                    * WRITE PROTECT TEST
001767                                    *
001768                                    *
001769          09F3  8700  0FC2          T1000   CL      <FLAG
001770          09F5  8700  0FC1                  CL      <ERFL
001771          09F7  9870  1000                  LDR     $R1,=Z'1000'
001772          09F9  9F00  0FEB                  STR     $R1,<TEST               STORE TEST NUMBER
001773          09FB  D380  0C6D                  LNJ     $B5,<TDST               'START TEST'
001774                                            CALL    ZV$T.ZV$TC,MSPS1        PROT SWTCH LIT ?
                09FD  FBC0  0003
                09FF  D380  0000        X
                0A01  0F80
                0A02  10FF
001775          0A03  D380  0D0B                  LNJ     $B5,<YSNO               Y OR N RESPONSE
001776          0A05  0000                        DC      <+$A                    'N' RESPONSE
001777          0A06  0000                        DC      <+$B                    'Y' RESPONSE
001778                                    $A      CALL    ZV$T.ZV$TC,MSPS2        'DEPRESS PROT SWTCH
                0A07  FBC0  0003
                0A09  D380  0000        X
                0A0B  0F80
                0A0C  1117
001779                                  $F      CALL    ZV$T.ZV$TC,MSDONE       'Y' WHEN DONE
                0A0D  FBC0  0003
                0A0F  D380  0000        X
                0A11  0F80
                0A12  10EA
001780          0A13  D380  0D0B                  LNJ     $B5,<YSNO               Y OR N REPLY
001781          0A15  0A0D                        DC      <-$F                    'N' REPLY
001782          0A16  0A17                        DC      <$+$AF                  'Y' REPLY
001783          0A17  D380  0C50          $B      LNJ     $B5,<TAGI
001784          0A19  D200                        DC      Z'D2'                   GET DIAG TAG
001785          0A1A  8280  0FE7                  LB      <TEMPA,=Z'01'           WRITE PROT ?
                0A1C  0100
001786          0A1D  0500                T       BBT     >+$C
001787          0A1E  D380  0C85                  LNJ     $B5,<TDER
001788          0A20  1040                        DC      Z'1040'                 WRT PROT BIT RESET
001789                                    $C      CALL    ZV$T.ZV$TC,MSPS2        HIT PROT SW
                0A21  FBC0  0003
                0A23  D380  0000        X
                0A25  0F80
                0A26  1117
001790                                  $F      CALL    ZV$T.ZV$TC,MSDONE       'Y' WHEN DONE
                0A27  FBC0  0003
                0A29  D380  0000        X
                0A2B  0F80
                0A2C  10EA
001791          0A2D  D380  0D0B                  LNJ     $B5,<YSNO               Y OR N REPLY
001792          0A2F  0A27                        DC      <-$F                    'N' REPLY
001793          0A30  0A31                        DC      <$+$AF                  'Y' REPLY
001794          0A31  D380  0C50          $D      LNJ     $B5,<TAGI
001795          0A33  D200                        DC      Z'D2'                   GET DIAG TAG
001796          0A34  8280  0FE7                  LB      <TEMPA,=Z'01'           PROT BIT ON ?
                0A36  0100
001797          0A37  0580                T       BBF     >+$E
001798          0A38  D380  0C85                  LNJ     $B5,<TDER
001799          0A3A  1042                        DC      Z'1042'                 PROT SWTCH SET
001800          0A3B  D380  0CDD          $E      LNJ     $B5,<TDTE
001801          0A3D  1000                        DC      Z'1000'                 END TEST 1000
001802                                    *
001803                                    *
001804                                    ************************************************************************
001805                                    * TEST 1001 DYNAMIC READ-WRITE
001806                                    *
001807                                    *
001808          0A3E  8700  0FC2          T1001   CL      <FLAG
001809          0A40  8700  0FC1                  CL      <ERFL
001810          0A42  9870  1001                  LDR     $R1,=Z'1001'
001811          0A44  9F00  0FEB                  STR     $R1,<TEST               STORE TEST NO
001812          0A46  D380  0C6D                  LNJ     $B5,<TDST               'START TEST'
001813                                            CALL    ZV$T.ZV$TC,MSWRT        'OK TO WRITE ?
                0A48  FBC0  0003
                0A4A  D380  0000        X
                0A4C  0F80
                0A4D  11DE
001814                                            CALL    ZV$T,MSPS1A             'REPLY Y OR N
                0A4E  FBC0  0003
                0A50  D380  0000        X
                0A52  0F80
                0A53  110C
001815          0A54  D380  0D0B                  LNJ     $B5,<YSNO
001816          0A56  0A58                        DC      <T1001A                 NO
001817          0A57  0A5D                        DC      <T1001B                 YES
001818          0A58  8900  0FC2          T1001A  LBT     <FLAG,=X'02'            SET BYPASS FLAG
                0A5A  0002
001819          0A5B  0F80  0BF2                  B       <T1001F                  AND GET OUT
001820          0A5D  9B80  1211          T1001B  LAB     $B1,<SA10DV             SETUP LV10 ISA
001821          0A5F  9F80  000A          X       STB     $B1,<ZHISAZ+10*$AF
001822          0A61  D380  0D58                  LNJ     $B5,<GETCY              GET CYL ADDRESS
001823          0A63  D380  0DA4                  LNJ     $B5,<GETSC              GET SECTOR ADDRESS
001824          0A65  D380  0E91                  LNJ     $B5,<LV10SU             SETUP FOR LV10
001825          0A67  0E82                        DC      <LV10T1                 TIMING PROCESS
001826          0A68  8800  0FAC                  LDR     $R3,<BITE               GET DEV NO.
001827          0A6A  9800  0FAD                  LDR     $R1,<CYAD               GET CYL ADDRESS
001828          0A6C  9F30  0FB9                  STR     $R1,<DXFN.$R3           SETUP CYL ADDR FOR CW1
001829          0A6E  9F00  0000          T       STR     $R1,<+$B                STORE IN SEEK ROUTINE
001830          0A70  9870  002E                  LDR     $R1,=46                 MAX 46 MS FOR 410 CYLS
001831          0A72  8280  0FC4                  LB      <IDEN,=Z'8000'          822 CYLS ?
                0A74  8000
001832          0A75  0580                T       BBF     >+$A                    KEEP 46MS FOR 410 CYL DEV
```

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001833  0A76  9A70 000A          ADD   $R1,=10              MAX 56MS FOR 822 CYLS
001834  0A78  9F00 0000     T    STR   $R1,<+$C             STORE IN TIMING PROCESS
001835  0A7A  D380 0DC6          LNJ   $B5,<SKCYF           SEEK
001836  0A7C  0000          $B   DC    0                   CYL ADDRESS IN HERE
001837  0A7D  D380 0E9E          LNJ   $B5,<TIMDE           TIME SEEK
001838  0A7F  0000          $C   DC    0                   MAX TIME IN HERE
001839  0A80  0F80          T    B     >+$D                TIME OK
001840  0A81  D380 0C85          LNJ   $B5,<TDER
001841  0A83  1012               DC    Z'1012'             TIMEOUT ERROR
001842  0A84  D380 0C50          LNJ   $B5,<TAGI    $D
001843  0A86  D700               DC    Z'D7'
001844  0A87  8280 0FE7          LB    <TEMPA,=Z'20'       ON CYL ?
        0A89  2000
001845  0A8A  0500          T    BBT   >+$E
001846  0A8B  D380 0C85          LNJ   $B5,<TDER
001847  0A8D  1014               DC    Z'1014'             NOT ON CYL
001848  0A8E  1C04          $E   LDV   $R1,=4                FOR 5 TRACK
001849  0A8F  8280 0FC4          LB    <IDEN,=Z'4'         19 TRACKS ?
        0A91  4000
001850  0A92  0580          T    BBF   >+$F                NO
001851  0A93  1E0E               ADV   $R1,=14             MAKE 19 TRACKS
001852  0A94  9F00 0FF1     $F   STR   $R1,<TRKMX          STORE MAX TRK
001853  0A96  8751               CL    =$R1                START AT TRK 0
001854  0A97  9F00 0FF0          STR   $R1,<TRKAD          NEW TRACK
001855                           CALL  ZV$T,ZV$TC,MSTKNO   PRINT TRACK
        0A99  FBC0 0003
        0A9B  D380 0000     X
        0A9D  0F80
        0A9E  1144
001856                           CALL  ZV$TH,ZV$TD,TRKAD
        0A9F  FBC0 0003
        0AA1  D380 0000     X
        0AA3  0F80
        0AA4  0FF0
001857  0AA5  B800 0FAC          LDR   $R3,<BITE           GET DEVICE NUMBER
001858  0AA7  9A80 0000     T    SRM   $R1,<+$F,=X'1F'     PUT TRK ADDR IN COMMAND
        0AA9  001F
001859  0AAA  1008               SOL   $R1,8               SETUP TRACK ADDRESS
001860  0AAB  9400 0FD2          OR    $R1,<SECAD           AND SECTOR ADDR
001861  0AAD  9F30 0FBD          STR   $R1,<DXRN,$R3        FOR CW2
001862  0AAF  D380 0C52          LNJ   $B5,<TAGO
001863  0AB1  D300          $F   DC    Z'D300'             SELCT TRACK ADDRESS
001864  0AB2  D380 0C50          LNJ   $B5,<TAGI
001865  0AB4  D200               DC    Z'D2'               GET DIAG REG
001866  0AB5  8280 0FE7          LB    <TEMPA,=Z'80'       HEAD SELCT ?
        0AB7  8000
001867  0AB8  0580          T    BBF   >+$A                YES
001868  0AB9  D380 0C85          LNJ   $B5,<TDER
001869  0ABB  1016               DC    Z'1016'             NO HEAD SELECT
001870  0ABC  D380 0F8D          LNJ   $B5,<SUFB           SETUP FORMAT BUFFER
001871  0ABE  8186          $B   IOLD  WBUF,<IOWRIT,<TEMPA
        0ABF  0000 11F7
        0AC1  0000 0FE7
001872  0AC3  07FB               BIOF  >-$B
001873  0AC4  D380 0F18          LNJ   $B5,<SUCA           SETUP CONFIG. WORDS
001874  0AC6  9800 11E8          LDR   $R1,<FMRW           FORMAT COMMAND
001875  0AC8  8051          $C   IO    =$R1,<OTTASK        TASK
        0AC9  0000 11FD
001876  0ACB  07FD               BIOF  >-$C
001877  0ACC  D380 0EF8          LNJ   $B5,<STALL          STALL
001878  0ACE  0F80          T    B     >+$D
001879  0ACF  D380 0C85          LNJ   $B5,<TDER
001880  0AD1  1050               DC    Z'1050'             FORMAT HANGUP
001881  0AD2  D380 0C50          LNJ   $B5,<TAGI    $D
001882  0AD4  D700               DC    Z'D7'
001883  0AD5  8280 0FE7          LB    <TEMPA,=Z'01'       TEST DIAG BIT
        0AD7  0100
001884  0AD8  0580          T    BBF   >+$A
001885  0AD9  D380 0C50          LNJ   $B5,<TAGI
001886  0ADB  D200               DC    Z'D2'
001887  0ADC  D380 0D46          LNJ   $B5,<SBIS           GET SB/IS DATA
001888  0ADE  0001               DC    X'01'               DONT CARE BIT
001889  0ADF  D380 0C85          LNJ   $B5,<TDER
001890  0AE1  1020               DC    Z'1020'             PRINT DEVICE FAULTS
001891  0AE2  D380 0E91          LNJ   $B5,<LV10SU         SETUP LV10 RUPT
001892  0AE4  0E82               DC    <LV10TI             TIME DEVICE EVENT
001893  0AE5  1C01               LDV   $R1,=1
001894  0AE6  8051          $D   IO    =$R1,<OTOFRG        OFFSET RANGE = 1
        0AE7  0000 11F8
001895  0AE9  07FD               BIOF  >-$D
001896  0AEA  8751               CL    =$R1
001897  0AEB  8180 0FE7     $A   IOLD  <TEMPA,<IOREAD,=$R1 RANGE = 0
        0AED  0000 11F6
        0AEF  0051
001898  0AF0  07FB               BIOF  >-$A
001899  0AF1  D380 0F18          LNJ   $B5,<SUCA           SETUP CONFIG. WORDS
001900  0AF3  9800 11E9          LDR   $R1,<RWD            SEARCH AND READ
001901  0AF5  8051          $B   IO    =$R1,<OTTASK        TASK
        0AF6  0000 11FD
001902  0AF8  07FD               BIOF  >-$D
001903  0AF9  D380 0E9E          LNJ   $B5,<TIMDE          TIME DEVICE TILL RUPT
001904  0AFB  0019               DC    25                  MAX 25MS
001905  0AFC  0F80          T    B     >+$E                OK
001906  0AFD  0F7F               NOP   >$-1                XXXXXX
001907  0AFE  D380 0C85          LNJ   $B5,<TDER
001908  0B00  1018               DC    Z'1018'             SECTOR NOT FOUND IN 25MS
001909  0B01  B800 0FAC     $E   LDR   $R3,<BITE           GET DEV ADDR
001910  0B03  D380 0F18          LNJ   $B5,<SUCA           SETUP CONFIG. WDS
001911  0B05  9870 012C          LDR   $R1,=300            DIAG FORMAT READ RANGE
001912  0B07  8184          $F   IOLD  RBUF,<IOREAD,=$R1
        0B08  0000 11F6
        0B0A  0051
001913  0B0B  07FC               BIOF  >-$F
001914  0B0C  9870 8A00          LDR   $R1,=Z'8A'          DIAG READ CMD
001915  0B0E  8051          $G   IO    =$R1,<OTTASK
        0B0F  0000 11FD
001916  0B11  07FD               BIOF  >-$G
001917  0B12  D380 0EF8     $H   LNJ   $B5,<STALL          STALL
001918  0B14  0F80          T    B     >+$D
001919  0B15  D380 0C85          LNJ   $B5,<TDER
001920  0B17  1052               DC    Z'1052'             FORMAT READ HANGUP
001921  0B18  9844 0009     $D   LDR   $R1,RBUF,9          GET SYNCH BYTE
001922  0B1A  9970 0019          CMR   $R1,=X'19'
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001923  0B1C  0900           T        BE      >+$A            OK
001924  0B1D  D380 0C85               LNJ     $B5,<TDER
001925  0B1F  1032                    DC      Z'1032'         NO SYNCH BYTE
001926  0B20  9804           $A       LDR     $R1,RBUF        GET CYL ADDR
001927  0B21  9900 0FAD               CMR     $R1,<CYAD
001928  0B23  0900           T        BE      >+$B
001929  0B24  D380 0C85               LNJ     $B5,<TDER
001930  0B26  1026                    DC      Z'1026'         CYL ADDR ERROR
001931  0B27  90C4 0001       $B       LDH     $R1,RBUF.1
001932  0B29  9900 0FF0               CMR     $R1,<TRKAD
001933  0B2B  0900           T        BE      >+$C
001934  0B2C  D380 0C85               LNJ     $B5,<TDER
001935  0B2E  1026                    DC      Z'1026'         TRK ADDR ERROR
001936  0B2F  9844 0001       $C       LDR     $R1,RBUF.1      GET SECTOR ADDR
001937  0B31  9570 00FF               AND     $R1,=X'FF'
001938  0B33  9900 0FD2               CMR     $R1,<SECAD
001939  0B35  0900           T        BE      >+$D
001940  0B36  D380 0C85               LNJ     $B5,<TDER
001941  0B38  1028                    DC      Z'1028'         SECT ADDR ERROR
001942  0B39  D380 0C50       $D       LNJ     $B5,<TAGI
001943  0B3B  D700                    DC      Z'D7'
001944  0B3C  8280 0FE7               LB      <TEMPA,=Z'01'   DIAG BIT ?
