```
000.000                 1  DEBUG   EQU     0                       ASSEMBLE FOR DEBUG
                        3  ***     SYDVD   - SY: Device Driver
                        4  *
                        5  *       SYDVD is the device driver for the SY: device,
                        6  *       the initial incarnation of which was the H-17.
                        7  *
                        8  *
                        9  *       Copyright Heath Co, 1980
                       10  *
                       11  *       G. C.                   80.06.GC
                       12  *
```

```
                        15  **      Assembly Constants
                        16  *
                        17
033.316                 18  R.SYDD  EQU     33316A          ROM device driver
                        19
000.003                 20  SYMNU   EQU     3               maximum number of units
                        21
000.017                 22  DEF.TDT EQU     30/2            Track Delay Time defaults to 30
```

```
000.000                 25          XTEXT   DDDEF


                        27X **      DEVICE DRIVER COMMUNICATION FLAGS.
                        28X *
                        29X
000.000                 30X         ORG     0
                        31X
000.000                 32X DC.REA  DS      1           READ
000.001                 33X DC.WRI  DS      1           WRITE
000.002                 34X DC.RER  DS      1           READ REGARDLESS
000.003                 35X DC.OPR  DS      1           OPEN FOR READ
000.004                 36X DC.OPW  DS      1           OPEN FOR WRITE
000.005                 37X DC.OPU  DS      1           OPEN FOR UPDATE
000.006                 38X DC.CLO  DS      1           CLOSE
000.007                 39X DC.ABT  DS      1           ABORT
000.010                 40X DC.MOU  DS      1           MOUNT DEVICE
000.011                 41X DC.LOD  DS      1           LOAD DEVICE DRIVER
000.012                 42X DC.RDY  DS      1           Device Ready                /80.04.GC/
000.013                 43X DC.MAX  DS      1           MAXIMUM ENTRY INDEX
000.014                 44          XTEXT   DEVDEF


                        46X **      DEVICE TABLE ENTRYS.
                        47X
000.000                 48X         ORG     0
                        49X
000.000                 50X DEV.NAM DS      2           DEVICE NAME
000.000                 51X DV.EL   EQU     00000000B   END OF DEVICE LIST FLAG
000.001                 52X DV.NU   EQU     00000001B   DEVICE ENTRY NOT IN USE
                        53X
000.002                 54X DEV.RES DS      1           DRIVER RESIDENSE CODE
000.001                 55X DR.IM   EQU     00000001B   DRIVER IN MEMORY
000.002                 56X DR.PR   EQU     00000010B   DRIVER PERMINANTLY RESIDENT
                        57X
000.003                 58X DEV.JMP DS      1           JMP TO PROCESSOR
000.004                 59X DEV.DDA DS      2           DRIVER ADDRESS
000.006                 60X DEV.FLG DS      1           FLAG BYTE
000.001                 61X DT.DD   EQU     00000001B   DIRECTORY DEVICE
000.002                 62X DT.CR   EQU     00000010B   CAPABLE OF READ OPERATION
000.004                 63X DT.CW   EQU     00000100B   CAPABLE OF WRITE OPERATION
000.010                 64X DT.RN   EQU     00001000B   Capable of random access    /80.02.sc/
000.020                 65X DT.CH   EQU     00010000B   Capable of Character mode   /80.02.sc/
                        66X
000.007                 67X DEV.MUM DS      1           MOUNTED UNIT MASK
000.010                 68X DEV.MNU DS      1           MAXIMUM NUMBER OF UNITS
000.011                 69X DEV.UNT DS      2           ADDRESS OF UNIT SPECIFIC DATA TABLE
                        70X
000.013                 71X DEV.DVL DS      2           DRIVER BYTE LENGTH
000.015                 72X DEV.DVG DS      1           DRIVER ROUTINE GROUP ADDRESS
                        73X
000.016                 74X DEVELEN EQU     *           DEVICE TABLE ENTRY LENGTH
```

```
                        76X **      UNIT SPECIFIC DEVICE DATA TABLE ENTRIES
                        77X
000.000                 78X         ORG     0
                        79X
000.000                 80X UNT.FLG DS      1           UNIT SPECIFIC *DEV.FLG*
000.001                 81X UNT.SPG DS      1           Sectors Per Group               /80.04.GC/
000.002                 82X UNT.GRT DS      2           ADDRESS OF GROUP RESERVATION TABLE (IF DT.DD)
000.004                 83X UNT.GTS DS      2           GRT SECTOR NUMBER
000.006                 84X UNT.DIS DS      2           DIRECTORY FIRST SECTOR NUMBER
                        85X
000.010                 86X UNT.SIZ EQU     *           SIZE OF UNIT SPECIFIC DATA TABLE PER UNIT
000.010                 87          XTEXT   DIRDEF


                        89X **      DIRECTORY ENTRY FORMAT.
                        90X
000.000                 91X         ORG     0
                        92X
                        93X
000.377                 94X DF.EMP  EQU     377Q        FLAGS ENTRY EMPTY
000.376                 95X DF.CLR  EQU     376Q        FLAGS ENTRY EMPTY, REST OF DIR ALSO CLEAR
                        96X
000.000                 97X DIR.NAM DS      8           NAME
000.010                 98X DIR.EXT DS      3           EXTENSION
000.013                 99X DIR.PRO DS      1           PROJECT
000.014                100X DIR.VER DS      1           VERSION
000.015                101X DIRIDL  EQU     *           FILE IDENTIFICATION LENGTH
                       102X
000.015                103X DIR.CLU DS      1           CLUSTER FACTOR
000.016                104X DIR.FLG DS      1           FLAGS
000.017                105X         DS      1           RESERVED
000.020                106X DIR.FGN DS      1           FIRST GROUP NUMBER
000.021                107X DIR.LGN DS      1           LAST GROUP NUMBER
000.022                108X DIR.LSI DS      1           LAST SECTOR INDEX (IN LAST GROUP)
000.023                109X DIR.CRD DS      2           CREATION DATE
000.025                110X DIR.ALD DS      2           LAST ALTERATION DATE
                       111X
000.027                112X DIRELEN EQU     *           DIRECTORY ENTRY LENGTH
000.027                113          XTEXT   H17DEF


                       115X **      H17 CONTROL INFORMATION.
                       116X
000.177                117X DF.DC   EQU     07FH        DISK CONTROL PORT
                       118X
000.001                119X DF.HD   EQU     00000001B   HOLE DETECT
000.002                120X DF.T0   EQU     00000010B   TRACK 0 DETECT
000.004                121X DF.WP   EQU     00000100B   WRITE PROTECT
000.010                122X DF.SD   EQU     00001000B   SYNC DETECT
                       123X
000.001                124X DF.WG   EQU     00000001B   WRITE GATE ENABLE
000.002                125X DF.DS0  EQU     00000010B   DRIVE SELECT 0
000.004                126X DF.DS1  EQU     00000100B   DRIVE SELECT 1
000.010                127X DF.DS2  EQU     00001000B   DRIVE SELECT 2
```

```
000.020                 128X DF.MO   EQU     00010000B       MOTOR ON (BOTH DRIVES)
000.040                 129X DF.DI   EQU     00100000B       DIRECTION (0=OUT)
000.100                 130X DF.ST   EQU     01000000B       STEP COMMAND (ACTIVE HIGH)
000.200                 131X DF.WR   EQU     10000000B       WRITE ENABLE RAM
                        132X
                        133X
                        134X
                        135X *       Drives other than Wansco's need a delay after write before step
                        136X
000.173                 137X H17SDL  EQU     900/15*1024/500+1       H17 step delay, 900 mic sec /80.06.sc/
                        138X *                                         = 900/15*2.048
                        139X
                        140X
                        141X
                        142X **      DISK UART PORTS AND CONTROL FLAGS.
                        143X
000.174                 144X UP.DP   EQU     07CH            DATA PORT
000.175                 145X UP.FC   EQU     07DH            FILL CHARACTER
000.175                 146X UP.ST   EQU     07DH            STATUS FLAGS
000.176                 147X UP.SC   EQU     07EH            SYN CHARACTER (OUTPUT)
000.176                 148X UP.SR   EQU     07EH            SYNC RESET (INPUT)
                        149X
000.001                 150X UF.RDA  EQU     00000001B       RECEIVE DATA AVAILABLE
000.002                 151X UF.ROR  EQU     00000010B       RECEIVER OVERRUN
000.004                 152X UF.RPE  EQU     00000100B       RECEIVER PARITY ERROR
000.100                 153X UF.FCT  EQU     01000000B       FILL CHAR TRANSMITTED
000.200                 154X UF.TBM  EQU     10000000B       TRANSMITTER BUFFER EMPTY
                        155X
                        156X
                        157X
                        158X **      CHARACTER DEFINITIONS.
                        159X
000.375                 160X C.DSYN  EQU     0FDH            PREFIX SYNC CHARACTER
000.027                 161          XTEXT   HDSROM


                        163X **      HDOS H17 ROM ENTRY POINTS.
