L 5

```
   SSSSSSSSSSSS  YYY         YYY     SSSSSSSSSSSS  LLL                 OOOOOOOOO        AAAAAAAAA
   SSSSSSSSSSSS  YYY         YYY     SSSSSSSSSSSS  LLL                 OOOOOOOOO        AAAAAAAAA
   SSSSSSSSSSSS  YYY         YYY     SSSSSSSSSSSS  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
SSSSSSSSSSSS           YYY        SSSSSSSSSSSS     LLLLLLLLLLLLLLL     OOOOOOOOO     AAA         AAA
SSSSSSSSSSSS           YYY        SSSSSSSSSSSS     LLLLLLLLLLLLLLL     OOOOOOOOO     AAA         AAA
SSSSSSSSSSSS           YYY        SSSSSSSSSSSS     LLLLLLLLLLLLLLL     OOOOOOOOO     AAA         AAA
```

```
_$2

Sym
---
SS$
SS$

SS$
SS$
SS$
SS$
SS$
SS$
SYS
SYS
SYS
TRY
UNL
WRI
```

```
**FILE**ID**INIADP790                                   K 10



  IIIIII    NN      NN    IIIIII      AAAAAA    DDDDDDDD    PPPPPPPP    77777777      999999      000000
  IIIIII    NN      NN    IIIIII      AAAAAA    DDDDDDDD    PPPPPPPP    77777777      999999      000000
    II      NN      NN      II      AA      AA  DD      DD  PP      PP          77  99      99  00      00
    II      NN      NN      II      AA      AA  DD      DD  PP      PP          77  99      99  00      00
    II      NNNN    NN      II      AA      AA  DD      DD  PP      PP          77  99      99  00    0000
    II      NNNN    NN      II      AA      AA  DD      DD  PP      PP          77  99      99  00    0000
    II      NN  NN  NN      II      AA      AA  DD      DD  PPPPPPPP          77      99999999  00  00  00
    II      NN  NN  NN      II      AA      AA  DD      DD  PPPPPPPP          77      99999999  00  00  00
    II      NN    NNNN      II      AAAAAAAAAA  DD      DD  PP                77              99  0000    00
    II      NN    NNNN      II      AAAAAAAAAA  DD      DD  PP                77              99  0000    00
    II      NN      NN      II      AA      AA  DD      DD  PP              77                99  00      00    ....
    II      NN      NN      II      AA      AA  DD      DD  PP              77                99  00      00    ....
  IIIIII    NN      NN    IIIIII    AA      AA  DDDDDDDD    PP          77              999999      000000      ....
  IIIIII    NN      NN    IIIIII    AA      AA  DDDDDDDD    PP          77              999999      000000      ....


LL            IIIIII      SSSSSSSS
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
```

Table of contents

```
0000            .NLIST  CND
0000
0000
0000
0000            .TITLE  INIADP790 - ADAPTER INITIALIZATION FOR VAX 11/790
0000
0000
0000
0000            .IDENT  'V04-002'
0000      ;
0000      ;****************************************************************************
0000      ;*                                                                          *
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0000      ;*                                                                          *
0000      ;*                                                                          *
0000      ;****************************************************************************
0000      ;
0000      ; Facility: System bootstrapping and initialization
0000      ;
0000      ; Abstract: This module contains initialization routines that are loaded
0000      ;           during system initialization (rather than linked into the system).
0000      ;
0000      ; Environment: Mode = KERNEL, Executing on INTERRUPT stack, IPL=31
0000      ;
0000      ; Author:  Trudy C. Matthews             Creation date: 22-Jan-1981
0000      ;
0000      ; Modification history:
0000      ;
0000      ;       V04-002 TCM0013         Trudy C. Matthews       10-Sep-1984
0000      ;               Add $BQODEF missing from TCM0012.
0000      ;
0000      ;       V04-001 TCM0012         Trudy C. Matthews       07-Sep-1984
0000      ;               For venus processor:  turn on cache before calibrating
0000      ;               TIMEDWAIT cells (routine EXE$INI_TIMWAIT).  Store the TIMEDWAIT
0000      ;               values calculated after cache is enabled in the boot driver's
0000      ;               TIMEDWAIT cells.  This is because the boot driver initially
0000      ;               has to run with cache off, but after booting will run with
0000      ;               cache on.
0000      ;
0000      ;       V03-024 TCM0011         Trudy C. Matthews       31-Jul-1984
0000      ;               Change venus's CRD interrupt vector back to ^X54 in the SCB,
0000  ;               and its SBIA Fail vector to ^X64.
0000  ;
0000  ;       V03-023 WMC0001         Wayne Cardoza           30-Jul-1984
0000  ;               Add H memory to 780 list.
0000  ;
0000  ;       V03-022 TCM0010         Trudy C. Matthews       25-Jul-1984
0000  ;               Fix a bug in INI$UBSPACE for the 11/790 that caused second
0000  ;               and subsequent unibus adapter spaces to be mapped incorrectly.
0000  ;               Fix bugs in INI$SCB for the 11/790.  Fix conditional
0000  ;               assembly flags in INI$CONSOLE for the 11/790.
0000  ;
0000  ;       V03-021 KDM0100         Kathleen D. Morse       01-May-1984
0000  ;               Correct address of memory CSRs to be past the 8 missing
0000  ;               Qbus adapter pages that do not exist.
0000  ;
0000  ;       V03-020 KDM0099         Kathleen D. Morse       27-Apr-1984
0000  ;               On a MicroVAX I, if the sysgen parameter TIMEDWAIT is set
0000  ;               to request no time-prompting, then use the last recorded
0000  ;               system time instead.  This is found in EXE$GQ_TODCBASE
0000  ;               which can be updated with a SET TIME command.
0000  ;
0000  ;       V03-019 RLRSCORPIO      Robert L. Rappaport     16-Mar-1984
0000  ;               Begin additions (to INI$IOMAP) for Scorpio support.
0000  ;               Also move ADAPDESC to SYSMAR.MAR, changing it to remove
0000  ;               the ADAP_GENERAL array.
0000  ;
0000  ;       V03-018 RLRINIADP       Robert Rappaport        28-Feb-1984
0000  ;               Add refinements to previous update that introduces
0000  ;               longword array CONFREG.  Mainly add logic to allow for
0000  ;               independently assembled invocations of ADAPDESC macro
0000  ;               to be linked into this code.  This provides possible
0000  ;               support of BI as a public bus, with user defined nodes.
0000  ;
0000  ;       V03-017 KPL0100         Peter Lieberwirth       30-Jan-1984
0000  ;               Implement first step towards a longword-array CONFREG to
0000  ;               replace current byte array CONFREG.  INIADP will construct
0000  ;               two confregs, CONFREG and CONFREGL.  CONFREGL will be
0000  ;               a longword array.  The high byte will be a VMS-bus
0000  ;               designation, and the low word will contain the 16-bit
0000  ;               device type.  The BI introduces 16 bit device types.
0000  ;
0000  ;               When all references to CONFREG have been modified to touch
0000  ;               CONFREGL, INIADP will be modified again to stop creating
0000  ;               the byte array.
0000  ;
0000  ;               While here, map 9 pages of CI register space, up from 8.
0000  ;
0000  ;       V03-016 KPL0001         Peter Lieberwirth       17-Jan-1984
0000  ;               Fix bug in V03-015 that caused a failure to boot on 750s.
0000  ;               Specifically, add NDT$_MEM1664NI to ADAPDESC macro.
0000  ;
0000  ;       V03-015 TCM0009         Trudy C. Matthews       12-Dec-1983
0000  ;               Add support for booting from VENUS console device to
0000  ;               INI$CONSOLE.  When mapping I/O space on VENUS, use the
0000  ;               PAMM to determine if any adaptors are present on the
0000  ;               ABUS.
0000  ;
```

```
0000  ;     V03-014 KDM0081          Kathleen D. Morse        13-Sep-1983
0000  ;             Create version for Micro-VAX I.
0000  ;
0000  ;     V03-013 DWT0126          David W. Thiel           30-Aug-1983
0000  ;             Modify EXE$INIT_TODR to set internal time without
0000  ;             modifying the contents of the system disk.
0000  ;
0000  ;     V03-012 KDM0062          Kathleen D. Morse        18-Jul-1983
0000  ;             Add loadable, cpu-dependent routine for initializing
0000  ;             the time-wait loop data cells, EXE$INI_TIMWAIT.
0000  ;
0000  ;     V03-011 KDM0057          Kathleen D. Morse        15-Jul-1983
0000  ;             Added loadable, cpu-dependent routine for initializing
0000  ;             the system time, EXE$INIT_TODR.
0000  ;
0000  ;     V03-010 KTA3071          Kerbey T. Altmann        12-Jul-1983
0000  ;             Include CPU-specific console init code.
0000  ;
0000  ;     V03-009 TCM0008          Trudy C. Matthews        10-Jan-1983
0000  ;             Change PSECT of 11/790 data that must stick around after
0000  ;             INIADP is deleted.  Build arrays ABUS_VA, ABUS_TYPE, and
0000  ;             ABUS_INDEX that describe the 11/790 ABUS configuration.
0000  ;
0000  ;     V03-008 MSH0002          Maryann Hinden           08-Dec-1982
0000  ;             Add powerfail support for DW750.
0000  ;
0000  ;     V03-007 ROW0142          Ralph O. Weber           24-NOV-1982
0000  ;             Change UBA interrupt services routines prototype so that
0000  ;             UBAERRADR is correctly computed as an offset from UBAINTBASE.
0000  ;
0000  ;     V03-006 TCM0007          Trudy C. Matthews        10-Nov-1982
0000  ;             Add 11/790-specific initialization of SCB.
0000  ;
0000  ;     V03-005 TCM0006          Trudy C. Matthews        8-Nov-1982
0000  ;             Initialize field ADP$L_AVECTOR with the address of
0000  ;             each adapter's first SCB vector.
0000  ;
0000  ;     V03-004 KTA3018          Kerbey T. Altmann        30-Oct-1982
0000  ;             Move from INILOA facility, rename from INITADP,
0000  ;             put in conditional assembly, rewrite some routines.
0000  ;
0000  ;     V03-003 MSH0001          Maryann Hinden           24-Sep-1982
0000  ;             Change EXE$DW780_INT to EXE$UBAERR_INT.
0000  ;
0000  ;     V03-002 TCM0005          Trudy C. Matthews        10-Aug-1982
0000  ;             Added support for 11/790 processor.
0000  ;
0000  ;     V03-001 KDM0002          Kathleen D. Morse        28-Jun-1982
0000  ;             Added $DCDEF.
0000  ;
0000  ;--
```

```
0000      ;
0000      ; MACRO LIBRARY CALLS
0000      ;
0000              $ADPDEF                         ; Define ADP offsets.
0000              $BIICDEF                        ; Define BIIC offsets.
0000              $BQODEF                         ; Define boot vector offsets.
0000              $BTDDEF                         ; Define boot devices
0000              $BUADEF                         ; Define BUA Register offsets.
0000              $CRBDEF                         ; Define CRB offsets.
0000              $DCDEF                          ; Define adapter types
0000              $DDBDEF                         ; Define DDB offsets
0000              $DYNDEF                         ; Define data structure type codes.
0000              $IDBDEF                         ; Define interrupt dispatcher offsets.
0000              $IO790DEF                       ; Define 11/790 I/O space.
0000              $PAMMDEF                        ; Define PAMM register fields.
0000              $SBIADEF                        ; Define SBI adapter register space.
0000              $MCHKDEF                        ; Define machine check masks.
0000              $NDTDEF                         ; Define nexus device types.
0000              $PRDEF                          ; Define IPR numbers.
0000
0000
0000
0000
0000              $PR790DEF                       ; Define 11/790 specific IPR numbers.
0000
0000
0000
0000              $PTEDEF                         ; Define Page Table Entry bits.
0000              $RPBDEF                         ; Define Restart Parameter Block fields.
0000              $UBADEF                         ; Define UBA register offsets.
0000              $UCBDEF                         ; Define UCB offsets.
0000              $VADEF                          ; Define virtual address fields.
0000              $VECDEF                         ; Define vec offsets.
```

```
0000          .SBTTL  Macros to describe nexus configurations
0000     ;
0000     ;        The macros FLOAT_NEXUS and FIXED_NEXUS add one or more entries to a
0000     ;        nexus descriptor table.  Each entry is of the form:
0000     ;
0000     ;                  +-------------------------------+
0000     ;                  !    PFN of nexus I/O space     !
0000     ;                  +-------+-------+---------------+
0000     ;                  !  bus  !   0   !     type      !
0000     ;                  +-------+-------+---------------+
0000     ;        type = 0 -> floating nexus
0000     ;        type = non-zero -> fixed nexus; type = fixed adapter type
0000     ;        bus  = 0, if SBI; %x80 if BI  (this is a VMS-only designation)
0000     ;
0000     ;
0000     ;        device_type:     SBI adapters have 8-bit device type codes.  These
0000     ;                         device types are simple integers.
0000     ;
0000     ;                         BI adapters have 16-bit device type codes, that are
0000     ;                         subject to the following interpretation:
0000     ;
0000     ;                         - the MSB of the device-type field will be 0 for DEC
0000     ;                         devices and 1 for non-DEC devices,
0000     ;
0000     ;                         - DEC memory devices will have 0s in the high-order
0000     ;                         byte of the device type,
0000     ;
0000     ;                         - non-DEC supplied memory devices will have a 1 in the
0000     ;                         MSB of the high-order byte, and the rest of the high
0000     ;                         order byte will contain 0s.
0000     ;
0000     ;                         - The "all 0s" and "all 1s" device-type codes are
0000     ;                         reserved for DEC.
0000     ;
0000     ; If SBI type codes were simply expanded to a word for purposes of the routines
0000     ; in this module, there would be possible conflicts between SBI devices and
0000     ; BI memory adapters supplied by DEC.  Voila:  the bus type.
0000     ;
0000     ; Macro FLOAT_NEXUS.
0000     ; INPUTS:
0000     ;        PHYSADR -- physical address of 1 or more contiguous floating nexus
0000     ;                   slots
0000     ;        NUMNEX -- number of contiguous floating nexuses, default = 1
0000     ;        PERNEX -- amount of address space per nexus (does not have to be
0000     ;                  specified if NUMNEX = 1)
0000     ;
0000              .MACRO  FLOAT_NEXUS      PHYSADR,NUMNEX=1,PERNEX=0
0000              PA = PHYSADR
0000              .REPEAT NUMNEX            ; For each nexus...
0000              .LONG   <PA/^X200>        ; Store PFN.
0000              .LONG   0                 ; Store floating nexus type.
0000              PA = PA + PERNEX          ; Increment to physical address of next nexus.
0000              .ENDR
0000              .ENDM   FLOAT_NEXUS
0000
0000     ;
0000     ; Macro FIXED_NEXUS.
0000     ;
```

```
            0000   ; INPUTS:
            0000   ;        PHYSADR - physical address of 1 or more contiguous fixed nexus slots
            0000   ;        PERNEX - amount of address space per nexus
            0000   ;        NEXUSTYPES - a list of fixed nexus types, enclosed in <>
            0000   ;
            0000            .MACRO  FIXED_NEXUS      PHYSADR,PERNEX=0,NEXUSTYPES
            0000            PA = PHYSADR
            0000            .IRP    TYPECODE,NEXUSTYPES       ; For each fixed nexus type...
            0000            .LONG   <PA/^X200>                ; Store PFN.
            0000            .LONG   TYPECODE                  ; Store fixed nexus type.
            0000            PA = PA + PERNEX                  ; Increment to address of next nexus.
            0000            .ENDR
            0000            .ENDM   FIXED_NEXUS
            0000
            0000   ;
            0000   ; Macro NEXUSDESC_TABLE - declare the beginning of a NEXUS descriptor table
            0000   ;
            0000   ;        1st byte in table (at offset -5 from label) contains length of
            0000   ;        adapter type code field in CSR's on this bus. [Note for SBI like
            0000   ;        busses, this is 1.]  The next longword (at offset -4) in the
            0000   ;        table contains the Software defined bus type byte defined in the
            0000   ;        high order byte of the longword.  [Note for SBI like busses, this
            0000   ;        value is 0, for the BI it is ^x80.]
            0000   ;
            0000
            0000   ; Define parameters that may be specified or used in macro invocation.
            0000
00000000    0000   BI_LIKE = 0                       ; BI like bus.
00000001    0000   SBI_LIKE = 1                      ; SBI like bus.
            0000
00000001    0000   SBI_CSR_LEN = 1                   ; Length of type code field in adapter CSR's
            0000                                     ;  on SBI, CMI, etc.
00000002    0000   BI_CSR_LEN  = 2                   ; Length of type code field in adapter CSR's
            0000                                     ;  on BI.
            0000
00000000    0000   SBI_BUS_CODE = 0                  ; Software defined bus code for SBI like busses.
80000000    0000   BI_BUS_CODE  = ^x80000000         ; Software defined bus code for the BI.
            0000
            0000            .MACRO  NEXUSDESC_TABLE LABEL,BUS_TYPE=SBI_LIKE
            0000            .IF     EQ,BUS_TYPE-SBI_LIKE
            0000                                     .BYTE   SBI_CSR_LEN
            0000                                     .LONG   SBI_BUS_CODE
            0000            .IFF
            0000                    .IF     EQ,BUS_TYPE-BI_LIKE
            0000                                     .BYTE   BI_CSR_LEN
            0000                                     .LONG   BI_BUS_CODE
            0000                    .IFF
            0000                                     .ERROR  ; UNRECOGNIZED BUS TYPE, NEXUSDESC_TABLE;
            0000                    .ENDC
            0000            .ENDC
            0000
            0000   LABEL:
            0000            .ENDM   NEXUSDESC_TABLE
            0000
FFFFFFFB    0000   CSR_LEN_OFFSET  = -5                        ; Offset before nexus descriptor of
            0000                                               ;  byte containing length of adapter
            0000                                               ;  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
```

```
            0000          .SBTTL  Adapter-specific data structures
            0000  ;
            0000  ; Put a symbol for arrays built by macros in the correct psects.
            0000  ;
            0000  ;****************** ADAPTERS array *************
    00000000          .PSECT  $$$INIT$DATA0
            0000  ADAPTERS:                               ; Build adapter type code arrays here.
            0000
    00000000          .PSECT  $$$INIT$DATA1               ; User contributions in this .PSECT.
            0000                                          ; End of ADAPTERS array.
            0000  ;****************** End of ADAPTERS array *************
            0000
            0000  ;****************** NUM_PAGES array *************
    00000000          .PSECT  $$$INIT$DATA2
            0000  NUM_PAGES:                              ; Build "number of pages to map" array.
    00000000          .PSECT  $$$INIT$DATA3               ; User contributions in this .PSECT.
            0000  ;****************** End of NUM_PAGESarray *************
            0000
            0000  ;****************** INIT_ROUTINES array *************
    00000000          .PSECT  $$$INIT$DATA4
            0000  INIT_ROUTINES:                          ; Build "address of init routine" array.
    00000000          .PSECT  $$$INIT$DATA5               ; User contributions in this .PSECT.
            0000  ;****************** End of INIT_ROUTINES array *************
            0000
            0000  ;
            0000  ; To add a new adapter type:
            0000  ;       1) Add a new ADAPDESC macro invocation to the end of this list.
