```
                                        .TITLE  TSGEN -- System Generation Parameters
                                        .IDENT  /V6.3/
  000000                                .CSECT  TSGEN
                                        .ENABL  LC
                                        .DSABL  GBL
                                        .NLIST  CND
                                ;-----------------------------------------------------------------------------
                                ;  TSGEN version 6.3
                                ;
                                ;  This module contains the the definitions of system parameters
                                ;  that define the characteristics of the TSX-Plus system
                                ;  being generated.
                                ;
                                ;  Written by Phil Sherrod.
                                ;
                                ;  Copyright (c) 1978,1979,1980,1981,1982,1983,1984,1985,1986,1987.
                                ;  S&H Computer Systems, Inc.
                                ;  1027 17th. Avenue South
                                ;  Nashville, Tennessee  U.S.A.
                                ;  (615) 327-3670
                                ;
                                ;  This software is furnished under a license for use only on a
                                ;  single computer system and may be copied only with the inclusion
                                ;  of the above copyright notice.
                                ;  This software, or any copies thereof, may not be provided
                                ;  or otherwise made available to any other person except for
                                ;  use on such system and to one who agrees to these license terms.
                                ;  Title to and ownership of the software shall at all times remain
                                ;  with S&H Computer Systems, Inc.
                                ;  This software is the valuable property of S&H Computer Systems, Inc.
                                ;  All rights reserved.
                                ;
                                ;  S&H will seek legal redress for any unauthorized use of this product.
                                ;
                                ;
                                ;  Set FULLST to 1 for a full assembly listing.
                                ;  Set FULLST to 0 for a normal short listing.
                                ;
             000001             FULLST  =       1
                                ;
  000000                        TSGEN:
                                ;
                                ;  Global definitions
                                ;
                                        .GLOBL  MXTTCT,HANDSK,HANRCB,HANRCO
                                        .GLOBL  IOHANQ,GETUMR,FREUMR,SYPSWD,SYPSPR,TSXVRS
                                        .GLOBL  TSGEN,RDBSEC,DTYPE,NAMSEC,LNMTOP,SASECT,SMONHD
                                        .GLOBL  NPL,NSL,NLIN2,LSTHL,TNHL,NIOL,FSTIOL
                                        .GLOBL  NLINES,NLCHN,$MEMSZ,MEMPTR,PHYMEM,CFSTS,CFABLV
                                        .GLOBL  VNGR,SHRRCB,SHRRCN,SCPFHD,VNUIP,INSTBL,INSTBN
                                        .GLOBL  SPLND,SPLNF,SPLNB,VU$CL,UCLNAM,MIOBHD,DETCBS
                                        .GLOBL  SPLBHD,SFCBFH,KMNTOP,KMNHI,NESB,FASTIN
                                        .GLOBL  SDCB,SDCBND,SPLDEV,SPLDVN,UKMNAM,IOHLTM
                                        .GLOBL  NFRESB,SPLBLK,NSPLDV,VSWPSL,CLEOFS,VMXWIN
                                        .GLOBL  INVEC,RSR,RBR,TSR,TTCSCH,VSLEDT,FRKINI,FRKGEN
                                        .GLOBL  TBR,INRECV,OTRECV,LSTPL,LUNAME,LSTIOL,NUMFRK,NXIVMH
                                        .GLOBL  QUAN1,QUAN2,LSTMX,R$TTOP,R$INST,LSTLIN,R$CFST
                                        .ENDM   MUXEND
```

```
        .GLOBL  INMXV,OTMXV,PVSPBL,LMXLN,LMXPRM,NDVRCB
        .GLOBL  OTRASZ,LNMAP,LNPRIM,LPRI,VLDSYS,NSPLFL,NSPLBL
        .GLOBL  CLVERS,CLORSZ,VMXMON,MONFQH,SPSTAT,LDVERS
        .GLOBL  NCSILO,NCXOFF,NCXON,CSHALC,VUXIFL
        .GLOBL  LSTSL,FSTSL,CTRLTT,VINABT,IOABFL
        .GLOBL  MAXSEC,VEDIT,WILDFL,VPRIVR,CLXTRA,CLTOTL
        .GLOBL  SWDBLK,TMIOL,TMIOH,TK1CNT,TK1SEC,NSCP
        .GLOBL  TMSWPL,TMSWPH,TMIOWL,TMIOWH,VCSHNB
        .GLOBL  DCTOTU,DCTRD,DCCRD,DCTWR,DCCWR
        .GLOBL  SFCB,SFCBND,QUAN1A,LOGCHN,QUAN1B
        .GLOBL  TSXSIT,CFCHAN,NUCHN,MVSIZ,VQUN1C,VNRFLG
        .GLOBL  VDISPC,VDOSPC,VDMKTP,VSYDMP,VDMTCR,MODDAT
        .GLOBL  VNCSLO,VNCXOF,VNCXON
        .GLOBL  CMFSEC,CMFTOP,VKEYMX,VSCHED,VDSKBU,MODTIM
        .GLOBL  VTSLCH,MXSPAC,PMSIZE,VVLSCH,VQUAN0,VQUAN3,VVPWCH
        .GLOBL  MXRBUF,MXRING,MXBRK,MH$SCR,MH$RCR,MH$CAR
        .GLOBL  MH$BCR,MH$BAR,MH$SSR,DHBFSZ,VCXTRM,VCXCTL
        .GLOBL  VH$CSR,VH$DBR,VH$LPR,VH$LSR,RUNCHN
        .GLOBL  VH$LCR,VH$BA1,VH$BA2,VH$BCR,CDX$PI
        .GLOBL  CDX$DL,CDX$DZ,CDX$DH,CDX$VH,CDX$PC,CDX$PP
        .GLOBL  VMSCHR,VMIOSZ,RPRCSR,RPRVEC,DWTYPE,CDX$QP
        .GLOBL  VMAXMC,VMXMSG,MSGBAS,USRBAS,VMXMRB,WINBAS
        .GLOBL  NUMDCD,VNUMDC,DCAGE,NUMCDB,VMIOBF
        .GLOBL  LOKBAS,LOKMEM,TIOBAS,LOKCSH
        .GLOBL  VQUAN1,VQUN1A,VQUN1B,VQUAN2,VCORTM
        .GLOBL  MAPPAR,RDB,RDBEND,NUMRDB,MIODBG
        .GLOBL  CSHDEV,CSHDVN,VMXCSH,VNFCSH,CSHHD
        .GLOBL  MAXALC,ALCTBL,ALCEND,VOFFTM
        .GLOBL  VTMOUT,SNDBX,USPLCH,UBUSMP,MEM256
        .GLOBL  FREFRK,BOTDEV,BOTUNI,BOTCSR,MIOFLG
        .GLOBL  AUTHAN,AHEND,SNBUX,UMSYTP,VINTIO
        .GLOBL  VMXSF,VMXSFC,VMLBLK,RSFBLK,VPLAS,SEGCHN
        .GLOBL  SDCBSZ,SDBULS,SPLANM,MIONWB,INDFIL
        .GLOBL  NDL,LSTDL,FSTDL,VSWPFL,MAPUSR,R$MFMV
        .GLOBL  CORUSR,LINNUM,MUXNUM,NUMON,PVON,TOTON
        .GLOBL  STPFLG,MINTIM,RTVECT,VHIPCT,FRKDLY
        .GLOBL  SYSCHN,SYCH0,SYCH1,SYCH2,SYCH3,SYCH4,SYCH5
        .GLOBL  SYCH6,SYCH7,SYCH10,SYCH11,SYCH12,SYCH13
        .GLOBL  SYCH14,SYCH15,SYCH16,SYCH17,SYCH20
        .GLOBL  BLKEY,CHKEY,SYSDAT,DFLG,QCOMP,VPRILO,VPRIHI
        .GLOBL  SPUSR,SYUNIT,SYSVER,SYSUPD,CONFIG,MAXBLK,VPRIDF
        .GLOBL  PNAME,HANSIZ,HANENT,DVSTAT,PROSLT,VIDCSR
        .GLOBL  DEVSIZ,MAXDEV,NUMDEV,SYTIML,SYTIMH,SPLCHN,HANIOC
        .GLOBL  SWPCHN,NUMIOQ,NUMSYQ,FREIOQ,NMFREQ,INTSSZ
        .GLOBL  MONVEC,TK1VAL,VHIMEM,CCLSAV,INDSAV
        .GLOBL  INDDBL,INDTSV,INDDBS,R$INTC
        .GLOBL  SYINDX,CONFG2,SYSGEN,MAXGVL,LDDEVX,CLDEVX,C1DEVX
        .GLOBL  TMTOTL,TMTOTH,TMUSRL,TMUSRH,SYNAME
        .GLOBL  TMSWTL,TMSWTH,TMIDLL,TMIDLH,NUMCCB
        .GLOBL  VMXFIL,VECBAS,VDFMEM,SNMSHD,MXJADR
        .GLOBL  NMSNMB,NMUMB,CORTIM,RF$WRT,GENTOP
        .GLOBL  BASMAP,LOMAP,HIMAP,FREPGS
        .GLOBL  JCXPGS,MXJMEM,DFJMEM,TK5VAL,TK3SVL
        .GLOBL  R$CHN,R$DATE,R$UBAS,R$JOB,R$CH17
        .GLOBL  R$XCHN,EXTCHN,MVWDS,TTOPTS,MAPSIZ
        .GLOBL  DVFLAG,VBUSTP,QBUS,UNIBUS
        .GLOBL  VUCLMC,UCLDAT,UCLBLK,VUCLOR,SR3FLG
        .GLOBL  SMRSIZ,SRTSIZ,CSHSIZ,MIOWHD,MIOSYQ
        .GLOBL  PROFLG,MPARFL,PIDPTR
        .GLOBL  PROBRK,SPOLID,VDBFLG,PROODC
        .GLOBL  HANPAR,MHNSIZ,KUSECK,USWPCH,R$SWPC
        .GLOBL  CA$BLK,CA$DVU,CA$HBL,CA$HFL,CA$HSH,CA$UBL,CA$UFL,CA$WCT
        .GLOBL  CSHBFP,CSHLRU,CSHMRU,CSHFHD,CCBHD
        .GLOBL  CASTBR,CASCBR,CASTBW,CASCUP,CASTRO,CASTWO
        .GLOBL  CSHIO,CSHINI,CSHCLN,CSHFIN,CSHBAS,CSHVEC
        .GLOBL  LOKVEC,LOKINI,DOOPAP,DOCOPN,SFSVST,SFRSST,DORLK
        .GLOBL  DOTLK,DOCULK,DOULK1,DOSFCK,SFCLS,SFWRIT,CLSCDB
        .GLOBL  DCRD1,DCRD2,LOKVEC,CLKVEC,VUSPHN,ABRTOV
;
;  Global references
;
        .GLOBL  ININT,DLINT,LINNUM,PROITP,FNDHRB
        .GLOBL  SD$HLD,MUXNUM,RMNBAS,SETERR
        .GLOBL  IOFIN,INTEN,PSW,SYNCH
        .GLOBL  LA36,LA120,VT52,VT100,ADM3A,VT200
        .GLOBL  DIABLO,QUME,HAZEL,TSDEFS,EXTP1,HANXMR,BLKMV,CVTPHY
        .GLOBL  GETRTQ,QFREE,IOSTRT,FRKGET,FORKQ,QIO,QCOMPL
        .GLOBL  SCHED,DSKBUF,IOQSIZ
```

```
                                ;------------------------------------------------------------------
                                ;  Internal parameters
                                ;
        001166                  TSXVRS  =       630.            ;TSX-Plus version number
        000017                  MAXDEV  =       15.             ;Max number of devices that can be supported
        000036                  NUMFRK  =       30.             ;# Fork request blocks
        000000                  NXIVMH  =       0.              ;# extra interrupt vectors for mapped handlers
        000120                  DETCBS  =       80.             ;# characters for detached job startup cmnd.
        000004                  FRKGEN  =       4.              ;# Fork blocks in TSGEN
        000004                  NMSNMB  =       4.              ;# System message buffers
        000002                  NMSYMB  =       2.              ;# message buffer reserved for system use
        000024                  NUCHN   =       20.             ;# I/O channels user may use
        000010                  MAXMUX  =       8.              ;Max # of DZ11's, DH11's, and DHV11's
        000040                  DHBFSZ  =       32.             ;# bytes for DH11 and DHV11 DMA output buffers
        000012                  TTCSCH  =       10.             ;# characters printed per scheduler check
        000050                  NUMIOQ  =       40.             ;# I/O queue elements
        000017                  NUMSYQ  =       15.             ;# I/O queue elements reserved for system I/O
        000017                  NUMCCB  =       15.             ;# data cache control blocks
        000010                  NSCP    =       8.              ;# swapper command packets
        000714                  INTSSZ  =       460.            ;# bytes for system interrupt stack
        000006                  MIONWB  =       6.              ;Number of mapped I/O wait queue elements
        000000                  MIODBG  =       0.              ;1=Force I/O mapping (debugging use only)
        000000                  MPARFL  =       0.              ;1==>Enable mem parity traps, 0==>disable.
        000000                  PROBRK  =       0.              ;1==>Enable ODT break on PRO printer port
        000003                  PROODC  =       3.              ;Clock ticks per PI driver call
        000000                  FASTIN  =       0.              ;1==>Clock driven input character processing
        000100                  CLKVEC  =       100             ;Clock interrupt vector
        000006                  DCAGE   =       6.              ;Shared file data cache ageing factor
        000001                  KUSECK  =       1.              ;0==>Don't check for usage on INIT & SQUEEZE.
        000024                  IOHLTM  =       20.             ;# 0.1 secs I/O can be held for job swapping
        000007                  CLEOFS  =       7.              ;Max num of chars in CL ENDSTRING parameter
        000002                  NDRTDF  =       2.              ;Number of dummy shared run-time definitions
        000000                  $PRIV   =       0               ;Obsolete line-def privilege flag
        000020                  $NOVLN  =       20              ;Obsolete no-virtual-line privilege flag
                                ;
                                ;--------------------------------------------------------------------
                                ;  Fork priority values.
                                ;  Unlike RT-11, TSX-Plus assigns priority values to its fork requests
                                ;  and allows higher priority fork requests to interrupt lower priority ones.
                                ;  The priority values range from 1 to 127.  The higher the numerical value,
                                ;  the higher the priority.
                                ;
                                        .GLOBL  FP$RT,FP$CKT,FP$DEF,FP$IOS,FP$IOF,FP$IOA,FP$MOV
                                        .GLOBL  FP$CDI,FP$CDO,FP$CK1,FP$MAX,FP$FLG,FP$PIO
                                ;
        100000                  FP$FLG  =       100000          ;Flag saying this is a priority value
        100177                  FP$MAX  =       FP$FLG+127.     ;Max legal fork priority
        100144                  FP$RT   =       FP$FLG+100.     ;Real-time interrupts
        100106                  FP$CKT  =       FP$FLG+70.      ;50/60 Hz clock interrupt processing
        100074                  FP$CDI  =       FP$FLG+60.      ;Terminal character input processing
        100067                  FP$CDO  =       FP$FLG+55.      ;Terminal character output processing
        100062                  FP$DEF  =       FP$FLG+50.      ;Default fork priority
        100062                  FP$IOF  =       FP$FLG+50.      ;I/O finish
        100062                  FP$IOA  =       FP$FLG+50.      ;I/O abort entry
        100062                  FP$PIO  =       FP$FLG+50.      ;PI output interrupt processing
        100036                  FP$CK1  =       FP$FLG+30.      ;0.1 second clock processing
                                ;  The following fork priorities are entered from a non-interrupt state.
        100014                  FP$IOS  =       FP$FLG+12.      ;I/O initiation
        100012                  FP$MOV  =       FP$FLG+10.      ;Move data to/from cache buffer
                                ;
                                ;--------------------------------------------------------------------------
                                ;  Completion routine class priorities.
                                ;  A completion routine with a higher (numerically larger) class priority
                                ;  is allowed to interrupt a lower class priority completion routine.
                                ;
                                        .GLOBL  CP$STD,CP$RT,CP$SYN
                                ;
        000001                  CP$STD  =       1               ;Standard -- I/O completion, .TIMIO, etc.
        000002                  CP$RT   =       2               ;Real-time completion routine
        000003                  CP$SYN  =       3               ;.SYNCH completion routine
                                ;
                                ;  Type codes used to identify communication device controllers
                                ;
        000000                  CDX$DL  =       0               ;DL11
        000002                  CDX$DZ  =       2               ;DZ11
        000004                  CDX$DH  =       4               ;DH11
        000006                  CDX$VH  =       6               ;DHV11
        000010                  CDX$PI  =       10              ;Console terminal on Professional
        000012                  CDX$PC  =       12              ;Communications port on Professional
        000014                  CDX$PP  =       14              ;Printer port on Professional
        000016                  CDX$QP  =       16              ;4 line Multiplexer on Professional
                                ;--------------------------------------------------------------------------
        000024                  CFCHAN  =       NUCHN           ;Channel to use for command file input
        000025                  LOGCHN  =       NUCHN+1         ;Channel for log file
        000026                  USPLCH  =       NUCHN+2         ;Channel to use to write to spool file
        000027                  RUNCHN  =       NUCHN+3         ;Channel to use when loading a SAV file
        000030                  USWPCH  =       NUCHN+4         ;Channel to use to access swap file
        000031                  NLCHN   =       NUCHN+5         ;Total # channels allocated per job
        000000                  LSTMX   =       0               ;Index to last mux
        000000                  CURMX   =       0               ;Current mux #
        000000                  NUMRDB  =       0               ;Count number of shared run-times declared
        000000                  CURCDX  =       CDX$DL          ;Comm device type for current line
        000000                  DHUSE   =       0               ;Set to 1 if DH11 or DHV11 support needed
```

```
                                ;----------------------------------------------------------------------
                                ;  Monitor fixed-offset value vector
                                ;
                                ;  Table of addresses of TSX-Plus routines. The pointer to this vector is
                                ;  stored at simulated RMON offset -2.
                                ;
                                        ;Negative offsets from TSXVEC reserved to users
000000  002260'                 TSXVEC: .WORD   NUMDEV          ;  0 Ptr to word with # devices in system
000002  000576'                         .WORD   HANENT          ;  2 Vector with handler entry points
000004  001026'                         .WORD   HANPAR          ;  4 64-byte phys mem base of mapped handlers
000006  000000G                         .WORD   GETRTQ          ;  6 Routine to get a free I/O queue element
000010  000000G                         .WORD   QFREE           ; 10 Routine to free an I/O queue element
000012  000000G                         .WORD   QIO             ; 12 Routine to queue an I/O request
000014  000000G                         .WORD   IOSTRT          ; 14 Routine to requeue an I/O request
000016  000000G                         .WORD   QCOMPL          ; 16 Routine to queue a completion request
000020  000000G                         .WORD   FRKGET          ; 20 Routine to get a fork request block
000022  000000G                         .WORD   FORKQ           ; 22 Routine to queue a fork request
000024  000000G                         .WORD   IOHANQ          ; 24 Place I/O queue element on handler list
000026  000000G                         .WORD   GETUMR          ; 26 Allocate a Unibus map register
000030  000000G                         .WORD   FREUMR          ; 30 Free a Unibus map register
000032  001166                          .WORD   TSXVRS          ; 32 TSX-Plus version number
000034  000000G                         .WORD   IOQSIZ          ; 34 Size of an I/O queue element (bytes)
                                ;
                                ;  Macro to reserve I/O channel space.
                                ;
                                        .MACRO  CHNRES
                                        .WORD   0,0,0,0,0
                                        .ENDM   CHNRES

                                ;----------------------------------------------------------------------
                                ;  Fixed-offset vector
                                ;
                                ;  The following vector of addresses and values corresponds to the fixed
                                ;  offset cells in RT-11 RMON.  These cells are mapped into user
                                ;  address space through PAR7 (160000 - 177777).
                                ;
000036  000000'                 VECBAS: .WORD   TSXVEC          ;  -2 Pointer to vector of TSX addresses
000040  000167  000000G         MONVEC: JMP     INTEN           ;   0 Handler interrupt entry point
                                ;
                                ;  System channel space
                                ;
000044                          SYSCHN:
000044                          SYCH0:  CHNRES
000056                          SYCH1:  CHNRES
000070                          SYCH2:  CHNRES
000102                          SYCH3:  CHNRES
000114                          SYCH4:  CHNRES
000126                          SYCH5:  CHNRES
000140                          SYCH6:  CHNRES
000152                          SYCH7:  CHNRES
000164                          SYCH10: CHNRES
000176                          SYCH11: CHNRES
000210                          SYCH12: CHNRES
000222                          SYCH13: CHNRES
000234                          SYCH14: CHNRES
000246                          SYCH15: CHNRES
000260                          SYCH16: CHNRES
```

```
   000272                         SYCH17: CHNRES
   000304                         SYCH20: CHNRES
                                  ;
   000316  000000                 BLKEY:  .WORD   0               ;256 - # of directory block that is in core
   000320  000000                 CHKEY:  .WORD   0               ;260 - # of device whose dir block is in core
   000322  000000                 SYSDAT: .WORD   0               ;262 - System date word
   000324  000000                 DFLG:   .WORD   0               ;264 - Directory op is in progress
                                  ;
                                  ;  The following cells are documented for access by .GVAL
                                  ;
   000326  000100                 USROFF: .WORD   HIMEM           ;266 - Base of USR
   000330  000000G                QCOMP:  .WORD   IOFIN           ;270 - I/O completion handler entry point
   000332  000000                 SPUSR:  .WORD   0               ;272 - USR error cell
   000334  000000                 SYUNIT: .WORD   0               ;274 - Unit # of SY device
   000336     004                 SYSVER: .BYTE   4               ;276 - System version number
   000337     000                 SYSUPD: .BYTE   0               ;277 - Release #
   000340  000000                 CONFIG: .WORD   0               ;300 - System configuration word
   000342                                 .BLKW   5.              ;302 - 313 (unused)
   000354  001750                 MAXBLK: .WORD   MAXFIL          ;314 - Largest output file size
                                  ;  Word 316 in TSX-Plus is reserved for specific use.  It must
                                  ;  be initialized to zero and not used by the operating system.
                                  ;  See the note in TSDEFS for more specific information.
   000356  000000  000000                 .WORD   0,0             ;316 - 321 unused
   000362  000000                 CORUSR: .WORD   0               ;322 - Current job number
   000364  000000G                        .WORD   SYNCH           ;324 - Address of .SYNCH request routine
   000366                                 .BLKW   13.             ;326 - 357  unused
   000420  000445                         BR      MTPS            ;360 - Move to PS routine
   000422  000432                         BR      MFPS            ;362 - Move from PS routine
   000424  000000                 SYINDX: .WORD   0               ;364 - Device number of system device
   000426  000000                 CFSTS:  .WORD   0               ;366 - Command file status flags
   000430  000000                 CONFG2: .WORD   0               ;370 - Extended configuration word
   000432  000000                 SYSGEN: .WORD   0               ;372 - System generation options
   000434  000002                         .WORD   2               ;374 - Size of USR
   000436     014                 CFABLV: .BYTE   14              ;376 - Error abort severity level
   000437     003                         .BYTE   3               ;377 - Max @file nesting level
   000440  000000                 EMTRTN: .WORD   0               ;400 - EMT return point
   000442  000000                 FRKADR: .WORD   0               ;402 - Fork routine
   000444  000500                 PNPTR:  .WORD   PNAME-MONVEC    ;404 - Offset to permanent dev name table
   000446  071677  142615         MONAME: .RAD50  /RT11XM/        ;406 - 410 - System name
   000452  000000                 HSUFFX: .WORD   0               ;412
   000454  000000                 SPSTAT: .WORD   0               ;414 - Spooler status flags
   000456     000                         .BYTE   0               ;416 - Error byte for IND
   000457     000                 INSTA:  .BYTE   0               ;417 - IND status byte
   000460  000000                 $MEMSZ: .WORD   0               ;420 - Total 32-word mem blocks avail
   000462  000000                         .WORD   0
   000464  000442G                $TCFIG: .WORD   TTOPTS+RMNBAS   ;424 - Address of TT config word
   000466  000444G                $INDDV: .WORD   INDOFF+RMNBAS   ;426 - Pointer to IND device name word
   000470  001300                 MEMPTR: .WORD   HNMEPT-MONVEC   ;430 - Offset to memory control blocks
   000472  001330'                P1EXT:  .WORD   P1XPTR          ;432 - Kernel PAR1 routine
   000474  000000                 RPRCSR: .WORD   0               ;434 - Get CSR address of PRO devices
   000476  000000                 RPRVEC: .WORD   0               ;436 - Get vector address of PRO devices
   000500  000000                 DWTYPE: .WORD   0               ;440 - Type of DW disk
                                  ;  Dummy cell corresponding to cell in RT-11 with TT option flags.
           000442                 TTOPTS  =       .-MONVEC        ;Offset to TTOPTS cell
   000502  000000                 TTOP:   .WORD   0               ;TTOPTS cell
                                  ;  Cell with name of IND RUN device
           000444                 INDOFF  =       .-MONVEC        ;Offset to INDDEV cell
```

```
000504     123     131     060     INDDEV: .ASCII  /SY0:/          ;Default device from which IND is run
000507     072
                                   ;-----------------------------------------------------------------------
                                   ;  MFPS is called to return on the stack the contents of the low-order
                                   ;  byte of the processor status word.
                                   ;  Note: This only works when used within handlers. If a .MFPS macro
                                   ;        is used in a TSX-Plus user job, a value of zero is returned.
                                   ;
                                   ;  Outputs:
                                   ;   Processor status word is on top of stack.