031.253                 164X         ORG     31253A
                        165X *DWRITE EQU     *               Obsolete        /80.04.sc/
031.253                 166X         DS      31256A-31253A
                        167X *DREAD  EQU     *               Obsolete        /80.04.sc/
031.256                 168X         DS      31275A-31256A
031.275                 169X S.READ  EQU     *
031.275                 170X         DS      31321A-31266A
031.330                 171X S.WRITE EQU     *
031.330                 172X         DS      31325A-31311A
031.344                 173X ERR.FNO EQU     *
031.344                 174X         DS      31331A-31325A
031.350                 175X ERR.ILR EQU     *
031.350                 176X         DS      31335A-31331A
031.354                 177X CFF     EQU     *
031.354                 178X         DS      31363A-31335A
032.002                 179X DCA     EQU     *
032.002                 180X         DS      32114A-31363A
032.133                 181X FFB     EQU     *
```

```
032.133                 182X            DS      32166A-32114A
032.205                 183X FFL        EQU     *
032.205                 184X            DS      32204A-32166A
                        185X *LDD       EQU     *
032.223                 186X            DS      32372A-32204A+1
033.012                 187X LDO        EQU     *
033.012                 188X            DS      33135A-33002A
033.145                 189X PDI        EQU     *
033.145                 190X            DS      33154A-33124A
033.175                 191X REL.       EQU     *
033.175                 192X            DS      33156A-33154A
033.177                 193X REL        EQU     *
033.177                 194X            DS      33212A-33156A
033.233                 195X TFE        EQU     *
033.233                 196X            DS      33232A-33206A
033.257                 197X RUC        EQU     *
                        198X
037.132                 199X BOOTA      EQU     37132A          Boot Vectors                    /80.06.sc/
000.130                 200X BOOTAL     EQU     00130A          Length of boot vectors          /80.06.sc/
                        201X
034.031                 202X CLOCK      EQU     34031A          Clock vector                    /80.06.GC/
033.257                 203             XTEXT   PICDEF


                        205X **         PIC FORMAT EQUIVALENCES.
                        206X
000.000                 207X            ORG     0
                        208X
000.000                 209X PIC.ID     DS      1               377Q = BINARY FILE FLAG
000.001                 210X            DS      1               FILE TYPE (FT.PIC)
000.002                 211X PIC.LEN    DS      2               LENGTH OF ENTIRE RECORD
000.004                 212X PIC.PTR    DS      2               INDEX OF START OF PIC TABLE
                        213X
000.006                 214X PIC.COD    DS      0               CODE STARTS HERE
000.006                 215             XTEXT   DVDDEF


                        217X **         DEVICE DRIVER EQUIVALENCES.
                        218X
000.307                 219X DVDFLV     EQU     307Q            DEVICE DRIVER FLAG VALUE
                        220X
000.006                 221X            ORG     PIC.COD         STARTS AT PIC CODE AREA
                        222X
000.006                 223X DVD.DVD    DS      1               MUST BE DVDFLV, FLAGS TO HDOS AS DRIVER
000.007                 224X DVD.CAP    DS      1               DEVICE CAPABILITY FLAG
000.010                 225X DVD.MUM    DS      1               MOUNTED UNIT MASK
000.011                 226X DVD.MNU    DS      1               MAXIMUM NUMBER OF UNITS
000.012                 227X DVD.UFL    DS      8               UNIT SUB-CAPABILITY FLAGS FOR UNITS 0-7
000.022                 228X DVD.SET    DS      1               = DVDFLV IFF DRIVER WILL TAKE SET OPTIONS
000.023                 229X DVD.INP    DS      2               Pointer to Init Code            /80.07.sc/
000.025                 230X            DS      22              RESERVED, MUST BE 0             /80.07.sc/
000.053                 231X DVD.STE    EQU     *               ENTRY FOR 'SET' INVOCATION
                        232X
```

```
002.000                 233X DVD.ENT EQU     2000A          DRIVER ENTRY POINT (MUST BE MULT OF 256)
000.053                 234          XTEXT   ECDEF


                        236X **      ERROR CODE DEFINITIONS.
                        237X
000.000                 238X         ORG     0
000.000                 239X         DS      1              NO ERROR #0
000.001                 240X EC.EOF  DS      1              END OF FILE
000.002                 241X EC.EOM  DS      1              END OF MEDIA
000.003                 242X EC.ILC  DS      1              ILLEGAL SYSCALL CODE
000.004                 243X EC.CNA  DS      1              CHANNEL NOT AVAILABLE
000.005                 244X EC.DNS  DS      1              DEVICE NOT SUITABLE
000.006                 245X EC.IDN  DS      1              ILLEGAL DEVICE NAME
000.007                 246X EC.IFN  DS      1              ILLEGAL FILE NAME
000.010                 247X EC.NRD  DS      1              NO ROOM FOR DEVICE DRIVER
000.011                 248X EC.FNO  DS      1              CHANNEL NOT OPEN
000.012                 249X EC.ILR  DS      1              ILLEGAL REQUEST
000.013                 250X EC.FUC  DS      1              FILE USAGE CONFLICT
000.014                 251X EC.FNF  DS      1              FILE NAME NOT FOUND
000.015                 252X EC.UND  DS      1              UNKNOWN DEVICE
000.016                 253X EC.ICN  DS      1              ILLEGAL CHANNEL NUMBER
000.017                 254X EC.DIF  DS      1              DIRECTORY FULL
000.020                 255X EC.IFC  DS      1              ILLEGAL FILE CONTENTS
000.021                 256X EC.NEM  DS      1              NOT ENOUGH MEMORY
000.022                 257X EC.RF   DS      1              READ FAILURE
000.023                 258X EC.WF   DS      1              WRITE FAILURE
000.024                 259X EC.WPV  DS      1              WRITE PROTECTION VIOLATION
000.025                 260X EC.WP   DS      1              DISK WRITE PROTECTED
000.026                 261X EC.FAP  DS      1              FILE ALREADY PRESENT
000.027                 262X EC.DDA  DS      1              DEVICE DRIVER ABORT
000.030                 263X EC.FL   DS      1              FILE LOCKED
000.031                 264X EC.FAO  DS      1              FILE ALREADY OPEN
000.032                 265X EC.IS   DS      1              ILLEGAL SWITCH
000.033                 266X EC.UUN  DS      1              UNKNOWN UNIT NUMBER
000.034                 267X EC.FNR  DS      1              FILE NAME REQUIRED
000.035                 268X EC.DIW  DS      1              DEVICE IS NOT WRITABLE (OR WRITE LOCKED)
000.036                 269X EC.UNA  DS      1              UNIT NOT AVAILABLE
000.037                 270X EC.ILV  DS      1              ILLEGAL VALUE
000.040                 271X EC.ILO  DS      1              ILLEGAL OPTION
000.041                 272X EC.VPM  DS      1              VOLUME PRESENTLY MOUNTED ON DEVICE
000.042                 273X EC.NVM  DS      1              NO VOLUME PRESENTLY MOUNTED
000.043                 274X EC.FOD  DS      1              FILE OPEN ON DEVICE
000.044                 275X EC.NPM  DS      1              NO PROVISIONS MADE FOR REMOUNTING MORE DISKS
000.045                 276X EC.DNI  DS      1              DISK NOT INITIALIZED
000.046                 277X EC.DNR  DS      1              DISK IS NOT READABLE
000.047                 278X EC.DSC  DS      1              DISK STRUCTURE IS CORRUPT
000.050                 279X EC.NCV  DS      1              NOT CORRECT VERSION OF HDOS
000.051                 280X EC.NOS  DS      1              NO OPERATING SYSTEM MOUNTED
000.052                 281X EC.IOI  DS      1              ILLEGAL OVERLAY INDEX
000.053                 282X EC.OTL  DS      1              OVERLAY TO LARGE
                        283
000.054                 284          XTEXT   HOSEQU
```

```
                    286X **     HDOS SYSTEM EQUIVALENCES.
                    287X *
                    288X
024.000             289X S.GRT0 EQU     24000A          SYSTEM AREA FOR  GRT0
025.000             290X S.GRT1 EQU     25000A          SYSTEM AREA FOR  GRT1
026.000             291X S.GRT2 EQU     26000A          SYSTEM AREA FOR  GRT2
                    292X
030.000             293X ROMBOOT EQU    30000A          ROM BOOT ENTRY
                    294X
040.100             295X        ORG     40100A          FREE SPACE FROM PAM-8
                    296X
040.100             297X        DS      8               JUMP TO SYSTEM EXIT
040.110             298X D.CON  DS      16              DISK CONSTANTS
040.130             299X SYDD   EQU     *               SYSTEM DISK ENTRY POINT
040.130             300X D.VEC  DS      24*3            SYSTEM ROM ENTRY VECTORS
040.240             301X D.RAM  DS      31              SYSTEM ROM WORK AREA
040.277             302X S.VAL  DS      36              SYSTEM VALUES
040.343             303X S.INT  DS      115             SYSTEM INTERNAL WORK AREAS
041.126             304X        DS      16
041.146             305X S.SOVR DS      2               STACK OVERFLOW WARNING
041.150             306X        DS      42200A-*        SYSTEM STACK
001.032             307X STACKL EQU     *-S.SOVR        STACK SIZE
                    308X
042.200             309X STACK  EQU     *               LWA+1 SYSTEM STACK
042.200             310X USERFWA EQU    *               USER FWA
042.200             311         XTEXT   EDCON


                    313X **     D.CON DETAILED EQUIVALENCES.
                    314X *
                    315X *      HOSEQU MUST BE MODIFIED WHEN THIS TABLE IS MODIFIED.
                    316X
040.110             317X        ORG     D.CON
                    318X
040.110             319X D.XITA DS      2               SEE SYSTEM ROM FOR DESCRIPTION
040.112             320X D.WRITA DS     1
040.113             321X D.WRITB DS     1
040.114             322X D.WRITC DS     1
040.115             323X D.MAIA DS      1
040.116             324X D.LPSA DS      1
040.117             325X D.SDPA DS      1
040.120             326X D.SDPB DS      1
040.121             327X D.STSA DS      1
040.122             328X D.STSB DS      1
040.123             329X D.WHDA DS      1
040.124             330X D.WNHA DS      1
040.125             331X D.WSCA DS      1
                    332X
040.126             333X D.ERTS DS      2               TRACK AND SECTOR OF LAST DISK ERRORS
040.130             334         XTEXT   EDRAM
```

```
                    336X **     EDRAM - DISK RAM WORKAREA DEFINITION.
