```
                2  ***     BOOT    - Boot a System Device
                3  *
                4  *       Copyright July, 1980, Heath Co.
                5  *
                6  *            G. C.,     July 23, 1980
                7  *
                8  *
                9  *       BOOT dismounts all disks, and attempts to boot
               10  *       the specified device.  The device may be specified
               11  *       on the command line.  If it is not, then the user
               12  *       is asked for the device name.
               13  *
               14  *       NOTE:   The routine to map the physical device routine
               15  *                must correspond to 1.SYDD in HDOS.SYS.
               16  *
```

```
000.000                 19          XTEXT   FILDEF

                        21X **      FILDEF - FILE TYPE DEFINITIONS.
                        22X *
                        23X *       DB      377Q,FT.XXX
                        24X
                        25X
000.000                 26X FT.ABS  EQU     0           ABSOLUTE BINARY
000.001                 27X FT.PIC  EQU     1           POSITION INDEPENDANT CODE
000.002                 28X FT.REL  EQU     2           RELOCATABLE CODE
000.003                 29X FT.BAC  EQU     3           COMPILED BASIC CODE
000.000                 30          XTEXT   ABSDEF

                        32X **      ABS FORMAT EQUIVALENCES.
                        33X
000.000                 34X         ORG     0
                        35X
000.000                 36X ABS.ID  DS      1           377Q = BINARY FILE FLAG
000.001                 37X         DS      1           FILE TYPE (FT.ABS)
000.002                 38X ABS.LDA DS      2           LOAD ADDRESS
000.004                 39X ABS.LEN DS      2           LENGTH OF ENTIRE RECORD
000.006                 40X ABS.ENT DS      2           ENTRY POINT
                        41X
000.010                 42X ABS.COD DS      0           CODE STARTS HERE
                        43
000.010                 44          XTEXT   DDDEF

                        46X **      DEVICE DRIVER COMMUNICATION FLAGS.
                        47X *
                        48X
000.000                 49X         ORG     0
                        50X
000.000                 51X DC.REA  DS      1           READ
000.001                 52X DC.WRI  DS      1           WRITE
000.002                 53X DC.RER  DS      1           READ REGARDLESS
000.003                 54X DC.OPR  DS      1           OPEN FOR READ
000.004                 55X DC.OPW  DS      1           OPEN FOR WRITE
000.005                 56X DC.OPU  DS      1           OPEN FOR UPDATE
000.006                 57X DC.CLO  DS      1           CLOSE
000.007                 58X DC.ABT  DS      1           ABORT
000.010                 59X DC.MOU  DS      1           MOUNT DEVICE
000.011                 60X DC.LOD  DS      1           LOAD DEVICE DRIVER
000.012                 61X DC.RDY  DS      1           Device Ready                /80.04.GC/
000.013                 62X DC.MAX  DS      1           MAXIMUM ENTRY INDEX
000.014                 63          XTEXT   DDFDEF
```

```
                        65X **      DIRECTORY DEVICE FORMAT DEFINITION.                 /80.09.sc/
                        66X *
                        67X *       Modified:       Sep-80
                        68X *                        No longer require 2 sectors per group
                        69X *                        Reserved Group Table dynamically allocated
                        70X *
                        71X
000.000                 72X         ORG     0
                        73X
000.000                 74X DDF.BOO DS      9           2K BOOT PROGRAM
000.011                 75X DDF.BOL EQU     *           LENGTH OF BOOT
000.011                 76X DDF.LAB DS      1           LABEL SECTOR
000.012                 77X DDF.USR DS      0           BEGINNING OF OPEN SPACE
000.012                 78          XTEXT   DEVDEF


                        80X **      DEVICE TABLE ENTRYS.
                        81X
000.000                 82X         ORG     0
                        83X
000.000                 84X DEV.NAM DS      2           DEVICE NAME
000.000                 85X DV.EL   EQU     00000000B   END OF DEVICE LIST FLAG
000.001                 86X DV.NU   EQU     00000001B   DEVICE ENTRY NOT IN USE
                        87X
000.002                 88X DEV.RES DS      1           DRIVER RESIDENSE CODE
000.001                 89X DR.IM   EQU     00000001B   DRIVER IN MEMORY
000.002                 90X DR.PR   EQU     00000010B   DRIVER PERMINANTLY RESIDENT
                        91X
000.003                 92X DEV.JMP DS      1           JMP TO PROCESSOR
000.004                 93X DEV.DDA DS      2           DRIVER ADDRESS
000.006                 94X DEV.FLG DS      1           FLAG BYTE
000.001                 95X DT.DD   EQU     00000001B   DIRECTORY DEVICE
000.002                 96X DT.CR   EQU     00000010B   CAPABLE OF READ OPERATION
000.004                 97X DT.CW   EQU     00000100B   CAPABLE OF WRITE OPERATION
000.010                 98X DT.RN   EQU     00001000B   Capable of random access        /80.02.sc/
000.020                 99X DT.CH   EQU     00010000B   Capable of Character mode       /80.02.sc/
                       100X
000.007                101X DEV.MUM DS      1           MOUNTED UNIT MASK
000.010                102X DEV.MNU DS      1           MAXIMUM NUMBER OF UNITS
000.011                103X DEV.UNT DS      2           ADDRESS OF UNIT SPECIFIC DATA TABLE
                       104X
000.013                105X DEV.DVL DS      2           DRIVER BYTE LENGTH
000.015                106X DEV.DVG DS      1           DRIVER ROUTINE GROUP ADDRESS
                       107X
000.016                108X DEVELEN EQU     *           DEVICE TABLE ENTRY LENGTH
```

```
                    110X **     UNIT SPECIFIC DEVICE DATA TABLE ENTRIES
                    111X
000.000             112X        ORG     0
                    113X
000.000             114X UNT.FLG DS     1           UNIT SPECIFIC *DEV.FLG*
000.001             115X UNT.SPG DS     1           Sectors Per Group               /80.04.GC/
000.002             116X UNT.GRT DS     2           ADDRESS OF GROUP RESERVATION TABLE (IF DT.DD)
000.004             117X UNT.GTS DS     2           GRT SECTOR NUMBER
000.006             118X UNT.DIS DS     2           DIRECTORY FIRST SECTOR NUMBER
                    119X
000.010             120X UNT.SIZ EQU    *           SIZE OF UNIT SPECIFIC DATA TABLE PER UNIT
000.010             121          XTEXT  DIRDEF


                    123X **     DIRECTORY ENTRY FORMAT.
                    124X
000.000             125X        ORG     0
                    126X
                    127X
000.377             128X DF.EMP  EQU    377Q        FLAGS ENTRY EMPTY
000.376             129X DF.CLR  EQU    376Q        FLAGS ENTRY EMPTY, REST OF DIR ALSO CLEAR
                    130X
000.000             131X DIR.NAM DS     8           NAME
000.010             132X DIR.EXT DS     3           EXTENSION
000.013             133X DIR.PRO DS     1           PROJECT
000.014             134X DIR.VER DS     1           VERSION
000.015             135X DIRIDL  EQU    *           FILE IDENTIFICATION LENGTH
                    136X
000.015             137X DIR.CLU DS     1           CLUSTER FACTOR
000.016             138X DIR.FLG DS     1           FLAGS
000.017             139X         DS     1           RESERVED
000.020             140X DIR.FGN DS     1           FIRST GROUP NUMBER
000.021             141X DIR.LGN DS     1           LAST GROUP NUMBER
000.022             142X DIR.LSI DS     1           LAST SECTOR INDEX (IN LAST GROUP)
000.023             143X DIR.CRD DS     2           CREATION DATE
000.025             144X DIR.ALD DS     2           LAST ALTERATION DATE
                    145X
000.027             146X DIRELEN EQU    *           DIRECTORY ENTRY LENGTH
000.027             147          XTEXT  ECDEF


                    149X **     ERROR CODE DEFINITIONS.
                    150X
000.000             151X        ORG     0
000.000             152X        DS      1           NO ERROR #0
000.001             153X EC.EOF  DS     1           END OF FILE
000.002             154X EC.EOM  DS     1           END OF MEDIA
000.003             155X EC.ILC  DS     1           ILLEGAL SYSCALL CODE
000.004             156X EC.CNA  DS     1           CHANNEL NOT AVAILABLE
000.005             157X EC.DNS  DS     1           DEVICE NOT SUITABLE
000.006             158X EC.IDN  DS     1           ILLEGAL DEVICE NAME
000.007             159X EC.IFN  DS     1           ILLEGAL FILE NAME
000.010             160X EC.NRD  DS     1           NO ROOM FOR DEVICE DRIVER
000.011             161X EC.FNO  DS     1           CHANNEL NOT OPEN
```

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000.012                 162X EC.ILR  DS      1               ILLEGAL REQUEST
000.013                 163X EC.FUC  DS      1               FILE USAGE CONFLICT
000.014                 164X EC.FNF  DS      1               FILE NAME NOT FOUND
000.015                 165X EC.UND  DS      1               UNKNOWN DEVICE
000.016                 166X EC.ICN  DS      1               ILLEGAL CHANNEL NUMBER
000.017                 167X EC.DIF  DS      1               DIRECTORY FULL
000.020                 168X EC.IFC  DS      1               ILLEGAL FILE CONTENTS
000.021                 169X EC.NEM  DS      1               NOT ENOUGH MEMORY
000.022                 170X EC.RF   DS      1               READ FAILURE
000.023                 171X EC.WF   DS      1               WRITE FAILURE
000.024                 172X EC.WPV  DS      1               WRITE PROTECTION VIOLATION
000.025                 173X EC.WP   DS      1               DISK WRITE PROTECTED
000.026                 174X EC.FAP  DS      1               FILE ALREADY PRESENT
000.027                 175X EC.DDA  DS      1               DEVICE DRIVER ABORT
000.030                 176X EC.FL   DS      1               FILE LOCKED
000.031                 177X EC.FAO  DS      1               FILE ALREADY OPEN
000.032                 178X EC.IS   DS      1               ILLEGAL SWITCH
000.033                 179X EC.UUN  DS      1               UNKNOWN UNIT NUMBER
000.034                 180X EC.FNR  DS      1               FILE NAME REQUIRED
000.035                 181X EC.DIW  DS      1               DEVICE IS NOT WRITABLE (OR WRITE LOCKED)
000.036                 182X EC.UNA  DS      1               UNIT NOT AVAILABLE
000.037                 183X EC.ILV  DS      1               ILLEGAL VALUE
000.040                 184X EC.ILO  DS      1               ILLEGAL OPTION
000.041                 185X EC.VPM  DS      1               VOLUME PRESENTLY MOUNTED ON DEVICE
000.042                 186X EC.NVM  DS      1               NO VOLUME PRESENTLY MOUNTED
000.043                 187X EC.FOD  DS      1               FILE OPEN ON DEVICE
000.044                 188X EC.NPM  DS      1               NO PROVISIONS MADE FOR REMOUNTING MORE DISKS
000.045                 189X EC.DNI  DS      1               DISK NOT INITIALIZED
000.046                 190X EC.DNR  DS      1               DISK IS NOT READABLE
000.047                 191X EC.DSC  DS      1               DISK STRUCTURE IS CORRUPT
000.050                 192X EC.NCV  DS      1               NOT CORRECT VERSION OF HDOS
000.051                 193X EC.NOS  DS      1               NO OPERATING SYSTEM MOUNTED
000.052                 194X EC.IOI  DS      1               ILLEGAL OVERLAY INDEX
000.053                 195X EC.OTL  DS      1               OVERLAY TO LARGE
000.054                 196          XTEXT   HOSDEF

                        198X **      HOSDEF - DEFINE HOS PARAMETER.