        0B3E  0100
001945  0B3F  0580           T        BBF     >+$E
001946  0B40  D380 0C50               LNJ     $B5,<TAGI
001947  0B42  D200                    DC      Z'D2'           DIAGS
001948  0B43  D380 0D46               LNJ     $B5,<SBIS       SB/IS PRINT
001949  0B45  0001                    DC      X'01'           DONT CARE BIT
001950  0B46  D380 0C85               LNJ     $B5,<TDER
001951  0B48  1036                    DC      Z'1036'         READ DIAG ERROR
001952  0B49  AC80 0FC6       $E       LDB     $B2,<JJPT       GET BUFFER ADDR
001953  0B4B  AF80 0000       T        STB     $B2,<+$F
001954  0B4D  D380 0F23               LNJ     $B5,<FLBF       FILL BUFFER WITH STRING
001955  0B4F  0FF6                    DC      <WORSC          WORST CASE PATTERN
001956  0B50  0005                    DC      5               STRING LNGTH
001957  0B51  0000           $F       RESV    $AF,0           BUFF ADDRESS
001958  0B52  0080                    DC      128             WRITE BUFF LNGTH
001959  0B53  AC80 0FC7               LDB     $B2,<KKPT       GET READ BUFF ADDR
001960  0B55  AF80 0000       T        STB     $B2,<+$G
001961  0B57  D380 0F23               LNJ     $B5,<FLBF       FILL BUFF
001962  0B59  0FD0                    DC      <NULL           FILL ADDR
001963  0B5A  0001                    DC      1               1 WD STRING
001964  0B5B  0000           $G       RESV    $AF,0           READ BUFF ADDR
001965  0B5C  0096                    DC      150             LENGTH IN WORDS
001966  0B5D  9870 0100               LDR     $R1,=256        WRITE RANGE
001967  0B5F  8186           $A       IOLD    WBUF,<IOWRIT,=$R1  WRITE WORST CASE
        0B60  0000 11F7
        0B62  0051
001968  0B63  07FC                    BIOF    >-$A
001969  0B64  D380 0F18               LNJ     $B5,<SUCA       RESET CONFIGURATION WORDS
001970  0B66  9800 11E9               LDR     $R1,<RWD        WRITE COMMAND
001971  0B68  8051           $B       IO      =$R1,<OTTASK
        0B69  0000 11FD
001972  0B6B  07FD                    BIOF    >-$B
001973  0B6C  D380 0EF8               LNJ     $B5,<STALL      STALL
001974  0B6E  0F80           T        B       >+$D
001975  0B6F  D380 0C85               LNJ     $B5,<TDER
001976  0B71  1054                    DC      Z'1054'         WRITE DATA HANGUP'
001977  0B72  D380 0C50       $D       LNJ     $B5,<TAGI
001978  0B74  D700                    DC      Z'D7'
001979  0B75  8280 0FE7               LB      <TEMPA,=Z'01'   GET DIAG BIT
        0B77  0100
001980  0B78  0580           T        BBF     >+$C            OK
001981  0B79  D380 0C50               LNJ     $B5,<TAGI
001982  0B7B  D200                    DC      Z'D2'
001983  0B7C  D380 0D46               LNJ     $B5,<SBIS       GET SB/IS DATA
001984  0B7E  0001                    DC      X'01'           DONT CARE BIT
001985  0B7F  D380 0C85               LNJ     $B5,<TDER
001986  0B81  1020                    DC      Z'1020'         PRINT DEV FAULTS
001987  0B82  B800 0FAC       $C       LDR     $R3,<BITE       GET DEV ADDR
001988  0B84  D380 0F18               LNJ     $B5,<SUCA       SETUP CONFIG. WORDS
001989  0B86  9870 0100               LDR     $R1,=256        DIAG FORM READ RANGE
001990  0B88  8184           $D       IOLD    RBUF,<IOREAD,=$R1
        0B89  0000 11F6
        0B8B  0051
001991  0B8C  07FC                    BIOF    >-$D
001992  0B8D  A870 8980               LDR     $R2,=Z'898'     READ DATA
001993  0B8F  8052           $E       IO      =$R2,<OTTASK
        0B90  0000 11FD
001994  0B92  07FD                    BIOF    >-$E
001995  0B93  D380 0EF8       $E       LNJ     $B5,<STALL      STALL
001996  0B95  0F80           T        B       >+$D
001997  0B96  D380 0C85               LNJ     $B5,<TDER
001998  0B98  1056                    DC      Z'1056'         READ DATA HANGUP'
001999  0B99  9870 0100       $D       LDR     $R1,=256
002000  0B9B  9F54                    STR     $R1,=$R4        GET RANGE IN BYTES
002001  0B9C  4041                    SUR     $R4,1           CHANGE TO WORDS
002002  0B9D  88D4                    DEC     =$R4            SET WORD COUNTER
002003  0B9E  8752                    CL      =$R2            CLEAR BUFF INDEX
002004  0B9F  ACD4                    LDB     $B2,=RBUF       SETUP FOR B-POP ADDR
002005  0BA0  E826           T1001D   LDR     $R6,WBUF.$R2    'SB' DATA
002006  0BA1  F86E                    LDR     $R7,$B2.+$R2    'IS' DATA
002007  0BA2  E957                    CMR     $R6,=$R7        CHECK DATA
002008  0BA3  0900 0BE2               BE      <T1001E         OK
002009  0BA5  AF00 0FE9               STR     $R2,<TEMPC      ERROR WORD LOCATION
002010  0BA7  8900 0FC1               LBT     <ERFL,=X'1'     SET ERROR FLAG
        0BA9  0001
002011                                 CALL    ZV$T.ZV$TC,MSWORD  PRINT WORD
        0BAA  FBC0 0003
        0BAC  D380 0000       X
        0BAE  0F80
        0BAF  1190
002012                                 CALL    ZV$TH,TEMPC     PRINT HEX WORD
        0BB0  FBC0 0003
        0BB2  D380 0000       X
        0BB4  0F80
        0BB5  0FE9
002013  0BB6  8D00 0FE7               SBT     <TEMPA          STORE IS/SB DATA
002014                                 CALL    ZV$T,MSIS       PRINT 'IS'
        0BB8  FBC0 0003
        0BBA  D380 0000       X
        0BBC  0F80
        0BBD  1198
```

```
002015                                          CALL    ZV$HZ,TEMPB,ASCBF       CONV 'IS' DATA ASCII
         0BBE  FBC0 0003
         0BC0  D380 0000        X
         0BC2  0F80
         0BC3  0FE8
         0BC4  0FA8
002016                                          CALL    ZV$I,ASCBF              PRINT HEX 'IS' DATA
         0BC5  FBC0 0003
         0BC7  D380 0000        X
         0BC9  0F80
         0BCA  0FA8
002017                                          CALL    ZV$I,MSSB               PRINT 'SB'
         0BCB  FBC0 0003
         0BCD  D380 0000        X
         0BCF  0F80
         0BD0  11DA
002018                                          CALL    ZV$HZ,TEMPA,ASCBF       CONV 'SB' DATA ASCII
         0BD1  FBC0 0003
         0BD3  D380 0000        X
         0BD5  0F80
         0BD6  0FE7
         0BD7  0FA8
002019                                          CALL    ZV$I,ASCBF              PRINT HEX 'SB' DATA
         0BD8  FBC0 0003
         0BDA  D380 0000        X
         0BDC  0F80
         0BDD  0FA8
002020   0BDE  D380 0D33                        LNJ     $B5,<QUIT               HIT BREAK TO QUIT
002021   0BE0  0BE2                            DC      <T1001E                 CONTINUE
002022   0BE1  0000                            DC      <+$F                    EXIT
002023   0BE2  4700 0BA0              T1001E    BDEC    $R4,<T1001D             GET NXT WORD
002024   0BE4  8280 0FC1              $F        LB      <ERFL,=X'1'             ANY ERRORS ?
         0BE6  0001
002025   0BE7  0580                   T         BDF     >+$A
002026   0BE8  D380 0C85                        LNJ     $B5,<TDER
002027   0BEA  1034                            DC      Z'1034'                 DATA ERROR
002028   0BEB  9800 0FF0              $A        LDR     $R1,<TRKAD
002029   0BED  8AD1                            INC     =$R1                    GET NEXT TRACK
002030   0BEE  9900 0FF1                        CMR     $R1,<TRKMX              LAST TRACK ?
002031   0BF0  0380 0A97                        BLE     <T1001C                 GO AGAIN
002032   0BF2  D380 0CDD              T1001F    LNJ     $B5,<TDTE               END TEST
002033   0BF4  1001                            DC      Z'1001'
002034                                          CALL    ZV$I,ZV$TC,MSETD        END T&D TESTS
         0BF5  FBC0 0003
         0BF7  D380 0000        X
         0BF9  0F80
         0BFA  10F6
002035   0BFB  0F80 0100                        B       <START
002036                                  *
002037                                  *
002038                                  *
002039                                  ********************************************************************************
002040                                  * SPARE SUBROUTINE
002041                                  *
002042   0BFD  0F7F                     LL       NOP     >$-1
002043   0BFE  0F7F                              NOP     >$-1
002044   0BFF  0F7F                              NOP     >$-1
002045   0C00  0F7F                              NOP     >$-1
002046   0C01  0F7F                              NOP     >$-1
002047   0C02  0F7F                              NOP     >$-1
002048   0C03  0F7F                              NOP     >$-1
002049   0C04  0F7F                              NOP     >$-1
002050   0C05  0F7F                              NOP     >$-1
002051   0C06  0F7F                              NOP     >$-1
002052   0C07  0F7F                              NOP     >$-1
002053   0C08  0F7F                              NOP     >$-1
002054   0C09  0F7F                              NOP     >$-1
002055   0C0A  0F7F                              NOP     >$-1
002056   0C0B  0F7F                              NOP     >$-1
002057   0C0C  0F7F                              NOP     >$-1
002058   0C0D  0F7F                              NOP     >$-1
002059   0C0E  0F7F                              NOP     >$-1
002060   0C0F  0F7F                              NOP     >$-1
002061   0C10  0F7F                              NOP     >$-1
002062   0C11  0F7F                              NOP     >$-1
002063   0C12  0F7F                              NOP     >$-1
002064   0C13  0F7F                              NOP     >$-1
002065   0C14  0F7F                              NOP     >$-1
002066   0C15  0F7F                              NOP     >$-1
002067   0C16  0F7F                              NOP     >$-1
002068   0C17  0F7F                              NOP     >$-1
002069   0C18  0F7F                              NOP     >$-1
002070   0C19  0F7F                              NOP     >$-1
002071   0C1A  0F7F                              NOP     >$-1
002072   0C1B  0F7F                              NOP     >$-1
002073   0C1C  0F7F                              NOP     >$-1
002074   0C1D  0F7F                              NOP     >$-1
002075   0C1E  0F7F                              NOP     >$-1
002076   0C1F  0F7F                              NOP     >$-1
002077   0C20  0F7F                              NOP     >$-1
002078   0C21  0F7F                              NOP     >$-1
002079                                  *
002080                                  * ROOM FOR CONSTANTS, ETC.
002081                                  *
002082   0C22  0000                             RESV    $AF,0
002083   0C23  0000                             RESV    $AF,0
002084   0C24  0000                             RESV    $AF,0
002085   0C25  0000                             RESV    $AF,0
002086   0C26  0000                             RESV    $AF,0
002087                                  ********************************************************************************
002088                                  ********************************************************************************
```

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002089                                  /*********************************************************************
002090                                  *
002091                                  * SUBROUTINES
002092                                  *
002093                                  *********************************************************************
002094                                  * FAULT RESET/READY CHECK ROUTINE
002095                                  *
002096                                  *
002097  0C27  DF80 0C4F                 FRRC    STB     $B5,<FRRCB5
002098  0C29  D380 0C52                 FRRCA   LNJ     $B5,<TAG0               TAG OUT
002099  0C2B  D270                              DC      Z'D270'                 CLR DIAG FAULTS
002100  0C2C  D380 0C50                         LNJ     $B5,<TAG1               TAG IN
002101  0C2E  D700                              DC      Z'D7'                   CONTROL BYTE
002102  0C2F  8280 0FE7                         LB      <TEMPA,=Z'10'           UNIT READY ?
        0C31  1000
002103  0C32  0580 0C49                         BBF     <FRRCC                  ERROR
002104  0C34  8280 0FE7                         LB      <TEMPA,=Z'01'           DIAG BIT ?
