```
   SSSSSSSSSSS  YYY         YYY    SSSSSSSSSSS  LLL              OOOOOOOOO       AAAAAAAAA
   SSSSSSSSSSS  YYY         YYY    SSSSSSSSSSS  LLL              OOOOOOOOO       AAAAAAAAA
   SSSSSSSSSSS  YYY         YYY    SSSSSSSSSSS  LLL              OOOOOOOOO       AAAAAAAAA
SSS             YYY         YYY SSS             LLL           OOO         OOO   AAA         AAA
SSS             YYY         YYY SSS             LLL           OOO         OOO   AAA         AAA
SSS             YYY         YYY SSS             LLL           OOO         OOO   AAA         AAA
SSS                YYY   YYY    SSS             LLL           OOO         OOO   AAA         AAA
SSS                YYY   YYY    SSS             LLL           OOO         OOO   AAA         AAA
SSS                YYY   YYY    SSS             LLL           OOO         OOO   AAA         AAA
   SSSSSSSSS          YYY          SSSSSSSSS     LLL           OOO         OOO   AAA         AAA
   SSSSSSSSS          YYY          SSSSSSSSS     LLL           OOO         OOO   AAA         AAA
   SSSSSSSSS          YYY          SSSSSSSSS     LLL           OOO         OOO   AAA         AAA
            SSS       YYY                   SSS  LLL           OOO         OOO   AAAAAAAAAAAAAAA
            SSS       YYY                   SSS  LLL           OOO         OOO   AAAAAAAAAAAAAAA
            SSS       YYY                   SSS  LLL           OOO         OOO   AAAAAAAAAAAAAAA
            SSS       YYY                   SSS  LLL           OOO         OOO   AAA         AAA
            SSS       YYY                   SSS  LLL           OOO         OOO   AAA         AAA
            SSS       YYY                   SSS  LLL           OOO         OOO   AAA         AAA
SSSSSSSSSSS           YYY SSSSSSSSSSS     LLLLLLLLLLLLLLL        OOOOOOOOO     AAA         AAA
SSSSSSSSSSS           YYY SSSSSSSSSSS     LLLLLLLLLLLLLLL        OOOOOOOOO     AAA         AAA
SSSSSSSSSSS           YYY SSSSSSSSSSS     LLLLLLLLLLLLLLL        OOOOOOOOO     AAA         AAA
```

```
IIIIII    NN      NN    IIIIII      AAAAAA    DDDDDDDD    PPPPPPPP    UU      UU  VV      VV      11
IIIIII    NN      NN    IIIIII      AAAAAA    DDDDDDDD    PPPPPPPP    UU      UU  VV      VV      11
  II      NN      NN      II      AA      AA  DD      DD  PP      PP  UU      UU  VV      VV    1111
  II      NN      NN      II      AA      AA  DD      DD  PP      PP  UU      UU  VV      VV    1111
  II      NNNN    NN      II      AA      AA  DD      DD  PP      PP  UU      UU  VV      VV      11
  II      NNNN    NN      II      AA      AA  DD      DD  PP      PP  UU      UU  VV      VV      11
  II      NN  NN  NN      II      AA      AA  DD      DD  PPPPPPPP    UU      UU  VV      VV      11
  II      NN  NN  NN      II      AA      AA  DD      DD  PPPPPPPP    UU      UU  VV      VV      11
  II      NN    NNNN      II      AAAAAAAAAA  DD      DD  PP          UU      UU  VV      VV      11
  II      NN    NNNN      II      AAAAAAAAAA  DD      DD  PP          UU      UU  VV      VV      11
  II      NN      NN      II      AA      AA  DD      DD  PP          UU      UU    VV  VV        11          ....
  II      NN      NN      II      AA      AA  DD      DD  PP          UU      UU    VV  VV        11          ....
IIIIII    NN      NN    IIIIII    AA      AA  DDDDDDDD    PP          UUUUUUUUUU      VV        111111        ....
IIIIII    NN      NN    IIIIII    AA      AA  DDDDDDDD    PP          UUUUUUUUUU      VV        111111        ....

LL              IIIIII      SSSSSSS
LL              IIIIII     SSSSSSSS
LL                II       SS
LL                II       SS
LL                II       SS
LL                II       SS
LL                II         SSSSSS
LL                II         SSSSSS
LL                II               SS
LL                II               SS
LL                II               SS
LL                II               SS
LLLLLLLLLL      IIIIII    SSSSSSSS
LLLLLLLLLL      IIIIII    SSSSSSSS
```

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```
0000     1          .NLIST  CND
0000     5
0000     9
0000    13
0000    17
0000    19          .TITLE  INIADPUV1 - ADAPTER INITIALIZATION FOR MICRO-VAX I
0000    21
0000    25
0000    26          .IDENT  'V04-002'
0000    27  ;
0000    28  ;*****************************************************************************
0000    29  ;*                                                                           *
0000    30  ;*  COPYRIGHT (c) 1978, 1980, 1982, 1984 BY                                  *
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0000    46  ;*  SOFTWARE ON EQUIPMENT WHICH IS NOT SUPPLIED BY DIGITAL.                  *
0000    47  ;*                                                                           *
0000    48  ;*                                                                           *
0000    49  ;*****************************************************************************
0000    50  ;
0000    51  ; Facility: System bootstrapping and initialization
0000    52  ;
0000    53  ; Abstract: This module contains initialization routines that are loaded
0000    54  ;           during system initialization (rather than linked into the system).
0000    55  ;
0000    56  ; Environment: Mode = KERNEL, Executing on INTERRUPT stack, IPL=31
0000    57  ;
0000    58  ; Author:  Trudy C. Matthews            Creation date: 22-Jan-1981
0000    59  ;
0000    60  ; Modification history:
0000    61  ;
0000    62  ;       V04-002 TCM0013         Trudy C. Matthews       10-Sep-1984
0000    63  ;               Add $BQODEF missing from TCM0012.
0000    64  ;
0000    65  ;       V04-001 TCM0012         Trudy C. Matthews       07-Sep-1984
0000    66  ;               For venus processor:  turn on cache before calibrating
0000    67  ;               TIMEDWAIT cells (routine EXE$INI_TIMWAIT).  Store the TIMEDWAIT
0000    68  ;               values calculated after cache is enabled in the boot driver's
0000    69  ;               TIMEDWAIT cells.  This is because the boot driver initially
0000    70  ;               has to run with cache off, but after booting will run with
0000    71  ;               cache on.
0000    72  ;
0000    73  ;       V03-024 TCM0011         Trudy C. Matthews       31-Jul-1984
0000    74  ;               Change venus's CRD interrupt vector back to ^X54 in the SCB,
```

```
0000     75 ;                  and its SBIA Fail vector to ^X64.
0000     76 ;
0000     77 ;          V03-023 WMC0001         Wayne Cardoza           30-Jul-1984
0000     78 ;                  Add H memory to 780 list.
0000     79 ;
0000     80 ;          V03-022 TCM0010         Trudy C. Matthews       25-Jul-1984
0000     81 ;                  Fix a bug in INI$UBSPACE for the 11/790 that caused second
0000     82 ;                  and subsequent unibus adapter spaces to be mapped incorrectly.
0000     83 ;                  Fix bugs in INI$SCB for the 11/790.  Fix conditional
0000     84 ;                  assembly flags in INI$CONSOLE for the 11/790.
0000     85 ;
0000     86 ;          V03-021 KDM0100         Kathleen D. Morse       01-May-1984
0000     87 ;                  Correct address of memory CSRs to be past the 8 missing
0000     88 ;                  Qbus adapter pages that do not exist.
0000     89 ;
0000     90 ;          V03-020 KDM0099         Kathleen D. Morse       27-Apr-1984
0000     91 ;                  On a MicroVAX I, if the sysgen parameter TIMEDWAIT is set
0000     92 ;                  to request no time-prompting, then use the last recorded
0000     93 ;                  system time instead.  This is found in EXE$GQ_TODCBASE
0000     94 ;                  which can be updated with a SET TIME command.
0000     95 ;
0000     96 ;          V03-019 RLRSCORPIO      Robert L. Rappaport     16-Mar-1984
0000     97 ;                  Begin additions (to INI$IOMAP) for Scorpio support.
0000     98 ;                  Also move ADAPDESC to SYSMAR.MAR, changing it to remove
0000     99 ;                  the ADAP_GENERAL array.
0000    100 ;
0000    101 ;          V03-018 RLRINIADP       Robert Rappaport        28-Feb-1984
0000    102 ;                  Add refinements to previous update that introduces
0000    103 ;                  longword array CONFREG.  Mainly add logic to allow for
0000    104 ;                  independently assembled invocations of ADAPDESC macro
0000    105 ;                  to be linked into this code.  This provides possible
0000    106 ;                  support of BI as a public bus, with user defined nodes.
0000    107 ;
0000    108 ;          V03-017 KPL0100         Peter Lieberwirth       30-Jan-1984
0000    109 ;                  Implement first step towards a longword-array CONFREG to
0000    110 ;                  replace current byte array CONFREG.  INIADP will construct
0000    111 ;                  two confregs, CONFREG and CONFREGL.  CONFREGL will be
0000    112 ;                  a longword array.  The high byte will be a VMS-bus
0000    113 ;                  designation, and the low word will contain the 16-bit
0000    114 ;                  device type.  The BI introduces 16 bit device types.
0000    115 ;
0000    116 ;                  When all references to CONFREG have been modified to touch
0000    117 ;                  CONFREGL, INIADP will be modified again to stop creating
0000    118 ;                  the byte array.
0000    119 ;
0000    120 ;                  While here, map 9 pages of CI register space, up from 8.
0000    121 ;
0000    122 ;          V03-016 KPL0001         Peter Lieberwirth       17-Jan-1984
0000    123 ;                  Fix bug in V03-015 that caused a failure to boot on 750s.
0000    124 ;                  Specifically, add NDT$_MEM1664NI to ADAPDESC macro.
0000    125 ;
0000    126 ;          V03-015 TCM0009         Trudy C. Matthews       12-Dec-1983
0000    127 ;                  Add support for booting from VENUS console device to
0000    128 ;                  INI$CONSOLE.  When mapping I/O space on VENUS, use the
0000    129 ;                  PAMM to determine if any adaptors are present on the
0000    130 ;                  ABUS.
0000    131 ;
```

```
0000    132 ;       V03-014 KDM0081         Kathleen D. Morse       13-Sep-1983
0000    133 ;               Create version for Micro-VAX I.
0000    134 ;
0000    135 ;       V03-013 DWT0126         David W. Thiel          30-Aug-1983
0000    136 ;               Modify EXE$INIT_TODR to set internal time without
0000    137 ;               modifying the contents of the system disk.
0000    138 ;
0000    139 ;       V03-012 KDM0062         Kathleen D. Morse       18-Jul-1983
0000    140 ;               Add loadable, cpu-dependent routine for initializing
0000    141 ;               the time-wait loop data cells, EXE$INI_TIMWAIT.
0000    142 ;
0000    143 ;       V03-011 KDM0057         Kathleen D. Morse       15-Jul-1983
0000    144 ;               Added loadable, cpu-dependent routine for initializing
0000    145 ;               the system time, EXE$INIT_TODR.
0000    146 ;
0000    147 ;       V03-010 KTA3071         Kerbey T. Altmann       12-Jul-1983
0000    148 ;               Include CPU-specific console init code.
0000    149 ;
0000    150 ;       V03-009 TCM0008         Trudy C. Matthews       10-Jan-1983
0000    151 ;               Change PSECT of 11/790 data that must stick around after
0000    152 ;               INIADP is deleted.  Build arrays ABUS_VA, ABUS_TYPE, and
0000    153 ;               ABUS_INDEX that describe the 11/790 ABUS configuration.
0000    154 ;
0000    155 ;       V03-008 MSH0002         Maryann Hinden          08-Dec-1982
0000    156 ;               Add powerfail support for DW750.
0000    157 ;
0000    158 ;       V03-007 ROW0142         Ralph O. Weber          24-NOV-1982
0000    159 ;               Change UBA interrupt services routines prototype so that
0000    160 ;               UBAERRADR is correctly computed as an offset from UBAINTBASE.
0000    161 ;
0000    162 ;       V03-006 TCM0007         Trudy C. Matthews       10-Nov-1982
0000    163 ;               Add 11/790-specific initialization of SCB.
0000    164 ;
0000    165 ;       V03-005 TCM0006         Trudy C. Matthews       8-Nov-1982
0000    166 ;               Initialize field ADP$L_AVECTOR with the address of
0000    167 ;               each adapter's first SCB vector.
0000    168 ;
0000    169 ;       V03-004 KTA3018         Kerbey T. Altmann       30-Oct-1982
0000    170 ;               Move from INILOA facility, rename from INITADP,
0000    171 ;               put in conditional assembly, rewrite some routines.
0000    172 ;
0000    173 ;       V03-003 MSH0001         Maryann Hinden          24-Sep-1982
0000    174 ;               Change EXE$DW780_INT to EXE$UBAERR_INT.
0000    175 ;
0000    176 ;       V03-002 TCM0005         Trudy C. Matthews       10-Aug-1982
0000    177 ;               Added support for 11/790 processor.
0000    178 ;
0000    179 ;       V03-001 KDM0002         Kathleen D. Morse       28-Jun-1982
0000    180 ;               Added $DCDEF.
0000    181 ;
0000    182 ;--
```