                    337X *
                    338X *     ZEROED UPON BOOTING UP.
                    339X *
                    340X *     HOSEQU MUST BE CHANGED WHEN THIS DECK IS CHANGED.
                    341X
                    342X
    040.240         343X       ORG     D.RAM
                    344X
    040.240         345X D.TT  DS      1           TARGET TRACK (CURRENT OPERATION)
    040.241         346X D.TS  DS      1           TARGET SECTOR (CURRENT OPERATION)
                    347X
    040.242         348X D.DVCTL DS    1           DEVICE CONTROL BYTE
                    349X
    040.243         350X D.DLYMO DS    1           MOTOR ON DELAY COUNT
    040.244         351X D.DLYHS DS    1           HEAD SETTLE DELAY COUNTER
                    352X
    040.245         353X D.TRKPT DS    2           ADDRESS IN D.DRVTB FOR TRACK NUMBER
    040.247         354X D.VOLPT DS    2           ADDRESS IN D.DRVTB FOR VOLUME NUMBER
                    355X
    040.251         356X D.DRVTB DS    2*4         TRACK NUMBER AND VOLUME NUMBER FOR 4 DRIVES
                    357X
    040.261         358X D.HECNT DS    1           HARD ERROR COUNT
    040.262         359X D.SECNT DS    2           SOFT ERROR COUNT
    040.264         360X D.OECNT DS    1           OPERATION ERROR COUNT
                    361X
                    362X *     GLOBAL DISK ERROR COUNTERS
                    363X
    040.265         364X D.ERR DS      0           BEGINNING OF ERROR BLOCK
    040.265         365X D.E.MDS DS    1           MISSING DATA SYNC
    040.266         366X D.E.HSY DS    1           MISSING HEADER SYNC
    040.267         367X D.E.CHK DS    1           DATA CHECKSUM
    040.270         368X D.E.HCK DS    1           HEADER CHECKSUM
    040.271         369X D.E.VOL DS    1           WRONG VOLUME NUMBER
    040.272         370X D.E.TRK DS    1           BAD TRACK SEEK
    040.273         371X D.ERRL DS     0           LIMIT OF ERROR COUNTERS
                    372X
                    373X *     I/O OPERATION COUNTS
                    374X
    040.273         375X D.OPR DS      2
    040.275         376X D.OPW DS      2
                    377X
    000.037         378X D.RAML EQU    *-D.RAM
    040.277         379        XTEXT   EDVEC


                    381X **    JMP VECTORS FOR ROM CODE
                    382X *
                    383X *     SEE DISK ROM FOR ADDRESSES
                    384X *
                    385X *     HOSEQU MUST BE ALTERED WHEN THIS TABLE IS ALTERED.
                    386X
    040.130         387X       ORG     D.VEC
                    388X
```

```
040.130              389X D.SYDD  DS      3              JMP  R.SYDD (MUST BE FIRST)
040.133              390X D.MOUNT DS      3              JMP  R.MOUNT
040.136              391X D.XOK   DS      3              JMP  R.XOK
040.141              392X D.ABORT DS      3              JMP  R.ABORT
040.144              393X D.XIT   DS      3              JMP  R.XIT
040.147              394X D.READ  DS      3              JMP  R.READ
040.152              395X D.READR DS      3              JMP  R.READR
040.155              396X D.WRITE DS      3              JMP  R.WRITE
040.160              397X D.CDE   DS      3              JMP  R.CDE
040.163              398X D.DTS   DS      3              JMP  R.DTS
040.166              399X D.SDT   DS      3              JMP  R.SDT
040.171              400X D.MAI   DS      3              JMP  R.MAI
040.174              401X D.MAO   DS      3              JMP  R.MAO
040.177              402X D.LPS   DS      3              JMP  R.LPS
040.202              403X D.RDB   DS      3              JMP  R.RDB
040.205              404X D.SDP   DS      3              JMP  R.SDP
040.210              405X D.STS   DS      3              JMP  R.STS
040.213              406X D.STZ   DS      3              JMP  R.STZ
040.216              407X D.UDLY  DS      3              JMP  R.UDLY
040.221              408X D.WSC   DS      3              JMP  R.WSC
040.224              409X D.WSP   DS      3              JMP  R.WSP
040.227              410X D.WNB   DS      3              JMP  R.WNB
040.232              411X D.ERRT  DS      3              JMP  R.ERRT
040.235              412X D.DLY   DS      3              JMP  R.DLY
040.240              413          XTEXT   ESINT


                     415X **      S.INT - SYSTEM INTERNAL WORKAREA DEFINITIONS.
                     416X *
                     417X *       THESE CELLS ARE REFERENCED BY OVERLAYS AND MAIN CODE, AND
                     418X *       MUST THEREFORE RESIDE IN FIXED LOW MEMORY.
                     419X
                     420X
040.343              421X         ORG     S.INT
                     422X
                     423X **      CONSOLE STATUS FLAGS
                     424X
040.343              425X S.CDB   DS      1              CONSOLE DESCRIPTOR BYTE
000.000              426X CDB.H85 EQU     00000000B
000.001              427X CDB.H84 EQU     00000001B      =0 IF H8-5, =1 IF H8-4
040.344              428X S.BAUD  DS      2              [0-14]  H8-4 BAUD RATE, =0 IF H8-5
                     429X *                              [15]    =1 IF BAUD RATE => 2 STOP BITS
                     430X
                     431X **      TABLE ADDRESS WORDS
                     432X
040.346              433X S.DLINK DS      2              ADDRESS OF DATA IN HDOS CODE
040.350              434X S.OFWA  DS      2              FWA  OVERLAY  TABLE
040.352              435X S.CFWA  DS      2              FWA  CHANNEL  TABLE
040.354              436X S.DFWA  DS      2              FWA  DEVICE   TABLE
040.356              437X S.RFWA  DS      2              FWA  RESIDENT HDOS CODE
                     438X
                     439X **      DEVICE DRIVER DELAYED LOAD FLAGS
                     440X
040.360              441X S.DDLDA DS      2              DRIVER LOAD ADDRESS (HIGH BYTE=0 IF NO LOAD PENDING)
```

```
040.362          442X S.DDLEN DS      2              CODE LENGTH IN BYTES
040.364          443X S.DDGRP DS      1              GROUP NUMBER FOR DRIVER
040.365          444X         DS      1              HOLD PLACE
                 445X *S.DDSEC        DS      2              SECTOR NUMBER FOR DRIVER ( * OBSOLETE ! * )
040.366          446X S.DDDTA DS      2              DEVICE'S ADDRESS IN DEVLST +DEV.RES
040.370          447X S.DDOPC DS      1              OPEN OPCODE PENDEDING
                 448X
                 449X **      OVERLAY MANAGEMENT FLAGS
                 450X
000.001          451X OVL.IN  EQU     00000001B      IN MEMORY
000.002          452X OVL.RES EQU     00000010B      PERMINANTLY RESIDENT
000.014          453X OVL.NUM EQU     00001100B      OVERLAY NUMBER MASK
000.200          454X OVL.UCS EQU     10000000B      USER CODE SWAPPED FOR OVERLAY
                 455X
040.371          456X S.OVLFL DS      1              OVERLAY FLAG
040.372          457X S.UCSF  DS      2              FWA SWAPPED USER CODE
040.374          458X S.UCSL  DS      2              LENGTH SWAPPED USER CODE
040.376          459X S.OVLS  DS      2              SIZE OF OVERLAY CODE
041.000          460X S.OVLE  DS      2              ENTRY POINT OF OVERLAY CODE
                 461X
041.002          462X S.SSN   DS      2              SWAP AREA SECTOR NUMBER
041.004          463X S.OSN   DS      2              OVERLAY SECTOR NUMBER
                 464X
                 465X *       SYSCALL PROCESSING WORK AREAS
                 466X
041.006          467X S.CACC  DS      1              (ACC) UPON SYSCALL
041.007          468X S.CODE  DS      1              SYSCALL INDEX IN PROGRESS
                 469X
                 470X *       JUMPS TO ROUTINES IN RESIDENT HDOS CODE
                 471X
041.010          472X S.JUMPS DS      0              START OF DUMP VECTORS
041.010          473X S.SDD   DS      3              JUMP TO STAND-IN DEVICE DRIVER
041.013          474X S.FASER DS      3              JUMP TO FATSERR (FATAL SYSTEM ERROR)
041.016          475X S.DIREA DS      3              JUMP TO DIREAD (DISK FILE READ)
041.021          476X S.FCI   DS      3              JUMP TO FCI (FETCH CHANNEL INFO)
041.024          477X S.SCI   DS      3              JUMP TO SCI (STORE CHANNEL INFO)
041.027          478X S.GUP   DS      3              JUMP TO GUP (GET UNIT POINTER)
                 479X
041.032          480X S.MOUNT DS      1              <>0 IF THE SYSTEM DISK IS MOUNTED
041.033          481X S.DCS   DS      1              DEFAULT CLUSTER SIZE-1
                 482X
041.034          483X S.BOOTF DS      1              BOOT FLAGS
000.001          484X BOOT.P  EQU     00000001B      EXECUTE PROLOGUE UPON BOOTUP
                 485X
                 486X *       STACK VALUE SAVED FOR OVERLAY SYSCALLS
                 487X
041.035          488X S.OVSTK DS      2              VALUE OF SP UPON SYSCALLS USING OVERLAY
                 489X
041.037          490X         DS      1              RESERVED
```

```
                        492X **      ACTIVE I/O AREA.