            0000  ;
    00000000          .PSECT  $$$INIT$DATA,LONG
            0000
            0000  ;
            0000  ; Default interupt vectors for UNIBUS system devices
            0000  ; (This array is indexed by the RPB field RPB$B_DEVTYP, if the RPB field
            0000  ; RPB$W_ROUBVEC is zero.  If RPB$W_ROUBVEC is not zero, then RPB$W_ROUBVEC
            0000  ; is used and this array is not referenced at all.  RPB$W_ROUBVEC is set up
            0000  ; by PQDRIVER.  RPB$L_BOOTR0 is set by VMB to contain the device name in
            0000  ; ASCII, not the vector number and device type, as it does on full
            0000  ; architecture VAX machines.
            0000  ;
            0000  BOOTVECTOR:
    0088    0000          .WORD   ^X88                    ; RK06/7 Interrupt vector
    0070    0002          .WORD   ^X70                    ; RL01/2 Interrupt vector
            0004
            0004  BUS_CSR_LEN:                            ; Static byte containing the length (in bytes)
      00    0004          .BYTE   0                       ;  of the adapter type field in the CSR's of
            0005                                          ;  the bus currently being configured.  The
            0005                                          ;  proper value for the bus of interest is
            0005                                          ;  copied here, from the current nexus
            0005                                          ;  descriptor table, when we enter subroutine
            0005                                          ;  CONFIG_IOSPACE.
            0005
            0005  SW_BUS_CODE:                            ; Static longword containing the software
00000000    0005          .LONG   0                       ;  defined bus type, of the bus currently being
            0009                                          ;  configured, in the high order byte.  The
            0009                                          ;  proper value for the bus of current interest
            0009                                          ;  is copied here, from the nexus descriptor
            0009                                          ;  table, when we enter subroutine
```

```
          0009                                          ; CONFIG_IOSPACE.
          0009
          0009  DIRECT_VEC_NODE_CNT:                    ; Static longword that counts the number of
          0009                                          ;  direct vectoring adpater nodes that we have
00000000  0009                .LONG   0                 ;  run across so far.
          000D
00000001  000D  $$$VMSDEFINED = 1                       ; Define symbol that means VMS system software.
00000080  000D  NUMUBAVEC = 128                         ; ALLOW FOR 128 UNIBUS VECTORS
          000D
          000D                ADAPDESC -                ; Memory. ** MUST BE 1ST IN DESCRIPTOR LIST **
          000D                ADPTYPES=<NDT$_MEM1664NI,NDT$_MEM4NI,NDT$_MEM4I,NDT$_MEM16NI, -
          000D                        NDT$_MEM16I, -
          000D                        NDT$_MEM64NIL,NDT$_MEM64EIL,NDT$_MEM64NIU,NDT$_MEM64EIU,  -
          000D                        NDT$_MEM64I, -
          000D                        NDT$_MEM256NIL,NDT$_MEM256EIL,NDT$_MEM256NIU,NDT$_MEM256EIU,  -
          000D                        NDT$_MEM256I, -
          000D                        NDT$_SCORMEM> -
          000D                        NUMPAGES=1
          000D
          000D                ADAPDESC -                ; MASSbus.
          000D                        ADPTYPES=NDT$_MB, -
          000D                        NUMPAGES=8, -
          000D                        INITRTN=INI$MBADP
          000D
          000D                ADAPDESC -                ; UNIbus.
          000D                        ADPTYPES=<NDT$_UB0,NDT$_UB1,NDT$_UB2,NDT$_UB3,NDT$_BUA>, -
          000D                        NUMPAGES=8, -
          000D                        INITRTN=INI$UBSPACE
          000D
          000D                ADAPDESC -                ; Multi-port memory.
          000D                        ADPTYPES=<NDT$_MPM0,NDT$_MPM1,NDT$_MPM2,NDT$_MPM3>, -
          000D                        NUMPAGES=1, -
          000D                        INITRTN=INI$MPMADP
          000D
          000D                ADAPDESC -                ; DR32.
          000D                        ADPTYPES=NDT$_DR32, -
          000D                        NUMPAGES=4, -
          000D                        INITRTN=INI$DRADP
          000D
          000D                ADAPDESC -                ; CI780
          000D                        ADPTYPES=NDT$_CI, -
          000D                        NUMPAGES=9, -
          000D                        INITRTN=INI$CIADP
          000D
          000D                ADAPDESC -                ; KDZ11 Processor
          000D                        ADPTYPES=NDT$_KDZ11, -
          000D                        NUMPAGES=1, -
          000D                        INITRTN=INI$KDZ11
          000D
```

```
                 000D   ;
                 000D   ; TABLES OF ADAPTER-DEPENDENT INFORMATION
                 000D   ;
                 000D   ; THE TABLE OFFSETS ARE:
                 000D   ;
                 000D           $DEFINI ADPTAB
                 0000
        00000001 0000   ADPTAB_IDBUNITS:.BLKB   1               ; # UNITS TO SET IN IDB
        00000003 0001   ADPTAB_ADPLEN:  .BLKW   1               ; LENGTH OF ADP
        00000004 0003   ADPTAB_ATYPE:   .BLKB   1               ; ADP TYPE
                 0004
                 0004           $DEFEND ADPTAB
                 000D
                 000D   ;
                 000D   ; TABLES THEMSELVES:
                 000D   ;
                 000D
                 000D   MBATAB:                                 ; TABLE OF MBA CONSTANTS
              08 000D           .BYTE   8                       ; # UNITS IN MBA IDB
            0030 000E           .WORD   ADP$C_MBAADPLEN         ; # BYTES IN MBA ADP
              00 0010           .BYTE   AT$_MBA                 ; MBA ADAPTER TYPE
                 0011
                 0011   DRTAB:                                  ; TABLE OF DR32 CONSTANTS
              01 0011           .BYTE   1                       ; # UNITS IN DR IDB
            0030 0012           .WORD   ADP$C_DRADPLEN          ; # BYTES IN DR ADP
              02 0014           .BYTE   AT$_DR                  ; DR ADAPTER TYPE
                 0015
                 0015   CITAB:                                  ; TABLE OF CI CONSTANTS
              01 0015           .BYTE   1                       ; # UNITS IN CI IDB
            0030 0016           .WORD   ADP$C_CIADPLEN          ; # BYTES IN CI ADP
              04 0018           .BYTE   AT$_CI                  ; CI ADAPTER TYPE
                 0019
```

```
                                           0019          .SBTTL  CPU-specific data structures
                                           0019  ;
                                           0019  ; To add a new CPU type:
                                           0019  ;       1) Create a new nexus descriptor table, using FLOAT_NEXUS and
                                           0019  ;          FIXED_NEXUS macros.  Put an END_NEXUSDESC macro at the end.
                                           0019  ;
                                           0019
                                           0019
                                           0019
                                           0019
                                           0019
                                           0019  CPU_ADPSIZE:
                                   04EC'   0019          .WORD   ADP$C_UBAADPLEN+UBINTSZ+<NUMUBAVEC*4>
                                           001B
                                           001B
                                           001B  ;
                                           001B  ; Declare the beginning of a nexus-descriptor table.
                                           001B  ;
                                           001B          NEXUSDESC_TABLE LABEL=NEXUSDESC
                                           0020
                                           0020
                                           0020  ;
                                           0020  ; Describe all nexuses on an 11/790 processor.
                                           0020  ;
                               00000001    0020          SBI_CPU = 1
                               00000000    0020          BI_CPU  = 0
                                           0020          FLOAT_NEXUS -
                                           0020                  PHYSADR=IO790$AL_IOA0, -
                                           0020                  NUMNEX=IO790$AL_NNEX, -
                                           0020                  PERNEX=IO790$AL_PERNEX
                                           00A0          END_NEXUSDESC
                                           00A4
                                           00A4  ;
                                           00A4  ; The following 11/790 data must remain in pool after INIADP is deallocated.
                                           00A4  ;
                                           00A4          .SAVE
                                       00000000          .PSECT  SYSLOA,LONG
                                           0000  ;
                                           0000  ; These arrays describe the adapters on the 11/790's ABUS.
                                           0000  ;
                                           0000  ABUS_VA::                                       ; Virtual address of ABUS adapter space.
00000000'00000000'00000000'00000000'       0000          .LONG   0[4]
                                           0010  ABUS_TYPE::
                           00'00'00'00'    0010          .BYTE   0[4]                            ; Type code of ABUS adapter.
                                           0014  ABUS_INDEX::
                           00'00'00'00'    0014          .BYTE   0[4]                            ; If this ABUS adapter is an SBIA, index
                                           0018                                                  ; into EXE$GL_CONFREGL and MMG$GL_SBICONF
                                           0018                                                  ; where this SBI's nexus slots start.
                                       000000A4          .RESTORE
                                           00A4
                                           00A4
                                           00A4
                                           00A4
                                           00A4  ;
                                           00A4  ; Nexus "descriptor" arrays -- these arrays hold the nexus-device type and
                                           00A4  ; virtual address of every adapter on the system.  The arrays, CONFREGL and
                                           00A4  ; SBICONF, are allocated enough space to hold the maximum number of adapters
```

```
                  00A4  ; that can be attached to any CPU.  When the code discovers how many adapters
                  00A4  ; actually exist on the system, it will allocate space from non-paged pool
                  00A4  ; and move a permanent copy of these arrays into that space.
                  00A4  ;
        00000040  00A4  MAXNEXUS = 64
                  00A4  CONFREG:
        000000E4  00A4                  .BLKB   MAXNEXUS                ; Byte array of nexus-device type codes..
                  00E4  SBICONF:
        000001E4  00E4                  .BLKL   MAXNEXUS                ; Longword array of VAs of adapter space.
                  01E4  CONFREGL:
        000002E4  01E4                  .BLKL   MAXNEXUS                ; Longword array of nexus-device type codes
```

```
                                   02E4   723           .SBTTL  Message strings
                                   02E4   724
                          0000000D 02E4   725 CR = 13
                          0000000A 02E4   726 LF = 10
                                   02E4   727 NOSPT:
2D 54 49 4E 49 43 45 58 45 25 0A 0D 02E4   728           .ASCIZ  <CR><LF>/%EXECINIT-F-Insufficient SPT entries/<CR><LF>
65 69 63 69 66 66 75 73 6E 49 2D 46 02F0
69 72 74 6E 65 20 54 50 53 20 74 6E 02FC
                  00 0A 0D 73 65    0308
                                   030D   730 BADUMR:
2D 54 49 4E 49 43 45 58 45 25 0A 0D 030D   731           .ASCIZ  <CR><LF>/%EXECINIT-F-UNIBUS memory does not start at 0/<CR><LF>
6D 65 6D 20 53 55 42 49 4E 55 2D 46 0319
74 6F 6E 20 73 65 6F 64 20 79 72 6F 0325
0D 30 20 74 61 20 74 72 61 74 73 20 0331
                              00 0A 033D
```

```
                                  033F   734          .SBTTL  INI$IOMAP, Initialize and map nexuses
                                  033F   735  ;++
                                  033F   736  ; FUNCTIONAL DESCRIPTION:
                                  033F   737  ;       This routine is executed only once, during system initialization.
                                  033F   738  ;       It loops through all nexuses on the system, testing for
                                  033F   739  ;       adapters.  When it finds an adapter, it maps its I/O space and
                                  033F   740  ;       initializes it.
                                  033F   741  ;
                                  033F   742  ; INPUTS:
                                  033F   743  ;       BOO$GL_SPTFREL  - next free VPN
                                  033F   744  ;       MMG$GL_SPTVASE  - base of system page table
                                  033F   745  ;       EXE$GL_RPB      - address of reboot parameter block
                                  033F   747  ;       RPB$L_ADPPHY(RPB) - PFN of boot adapter space
                                  033F   749  ;
                                  033F   750  ; OUTPUTS:
                                  033F   751  ;       R0 - SS$_NORMAL
                                  033F   752  ;
                                  033F   753  ;       For each adapter found, its accessible I/O space is mapped to virtual
                                  033F   754  ;       addresses.  An ADP (Adapter Control Block) is built, and the hardware
                                  033F   755  ;       adapter is initialized.
                                  033F   756  ;
                                  033F   757  ;       The arrays CONFREG (a byte array of nexus-device type codes, defined
                                  033F   758  ;       by NDT$_ symbols) and SBICONF (a longword array of
                                  033F   759  ;       virtual addresses that map adapter space) are initialized.  Pointers
                                  033F   760  ;       to these arrays are stored in EXE$GL_CONFREG  and
                                  033F   761  ;       MMG$GL_SBICONF.  The number of entries in these two parallel arrays is
                                  033F   762  ;       stored in EXE$GL_NUMNEXUS.
                                  033F   763  ;
                                  033F   764  ;       Since BI devices have a 16-bit device type code, a new CONFREG array is
                                  033F   765  ;       constructed.  This is a longword array called CONFREGL.
                                  033F   766  ;
                                  033F   767  ;       Several locations in the RPB that describe the boot device are init'ed:
                                  033F   768  ;       RPB$L_BOOTR1     - holds index into CONFREG and SBICONF for the boot
                                  033F   769  ;                          adapter
                                  033F   770  ;       RPB$L_ADPVIR     - holds VA of boot device adapter's register space
                                  033F   771  ;       RPB$L_CSRVIR     - holds VA of boot device's register space
                                  033F   772  ;--
                                  033F   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.
   5A    5C A9    F7 8F       78  002A   789          ASHL    #-9,RPB$[_ADPPHY(R9),R10; Get PFN of boot adapter space.
00000000'GF     00E4'CF       DE  0030   791          MOVAL   W^SBICONF,G^MMG$GL_SBICONF  ; Set pointers to local copies
00000000'GF     00A4'CF       DE  0039   792          MOVAL   W^CONFREG,G^EXE$GL_CONFREG  ; of these arrays for init routines.
00000000'GF     01E4'CF       DE  0042   793          MOVAL   W^CONFREGL,G^EXE$G[_CONFREGL ; ...
```

```
                                 004B           .SBTTL  INITADP_790
                                 004B     ;++
                                 004B     ; Configure VENUS I/O Address Space.
                                 004B     ;
                                 004B     ; ABUS Physical Address Space:
                                 004B     ;
                                 004B     ;       VENUS's internal I/O bus, or ABUS, has 4 slots on it.   ABUS adapters
                                 004B     ; occupy the following ranges of I/O address space:
                                 004B     ;
                                 004B     ;       ABUS slot               Physical address range
                                 004B     ;       ---------               ----------------------
                                 004B     ;           0               2000 0000   through   21FF FFFF
                                 004B     ;           1               2200 0000   through   23FF FFFF
                                 004B     ;           2               2400 0000   through   25FF FFFF
                                 004B     ;           3               2600 0000   through   27FF FFFF
                                 004B     ;
                                 004B     ;
                                 004B     ;       For each adapter attached to the ABUS, some adapter register space
                                 004B     ; is defined (addresses 2x08 0000 through 2x08 007F).  The first 12 (decimal)
                                 004B     ; longwords of the ABUS adapter register space are generically defined for all
                                 004B     ; types of ABUS adapters; the remaining register address space is ABUS
                                 004B     ; adapter-specific.  The first generic register is the configuration register.
                                 004B     ; The low byte of the configuration register identifies the type of ABUS
                                 004B     ; adapter, and its revision level.
                                 004B     ;
                                 004B     ;       Currently, only one adapter is supported on the ABUS: the SBIA, or
                                 004B     ; SBI/ABUS adapter.  This adapter allows a standard 780 SBI to be attached to
                                 004B     ; VENUS's ABUS, and allows VENUS to support all standard 780 adapters and
                                 004B     ; peripherals.
                                 004B     ;
                                 004B     ;       Search the ABUS slots for SBIA adapters, and configure SBI I/O space
                                 004B     ; and SBIA register space for any that are found.
                                 004B     ;
                                 004B     ;--
                                 004B           ASSUME  SBIA$L_CR EQ 0                  ; Assume configuration register is first
                                 004B                                                   ; register in SBIA register space.
58    C0100400 8F     D0         004B           MOVL    #<<IO790$AL_IOA0+ -
                                 0052                    IO790$AL_IOACR>/^X200>,R8         ; Calculate PFN
                                 0052                                                   ; of first ABUS configuration register.
               5B     D4         0052           CLRL    R11                             ; Index into ABUS slots.
                                 0054
                                 0054     ABUS_LOOP:
     51    58  09     78         0054           ASHL    #9,R8,R1                        ; Get physical address back from PFN.
51    C00FFFFF 8F     CA         0058           BICL    #^C<PAMM$M_PAMADD>,R1           ; Only want bits 29:20 of physical addr.
00000041 8F    51     DA         005F           MTPR    R1,#PR790$_PAMLOC               ; Request PAMM code for this address.
51    00000040 8F     DB         0066           MFPR    #PR790$_PAMACC,R1               ; Read PAMM location.
     51    04  00     EF         006D           EXTZV   #PAMM$V_CODE,#PAMM$S_CODE, -        ; Extract PAMM code.
               51                0071                   R1,R1
           0F  51     91         0072           CMPB    R1,#PAMM$C_NEXM                 ; Is an ABUS adapter present?
               70     13         0075           BEQL    END_ABUS_LOOP                   ; Nothing at this ABUS slot.
      90000000 8F     C9         0077           BISL3   #PTE$M_VALID!PTE$C_KW,-         ; Temporarily associate VA in R2 with
           63  58                007D                   R8,(R3)                         ; PFN in R8 via SPTE in R3.
                                 007F           $PRTCTINI       B^10$ -                 ; Protect against non-existent memory
                                 007F                   #<MCHK$M_NEXM!MCHK$M_LOG>               ; machine checks.
           51  62     D0         008B           MOVL    (R2),R1                         ; Read ABUS configuration register.
                                 008E           $PRTCTEND       10$                     ; End of protected code.
                                 008F           INVALID R2                              ; Clear TB of temporary mapping.
```

```
                 52 50    E9  0092   853            BLBC    R0,END_ABUS_LOOP          ; Nothing at this ABUS slot.
                              0095   854 ;
                              0095   855 ; Found an adapter.  See if its an SBIA.
                              0095   856 ;
      51   51  04   04    EF  0095   857            EXTZV   #SBIA$V_TYPE,#SBIA$S_TYPE,R1,R1 ; Get type field in config reg.
       0010'CF4B   51     90  009A   858            MOVB    R1,W^ABUS_TYPE[R11]       ; Save in ABUS type array.
               51  01     91  00A0   859            CMPB    #IO790$C_SBIA,R1          ; Is this an SBIA?
                   42     12  00A3   860            BNEQ    END_ABUS_LOOP             ; Nope, go to next slot.
                              00A5   861 ;
                              00A5   862 ; Found an SBIA.
                              00A5   863 ; Fill in the 790 nexus descriptor table with the physical addresses
                              00A5   864 ; corresponding to this ABUS slot.
                              00A5   865 ;
                   5B     D5  00A5   866            TSTL    R11                       ; If this is the first ABUS slot,
                   1C     13  00A7   867            BEQL    CONFIG_790                ; table is already set up properly.
               51  10     D0  00A9   868            MOVL    #IO790$AL_NNEX,R1         ; Get number of nexues on this SBI.