```
                        ;
                        ; MACRO LIBRARY CALLS
                        ;
                        $ADPDEF                 ; Define ADP offsets.
                        $BIICDEF                ; Define BIIC offsets.
                        $BQODEF                 ; Define boot vector offsets.
                        $BTDDEF                 ; Define boot devices
                        $BUADEF                 ; Define BUA Register offsets.
                        $CRBDEF                 ; Define CRB offsets.
                        $DCDEF                  ; Define adapter types
                        $DDBDEF                 ; Define DDB offsets
                        $DYNDEF                 ; Define data structure type codes.
                        $IDBDEF                 ; Define interrupt dispatcher offsets.
                        $IOUV1DEF               ; Define Micro-VAX I I/O space.
                        $MCHKDEF                ; Define machine check masks.
                        $NDTDEF                 ; Define nexus device types.
                        $PRDEF                  ; Define IPR numbers.
                        $PRUV1DEF               ; Define Micro-VAX I specific IPRs.
                        $PTEDEF                 ; Define Page Table Entry bits.
                        $RPBDEF                 ; Define Restart Parameter Block fields.
                        $UBADEF                 ; Define UBA register offsets.
                        $UCBDEF                 ; Define UCB offsets.
                        $VADEF                  ; Define virtual address fields.
                        $VECDEF                 ; Define vec offsets.
```

```
0000    254 ;       .SBTTL  Macros to describe nexus configurations
0000    255 ;
0000    256 ;       The macros FLOAT_NEXUS and FIXED_NEXUS add one or more entries to a
0000    257 ;       nexus descriptor table.  Each entry is of the form:
0000    258 ;
0000    259 ;               +-------------------------------+
0000    260 ;               |   PFN of nexus I/O space      |
0000    261 ;               +-------+-------+---------------+
0000    262 ;               |  bus  |   0   |      type     |
0000    263 ;               +-------+-------+---------------+
0000    264 ;       type = 0 -> floating nexus
0000    265 ;       type = non-zero -> fixed nexus; type = fixed adapter type
0000    266 ;       bus  = 0, if SBI; %x80 if BI  (this is a VMS-only designation)
0000    267 ;
0000    268 ;       device_type:    SBI adapters have 8-bit device type codes.  These
0000    269 ;                       device types are simple integers.
0000    270 ;
0000    271 ;                       BI adapters have 16-bit device type codes, that are
0000    272 ;                       subject to the following interpretation:
0000    273 ;
0000    274 ;                       - the MSB of the device-type field will be 0 for DEC
0000    275 ;                       devices and 1 for non-DEC devices,
0000    276 ;
0000    277 ;                       - DEC memory devices will have 0s in the high-order
0000    278 ;                       byte of the device type,
0000    279 ;
0000    280 ;                       - non-DEC supplied memory devices will have a 1 in the
0000    281 ;                       MSB of the high-order byte, and the rest of the high
0000    282 ;                       order byte will contain 0s.
0000    283 ;
0000    284 ;                       - The "all 0s" and "all 1s" device-type codes are
0000    285 ;                       reserved for DEC.
0000    286 ;
0000    287 ; If SBI type codes were simply expanded to a word for purposes of the routines
0000    288 ; in this module, there would be possible conflicts between SBI devices and
0000    289 ; BI memory adapters supplied by DEC.  Voila:  the bus type.
0000    290 ;
0000    291 ; Macro FLOAT_NEXUS.
0000    292 ; INPUTS:
0000    293 ;       PHYSADR -- physical address of 1 or more contiguous floating nexus
0000    294 ;                  slots
0000    295 ;       NUMNEX -- number of contiguous floating nexuses, default = 1
0000    296 ;       PERNEX -- amount of address space per nexus (does not have to be
0000    297 ;                 specified if NUMNEX = 1)
0000    298 ;
0000    299         .MACRO  FLOAT_NEXUS     PHYSADR,NUMNEX=1,PERNEX=0
0000    300         PA = PHYSADR
0000    301         .REPEAT NUMNEX          ; For each nexus...
0000    302         .LONG   <PA/^X200>      ; Store PFN.
0000    303         .LONG   0               ; Store floating nexus type.
0000    304         PA = PA + PERNEX        ; Increment to physical address of next nexus.
0000    305         .ENDR
0000    306         .ENDM   FLOAT_NEXUS
0000    307
0000    308 ;
0000    309 ; Macro FIXED_NEXUS.
0000    310 ;
```

```
                     0000   311 ; INPUTS:
                     0000   312 ;       PHYSADR - physical address of 1 or more contiguous fixed nexus slots
                     0000   313 ;       PERNEX - amount of address space per nexus
                     0000   314 ;       NEXUSTYPES - a list of fixed nexus types, enclosed in <>
                     0000   315 ;
                     0000   316         .MACRO  FIXED_NEXUS     PHYSADR,PERNEX=0,NEXUSTYPES
                     0000   317         PA = PHYSADR
                     0000   318         .IRP    TYPECODE,NEXUSTYPES     ; For each fixed nexus type...
                     0000   319         .LONG   <PA/^X200>              ; Store PFN.
                     0000   320         .LONG   TYPECODE                ; Store fixed nexus type.
                     0000   321         PA = PA + PERNEX                ; Increment to address of next nexus.
                     0000   322         .ENDR
                     0000   323         .ENDM   FIXED_NEXUS
                     0000   324
                     0000   325 ;
                     0000   326 ; Macro NEXUSDESC_TABLE - declare the beginning of a NEXUS descriptor table
                     0000   327 ;
                     0000   328 ;       1st byte in table (at offset -5 from label) contains length of
                     0000   329 ;       adapter type code field in CSR's on this bus. [Note for SBI like
                     0000   330 ;       busses, this is 1.]  The next longword (at offset -4) in the
                     0000   331 ;       table contains the Software defined bus type byte defined in the
                     0000   332 ;       high order byte of the longword.  [Note for SBI like busses, this
                     0000   333 ;       value is 0, for the BI it is ^x80.]
                     0000   334 ;
                     0000   335
                     0000   336 ; Define parameters that may be specified or used in macro invocation.
                     0000   337
00000000             0000   338 BI_LIKE  = 0                    ; BI like bus.
00000001             0000   339 SBI_LIKE = 1                    ; SBI like bus.
                     0000   340
00000001             0000   341 SBI_CSR_LEN = 1                 ; Length of type code field in adapter CSR's
                     0000   342                                 ;  on SBI, CMI, etc.
00000002             0000   343 BI_CSR_LEN  = 2                 ; Length of type code field in adapter CSR's
                     0000   344                                 ;  on BI.
                     0000   345
00000000             0000   346 SBI_BUS_CODE = 0                ; Software defined bus code for SBI like busses.
80000000             0000   347 BI_BUS_CODE  = ^x80000000        ; Software defined bus code for the BI.
                     0000   348
                     0000   349         .MACRO  NEXUSDESC_TABLE LABEL,BUS_TYPE=SBI_LIKE
                     0000   350         .IF     EQ,BUS_TYPE-SBI_LIKE
                     0000   351                                 .BYTE   SBI_CSR_LEN
                     0000   352                                 .LONG   SBI_BUS_CODE
                     0000   353         .IFF
                     0000   354                 .IF     EQ,BUS_TYPE-BI_LIKE
                     0000   355                                 .BYTE   BI_CSR_LEN
                     0000   356                                 .LONG   BI_BUS_CODE
                     0000   357                 .IFF
                     0000   358                                 .ERROR  ; UNRECOGNIZED BUS TYPE, NEXUSDESC_TABLE;
                     0000   359                 .ENDC
                     0000   360         .ENDC
                     0000   361
                     0000   362 LABEL:
                     0000   363         .ENDM   NEXUSDESC_TABLE
                     0000   364
FFFFFFFB             0000   365 CSR_LEN_OFFSET  = -5                     ; Offset before nexus descriptor of
                     0000   366                                         ;  byte containing length of adapter
                     0000   367                                         ;  type field in adapter CSR.
```

```
FFFFFFFC  0000   368 BUS_CODE_OFFSET = -4                    ; Offset before nexus descriptor table
          0000   369                                        ;  of longword containing software
          0000   370                                        ;  defined bus type to be or'ed with
          0000   371                                        ;  adapter type to produce NDT$_ value.
          0000   372 ;
          0000   373 ; Macro END_NEXUSDESC.
          0000   374 ;
          0000   375         .MACRO  END_NEXUSDESC
          0000   376         .LONG   0                      ; PFN=0 -> end of nexus descriptors.
          0000   377         .ENDM   END_NEXUSDESC
```

```
                        .SBTTL  Adapter-specific data structures
                ;
                ; Put a symbol for arrays built by macros in the correct psects.
                ;
                ;****************** ADAPTERS array *************
00000000                .PSECT  $$$INIT$DATA0
                ADAPTERS:                               ; Build adapter type code arrays here.
                
00000000                .PSECT  $$$INIT$DATA1           ; User contributions in this .PSECT.
                                                        ; End of ADAPTERS array.
                ;****************** End of ADAPTERS array **************
                
                ;****************** NUM_PAGES array *************
00000000                .PSECT  $$$INIT$DATA2
                NUM_PAGES:                              ; Build "number of pages to map" array.
00000000                .PSECT  $$$INIT$DATA3           ; User contributions in this .PSECT.
                ;****************** End of NUM_PAGESarray **************
                
                ;****************** INIT_ROUTINES array *************
00000000                .PSECT  $$$INIT$DATA4
                INIT_ROUTINES:                          ; Build "address of init routine" array.
00000000                .PSECT  $$$INIT$DATA5           ; User contributions in this .PSECT.
                ;****************** End of INIT_ROUTINES array **************
                
                ;
                ; To add a new adapter type:
                ;       1) Add a new ADAPDESC macro invocation to the end of this list.
                ;
00000000                .PSECT  $$$INIT$DATA,LONG
                
                ;
                ; Default interupt vectors for UNIBUS system devices
                ; (This array is indexed by the RPB field RPB$B_DEVTYP, if the RPB field
                ; RPB$W_ROUBVEC is zero.  If RPB$W_ROUBVEC is not zero, then RPB$W_ROUBVEC
                ; is used and this array is not referenced at all.  RPB$W_ROUBVEC is set up
                ; by PQDRIVER.  RPB$L_BOOTRO is set by VMB to contain the device name in
                ; ASCII, not the vector number and device type, as it does on full
                ; architecture VAX machines.
                ;
                BOOTVECTOR:
0088                    .WORD   ^X88                    ; RK06/7 Interrupt vector
0070                    .WORD   ^X70                    ; RL01/2 Interrupt vector
                
                BUS_CSR_LEN:                            ; Static byte containing the length (in bytes)
00                      .BYTE   0                       ;  of the adapter type field in the CSR's of
                                                        ;  the bus currently being configured.  The
                                                        ;  proper value for the bus of interest is
                                                        ;  copied here, from the current nexus
                                                        ;  descriptor table, when we enter subroutine
                                                        ;  CONFIG_IOSPACE.
                