                        199X *
                        200X
                        201X
000.040                 202X VERS    EQU     2*16+0          VERSION 2.0
                        203X
000.377                 204X SYSCALL EQU     377Q            SYSCALL INSTRUCTION
                        205X
                        206X
000.000                 207X         ORG     0
                        208X
                        209X *       RESIDENT FUNCTIONS
                        210X
000.000                 211X .EXIT   DS      1               EXIT (MUST BE FIRST)
000.001                 212X .SCIN   DS      1               SCIN
000.002                 213X .SCOUT  DS      1               SCOUT
000.003                 214X .PRINT  DS      1               PRINT
000.004                 215X .READ   DS      1               READ
```

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000.005                216X .WRITE  DS      1               WRITE
000.006                217X .CONSL  DS      1               SET/CLEAR CONSOLE OPTIONS
000.007                218X .CLRCO  DS      1               CLEAR CONSOLE BUFFER
000.010                219X .LOADO  DS      1               LOAD AN OVERLAY
000.011                220X .VERS   DS      1               RETURN HDOS VERSION NUMBER
000.012                221X .SYSRES DS      1               PRECEDING FUNCTIONS ARE RESIDENT
                       222X
                       223X
                       224X *       *HDOSOVL0.SYS*  FUNCTIONS
                       225X
000.040                226X         ORG     40A
                       227X
000.040                228X .LINK   DS      1               LINK  (MUST BE FIRST)
000.041                229X .CTLC   DS      1               CTL-C
000.042                230X .OPENR  DS      1               OPENR
000.043                231X .OPENW  DS      1               OPENW
000.044                232X .OPENU  DS      1               OPENU
000.045                233X .OPENC  DS      1               OPENC
000.046                234X .CLOSE  DS      1               CLOSE
000.047                235X .POSIT  DS      1               POSITION
000.050                236X .DELET  DS      1               DELETE
000.051                237X .RENAM  DS      1               RENAME
000.052                238X .SETTP  DS      1               SETTOP
000.053                239X .DECODE DS      1               NAME DECODE
000.054                240X .NAME   DS      1               GET FILE NAME FROM CHANNEL
000.055                241X .CLEAR  DS      1               CLEAR CHAN
000.056                242X .CLEARA DS      1               CLEAR ALL CHANS
000.057                243X .ERROR  DS      1               LOOKUP ERROR
000.060                244X .CHFLG  DS      1               CHANGE FLAGS
000.061                245X .DISMT  DS      1               FLAG SYSTEM DISK DISMOUNTED
000.062                246X .LOADD  DS      1               LOAD DEVICE DRIVER
000.063                247X .OPEN   DS      1               Parametrized Open
                       248X
                       249X
                       250X *       *HDOSOVL1.SYS*  FUNCTIONS
                       251X
000.200                252X         ORG     200Q
                       253X
000.200                254X .MOUNT  DS      1               MOUNT  (MUST BE FIRST)
000.201                255X .DMOUN  DS      1               DISMOUNT
000.202                256X .MONMS  DS      1               MOUNT/NO MESSAGE
000.203                257X .DMNMS  DS      1               DISMOUNT/NO MESSAGE
000.204                258X .RESET  DS      1               RESET = DISMOUNT/MOUNT OF UNIT
000.205                259X .CLEAN  DS      1               Clean device
000.206                260X .DAD    DS      1               Dismount All Disks              /80.08.SC/
000.207                261          XTEXT   IOCDEF
```

```
                        263X **     I/O CHANNEL DEFINITIONS.
                        264X
000.000                 265X        ORG     0
                        266X
000.000                 267X IOC.LNK DS     2           ADDRESS OF NEXT CHANNEL, =0 IF LAST
000.002                 268X IOC.DDA DS     2           THREAD JUMP TO DEVICE DRIVER (VIA DEV TABLE)
                        269X
000.004                 270X IOC.FLG DS     1           FILE TYPE FLAGS
000.001                 271X FT.DD  EQU     00000001B   =1 IF DIRECTORY DEVICE
000.002                 272X FT.OR  EQU     00000010B   =1 IF OPEN FOR READ
000.004                 273X FT.OW  EQU     00000100B   =1 IF OPEN FOR WRITE
000.010                 274X FT.OU  EQU     00001000B   =1 IF OPEN FOR UPDATE
000.020                 275X FT.OC  EQU     00010000B   =1 IF OPEN FOR CHARACTER MODE   /80.02.GC/
000.003                 276X IOC.SQL EQU    *-IOC.DDA   LENGTH OF INFO FOR SEQUENTIAL FILE (FROM IOC)
                        277X
000.005                 278X IOC.GRT DS     2           ADDRESS OF GROUP RESERVATION TABLE
000.007                 279X IOC.SPG DS     1           SECTORS PER GROUP, THIS DEVICE
000.010                 280X IOC.CGN DS     1           CURRENT GROUP NUMBER
000.011                 281X IOC.CSI DS     1           CURRENT SECTOR INDEX (IN CURRENT GROUP)
000.012                 282X IOC.LGN DS     1           LAST GROUP NUMBER
000.013                 283X IOC.LSI DS     1           LAST SECTOR INDEX (IN LAST GROUP)
000.010                 284X IOC.DRL EQU    *-IOC.FLG   LENGTH OF INFO NORMALLY COPIED BACK TO
                        285X *                          THE CHANNEL TABLE
000.014                 286X IOC.DTA DS     2           DEVICE TABLE ADDRESS FOR THIS DEVICE
000.016                 287X IOC.DES DS     2           SECTOR NUMBER OF DIRECTORY ENTRY
000.020                 288X IOC.DEV DS     2           DEVICE CODE
000.022                 289X IOC.UNI DS     1           UNIT NUMBER (0-9)
000.021                 290X IOC.DIL EQU    *-IOC.DDA   LENGTH OF INFO FOR DIRECTORY FILE (FROM IOC)
                        291X
000.023                 292X IOC.DIR DS     DIRELEN     DIRECTORY ENTRY
                        293X
000.052                 294X IOCELEN EQU    *           IOC ENTRY LENGTH
                        295X
000.001                 296X IOCCTD  EQU    1           INDEX OF USER CHANNEL #0 IN CHANTAB (FIRST = 0)
000.052                 297         XTEXT   OVLDEF


                        299X **     OVERLAY TABLE ENTRYS.
                        300X
000.000                 301X        ORG     0
                        302X
000.000                 303X OVL.COD DS     2           FIRST SECTOR OF OVERLAY CODE
000.002                 304X OVL.SIZ DS     2           OVERLAY SIZE
000.004                 305X OVL.ENT DS     2           OVERLAY ENTRY POINT
000.006                 306X OVL.FLB DS     1           OVERLAY FLAG BYTE
000.007                 307X         DS     1           DUMMY BYTE TO ROUND TABLE SIZE UP TO 8
000.010                 308X OVL.ENS EQU    *           OVERLAY ENTRY SIZE
                        309X
                        310X *      OVERLAY INDICES
                        311X
000.000                 312X        ORG     0
                        313X
000.000                 314X OVL0   DS      1
000.001                 315X OVL1   DS      1
```

```
000.002                 316           XTEXT   MTRDEF


                        318X **       HDOS MONITOR PRIVATE RAM AREA DEFINITIONS.
                        319X
000.000                 320X          ORG     0
000.000                 321X M.SYSM   DS      1               SYSCALL ITTERATION COUNT
000.001                 322X M.SALO   DS      1               STAND-ALONE FLAG
000.002                 323X M.CSLC   DS      1               LINES IN CONSOLE BUFFER
000.003                 324X M.CPRE   DS      1               CONSOLE PREVIOUS CHARACTER
000.004                 325X M.CRUB   DS      1               CONSOLE RUBOUT FLAG
000.005                 326X M.CINT   DS      1               CONSOLE INTERRUPT FLAG
000.006                 327X M.CIN    DS      2               CONSOLE CB IN POINTER
000.010                 328X M.COUT   DS      2               CONSOLE CB OUT POINTER
000.012                 329X M.CFWA   DS      2               CONSOLE CB FWA POINTER
000.014                 330X M.CLWA   DS      2               CONSOLE CB LWA POINTER
000.016                 331X M.CULY   DS      1               CONSOLE PAD CHARACTER COUNT
000.017                 332X M.CDCA   DS      2               ADDRESS OF CHARACTER BEING PADDED
000.021                 333X M.SUNI   DS      1               System Unit Number              /80.05.sc/
000.022                 334X M.SYDD   DS      2               Address of Raw System Driver    /80.09.sc/
                        335
000.024                 336           XTEXT   HOSEQU


                        338X **       HDOS SYSTEM EQUIVALENCES.