                        493X *
                        494X *       THE AIO.XXX AREA CONTAINS INFORMATION ABOUT THE I/O OPERATION
                        495X *       CURRENTLY BEING PERFORMED. THE INFORMATION IS OBTAINED FROM
                        496X *       THE CHANNEL TABLE, AND WILL BE RESTORED THERE WHEN DONE.
                        497X *
                        498X *       NORMALLY, THE AIO.XXX INFORMATION WOULD BE OBTAINED DIRECTLY
                        499X *       FROM VARIOUS SYSTEM TABLES VIA POINTER REGISTERS. SINCE THE
                        500X *       8080 HAS NO GOOD INDEXED ADDRESSING, THE DATA IS MANUALLY
                        501X *       COPIED INTO THE AIO.XXX CELLS BEFORE PROCESSING, AND
                        502X *       BACKDATED AFTER PROCESSING.
                        503X
041.040                 504X AIO.VEC DS      3              JUMP INSTRUCTION
041.041                 505X AIO.DDA EQU     *-2            DEVICE DRIVER ADDRESS
041.043                 506X AIO.FLG DS      1              FLAG BYTE
041.044                 507X AIO.GRT DS      2              ADDRESS OF GROUP RESERV TABLE
041.046                 508X AIO.SPG DS      1              SECTORS PER GROUP
041.047                 509X AIO.CGN DS      1              CURRENT GROUP NUMBER
041.050                 510X AIO.CSI DS      1              CURRENT SECTOR INDEX
041.051                 511X AIO.LGN DS      1              LAST GROUP NUMBER
041.052                 512X AIO.LSI DS      1              LAST SECTOR INDEX
041.053                 513X AIO.DTA DS      2              DEVICE TABLE ADDRESS
041.055                 514X AIO.DES DS      2              DIRECTORY SECTOR
041.057                 515X AIO.DEV DS      2              DEVICE CODE
041.061                 516X AIO.UNI DS      1              UNIT NUMBER (0-9)
                        517X
041.062                 518X AIO.DIR DS      DIRELEN        DIRECTORY ENTRY
                        519X
041.111                 520X AIO.CNT DS      1              SECTOR COUNT
041.112                 521X AIO.EOM DS      1              END OF MEDIA FLAG
041.113                 522X AIO.EOF DS      1              END OF FILE FLAG
041.114                 523X AIO.TFP DS      2              TEMP FILE POINTERS
041.116                 524X AIO.CHA DS      2              ADDRESS OF CHANNEL BLOCK (IOC.DDA)


041.120                 526X S.BDA   DS      1              Boot Device Address (Setup by ROM) /80.09.sc/
041.121                 527X S.SCR   DS      2              SYSTEM SCRATCH AREA ADDRESS
041.123                 528          XTEXT   ESVAL


                        530X **      S.VAL - SYSTEM VALUE DEFINTIONS.
                        531X *
                        532X *       THESE VALUES ARE SET AND MAINTAINED BY THE SYSTEM.
                        533X *
                        534X *       THE DECK HOSEQU MUST BE MODIFIED WHEN THIS IS MODIFIED.
                        535X
                        536X
040.277                 537X         ORG     S.VAL
                        538X
040.277                 539X S.DATE  DS      9              SYSTEM DATE (IN ASCII)
040.310                 540X S.DATC  DS      2              CODED DATE
040.312                 541X S.TIME  DS      4              TIME FROM MIDNIGHT (IN TICS)
```

```
040.316                 542X S.HIMEM DS      2               HARDWARE HIGH MEMORY ADRESS+1
                        543X
040.320                 544X S.SYSM  DS      2               FWA RESIDENT SYSTEM
                        545X
040.322                 546X S.USRM  DS      2               LWA USER MEMORY
                        547X
040.324                 548X S.OMAX  DS      2               MAX OVERLAY SIZE FOR SYSTEM
                        549X
                        550X
                        551X **      THE FOLLOWING FIVE CELLS SHOULD BE MODIFIED/READ ONLY VIA THE .CONSL SYSCALL
                        552X
000.200                 553X CSL.ECH EQU     10000000B       SUPPRESS ECHO
000.004                 554X CSL.RAW EQU     00000100B       Raw Mode I/O                    /80.09.sc/
000.002                 555X CSL.WRP EQU     00000010B       WRAP LINES AT WIDTH
000.001                 556X CSL.CHR EQU     00000001B       OPERATE IN CHARACTER MODE
                        557X
000.000                 558X I.CSLMD EQU     0               S.CSLMD IS FIRST BYTE
040.326                 559X S.CSLMD DS      1               CONSOLE MODE
                        560X
000.200                 561X CTP.BKS EQU     10000000B       TERMINAL PROCESSES BACKSPACES
000.100                 562X CTP.FF  EQU     01000000B       Terminal Processes Form-Feed    /80.09.sc/
000.040                 563X CTP.MLI EQU     00100000B       MAP LOWER CASE TO UPPER ON INPUT
000.020                 564X CTP.MLO EQU     00010000B       MAP LOWER CASE TO UPPER ON OUTPUT
000.010                 565X CTP.2SB EQU     00001000B       TERMINAL NEEDS TWO STOP BITS
000.002                 566X CTP.BKM EQU     00000010B       MAP BKSP (UPON INPUT) TO RUBOUT
000.001                 567X CTP.TAB EQU     00000001B       TERMINAL SUPPORTS TAB CHARACTERS
                        568X
000.001                 569X I.CONTY EQU     1               S.CONTY IS 2ND BYTE
000.000                 570X         ERRNZ   *-S.CSLMD-I.CONTY
040.327                 571X S.CONTY DS      1               CONSOLE TYPE FLAGS
000.002                 572X I.CUSOR EQU     2               S.CUSOR IS 3RD BYTE
000.000                 573X         ERRNZ   *-S.CSLMD-I.CUSOR
040.330                 574X S.CUSOR DS      1               CURRENT CURSOR POSITION
000.003                 575X I.CONWI EQU     3               S.CONWI IS 4TH BYTE
000.000                 576X         ERRNZ   *-S.CSLMD-I.CONWI
040.331                 577X S.CONWI DS      1               CONSOLE WIDTH
                        578X
000.001                 579X CO.FLG  EQU     00000001B       CTL-O FLAG
000.200                 580X CS.FLG  EQU     10000000B       CTL-S FLAG
                        581X
000.004                 582X I.CONFL EQU     4               S.CONFL IS 5TH BYTE
000.000                 583X         ERRNZ   *-S.CSLMD-I.CONFL
040.332                 584X S.CONFL DS      1               CONSOLE FLAGS
                        585X
040.333                 586X S.CAADR DS      2               ADDRESS FOR ABORT PROCESSING (>256 IF VALID)
040.335                 587X S.CCTAB DS      6               ADDR FOR CTL-A, CTL-B, CTL-C PROCESSING
                        588
040.343                 589          XTEXT   ASCII
```

```
                        591X **     ASCII CHARACTER EQUIVALENCES.
                        592X
000.015                 593X CR     EQU   13          CARRIAGE RETURN
000.012                 594X LF     EQU   10          LINE FEED
000.200                 595X NULL   EQU   200Q        PAD CHARACTER
000.000                 596X NUL2   EQU   0
000.007                 597X BELL   EQU   7           BELL CHARACTER
000.177                 598X RUBOUT EQU   177Q
000.010                 599X BKSP   EQU   10Q         CTL-H
000.026                 600X C.SYN  EQU   26Q         SYNC
000.002                 601X C.STX  EQU   2           STX
000.047                 602X QUOTE  EQU   47Q
000.011                 603X TAB    EQU   11Q
000.033                 604X ESC    EQU   33Q
000.012                 605X NL     EQU   12Q         NEW LINE (HDOS SYSTEMS)
000.212                 606X ENL    EQU   NL+200Q     NL + END-OF-LINE-FLAG
000.014                 607X FF     EQU   14Q         FORM FEED
000.001                 608X CTLA   EQU   01Q         CTL-A
000.002                 609X CTLB   EQU   02Q         CTL-B
000.003                 610X CTLC   EQU   03Q         CTL-C
000.004                 611X CTLD   EQU   04Q         CTL-D
000.017                 612X CTLO   EQU   17Q         CTL-O
000.020                 613X CTLP   EQU   20Q         CTL-P
000.021                 614X CTLQ   EQU   21Q         CTL-Q
000.023                 615X CTLS   EQU   23Q         CTL-S
000.032                 616X CTLZ   EQU   32Q         CTL-Z
040.343                 617         XTEXT SETCAL


                        619X **     SETCAL - FIXED ADDRESS ROUTINES IN SET
                        620X *
                        621X *      THESE VECTORS ARE FIXED ENTRY POINTS INTO THE
                        622X *      SET PROGRAM TO UTILIZED BY DEVICE DRIVERS IN
                        623X *      PROCESSING SET COMMANDS.