                SW_BUS_CODE:                            ; Static longword containing the software
00000000                .LONG   0                       ;  defined bus type, of the bus currently being
                                                        ;  configured, in the high order byte.  The
                                                        ;  proper value for the bus of current interest
                                                        ;  is copied here, from the nexus descriptor
                                                        ;  table, when we enter subroutine
```

```
                0009   436                                     ;  CONFIG_IOSPACE.
                0009   437
                0009   438 DIRECT_VEC_NODE_CNT:                ; Static longword that counts the number of
                0009   439                                     ;  direct vectoring adpater nodes that we have
00000000        0009   440         .LONG   0                   ;  run across so far.
                000D   441
00000001        000D   442 $$$VMSDEFINED = 1                    ; Define symbol that means VMS system software.
00000080        000D   443 NUMUBAVEC = 128                      ; ALLOW FOR 128 UNIBUS VECTORS
                000D   444
                000D   445         ADAPDESC -                   ; Memory. ** MUST BE 1ST IN DESCRIPTOR LIST **
                000D   446         ADPTYPES=<NDT$_MEM1664NI,NDT$_MEM4NI,NDT$_MEM4I,NDT$_MEM16NI, -
                000D   447                 NDT$_MEM16I, -
                000D   448                 NDT$_MEM64NIL,NDT$_MEM64EIL,NDT$_MEM64NIU,NDT$_MEM64EIU,  -
                000D   449                 NDT$_MEM64I, -
                000D   450                 NDT$_MEM256NIL,NDT$_MEM256EIL,NDT$_MEM256NIU,NDT$_MEM256EIU,  -
                000D   451                 NDT$_MEM256I, -
                000D   452                 NDT$_SCORMEM> -
                000D   453                 NUMPAGES=1
                000D   454
                000D   455         ADAPDESC -                   ; MASSbus.
                000D   456                 ADPTYPES=NDT$_MB, -
                000D   457                 NUMPAGES=8, -
                000D   458                 INITRTN=INI$MBADP
                000D   459
                000D   460         ADAPDESC -                   ; UNIbus.
                000D   461                 ADPTYPES=<NDT$_UB0,NDT$_UB1,NDT$_UB2,NDT$_UB3,NDT$_BUA>, -
                000D   462                 NUMPAGES=8, -
                000D   463                 INITRTN=INI$UBSPACE
                000D   464
                000D   465         ADAPDESC -                   ; Multi-port memory.
                000D   466                 ADPTYPES=<NDT$_MPM0,NDT$_MPM1,NDT$_MPM2,NDT$_MPM3>, -
                000D   467                 NUMPAGES=1, -
                000D   468                 INITRTN=INI$MPMADP
                000D   469
                000D   470         ADAPDESC -                   ; DR32.
                000D   471                 ADPTYPES=NDT$_DR32, -
                000D   472                 NUMPAGES=4, -
                000D   473                 INITRTN=INI$DRADP
                000D   474
                000D   475         ADAPDESC -                   ; CI780
                000D   476                 ADPTYPES=NDT$_CI, -
                000D   477                 NUMPAGES=9, -
                000D   478                 INITRTN=INI$CIADP
                000D   479
                000D   480         ADAPDESC -                   ; KDZ11 Processor
                000D   481                 ADPTYPES=NDT$_KDZ11, -
                000D   482                 NUMPAGES=1, -
                000D   483                 INITRTN=INI$KDZ11
                000D   484
```

```
                     000D   523          .SBTTL  CPU-specific data structures
                     000D   524 ;
                     000D   525 ; To add a new CPU type:
                     000D   526 ;       1) Create a new nexus descriptor table, using FLOAT_NEXUS and
                     000D   527 ;          FIXED_NEXUS macros.  Put an END_NEXUSDESC macro at the end.
                     000D   528 ;
                     000D   529
                     000D   552
                     000D   590
                     000D   617
                     000D   659
                     000D   660
                     000D   662 CPU_ADPSIZE:
                0258 000D   663          .WORD   ADP$C_UBAADPLEN
                     000F   664
                     000F   665
                     000F   666 ;
                     000F   667 ; Declare the beginning of a nexus-descriptor table.
                     000F   668 ;
                     000F   669          NEXUSDESC_TABLE LABEL=NEXUSDESC
                     0014   670
                     0014   671
                     0014   672 ;
                     0014   673 ; Describe all nexuses on a Micro-VAX I processor.
                     0014   674 ;
            00000000 0014   675          SBI_CPU = 0
            00000000 0014   676          BI_CPU  = 0
                     0014   677          FIXED_NEXUS -
                     0014   678                  PHYSADR=IOUV1$AL_QBOSP, -
                     0014   679                  NEXUSTYPES=NDT$_QBO
                     001C   680          END_NEXUSDESC
                     0020   682
                     0020   706
                     0020   707 ;
                     0020   708 ; Nexus "descriptor" arrays -- these arrays hold the nexus-device type and
                     0020   709 ; virtual address of every adapter on the system.  The arrays, CONFREGL and
                     0020   710 ; SBICONF, are allocated enough space to hold the maximum number of adapters
                     0020   711 ; that can be attached to any CPU.  When the code discovers how many adapters
                     0020   712 ; actually exist on the system, it will allocate space from non-paged pool
                     0020   713 ; and move a permanent copy of these arrays into that space.
                     0020   714 ;
            00000040 0020   715 MAXNEXUS = 64
                     0020   716 CONFREG:
                                                                ; Byte array of nexus-device type codes..
            00000060 0020   717          .BLKB   MAXNEXUS
                     0060   718 SBICONF:
            00000160 0060   719          .BLKL   MAXNEXUS       ; Longword array of VAs of adapter space.
                     0160   720 CONFREGL:
            00000260 0160   721          .BLKL   MAXNEXUS       ; Longword array of nexus-device type codes
```

```
                                        0260   723          .SBTTL  Message strings
                                        0260   724
                                0000000D 0260   725 CR = 13
                                0000000A 0260   726 LF = 10
                                        0260   727 NOSPT:
2D 54 49 4E 49 43 45 58 45 25 0A 0D     0260   728          .ASCIZ  <CR><LF>/%EXECINIT-F-Insufficient SPT entries/<CR><LF>
65 69 63 69 66 66 75 73 6E 49 2D 46     026C
69 72 74 6E 65 20 54 50 53 20 74 6E     0278
                  00 0A 0D 73 65        0284
```

```
                                0289   734          .SBTTL  INI$IOMAP, Initialize and map nexuses
                                0289   735 ;++
                                0289   736 ; FUNCTIONAL DESCRIPTION:
                                0289   737 ;       This routine is executed only once, during system initialization.
                                0289   738 ;       It loops through all nexuses on the system, testing for
                                0289   739 ;       adapters.  When it finds an adapter, it maps its I/O space and
                                0289   740 ;       initializes it.
                                0289   741 ;
                                0289   742 ; INPUTS:
                                0289   743 ;       BOO$GL_SPTFREL  - next free VPN
                                0289   744 ;       MMG$GL_SPTVASE  - base of system page table
                                0289   745 ;       EXE$GL_RPB      - address of reboot parameter block
                                0289   749 ;
                                0289   750 ; OUTPUTS:
                                0289   751 ;       R0 - SS$_NORMAL
                                0289   752 ;
                                0289   753 ;       For each adapter found, its accessible I/O space is mapped to virtual
                                0289   754 ;       addresses.  An ADP (Adapter Control Block) is built, and the hardware
                                0289   755 ;       adapter is initialized.
                                0289   756 ;
                                0289   757 ;       The arrays CONFREG (a byte array of nexus-device type codes, defined
                                0289   758 ;       by NDT$_ symbols) and SBICONF (a longword array of
                                0289   759 ;       virtual addresses that map adapter space) are initialized.  Pointers
                                0289   760 ;       to these arrays are stored in EXE$GL_CONFREG  and
                                0289   761 ;       MMG$GL_SBICONF.  The number of entries in these two parallel arrays is
                                0289   762 ;       stored in EXE$GL_NUMNEXUS.
                                0289   763 ;
                                0289   764 ;       Since BI devices have a 16-bit device type code, a new CONFREG array is
                                0289   765 ;       constructed.  This is a longword array called CONFREGL.
                                0289   766 ;
                                0289   767 ;       Several locations in the RPB that describe the boot device are init'ed:
                                0289   768 ;       RPB$L_BOOTR1    - holds index into CONFREG and SBICONF for the boot
                                0289   769 ;                         adapter
                                0289   770 ;       RPB$L_ADPVIR    - holds VA of boot device adapter's register space
                                0289   771 ;       RPB$L_CSRVIR    - holds VA of boot device's register space
                                0289   772 ;--
                                0289   773
                           00000000   774          .PSECT  $$$INIT$CODE,QUAD
                                0000   775 INI$IOMAP::
                                0000   776
                     0FFF 8F    BB  0000   777          PUSHR   #^M<R0,R1,R2,R3,R4,R5,R6,R7,R8,R9,R10,R11>
                                0004   778 ;
                                0004   779 ; Set up common inputs to CONFIG_IOSPACE subroutine for the CPU-specific code.
                                0004   780 ;
          52    00000000'GF    D0  0004   781          MOVL    G^BOO$GL_SPTFREL,R2     ; Get next available VPN.
          53    00000000'GF    D0  000B   782          MOVL    G^MMG$GL_SPTBASE,R3     ; Get base of System Page Table.
                  53    6342   DE  0012   783          MOVAL   (R3)[R2],R3             ; Compute SVASPT.
             52   52    09     78  0016   784          ASHL    #9,R2,R2                ; Convert VPN to VA.
          52    80000000 8F    C8  001A   785          BISL    #VA$M_SYSTEM,R2         ; Set system bit.
                       54    D4  0021   786          CLRL    R4                      ; Clear index into CONFREG and SBICONF.
          59    00000000'GF    D0  0023   787          MOVL    G^EXE$GL_RPB,R9         ; Get address of RPB.
00000000'GF     0060'CF    DE  002A   791          MOVAL   W^SBICONF,G^MMG$GL_SBICONF  ; Set pointers to local copies
00000000'GF     0020'CF    DE  0033   792          MOVAL   W^CONFREG,G^EXE$GL_CONFREG  ; of these arrays for init routines.
00000000'GF     0160'CF    DE  003C   793          MOVAL   W^CONFREGL,G^EXE$GL_CONFREGL ; ...
```

```
                          0045   899          .SBTTL  INITADP_780, _750, _730, and _UV1
                          0045   900 ;
                          0045   901 ; I/O address space for the 11/780, 11/750, 11/730, and Micro-VAX I cpus
                          0045   902 ; is statically defined in their respective nexus descriptor tables.
                          0045   903 ;
56   0014'CF    DE        0045   904          MOVAL   W^NEXUSDESC,R6          ; Get address of nexus table.
       5B       D4        004A   905          CLRL    R11                     ; Signal use 1st page of SCB.
       0B       10        004C   906          BSBB    CONFIG_IOSPACE          ; Configure processor I/O space.
                          004E   907
                          004E   909
     0079       30        004E   910          BSBW    CREATE_ARRAYS           ; Create CONFREG and SBICONF arrays.
   0FFF 8F      BA        0051   911          POPR    #^M<R0,R1,R2,R3,R4,R5,R6,R7,R8,R9,R10,R11>
   50   01      D0        0055   912          MOVL    #1,R0                   ; Set success status
                05        0058   913          RSB                             ; Return.
```

```
                     0059   916          .SBTTL  CONFIG_IOSPACE
                     0059   917 ;
                     0059   918 ; CONFIG_IOSPACE
                     0059   919 ;       Given a nexus descriptor table, which describes what "nexuses" or
                     0059   920 ;       "slots" are available on a system to hold I/O adapters, find and
                     0059   921 ;       initialize all adapters on the system.
                     0059   922 ;
                     0059   923 ; Inputs:
                     0059   924 ;       R2 - next available virtual address, to be used for mapping I/O space
                     0059   925 ;       R3 - address of PTE associated with VA in R2
                     0059   926 ;       R4 - Current index into CONFREG and SBICONF arrays (should be 0 the
                     0059   927 ;            first time CONFIG_IOSPACE is called)
                     0059   928 ;       R6 - address of nexus descriptor table
                     0059   929 ;       R9 - address of Restart Parameter Block (RPB)
                     0059   930 ;       R10 - PFN of boot adapter space
                     0059   931 ;       R11- page offset from beginning of SCB; tells which page of the SCB
                     0059   932 ;            to use for this set of nexuses (passed to routines that init ADP)
                     0059   933 ;
                     0059   934 ; Outputs:
                     0059   935 ;       R2,R3,R4 - updated
                     0059   936 ;       R9,R10,R11 - preserved; all other registers potentially modified
                     0059   937 ;       CONFREG - initialized with adapter NDT$ code for each nexus
                     0059   938 ;       SBICONF - initialized with adapter space VA for each nexus
                     0059   939 ;
                     0059   940 CONFIG_IOSPACE:
                     0059   946 ;
                     0059   947 ; There is only one adapter, the Qbus.
                     0059   948 ;
                     0059   950
      FB A6    90    0059   951          MOVB    CSR_LEN_OFFSET(R6),-    ; Move length of adapter type field
0004'CF                005C   952                  W^BUS_CSR_LEN           ;  in CSR's to static location.
      FC A6    D0    005F   953          MOVL    BUS_CODE_OFFSET(R6),-   ; Move software defined bus type code
0005'CF                0062   954                  W^SW_BUS_CODE           ;  to static longword.
                       0065   955
                       0065   956 NXT_NEXUS:                              ; For each nexus...
      58   86    D0    0065   957          MOVL    (R6)+,R8                ; Get PFN of nexus.
                       0068   984 ;
                       0068   985 ; Execution continues here if adapter was present.
                       0068   986 ;
                       0068   987 GET_TYPE:
      57   86    D0    0068   988          MOVL    (R6)+,R7                ; Get nexus-device type from nexus table.
                       006B  1005 ;
                       006B  1006 ; Here R7 has hardware adapter code or'ed with software bus code.
                       006B  1007 ; Translate specific nexus device type code into general adapter type code.
                       006B  1008 ;
                       006B  1009 GET_GEN_TYPE:
0020'CF44  57    90    006B  1010          MOVB    R7,W^CONFREG[R4]        ; Save nexus-device type in CONFREG.
0160'CF44  57    D0    0071  1011          MOVL    R7,W^CONFREGL[R4]       ; CONFREGL also filled in.
           55    D4    0077  1012          CLRL    R5                      ; Clear loop index.
                       0079  1013 30$:                                    ;
50   0000'CF45  DE    0079  1014          MOVAL   W^ADAPTERS[R5],R0       ; Get address of adapter type code.
     0000'CF    9F    007F  1015          PUSHAB  W^NUM_PAGES             ; Push addr of end of ADAPTERS array.
     8E   50    D1    0083  1016          CMPL    R0,(SP)+                ; See if we went beyond array.
          3F    1E    0086  1017          BGEQU   END_NEXUS               ; unrecognized adapter, do not map.
     60   57    D1    0088  1018          CMPL    R7,(R0)                 ; Adapter type match?
          04    13    008B  1019          BEQL    40$                     ; If EQL yes, adapter type match.
          55    D6    008D  1020          INCL    R5                      ; Increment loop index.
```