                        339X *
                        340X
024.000                 341X S.GRT0   EQU     24000A          SYSTEM AREA FOR  GRT0
025.000                 342X S.GRT1   EQU     25000A          SYSTEM AREA FOR  GRT1
026.000                 343X S.GRT2   EQU     26000A          SYSTEM AREA FOR  GRT2
                        344X
030.000                 345X ROMBOOT  EQU     30000A          ROM BOOT ENTRY
                        346X
040.100                 347X          ORG     40100A          FREE SPACE FROM PAM-8
                        348X
040.100                 349X          DS      8               JUMP TO SYSTEM EXIT
040.110                 350X D.CON    DS      16              DISK CONSTANTS
040.130                 351X SYDD     EQU     *               SYSTEM DISK ENTRY POINT
040.130                 352X D.VEC    DS      24*3            SYSTEM ROM ENTRY VECTORS
040.240                 353X D.RAM    DS      31              SYSTEM ROM WORK AREA
040.277                 354X S.VAL    DS      36              SYSTEM VALUES
040.343                 355X S.INT    DS      115             SYSTEM INTERNAL WORK AREAS
041.126                 356X          DS      16
041.146                 357X S.SOVR   DS      2               STACK OVERFLOW WARNING
041.150                 358X          DS      42200A-*        SYSTEM STACK
001.032                 359X STACKL   EQU     *-S.SOVR        STACK SIZE
                        360X
042.200                 361X STACK    EQU     *               LWA+1 SYSTEM STACK
042.200                 362X USERFWA  EQU     *               USER FWA
042.200                 363           XTEXT   ESINT
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                        365X **      S.INT - SYSTEM INTERNAL WORKAREA DEFINITIONS.
                        366X *
                        367X *       THESE CELLS ARE REFERENCED BY OVERLAYS AND MAIN CODE, AND
                        368X *       MUST THEREFORE RESIDE IN FIXED LOW MEMORY.
                        369X
                        370X
    040.343             371X         ORG     S.INT
                        372X
                        373X **      CONSOLE STATUS FLAGS
                        374X
    040.343             375X S.CDB   DS      1               CONSOLE DESCRIPTOR BYTE
    000.000             376X CDB.H85 EQU     00000000B
    000.001             377X CDB.H84 EQU     00000001B       =0 IF H8-5, =1 IF H8-4
    040.344             378X S.BAUD  DS      2               [0-14]  H8-4 BAUD RATE, =0 IF H8-5
                        379X *                               [15]    =1 IF BAUD RATE => 2 STOP BITS
                        380X
                        381X **      TABLE ADDRESS WORDS
                        382X
    040.346             383X S.DLINK DS      2               ADDRESS OF DATA IN HDOS CODE
    040.350             384X S.OFWA  DS      2               FWA  OVERLAY  TABLE
    040.352             385X S.CFWA  DS      2               FWA  CHANNEL  TABLE
    040.354             386X S.DFWA  DS      2               FWA  DEVICE   TABLE
    040.356             387X S.RFWA  DS      2               FWA  RESIDENT HDOS CODE
                        388X
                        389X **      DEVICE DRIVER DELAYED LOAD FLAGS
                        390X
    040.360             391X S.DDLDA DS      2               DRIVER LOAD ADDRESS (HIGH BYTE=0 IF NO LOAD PENDING)
    040.362             392X S.DDLEN DS      2               CODE LENGTH IN BYTES
    040.364             393X S.DDGRP DS      1               GROUP NUMBER FOR DRIVER
    040.365             394X         DS      1               HOLD PLACE
                        395X *S.DDSEC        DS      2               SECTOR NUMBER FOR DRIVER ( * OBSOLETE ! * )
    040.366             396X S.DDDTA DS      2               DEVICE'S ADDRESS IN DEVLST +DEV.RES
    040.370             397X S.DDOPC DS      1               OPEN OPCODE PENDEDING
                        398X
                        399X **      OVERLAY MANAGEMENT FLAGS
                        400X
    000.001             401X OVL.IN  EQU     00000001B       IN MEMORY
    000.002             402X OVL.RES EQU     00000010B       PERMINANTLY RESIDENT
    000.014             403X OVL.NUM EQU     00001100B       OVERLAY NUMBER MASK
    000.200             404X OVL.UCS EQU     10000000B       USER CODE SWAPPED FOR OVERLAY
                        405X
    040.371             406X S.OVLFL DS      1               OVERLAY FLAG
    040.372             407X S.UCSF  DS      2               FWA SWAPPED USER CODE
    040.374             408X S.UCSL  DS      2               LENGTH SWAPPED USER CODE
    040.376             409X S.OVLS  DS      2               SIZE OF OVERLAY CODE
    041.000             410X S.OVLE  DS      2               ENTRY POINT OF OVERLAY CODE
                        411X
    041.002             412X S.SSN   DS      2               SWAP AREA SECTOR NUMBER
    041.004             413X S.OSN   DS      2               OVERLAY SECTOR NUMBER
                        414X
                        415X *       SYSCALL PROCESSING WORK AREAS
                        416X
    041.006             417X S.CACC  DS      1               (ACC) UPON SYSCALL
    041.007             418X S.CODE  DS      1               SYSCALL INDEX IN PROGRESS
                        419X
                        420X *       JUMPS TO ROUTINES IN RESIDENT HDOS CODE
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                    421X
041.010             422X S.JUMPS DS      0              START OF DUMP VECTORS
041.010             423X S.SDD   DS      3              JUMP TO STAND-IN DEVICE DRIVER
041.013             424X S.FASER DS      3              JUMP TO FATSERR (FATAL SYSTEM ERROR)
041.016             425X S.DIREA DS      3              JUMP TO DIREAD (DISK FILE READ)
041.021             426X S.FCI   DS      3              JUMP TO FCI (FETCH CHANNEL INFO)
041.024             427X S.SCI   DS      3              JUMP TO SCI (STORE CHANNEL INFO)
041.027             428X S.GUP   DS      3              JUMP TO GUP (GET UNIT POINTER)
                    429X
041.032             430X S.MOUNT DS      1              <>0 IF THE SYSTEM DISK IS MOUNTED
041.033             431X S.DCS   DS      1              DEFAULT CLUSTER SIZE-1
                    432X
041.034             433X S.BOOTF DS      1              BOOT FLAGS
000.001             434X BOOT.P  EQU     00000001B      EXECUTE PROLOGUE UPON BOOTUP
                    435X
                    436X *       STACK VALUE SAVED FOR OVERLAY SYSCALLS
                    437X
041.035             438X S.OVSTK DS      2              VALUE OF SP UPON SYSCALLS USING OVERLAY
                    439X
041.037             440X         DS      1              RESERVED


                    442X **      ACTIVE I/O AREA.
                    443X *
                    444X *       THE AIO.XXX AREA CONTAINS INFORMATION ABOUT THE I/O OPERATION
                    445X *       CURRENTLY BEING PERFORMED. THE INFORMATION IS OBTAINED FROM
                    446X *       THE CHANNEL TABLE, AND WILL BE RESTORED THERE WHEN DONE.
                    447X *
                    448X *       NORMALLY, THE AIO.XXX INFORMATION WOULD BE OBTAINED DIRECTLY
                    449X *       FROM VARIOUS SYSTEM TABLES VIA POINTER REGISTERS. SINCE THE
                    450X *       8080 HAS NO GOOD INDEXED ADDRESSING, THE DATA IS MANUALLY
                    451X *       COPIED INTO THE AIO.XXX CELLS BEFORE PROCESSING, AND
                    452X *       BACKDATED AFTER PROCESSING.
                    453X
041.040             454X AIO.VEC DS      3              JUMP INSTRUCTION
041.041             455X AIO.DDA EQU     *-2            DEVICE DRIVER ADDRESS
041.043             456X AIO.FLG DS      1              FLAG BYTE
041.044             457X AIO.GRT DS      2              ADDRESS OF GROUP RESERV TABLE
041.046             458X AIO.SPG DS      1              SECTORS PER GROUP
041.047             459X AIO.CGN DS      1              CURRENT GROUP NUMBER
041.050             460X AIO.CSI DS      1              CURRENT SECTOR INDEX
041.051             461X AIO.LGN DS      1              LAST GROUP NUMBER
041.052             462X AIO.LSI DS      1              LAST SECTOR INDEX
041.053             463X AIO.DTA DS      2              DEVICE TABLE ADDRESS
041.055             464X AIO.DES DS      2              DIRECTORY SECTOR
041.057             465X AIO.DEV DS      2              DEVICE CODE
041.061             466X AIO.UNI DS      1              UNIT NUMBER (0-9)
                    467X
041.062             468X AIO.DIR DS      DIRELEN        DIRECTORY ENTRY
                    469X
041.111             470X AIO.CNT DS      1              SECTOR COUNT
041.112             471X AIO.EOM DS      1              END OF MEDIA FLAG
041.113             472X AIO.EOF DS      1              END OF FILE FLAG
041.114             473X AIO.TFP DS      2              TEMP FILE POINTERS
```

```
041.116                 474X AIO.CHA DS      2              ADDRESS OF CHANNEL BLOCK (IOC.DDA)


041.120                 476X S.BDA   DS      1              Boot Device Address (Setup by ROM) /80.09.sc/
041.121                 477X S.SCR   DS      2              SYSTEM SCRATCH AREA ADDRESS
041.123                 478          XTEXT   ESVAL


                        480X **      S.VAL - SYSTEM VALUE DEFINTIONS.
                        481X *
                        482X *       THESE VALUES ARE SET AND MAINTAINED BY THE SYSTEM.
                        483X *
                        484X *       THE DECK HOSEQU MUST BE MODIFIED WHEN THIS IS MODIFIED.