                                   ;
000510  005046                     MFPS:   CLR     -(SP)
000512  013716  000000G            MFPMOV: MOV     @#PSW,(SP)      ;Get the psw (** patched during job init **)
000516  016646  000002                     MOV     2(SP),-(SP)     ;Now push return address on top
000522  016666  000002  000004             MOV     2(SP),4(SP)     ;Move down PS value
000530  012616                             MOV     (SP)+,(SP)      ;Move down return address
000532  000207                             RETURN
                                   ;
                                   ;  MTPS is called to set the value of the low-order byte of the
                                   ;  processor status word.
                                   ;
                                   ;  Inputs:
                                   ;   Value to be moved to psw is on top of stack before call.
                                   ;
                                   ;  Outputs:
                                   ;   Value is moved to psw and popped from the stack.
                                   ;
000534  000006                     MTPS:   RTT                     ;PC&PS are on stack, let RTT set PS and return
                                   ;
                                   ;-----------------------------------------------------------------------
                                   ;  Device and handler information tables (Do not change the order).
                                   ;
                                   ;  *** VM depends on PHYMEM being 1 word below PNAME ***
                                   ;
000536  000000                     PHYMEM: .WORD   0               ;*** Store actual physical memory size ***
000540  000017                     PNAME:  .REPT   MAXDEV          ;Table of permanent device names (Rad50)
                                           .WORD   0
                                           .ENDR
000576  000017                     HANENT: .REPT   MAXDEV          ;Handler entry point
                                           .WORD   0
                                           .ENDR
000634  177777                             .WORD   -1              ;Flag to mark end of HANENT table
000636  000017                     DVSTAT: .REPT   MAXDEV          ;Device status flags
                                           .WORD   0
                                           .ENDR
000674  000017                     HANDSK: .REPT   MAXDEV          ;Location of handler on the disk
                                           .WORD   0
                                           .ENDR
000732  000017                     HANSIZ: .REPT   MAXDEV          ;Size of device handler
                                           .WORD   0
                                           .ENDR
000770  000017                     DEVSIZ: .REPT   MAXDEV          ;# 256-word blocks on device
                                           .WORD   0
                                           .ENDR
001026  000017                     HANPAR: .REPT   MAXDEV          ;64-byte base block for handler if mapped
                                           .WORD   0
                                           .ENDR
```

```
001064  000017                  HANIOC: .REPT   MAXDEV          ;# uncompleted I/O requests for handler
                                        .WORD   0
                                        .ENDR
001122  000017                  DVFLAG: .REPT   MAXDEV          ;Table of device characteristics
                                        .WORD   0
                                        .ENDR
        001120                  MAXGVL  =       .-MONVEC        ;Max offset allowed with .GVAL
                                ;--------------------------------------------------------------------------
                                ;
                                ;  Reserve space for extended channel space
                                ;
001160                          EXTCHN:
        000010                          .REPT   <NLCHN-17.>
                                        CHNRES
                                        .ENDR
                                ;
                                ;  Reserve space for channel used to access INDTMP file
                                ;
001300                          INDTSV: CHNRES                  ;Channel used for I/O to INDTMP file
                                ;
                                ;  Address of channel block for swap file access
                                ;
        001266'                 SWPCHN  =       EXTCHN+<10.*<USWPCH-17.>>
                                ;
                                ;  End of MONVEC pointer table area.
                                ;
        001254                  MVSIZ   =       .-VECBAS
        000526                  MVWDS   =       MVSIZ/2         ;# words in mon vector table
                                ;
                                ;  Define offsets into monitor vector area
                                ;
        000006                  R$CHN   =       SYSCHN-VECBAS   ;Start of channel space
        000234                  R$CH17  =       SYCH17-VECBAS   ;Offset to channel # 17
        001122                  R$XCHN  =       EXTCHN-VECBAS   ;Offset to extended channel space
        000264                  R$DATE  =       SYSDAT-VECBAS   ;Offset to date word
        000324                  R$JOB   =       CORUSR-VECBAS   ;Offset to job number cell
        000270                  R$UBAS  =       USROFF-VECBAS   ;Offset to usr base address cell
        000444                  R$TTOP  =       TTOP-VECBAS     ;Offset to TT option word
        000421                  R$INST  =       INSTA-VECBAS    ;Offset to IND status byte
        000370                  R$CFST  =       CFSTS-VECBAS    ;Offset to command file status word
        001242                  R$INTC  =       INDTSV-VECBAS   ;Offset to INDTMP channel block
        001230                  R$SWPC  =       SWPCHN-VECBAS   ;Offset to USWPCH channel block
        000454                  R$MFMV  =       MFPMOV-VECBAS   ;Offset to MFPMOV instruction
                                ;
                                ;------------------------------------------------------------------------
                                ;  Vector of entry points to handler support routines
                                ;  (Do not alter the order)
                                ;
001312  000167  000000G                 JMP     CVTPHY          ;Routine to convert virtual to physical addr
001316  000167  000000G                 JMP     FNDHRB          ;Routine to search for RCB for handler
001322  000167  000000G                 JMP     HANXMR          ;Routine to allocate XM region for handler
001326  000402                          BR      BMJMP           ;Routine to do block move
001330  000167  000000G         P1XPTR: JMP     EXTP1           ;Routine to execute mapped code
001334  000167  000000G         BMJMP:  JMP     BLKMV
                                ;
                                ;--------------------------------------------------------------------------
                                ;  Memory allocation information for handlers
```

```
    228                                       ;
    229 001340  000000                        HNMEPT: .WORD   0
    230 001342  000000                                .WORD   0
    231 001344  000000                        HANRCO: .WORD   0
```

```
                                ;-----------------------------------------------------------------
                                ;  Misc data cells
                                ;
001346  000002                  VQUAN0: .WORD   QUAN0
001350  000024                  VQUAN1: .WORD   QUAN1
001352  000002                  VQUN1A: .WORD   QUAN1A
001354  000002                  VQUN1B: .WORD   QUAN1B
001356  000001                  VQUN1C: .WORD   QUAN1C
001360  000012                  VQUAN2: .WORD   QUAN2
001362  000024                  VQUAN3: .WORD   QUAN3
001364  000002                  VCORTM: .WORD   CORTIM
001366  000050                  VHIPCT: .WORD   HIPRCT
001370  000036                  VINTIO: .WORD   INTIOC
001372  000036                  VMXSF:  .WORD   MAXSF
001374  000036                  VMXSFC: .WORD   MAXSFC
001376  000000                  VNUMDC: .WORD   NUMDC
001400  000003                  VMLBLK: .WORD   MXLBLK
001402  000005                  VUCLMC: .WORD   UCLMNC
001404  001750                  VMXFIL: .WORD   MAXFIL
001406  000050                  VNFCSH: .WORD   NMFCSH
001410  000005                  VMXMON: .WORD   MAXMON
001412  000036                  VTMOUT: .WORD   TIMOUT
001414  000074                  VOFFTM: .WORD   OFFTIM
001416  000003                  VMAXMC: .WORD   MAXMC
001420  000310                  VMSCHR: .WORD   MSCHRS
001422  000003                  VMXMSG: .WORD   MAXMSG
001424  000012                  VMXMRB: .WORD   MAXMRB
001426  000100                  VHIMEM: .WORD   HIMEM
001430  000070                  VDFMEM: .WORD   DFLMEM
001432  000007                  VSWPSL: .WORD   SWPSLT          ;# of job slots in swap file
001434  000000                  VPLAS:  .WORD   SEGBLK          ;# blocks for PLAS swap file
001436  000014                  VNGR:   .WORD   NGR             ;Number of global PLAS regions
001440  000004                  NDVRCB: .WORD   DEVXMR          ;Number of PLAS regions for device handlers
001442  000012                  VMXWIN: .WORD   MAXWIN          ;Maximum number of display windows
001444  000007                  VKEYMX: .WORD   KEYMAX          ;Maximum # user-defined keys
001446  000004                  VNUIP:  .WORD   NUIP            ;Number of user programs that may be INSTALLed
001450  000000                  VCSHNB: .WORD   CACHE           ;# blocks in use for generalized data cache
001452  000000                  CSHALC: .WORD   CACHE           ;# blocks allocated for generalized data cache
001454  040150                  VNRFLG: .WORD   NRMFLG          ;Default time-sharing line flags
001456  000000G                 VSCHED: .WORD   SCHED           ;An entry point in TSEXEC
001460  000000G                 VDSKBU: .WORD   DSKBUF          ;A global from TSINIT
001462  000040                  VNCSLO: .WORD   NCSILO          ;Default #bytes for TT and CL silos
001464     014                  VNCXOF: .BYTE   NCXOFF          ;Default XOFF when only this many free
001465     004                  VNCXON: .BYTE   NCXON           ;Default XON when this many remain
001466  000144                  VDISPC: .WORD   DINSPC          ;Default line input buffer size
001470  000360                  VDOSPC: .WORD   DOTSPC          ;Default line output buffer size
001472  000000                  SYTIMH: .WORD   0               ;High-order system time word
001474  000000                  SYTIML: .WORD   0               ;Low-order system time word
001476  000000                  TK1SEC: .WORD   0               ;# clock ticks per second
001500  000000                  TK1VAL: .WORD   0               ;# clock ticks per 0.1 second
001502  000000                  TK1CNT: .WORD   0
001504  000000                  TK5VAL: .WORD   0               ;# clock ticks per 0.5 seconds
001506  000000                  TK3SVL: .WORD   0               ;# clock ticsk per 3 seconds
001510  000000                  TSXSIT: .WORD   0
001512  000000                  FRKDLY: .WORD   0               ;Max clock ticks a fork request was delayed
001514  000000                  CTRLTT: .WORD   0               ;# of operator's console
001516  000000                  MINTIM: .WORD   0               ;Number of minutes of system up-time
```

```
     58 001520                          SEGCHN: .BLKW   5                   ;Channel block used for PLAS region swapping
     59 001532  000000                  KMNTOP: .WORD   0                   ;Abs address of top of TSKMON
     60 001534  000000                  KMNHI:  .WORD   0                   ;KMNTOP-KMNBAS
     61 001536                          CCLSAV: .BLKW   5                   ;Savestatus for CCL.SAV file info
     62 001550                          INDSAV: .BLKW   5                   ;Savestatus for IND.SAV file info
     63 001562  000000                  INDDBL: .WORD   0                   ;Lowest block in IND.SAV file of data segmemt
     64 001564  000000                  INDDBS: .WORD   0                   ;Number of blocks in IND.SAV data segment
     65 001566  000000                  USRBAS: .WORD   0                   ;Phys 64-byte block # of TSUSR overlay
     66 001570  000000                  MSGBAS: .WORD   0                   ;Phys 64-byte block # of TSMSG overlay
     67 001572  000000                  WINBAS: .WORD   0                   ;Phys 64-byte block # of TSWIN overlay
     68 001574  000000                  LOKBAS: .WORD   0                   ;Phys 64-byte block # of TSLOCK overlay
     69 001576  000000                  CSHBAS: .WORD   0                   ;Phys address of TSCASH code
     70 001600  000000                  TIOBAS: .WORD   0                   ;Phys address of TSTIOX code
     71 001602  000000                  LOKMEM: .WORD   0                   ;Phys 64-byte block # of rec locking data area
     72 001604  000000                  LOKCSH: .WORD   0                   ;Phys 64-byte block # of shared file cache buf
     73 001606  000000                  NUMDCD: .WORD   NUMDC               ;Num of shared file data cache entries
     74 001610  000036                  NUMCDB: .WORD   MAXSFC              ;Number of free shared file channels
     75 001612  000000                  SNMSHD: .WORD   0                   ;Head of free list of system message buffers
     76 001614  000002                  NMUMB:  .WORD   <NMSNMB-NMSYMB>     ;# message buffers available for user access
     77 001616  000000                  CSHHD:  .WORD   0                   ;Head of directory cache list
     78 001620  000000                  MONFQH: .WORD   0                   ;Head of free list of monitor control blocks
     79 001622  000000                  MIOBHD: .WORD   0                   ;Head of mapped I/O control block list
     80 001624  000000                  MIOWHD: .WORD   0                   ;Head of mapped I/O wait block list
     81 001626  000000                  MIOSYQ: .WORD   0                   ;Pointer to 1st active mapped I/O wait block
     82 001630  000000                  SMONHD: .WORD   0                   ;Head of job monitoring requests for all jobs
     83 001632  000000                  SFCB:   .WORD   0                   ;Start of spool file control block area
     84 001634  000000                  SFCBND: .WORD   0                   ;End of spool file control block area
     85 001636  000000                  SFCBFH: .WORD   0                   ;Head of free spool file control block list
     86 001640  000024                  NSPLFL: .WORD   SPLNF               ;Number of spool files
     87 001642  000764                  NSPLBL: .WORD   SNDBX               ;Number of blocks in spool file
     88 001644  000000                  NFRESB: .WORD   0                   ;Number of public spool file blocks
     89 001646  000000                  SHRRCB: .WORD   0                   ;Pointer to base of global RCB area
     90 001650  000000                  SHRRCN: .WORD   0                   ;Pointer to end of global RCB area
     91 001652  000000                  INSTBL: .WORD   0                   ;Pointer to base of INSTALL table
     92 001654  000000                  INSTBN: .WORD   0                   ;Pointer past end of INSTALL table
     93 001656  000000                  ABRTOV: .WORD   0                   ;Rad50 name of overlay during trap
     94 001660  000012                  VMXCSH: .WORD   MAXCSH              ;Max number of cached devices
     95 001662  000000                  CSHDEV: .WORD   0                   ;Start of area with device cache blocks
     96 001664  000000                  CSHDVN: .WORD   0                   ;End of area with device cache blocks
     97 001666  000000                  SCPFHD: .WORD   0                   ;Head of free list of swap command packets
     98 001670  177777                  LDDEVX: .WORD   -1                  ;Device index number of "LD" device
     99 001672  177777                  CLDEVX: .WORD   -1                  ;Device index number of "CL" device
    100 001674  177777                  C1DEVX: .WORD   -1                  ;Device index number of "C1" device
    101 001676  000000  000000  000000  BOTDEV: .WORD   0,0,0,0             ;Device spec for device being booted from
        001704  000000
    102 001706  000000                  BOTUNI: .WORD   0                   ;Unit # of device being booted from
    103 001710  000000                  BOTCSR: .WORD   0                   ;CSR of device being booted from
    104 001712  000000                  SPOLID: .WORD   0                   ;Last spool file ID number
    105 001714  000000                  UMSYTP: .WORD   0                   ;Address of top of unmapped system space
    106 001716  000001                  IOABFL: .WORD   IOABT               ;1==>Do I/O abort, 0==>Do I/O wait
    107 001720  000000G                 DEFBAS: .WORD   TSDEFS
    108 001722  114716                  SYNAME: .RAD50  /XXN/               ;Actual name of SY physical device
    109 001724  075250  100020  101704  UCLNAM: .RAD50  /SY TSXUCLSAV/      ;Name of TSXUCL program
        001732  073376
    110 001734  000000                  UCLBLK: .WORD   0                   ;# blocks in TSXUCL data file for each job
    111 001736  075250  102405  057760  UKMNAM: .RAD50  /SY UKMON SAV/      ;Name of user-provided TSKMON command processr
        001744  073376
```

```
001746  000000                  PIDPTR: .WORD   0               ;Pointer to clock-driven PI handler routine
001750                          PROSLT: .BLKW   9.              ;ID # of device in each PRO option slot
001772  000000                  VIDCSR: .WORD   0               ;Address of PRO video CSR
001774  177560                  VDMTCR: .WORD   DMPTCR          ;Transmitter control reg addr for dump device
001776  000000                  MODDAT: .WORD   0               ;Date last modified by TSXMOD
002000  000000                  MODTIM: .WORD   0               ;Time (3-sec) last modified by TSXMOD
002002  000000                  HANRCB: .WORD   0               ;Pointer to start of handler RCB area
                                ;
                                ;  Data for generalized data cache
                                ;
002004  000000                  CA$BLK: .WORD   0               ;Block number associated with cache entry
002006  000000                  CA$DVU: .WORD   0               ;Device and unit # associated with entry
002010  000000                  CA$WCT: .WORD   0               ;Number of words in entry
002012  000000                  CA$UFL: .WORD   0               ;LRU chain forward link
002014  000000                  CA$UBL: .WORD   0               ;LRU chain backward link
002016  000000                  CA$HFL: .WORD   0               ;Hash chain forward link
002020  000000                  CA$HBL: .WORD   0               ;Hash chain backward link
002022  000000                  CA$HSH: .WORD   0               ;Hash chains list head vector
002024  000000                  CSHBFP: .WORD   0               ;64-byte block number of buffer area
002026  000000                  CSHLRU: .WORD   0               ;Pointer to least-recently-used entry
002030  000000                  CSHMRU: .WORD   0               ;Pointer to most-recently-used entry
002032  000000                  CSHFHD: .WORD   0               ;Head of cache block free list
002034  000000                  CCBHD:  .WORD   0               ;Head of cache control block free list
002036  000000  000000          CASTRO: .WORD   0,0             ;Total # reads from mounted devices
002042  000000  000000          CASTBR: .WORD   0,0             ;Total # blocks read from mounted devices
002046  000000  000000          CASCBR: .WORD   0,0             ;Number of blocks that were read from cache
002052  000000  000000          CASTWO: .WORD   0,0             ;Total # writes to mounted devices
002056  000000  000000          CASTBW: .WORD   0,0             ;Total # blocks written to mounted devices
002062  000000  000000          CASCUP: .WORD   0,0             ;Number of blocks moved into data cache
                                ;  Entry point vector for caching module
002066                          CSHVEC:
002066  000000                  CSHINI: .WORD   0               ;-
002070  000000                  CSHIO:  .WORD   0               ;-
002072  000000                  CSHCLN: .WORD   0               ;-
002074  000000                  CSHFIN: .WORD   0               ;-
002076  177777                          .WORD   -1              ;- End of pointer vector
                                ;
                                ;  Entry point vector for record locking module
                                ;
002100                          LOKVEC:
002100  000000                  LOKINI: .WORD   0               ;-
002102  000000                  DOOPAP: .WORD   0               ;-
002104  000000                  DOCOPN: .WORD   0               ;-
002106  000000                  SFSVST: .WORD   0               ;-
002110  000000                  SFRSST: .WORD   0               ;-
002112  000000                  DORLK:  .WORD   0               ;-
002114  000000                  DOTLK:  .WORD   0               ;-
002116  000000                  DOCULK: .WORD   0               ;-
002120  000000                  DOULK1: .WORD   0               ;-
002122  000000                  DOSFCK: .WORD   0               ;-
002124  000000                  SFCLS:  .WORD   0               ;-
002126  000000                  SFWRIT: .WORD   0               ;-
002130  000000                  CLSCDB: .WORD   0               ;-
002132  000000                  DCRD1:  .WORD   0               ;-
002134  000000                  DCRD2:  .WORD   0               ;-
002136  177777                          .WORD   -1              ;- End of pointer vector
                                ;
```

```
                                  ;  Misc byte data
                                  ;
 002140     000                   VSYDMP:  .BYTE   SYSDMP          ;Generate dump on crash if non-zero
 002141     000                   VDMKTP:  .BYTE   DMPKTP          ;Crash on any kernel trap if non-zero
 002142     001                   VSWPFL:  .BYTE   SWAPFL
 002143     001                   VBUSTP:  .BYTE   BUSTYP
 002144     000                   VINABT:  .BYTE   INIABT
 002145     001                   VUXIFL:  .BYTE   UXIFLG
 002146     001                   VU$CL:   .BYTE   U$CL
 002147     002                   VUCLOR:  .BYTE   UCLORD
 002150     001                   VLDSYS:  .BYTE   LDSYS
 002151     001                   VSLEDT:  .BYTE   SLEDIT
 002152     000                   VDBFLG:  .BYTE   DBGFLG
 002153     023                   VPRILO:  .BYTE   PRILOW
 002154     120                   VPRIHI:  .BYTE   PRIHI
 002155     062                   VPRIDF:  .BYTE   PRIDEF
 002156     012                   VPRIVR:  .BYTE   PRIVIR
 002157     035                   VTSLCH:  .BYTE   TSLICH
 002160     027                   VVLSCH:  .BYTE   VLSWCH
 002161     002                   VVPWCH:  .BYTE   PWCH
 002162     034                   VCXTRM:  .BYTE   CCXTRM
 002163     001                   VCXCTL:  .BYTE   CCXCTL
 002164     003                   VEDIT:   .BYTE   EDITOR
 002165     001                   VMIOBF:  .BYTE   MIONBF
 002166     010                   VMIOSZ:  .BYTE   MIOBSZ
 002167     000                   VUSPHN:  .BYTE   PHONE           ;0=local if no DCD;1=always mon DCD if $phone
 002170     000                   MAPUSR:  .BYTE   0               ;Number of job memory mapping is set up for
 002171     000                   LINNUM:  .BYTE   0
 002172     000                   MUXNUM:  .BYTE   0
 002173     000                   NUMON:   .BYTE   0
 002174     000                   PVON:    .BYTE   0
 002175     000                   TOTON:   .BYTE   0
 002176     000                   PROFLG:  .BYTE   0               ;Non-zero ==> Running on PRO-350
 002177     000                   STPFLG:  .BYTE   0
 002200     000                   UBUSMP:  .BYTE   0               ;1==>Do Unibus mapping
 002201     000                   SR3FLG:  .BYTE   0               ;NON-ZERO==>MEMORY MANAGEMENT REG 3 PRESENT
 002202     000                   MEM256:  .BYTE   0               ;Non-zero==>machine has at least 256kb
 002203     000                   MIOFLG:  .BYTE   0               ;Non-zero==>I/O mapping needed for some device
 002204     000                   NSPLDV:  .BYTE   0               ;Number of installed spooled devices
 002205     000                   CLVERS:  .BYTE   CLVRSN          ;CL handler version number
 002206     000                   LDVERS:  .BYTE   0               ;LD translation table format (1<RTV5.4=<2)
 002207     041     200           SYPSPR:  .ASCII  /!/<200>        ;Prompt for system password
                                           .EVEN
                                  ;  System time counters
 002212   000000                  TMTOTH:  .WORD   0               ;Total uptime (0.1 second units)
 002214   000000                  TMTOTL:  .WORD   0
 002216   000000                  TMUSRH:  .WORD   0               ;Time spent in user jobs
 002220   000000                  TMUSRL:  .WORD   0
 002222   000000                  TMSWTH:  .WORD   0               ;Swap-wait time
 002224   000000                  TMSWTL:  .WORD   0
 002226   000000                  TMIOH:   .WORD   0               ;Time user i/o is active
 002230   000000                  TMIOL:   .WORD   0
 002232   000000                  TMSWPH:  .WORD   0               ;Time swapping is active
 002234   000000                  TMSWPL:  .WORD   0
 002236   000000                  TMIOWH:  .WORD   0               ;Time system is doing i/o-wait
 002240   000000                  TMIOWL:  .WORD   0
 002242   000000                  TMIDLH:  .WORD   0               ;Idle time
```

```
002244  000000          TMIDLL: .WORD   0
                        ;
                        ;  Shared file data cache statistics counters
                        ;
002246  000000          DCTOTU: .WORD   0               ;Total number of cache hits since last divisn
002250  000000          DCTRD:  .WORD   0               ;Total number of reads from shared files
002252  000000          DCCRD:  .WORD   0               ;Number of reads satisfied by data in cache
002254  000000          DCTWR:  .WORD   0               ;Total number of writes to shared files
002256  000000          DCCWR:  .WORD   0               ;Number of writes that update cache
                        ;
002260  000000          NUMDEV: .WORD   0               ;Byte index to last entry in device tables
002262  000000          FREIOQ: .WORD   0               ;Head of i/o queue element chain
                        ;
                        ;  Define mux tables for DZ11's and DH11's.
                        ;
                                .MACRO  MXTBL   NAME
                                .NLIST
                        NAME    =       .-2
                                .GLOBL  NAME
                                .REPT   MAXMUX
                                .WORD   0
                                .ENDR
                                .LIST
                                .ENDM   MXTBL
                        ;
002264                          MXTBL   MXTYPE          ;DZ11 & DH11 type of mux (CDX$DZ or CDX$DH)
002304                          MXTBL   MXCSR           ;DZ11 Control Status Register
002324                          MXTBL   MXLPR           ;DZ11 Line Parameter Register
002344                          MXTBL   MXTCR           ;DZ11 Transmit Control Register
002364                          MXTBL   MXDTR           ;DZ11 Data Terminal Ready
002404                          MXTBL   MXTBUF          ;DZ11 Transmitter Buffer Register
002424                          MXTBL   MXSBRK          ;DZ11 Shadow register for hardware BRK reg.
002444                          MXTBL   MXCAR           ;DZ11 Carrier Detect
002464                          MXTBL   MXVEC           ;DZ11 & DH11 Vector address
002504                          MXTBL   MXLNT           ;DZ11 & DH11 Addr of table to map mux # to Lin
002524                          MXTBL   MH$BRK          ;DH11 Break control register
002544                          MXTBL   MH$LPR          ;DH11 Line Parameter Register
002564                          MXTBL   MH$PBR          ;DH11 Previous value of BAR register
002604                          MXTBL   DM$CSR          ;DH11(DM11) Control Status Register
002624                          MXTBL   DM$LSR          ;DH11(DM11) Line Status Register
002644                          MXTBL   DM$VEC          ;DH11(DM11) Address of DM11 interrupt vector
        002322'         MXRBUF  =       MXLPR           ;DZ11 Receiver Buffer Register
        002402'         MXRING  =       MXTBUF          ;DZ11 Ring indicator flags
        002442'         MXBRK   =       MXCAR           ;DZ11 Break control flags
                        ;  Equates for DH11 control registers
        002302'         MH$SCR  =       MXCSR           ;DH11 System Control Register
        002322'         MH$RCR  =       MXRBUF          ;DH11 Received Character Register
        002342'         MH$CAR  =       MXTCR           ;DH11 Current Address Register
        002362'         MH$BCR  =       MXDTR           ;DH11 Byte Count Register
        002402'         MH$BAR  =       MXTBUF          ;DH11 Buffer Active Register
        002442'         MH$SSR  =       MXCAR           ;DH11 Silo Status Register
                        ;  Equates for DHV11 control registers
        002302'         VH$CSR  =       MH$SCR          ;DHV11 Control and Status Register
        002322'         VH$DBR  =       MH$RCR          ;DHV11 Data Buffer Register
        002542'         VH$LPR  =       MH$LPR          ;DHV11 Line Parameter Register
        002622'         VH$LSR  =       DM$LSR          ;DHV11 Line Status Register
        002602'         VH$LCR  =       DM$CSR          ;DHV11 Line Control Register
```

```
   283           002342'                VH$BA1  =       MH$CAR          ;DHV11 Buffer Address register 1
   284           002442'                VH$BA2  =       MH$SSR          ;DHV11 Buffer Address register 2
   285           002362'                VH$BCR  =       MH$BCR          ;DHV11 Byte Count Register
   286                                  ;
   287                                  ;  Generate FORK request blocks.