          00000400 8F     C3  00AC   869            SUBL3   #IO790$AL_IOACR/^X200,-   ; Get PFN of SBI nexus space for
               50  58         00B2   870                    R8,R0                     ; this ABUS slot.
         56   0020'CF     DE  00B4   871            MOVAL   W^NEXUSDESC,R6            ; Get address of 790 nexus table.
                              00B9   872 20$:
               86  50     D0  00B9   873            MOVL    R0,(R6)+                  ; Put PFN in table.
               56  04     C0  00BC   874            ADDL2   #4,R6                     ; Step past fixed/floating type code.
               50  10     C0  00BF   875            ADDL    #IO790$AL_PERNEX/^X200,R0    ; PFN of next nexus on this SBI.
                 F4 51    F5  00C2   876            SOBGTR  R1,20$                    ; Fill in entire table.
                              00C5   877 ;
                              00C5   878 ; Fill in 11/790-specific SCB slots and map SBIA register space, then
                              00C5   879 ; call CONFIG_IOSPACE as a subroutine, to configure this SBI.
                              00C5   880 ;
                              00C5   881 CONFIG_790:
       0000'CF4B    52    D0  00C5   882            MOVL    R2,W^ABUS_VA[R11]         ; Save VA of SBIA register space.
                    58    DD  00CB   883            PUSHL   R8                        ; Save PFN of SBIA register space.
               51   01    D0  00CD   884            MOVL    #1,R1                     ; Number of pages to map.
                  0140    30  00D0   885            BSBW    MAP_PAGES                 ; Map SBIA register space.
                  0183    30  00D3   886            BSBW    INI$SCB                   ; Fill in 790-specific SCB vectors.
         56   0020'CF     DE  00D6   887            MOVAL   W^NEXUSDESC,R6            ; Address of 790 nexus descriptor table.
       0014'CF4B    54    90  00DB   888            MOVB    R4,W^ABUS_INDEX[R11]      ; Save index into CONFREG and SBICONF.
                    1C    10  00E1   889            BSBB    CONFIG_IOSPACE            ; Configure this SBI.
             0100 8F      BA  00E3   890            POPR    #^M<R8>                   ; Restore PFN of SBIA register space.
                              00E7   891
                              00E7   892
                              00E7   893 END_ABUS_LOOP:
      58    00010000 8F   C0  00E7   894            ADDL    #IO790$AL_PERABS/^X200,R8 ; R8 <- PFN of next ABUS adapter's
                              00EE   895                                              ; register space.
     FF60 5B   01   03    F1  00EE   896            ACBL    #3,#1,R11,ABUS_LOOP       ; Branch if more ABUS slots.
                              00F4   909
                  00C3    30  00F4   910            BSBW    CREATE_ARRAYS             ; Create CONFREG and SBICONF arrays.
             0FFF 8F      BA  00F7   911            POPR    #^M<R0,R1,R2,R3,R4,R5,R6,R7,R8,R9,R10,R11>
               50   01    D0  00FB   912            MOVL    #1,R0                     ; Set success status
                          05  00FE   913            RSB                               ; Return.
                    00FF          .SBTTL  CONFIG_IOSPACE
                    00FF  ;
                    00FF  ; CONFIG_IOSPACE
                    00FF  ;       Given a nexus descriptor table, which describes what ''nexuses'' or
                    00FF  ;       ''slots'' are available on a system to hold I/O adapters, find and
                    00FF  ;       initialize all adapters on the system.
                    00FF  ;
                    00FF  ; Inputs:
                    00FF  ;       R2 - next available virtual address, to be used for mapping I/O space
                    00FF  ;       R3 - address of PTE associated with VA in R2
                    00FF  ;       R4 - Current index into CONFREG and SBICONF arrays (should be 0 the
                    00FF  ;               first time CONFIG_IOSPACE is called)
                    00FF  ;       R6 - address of nexus descriptor table
                    00FF  ;       R9 - address of Restart Parameter Block (RPB)
                    00FF  ;       R10 - PFN of boot adapter space
                    00FF  ;       R11- page offset from beginning of SCB; tells which page of the SCB
                    00FF  ;               to use for this set of nexuses (passed to routines that init ADP)
                    00FF  ;
                    00FF  ; Outputs:
                    00FF  ;       R2,R3,R4 - updated
                    00FF  ;       R9,R10,R11 - preserved; all other registers potentially modified
                    00FF  ;       CONFREG - initialized with adapter NDT$ code for each nexus
                    00FF  ;       SBICONF - initialized with adapter space VA for each nexus
                    00FF  ;
                    00FF CONFIG_IOSPACE:
                    00FF  ;
                    00FF  ; Main loop.  Map and initialize all adapters on system.
                    00FF  ;
                    00FF
       FB A6   90   00FF          MOVB    CSR_LEN_OFFSET(R6),-    ; Move length of adapter type field
     0004'CF        0102                  W^BUS_CSR_LEN           ;   in CSR's to static location.
       FC A6   D0   0105          MOVL    BUS_CODE_OFFSET(R6),-   ; Move software defined bus type code
     0005'CF        0108                  W^SW_BUS_CODE           ;   to static longword.
                    010B
                    010B NXT_NEXUS:                               ; For each nexus...
     58   86   D0   010B          MOVL    (R6)+,R8                ; Get PFN of nexus.
          01   12   010E          BNEQ    TEST_NEXUS              ; If PFN non-zero, go test the slot.
               05   0110          RSB                             ; If 0, we've found all nexuses.
                    0111  ;
                    0111  ; Read configuration register to determine if anything is present at this
                    0111  ; nexus.
                    0111  ;
                    0111 TEST_NEXUS:
 90000000 8F   C9   0111          BISL3   #PTE$M_VALID!PTE$C_KW,- ; Temporarily associate VA in R2 with
       63 58        0117                  R8,(R3)                 ; PFN in R8 via SPTE in R3.
                    0119          $PRTCTINI B^10$, -              ; Protect following code from non-
                    0119                  #<MCHK$M_NEXM!MCHK$M_LOG>; existent memory machine checks.
     51   62   D0   0125          MOVL    (R2),R1                 ; Read adapter configuration register.
                    0128          $PRTCTEND 10$                   ; End of protected code.
                    0129          INVALID R2                      ; Clear TB of temporary mapping.
       11 50   E8   012C          BLBS    R0,GET_TYPE             ; Branch if no machine check occurred.
                    012F  ;
                    012F  ; No adapter present at this nexus.
                    012F  ;
   00A4'CF44   94   012F          CLRB    W^CONFREG[R4]           ; Store ''unknown'' type in CONFREG
   01E4'CF44   D4   0134          CLRL    W^CONFREGL[R4]          ; and in CONFREGL also.
          55   D4   0139          CLRL    R5                      ; Use general memory type to map
```

```
                                 013B                                        ; one page of I/O space.
               56    04    C0    013B          ADDL2   #4,R6                 ; Step past type code in nexus table.
                     59    11    013E          BRB     MAP_NEXUS             ; Go map I/O space for this nexus.
                                 0140  ;
                                 0140  ; Execution continues here if adapter was present.
                                 0140  ;
                                 0140  GET_TYPE:
               57    86    D0    0140          MOVL    (R6)+,R7              ; Get nexus-device type from nexus table.
                     14    12    0143          BNEQ    GET_GEN_TYPE          ; Branch if fixed slot.
                                 0145  ;
                                 0145  ; Floating-type slot.  Use type from configuration register.
                                 0145  ; Determine if type in configuration register is 8-bits or 16-bits.
                                 0145  ;
                                 0145
       0004'CF       01    91    0145          CMPB    #1,W^BUS_CSR_LEN      ; Determine length of adapter type
                                 014A                                        ;  field in CSR contained in R7.
                     05    13    014A          BEQL    10$                   ; EQL implies 1 byte (8-bit) field.
               57    51    3C    014C          MOVZWL  R1,R7                 ; BI_LIKE, so use word instruction.
                     03    11    014F          BRB     20$                   ; Skip byte instruction.
               57    51    9A    0151  10$:    MOVZBL  R1,R7                 ; Use byte instruction to get type.
                                 0154  20$:                                  ;
        57    0005'CF      C8    0154          BISL    W^SW_BUS_CODE,R7      ; Or in software bus code.
                                 0159  ;
                                 0159  ; Here R7 has hardware adapter code or'ed with software bus code.
                                 0159  ; Translate specific nexus device type code into general adapter type code.
                                 0159  ;
                                 0159  GET_GEN_TYPE:
     00A4'CF44       57    90    0159          MOVB    R7,W^CONFREG[R4]      ; Save nexus-device type in CONFREG.
     01E4'CF44       57    D0    015F          MOVL    R7,W^CONFREGL[R4]     ; CONFREGL also filled in.
                     55    D4    0165          CLRL    R5                    ; Clear loop index.
                                 0167  30$:                                  ;
        50   0000'CF45     DE    0167          MOVAL   W^ADAPTERS[R5],R0     ; Get address of adapter type code.
                0000'CF    9F    016D          PUSHAB  W^NUM_PAGES           ; Push addr of end of ADAPTERS array.
                8E   50    D1    0171          CMPL    R0,(SP)+              ; See if we went beyond array.
                     3F    1E    0174          BGEQU   END_NEXUS             ; unrecognized adapter, do not map.
               60    57    D1    0176          CMPL    R7,(R0)               ; Adapter type match?
                     04    13    0179          BEQL    40$                   ; If EQL yes, adapter type match.
                     55    D6    017B          INCL    R5                    ; Increment loop index.
                     E8    11    017D          BRB     30$                   ; Look at next adapter.
                                 017F  40$:
                                 017F
                                 017F  ;
                                 017F  ; Store boot parameters.
                                 017F  ;
               5A    58    D1    017F          CMPL    R8,R10                ; Does PFN match boot adapter's PFN?
                     15    12    0182          BNEQ    MAP_NEXUS             ; No; continue.
            60 A9    52    D0    0184          MOVL    R2,RPB$L_ADPVIR(R9)   ; Store VA of boot adapter space.
            20 A9    54    D0    0188          MOVL    R4,RPB$L_BOOTR1(R9)   ; Store boot adapter nexus number.
    51    54 A9    0D    00    EF    018C          EXTZV   #0,#13, -             ; Get offset into UNIBUS/QBUS I/O page.
                                 0192                  RPB$L_CSRPHY(R9),R1
     58 A9    1000 C241    9E    0192          MOVAB   <8*512>(R2)[R1], -    ; Set VA of UNIBUS/QBUS registers.
                                 0199                  RPB$L_CSRVIR(R9)      ;
                                 0199
                                 0199
                                 0199  ;
                                 0199  ; R5/ general adapter type; index into "general" adapter arrays.
                                 0199  ; For each adapter -
```

```
                        0199  1042 ;          Map the # of pages specified in ADAPDESC macro
                        0199  1043 ;          JSB to initialization routine specified in ADAPDESC macro
                        0199  1044 ;
                        0199  1045 MAP_NEXUS:
 00E4'CF44     52   D0  0199  1050          MOVL    R2,W^SBICONF[R4]           ; Save VA of adapter space in SBICONF.
 51    0000'CF45   3C   019F  1051          MOVZWL  W^NUM_PAGES[R5],R1         ; Get number of pages to map.
               6C   10  01A5  1052          BSBB    MAP_PAGES                  ; Map the I/O pages.
 51    0000'CF45   DE   01A7  1053          MOVAL   W^INIT_ROUTINES[R5],R1     ; Get address of initialization routine.
               61   D5  01AD  1054          TSTL    (R1)                       ; Initialization routine specified?
               04   13  01AF  1055          BEQL    END_NEXUS                  ; Branch if none.
        00 B141     16  01B1  1056          JSB     @(R1)[R1]                  ; Call initialization routine.
                        01B5  1057 END_NEXUS:
               54   D6  01B5  1058          INCL    R4                         ; Increment CONFREG and SBICONF index.
             FF51   31  01B7  1060          BRW     NXT_NEXUS                  ; Go do next nexus.
                        01BA  1064
```

```
                                 01BA              .SBTTL  CREATE_ARRAYS
                                 01BA   ;
                                 01BA   ; CREATE_ARRAYS
                                 01BA   ;
                                 01BA   ;          Move the local CONFREG and SBICONF arrays into non-paged pool.
                                 01BA   ;
                                 01BA   ; Inputs:
                                 01BA   ;          R4 - Number of nexuses on the system.
                                 01BA   ;          CONFREG and SBICONF have been initialized.
                                 01BA   ;
                                 01BA   ; Outputs:
                                 01BA   ;          R0 - R5 destroyed
                                 01BA   ;          EXE$GL_CONFREG points to a copy of the CONFREG array in non-paged pool
                                 01BA   ;          MMG$GL_SBICONF points to a copy of the SBICONF array in non-paged pool
                                 01BA   ;          EXE$GL_NUMNEXUS contains the number of nexuses on the system
                                 01BA   ;
                                 01BA   ;
                                 01BA  CREATE_ARRAYS:
   00000000'GF      54     D0    01BA              MOVL    R4,G^EXE$GL_NUMNEXUS          ; Store number of nexuses on system.
          51   0C A444     DE    01C1              MOVAL   12(R4)[R4],R1                 ; Allocate n bytes for CONFREG plus
                                 01C6                                                    ; 4n bytes for SBICONF + header
            51    6144     DE    01C6              MOVAL   (R1)[R4],R1                   ; Another 4n bytes for CONFREGL.
                  0317     30    01CA              BSBW    ALONPAGD                      ; Get pool for CONFREG and SBICONF.
                    82     7C    01CD              CLRQ    (R2)+                         ; Clear out unused
              82    51     B0    01CF              MOVW    R1,(R2)+                      ; Set in size
          82   0763 8F     B0    01D2              MOVW    #<DYN$C_CONF@8>!DYN$C_INIT,(R2)+ ; Set type and subtype
   00000000'GF      62     9E    01D7              MOVAB   (R2),G^EXE$GL_CONFREG         ; Store address of system CONFREG.
              51  6244     9E    01DE              MOVAB   (R2)[R4],R1                   ; Two steps to CONFREGL, 1st, SBICONF,
   00000000'GF      51     D0    01E2              MOVL    R1,G^MMG$GL_SBICONF           ; Store address of system SBICONF.
  00000000'GF     6144     DE    01E9              MOVAL   (R1)[R4],G^EXE$GL_CONFREGL ; And address of system CONFREGL.
                    14     BB    01F1              PUSHR   #^M<R2,R4>                    ; Save pool address and nexus count.
    62   00A4'CF    54     28    01F3              MOVC3   R4,W^CONFREG,(R2)             ; Copy CONFREG to pool.
                    14     BA    01F9              POPR    #^M<R2,R4>                    ; Retrieve pool address and nexus count.
         51   54    04     C5    01FB              MULL3   #4,R4,R1                      ; Number of bytes in SBICONF.
              7E    51     D0    01FF              MOVL    R1,-(SP)                      ; Save, SBICONF size = CONFREGL size
  6244   00E4'CF    51     28    0202              MOVC3   R1,W^SBICONF,(R2)[R4]         ; Copy SBICONF to pool.
              51    8E     D0    0209              MOVL    (SP)+,R1                      ; Restore size of SBICONF and CONFREGL.
    63   01E4'CF    51     28    020C              MOVC3   R1,W^CONFREGL,(R3)            ; Copy CONFREGL to pool.  R3 is output
                                 0212                                                    ; from SBICONF MOVC3, so SBICONF and
                                 0212                                                    ; CONFREGL must be adjacent.
                                 0212
                           05    0212              RSB
```

```
                                    0213          .SBTTL  MAP_PAGES
                                    0213    ;++
                                    0213    ; INPUTS:
                                    0213    ;         R1/ Number of pages to map.
                                    0213    ;         R2/ VA of page to map.
                                    0213    ;         R3/ VA of system page table entry to be used.
                                    0213    ;         R8/ PFN of page(s) to map.
                                    0213    ;
                                    0213    ; OUTPUTS:
                                    0213    ;         R2,R3 updated; R1,R8 destroyed; all other registers preserved
                                    0213    ;
                                    0213    ;--
                                    0213
                                    0213    MAP_PAGES:
                                    0213
     83   58   90000000 8F     C9   0213          BISL3   #<PTE$M_VALID!PTE$C_KW>,R8,(R3)+
                                    021B                                              ; Map a page.
                         58    D6   021B          INCL    R8                          ; Next PFN.
               52   0200 C2    9E   021D          MOVAB   512(R2),R2                  ; Next VA.
                 00000000'GF   D6   0222          INCL    G^BOO$GL_SPTFREL            ; Next free entry.
 00000000'GF     00000000'GF   D1   0228          CMPL    G^BOO$GL_SPTFREH, -         ; Check for no more system page
                                    0233                  G^BOO$GL_SPTFREL            ; table entries.
                    04         15   0233          BLEQ    ERROR_HALT                  ; Branch if out of SPTEs.
                 DB 51         F5   0235          SOBGTR  R1,MAP_PAGES                ; Map another page.
                               05   0238          RSB                                 ; All done.
                                    0239
                                    0239    ERROR_HALT:
               51   02E4'CF    9E   0239          MOVAB   W^NOSPT,R1                  ; Set error message.
                                    023E    ERROR_HALT_1:
                         5B    D4   023E          CLRL    R11                         ; Indicate console terminal.
                 00000000'GF   16   0240          JSB     G^EXE$OUTZSTRING            ; Output error message.
                               00   0246          HALT                                ; ***** FATAL ERROR *******
```

```
          0247          .SBTTL  INI$SCB
          0247  ;++
          0247  ;       Fill in 11/790-specific SCB vectors.
          0247  ;
          0247  ; INPUTS:
          0247  ;       R11             - Which SCB page is used by this SBIA
          0247  ;       ABUS_VA[R11]    - Address of this SBIA's register space
          0247  ;
          0247  ; OUTPUTS:
          0247  ;       790-specific SCB vectors are filled in; they will point into a
          0247  ;       JSB table, which transfers control to the appropriate interrupt
          0247  ;       handling routine with the address of the SBIA's register space
          0247  ;       on top of the stack (so the interrupt routine will know which SBIA
          0247  ;       interrupted).  After this routine executes, each 790-specific SCB
          0247  ;       vector is set up as shown below:
          0247  ;
          0247  ;         SCB              SYSLOA790
          0247  ;       +--------+         +----------------+
          0247  ;       |   .    |         |       .        |
          0247  ;       |--------|         |----------------|
          0247  ;       |    +---|-------->|  JSB int_rtn --|---+
          0247  ;       |--------|         |  <SBIA reg adr>|   |
          0247  ;       |   .    |         |----------------|   |
          0247  ;       +--------+         |                |   |
          0247  ;                          |----------------|<--+
          0247  ;                          |    int_rtn     |
          0247  ;                          |----------------|
          0247  ;
          0247  ;       All registers are preserved.
          0247  ;++
          0247
          0247  ;
          0247  ; Macro SCBVEC.
          0247  ;
          0247  ;       This macro defines a table of <SCB vector, interrupt service routine>
          0247  ;       pairs.  This table is used to initialize the 11/790-specific vectors
          0247  ;       in the SCB.
          0247  ;
          0247          .MACRO  SCBVEC  VECNUM,SERVICE_RTN,SYS
          0247
          0247          .WORD   <VECNUM/4>                      ; Longword offset from start of SCB page.
          0247          .LONG   <SERVICE_RTN-.>                 ; Store self-relative offset to service
          0247                                                  ; routines defined in SYSLOA790.