                        485X
                        486X
040.277                 487X         ORG     S.VAL
                        488X
040.277                 489X S.DATE  DS      9              SYSTEM DATE (IN ASCII)
040.310                 490X S.DATC  DS      2              CODED DATE
040.312                 491X S.TIME  DS      4              TIME FROM MIDNIGHT (IN TICS)
040.316                 492X S.HIMEM DS      2              HARDWARE HIGH MEMORY ADRESS+1
                        493X
040.320                 494X S.SYSM  DS      2              FWA RESIDENT SYSTEM
                        495X
040.322                 496X S.USRM  DS      2              LWA USER MEMORY
                        497X
040.324                 498X S.OMAX  DS      2              MAX OVERLAY SIZE FOR SYSTEM
                        499X
                        500X
                        501X **      THE FOLLOWING FIVE CELLS SHOULD BE MODIFIED/READ ONLY VIA THE .CONSL SYSCALL
                        502X
000.200                 503X CSL.ECH EQU     10000000B      SUPPRESS ECHO
000.004                 504X CSL.RAW EQU     00000100B      Raw Mode I/O                    /80.09.sc/
000.002                 505X CSL.WRP EQU     00000010B      WRAP LINES AT WIDTH
000.001                 506X CSL.CHR EQU     00000001B      OPERATE IN CHARACTER MODE
                        507X
000.000                 508X I.CSLMD EQU     0              S.CSLMD IS FIRST BYTE
040.326                 509X S.CSLMD DS      1              CONSOLE MODE
                        510X
000.200                 511X CTP.BKS EQU     10000000B      TERMINAL PROCESSES BACKSPACES
000.100                 512X CTP.FF  EQU     01000000B      Terminal Processes Form-Feed    /80.09.sc/
000.040                 513X CTP.MLI EQU     00100000B      MAP LOWER CASE TO UPPER ON INPUT
000.020                 514X CTP.MLO EQU     00010000B      MAP LOWER CASE TO UPPER ON OUTPUT
000.010                 515X CTP.2SB EQU     00001000B      TERMINAL NEEDS TWO STOP BITS
000.002                 516X CTP.BKM EQU     00000010B      MAP BKSP (UPON INPUT) TO RUBOUT
000.001                 517X CTP.TAB EQU     00000001B      TERMINAL SUPPORTS TAB CHARACTERS
                        518X
000.001                 519X I.CONTY EQU     1              S.CONTY IS 2ND BYTE
000.000                 520X         ERRNZ   *-S.CSLMD-I.CONTY
040.327                 521X S.CONTY DS      1              CONSOLE TYPE FLAGS
000.002                 522X I.CUSOR EQU     2              S.CUSOR IS 3RD BYTE
000.000                 523X         ERRNZ   *-S.CSLMD-I.CUSOR
```

```
040.330                 524X S.CUSOR DS      1               CURRENT CURSOR POSITION
000.003                 525X I.CONWI EQU     3               S.CONWI IS 4TH BYTE
000.000                 526X         ERRNZ   *-S.CSLMD-I.CONWI
040.331                 527X S.CONWI DS      1               CONSOLE WIDTH
                        528X
000.001                 529X CO.FLG  EQU     00000001B       CTL-O FLAG
000.200                 530X CS.FLG  EQU     10000000B       CTL-S FLAG
                        531X
000.004                 532X I.CONFL EQU     4               S.CONFL IS 5TH BYTE
000.000                 533X         ERRNZ   *-S.CSLMD-I.CONFL
040.332                 534X S.CONFL DS      1               CONSOLE FLAGS
                        535X
040.333                 536X S.CAADR DS      2               ADDRESS FOR ABORT PROCESSING (>256 IF VALID)
040.335                 537X S.CCTAB DS      6               ADDR FOR CTL-A, CTL-B, CTL-C PROCESSING
                        538
040.343                 539          XTEXT   ASCII

                        541X **      ASCII CHARACTER EQUIVALENCES.
                        542X
000.015                 543X CR      EQU     13              CARRIAGE RETURN
000.012                 544X LF      EQU     10              LINE FEED
000.200                 545X NULL    EQU     200Q            PAD CHARACTER
000.000                 546X NUL2    EQU     0
000.007                 547X BELL    EQU     7               BELL CHARACTER
000.177                 548X RUBOUT  EQU     177Q
000.010                 549X BKSP    EQU     10Q             CTL-H
000.026                 550X C.SYN   EQU     26Q             SYNC
000.002                 551X C.STX   EQU     2               STX
000.047                 552X QUOTE   EQU     47Q
000.011                 553X TAB     EQU     11Q
000.033                 554X ESC     EQU     33Q
000.012                 555X NL      EQU     12Q             NEW LINE (HDOS SYSTEMS)
000.212                 556X ENL     EQU     NL+200Q         NL + END-OF-LINE-FLAG
000.014                 557X FF      EQU     14Q             FORM FEED
000.001                 558X CTLA    EQU     01Q             CTL-A
000.002                 559X CTLB    EQU     02Q             CTL-B
000.003                 560X CTLC    EQU     03Q             CTL-C
000.004                 561X CTLD    EQU     04Q             CTL-D
000.017                 562X CTLO    EQU     17Q             CTL-O
000.020                 563X CTLP    EQU     20Q             CTL-P
000.021                 564X CTLQ    EQU     21Q             CTL-Q
000.023                 565X CTLS    EQU     23Q             CTL-S
000.032                 566X CTLZ    EQU     32Q             CTL-Z
                        567

                        569  **      Assembly Constants
                        570  *
                        571
053.200                 572  ORIGIN  EQU     DDF.BOL*256+USERFWA
                        573
053.170                 574          ORG     ORIGIN-ABS.COD
                        575
```

```
053.170  377 000        576             DB      377Q,FT.ABS
053.172  200 053        577             DW      LOAD
053.174  303 002        578             DW      MEML-LOAD
053.176  200 053        579             DW      ENTRY
                        580
053.200                 581  LOAD       EQU     *
```

```
                                584  ***     Main Line
                                585  *
                                586
053.200  377 011                587  ENTRY   SCALL   .VERS
053.202  365                    588          PUSH    PSW
053.203  076 050                589          MVI     A,EC.NCV
053.205  332 031 054            590          JC      ERROR           Probably No Version System Call
053.210  361                    591          POP     PSW
053.211  376 040                592          CPI     VERS
053.213  302 031 054            593          JNZ     ERROR           NOT the correct version
                                594
053.216  076 377                595          MVI     A,-1
053.220  377 055                596          SCALL   .CLEAR          Clear the link channel
053.222  332 031 054            597          JC      ERROR
                                598
053.225  041 000 000            599          LXI     H,0
053.230  071                    600          DAD     SP
053.231  021 200 042            601          LXI     D,STACK
053.234  315 064 055            602          CALL    HLCPDE
053.237  302 250 053            603          JNZ     BOO1            Command line passed on stack
                                604
                                605  *       No command line passed on the stack
                                606
053.242  315 056 054            607          CALL    PDN
053.245  303 253 053            608          JMP     BOO2
                                609
                                610  *       Command line passed on the stack
                                611
053.250  315 112 054            612  BOO1    CALL    PDN.
                                613
                                614  *       Boot the device
                                615
053.253  041 354 055            616  BOO2    LXI     H,DEVICE
053.256  377 062                617          SCALL   .LOADD          Load the driver before dismount
053.260  332 031 054            618          JC      ERROR
                                619
053.263  042 361 055            620          SHLD    DEVTAB          Save device table entry address
053.266  021 003 000            621          LXI     D,DEV.JMP
053.271  031                    622          DAD     D
053.272  042 054 054            623          SHLD    DRIVERA         Stuff driver address
                                624
053.275  315 047 055            625          CALL    $DOS.
053.300  332 031 054            626          JC      ERROR
                                627
053.303  076 012                628  BOO3    MVI     A,DC.RDY
053.305  315 041 054            629          CALL    DRIVER
053.310  332 303 053            630          JC      BOO3            Wait for device to so ready
                                631
053.313  076 007                632          MVI     A,DC.ABT
053.315  315 041 054            633          CALL    DRIVER          Abort the device
                                634
053.320  041 000 000            635          LXI     H,0
053.323  076 010                636          MVI     A,DC.MOU
053.325  315 041 054            637          CALL    DRIVER          Mount the volume
                                638
053.330  001 000 011            639          LXI     B,DDF.BOL*256
```

```
053.333  021 200 042   640          LXI     D,USERFWA
053.336  041 000 000   641          LXI     H,0
053.341  076 002       642          MVI     A,DC.RER
053.343  315 041 054   643          CALL    DRIVER          Read a maximal boot from the device
053.346  332 031 054   644          JC      ERROR
                       645
053.351  052 354 055   646          LHLD    DEVICE
053.354  021 123 131   647          LXI     D,'YS'
053.357  315 064 055   648          CALL    HLCPDE
053.362  302 200 042   649          JNZ     USERFWA         Execute the boot code
                       650
                       651  *       Re-Compute the Physical device number
                       652
053.365  052 361 055   653          LHLD    DEVTAB
053.370  315 077 055   654          CALL    $INDLB
053.373  010 000       655          DW      DEV.MNU
053.375  127           656          MOV     D,A             D  = Maximum number of units
                       657
053.376  052 346 040   658          LHLD    S.DLINK
054.001  315 077 055   659          CALL    $INDLB
054.004  021 000       660          DW      M.SUN1
054.006  137           661          MOV     E,A             E  = Physical unit 0
                       662
054.007  072 061 041   663          LDA     AIO.UN1
054.012  203           664          ADD     E
054.013  222           665          SUB     D
054.014  062 061 041   666          STA     AIO.UNI         Set real boot unit
054.017  322 200 042   667          JNC     USERFWA         Enter the user code
                       668
054.022  202           669          ADD     D
054.023  062 061 041   670          STA     AIO.UNI         Set real boot unit
054.026  303 200 042   671          JMP     USERFWA         Enter the user code


                       673  **      ERROR
                       674  *
                       675
054.031  046 012       676  ERROR   MVI     H,NL
054.033  377 057       677          SCALL   .ERROR
                       678
054.035  076 001       679          MVI     A,1
054.037  377 000       680          SCALL   .EXIT
```

```
                                684  **      DRIVER  - Call Device Driver
                                685  *
                                686  *       DRIVER calls the device driver specified from the look-up.
                                687  *
                                688  *       ENTRY:  NONE
                                689  *
                                690  *       EXIT:   NONE
                                691  *
                                692  *       USES:   NONE
                                693  *
                                694
054.041  365                    695  DRIVER  PUSH    PSW
054.042  072 356 055            696          LDA     UNIT
054.045  326 060                697          SUI     '0'
054.047  062 061 041            698          STA     AIO.UNI         Set the unit
054.052  361                    699          POP     PSW
                                700
054.053  303 377 377            701          JMP     -1
054.054                         702  DRIVERA EQU     *-2             Word to patch with driver address


                                704  **      PDN     - Parse Device Name
                                705  *
                                706  *       PDN parses the device name, with SY0: for the default.