        0C36  0100
002105  0C37  0580 0C4C                         BBF     <FRRCB                  OK
002106  0C39  D380 0C50                         LNJ     $B5,<TAG1
002107  0C3B  D200                              DC      Z'D2'
002108  0C3C  8280 0FE7                         LB      <TEMPA,=Z'FE'           CHECK FOR ANY FAULTS
        0C3E  FE00
002109  0C3F  0500                  1              BBT     >+$A
002110  0C40  D380 0C85                         LNJ     $B5,<TDER
002111  0C42  0008                              DC      Z'0008'                 NO FAULTS SHOWING
002112  0C43  D380 0D46                 $A      LNJ     $B5,<SBIS               GET SB/IS DATA
002113  0C45  0001                              DC      X'01'                   TEST ALL EXCEPT PROTECT
002114  0C46  D380 0C85                         LNJ     $B5,<TDER
002115  0C48  0010                              DC      Z'0010'                 DISPLAY BITS SET
002116  0C49  D380 0C85                 FRRCC   LNJ     $B5,<TDER
002117  0C4B  0096                              DC      Z'0096'
002118  0C4C  DC80 0C4F                 FRRCB   LDB     $B5,<FRRCB5
002119  0C4E  8385                             JMP     $B5
002120                                  *
002121  0C4F  0000                      FRRCB5  RESV    $AF,0
002122                                  *
002123                                  *
002124                                  *********************************************************************
002125                                  * LAUNCH IO TAG COMMANDS
002126                                  *
002127                                  *
002126  0C50  8754                      TAG1    CL      =$R4                    SET DIRECTION BIT
002129  0C51  0F80                  1           B       >+$A
002130  0C52  4C40                      TAG0    LDV     $R4,=X'40'              SET DIRECTION BIT OUT
002131  0C53  CF00 0FD4                 $A      STR     $R4,<TASK
002132  0C55  C400 11F6                         OR      $R4,<IOREAD
002133  0C57  8180 0FE7                 $A      IOLD    <TEMPA,=$R4,<D-1
        0C59  0054
        0C5A  0000 0FAF
002134  0C5C  07FB                              BIOF    >-$A
002135  0C5D  C875                              LDR     $R4,+$B5                GET  &DATA
002136  0C5E  8054                      $B      IO      =$R4,<OTTASK            OUTPUT TASK WORD
        0C5F  0000 11FD
002137  0C61  07FD                              BIOF    >-$B
002138  0C62  DF80 0C6C                         STB     $B5,<TAG5
002139  0C64  8980 0FD4                         CMZ     <TASK
002140  0C66  0300                  T           BG      >+$C
002141  0C67  D380 0F12                         LNJ     $B5,<ISTAT1             STALL
002142  0C69  DC80 0C6C                 $C      LDB     $B5,<TAG5
002143  0C6B  8385                             JMP     $B5
002144                                  *
002145  0C6C  0000                      TAG5    RESV    $AF,0
002146                                  *
002147                                  *
002148                                  *********************************************************************
002149                                  *
002150                                  * START TEST
002151                                  *
002152                                  *
002153  0C6D  DF80 0C80                 TDST    STB     $B5,<TDSTB5
002154  0C6F  D380 0F7B                         LNJ     $B5,<CRLF
002155                                          CALL    ZV$T,ZV$TC,MSTEST       'TEST'
        0C71  FBC0 0003
        0C73  D380 0000         X
        0C75  0F80
        0C76  1181
002156                                          CALL    ZV$THZ,TEST             PRINT TEST NO
        0C77  FBC0 0003
        0C79  D380 0000         X
        0C7B  0F80
        0C7C  0FEB
002157  0C7D  DC80 0C80                         LDB     $B5,<TDSTB5
002158  0C7F  8385                             JMP     $B5
002159                                  *
002160  0C80  0000                      TDSTB5  RESV    $AF,0
002161                                  *
002162                                  *
002163                                  *********************************************************************
002164                                  *
002165                                  *
002166  0C81  8280 0FC1                 TDER1   LB      <ERFL,=X'02'            TEST FOR CONTINUE MODE
        0C83  0002
002167  0C84  0500                  T           BBT     >+$C
002168  0C85  8F00 0FD5                 TDER    SAVE    <SAVE-1,=-1             SAVE REGISTERS
        0C87  FFFF
002169  0C88  C800 0FEB                 $C      LDR     $R4,<TEST               GET TEST NUMBER
002170  0C8A  C570 FF00                         AND     $R4,=Z'FF'              STRIP SUBTEST
002171  0C8C  C475                             OR      $R4,+$B5                GET DICTIONARY ENTRY
002172  0C8D  DF80 0CDC                         STB     $B5,<TDERB5             SAVE CONTINUE ADDR
002173  0C8F  CF00 1157                         STR     $R4,<MSDICT             PUT IN MESSAGE
002174                                          CALL    ZV$T,ZV$TC,MSTDER       PRINT ERROR MESSAGE
        0C91  FBC0 0003
        0C93  D380 0000         X
        0C95  0F80
        0C96  1138
002175                                          CALL    ZV$THZ,MSDICT           WITH DICT ENTRY
        0C97  FBC0 0003
        0C99  D380 0000         X
        0C9B  0F80
        0C9C  1157
002176  0C9D  8280 0FC5                         LB      <IPFL,=X'2'             IS ? SB DATA PRINT ?
        0C9F  0002
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002177  0CA0  0580          1          BBF   >+$A                NO
002178  0CA1  D380 0F33                LNJ   $B5,<PISBC         PRINT IS/SB DATA
002179  0CA3  8900 0FC1      $A        LBT   <ERFL,=Z'0001'      SET ERROR FLAG
        0CA5  0001
002180  0CA6  8800 0FC5                LBF   <IPFL,=X'2'         CLEAR IS/SB PRINT FLAG
        0CA8  0002
002181  0CA9  8800 0FC2                LBF   <FLAG,=Z'10'        OVFLOW FLAG
        0CAB  1000
002182  0CAC  0580          1          BBF   >+$C
002183                                 CALL  ZV$T,MSTMOF          OVERFLOW MSG
        0CAD  FBC0 0003
        0CAF  D380 0000      X
        0CB1  0F80
        0CB2  1187
002184  0CB3  8280 0FC1      $C        LB    <ERFL,=X'02'        CONTINUE
        0CB5  0002
002185  0CB6  0580          1          BBF   >+$B                EXIT
002186  0CB7  DC80 0CDC                LDB   $B5,<TDERB5         GET CONTINUE ADDR
002187  0CB9  8385                    JMP   $B5
002188                      $B        CALL  ZV$T,ZV$TC,MSREGS    PRINT ALL REGISTERS
        0CBA  FBC0 0003
        0CBC  D380 0000      X
        0CBE  0F80
        0CBF  11A6
002189  0CC0  D380 0F7B                LNJ   $B5,<CRLF
002208  0CC2  9B80 0FD5      TDER2     LAB   $B1,<SAVE-1         GET REGISTERS
002209  0CC4  4CFC                    LDV   $R4,=-4             LINE COUNTER
002210  0CC5  CF00 0FE9      $C        STR   $R4,<TEMPC          SAVE IT
002211  0CC7  5CFC                    LDV   $R5,=-4             4 WORDS PER LINE
002212  0CC8  FCF1           $E        LDB   $B7,+$B1            GET DATA
002213  0CC9  D380 0EE2                LNJ   $B5,<LNGASC         CONVERT TO ASCII
002214                                 CALL  ZV$T,LNGAD+$AF-1    PRINT DATA
        0CCB  FBC0 0003
        0CCD  D380 0000      X
        0CCF  0F80
        0CD0  0FCA
002215  0CD1  57F7                    BINC  $R5,>-$E            GET NEXT DATA
002216  0CD2  D380 0F7B                LNJ   $B5,<CRLF           START NEXT LINE
002217  0CD4  C800 0FE9                LDR   $R4,<TEMPC          GET NEXT LINE
002218  0CD6  47EF                    BINC  $R4,>-$C
002219  0CD7  D380 0CDD                LNJ   $B5,<TDTE           END THIS TEST
002220  0CD9  0000                    DC    X'0'                S/R WILL INSERT TEST NUMBER
002221  0CDA  0F80 0100                B     <START              RETURN TO RESTART
002222                      *
002223  0CDC  0000          TDERB5 RESV   $AF,0
002224                      *
002225                      ************************************************************
002226                      * PRINT TEST END MESSAGE
002227                      *
002228  0CDD  C875          TDTE      LDR   $R4,+$B5
002229  0CDE  DF80 0DDA               STB   $B5,<TDTEB5
002230  0CE0  C400 0FEB               OR    $R4,<TEST           ADD TEST NUMBER
002231  0CE2  CF00 1162               STR   $R4,<MSTE
002232                                CALL  ZV$IHZ,MSTE,LFCR
        0CE4  FBC0 0003
        0CE6  D380 0000      X
        0CE8  0F80
        0CE9  1162
        0CEA  0FC8
002233  0CEB  8800 0FC2                LBF   <FLAG,=X'02'        TEST BYPASS AND RESET
        0CED  0002
002234  0CEE  0580          1          BBF   >+$C
002235                                 CALL  ZV$T,MSTBP          BYPASS MSG
        0CEF  FBC0 0003
        0CF1  D380 0000      X
        0CF3  0F80
        0CF4  1178
002236  0CF5  0F80          1          B     >+$B
002237  0CF6  8800 0FC1      $C        LBF   <ERFL,=Z'0001'      TEST FOR ERRORS AND RESET
        0CF8  0001
002238  0CF9  0500          1          BBT   >+$A
002239                                 CALL  ZV$T,MSTEP          TEST PASSED MESSAGE
        0CFA  FBC0 0003
        0CFC  D380 0000      X
        0CFE  0F80
        0CFF  1170
002240  0D00  0FF5          1          B     >+$B
002241                      $A        CALL  ZV$T,MSTEF          TEST FAIL MESSAGE
        0D01  FBC0 0003
        0D03  D380 0000      X
        0D05  0F80
        0D06  1163
002242  0D07  DC80 0DDA                LDB   $B5,<TDTEB5
002243  0D09  8385                    JMP   $B5
002244                      *
002245  0DDA  0000          TDTEB5 RESV   $AF,0
002246                      *
002247                      *
002248                      ************************************************************
002249                      * YES OR NO RESPONSE
002250                      *
002251                      * LNJ $B5,<YSNO
002252                      * 'N' RETURN
002253                      * 'Y' RETURN
002254  0DDB  DF80 0D32      YSNO      STB   $B5,<YSNOB5
002255                      $A        CALL  ZV$IA,ZVSTAT,TEMPC   INPUT 'Y' OR 'N' RESPONSE
        0DDD  FBC0 0003
        0DDF  D380 0000      X
        0D11  0F80
        0D12  0FFC
        0D13  0FE9
002256  0D14  C800 0FE9                LDR   $R4,<TEMPC
002257  0D16  4048                    SOR   $R4,8               SHIFT IT
002258  0D17  C970 0059                CMR   $R4,=X'59'
002259  0D19  0900          1          BE    >+$B                IT IS 'Y'
002260  0D1A  C970 004E                CMR   $R4,=X'4E'          IS IT 'N' ?
002261  0D1C  0900          1          BE    >+$C                IT IS
002262                                 CALL  ZV$T,ZV$QC,MSBLNK   ? NEITHER
        0D1D  FBC0 0003
        0D1F  D380 0000      X
        0D21  0F80
        0D22  1042
002263  0D23  0FEA                     B     >-$A                RETRY
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002264  0D24  DC80 0D32          $B      LDB   $B5,<YSNOB5
002265  0D26  DBC5 0001                  LAB   $B5,$B5,$AF          BUMP RETURN ADDRESS
002266  0D28  DF80 0D32                  STB   $B5,<YSNOB5
002267  0D2A  D380 0E38          $C      LNJ   $B5,<TIME
002268  0D2C  03E8                       DC    1000                 WAIT 1 SEC FOR ANY CRLF
002269  0D2D  D380 0F7B                  LNJ   $B5,<CRLF            THEN SEND ONE
002270  0D2F  DC80 0D32                  LDB   $B5,<YSNOB5
002271  0D31  838B                       JMP   *$B5
002272                                *
002273  0D32  0000                    YSNOB5 RESV  $AF,0
002274                                *
002275                                *
002276                                ********************************************************************
002277                                * TEST FOR ATTENTION FROM CONSOLE
002278                                * IF BREAK, INCREMENT RETURN
002279                                *
002280                                *
002281  0D33  DF80 0D45          QUIT  STB   $B5,<QUITB5
002282                                CALL  ZV$BRK               TEST FOR BRK
        0D35  FBF0 0001
        0D37  D380 0000      X
002283  0D39  8980 0000      X         CMZ   <ZV$BKF              BREAK=1
002284  0D3B  0900           T         BE    >+$A                 NO BRK
002285  0D3C  DC80 0D45                 LDB   $B5,<QUITB5
002286  0D3E  DBC5 0001                 LAB   $B5,$B5,$AF          BUMP RETURN ADDRESS
002287  0D40  DF80 0D45                 STB   $B5,<QUITB5
002288  0D42  DC80 0D45          $A     LDB   $B5,<QUITB5
002289  0D44  838B                      JMP   *$B5
002290                                *
002291  0D45  0000                    QUITB5 RESV  $AF,0
002292                                *
002293                                *
002294                                ********************************************************************
002295                                * SETUP "SB" / "IS" DATA
002296                                *  TAG LABLE IN R4
002297                                *  DONT CARE DATA INTO R6; ACTUAL INTO R7
002298                                *
002299                                *  LNJ $B5,<SBIS
002300                                *  DC  X'HH' DONT CARE MASK
002301                                *
002302                                *
002303  0D46  E875                    SBIS  LDR   $R6,+$B5           GET DONT CARE MASK
002304  0D47  4048                       SOR   $R4,8                 SHIFT TAG LABLE
002305  0D48  C570 000F                  AND   $R4,=X'F'             SAVE TAG NUMBER
002306  0D4A  CF00 0FE9                  STR   $R4,<TEMPC
002307  0D4C  C080 0FE7                  LDM   $R4,<TEMPA            SHIFT RETURN DATA
002308  0D4E  CF00 0FE7                  STR   $R4,<TEMPA            PUT IT BACK
002309  0D50  E500 0FE7                  AND   $R6,<TEMPA            SB DATA
002310  0D52  F800 0FE7                  LDR   $R7,<TEMPA            IS DATA
002311  0D54  8900 0FC5                  LBT   <IPFL,=X'2'           SET PRINT FLAG
        0D56  0002
002312  0D57  8385                       JMP   $B5                   RETURN
002313                                *
002314                                *
002315                                ********************************************************************
002316                                * GET CYLINDER ADDRESS
002317                                *
002318                                *
002319  0D58  DF80 0D7D          GETCY  STB   $B5,<GTCYB5
002320                                CALL  ZV$T.ZV$QC,MSCYNO    ASK FOR CYL
        0D5A  FBC0 0003
        0D5C  D380 0000      X
        0D5E  0F80
        0D5F  102F
002321                          $C    CALL  ZV$ID,CYAD           INPUT CYL
        0D60  FBC0 0003
        0D62  D380 0000      X
        0D64  0F80
        0D65  0FAD
002322  0D66  9800 0FAD                 LDR   $R1,<CYAD
002323  0D68  1800           T         BLZ   $R1,>+$A             CYL IS NEG
002324  0D69  9970 0336                 CMR   $R1,=822             HI CYL
002325  0D6B  037B           T         BG    >+$A                 >822
002326  0D6C  9970 019A                 CMR   $R1,=410             GOOD FOR ANY DEV
002327  0D6E  0380           T         BLE   >+$B
002328  0D6F  8280 0FC4                 LB    <IDEN,=Z'8000'       822 CYLS ?