          0247          NUMVECS = NUMVECS + 1                   ; Count number of vectors to load.
          0247          .ENDM   SCBVEC
          0247
          0247
          0247  ;
          0247  ; List the 11/790 SCB vectors to be directed to the JSB table.
          0247  ;
00000000  0247          NUMVECS = 0                             ; Number of SCB vectors to load.
          0247  INI$L_SCBVALS:                                  ; Define SCB vectors and their
          0247                                                  ; interrupt handling routines.
          0247          SCBVEC  VECNUM=<^X58>,SERVICE_RTN=EXE$INT58
          024D          SCBVEC  VECNUM=<^X5C>,SERVICE_RTN=EXE$INT5C
          0253          SCBVEC  VECNUM=<^X60>,SERVICE_RTN=EXE$INT60
          0259
```

```
                       00000018          .PSECT  SYSLOA,LONG                   ; This data stays after INIADP is gone.
                           0018
                           0018          .ALIGN  LONG
                           0018  INI$L_IOAVECS:
                           0018          .REPT   4*NUMVECS                     ; 4 pages of SCB * number of vectors/page.
                           0018          .ALIGN  LONG                          ; SCB routines must be longword aligned.
                           0018          JSB     @#EXE$LOAD_ERROR              ; Init to error halt.
                           0018          .LONG   0                             ; Reserve space for address of IOA regs.
                           0018          .ENDR
                           00A6
                       00000259          .PSECT  $$$INIT$CODE
                           0259
                           0259  INI$SCB:
              1F     BB    0259          PUSHR   #^M<R0,R1,R2,R3,R4>           ; Save some registers.
        50    E9 AF  DE    025B          MOVAL   INI$L_SCBVALS,R0              ; Get address of SCB value table.
   51  00000018'EF   DE    025F          MOVAL   INI$L_IOAVECS,R1              ; Get address of JSB table.
     52   5B   24    C5    0266          MULL3   #<NUMVECS*12>,R11,R2          ; Get byte offset into JSB table for
                           026A                                                ; this SCB page.
          51   52    C0    026A          ADDL    R2,R1                         ; R1 points to 1st JSB table entry
                           026D                                                ; for this SCB page.
   52  00000000'GF   D0    026D          MOVL    G^EXE$GL_SCB,R2               ; Address of SCB.
     53   5B   09    78    0274          ASHL    #9,R11,R3                     ; Turn SCB page offset into byte offset.
          52   53    C0    0278          ADDL    R3,R2                         ; R2 points to beginning of correct
                           027B                                                ; SCB page.
          53   03    D0    027B          MOVL    #NUMVECS,R3                   ; Get number of vectors to load.
                           027E
                           027E  ;
                           027E  ; R0 walks through a table of the form:
                           027E  ;         .WORD   <longword offset into SCB>
                           027E  ;         .LONG   <self-relative offset to SCB interrupt handling routine>
                           027E  ; where each JSB instruction is longword aligned.
                           027E  ;
                           027E  ; R1 walks through a table of the form:
                           027E  ;         JSB     <@#interrupt handling routine>
                           027E  ;         .LONG   <address of SBIA register space>
                           027E  ;
                           027E  ; R2 points to the beginning of the SCB page for this SBIA.
                           027E  ;
                           027E  ; This loop performs the following functions:
                           027E  ;         (1) Fills in the SCB vector to point to one of the JSB instructions
                           027E  ;             in the IOAVEC table.
                           027E  ;         (2) Fills in the destination of the JSB instruction to point to the
                           027E  ;             correct interrupt handling routine in SYSLOA790.EXE.
                           027E  ;         (3) Fills in the longword after the JSB instruction with the address
                           027E  ;             of register space for this SBIA adapter.
                           027E  ;
                           027E
                           027E  FILL_IN_SCB:
          54   80    B0    027E          MOVW    (R0)+,R4                      ; R4 <- longword offset into SCB page.
   6244   01 A1      9E    0281          MOVAB   1(R1),(R2)[R4]                ; Point SCB vector to JSB instruction
                           0286                                                ; (+1 to execute on interrupt stack).
  02 A1   00 B040    9E    0286          MOVAB   @(R0)[R0],2(R1)               ; Fill in destination of JSB instruction.
 06 A1   0000'CF4B   D0    028C          MOVL    W^ABUS_VA[R11],6(R1)          ; Put address of IOA regs after the JSB.
        50   04 A0   DE    0293          MOVAL   4(R0),R0                      ; Step to next entry in SCB table.
        51   0C A1   DE    0297          MOVAL   12(R1),R1                     ; Step to next entry in JSB table.
             E0 53   F5    029B          SOBGTR  R3,FILL_IN_SCB                ; Repeat for all vectors.
                           029E  ;
```

```
                     029E  ; Take care of a special case: the vector at offset ^x54 into venus' SCB is
                     029E  ; the SBI FAIL vector.  This condition is handled as a powerfail.  This is a
                     029E  ; special case because we don't want the address of the SBIA registers on the
                     029E  ; stack when we vector to the powerfail code.
                     029E  ;
00000001'GF     9E   029E          MOVAB   G^EXE$POWERFAIL+1,-      ; Load address of powerfail routine.
      64 A2          02A4                  ^X64(R2)
         1F     BA   02A6          POPR    #^M<R0,R1,R2,R3,R4>
                05   02A8          RSB
                     02A9
```

```
                              02A9          .SBTTL  INI$UBSPACE
                              02A9  ;++
                              02A9  ;       Map UNIBUS space; initialize UNIBUS ADP.
                              02A9  ;
                              02A9  ; INPUTS:
                              02A9  ;       R2 - VA of next free system page
                              02A9  ;       R3 - VA of system page table entry to be used to map VA in R2
                              02A9  ;       R4 - nexus identification number of this adapter
                              02A9  ;   -8(R6) - PFN of this UNIBUS adapter's register space
                              02A9  ;
                              02A9  ; OUTPUTS:
                              02A9  ;       UNIBUS space is mapped.
                              02A9  ;       INI$UBADP is called to build an ADP block and initialize UNIBUS
                              02A9  ;       adapter hardware.
                              02A9  ;
                              02A9  ;--
                              02A9
                              02A9 INI$UBSPACE:
                              02A9
           58  01E4'CF44  DE  02A9          MOVAL   W^CONFREGL[R4],R8               ; R8 => CONFREGL slot.
       58  68    02   00  EF  02AF          EXTZV   #0,#2,(R8),R8                   ; Get UBA number.
           58    58   09  78  02B4          ASHL    #9,R8,R8                        ; Position UB number.
                              02B8
                              02B8
                              02B8
                              02B8
                              02B8
   51  F8 A6  000000FF 8F  CB  02B8          BICL3   #^XFF,-8(R6),R1                ; Get PFN of start of SBI addr space.
           58    09F0 C148  9E  02C1          MOVAB   W^<<IO790$AL_UBOSP+^O760000>/^X200>(R1)[R8],R8
                              02C7                                                 ; Calculate PFN of Unibus I/O page.
                              02C7
                              02C7
                 51   10  D0  02C7          MOVL    #16,R1                         ; Number of pages to map (UB/Qbus space).
                    FF46  30  02CA          BSBW    MAP_PAGES                      ; Map I/O pages.
                              02CD  ;
                              02CD  ; Call adapter initialization routine.
                              02CD  ;
                              02CD  ;       BSBW    INI$UBADP                      ; Init ADP block.
                              02CD  ;       RSB
```

```
                            02CD          .SBTTL  INI$UBADP - BUILD ADP AND INITIALIZE UBA
                            02CD    ;+
                            02CD    ; INI$UBADP ALLOCATES AND FILLS IN AN ADAPTER CONTROL BLOCK, INTERRUPT
                            02CD    ; DISPATCHER AND CONNECTS THEM TO THE PROPER SCB VECTORS.  A CALL IS
                            02CD    ; THEN MADE TO UBA$INITIAL TO INITIALIZE THE ADAPTER HARDWARE.
                            02CD    ;
                            02CD    ; INPUT:
                            02CD    ;         R4 - nexus identification number of this adapter
                            02CD    ;         R11- offset from beginning of SCB to correct SCB page for this adapter
                            02CD    ;-
                            02CD
                            02CD    INI$UBADP:
                            02CD
         01FF 8F      BB    02CD          PUSHR   #^M<R0,R1,R2,R3,R4,R5,R6,R7,R8> ; SAVE R0-R8
                            02D1    ;
                            02D1    ; Allocate and initialize Adapter Control Block (ADP).
                            02D1    ;
     51   0019'CF     3C    02D1          MOVZWL  W^CPU_ADPSIZE,R1            ; PICK UP LENGTH OF ADP
             020B     30    02D6          BSBW    ALONPAGD                    ; ALLOCATE SPACE FOR ADP
      08 A2    51     B0    02D9          MOVW    R1,ADP$W_SIZE(R2)           ; SET SIZE INTO ADP BLOCK
      0A A2    01     90    02DD          MOVB    #DYN$C_ADP, -               ; AND SET TYPE OF BLOCK
                            02E1                  ADP$B_TYPE(R2)
      0E A2    01     B0    02E1          MOVW    #AT$_UBA, -                 ; SET TYPE OF ADAPTER
                            02E5                  ADP$W_ADPTYPE(R2)
   62    00E4'CF44    D0    02E5          MOVL    W^SBICONF[R4], -            ; SET VA OF CONFIGURATION REG
                            02EB                  ADP$L_CSR(R2)
      0C A2    54     B0    02EB          MOVW    R4,ADP$W_TR(R2)             ; SET TR NUMBER FOR ADAPTER
                            02EF
      50    14 A2     DE    02EF          MOVAL   ADP$L_DPQFL(R2),R0          ; ADDRESS OF DATA PATH WAIT QUEUE
         60    50     D0    02F3          MOVL    R0,(R0)                     ; INIT QUEUE HEADER
      04 A0    50     D0    02F6          MOVL    R0,4(R0)                    ;
                            02FA
      50    30 A2     DE    02FA          MOVAL   ADP$L_MRQFL(R2),R0          ; ADDRESS OF MAP WAIT QUEUE
         60    50     D0    02FE          MOVL    R0,(R0)                     ; INIT QUEUE HEADER
      04 A0    50     D0    0301          MOVL    R0,4(R0)                    ;
            04 A2     D4    0305          CLRL    ADP$L_LINK(R2)              ; ZAP ADAPTER CHAIN LINK
             FCF5'    30    0308          BSBW    ADPLINK                     ; LINK ADP TO END OF LIST
                            030B    ;
                            030B    ; Initialize adapter interrupt vectors in System Control Block.
                            030B    ;
  58    00000000'GF   D0    030B          MOVL    G^EXE$GL_SCB,R8             ; GET SCB ADDRESS
                            0312
                            0312
     53    5B    09   78    0312          ASHL    #9,R11,R3                   ; Turn SCB page offset into byte offset.
           58    53   C0    0316          ADDL    R3,R8                       ; Set to beginning of correct SCB page.
                            0319                                              ; Fall into 11/780 code.
                            0319
                            0319
                            0319    ;
                            0319    ; Following ASSUME breaks if the ADP length is not a multiple of 4, thereby
                            0319    ;         causing the vectors to NOT be long word aligned.
                            0319
                            0319          ASSUME  ADP$C_UBAADPLEN/4*4     EQ      ADP$C_UBAADPLEN
                            0319
     53   02EC'C2     9E    0319          MOVAB   ADP$C_UBAADPLEN+UBINTSZ(R2),R3  ; LOCATE VECTORS
      10 A2    53     D0    031E          MOVL    R3,ADP$L_VECTOR(R2)         ; AND RECORD IN ADP
   60 A2   FFFE 8F    B0    0322          MOVW    #^XFFFE,ADP$W_DPBITMAP(R2) ; MARK DATAPATHS 1-15 AVAILABLE
```

```
         53   FF6C'C3   9E  0328  1399           MOVAB   -UBINTSZ(R3),R3             ; BASE OF INTERRUPT CODE
                    3F   BB  032D  1400           PUSHR   #^M<R0,R1,R2,R3,R4,R5>      ; SAVE MOVC REGISTERS
   63   0450'CF   0094'8F   28  032F  1401           MOVC3   #UBINTSZ,W^UBAINTBASE,(R3)         ; COPY INTERRUPT CODE
                    3F   BA  0337  1402           POPR    #^M<R0,R1,R2,R3,R4,R5>      ; RESTORE MOVC REGISTERS
      54   54    04    00   EF  0339  1403           EXTZV   #0,#4,R4,R4                 ; Use low 4 bits of nexus number.
         50    0100 C844   DE  033E  1404           MOVAL   ^X100(R8)[R4],R0            ; COMPUTE 1ST VECTOR ADDRESS
               1C A2    50   D0  0344  1405           MOVL    R0,ADP$L_AVECTOR(R2)        ; SAVE ADDR OF ADAPTER SCB VECTORS
               60    01'A3   9E  0348  1406           MOVAB   B^UBAINT4+1(R3),(R0)        ; STORE VECTOR FOR BR4
            40 A0    21'A3   9E  034C  1407           MOVAB   B^UBAINT5+1(R3),64(R0)      ; STORE VECTOR FOR BR5
          0080 C0    41'A3   9E  0351  1408           MOVAB   B^UBAINT6+1(R3),128(R0)     ; STORE VECTOR FOR BR6
          00C0 C0    61'A3   9E  0357  1409           MOVAB   B^UBAINT7+1(R3),192(R0)     ; STORE VECTOR FOR BR7
                  50    62   D0  035D  1410           MOVL    ADP$L_CSR(R2),R0            ; GET UBACSR ADDRESS
               0A'A3    50   C0  0360  1411           ADDL    R0,B^UBAINT4REL(R3)         ; ADD CSR VA
               2A'A3    50   C0  0364  1412           ADDL    R0,B^UBAINT5REL(R3)         ; TO EACH OF THE
               4A'A3    50   C0  0368  1413           ADDL    R0,B^UBAINT6REL(R3)         ; BICL INSTRUCTIONS
               6A'A3    50   C0  036C  1414           ADDL    R0,B^UBAINT7REL(R3)         ; IN THE INTERRUPT DISPATCHERS
             0089'C3    52   D0  0370  1415           MOVL    R2,UBAINTADP(R3)            ;SET ADDRESS OF ADAPTOR CONTROL BLOCK
                  0000'CF   9E  0375  1416           MOVAB   W^EXE$UBAERR_INT,-
                  0090'C3       0379  1417                    UBAERRADR(R3)               ; SET ADDRESS OF ERROR HANDLER
                    01'A3   9E  037C  1418           MOVAB   B^UBAINT4+1(R3),-
                    44 A2       037F  1419                    ADP$L_UBASCB(R2)            ; SAVE 4 SCB VECTOR CONTENTS
                    21'A3   9E  0381  1420           MOVAB   B^UBAINT5+1(R3),-
                    48 A2       0384  1421                    ADP$L_UBASCB+4(R2)          ; DITTO
                    41'A3   9E  0386  1422           MOVAB   B^UBAINT6+1(R3),-
                    4C A2       0389  1423                    ADP$L_UBASCB+8(R2)          ; DITTO
                    61'A3   9E  038B  1424           MOVAB   B^UBAINT7+1(R3),-
                    50 A2       038E  1425                    ADP$L_UBASCB+12(R2)         ; DITTO
                  54    52   D0  0390  1426           MOVL    R2,R4                       ; COPY ADP ADDRESS
                  52    62   D0  0393  1427           MOVL    ADP$L_CSR(R2),R2            ; VIRTUAL ADDRESS OF ADAPTER
       04 A2    7C000000 8F   D0  0396  1428           MOVL    #^X7C000000,UBA$L_CR(R2);   DISABLE ALL UMR'S
              00000000'GF   16  039E  1429           JSB     G^MMG$SVAPTECHK             ; ADDRESS OF SPTE THAT MAPS ADAPTER
               54 A4    63   D0  03A4  1430           MOVL    (R3),ADP$L_UBASPTE(R4)      ; SAVE CONTENTS OF SPTE MAPPING ADAPTER
         58 A4    20 A3   D0  03A8  1431           MOVL    <8*4>(R3),-                 ; CONTENTS OF SPTE MAPPING I/O SPACE
                                03AD  1432                    ADP$L_UBASPTE+4(R4)
                  52    54   D0  03AD  1433           MOVL    R4,R2                       ; COPY ADP ADDRESS BACK TO R2
         53   00000000'GF   DE  03B0  1434           MOVAL   G^UBA$UNEXINT,R3            ; GET ADDR OF UNEXP INT SERVICE(IN EXEC)
         54       0000'CF   DE  03B7  1435           MOVAL   W^UBA$INT0,R4               ; GET ADDR OF SPECIAL VECTOR 0 ROUTINE
                                03BC  1436
                                03BC  1437 ;
                                03BC  1438 ; INIT UB VECTORS TO UNEXPECTED INTERRUPT SERVICE
                                03BC  1439 ;
         50    10 A2   D0  03BC  1440           MOVL    ADP$L_VECTOR(R2),R0         ; GET ADDRESS OF VECTORS
               80    54   D0  03C0  1441           MOVL    R4,(R0)+                    ; SPECIAL CASE FOR VECTOR 0
         51    7F 8F   9A  03C3  1442           MOVZBL  #<NUMUBAVEC-1>,R1           ; REST OF VECTORS
               80    53   D0  03C7  1443 10$:      MOVL    R3,(R0)+                    ; FILL VECTOR WITH UNEXP INT
               FA 51   F5  03CA  1444           SOBGTR  R1,10$                      ; FILL ALL VECTORS
                                03CD  1445
                                03CD  1447
                                03CD  1507
                                03CD  1508
                                03CD  1536
                                03CD  1537
                                03CD  1558
                                03CD  1559
                                03CD  1601
                                03CD  1602
                                03CD  1651 ;
```

```
                                  03CD   ; Now check for any UNIBUS memory that may be on the adapter. First we must
                                  03CD   ; disable all the UNIBUS Map Registers so that there is no conflict in
                                  03CD   ; which memory will respond.  Then we check all 248Kb of potential memory in
                                  03CD   ; 8Kb chunks, since each disable bit on the 780 UBA represents 16 UMR's or
                                  03CD   ; 8Kb of memory.  The number of registers is stored in the ADP and the
                                  03CD   ; corresponding number withdrawn from the UMR map in the ADP.
                                  03CD   ;
                                  03CD
                     56   62   D0 03CD          MOVL    ADP$L_CSR(R2),R6          ; Pick up adapter pointer
                          51   D4 03D0          CLRL    R1                        ; Zero out number of UMR to disable
   57  08 AE   00000200 8F     C3 03D2          SUBL3   #512,8(SP),R7             ; R7 = VA of last page of UNIBUS
           58   0C AE   04     C3 03DB          SUBL3   #4,12(SP),R8              ; R8 = VA of SPTE mapping (R7)
   54  20 AE   00000200 8F     C3 03E0          SUBL3   #512,32(SP),R4            ; R4 = PFN of first page of UNIBUS
                          68   DD 03E9          PUSHL   (R8)                      ; Save contents of SPTE
                     53   54   D0 03EB          MOVL    R4,R3                     ; Copy starting PFN
                     55   1F   D0 03EE          MOVL    #31,R5                    ; 31 8Kb chunks to test
                                  03F1   50$:   INVALID R7                        ; Invalidate TB
               90000000 8F     C9 03F4          BISL3   #<PTE$M_VALID!PTE$C_KW>,-
                     68   54      03FA                  R4,(R8)                   ; Map each page of UNIBUS
                     50   57   D0 03FC          MOVL    R7,R0                     ; Address to check
                       FBFE'   30 03FF          BSBW    EXE$TEST_CSR              ; Validate it
                       0D 50   E9 0402          BLBC    R0,70$                    ; Not there
                     54   53   D1 0405          CMPL    R3,R4                     ; First time in?