```
                     E8   11   008F  1021          BRB     30$                     ; Look at next adapter.
                                0091  1022 40$:
                                0091  1023
                                0091  1024 ;
                                0091  1025 ; Store boot parameters.
                                0091  1026 ;
                60 A9    52    D0  0091  1031          MOVL    R2,RPB$L_ADPVIR(R9)     ; Store VA of boot adapter space.
                20 A9    54    D0  0095  1032          MOVL    R4,RPB$L_BOOTR1(R9)     ; Store boot adapter nexus number.
          51    54 A9    0D    00  EF  0099  1033          EXTZV   #0,#13, -               ; Get offset into UNIBUS/QBUS I/O page.
                                009F  1034                  RPB$L_CSRPHY(R9),R1     ;
             58 A9    1000 C241  9E  009F  1035          MOVAB   <8*512>(R2)[R1], -      ; Set VA of UNIBUS/QBUS registers.
                                00A6  1036                  RPB$L_CSRVIR(R9)        ;
                                00A6  1037
                                00A6  1038
                                00A6  1039 ;
                                00A6  1040 ; R5/ general adapter type; index into "general" adapter arrays.
                                00A6  1041 ; For each adapter -
                                00A6  1042 ;       Map the # of pages specified in ADAPDESC macro
                                00A6  1043 ;       JSB to initialization routine specified in ADAPDESC macro
                                00A6  1044 ;
                                00A6  1045 MAP_NEXUS:
                   58   2000 C8  9E  00A6  1047          MOVAB   <16*512>(R8),R8         ; Since no Qbus adapter space, point to
                                00AB  1048                                              ;  non-exist memory past Qbus I/O space.
                0060'CF44    52    D0  00AB  1050          MOVL    R2,W^SBICONF[R4]        ; Save VA of adapter space in SBICONF.
                51   0000'CF45    3C  00B1  1051          MOVZWL  W^NUM_PAGES[R5],R1      ; Get number of pages to map.
                           6A    10  00B7  1052          BSBB    MAP_PAGES               ; Map the I/O pages.
                51   0000'CF45    DE  00B9  1053          MOVAL   W^INIT_ROUTINES[R5],R1  ; Get address of initialization routine.
                           61    D5  00BF  1054          TSTL    (R1)                    ; Initialization routine specified?
                           04    13  00C1  1055          BEQL    END_NEXUS               ; Branch if none.
                        00 B141  16  00C3  1056          JSB     @(R1)[R1]               ; Call initialization routine.
                                00C7  1057 END_NEXUS:
                           54    D6  00C7  1058          INCL    R4                      ; Increment CONFREG and SBICONF index.
                           05    00C9  1062          RSB                             ; Return, as only one nexus.
                                00CA  1064
```

```
                                00CA  1066          .SBTTL  CREATE_ARRAYS
                                00CA  1067 ;
                                00CA  1068 ; CREATE_ARRAYS
                                00CA  1069 ;
                                00CA  1070 ;       Move the local CONFREG and SBICONF arrays into non-paged pool.
                                00CA  1071 ;
                                00CA  1072 ; Inputs:
                                00CA  1073 ;       R4 - Number of nexuses on the system.
                                00CA  1074 ;       CONFREG and SBICONF have been initialized.
                                00CA  1075 ;
                                00CA  1076 ; Outputs:
                                00CA  1077 ;       R0 - R5 destroyed
                                00CA  1078 ;       EXE$GL_CONFREG points to a copy of the CONFREG array in non-paged pool
                                00CA  1079 ;       MMG$GL_SBICONF points to a copy of the SBICONF array in non-paged pool
                                00CA  1080 ;       EXE$GL_NUMNEXUS contains the number of nexuses on the system
                                00CA  1081 ;
                                00CA  1082 ;
                                00CA  1083 CREATE_ARRAYS:
00000000'GF    54    D0        00CA  1084          MOVL    R4,G^EXE$GL_NUMNEXUS    ; Store number of nexuses on system.
     51    0C A444    DE        00D1  1085          MOVAL   12(R4)[R4],R1           ; Allocate n bytes for CONFREG plus
                                00D6  1086                                          ; 4n bytes for SBICONF + header
          51    6144    DE        00D6  1087          MOVAL   (R1)[R4],R1             ; Another 4n bytes for CONFREGL.
                017D    30        00DA  1088          BSBW    ALONPAGD                ; Get pool for CONFREG and SBICONF.
                  82    7C        00DD  1089          CLRQ    (R2)+                   ; Clear out unused
               82    51    B0        00DF  1090          MOVW    R1,(R2)+                ; Set in size
          82    0763    8F    B0        00E2  1091          MOVW    #<DYN$C_CONF@8>!DYN$C_INIT,(R2)+ ; Set type and subtype
00000000'GF    62    9E        00E7  1092          MOVAB   (R2),G^EXE$GL_CONFREG   ; Store address of system CONFREG.
          51    6244    9E        00EE  1093          MOVAB   (R2)[R4],R1             ; Two steps to CONFREGL, 1st, SBICONF,
00000000'GF    51    D0        00F2  1094          MOVL    R1,G^MMG$GL_SBICONF     ; Store address of system SBICONF.
00000000'GF    6144    DE        00F9  1095          MOVAL   (R1)[R4],G^EXE$GL_CONFREGL ; And address of system CONFREGL.
                  14    BB        0101  1096          PUSHR   #^M<R2,R4>              ; Save pool address and nexus count.
62    0020'CF    54    28        0103  1097          MOVC3   R4,W^CONFREG,(R2)       ; Copy CONFREG to pool.
                  14    BA        0109  1098          POPR    #^M<R2,R4>              ; Retrieve pool address and nexus count.
          51    54    04    C5        010B  1099          MULL3   #4,R4,R1                ; Number of bytes in SBICONF.
                7E    51    D0        010F  1100          MOVL    R1,-(SP)                ; Save, SBICONF size = CONFREGL size
6244    0060'CF    51    28        0112  1101          MOVC3   R1,W^SBICONF,(R2)[R4]   ; Copy SBICONF to pool.
                  51    8E    D0        0119  1102          MOVL    (SP)+,R1                ; Restore size of SBICONF and CONFREGL.
63    0160'CF    51    28        011C  1103          MOVC3   R1,W^CONFREGL,(R3)      ; Copy CONFREGL to pool.  R3 is output
                                0122  1104                                          ; from SBICONF MOVC3, so SBICONF and
                                0122  1105                                          ; CONFREGL must be adjacent.
                                0122  1106
                          05    0122  1107          RSB
```

```
                                0123  1109          .SBTTL  MAP_PAGES
                                0123  1110 ;++
                                0123  1111 ; INPUTS:
                                0123  1112 ;       R1/ Number of pages to map.
                                0123  1113 ;       R2/ VA of page to map.
                                0123  1114 ;       R3/ VA of system page table entry to be used.
                                0123  1115 ;       R8/ PFN of page(s) to map.
                                0123  1116 ;
                                0123  1117 ; OUTPUTS:
                                0123  1118 ;       R2,R3 updated; R1,R8 destroyed; all other registers preserved
                                0123  1119 ;
                                0123  1120 ;--
                                0123  1121
                                0123  1122 MAP_PAGES:
                                0123  1123
     83    58    90000000 8F    0123  1124          BISL3   #<PTE$M_VALID!PTE$C_KW>,R8,(R3)+
                                012B  1125                                                  ; Map a page.
                          58    012B  1126          INCL    R8                            ; Next PFN.
                    52    0200  012D  1127          MOVAB   512(R2),R2                    ; Next VA.
                     00000000'GF  0132  1128          INCL    G^BOO$GL_SPTFREL              ; Next free entry.
     00000000'GF     00000000'GF  0138  1129          CMPL    G^BOO$GL_SPTFREH, -           ; Check for no more system page
                                0143  1130                  G^BOO$GL_SPTFREL              ; table entries.
                          04    0143  1131          BLEQ    ERROR_HALT                    ; Branch if out of SPTEs.
                       DB 51    0145  1132          SOBGTR  R1,MAP_PAGES                  ; Map another page.
                                0148  1133          RSB                                   ; All done.
                                0149  1134
                                0149  1135 ERROR_HALT:
                    51    0260'CF 0149  1136          MOVAB   W^NOSPT,R1                    ; Set error message.
                                014E  1137 ERROR_HALT_1:
                          5B    014E  1138          CLRL    R11                           ; Indicate console terminal.
                     00000000'GF  0150  1139          JSB     G^EXE$OUTZSTRING              ; Output error message.
                                0156  1140          HALT                                  ; ***** FATAL ERROR *******
```

```
                        0157  1269          .SBTTL  INI$UBSPACE
                        0157  1270 ;++
                        0157  1271 ;       Map UNIBUS space; initialize UNIBUS ADP.
                        0157  1272 ;
                        0157  1273 ; INPUTS:
                        0157  1274 ;       R2 - VA of next free system page
                        0157  1275 ;       R3 - VA of system page table entry to be used to map VA in R2
                        0157  1276 ;       R4 - nexus identification number of this adapter
                        0157  1277 ;    -8(R6) - PFN of this UNIBUS adapter's register space
                        0157  1278 ;
                        0157  1279 ; OUTPUTS:
                        0157  1280 ;       UNIBUS space is mapped.
                        0157  1281 ;       INI$UBADP is called to build an ADP block and initialize UNIBUS
                        0157  1282 ;       adapter hardware.
                        0157  1283 ;
                        0157  1284 ;--
                        0157  1285
                        0157  1286 INI$UBSPACE:
                        0157  1287
      58   0160'CF44   DE   0157  1290          MOVAL   W^CONFREGL[R4],R8               ; R8 => CONFREGL slot.
   58   68   02   00   EF   015D  1291          EXTZV   #0,#2,(R8),R8                   ; Get UBA number.
      58   58   09   78   0162  1292          ASHL    #9,R8,R8                        ; Position UB number.
                        0166  1295
                        0166  1304
                        0166  1309
                        0166  1314
                        0166  1319
                        0166  1325
58   00100000 8F   58   C3   0166  1327          SUBL3   R8,#<IOUV1$AL_QBOSP/^X200>,R8
                        016E  1328                                                      ; Get PFN of Qbus I/O page.
                        016E  1330
            51   10   D0   016E  1331          MOVL    #16,R1                          ; Number of pages to map (UB/Qbus space).
               FFAF   30   0171  1332          BSBW    MAP_PAGES                       ; Map I/O pages.
                        0174  1333 ;
                        0174  1334 ; Call adapter initialization routine.
                        0174  1335 ;
                        0174  1336 ;       BSBW    INI$UBADP                       ; Init ADP block.
                        0174  1337 ;       RSB
```