   288                                  ;
   289 002664    002670'                FREFRK: .WORD   FRKLST          ;Head of free list
   290 002666    000000                 FRKINI: .WORD   0               ;Pointer to fork blocks in init area
   291 002670                           FRKLST:
   292           000004                         .REPT   FRKGEN          ;Gen in a few static fork blocks
   293                                          .WORD   .+22.           ;Link to next block in free list
   294                                          .WORD   0,0,0,0,0,0,0,0,0
   295                                          .ENDR
   296 003020    000000  000000  000000         .WORD   0,0,0,0,0,0,0,0,0,0 ;Last block with 0 forward link
       003026    000000  000000  000000
       003034    000000  000000  000000
       003042    000000  000000
   297                                  ;
   298                                  ;  Symbolic equates for QBUS and UNIBUS machines.
   299                                  ;
   300           000001                 QBUS    =       1
   301           000000                 UNIBUS  =       0
   302                                  ;
   303                                  ;  Generate the memory size limit checking certain restrictions.
   304                                  ;  On non-extended machines, allow 256.Kb - 8.Kb I/O page
   305                                  ;  On extended machines, allow 4096.Kb - 256.Kb I/O page
   306                                  ;
   307                                          .MACRO  MEMORY  SIZE
   308                                          SIZMEM  = SIZE
   309                                          .IF     LE, SIZMEM
   310                                                  SIZMEM = 3840.
   311                                          .ENDC
   312                                          .IF     GT, SIZMEM-3840.
   313                                                  SIZMEM = 3840.
   314                                          .ENDC
   315                                          .IF     LT, <SIZMEM - 96.>
   316                                  .ERROR  ;Memory size limit too small for running TSX-Plus
   317                                          .ENDC
   318                                  ;  Allocate the memory size to examine.
   319                                          .WORD   SIZMEM*20
   320                                          .ENDM   MEMORY
   321                                  ;
   322                                  ;  Memory management tables
   323                                  ;
   324 003046                           MAPSIZ: MEMORY  MEMSIZ          ;PAR value of physical memory cutoff
   325 003050    000000                 BASMAP: .WORD   0               ;Pointer to base of memory map table
   326 003052    000000                 LOMAP:  .WORD   0               ;Pointer to 1st user page in MEMMAP
   327 003054    000000                 HIMAP:  .WORD   0               ;Pointer above top user page in memmap
   328 003056    000000                 MAPPAR: .WORD   0               ;Value to map PAR 5 to mem allocation table
   329 003060    000000                 FREPGS: .WORD   0               ;# free pages
   330 003062    000000                 JCXPGS: .WORD   0               ;# pages needed for job context block
   331 003064    000000                 MXJMEM: .WORD   0               ;Max # K-bytes a job may use
   332 003066    000000                 DFJMEM: .WORD   0               ;Default # K-bytes a job may use
   333 003070    000000                 MXJADR: .WORD   0               ;Address above top of largest job space
   334 003072    000000                 SMRSIZ: .WORD   0               ;# 64-byte blocks allocated to system overlays
   335 003074    000000                 MHNSIZ: .WORD   0               ;# 64-byte blocks allocated for mapped handler
   336 003076    000000                 SRTSIZ: .WORD   0               ;# 64-byte blocks allocated for shared run-tim
```

```
003100  000000          CSHSIZ: .WORD   0               ;# 64-byte blocks allocated for data cache
                        ;
                        ;  Start a CSECT to hold shared run-time descriptor blocks
                        ;
000000                          .CSECT  RDBSEC          ;CSECT for RDB entries
000000                  RDBSEC:
000000                  RDB:                            ;Define base of RDB entries
003102                          .CSECT  TSGEN           ;Go back to standard TSGEN CSECT
                        ;
                        ;  Symbolic equates for system editor names.
                        ;  Note these equates must match those in TSDEFS.
                        ;
        000001          EDIT    =       1
        000002          TECO    =       2
        000003          KED     =       3
        000004          K52     =       4
                        ;
                        ;  Symbolic equates for UCL order
                        ;
        000001          FIRST   =       1
        000002          MIDDLE  =       2
        000003          LAST    =       3
                        ;
                        ;  Symbolic names used to define line transmit/receive speeds.
                        ;
        000000          S50     =       0               ;50    baud
        000001          S75     =       1               ;75    baud
        000002          S110    =       2               ;110   baud
        000003          S134.5  =       3               ;134.5 baud
        000004          S150    =       4               ;150   baud
        000005          S300    =       5               ;300   baud
        000006          S600    =       6               ;600   baud
        000007          S1200   =       7               ;1200  baud
        000010          S1800   =       10              ;1800  baud
        000011          S2000   =       11              ;2000  baud
        000012          S2400   =       12              ;2400  baud
        000013          S3600   =       13              ;3600  baud
        000014          S4800   =       14              ;4800  baud
        000015          S7200   =       15              ;7200  baud
        000016          S9600   =       16              ;9600  baud
        000017          S19200  =       17              ;19200 baud
                        ;
                        ;  Symbolic names for parity codes
                        ;
        040000          EVEN    =       040000          ;Even parity
        140000          ODD     =       140000          ;Odd parity
        000000          NONE    =       000000          ;No parity
```

```
                ;------------------------------------------------------------
                ;  The following macro define the device handler tables.
                ;  There are two psects use in the device definition - one
                ;  allocates and defines the rad50 device name - the second
                ;  defines the handler attributes.
                ;
                        .MACRO  DEVBEG          ;DEFINE THE DEVICE GLOBAL ENTRIES
                        .CSECT  DNAME           ;DEFINE THE DEVICE NAME PSECT
                AUTHAN:                         ;GLOBAL LABEL FOR DEVICE NAMES
                        .CSECT  DTYPE           ;DEFINE THE DEVICE TYPE PSECT
                DTYPE:
                        .CSECT  TSGEN
                        .ENDM   DEVBEG

                ;-----------------------------------------------------------------------------
                ;  The following flag definitions must match the TSDEFS definitions.
                ;

000001          DMA     =       1       ;DX$DMA - This is a DMA device
000002          MAPIO   =       2       ;DX$MAP - 18-bit controller -- may require mapped I/O
000004          EVNBUF  =       4       ;DX$EBA - Buffer must be on even byte boundary
000010          NOCACHE =       10      ;DX$NCA - Do not do caching for this device
000020          NOMOUNT =       20      ;DX$NMT - Do not allow mounts for this device
000040          REQALC  =       40      ;DX$RAL - Require device to be allocated before use
000100          MAPH    =       100     ;DX$MPH - Map the handler for this device
000200          NOMAPH  =       200     ;DX$NHM - Do not map the handler for this device
000400          HANBUF  =       400     ;DX$IBH - Handler contains internal I/O buffer
001000          HNSPDO  =       1000    ;DX$NRD - Do .SPFUN to tell handler about dir ops
002000          NOSET   =       2000    ;DX$NST - Do not reload handler after SET

000000          NODMA   =       0               ;This is not a DMA device
000000          NONDMA  =       NODMA

                ;-----------------------------------------------------------------------------
                ;  The DEVDEF macro defines the device name and allocates
                ;  table entries for the device name and the device attributes.
                ;
000001          DVNUM = 1

                        .MACRO  DEVDEF  DEVNAM,DFLG1,DFLG2,DFLG3,DFLG4,DFLG5,DFLG6,DFLG7,DFLG8,DFLG9

                DVNUM = DVNUM + 1               ;Increment the device number
                DVFLG   =       0               ;Get device flags in DVFLG

                        .IF     LT, <MAXDEV-2 - DVNUM>  ;Check the maximum devices allowed
                .ERROR  1;More devices defined than MAXDEV
                        .MEXIT
                        .ENDC

                ;  Accumulate flags for the device definition

                        .IF     NB DFLG1        ;Check if argument exists
                DVFLG = DVFLG!DFLG1             ;Include in device attributes
                        .ENDC ;NB DFLG1

                        .IF     NB DFLG2        ;Check if argument exists
                DVFLG = DVFLG!DFLG2             ;Include in device attributes
```

```
        .ENDC ;NB DFLG2

        .IF     NB DFLG3        ;Check if argument exists
DVFLG = DVFLG!DFLG3             ;Include in device attributes
        .ENDC ;NB DFLG3

        .IF     NB DFLG4        ;Check if argument exists
DVFLG = DVFLG!DFLG4             ;Include in device attributes
        .ENDC ;NB DFLG4

        .IF     NB DFLG5        ;Check if argument exists
DVFLG = DVFLG!DFLG5             ;Include in device attributes
        .ENDC ;NB DFLG5

        .IF     NB DFLG6        ;Check if argument exists
DVFLG = DVFLG!DFLG6             ;Include in device attributes
        .ENDC ;NB DFLG6

        .IF     NB DFLG7        ;Check if argument exists
DVFLG = DVFLG!DFLG7             ;Include in device attributes
        .ENDC ;NB DFLG7

        .IF     NB DFLG8        ;Check if argument exists
DVFLG = DVFLG!DFLG8             ;Include in device attributes
        .ENDC ;NB DFLG8

        .IF     NB DFLG9        ;Check if argument exists
DVFLG = DVFLG!DFLG9             ;Include in device attributes
        .ENDC ;NB DFLG9

;  Enter the device name into the table defining handlers to load on startup

        .CSECT  DNAME
        X = .
        .RAD50  /'DEVNAM'/      ;Include the device name in the PSECT
        .IF     NE, <.-X-2>
.ERROR  2;Incorrect device name specified
        .MEXIT
        .ENDC

;  Enter the device specification flag into handler flags table

        .CSECT  DTYPE
        .WORD   DVFLG           ;Include the device type in the PSECT
        .CSECT  TSGEN

        .ENDM   DEVDEF

;-------------------------------------------------------------
;  The DEVEND macro allocates the remainder of the table entries.
;
        .MACRO  DEVEND
L       = <MAXDEV-2-DVNUM>
        .IF     GT,L
        .REPT   L
        DEVDEF  <$$ >
        .ENDR
```

```
                        .ENDC   ;GT,L
                        .CSECT  DNAME
                AHEND:
                        .CSECT  TSGEN
                        .ENDM   DEVEND
```

```
;------------------------------------------------------------
;  The OB macro creates a table with NLINES entries
;  and defines the name of the table to be
;  1 word in front of the start of the table.
;  The name if globally defined.
;
        .MACRO  OB      NAME
        .NLIST
NAME    =       .-2
        .GLOBL  NAME
        .REPT   NLINES
        .WORD   0
        .ENDR
        .LIST
        .ENDM   OB

;------------------------------------------------------
;  The OBP macro is similar to OB except it
;  generates only NPL (# of primary lines) entries
;  instead of NLINES entries.
;
        .MACRO  OBP     NAME
        .NLIST
NAME    =       .-2
        .GLOBL  NAME
        .REPT   NPL
        .WORD   0
        .ENDR
        .LIST
        .ENDM   OBP

;------------------------------------------------------
;  The OBH macro is similar to OB except it
;  generates  TNHL (# lines requiring hardware control tables) entries
;  instead of NLINES entries.
;
        .MACRO  OBH     NAME
        .NLIST
NAME    =       .-2
        .GLOBL  NAME
        .REPT   TNHL
        .WORD   0
        .ENDR
        .LIST
        .ENDM   OBH

;------------------------------------------------------
;  The OBT macro is similar to OB except it
;  generates  NPL+NSL+NDL+NIOL entries
;  instead of NLINES entries.
;
        .MACRO  OBT     NAME
        .NLIST
NAME    =       .-2
        .GLOBL  NAME
        .REPT   NPL+NSL+NDL+NIOL
        .WORD   0
        .ENDR
        .LIST
        .ENDM   OBT

;----------------------------------------------------------------------
;  The TBLDEF macro is called once to define table
;  space needed by all of the lines.
;  It has four arguments:
;  Argument 1 is the number of primary (real) lines.
;  Argument 2 is the number of subprocesses.
;  Argument 3 is the number of detached lines.
;  Argument 4 is the number of dedicated CL lines.
;
        .MACRO  TBLDEF  ANPL,ANSL,ANDL,ANIOL
        .NLIST  MD
NPL     =       ANPL            ;# of primary lines
NSL     =       ANSL            ;Number of subprocesses
NDL     =       ANDL            ;Number of detached lines
NIOL    =       ANIOL           ;Number of dedicated CL lines
NLINES  =       NPL+NSL+NDL     ;Total number of jobs
;
;  Make sure the total number of CL units does not exceed 16
;
        .IF     GT <NIOL-16.>
.ERROR ;You cannot have more than 16 CL units
NIOL    =       16.             ;Reduce number to 16.
        .ENDC
        .IF     GT <<NIOL+CLXTRA>-16.>
.ERROR ;You cannot have more than 16 CL units
CLXTRA  =       16.-NIOL                ;Reduce extra units if total > 16
        .ENDC
CLTOTL  =       NIOL+CLXTRA
;
;  Set up number of lines variables.
;  The lines are numbered in the following order:
;    Primary lines.
;    Detached job lines.
;    Subprocesses.
;    Dedicated CL lines.
;
LSTPL   =       2*NPL           ;Last primary line index
FSTDL   =       LSTPL+2         ;First detached line
LSTDL   =       LSTPL+<2*NDL>   ;Last detached line
FSTSL   =       LSTDL+2         ;Index to first subprocess
NLIN2   =       2*NLINES        ;Index to last time-sharing line
LSTSL   =       NLIN2           ;Index to last subprocess
FSTIOL  =       LSTSL+2         ;Index to first CL line
LSTIOL  =       FSTIOL+<2*<NIOL-1>> ;Index to last CL line
LSTLIN  =       2*<NPL+NSL+NDL+NIOL> ;Index number of last line
        .IF     EQ,NIOL         ;If there are no CL lines
TNHL    =       NPL             ;Total number of lines with hardware-ctrl tbls
        .IFF                    ;If there are CL lines
TNHL    =       NPL+NSL+NDL+NIOL;Total number of lines with hardware-ctrl tbls
        .ENDC
LSTHL   =       TNHL*2          ;Index # of last hardware line
;
;  Define number of slots in job swap file if SWPSLT=0
```

```
;
        .IF     EQ,SWPSLT
SWPSLT  =       NLINES          ;Default to one slot for each job
        .ENDC   ;EQ,SWPSLT
        .IF     GT,<SWPSLT-NLINES> ;Never need more slots than lines
SWPSLT  =       NLINES
        .ENDC   ;GT,<SWPSLT-NLINES>
        .IF     EQ,SWAPFL       ;If this is a non-swapping system
SWPSLT  =       0               ;No swap slots needed
        .ENDC   ;EQ,SWAPFL
;
;   Define line tables.
;
        OB      LQLINK          ;Link for execution queues
        OB      LSTATE          ;Current execution state
        OB      LBSPRI          ;Job base priority value (byte)
LPRI    =       LBSPRI+1        ;Current job priority (byte)
        OB      LPARNT          ;Index number of parent job
        OBT     LSW             ;Line status word
        OB      LSW2            ;Additional line status
        OB      LSW2S           ;Copy of LSW2 used for reset on prog exit
        OBH     ILSW2           ;Initial values for LSW2
        OBT     LSW3            ;Additional line status flags
        OB      LSW4            ;Additional line status flags
        OBT     LSW5            ;More line status flags
        OBT     LSW6            ;Line status table # 6
        OB      LSW7            ;Line status table # 7
        OB      LSW8            ;Line status table # 8
        OB      LSW9            ;Line status table # 9
        OBT     LSW10           ;Line status table # 10
        OB      LSW11           ;Line status table # 11
        OBT     LCLUNT          ;CL unit index number if connected as CL line
        OBP     ITRMTP          ;Initial terminal type code
        OBT     LTRMTP          ;Current terminal type code
        OBH     LNAME           ;Descriptive name for line
        OB      LMEMIN          ;# pages of memory needed to inswap job
        OB      LPARBS          ;PAR base address for job
        OB      LCXPAR          ;Value for KPAR6 to map to job context block
        OB      LNBLKS          ;# pages of memory currently assigned to job
        OB      LNSBLK          ;# pages of memory used by PLAS regions
        OB      LTTPAR          ;Physical memory PAR value for terminal buffer
        OB      LQUAN           ;Job's execution quantum
        OB      LITIME          ;Time job is held in "interactive" state
        OB      LIOHLD          ;Hold time for I/O starts while starting swap
        OB      LMINQ           ;Minimum core-residency time
        OB      LHIPCT          ;Controls # high-prio quantum periods job gets
        OB      LIOCNT          ;# active i/o operations for job
        OB      LBASE           ;Base page # assigned to job
        OBH     LHIRBB          ;Start of silo input ring buffer
        OBH     LHIRBE          ;End of silo input ring buffer
        OBH     LHIRBA          ;Allocated size of silo input ring buf
        OBH     LHIRBS          ;Free space in silo input ring buffer
        OBH     LHIRBP          ;Pointer where to store next char in buffer
        OBH     LHIRBG          ;Pointer where to get next char from buffer
        OBH     LHIRBC          ;Autoflow control stop/start char count limits
        OBT     LINSIZ          ;Size of input character buffer
        OB      LINBUF          ;Start of input buffer
        OB      LINEND          ;End of input buffer
        OB      LINNXT          ;Where next input char goes
        OB      LINPNT          ;Where to get next char read
        OB      LINCNT          ;# of chars in input buffer
        OB      LINSPC          ;# free bytes in input buffer
        OB      LACTIV          ;# of activation chars pending
        OB      LAFSIZ          ;Field width for activation condition
        OB      LFWLIM          ;Field width limit
        OB      LSTACT          ;Position of last activation char
        OB      LINCUR          ;Pos of cursor at start of line
        OBT     LOTSIZ          ;Size of output buffer
        OB      LOTBUF          ;Start of output buffer
        OB      LOTEND          ;End of output buffer
        OB      LOTNXT          ;Place to put next output char
        OB      LOTPNT          ;Place to get next output char
        OB      LOTSPC          ;Space left in output buffer
        OB      LWINDO          ;Pointer to current display window block
        OBH     LCDTYP          ;Type of communications device (CDX$xxx)
        OBH     LINIR           ;Terminal input service routine
        OBH     LOUTIR          ;Terminal output service routine
        OBH     INVEC           ;Input interrupt vector loc
        OBH     RSR             ;Receiver status register address
        OBH     RBR             ;Receiver buffer register
        OBH     TSR             ;Transmitter status register
        OBH     TBR             ;Transmitter buffer register
        OBH     LDHB1B          ;Base of DMA buffer 1
        OBH     LDHB1P          ;Pointer into DMA buffer 1
        OBH     LDHB2B          ;Base of DMA buffer 2
        OBH     LDHB2R          ;Remaining byte count for buffer 2
        OBH     LDHB2S          ;Suspended pointer for buffer 2
        OBH     LCXTBL          ;Pointer to character translation table
        OBP     LSECPT          ;Pointer to secondary line # table
        OBP     LXCL            ;CL unit to which line is cross connected
        OB      LCMPL           ;Head of chain of completion requests for job
        OB      LCMQHD          ;Queue head for completed message requests
        OB      LMONHD          ;Queue head for job monitor blocks
        OB      LSUCF           ;Start-up command file
        OB      LSWPBK          ;Block # in swap file
        OB      LJSW            ;User's JSW
        OB      LEMTPC          ;PC of last user-mode emt
        OB      LSCCA           ;.SCCA control word address
        OB      LSPND           ;.SPND counter for job
        OB      LBRKCQ          ;Break character completion queue entry
        OB      LTTCR           ;Completion routine for TT input activation
        OB      LBRKCH          ;Break character for line
        OB      LCOL            ;Current column position
        OBP     LMSGBF          ;Send message pointer
        OB      LSNDCH          ;Last char sent
        OB      LESRTN          ;Echo suppression routine
        OB      LESCHR          ;Echo suppression char code
        OB      LRBFIL          ;Rubout filler for line
        OB      LTSCMD          ;Pending special action command
        OB      LNSPAC          ;# of special activation chars
        OB      LSPACT          ;Point to special actv char tbl
        OB      LPROJ           ;Project #
        OB      LPROG           ;Programmer #
        OB      LCPUHI          ;High-order CPU time
```

```
                OB      LCPULO          ;Low-order CPU time
                OB      LCONTM          ;Connect time
                OBP     LCDTIM          ;Lost-carrier disconnect time
                OBP     LOFFTM          ;Allowed logoff time before DTR drop for line
                OBP     LABTIM          ;Autobaud control timer
                OB      LRDTIM          ;TT read timeout
                OB      LRTCHR          ;TT read timeout activation character
                OB      LSLEPL          ;.TWAIT sleep time for job (low-order)
                OB      LSLEPH          ;.TWAIT sleep time for job (high-order)
                OBH     LMXNUM          ;Index # of mux controlling line
                OBH     LMXPRM          ;Line parameters (speed, parity, stop bits)
                OB      LPRG1           ;1st 3 chars of running program name (rad50)
                OB      LPRG2           ;2nd 3 chars of running program name (rad50)
        LUNAME  =       .-12.           ;Offset user name table by size of 1 entry
                .BLKB   NLINES*12.      ;Store 12 char user name here
        LMXLN   =       RBR             ;# of this line within mux group
```

```
;
;  Define subprocess mapping tables
;
LNMAP   =       .-2
        .NLIST  BIN
I       =       0
        .REPT   NPL
I       =       I+2
        .WORD   I
        .ENDR
;  Define LNPRIM table
LNPRIM  =       .-2
I       =       0
        .REPT   NPL+NDL
I       =       I+2
        .WORD   I
        .ENDR
        .IF     NE,NSL
        .REPT   NSL
I       =       I+2             ;Keep count for NIOL if any
        .WORD   0
        .ENDR
        .ENDC
        .IF     NE,NIOL
        .REPT   NIOL
I       =       I+2
        .WORD   I
        .ENDR
        .ENDC
        .LIST   BIN
;
;  Generate interrupt receivers
;
;  Input interrupt vector
        .NLIST  BIN
        .REPT   TNHL
        INCB    LINNUM          ;COUNT UP WHICH LINE INTERRUPTED
        .ENDR
INRECV: JMP     ININT           ;ENTER INTERRUPT SERVICE ROUTINE
; Output interrupt vector
LXX     =       2
OTRECV:
        .REPT   TNHL
        JSR     R4,@#DLINT
        .WORD   LXX
LXX     =       LXX+2
        .ENDR
        .LIST   BIN
        .LIST   MD
        .ENDM   TBLDEF
```

```
                ;-------------------------------------------------------------------------
                ;  The CLDEF macro begins a line definition block for a serial communications
                ;  line that will be used as a dedicated CL line.
                ;  The CLDEF macro is similar to a LINDEF and can occur inside or outside
                ;  of a MUXDEF block.
                ;  The form of the CLDEF macro outside a MUXDEF block is:
                ;       CLDEF   line_number,vector_address,RSR_address
                ;  The form of the CLDEF macro inside a MUXDEF block is:
                ;       CLDEF   line_number,mux_line_number
                ;
                        .MACRO  CLDEF   AIOLN,ARG1,ARG2
                ;
                ;  Check to make sure the CL unit number is valid
                ;
                IOLN    =       AIOLN
                        .IF     GE <IOLN-CLTOTL>
                .ERROR ;O CL unit number exceeds # declared CL units
                IOLN    =       0
                        .ENDC
                ;
                ;  See if this CL unit has already been assigned to another line
                ;
                        .IF     NDF     CLUD'AIOLN
                CLUD'AIOLN      =       1
                        .ENDC
                        .IF     GT <CLUD'AIOLN-2>
                .ERROR ;CL unit AIOLN used more than once
                        .ENDC
                CLUD'AIOLN      =       CLUD'AIOLN+1
                ;
                ;  Set flag saying we are doing an CLDEF definition and then invoke LINDEF.
                ;  Note, the LINEND macro will reset IOLFLG.
                ;
                IOLFLG  =       1               ;We are inside CLDEF
                        LINDEF  ARG1 ARG2
                        .ENDM   CLDEF
                ;
                ;-----------------------------------------------------
                ;  The LINDEF macro begins a line definition block.
                ;  A line definition block is required for each primary
                ;  (real) line.  A line definition block begins with
                ;  a LINDEF macro call, may include other macro calls
                ;  such as LFLAGS and must end with a LINEND macro call.
                ;  there are two arguments to the LINDEF macro:
                ;  Arg 1 is the input interrupt vector address or mux line #.
                ;  Arg 2 is the address of the receiver status register.