                          04   13 0408          BEQL    60$                       ; Yes, skip next test
                          51   D5 040A          TSTL    R1                        ; Any registers already?
                          3A   13 040C          BEQL    80$                       ; No, memory not start at 0
                  51   10 A1   9E 040E   60$:   MOVAB   16(R1),R1                 ; Yes, up the count
                  54   10 A4   9E 0412   70$:   MOVAB   16(R4),R4                 ; Map Next 8Kb (16*512)
                       D8 55   F5 0416          SOBGTR  R5,50$                    ; Loop until done
                        68 8ED0   0419          POPL    (R8)                      ; Restore old contents of SPTE
                                  041C          INVALID R7                        ; Invalidate TB
                0256 C2   51   B0 041F          MOVW    R1,ADP$W_UMR_DIS(R2)      ; Record number disabled
                                  0424   ;
                                  0424   ; Initialize fields for new UBA map register allocation.  Make it appear
                                  0424   ;       that we have one contiguous array of 496 available map registers.
                                  0424   ;       To do this we set ADP$L_MRACTMDRS to one (the number of active
                                  0424   ;       map register descriptors for distinct contiguous areas),
                                  0424   ;       ADP$W_MRNREGARY(0) to 496 (i.e the number of registers in this
                                  0424   ;       contiguous range) and ADP$FREGARY(0) to 0 (i.e. the first register
                                  0424   ;       in the range is register 0).
                                  0424   ;
                  5C A2   01   D0 0424          MOVL    #1,ADP$L_MRACTMDRS(R2)    ; 1 active map descriptor
        64 A2   01F0 8F   51   A3 0428          SUBW3   R1,#496,ADP$W_MRNREGARY(R2);  for a range of 496 registers
                015E C2   51   B0 042F          MOVW    R1,ADP$W_MRFREGARY(R2)    ;  starting at register zero.
                  62 A2   01   AE 0434          MNEGW   #1,ADP$W_MRNFENCE(R2)     ; Also init "fences" which preceed
                015C C2   01   AE 0438          MNEGW   #1,ADP$W_MRFFENCE(R2)     ;  the two descriptor arrays.
                                  043D   ;
                                  043D   ; Initialize adapter hardware.
                                  043D   ;
                     54   62   D0 043D          MOVL    ADP$L_CSR(R2),R4          ; Get CSR address to init
                       FBBD'   30 0440          BSBW    UBA$INITIAL               ; And initialize adapter
                    01FF 8F    BA 0443          POPR    #^M<R0,R1,R2,R3,R4,R5,R6,R7,R8> ; Restore registers
                               05 0447          RSB                               ; Return
                                  0448
                                  0448   ;
                                  0448   ; Error if UNIBUS memory not start at location 0
                                  0448   ;
```

```
         51   030D'CF   9E  0448  1725 80$:      MOVAB   W^BADUMR,R1              ; Set error message
                 FDEE   31  044D  1726           BRW     ERROR_HALT_1             ; Put it out
                            0450  1728
```

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                                       0450  1731 ;
                                       0450  1732 ; UBA INTERRUPT SERVICE ROUTINES.  ONE COPY OF THESE ROUTINES IS
                                       0450  1733 ; MOVED INTO NONPAGED POOL AND RELOCATED FOR EACH UBA.
                                       0450  1734 ;
                                       0450  1735 ; **** NOTE ****  THE CODING SEQUENCE FOR DISPATCHING ON UBA INTTERUPTS
                                       0450  1736 ; IS ASSUMED IN THE MODULE MCHECK780.MAR.  THE ASSUMPTIONS ARE MADE SO
                                       0450  1737 ; THE MACHINE CHECK HANDLER CAN IDENTIFY A CPU TIMEOUT WHEN THE
                                       0450  1738 ; BICL3 INSTRUCTION IS READING THE  UBA'S BRRVR REGISTER.
                                       0450  1739 ; THE ASSUMPTIONS MADE ARE THAT THE VALUE OF THE VIRTUAL ADDRESS OF THE BRRVR
                                       0450  1740 ; REGISTER IS AT AN OFFSET OF 10. BYTES PAST THE INTERRUPT VECTOR ENTRY POINT,
                                       0450  1741 ; THAT THE PC OF THE INSTRUCTION ACCESSING BRRVR IS 3 BYTES PAST THE INTERRUPT
                                       0450  1742 ; VECTOR ENTRY, AND THAT R4 AND R5 ARE SAVED ON THE STACK AT THAT POINT.
                                       0450  1743 ;
                                       0450  1744
                                       0450  1745            .ENABL  LSB
                                       0450  1746            .ALIGN  QUAD
                                       0450  1747 UBAINTBASE:                                  ; BASE OF UBA INTERRUPT DISPATCHERS
                               00000000 0450  1748 UBAINT4=.-UBAINTBASE                         ; UBA 0 INTERRUPT DISPATCH LEVEL 4
                         7E    54    7D 0450  1749            MOVQ    R4,-(SP)                  ; SAVE REGISTERS
54    00000030 9F    7FFFFE03 8F    CB 0453  1750            BICL3   #^X7FFFFE03,@#UBA$L_BRRVR,R4 ; READ VECTOR  REGISTER AND CLEAR BITS
                               0000000A 045F  1751 UBAINT4REL=.-UBAINTBASE-5                    ; OFFSET TO ADD UBACSR VALUE
                         7E    52    7D 045F  1752            MOVQ    R2,-(SP)                  ; SAVE REGISTERS
                  55    E4'AF44    9E 0462  1753            MOVAB   B^VECTAB[R4],R5           ; GET ADDRESS OF INTERRUPT VECTOR
                               65    18 0467  1754            BGEQ    10$                       ; IF GEQ UBA INTERRUPTS
                         7E    50    7D 0469  1755            MOVQ    R0,-(SP)                  ; SAVE REGISTERS
                               95    17 046C  1756            JMP     @(R5)+                    ; DISPATCH INTERRUPT
                                       046E  1757            .ALIGN  QUAD
                               00000020 0470  1758 UBAINT5=.-UBAINTBASE                         ; UBA 0 INTERRUPT DISPATCH LEVEL 5
                         7E    54    7D 0470  1759            MOVQ    R4,-(SP)                  ; SAVE REGISTERS
54    00000034 9F    7FFFFE03 8F    CB 0473  1760            BICL3   #^X7FFFFE03,@#UBA$L_BRRVR+4,R4 ; READ VECTOR REGISTER AND CLEAR BITS
                               0000002A 047F  1761 UBAINT5REL=.-UBAINTBASE-5                    ; OFFSET TO ADD UBACSR VALUE
                         7E    52    7D 047F  1762            MOVQ    R2,-(SP)                  ; SAVE REGISTERS
                  55    E4'AF44    9E 0482  1763            MOVAB   B^VECTAB[R4],R5           ; GET ADDRESS OF INTERRUPT VECTOR
                               45    18 0487  1764            BGEQ    10$                       ; IF GEQ UBA INTERRUPTS
                         7E    50    7D 0489  1765            MOVQ    R0,-(SP)                  ; SAVE REGISTERS
                               95    17 048C  1766            JMP     @(R5)+                    ; DISPATCH INTERRUPT
                                       048E  1767            .ALIGN  QUAD
                               00000040 0490  1768 UBAINT6=.-UBAINTBASE                         ; UBA 0 INTERRUPT DISPATCH LEVEL 6
                         7E    54    7D 0490  1769            MOVQ    R4,-(SP)                  ; SAVE REGISTERS
54    00000038 9F    7FFFFE03 8F    CB 0493  1770            BICL3   #^X7FFFFE03,@#UBA$L_BRRVR+8,R4 ; READ VECTOR REGISTER AND CLEAR BITS
                               0000004A 049F  1771 UBAINT6REL=.-UBAINTBASE-5                    ; OFFSET TO ADD UBACSR VALUE
                         7E    52    7D 049F  1772            MOVQ    R2,-(SP)                  ; SAVE REGISTERS
                  55    E4'AF44    9E 04A2  1773            MOVAB   B^VECTAB[R4],R5           ; GET ADDRESS OF INTERRUPT VECTOR
                               25    18 04A7  1774            BGEQ    10$                       ; IF GEQ UBA INTERRUPTS
                         7E    50    7D 04A9  1775            MOVQ    R0,-(SP)                  ; SAVE REGISTERS
                               95    17 04AC  1776            JMP     @(R5)+                    ; DISPATCH INTERRUPT
                                       04AE  1777            .ALIGN  QUAD
                               00000060 04B0  1778 UBAINT7=.-UBAINTBASE                         ; UBA 0 INTERRUPT DISPATCH LEVEL 7
                         7E    54    7D 04B0  1779            MOVQ    R4,-(SP)                  ; SAVE REGISTERS
54    0000003C 9F    7FFFFE03 8F    CB 04B3  1780            BICL3   #^X7FFFFE03,@#UBA$L_BRRVR+12,R4 ; READ VECTOR AND CLEAR BITS
                               0000006A 04BF  1781 UBAINT7REL=.-UBAINTBASE-5                    ; OFFSET TO ADD UBACSR VALUE
                         7E    52    7D 04BF  1782            MOVQ    R2,-(SP)                  ; SAVE REGISTERS
                  55    E4'AF44    9E 04C2  1783            MOVAB   B^VECTAB[R4],R5           ; GET ADDRESS OF INTERRUPT VECTOR
                               05    18 04C7  1784            BGEQ    10$                       ; IF GEQ UBA INTERRUPTS
                         7E    50    7D 04C9  1785            MOVQ    R0,-(SP)                  ; SAVE REGISTERS
                               95    17 04CC  1786            JMP     @(R5)+                    ; DISPATCH INTERRUPT
                     00 54    1F    E5 04CE  1787 10$:       BBCC    #31,R4,20$                ;CLEAR ADAPTER ERROR INTERRUPT FLAG (MSB)
```

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          55   E4'AF44    9E   04D2   1788 20$:     MOVAB   B^VECTAB[R4],R5              ;GET ADDRESS OF INTERRUPT VECTOR
     54    00000000'8F    D0   04D7   1789          MOVL    I^#0,R4                      ;GET ADDRESS OF ADAPTOR CONTROL BLOCK
                 00000089      04DE   1790 UBAINTADP=.-UBAINTBASE-5                      ;OFFSET TO START OF LOADED CODE
        00000000 9F       17   04DE   1791          JMP     @#0                          ;ERROR ROUTINE IN ADPERR780
                 00000090      04E4   1792 UBAERRADR=.-UBAINTBASE-4
                               04E4   1793          .DSABL  LSB
                               04E4   1794
                               04E4   1795          .ALIGN  LONG                         ; LONGWORD ALIGN VECTORS
                               04E4   1796 VECTAB:                                       ; END OF INTERRUPT CODE, START OF VECTORS
                 00000094      04E4   1797 UBINTSZ=.-UBAINTBASE                          ; SIZE OF UBA INTERRUPT CODE
                               04E4   1798
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                            04E4          .SBTTL  INI$MBADP - BUILD ADP AND INITIALIZE MBA
                            04E4          .SBTTL  INI$DRADP - BUILD ADP AND INITIALIZE DR32
                            04E4          .SBTTL  INI$CIADP - BUILD ADP AND INITIALIZE CI
                            04E4  ;+
                            04E4  ; INI$MBADP IS CALLED AFTER MAPPING THE REGISTERS FOR A MASSBUS ADAPTER.
                            04E4  ; AN ADAPTER CONTROL BLOCK IS ALLOCATED AND FILLED.  A CRB AND IDB ARE
                            04E4  ; ALSO ALLOCATED AND INITIALIZED. THE ADAPTER HARDWARE IS THEN INITIALIZED
                            04E4  ; BY CALLING MBA$INITIAL.
                            04E4  ;
                            04E4  ; INI$DRADP IS CALLED AFTER MAPPING THE REGISTERS FOR THE DR32
                            04E4  ; ADAPTER.  THE ADAPTER CONTROL BLOCK, CRB, AND IDB ARE ALLOCATED
                            04E4  ; AND INITIALIZED.  THE ADAPTER HARDWARE IS THEN INITIALIZED BY
                            04E4  ; CALLING DR$INITIAL.
                            04E4  ;
                            04E4  ; INI$MBADP AND INI$DRADP SHARE COMMON CODE AFTER THE TABLE OF ADAPTER
                            04E4  ; SPECIFIC CONSTANTS IS SELECTED AND STORED IN R8.
                            04E4  ;
                            04E4  ; INPUT:
                            04E4  ;         R4 - nexus identification number of this adapter
                            04E4  ;         R11- offset from beginning of SCB to correct SCB page for this adapter
                            04E4  ;
                            04E4  ; OUTPUTS:
                            04E4  ;         ALL REGISTERS PRESERVED
                            04E4  ;-
                            04E4
     00000000'GF      17    04E4  ALONPAGD:JMP    G^INI$ALONONPAGED
                            04EA
                            04EA          .ENABL  LSB
                            04EA
                            04EA  INI$DRADP:                                      ; INITIALIZE DR32 DATA STRUCTURES
                            04EA
        07FF 8F       BB    04EA          PUSHR   #^M<R0,R1,R2,R3,R4,R5,R6,R7,R8,R9,R10> ; SAVE REGISTERS
   58   0011'CF       DE    04EE          MOVAL   W^DRTAB,R8                      ; GET DR32 TABLE OF CONSTANTS
   59   0000'CF       9E    04F3          MOVAB   W^DR$INT,R9                     ; ADDRESS OF INITERRUPT SERVICE ROUTINE
   5A   0000'CF       9E    04F8          MOVAB   W^DR$INITIAL,R10                ; ADDRESS OF DEVICE INITIALIZATION
             28       11    04FD          BRB     10$                             ; JOIN COMMON CODE
                            04FF
                            04FF  INI$CIADP:                                      ; INITIALIZE CI DATA STRUCTURES
                            04FF
        07FF 8F       BB    04FF          PUSHR   #^M<R0,R1,R2,R3,R4,R5,R6,R7,R8,R9,R10> ; SAVE REGISTERS
   58   0015'CF       DE    0503          MOVAL   W^CITAB,R8                      ; GET CI TABLE OF CONSTANTS
   59   0000'CF       9E    0508          MOVAB   W^CI$INT,R9                     ; ADDRESS OF INITERRUPT SERVICE ROUTINE
   5A   0000'CF       9E    050D          MOVAB   W^CI$INITIAL,R10                ; ADDRESS OF DEVICE INITIALIZATION
             13       11    0512          BRB     10$                             ; JOIN COMMON CODE
                            0514
                            0514  INI$MBADP:                                      ; INIT MBA DATA STRUCTURES
                            0514
        07FF 8F       BB    0514          PUSHR   #^M<R0,R1,R2,R3,R4,R5,R6,R7,R8,R9,R10> ;
   58   000D'CF       DE    0518          MOVAL   W^MBATAB,R8                     ; GET MBA TABLE OF CONSTANTS
   59   0000'CF       9E    051D          MOVAB   W^MBA$INT,R9                    ; ADDRESS OF INITERRUPT SERVICE ROUTINE
   5A   0000'CF       9E    0522          MOVAB   W^MBA$INITIAL,R10               ; ADDRESS OF DEVICE INITIALIZATION
                            0527  10$:                                            ;
                            0527  ;
                            0527  ; Allocate and initialize Channel Request Block.
                            0527  ;
   51     0048 8F     3C    0527          MOVZWL  #CRB$C_LENGTH,R1                ; SET SIZE OF CRB
             B6       10    052C          BSBB    ALONPAGD                        ; ALLOCATE SPACE FOR CRB
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           08 A2    51  B0  052E  1882          MOVW    R1,CRB$W_SIZE(R2)             ; SET CORRECT SIZE
           0A A2    05  90  0532  1883          MOVB    #DYN$C_CRB,CRB$B_TYPE(R2)     ; SET CORRECT TYPE
              62    62  DE  0536  1884          MOVAL   CRB$L_WQFL(R2),CRB$L_WQFL(R2)    ; INITIALIZE WAIT QUEUE HEADER
           04 A2    62  DE  0539  1885          MOVAL   CRB$L_WQFL(R2),CRB$L_WQBL(R2)    ; FLINK AND BLINK
           50    24 A2  9E  053D  1886          MOVAB   CRB$L_INTD(R2),R0             ; SET ADDRESS OF INTD AREAD
    80     9F163CBB 8F  D0  0541  1887          MOVL    #^X9F163CBB,(R0)+             ; "PUSHR ^M<R2,R3,R4,R5>,JSB @#"
              80    59  D0  0548  1888          MOVL    R9,(R0)+                      ; ADDR OF XXX$INT ROUTINE
                    80  D4  054B  1889          CLRL    (R0)+                         ; CLEAR OUT UNNEEDED AREA
              60    5A  D0  054D  1890          MOVL    R10,(R0)                      ; ADDR OF XXX$INITIAL ROUTINE
              5A    52  D0  0550  1891          MOVL    R2,R10                        ; SAVE CRB ADDRESS
                            0553  1892  ;
                            0553  1893  ; Allocate and initialize Interrupt Dispatch Block.
                            0553  1894  ;
              51    68  9A  0553  1895          MOVZBL  ADPTAB_IDBUNITS(R8),R1        ; GET # OF IDB UNITS
 51     00000038 9F41   DE  0556  1896          MOVAL   @#IDB$C_LENGTH[R1],R1         ; GET TOTAL SIZE OF IDB
                    84  10  055E  1897          BSBB    ALONPAGD                      ; ALLOCATE SPACE FOR CRB
           08 A2    51  B0  0560  1898          MOVW    R1,IDB$W_SIZE(R2)             ; SET STRUCTURE SIZE
           0A A2    09  90  0564  1899          MOVB    #DYN$C_IDB, -                 ; AND TYPE CODE
                            0568  1900                  IDB$B_TYPE(R2)
                    68  9B  0568  1901          MOVZBW  ADPTAB_IDBUNITS(R8),-         ; SET COUNT OF UNITS
                 0C A2      056A  1902                  IDB$W_UNITS(R2)
    62     00E4'CF44    D0  056C  1903          MOVL    W^SBICONF[R4], -              ; SET CSR ADDRESS TO
                            0572  1904                  IDB$L_CSR(R2)                 ;  START OF ADAPTER REG SPACE
           2C AA    52  D0  0572  1905          MOVL    R2, -                         ; SET ADDRESS OF IDB INTO CRB
                            0576  1906                  CRB$L_INTD+VEC$L_IDB(R10)
              59    52  D0  0576  1907          MOVL    R2,R9                         ; SAVE ADDRESS OF IDB
                            0579  1908  ;
                            0579  1909  ; Allocate and initialize Adapter Control Block (ADP).