```
                                0174  1339          .SBTTL  INI$UBADP - BUILD ADP AND INITIALIZE UBA
                                0174  1340 ;+
                                0174  1341 ; INI$UBADP ALLOCATES AND FILLS IN AN ADAPTER CONTROL BLOCK, INTERRUPT
                                0174  1342 ; DISPATCHER AND CONNECTS THEM TO THE PROPER SCB VECTORS.  A CALL IS
                                0174  1343 ; THEN MADE TO UBA$INITIAL TO INITIALIZE THE ADAPTER HARDWARE.
                                0174  1344 ;
                                0174  1345 ; INPUT:
                                0174  1346 ;       R4 - nexus identification number of this adapter
                                0174  1347 ;       R11- offset from beginning of SCB to correct SCB page for this adapter
                                0174  1348 ;-
                                0174  1349
                                0174  1350 INI$UBADP:
                                0174  1351
          01FF 8F       BB      0174  1352          PUSHR   #^M<R0,R1,R2,R3,R4,R5,R6,R7,R8> ; SAVE R0-R8
                                0178  1353 ;
                                0178  1354 ; Allocate and initialize Adapter Control Block (ADP).
                                0178  1355 ;
    51   000D'CF    3C          0178  1356          MOVZWL  W^CPU_ADPSIZE,R1        ; PICK UP LENGTH OF ADP
            00DA    30          017D  1357          BSBW    ALONPAGD                ; ALLOCATE SPACE FOR ADP
       08 A2   51   B0          0180  1358          MOVW    R1,ADP$W_SIZE(R2)       ; SET SIZE INTO ADP BLOCK
       0A A2   01   90          0184  1359          MOVB    #DYN$C_ADP, -           ; AND SET TYPE OF BLOCK
                                0188  1360                  ADP$B_TYPE(R2)
       0E A2   01   B0          0188  1361          MOVW    #AT$_UBA, -             ; SET TYPE OF ADAPTER
                                018C  1362                  ADP$W_ADPTYPE(R2)
    62   0060'CF44   D0          018C  1363          MOVL    W^SBICONF[R4], -        ; SET VA OF CONFIGURATION REG
                                0192  1364                  ADP$L_CSR(R2)
       0C A2   54   B0          0192  1365          MOVW    R4,ADP$W_TR(R2)         ; SET TR NUMBER FOR ADAPTER
                                0196  1366
       50   14 A2   DE          0196  1367          MOVAL   ADP$L_DPQFL(R2),R0      ; ADDRESS OF DATA PATH WAIT QUEUE
          60   50   D0          019A  1368          MOVL    R0,(R0)                 ; INIT QUEUE HEADER
       04 A0   50   D0          019D  1369          MOVL    R0,4(R0)                ;
                                01A1  1370
       50   30 A2   DE          01A1  1371          MOVAL   ADP$L_MRQFL(R2),R0      ; ADDRESS OF MAP WAIT QUEUE
          60   50   D0          01A5  1372          MOVL    R0,(R0)                 ; INIT QUEUE HEADER
       04 A0   50   D0          01A8  1373          MOVL    R0,4(R0)                ;
             04 A2   D4         01AC  1374          CLRL    ADP$L_LINK(R2)          ; ZAP ADAPTER CHAIN LINK
              FE4E'  30         01AF  1375          BSBW    ADPLINK                 ; LINK ADP TO END OF LIST
                                01B2  1376 ;
                                01B2  1377 ; Initialize adapter interrupt vectors in System Control Block.
                                01B2  1378 ;
58   00000000'GF    D0          01B2  1379          MOVL    G^EXE$GL_SCB,R8         ; GET SCB ADDRESS
                                01B9  1380
                                01B9  1387
                                01B9  1447
                                01B9  1507
                                01B9  1508
                                01B9  1536
                                01B9  1537
                                01B9  1539                                          ; REMAINING ADP INIT FOR MICRO-VAX I:
          0200 CF   DE          01B9  1540          MOVAL   ^X200(R8),-             ; ASSUME UB0
            10 A2               01BD  1541                  ADP$L_VECTOR(R2)        ;  VECTOR SPACE
                                01BF  1542
       60 A2   0E   B0          01BF  1543          MOVW    #^XE,ADP$W_DPBITMAP(R2) ; MARK DATAPATHS 1-3 AVAILABLE
53   00000001'GF    DE          01C3  1544          MOVAL   G^UBA$UNEXINT+1,R3      ; GET ADDR OF UNEXP INT SERVICE
                                01CA  1545                                          ;  (+1 MEANS HANDLE ON INT STACK)
    54   0001'CF    DE          01CA  1546          MOVAL   W^UBA$INT0+1,R4         ; SPECIAL CASE TO COUNT PASSIVE RELEASE
                                01CF  1547
```

```
                                01CF  1548 ;
                                01CF  1549 ; INIT QBUS VECTORS TO UNEXPECTED INTERRUPT SERVICE
                                01CF  1550 ;
          50    10 A2    D0     01CF  1551          MOVL    ADP$L_VECTOR(R2),R0      ; GET ADDRESS OF VECTORS
             80    54    D0     01D3  1552          MOVL    R4,(R0)+                 ; SPECIAL CASE FOR VECTOR 0
          51     7F 8F    9A     01D6  1553          MOVZBL  #<NUMUBAVEC-1>,R1        ; REST OF VECTORS
             80    53    D0     01DA  1554 30$:     MOVL    R3,(R0)+                 ; FILL VECTOR WITH UNEXP INT
                FA 51    F5     01DD  1555          SOBGTR  R1,30$                   ; FILL ALL VECTORS
                                01E0  1556
                                01E0  1558
                                01E0  1559
                                01E0  1601
                                01E0  1602
                                01E0  1604 ;
                                01E0  1605 ; All memory on the QBUS is main memory.  There is no memory analogous
                                01E0  1606 ; to UNIBUS memory.
                                01E0  1607 ;
                                01E0  1608 ; Now locate the memory controllers and build a list of the addresses
                                01E0  1609 ; at which they are located.  This list is used by the memory error logic
                                01E0  1610 ; in machine-check.  This information must be determined outside of machine-
                                01E0  1611 ; check, since the machine-check code cannot cause another machine-check
                                01E0  1612 ; without causing a cpu double-error halt.
                                01E0  1613 ;
                                01E0  1614 ; The list is a count of controllers, followed by the virtual addresses
                                01E0  1615 ; that are the memory controller CSRs.  Each MSV-11P has a single word CSR.
                                01E0  1616 ;
                                01E0  1617          .ENABLE LSB
    53    00000000'GF    D0     01E0  1618          MOVL    G^EXE$GL_SCB,R3          ; Get SCB address.
             04 A3    DD     01E7  1619          PUSHL   4(R3)                    ; Save current mcheck handler address.
          50    5E    D0     01EA  1620          MOVL    SP,R0                    ; Mark current stack position.
       04 A3    20'AF    DE     01ED  1621          MOVAL   B^MCHK_HANDLER,4(R3)     ; Connect temp mcheck handler.
                                01F2  1622
    51    00000000'GF    D0     01F2  1623          MOVL    G^MMG$GL_SBICONF,R1      ; Get address of SBICONF array.
          51    61    D0     01F9  1624          MOVL    (R1),R1                  ; Get VA of Qbus I/O space.
    51    00002440 8F    C0     01FC  1625          ADDL    #<^O12100+^X1000>,R1     ; Offset to memory controller CSR(772100).
    54    00000000'GF    DE     0203  1626          MOVAL   G^EXE$AL_MEMCSRS,R4      ; Get address of memory CSR count.
          56    04 A4    DE     020A  1627          MOVAL   4(R4),R6                 ; Get address of buffer for CSRs.
                55    D4     020E  1628          CLRL    R5                       ; Initialize index.
                                0210  1629
                6145    B5     0210  1630 50$:     TSTW    (R1)[R5]                 ; Touch possible memory CSR.
                  64    D6     0213  1631          INCL    (R4)                     ; Count number of error bits set.
             86   6145    3E     0215  1632          MOVAW   (R1)[R5],(R6)+           ; Save address of this CSR
          F3 55    10    F2     0219  1633 60$:     AOBLSS  #16,R5,50$               ; Loop through all possible CSRs.
                  09    11     021D  1634          BRB     70$                      ; Continue with common code.
                                021F  1635 ;
                                021F  1636 ; TEMPORARY MACHINE CHECK HANDLER
                                021F  1637 ;
                                021F  1638
                                021F  1639          .ALIGN  LONG                     ; Align machine-check vector.
                                0220  1640 MCHK_HANDLER:                         ;
                                0220  1641
             26    0F    DA     0220  1642          MTPR    #^XF,#PRUV1$_MCESR       ; Clear machine-check state.
          5E    50    D0     0223  1643          MOVL    R0,SP                    ; Clean mcheck frame from stack.
                F1    11     0226  1644          BRB     60$                      ; Continue looking for memory CSRs.
                                0228  1645
             04 A3 8ED0     0228  1646 70$:     POPL    4(R3)                    ; Restore mcheck handler address.
                                022C  1647
```

```
                                022C  1648          .DISABLE LSB
                     56   62    D0  022C  1661          MOVL    ADP$L_CSR(R2),R6        ; Pick up adapter pointer
                          51    D4  022F  1662          CLRL    R1                      ; Zero out number of UMR to disable
                0256 C2   51    B0  0231  1686          MOVW    R1,ADP$W_UMR_DIS(R2)    ; Record number disabled
                                    0236  1700 ;
                                    0236  1701 ; Initialize fields for the Qbus map register allocation.  Since there
                                    0236  1702 ; are no map registers for the Micro-VAX I Qbus, initialize the data structures
                                    0236  1703 ; so that the standard allocate routine will just return an error.
                                    0236  1704 ;
                      5C A2   01    D0  0236  1705          MOVL    #1,ADP$L_MRACTMDRS(R2)  ; 1 active map descriptor
          64 A2    01F0 8F    51    A3  023A  1706          SUBW3   R1,#496,ADP$W_MRNREGARY(R2);  for a range of 496 registers
                                    0241  1707 ;           CLRL    ADP$L_MRACTMDRS(R2)     ; No active descripters.
                                    0241  1708 ;           CLRL    ADP$W_MRNREGARY(R2)     ; No registers to allocate,
                0015E C2   51    B0  0241  1710          MOVW    R1,ADP$W_MRFREGARY(R2)  ;  starting at register zero.
                      62 A2   01    AE  0246  1711          MNEGW   #1,ADP$W_MRNFENCE(R2)   ; Also init "fences" which preceed
                0015C C2   01    AE  024A  1712          MNEGW   #1,ADP$W_MRFFENCE(R2)   ;  the two descriptor arrays.
                                    024F  1713 ;
                                    024F  1714 ; Initialize adapter hardware.
                                    024F  1715 ;
                     54   62    D0  024F  1716          MOVL    ADP$L_CSR(R2),R4        ; Get CSR address to init
                        FDAB'   30  0252  1717          BSBW    UBA$INITIAL             ; And initialize adapter
                     01FF 8F    BA  0255  1718          POPR    #^M<R0,R1,R2,R3,R4,R5,R6,R7,R8> ; Restore registers
                                05  0259  1719          RSB                             ; Return
                                    025A  1720
                                    025A  1728
```

```
                     025A  1815          .SBTTL  INI$MBADP - BUILD ADP AND INITIALIZE MBA
                     025A  1816          .SBTTL  INI$DRADP - BUILD ADP AND INITIALIZE DR32
                     025A  1817          .SBTTL  INI$CIADP - BUILD ADP AND INITIALIZE CI
                     025A  1818 ;+
                     025A  1819 ; INI$MBADP IS CALLED AFTER MAPPING THE REGISTERS FOR A MASSBUS ADAPTER.
                     025A  1820 ; AN ADAPTER CONTROL BLOCK IS ALLOCATED AND FILLED.  A CRB AND IDB ARE
                     025A  1821 ; ALSO ALLOCATED AND INITIALIZED. THE ADAPTER HARDWARE IS THEN INITIALIZED
                     025A  1822 ; BY CALLING MBA$INITIAL.
                     025A  1823 ;
                     025A  1824 ; INI$DRADP IS CALLED AFTER MAPPING THE REGISTERS FOR THE DR32
                     025A  1825 ; ADAPTER.  THE ADAPTER CONTROL BLOCK, CRB, AND IDB ARE ALLOCATED
                     025A  1826 ; AND INITIALIZED.  THE ADAPTER HARDWARE IS THEN INITIALIZED BY
                     025A  1827 ; CALLING DR$INITIAL.
                     025A  1828 ;
                     025A  1829 ; INI$MBADP AND INI$DRADP SHARE COMMON CODE AFTER THE TABLE OF ADAPTER
                     025A  1830 ; SPECIFIC CONSTANTS IS SELECTED AND STORED IN R8.
                     025A  1831 ;
                     025A  1832 ; INPUT:
                     025A  1833 ;       R4 - nexus identification number of this adapter
                     025A  1834 ;       R11- offset from beginning of SCB to correct SCB page for this adapter
                     025A  1835 ;
                     025A  1836 ; OUTPUTS:
                     025A  1837 ;       ALL REGISTERS PRESERVED
                     025A  1838 ;-
                     025A  1839
00000000'GF    17    025A  1840 ALONPAGD:JMP    G^INI$ALONONPAGED
                     0260  1841
                     0260  1842          .ENABL  LSB
                     0260  1843
                     0260  1844 INI$DRADP:                                ; INITIALIZE DR32 DATA STRUCTURES
                     0260  1845
                     0260  1855
                     0260  1856 INI$CIADP:                                ; INITIALIZE CI DATA STRUCTURES
                     0260  1857
                     0260  1867
                     0260  1868 INI$MBADP:                                ; INIT MBA DATA STRUCTURES
                     0260  1869
```

```
                0260  1997          .SBTTL  INI$KDZ11
                0260  1998 ;++
                0260  1999 ;
                0260  2000 ; INPUTS:
                0260  2001 ;       R2 - VA of next free system page
                0260  2002 ;       R3 - VA of system page table entry to be used to map VA in R2
                0260  2003 ;       R4 - nexus identification number of this adapter
                0260  2004 ;
                0260  2005 ; OUTPUTS:
                0260  2006 ;
                0260  2007 ;--
                0260  2008
                0260  2009 INI$KDZ11:
                0260  2010
05              0260  2029          RSB                             ; Return to caller.
```