                ;  Arg 3 is 'OPERATOR' to specify line is control terminal.
                ;
000000          LN      =       0               ;Current line number
000000          BO      =       0               ;1 if inside LINDEF block
000000          LX      =       0               ;Line index number
000000          IOLFLG  =       0               ;1 if inside an CLDEF block
000000          IOLN    =       0               ;Number of dedicated CL line
000000          NPLDF   =       0               ;Number of declared primary T/S lines
000000          NCLDF   =       0               ;Number of CL lines that have been defined
000000          NDLDF   =       0               ;Number of declared detached jobs
                ;
```

```
        .MACRO  LINDEF  AINTAD,ARSR,AOPR
        .IF     NE BO           ;SEE IF LAST BLOCK LEFT OPEN
.ERROR  1; Missing LINEND on last line
        LINEND                  ;CLOSE OFF PREVIOUS BLOCK
        .ENDC
BO      =       1               ;SAY WE'RE INSIDE A BLOCK
NAMDON  = 0                     ;SAY NO NAME DECLARED YET
CMFDON  = 0                     ;SAY NO SUCF DECLARED YET
;
;  Update current line #
;  and make sure we don't overflow tables
;
        .IF     EQ,IOLFLG       ;If not inside an CLDEF block
LN      =       LN+1            ;Line counter
NPLDF   =       NPLDF+1         ;Count number of primary lines
LX      =       LX+2            ;Line index
CLX     =       LX
        .IF     GT <LN-NPL>
.ERROR  2; More lines than declared with TBLDEF
        .MEXIT
        .ENDC   ;GT <LN-NPL>
        .IFF    ;EQ,IOLFLG      ;If inside an CLDEF block
CLX     =       FSTIOL+<2*NCLDF>;Get line index # of this line
NCLDF   =       NCLDF+1         ;Count # of dedicated CL lines
        .IF     GT <NCLDF-NIOL> ;Don't exceed # CL lines declared in TBLDEF
.ERROR  0; More CL lines than declared in TBLDEF
        .MEXIT
        .ENDC   ;GT <NCLDF-NIOL>
S       =       .
.       =       LCLUNT+CLX      ;Store CL unit # into table for this line
        .WORD   2*IOLN
.       =       S
        .ENDC
;
; *** Do this for DL11 lines only ***
;
        .IF     EQ CURMX        ;True if not within mux definition block
CURMXL  =       0
;
;  Set up interrupt vector addresses
;
        .IF     B AINTAD
        .IF     EQ,IOLFLG
.ERROR 3; Missing interrupt address (arg 1)
        .IFF
.ERROR 3; Missing interrupt address (arg 2)
        .ENDC
        .MEXIT
        .ENDC
        VECCHK  AINTAD,7
S       =       .
.       =       INVEC+CLX
        .WORD   AINTAD
.       =       S
;
;  Set up DL11 register addresses
;
```

```
                .IF     B ARSR
                .IF     EQ,IOLFLG
        .ERROR  4 ; Missing receiver register address (arg 2)
                .IFF
        .ERROR 4; Missing receiver register address (arg 3)
                .ENDC
                .MEXIT
                .ENDC
                SRCHK   ARSR
        S       =       .
        .       =       RSR+CLX
                .WORD   ARSR
        .       =       RBR+CLX
                .WORD   ARSR+2
        .       =       TSR+CLX
                .WORD   ARSR+4
        .       =       TBR+CLX
                .WORD   ARSR+6
                .IF     NB AOPR         ;SEE IF THIS IS CONTROL TERMINAL
        .       =       CTRLTT          ;REMBER CONTROL TERMINAL #
                .WORD   CLX
                .ENDC
        .       =       S
        ;
        ;  *** Do this for DZ11 and DH11 lines only ***
        ;
                .IFF
        S       =       .
        .       =       LMXNUM+CLX      ;MUX UNIT NUMBER
                .WORD   CURMX
                .IF     B AINTAD
        .ERROR 0;Missing multiplexer line number
        CURMXL  =       0
                .IFF
        CURMXL  =       AINTAD
                .ENDC
        .       =       LMXLN+CLX       ;LINE WITHIN MUX
                .WORD   CURMXL
                .IF     NB ARSR
        .       =       CTRLTT
                .WORD   CLX
                .ENDC
        .       =       S
                .ENDC
        ;
        ;  *** Do this for all lines ***
        ;
        S       =       .
        .       =       LCDTYP+CLX      ;Communications device type index
                .WORD   CURCDX
        .       =       S
        ;
        ;  Establish default values in case user doesn't specify
        ;  them inside line definition block.
        ;
        DFLAGS  =       NRMFLG          ;DEFAULT LINE CONTROL FLAGS
                .IF     EQ,IOLFLG       ;If this is not an CLDEF
```

```
DIS     =       DINSPC          ;INPUT BUFFER SIZE
DOS     =       DOTSPC          ;OUTPUT BUFFER SIZE
        .IFF                    ;If this is an CLDEF
DIS     =       0               ;Input ring buffer size
DOS     =       CLORSZ          ;Output ring buffer size
        .IIF    LE,DOS  DOS = 32.       ;Don't allow <= 0 size
        .ENDC
;
;  Establish default values for character silos
;
SILSIZ  =       0
SILXOF  =       0
SILXON  =       0
;
        .ENDM   LINDEF
```

```
                ;-----------------------------------------------------------
                ;  The FLAGS macro is used to set flags in the ILSW2 table.
                ;  The one argument to flags is the value to be stored
                ;  in ILSW2.
                ;
                        .MACRO  FLAGS   AFLG
                DFLAGS  =       AFLG            ;SAVE FOR LINEND
                        .ENDM   FLAGS
                ;-----------------------------------------------------------------------
                ;  The TRMTYP macro is used to declare the terminal type.
                ;
                        .MACRO  TRMTYP  ATYP
                        .IF     EQ,IOLFLG       ;Do not do for CL lines
                S       =       .
                .       =       ITRMTP+CLX
                        .WORD   ATYP
                .       =       S
                        .ENDC
                        .ENDM   TRMTYP
                ;
                ;-----------------------------------------------------------------------
                ;  The NAME macro is used within a line definition block to declare
                ;  a commentary name for the line which is displayed with the
                ;  SHOW TERMINALS keyboard command.
                ;
000000                  .CSECT  NAMSEC
000000          NAMSEC:
003102                  .CSECT  TSGEN
                        .MACRO  NAME    NAMSTR
                        .CSECT  NAMSEC
                NAMPTR  =       .
                        .ASCIZ  \NAMSTR\
                LNMTOP  = .
                ;
                        .CSECT  TSGEN
                S       =       .
                .       =       LNAME+CLX
                        .WORD   NAMPTR
                .       =       S
                NAMDON  = 1
                        .ENDM   NAME
                ;
                ;--------------------------------------------------
                ;  The BUFSIZ macro is used to set the size of
                ;  the input and output character buffers.
                ;  Arg 1 = Input buffer size (# of characters)
                ;  Arg 2 = output buffer size (# of characters)
                ;
                        .MACRO  BUFSIZ  AIS,AOS
                DIS     =       AIS
                        .IF     NB AOS
                DOS     =       AOS             ;SET OUTPUT BUFFER SIZE
                        .ENDC
                        .ENDM   BUFSIZ
                ;
                ;-----------------------------------------------------------------------
                ;  The SILO macro is used to set up information about the
                ;  terminal input character silo.
                ;   Arg 1 = Size of the silo buffer.
                ;   Arg 2 = Free space remaining when XOFF is to be sent.
                ;   Arg 3 = Number of chars remaining when XON is to be sent.
                ;
                        .MACRO  SILO    ASIZ,AXOF,AXON
                SILSIZ  =       ASIZ
                SILXOF  =       AXOF
                SILXON  =       AXON
                        .ENDM   SILO
                ;
                ;----------------------------------------------------
                ;  The PAGE macro is used to establish the number
                ;  of lines on a page.
                ;
                        .MACRO  PAGE ALINES
                        .ENDM   PAGE
                ;
                ;---------------------------------------------------
                ;  The CMDFIL macro is used to declare a command file which
                ;  is to be executed when the line is started.
                ;
000000                  .CSECT  CMFSEC
000000          CMFSEC:
003102                  .CSECT  TSGEN
                        .MACRO  CMDFIL  ARG
                        .IF     EQ,IOLFLG       ;Only do for non-CL lines
                        .CSECT  CMFSEC
                NAMPTR  = .
                        .ASCIZ  /ARG/
                CMFTOP  = .
                        .CSECT  TSGEN
                S       =       .
                .       =       LSUCF+CLX
                        .WORD   NAMPTR
                .       =       S
                        .ENDC
                CMFDON  = 1
                        .ENDM   CMDFIL
                ;
                ;--------------------------------------------------
                ;  The LINPRM macro is used to specify parameters
                ;  for lines.
                ;  There are three parameters:
                ;  1. Speed select code.
                ;  2. Even (0) / Odd (1) parity (No longer used).
                ;  3. One (0) or two (1) stop bits
                ;
                        .MACRO  LINPRM  ASPD,APAR,ASTOP
                PERR    =       0
                .IIF    GT,ASPD-17      PERR=1
                .IIF    GT,APAR-2       PERR=1
                .IIF    LT,ASTOP-1      PERR=1
                .IIF    GT,ASTOP-2      PERR=1
                        .IF     NE,PERR
                .ERROR  ;Invalid speed, parity or stop-bits parameter in LINPRM
                        .ENDC
                        XPAR    =       100
                        CARLEN  =       20
                                .IF     GT,<APAR-1>
                        XPAR    =       0
                        CARLEN  =       30
                                .ENDC
                        LSTPRM  =       <ASPD*400>
                                .ENDM   LINPRM
                        ;
                        ;-----------------------------------------------------------------------
                        ;  The SPEED macro is used to specify baud rates for lines
                        ;  as well as number of data bits and parity selection.
                        ;  The default is 9600 baud with 8. data bits and no parity.
                        ;  The form of the macro is:
                        ;
                        ;       SPEED   speedcode,data_bits,parity
                        ;
                        ;  where   speedcode is selected from the speed code table
                        ;            and is of the form S9600, for example
                        ;    and   data_bits = 7 or 8.
                        ;    and   parity = EVEN, ODD or NONE
                        ;
007000                  LSTPRM  = <S9600*400>!<20000*0>!NONE    ;Default to 4800,8,N
                        ;
                                .MACRO  SPEED   SPDCOD,NBITS,PARCOD
                                .IF     DF,S'SPDCOD
                        SPDVAL  =       S'SPDCOD
                                .IFF    ;DF,S'SPDCOD
                                .IF     DF,SPDCOD
                        SPDVAL  =       SPDCOD
                                .IFF    ;DF,SPDCOD
                        .ERROR  0;Invalid speed specified with SPEED macro
                        SPDVAL  =       14.
                                .ENDC   ;NDF,S'SPDCOD
                                .ENDC   ;DF,S'SPDCOD
                                .IF     B,NBITS
                        NDBITS  = 8.
                                .IFF    ;B,NBITS
                        NDBITS  = NBITS
                                .IF     LT,<NDBITS-7>
                        .ERROR  ;SPEED macro only accepts 7 or 8. data bits
                        NBDITS  = 8.
                                .ENDC   ;LT,<NDBITS-7>
                                .IF     GT,<NDBITS-8.>
                        .ERROR  ;SPEED macro only accepts 7 or 8. data bits
                        NDBITS  = 8.
                                .ENDC   ;GT,<NDBITS-8.>
                                .ENDC   ;B,NBITS
                                .IF     B,PARCOD
                        PARITY  = NONE
                                .IFF    ;B,PARCOD
                        PARITY  = PARCOD
                                .IF     NE,PARITY        ;NOT NONE?
                                .IF     NE,<PARITY-EVEN> ;NOT EVEN?
                                .IF     NE,<PARITY-ODD>  ;NOR ODD?
                        .ERROR  ;Parity must be EVEN, ODD or NONE in SPEED macro
                        PARITY  = NONE
```

```
        .ENDC   ;NOT ODD
        .ENDC   ;NOT EVEN
        .ENDC   ;EVEN OR ODD
        .ENDC   ;B,PARCOD
LSTPRM  =       <SPDVAL*400>!<20000*<8.-NDBITS>>!PARITY
        .ENDM   SPEED
;
;--------------------------------------------------------
;   The VECCHK macro is called to see if a line vector
;   address is reasoanble.
;
        .MACRO  VECCHK  VA,MASK
VERR=0
.IIF    LT,VA-60        VERR=1
; Although RT-11 V5.3 reserves 470 and 474, we do not (for now).
.IIF    GE,VA-500       VERR=1
.IIF    NE,VA&MASK      VERR=1
        .IF     NE,VERR
.ERROR  ;Invalid vector address for this line
        .ENDC
        .ENDM   VECCHK
;
;----------------------------------------------------------------
;   SRCHK macro checks the validity of a receiver status
;   register address
;
        .MACRO  SRCHK   SR
SRERR=0
.IIF    LT,SR-160000    SRERR=1
.IIF    NE,SR&7         SRERR=1
        .IF     NE,SRERR
.ERROR  ;Invalid status register address for this line
        .ENDC
        .ENDM   SRCHK
```

```
                ;-----------------------------------------------
                ;  The LINEND macro is used to close out a line
                ;  definition block.
                ;
000000                  .CSECT  SASECT
000000          SASECT:
003102                  .CSECT  TSGEN
                        .MACRO  LINEND
                ;  Make sure we're inside a line def block.
                        .IF     EQ BO
                .ERROR  6 ; Missing LINDEF for this line
                BO      =       0
                        .MEXIT
                        .ENDC
                BO      =       0               ;END LINDEF BLOCK
                ;
                ;  Make sure NAME and CMDFIL reserve at least 1 byte
                        .IF     EQ,NAMDON
                        NAME    <>
                        .ENDC
                        .IF     EQ,CMFDON
                        CMDFIL  <>
                        .ENDC
                ;
                ;  Define input and output character buffer sizes for line
                ;  Define input buffer
                S       =       .
                .       =       LINSIZ+CLX
                        .WORD   DIS-1           ;DEFINE BUFFER SIZE
                .       =       S
                ;  Define output buffer
                S       =       .
                .       =       LOTSIZ+CLX
                        .WORD   DOS             ;DEFINE BUFFER SIZE
                .       =       S
                ;
                ;  Define table for user defined activation characters.
                ;
                        .IF     EQ,IOLFLG       ;Only do for non-CL lines
                S       =       .
                        .CSECT  SASECT
                T       =       .
                        .BLKB   MXSPAC
                        .CSECT  TSGEN
                .       =       LSPACT+CLX
                        .WORD   T
                .       =       S
                        .ENDC                   ;End conditional (EQ,IOLFLG)
                ;
                ;  Items for primary lines only.
                ;
                LF      =       0               ;Assume this is not a primary or CL line
                        .IF     NE,IOLFLG       ;If doing a CL line definition
                LF      =       1               ;Treat like primary line
                        .IFF                    ;If not doing a CL line definition
                        .IF     LE <LN-NPL>     ;Do only if this is a primary line
                LF      =       1               ;Gen code
                .ENDC                           ;End conditional (LE <LN-NPL>)
                .ENDC                           ;End conditional (NE,IOLFLG)
;
                .IF     NE,LF                   ;Do if primary line or CL line
;
;   Define line control flags
;
S               =       .
.               =       ILSW2+CLX
                .WORD   DFLAGS                  ;SET THE FLAGS
.               =       S
;
;   Defile silo buffer size information
;
S               =       .
.               =       LHIRBA+CLX              ;Silo size
                .WORD   SILSIZ
.               =       LHIRBC+CLX              ;XOFF/XON control info
                .BYTE   SILXOF                  ;XOFF point
                .BYTE   SILXON                  ;XON point
.               =       S
;
;   Define line parameters (Required for DZ11 & DH11 lines, optional for DL11)
;
                .IF     NDF,LSTPRM
LSTPRM          =       0
                .IF     NE CURMX
.ERROR          0;Missing SPEED macro call
                .ENDC           ;End conditional (NE CURMX)
                .ENDC           ;End conditional (NDF,LSTPRM)
S               =       .
.               =       LMXPRM+CLX
                .WORD   <LSTPRM>!<CURMXL>
.               =       S
;
;   Define subprocess table.
;
                .IF     EQ,IOLFLG               ;Do if not inside CLDEF block
                .IF     NE MAXSEC
S               =       .
.               =       LSECPT+CLX
                .WORD   S
.               =       S
                .REPT   MAXSEC
                .BYTE   0
                .ENDR
                .EVEN
                .ENDC           ;End conditional (NE MAXSEC)
                .ENDC           ;End conditional (EQ,IOLFLG)
;
;   Define chracter translation table
;
                .IF     NE MXTTCT
S               =       .
.               =       LCXTBL+CLX
                .WORD   S
.               =       S
```

```
        .REPT   MXTTCT+1
        .WORD   0
        .ENDR
        .EVEN
        .ENDC           ;End conditional (NE MXTTCT)
;
        .ENDC           ;End conditional (NE,LF)
;
;  Reset flag that says we are inside an CLDEF block
;
IOLFLG  =       0       ;No longer inside an CLDEF block
        .ENDM   LINEND
;
;--------------------------------------------------------------------
;  The CLEND macro is like the LINEND macro except it is used to
;  terminate a communication line definition started with a CLDEF macro.
;
        .MACRO  CLEND
        LINEND
        .ENDM   CLEND
;
;-----------------------------------------------------------------
;  The DETACH macro is used to define a start-up command file
;  To be run on a detached line when TSX-Plus is started.
;  The one argument to DETACH is the name of the command file.
;
        .MACRO  DETACH  NAME
        .IF     NE      B0
.ERROR  1; Missing LINEND on last line
        LINEND
        .ENDC
NDLDF   =       NDLDF+1         ;Count number of detached jobs
LN      =       LN+1
LX      =       LX+2
CLX     =       LX
        .IF     LE,<NDL>
.ERROR  2; DETACH macro declared with no detached lines
        .MEXIT
        .ENDC
        .IF     GT,<LN-NPL-NDL>
.ERROR  2; More lines than declared with TBLDEF
        .MEXIT
        .ENDC
;  Store startup command file name
S       =       .
.       =       LSUCF+CLX
        .WORD   S
.       =       S
        .IF     NB,<NAME>
        .ASCIZ  /NAME/
        .ENDC
        .REPT   <DETCBS+1-<.-S>>
        .BYTE   0
        .ENDR
        .EVEN
        .ENDM   DETACH
;
```

```
                                        ;-----------------------------------------------------------------------
                                        ;  The SYSPS macro is used to define a system password which may be
                                        ;  required to be entered for some lines before the normal logon
                                        ;  sequence begins.
                                        ;
             000000                             SYSPSS  = 0
                                                .MACRO  SYSPS   STRING
                                                SYSPSS = 1
                                        SYPSWD: .ASCIZ  \STRING\
                                                .IF     GT,<21.-<.-SYPSWD>>
                                                .REPT   <21.-<.-SYPSWD>>
                                                .BYTE   0
                                                .ENDR
                                                .ENDC   ;GT,<21.-<.-SYPSWD>>
                                                .EVEN
                                                .ENDM   SYSPS

                                        ;-----------------------------------------------------------------------
                                        ;  The RTDEF macro is used to declare information about shared
                                        ;  run-time systems.
                                        ;
                                        ;  The 3 arguments to RTDEF are
                                        ;  1. 12 character name of run-time system file.
                                        ;  2. R or RW indicating Read-only or Read-Write access.
                                        ;  3. Number of blocks to skip at the front of the file.
                                        ;
                                                .MACRO  RTDEF   NAME,RFLAG,SKIP
                                                .CSECT  RDBSEC
                                        T       =       .
                                                .RAD50  /'NAME'/
                                                .IF     NE,<<.-T>-8.>
                                        .ERROR  0;Run-time system name was not correctly specified
                                                .ENDC
                                                .WORD   0,0
                                                .IF     IDN,RFLAG,RW
                                                .BYTE   RF$WRT
                                                .IFF
                                                .BYTE   0
                                                .ENDC
                                                .BYTE   SKIP
                                                .CSECT  TSGEN
                                        NUMRDB  =       NUMRDB+1
                                                .ENDM   RTDEF
```

```
;
;--------------------------------------------------------
;   The DHDEF macro is used to declare the beginning
;   of a block of lines which are attached to a DH11
;   multiplexer.  All line definition blocks up to
;   the next MUXEND macro call will be connected to
;   the DH11.
;   There are four arguments to DHDEF:
;   1.  The interrupt vector address of the mux receiver.
;   2.  The address of the mux control and status register.
;   3.  The interrupt vector address of the associated DM11.
;   4.  The CSR address of the associated DM11.
;
                .MACRO  DHDEF   AVEC,ACSR,ADMVEC,ADMADR
                .IF     NE CURMX
.ERROR          1; Missing MUXEND macro
                MUXEND
                .ENDC
LSTMX           =       LSTMX+2
CURMX           =       LSTMX
CURCDX          =       CDX$DH          ;Lines within this block are connected to DH11
DHUSE           =       1               ;Set flag saying DH11 support is needed
                VECCHK  AVEC,7
                SRCHK   ACSR
                .IF     NE,ADMVEC
                VECCHK  ADMVEC,3
                .ENDC
                .IF     NE,ADMADR
                SRCHK   ADMADR
                .ENDC
S               =       .
.               =       MXTYPE+CURMX    ;Type of multiplexor
                .WORD   CDX$DH          ;Type = DH11
.               =       MH$SCR+CURMX    ;Status and control register address
                .WORD   ACSR
.               =       MH$RCR+CURMX    ;Received character register
                .WORD   ACSR+2
.               =       MH$LPR+CURMX    ;Line parameter register
                .WORD   ACSR+4
.               =       MH$CAR+CURMX    ;Current address register
                .WORD   ACSR+6
.               =       MH$BCR+CURMX    ;Byte count register
                .WORD   ACSR+10
.               =       MH$BAR+CURMX    ;Buffer active register
                .WORD   ACSR+12
.               =       MH$BRK+CURMX    ;Break control register
                .WORD   ACSR+14
.               =       MH$SSR+CURMX    ;Silo status register
                .WORD   ACSR+16
.               =       DM$CSR+CURMX    ;DM11 Control Status register
                .WORD   ADMADR
.               =       DM$LSR+CURMX    ;DM11 Line status register
                .WORD   ADMADR+2
.               =       MXVEC+CURMX     ;DH11 Interrupt vector address
                .WORD   AVEC
.               =       DM$VEC+CURMX    ;DM11 Interrupt vector address
                .WORD   ADMVEC
```

```
     58                                          .               =       S
     59                                                   .ENDM   DHDEF
```

```
;
;------------------------------------------------------
;  The DHVDEF macro is used to declare the beginning
;  of a block of lines which are attached to a DHV11
;  multiplexer.  All line definition blocks up to
;  the next MUXEND macro call will be connected to
;  the DHV11.
;  There are two arguments to DHVDEF:
;  1. The interrupt vector address of the mux receiver.
;  2. The address of the mux control and status register.
;
        .MACRO  DHVDEF  AVEC,ACSR
        .IF     NE CURMX
.ERROR  1; Missing MUXEND macro
        MUXEND
        .ENDC
LSTMX   =       LSTMX+2
CURMX   =       LSTMX
CURCDX  =       CDX$VH          ;Lines within this block connected to DHV11
DHUSE   =       1               ;Set flag saying DHV11 support is needed
        VECCHK  AVEC,7
        SRCHK   ACSR
S       =       .
.       =       MXTYPE+CURMX    ;Type of multiplexor
        .WORD   CDX$VH          ;Type = DHV11
.       =       VH$CSR+CURMX    ;Status and control register address
        .WORD   ACSR
.       =       VH$DBR+CURMX    ;Data buffer register
        .WORD   ACSR+2
.       =       VH$LPR+CURMX    ;Line parameter register
        .WORD   ACSR+4
.       =       VH$LSR+CURMX    ;Line Status Register
        .WORD   ACSR+6
.       =       VH$LCR+CURMX    ;Line Control Register
        .WORD   ACSR+10
.       =       VH$BA1+CURMX    ;Buffer Address register 1
        .WORD   ACSR+12
.       =       VH$BA2+CURMX    ;Buffer Address register 2
        .WORD   ACSR+14
.       =       VH$BCR+CURMX    ;Byte Count Register
        .WORD   ACSR+16
.       =       MXVEC+CURMX     ;Interrupt vector address
        .WORD   AVEC
.       =       S
        .ENDM   DHVDEF
;
;------------------------------------------------------
;  The DHUDEF macro is used to declare the beginning
;  of a block of lines which are attached to a DHU11
;  multiplexer.  All line definition blocks up to
;  the next MUXEND macro call will be connected to
;  the DHU11.
;  There are two arguments to DHUDEF:
;  1. The interrupt vector address of the mux receiver.
;  2. The address of the mux control and status register.
;
        .MACRO  DHUDEF  AVEC,ACSR
```

```
     58                                         DHVDEF  AVEC,ACSR               ;Handle same as DHV11
     59                                         .ENDM   DHUDEF
```

```
;-----------------------------------------------------
;  The SPOOL macro is used to declare those devices which
;  are to be spooled by TSX-Plus (such as line printers).
;  There are seven arguments to spool:
;    1) Number of devices to be spooled (may be zero)
;    2) Number of spool files allowed to be open.
;    3) Number of buffers for spooler to use.
;    4) Number of blocks in spool disk file.
;    5) List of 3 character names of devices to be spooled.
;    6) 0 for 'nohold' mode, 1 for 'hold' mode.
;    7) # of blocks which will be remembered for back up.