                            0579  1910  ;
           51    01 A8  3C  0579  1911          MOVZWL  ADPTAB_ADPLEN(R8),R1          ; GET SIZE OF ADAPTER
                  FF64  30  057D  1912          BSBW    ALONPAGD                      ; ALLOCATE SPACE FOR CRB
           08 A2    51  B0  0580  1913          MOVW    R1,ADP$W_SIZE(R2)             ; SET SIZE OF STRUCTURE
           0A A2    01  90  0584  1914          MOVB    #DYN$C_ADP,ADP$B_TYPE(R2); AND TYPE CODE
              62    69  D0  0588  1915          MOVL    IDB$L_CSR(R9),ADP$L_CSR(R2); SET ADDRESS OF CONFIGURATION REGISTER
           0C A2    54  B0  058B  1916          MOVW    R4,ADP$W_TR(R2)               ; SET TR/SLOT-16 NUMBER OF ADAPTER
                 03 A8  9B  058F  1917          MOVZBW  ADPTAB_ATYPE(R8),-            ; SET THE ADAPTER TYPE
                 0E A2      0592  1918                  ADP$W_ADPTYPE(R2)
           10 A2    5A  D0  0594  1919          MOVL    R10,ADP$L_CRB(R2)             ; POINT ADP TO CRB
                            0598  1920  ;       CMPW    ADP$W_ADPTYPE(R2),#AT$_CI     ; CI?
                            0598  1921  ;       BEQL    20$                           ; YES, DO NOT CONNECT UP VECTORS
                            0598  1922  ;
                            0598  1923  ; Initialize adapter interrupt vectors in System Control Block.
                            0598  1924  ;
 50      00000000'GF    D0  0598  1925          MOVL    G^EXE$GL_SCB,R0               ; GET ADDRESS OF SCB
      55     5B     09  78  059F  1926          ASHL    #9,R11,R5                     ; Turn SCB page offset into byte offset.
             50     55  C0  05A3  1927          ADDL    R5,R0                         ; set to beginning of correct SCB page.
 54   54     04     00  EF  05A6  1928          EXTZV   #0,#4,R4,R4                   ; Use low 4 bits of nexus number.
   50      0100 C044    DE  05AB  1929          MOVAL   ^X100(R0)[R4],R0              ; COMPUTE ADDR OF 1ST VECTOR
           1C A2    50  D0  05B1  1930          MOVL    R0,ADP$L_AVECTOR(R2)          ; SAVE ADDR OF ADAPTER'S SCB VECTORS
             60    25 AA  DE  05B5  1931          MOVAL   CRB$L_INTD+1(R10),(R0)        ; CONNECT VECTOR TO CRB CODE
          40 A0    25 AA  DE  05B9  1932          MOVAL   CRB$L_INTD+1(R10),64(R0); SAME FOR
        0080 C0    25 AA  DE  05BE  1933          MOVAL   CRB$L_INTD+1(R10),128(R0); ALL FOUR
        00C0 C0    25 AA  DE  05C4  1934          MOVAL   CRB$L_INTD+1(R10),192(R0); VECTORS
                            05CA  1935  ;
                            05CA  1936  ; Continue with ADP initialization.
                            05CA  1937  ;
           14 A2    25 AA  DE  05CA  1938  20$:     MOVAL   CRB$L_INTD+1(R10), -          ; SAVE SCB VECTOR CONTENTS IN ADP
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                        05CF         ADP$L_MBASCB(R2)
          0C      BB    05CF     PUSHR   #^M<R2,R3>                ; SAVE SOME REGISTERS
       55 52      D0    05D1     MOVL    R2,R5                     ; COPY ADP ADDRESS
       52 62      D0    05D4     MOVL    ADP$L_CSR(R2),R2          ; VIRTUAL ADDRESS OF ADAPTER
 00000000'GF      16    05D7     JSB     G^MMG$SVAPTECHK           ; ADDRESS OF SPTE THAT MAPS ADAPTER
    18 A5 63      D0    05DD     MOVL    (R3),ADP$L_MBASPTE(R5)    ; SAVE CONTENTS OF SPTE
          0C      BA    05E1     POPR    #^M<R2,R3>                ; RESTORE REGISTERS
    38 AA 52      D0    05E3     MOVL    R2,CRB$L_INTD+VEC$L_ADP(R10)     ; SET CRB POINTER TO ADP
    14 A9 52      D0    05E7     MOVL    R2,IDB$L_ADP(R9)          ; AND INTO IDB
       FA12'      30    05EB     BSBW    ADPLINK                   ; LINK ADP TO END OF CHAIN
                        05EE  ;
                        05EE  ; Initialize adapter hardware.
                        05EE  ;
       55 59      D0    05EE     MOVL    R9,R5                     ; ADDRESS OF IDB
       54 65      D0    05F1     MOVL    IDB$L_CSR(R5),R4          ; ADDRESS OF CONFIGURATION REGISTER 0
       30 BA      16    05F4     JSB     @CRB$L_INTD+VEC$L_INITIAL(R10) ; INIT ADAPTER
     07FF 8F      BA    05F7     POPR    #^M<R0,R1,R2,R3,R4,R5,R6,R7,R8,R9,R10>; RESTORE ALL REGISTERS
          05            05FB     RSB                               ; RETURN
                        05FC
                        05FC     .DSABL  LSB
```

```
        05FC           .SBTTL  INI$KDZ11
        05FC      ;++
        05FC      ;
        05FC      ; INPUTS:
        05FC      ;         R2 - VA of next free system page
        05FC      ;         R3 - VA of system page table entry to be used to map VA in R2
        05FC      ;         R4 - nexus identification number of this adapter
        05FC      ;
        05FC      ; OUTPUTS:
        05FC      ;
        05FC      ;--
        05FC
        05FC      INI$KDZ11:
        05FC
    05  05FC           RSB                                  ; Return to caller.
```

```
                              05FD  2031          .SBTTL  INI$CONSOLE, init data structures for console
                              05FD  2032 ;++
                              05FD  2033 ; FUNCTIONAL DESCRIPTION:
                              05FD  2034 ;
                              05FD  2035 ;        This routine is executed only once, during system initialization.
                              05FD  2036 ;        It initializes the CRB and IDB for boot/console device.
                              05FD  2037 ;
                              05FD  2038 ;        This routine is called from INIT.
                              05FD  2039 ;
                              05FD  2040 ; INPUTS:
                              05FD  2041 ;
                              05FD  2042 ;        R3 -->  DISK [CLASS] DRIVER DDB
                              05FD  2043 ;        R4 -->  DISK [CLASS] DRIVER DPT
                              05FD  2044 ;        R5 -->  DISK [CLASS] DRIVER UCB
                              05FD  2045 ;        R6 -->  RPB
                              05FD  2046 ;        R7 -->  ADP FOR EITHER A REAL DISK OR A PORT
                              05FD  2047 ;        R9 -->  PORT DRIVER DPT (IF PRESENT)
                              05FD  2048 ;        R10-->  PORT DIRVER UCB (IF PRESENT)
                              05FD  2049 ;
                              05FD  2050 ;--
                              05FD  2051
                              05FD  2052 INI$CONSOLE::
                              05FD  2053          .ENABL  LSB
                              05FD  2054
           66 A6      91      05FD  2056          CMPB    RPB$B_DEVTYP(R6),-        ; BOOTING FROM CONSOLE BLOCK
              40 8F           0600  2057                  #BTD$K_CONSOLE            ; STORAGE DEVICE?
                 10   12      0602  2058          BNEQ    BLD_CRB                   ; NO
      41534303 8F     D0      0604  2059          MOVL    #^A7CSA/@8+3,-            ; YES, SET DEVICE NAME
              14 A3           060A  2060                  DDB$T_NAME(R3)            ; COUNTED STRING
                              060C  2062
                              060C  2067
                 57   D4      060C  2070          CLRL    R7                        ; CLEAR ADP POINTER
        54 A5    01   B0      060E  2071          MOVW    #1,UCB$W_UNIT(R5)         ; SET UNIT NUMBER TO 1
                 0D   11      0612  2072          BRB     FILL_CRB
                              0614  2075
                              0614  2076 ;
                              0614  2077 ; NOW BUILD THE AUXILIARY DATA BLOCKS (CRB,IDB)
                              0614  2078 ;
                              0614  2079 BLD_CRB:
        58   10 A7    D0      0614  2080          MOVL    ADP$L_CRB(R7),R8          ; GET ADDRESS OF CRB IF IT EXISTS
        0E A7    01   B1      0618  2081          CMPW    #AT$_UBA,ADP$W_ADPTYPE(R7); IS THIS A UNIBUS ADAPTER?
                 03   13      061C  2082          BEQL    FILL_CRB                  ; YES, ALLOCATE CRB
               0088   31      061E  2083          BRW     100$                      ; NO, CRB/IDB ALREADY ALLOCATED
                              0621  2084
                              0621  2085 FILL_CRB:
        00000000'9F   16      0621  2086          JSB     @#INI$ALLOC_CRB           ; GO ALLOCATE AND SETUP CRB
24 A2   9F163FBB 8F   D0      0627  2087          MOVL    #^X9F163FBB,CRB$L_INTD(R2) ; SET PUSHR #^M<R0,...R5>
                              062F  2088                                            ;  JSB @#0 INTO INTERRUPT DISPATCH
        38 A2    57   D0      062F  2089          MOVL    R7,CRB$L_INTD+VEC$L_ADP(R2)     ; SET POINTER TO ADP
           58    52   D0      0633  2090          MOVL    R2,R8                     ; SAVE CRB POINTER
      51   0058 8F    3C      0636  2091          MOVZWL  #<IDB$C_LENGTH+<8*4>>,R1; SIZE TO ALLOCATE FOR IDB
        00000000'9F   16      063B  2092          JSB     @#INI$ALONONPAGED         ; ALLOCATE IDB
        08 A2    51   B0      0641  2093          MOVW    R1,IDB$W_SIZE(R2)         ; SET SIZE OF IDB
        0A A2    09   90      0645  2094          MOVB    #DYN$C_IDB,IDB$B_TYPE(R2); AND STRUCTURE TYPE CODE
        2C A8    52   D0      0649  2095          MOVL    R2,CRB$L_INTD+VEC$L_IDB(R8) ; SET IDB INTO CRB
                              064D  2096
           66 A6      91      064D  2099          CMPB    RPB$B_DEVTYP(R6),-        ; BOOTING FROM CONSOLE BLOCK
```

```
                           40 8F     0650                #BTD$K_CONSOLE               ; STORAGE DEVICE?
                              26 12  0652        BNEQ    10$                          ; NO
50     000000F0 8F   00000000'9F C1  0654        ADDL3   @#EXE$GL_SCB,#^XF0,R0        ; YES, GET ADDRESS OF VECTOR IN SCB
                      80   25 A8 DE  0660        MOVAL   CRB$L_INTD+1(R8),(R0)+       ; SET ADDR IN 1ST VECTOR
                      60   49 A8 DE  0664        MOVAL   CRB$L_INTD2+1(R8),(R0)       ; SET ADDR IN 2ND VECTOR
             48 A8   9F163FBB 8F D0  0668        MOVL    #^X9FT63FBB,CRB$L_INTD2(R8)  ; STORE PUSHR #^M<R0...R5>
                                     0670                                             ; JMP @# IN 2ND INT. DISPATCH
                      50 A8   52 D0  0670        MOVL    R2,CRB$L_INTD2+VEC$L_IDB(R8); STORE ADDRESS OF IDB IN CRB
                      2C B8   1F D0  0674        MOVL    #PR$_CSTD, -                 ; STORE IPR NUMBER OF CONSOLE INTERFACE
                                     0678                @CRB$L_INTD+8(R8)            ; REGISTER AS DEVICE CSR ADDRESS
                              2F 11  0678        BRB     100$
                                     067A
                      62   58 A6 D0  067A 10$:   MOVL    RPB$L_CSRVIR(R6), -          ; SAVE BOOT DEVICE CSR ADDRESS
                                     067E                IDB$L_CSR(R2)                ; IN INTERRUPT DISPATCH BLOCK
                              11 91  067E        CMPB    #BTD$K_UDA,-                 ; LOW ORDER BYTE OF ORIGINAL R0 TELLS
                           66 A6     0680                RPB$B_DEVTYP(R6)             ;  BOOT DEVICE TYPE.
                              08 12  0682        BNEQ    20$                          ; IF NOT BOOTING FROM A UDA BRANCH
                                     0684                                             ;  AROUND.
             00000000'9F   58 A6 D0  0684        MOVL    RPB$L_CSRVIR(R6), -          ; COPY VIRTUAL ADDRESS OF UDA PORT CSR
                                     068C                @#BOO$GB_SYSTEMID            ;  TO LOW ORDER LONGWORD OF SYSTEMID
                                     068C 20$:
                      14 A2   57 D0  068C        MOVL    R7,IDB$L_ADP(R2)             ; POINT IDB TO ADP
                      50   1E A6 3C  0690        MOVZWL  RPB$W_ROUBVEC(R6),R0         ; GET USER SPECIFIED VECTOR
                              0A 12  0694        BNEQ    30$                          ; BRANCH IF VECTOR SPECIFIED
                      50   66 A6 9A  0696        MOVZBL  RPB$B_DEVTYP(R6),R0          ; ELSE GET DEVICE TYPE CODE
                  50   FFFE'CF40 3C  069A        MOVZWL  W^BOOTVECTOR-2[R0],R0        ; GET DEFAULT INTERRUPT VECTOR
                    50   10 B740 9E  06A0 30$:   MOVAB   @ADP$L_VECTOR(R7)[R0],R0;    COMPUTE ADDRESS OF VECTOR
                      60   26 A8 9E  06A5        MOVAB   CRB$L_INTD+2(R8),(R0)        ; SET ADDR OF INTERRUPT VECTOR
                                     06A9
                                     06A9                                             ;
                                     06A9 100$:
                                 05  06A9        RSB                                  ; RETURN
                                     06AA        .DISABLE LSB
```

```
                         06AA  2141          .SBTTL  EXE$INI_TIMWAIT - COMPUTE CORRECT TIMEWAIT LOOP VALUES
                         06AA  2142  ;++
                         06AA  2143  ; FUNCTIONAL DESCRIPTION:
                         06AA  2144  ;
                         06AA  2145  ; EXE$INI_TIMWAIT initializes EXE$GL_TENUSEC and EXE$GL_UBDELAY, cells used
                         06AA  2146  ; in the time-wait macros.  The first data cell, EXE$GL_TENUSEC, is the number
                         06AA  2147  ; of times the following loop will be executed in ten u-seconds.  This is
                         06AA  2148  ; done once here to calibrate the loop instead of reading the processor clock.
                         06AA  2149  ; The resulting number is used in the system macros TIMEWAIT and TIMEDWAIT.
                         06AA  2150  ;
                         06AA  2151  ; The first step is to initialize EXE$GL_UBDELAY.  If the bit test instruction
                         06AA  2152  ; in the TIMEWAIT macro is executed too rapidly in a loop, it can saturate the
                         06AA  2153  ; Unibus.  EXE$GL_UBDELAY is used to introduce a 3 microsecond delay loop into
                         06AA  2154  ; the TIMEWAIT bit test loop.
                         06AA  2155  ;
                         06AA  2156  ; This routine is called only once, from INIT.
                         06AA  2157  ;
                         06AA  2158  ; INPUT PARAMETERS:
                         06AA  2159  ;
                         06AA  2160  ;       NONE
                         06AA  2161  ;
                         06AA  2162  ; IMPLICIT INPUTS:
                         06AA  2163  ;
                         06AA  2164  ;       Time-of-day processor clock.
                         06AA  2165  ;       Interval timers.
                         06AA  2166  ;
                         06AA  2167  ; OUTPUT PARAMETERS:
                         06AA  2168  ;
                         06AA  2169  ;       R0 - Destroyed.
                         06AA  2170  ;
                         06AA  2171  ; IMPLICIT OUTPUTS:
                         06AA  2172  ;
                         06AA  2173  ;       EXE$GL_TENUSEC - set to appropriate value to make TIMEWAIT and TIMEDWAIT
                         06AA  2174  ;                        macros loop for 10 micro-seconds.
                         06AA  2175  ;
                         06AA  2176  ;       EXE$GL_UBDELAY - set to appropriate value to make TIMEWAIT and TIMEDWAIT
                         06AA  2177  ;                        macros loop for 3 micro-seconds in the unibus delay
                         06AA  2178  ;                        loop.
                         06AA  2179  ;
                         06AA  2180  ;--
                         06AA  2181
                         06AA  2182  EXE$INI_TIMWAIT::                              ; Initialize time-wait data cells
                         06AA  2184          .ENABLE LSB
                         06AA  2185
                         06AA  2189
                         06AA  2193
                         06AA  2197
         F953'   30      06AA  2199          BSBW    INI$CACHE              ; Initialize and enable cache.
      19    00   DA      06AD  2200          MTPR    #0,#PR790$_NICR        ; Initialize next interval count register.
                         06B0  2202
7E   00004E20 8F  D0     06B0  2203          MOVL    #20000,-(SP)           ; # of times to execute timed loop.
      18    11   DA      06B7  2204          MTPR    #^X11,#PR$_ICCS        ; Start clock, no interrupts.
                         06BA  2205
                         06BA  2206  ; * * * start of loop to time * * *
         FD 6E   F5      06BA  2207  10$:    SOBGTR  (SP),10$               ; Delay loop.
                         06BD  2208  ; * * * end of loop to time * * *
                         06BD  2209
```

```
                                        06BD
                                        06BD
                                        06BD
                        50      1A  DB  06BD             MFPR    #PR790$_ICR,R0              ; Read total time to execute loop.
                                        06C0
                        18      00  DA  06C0             MTPR    #0,#PR$_ICCS                ; Shut off clock.
00000000'GF     0000EA60 8F     50  C7  06C3             DIVL3   R0,#60000,G^EXE$GL_UBDELAY; Calculate number of times through
                     00000000'GF    D6  06CF             INCL    G^EXE$GL_UBDELAY            ; loop to delay 3 microseconds.
                                        06D5
                                        06D5
                                        06D5
                                        06D5
                        19      00  DA  06D5             MTPR    #0,#PR790$_NICR             ; Initialize next interval count register.
                                        06D8
                  50  00004E20 8F   D0  06D8             MOVL    #20000,R0                   ; Number of times to execute test loop
                  6E  00000000'GF   D0  06DF             MOVL    G^EXE$GL_UBDELAY,(SP)       ; Get delay loop iteration count.
                        18      11  DA  06E6             MTPR    #^X11,#PR$_ICCS             ; Start clock, no interrupts
                                        06E9
                                        06E9       ; **** Start of loop to time
       000006F7'EF      8000 8F     B3  06E9       20$:  BITW    #^X8000,40$                 ; Random BITx instruction to time
                                03  12  06F2             BNEQ    40$                         ; Random conditional branch instruction
                             FD 6E  F5  06F4       30$:  SOBGTR  (SP),30$                    ; Delay 3 microseconds.
                             EF 50  F5  06F7       40$:  SOBGTR  R0,20$                      ; Loop
                                        06FA       ; **** End of loop to time
                                        06FA
                                        06FA
                                        06FA
                                        06FA
                        50      1A  DB  06FA             MFPR    #PR790$_ICR,R0              ; Read total time to execute loop.
                        18      00  DA  06FD             MTPR    #0,#PR$_ICCS                ; Shut clock off
                                8E  D5  0700             TSTL    (SP)+                       ; Pop delay loop index off stack.