                        624X *
                        625X
042.201                 626X        ORG   USERFWA+1
                        627X
042.201                 628X $SNA   DS    3
                        629X
042.204                 630X $DCS   DS    3
                        631X
042.207                 632X $CNA   DS    3
                        633X
042.212                 634X $FST   DS    3
                        635X
042.215                 636X $TBLS  DS    3
                        637X
042.220                 638X $WTBLS DS    3
                        639X
042.223                 640X $LBD   DS    3
                        641X
042.226                 642X $SOP   DS    3
                        643X
```

```
042,231                 644X $PBF    DS      3
                        645X
042,234                 646X $PBV    DS      3
                        647X
042,237                 648X         DS      60      RESERVED
```

```
                        651  **      Device Unit Definition
                        652  *
                        653
                        654          CODE    PIC
                        655
000.017                 656  SYCAP   EQU     DT.CW+DT.CR+DT.DD+DT.RN         Read, Write, Directory, Random
                        657
000.006  307            658          DB      DVDFLV                  DEVICE DRIVER FLAG
000.007  017            659          DB      SYCAP                   Device Capabilities
000.010  000            660          DB      00000000B               Mounted Units Mask
000.011  003            661          DB      SYMNU                   Maximum of Number of Units
000.012  017            662          DB      SYCAP                   0:  Read, Write, Directory, Random
000.013  017            663          DB      SYCAP                   1:  Read, Write, Directory, Random
000.014  017            664          DB      SYCAP                   2:  Read, Write, Directory, Random
000.015  000            665          DB      0                       3:  Ignored
000.016  000            666          DB      0                       4:  Ignored
000.017  000            667          DB      0                       5:  Ignored
000.020  000            668          DB      0                       6:  Ignored
000.021  000            669          DB      0                       7:  Ignored
000.022  307            670          DB      DVDFLV                  Device driver flag
                        671
000.023                 672  .       SET     023Q
000.000                 673          ERRNZ   *-.
000.023                 674          DS      DVD.STE-.
```

```
                        677  ***     Set Dispatch
                        678  *
                        679  *       Set Commands enter here
                        680  *
                        681  *       ENTRY:  A       = unit number
                        682  *               DE      = line pointer
                        683  *
                        684  *       EXIT:   PSW     = 'C' clear if NO error
                        685  *                         'C' set   if    error
                        686  *
                        687  *       USES:   ALL
                        688  *
                        689
000.053                 690  SETNTR  EQU     *
000.000                 691          ERRNZ   *-DVD.STE
                        692
000.053  102            693          MOV     B,D
000.054  113            694          MOV     C,E
000.055  021 300 000    695          LXI     D,PRCTAB        DE = Processor table
000.060  041 250 000    696          LXI     H,OPTTAB        HL = option table
000.063  315 226 042    697          CALL    $SOP
000.066  330            698          RC                      ERROR
                        699
000.067  315 201 042    700          CALL    $SNA
000.072  310            701          RZ                      At the end of the line
                        702
000.073  076 040        703          MVI     A,EC.ILO
000.075  067            704          STC                     Other trailing junk
000.076  311            705          RET
```

```
                        708  ***     Processors
                        709  *
                        710
                        711  **      FLAG    - Process Flag Options
                        712  *
                        713
042.231                 714  FLAG    EQU     $PBF
                        715
                        716  **      VAL     - Process Value Options
                        717  *
                        718
042.234                 719  VAL     EQU     $PBV
                        720
                        721  **      HELP    - Process HELP Options
                        722  *
                        723
000.077  315 136 031    724  HELP    CALL    $TYPTX
000.102  012 012 123    725          DB      NL,NL,'Set Options:',NL,NL
000.122  110 105 114    726          DB      'HELP',TAB,TAB,'Type this message',NL
000.152  123 124 105    727          DB      'STEP',TAB,'n',TAB,'Set track step time',NL
000.205  012 212        728          DB      NL,ENL
000.207  257            729          XRA     A
000.210  311            730          RET
                        731
                        732  **      STEP    - Process STEP Options
                        733  *
                        734
000.211  076 012        735  STEP    MVI     A,10            Default radix of 10
000.213  315 207 042    736          CALL    $CNA            Convert Numeric Argument
000.216  332 244 000    737          JC      STEP1           Illegal Value
000.221  174            738          MOV     A,H
000.222  247            739          ANA     A
000.223  302 244 000    740          JNZ     STEP1           Value is too BIG
                        741
000.226  175            742          MOV     A,L
000.227  037            743          RAR
000.230  376 003        744          CPI     3
000.232  332 244 000    745          JC      STEP1           Value is too small
                        746
000.235  062 115 040    747          STA     D.MAIA          Set disk value
000.240  062 054 003    748          STA     TDT             Set track delay time
000.243  311            749          RET
                        750
                        751  *       Illegal Value
```

```
                                752
000.244 076 037                 753 STEP1   MVI     A,EC.ILV        Illegal Value
000.246 067                     754         STC
000.247 311                     755         RET
```

```
                        758  ***     Tables
                        759  *


                        761  **      Option Table
                        762  *
                        763
000.250  277 000        764  OPTTAB  DW      OPTABE          End of Option Table
000.252  006            765          DB      6               6 data bytes
                        766
000.253  110 105 114    767          DB      'HEL','P'+200Q,HELPI
000.260  000 000 000    768          DB      0,0,0,0,0
                        769
000.265  123 124 105    770          DB      'STE','P'+200Q,STEPI
000.272  000 000 000    771          DB      0,0,0,0,0
                        772
000.277  000            773  OPTABE  DB      0


                        775  **      Processor Table
                        776  *
                        777
000.300                 778  PRCTAB  DS      0
                        779
000.000                 780  FLAGI   EQU     *-PRCTAB/2
000.300  231 042        781          DW      FLAG
                        782
000.001                 783  HELPI   EQU     *-PRCTAB/2
000.302  077 000        784          DW      HELP
                        785
000.002                 786  STEPI   EQU     *-PRCTAB/2
000.304  211 000        787          DW      STEP
                        788
000.003                 789  VALI    EQU     *-PRCTAB/2
000.306  234 042        790          DW      VAL
                        791
000.310                 792          SET     310A
000.000                 793          ERRNZ   *-.
000.000                 794          ERRMI   *-.
000.310                 795          DS      DVD.ENT-.
```

```
                                798  ***     Driver Dispatch
                                799  *
                                800  *
                                801  *       ENTRY:  A       = Driver function code
                                802  *
                                803  *       EXIT:   ???
                                804  *
                                805  *       USES:   ALL
                                806  *
                                807
002.000                         808  SYDVD   EQU     *
000.000                         809          ERRNZ   *-DVD,ENT
                                810
002.000 376 013                 811          CPI     DC.MAX
002.002 332 011 002             812          JC      SY1             Legal entry point
                                813
                                814  *       Illegal Driver Call
                                815
002.005 076 012                 816          MVI     A,EC.ILR
002.007 067                     817          STC
002.010 311                     818          RET
                                819
                                820  *       Dispatch Valid Driver Call
                                821
002.011 376 011                 822  SY1     CPI     DC.LOD
002.013 322 022 002             823          JNC     SY2             Process this entry
                                824
002.016 247                     825          ANA     A               Clear /C/
002.017 303 316 033             826          JMP     R.SYDD          Use the ROM routines
                                827
002.022 326 011                 828  SY2     SUI     DC.LOD
002.024 315 076 031             829          CALL    $TBRA           Process new routines
002.016                         830  .       SET     2027A-DC.LOD
000.000                         831          ERRNZ   *-.-DC.LOD
                                832
000.000                         833          ERRNZ   *-.-DC.LOD
002.027 002                     834          DB      SYLOAD-*        Load
                                835
000.000                         836          ERRNZ   *-.-DC.RDY
002.030 120                     837          DB      SYREDY-*        Ready
                                838
000.000                         839          ERRNZ   *-.-DC.MAX      All entries must be handled
```

```
                                842  ***     SYLOAD
                                843  *
                                844  *       SYLOAD process the device LOAD entry.
                                845  *
                                846  *       Formerly, this code was found in HDOS proper, for the
                                847  *       sake of modularity, it has been moved.
                                848  *
                                849
002.031                         850  SYLOAD  EQU     *
                                851
002.031  257                    852          XRA     A
002.032  323 175                853          OUT     UP.FC           Set Fill character = 0
                                854
                                855  *       Set up the orisinal vectors
                                856
002.034  052 131 040            857          LHLD    SYDD+1
002.037  345                    858          PUSH    H               Save current system device
002.040  001 130 000            859          LXI     B,BOOTAL
002.043  021 132 037            860          LXI     D,BOOTA
002.046  041 110 040            861          LXI     H,D.CON
002.051  315 252 030            862          CALL    $MOVE           Move in constants and vectors
002.054  341                    863          POP     H
002.055  042 131 040            864          SHLD    SYDD+1          Restore system device
                                865
                                866  *       Re-Vector any obsolete ROM code
                                867
002.060  041 255 002            868          LXI     H,DSKERR
002.063  042 233 040            869          SHLD    D.ERRT+1        ERROR Trap
                                870
002.066  041 272 002            871          LXI     H,RAMCDE
002.071  042 161 040            872          SHLD    D.CDE+1         Count Disk Errors
                                873
002.074  041 350 002            874          LXI     H,RAMWRI
002.077  042 156 040            875          SHLD    D.WRITE+1       Write
                                876
002.102  041 012 003            877          LXI     H,RAMSDP
002.105  042 206 040            878          SHLD    D.SDP+1         Set-Up Device Parameters
                                879
002.110  052 167 040            880          LHLD    D.SDT+1
002.113  042 346 002            881          SHLD    RAMSDTA         Save Current Address
002.116  041 336 002            882          LXI     H,RAMSDT
002.121  042 167 040            883          SHLD    D.SDT+1         Replace  R.SDT
                                884
                                885  *       Initialize Drive Parameters
                                886
002.124  076 074                887          MVI     A,30*2
002.126  062 110 040            888          STA     D.XITA          Set Motor on delay
                                889
002.131  257                    890          XRA     A
002.132  062 111 040            891          STA     D.XITA+1        Set No head settle time-out
                                892
002.135  062 126 040            893          STA     D.ERTS          Clear Error Track Number
                                894
002.140  072 054 003            895          LDA     TDT
002.143  062 115 040            896          STA     D.MAIA          Set Track Delay Time
                                897
```

```
002.146  247          898          ANA     A               Clear Carry
002.147  311          899          RET
```

```
                                902  **      SYREDY
                                903  *
                                904  *       SYREDY processes the device READY entry.