;
        .MACRO  SPOOL   SND,SNF,SNB,SNDB,SNAM,SHLD,SNBU
;  Define number of spooled devices
SPLND   =       SND
SNBUX   =       SNBU
        .IF     EQ,SNBU
SNBUX   =       1
        .ENDC
PVSPBL  =       SNBUX+10.                 ;# PRIVATE BLOCKS PER DEV
SNDBX   =       SNDB            ;TOTAL # OF SPOOL BLOCKS
        .IF     LT <SNDB-<SND*PVSPBL>-2>
SNDBX   =       <SND*PVSPBL>+2
        .ENDC
        .IF     GT,SPLND
;**
;**  Assemble this code if there are spooled devices.
;**
SPLNF   =       SNF             ;DEFINE # OF SPOOL FILES
SPLNB   =       SNB             ;DEFINE # OF SPOOL BUFFERS
NESB:   .WORD   SPLNB
;  DEFINE SPOOL BUFFERS
        .IF     EQ,SPLNB        ;THERE MUST BE AT LEAST 1 BUFFER
.ERROR  ;There must be at least 1 buffer for spooler
SPLNB   =       1               ;FORCE 1 BUFFER
        .ENDC
SPLBHD: .WORD   0               ;HEAD OF FREE BUFFER CHAIN
        .IF     EQ,SPLNF        ;Make sure we have at least 1 file
.ERROR  ;There must be at least 1 spool file
SPLNF   =       1               ;FORCE 1 FILE
        .ENDC
;
;  Define spool device control blocks (SDCB)
;
SDCB:
        .REPT   SPLND
        .WORD   0,0,0,0,0       ;SDCHAN
        .WORD   0,0,0,0,0,0
        .WORD   0,0,0,0
;  INITIAL FORM NAME
        .ASCII  /STD    /       ;SDFORM
        .WORD   0,0             ;SDANAM
;  GEN INIT FLAGS
        .IF     NE,SHLD
        .WORD   SD$HLD          ;SDFLAG
        .IFF
        .WORD   0               ;SDFLAG
        .ENDC
        .WORD   0               ;SDSKIP
        .WORD   PVSPBL          ;SDFRBL
;   GEN BACKUP CELLS
        .REPT   SNBUX
        .WORD   0
        .ENDR
        .WORD   0               ;SDBULS = END OF SDBU
        .ENDR
SDCBND:                         ;END OF SDCB AREA
;   DEFINE SIZE OF SDCB
SDCBSZ  =       48.+<2*SNBUX>
SDBULS  =       SDCBSZ-4.
;
;   Define table of device names.
;
SPLDEV: .RAD50  /'SNAM'/        ;DEFINE TABLE OF NAMES
        .EVEN
SPLDVN:                         ;END OF TABLE
        .IF     NE,<<SPLDVN-SPLDEV>-<2*SND>>
.ERROR  ;Number of spooled devices not equal to number of names
        .ENDC
SPLANM: .ASCII  /'SNAM'/
        .EVEN
;   Reserve space for spool file channel block
SPLCHN: .BLKW   5
;
        .IFF
;**
;**  This code is assembled if there are no spooled devices.
;**
SPLND   =       0
SPLNF   =       0
SPLNB   =       0
SDCBSZ  =       1
SDBULS  =       1
;
SPLDEV:
SPLDVN:
SPLANM:
SPLBHD:
SPLCHN:
SDCB:
SDCBND:
NESB:
        .WORD   0               ;SAY ALL LISTS ARE EMPTY
;
        .ENDC
        .ENDM   SPOOL
```

```
                                ;=================================================================
                                ;  The TSX-Plus system manager alters values in the following
                                ;  section to customize the system for a particular configuration.
                                ;
                                ;  System parameters:
                                ;
                                ;  Swap file device-file specification (do not place on VM).
                                ;
003102  075250  100020  075150  SWDBLK: .RAD50  /SY TSXSWPTSX/
003110  100020
                                ;
                                ;  Spool file device-file specification (do not place on VM).
                                ;
003112  075250  100020  074514  SPLBLK: .RAD50  /SY TSXSPLTSX/
003120  100020
                                ;
                                ;  PLAS region swap file specification (do not place on VM).
                                ;
003122  075250  100020  071576  RSFBLK: .RAD50  /SY TSXRSFTSX/
003130  100020
                                ;
                                ;  File spec for file used to hold user defined command definitions (UCL)
                                ;
003132  075250  100020  101704  UCLDAT: .RAD50  /SY TSXUCLTSX/
003140  100020
                                ;
                                ;  File spec for temp file used while processing IND command files
                                ;
003142  075250  100020  035164  INDFIL: .RAD50  /SY TSXINDTSX/
003150  100020
                                ;
                                ;  Maximum amount of memory that can be used by any job (# K bytes).
                                ;  This value must not exceed 64. (Kb)
                                ;
        000100                  HIMEM   =       64.     ;Max memory that any job may use
                                ;
                                ;  Default memory size for jobs that will be in effect when the job
                                ;  logs on.  (Specify in # K bytes).
                                ;
        000070                  DFLMEM  =       56.     ;Default memory limit for jobs
                                ;
                                ;  SWAPFL controls whether TSX-Plus is allowed to swap jobs to disk if
                                ;  insufficient memory is available to hold all active users.
                                ;  The normal case (SWAPFL=1) allows TSX-Plus to do job swapping.
                                ;  SWAPFL can be set to 0 (zero) in special situations such as when a
                                ;  small number of lines are being supported on a floppy disk based system
                                ;  that does not have room for a swap file.
                                ;  If SWAPFL is set to zero the following actions occur:
                                ;  1. No disk swap file is created.
                                ;  2. A line will not be allowed to log on if there is insufficient
                                ;     free memory space to support it.
                                ;  3. Each job is allocated a memory size equal to DFLMEM (default job
                                ;     memory size).
                                ;  4. The MEMORY command cannot be used to change the job size.
                                ;
        000001                  SWAPFL  =       1       ;1==>Allow job swapping; 0==>Do not swap.
                                ;
```

```
                        ;  If the system is generated with job swapping enabled (SWAPFL=1), then
                        ;  the SWPSLT parameter controls the number of job slots allocated
                        ;  in the swap file.  SWPSLT should be in the range 0 up to the
                        ;  total number of jobs. If SWPSLT is set to zero, TSX-Plus will
                        ;  automatically allocate one job slot in the swap file for each job.
                        ;  SWPSLT may be set to a value less than the total number of jobs if
                        ;  a small amount of job swapping is anticipated; however, a system
                        ;  crash will occur if the system needs to swap a job out of memory
                        ;  and no free slot is available in the swap file.
                        ;  The SWPSLT parameter has no effect on non-swapping systems (SWAPFL=0).
                        ;  The recommended setting for this parameter is 0 (zero).
                        ;
        000000          SWPSLT  =       0.      ;Number of job slots in swap file
                        ;
                        ;  Number of 512-byte blocks to allocate for swap file that is used
                        ;  for extended memory PLAS (Program's Logical Address Space) regions
                        ;  that are used by jobs that have virtual overlays or virtual arrays.
                        ;  Note that this is the total space in the PLAS swap file for all
                        ;  extended memory regions in use at any time by all jobs.
                        ;  Note: In a non-swapping system (SWAPFL=0), SEGBLK must be non-zero
                        ;  if PLAS support is wanted, but its value does not matter.
                        ;
        000000          SEGBLK  =       0.      ;# blocks for PLAS swap file
                        ;
                        ;  Number of shared global PLAS regions that can be created by all jobs.
                        ;
        000014          NGR     =       12.     ;Number of global PLAS regions
                        ;
                        ;  BUSTYP defines the machine bus structure for TSX-Plus.  Their are two
                        ;  possible machine bus structures supported by TSX-Plus - the QBUS (LSI)
                        ;  and the UNIBUS.  Select one of these parameters below to specify the
                        ;  bus support desired.  Use the following information for choosing the
                        ;  correct bus structure.
                        ;
                        ;  QBUS    - 11/23, 11/23-Plus, 11/73, and Professional.
                        ;  UNIBUS  - 11/24, 11/34a, 11/44, and 11/60.
                        ;
        000001          BUSTYP  =       QBUS    ;Specify machine bus structure (UNIBUS/QBUS)
                        ;
                        ;  Memory upper limit size specification expressed in number of k-bytes.
                        ;  This parameter controls the maximum memory available for TSX-Plus
                        ;  system use.  Memory above this upper limit will not be used by the
                        ;  operating system.
                        ;  If the MEMSIZ parameter is set to 0 (zero), TSX-Plus will use all
                        ;  available memory on the machine.  To disable the use of extended
                        ;  memory, set MEMSIZ to 248 or less.
                        ;
        000370          MEMSIZ  =       248.    ;Upper memory limit
                        ;
                        ;  The INIABT parameter controls the action taken by TSX-Plus when
                        ;  certain errors are detected during system initialization.
                        ;  If INIABT=0, TSX-Plus ignores the error and continues running.
                        ;  If INIABT=1, TSX-Plus aborts initialization and prints an error message.
                        ;
                        ;  ************************************************
                        ;  **  The normal and recommended setting for     **
                        ;  **  this parameter is INIABT=1. It is cleared  **
```

```
                ;   **  for default installation.                   **
                ;   ************************************************
                ;
                ;   The following initialization errors are controlled by the INIABT flag:
                ;     1. A device that was specified in TSGEN does not have a
                ;        TSX-Plus handler on the system disk.
                ;     2. A time sharing line that was generated into TSX-Plus is not
                ;        installed on the machine.
                ;     3. A shared run-time system file could not be found during startup.
                ;
000000          INIABT  =       0       ;0==>Continue on error, 1==>Abort on error
                ;
                ;   The UXIFLG parameter controls the action taken by TSX-Plus when
                ;   an interrupt occurs at an unexpected location. Unexpected interrupts
                ;   may occur if the interrupt vector address specified in a device
                ;   handler does not match the actual interrupt address for which the
                ;   device has been set. Unexpected interrupts can also occur if real-time
                ;   interrupts occur and no connection has been established between the
                ;   real-time interrupt and a TSX-Plus real-time program.
                ;
                ;   If UXIFLG is set to 1 (one) then unexpected interrupts cause a system
                ;   crash with the error message:
                ;        ?TSX-F-UEI-Interrupt occurred at unexpected location
                ;        Argument value = xxxx
                ;   Where "xxxx" is the address at which the interrupt occurred.
                ;
                ;   If UXIFLG is set to 0 (zero) then unexpected interrupts are ignored
                ;   by the system and do not cause a crash or print an error message.
                ;
                ;   The recommended setting for UXIFLG is 1 (one).
                ;
000001          UXIFLG  =       1       ;Unexpected interrupt control flag
                ;
                ;   Parameters related to the TSX-Plus system crash dump facility.
                ;   This optional facility will print some useful internal system
                ;   data if a system crash occurs.  The dump information can be printed
                ;   on any terminal connected to a DL-11 type line (including DLV-11)
                ;   or on a parallel printer port.
                ;   It is recommended that this facility not be included in the system
                ;   unless you are experiencing system crashes.
                ;
                ;   Set SYSDMP to 1 if you want the crash dump facility, 0 if not.
                ;
000000          SYSDMP  =       0       ;1==>Enable crash dump, 0==>No crash dump
                ;
                ;   Address of transmitter control register for device to which crash
                ;   dump is to be written.  This must be a DL-11 type device controller
                ;   or a parallel printer controller.
                ;   Specify 177564 to dump on the console terminal.
                ;   Specify 177514 to dump to line printer connected to standard parallel port.
                ;
177560          DMPTCR  =       177560  ;Transmitter control reg for dump device
                ;
                ;   Set DMPKTP to 1 if you want a system crash to occur any time a trap
                ;   occurs within the system. Set it to 0 (zero) if you want recoverable
                ;   traps within the system to abort the job but continue execution of the
                ;   system.
```

```
                                ;
        000000                  DMPKTP  =       0       ;1==>Always crash on traps within system
                                ;
                                ;  The  IOABT parameter controls the action taken by TSX-Plus when
                                ;  a job terminates execution.  If IOABT=0, TSX-Plus will wait for
                                ;  all outstanding I/O pending for the job to complete before the job
                                ;  is actually terminated.  If IOABT=1, TSX-Plus will call the handler
                                ;  abort entry point for all outstanding I/O pending for the job.
                                ;  Note, the "SET IO [NO] ABORT" keyboard command may be used to
                                ;  change the value of this parameter.
                                ;
        000001                  IOABT   =       1       ;0==>I/O rundown, 1==>I/O abort
                                ;
                                ;  U$CL is a flag that controls whether the User Command Linkage is to
                                ;  be used to allow users to define their own commands.
                                ;  If U$CL is non-zero the UCL facility is enabled and users may define
                                ;  their own system commands. If U$CL is zero, user defined commands
                                ;  will not be supported by the system. Note: if the UCL facility is
                                ;  enabled, the TSXUCL.SAV file must be placed on the system disk.
                                ;
        000001                  U$CL    =       1       ;0==>No UCL program, 1==>UCL program
                                ;
                                ;  Number of user-defined commands that can be stored by TSXUCL
                                ;  for each job. (The number of blocks required in the SY:TSXUCL.DAT file
                                ;  is approximately equal to the number of commands per job times the
                                ;  total number of time-sharing lines divided by 5).
                                ;
        000005                  UCLMNC  =       5.      ;Maximum user-defined commands per job
                                ;
                                ;  The UCLORD parameter selects the default call order for checking
                                ;  to see if a command is a user-defined command.
                                ;  FIRST  ==> Check for user-defined commands before system commands.
                                ;  MIDDLE ==> Check after system commands but before command files.
                                ;  LAST   ==> Check after system commands and command files.
                                ;
                                ;  Note that the SET UCL FIRST/LAST keyboard command can be used to
                                ;  alter this order on a line-by-line basis.
                                ;
        000002                  UCLORD  =       MIDDLE  ;Select FIRST / MIDDLE / LAST
                                ;
                                ;  The LDSYS flag controls whether the standard system support for
                                ;  logical disks (LD) is to be provided.
                                ;  If LDSYS is set to 1, system support for logical disks is included.
                                ;  If LDSYS is set to 0, system support for logical disks is excluded.
                                ;
        000001                  LDSYS   =       1       ;1==>Include LD support, 0==>Exclude LD.
                                ;
                                ;  The SLEDIT flag controls whether the Single Line Editor (SL) facility
                                ;  is to be made available to the system.
                                ;  If SLEDIT is set to 1, Single Line Editor support is included.
                                ;  If SLEDIT is set to 0, Single Line Editor support is omitted.
                                ;  Single Line Editor support adds approximately 2Kb to the size of the
                                ;  mapped portion of the system.
                                ;
        000001                  SLEDIT  =       1       ;1==>Include SL support, 0==>Exclude SL
                                ;
                                ;  The KEYMAX parameter specifies the number of user-defined keys supported
```

```
                               ;  by the single line editor.  The DEFINE/KEY command is used to associate
                               ;  a user-specified text string with a function key.  The maximum number
                               ;  of such key definitions that may be in effect at one time for each user
                               ;  is controlled by the KEYMAX parameter.
                               ;  The maximum supported value for KEYMAX is 60.
                               ;
        000007                 KEYMAX  =       7.      ;Maximum number of user-defined keys for SL
                               ;
                               ;  The MAXWIN parameter specifies the maximum number of terminal display
                               ;  windows that may be in use by all jobs on the system.
                               ;  If MAXWIN is set to 0 (zero), the display window feature is not included
                               ;  in the system.  Display windows are useful if you frequently utilize
                               ;  subprocesses in that they preserve the screen context when you switch
                               ;  between processes.
                               ;
        000012                 MAXWIN  =       10.     ;Total number of display windows for all jobs
                               ;
                               ;  Set DBGFLG to 1 to cause the TSX-Plus program debugging facility
                               ;  to be included with the system.
                               ;  Set DBGFLG to 0 if the debugging facility is not wanted.
                               ;
        000000                 DBGFLG  =       0       ;1==>Include debugger; 0==>Exclude debugger
                               ;
                               ;  Number of slots in INSTALL table to reserve for user programs.
                               ;
        000004                 NUIP    =       4.      ;Number of INSTALL slots for user programs
                               ;
                               ;  The following time-slice values are used to schedule jobs for execution.
                               ;  Each time value must be specified in 0.1 second units.
                               ;
                               ;  QUAN0 -- Time slice for round-robin scheduling of high-priority
                               ;           real-time jobs. That is, jobs with execution priorities
                               ;           greater than or equal to PRIHI.
                               ;
        000002                 QUAN0   =       2.      ;Time slice for real-time jobs
                               ;
                               ;  QUAN1 -- Time that jobs will remain in a high-priority state after
                               ;           they receive an activation character from the terminal.
                               ;           A job is classified as "interactive" from the time when an
                               ;           activation character is received until the job consumes
                               ;           QUAN1 units of time, then the job is classified as "compute
                               ;           bound".
                               ;
        000024                 QUAN1   =       20.     ;High-priority time for interactive jobs
                               ;
                               ;  QUAN1A -- Time that jobs will remain in a high-priority state after
                               ;            they are activated because of I/O completion or they are
                               ;            restarted following other wait states.
                               ;
        000002                 QUAN1A  =       2.      ;High-priority time for wait-reactivation
                               ;
                               ;  QUAN1B -- Time slice used to switch between "interactive" jobs.
                               ;
        000002                 QUAN1B  =       2.      ;Time slice for "interactive" jobs.
                               ;
                               ;  QUAN1C -- Time job will be allowed to stay in highest execution state
                               ;            after receipt of a character from the terminal.
```

```
                        ;
000001                  QUAN1C  =       1.      ;Time at highest execution state
                        ;
                        ;  QUAN2 -- Time that normal priority CPU-bound jobs are allowed to run
                        ;           if there are no high-priority jobs that want to run.
                        ;           This time-slice controls round-robin scheduling of CPU-bound jobs
                        ;           with execution priority values in the range (PRILOW+1) to
                        ;           (PRIHI-1).
                        ;
000012                  QUAN2   =       10.     ;Normal-priority CPU-bound job time-slice
                        ;
                        ;  QUAN3  -- Time slice for round-robin scheduling of very low priority
                        ;            jobs. That is, jobs with priorities less than or equal
                        ;            to PRILOW.
                        ;
000024                  QUAN3   =       20.     ;Time slice for very low priority jobs
                        ;
                        ;  INTIOC -- Number of consecutive times that a job will be allowed to
                        ;            perform I/O operations following input of an activation
                        ;            character from the terminal before the job is classified
                        ;            as non-interactive.
                        ;
000036                  INTIOC  =       30.     ;Number of I/O ops. while "interactive".
                        ;
                        ;  HIPRCT -- Number of consecutive times that a job will be given a
                        ;            high-priority execution boost following wait states such
                        ;            as I/O wait before the job will be scheduled as a normal
                        ;            CPU-bound job.
                        ;
000050                  HIPRCT  =       40.     ;Number of consecutive high-priority hits
                        ;
                        ;  Time that job will be held in memory after being swapped in from disk.
                        ;  A job is not eligible to be swapped out of memory until CORTIM has
                        ;  elapsed since it was swapped into memory.  However, the job becomes
                        ;  immediately eligible to be swapped if it goes into a state where it is
                        ;  waiting on any resource other than non-terminal I/O.
                        ;  Specify in 0.1 second units.
                        ;
000002                  CORTIM  =       2.      ;Guaranteed memory-residency time
                        ;
                        ;  Job priority classes:  There are three groups of job priorities,
                        ;  the lowest priority group ranges from a job priority 0 up to and
                        ;  including the priority equal to the PRILOW parameter. Jobs with
                        ;  priorities in this range execute with lower priority than all normal
                        ;  time-sharing jobs.
                        ;  The second range of priorities is from (PRILOW+1) up to (PRIHI-1).
                        ;  Jobs in this range are treated as normal time-sharing jobs.
                        ;  The third range of priorities is from PRIHI up to 127. These priorities
                        ;  are for real-time jobs which will take unconditional precedence over
                        ;  all other jobs.
                        ;  All priority values must be in the range 0 to 127.
                        ;
000023                  PRILOW  =       19.     ;Highest "low priority" value
000120                  PRIHI   =       80.     ;Lowest "high priority" value
                        ;
                        ;  PRIDEF -- Default job priority.
                        ;
```

```
000062          PRIDEF  =       50.     ;Default job priority
                ;
                ;  PRIVIR -- Amount by which a job's execution priority is reduced
                ;            when the job is disconnected from the terminal by switching
                ;            to a subprocess. Note: this only applies to jobs with
                ;            base priorities in the range (PRILOW+1) to (PRIHI-1).
                ;
000012          PRIVIR  =       10.     ;Disconnect job priority reduction
                ;
                ;  Maximum number of subprocesses per primary process.
                ;
000002          MAXSEC  =       2.      ;Max subprocesses per user
                ;
                ;  Maximum file size (# blocks) that will be returned in response to
                ;  a .ENTER request that specifies a file size of 0 blocks.
                ;
001750          MAXFIL  =       1000.   ;Max # blocks for default allocation
                ;
                ;  Number of 512 byte blocks to hold in memory in a generalized data cache.
                ;  If the CACHE parameter is set to 0 (zero), data caching is not performed.
                ;  Note: The data caching facility adds approximately 2000 bytes to the
                ;  size of the unmapped portion of the system and 528*CACHE bytes to
                ;  the mapped portion of the system.
                ;  The maximum number of blocks that may be held in the cache is 4095. (2MB)
                ;
000000          CACHE   =       0.      ;Number of blocks in data cache
                ;
                ;  The following parameters relate to the cache of file directory entries
                ;  maintained by TSX-Plus.  This cache is used to reduce the number of disk
                ;  accesses required to do lookups on frequently accessed files.
                ;  The system disk (SY:) is automatically cached.
                ;  Other devices are only cached if they are introduced to the system
                ;  by use of the MOUNT command.
                ;
                ;  Maximum number of units that may be cached.
                ;  This includes all logical disks (LD) and all physical disks for which
                ;  directory caching is enabled by use of the MOUNT command.
                ;  (Space required is 18 bytes per unit).
                ;
000012          MAXCSH  =       10.     ;Max # device units whose directories to cache
                ;
                ;  Maximum number of file entries to be held in directory cache.
                ;  (Space required is 18 bytes per entry)
                ;
000050          NMFCSH  =       40.     ;Max # file entries to be cached
                ;
                ;  Maximum number of device units that can be allocated to jobs for exclusive
                ;  use by use of the ALLOCATE command.
                ;
000005          MAXALC  =       5.      ;Max # units that can be allocated
                ;
                ;  Maximum number of simultaneous requests by jobs to monitor other jobs.
                ;
000005          MAXMON  =       5.      ;Max # job monitoring requests
                ;
                ;  The system password is a global password which must be entered
                ;  when a line is initiated before the normal logon sequence begins.
```

```
                                   ;  The use of a system password is optional and may be enabled on a
                                   ;  line-by-line basis by specifying the $SYSPS flag with the
                                   ;  FLAGS macro within the line definition blocks for the lines
                                   ;  for which the password will be required.  If a system password is
                                   ;  required for a line, an exclamation point prompt is printed as the
                                   ;  first thing when the line is initiated.  The idea is to force the
                                   ;  calling person to provide a password before printing the normal
                                   ;  logon greeting which identifies the nature and identity of the site.
                                   ;
003152                                   SYSPS   <TSX>    ;System password for all lines with $SYSPS
                                   ;
                                   ;  Amount of time that carrier signal must be lost on dial-up
                                   ;  lines before we assume the connection has been broken.
                                   ;  This value is also used to time-out lines which ring and
                                   ;  do not raise carrier.
                                   ;  Specify in 0.5 second units.
                                   ;
      000036                       TIMOUT  =       30.      ;Time allowed for lost carrier
                                   ;
                                   ;  Amount of time that a user may remain connected to a dial-up line
                                   ;  after logging off before Data Terminal Ready (DTR) will be
                                   ;  dropped causing the phone to hang up.
                                   ;  Specify in 0.5 second units.
                                   ;
      000074                       OFFTIM  =       60.      ;Time allowed for job to be logged off
                                   ;
                                   ;  Modem lines ($PHONE in the LINDEF FLAGS macro) are normally
                                   ;  treated as phone lines if the DCD signal (carrier) is present
                                   ;  when the lines are started and optionally treated as local lines
                                   ;  if the signal is not present. The OFFTIM and TIMOUT parameters
                                   ;  are only effective if the line is recognized as a phone line when
                                   ;  started. Set PHONE to 0 to allow lines with the $PHONE
                                   ;  flag to optionally support local lines. Set PHONE to 1 to
                                   ;  force the OFFTIM and TIMOUT parameters to always take effect for
                                   ;  lines with the $PHONE flag.
                                   ;
      000000                       PHONE   =       0.       ;$PHONE lines may be local if carrier absent
                                   ;
                                   ;  Define Lead-in character that tells TSX-Plus that a special
                                   ;  terminal control sequence is coming from the program.
                                   ;
      000035                       TSLICH  =       035      ;Octal 35 = decimal 29.
                                   ;
                                   ;  Define the keyboard control character that will be used to
                                   ;  switch to a subprocess.
                                   ;  (Specify the octal value of the ASCII control character)
                                   ;
      000027                       VLSWCH  =       027      ;Octal 27 = control-W
                                   ;
                                   ;  Define keyboard control character used to cause the current screen
                                   ;  window contents to be printed.
                                   ;  (Specify the octal value of the ASCII control character)
                                   ;
      000002                       PWCH    =       002      ;Octal 02 = control-B
                                   ;
                                   ;  Define keyboard control character that is used to terminate
                                   ;  a cross-connection between a time-sharing line and a CL line.