        0D71  8000
002329  0D72  057C           T         BBT   >+$D                 YES
002330                          $A    CALL  ZV$T.ZV$QC,MSBLNK    ILLEGAL CYL
        0D73  FBC0 0003
        0D75  D380 0000      X
        0D77  0F80
        0D78  1042
002331  0D79  0FE7                       B     >-$C                 RETRY
002332  0D7A  DC80 0D7D          $B     LDB   $B5,<GTCYB5
002333  0D7C  8385                       JMP   $B5
002334                                *
002335  0D7D  0000                    GTCYB5 RESV  $AF,0
002336                                *
002337                                *
002338                                ********************************************************************
002339                                * GET TRACK ADDRESS
002340                                *
002341                                *
002342  0D7E  DF80 0DA3          GETTK  STB   $B5,<GTTKB5
002343                                CALL  ZV$T.ZV$QC,MSTKNO    ASK FOR TRK
        0D80  FBC0 0003
        0D82  D380 0000      X
        0D84  0F80
        0D85  1144
002344                          $C    CALL  ZV$ID,TRKAD          INPUT TRK
        0D86  FBC0 0003
        0D88  D380 0000      X
        0D8A  0F80
        0D8B  0FF0
002345  0D8C  9800 0FF0                 LDR   $R1,<TRKAD
002346  0D8E  1800           T         BLZ   $R1,>+$A             TRK IS NEG
002347  0D8F  9970 0012                 CMR   $R1,=18              HI TRK
002348  0D91  037B           T         BG    >+$A                 >18
002349  0D92  9970 0004                 CMR   $R1,=4               GOOD FOR ANY DEV
002350  0D94  0380           T         BLE   >+$B
002351  0D95  8280 0FC4                 LB    <IDEN,=Z'4000'       19 TRKS ?
        0D97  4000
```

```
002352  0D98  057C          T           BBT     >+$B                YES
002353                              $A      CALL    ZV$T.ZV$QC,MSBLNK   ILLEGAL TRK
        0D99  FBC0 0003
        0D9B  D380 0000     X
        0D9D  0F80
        0D9E  1042
002354  0D9F  0FE7                      B       >-$C                RETRY
002355  0DA0  DC80 0DA3             $B      LDB     $B5,<GTTKB5
002356  0DA2  8385                      JMP     $B5
002357                              *
002358  0DA3  0000                  GTTKB5  RESV    $AF,0
002359                              *
002360                              *
002361                              ********************************************************************
002362                              * GET SECTOR ADDRESS
002363                              *
002364                              *
002365  0DA4  DF80 0DC2             GETSC   STB     $B5,<GTSCB5
002366                                      CALL    ZV$T.ZV$QC,MSSCNO   ASK FOR SECT
        0DA6  FBC0 0003
        0DA8  D380 0000     X
        0DAA  0F80
        0DAB  1123
002367                              $C      CALL    ZV$ID,SECAD         INPUT SECT
        0DAC  FBC0 0003
        0DAE  D380 0000     X
        0DB0  0F80
        0DB1  0FD2
002368  0DB2  9800 0FD2                  LDR     $R1,<SECAD
002369  0DB4  1800                  1       BLZ     $R1,>+$A            SEC IS NEG
002370  0DB5  9970 003F                  CMR     $R1,=63             HI SECT
002371  0DB7  0380                  T       BLE     >+$B
002372                              $A      CALL    ZV$T.ZV$QC,MSBLNK   ILLEGAL SECT
        0DB8  FBC0 0003
        0DBA  D380 0000     X
        0DBC  0F80
        0DBD  1042
002373  0DBE  0FEE                      B       >-$C                RETRY
002374  0DBF  DC80 0DC2             $B      LDB     $B5,<GTSCB5
002375  0DC1  8385                      JMP     $B5
002376                              *
002377  0DC2  0000                  GTSCB5  RESV    $AF,0
002378                              *
002379                              *
002380                              ********************************************************************
002381                              * SEEK CYLINDER ADDRESS
002382                              *
002383                              *  LNJ $B5,<SKCY
002384                              *  DC DDDD CYLINDER ADDRESS
002385                              * FLAG = '0008' SLOW SEEK
002386                              *
002387                              *
002388  0DC3  8900 0FC2             SKCYS   LBT     <FLAG,=X'8'         SET SLOW FLAG
        0DC5  0008
002389  0DC6  C875                  SKCYF   LDR     $R4,+$B5            GET CYLINDER DATA
002390  0DC7  DF80 0DF4                     STB     $B5,<SKCYB5         SAVE RTN ADDRESS
002391  0DC9  B800 0FAC                     LDR     $R3,<BITE           GET DEVICE NUMBER
002392  0DCB  CF30 0FB9                     STR     $R4,<DXFN,$R3       STORE CYL ADDRESS
002393  0DCD  D380 0F18                     LNJ     $B5,<SUCA           LOAD CONFIGURATION WORDS
002394  0DCF  8180 0FE7             $A      IOLD    <TEMPA,<IOWRI1,<D-1 SET OUTPUT
        0DD1  0000 11F7
        0DD3  0000 0FAF
002395  0DD5  07FA                      BIOF    >-$A
002396  0DD6  8280 0FC2                 LB      <FLAG,=X'8'         CHECK FOR SLOW
        0DD8  0008
002397  0DD9  0500                  1       BBT     >+$C
002398  0DDA  C870 0100                     LDR     $R4,=Z'0100'        LOAD SEEK COMAND
002399  0DDC  8054                  $B      IO      =$R4,<OTTASK        SEEK
        0DDD  0000 11FD
002400  0DDF  07FD                      BIOF    >-$B
002401  0DE0  0F80                  T       B       >+$D
002402  0DE1  CA80 0DED             $C      SRM     $R4,<SKCYB,=X'FF'   STORE LO CYL ADDR
        0DE3  00FF
002403  0DE4  4048                          SOR     $R4,8               GET HI ADDR
002404  0DE5  CA80 0DEA                     SRM     $R4,<SKCYA,=X'FF'   STORE HI CYL
        0DE7  00FF
002405  0DE8  D380 0C52                     LNJ     $B5,<TAGO
002406  0DEA  D400                  SKCYA   DC      Z'D400'             HI CYL ADDR
002407  0DEB  D380 0C52                     LNJ     $B5,<TAGO
002408  0DED  D600                  SKCYB   DC      Z'D600'             LO CYL ADDR
002409  0DEE  8800 0FC2                     LBF     <FLAG,=X'8'         RESET SLOW FLAG
        0DF0  0008
002410  0DF1  DC80 0DF4             $D      LDB     $B5,<SKCYB5
002411  0DF3  8385                          JMP     $B5
002412                              *
002413  0DF4  0000                  SKCYB5  RESV    $AF,0
002414                              *
002415                              *
002416                              ********************************************************************
002417                              * SETUP CURRENT DEVICE CHANNELS
002418                              *
002419                              *  $R3=CURRENT DEVICE
002420                              *
002421                              *
002422  0DF5  DF80 0E00             CDCH    STB     $B5,<CDCHB5         STORE RETURN
002423  0DF7  C830 0FB5                     LDR     $R4,<DRIVE0,$R3
002424  0DF9  CF40 01BA                     STR     $R4,DRIVE           CURRENT DRIVE ADDRESS
002425  0DFB  D380 0F6F                     LNJ     $B5,<SETCHN         SET CHAN ADDR FOR CURRENT DRIVE
002426  0DFD  DC80 0E00                     LDB     $B5,<CDCHB5
002427  0DFF  8385                          JMP     $B5                 RETURN
002428                              *
002429  0E00  0000                  CDCHB5  RESV    $AF,0               RETURN ADDRESS
002430                              *
002431                              *
002432                              ********************************************************************
002433                              * NON-EXISTANT RESOURCE, TRAP 15 HANDLER
002434                              *
002435  0E01  8F00 0FD5             TH15    SAVE    <SAVE-1,=-1         SAVE ALL REGS
        0E03  FFFF
002436  0E04  9B80 0100                     LAB     $B1,<START
002437  0E06  9F80 1222                     STB     $B1,<TSA1P          SAVE IN CURRENT TSAP
002438                                      CALL    ZV$T.ZV$TC,MSMRT    MISSING RESOURCE TRAP
        0E08  FBC0 0003
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                0E0A  D380 0000      X
                0E0C  0F80
                0E0D  10BF
002439          0E0E  0003                    RTT                         RETURN FROM TRAP
002440                              ***********************************************************************
002441                              * HANDLE RTC RUPT AND CALIBRATE CLOCK (AT LEVEL 5)
002442                              *
002443          0E0F  0005          RTCFC     RTCF                        STOP THE CLOCK
002444          0E10  CF56                    STR     $R4,=$R6            STORE MAJOR TIME LOOPS
002445          0E11  AF57                    STR     $R2,=$R7            STORE MINOR TIME LOOPS
002446          0E12  8D00 0FEE               SDI     <TMLPA              STORE LOOPS
002447          0E14  7000                    DOR     $R7,16
002448          0E15  F370 03E8               DIV     $R7,=1000
002449          0E17  E370 01F4               DIV     $R6,=500            TEST FOR ROUNDING
002450          0E19  6A80          T         BLEZ    $R6,>+$A
002451          0E1A  8AD7                    INC     =$R7                ROUND
002452          0E1B  8257          $A        NEG     =$R7
002453          0E1C  FF00 0E37               STR     $R7,<SYNCHC         TIME FOR 1 MILLISECOND
002454          0E1E  9B80 0177               LAB     $B1,<RESUME
002455          0E20  9F80 121A               STB     $B1,<SA15P          PREPARE FOR SUSPEND
002456          0E22  8E70 800F               LEV     =Z'8000'+15         SUSPEND TO LEVEL 15
002457          0E24  0000                    HLT
002458          0E25  0FFF                    B       >$-1                DIDN'T SET UP FOR SECOND INTERRUPT
002459                              ***********************************************************************
002460                              * CALIBRATE THE CPU FOR ONE SECOND
002461                              *
002462          0E26  8754          SYNCH     CL      =$R4                LOOPS FOR 1 SEC
002463          0E27  0004                    RTCN                        START THE CLOCK
002464          0E28  9900 0000      X        CMR     $R1,<ZHRTCC         SYNCHRONIZE THE CLOCK TICKS
002465          0E2A  0200 0E28               BL      <SYNCHA             WAIT FOR FIRST TICK
002466          0E2C  1CFF                    LDV     $R1,=-1             IN CASE RTC DOESN'T RUPT
002467                              *
002468          0E2D  2CEC          SYNCHB    LDV     $R2,=-20            -20
002469          0E2E  2780 0E2E               BINC    $R2,<$              LONG NOP
002470          0E30  4780 0E2D               BINC    $R4,<SYNCHB         COUNT LOOPS/SEC (/MS)
002471                              *
002472                              * IF DOING INITIAL CALIBRATION, SHOULD RUPT OUT OF LOOP TIMEC.
002473                              *
002474          0E32  C800 0E37               LDR     $R4,<SYNCHC         NMBR OF LOOPS/MS
002475          0E34  1780 0E2D               BINC    $R1,<SYNCHB         NMBR OF MSECS
002476          0E36  8385                    JMP     $B5                 RETURN
002477                              *
002478          0E37  0000          SYNCHC    RESV    1,0                 NEG NMBR TO RE-INIT FOR 1 MSEC
002479                              ***********************************************************************
002480                              * TIMEOUT FOR N MILLISECONDS
002481                              *
002482          0E38  9875          TIME      LDR     $R1,+$B5            GET NMBR OF MSECS
002483          0E39  8251                    NEG     =$R1
002484          0E3A  C800 0E37               LDR     $R4,<SYNCHC         SET UP FOR FIRST MSEC
002485          0E3C  0F80 0E2D               B       <SYNCHB             TIMEOUT
002486                              ***********************************************************************
002487                              * RTC INTERUPT ROUTINE
002488                              *
002489                              *
002490          0E3E  8900 0FC2     T10MS     LBT     <FLAG,=X'4'         10 MILLISEC FLAG + OR - 8.3MS
                0E40  0004
002491          0E41  C875          T1SEC     LDR     $R4,+$B5            1 SEC ENTRY
002492          0E42  DF80 0E6C               STB     $B5,<TIMOT5
002493          0E44  D800 0FD1               LDR     $R5,<RTCHZ          GET CLOCK FREQ.
002494          0E46  5F02                    MLV     $R5,=2              CONVERT TO TICKS
002495          0E47  CB55                    MUL     $R4,=$R5            TOTAL TICKS
002496          0E48  8280 0FC2               LB      <FLAG,=X'4'         10 MILLISECS ?
                0E4A  0004
002497          0E4B  0580          T         BBF     >+$A                NO- ITS 1 SECOND
002498          0E4C  C370 0064               DIV     $R4,=100            CONVERT TO MS
002499          0E4E  8800 0FC2               LBF     <FLAG,=X'4'         FOR NEXT TIME
                0E50  0004
002500          0E51  CF00 0000      X   $A   STR     $R4,<ZHRTCI         INITIAL VALUE
002501          0E53  CF00 0000      X        STR     $R4,<ZHRTCC         CURRENT VALUE
002502          0E55  9B80 0E62               LAB     $B1,<TIMLV5         GO HERE AFTER TIMEOUT
002503          0E57  9F80 120E               STB     $B1,<SA5P
002504          0E59  9B80 120B               LAB     $B1,<SA5DV
002505          0E5B  9F80 0005      X        STB     $B1,<ZHISAZ+5*$AF
002506          0E5D  2C05                    LDV     $R2,=5
002507          0E5E  AF00 0000      X        STR     $R2,<ZHRTCL         SET RUPT TO LVL 5
002508          0E60  0004                    RTCN                        TURN CLOCK ON
002509          0E61  8385                    JMP     $B5                 RETURN TO PROCESS
002510                              *
002511                              * INTERUPT, IF IT OCCURS, BRINGS US HERE
002512                              *
002513          0E62  0005          TIMLV5    RTCF                        TURN OFF CLOCK
002514          0E63  DC80 0E6C               LDB     $B5,<TIMOT5
002515          0E65  C875                    LDR     $R4,+$B5            BUMP RETURN ADDRESS
002516          0E66  DF80 121A               STB     $B5,<SA15P          PREPARE FOR SUSPEND
002517          0E68  8E70 800F               LEV     =Z'8000'+15         SUSPEND TO LVL 15
002518          0E6A  0000                    HLT
002519          0E6B  0FFF                    B       >$-1
002520                              *
002521          0E6C  0000          TIMOT5    RESV    $AF,0
002522                              *
002523                              *
002524                              ***********************************************************************
002525                              * TIMER LOOP INTERUPTED BY DEVICE EVENT
002526                              * LOOPS ARE TOTALED AND STORED IN $R6 AND $R7
002527                              * ENTRY DECLARED WITH LV10SU ROUTINE
002528                              *  LV10TM ENTRY ACCUMULATES MULTI EVENTS TEMPB/TEMPC
002529                              *  LV10T1 ENTRY RETURNS SINGLE EVENT TIME LOOP IN $R5
002530                              *
002531                              *
002532          0E6D  DF80 0E7F     TIMER     STB     $B5,<TIMB5
002533          0E6F  8755                    CL      =$R5
002534          0E70  4CEC          $A        LDV     $R4,=-20            SET MINOR LOOP COUNT
002535          0E71  4780 0E71               BINC    $R4,<$              LOOP 20 TIMES
002536          0E73  5780 0E70               BINC    $R5,<-$A            INCR MAJOR LOOP
002537          0E75  8900 0FC2               LBT     <FLAG,=X'10'        TIMER OVERFLOW
                0E77  0010
002538          0E78  D870 7FFF               LDR     $R5,=Z'7FFF'        FORCE MAX TIME
002539          0E7A  8040 0379     $B        IO      STOPIO,<OTCONT      FORCE IRUPT
                0E7C  0000 11FB
002540          0E7E  07FC                    BIOF    >-$B
002541                              *
002542          0E7F  0000          TIMB5     RESV    $AF,0
002543                              *
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002544                                  * DEVICE RUPT TAKES US HERE
002545                                  *
002546  0E80  6C80 0FE8                LV10TM LDI     <TEMPB              GET TOTAL LOOPS
002547  0E82  FA55                     LV10T1 ADD     $R7,=$R5            UP DATE TOTALS
002548  0E83  8ED6                            CAD     =$R6                ADD CARRY IF ANY
002549  0E84  0680              T             BCF     >+$A                MORE CARRY ?