00000000'GF     00030D40 8F     50  C7  0702             DIVL3   R0,#200000,G^EXE$GL_TENUSEC ; Calculate number of times to
                     00000000'GF    D6  070E             INCL    G^EXE$GL_TENUSEC            ; execute the loop to kill 10 u-secs.
                                        0714
                                        0714       ;
                                        0714       ; Store the TIMEDWAIT values calculated with cache enabled in the BOOTDRIVR
                                        0714       ; TIMEDWAIT cells.
                                        0714       ;
                  50  00000000'GF   D0  0714             MOVL    G^EXE$GL_RPB,R0             ; Get address of RPB.
                        50   34 A0  D0  071B             MOVL    RPB$L_IOVEC(R0),R0          ; Get address of BOOTDRIVR I/O cells.
                      00000000'GF   D0  071F             MOVL    G^EXE$GL_TENUSEC,-          ; Store TENUSEC value in BOOTDRIVR.
                             3E A0      0725                     BQO$L_TENUSEC(R0)
                      00000000'GF   D0  0727             MOVL    G^EXE$GL_UBDELAY,-          ; Store UBDELAY value in BOOTDRIVR.
                             42 A0      072D                     BQO$L_UBDELAY(R0)
                                        072F
                                    05  072F             RSB                                 ; Return
                                        0730             .DISABLE LSB
                                    0730                  .SBTTL  EXE$INIT_TODR  -  SET SYSTEM TIME TO CORRECT VALUE AT STARTUP
                                    0730          ;++
                                    0730          ; FUNCTIONAL DESCRIPTION:
                                    0730          ;
                                    0730          ;       EXE$INIT_TODR SOLICITS THE CORRECT TIME FROM THE OPERATOR IF NECESSARY,
                                    0730          ;       CONVERTS THE ASCII RESPONSE TO BINARY FORMAT AND CALLS AN INTERNAL
                                    0730          ;       ENTRY POINT OF THE $SETIME SYSTEM SERVICE TO SET THE NEW SYSTEM TIME
                                    0730          ;       IN MEMORY WITHOUT MODIFYING THE CONTENTS OF THE SYSTEM DISK.
                                    0730          ;
                                    0730          ;       IF THE TIME WOULD NORMALLY BE SOLICITED FROM AN OPERATOR, BECAUSE
                                    0730          ;       THE HARDWARE TIME OF YEAR CLOCK IS ZERO, THEN THE SYSGEN PARAMETER
                                    0730          ;       "TPWAIT" IS CHECKED.  IF IT IS ZERO, THEN IT IS ASSUMED THAT NO
                                    0730          ;       OPERATOR IS PRESENT AND THE SYSTEM IS BOOTED USING THE LAST TIME
                                    0730          ;       RECORDED IN THE SYSTEM IMAGE.  IF THE PARAMETER IS NON ZERO THEN
                                    0730          ;       THAT TIME IS USED AS THE MAXIMUM TIME TO WAIT BEFOR ASSUMING THAT
                                    0730          ;       THERE IS NO OPERATOR AND BOOTING ANY WAY.  IF THE PARAMETER IS
                                    0730          ;       NEGATIVE, THE SYSTEM WILL WAIT FOREVER.
                                    0730          ;
                                    0730          ;       THIS ROUTINE IS CALLED ONLY ONCE, FROM SYSINIT OR STASYSGEN.
                                    0730          ;
                                    0730          ; INPUT PARAMETERS:
                                    0730          ;
                                    0730          ;       NONE
                                    0730          ;
                                    0730          ; IMPLICIT INPUTS:
                                    0730          ;
                                    0730          ;       TIME-OF-DAY PROCESSOR CLOCK.
                                    0730          ;
                                    0730          ; OUTPUT PARAMETERS:
                                    0730          ;
                                    0730          ;       R0,R1 - DESTROYED
                                    0730          ;
                                    0730          ; IMPLICIT OUTPUTS:
                                    0730          ;
                                    0730          ;       EXE$GQ_SYSTIME - SET TO CURRENT TIME IN 100 NANOSECOND UNITS SINCE
                                    0730          ;                        17-NOV-1858  00:00:00.
                                    0730          ;
                                    0730          ;--
                                    0730
                                    0730          ;
                                    0730          ; Stack storage offsets:
                                    0730          ;
                          00000000  0730          TTCHAN  = ^X00                          ; CHANNEL FOR TERMINAL (LONGWORD)
                          00000004  0730          TTNAME  = ^X04                          ; STRING DESCRIPTOR FOR OPERATOR'S TERM
                          0000000C  0730          TMPDESC = ^X0C                          ; TEMPORY STRING DESCRIPTOR (QUADWORD)
                          00000014  0730          INTIME  = ^X14                          ; INPUT TIME VALUE (QUADWORD)
                          0000001C  0730          LINBUF  = ^X1C                          ; INPUT LINE BUFFER (5 LONGWORDS)
                          00000014  0730          LINBUFSIZ = ^X14                        ;  (LENGTH OF LINE BUFFER IN BYTES)
                                    0730
                                    0730          ;
                                    0730          ; PURE DATA
                                    0730          ;
                                    0730          TERM_NAMADR:
                       30 41 50 4F  0730                  .ASCII  \OPA0\                  ; DEVICE NAME FOR OPERATOR'S TERMINAL
                          00000004  0734          TERM_NAMSIZ = . - TERM_NAMADR
74 61 64 20 64 69 6C 61 76 6E 69 00' 0734         TIMERR: .ASCIC  \invalid date/time\     ;
                 65 6D 69 74 2F 65  0740
```

```
                                   11  0734
                                       0746  TIMEPROMPT:
                                  33'  0746            .BYTE   NPROMPT
54 4E 45 20 45 53 41 45 4C 50 0A  0D  0747            .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  0753
4D 4D 4D 2D 44 44 28 20 45 4D 49  54  075F
4D 4D 3A 48 48 20 20 59 59 59 59  2D  076B
                          20 20  29  0777
                           00000033  077A  NPROMPT=.-TIMEPROMPT-1
                                     077A
                                     077A
                                     077A  EXE$INIT_TODR::                            ; SET CORRECT TIME
                                     077A          .ENABLE LSB
                     077C 8F    BB  077A          PUSHR   #^M<R2,R3,R4,R5,R6,R8,R9,R10> ; SAVE REGISTERS
                       5E 30    C2  077E          SUBL    #4*12,SP                     ; SCRATCH STORAGE
                       56 5E    D0  0781          MOVL    SP,R6                        ; SAVE ADDRESS OF SCRATCH STORAGE
                  04 A6 04      9A  0784          MOVZBL  #TERM_NAMSIZ,TTNAME(R6)      ; SET SIZE OF OPERATOR'S TERM NAME AND
               08 A6  FFA4 CF   9E  0788          MOVAB   W^TERM_NAMADR,TTNAME+4(R6)  ;  PIC ADDRESS INTO TERM NAME DESC
        1C 00000000'GF   00'    E0  078E          BBS     S^#EXE$V_SETTIME,G^EXE$GL_FLAGS,READTIME ; BR TO SOLICIT TIME
                                     0796
                                     0796
                                     0796
                                     0796
                                     0796
                       50 1B    DB  0796          MFPR    #PR790$_TODR,R0              ; GET TIME OF DAY CLOCK VALUE
                                     0799
     59   00000000'GF   50      C3  0799          SUBL3   R0,G^EXE$GL_TODR,R9          ; GET TOD DELTA TIME (10 MS UNITS)
                        09      1B  07A1          BLEQU   5$                           ; BRANCH IF TIME IS LATER
          0083D600 8F   59      D1  07A3          CMPL    R9,#24*60*60*100             ; CHECK FOR SETBACK OF ONE DAY
                        06      1E  07AA          BGEQU   READTIME                     ; MORE, MUST SOLICIT TIME
                     14 A6      7C  07AC  5$:     CLRQ    INTIME(R6)                   ; NULL ARGUMENT FOR EXE$SETIME_INT
                      00C7      31  07AF          BRW     200$                         ; RETURN TO CALLER
                                     07B2
                                     07B2  READTIME:                                   ; SOLICIT TIME
                        59      D4  07B2          CLRL    R9                           ; CLEAR A FLAG
          58    00000000'GF     32  07B4          CVTWL   G^SGN$GW_TPWAIT,R8           ; PICK UP TIMEOUT WAIT INTERVAL
                        14      14  07BB          BGTR    8$                           ; POSITIVE, WAIT THAT PERIOD ONCE
                        0D      19  07BD          BLSS    7$                           ; NEGATIVE IS WAIT FOREVER
                                     07BF  6$:
     50   00000000'GF   01      C1  07BF          ADDL3   #1,G^EXE$GL_TODR,R0          ; ZERO, SET TIME-OF-DAY CLOCK TO
                                     07C7
                                     07C7
                                     07C7
                                     07C7
                     1B 50      DA  07C7          MTPR    R0,#PR790$_TODR              ;   KNOWN VALUE + 10 MSEC AND FINISH UP
                                     07CA
                        E0      11  07CA          BRB     5$                           ;
                                     07CC
                                     07CC
                     58 14      D0  07CC  7$:     MOVL    #20,R8                       ; STARTING WAIT
                        59      D6  07CF          INCL    R9                           ; NEGATIVE - WAIT FOREVER
                                     07D1  8$:     $ASSIGN_S       TTNAME(R6),TTCHAN(R6) ; AND ASSIGN TO INPUT DEVICE
                     DD 50      E9  07DF          BLBC    R0,6$                        ; ERROR - FALL BACK TO STORED TIME
               52  FF60 CF      9E  07E2  10$:    MOVAB   W^TIMEPROMPT,R2              ; GET ADDRESS OF PROMPT STRING
                     53 82      9A  07E7          MOVZBL  (R2)+,R3                     ; AND LENGTH
                                     07EA          $QIOW_S #0,W^TTCHAN(R6),-            ; PROMPT AND READ TIME
                                     07EA                  #<IO$_READPROMPT!IO$M_PURGE!IO$M_TIMED!IO$M_CVTLOW>,-
```

```
                              07EA                  TMPDESC(R6),,,-              ;  I/O STATUS BLOCK , NO AST OR PARAM
                              07EA                  LINBUF(R6),#LINBUFSIZ,-      ;  BUFFER ADDRESS AND SIZE
                              07EA                  R8,#0,-                      ;  TIME OUT
                              07EA                  R2,R3                        ;  PROMPT ADDRESS AND SIZE
              AD 50      E9   080F         BLBC     R0,6$                        ; ERROR - FALL BACK TO STORED TIME
     54       0C A6      7D   0812         MOVQ     TMPDESC(R6),R4               ; GET COMPLETION STATUS
              0D 54      E8   0816         BLBS     R4,20$                       ; CONTINUE IF SUCCESSFUL READ
              A3 59      E9   0819         BLBC     R9,6$                        ; FAILED ON ONE-TIME READ, RETURN
     58    01 A848       9E   081C         MOVAB    1(R8)[R8],R8                 ; (2 * TIMEOUT) + 1
        58       58      3C   0821         MOVZWL   R8,R8                        ; BOUND TIMEOUT
                 BC      11   0824         BRB      10$                          ; TRY AGAIN FOR TIME
                              0826  20$:                                         ; SOMETHING WAS INPUT
  0C A6       0E A6      3C   0826         MOVZWL   TMPDESC+2(R6),TMPDESC(R6)    ;  FORM DESCRIPTOR FOR BUFFER
  10 A6       1C A6      9E   082B         MOVAB    LINBUF(R6),TMPDESC+4(R6)     ;  SET DESCRIPTOR ADDRESS
                              0830         $BINTIM_S TMPDESC(R6),INTIME(R6)      ;  CONVERT TO BINARY TIME
              05 50      E9   083D         BLBC     R0,89$                       ; INVALID TIME
              18 A6      D5   0840         TSTL     INTIME+4(R6)                 ; CHECK FOR DELTA TIME
                 2A      14   0843         BGTR     100$                         ; BRANCH IF NOT - OK
                              0845  89$:                                         ; INVALID TIME VALUE INPUT
     52    FEEB CF       9E   0845         MOVAB    W^TIMERR,R2                  ; ADDRESS OF ERROR MESSAGE
        53       82      9A   084A         MOVZBL   (R2)+,R3                     ; GET STRING LENGTH
                              084D         $QIOW_S #0,TTCHAN(R6),-               ; GIVE ERROR MESSAGE
                              084D                  #IO$_WRITEVBLK,-             ;
                              084D                  ,,,-                         ;  NO I/O STATUS,AST OR AST PARAM
                              084D                  (R2),R3 ,-                   ;  BUFFER ADDRESS, LENGTH
                              084D                  #0,#32                       ;  SET CARRIAGE CONTROL TO CR/LF
               FF73      31   086C         BRW      10$                          ; AND TRY AGAIN
                              086F  100$:                                        ; EXIT
                              086F         $DASSGN_S TTCHAN(R6)                  ; DE-ASSIGN TERMINAL CHANNEL
              14 A6      7F   0879  200$:  PUSHAQ   INTIME(R6)                   ; SET NEW SYSTEM TIME
     00000000'GF    01   FB   087C         CALLS    #1,G^EXE$SETIME_INT          ; USE TODR CLOCK TO SET SYSTEM TIME
00000000'GF  00000000'GF 7D   0883         MOVQ     G^EXE$GQ_TODCBASE,G^EXE$GQ_BOOTTIME ; SAVE BOOT TIME
              5E 30      C0   088E         ADDL     #12*4,SP                     ; CLEAN OFF SCRATCH STORAGE
            077C 8F      BA   0891         POPR     #^M<R2,R3,R4,R5,R6,R8,R9,R10> ; RESTORE REGISTERS
                              0895
                              0895  ;
                              0895  ; Fall through into the deallocate logic.
                              0895  ;
                              0895  ;      RSB                                       ; *** This goes in if another piece of
                              0895                                               ; *** initialization code is added that
                              0895                                               ; *** is executed after EXE$INI_TIMWAIT.
                              0895         .DISABLE LSB
                              0895
```

```
                            0895  DEAL_INIT_CODE:                          ; DEALLOCATE THE INITIALIZATION CODE
                            0895  ;
                            0895  ; It is the duty of the last-executed, loadable initialization
                            0895  ; routine to make itself and all other such routines disappear, i.e.,
                            0895  ; release the space they occupy to non-paged pool.  Each routine's vector
                            0895  ; must be disconnected, e.g., be made to point to the symbol, EXE$LOAD_ERROR.
                            0895  ;
                            0895  ; NOTE:  This means that new initialization routines should be added
                            0895  ;        to this module in a particular order, not necessarily at the
                            0895  ;        end of the module!
                            0895  ;
                            0895          .ENABLE LSB
             7E    52   7D  0895          MOVQ    R2,-(SP)                 ; Save some registers
                            0898
                            0898  ;
                            0898  ; First find the vectors that point to these initialization routines
                            0898  ; and reset them to point to EXE$LOAD_ERROR.
                            0898  ;
         50    0000'CF  9E  0898          MOVAB   W^SYSL$BEGIN,R0          ; Compute bounds of releasable piece:
  51  50   00000000'8F  C1  089D          ADDL3   #<STAY_HEADER-SYSL$BEGIN>,R0,R1 ; starting and ending addresses.
      52   00000000'GF  9E  08A5          MOVAB   G^EXE$AL_LOAVEC,R2       ; Get starting address of vectors.
      53   00000000'GF  9E  08AC          MOVAB   G^EXE$LOAD_ERROR,R3      ; Get end of vectors.
        9F17 8F    62   B1  08B3  10$:    CMPW    (R2),#^X9F17             ; Is this JMP @# ?
                   1B   13  08B8          BEQL    30$                      ; Br if yes, skip past it.
      80 8F    03  A2   91  08BA          CMPB    3(R2),#^X80              ; Is this a system space address
                   16   12  08BF          BNEQ    40$                      ; Br if no, assume it's a HALT instr.
             50    62   D1  08C1          CMPL    (R2),R0                  ; Is address before the releasable
                   0C   1F  08C4          BLSSU   20$                      ;  piece of memory?  Br on yes.
             51    62   D1  08C6          CMPL    (R2),R1                  ; Is address after the releasable
                   07   1A  08C9          BGTRU   20$                      ;  piece of memory?  Br on yes.
      62   00000000'GF  9E  08CB          MOVAB   G^EXE$LOAD_ERROR,(R2)    ; Reset this vector.
             52    02   C0  08D2  20$:    ADDL    #2,R2                    ; Point past this vector.
                   52   D6  08D5  30$:    INCL    R2                       ; Come here to point past JMP @#.
                   52   D6  08D7  40$:    INCL    R2                       ; Come here to point past HALT.
             53    52   D1  08D9          CMPL    R2,R3                    ; Past the end of the vectors?
                   D5   1F  08DC          BLSSU   10$                      ; Keep searching vectors.
                            08DE  ;
                            08DE  ; Now release the memory to non-paged pool.
                            08DE  ;
         50    0000'CF  9E  08DE          MOVAB   W^SYSL$BEGIN,R0          ; Point to start of module
         51    0000'8F  3C  08E3          MOVZWL  #<STAY_HEADER-SYSL$BEGIN>,R1 ; Length to vaporize
                 F721'  31  08E8          BRW     50$                      ; Br to code that is not released.
                            08EB
                        00000000          .PSECT  $$$INIT__END,PAGE        ; 'PAGE' SINCE 16-BYTE ALIGN IS NOT
                            0000
                            0000  STAY_HEADER:
          00000000 00000000 0000          .LONG   0,0
                       0000' 0008         .WORD   <SYSL$END-STAY_HEADER>
                        62  000A          .BYTE   DYN$C_LOADCODE
                        00  000B          .BYTE   0
                            000C
          00000000'9F   16  000C  50$:    JSB     @#EXE$DEANONPGDSIZ       ; Just the smile on the Chesire cat
             52    8E   7D  0012          MOVQ    (SP)+,R2                 ; Restore
                        05  0015          RSB                              ; Return.