```

```
                                 ;  (Specify the octal value of the ASCII control character)
                                 ;
        000034                   CCXTRM  =       034     ;Octal 34 = control-\ (control backslash)
                                 ;
                                 ;  Define keyboard control character that is used to signal
                                 ;  special control functions for a time-sharing line cross-connected
                                 ;  to a CL line.
                                 ;  (Specify the octal value of the ASCII control character)
                                 ;
        000001                   CCXCTL  =       001     ;Octal 001 = control-A
                                 ;
                                 ;  Define the version number to be associated with the CL handler when
                                 ;  being used with VTCOM.  If CLVRSN is defined as 0 then an appropraite
                                 ;  value will be selected via an internal table.  Zero is the suggested
                                 ;  setting.
                                 ;
        000000                   CLVRSN  =       0.      ;CL version number
                                 ;
                                 ;  Define maximum number of user defined activation characters
                                 ;  that each line may define during execution.
                                 ;
        000020                   MXSPAC  =       16.     ;Max # user defined activation chars per job
                                 ;
                                 ;  Define maximum number of characters that can be translated by
                                 ;  the terminal handler.  This translation consists of replacing
                                 ;  a received character by a substitution character on input and replacing
                                 ;  the substitution character by the original character on output.
                                 ;  This parameter must be non-zero to use the SET TT TRANSLATE=( ) command.
                                 ;
        000004                   MXTTCT  =       4.      ;Max # chars that terminal handler can translate
                                 ;
                                 ;  Select default system editor.
                                 ;  The choices are
                                 ;   EDIT
                                 ;   TECO
                                 ;   KED
                                 ;   K52
                                 ;
        000003                   EDITOR  =       KED     ;Default system editor
                                 ;
                                 ;  Select system default implicit or explicit wildcards for CCL commands.
                                 ;    If WILDFL = 0 then explicit wildcards are selected.
                                 ;    If WILDFL = 1 then implicit wildcards are selected.
                                 ;
        000001                   WILDFL  =       1       ;1==>Implicit wildcard, 0==>Explicit wildcard
                                 ;
                                 ;---------------------------------------------------------------------
                                 ;  The DEVDEF macro must be used to define the names and characteristics
                                 ;  of all devices which are to be available to TSX-Plus users.
                                 ;  The form of a device definition is:
                                 ;
                                 ;       DEVDEF  <device>[,option,...,option]
                                 ;
                                 ;  For each device to be available to the system an entry must be made
                                 ;  using the DEVDEF macro. This macro requires at least one argument
                                 ;  but may have several optional arguments as described below:
                                 ;
```

```
                        ;  1.  The first parameter is the two character device name enclosed
                        ;      in angle brackets.
                        ;  2.  The optional parameters specify the device characteristics.
                        ;      There are nine allowable device attributes which may be
                        ;      specified in any order.  They are as follows:
                        ;
                        ;      DMA      Device performs Direct Memory Access (DMA).
                        ;      MAPIO    Perform I/O mapping (18-bit controllers on 22-bit QBUS).
                        ;      EVNBUF   Require even byte buffer address for I/O transfers.
                        ;      NOCACHE  Do not use generalized data cache for this device.
                        ;      NOMOUNT  Do not allow mounts (i.e., use directory cache) for
                        ;               this device.
                        ;      REQALC   Require device allocation before use.
                        ;      MAPH     Load the device handler outside the low memory 40K
                        ;               byte region and into a mapped handler region.
                        ;      NOMAPH   Do not load the handler into a mapped handler region
                        ;               instead load it into the low memory 40k byte region.
                        ;      HANBUF   Handler contains an internal I/O buffer.
                        ;
                        ;  For standard device drivers, it is important to choose MAPIO when
                        ;  18-bit controllers or handlers will be used on a 22-bit LSI system.
                        ;  It is not necessary to specify other device attributes for standard
                        ;  TSX-Plus supplied device drivers since TSX-Plus will automatically
                        ;  make default selections.
                        ;
                        ;       *************************************
                        ;       **  When performing a TSX-Plus     **
                        ;       **  system generation, remove the  **
                        ;       **  devices in this list which are **
                        ;       **  not present on your system,    **
                        ;       **  and include those which are.   **
                        ;       *************************************
                        ;
003200                          DEVBEG          ;Beginning of device definitions
003200                          DEVDEF  <DL>
003200                          DEVDEF  <DM>
003200                          DEVDEF  <DU>,NOSET
003200                          DEVDEF  <RK>,MAPIO
003200                          DEVDEF  <DY>,MAPIO
003200                          DEVDEF  <DX>
003200                          DEVDEF  <LP>
003200                          DEVDEF  <NL>
003200                          DEVEND          ;End of device definitions

                        ;---------------------------------------------------------------------------
                        ;  Parameters related to system I/O buffers used when DMA devices
                        ;  with 18-bit controllers are used on Q-bus systems with
                        ;  22-bit addressing (e.g., 11/23-Plus and 11/73).
                        ;
                        ;  Number of system buffers allocated for I/O buffering.
                        ;  (The recommended number is one per active device that requires buffering.)
                        ;
        000001          MIONBF  =       1.      ;Number of system I/O buffers
                        ;
                        ;  Size of each system I/O buffer, in units of 512 bytes.
                        ;  The maximum allowed value for this parameter is 15.
                        ;
        000010                  MIOBSZ  =       8.      ;I/O buffer size in units of 512 bytes

                                ;-----------------------------------------------------------------
                                ;  Some device handlers allocate extended memory (PLAS) regions for
                                ;  their use.  For example, the DU and MU handlers each require one
                                ;  PLAS region. If you are using any other handlers which require
                                ;  extended memory regions, include the number of regions required.
                                ;
        000004                  DEVXMR  =       4.      ;Number of XM regions for device handlers

                                ;-----------------------------------------------------------------
                                ;  Define those devices which are to be spooled by TSX-Plus
                                ;  (such as line printers).
                                ;  There are seven arguments to the SPOOL macro:
                                ;    1. Number of devices to be spooled (may be zero).
                                ;    2. Number of spool files which may be open by all users.
                                ;    3. Number of spool buffers (512. bytes each).
                                ;    4. Number of blocks in spool disk file.
                                ;    5. List of 3 character names of devices to be spooled.
                                ;    6. Specify 0 if spool files are to be eligible to be
                                ;       started as soon as they are created,
                                ;       specify 1 if they are to be held until the channel
                                ;       is closed.  Note: The "SPOOL xx,[NO]HOLD" keyboard
                                ;       command can override this parameter.
                                ;    7. Number of blocks which are to be backed up
                                ;       when the "SPOOL xx,BACK" command is given.
                                ;
                                ;  Note: The SPOOL macro must be present even if
                                ;  there are no spooled devices.  However, if the first
                                ;  argument (number of spooled devices) is zero, no spool
                                ;  tables are generated and arguments 2-7 are ignored.
                                ;
003200                                  SPOOL   1,20.,2,500.,<LP >,0,10.

                                ;-------------------------------------------------------------
                                ;  Define parameters pertaining to record (block) locking
                                ;  for shared files.  If the shared file block locking
                                ;  facility is not wanted, set all of these parameters to
                                ;  0 (zero).
                                ;
                                ;  Maximum number of shared files which may be open
                                ;  simultaneously.  Note that several users accessing the same
                                ;  file count as 1.
                                ;
        000036                  MAXSF   =       30.     ;Max number of shared files
                                ;
                                ;  Maximum number of I/O channels which all users may
                                ;  simultaneously have open to shared files.
                                ;  Note, this is the total number for all users not
                                ;  for each user.
                                ;
        000036                  MAXSFC  =       30.     ;Max # shared file channels
                                ;
                                ;  Maximum number of blocks which may be simultaneously
                                ;  held locked by any channel.  That is, max blocks
                                ;  locked per channel.
                                ;
```

```
000003                  MXLBLK  =       3.      ;Max blocks locked per channel
                        ;
                        ;  Number of 512-byte blocks to be held in the in-memory data
                        ;  cache for shared files.
                        ;  (Note that the MAXSF, MAXSFC, and MXLBLK parameters must be
                        ;  non-zero to enable shared file data caching.)
                        ;
000000                  NUMDC   =       0.      ;Number of blocks in shared file data cache
                        ;
                        ;-----------------------------------------------------------------
                        ;  Define parameters pertaining to the inter-program
                        ;  message communication feature.  If this feature is
                        ;  not wanted, set all four parameters to 0 (zero).
                        ;
                        ;  Maximum number of message communication channels
                        ;  which may be simultaneously in use.
                        ;
000003                  MAXMC   =       3.      ;Max message channels
                        ;
                        ;  Maximum message length (bytes).
                        ;
000310                  MSCHRS  =       200.    ;Max message length (bytes)
                        ;
                        ;  Maximum number of messages which may be held in queue.
                        ;
000003                  MAXMSG  =       3.      ;Max queued messages
                        ;
                        ;  Maximum number of requests for messages that may be held in queue
                        ;
000012                  MAXMRB  =       10.     ;Max # pending message requests

                        ;---------------------------------------------------------------------------
                        ;  The RTVECT parameter specifies the number of real-time interrupt vectors
                        ;  that can be connected to TSX-Plus jobs.  Set RTVECT to the maximum number
                        ;  of interrupt vectors that all running real-time programs may be connected
                        ;  to at the same time.
                        ;  (Note: The basic real-time support facility is now a standard part of
                        ;  TSX-Plus and it is no longer necessary to set RTVECT to 1 to include
                        ;  real-time facilities such as locking a job in memory or accessing the
                        ;  I/O page.  It is also no longer necessary to set RTVECT to 1 to allow
                        ;  use of the SYSMON program. RTVECT should be set to 0 (zero) unless some
                        ;  real-time interrupts are going to be connected to TSX-Plus jobs.)
                        ;
000000                  RTVECT  =       0.      ;Max # interrupt vectors that may be connected

                        ;------------------------------------------------------------------------
                        ;  Define the size of the table within TSX-Plus used to hold information
                        ;  when the performance monitoring feature is being used.
                        ;  Each word in this table corresponds to one cell in the histogram.
                        ;  Specify the size as number of bytes for the table.
                        ;  (Note: The maximum allowed size is 8192 bytes)
                        ;
000000                  PMSIZE  =       0.      ;Size of performance monitor table (bytes)

                        ;---------------------------------------------------------------------------
                        ;  Use the RTDEF macro at this point to specify information about
                        ;  any shared run-time systems to be loaded when TSX-Plus is started.
```

```
;
;  The form of the RTDEF macro is
;       RTDEF   <name>,r-flag,skip-count
;
;  Where
; - Name is the 12 character name of the file containing the run-time system
;   which must be specified in the form DevFilnamExt -- that is, three
;   character device name, six character file name and three character
;   extension.
; - R-flag is either R if user programs are to have read-only access to
;   the run-time system, or RW if read-write access is to be granted.
; - Skip-count is the number of blocks to be skipped over at the front
;   of the file when loading it.
;
;  Example:
;       RTDEF   <SY CBR063SHR>,R,1.     ;COBOL-Plus shared run-time
;       RTDEF   <SY DBLSHRRTS>,R,1.     ;DBL shared run-time
;       RTDEF   <SY DB4RTSSHR>,R,0.     ;DBL V4 shared run-time
;
```

```
                        ;-------------------------------------------------------------------------
                        ;  Time-sharing line parameters:
                        ;
                        ;  Default input and output character buffer sizes.
                        ;  These buffer sizes will be used for lines that don't use
                        ;  the BUFSIZ macro within their line definitions to declare
                        ;  their character buffer sizes.
                        ;  These buffer sizes are also used for all subprocesses.
                        ;
        000144          DINSPC  =       100.    ;Default input char buffer size
        000360          DOTSPC  =       240.    ;Default output char buffer size
                        ;
                        ;  When the terminal-output character buffer is filled a job is suspended.
                        ;  The job is restarted after characters are printed from the buffer and
                        ;  there are OTRASZ characters remaining in the buffer.
                        ;
        000031          OTRASZ  =       25.     ;Reactivation character count
                        ;
                        ;  A software character "silo" is used to hold characters received
                        ;  from time-sharing lines until they can be processed by the system.
                        ;  The silo is used to prevent the loss of characters during high
                        ;  speed input.  Each time-sharing line and CL line has its own silo.
                        ;  If the input to the line is coming from a terminal, the silo can be
                        ;  quite small.  On the other hand, if the input is coming from another
                        ;  computer or other high speed device, the silo size should be increased.
                        ;  The NCSILO, NCXOFF, and NCXON parameters set default values pertaining
                        ;  to the silos.  The SILO macro can be used within a line definition
                        ;  to specify silo parameters for a specific line.
                        ;
                        ;  Default size of input character silos.
                        ;
        000040          NCSILO  =       32.     ;Default silo size
                        ;
                        ;  The system will transmit a control-S (XOFF) character when an input
                        ;  silo is filled to the point where there are only NCXOFF free
                        ;  character positions remaining.
                        ;
        000014          NCXOFF  =       12.     ;Default XOFF point for silos
                        ;
                        ;  If the system sends an XOFF because a silo becomes nearly full,
                        ;  it will send an XON to restart transmission when there are only
                        ;  NCXON characters remaining in the silo.
                        ;
        000004          NCXON   =       4.      ;Default XON point for silos
                        ;
                        ;  Number of "extra" CL (communication line) units to be genned into
                        ;  system.  These CL units are not initially assigned to any line but
                        ;  may be used "take over" a time-sharing line to use it as a CL unit.
                        ;  The total number of CL units (those defined using CLDEF blocks plus
                        ;  the extra units) may not exceed 16. The first 8 CL units are
                        ;  named CL0 to CL7, the second 8 are named C10 through C17.
                        ;
        000001          CLXTRA  =       1.      ;Number of extra CL units.
                        ;
                        ;  Default output ring buffer size for I/O communication lines defined
                        ;  with the CLDEF macro and accessed as "CL" devices.
                        ;  The recommended value is ((3*baud_rate)/1000+2).
```

```
                                    ;
       000040                       CLORSZ  =       32.     ;Size of CL output ring buffers
                                    ;
                                    ;---------------------------------------------------------------------------
                                    ;  Flags which can be used with the FLAGS macro within
                                    ;  a line definition block to define line characteristics.
                                    ;
       100000                       $SCOPE  =       100000  ;ON==>CRT type terminal
       040000                       $ECHO   =       40000   ;ON==>Echo characters to terminal
       020000                       $TAPE   =       20000   ;ON==>"Paper-tape" mode (do x-on/x-off control, etc.)
       010000                       $8BIT   =       10000   ;ON==>Support 8 bit (rather than 7 bit) characters.
       004000                       $START  =       4000    ;ON==>Automatically start line during initialization
       001000                       $TAB    =       1000    ;ON==>Do not simulate tabs (Terminal handles tab char)
       000400                       $FORM   =       400     ;ON==>Do not simulate form-feeds (Terminal handles FF)
       000200                       $AUTO   =       200     ;ON==>Do autobaud speed selection for line
       000100                       $PAGE   =       100     ;ON==>Enable ctrl-S/ctrl-Q input processing
       000040                       $LC     =       40      ;ON==>Enable lower-case input
       000020                       $NOSUB  =       20      ;ON==>Disallow use of subprocesses
       000010                       $DEFER  =       10      ;ON==>Do defered character echoing (recommended)
       000004                       $QTSET  =       4       ;ON==>Set tt quiet (Don't list command files)
       000002                       $SYSPS  =       2       ;ON==>Require system password before logon
       000001                       $PHONE  =       1       ;ON==>Dial-up, modem connected line
                                    ;
                                    ;  Default line flags that will be used for each line that does
                                    ;  not explicitly specify flags using a FLAGS macro.
                                    ;
       040150                       NRMFLG  =       $ECHO!$DEFER!$PAGE!$LC
                                    ;
                                    ;----------------------------------------------------------------------
                                    ;  Terminal type names that are legal to used with the TRMTYP macro
                                    ;  within a line definition block to define the terminal type.
                                    ;
                                    ;  VT100 ==> DEC VT100
                                    ;  VT200 ==> DEC VT200 with 7 bit control codes
                                    ;  VT52  ==> DEC VT52
                                    ;  LA36  ==> DEC LA36
                                    ;  LA120 ==> DEC LA120
                                    ;  HAZEL ==> Hazeltine brand terminals
                                    ;  ADM3A ==> Lear Siegler ADM3A
                                    ;  DIABLO==> Diablo brand terminals (with X-ON/X-OFF protocol)
                                    ;  QUME  ==> Qume brand terminals (with X-ON/X-OFF protocol)
                                    ;
```

```
        ;------------------------------------------------------------------
        ;  Line definitions
        ;
        ;  The TBLDEF macro call requires four arguments:
        ;    1. The number of real (physical) time-sharing lines on machine.
        ;    2. The number of subprocess jobs.
        ;    3. The number of detached jobs.
        ;    4. The number of dedicated CL lines.
        ;
003330          TBLDEF  3.,2.,2.,0.     ;# Real, # Subprocess, # Detached, # CL lines

        ;
        ;  Define primary (real) time-sharing lines
        ;

        ;  #1 time-sharing line
006220          LINDEF  60,177560,OPER          ;USE CONSOLE TERMINAL AS T/S TERM
006220          NAME    <Console>
        ;       CMDFIL  LINE1.TSX
        ;       TRMTYP  VT100
006220          FLAGS   NRMFLG!$START
006220          LINEND

        ;  #2 time-sharing line
006234          LINDEF  310,176510
        ;       CMDFIL  LINE2.TSX
        ;       TRMTYP  LA120
006234          FLAGS   NRMFLG
006234          LINEND

        ;  #3 time-sharing line
006250          LINDEF  320,176520
        ;       CMDFIL  LINE3.TSX
        ;       TRMTYP  VT52
006250          FLAGS   NRMFLG
006250          LINEND
        ;
        ;;  The following section is an example of line definitions for a
        ;;  DHV11 type multiplexer.
        ;
        ;       DHVDEF  370,160020              ;DHV11 MUX VECTOR & RSR ADDRESS
        ;
        ;;  Mux line # 0 - first line on DHV
        ;       LINDEF  0
        ;       CMDFIL  LINE2.TSX
        ;       FLAGS   NRMFLG!$AUTO
        ;       LINEND
        ;
        ;;  Mux line # 7 - last line on DHV
        ;       LINDEF  7
        ;       CMDFIL  LINE2.TSX
        ;       FLAGS   NRMFLG!$AUTO
        ;       LINEND
        ;
        ;       MUXEND                          ;END OF DHV11 MUX LINES USED
        ;
        ;;  The following section is an example of line definitions for a
;;  DZV11 type multiplexer.
;
;       DZDEF   360,160010              ;DZV11 MUX VECTOR & RSR ADDRESS
;
;;  Mux line # 0 - first line on DZ
;       LINDEF  0
;       TRMTYP  VT100
;       SPEED   S9600
;       CMDFIL  LINE2.TSX
;       LINEND
;
;;  Mux line # 3 - last line on DZ
;       LINDEF  3
;       TRMTYP  LA120
;       SPEED   S1200
;       CMDFIL  LINE2.TSX
;       FLAGS   NRMFLG!$FORM
;       LINEND
;
;       MUXEND          ;End of DZ11 lines
;
;  Use the "DETACH" macro here to declare any start-up command
;  files and associated parameters (up to 80 characters) to be
;  run as detached jobs:
;
;       DETACH  <SY:EXAMPL.TSX PARM1 PARM2> ;Detached job with parameters
;       DETACH  <SY:DETACH.TSX>          ;Start-up detached job
;       DETACH  <SY:WINPRT.TSX>          ;Start window-print detached job
;
;=================================================================
;  END OF SECTION OF TSGEN TO BE ALTERED BY USER
;=================================================================
        .LIST   MD
        .LIST   CND
        .ENDC
```

```
                        ;-------------------------------------------------
                        ;  Finish building tables
                        ;
                        ;  Make sure memory size parameters are reasonable.
                        ;
                        .IF     GT,HIMEM-64.
                        .ERROR  ;HIMEM may not exceed 64.
                        HIMEM   =       64.
                                .ENDC
                        .IF     GT,DFLMEM-HIMEM
                        DFLMEM  =       HIMEM
                                .ENDC
                        ;
                        ;  Make sure silo parameters are reasonable
                        ;  Actual silo limit is specified by MAXSLO
                        ;
                                .IIF    GT,<NCSILO-255.> NCSILO = 255.
        000016          S = <NCSILO/2>-2
                                .IIF    GT,<NCXOFF-S>    NCXOFF = S
        000014          NCXOFF  = NCXOFF&377    ;MUST BE BYTE SIZE
                                .IIF    GT,<NCXON-S>     NCXON  = S
        000004          NCXON   = NCXON&377     ;MUST BE BYTE SIZE
                        ;
                        ;  Make sure last line definitions were properly terminated
                        ;
                                .IF     NE BO
                        .ERROR  1 ; Missing LINEND for last line
                                LINEND
                                .ENDC
                                .IF     NE CURMX
                        .ERROR  1 ; Missing MUXEND
                                MUXEND
                                .ENDC
                        ;
                        ;  Make sure the right # of lines were defined.
                        ;
                                .IF     NE <NPLDF-NPL>
                        .ERROR  2; Wrong number of primary lines defined
                                .ENDC
                                .IF     NE <NCLDF-NIOL>
                        .ERROR  2; Wrong number of CL lines defined
                                .ENDC
                                .IF     GT <NDLDF-NDL>
                        .ERROR  2; Wrong number of detached jobs defined
                                .ENDC
                        ;
                        ;  Define any additional detached job lines.
                        ;
        000002                  .REPT   <NPL+NDL-LN>
                                DETACH
                                .ENDR
                                .IF     NE <LN-NPL-NDL>
                        .ERROR  2 ; Wrong number of lines defined
                                .ENDC
                                .IF     NE <NCLDF-NIOL>
                        .ERROR  2; Wrong number of CL lines defined
                                .ENDC
                                ;
                                ;  Define tables for subprocesses (if any)
                                ;
                                        .IF     NE NSL
        000002                          .REPT   NSL
                                BO      =       1               ;BEGIN BLOCK
                                LN      =       LN+1
                                LX      =       LX+2
                                CLX     =       LX
                                        BUFSIZ  DINSPC,DOTSPC
                                        LINEND
                                        .ENDR
                                        .ENDC
006530                                  .CSECT  TSGEN
                                ;
                                ;  Define mux interrupt entry vectors
                                ;
                                ;  Input interrupt entry points
        000000                          .REPT   LSTMX/2
                                        INCB    MUXNUM
                                        .ENDR
006530  000167  000000G         INMXV:  JMP     ININT
                                ;  Output interrupt entry points (set up by TSINIT)
006534                          OTMXV:  .BLKW   3*<LSTMX/2>
                                ;
                                ;  Generate tables for Unibus map registers
                                ;
                                        .GLOBL  UMRBAS,UMREND,UMRWHD
006534  000000                  UMRWHD: .WORD   0
                                        .MACRO  UMRDEF  NUM
                                        .BYTE   CURUMR                  ;UM$UMR
                                        .BYTE   NUM                     ;UM$NMR
                                        .WORD   NUM*4096.               ;UM$WDS
                                        .WORD   0                       ;UM$IOQ
                                CURUMR  =       CURUMR+NUM
                                        .ENDM   UMRDEF
                                ;  Define UMR sets in order of size -- small to large.
        000005                  CURUMR  =       5               ;Map regs 0-4 always mapped by init code.
006536                          UMRBAS:
                                        .IF     EQ,<BUSTYP-UNIBUS>      ;Generate only for UNIBUS machines
                                        UMRDEF  1.
                                        UMRDEF  1.
                                        UMRDEF  4.
                                        UMRDEF  4.
                                        UMRDEF  8.
                                        UMRDEF  8.
                                        .ENDC
006536                          UMREND:
                                ;
                                ;  Check file and device caching parameters
                                ;
                                        .IF     LT,<MAXCSH-1>           ;MAKE SURE WE CACHE AT LEAST 1 DEVICE
                                MAXCSH  =       1
                                        .ENDC
                                        .IF     LT,<NMFCSH-4>           ;MINIMUM NUMBER OF CASHED FILES
                                NMFCSH  =       4
                                        .ENDC
                                ;
                                ;  Generate tables to keep track of allocated devices
                                ;
                                        .IF     LT <MAXALC-1>           ;Make sure we have at least 1 entry
                                MAXALC  =       1
                                        .ENDC
006536                          ALCTBL:                                 ;Base of device allocation table
        000005                          .REPT   MAXALC
                                        .WORD   0                       ;AD$DVU
                                        .BYTE   0                       ;AD$JOB
                                        .BYTE   0                       ;AD$FLG
                                        .ENDR
006562                          ALCEND:                                 ;End of device allocaton table
                                ;
                                ;  Check validity of PMSIZE
                                ;
                                        .IF     GT <PMSIZE-8192.> ;PMSIZE MAY NOT EXCEED 8192.
                                .ERROR 0;PMSIZE may not exceed 8192.
                                PMSIZE  =       8192.
                                        .ENDC
                                ;
                                ;  Check validity of MIOBSZ
                                ;
                                        .IF     GT <MIOBSZ-15.>
                                .ERROR 0;MIOBSZ may not exceed 15.
                                MIOBSZ  =       15.
                                        .ENDC
                                ;
                                ;  Check validity of CACHE parameter
                                ;
                                        .IF     GT <CACHE-4095.>
                                CACHE   =       4095.
                                        .ENDC
                                ;--------------------------------------------------
                                ;  Generate tables for shared file i/o control
                                ;
                                        .IF     NE,MAXSF        ;ANY SHARED FILES?