002550  0E85  0000                            HLT                         TOTALS OVERFLOW-CANT GET HERE!
002551  0E86  6D00 0FE8                $A     SDI     <TEMPB              STORE RESULT
002552  0E88  DC80 0E7F                        LDB     $B5,<TIMB5          GET RETURN
002553  0E8A  0F7F                             NOP     >$-1                XXXXXX
002554  0E8B  DF80 121A                        STB     $B5,<SA15P          SET UP LEV 15 RETURN
002555  0E8D  8E70 800F                        LEV     =Z'8000'+15         LEV 15 TO PROCESS
002556  0E8F  0000                            HLT
002557  0E90  0FFF                            B       >$-1
002558                                  *
002559                                  *
002560                                  ********************************************************************
002561                                  * SET UP FOR LEV 10 RUPT
002562                                  *   LNJ $B5,<LV10SU
002563                                  *    DC  <PROCESS
002564                                  *
002565                                  *
002566  0E91  9CF5                     LV10SU LDB     $B1,+$B5            GET LV 10 PROCESS
002567  0E92  9F80 1214                        STB     $B1,<SA10P          PUT IN SAVE AREA
002568  0E94  8C51                             STS     =$R1                GET S REG
002569  0E95  9570 03C0                        AND     $R1,=Z'03C0'
002570  0E97  9470 000A                        OR      $R1,=10             SET TO LEV 10
002571  0E99  8051                     $A     IO      =$R1,<OTRUPT        ALLOW DEV RUPT
        0E9A  0000 11FC
002572  0E9C  07FD                             B10F    >-$A
002573  0E9D  8385                             JMP     $B5
002574                                  *
002575                                  *
002576                                  ********************************************************************
002577                                  * TIME DEVICE EVENT AT LEVEL 10 (MILLISECS)
002578                                  * PREVIOUSLY LV10SU CALLED WITH
002579                                  *  LV10TM OR LV10T1 PARAMETERS
002580                                  * $R5 RETURNS TIME IN MS
002581                                  * DEVICE RUPT INH ON EXIT
002582                                  * ENTRY  LNJ $B5,<TIMDE
002583                                  *         DC  MSECS
002584                                  *         OK RETURN
002585                                  *         TIMEOUT RTN
002586                                  *
002587                                  *
002588  0E9E  A875                     TIMDE  LDR     $R2,+$B5            GET MSEC PARAMETER
002589  0E9F  DF80 0EBD                        STB     $B5,<TIMDE5
002590  0EA1  8756                             CL      =$R6
002591  0EA2  8757                             CL      =$R7
002592  0EA3  D380 0E6D                        LNJ     $B5,<TIMER          START TIMING
002593  0EA5  C800 0E37                TIMDE1 LDR     $R4,<SYNCHC         RUPT RETURN
002594  0EA7  8254                             NEG     =$R4                GET MSECS DIVIDER
002595  0EA8  8756                             CL      =$R6
002596  0EA9  F855                             LDR     $R7,=$R5
002597  0EAA  F354                             DIV     $R7,=$R4            LONG DIVIDE
002598  0EAB  4041                             SOR     $R4,1
002599  0EAC  E354                             DIV     $R6,=$R4            TEST FOR ROUNDING
002600  0EAD  6A80              T              BLEZ    $R6,>+$A
002601  0EAE  8AD7                             INC     =$R7                ROUND OFF
002602  0EAF  FF55                     $A      STR     $R7,=$R5            $R5 HAS TIME IN MS
002603  0EB0  8751                     $B      CL      =$R1                INH DEVICE RUPTS
002604  0EB1  8051                     $D      IO      =$R1,<OTRUPT
        0EB2  0000 11FC
002605  0EB4  07FD                             B10F    >-$D
002606  0EB5  DC80 0EBD                        LDB     $B5,<TIMDE5         GET RTN ADDRESS
002607  0EB7  0F7F                             NOP     >$-1                XXXXX
002608  0EB8  D952                             CMR     $R5,=$R2            ACTUAL VS EXPECTED MSECS
002609  0EB9  0380              T              BLE     >+$C                OK
002610  0EBA  DBC5 0001                        LAB     $B5,$B5,$AF         BUMP TIMEOUT RTN
002611  0EBC  8385                     $C     JMP     $B5
002612                                  *
002613  0EBD  0000                     TIMDE5 RESV    $AF,0
002614                                  *
002615                                  *
002616                                  ********************************************************************
002617                                  * COMPUTE AVE.TIME FOR TOTAL IN $R6 AND $R7
002618                                  * AVE TIME IN $R6 (MILLISECS)
002619                                  *
002620  0EBE  C800 0FCF                TMAVE  LDR     $R4,<LPCUR          GET NEG CURRENT COUNT
002621  0EC0  8AD4                             INC     =$R4                GET LAST LOOP
002622  0EC1  C200 0FCE                        SUB     $R4,<LPCNT          $R4 HAS CURR LOOP CNT
002623  0EC3  8C80 0FE8                        LDI     <TEMPB              GET TOTAL LOOP COUNT
002624  0EC5  F354                             DIV     $R7,=$R4            GET AVE LOOPS
002625  0EC6  4041                             SOR     $R4,1               DIVIDE BY 2
002626  0EC7  E354                             DIV     $R6,=$R4            TEST REMAINDER
002627  0EC8  6A80              T              BLEZ    $R6,>+$A            DONT ROUND
002628  0EC9  8AD7                             INC     =$R7                ROUND OFF FRACTION
002629  0ECA  FF56                     $A      STR     $R7,=$R6            SET UP FOR NXT DIVIDE
002630  0ECB  C800 0E37                        LDR     $R4,<SYNCHC         GET MS TIME CONSTANT
002631  0ECD  8254                             NEG     =$R4
002632  0ECE  E354                             DIV     $R6,=$R4
002633  0ECF  EF00 0FA7                        STR     $R6,<AVETM
002634  0ED1  8385                             JMP     $B5
002635                                  *
002636                                  *
002637                                  ********************************************************************
002638                                  * TYPE OUT ASCII CONTENTS OF R1
002639                                  *
002640  0ED2  DF80 0EE1                VDTR   STB     $B5,<VDTRB5
002641  0ED4  9F00 0EDF                        STR     $R1,<VDTRA
002642                                         CALL    ZV$T,VDTRA
        0ED6  FBC0 0003
        0ED8  D380 0000         X
        0EDA  0F80
        0EDB  0EDF
002643  0EDC  DC80 0EE1                        LDB     $B5,<VDTRB5
002644  0EDE  8385                             JMP     $B5                 RETURN
002645                                  *
002646  0EDF  0000                     VDTRA  RESV    1,0
002647  0EE0  2424                            DC      '$$'
002648  0EE1  0000                     VDTRB5 RESV    $AF,0
002649                                  ********************************************************************
002650                                  * CONVERT SAF OR LAF ADDRESS TO ASCII
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```
002651                                  * HEX ADDRESS IN $B7
002652                                  * ASCII RESULT IN LNGAD
002653                                  *
002654                                  *
002655  0EE2  4C01                     LNGASC LDV     $R4,=$AF            SET UP FOR EXIT
002656  0EE3  8254                            NEG     =$R4
002657  0EE4  FF80 0FE7                       STB     $B7,<TEMPA          STORE ADDR WORD/S
002658  0EE6  AB80 0FE7                       LAB     $B2,<TEMPA
002659  0EE8  BB80 0FCA                       LAB     $B3,<LNGAD
002660  0EEA  8751                            CL      =$R1                WORD COUNTER
002661  0EEB  8752                            CL      =$R2                CHAR COUNTER
002662  0EEC  F85E                     $A      LDR     $R7,$B2.+$R1        GET ADDR WORD
002663  0EED  3CFC                            LDV     $R3,=-4             BYTE COUNTER
002664  0EEE  8756                     $B      CL      =$R6                WORK AREA
002665  0EEF  7084                            DOL     $R7,4               STORE CHAR IN $R6
002666  0EF0  6D09                            CMV     $R6,=9              ALPHA OR NUMBER
002667  0EF1  0380                  T         BLE     >+$C                NUMBER
002668  0EF2  6E07                            ADV     $R6,=7              ALPHA CONVERT
002669  0EF3  6E30                     $C     ADV     $R6,=X'30'          ASCII CONVERT
002670  0EF4  E7EF                            STH     $R6,$B3.+$R2        STORE ASCII
002671  0EF5  37F9                            BINC    $R3,>-$B            GET NEXT CHAR
002672  0EF6  47F6                            BINC    $R4,>-$A            GET NEXT WORD
002673  0EF7  8385                            JMP     $B5
002674                                  *
002675                                  *
002676                                  ********************************************************************
002677                                  * IO STALL ROUTINE
002678                                  *
002679                                  *
002680  0EF8  DF80 0F0C                STALL   STB     $B5,<STALB5
002681  0EFA  8755                             CL      =$R5                CLEAR COUNTER
002682  0EFB  8000 0FE5                $A      IO      <STAT1,<INSTW1
      0EFD  0000 1204
002683  0EFF  0700 0F0B                        BIOT    <STALLB             EXIT
002684  0F01  57FA                             BINC    $R5,>-$A            WAIT HERE FOR BIOT
002685  0F02  8000 11F4                $B      IO      <STOPIO,<OTCONT     ABORT
      0F04  0000 11FB
002686  0F06  07FC                             BIOF    >-$B
002687  0F07  DC80 0F0C                        LDB     $B5,<STALB5
002688  0F09  DBC5 0001                        LAB     $B5,$B5.$AF         BUMP FOR ERROR RETURN
002689  0F0B  8385                     STALLB  JMP     $B5
002690                                  *
002691  0F0C  0000                      STALB5  RESV    $AF,0
002692                                  *
002693                                  ********************************************************************
002694                                  * GET TWO STATUS WORDS
002695                                  *
002696  0F0D  8000 0FE6                INSTAT  IO      <STAT2,<INSTW2      GET STATUS WORD 2
      0F0F  0000 1205
002697  0F11  07FC                             BIOF    >INSTAT
002698  0F12  8000 0FE5                ISTAT1  IO      <STAT1,<INSTW1      GET STATUS WORD 1
      0F14  0000 1204
002699  0F16  07FC                             BIOF    >ISTAT1
002700  0F17  8385                             JMP     $B5                 RETURN
002701                                  ********************************************************************
002702                                  * SET UP CONFIGURATION WORDS
002703                                  *
002704  0F18  8030 0FB9                SUCA    IO      <DXFN.$R3,<OTCONF   SET UP CW1
      0F1A  0000 11F9
002705  0F1C  07FC                             BIOF    >SUCA
002706  0F1D  8030 0FBD                SUCB    IO      <DXRN.$R3,<OTCON2   SET UP CW2
      0F1F  0000 11FA
002707  0F21  07FC                             BIOF    >SUCB
002708  0F22  8385                             JMP     $B5                 RETURN
002709                                  ********************************************************************
002710                                  * FILL BUFFER WITH WORD STRING
002711                                  *
002712                                  *  LNJ $B5,<FLBF
002713                                  *  DC  <SENDER SENDER ADDRESS
002714                                  *  DC  DD SENDER WORD LENGTH
002715                                  *  DC  <RECEIVER RECEIVER ADDRESS
002716                                  *  DC  DD RECEIVER WORD LENGTH
002717                                  *
002718                                  *
002719  0F23  ACF5                     FLBF    LDB     $B2,+$B5            ADDR OF SENDER
002720  0F24  C875                             LDR     $R4,+$B5            LENGTH OF SENDER
002721  0F25  BCF5                             LDB     $B3,+$B5            ADDR OF REC
002722  0F26  D875                             LDR     $R5,+$B5            LNGTH OF REC
002723  0F27  88D4                             DEC     =$R4                SENDER COUNTER
002724  0F28  CF57                             STR     $R4,=$R7            SAVE INIT COUNT
002725  0F29  88D5                             DEC     =$R5                REC COUNTER
002726  0F2A  8751                             CL      =$R1                INITIALIZE INDEX REGS
002727  0F2B  8752                             CL      =$R2
002728  0F2C  E85E                     $A      LDR     $R6,$B2.+$R1        GET SENDER DATA
002729  0F2D  EF6F                             STR     $R6,$B3.+$R2        STORE IN RECEIVER
002730  0F2E  4700                  1          BDEC    $R4,>+$B            MORE TO SEND ?
002731  0F2F  8751                             CL      =$R1                RESET SENDER INDEX
002732  0F30  FF54                             STR     $R7,=$R4            INIT SENDER COUNT
002733  0F31  577B                     $B      BDEC    $R5,>-$A            RECEIVER FILLED ?