                                905  *
                                906  *       A drive is considered ready if 12 holes pass before
                                907  *       time-out count expires.  (12 holes means one entire
                                908  *       revolution of the diskette.)
                                909  *
                                910  *       ENTRY:  NONE
                                911  *
                                912  *       EXIT:   PSW     = 'C' set if
                                913  *
                                914
002.150  001 000 012            915  SYREDY  LXI     B,REDYA         Initialize Time-Out Count
002.153  036 014                916          MVI     E,12            Initialize the Hole Count
                                917
                                918  *       Watch a hole
                                919
002.155  170                    920  SYREDY1 MOV     A,B
002.156  261                    921          ORA     C
002.157  312 225 002            922          JZ      SYREDY3         Time-Out
002.162  315 227 002            923          CALL    REDY
002.165  302 225 002            924          JNZ     SYREDY3         Abort
                                925
002.170  346 001                926          ANI     DF.HD
002.172  013                    927          DCX     B               check for time-out
002.173  302 155 002            928          JNZ     SYREDY1         Watching a hole so by
                                929
                                930  *       Watch a gap
                                931
002.176  170                    932  SYREDY2 MOV     A,B
002.177  261                    933          ORA     C
002.200  312 225 002            934          JZ      SYREDY3         Time-Out
002.203  315 227 002            935          CALL    REDY
002.206  302 225 002            936          JNZ     SYREDY3         Abort
                                937
002.211  346 001                938          ANI     DF.HD
002.213  013                    939          DCX     B
002.214  312 176 002            940          JZ      SYREDY2         Watching a gap pass
                                941
002.217  035                    942          DCR     E               Count a hole
                                943
002.220  302 155 002            944          JNZ     SYREDY1         More holes to go
                                945
                                946  *       The device must be ready
                                947
002.223  247                    948          ANA     A               Flag device ready
002.224  311                    949          RET
                                950
                                951  *       The device must be NOT ready
                                952
002.225  067                    953  SYREDY3 STC                     Flag device NOT ready
002.226  311                    954          RET
                                955
002.227  305                    956  REDY    PUSH    B
002.230  072 061 041            957          LDA     AIO.UNI
```

```
002.233  107             958          MOV     B,A
002.234  004             959          INR     B
002.235  257             960          XRA     A
002.236  315 035 003     961          CALL    BITS        A = device select byte
002.241  366 020         962          ORI     DF.MO
002.243  323 177         963          OUT     DP.DC       Turn on Motor and Drive Select
                         964
002.245  072 334 040     965          LDA     S,CAADR+1
002.250  247             966          ANA     A
002.251  333 177         967          IN      DP.DC       Look at the drive status
002.253  301             968          POP     B
002.254  311             969          RET
                         970
012.000                  971  REDYA   EQU     12000A      Time-Out Counter
```

```
                                975  **      DSKERR - DISK ERROR.
                                976  *
                                977
002.255  064                    978  DSKERR  INR     M               COUNT ERROR
000.000                         979          IF      DEBUG
002.256  076 174                980          MVI     A,'!'           ** DEBUG **
002.260  323 372                981          OUT     372Q            FLAG TO CONSOLE
                                982          ENDIF
002.262  052 262 040            983          LHLD    D.SECNT
002.265  043                    984          INX     H
002.266  042 262 040            985          SHLD    D.SECNT
002.271  311                    986          RET


                                988  **      CDE - COUNT DISK ERRORS.
                                989  *
                                990  *       CDE IS CALLED WHEN A DISK SOFT ERROR OCCURS. IF THERE HAVE
                                991  *       OCCURED 10 SOFT ERRORS FOR THIS OPERATION, THEN A HARD ERROR
                                992  *       IS FLAGGED.
                                993  *
                                994  *       ENTRY   NONE
                                995  *       EXIT    'C' SET IF HARD ERROR
                                996  *               INTERRUPTS DISABLED
                                997  *       USES    A,F,H,L
                                998
000.012                         999  ERPTCNT EQU     10              ERROR REPEAT COUNT (DEFINED IN ROMDD)
                               1000
002.272  373                   1001  RAMCDE  EI
002.273  315 213 040           1002          CALL    D.STZ           SEEK TRACK ZERO
002.276  315 166 040           1003          CALL    D.SDT           SEEK DESIRED TRACK
002.301  247                   1004          ANA     A               CLEAR CARRY
002.302  052 262 040           1005          LHLD    D.SECNT
002.305  043                   1006          INX     H
002.306  042 262 040           1007          SHLD    D.SECNT         INCREMENT COUNT
002.311  041 264 040           1008          LXI     H,D.OECNT       (HL) = #OPERATION ERROR COUNT
002.314  065                   1009          DCR     M
002.315  360                   1010          RP                      NOT TOO MANY
002.316  053                   1011          DCX     H
002.317  053                   1012          DCX     H               (HL) = #D.SECNT
                               1013
000.000                        1014          ERRNZ   D.SECNT-D.OECNT+2
002.320  076 366               1015          MVI     A,-ERPTCNT
002.322  206                   1016          ADD     M               REMOVE SOFT COUNT
002.323  167                   1017          MOV     M,A
000.000                        1018          ERRNZ   D.SECNT-D.HECNT-1
002.324  053                   1019          DCX     H               (HL) = #D.HECNT
002.325  064                   1020          INR     M               COUNT HARD ERROR
002.326  052 240 040           1021          LHLD    D.TT
002.331  042 126 040           1022          SHLD    D.ERTS          RECORD ERROR TRACK AND SECTOR
002.334  067                   1023          STC
002.335  311                   1024          RET                     EXIT WITH 'C' SET
```

```
                        1026  **      R.SDT   - Seek Desired Track
                        1027  *
                        1028  *       R.SDT seeks the desired track.  This is a preface to the H17 ROM
                        1029  *       code because it does not delay enough after turning off the write
                        1030  *       gate.  When sectors are rapidly updated as are those in the dir-
                        1031  *       ectory and GRT, they tend to be smashed if the drives begins to
                        1032  *       step before the tunnel erase is finished.
                        1033  *
                        1034
002.336  365           1035  RAMSDT  PUSH    PSW
002.337  076 172       1036          MVI     A,900/15*1024/500       900*2.048/15 = 900 mic sec delay
002.341  315 216 040   1037          CALL    D,UDLY          Wait for the disk to settle
002.344  361           1038          POP     PSW
                        1039
002.345  303 377 377   1040          JMP     -1              Enter the original
002.346                 1041  RAMSDTA EQU     *-2


                        1043  **      R.WRITE - PERFORM DISK WRITE.
                        1044  *
                        1045  *       PARTIALLY REPLACES ROM CODE IN H17ROM (ROMDD OR H17ROM LISTING)
                        1046  *
                        1047  *       SEE LISTING FOR DETAILS.
                        1048
                        1049
034.370                 1050  WRITE1  EQU     34370A
035.132                 1051  WRITE8  EQU     35132A
                        1052
002.350                 1053  RAMWRI  EQU     *
002.350                 1054  R.WRITE EQU     *
002.350  345           1055          PUSH    H               SAVE BLOCK NUMBER
002.351  315 205 040   1056          CALL    D.SDP           SET DEVICE PARAMETERS
002.354  052 275 040   1057          LHLD    D.OPW
002.357  043           1058          INX     H
002.360  042 275 040   1059          SHLD    D.OPW           COUNT OPERATION
002.363  333 177       1060          IN      DF.DC           SEE IF DISK WRITE PROTECTED
002.365  346 004       1061          ANI     DF.WP
002.367  067           1062          STC
002.370  076 025       1063          MVI     A,EC.WP
002.372  302 132 035   1064          JNZ     WRITE8          DISK IS WRITE PROTECTED
                        1065
                        1066  *       READY TO WRITE SECTOR
                        1067  *
                        1068  *               (BC) = COUNT
                        1069  *               (DE) = ADDRESS
                        1070  *               ((SP)) = SECTOR NUMBER
                        1071
002.375  041 377 000   1072          LXI     H,377Q
003.000  011           1073          DAD     B
003.001  104           1074          MOV     B,H             (B) = # OF SECTORS TO WRITE
003.002  170           1075          MOV     A,B
003.003  247           1076          ANA     A
003.004  312 132 035   1077          JZ      WRITE8          NONE TO WRITE
003.007  303 370 034   1078          JMP     WRITE1          RE-JOIN ROM
```

```
                        1080  **      R.SDP   -  SETUP DEVICE PARAMETERS
                        1081  *
                        1082  *       SDP SETS UP ARGUMENTS FOR THE SPECIFIC UNIT.
                        1083  *
                        1084  *               D.DVCTL = MOTOR ON
                        1085  *               D.TRKPT =ADDRESS OF DEVICE TRACK NUMBER
                        1086  *
                        1087  *
                        1088  *       Modified to access drive 3, or SY2:.
                        1089  *
                        1090  *       ENTRY:  AIO.UNI = UNIT NUMBER
                        1091  *
                        1092  *       EXIT:   (HL) = (D.TRKPT)
                        1093  *
                        1094  *       USES:   (PSW);(HL)
                        1095  *
                        1096
036.073                 1097  R.SDP.  EQU     036073A                 THE GOOD ROM CODE ENTRY POINT
                        1098
003.012                 1099  RAMSDP  EQU     *
003.012                 1100  R.SDP   EQU     *
                        1101
003.012  076 012       1102          MVI     A,ERPTCNT
003.014  062 264 040   1103          STA     D.OECNT                 SET MAX ERROR COUNT FOR THE OPERATION
003.017  072 061 041   1104          LDA     AIO.UNI
003.022  365           1105          PUSH    PSW
003.023  376 002       1106          CPI     1+1
                        1107
003.025  332 073 036   1108          JC      R.SDP.                  UNIT 0 OR 1
000.000                 1109          ERRNZ   DF.DS0-2
000.000                 1110          ERRNZ   DF.DS1-4
                        1111
003.030  076 003       1112          MVI     A,3                     UNIT 2
000.000                 1113          ERRNZ   DF.DS2-8
003.032  303 073 036   1114          JMP     R.SDP.