                                ;**
                                ;**  Assemble if there are shared files **
                                ;**
                                        .IFF
                                ;**
                                ;**  Assemble this code if there are no shared files **
                                ;**
                                MAXSFC  =       0
                                MXLBLK  =       0
                                NUMDC   =       0
                                ;
                                        .ENDC
                                ;
                                ;
                                ;
                                ;-----------------------------------------------------------------------
                                ;  Generate dummy shared run-time definitions
                                ;
        000002                          .REPT   NDRTDF
                                        RTDEF   <$$             >,R,0
                                        .ENDR
```

```
                        ;-----------------------------------------------------------------------
                        ;  Generate tables for real-time support facility.
                        ;
                        ;  Generate the vector control blocks
                        ;
                                .GLOBL  VCBBAS,VCBEND
006562                  VCBBAS:
        000000                  .REPT   RTVECT
                                JSR     R2,@#RTINT
                                .WORD   0,0,0           ;Must match size defined in TSDEFS
                                .ENDR
006562                  VCBEND:
        000050          NUMIOQ  =       NUMIOQ+RTVECT   ;ADD I/O QUEUE ELEMENTS FOR INT COMPL ROUTINES
        000017          NUMSYQ  =       NUMSYQ+RTVECT
                        ;
                                .IF     NE,RTVECT
                        ;**
                        ;**  Assemble this code if real-time support is wanted
                        ;**
                                .GLOBL  RTINT
                                .ENDC           ;End of real-time conditional
                        ;
                        ;------------------------------------------------------------------------
                        ;  Conditional code for different types of terminals.
                        ;
                                .IF     NE,DHUSE
                        ;**
                        ;**  Assemble this code if DH11 support is needed
                        ;**
                                .IFF
                        ;**
                        ;**  Assemble this code if DH11 support is not needed
                        ;**
                                .GLOBL  TSDHIO,DHSTRT,DHSTOP,DHOINT
                                .GLOBL  VHSTRT,VHOINT,DHTIMR,VHSTOP
                                .GLOBL  DHXON,DHXOFF,VHXOFF,VHXON
        000000          TSDHIO  =       0
006562                  DHTIMR:
006562                  DHSTRT:
006562                  DHSTOP:
006562                  DHXON:
006562                  DHXOFF:
006562                  DHOINT:
006562                  VHSTRT:
006562                  VHSTOP:
006562                  VHXON:
006562                  VHXOFF:
006562                  VHOINT:
006562  000207                  RETURN
                                .ENDC           ;End of DH11 conditional code
                        ;
                        ;----------------------------------------------------------------------
                        ;  Conditional code for CL units
                        ;
                                .GLOBL  CL$OPT,CL$STA,CL$COL,CL$RQH,CL$WQH
                                .GLOBL  CL$ORB,CL$ORA,CL$ORS,CL$ORG,CL$ORP,CL$ORE
                                .GLOBL  CL$LEN,CL$LIN,CL$WID,CL$SKP,CL$LIX
```

```
                                                  .GLOBL   CL$EPN,CL$EPS,CL$EPP,CL$XLN,CLSTS
                                          ;
                                          ;  Define CL device status word.  See the RT-11 .DSTATUS or .DRDEF macros
                                          ;  for status bit definitions.  The device type code is the same as XL.
                                          ;  (To make file names appear in SHOW QUEUE for spooled CL device,
                                          ;   add the SPECL$ flag (10000).)
                                          ;
        006057                            CLSTS    = 4000+2000+57            ;HNDLR$+SPFUN$+XL$COD
                                          ;
                                                  .IF      NE,CLVRSN        ; Test to see if CLVRSN is defined as 0
                                                  .IF      LE,<CLVRSN-14.> ; or greater than 14.
                                                  .ERROR 0;Minimum CL version number is 15.   ;If not report an error
                                                  CLVRSN   = 15.            ; and set to a reasonable number
                                                  .ENDC                     ; End conditional LE,<CLVRSN-14.>
                                                  .ENDC                     ; End conditional NE,CLVRSN
                                          ;
                                          ;  Define table that tells which line is associated with each CL unit.
                                          ;  Note, this table is always generated.  Even if there are no CL lines
                                          ;  genned in.
                                          ;
006564  000000  000000  000000            CL$LIX: .WORD   0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0 ;Line index for each CL unit
006572  000000  000000  000000
006600  000000  000000  000000
006606  000000  000000  000000
006614  000000  000000  000000
006622  000000
                                          ;
                                          ;  Macro to define CL tables which have one entry per CL unit
                                          ;
                                                  .MACRO  CLTABL NAME
                                          NAME:
                                                  .REPT   CLTOTL
                                                  .WORD   0
                                                  .ENDR
                                                  .ENDM   CLTABL
                                          ;
                                                  .IF     NE,CLTOTL         ;Assemble if there are CL units
                                          ;**
                                          ;**  Assemble this code if there are CL units
                                          ;**
006624                                            CLTABL  CL$OPT            ;Option flags (CO$xxx)
006626                                            CLTABL  CL$STA            ;Status flags (CM$xxx)
006630                                            CLTABL  CL$COL            ;Current column position
006632                                            CLTABL  CL$LEN            ;Number of lines per page
006634                                            CLTABL  CL$LIN            ;Current line number
006636                                            CLTABL  CL$XLN            ;Number of line CL unit is cross connected to
006640                                            CLTABL  CL$SKP            ;Number of lines to skip at bottom of page
006642                                            CLTABL  CL$WID            ;Maximum allowed line width
006644                                            CLTABL  CL$RQH            ;Internal queue head for read requests
006646                                            CLTABL  CL$WQH            ;Internal queue head for write requests
006650                                            CLTABL  CL$ORB            ;Start of output ring buffer
006652                                            CLTABL  CL$ORE            ;End of output ring buffer
006654                                            CLTABL  CL$ORP            ;Pointer where next char goes in output ring
006656                                            CLTABL  CL$ORG            ;Pointer to next char to get from output ring
006660                                            CLTABL  CL$ORA            ;Allocated size of output ring buffer
006662                                            CLTABL  CL$ORS            ;Free space in output ring buffer
006664                                            CLTABL  CL$EPN            ;Number of Form-feeds for end page
```

```
006666                          CLTABL  CL$EPS          ;Pointer to end-of-file string buffer
006670                          CLTABL  CL$EPP          ;Pointer to next char within EOF string buffer
                        ;
                                .IFF                    ;Assemble if no CL units
                        ;**
                        ;**  Assemble this code if there are no CL units
                        ;**
                                .GLOBL  CLOTIR,CLSIZE,CLHEAD,CLLQE,CLCQE,CLINIR,CLABF
                                .GLOBL  TSCLR
                        TSCLR   =       0
                        CLSIZE  =       0
                        CLHEAD  =       0
                        ;
                        CLCQE:
                        CLLQE:
                        CL$OPT:
                        CL$STA:
                        CL$COL:
                        CL$LEN:
                        CL$LIN:
                        CL$XLN:
                        CL$SKP:
                        CL$WID:
                        CL$RQH:
                        CL$WQH:
                        CL$ORB:
                        CL$ORE:
                        CL$ORP:
                        CL$ORG:
                        CL$ORA:
                        CL$ORS:
                        CL$EPN:
                        CL$EPS:
                        CL$EPP:
                                .WORD   0
                        ;
                        CLINIR:
                        CLOTIR:
                        CLABF:
                                RETURN
                        ;
                                .ENDC                   ;End conditional (NE,CLTOTL)
                        ;
                        ;-----------------------------------------------------------------------
                        ;  Define some misc data cells
                        ;
006672  000031          NMFREQ: .WORD   NUMIOQ-NUMSYQ   ;# I/O queue elements available for user jobs
                        ;
                        ;  Invoke dummy SYSPS if user commented it out
                        ;
                                .IIF    EQ,SYSPSS       SYSPS   <>
                        ;
                        ;  Make sure PHONE parameter is 0 or 1
                        ;
                                .IIF    NE,PHONE        PHONE = 1
                        ;
                        ;  Close out some CSECTS.
```

```
    167                                 ;
    168 000034                                  .CSECT  RDBSEC
    169 000034                          RDBEND:
    170 000120                                  .CSECT  SASECT
    171                                         .EVEN
    172 000000                                  .CSECT  GENTOP
    173 000000  123456                  GENTOP: .WORD   123456          ;Flag word for top of tsgen
    174                                         .IF NE FULLST
    176                                         .LIST   BIN
    177                                         .ENDC ;NE FULLST
    178                                 ;
    179                                 ;  Define address of top of resident portion of TSX-Plus
    180                                 ;
    181 000000                                  .ASECT
    182         000050                  .       =       50
    183 000050  000000G                         .WORD   PROITP
    184         000014                  .       =       14
    185 000014  000000G                         .WORD   SCHED
    186 000016  000000G                         .WORD   DSKBUF
    187                                 ;
    188         000001                          .END
Errors detected:  0

*** Assembler statistics


Work  file  reads: 137
Work  file writes: 127
Size of work file: 21456 Words  ( 84 Pages)
Size of core pool: 17920 Words  ( 70 Pages)
Operating  system: RT-11

Elapsed time: 00:04:39.38
DK:TSGEN,LP:TSGEN=DK:TSGEN.MAC/C/N:SYM
```

```
$BBIT   17-68#
$AUTO   17-72#
$DEFER  17-76#    17-84
$ECHO   17-66#    17-84
$FORM   17-71#
$INDDV   3-104#
$LC     17-74#    17-84
$MEMSZ   1-50      3-101#
$NOSUB  17-75#
$NOVLN   2-34#
$PAGE   17-73#    17-84
$PHONE  17-79#
$PRIV    2-33#
$QTSET  17-77#
$SCOPE  17-65#
$START  17-69#    18-21
$SYSPS  17-78#
$TAB    17-70#
$TAPE   17-67#
$TCFIG   3-103#
ABRTOV   1-126     4-93#
ADM3A    1-133
AHEND    1-89     16-551#
ALCEND   1-86     20-127#
ALCTBL   1-86     20-121#
AUTHAN   1-89     16-542#
BASMAP   1-110     4-325#
BLKEY    1-98      3-61#
BLKMV    1-134     3-224
BMJMP    3-222     3-224#
BO       8-50#    18-17     18-17#    18-22     18-22#    18-25     18-25#    18-29     18-29#    18-32     18-32#    18-36
        18-36#    20-26     20-51     20-51     20-69     20-69     20-69#    20-69#    20-69#    20-69#
BOTCSR   1-88      4-103#
BOTDEV   1-88      4-101#
BOTUNI   1-88      4-102#
BUSTYP   4-174    16-90#    20-97
C1DEVX   1-105     4-100#
CA$BLK   1-120     4-122#
CA$DVU   1-120     4-123#
CA$HBL   1-120     4-128#
CA$HFL   1-120     4-127#
CA$HSH   1-120     4-129#
CA$UBL   1-120     4-126#
CA$UFL   1-120     4-125#
CA$WCT   1-120     4-124#
CACHE    4-37      4-38     16-363#   20-145
CASCBR   1-122     4-137#
CASCUP   1-122     4-140#
CASTBR   1-122     4-136#
CASTBW   1-122     4-139#
CASTRO   1-122     4-135#
CASTWO   1-122     4-138#
CCBHD    1-121     4-134#
CCLSAV   1-103     4-61#
CCXCTL   4-190    16-461#
CCXTRM   4-189    16-454#
```

```
CDX$DH    1-78      2-76#
CDX$DL    1-78      2-74#     2-92
CDX$DZ    1-78      2-75#
CDX$PC    1-78      2-79#
CDX$PI    1-77      2-78#
CDX$PP    1-78      2-80#
CDX$QP    1-79      2-81#
CDX$VH    1-78      2-77#
CFABLV    1-50      3-91#
CFCHAN    1-69      2-83#
CFSTS     1-50      3-87#     3-210
CHKEY     1-98      3-62#
CL$COL   22-55     22-95#
CL$EPN   22-58     22-109#
CL$EPP   22-58     22-111#
CL$EPS   22-58     22-110#
CL$LEN   22-57     22-96#
CL$LIN   22-57     22-97#
CL$LIX   22-57     22-78#
CL$OPT   22-55     22-93#
CL$ORA   22-56     22-107#
CL$ORB   22-56     22-103#
CL$ORE   22-56     22-104#
CL$ORG   22-56     22-106#
CL$ORP   22-56     22-105#
CL$ORS   22-56     22-108#
CL$RQH   22-55     22-101#
CL$SKP   22-57     22-99#
CL$STA   22-55     22-94#
CL$WID   22-57     22-100#
CL$WQH   22-55     22-102#
CL$XLN   22-58     22-98#
CLDEVX    1-105     4-99#
CLEOFS    1-55      2-31#
CLKVEC    1-126     2-27#
CLORSZ    1-61     17-59#
CLSCDB    1-125     4-164#
CLSTS    22-58     22-65#
CLTOTL    1-64     18-10#    22-89     22-93     22-94     22-95     22-96     22-97     22-98     22-99     22-100    22-101
         22-102    22-103    22-104    22-105    22-106    22-107    22-108    22-109    22-110    22-111
CLVERS    1-61      4-208#
CLVRSN    4-208    16-468#   22-67
CLX      18-17     18-17     18-17     18-17     18-17     18-17     18-17     18-17#    18-18     18-22     18-22     18-22
         18-22     18-22     18-22     18-22     18-22     18-22     18-22     18-25     18-25     18-25     18-25     18-25
         18-25     18-25#    18-29     18-29     18-29     18-29     18-29     18-29     18-29     18-29     18-29     18-29
         18-29     18-32     18-32     18-32     18-32     18-32     18-32     18-32#    18-36     18-36     18-36     18-36
         18-36     18-36     18-36     18-36     18-36     18-36     18-36     20-51     20-51     20-51#    20-51#    20-69
         20-69     20-69     20-69     20-69     20-69     20-69#    20-69#
CLXTRA    1-64     17-53#    18-10     18-10
CMFDON   18-17#    18-22     18-22#    18-25#    18-29     18-29#    18-32#    18-36     18-36#    20-69     20-69
CMFSEC    1-72      9-81#
CMFTOP    1-72     18-22#    18-29#    18-36#
CONFG2    1-105     3-88#
CONFIG    1-99      3-74#
CORTIM    1-109     4-11     16-319#
CORUSR    1-93      3-81#     3-206
```

```
CP$RT     2-66      2-69#
CP$STD    2-66      2-68#
CP$SYN    2-66      2-70#
CSHALC    1-62      4-38#
CSHBAS    1-123     4-69#
CSHBFP    1-121     4-130#
CSHCLN    1-123     4-145#
CSHDEV    1-85      4-95#
CSHDVN    1-85      4-96#
CSHFHD    1-121     4-133#
CSHFIN    1-123     4-146#
CSHHD     1-85      4-77#
CSHINI    1-123     4-143#
CSHIO     1-123     4-144#
CSHLRU    1-121     4-131#
CSHMRU    1-121     4-132#
CSHSIZ    1-116     4-337#
CSHVEC    1-123     4-142#
CTRLTT    1-63      4-56#    18-17
CURCDX    2-92#    18-17     18-25     18-32
CURMX     2-90#    18-17     18-25     18-32     20-30
CURMXL   18-17#    18-22     18-25#    18-29     18-32#    18-36
CURUMR   20-95#
CVTPHY    1-134     3-219
DBGFLG    4-181    16-245#
DCAGE     1-81      2-28#
DCCRD     1-67      4-232#
DCCWR     1-67      4-234#
DCRD1     1-126     4-165#
DCRD2     1-126     4-166#
DCTOTU    1-67      4-230#
DCTRD     1-67      4-231#
DCTWR     1-67      4-233#
DEFBAS    4-107#
DETCBS    1-52      2-8#     20-51     20-51
DEVSIZ    1-101     3-165#
DEVXMR    4-33     16-574#
DFJMEM    1-111     4-332#
DFLAGS   18-17#    18-21#    18-22     18-25#    18-28#    18-29     18-32#    18-35#    18-36
DFLG      1-98      3-64#
DFLMEM    4-29     16-35#    20-10
DHBFSZ    1-75      2-14#
DHOINT   22-34     22-43#
DHSTOP   22-34     22-40#
DHSTRT   22-34     22-39#
DHTIMR   22-35     22-38#
DHUSE     2-93#    22-26
DHXOFF   22-36     22-42#
DHXON    22-36     22-41#
DIABLO    1-134
DINSPC    4-45     17-10#    18-17     18-25     18-32     20-69     20-69
DIS      18-17#    18-22     18-25#    18-29     18-32#    18-36     20-69     20-69     20-69#    20-69#
DLINT     1-130    18-10     18-10     18-10
DM$CSR    4-264     4-264#    4-282
DM$LSR    4-265     4-265#    4-281
DM$VEC    4-266     4-266#
```

```
DMA      5-19#
DMPKTP   4-172    16-168#
DMPTCR   4-115    16-161#
DOCOPN   1-124     4-154#
DOCULK   1-125     4-159#
DOOPAP   1-124     4-153#
DORLK    1-124     4-157#
DOS     18-17#    18-22     18-25#    18-29     18-32#    18-36     20-69     20-69     20-69#    20-69#
DOSFCK   1-125     4-161#
DOTLK    1-125     4-158#
DOTSPC   4-46     17-11#    18-17     18-25     18-32     20-69     20-69
DOULK1   1-125     4-160#
DSKBUF   1-136     4-41     22-186
DTYPE    1-48     16-542#
DVFLAG   1-114     3-174#
DVFLG   16-543    16-543#   16-544    16-544#   16-545    16-545    16-545#   16-545#   16-546    16-546    16-546#   16-546#
        16-547    16-547    16-547#   16-547#   16-548    16-548#   16-549    16-549#   16-550    16-550#   16-551    16-551
        16-551    16-551    16-551#   16-551#   16-551#   16-551#
DVNUM    5-38#    16-543    16-543    16-543#   16-544    16-544    16-544#   16-545    16-545    16-545#   16-546    16-546
        16-546#   16-547    16-547    16-547#   16-548    16-548    16-548#   16-549    16-549    16-549#   16-550    16-550
        16-550#   16-551    16-551    16-551    16-551    16-551    16-551    16-551    16-551    16-551    16-551#   16-551#
        16-551#   16-551#
DVSTAT   1-100     3-156#
DWTYPE   1-79      3-109#
EDIT     4-349#
EDITOR   4-191    16-490#
EMTRTN   3-93#
EVEN     4-381#
EVNBUF   5-21#
EXTCHN   1-113     3-182#    3-193     3-204
EXTP1    1-134     3-223
FASTIN   1-53      2-26#
FIRST    4-356#
FNDHRB   1-130     3-220
FORKQ    1-135     3-17
FP$CDI   2-44      2-50#
FP$CDO   2-44      2-51#
FP$CK1   2-44      2-56#
FP$CKT   2-43      2-49#
FP$DEF   2-43      2-52#
FP$FLG   2-44      2-46#     2-47      2-48      2-49      2-50      2-51      2-52      2-53      2-54      2-55      2-56
         2-58      2-59
FP$IOA   2-43      2-54#
FP$IOF   2-43      2-53#
FP$IOS   2-43      2-58#
FP$MAX   2-44      2-47#
FP$MOV   2-43      2-59#
FP$PIO   2-44      2-55#
FP$RT    2-43      2-48#
FREFRK   1-88      4-289#
FREIOQ   1-102     4-237#
FREPGS   1-110     4-329#
FREUMR   1-47      3-20
FRKADR   3-94#
FRKDLY   1-94      4-55#
FRKGEN   1-56      2-9#      4-292
```

```
FRKGET   1-135     3-16
FRKINI   1-56      4-290#
FRKLST   4-289     4-291#
FSTDL    1-92     18-10#
FSTIOL   1-49     18-10     18-10#
FSTSL    1-63     18-10#
FULLST   1-39#     1-41     15-1      19-1      19-2      22-174
GENTOP   1-109    22-173#
GETRTQ   1-135     3-11
GETUMR   1-47      3-19
HANBUF   5-27#
HANDSK   1-46      3-159#
HANENT   1-100     3-9       3-152#
HANIOC   1-101     3-171#
HANPAR   1-119     3-10      3-168#
HANRCB   1-46      4-118#
HANRCO   1-46      3-231#
HANSIZ   1-100     3-162#
HANXMR   1-134     3-221
HAZEL    1-134
HIMAP    1-110     4-327#
HIMEM    3-68      4-28     16-30#    20-6      20-10
HIPRCT   4-12     16-310#
HNMEPT   3-105     3-229#
HNSPDO   5-28#
HSUFFX   3-97#
I       18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10
        18-10     18-10     18-10     18-10     18-10     18-10     18-10#    18-10#    18-10#    18-10#    18-10#    18-10#
        18-10#    18-10#    18-10#    18-10#    18-10#    18-10#
ILSW2   18-10     18-10#    18-22     18-29     18-36
INDDBL   1-104     4-63#
INDDBS   1-104     4-64#
INDDEV   3-115#
INDFIL   1-91     16-25#
INDOFF   3-104     3-114#
INDSAV   1-103     4-62#
INDTSV   1-104     3-189#    3-211
INIABT   4-175    16-120#
ININT    1-130    18-10     20-79
INMXV    1-59     20-79#
INRECV   1-57     18-10#
INSTA    3-100#    3-209
INSTBL   1-51      4-91#
INSTBN   1-51      4-92#
INTEN    1-132     3-38
INTIOC   4-13     16-303#
INTSSZ   1-102     2-20#
INVEC    1-56     18-10     18-10#    18-17     18-25     18-32
IOABFL   1-63      4-106#
IOABT    4-106    16-178#
IOFIN    1-132     3-69
IOHANQ   1-47      3-18
IOHLTM   1-54      2-30#
IOLFLG   8-52#    18-17     18-17     18-22     18-22     18-22     18-22     18-22#    18-25     18-25     18-29     18-29
        18-29     18-29     18-29#    18-32     18-32     18-36     18-36     18-36     18-36     18-36#    20-69     20-69
        20-69     20-69     20-69#    20-69#
```

```
IOLN      8-53#
IOQSIZ    1-136     3-22
IOSTRT    1-135     3-14
ITRMTP   18-10     18-10#
JCXPGS    1-111     4-330#
K52       4-352#
KED       4-351#   16-490
KEYMAX    4-35     16-230#
KMNHI     1-53      4-60#
KMNTOP    1-53      4-59#
KUSECK    1-119     2-29#
L        16-551    16-551    16-551#
LA120     1-133
LA36      1-133
LABTIM   18-10     18-10#
LACTIV   18-10     18-10#
LAFSIZ   18-10     18-10#
LAST      4-358#
LBASE    18-10     18-10#
LBRKCH   18-10     18-10#