002734  0F32  8385                             JMP     $B5
002735                                  *
002736                                  *
002737                                  ********************************************************************
002738                                  * PRINT "IS" AND "SHOULD-BE" DATA
002739                                  *
002740  0F33  DF80 0F6E                PISBC   STB     $B5,<PISBB5
002741  0F35  8D00 0FE7                        SDI     <TEMPA
002742                                          CALL    ZV$I,MSTAG          PRINT "TAG"
      0F37  FBC0 0003
      0F39  D380 0000           X
      0F3B  0F80
      0F3C  11D6
002743                                          CALL    ZV$HZ,TEMPC,VRBL    CONVERT TAG DATA TO ASCII
      0F3D  FBC0 0003
      0F3F  D380 0000           X
      0F41  0F80
      0F42  0FE9
      0F43  0FF2
002744  0F44  9800 0FF4                        LDR     $R1,<VRBL+2
002745  0F46  D380 0ED2                        LNJ     $B5,<VDTR           PRINT HEX TAG
002746                                          CALL    ZV$I,MSIS           PRINT "IS"
      0F48  FBC0 0003
      0F4A  D380 0000           X
```

```
                0F4C  0F80
                0F4D  1198
002747                                      CALL    ZV$HZ,TEMPB,VRBL        CONVERT "IS" DATA ASCII
                0F4E  FBC0 0003
                0F50  D380 0000       X
                0F52  0F80
                0F53  0FE8
                0F54  0FF2
002748          0F55  9800 0FF4             LDR     $R1,<VRBL+2
002749          0F57  D380 0ED2             LNJ     $B5,<VDTR               PRINT HEX "IS" DATA
002750                                      CALL    ZV$I,MSSB               PRINT "SB"
                0F59  FBC0 0003
                0F5B  D380 0000       X
                0F5D  0F80
                0F5E  11DA
002751                                      CALL    ZV$HZ,TEMPA,VRBL        CONVERT SB DATA TO ASCII
                0F5F  FBC0 0003
                0F61  D380 0000       X
                0F63  0F80
                0F64  0FE7
                0F65  0FF2
002752          0F66  9800 0FF4             LDR     $R1,<VRBL+2
002753          0F68  D380 0ED2             LNJ     $B5,<VDTR               PRINT HEX "SB" DATA
002754                                *
002755          0F6A  0F02                  NOP     >$+2
002756          0F6B  DC80 0F6E       $A    LDB     $B5,<PISBB5
002757          0F6D  8385                  JMP     $B5                     RETURN
002758                                *
002759          0F6E  0000            PISBB5 RESV   $AF,0
002760                                ********************************************************************
002761                                * SET ALL CHANNEL CONSTANTS TO CURRENT DRIVE ADDRESS (PORT NUMBER)
002762                                *
002763          0F6F  9B80 11F6       SETCHN LAB    $B1,<IOREAD               START OF CHAN ADDRESSES
002764          0F71  AB80 120A             LAB     $B2,<CHANZ              END OF CHAN ADDRESSES
002765          0F73  9800 0FB4             LDR     $R1,<DRIVE              DRIVE ADDRESS
002766          0F75  9AF1            SETCHA SRM    $R1,+$B1,=Z'0180'       ADD DRIVE ADDRESS TO CHANNEL
                0F76  0180
002767          0F77  9DD2                  CMB     $B1,=$B2
002768          0F78  0200 0F75             BL      <SETCHA                 B IF TABLE NOT DONE YET
002769          0F7A  8385                  JMP     $B5                     RETURN
002770                                ********************************************************************
002771                                * DO A CARRAIGE RETURN/LINE FEED
002772                                *
002773          0F7B  DF80 0F86       CRLF  STB     $B5,<CRLFB5
002774                                      CALL    ZV$T,ZV$TC,NULL         (CRLF)
                0F7D  FBC0 0003
                0F7F  D380 0000       X
                0F81  0F80
                0F82  0FD0
002775          0F83  DC80 0F86             LDB     $B5,<CRLFB5
002776          0F85  8385                  JMP     $B5                     RETURN
002777                                *
002778          0F86  0000            CRLFB5 RESV   $AF,0
002779                                ********************************************************************
002780                                * INVOKE THE PATCHING LIBRARY ROUTINE
002781                                *
002782                                PCH   CALL    ZV$PCH                  B <START RESTART
                0F87  FBF0 0001
                0F89  D380 0000       X
002783          0F8B  0F80 0100             B       <START
002784                                ********************************************************************
002785                                * SET UP BUFFER FOR FORMAT WRITE OPERATION
002786                                *
002787          0F8D  DF80 0FA6       SUFB  STB     $B5,<SUFBB5               STORE RETURN
002788          0F8F  9C80 0FC6             LDB     $B1,<JJPT               BUFFER ADDRESS
002789          0F91  E830 0FB9             LDR     $R6,<DXFN.$R3           LOAD CW1
002790          0F93  F830 0FBD             LDR     $R7,<DXRN.$R3           LOAD CW2
002791          0F95  F570 FF00             AND     $R7,=Z'FF00'            SET SECTOR COUNT TO ZERO
002792          0F97  9800 0FD3             LDR     $R1,<SECTRK             SET SECTOR COUNT
002793          0F99  A851                  LDR     $R2,=$R1                SET UP RANGE
002794          0F9A  8AD2                  INC     =$R2                    NUMBER OF ID'S
002795          0F9B  2002                  SUL     $R2,2                   4 BYTES PER ID
002796          0F9C  AF00 0FE7             STR     $R2,<TEMPA              STORE RANGE
002797          0F9E  EF71            SUFBA STR     $R6,+$B1                SET UP ID'S
002798          0F9F  FF71                  STR     $R7,+$B1
002799          0FA0  8AD7                  INC     =$R7                    INCREMENT SECTOR NUMBER
002800          0FA1  1700 0F9E             BDEC    $R1,<SUFBA              BRANCH IF NOT COMPLETE
002801          0FA3  DC80 0FA6             LDB     $B5,<SUFBB5
002802          0FA5  8385                  JMP     $B5                     RETURN
002803                                *
002804          0FA6  0000            SUFBB5 RESV   $AF,0                   RETURN ADDRESS
```

```
002805                              /*****************************************************************
002806                              *
002807                              * CONSTANTS, MESSAGES, TABLES, BUFFERS, ETC.
002808                              *
002809                              *****************************************************************
002810                              * CONSTANTS, BUFFERS
002811                              *
002812  0FA7  0000                  AVETM   RESV    1,0                     AVERAGE TIME
002813  0FA8  0000                  ASCBF   RESV    3,0                     ASCII BUFFER
002814  0FAB  2420                          DC      '$'
002815  0FAC  0000                  BITE    RESV    1,0                     DRIVE NUMBER
002816  0FAD  0000                  CYAD    RESV    1,0                     CURRENT CYL ADDRESS
002817  0FAE  0000                  CYADMX  RESV    1,0                     MAX CYL ADDR
002818  0FAF  0001                  D-1     DC      1
002819  0FB0  0000                  DEVID   RESV    4,0                     ID'S OF DEVICES FOUND
002820  0FB4  0000                  DRIVE   RESV    1,0                     CURRENTLY SELECTED UNIT (FROM "DRIVE0" ETC.)
002821  0FB5  0000                  DRIVE0  DC      Z'0000'
002822  0FB6  0080                  DRIVE1  DC      Z'0080'
002823  0FB7  0100                  DRIVE2  DC      Z'0100'
002824  0FB8  0180                  DRIVE3  DC      Z'0180'
002825  0FB9  0001                  DXFN    RESV    4,1                     HEX CYLINDER NUMBER FOR CURRENT DRIVE (CW1)
002826  0FBD  0000                  DXRN    RESV    4,0                     HEX SECTOR NUMBER FOR CURRENT DRIVE (CW2)
002827  0FC1  0000                  ERFL    RESV    1,0                     DIAGNOSTIC ERROR FLAG
002828  0FC2  0000                  FLAG    RESV    1,0                     GENERAL PURPOSE FLAG
002829  0FC3  0000                  GOFLAG  RESV    1,0                     IF SET, BYPASS "START"
002830  0FC4  0000                  IDEN    RESV    1,0                     ID CODE
002831  0FC5  0000                  IPFL    RESV    1,0                     INHIBIT PRINT FLAG
002832  0FC6  0000                  JJPT    RESV    $AF,0                   WRITE BUFFER POINTER
002833  0FC7  0000                  KKPT    RESV    $AF,0                   READ BUFFER POINTER
002834  0FC8  805C                  LFCR    DC      Z'805C'                 CRLF FOR ZV$
002835  0FC9  0400                  LENGTH  DC      1024                    LENGTH (WORDS) OF WRITE/READ BUFFERS
002836  0FCA  0000                  LNGAD   RESV    $AF*2,0                 LONG ADDRESS ASCII
002837  0FCC  2020 2424                     DC      '  $$' END              OF MESSAGE
002838  0FCE  0000                  LPCNT   RESV    1,0                     LOOPING COUNTER
002839  0FCF  0000                  LPCUR   RESV    1,0                     CURRENT LOOPING COUNTER
002840  0FD0  0000                  NULL    DC      0
002841  0FD1  003C                  RTCHZ   DC      60                      DEFAULT RTC FREQUENCY
002842  0FD2  0000                  SECAD   RESV    1,0                     CURRENT SECTOR ADDR
002843  0FD3  003F                  SECTRK  RESV    1,63                    NUMBER OF SECTORS PER TRACK
002844  0FD4  0000                  TASK    RESV    1,0
002845  0FD5  0000                  SAVE-1  RESV    16*$AF,0                CONTEXT SAVE AREA
002846  0FE5  0000                  STAT1   RESV    1,0                     FIRST STATUS WORD
002847  0FE6  0000                  STAT2   RESV    1,0                     SECOND STATUS WORD
002848  0FE7  0000                  TEMPA   RESV    1,0
002849  0FE8  0000                  TEMPB   RESV    1,0
002850  0FE9  0000                  TEMPC   RESV    1,0
002851  0FEA  0000                  TEMPD   RESV    1,0
002852  0FEB  0000                  TEST    RESV    1,0                     TEST NUMBER
002853  0FEC  0000                  TMFWD   RESV    1,0                     FWD SEEK TIME
002854  0FED  0000                  TMREV   RESV    1,0                     REV SEEK TIME
002855  0FEE  0000                  TMLPA   RESV    1,0                     MAJOR TIME LOOP
002856  0FEF  0000                  TMLPB   RESV    1,0                     MINOR TIME LOOP
002857  0FF0  0000                  TRKAD   RESV    1,0                     CURRENT TRK ADDR
002858  0FF1  0000                  TRKMX   RESV    1,0                     MAX TRACK ADDR
002859  0FF2  0000                  VRBL    RESV    3,0                     VARIABLE CONVERSION BUFFER
002860  0FF5  2424                  VRBLZ   DC      '$$'                    END OF MESSAGE FROM VRBL
002861  0FF6  EB6D B6DB 16EB        WORSC   DC      Z'EB6DB6DB16EB6DB6DB16' WORST CASE PATTERN
              6DB6 DB16
002862  0FFB  FFFF                  X-FFFF  DC      Z'FFFF'
002863  0FFC  0000                  ZVSTAT  RESV    1,0                     RETURNED STATUS FOR ZV$ ROUTINES
002864                              *****************************************************************
002865                              * MESSAGES
002866                              *
002867                                      IFEV    $AF,SKIP1
002868  0FFD  5340 4453 322C        MSNAME  TEXT    'SMDS2,'
002871  1000  2052 4556 2043        SKIP2   TEXT    ' REV C, STORAGE MODULE T&D, FEB 18,1978$'
        1003  2C20 5354 4F52
              4147 4520 4D4F
              4455 4C45 2054
              2644 2C20 4645
              4220 3138 2C31
              3937 3824
002872  1014  434F 5059 5249        CPYRIT  TEXT    'COPYRIGHT 1977 BY HONEYWELL INFORMATION SYSTEMS, INC.'