```

```
003.035                 1117            XTEXT   BITS

                        1119X **        BITS    -  BIT SET
                        1120X *
                        1121X *         BITS SETS THE SPECIFIED BIT IN THE ACCUMULATOR.
                        1122X *
                        1123X *         ENTRY:  A       = ORIGINAL  A
                        1124X *                 B       = NUMBER OF BIT TO SET ( 7=HIGH,...,0=LOW )
                        1125X *
                        1126X *         EXIT:   A       = ORIGINAL  A  WITH  BIT(B) SET
                        1127X *
                        1128X *         USES:   PSW
                        1129X *
                        1130X
003.035 305             1131X BITS      PUSH    B
                        1132X
003.036 365             1133X           PUSH    PSW
003.037 076 200         1134X           MVI     A,10000000B
003.041 004             1135X           INR     B
003.042 007             1136X BITS1     RLC
003.043 005             1137X           DCR     B
003.044 302 042 003     1138X           JNZ     BITS1
                        1139X
003.047 117             1140X           MOV     C,A
003.050 361             1141X           POP     PSW
003.051 261             1142X           ORA     C
                        1143X
003.052 301             1144X           POP     BC
003.053 311             1145X           RET
003.054                 1146            XTEXT   MOVE

                        1148X **        $MOVE - MOVE DATA
                        1149X *
                        1150X *         $MOVE MOVES A BLOCK OF BYTES TO A NEW MEMORY ADDRESS.
                        1151X *         IF THE MOVE IS TO A LOWER ADDRESS, THE BYTES ARE MOVED FROM
                        1152X *         FIRST TO LAST,
                        1153X *
                        1154X *         IF THE MOVE IS TO A HIGHER ADDRESS, THE BYTES ARE MOVED FROM
                        1155X *         LAST TO FIRST.
                        1156X *
                        1157X *         THIS IS DONE SO THAT AN OVERLAPED MOVE WILL NOT 'RIPPLE'.
                        1158X *
                        1159X *         ENTRY   (BC) = COUNT
                        1160X *                 (DE) = FROM
                        1161X *                 (HL) = TO
                        1162X *         EXIT    MOVED
                        1163X *                 (DE) = ADDRESS OF NEXT FROM BYTE
                        1164X *                 (HL) = ADDRESS OF NEXT *TO* BYTE
                        1165X *                 'C' CLEAR
                        1166X *         USES    ALL
```

```
                    1167X
                    1168X
030.252             1169X $MOVE   EQU     30252A          IN H17 ROM
003.054             1170          XTEXT   TBRA


                    1172X **      $TBRA - BRANCH RELATIVE THOUGH TABLE.
                    1173X *
                    1174X *       $TBRA USES THE SUPPLIED INDEX TO SELECT A BYTE FROM THE
                    1175X *       JUMP TABLE. THE CONTENTS OF THIS BYTE ARE ADDED TO THE
                    1176X *       ADDRESS OF THE BYTE, YEILDING THE PROCESSOR ADDRESS.
                    1177X *
                    1178X *       CALL    $TBRA
                    1179X *       DB      LAB1-*          INDEX = 0 FOR LAB1
                    1180X *       DB      LAB2-*          INDEX = 1 FOR LAB2
                    1181X *       DB      LABN-*          INDEX = N-1 FOR LABN
                    1182X *
                    1183X *       ENTRY   (A) = INDEX
                    1184X *               (RET) = TABLE FWA
                    1185X *       EXIT    TO COMPUTED ADDRESS
                    1186X *       USES    F,H,L
                    1187X
                    1188X
031.076             1189X $TBRA   EQU     31076A          IN H17 ROM
003.054             1190          XTEXT   TYPTX


                    1192X **      $TYPTX - TYPE TEXT.
                    1193X *
                    1194X *       $TYPTX IS CALLED TO TYPE A BLOCK OF TEXT ON THE SYSTEM CONSOLE.
                    1195X *
                    1196X *       IMBEDDED ZERO BYTES INDICATE A CARRIAGE RETURN LINE FEED,
                    1197X *       A BYTE WITH THE 200Q BIT SET IS THE LAST BYTE IN THE MESSAGE.
                    1198X *
                    1199X *       ENTRY   (RET) = TEXT
                    1200X *       EXIT    TO (RET+LENGTH)
                    1201X *       USES    A,F
                    1202X
                    1203X
031,136             1204X $TYPTX  EQU     31136A          IN H17 ROM
                    1205X
031,144             1206X $TYPTX. EQU     31144A          IN H17 ROM
```

```
                        1209  ***     Data
                        1210  *
                        1211
003.054 017             1212  TDT     DB      DEF.TDT         Track Delay Time
                        1213
003.055 000 000         1214          DW      0               Dummy Relocation address for patches
                        1215
003.057                 1216          DS      32              Patch area
                        1217
                        1218          LON     G
                        1219
003.117 056 000 061     1220          END
        000 217 000
        224 000 233
        000 241 000
        250 000 302
        000 304 000
        003 002 014
        002 061 002
        067 002 075
        002 103 002
        114 002 117
        002 141 002
        160 002 163
        002 166 002
        174 002 201
        002 204 002
        207 002 215
        002 221 002
        237 002 045
        003 000 000
ASSEMBLY COMPLETE
  1220 STATEMENTS
     0 ERRORS DETECTED
 12352 BYTES FREE
```

```
$CNA     042207      632L      736
$DCS     042204      630L
$FST     042212      634L
$LBD     042223      640L
$MOVE    030252      862      1169E
$PBF     042231      644L      714
$PBV     042234      646L      719
$SNA     042201      628L      700
$SOP     042226      642L      697
$TBLS    042215      636L
$TBRA    031076      829      1189E
$TYPTX   031136      724      1204E
$TYPTX.  031144     1206E
$WTBLS   042220      638L
.        002016      672S      673      674      792S     793      794      795      830S     831      833      836      839
AIO.CGN  041047      509L
AIO.CHA  041116      524L
AIO.CNT  041111      520L
AIO.CSI  041050      510L
AIO.DDA  041041      505E
AIO.DES  041055      514L
AIO.DEV  041057      515L
AIO.DIR  041062      518L
AIO.DTA  041053      513L
AIO.EOF  041113      522L
AIO.EOM  041112      521L
AIO.FLG  041043      506L
AIO.GRT  041044      507L
AIO.LGN  041051      511L
AIO.LSI  041052      512L
AIO.SPG  041046      508L
AIO.TFP  041114      523L
AIO.UNI  041061      516L      957      1104
AIO.VEC  041040      504L
BELL     000007      597E
BITS     003035'      961     1131L
BITS1    003042'     1136L     1138
BKSP     000010      599E
BOOT.P   000001      484E
BOOTA    037132      199E      860
BOOTAL   000130      200E      859
C.DSYN   000375      160E
C.STX    000002      601E
C.SYN    000026      600E
CDB.H84  000001      427E
CDB.H85  000000      426E
CFF      031354      177E
CLOCK    034031      202E
CO.FLG   000001      579E
CR       000015      593E
CS.FLG   000200      580E
CSL.CHR  000001      556E
CSL.ECH  000200      553E
CSL.RAW  000004      554E
CSL.WRP  000002      555E
CTLA     000001      608E
CTLB     000002      609E
CTLC     000003      610E
```

```
CTLD    000004  611E
CTLO    000017  612E
CTLP    000020  613E
CTLQ    000021  614E
CTLS    000023  615E
CTLZ    000032  616E
CTP.2SB 000010  565E
CTP.BKM 000002  566E
CTP.BKS 000200  561E
CTP.FF  000100  562E
CTP.MLI 000040  563E
CTP.MLO 000020  564E
CTP.TAB 000001  567E
D.ABORT 040141  392L
D.CDE   040160  397L  872
D.CON   040110  298L  317   861
D.DLY   040235  412L
D.DLYHS 040244  351L
D.DLYMD 040243  350L
D.DRVTB 040251  356L
D.DTS   040163  398L
D.DVCTL 040242  348L
D.E.CHK 040267  367L
D.E.HCK 040270  368L
D.E.HSY 040266  366L
D.E.MDS 040265  365L
D.E.TRK 040272  370L
D.E.VOL 040271  369L
D.ERR   040265  364L
D.ERRL  040273  371L
D.ERRT  040232  411L  869
D.ERTS  040126  333L  893   1022
D.HECNT 040261  358L  1018
D.LPS   040177  402L