                                707  *
                                708  *       ENTRY:  NONE
                                709  *
                                710  *       EXIT:   PSW     = 'C' set   if    ERROR
                                711  *                               A  = Error code
                                712  *                             'C' clear if NO Error
                                713  *                               DEVICE = devie specification
                                714  *                               UNIT   = unit number
                                715  *               To EXIT if CTL-D struck
                                716  *
                                717
054.056  315 160 054            718  PDN     CALL    $CCO
054.061  315 136 031            719          CALL    $TYPTX
054.064  012                    720          DB      NL
054.065  104 145 166            721          DB      'Device<SY0:>?',' '+2000
                                722
054.103  315 202 055            723          CALL    $ITL,
054.106  330                    724          RC
                                725
054.107  041 363 055            726          LXI     H,ITLA          HL = address of device specification
054.112  001 147 054            727  PDN.    LXI     B,PDNA          BC = address of decode area
054.115  021 152 054            728          LXI     D,PDNC          DE = default device
054.120  315 175 054            729          CALL    DDS
054.123  076 006                730          MVI     A,EC.IDN
054.125  332 031 054            731          JC      ERROR
                                732
054.130  052 147 054            733          LHLD    PDNA
054.133  042 354 055            734          SHLD    DEVICE
054.136  072 151 054            735          LDA     PDNB
054.141  306 060                736          ADI     '0'
```

```
054.143  062 356 055   737          STA     UNIT
054.146  311           738          RET
                       739
054.147  170 170       740  PDNA    DB      'xx'            2-Byte Device
054.151  000           741  PDNB    DB      0               1-Byte Unit
                       742
054.152  123 131 060   743  PDNC    DB      'SY0',0,0,0     Default Device
```

```
054.160                 746           XTEXT   CCO


                        748X **       $CCO - CLEAR CONTROL-O
                        749X *
                        750X *        $CCO IS CALLED TO CLEAR THE EFFECT OF THE CTL-O CHARACTER.
                        751X *
                        752X *        ENTRY   NONE
                        753X *        EXIT    NONE
                        754X *        USES    NONE
                        755X
                        756X
054.160 315 054 031     757X $CCO     CALL    $SAVALL         SAVE REGISTERS
054.163 076 004         758X          MVI     A,1,CONFL
054.165 001 001 000     759X          LXI     B,CO.FLG        CLEAR CO.FLG
054.170 377 006         760X          DB      SYSCALL,.CONSL
054.172 303 047 031     761X          JMP     $RSTALL         RESTORE REGISTERS AND RETURN
054.175                 762           XTEXT   DDS


                        764X **       DDS     -  Decode Device Specification                /80.05.sc/
                        765X *
                        766X *        DDS decodes the device specification, returning a two character
                        767X *        device name, and one byte unit number.
                        768X *
                        769X *
                        770X *        ENTRY:  BC      = Address of destination fields
                        771X *                DE      = Address of default
                        772X *                HL      = Address of string specifier
                        773X *
                        774X *        EXIT:   PSW     = 'C' SET   if ERROR
                        775X *                          'C' CLEAR if NO ERROR
                        776X *
                        777X *        USES:   ALL
                        778X *
                        779X
054.175                 780X DDS      EQU     *
                        781X
                        782X *        Initialize the fields to the defaults
                        783X
054.175 305             784X          PUSH    B
054.176 315 305 054     785X          CALL    DDS3
054.201 315 305 054     786X          CALL    DDS3
054.204 032             787X          LDAX    D
054.205 326 060         788X          SUI     '0'
054.207 002             789X          STAX    B
054.210 301             790X          POP     B
                        791X
054.211 176             792X          MOV     A,M
054.212 247             793X          ANA     A
054.213 310             794X          RZ                      took the default
                        795X
```

```
                            796X *      Check the supplied name
                            797X
054.214  315 325 055        798X        CALL    $SUB            skip the whitespace
054.217  315 266 054        799X        CALL    DDS2
054.222  330                800X        RC                      Not alpha
054.223  315 266 054        801X        CALL    DDS2
054.226  330                802X        RC                      Not alpha
                            803X
054.227  176                804X        MOV     A,M
054.230  376 072            805X        CPI     ':'
054.232  076 000            806X        MVI     A,0             assume unit 0
054.234  312 250 054        807X        JZ      DDS1            default to unit 0
                            808X
                            809X *      Check for a valid digit
                            810X
054.237  176                811X        MOV     A,M
054.240  326 060            812X        SUI     '0'
054.242  330                813X        RC                      Not digit
054.243  376 010            814X        CPI     7+1
054.245  077                815X        CMC
054.246  330                816X        RC                      digit too large
054.247  043                817X        INX     H
                            818X
054.250  002                819X DDS1   STAX    B
054.251  003                820X        INX     B
054.252  176                821X        MOV     A,M
054.253  043                822X        INX     H
054.254  376 072            823X        CPI     ':'
054.256  067                824X        STC
054.257  300                825X        RNZ                     requires ':'
                            826X
054.260  176                827X        MOV     A,M
054.261  247                828X        ANA     A
054.262  067                829X        STC
054.263  300                830X        RNZ                     require 'NULL'
                            831X
054.264  247                832X        ANA     A               Clear ERROR flag
054.265  311                833X        RET
                            834X
054.266  176                835X DDS2   MOV     A,M
054.267  043                836X        INX     H
054.270  315 216 055        837X        CALL    $MCU
054.273  376 101            838X        CPI     'A'
054.275  330                839X        RC                      Not alpha
                            840X
054.276  376 133            841X        CPI     'Z'+1
054.300  077                842X        CMC
054.301  330                843X        RC                      Not alpha
                            844X
054.302  002                845X        STAX    B
054.303  003                846X        INX     B               replace the default char
054.304  311                847X        RET
                            848X
054.305  032                849X DDS3   LDAX    D
054.306  023                850X        INX     D
054.307  315 216 055        851X        CALL    $MCU            Map to upper case
```

```
054.312  002          852X          STAX    B
054.313  003          853X          INX     B
054.314  311          854X          RET
000.000               855X          ERRNZ   IOC.UNI-IOC.DEV-2       2 byte device
000.000               856X          ERRNZ   IOC.DIR-IOC.UNI-1       1 byte unit
054.315               857           XTEXT   DOS


                      859X **       $DOS - DISMOUNT OPERATING SYSTEM.
                      860X *
                      861X *        $DOS disounts all units of all directory devices        /80.04.sc/
                      862X *
                      863X *        THE USER IS MESSAGED ABOUT THE DISKS, AND THE OPERATING
                      864X *        SYSTEM IS NOTIFIED.
                      865X *
                      866X *
                      867X *        ENTRY   NONE
                      868X *
                      869X *        EXIT    (PSW)   = 'C' CLEAR IF NO ERROR
                      870X *                          'C' SET   IF    ERROR
                      871X *                          (A)   = ERROR CODE
                      872X *
                      873X *        USES    ALL
                      874X *
                      875X
054.315  315 136 031  876X $DOS     CALL    $TYPTX
054.320  012 007 104  877X          DB      NL;BELL;'Dismounting All Disks!';NL;ENL
                      878X
054.352  315 047 055  879X          CALL    $DOS.
054.355  330          880X          RC
                      881X
054.356  315 136 031  882X          CALL    $TYPTX
054.361  012 122 145  883X          DB      NL;'Remove the Disk(s), Hit RETURN when ready!';' '+2000
                      884X
055.035  315 247 055  885X DOS1     CALL    $RCHAR          READ CHARACTER
055.040  376 012      886X          CPI     NL
055.042  302 035 055  887X          JNE     DOS1
                      888X
055.045  247          889X          ANA     A               CLEAR CARRY
055.046  311          890X          RET


055.047  076 000      892X $DOS.    MVI     A;OVL0
055.051  377 010      893X          SCALL   .LOADO
055.053  330          894X          RC
                      895X
055.054  076 001      896X          MVI     A;OVL1
055.056  377 010      897X          SCALL   .LOADO
055.060  330          898X          RC
                      899X
055.061  377 206      900X          SCALL   .DAD            Dismount all Disks              /80.09.sc/
055.063  311          901X          RET
```

```
055.064                 902             XTEXT   HLCPDE
                        903X **         HLCPDE  - (HL) COMPARED TO (DE)
                        904X *
                        905X *          THIS ROUTINE IS DOUBLE WORD COMPARE OF REGISTER PAIRS (DE) AND (HL).
                        906X *
                        907X *          ENTRY:  (HL)&(DE) SET UP
                        908X *
                        909X *          EXIT:   (PSW)   =
                        910X *                          'Z' SET   IF (HL) =  (DE)
                        911X *                          'C' SET   IF (HL) <  (DE)
                        912X *                          'C' CLEAR IF (HL) >= (DE)
                        913X *
                        914X *
                        915X *          USES:   (PSW)
                        916X *
                        917X
055.064  174            918X HLCPDE     MOV     A,H
055.065  272            919X            CMP     D       'C' SET => (A) < (D)
055.066  300            920X            RNZ
055.067  175            921X            MOV     A,L
055.070  273            922X            CMP     E       'C' SET => (L) < (E)
055.071  311            923X            RET
055.072                 924             XTEXT   ILDEHL


                        926X **         ILDEHL  - INDEXED LOAD OF DE FROM HL
                        927X *
                        928X *          'DE' GET THE FULL WORD VALUE POINTED TO BY 'HL', AND 'HL' IS
                        929X *          INCREMENTED BY TWO.
                        930X *
                        931X *          ENTRY:  HL      = ADDRESS OF FULL WORD VALUE
                        932X *
                        933X *          EXIT:   DE      = (HL)
                        934X *                  HL      = HL + 2
                        935X *
                        936X *          USES:   DE
                        937X *
                        938X
055.072  136            939X ILDEHL     MOV     E,M
055.073  043            940X            INX     H
055.074  126            941X            MOV     D,M
055.075  043            942X            INX     H
055.076  311            943X            RET
055.077                 944             XTEXT   INDL
```

```
                        946X **     $INDL - INDEXED LOAD.