                            0016
                            0016          .DISABLE LSB
                            0016          .END
```

```
$$$VMSDEFINED    = 00000001               BUS_CSR_LEN           00000004 R        08
$$T1             = 00000001               CI$INITIAL            ********      X   0A
ABUS_INDEX         00000014 RG       09   CI$INT                ********      X   0A
ABUS_LOOP          00000054 R        0A   CITAB                 00000015 R        08
ABUS_TYPE          00000010 RG       09   CONFIG_790            000000C5 R        0A
ABUS_VA            00000000 RG       09   CONFIG_IOSPACE        000000FF R        0A
ADAPTERS           00000000 R        02   CONFREG               000000A4 R        08
ADP$B_TYPE       = 0000000A               CONFREGL              000001E4 R        08
ADP$C_CIADPLEN   = 00000030               CPU_ADPSIZE           00000019 R        08
ADP$C_DRADPLEN   = 00000030               CPU_TYPE            = 00000004
ADP$C_MBAADPLEN  = 00000030               CR                  = 0000000D
ADP$C_UBAADPLEN  = 00000258               CRB$B_TYPE          = 0000000A
ADP$L_AVECTOR    = 0000001C               CRB$C_LENGTH        = 00000048
ADP$L_CRB        = 00000010               CRB$L_INTD          = 00000024
ADP$L_CSR        = 00000000               CRB$L_INTD2         = 00000048
ADP$L_DPQFL      = 00000014               CRB$L_WQBL          = 00000004
ADP$L_LINK       = 00000004               CRB$L_WQFL          = 00000000
ADP$L_MBASCB     = 00000014               CRB$W_SIZE          = 00000008
ADP$L_MBASPTE    = 00000018               CREATE_ARRAYS         000001BA R        0A
ADP$L_MRACTMDRS  = 0000005C               CSR_LEN_OFFSET      = FFFFFFFB
ADP$L_MRQFL      = 00000030               DDB$T_NAME          = 00000014
ADP$L_UBASCB     = 00000044               DEAL_INIT_CODE        00000895 R        0A
ADP$L_UBASPTE    = 00000054               DIRECT_VEC_NODE_CNT   00000009 R        08
ADP$L_VECTOR     = 00000010               DR$INITIAL            ********      X   0A
ADP$W_ADPTYPE    = 0000000E               DR$INT                ********      X   0A
ADP$W_DPBITMAP   = 00000060               DRTAB                 00000011 R        08
ADP$W_MRFFENCE   = 0000015C               DYN$C_ADP           = 00000001
ADP$W_MRFREGARY  = 0000015E               DYN$C_CONF          = 00000007
ADP$W_MRNFENCE   = 00000062               DYN$C_CRB           = 00000005
ADP$W_MRNREGARY  = 00000064               DYN$C_IDB           = 00000009
ADP$W_SIZE       = 00000008               DYN$C_INIT          = 00000063
ADP$W_TR         = 0000000C               DYN$C_LOADCODE      = 00000062
ADP$W_UMR_DIS    = 00000256               END_ABUS_LOOP         000000E7 R        0A
ADPLINK            ********      X   0A   END_NEXUS             000001B5 R        0A
ADPTAB_ADPLEN      00000001               ERROR_HALT            00000239 R        0A
ADPTAB_ATYPE       00000003               ERROR_HALT_1          0000023E R        0A
ADPTAB_IDBUNITS    00000000               EXE$AC_LOAVEC         ********      X   0A
ALONPAGD           000004E4 R        0A   EXE$DEANONPGDSIZ      ********      X   0B
AT$_CI           = 00000004               EXE$GL_CONFREG        ********      X   0A
AT$_DR           = 00000002               EXE$GL_CONFREGL       ********      X   0A
AT$_MBA          = 00000000               EXE$GL_FLAGS          ********      X   0A
AT$_UBA          = 00000001               EXE$GL_NUMNEXUS       ********      X   0A
BADUMR             0000030D R        08   EXE$GL_RPB            ********      X   0A
BI_BUS_CODE      = 80000000               EXE$GL_SCB            ********      X   0A
BI_CPU           = 00000000               EXE$GL_TENUSEC        ********      X   0A
BI_CSR_LEN       = 00000002               EXE$GL_TODR           ********      X   0A
BI_LIKE          = 00000000               EXE$GL_UBDELAY        ********      X   0A
BLD_CRB            00000614 R        0A   EXE$GQ_BOOTTIME       ********      X   0A
BOO$GB_SYSTEMID    ********      X   0A   EXE$GQ_TODCBASE       ********      X   0A
BOO$GL_SPTFREH     ********      X   0A   EXE$INIT_TODR         0000077A RG       0A
BOO$GL_SPTFREL     ********      X   0A   EXE$INI_TIMWAIT       000006AA RG       0A
BOOTVECTOR         00000000 R        08   EXE$INT58             ********      X   0A
BQO$L_TENUSEC    = 0000003E               EXE$INT5C             ********      X   0A
BQO$L_UBDELAY    = 00000042               EXE$INT60             ********      X   0A
BTD$K_CONSOLE    = 00000040               EXE$LOAD_ERROR        ********      X   09
BTD$K_UDA        = 00000011               EXE$MCHK_PRTCT        ********      X   0A
BUS_CODE_OFFSET  = FFFFFFFC               EXE$OUTZSTRING        ********      X   0A
```

```
EXE$POWERFAIL             ********     X 0A    MMG$SVAPTECHK             ********     X 0A
EXE$SETIME_INT            ********     X 0A    NDT$_BUA                = 80000102
EXE$TEST_CSR              ********     X 0A    NDT$_CI                 = 00000038
EXE$UBAERR_INT            ********     X 0A    NDT$_DR32               = 00000030
EXE$V_SETTIME             ********     X 0A    NDT$_KDZ11              = 80000105
FILL_CRB                  00000621 R     0A    NDT$_MB                 = 00000020
FILL_IN_SCB               0000027E R     0A    NDT$_MEM1664NI          = 00000012
GET_GEN_TYPE              00000159 R     0A    NDT$_MEM16I             = 00000011
GET_TYPE                  00000140 R     0A    NDT$_MEM16NI            = 00000010
IDB$B_TYPE              = 0000000A             NDT$_MEM256EIL          = 00000071
IDB$C_LENGTH            = 00000038             NDT$_MEM256EIU          = 00000073
IDB$L_ADP               = 00000014             NDT$_MEM256I            = 00000074
IDB$L_CSR               = 00000000             NDT$_MEM256NIL          = 00000070
IDB$W_SIZE              = 00000008             NDT$_MEM256NIU          = 00000072
IDB$W_UNITS             = 0000000C             NDT$_MEM4I              = 00000009
INI$ALLOC_CRB             ********     X 0A    NDT$_MEM4NI             = 00000008
INI$ALONONPAGED           ********     X 0A    NDT$_MEM64EIL           = 00000069
INI$CACHE                 ********     X 0A    NDT$_MEM64EIU           = 0000006B
INI$CIADP                 000004FF R     0A    NDT$_MEM64I             = 0000006C
INI$CONSOLE               000005FD RG    0A    NDT$_MEM64NIL           = 00000068
INI$DRADP                 000004EA R     0A    NDT$_MEM64NIU           = 0000006A
INI$IOMAP                 00000000 RG    0A    NDT$_MPM0               = 00000040
INI$KDZ11                 000005FC R     0A    NDT$_MPM1               = 00000041
INI$L_IOAVECS             00000018 R     09    NDT$_MPM2               = 00000042
INI$L_SCBVALS             00000247 R     0A    NDT$_MPM3               = 00000043
INI$MBADP                 00000514 R     0A    NDT$_SCORMEM            = 80000001
INI$MPMADP                ********     X 06    NDT$_UB0                = 00000028
INI$SCB                   00000259 R     0A    NDT$_UB1                = 00000029
INI$UBADP                 000002CD R     0A    NDT$_UB2                = 0000002A
INI$UBSPACE               000002A9 R     0A    NDT$_UB3                = 0000002B
INIT_ROUTINES             00000000 R     06    NEXUSDESC                 00000020 R     08
INTIME                  = 00000014             NOSPT                     000002E4 R     08
IO$M_CVTLOW               ********     X 0A    NPROMPT                 = 00000033
IO$M_PURGE                ********     X 0A    NUMUBAVEC               = 00000080
IO$M_TIMED                ********     X 0A    NUMVECS                 = 00000003
IO$_READPROMPT            ********     X 0A    NUM_PAGES                 00000000 R     04
IO$_WRITEVBLK             ********     X 0A    NXT_NEXUS                 0000010B R     0A
IO790$AL_IOA0           = 20000000             PA                      = 20020000
IO790$AL_IOACR          = 00080000             PAMM$C_NEXM             = 0000000F
IO790$AL_NNEX           = 00000010             PAMM$M_PAMADD           = 3FF00000
IO790$AL_PERABS         = 02000000             PAMM$S_CODE             = 00000004
IO790$AL_PERNEX         = 00002000             PAMM$V_CODE             = 00000000
IO790$AL_UBOSP          = 00100000             PR$_CSTD                = 0000001F
IO790$C_SBIA            = 00000001             PR$_ICCS                = 00000018
LF                      = 0000000A             PR$_SID_TYP730          = 00000003
LINBUF                  = 0000001C             PR$_SID_TYP750          = 00000002
LINBUFSIZ               = 00000014             PR$_SID_TYP780          = 00000001
MAP_NEXUS                 00000199 R     0A    PR$_SID_TYP790          = 00000004
MAP_PAGES                 00000213 R     0A    PR$_SID_TYP8NN          = 00000006
MAXNEXUS                = 00000040             PR$_SID_TYP8SS          = 00000005
MBA$INITIAL               ********     X 0A    PR$_SID_TYPUV1          = 00000007
MBA$INT                   ********     X 0A    PR$_TBIS                = 0000003A
MBATAB                    0000000D R     08    PR790$_ICR              = 0000001A
MCHK$M_LOG              = 00000001             PR790$_NICR             = 00000019
MCHK$M_NEXM             = 00000004             PR790$_PAMACC           = 00000040
MMG$GL_SBICONF            ********     X 0A    PR790$_PAMLOC           = 00000041
MMG$GL_SPTBASE            ********     X 0A    PR790$_TODR             = 0000001B
```

```
PTE$C_KW                          = 10000000
PTE$M_VALID                       = 80000000
READTIME                            000007B2 R      0A
RPB$B_DEVTYP                      = 00000066
RPB$L_ADPPHY                      = 0000005C
RPB$L_ADPVIR                      = 00000060
RPB$L_BOOTR1                      = 00000020
RPB$L_CSRPHY                      = 00000054
RPB$L_CSRVIR                      = 00000058
RPB$L_IOVEC                       = 00000034
RPB$W_ROUBVEC                     = 0000001E
SBIA$C_CR                           00000000
SBIA$L_CSR                          00000004
SBIA$L_DIAGNOS                      0000000C
SBIA$L_DMAACA                       00000018
SBIA$L_DMAAID                       0000001C
SBIA$L_DMABCA                       00000020
SBIA$L_DMABID                       00000024
SBIA$L_DMACCA                       00000028
SBIA$L_DMACID                       0000002C
SBIA$L_DMAICA                       00000010
SBIA$L_DMAIID                       00000014
SBIA$L_MAINT                        00000044
SBIA$L_SBIERR                       00000034
SBIA$L_SBIQC                        0000004C
SBIA$L_SBISILO                      00000030
SBIA$L_SBISTS                       0000003C
SBIA$L_SILOCMP                      00000040
SBIA$L_SUMRY                        00000008
SBIA$L_TMOADDRS                     00000038
SBIA$L_UNJAM                        00000048
SBIA$S_TYPE                       = 00000004
SBIA$V_TYPE                       = 00000004
SBICONF                             000000E4 R      08
SBI_BUS_CODE                      = 00000000
SBI_CPU                           = 00000001
SBI_CSR_LEN                       = 00000001
SBI_LIKE                          = 00000001
SGN$GW_TPWAIT                       ********   X    0A
STAY_HEADER                         00000000 R      0B
SW_BUS_CODE                         00000005 R      08
SYS$ASSIGN                          ********  GX    0A
SYS$BINTIM                          ********  GX    0A
SYS$DASSGN                          ********  GX    0A
SYS$QIOW                            ********  GX    0A
SYSL$BEGIN                          ********   X    0A
SYSL$END                            ********   X    0B
TERM_NAMADR                         00000730 R      0A
TERM_NAMSIZ                       = 00000004
TEST_NEXUS                          00000111 R      0A
TIMEPROMPT                          00000746 R      0A
TIMERR                              00000734 R      0A
TMPDESC                           = 0000000C
TTCHAN                            = 00000000
TTNAME                            = 00000004
UBA$INITIAL                         ********   X    0A
UBA$INTO                            ********   X    0A
```

```
UBA$L_BRRVR                       = 00000030
UBA$L_CR                          = 00000004
UBA$UNEXINT                         ********   X    0A
UBAERRADR                         = 00000090
UBAINT4                           = 00000000
UBAINT4REL                        = 0000000A
UBAINT5                           = 00000020
UBAINT5REL                        = 0000002A
UBAINT6                           = 00000040
UBAINT6REL                        = 0000004A
UBAINT7                           = 00000060
UBAINT7REL                        = 0000006A
UBAINTADP                         = 00000089
UBAINTBASE                          00000450 R      0A
UBINTSZ                           = 00000094
UCB$W_UNIT                        = 00000054
VA$M_SYSTEM                       = 80000000
VEC$C_ADP                         = 00000014
VEC$L_IDB                         = 00000008
VEC$L_INITIAL                     = 0000000C
VECTAB                              000004E4 R      0A
```

```
                                                       +----------------+
                                                       ! Psect synopsis !
                                                       +----------------+

PSECT name                      Allocation          PSECT No.  Attributes
----------                      ----------          ---------  ----------
.  ABS  .                       00000000  (      0.)  00 (  0.)  NOPIC    USR   CON   ABS   LCL NOSHR NOEXE NORD   NOWRT NOVEC BYTE
$ABS$                           00000050  (     80.)  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
$$$INIT$DATA                    0000033F  (    831.)  08 (  8.)  NOPIC    USR   CON   REL   LCL NOSHR   EXE   RD     WRT NOVEC LONG
SYSLOA                          000000A6  (    166.)  09 (  9.)  NOPIC    USR   CON   REL   LCL NOSHR   EXE   RD     WRT NOVEC LONG
$$$INIT$CODE                    000008EB  (   2283.)  0A ( 10.)  NOPIC    USR   CON   REL   LCL NOSHR   EXE   RD     WRT NOVEC QUAD
$$$INIT__END                    00000016  (     22.)  0B ( 11.)  NOPIC    USR   CON   REL   LCL NOSHR   EXE   RD     WRT NOVEC PAGE

                                                    +------------------------+
                                                    ! Performance indicators !
                                                    +------------------------+

Phase                    Page faults    CPU Time       Elapsed Time
-----                    -----------    --------       ------------
Initialization                    36    00:00:00.05    00:00:00.88
Command processing               128    00:00:00.60    00:00:03.78
Pass 1                           584    00:00:15.14    00:00:56.71
Symbol table sort                  0    00:00:01.92    00:00:07.68
Pass 2                           342    00:00:04.34    00:00:18.34
Symbol table output               36    00:00:00.19    00:00:00.60
Psect synopsis output              4    00:00:00.03    00:00:00.04
Cross-reference output             0    00:00:00.00    00:00:00.00
Assembler run totals            1132    00:00:22.27    00:01:28.03

The working set limit was 2400 pages.
149851 bytes (293 pages) of virtual memory were used to buffer the intermediate code.
There were 100 pages of symbol table space allocated to hold 1837 non-local and 38 local symbols.
2546 source lines were read in Pass 1, producing 43 object records in Pass 2.
50 pages of virtual memory were used to define 48 macros.

                                                   +--------------------------+
                                                   ! Macro library statistics !
                                                   +--------------------------+

Macro library name                                 Macros defined
------------------                                 --------------
_$255$DUA28:[SYSLOA.OBJ]790DEF.MLB;1                           2
_$255$DUA28:[SYS.OBJ]LIB.MLB;1                                22
_$255$DUA28:[SYSLIB]STARLET.MLB;2                             15
TOTALS (all libraries)                                        39

1979 GETS were required to define 39 macros.

There were no errors, warnings or information messages.
```

```
MACRO/LIS=LIS$:INIADP790/OBJ=OBJ$:INIADP790 MSRC$:CPUSW790/UPDATE=(ENH$:CPUSW790)+MSRC$:INIADP/UPDATE=(ENH$:INIADP)+EXECML$/LIB+LIB$
```

0396 AH-BT13A-SE
VAX/VMS V4.0

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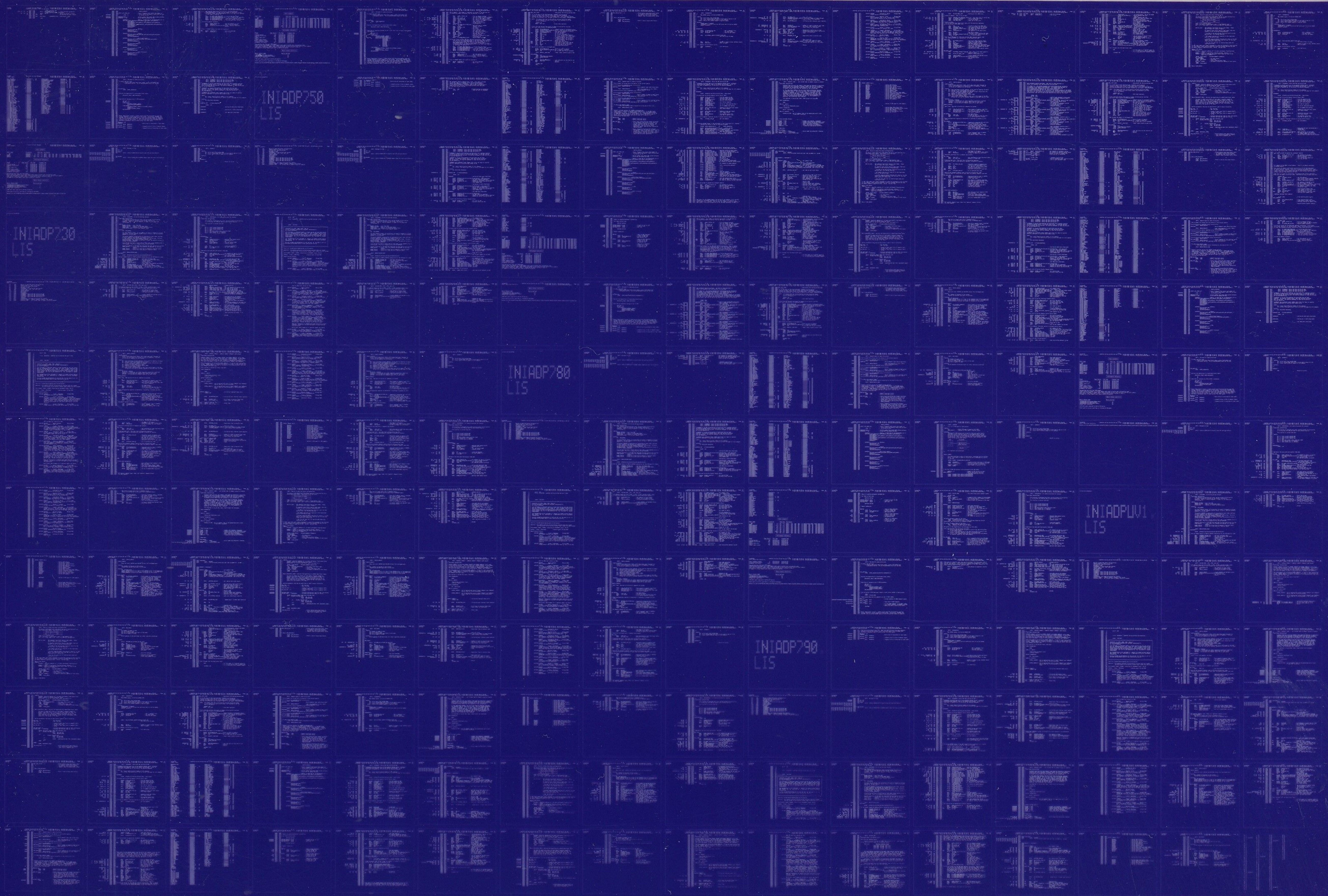

INIADP750
LIS

INIADP730
LIS

INIADP780
LIS

INIADPUV1
LIS

INIADP790
LIS