```
                                0261  2031          .SBTTL  INI$CONSOLE, init data structures for console
                                0261  2032 ;++
                                0261  2033 ; FUNCTIONAL DESCRIPTION:
                                0261  2034 ;
                                0261  2035 ;       This routine is executed only once, during system initialization.
                                0261  2036 ;       It initializes the CRB and IDB for boot/console device.
                                0261  2037 ;
                                0261  2038 ;       This routine is called from INIT.
                                0261  2039 ;
                                0261  2040 ; INPUTS:
                                0261  2041 ;
                                0261  2042 ;       R3 -->  DISK [CLASS] DRIVER DDB
                                0261  2043 ;       R4 -->  DISK [CLASS] DRIVER DPT
                                0261  2044 ;       R5 -->  DISK [CLASS] DRIVER UCB
                                0261  2045 ;       R6 -->  RPB
                                0261  2046 ;       R7 -->  ADP FOR EITHER A REAL DISK OR A PORT
                                0261  2047 ;       R9 -->  PORT DRIVER DPT (IF PRESENT)
                                0261  2048 ;       R10-->  PORT DIRVER UCB (IF PRESENT)
                                0261  2049 ;
                                0261  2050 ;--
                                0261  2051
                                0261  2052 INI$CONSOLE::
                                0261  2053          .ENABL  LSB
                                0261  2054
                                0261  2062
                                0261  2067
                                0261  2075
                                0261  2076 ;
                                0261  2077 ; NOW BUILD THE AUXILIARY DATA BLOCKS (CRB,IDB)
                                0261  2078 ;
                                0261  2079 BLD_CRB:
          58    10 A7    D0    0261  2080          MOVL    ADP$L_CRB(R7),R8         ; GET ADDRESS OF CRB IF IT EXISTS
          0E A7    01    B1    0265  2081          CMPW    #AT$_UBA,ADP$W_ADPTYPE(R7); IS THIS A UNIBUS ADAPTER?
                03    13    0269  2082          BEQL    FILL_CRB                 ; YES, ALLOCATE CRB
             005D    31    026B  2083          BRW     100$                     ; NO, CRB/IDB ALREADY ALLOCATED
                                026E  2084
                                026E  2085 FILL_CRB:
     00000000'9F    16    026E  2086          JSB     @#INI$ALLOC_CRB          ; GO ALLOCATE AND SETUP CRB
24 A2 9F163FBB 8F    D0    0274  2087          MOVL    #^X9F163FBB,CRB$L_INTD(R2) ; SET PUSHR #^M<R0,...R5>
                                027C  2088                                   ;  JSB @#0 INTO INTERRUPT DISPATCH
          38 A2    57    D0    027C  2089          MOVL    R7,CRB$L_INTD+VEC$L_ADP(R2)      ; SET POINTER TO ADP
             58    52    D0    0280  2090          MOVL    R2,R8                    ; SAVE CRB POINTER
        51    0058 8F    3C    0283  2091          MOVZWL  #<IDB$C_LENGTH+<8*4>>,R1; SIZE TO ALLOCATE FOR IDB
     00000000'9F    16    0288  2092          JSB     @#INI$ALONONPAGED        ; ALLOCATE IDB
          08 A2    51    B0    028E  2093          MOVW    R1,IDB$W_SIZE(R2)        ; SET SIZE OF IDB
          0A A2    09    90    0292  2094          MOVB    #DYN$C_IDB,IDB$B_TYPE(R2); AND STRUCTURE TYPE CODE
          2C A8    52    D0    0296  2095          MOVL    R2,CRB$L_INTD+VEC$L_IDB(R8) ; SET IDB INTO CRB
                                029A  2096
                                029A  2113
          62    58 A6    D0    029A  2114 10$:     MOVL    RPB$L_CSRVIR(R6), -      ; SAVE BOOT DEVICE CSR ADDRESS
                                029E  2115                   IDB$L_CSR(R2)          ; IN INTERRUPT DISPATCH BLOCK
                   11    91    029E  2116          CMPB    #BTD$K_UDA,-             ; LOW ORDER BYTE OF ORIGINAL R0 TELLS
                66 A6          02A0  2117                   RPB$B_DEVTYP(R6)       ;  BOOT DEVICE TYPE.
                   08    12    02A2  2118          BNEQ    20$                      ; IF NOT BOOTING FROM A UDA BRANCH
                                02A4  2119                                         ;  AROUND.
00000000'9F     58 A6    D0    02A4  2120          MOVL    RPB$L_CSRVIR(R6), -      ; COPY VIRTUAL ADDRESS OF UDA PORT CSR
                                02AC  2121                   @#BOO$GB_SYSTEMID      ;  TO LOW ORDER LONGWORD OF SYSTEMID
```

```
                          02AC  2122 20$:
      14 A2    57    D0   02AC  2123          MOVL    R7,IDB$L_ADP(R2)          ; POINT IDB TO ADP
      50   1E A6    3C   02B0  2124          MOVZWL  RPB$W_ROOBVEC(R6),R0      ; GET USER SPECIFIED VECTOR
             0A     12   02B4  2125          BNEQ    30$                       ; BRANCH IF VECTOR SPECIFIED
      50   66 A6    9A   02B6  2126          MOVZBL  RPB$B_DEVTYP(R6),R0       ; ELSE GET DEVICE TYPE CODE
   50   FFFE'CF40    3C   02BA  2127          MOVZWL  W^BOOTVECTOR-2[R0],R0     ; GET DEFAULT INTERRUPT VECTOR
    50   10 B740    9E   02C0  2128 30$:     MOVAB   @ADP$L_VECTOR(R7)[R0],R0  ; COMPUTE ADDRESS OF VECTOR
      60   26 A8    9E   02C5  2129          MOVAB   CRB$L_INTD+2(R8),(R0)     ; SET ADDR OF INTERRUPT VECTOR
                          02C9  2130
             60     D7   02C9  2133          DECL    (R0)                      ;  BACK TWO BYTES TO PUSHR, +1 TO
                          02CB  2136                                            ;
                          02CB  2137 100$:
                    05    02CB  2138          RSB                               ; RETURN
                          02CC  2139          .DISABLE LSB
```

```
                        02CC  2141          .SBTTL  EXE$INI_TIMWAIT - COMPUTE CORRECT TIMEWAIT LOOP VALUES
                        02CC  2142 ;++
                        02CC  2143 ; FUNCTIONAL DESCRIPTION:
                        02CC  2144 ;
                        02CC  2145 ; EXE$INI_TIMWAIT initializes EXE$GL_TENUSEC and EXE$GL_UBDELAY, cells used
                        02CC  2146 ; in the time-wait macros.  The first data cell, EXE$GL_TENUSEC, is the number
                        02CC  2147 ; of times the following loop will be executed in ten u-seconds.  This is
                        02CC  2148 ; done once here to calibrate the loop instead of reading the processor clock.
                        02CC  2149 ; The resulting number is used in the system macros TIMEWAIT and TIMEDWAIT.
                        02CC  2150 ;
                        02CC  2151 ; The first step is to initialize EXE$GL_UBDELAY.  If the bit test instruction
                        02CC  2152 ; in the TIMEWAIT macro is executed too rapidly in a loop, it can saturate the
                        02CC  2153 ; Unibus.  EXE$GL_UBDELAY is used to introduce a 3 microsecond delay loop into
                        02CC  2154 ; the TIMEWAIT bit test loop.
                        02CC  2155 ;
                        02CC  2156 ; This routine is called only once, from INIT.
                        02CC  2157 ;
                        02CC  2158 ; INPUT PARAMETERS:
                        02CC  2159 ;
                        02CC  2160 ;       NONE
                        02CC  2161 ;
                        02CC  2162 ; IMPLICIT INPUTS:
                        02CC  2163 ;
                        02CC  2164 ;       Time-of-day processor clock.
                        02CC  2165 ;       Interval timers.
                        02CC  2166 ;
                        02CC  2167 ; OUTPUT PARAMETERS:
                        02CC  2168 ;
                        02CC  2169 ;       R0 - Destroyed.
                        02CC  2170 ;
                        02CC  2171 ; IMPLICIT OUTPUTS:
                        02CC  2172 ;
                        02CC  2173 ;       EXE$GL_TENUSEC - set to appropriate value to make TIMEWAIT and TIMEDWAIT
                        02CC  2174 ;                        macros loop for 10 micro-seconds.
                        02CC  2175 ;
                        02CC  2176 ;       EXE$GL_UBDELAY - set to appropriate value to make TIMEWAIT and TIMEDWAIT
                        02CC  2177 ;                        macros loop for 3 micro-seconds in the unibus delay
                        02CC  2178 ;                        loop.
                        02CC  2179 ;
                        02CC  2180 ;--
                        02CC  2181
                        02CC  2182 EXE$INI_TIMWAIT::                            ; Initialize time-wait data cells
00000000'GF   01   9A   02CC  2294          MOVZBL  #1,G^EXE$GL_UBDELAY         ; Set UV1 value same as 11/730
00000000'GF   01   9A   02D3  2295          MOVZBL  #1,G^EXE$GL_TENUSEC         ; Set UV1 value same as 11/730
                   05   02DA  2296          RSB                                 ; Return
```

```
                     02DB  2299          .SBTTL  EXE$INIT_TODR  -  SET SYSTEM TIME TO CORRECT VALUE AT STARTUP
                     02DB  2300 ;++
                     02DB  2301 ; FUNCTIONAL DESCRIPTION:
                     02DB  2302 ;
                     02DB  2303 ;       EXE$INIT_TODR SOLICITS THE CORRECT TIME FROM THE OPERATOR IF NECESSARY,
                     02DB  2304 ;       CONVERTS THE ASCII RESPONSE TO BINARY FORMAT AND CALLS AN INTERNAL
                     02DB  2305 ;       ENTRY POINT OF THE $SETIME SYSTEM SERVICE TO SET THE NEW SYSTEM TIME
                     02DB  2306 ;       IN MEMORY WITHOUT MODIFYING THE CONTENTS OF THE SYSTEM DISK.
                     02DB  2307 ;
                     02DB  2308 ;       IF THE TIME WOULD NORMALLY BE SOLICITED FROM AN OPERATOR, BECAUSE
                     02DB  2309 ;       THE HARDWARE TIME OF YEAR CLOCK IS ZERO, THEN THE SYSGEN PARAMETER
                     02DB  2310 ;       "TPWAIT" IS CHECKED.  IF IT IS ZERO, THEN IT IS ASSUMED THAT NO
                     02DB  2311 ;       OPERATOR IS PRESENT AND THE SYSTEM IS BOOTED USING THE LAST TIME
                     02DB  2312 ;       RECORDED IN THE SYSTEM IMAGE.  IF THE PARAMETER IS NON ZERO THEN
                     02DB  2313 ;       THAT TIME IS USED AS THE MAXIMUM TIME TO WAIT BEFOR ASSUMING THAT
                     02DB  2314 ;       THERE IS NO OPERATOR AND BOOTING ANY WAY.  IF THE PARAMETER IS
                     02DB  2315 ;       NEGATIVE, THE SYSTEM WILL WAIT FOREVER.
                     02DB  2316 ;
                     02DB  2317 ;       THIS ROUTINE IS CALLED ONLY ONCE, FROM SYSINIT OR STASYSGEN.
                     02DB  2318 ;
                     02DB  2319 ; INPUT PARAMETERS:
                     02DB  2320 ;
                     02DB  2321 ;       NONE
                     02DB  2322 ;
                     02DB  2323 ; IMPLICIT INPUTS:
                     02DB  2324 ;
                     02DB  2325 ;       TIME-OF-DAY PROCESSOR CLOCK.
                     02DB  2326 ;
                     02DB  2327 ; OUTPUT PARAMETERS:
                     02DB  2328 ;
                     02DB  2329 ;       R0,R1 - DESTROYED
                     02DB  2330 ;
                     02DB  2331 ; IMPLICIT OUTPUTS:
                     02DB  2332 ;
                     02DB  2333 ;       EXE$GQ_SYSTIME - SET TO CURRENT TIME IN 100 NANOSECOND UNITS SINCE
                     02DB  2334 ;                        17-NOV-1858  00:00:00.
                     02DB  2335 ;
                     02DB  2336 ;--
                     02DB  2337
                     02DB  2338 ;
                     02DB  2339 ; Stack storage offsets:
                     02DB  2340 ;
                00000000  02DB  2341 TTCHAN  = ^X00                          ; CHANNEL FOR TERMINAL (LONGWORD)
                00000004  02DB  2342 TTNAME  = ^X04                          ; STRING DESCRIPTOR FOR OPERATOR'S TERM
                0000000C  02DB  2343 TMPDESC = ^X0C                          ; TEMPORY STRING DESCRIPTOR (QUADWORD)
                00000014  02DB  2344 INTIME  = ^X14                          ; INPUT TIME VALUE (QUADWORD)
                0000001C  02DB  2345 LINBUF  = ^X1C                          ; INPUT LINE BUFFER (5 LONGWORDS)
                00000014  02DB  2346 LINBUFSIZ = ^X14                        ;  (LENGTH OF LINE BUFFER IN BYTES)
                     02DB  2347
                     02DB  2348 ;
                     02DB  2349 ; PURE DATA
                     02DB  2350 ;
                     02DB  2351 TERM_NAMADR:
                30 41 50 4F  02DB  2352          .ASCII  \OPA0\              ; DEVICE NAME FOR OPERATOR'S TERMINAL
                00000004  02DF  2353 TERM_NAMSIZ = . - TERM_NAMADR
74 61 64 20 64 69 6C 61 76 6E 69 00'  02DF  2354 TIMERR: .ASCIC  \invalid date/time\     ;
                   65 6D 69 74 2F 65  02EB
```