D.LPSA  040116  324L
D.MAI   040171  400L
D.MAIA  040115  323L  747   896
D.MAO   040174  401L
D.MOUNT 040133  390L
D.OECNT 040264  360L  1008  1014  1103
D.OPR   040273  375L
D.OPW   040275  376L  1057  1059
D.RAM   040240  301L  343   378
D.RAML  000037  378E
D.RDB   040202  403L
D.READ  040147  394L
D.READR 040152  395L
D.SDP   040205  404L  878   1056
D.SDPA  040117  325L
D.SDPB  040120  326L
D.SDT   040166  399L  880   883   1003
D.SECNT 040262  359L  983   985   1005  1007  1014  1018
D.STS   040210  405L
D.STSA  040121  327L
D.STSB  040122  328L
D.STZ   040213  406L  1002
D.SYDD  040130  389L
D.TRKPT 040245  353L
```

D.TS	040241	346L						
D.TT	040240	345L	1021					
D.UDLY	040216	407L	1037					
D.VEC	040130	300L	387					
D.VOLPT	040247	354L						
D.WHDA	040123	329L						
D.WNB	040227	410L						
D.WNHA	040124	330L						
D.WRITA	040112	320L						
D.WRITB	040113	321L						
D.WRITC	040114	322L						
D.WRITE	040155	396L	875					
D.WSC	040221	408L						
D.WSCA	040125	331L						
D.WSP	040224	409L						
D.XIT	040144	393L						
D.XITA	040110	319L	888	891				
D.XOK	040136	391L						
DC.ABT	000007	39L						
DC.CLO	000006	38L						
DC.LOD	000011	41L	822	828	830	831	833	
DC.MAX	000013	43L	811	839				
DC.MOU	000010	40L						
DC.OPR	000003	35L						
DC.OPU	000005	37L						
DC.OPW	000004	36L						
DC.RDY	000012	42L	836					
DC.REA	000000	32L						
DC.RER	000002	34L						
DC.WRI	000001	33L						
DCA	032002	179E						
DEBUG	000000	1E	979					
DEF.TDT	000017	22E	1212					
DEV.DDA	000004	59L						
DEV.DVG	000015	72L						
DEV.DVL	000013	71L						
DEV.FLG	000006	60L						
DEV.JMP	000003	58L						
DEV.MNU	000010	68L						
DEV.MUM	000007	67L						
DEV.NAM	000000	50L						
DEV.RES	000002	54L						
DEV.UNT	000011	69L						
DEVELEN	000016	74E						
DF.CLR	000376	95E						
DF.DI	000040	129E						
DF.DS0	000002	125E	1109					
DF.DS1	000004	126E	1110					
DF.DS2	000010	127E	1113					
DF.EMP	000377	94E						
DF.HD	000001	119E	926	938				
DF.MO	000020	128E	962					
DF.SD	000010	122E						
DF.ST	000100	130E						
DF.TO	000002	120E						
DF.WG	000001	124E						
DF.WP	000004	121E	1061					
DF.WR	000200	131E						

```
DIR.ALD 000025       110L
DIR.CLU 000015       103L
DIR.CRD 000023       109L
DIR.EXT 000010        98L
DIR.FGN 000020       106L
DIR.FLG 000016       104L
DIR.LGN 000021       107L
DIR.LSI 000022       108L
DIR.NAM 000000        97L
DIR.PRO 000013        99L
DIR.VER 000014       100L
DIRELEN 000027       112E      518
DIRIDL  000015       101E
DP.DC   000177       117E      963     967     1060
DR.IM   000001        55E
DR.PR   000002        56E
DSKERR  002255'      868       978L
DT.CH   000020        65E
DT.CR   000002        62E      656
DT.CW   000004        63E      656
DT.DD   000001        61E      656
DT.RN   000010        64E      656
DV.EL   000000        51E
DV.NU   000001        52E
DVD.CAP 000007       224L
DVD.DVD 000006       223L
DVD.ENT 002000       233E      795     809
DVD.INP 000023       229L
DVD.MNU 000011       226L
DVD.MUM 000010       225L
DVD.SET 000022       228L
DVD.STE 000053       231E      674     691
DVD.UFL 000012       227L
DVDFLV  000307       219E      658     670
EC.CNA  000004       243L
EC.DDA  000027       262L
EC.DIF  000017       254L
EC.DIW  000035       268L
EC.DNI  000045       276L
EC.DNR  000046       277L
EC.DNS  000005       244L
EC.DSC  000047       278L
EC.EOF  000001       240L
EC.EOM  000002       241L
EC.FAO  000031       264L
EC.FAP  000026       261L
EC.FL   000030       263L
EC.FNF  000014       251L
EC.FNO  000011       248L
EC.FNR  000034       267L
EC.FQD  000043       274L
EC.FUC  000013       250L
EC.ICN  000016       253L
EC.IDN  000006       245L
EC.IFC  000020       255L
EC.IFN  000007       246L
EC.ILC  000003       242L
EC.ILO  000040       271L      703
```

```
EC.ILR  000012   249L   816
EC.ILV  000037   270L   753
EC.IOI  000052   281L
EC.IS   000032   265L
EC.NCV  000050   279L
EC.NEM  000021   256L
EC.NOS  000051   280L
EC.NPM  000044   275L
EC.NRD  000010   247L
EC.NVM  000042   273L
EC.OTL  000053   282L
EC.RF   000022   257L
EC.UNA  000036   269L
EC.UND  000015   252L
EC.UUN  000033   266L
EC.VPM  000041   272L
EC.WF   000023   258L
EC.WP   000025   260L   1063
EC.WPV  000024   259L
ENL     000212   606E   728
ERPTCNT 000012   999E   1015   1102
ERR.FNO 031344   173E
ERR.ILR 031350   175E
ESC     000033   604E
FF      000014   607E
FFB     032133   181E
FFL     032205   183E
FLAG    042231   714E   781
FLAGI   000000   780E
HI7SDL  000173   137E
HELP    000077'  724L   784
HELPI   000001   767    783E
I.CONFL 000004   582E   583
I.CONTY 000001   569E   570
I.CONWI 000003   575E   576
I.CSLMD 000000   558E
I.CUSOR 000002   572E   573
LDD     033012   187E
LF      000012   594E
NL      000012   605E   606    725    725    725    725    726    727    728
NUL2    000000   596E
NULL    000200   595E
OPTABE  000277'  764    773L
OPTTAB  000250'  696    764L
OVL.IN  000001   451E
OVL.NUM 000014   453E
OVL.RES 000002   452E
OVL.UCS 000200   454E
PDI     033145   189E
PIC.COD 000006   214L   221
PIC.ID  000000   209L
PIC.LEN 000002   211L
PIC.PTR 000004   212L
PRCTAB  000300'  695    778L   780    783    786    789
QUOTE   000047   602E
R.SDP   003012'  1100E
R.SDP.  036073   1097E  1108   1114
R.SYDD  033316   18E    826
```

```
R.WRITE 002350'     1054E
RAMCDE  002272'     871       1001L
RAMSDP  003012'     877       1099E
RAMSDT  002336'     882       1035L
RAMSDTA 002346'     881       1041E
RAMWRI  002350'     874       1053E
REDY    002227'     923        935     956L
REDYA   012000      915        971E
REL     033177      193E
REL.    033175      191E
ROMBOOT 030000      293E
RUBOUT  000177      598E
RUC     033257      197E
S.BAUD  040344      428L
S.BDA   041120      526L
S.BOOTF 041034      483L
S.CAADR 040333      586L       965
S.CACC  041006      467L
S.CCTAB 040335      587L
S.CDB   040343      425L
S.CFWA  040352      435L
S.CODE  041007      468L
S.CONFL 040332      584L
S.CONTY 040327      571L
S.CONWI 040331      577L
S.CSLMD 040326      559L       570     573     576     583
S.CUSOR 040330      574L
S.DATC  040310      540L
S.DATE  040277      539L
S.DCS   041033      481L
S.DDBTA 040366      446L
S.DDGRP 040364      443L
S.DDLDA 040360      441L
S.DDLEN 040362      442L
S.DDOPC 040370      447L
S.DFWA  040354      436L
S.DIREA 041016      475L
S.DLINK 040346      433L
S.FASER 041013      474L
S.FCI   041021      476L
S.GRT0  024000      289E
S.GRT1  025000      290E
S.GRT2  026000      291E
S.GUP   041027      478L
S.HIMEM 040316      542L
S.INT   040343      303L       421
S.JUMPS 041010      472L
S.MOUNT 041032      480L
S.OFWA  040350      434L
S.OMAX  040324      548L
S.OSN   041004      463L
S.OVLE  041000      460L
S.OVLFL 040371      456L
S.OVLS  040376      459L
S.OVSTK 041035      488L
S.READ  031275      169E
S.RFWA  040356      437L
S.SCI   041024      477L
```

```
S.SCR    041121  527L
S.SDD    041010  473L
S.SOVR   041146  305L  307
S.SSN    041002  462L
S.SYSM   040320  544L
S.TIME   040312  541L
S.UCSF   040372  457L
S.UCSL   040374  458L
S.USRM   040322  546L
S.VAL    040277  302L  537
S.WRITE  031330  171E
SETNTR   000053' 690E
STACK    042200  309E
STACKL   001032  307E
STEP     000211' 735L  787
STEP1    000244' 737   740   745   753L
STEPI    000002  770   786E
SY1      002011' 812   822L
SY2      002022' 823   828L
SYCAP    000017  656E  659   662   663   664
SYDD     040130  299E  857   864
SYDVD    002000' 808E
SYLOAD   002031' 834   850E
SYMNU    000003   20E  661
SYREDY   002150' 837   915L
SYREDY1  002155' 920L  928   944
SYREDY2  002176' 932L  940
SYREDY3  002225' 922   924   934   936   953L
TAB      000011  603E  726   726   727   727
TDT      003054' 748   895   1212L
TFE      033233  195E
UF.FCT   000100  153E
UF.RDA   000001  150E
UF.ROR   000002  151E
UF.RPE   000004  152E
UF.TBM   000200  154E
UNT.DIS  000006   84L
UNT.FLG  000000   80L
UNT.GRT  000002   82L
UNT.GTS  000004   83L
UNT.SIZ  000010   86E
UNT.SPG  000001   81L
UP.DP    000174  144E
UP.FC    000175  145E  853
UP.SC    000176  147E
UP.SR    000176  148E
UP.ST    000175  146E
USERFWA  042200  310E  626
VAL      042234  719E  790
VALI     000003  789E
WRITE1   034370  1050E 1078
WRITE8   035132  1051E 1064  1077

27404 BYTES FREE
```