        1017  4748 5420 3139
              3737 2042 5920
              484F 4E45 5957
              454C 4C20 494E
              464F 524D 4154
              494F 4E20 5359
              5354 454D 532C
              2049 4E43 2E00
002873                              *- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
002874  102F  2020 2020 2020        MSCYNO  TEXT    '        CYL NO.  $'
        1032  2020 4359 4C20
              4E4F 2E20 2024
002875  1038  2020 2020 2020        MSDVNO  TEXT    '        DRIVE NO.  $'
        103B  2020 4452 4956
              4520 4E4F 2E20
              2024
002876  1042  2020 2020 2400        MSBLNK  TEXT    '    $' BLANKS
002877  1045  4649 524D 5741        MSFWRV  TEXT    'FIRMWARE REV.  $'
        1048  5245 2052 4556
              2E20 2024
002878  104D  4F42 5345 5256        MSIND   TEXT    'OBSERVE THE START INDICATOR ON THE DEVICES$'
        1050  4520 5448 4520
              5354 4152 5420
              494E 4449 4341
              544F 5220 4F4E
              2054 4845 2044
              4556 4943 4524
002879  1062  4946 2049 4C4C        MSIND1  TEXT    'IF ILLUMINATED, PRESS START SWITCH AND'
        1065  554D 494E 4154
              4544 2C20 5052
              4553 5320 5354
              4152 5420 5357
              4954 4348 2041
              4E44
002880  1075  0D0A                          TEXT    Z'0D0A'                 CRLF
002881  1076  2020 2020 2045               TEXT    '     ENTER (Y) AT CONSOLE '
        1079  4E54 4552 2028
              5929 2041 5420
              434F 4E53 4F4C
              4520
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002882  1083  0D0A 2024                    TEXT  2'0D0A',' $' CRLF
002883  1085  4946 204E 4F54       MSIND2  TEXT  'IF NOT ILLUMINATED,ENTER (N) AT CONSOLE '
        1088  2049 4C4C 554D
              494E 4154 4544
              2C45 4E54 4552
              2028 4E29 2041
              5420 434F 4E53
              4F4C 4520
002884  1099  0D0A 2024                    TEXT  2'0D0A',' $' CRLF
002885  109B  494E 5354 414C       MSILP   TEXT  'INSTALL LOGIC PLUG$'
        109E  4C20 4C4F 4749
              4320 504C 5547
              2400
002886  10A5  2020 4D53 2041       MSRTM   TEXT  '  MS AVE. SEEK TIME $'
        10A8  5645 2E20 5345
              454B 2054 494D
              4520 2400
002887  10B0  454E 5445 5220       MSLCT   TEXT  'ENTER LOOP COUNT      $'
        10B3  4C4F 4F50 2043
              4F55 4E54 2020
              2020 2020 2400
002888  10BC  4C4F 4F50 2024       MSLP    TEXT  'LOOP $'
002889  10BF  4D49 5353 494E       MSMRT   TEXT  'MISSING RESOURCE TRAP $'
        10C2  4720 5245 534F
              5552 4345 2054
              5241 5020 2400
002890  10CD  2020 4D53 204D       MSMXF   TEXT  '  MS MAX. FWD  TIME $'
        10CE  4158 2E20 4657
              4420 2054 494D
              4520 2400
002891  10D6  2020 4D53 204D       MSMXR   TEXT  '  MS MAX. REV  TIME $'
        10D9  4158 2E20 5245
              5620 2054 494D
              4520 2400
002892  10E1  2020 2020 2020       MSDVID  TEXT  '       DEVICE ID$'
        10E4  2044 4556 4943
              4520 4944 2400
002893  10EA  5245 504C 5920       MSDONE  TEXT  'REPLY (Y) WHEN DONE    $'
        10ED  2859 2920 5748
              454E 2044 4F4E
              4520 2020 2024
002894  10F6  454E 4420 5426       MSETD   TEXT  'END T&D ROUTINE $'
        10F9  4420 524F 5554
              494E 4520 2400
002895  10FF  5052 4F54 4543       MSPS1   TEXT  'PROTECT SWITCH LIT  ?  $$'
        1102  5420 5357 4954
              4348 204C 4954
              2020 3F20 2024
              2400
002896  110C  5245 5350 4F4E       MSPS1A  TEXT  'RESPOND (Y) OR (N) $$'
        110F  4420 2859 2920
              4F52 2028 4E29
              2024 2400
002897  1117  4445 5052 4553       MSPS2   TEXT  'DEPRESS PROTECT SWITCH $'
        111A  5320 5052 4F54
              4543 5420 5357
              4954 4348 2024
002898  1123  2020 2020 2020       MSSCNO  TEXT  '       SEC NO.   $'
        1126  2020 5345 4320
              4E4F 2E20 2020
              2400
002899  112D  4445 5052 4553       MSSTR   TEXT  'DEPRESS START SWITCH $'
        1130  5320 5354 4152
              5420 5357 4954
              4348 2024
002900  1138  4552 524F 5220       MSTDER  TEXT  'ERROR DICTIONARY ENTRY$'
        113B  4449 4354 494F
              4E41 5259 2045
              4E54 5259 2400
002901  1144  2020 2020 2020       MSTKNO  TEXT  '       TRK NO.   $'
        1147  2020 5452 4B20
              4E4F 2E20 2020
              2400
002902  114E  5749 5448 494E       MSTIME  TEXT  'WITHIN 15 SECS. $'
        1151  2031 3520 5345
              4353 2E20 2400
002903  1157  0000                 MSDICT  RESV  1,0
002904  1158  5245 4D4F 5645       MSRLP   TEXT  'REMOVE LOGIC PLUG $'
        115B  204C 4F47 4943
              2050 4C55 4720
              2400
002905  1162  0000                 MSTE    RESV  1,0
002906  1163  2020 5445 5354       MSTEF   TEXT  '  TEST FAILED ********** $'
        1166  2046 4149 4C45
              4420 2A2A 2A2A
              2A2A 2A2A 2A2A
              2024
002907  1170  2020 5445 5354       MSTEP   TEXT  '  TEST PASSED $'
        1173  2050 4153 5345
              4420 2400
002908  1178  2020 5445 5354       MSTBP   TEXT  '  TEST BYPASSED $'
        117B  2042 5950 4153
              5345 4420 2400
002909  1181  5354 4152 5420       MSTEST  TEXT  'START TEST$'
        1184  5445 5354 2400
002910  1187  2054 494D 4552       MSTMOF  TEXT  ' TIMER OVERFLOW $'
        118A  204F 5645 5246
              4C4F 5720 2400
002911  1190  2020 574F 5244       MSWORD  TEXT  '  WORD$'
        1193  2400
002912  1194  4348 414E 4E45       MSCHAN  TEXT  'CHANNEL$'
        1197  4C24
002913  1198  2020 4953 2020       MSIS    TEXT  '  IS  $'
        119B  2400
002914  119C  4E4F 2044 4556       MSND    TEXT  'NO DEVICE THIS CHANNEL $'
        119F  4943 4520 5448
              4953 2043 4841
              4E4E 454C 2024
002915  11A8  5245 4749 5354       MSREGS  TEXT  'REGISTER DUMP;$$'
        11AB  4552 2044 554D
              503A 2424
002916  11B0  504F 5745 5220       MSRTC   TEXT  'POWER FREQ, HZ$'
        11B3  4652 4551 2C20
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                485A 2400
002917  11B8    5245 4144 2020          MSRBUF TEXT   'READ  BUFF ADDR (HEX):  $'
        11BB    4255 4646 2041
                4444 5220 2848
                4558 293A 2020
                2400
002918  11C5    5245 5354 4152          MSRSTR TEXT   'RESTART$'
        11C8    5424
002919  11C9    5752 4954 4520          MSWBUF TEXT   'WRITE BUFF ADDR (HEX):  $'
        11CC    4255 4646 2041
                4444 5220 2848
                4558 293A 2020
                2400
002920  11D6    2020 5441 4720          MSTAG  TEXT   '  TAG $'
        11D9    2400
002921  11DA    2C20 2053 4220          MSSB   TEXT   ',  SB  $'
        11DD    2024
002922  11DE    4F4B 2054 4F20          MSWRT  TEXT   'OK TO WRITE ?  $'
        11E1    5752 4954 4520
                3F20 2024
002923                                  ********************************************************************
002924                                  * LIST OF TASK WORDS  (IO <OTTASK)
002925                                  *
002926  11E6    0000                    RECAL  DC     Z'0000'           RECALIBRATE
002927  11E7    0100                    SEEK   DC     Z'0100'           SEEK
002928  11E8    8000                    FMRW   DC     Z'8000'           FORMAT READ OR WRITE
002929  11E9    8100                    RWD    DC     Z'8100'           READ OR WRITE DATA
002930  11EA    8200                    DFMRW  DC     Z'8200'           DIAGNOSTIC FORMAT READ OR WRITE
002931  11EB    8300                    DRWD   DC     Z'8300'           DIAGNOSTIC READ OR WRITE DATA
002932  11EC    8400                    FRIDW  DC     Z'8400'           FORMAT READ ID OR FORMAT WRITE
002933  11ED    C000                    WRPAR  DC     Z'C000'           WRAPAROUND
002934  11EE    C800                    SZRL   DC     Z'C800'           SEIZE OR RELEASE
002935  11EF    D000                    TCIO   DC     Z'D000'           TAG CODE IN OR OUT
002936  11F0    2000                    ASB    DC     Z'2000'           AUTOMATIC SEEK BIT
002937  11F1    1000                    SSB    DC     Z'1000'           SECTOR SIZE BIT
002938  11F2    0800                    ARB    DC     Z'0800'           AUTOMATIC RPS BIT
002939                                  ********************************************************************
002940                                  * LIST OF CONTROL WORDS (IO <STOPIO,<OTCONT)
002941                                  *
002942  11F3    8000                    INZBDC DC     Z'8000'           INITIALIZE MSC, DO CLT ON 4 PORTS OF MSC
002943  11F4    4000                    STOPIO DC     Z'4000'           RESET BSY, RUPT IF FNB, STOP DMA (AFFECTS 1 P
002944                                  ********************************************************************
002945                                  * CHANNEL CONSTANTS
002946                                  *
002947  11F5    1200                    CHAN   DC     Z'1200'           DEFAULT CHAN ADDRESS
002948                                  *
002949  11F6    1209                    IOREAD DC     Z'1209'           IOLD READ
002950  11F7    1249                    IOWRIT DC     Z'1249'           IOLD WRITE
002951  11F8    120F                    OTOFRG DC     Z'120F'           OUTPUT OFFSET RANGE
002952                                  *
002953  11F9    1211                    OTCONF DC     Z'1211'           OUTPUT CONFIGURATION WORD 1
002954  11FA    1213                    OTCON2 DC     Z'1213'           OUTPUT CONFIGURATION WORD 2
002955  11FB    1201                    OTCONT DC     Z'1201'           OUTPUT CONTROL WORD
002956  11FC    1203                    OTRUPT DC     Z'1203'           OUTPUT INTERRUPT CONTROL
002957  11FD    1207                    OTTASK DC     Z'1207'           OUTPUT TASK WORD
002958                                  *
002959  11FE    1210                    INCONF DC     Z'1210'           INPUT CONFIGURATION WORD 1
002960  11FF    1212                    INCON2 DC     Z'1212'           INPUT CONFIGURATION WORD 2
002961  1200    123C                    INFWRV DC     Z'123C'           INPUT FIRMWARE REV
002962  1201    1226                    INIDEN DC     Z'1226'           INPUT ID CODE
002963  1202    120C                    INRANG DC     Z'120C'           INPUT RANGE
002964  1203    1202                    INRUPT DC     Z'1202'           INPUT INTERRUPT CONTROL
002965  1204    1218                    INSTW1 DC     Z'1218'           INPUT STATUS WORD 1
002966  1205    121A                    INSTW2 DC     Z'121A'           INPUT STATUS WORD 2
002967  1206    120A                    INMMA  DC     Z'120A'           INPUT MEMORY MODULE ADDRESS
002968  1207    1208                    INMBA  DC     Z'1208'           INPUT MEMORY BYTE ADDRESS
002969  1208    120E                    INOFRG DC     Z'120E'           INPUT OFFSET RANGE
002970  1209    1206                    INTASK DC     Z'1206'           INPUT TASK WORD
002971                                  *
002972          120A                    CHANZ  EQU    $                 END OF CHANNEL WORDS
002973                                  *
002974                                  ********************************************************************
002975                                  * LEVEL 5 INTERRUPT SAVE AREA (RTC LEVEL)
002976                                  *
002977  120A    0000                    SA5TL  RESV   $AF,0             TSA LINK
002978  120B    0000                    SA5DV  RESV   1,0               DEVICE
002979  120C    0000                    SA5M1  DC     0                 MASK 1
002980  120D    0000                    SA5M2  DC     0                 MASK 2
002981  120E    0000                    SA5P   RESV   $AF,0             P REG
002982  120F    4000                    SA5S   DC     Z'4000'           PRIV BIT
002983                                  *
002984                                  * LEVEL 10 INTERRUPT SAVE AREA (DEVICE INTERRUPT LVL, WHEN ENABLED)
002985                                  *
002986  1210    0000                    SA10TL RESV   $AF,0             TSA LINK
002987  1211    0000                    SA10DV RESV   1,0               DEVICE
002988  1212    0000                    SA10M1 DC     0                 MASK 1
002989  1213    0000                    SA10M2 DC     0                 MASK 2
002990  1214    0000                    SA10P  RESV   $AF,0             P REG
002991  1215    4000                    SA10S  DC     Z'4000'           PRIV BIT
002992                                  *
002993                                  * LEVEL 15 INTERRUPT SAVE AREA (NORMAL RUNNING LEVEL)
002994                                  *
002995  1216    0000                    SA15TL RESV   $AF,0             TSA LINK
002996  1217    0000                    SA15DV RESV   1,0               DEVICE
002997  1218    0000                    SA15M1 DC     0                 MASK 1
002998  1219    0000                    SA15M2 DC     0                 MASK 2
002999  121A    0000                    SA15P  RESV   $AF,0             P REG
003000  121B    4000                    SA15S  DC     Z'4000'           PRIV BIT
003001                                  ********************************************************************
003002                                  * TRAP SAVE AREA 1
003003                                  *
003004  121C    0000                    TSA1   RESV   $AF,0             TSA LINK
003005  121D    0000                    TSA1I  RESV   1,0               I REGISTER
003006  121E    0000                    TSA1R3 RESV   1,0               R3
003007  121F    0000                    TSA1F  RESV   1,0               F
003008  1220    0000                    TSA1Z  RESV   1,0               Z
003009  1221    0000                    TSA1EA RESV   $AF,0             EA
003010  1222    0000                    TSA1P  RESV   $AF,0             P
003011  1223    0000                    TSA1B3 RESV   $AF,0             B3
003012                                  *
003013                                  * TRAP SAVE AREA 2
003014                                  *
003015  1224    0000                    TSA2   RESV   $AF,0             TSA LINK
```

```
003016  1225  0000              TSA2I   RESV    1,0             I REGISTER
003017  1226  0000              TSA2R3  RESV    1,0             R3
003018  1227  0000              TSA2F   RESV    1,0             F
003019  1228  0000              TSA2Z   RESV    1,0             Z
003020  1229  0000              TSA2EA  RESV    $AF,0           EA
003021  122A  0000              TSA2P   RESV    $AF,0           P
003022  122B  0000              TSA2B3  RESV    $AF,0           B3
003023                          ********************************************************************************
003024  122C  0100                      END     SMDS2,<START
0000  ERR COUNT
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TITLE SMDS2,'REV C', STORAGE MODULE T&D, FEB 18, 1978

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503  $A      500B   504B   520B   537    540B   573B   611B   621B   624B   627B
             630B   650B   655B   662B   728B   750B   762B   779B   785B   835B
             840B   866B   897B   912B   936B   978B  1004B  1050B  1096B  1124B
            1172B  1177B  1199B  1209B  1247B  1270B  1333B  1364B  1416   1487B
            1527B  1561B  1619B  1652B  1686B  1700B  1716B  1728B  1734B  1776
            1832B  1867B  1884B  1898B  1923B  1968B  2025B  2109B  2129B  2134B
            2177B  2204B  2238B  2263B  2284B  2323B  2325B  2346B  2348B  2369B
            2395B  2450B  2497B  2536B  2549B  2572B  2600B  2627B  2672B  2684B
            2733B

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2571 $A
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2629 $A
2662 $A
2682 $A
2728 $A
2756 $A

     $AF     402    407C   413    417    429C   438C   524C   528C   562    581
             640    698   1241C  1372C  1442C  1495   1499   1519C  1669   1782
            1793   1821C  1957   1964   2082   2083   2084   2085   2086   2121
            2145   2160   2190   2214   2223   2245   2265   2273   2286   2291
            2335   2358   2377   2413   2429   2505C  2521   2542   2610   2613
            2648   2655   2688   2691   2759   2778   2804   2832   2833   2836
            2845   2867   2869   2977   2981   2986   2990   2995   2999   3004
            3009   3010   3011   3015   3020   3021   3022

583  $B      571B   609B   613B   760B   789B   795B   836B   847B   864B   879B
             886B   905B   946B   982B  1010B  1060B  1131B  1174B  1211B  1251B
            1309B  1368B  1382B  1491B  1542B  1573B  1662B  1694B  1730B  1777
            1829C  1872B  1902B  1928B  1972B  2137B  2185B  2236B  2240B  2259B