                        947X *
                        948X *      $INDL LOADS DE WITH THE TWO BYTES AT (HL)+DISPLACMENT
                        949X *
                        950X *      THIS ACTS AS AN INDEXED FULL WORD LOAD.
                        951X *
                        952X *      (DE) = ( (HL) + DSPLACEMENT )
                        953X *
                        954X *      ENTRY   ((RET)) = DISPLACMENT (FULL WORD)
                        955X *              (HL) = TABLE ADDRESS
                        956X *      EXIT    TO (RET+2)
                        957X *      USES    A,F,D,E
                        958X
                        959X
030.234                 960X $INDL  EQU     30234A          IN H17 ROM
055.077                 961         XTEXT   INDXX


                        963X **     $INDLB - INDEXED LOAD BYTE
                        964X *
                        965X *      BYTE INDEXED LOAD PRIMITIVE
                        966X *
                        967X *      ENTRY:  HL      = BASE ADDRESS
                        968X *              (RET)   = FULL WORD RELOCATION
                        969X *
                        970X *      EXIT:   A       = ( HL + (RET) )
                        971X *
                        972X *      USES:   A
                        973X *
                        974X
055.077  353           975X $INDLB  XCHG                    DE = BASE
055.100  343           976X         XTHL                    SAVE  .DE.
055.101  325           977X         PUSH    D               SAVE  BASE
055.102  305           978X         PUSH    B               SAVE  .BC.
                        979X
055.103  116           980X         MOV     C,M
055.104  043           981X         INX     H
055.105  106           982X         MOV     B,M             BC = OFFSET
055.106  043           983X         INX     H               HL = .RET.
                        984X
055.107  353           985X         XCHG                    HL = BASE
055.110  011           986X         DAD     B               HL = BASE + OFFSET
055.111  176           987X         MOV     A,M             A = ( BASE + OFFSET )
055.112  353           988X         XCHG                    HL =  .RET.
                        989X
055.113  301           990X         POP     B               RESTORE  .BC.
055.114  321           991X         POP     D               RESTORE  BASE
055.115  343           992X         XTHL                    HL = .DE. ; (SP) = .RET.
055.116  353           993X         XCHG                    DE = .DE. ; HL = BASE
055.117  311           994X         RET
```

```
                                  996X **       $INDS   -  INDEXED STORE
                                  997X *
                                  998X *        INDEXED STORE PRIMITIVE.
                                  999X *
                                  1000X *       ENTRY:  HL = BASE ADDRESS
                                  1001X *               DE = VALUE TO STORE
                                  1002X *
                                  1003X *       EXIT:   ( HL + (RET) ) = DE
                                  1004X *
                                  1005X *       USES:   NONE
                                  1006X *
                                  1007X
055.120  315 343 055             1008X $INDS   CALL    XCHGBC
055.123  343                     1009X         XTHL                    SAVE  .BC.
055.124  325                     1010X         PUSH    D
055.125  315 072 055             1011X         CALL    ILDEHL          DE = OFFSET
055.130  315 343 055             1012X         CALL    XCHGBC          BC = .RET.
055.133  353                     1013X         XCHG                    DE = BASE ; HL = OFFSET
055.134  031                     1014X         DAD     D               HL = BASE + OFFSET
055.135  353                     1015X         XCHG
055.136  343                     1016X         XTHL                    SAVE  BASE
055.137  353                     1017X         XCHG                    DE = VALUE
055.140  315 175 055             1018X         CALL    ISDEHL
055.143  341                     1019X         POP     H               HL = BASE
055.144  315 343 055             1020X         CALL    XCHGBC
055.147  343                     1021X         XTHL                    RESTORE  .BC.
055.150  315 343 055             1022X         CALL    XCHGBC
055.153  311                     1023X         RET


                                  1025X **      $INDSB  -  INDEXED BYTE STORE
                                  1026X *
                                  1027X *       INDEXED BYTE STORE.
                                  1028X *
                                  1029X *       ENTRY:  A       = VALUE TO STORE
                                  1030X *               HL      = BASE ADDRESS
                                  1031X *               (RET)   = OFFSET
                                  1032X *
                                  1033X *       EXIT:   NONE
                                  1034X *
                                  1035X *       USES:   PSW
                                  1036X *
                                  1037X
055.154  353                     1038X $INDSB  XCHG                    DE = BASE
055.155  343                     1039X         XTHL                    SAVE  .DE.
055.156  325                     1040X         PUSH    D               SAVE  BASE
055.157  305                     1041X         PUSH    B               SAVE  .BC.
                                  1042X
055.160  116                     1043X         MOV     C,M
055.161  043                     1044X         INX     H
055.162  106                     1045X         MOV     B,M             BC = OFFSET
055.163  043                     1046X         INX     H               HL = .RET.
                                  1047X
055.164  353                     1048X         XCHG                    HL = BASE
```

```
055.165  011          1049X          DAD     B               HL = BASE + OFFSET
055.166  167          1050X          MOV     M,A             ( BASE + OFFSET ) = A
055.167  353          1051X          XCHG
                       1052X
055.170  301          1053X          POP     B               RESTORE  .BC.
055.171  321          1054X          POP     D               RESTORE  BASE
055.172  343          1055X          XTHL                    HL = .DE. ; (SP) = .RET.
055.173  353          1056X          XCHG                    DE = .DE. ; HL = BASE
055.174  311          1057X          RET
055.175                1058           XTEXT   ISDEHL



                       1060X **       ISDEHL  - INDEXED STORE OF DE AT HL
                       1061X *
                       1062X *        STORE 'DE' AT THE ADDRESS POINTED TO BY 'HL', AND INCREMENT 'HL'
                       1063X *        BY 2.
                       1064X *
                       1065X *        ENTRY:  DE      = VALUE
                       1066X *                HL      = ADDRESS OF VALUE
                       1067X *
                       1068X *        EXIT:   (HL)    = DE
                       1069X *                HL      = HL + 2
                       1070X *
                       1071X *        USES:   HL
                       1072X *
                       1073X
055.175  163          1074X ISDEHL   MOV     M,E
055.176  043          1075X          INX     H
055.177  162          1076X          MOV     M,D
055.200  043          1077X          INX     H
055.201  311          1078X          RET
055.202                1079           XTEXT   ITL



                       1081X **       $ITL - INPUT TEXT LINE.
                       1082X *
                       1083X *        $ITL INPUTS A LINE FROM THE TERMINAL.
                       1084X *
                       1085X *        CHARACTER ARE ACCEPTED FROM THE TERMINAL, RUBOUT AND BACKSPACE
                       1086X *        CHARACTERS ARE PROCESSED. WHEN A CARRIAGE RETURN IS ENTERED,
                       1087X *        $ITL RETURNS.
                       1088X *
                       1089X *        ENTRY   NONE
                       1090X *        EXIT    (HL) = $ITLA
                       1091X *                (A) = TEXT LENGTH
                       1092X *        USES    A,F,H,L
                       1093X
                       1094X
055.202  315 210 055  1095X $ITL:    CALL    $ITL            INPUT LINE IN UPPER CASE
055.205  303 227 055  1096X          JMP     $MLU            MAP LINE TO UPPER
                       1097X
055.210  041 363 055  1098X $ITL     LXI     H,ITLA
```

```
055.213  303 267 055  1099X          JMP     $RTL            READ TEXT LINE
055.216               1100           XTEXT   MCU

                      1102X **       MCU - MAP LOWER CASE TO UPPER CASE.
                      1103X *
                      1104X *        MCU MAPS A LOWER CASE ALPHABETIC TO UPPER
                      1105X *        CASE.
                      1106X *
                      1107X *        ENTRY   (A) = CHARACTER
                      1108X *        EXIT    (A) = CHARACTER RESULT
                      1109X *        USES    A,F
                      1110X
                      1111X
055.216  376 141      1112X $MCU     CPI     'a'
055.220  330          1113X          RC                      NOT LOWER CASE
055.221  376 173      1114X          CPI     'z'+1
055.223  320          1115X          RNC                     NOT LOWER CASE
055.224  326 040      1116X          SUI     'a'-'A'
055.226  311          1117X          RET
055.227               1118           XTEXT   MLU

                      1120X **       MLU - MAP LOWER CASE LINE TO UPPER CASE.
                      1121X *
                      1122X *        MLU MAPS THE LOWER CASE ALPHABETICS IN A LINE TO UPPER CASE.
                      1123X *
                      1124X *        ENTRY   (HL) = LINE FWA
                      1125X *        EXIT    NONE
                      1126X *        USES    NONE
                      1127X
                      1128X
055.227  365          1129X $MLU     PUSH    PSW             SAVE (PSW)
055.230  345          1130X          PUSH    H               SAVE FWA
055.231  053          1131X          DCX     H               ANTICIPATE INX H
055.232  043          1132X $MLU1    INX     H
055.233  176          1133X          MOV     A,M             (A)= CHARACTER
055.234  315 216 055  1134X          CALL    $MCU            MAP CHAR TO UPPER
055.237  167          1135X          MOV     M,A
055.240  247          1136X          ANA     A
055.241  302 232 055  1137X          JNZ     $MLU1           MORE TO GO
055.244  341          1138X          POP     H               RESTORE (HL)
055.245  361          1139X          POP     PSW             RESTORE (PSW)
055.246  311          1140X          RET
055.247               1141           XTEXT   RCHAR
```

```
                                1143X **      $RCHAR - READ SINGLE CHARACTER FROM CONSOLE.
                                1144X *
                                1145X *       ENTRY   NONE
                                1146X *       EXIT    (A) = CHARACTER
                                1147X *       USES    A,F
                                1148X
                                1149X
055.247  377 001               1150X $RCHAR  DB      SYSCALL,.SCIN
055.251  332 247 055           1151X         JC      $RCHAR          NOT READY
055.254  311                   1152X         RET
                                1153X
055.255  377 002               1154X $WCHAR  DB      SYSCALL,.SCOUT
055.257  311                   1155X         RET
055.260                        1156          XTEXT   RTL


                                1158X **      $RTL - READ TEXT LINE.