```
                                 11  02DF
                                     02F1  2355 TIMEPROMPT:
                                 33' 02F1  2356          .BYTE   NPROMPT
54 4E 45 20 45 53 41 45 4C 50 0A 0D  02F2  2357          .ASCII  <13><10>/PLEASE ENTER DATE AND TIME (DD-MMM-YYYY  HH:MM)  /
20 44 4E 41 20 45 54 41 44 20 52 45  02FE
4D 4D 4D 2D 44 44 28 20 45 4D 49 54  030A
4D 4D 3A 48 48 20 20 59 59 59 59 2D  0316
                       20 20 29      0322
                   00000033          0325  2358 NPROMPT=.-TIMEPROMPT-1
                                     0325  2359
                                     0325  2360
                                     0325  2361 EXE$INIT_TODR::                            ; SET CORRECT TIME
                                     0325  2362          .ENABLE LSB
                 077C 8F    BB       0325  2363          PUSHR   #^M<R2,R3,R4,R5,R6,R8,R9,R10> ; SAVE REGISTERS
                   5E   30  C2       0329  2364          SUBL    #4*12,SP                    ; SCRATCH STORAGE
                   56   5E  D0       032C  2365          MOVL    SP,R6                       ; SAVE ADDRESS OF SCRATCH STORAGE
              04 A6     04  9A       032F  2366          MOVZBL  #TERM_NAMSIZ,TTNAME(R6) ; SET SIZE OF OPERATOR'S TERM NAME AND
           08 A6    FFA4 CF  9E       0333  2367          MOVAB   W^TERM_NAMADR,TTNAME+4(R6) ;  PIC ADDRESS INTO TERM NAME DESC
        08 00000000'GF  00'  E0       0339  2368          BBS     S^#EXE$V_SETTIME,G^EXE$GL_FLAGS,READTIME ; BR TO SOLICIT TIME
                                     0341  2369
                                     0341  2370
                                     0341  2374
                                     0341  2378
                                     0341  2382
                                     0341  2386
                    06   11         0341  2394          BRB     READTIME                    ; ON MICROVAX I, ALWAYS SOLICIT TIME
                 14 A6   7C         0343  2396 5$:       CLRQ    INTIME(R6)                  ; NULL ARGUMENT FOR EXE$SETIME_INT
                  00C5   31         0346  2397          BRW     200$                        ; RETURN TO CALLER
                                     0349  2398
                                     0349  2399 READTIME:                                   ; SOLICIT TIME
                   59   D4         0349  2400          CLRL    R9                          ; CLEAR A FLAG
              58   00000000'GF   32  034B  2401          CVTWL   G^SGN$GW_TPWAIT,R8          ; PICK UP TIMEOUT WAIT INTERVAL
                   12   14         0352  2402          BGTR    8$                          ; POSITIVE, WAIT THAT PERIOD ONCE
                   0B   19         0354  2403          BLSS    7$                          ; NEGATIVE IS WAIT FOREVER
                                     0356  2404 6$:
                                     0356  2408
                                     0356  2412
                                     0356  2416
                                     0356  2420
                                     0356  2424
                                     0356  2428
          14 A6     00000000'GF   7D  0356  2430          MOVQ    G^EXE$GQ_TODCBASE,INTIME(R6) ; USE LAST KNOWN SYSTEM TIME
                       00AD      31  035E  2431          BRW     200$                        ; IF THE USER REQUESTS NO PROMPTING
                                     0361  2433
                   58   14         D0  0361  2434 7$:       MOVL    #20,R8                      ; STARTING WAIT
                        59         D6  0364  2435          INCL    R9                          ; NEGATIVE - WAIT FOREVER
                                     0366  2436 8$:       $ASSIGN_S       TTNAME(R6),TTCHAN(R6) ; AND ASSIGN TO INPUT DEVICE
                     DF 50         E9  0374  2437          BLBC    R0,6$                       ; ERROR - FALL BACK TO STORED TIME
                52   FF76 CF       9E  0377  2438 10$:      MOVAB   W^TIMEPROMPT,R2             ; GET ADDRESS OF PROMPT STRING
                   53   82         9A  037C  2439          MOVZBL  (R2)+,R3                    ; AND LENGTH
                                     037F  2440          $QIOW_S #0,W^TTCHAN(R6),-           ; PROMPT AND READ TIME
                                     037F  2441                  #<IO$_READPROMPT!IO$M_PURGE!IO$M_TIMED!IO$M_CVTLOW>,-
                                     037F  2442                  TMPDESC(R6),,-              ;  I/O STATUS BLOCK, NO AST OR PARAM
                                     037F  2443                  LINBUF(R6),#LINBUFSIZ,-     ;  BUFFER ADDRESS AND SIZE
                                     037F  2444                  R8,#0,-                     ;  TIME OUT
                                     037F  2445                  R2,R3                       ;  PROMPT ADDRESS AND SIZE
                    AF 50         E9  03A4  2446          BLBC    R0,6$                       ; ERROR - FALL BACK TO STORED TIME
```

```
                54    0C A6   7D   03A7  2447          MOVQ    TMPDESC(R6),R4          ; GET COMPLETION STATUS
                      0D 54   E8   03AB  2448          BLBS    R4,20$                  ; CONTINUE IF SUCCESSFUL READ
                      A5 59   E9   03AE  2449          BLBC    R9,6$                   ; FAILED ON ONE-TIME READ, RETURN
             58    01 A848   9E   03B1  2450          MOVAB   1(R8)[R8],R8            ; (2 * TIMEOUT) + 1
                58    58     3C   03B6  2451          MOVZWL  R8,R8                   ; BOUND TIMEOUT
                      BC     11   03B9  2452          BRB     10$                     ; TRY AGAIN FOR TIME
                                  03BB  2453 20$:                                    ; SOMETHING WAS INPUT
          0C A6    0E A6   3C   03BB  2454          MOVZWL  TMPDESC+2(R6),TMPDESC(R6) ; FORM DESCRIPTOR FOR BUFFER
          10 A6    1C A6   9E   03C0  2455          MOVAB   LINBUF(R6),TMPDESC+4(R6) ; SET DESCRIPTOR ADDRESS
                                  03C5  2456          $BINTIM_S TMPDESC(R6),INTIME(R6) ; CONVERT TO BINARY TIME
                   05 50   E9   03D2  2457          BLBC    R0,89$                  ; INVALID TIME
                   18 A6   D5   03D5  2458          TSTL    INTIME+4(R6)            ; CHECK FOR DELTA TIME
                      2A   14   03D8  2459          BGTR    100$                    ; BRANCH IF NOT - OK
                                  03DA  2460 89$:                                    ; INVALID TIME VALUE INPUT
                52  FF01 CF   9E   03DA  2461          MOVAB   W^TIMERR,R2             ; ADDRESS OF ERROR MESSAGE
                53    82   9A   03DF  2462          MOVZBL  (R2)+,R3                ; GET STRING LENGTH
                                  03E2  2463          $QIOW_S #0,TTCHAN(R6),-         ; GIVE ERROR MESSAGE
                                  03E2  2464                  #IO$_WRITEVBLK,-
                                  03E2  2465                  ,,,-                    ;  NO I/O STATUS,AST OR AST PARAM
                                  03E2  2466                  (R2),R3 ,-              ;  BUFFER ADDRESS, LENGTH
                                  03E2  2467                  #0,#32                  ;  SET CARRIAGE CONTROL TO CR/LF
                      FF73   31   0401  2468          BRW     10$                     ; AND TRY AGAIN
                                  0404  2469 100$:                                   ; EXIT
                                  0404  2470          $DASSGN_S TTCHAN(R6)            ; DE-ASSIGN TERMINAL CHANNEL
                   14 A6    7F   040E  2471 200$:    PUSHAQ  INTIME(R6)              ; SET NEW SYSTEM TIME
          00000000'GF    01   FB   0411  2472          CALLS   #1,G^EXE$SETIME_INT     ; USE TODR CLOCK TO SET SYSTEM TIME
00000000'GF  00000000'GF   7D   0418  2473          MOVQ    G^EXE$GQ_TODCBASE,G^EXE$GQ_BOOTTIME ; SAVE BOOT TIME
                5E    30   C0   0423  2474          ADDL    #12*4,SP                ; CLEAN OFF SCRATCH STORAGE
                077C  8F   BA   0426  2475          POPR    #^M<R2,R3,R4,R5,R6,R8,R9,R10> ; RESTORE REGISTERS
                                  042A  2476
                                  042A  2477 ;
                                  042A  2478 ; Fall through into the deallocate logic.
                                  042A  2479 ;
                                  042A  2480 ;        RSB                             ; *** This goes in if another piece of
                                  042A  2481                                          ; *** initialization code is added that
                                  042A  2482                                          ; *** is executed after EXE$INI_TIMWAIT.
                                  042A  2483          .DISABLE LSB
                                  042A  2484
```

```
                                042A  2486 DEAL_INIT_CODE:                          ; DEALLOCATE THE INITIALIZATION CODE
                                042A  2487 ;
                                042A  2488 ; It is the duty of the last-executed, loadable initialization
                                042A  2489 ; routine to make itself and all other such routines disappear, i.e.,
                                042A  2490 ; release the space they occupy to non-paged pool.  Each routine's vector
                                042A  2491 ; must be disconnected, e.g., be made to point to the symbol, EXE$LOAD_ERROR.
                                042A  2492 ;
                                042A  2493 ; NOTE:  This means that new initialization routines should be added
                                042A  2494 ;        to this module in a particular order, not necessarily at the
                                042A  2495 ;        end of the module!
                                042A  2496 ;
                                042A  2497         .ENABLE LSB
                      7E   52   7D  042A  2498         MOVQ    R2,-(SP)               ; Save some registers
                                042D  2499
                                042D  2500 ;
                                042D  2501 ; First find the vectors that point to these initialization routines
                                042D  2502 ; and reset them to point to EXE$LOAD_ERROR.
                                042D  2503 ;
                 50    0000'CF   9E  042D  2504         MOVAB   W^SYSL$BEGIN,R0        ; Compute bounds of releasable piece:
              51 50    00000000'8F   C1  0432  2505         ADDL3   #<STAY_HEADER-SYSL$BEGIN>,R0,R1 ; starting and ending addresses.
                 52    00000000'GF   9E  043A  2506         MOVAB   G^EXE$AL_LOAVEC,R2     ; Get starting address of vectors.
                 53    00000000'GF   9E  0441  2507         MOVAB   G^EXE$LOAD_ERROR,R3    ; Get end of vectors.
                    9F17 8F    62   B1  0448  2508 10$:     CMPW    (R2),#^X9F17           ; Is this JMP @# ?
                                1B   13  044D  2509         BEQL    30$                    ; Br if yes, skip past it.
                       80 8F    03   A2  044F  2510         CMPB    3(R2),#^X80            ; Is this a system space address
                                16   12  0454  2511         BNEQ    40$                    ; Br if no, assume it's a HALT instr.
                             50   62   D1  0456  2512         CMPL    (R2),R0                ; Is address before the releasable
                                0C   1F  0459  2513         BLSSU   20$                    ;  piece of memory?  Br on yes.
                             51   62   D1  045B  2514         CMPL    (R2),R1                ; Is address after the releasable
                                07   1A  045E  2515         BGTRU   20$                    ;  piece of memory?  Br on yes.
                62    00000000'GF   9E  0460  2516         MOVAB   G^EXE$LOAD_ERROR,(R2)  ; Reset this vector.
                          52   02   C0  0467  2517 20$:     ADDL    #2,R2                  ; Point past this vector.
                          52   D6  046A  2518 30$:     INCL    R2                     ; Come here to point past JMP @#.
                          52   D6  046C  2519 40$:     INCL    R2                     ; Come here to point past HALT.
                          53   52   D1  046E  2520         CMPL    R2,R3                  ; Past the end of the vectors?
                               D5   1F  0471  2521         BLSSU   10$                    ; Keep searching vectors.
                                    0473  2522 ;
                                    0473  2523 ; Now release the memory to non-paged pool.
                                    0473  2524 ;
                    50    0000'CF   9E  0473  2525         MOVAB   W^SYSL$BEGIN,R0        ; Point to start of module
                    51    0000'8F   3C  0478  2526         MOVZWL  #<STAY_HEADER-SYSL$BEGIN>,R1 ; Length to vaporize
                             FB8C'  31  047D  2527         BRW     50$                    ; Br to code that is not released.
                                    0480  2528
                                00000000  2529         .PSECT  $$$INIT__END,PAGE      ; 'PAGE' SINCE 16-BYTE ALIGN IS NOT
                                    0000  2530
                                    0000  2531 STAY_HEADER:
                    00000000 00000000     0000  2532         .LONG   0,0
                                  0000'   0008  2533         .WORD   <SYSL$END-STAY_HEADER>
                                      62  000A  2534         .BYTE   DYN$C_LOADCODE
                                      00  000B  2535         .BYTE   0
                                    000C  2536
                 00000000'9F      16   000C  2537 50$:     JSB     @#EXE$DEANONPGDSIZ     ; Just the smile on the Chesire cat
                          52   8E   7D  0012  2538         MOVQ    (SP)+,R2               ; Restore
                                    05  0015  2539         RSB                            ; Return.
                                    0016  2540
                                    0016  2541         .DISABLE LSB
                                    0016  2542         .END
```