LBRKCQ   18-10     18-10#
LBSPRI   18-10     18-10     18-10#
LCDTIM   18-10     18-10#
LCDTYP   18-10     18-10#    18-17     18-25     18-32
LCLUNT   18-10     18-10#
LCMPL    18-10     18-10#
LCMQHD   18-10     18-10#
LCOL     18-10     18-10#
LCONTM   18-10     18-10#
LCPUHI   18-10     18-10#
LCPULO   18-10     18-10#
LCXPAR   18-10     18-10#
LCXTBL   18-10     18-10#    18-22     18-29     18-36
LDDEVX    1-105     4-98#
LDHB1B   18-10     18-10#
LDHB1P   18-10     18-10#
LDHB2B   18-10     18-10#
LDHB2R   18-10     18-10#
LDHB2S   18-10     18-10#
LDSYS     4-179    16-212#
LDVERS    1-61      4-209#
LEMTPC   18-10     18-10#
LESCHR   18-10     18-10#
LESRTN   18-10     18-10#
LF       18-22     18-22#    18-22#    18-29     18-29#    18-29#    18-36     18-36#    18-36#    20-69     20-69     20-69#
         20-69#
LFWLIM   18-10     18-10#
LHIPCT   18-10     18-10#
LHIRBA   18-10     18-10#    18-22     18-29     18-36
LHIRBB   18-10     18-10#
LHIRBC   18-10     18-10#    18-22     18-29     18-36
LHIRBE   18-10     18-10#
LHIRBG   18-10     18-10#
LHIRBP   18-10     18-10#
LHIRBS   18-10     18-10#
LINBUF   18-10     18-10#
```

```
LINCNT  18-10     18-10#
LINCUR  18-10     18-10#
LINEND  18-10     18-10#
LINIR   18-10     18-10#
LINNUM   1-93      1-130     4-196#   18-10*    18-10*    18-10*
LINNXT  18-10     18-10#
LINPNT  18-10     18-10#
LINSIZ  18-10     18-10#   18-22     18-29     18-36     20-69     20-69
LINSPC  18-10     18-10#
LIOCNT  18-10     18-10#
LIOHLD  18-10     18-10#
LITIME  18-10     18-10#
LJSW    18-10     18-10#
LMEMIN  18-10     18-10#
LMINQ   18-10     18-10#
LMONHD  18-10     18-10#
LMSGBF  18-10     18-10#
LMXLN    1-59     18-10#
LMXNUM  18-10     18-10#
LMXPRM   1-59     18-10     18-10#   18-22     18-29     18-36
LN       8-49#    18-17     18-17     18-17#   18-22     18-25     18-25     18-25#   18-29     18-32     18-32     18-32#
        18-36     20-49     20-51     20-51     20-51     20-51     20-51#   20-51#   20-52     20-69     20-69     20-69
        20-69     20-69#   20-69#
LNAME   18-10     18-10#   18-18     18-29     18-36
LNBLKS  18-10     18-10#
LNMAP    1-60     18-10#
LNMTOP   1-48     18-18#   18-29#   18-36#
LNPRIM   1-60     18-10#
LNSBLK  18-10     18-10#
LNSPAC  18-10     18-10#
LOFFTM  18-10     18-10#
LOGCHN   1-68      2-84#
LOKBAS   1-82      4-68#
LOKCSH   1-82      4-72#
LOKINI   1-124     4-152#
LOKMEM   1-82      4-71#
LOKVEC   1-124     1-126     4-151#
LOMAP    1-110     4-326#
LOTBUF  18-10     18-10#
LOTEND  18-10     18-10#
LOTNXT  18-10     18-10#
LOTPNT  18-10     18-10#
LOTSIZ  18-10     18-10#   18-22     18-29     18-36     20-69     20-69
LOTSPC  18-10     18-10#
LOUTIR  18-10     18-10#
LPARBS  18-10     18-10#
LPARNT  18-10     18-10#
LPRG1   18-10     18-10#
LPRG2   18-10     18-10#
LPRI     1-60     18-10#
LPROG   18-10     18-10#
LPROJ   18-10     18-10#
LQLINK  18-10     18-10#
LQUAN   18-10     18-10#
LRBFIL  18-10     18-10#
LRDTIM  18-10     18-10#
```

```
LRTCHR  18-10     18-10#
LSCCA   18-10     18-10#
LSECPT  18-10     18-10#    18-22     18-29     18-36
LSLEPH  18-10     18-10#
LSLEPL  18-10     18-10#
LSNDCH  18-10     18-10#
LSPACT  18-10     18-10#    18-22     18-29     18-36     20-69     20-69
LSPND   18-10     18-10#
LSTACT  18-10     18-10#
LSTATE  18-10     18-10#
LSTDL    1-92     18-10     18-10#
LSTHL    1-49     18-10#
LSTIOL   1-57     18-10#
LSTLIN   1-58     18-10#
LSTMX    1-58      2-89#    20-76     20-81
LSTPL    1-57     18-10     18-10     18-10#
LSTPRM   9-137#   18-22     18-22     18-29     18-29     18-36     18-36
LSTSL    1-63     18-10     18-10#
LSUCF   18-10     18-10#    18-22     18-29     18-36     20-51     20-51
LSW     18-10     18-10#
LSW10   18-10     18-10#
LSW11   18-10     18-10#
LSW2    18-10     18-10#
LSW2S   18-10     18-10#
LSW3    18-10     18-10#
LSW4    18-10     18-10#
LSW5    18-10     18-10#
LSW6    18-10     18-10#
LSW7    18-10     18-10#
LSW8    18-10     18-10#
LSW9    18-10     18-10#
LSWPBK  18-10     18-10#
LTRMTP  18-10     18-10#
LTSCMD  18-10     18-10#
LTTCR   18-10     18-10#
LTTPAR  18-10     18-10#
LUNAME   1-57     18-10#
LWINDO  18-10     18-10#
LX       8-51#    18-17     18-17     18-17#    18-25     18-25     18-25#    18-32     18-32     18-32#    20-51     20-51
        20-51     20-51     20-51#    20-51#    20-69     20-69     20-69     20-69     20-69#    20-69#
LXCL    18-10     18-10#
LXX     18-10     18-10     18-10     18-10     18-10     18-10     18-10#    18-10#    18-10#    18-10#
MAPH     5-25#
MAPIO    5-20#    16-546    16-547
MAPPAR   1-84      4-328#
MAPSIZ   1-113     4-324#
MAPUSR   1-92      4-195#
MAXALC   1-86     16-387#   20-118    20-122
MAXBLK   1-99      3-76#
MAXCSH   4-94     16-377#   20-109
MAXDEV   1-101     2-5#      3-149     3-152     3-156     3-159     3-162     3-165     3-168     3-171     3-174    16-543
        16-544    16-545    16-546    16-547    16-548    16-549    16-550    16-551    16-551    16-551    16-551    16-551
MAXFIL   3-76      4-19     16-354#
MAXGVL   1-105     3-177#
MAXMC    4-24     16-640#
MAXMON   4-21     16-391#
```

```
MAXMRB   4-27      16-652#
MAXMSG   4-26      16-648#
MAXMUX   2-13#      4-251     4-252     4-253     4-254     4-255     4-256     4-257     4-258     4-259     4-260     4-261
         4-262      4-263     4-264     4-265     4-266
MAXSEC   1-64      16-349#   18-22     18-22     18-29     18-29     18-36     18-36
MAXSF    4-14      16-610#   21-4
MAXSFC   4-15       4-74     16-617#
MAXWIN   4-34      16-239#
MEM256   1-87       4-205#
MEMPTR   1-50       3-105#
MEMSIZ   4-324     16-100#
MFPMOV   3-126#     3-213
MFPS     3-85       3-125#
MH$BAR   1-75       4-275#
MH$BCR   1-75       4-274#    4-285
MH$BRK   4-261      4-261#
MH$CAR   1-74       4-273#    4-283
MH$LPR   4-262      4-262#    4-280
MH$PBR   4-263      4-263#
MH$RCR   1-74       4-272#    4-279
MH$SCR   1-74       4-271#    4-278
MH$SSR   1-75       4-276#    4-284
MHNSIZ   1-119      4-335#
MIDDLE   4-357#    16-205
MINTIM   1-94       4-57#
MIOBHD   1-52       4-79#
MIOBSZ   4-193     16-566#   20-138
MIODBG   1-84       2-22#
MIOFLG   1-88       4-206#
MIONBF   4-192     16-561#
MIONWB   1-91       2-21#
MIOSYQ   1-116      4-81#
MIOWHD   1-116      4-80#
MODDAT   1-70       4-116#
MODTIM   1-72       4-117#
MONAME   3-96#
MONFQH   1-61       4-78#
MONVEC   1-103      3-38#     3-95      3-105     3-111     3-114     3-177
MPARFL   1-117      2-23#
MSCHRS   4-25      16-644#
MSGBAS   1-80       4-66#
MTPS     3-84       3-141#
MUXNUM   1-93       1-131     4-197#
MVSIZ    1-69       3-197#    3-198
MVWDS    1-113      3-198#
MXBRK    1-74       4-269#
MXCAR    4-258      4-258#    4-269     4-276
MXCSR    4-252      4-252#    4-271
MXDTR    4-255      4-255#    4-274
MXJADR   1-108      4-333#
MXJMEM   1-111      4-331#
MXLBLK   4-17      16-623#
MXLNT    4-260      4-260#
MXLPR    4-253      4-253#    4-267
MXRBUF   1-74       4-267#    4-272
MXRING   1-74       4-268#
```

```
MXSBRK   4-257     4-257#
MXSPAC   1-73      16-473#   18-22     18-29     18-36     20-69     20-69
MXTBUF   4-256     4-256#    4-268     4-275
MXTCR    4-254     4-254#    4-273
MXTTCT   1-46      16-481#   18-22     18-22     18-29     18-29     18-36     18-36
MXTYPE   4-251     4-251#
MXVEC    4-259     4-259#
NAMDON   18-17#    18-18#    18-22     18-25#    18-29     18-29#    18-32#    18-36     18-36#    20-69     20-69
NAMPTR   18-18     18-18#    18-22     18-22#    18-29     18-29     18-29#    18-29#    18-36     18-36     18-36#    18-36#
NAMSEC   1-48      9-27#
NCLDF    8-55#     20-40     20-55
NCSILO   1-62      4-42      17-32#    20-17     20-18
NCXOFF   1-62      4-43      17-38#    20-19     20-20     20-20#
NCXON    1-62      4-44      17-44#    20-21     20-22     20-22#
NDL      1-92      18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10
         18-10     18-10     18-10#    20-43     20-49     20-51     20-51     20-51     20-51     20-52
NDLDF    8-56#     20-43     20-51     20-51     20-51#    20-51#
NDRTDF   2-32#     21-23
NDVRCB   1-59      4-33#
NESB     1-53      16-598#
NFRESB   1-55      4-88#
NGR      4-32      16-79#
NIOL     1-49      18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10
         18-10     18-10     18-10     18-10     18-10     18-10#    20-40     20-55
NLCHN    1-50      2-88#     3-183
NLIN2    1-49      18-10     18-10#
NLINES   1-50      18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10
         18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10
         18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10
         18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10
         18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10
         18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10
         18-10     18-10     18-10     18-10     18-10     18-10#
NMFCSH   4-20      16-382#   20-112
NMFREQ   1-102     22-156#
NMSNMB   1-109     2-10#     4-76
NMSYMB   2-11#     4-76
NMUMB    1-109     4-76#
NOCACH   5-22#
NODMA    5-31#     5-32
NOMAPH   5-26#
NOMOUN   5-23#
NONDMA   5-32#
NONE     4-383#    9-137
NOSET    5-29#     16-545
NPL      1-49      18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10
         18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10#
         18-17     18-22     18-25     18-29     18-32     18-36     20-37     20-49     20-51     20-51     20-52     20-69
         20-69
NPLDF    8-54#     18-17     18-17#    18-25     18-25#    18-32     18-32#    20-37
NRMFLG   4-39      17-84#    18-17     18-21     18-25     18-28     18-32     18-35
NSCP     1-65      2-19#
NSL      1-49      18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10
         18-10     18-10     18-10#    20-61     20-62
NSPLBL   1-60      4-87#
NSPLDV   1-55      4-207#
```

```
NSPLFL   1-60      4-86#
NUCHN    1-69      2-12#     2-83      2-84      2-85      2-86      2-87      2-88
NUIP     4-36     16-249#
NUMCCB   1-107     2-18#
NUMCDB   1-81      4-74#
NUMDC    4-16      4-73     16-630#
NUMDCD   1-81      4-73#
NUMDEV   1-101     3-8       4-236#
NUMFRK   1-57      2-6#
NUMIOQ   1-102     2-16#    22-13     22-13#    22-156
NUMON    1-93      4-198#
NUMRDB   1-84      2-91#    21-25     21-25     21-25#    21-25#
NUMSYQ   1-102     2-17#    22-14     22-14#    22-156
NXIVMH   1-57      2-7#
ODD      4-382#
OFFTIM   4-23     16-419#
OTMXV    1-59     20-81#
OTRASZ   1-60     17-17#
OTRECV   1-57     18-10#
P1EXT    3-106#
P1XPTR   3-106     3-223#
PHONE    4-194    16-431#    22-164
PHYMEM   1-50      3-148#
PIDPTR   1-117     4-112#
PMSIZE   1-73     16-675#    20-131
PNAME    1-100     3-95      3-149#
PNPTR    3-95#
PRIDEF   4-184    16-338#
PRIHI    4-183    16-334#
PRILOW   4-182    16-333#
PRIVIR   4-185    16-345#
PROBRK   1-118     2-24#
PROFLG   1-117     4-201#
PROITP   1-130    22-183
PROODC   1-118     2-25#
PROSLT   1-100     4-113#
PSW      1-132     3-126
PVON     1-93      4-199#
PVSPBL   1-59     16-598    16-598    16-598#
PWCH     4-188    16-448#
QBUS     1-114     4-300#    16-90
QCOMP    1-98      3-69#
QCOMPL   1-135     3-15
QFREE    1-135     3-12
QIO      1-135     3-13
QUAN0    4-4      16-258#
QUAN1    1-58      4-5      16-267#
QUAN1A   1-68      4-6      16-273#
QUAN1B   1-68      4-7      16-277#
QUAN1C   4-8      16-282#
QUAN2    1-58      4-9      16-290#
QUAN3    4-10     16-296#
QUME     1-134
R$CFST   1-58      3-210#
R$CH17   1-112     3-203#
R$CHN    1-112     3-202#
```

Cross reference table (CREF V05.04)

```
R$DATE   1-112     3-205#
R$INST   1-58      3-209#
R$INTC   1-104     3-211#
R$JOB    1-112     3-206#
R$MFMV   1-92      3-213#
R$SWPC   1-119     3-212#
R$TTOP   1-58      3-208#
R$UBAS   1-112     3-207#
R$XCHN   1-113     3-204#
RBR      1-56     18-10     18-10     18-10#    18-17     18-25     18-32
RDB      1-84      4-343#
RDBEND   1-84     22-169#
RDBSEC   1-48      4-342#
REQALC   5-24#
RF$WRT   1-109
RMNBAS   1-131     3-103     3-104
RPRCSR   1-79      3-107#
RPRVEC   1-79      3-108#
RSFBLK   1-90     16-17#
RSR      1-56     18-10     18-10#    18-17     18-25     18-32
RTVECT   1-94     16-666#   22-8      22-13     22-14     22-16
RUNCHN   1-76      2-86#
S       18-17     18-17     18-17     18-17#    18-17#    18-17#    18-18     18-18#    18-22     18-22     18-22     18-22
        18-22     18-22     18-22     18-22     18-22     18-22     18-22     18-22#    18-22#    18-22#    18-22#    18-22#
        18-22#    18-22#    18-22#    18-22#    18-25     18-25     18-25     18-25#    18-25#    18-25#    18-29     18-29
        18-29     18-29     18-29     18-29     18-29     18-29     18-29     18-29     18-29     18-29     18-29#    18-29#
        18-29#    18-29#    18-29#    18-29#    18-29#    18-29#    18-29#    18-29#    18-32     18-32     18-32     18-32#
        18-32#    18-32#    18-36     18-36     18-36     18-36     18-36     18-36     18-36     18-36     18-36     18-36
        18-36     18-36     18-36#    18-36#    18-36#    18-36#    18-36#    18-36#    18-36#    18-36#    18-36#    18-36#
        20-18#    20-19     20-21     20-51     20-51     20-51     20-51     20-51     20-51     20-51#    20-51#    20-69
        20-69     20-69     20-69     20-69     20-69     20-69#    20-69#    20-69#    20-69#    20-69#    20-69#
S110     4-364#
S1200    4-369#
S134.5   4-365#
S150     4-366#
S1800    4-370#
S19200   4-377#
S2000    4-371#
S2400    4-372#
S300     4-367#
S3600    4-373#
S4800    4-374#
S50      4-362#
S600     4-368#
S7200    4-375#
S75      4-363#
S9600    4-376#    9-137
SASECT   1-48     10-6#
SCHED    1-136     4-40     22-185
SCPFHD   1-51      4-97#
SD$HLD   1-131
SDBULS   1-91     16-598#
SDCB     1-54     16-598#
SDCBND   1-54     16-598#
SDCBSZ   1-91     16-598    16-598#
SEGBLK   4-31     16-75#
```

```
SEGCHN   1-90      4-58#
SETERR   1-131
SFCB     1-68      4-83#
SFCBFH   1-53      4-85#
SFCBND   1-68      4-84#
SFCLS    1-125     4-162#
SFRSST   1-124     4-156#
SFSVST   1-124     4-155#
SFWRIT   1-125     4-163#
SHRRCB   1-51      4-89#
SHRRCN   1-51      4-90#
SILSIZ  18-17#    18-22     18-25#    18-29     18-32#    18-36
SILXOF  18-17#    18-22     18-25#    18-29     18-32#    18-36
SILXON  18-17#    18-22     18-25#    18-29     18-32#    18-36
SIZMEM   4-324     4-324     4-324     4-324     4-324#
SLEDIT   4-180    16-221#
SMONHD   1-48      4-82#
SMRSIZ   1-116     4-334#
SNBUX    1-89     16-598    16-598    16-598    16-598#
SNDBX    1-87      4-87     16-598#
SNMSHD   1-108     4-75#
SPLANM   1-91     16-598#
SPLBHD   1-53     16-598#
SPLBLK   1-55     16-13#
SPLCHN   1-101    16-598#
SPLDEV   1-54     16-598    16-598#
SPLDVN   1-54     16-598    16-598#
SPLNB    1-52     16-598    16-598    16-598#
SPLND    1-52     16-598    16-598    16-598#
SPLNF    1-52      4-86     16-598    16-598#
SPOLID   1-118     4-104#
SPSTAT   1-61      3-98#
SPUSR    1-99      3-70#
SR3FLG   1-115     4-204#
SRERR   18-17     18-17#    18-25     18-25#    18-32     18-32#
SRTSIZ   1-116     4-336#
STPFLG   1-94      4-202#
SWAPFL   4-173    16-51#    18-10
SWDBLK   1-65     16-9#
SWPCHN   1-102     3-193#    3-212
SWPSLT   4-30     16-65#    18-10     18-10     18-10#
SYCH0    1-95      3-43#
SYCH1    1-95      3-44#
SYCH10   1-96      3-51#
SYCH11   1-96      3-52#
SYCH12   1-96      3-53#
SYCH13   1-96      3-54#
SYCH14   1-97      3-55#
SYCH15   1-97      3-56#
SYCH16   1-97      3-57#
SYCH17   1-97      3-58#     3-203
SYCH2    1-95      3-45#
SYCH20   1-97      3-59#
SYCH3    1-95      3-46#
SYCH4    1-95      3-47#
SYCH5    1-95      3-48#
```

```
SYCH6    1-96      3-49#
SYCH7    1-96      3-50#
SYINDX   1-105     3-86#
SYNAME   1-106     4-108#
SYNCH    1-132     3-82
SYPSPR   1-47      4-210#
SYPSWD   1-47     16-404    16-404    16-404#
SYSCHN   1-95      3-42#     3-202
SYSDAT   1-98      3-63#     3-205
SYSDMP   4-171    16-153#
SYSGEN   1-105     3-89#
SYSPSS  10-177#   16-404#   22-160
SYSUPD   1-99      3-73#
SYSVER   1-99      3-72#
SYTIMH   1-101     4-47#
SYTIML   1-101     4-48#
SYUNIT   1-99      3-71#
T       18-22     18-22#    18-29     18-29#    18-36     18-36#    20-69     20-69     20-69#    20-69#    21-25     21-25
        21-25#    21-25#
TBR      1-57     18-10     18-10#    18-17     18-25     18-32
TECO     4-350#
TIMOUT   4-22     16-412#
TIOBAS   1-82      4-70#
TK1CNT   1-65      4-51#
TK1SEC   1-65      4-49#
TK1VAL   1-103     4-50#
TK3SVL   1-111     4-53#
TK5VAL   1-111     4-52#
TMIDLH   1-107     4-225#
TMIDLL   1-107     4-226#
TMIOH    1-65      4-219#
TMIOL    1-65      4-220#
TMIOWH   1-66      4-223#
TMIOWL   1-66      4-224#
TMSWPH   1-66      4-221#
TMSWPL   1-66      4-222#
TMSWTH   1-107     4-217#
TMSWTL   1-107     4-218#
TMTOTH   1-106     4-213#
TMTOTL   1-106     4-214#
TMUSRH   1-106     4-215#
TMUSRL   1-106     4-216#
TNHL     1-49     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10
        18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10
        18-10     18-10     18-10     18-10     18-10     18-10#
TOTON    1-93      4-200#
TSDEFS   1-134     4-107
TSDHIO  22-34     22-37#
TSGEN    1-42#     1-48
TSLICH   4-186    16-436#
TSR      1-56     18-10     18-10#    18-17     18-25     18-32
TSXSIT   1-69      4-54#
TSXVEC   3-8#      3-37
TSXVRS   1-47      2-4#      3-21
TTCSCH   1-56      2-15#
TTOP     3-112#    3-208
```

```
TTOPTS   1-113     3-103     3-111#
U$CL     4-177    16-187#
UBUSMP   1-87      4-203#
UCLBLK   1-115     4-110#
UCLDAT   1-115    16-21#
UCLMNC   4-18     16-194#
UCLNAM   1-52      4-109#
UCLORD   4-178    16-205#
UKMNAM   1-54      4-111#
UMRBAS  20-85     20-96#
UMREND  20-85     20-105#
UMRWHD  20-85     20-86#
UMSYTP   1-89      4-105#
UNIBUS   1-114     4-301#   20-97
USPLCH   1-87      2-85#
USRBAS   1-80      4-65#
USROFF   3-68#     3-207
USWPCH   1-119     2-87#     3-193
UXIFLG   4-176    16-141#
VBUSTP   1-114     4-174#
VCBBAS  22-6      22-7#
VCBEND  22-6      22-12#
VCORTM   1-83      4-11#
VCSHNB   1-66      4-37#
VCXCTL   1-75      4-190#
VCXTRM   1-75      4-189#
VDBFLG   1-118     4-181#
VDFMEM   1-108     4-29#
VDISPC   1-70      4-45#
VDMKTP   1-70      4-172#
VDMTCR   1-70      4-115#
VDOSPC   1-70      4-46#
VDSKBU   1-72      4-41#
VECBAS   1-108     3-37#     3-197     3-202     3-203     3-204     3-205     3-206     3-207     3-208     3-209     3-210
         3-211     3-212     3-213
VEDIT    1-64      4-191#
VERR    18-17     18-17#    18-25     18-25#    18-32     18-32#
VH$BA1   1-77      4-283#
VH$BA2   1-77      4-284#
VH$BCR   1-77      4-285#
VH$CSR   1-76      4-278#
VH$DBR   1-76      4-279#
VH$LCR   1-77      4-282#
VH$LPR   1-76      4-280#
VH$LSR   1-76      4-281#
VHIMEM   1-103     4-28#
VHIPCT   1-94      4-12#
VHOINT  22-35     22-48#
VHSTOP  22-35     22-45#
VHSTRT  22-35     22-44#
VHXOFF  22-36     22-47#
VHXON   22-36     22-46#
VIDCSR   1-100     4-114#
VINABT   1-63      4-175#
VINTIO   1-89      4-13#
VKEYMX   1-72      4-35#
```

```
VLDSYS   1-60      4-179#
VLSWCH   4-187    16-442#
VMAXMC   1-80      4-24#
VMIOBF   1-81      4-192#
VMIOSZ   1-79      4-193#
VMLBLK   1-90      4-17#
VMSCHR   1-79      4-25#
VMXCSH   1-85      4-94#
VMXFIL   1-108     4-19#
VMXMON   1-61      4-21#
VMXMRB   1-80      4-27#
VMXMSG   1-80      4-26#
VMXSF    1-90      4-14#
VMXSFC   1-90      4-15#
VMXWIN   1-55      4-34#
VNCSLO   1-71      4-42#
VNCXOF   1-71      4-43#
VNCXON   1-71      4-44#
VNFCSH   1-85      4-20#
VNGR     1-51      4-32#
VNRFLG   1-69      4-39#
VNUIP    1-51      4-36#
VNUMDC   1-81      4-16#
VOFFTM   1-86      4-23#
VPLAS    1-90      4-31#
VPRIDF   1-99      4-184#
VPRIHI   1-98      4-183#
VPRILO   1-98      4-182#
VPRIVR   1-64      4-185#
VQUAN0   1-73      4-4#
VQUAN1   1-83      4-5#
VQUAN2   1-83      4-9#
VQUAN3   1-73      4-10#
VQUN1A   1-83      4-6#
VQUN1B   1-83      4-7#
VQUN1C   1-69      4-8#
VSCHED   1-72      4-40#
VSLEDT   1-56      4-180#
VSWPFL   1-92      4-173#
VSWPSL   1-55      4-30#
VSYDMP   1-70      4-171#
VT100    1-133
VT200    1-133
VT52     1-133
VTMOUT   1-87      4-22#
VTSLCH   1-73      4-186#
VU$CL    1-52      4-177#
VUCLMC   1-115     4-18#
VUCLOR   1-115     4-178#
VUSPHN   1-126     4-194#
VUXIFL   1-62      4-176#
VVLSCH   1-73      4-187#
VVPWCH   1-73      4-188#
WILDFL   1-64     16-496#
WINBAS   1-80      4-67#
X       16-543    16-543#  16-544   16-544#  16-545   16-545#  16-546   16-546#  16-547   16-547#  16-548   16-548#
        16-549    16-549#  16-550   16-550#  16-551   16-551   16-551   16-551   16-551#  16-551#  16-551#  16-551#
```

```
BUFSIZ   9-49#    20-69     20-69
CHNRES   3-26#     3-43      3-44      3-45      3-46      3-47      3-48      3-49      3-50      3-51      3-52      3-53
         3-54      3-55      3-56      3-57      3-58      3-59      3-185     3-185     3-185     3-185     3-185     3-185
         3-185     3-185     3-189
CLDEF    8-11#
CLEND   10-132#
CLTABL  22-82#    22-93     22-94     22-95     22-96     22-97     22-98     22-99     22-100    22-101    22-102    22-103
        22-104    22-105    22-106    22-107    22-108    22-109    22-110    22-111
CMDFIL   9-83#    18-22     18-29     18-36
DETACH  10-141#   20-51     20-51
DEVBEG   5-7#     16-542
DEVDEF   5-40#    16-543    16-544    16-545    16-546    16-547    16-548    16-549    16-550    16-551    16-551    16-551
        16-551
DEVEND   5-109#   16-551
DHDEF   11-14#
DHUDEF  12-57#
DHVDEF  12-12#
DZDEF   13-44#
FLAGS    9-6#     18-21     18-28     18-35
LINDEF   8-58#    18-17     18-25     18-32
LINEND  10-8#     18-22     18-29     18-36     20-69     20-69
LINPRM   9-106#
MEMORY   4-307#    4-324
MUXDEF  13-12#
MUXEND  13-52#
MXTBL    4-241#    4-251     4-252     4-253     4-254     4-255     4-256     4-257     4-258     4-259     4-260     4-261
         4-262     4-263     4-264     4-265     4-266
NAME     9-29#    18-18     18-29     18-36
OB       6-7#     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10
        18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10
        18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10
        18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10
        18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10
        18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10
        18-10
OBH      6-37#    18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10
        18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10
        18-10     18-10
OBP      6-22#    18-10     18-10     18-10     18-10     18-10     18-10     18-10
OBT      6-52#    18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10     18-10
PAGE     9-73#
RTDEF   10-198#   21-25     21-25
SILO     9-63#
SPEED    9-139#
SPOOL   14-13#    16-598
SRCHK    9-198#   18-17     18-25     18-32
SYSPS   10-178#   16-404
TBLDEF   6-71#    18-10
TRMTYP   9-12#
UMRDEF  20-87#
VECCHK   9-183#   18-17     18-25     18-32
```