                                1159X *
                                1160X *       $RTL READS A LINE FROM THE TERMINAL.
                                1161X *
                                1162X *       CHARACTER ARE ACCEPTED FROM THE TERMINAL, RUBOUT AND BACKSPACE
                                1163X *       CHARACTERS ARE PROCESSED. WHEN A CARRIAGE RETURN IS ENTERED,
                                1164X *       $RTL RETURNS.
                                1165X *
                                1166X *       ENTRY   (HL) = BUFFER FWA
                                1167X *       EXIT    'C' CLEAR IF OK
                                1168X *                 DATA IN BUFFER
                                1169X *                 (A) = TEXT LENGTH
                                1170X *                 'C' SET IF CTL-D STRUCK
                                1171X *       USES    A,F
                                1172X
                                1173X
055.260  315 267 055           1174X $RTL:   CALL    $RTL            $RTL IN UPPER CASE
055.263  330                   1175X         RC                      CTL-D
055.264  303 227 055           1176X         JMP     $MLU            MAP LINE TO UPPER CASE
                                1177X
055.267                        1178X $RTL    EQU     *
055.267  345                   1179X         PUSH    H               SAVE FWA
055.270  315 247 055           1180X $RTL1   CALL    $RCHAR
055.273  376 004               1181X         CPI     CTLD
055.275  312 322 055           1182X         JE      $RTL2           CTL-D STRUCK
055.300  167                   1183X         MOV     M,A
055.301  043                   1184X         INX     H
055.302  376 012               1185X         CPI     NL
055.304  302 270 055           1186X         JNE     $RTL1
055.307  053                   1187X         DCX     H
055.310  066 000               1188X         MVI     M,0
055.312  043                   1189X         INX     H
                                1190X
                                1191X *       ALL DONE, COMPUTE LENGTH
                                1192X
055.313  353                   1193X         XCHG                    (DE) = LWA+1
055.314  343                   1194X         XTHL                    (HL) = FWA
055.315  173                   1195X         MOV     A,E
```

```
055.316  225          1196X          SUB     L               (A) = LENGTH
055.317  247          1197X          ANA     A               CLEAR CARRY
055.320  321          1198X          POP     D               RESTORE (DE)
055.321  311          1199X          RET
                      1200X
                      1201X *        CTL-D STRUCK
                      1202X
055.322  341          1203X $RTL2    POP     H               (HL) = FWA
055.323  067          1204X          STC
055.324  311          1205X          RET
055.325               1206           XTEXT   SAVALL


                      1208X **       $RSTALL - RESTORE ALL REGISTERS.
                      1209X *
                      1210X *        $RSTALL RESTORES ALL THE REGISTERS OFF THE STACK, AND
                      1211X *        RETURNS TO THE PREVIOUS CALLER.
                      1212X *
                      1213X *        ENTRY   (SP) = PSW
                      1214X *                (SP+2) = BC
                      1215X *                (SP+4) = DE
                      1216X *                (SP+6) = HL
                      1217X *                (SP+8) = RET
                      1218X *        EXIT    TO *RET*, REGISTERS RESTORED
                      1219X *        USES    ALL
                      1220X
                      1221X
031.047               1222X $RSTALL EQU     31047A          IN H17 ROM


                      1224X **       $SAVALL - SAVE ALL REGISTERS ON STACK.
                      1225X *
                      1226X *        $SAVALL SAVES ALL THE REGISTERS ON THE STACK.
                      1227X *
                      1228X *        ENTRY   NONE
                      1229X *        EXIT    (SP) = PSW
                      1230X *                (SP+2) = BC
                      1231X *                (SP+4) = DE
                      1232X *                (SP+6) = HL
                      1233X *        USES    H,L
                      1234X
                      1235X
031.054               1236X $SAVALL EQU     31054A          IN H17 ROM
055.325               1237           XTEXT   SOB
```

```
                                1239X **      $SOB - SKIP OVER BLANKS.
                                1240X *
                                1241X *       $SOB IS CALLED TO SKIP AN ARBITRARILY LONG STRING OF BLANKS AND TABS.
                                1242X *
                                1243X *       ENTRY   (HL) = FWA OF (POSSIBLE) BLANK STRING
                                1244X *       EXIT    (HL) = LWA+1 OF BLANK STRING (UNCHANGED IF NO BLANKS)
                                1245X *               (A) = FIRST NON-BLANK, NON-TAB CHARACTER EEN
                                1246X *       USES    A,F,H,L
                                1247X
                                1248X
     055.325  053              1249X $SOB    DCX     H               PRE-DECREMENT
     055.326  043              1250X $SOB1   INX     H
     055.327  176              1251X         MOV     A,M
     055.330  376 040          1252X         CPI     ' '
     055.332  312 326 055      1253X         JE      $SOB1           GOT BLANK
     055.335  376 011          1254X         CPI     TAB
     055.337  312 326 055      1255X         JE      $SOB1           GOT TAB
     055.342  311              1256X         RET
     055.343                   1257          XTEXT   TYPTX


                                1259X **      $TYPTX - TYPE TEXT.
                                1260X *
                                1261X *       $TYPTX IS CALLED TO TYPE A BLOCK OF TEXT ON THE SYSTEM CONSOLE.
                                1262X *
                                1263X *       IMBEDDED ZERO BYTES INDICATE A CARRIAGE RETURN LINE FEED,
                                1264X *       A BYTE WITH THE 200Q BIT SET IS THE LAST BYTE IN THE MESSAGE.
                                1265X *
                                1266X *       ENTRY   (RET) = TEXT
                                1267X *       EXIT    TO (RET+LENGTH)
                                1268X *       USES    A,F
                                1269X
                                1270X
     031.136                    1271X $TYPTX  EQU     31136A          IN H17 ROM
                                1272X
     031.144                    1273X $TYPTX. EQU     31144A          IN H17 ROM
     055.343                    1274          XTEXT   XCHGBC


                                1276X **      XCHGBC  -  XCHG BC
                                1277X *
                                1278X *       EXCHANGE THE 'BC' REGISTER PAIR WITH THE 'HL' REGISTER PAIR.
                                1279X *
                                1280X *       ENTRY:  BC      = ORIGINAL BC
                                1281X *               HL      = ORIGINAL HL
                                1282X *
                                1283X *       EXIT:   BC      = ORIGINAL HL
                                1284X *               HL      = ORIGINAL BC
                                1285X *
                                1286X *       USES:   BC,HL
                                1287X *
                                1288X
```

```
055.343  365          1289X XCHGBC  PUSH    PSW
055.344  170          1290X         MOV     A,B
055.345  104          1291X         MOV     B,H
055.346  147          1292X         MOV     H,A
055.347  171          1293X         MOV     A,C
055.350  115          1294X         MOV     C,L
055.351  157          1295X         MOV     L,A
055.352  361          1296X         POP     PSW
055.353  311          1297X         RET
```

```
                                1300  ***     Data and Buffers
                                1301  *
                                1302
        055.354  170 170       1303  DEVICE  DB      'xx'            Device specification
        055.356  060 072 000   1304  UNIT    DB      '0:',0          Ascii unit number
                                1305
        055.361  000 000       1306  DEVTAB  DW      0               Device Table Address
                                1307
        055.363                1308  ITLA    DS      80              Line Buffer
                                1309
        056.103                1310  MEML    EQU     *
                                1311
        056.103                1312          END     ENTRY
    ASSEMBLY COMPLETE
      1312 STATEMENTS
         0 ERRORS DETECTED
     12528 BYTES FREE
```

```
$CCO    054160   718   757L
$DOS    054315   876L
$DOS.   055047   625   879   892L
$INDL   030234   960E
$INDLB  055077   654   659   975L
$INDS   055120  1008L
$INDSB  055154  1038L
$ITL    055210  1095  1098L
$ITL.   055202   723  1095L
$MCU    055216   837   851  1112L  1134
$MLU    055227  1096  1129L  1176
$MLU1   055232  1132L  1137
$RCHAR  055247   885  1150L  1151  1180
$RSTALL 031047   761  1222E
$RTL    055267  1099  1174  1178E
$RTL.   055260  1174L
$RTL1   055270  1180L  1186
$RTL2   055322  1182  1203L
$SAVALL 031054   757  1236E
$SOB    055325   798  1249L
$SOB1   055326  1250L  1253  1255
$TYPTX  031136   719   876   882  1271E