```
$$$VMSDEFINED                = 00000001
$$T1                         = 00000001
ADAPTERS                       00000000 R      02
ADP$B_TYPE                   = 0000000A
ADP$C_UBAADPLEN              = 00000258
ADP$L_CRB                    = 00000010
ADP$L_CSR                    = 00000000
ADP$L_DPQFL                  = 00000014
ADP$L_LINK                   = 00000004
ADP$L_MRACTMDRS              = 0000005C
ADP$L_MRQFL                  = 00000030
ADP$L_VECTOR                 = 00000010
ADP$W_ADPTYPE                = 0000000E
ADP$W_DPBITMAP               = 00000060
ADP$W_MRFENCE                = 0000015C
ADP$W_MRFREGARY              = 0000015E
ADP$W_MRNFENCE               = 00000062
ADP$W_MRNREGARY              = 00000064
ADP$W_SIZE                   = 00000008
ADP$W_TR                     = 0000000C
ADP$W_UMR_DIS                = 00000256
ADPLINK                        ********   X    09
ALONPAGD                       0000025A R      09
AT$_UBA                      = 00000001
BI_BUS_CODE                  = 80000000
BI_CPU                       = 00000000
BI_CSR_LEN                   = 00000002
BI_LIKE                      = 00000000
BLD_CRB                        00000261 R      09
BOO$GB_SYSTEMID                ********   X    09
BOO$GL_SPTFREH                 ********   X    09
BOO$GL_SPTFREL                 ********   X    09
BOOTVECTOR                     00000000 R      08
BTD$K_UDA                    = 00000011
BUS_CODE_OFFSET              = FFFFFFFC
BUS_CSR_LEN                    00000004 R      08
CONFIG_IOSPACE                 00000059 R      09
CONFREG                        00000020 R      08
CONFREGL                       00000160 R      08
CPU_ADPSIZE                    0000000D R      08
CPU_TYPE                     = 00000007
CR                           = 0000000D
CRB$L_INTD                   = 00000024
CREATE_ARRAYS                  000000CA R      09
CSR_LEN_OFFSET               = FFFFFFFB
DEAL_INIT_CODE                 0000042A R      09
DIRECT_VEC_NODE_CNT            00000009 R      08
DYN$C_ADP                    = 00000001
DYN$C_CONF                   = 00000007
DYN$C_IDB                    = 00000009
DYN$C_INIT                   = 00000063
DYN$C_LOADCODE               = 00000062
END_NEXUS                      000000C7 R      09
ERROR_HALT                     00000149 R      09
ERROR_HALT_1                   0000014E R      09
EXE$AL_LOAVEC                  ********   X    09
EXE$AL_MEMCSRS                 ********   X    09
EXE$DEANONPGDSIZ               ********   X    0A
EXE$GL_CONFREG                 ********   X    09
EXE$GL_CONFREGL                ********   X    09
EXE$GL_FLAGS                   ********   X    09
EXE$GL_NUMNEXUS                ********   X    09
EXE$GL_RPB                     ********   X    09
EXE$GL_SCB                     ********   X    09
EXE$GL_TENUSEC                 ********   X    09
EXE$GL_UBDELAY                 ********   X    09
EXE$GQ_BOOTTIME                ********   X    09
EXE$GQ_TODCBASE                ********   X    09
EXE$INIT_TODR                  00000325 RG     09
EXE$INI_TIMWAIT                000002CC RG     09
EXE$LOAD_ERROR                 ********     X  09
EXE$OUTZSTRING                 ********     X  09
EXE$SETIME_INT                 ********     X  09
EXE$V_SETTIME                  ********     X  09
FILL_CRB                       0000026E R      09
GET_GEN_TYPE                   0000006B R      09
GET_TYPE                       00000068 R      09
IDB$B_TYPE                   = 0000000A
IDB$C_LENGTH                 = 00000038
IDB$L_ADP                    = 00000014
IDB$L_CSR                    = 00000000
IDB$W_SIZE                   = 00000008
INI$ALLOC_CRB                  ********   X    09
INI$ALONONPAGED                ********   X    09
INI$CIADP                      00000260 R      09
INI$CONSOLE                    00000261 RG     09
INI$DRADP                      00000260 R      09
INI$IOMAP                      00000000 RG     09
INI$KDZ11                      00000260 R      09
INI$MBADP                      00000260 R      09
INI$MPMADP                     ********     X  06
INI$UBADP                      00000174 R      09
INI$UBSPACE                    00000157 R      09
INIT_ROUTINES                  00000000 R      06
INTIME                       = 00000014
IO$M_CVTLOW                    ********   X    09
IO$M_PURGE                     ********   X    09
IO$M_TIMED                     ********   X    09
IO$_READPROMPT                 ********   X    09
IO$_WRITEVBLK                  ********   X    09
IOUV1$AL_QBOSP               = 20000000
LF                           = 0000000A
LINBUF                       = 0000001C
LINBUFSIZ                    = 00000014
MAP_NEXUS                      000000A6 R      09
MAP_PAGES                      00000123 R      09
MAXNEXUS                     = 00000040
MCHK_HANDLER                   00000220 R      09
MMG$GL_SBICONF                 ********   X    09
MMG$GL_SPTBASE                 ********   X    09
NDT$_BDA                     = 80000102
NDT$_CI                      = 00000038
NDT$_DR32                    = 00000030
NDT$_KDZ11                   = 80000105
```

```
NDT$_MB                         = 00000020
NDT$_MEM1664NI                  = 00000012
NDT$_MEM16I                     = 00000011
NDT$_MEM16NI                    = 00000010
NDT$_MEM256EIL                  = 00000071
NDT$_MEM256EIU                  = 00000073
NDT$_MEM256I                    = 00000074
NDT$_MEM256NIL                  = 00000070
NDT$_MEM256NIU                  = 00000072
NDT$_MEM4I                      = 00000009
NDT$_MEM4NI                     = 00000008
NDT$_MEM64EIL                   = 00000069
NDT$_MEM64EIU                   = 0000006B
NDT$_MEM64I                     = 0000006C
NDT$_MEM64NIL                   = 00000068
NDT$_MEM64NIU                   = 0000006A
NDT$_MPM0                       = 00000040
NDT$_MPM1                       = 00000041
NDT$_MPM2                       = 00000042
NDT$_MPM3                       = 00000043
NDT$_SCORMEM                    = 80000001
NDT$_UB0                        = 00000028
NDT$_UB1                        = 00000029
NDT$_UB2                        = 0000002A
NDT$_UB3                        = 0000002B
NEXUSDESC                         00000014 R      08
NOSPT                             00000260 R      08
NPROMPT                         = 00000033
NUMUBAVEC                       = 00000080
NUM_PAGES                         00000000 R      04
NXT_NEXUS                         00000065 R      09
PA                              = 20000000
PR$_SID_TYP730                  = 00000003
PR$_SID_TYP750                  = 00000002
PR$_SID_TYP780                  = 00000001
PR$_SID_TYP790                  = 00000004
PR$_SID_TYP8NN                  = 00000006
PR$_SID_TYP8SS                  = 00000005
PR$_SID_TYPUV1                  = 00000007
PRUV1$_MCESR                    = 00000026
PTE$C_RW                        = 10000000
PTE$M_VALID                     = 80000000
READTIME                          00000349 R      09
RPB$B_DEVTYP                    = 00000066
RPB$L_ADPVIR                    = 00000060
RPB$L_BOOTR1                    = 00000020
RPB$L_CSRPHY                    = 00000054
RPB$L_CSRVIR                    = 00000058
RPB$W_ROUBVEC                   = 0000001E
SBICONF                           00000060 R      08
SBI_BUS_CODE                    = 00000000
SBI_CPU                         = 00000000
SBI_CSR_LEN                     = 00000001
SBI_LIKE                        = 00000001
SGN$GW_TPWAIT                     ********   X    09
STAY_HEADER                       00000000 R      0A
SW_BUS_CODE                       00000005 R      08
SYS$ASSIGN                        ********  GX    09
SYS$BINTIM                        ********  GX    09
SYS$DASSGN                        ********  GX    09
SYS$QIOW                          ********  GX    09
SYSL$BEGIN                        ********   X    09
SYSL$END                          ********   X    0A
TERM_NAMADR                       000002DB R       09
TERM_NAMSIZ                     = 00000004
TIMEPROMPT                        000002F1 R       09
TIMERR                            000002DF R       09
TMPDESC                         = 0000000C
TTCHAN                          = 00000000
TTNAME                          = 00000004
UBA$INITIAL                       ********   X    09
UBA$INTO                          ********   X    09
UBA$UNEXINT                       ********   X    09
VA$M_SYSTEM                     = 80000000
VEC$L_ADP                       = 00000014
VEC$L_IDB                       = 00000008
```

Psect synopsis

PSECT name	Allocation	PSECT No.	Attributes
. ABS .	00000000 (0.)	00 (0.)	NOPIC USR CON ABS LCL NOSHR NOEXE NORD NOWRT NOVEC BYTE
ABS	00000000 (0.)	01 (1.)	NOPIC USR CON ABS LCL NOSHR EXE RD WRT NOVEC BYTE
$$$INIT$DATA0	00000074 (116.)	02 (2.)	NOPIC USR CON REL LCL NOSHR EXE RD WRT NOVEC BYTE
$$$INIT$DATA1	00000000 (0.)	03 (3.)	NOPIC USR CON REL LCL NOSHR EXE RD WRT NOVEC BYTE
$$$INIT$DATA2	0000003A (58.)	04 (4.)	NOPIC USR CON REL LCL NOSHR EXE RD WRT NOVEC BYTE
$$$INIT$DATA3	00000000 (0.)	05 (5.)	NOPIC USR CON REL LCL NOSHR EXE RD WRT NOVEC BYTE
$$$INIT$DATA4	00000074 (116.)	06 (6.)	NOPIC USR CON REL LCL NOSHR EXE RD WRT NOVEC BYTE
$$$INIT$DATA5	00000000 (0.)	07 (7.)	NOPIC USR CON REL LCL NOSHR EXE RD WRT NOVEC BYTE
$$$INIT$DATA	00000289 (649.)	08 (8.)	NOPIC USR CON REL LCL NOSHR EXE RD WRT NOVEC LONG
$$$INIT$CODE	00000480 (1152.)	09 (9.)	NOPIC USR CON REL LCL NOSHR EXE RD WRT NOVEC QUAD
$$$INIT__END	00000016 (22.)	0A (10.)	NOPIC USR CON REL LCL NOSHR EXE RD WRT NOVEC PAGE

Performance indicators

Phase	Page faults	CPU Time	Elapsed Time
Initialization	35	00:00:00.06	00:00:01.64
Command processing	141	00:00:00.45	00:00:03.20
Pass 1	507	00:00:12.82	00:00:47.78
Symbol table sort	0	00:00:01.65	00:00:06.88
Pass 2	234	00:00:03.78	00:00:17.39
Symbol table output	24	00:00:00.13	00:00:00.82
Psect synopsis output	4	00:00:00.03	00:00:00.03
Cross-reference output	0	00:00:00.00	00:00:00.00
Assembler run totals	947	00:00:18.92	00:01:17.74

The working set limit was 2100 pages.
132724 bytes (260 pages) of virtual memory were used to buffer the intermediate code.
There were 90 pages of symbol table space allocated to hold 1600 non-local and 24 local symbols.
2546 source lines were read in Pass 1, producing 36 object records in Pass 2.
42 pages of virtual memory were used to define 40 macros.

Macro library statistics

Macro library name	Macros defined
_255DUA28:[SYS.OBJ]LIB.MLB;1	19
_255DUA28:[SYSLIB]STARLET.MLB;2	14
TOTALS (all libraries)	33

1745 GETS were required to define 33 macros.

There were no errors, warnings or information messages.

```
MACRO/LIS=LIS$:INIADPUV1/OBJ=OBJ$:INIADPUV1 MSRC$:CPUSWUV1/UPDATE=(ENH$:CPUSWUV1)+MSRC$:INIADP/UPDATE=(ENH$:INIADP)+EXECML$/LIB
```

INIADP750
LIS

INIADP730
LIS

INIADP780
LIS

INIADPUVI
LIS

INIADP790
LIS

LIOSUB750
LIS

MCHECKUV1
LIS

MCHECK730
LIS

MCHECK750
LIS

LIOSUB730
LIS

LIOSUB790
LIS

MCHECK780
LIS

MCF790
LIS

MCHECK790
LIS

LIOSUB780
LIS

LIOSUBUV1
LIS