            2327B  2329B  2350B  2352B  2371B  2400B  2540B  2671B  2686B  2730B

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615  $B
644  $B
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2685  $B
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      $B1    426    427C   428    429C   435    436C   437    438C   464    466
             467    475    476C   477C   497    498C   511    512C   517    518C
             523    524C   525    526C   527    528C   1240   1241C  1371   1372C
            1441   1442C  1516   1519C  1676   1677C  1708   1709C  1820   1821C
            2195   2199   2202C  2208   2212   2436   2437C  2454   2455C  2502
            2503C  2504   2505C  2566   2567C  2763   2766   2767   2788   2797C
            2798C
      $B2    465    467    479    480C   1675   1692C  1693   1697   1699   1702C
            1727   1731   1733   1741   1742   1952   1953C  1959   1960C  2004
            2006   2196   2203C  2658   2662   2719   2728   2764   2767
      $B3   2659   2670C  2721   2729C
      $B4    398    399C   400    410    521   1665C
      $B5    411B   415B   450B   536B   556B   560B   564B   567B   574B   579B
             585B   587B   604B   638B   642B   646B   651B   656B   663B   665B
             677B   680B   692B   693B   696B   699B   704B   718B   719B   723B
             725B   729B   731B   735B   737B   739B   746B   751B   753B   755B
             758B   763B   769B   773B   777B   780B   782B   787B   790B   792B
             797B   799B   803B   807B   809B   811B   815B   817B   819B   821B
             825B   829B   831B   833B   837B   848B   850B   854B   856B   860B
             862B   867B   871B   873B   875B   877B   880B   882B   890B   892B
             894B   900B   902B   906B   909B   913B   916B   918B   929B   934B
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            1011B  1013B  1016B  1018B  1025B  1027B  1029B  1033B  1037B  1039B
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            1071B  1078B  1080B  1084B  1091B  1093B  1097B  1099B  1116B  1117B
            1119B  1121B  1126B  1128B  1132B  1136B  1140B  1143B  1145B  1149B
            1153B  1157B  1159B  1163B  1165B  1169B  1175B  1178B  1182B  1184B
            1186B  1190B  1192B  1194B  1196B  1200B  1202B  1204B  1214B  1216B
            1220B  1222B  1224B  1239B  1242B  1244B  1248B  1252B  1254B  1256B
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            1481B  1484B  1488B  1493B  1497B  1501B  1517B  1520B  1522B  1524B
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            1601B  1629B  1631B  1643B  1644B  1645B  1647B  1653B  1655B  1657B
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            1910B  1917B  1919B  1924B  1929B  1934B  1940B  1942B  1946B  1948B
            1950B  1954B  1961B  1969B  1973B  1975B  1977B  1981B  1983B  1985B
            1988B  1995B  1997B  2020B  2026B  2032B  2097C  2098B  2100B  2106B
            2110B  2112B  2114B  2116B  2118   2119B  2135   2138C  2141B  2142
            2143B  2153C  2154B  2157   2158B  2171   2172C  2178B  2186   2187B
            2189B  2213B  2216B  2219B  2228   2229C  2242   2243B  2254C  2264
            2265   2265   2266C  2267B  2269B  2270   2271B  2281C  2285   2286
            2286   2287C  2288   2289B  2303   2312B  2319C  2332   2333B  2342C
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            2410   2411B  2422C  2425B  2426   2427B  2476B  2482   2491   2492C
            2509B  2514   2515   2516C  2532C  2552   2554C  2566   2573B  2588
            2589C  2592B  2606   2610   2610   2611B  2634B  2640C  2643   2644B
            2673B  2680C  2687   2688   2688   2689B  2700B  2708B  2719   2720
            2721   2722   2734B  2740C  2745B  2749B  2753B  2756   2757B  2769B
            2773C  2775   2776B  2787C  2801   2802B
      $B6    408    409    414    522
      $B7    410    414   2212   2657C
587   $C     584B   761B   768B   806B   845B   865B   885B   915B   986B  1024B
            1036B  1070B  1139B  1181B  1264B  1310B  1384C  1450B  1538B  1581B
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            2162B  2218B  2234B  2261B  2331B  2354B  2373B  2397B  2609B  2667B
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1915  $G
1964  $G
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1409  $H
1917  $H
1216  $J        1213B
1222  $K        1219B
      $R1        418     419     442     443     444    445C    446C    447C    463     466
                 482     483    488C    493B     503     505    506C     552    553C     569
                 572     583     602    603C     607     608    609B     616    617B     618
                 620     622     623     625     626     628     629     631     632    634C
                 648     649     653     654     658     659     660     661     675    676C
                 678    679C     716    717C     765     766     767     958    959C    1073
                1076   1077C    1086    1089   1090C    1114   1115C    1237   1238C    1277
                1280   1281C    1282   1283C   1284C    1307   1310B   1312B    1331   1334C
                1335    1338   1339B    1353   1354C    1377    1378    1379    1383   1384C
                1438   1439C    1465   1466C    1515   1516C    1551    1553   1554C    1641
                1642C   1649    1650    1651   1652B    1659    1660    1661   1662B    1678
                1679C  1680C   1681C    1685    1687    1693    1727    1740    1743   1746C
                1747   1750C    1771   1772C    1810   1811C    1827   1828C   1829C    1830
                1833   1834C    1848    1851   1852C   1853C   1854C    1858    1859    1860
                1861C   1874    1875    1893    1894   1896C    1897    1900    1901    1911
                1912   1914     1915    1921    1922    1926    1927    1931    1932    1936
                1937   1938     1966    1967    1970    1971    1989    1990    1999   2000C
                2026   2029C    2030    2197    2199   2200C   2204B    2322   2323B    2324
                2326   2345    2346B    2347    2349    2368   2369B    2370    2464    2466
                2475B  2482    2483C    2568    2569    2570    2571   2603C    2604   2641C
                2660C  2662    2726C    2728   2731C    2744    2748    2752    2765    2766
                2792   2793    2800B
      $R2        448    449C     483     484     565    566C     572     583     644    645C
                 649     923     926    928C    1290    1373   1374C   1375C    1417   1418B
                1533   1534C    1589   1590B    1671    1693    1727    1742    1743   1751C
                1992   1993    2003C    2005    2006   2009C   2200C    2201   2202C   2203C
                2445C  2468    2469B    2506   2507C    2588    2608   2661C   2670C   2727C
                2729C  2793    2794C    2795   2796C
      $R3        392C    563     641     643    1672    1695    1729    1826   1828C    1857
                1861C  1909    1987    2391   2392C    2423    2663   2671B    2704    2706
                2789   2790
      $R4        689     690    691C    1682   1683C    1688    1733   2000C    2001   2002C
                2023B  2128C    2130   2131C    2132    2133    2135    2136    2169    2170
                2171   2173C    2199   2203C    2209   2210C    2217   2218B    2228    2230
                2231C   2256    2257    2258    2260    2304    2305   2306C    2307   2308C
                2389   2392C    2398    2399    2402    2403    2404    2423   2424C   2444C
                2462C  2470B    2474    2484    2491    2495    2498   2500C   2501C    2515
                2534   2535B    2593   2594C    2597    2598    2599    2620   2621C    2622
                2624   2625     2626    2630   2631C    2632    2655   2656C   2672B    2720
                2723C  2724C   2730B    2732C
      $R5        485C    486     488C    489     490     922     925     927C    936B    1118
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                1720   1721C    1729    1753    1754   1755C   2198C    2202C   2211   2215B
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                2681C  2684B    2722   2725C   2733B
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                1435C  1511C    1592    1593   1594C    1606    1608    1613    1615    1620
                1622   1625     1627    1699   1700B    1715   1750C    2005    2007    2303
                2309   2444C    2449   2450B    2548   2590C   2595C    2599   2600B    2626
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                2445C  2447     2448   2451C   2452C   2453C    2547   2591C    2596    2597
                2601C  2602C    2624   2628C   2629C    2662    2665   2724C   2732C    2790
                2791   2798C   2799C
2938  ARB
2936  ASB
2813  ASCBF     2015    2016    2018    2019
2812  AVETM     1422   1594C    1602   2633C
2815  BITL       551C     558     563     577    601C     606     607     636     641     660
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2429  CDCHBB    2422C   2426
2947  CHAN       462     463
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2816  CYAL      1283C   1307    1331    1465    1627    1927    2321    2322
2817  CYALMX    1281C   1335
2818  D=1       1171    1206    1376    2133    2394
2819  DEVID      488C
2930  DFMRW
2820  DRIVE     2424C   2765
2821  DRIVE0     483    2423
2822  DRIVE1
2823  DRIVE2
2824  DRIVE3
2931  DRWD
2825  DXFR      1828C   2392C   2704    2789
2826  DXRR      1861C   2706    2790
2827  ERFL       550C    600C    674C     694     715C    957C   1113C   1125    1138   1236C
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2828  FLAG       549C     570     599C    673C     714C    956C   1112C   1235C    1332    1337
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2719  FLBF      1666B   1954B   1961B
2928  FMRW      1874
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2118  FRRCB     2105B
2121  FRRCBB    2097C   2118
2116  FRRCC     2103B
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2342  GETTK
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2966  INSIW2    2696
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2949  IOREAD    464    1171   1206   1687   1897   1912   1990   2132   2763
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2831  IPFL      554    688    695    1490   1496   1500C  1718   1752   2176   2180
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2655  LNGASC    411B   415B   2213B
2838  LPCNT     1374C  1531   1532C  1533   2622
2839  LPCUR     1375C  1417   1534C  1589   2620
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2912  MSCHAN    461
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2894  MSEID     2034
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2885  MSILP     557    635
2878  MSIND     743
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2883  MSIND2    745
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2886  MSKTM     1423   1603
2887  MSLCT     1530
2888  MSLP      1492
2889  MSMRT     2438
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2895  MSPS1     1774
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2897  MSPS2     1778   1789
2917  MSRBUF    412
2915  MSREGS    2188
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2916  MSRSTR    535
2916  MSRTC     421
2921  MSSB      2017   2750
2898  MSSCNU    2366
2899  MSSTR     775    908    943
2920  MSTAG     2742
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2905  MSTE      2231C  2232
2906  MSTEF     2241
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2910  MSTMUF    2183
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2911  MSWORD    2011
2922  MSWRT     1813
2840  NULL      1962   2774
2954  OTCON2    2706
2953  OTCONF    2704
2955  OTCONT    519    2539   2685
2951  OTOFRG    1894
2956  OTRUPT    2571   2604
2957  OTTASK    1173   1208   1672   1875   1901   1915   1971   1993   2136   2399
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2740  PISBC     693B   2178B
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2929  RWD       1900   1970
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2845  SAVE-1    2168C   2195   2196   2208   2435C
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1348  T0603
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1444  T0604D    1498
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1535  T0700A
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1562  T0700C    1582B
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2166  !DER1    1132B   1136B   1399B   1407B
2208  !DER2    2190
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                896     898     904     911     920     931     939     963     967     973
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2849  !EMFB     1210    1352    1419    1437    1469C   1513    2015    2546    2551    2623
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2850  !EMFC     691C   1470C   1721C   1755C   2009C   2012   2210C    2217    2255    2256
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2852  !EST      553C    603C    676C    717C    959C   1115C   1238C   1354C   1439C   1516C
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2613  !IMDE5   1292C   2589C   2606
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2513  !IMLVS   2502
2521  !IMOTS   2492C   2514
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2853  !MFWD    1514    1572    1574C   1596
2855  !MLFA    2446
2856  !MLFB
2854  !MRLV    1583    1585C   1599
2857  !RAD     1854C   1856    1932    2028    2344    2345
2858  !RMX     1852C   2030
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3007  !SA1F
3005  !SA1I
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3008  !SA1Z
3015  !SA2
3022  !SA2B3
3020  !SA2EA
3018  !SA2F
3016  !SA2I
3021  !SA2P
3017  !SA2R3
3019  !SA2Z
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2646  VDTRA    2641C   2642
2648  VDTRB5   2640C   2643
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2860  VRBL2
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2861  WORSC    1955
2933  WRPAR
2862  ^-FFFF    565     644    1067
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          ZV$RD      393B
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          ZV$SV2     387
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   1 M FLAGS
 313 N FLAGS
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 CURRENT        1A62
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  ZHWDTC        0017
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  ZHSC-N        007D
  ZHTH2         007E
  ZHTRC         007E
  ZHTH1         007F
  ZHMCL         007F
  ZHISAZ        0080
  ZHIVBS        0080
  ZHTVBS        0080
  *ZV$I         122C   REV. 5.0
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  ZV$T          122C
  ZV$GC         1249
  ZV$G          123E
  *ZV$IH        125D
  ZV$ID         1262
  ZV$IH         125D
  ZV$IAD        1267
  ZV$--2        127F
  ZV$--3        1291
  *ZV$TH        12F6
  ZV$TH         12F6
  ZV$TD         1326
  ZV$THZ        131E
  *ZV$FR        1346
  ZV$FR         1346
  ZV$FI         1368
  ZV$FS         138B
  ZV$FRA        1398
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 ZV$FKA        1399
 ZV$FKK        135D
 ZV$FKD        139A
 ZV$FKM        1397
*ZV$IA         139D   REV. 6.0
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 ZV$AKG        1443
 ZV$ADF        1445
 ZV$--1        1408
 ZV$IAV        1471
*ZV$DRK        1475
 ZV$DRK        1475
*ZV$FCM        148F
 ZV$PCM        148F
*ZV$GP         1591
 ZV$GP         1591
 ZV$--4        15D1
*ZV$MA         15DD
 ZV$MZ         15C7
 ZV$MA         15DD
 ZV$MS         15C2
*ZV$MD         15F6
 ZV$MD         15F6
*ZV$MLW        1628   REV. 0
 ZV$MLW        1628
 ZV$MLR        1657
*ZV$EK         166F   REV. 5.0
 ZV$TA         169B
 ZV$EK         166F
 ZV$--0        1682
*ZV$KD         16DF   REV. 6.0
 ZV$KD         16DF
 ZV$LK         1709
 ZV$DKF        1705
 ZV$SV2        1863
 ZV$UTP        1784
 ZV$SV1        1853
 ZV$SV3        1873
 ZV$AF         16F0
 ZV$ITY        16F2
 ZV$TID        16F1
 ZV$CF2        16F9
 ZV$TK         16F5
 ZV$KAK        16F6
 ZV$ST1        16FA
 ZV$DUD        16F3
 ZV$CLD        16FD
 ZV$KCD        16FE
 ZV$KCC        16FB
 ZV$NSK        1702
 ZV$STK        1700
 ZV$DKS        1704
 ZV$IZ         1717
 ZV$MK         170C
 ZV$DAT        16EE
 ZV$MM         1753
 ZV$MKD        1706
 ZV$MKL        1707
 ZV$LKD        1708
 ZV$LKL        1709
 ZV$MBD        170A
 ZV$CF1        16F8
 ZV$--5        170F
 ZV$KMD        16EF
 ZV$MCP        170B
 HIBAUD        170A
 ZV$KAW        16F7
 ZV$KDT        18AF
 ZV$CTL        16F4
 ZV$B1         1822
 ZV$TST        18DF
 ZV$MDC        18C0
 ZV$K99        1A5D
 ZV$ISA        1712
 ZV$UIH        1700
 ZV$ZKD        1791
 ZV$DSM        1793
*UNLINK MODULE(S)
 ZV$ID
 ZV$HZ
 ZV$TM
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