$TYPTX. 031144  1273E
$WCHAR  055255  1154L
.CHFLG  000060   244L
.CLEAN  000205   259L
.CLEAR  000055   241L   596
.CLEARA 000056   242L
.CLOSE  000046   234L
.CLRCO  000007   218L
.CONSL  000006   217L   760
.CTLC   000041   229L
.DAD    000206   260L   900
.DECODE 000053   239L
.DELET  000050   236L
.DISMT  000061   245L
.DMNMS  000203   257L
.DMOUN  000201   255L
.ERROR  000057   243L   677
.EXIT   000000   211L   680
.LINK   000040   228L
.LOADD  000062   246L   617
.LOADO  000010   219L   893   897
.MONMS  000202   256L
.MOUNT  000200   254L
.NAME   000054   240L
.OPEN   000063   247L
.OPENC  000045   233L
.OPENR  000042   230L
.OPENU  000044   232L
.OPENW  000043   231L
.POSIT  000047   235L
.PRINT  000003   214L
.READ   000004   215L
.RENAM  000051   237L
.RESET  000204   258L
.SCIN   000001   212L  1150
.SCOUT  000002   213L  1154
```

```
.SETTP  000052      238L
.SYSRES 000012      221L
.VERS   000011      220L      587
.WRITE  000005      216L
ABS.COD 000010       42L      574
ABS.ENT 000006       40L
ABS.ID  000000       36L
ABS.LDA 000002       38L
ABS.LEN 000004       39L
AIO.CGN 041047      459L
AIO.CHA 041116      474L
AIO.CNT 041111      470L
AIO.CSI 041050      460L
AIO.DDA 041041      455E
AIO.DES 041055      464L
AIO.DEV 041057      465L
AIO.DIR 041062      468L
AIO.DTA 041053      463L
AIO.EOF 041113      472L
AIO.EOM 041112      471L
AIO.FLG 041043      456L
AIO.GRT 041044      457L
AIO.LGN 041051      461L
AIO.LSI 041052      462L
AIO.SPG 041046      458L
AIO.TFP 041114      473L
AIO.UNI 041061      466L      663     666     670     698
AIO.VEC 041040      454L
BELL    000007      547E      877
BKSP    000010      549E
BOO1    053250      603       612L
BOO2    053253      608       616L
BOO3    053303      628L      630
BOOT.P  000001      434E
C.STX   000002      551E
C.SYN   000026      550E
CDB.H84 000001      377E
CDB.H85 000000      376E
CO.FLG  000001      529E      759
CR      000015      543E
CS.FLG  000200      530E
CSL.CHR 000001      506E
CSL.ECH 000200      503E
CSL.RAW 000004      504E
CSL.WRP 000002      505E
CTLA    000001      558E
CTLB    000002      559E
CTLC    000003      560E
CTLD    000004      561E     1181
CTLO    000017      562E
CTLP    000020      563E
CTLQ    000021      564E
CTLS    000023      565E
CTLZ    000032      566E
CTP.2SB 000010      515E
CTP.BKM 000002      516E
CTP.BKS 000200      511E
CTP.FF  000100      512E
```

```
CTP.MLI 000040      513E
CTP.MLO 000020      514E
CTP.TAB 000001      517E
D.CON   040110      350L
D.RAM   040240      353L
D.VEC   040130      352L
DC.ABT  000007      58L     632
DC.CLO  000006      57L
DC.LOD  000011      60L
DC.MAX  000013      62L
DC.MOU  000010      59L     636
DC.OPR  000003      54L
DC.OPU  000005      56L
DC.OPW  000004      55L
DC.RDY  000012      61L     628
DC.REA  000000      51L
DC.RER  000002      53L     642
DC.WRI  000001      52L
DDF.BOL 000011      75E     572     639
DDF.BOO 000000      74L
DDF.LAB 000011      76L
DDF.USR 000012      77L
DDS     054175      729     780E
DDS1    054250      807     819L
DDS2    054266      799     801     835L
DDS3    054305      785     786     849L
DEV.DDA 000004      93L
DEV.DVG 000015      106L
DEV.DVL 000013      105L
DEV.FLG 000006      94L
DEV.JMP 000003      92L     621
DEV.MNU 000010      102L    655
DEV.MUM 000007      101L
DEV.NAM 000000      84L
DEV.RES 000002      88L
DEV.UNT 000011      103L
DEVELEN 000016      108E
DEVICE  055354      616     646     734     1303L
DEVTAB  055361      620     653     1306L
DF.CLR  000376      129E
DF.EMP  000377      128E
DIR.ALD 000025      144L
DIR.CLU 000015      137L
DIR.CRD 000023      143L
DIR.EXT 000010      132L
DIR.FGN 000020      140L
DIR.FLG 000016      139L
DIR.LGN 000021      141L
DIR.LSI 000022      142L
DIR.NAM 000000      131L
DIR.PRO 000013      133L
DIR.VER 000014      134L
DIRELEN 000027      146E    292     468
DIRIDL  000015      135E
DQS1    055035      885L    887
DR.IM   000001      89E
DR.PR   000002      90E
DRIVER  054041      629     633     637     643     695L
```

DRIVERA	054054	623	702E							
DT.CH	000020	99E								
DT.CR	000002	96E								
DT.CW	000004	97E								
DT.DD	000001	95E								
DT.RN	000010	98E								
DV.EL	000000	85E								
DV.NU	000001	86E								
EC.CNA	000004	156L								
EC.DDA	000027	175L								
EC.DIF	000017	167L								
EC.DIW	000035	181L								
EC.DNI	000045	189L								
EC.DNR	000046	190L								
EC.DNS	000005	157L								
EC.DSC	000047	191L								
EC.EOF	000001	153L								
EC.EOM	000002	154L								
EC.FAO	000031	177L								
EC.FAP	000026	174L								
EC.FL	000030	176L								
EC.FNF	000014	164L								
EC.FNO	000011	161L								
EC.FNR	000034	180L								
EC.FOD	000043	187L								
EC.FUC	000013	163L								
EC.ICN	000016	166L								
EC.IDN	000008	158L	730							
EC.IFC	000020	168L								
EC.IFN	000007	159L								
EC.ILC	000003	155L								
EC.ILO	000040	184L								
EC.ILR	000012	162L								
EC.ILV	000037	183L								
EC.IOI	000052	194L								
EC.IS	000032	178L								
EC.NCV	000050	192L	589							
EC.NEM	000021	169L								
EC.NOS	000051	193L								
EC.NPM	000044	188L								
EC.NRD	000010	160L								
EC.NVM	000042	186L								
EC.OTL	000053	195L								
EC.RF	000022	170L								
EC.UNA	000036	182L								
EC.UND	000015	165L								
EC.UUN	000033	179L								
EC.VFM	000041	185L								
EC.WF	000023	171L								
EC.WP	000025	173L								
EC.WPV	000024	172L								
ENL	000212	556E	877							
ENTRY	053200	579	587L							
ERROR	054031	590	593	597	618	626	644	676L	731	
ESC	000033	554E								
FF	000014	557E								
FT.ABS	000000	26E	576							
FT.BAC	000003	29E								

```
FT.DD   000001   271E
FT.OC   000020   275E
FT.OR   000002   272E
FT.OU   000010   274E
FT.OW   000004   273E
FT.PIC  000001    27E
FT.REL  000002    28E
HLCPDE  055064   602     648    918L
I.CONFL 000004   532E    533    758
I.CONTY 000001   519E    520
I.CONWI 000003   525E    526
I.CSLMD 000000   508E
I.CUSOR 000002   522E    523
ILDEHL  055072   939L   1011
IOC.CGN 000010   280L
IOC.CSI 000011   281L
IOC.DDA 000002   268L    276    290
IOC.DES 000016   287L
IOC.DEV 000020   288L    855
IOC.DIL 000021   290E
IOC.DIR 000023   292L    856
IOC.DRL 000010   284E
IOC.DTA 000014   286L
IOC.FLG 000004   270L    284
IOC.GRT 000005   278L
IOC.LGN 000012   282L
IOC.LNK 000000   267L
IOC.LSI 000013   283L
IOC.SPG 000007   279L
IOC.SQL 000003   276E
IOC.UNI 000022   289L    855    856
IOCCTD  000001   296E
IOCELEN 000052   294E
ISDEHL  055175  1018   1074L
ITLA    055363   726    1098   1308L
LF      000012   544E
LOAD    053200   577    578    581E
M.CDCA  000017   332L
M.CDLY  000016   331L
M.CFWA  000012   329L
M.CIN   000006   327L
M.CINT  000005   326L
M.CLWA  000014   330L
M.COUT  000010   328L
M.CPRE  000003   324L
M.CRUB  000004   325L
M.CSLC  000002   323L
M.SALO  000001   322L
M.SUNI  000021   333L    660
M.SYDD  000022   334L
M.SYSM  000000   321L
MEML    056103   578    1310E
NL      000012   555E    556    676    720    877    877    883    886   1185
NUL2    000000   546E
NULL    000200   545E
ORIGIN  053200   572E    574
OVL.COD 000000   303L
OVL.ENS 000010   308E
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OVL.ENT 000004      305L
OVL.FLB 000006      306L
OVL.IN  000001      401E
OVL.NUM 000014      403E
OVL.RES 000002      402E
OVL.SIZ 000002      304L
OVL.UCS 000200      404E
OVL0    000000      314L    892
OVL1    000001      315L    896
PDN     054056      607     718L
PDN.    054112      612     727L
PDNA    054147      727     733     740L
PDNB    054151      735     741L
PDNC    054152      728     743L
QUOTE   000047      552E
ROMBOOT 030000      345E
RUBOUT  000177      548E
S.BAUD  040344      378L
S.BDA   041120      476L
S.BOOTF 041034      433L
S.CAADR 040333      536L
S.CACC  041006      417L
S.CCTAB 040335      537L
S.CDB   040343      375L
S.CFWA  040352      385L
S.CODE  041007      418L
S.CONFL 040332      534L
S.CONTY 040327      521L
S.CONWI 040331      527L
S.CSLMD 040326      509L    520     523     526     533
S.CUSOR 040330      524L
S.DATC  040310      490L
S.DATE  040277      489L
S.DCS   041033      431L
S.DDDTA 040366      396L
S.DDGRP 040364      393L
S.DDLDA 040360      391L
S.DDLEN 040362      392L
S.DDOPC 040370      397L
S.DFWA  040354      386L
S.DIREA 041016      425L
S.DLINK 040346      383L    658
S.FASER 041013      424L
S.FCI   041021      426L
S.GRT0  024000      341E
S.GRT1  025000      342E
S.GRT2  026000      343E
S.GUP   041027      428L
S.HIMEM 040316      492L
S.INT   040343      355L    371
S.JUMPS 041010      422L
S.MOUNT 041032      430L
S.OFWA  040350      384L
S.OMAX  040324      498L
S.OSN   041004      413L
S.OVLE  041000      410L
S.OVLFL 040371      406L
S.OVLS  040376      409L
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S.OVSTK 041035  438L
S.RFWA  040356  387L
S.SCI   041024  427L
S.SCR   041121  477L
S.SDD   041010  423L
S.SOVR  041146  357L  359
S.SSN   041002  412L
S.SYSM  040320  494L
S.TIME  040312  491L
S.UCSF  040372  407L
S.UCSL  040374  408L
S.USRM  040322  496L
S.VAL   040277  354L  487
STACK   042200  361E  601
STACKL  001032  359E
SYDD    040130  351E
SYSCALL 000377  204E  760  1150  1154
TAB     000011  553E  1254
UNIT    055356  696   737  1304L
UNT.DIS 000006  118L
UNT.FLG 000000  114L
UNT.GRT 000002  116L
UNT.GTS 000004  117L
UNT.SIZ 000010  120E
UNT.SPG 000001  115L
USERFWA 042200  362E  572  640  649  667  671
VERS    000040  202E  592
XCHGBC  055343  1008  1012  1020  1022  1289L

27864 BYTES FREE
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