J 13

```
   SSSSSSSSSSSS  YYY         YYY      SSSSSSSSSSSS      IIIIIIIII     NNN         NNN      IIIIIIIII
   SSSSSSSSSSSS  YYY         YYY      SSSSSSSSSSSS      IIIIIIIII     NNN         NNN      IIIIIIIII
   SSSSSSSSSSSS  YYY         YYY      SSSSSSSSSSSS      IIIIIIIII     NNN         NNN      IIIIIIIII
SSS              YYY         YYY   SSS                     III        NNN         NNN         III
SSS              YYY         YYY   SSS                     III        NNN         NNN         III
SSS              YYY         YYY   SSS                     III        NNN         NNN         III
SSS                 YYY   YYY      SSS                     III        NNNNNN      NNN         III
SSS                 YYY   YYY      SSS                     III        NNNNNN      NNN         III
SSS                 YYY   YYY      SSS                     III        NNNNNN      NNN         III
   SSSSSSSSS           YYY            SSSSSSSSS            III        NNN   NNN   NNN         III
   SSSSSSSSS           YYY            SSSSSSSSS            III        NNN   NNN   NNN         III
   SSSSSSSSS           YYY            SSSSSSSSS            III        NNN   NNN   NNN         III
            SSS        YYY                     SSS         III        NNN      NNNNNN         III
            SSS        YYY                     SSS         III        NNN      NNNNNN         III
            SSS        YYY                     SSS         III        NNN      NNNNNN         III
            SSS        YYY                     SSS         III        NNN         NNN         III
            SSS        YYY                     SSS         III        NNN         NNN         III
            SSS        YYY                     SSS         III        NNN         NNN         III
SSSSSSSSSSSS           YYY         SSSSSSSSSSSS         IIIIIIIII     NNN         NNN      IIIIIIIII
SSSSSSSSSSSS           YYY         SSSSSSSSSSSS         IIIIIIIII     NNN         NNN      IIIIIIIII
SSSSSSSSSSSS           YYY         SSSSSSSSSSSS         IIIIIIIII     NNN         NNN      IIIIIIIII
```

```
**FILE**ID**SYSINIT                                  G 15

  SSSSSSSS  YY      YY    SSSSSSSS    IIIIII    NN      NN    IIIIII    TTTTTTTTTT
  SSSSSSSS  YY      YY    SSSSSSSS    IIIIII    NN      NN    IIIIII    TTTTTTTTTT
SS          YY      YY  SS              II      NN      NN      II          TT
SS          YY      YY  SS              II      NN      NN      II          TT
SS            YY  YY    SS              II      NNNN    NN      II          TT
SS            YY  YY    SS              II      NNNN    NN      II          TT
  SSSSSS        YY        SSSSSS        II      NN  NN  NN      II          TT
  SSSSSS        YY        SSSSSS        II      NN  NN  NN      II          TT
        SS      YY              SS      II      NN    NNNN      II          TT
        SS      YY              SS      II      NN    NNNN      II          TT
        SS      YY              SS      II      NN      NN      II          TT          ....
        SS      YY              SS      II      NN      NN      II          TT          ....
SSSSSSSS        YY      SSSSSSSS      IIIIII    NN      NN    IIIIII        TT          ....
SSSSSSSS        YY      SSSSSSSS      IIIIII    NN      NN    IIIIII        TT          ....

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
```

SY
VC

4E

3A

4E

Table of contents

```
0000            .TITLE  SYSINIT - SYSTEM INITIALIZATION PROCESS
0000            .IDENT  'V04-000'
0000    ;
0000    ;****************************************************************************
0000    ;*                                                                          *
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0000    ;*                                                                          *
0000    ;*                                                                          *
0000    ;****************************************************************************
0000
0000    ;++
0000    ; FACILITY:     SYSTEM INITIALIZATION
0000    ;
0000    ; ABSTRACT:     PERFORMS OPERATIONS NECESSARY TO GET
0000    ;               THE SYSTEM TO A POINT THAT IT CAN
0000    ;               SUPPORT ITSELF.
0000    ;
0000    ; ENVIRONMENT:  OPERATES WITHIN THE LIMITED CAPABILITIES
0000    ;               THE BOOT STRAPPED OPERATING SYSTEM.
0000    ;
0000    ; AUTHOR:  W.H.BROWN, CREATION DATE:  6-JAN-77
0000    ;
0000    ; MODIFIED BY:
0000    ;
0000    ;       V03-033 HH0052          Hai Huang               28-Aug-1984
0000    ;               Correctly bias the reference count for the system device.
0000    ;
0000    ;       V03-032 RAS0304         Ron Schaefer            4-May-1984
0000    ;               Re-define SYS$SYSDEVICE and SYS$DISK so that the
0000    ;               correct allocation-class is available to define the name.
0000    ;
0000    ;       V03-031 CDS0001         Christian D. Saether    1-May-1984
0000    ;               Set the device characteristic CLU before mounting the
0000    ;               system disk if we intend to be a cluster.
0000    ;
0000    ;       V03-030 TMK0002         Todd M. Katz            28-Apr-1984
0000    ;               Completely redo how the system logical names are created.
0000    ;               I have done this to eliminate the last vestiges of the old
0000    ;               logical name system services and to optimize this code in
0000    ;               the process.
0000    ;
```

```
0000  ;      V03-029 DWT0212         David W. Thiel            09-Apr-1984
0000  ;              Add call to CNX$DISK_CHANGE when CLUB$T_QDNAME is
0000  ;              filled in.
0000  ;
0000  ;      V03-028 WMC0022         Wayne Cardoza             02-Apr-1984
0000  ;              Use XQP_RESIDENT SYSGEN parameter.
0000  ;
0000  ;      V03-027 RSH0120         R. Scott Hanna            19-Mar-1984
0000  ;              Make changes to SIP_LOOKUP_QFILE due to new quorum
0000  ;              file algorithm. Add SIP_START_QUORUM_TIMER.
0000  ;
0000  ;      V03-026 WMC0021         Wayne Cardoza             14-Mar-1984
0000  ;              Don't give message for NOSUCHFILE errors.
0000  ;
0000  ;      V03-025 WMC0020         Wayne Cardoza             10-Mar-1984
0000  ;              Make XQP a resident global section.
0000  ;
0000  ;      V03-024 ACG0399         Andrew C. Goldstein,      27-Feb-1984  12:33
0000  ;              Rename EXE$LOCK_DEV to IOC$LOCK_DEV
0000  ;
0000  ;      V03-023 WHM0001         Bill Matthews             17-Jan-1984
0000  ;              Add definition of SYS$SYSROOT and SYS$COMMON. Convert
0000  ;              CRELOG'S and TRNLOG to the LNM form.
0000  ;
0000  ;      V03-022 WMC0019         Wayne Cardoza             12-Jan-1984
0000  ;              XQP now has DZRO space, no CRF allowed.
0000  ;
0000  ;      V03-021 RSH0086         R. Scott Hanna            23-Nov-1983
0000  ;              Remove all timeout checks in SIP_LOOKUP_QFILE.
0000  ;
0000  ;      V03-020 RSH0080         R. Scott Hanna            11-Nov-1983
0000  ;              Use SIP_A_INDEXFHDR and SIP_A_FILEHDR as the index file
0000  ;              header and file header buffers in the call to FIL$OPENFILE_1
0000  ;              from SIP_LOOKUP_QFILE.
0000  ;
0000  ;      V03-019 TMK0001         Todd M. Katz              08-Nov-1983
0000  ;              Add a PQL$_JTQUOTA (job-wide logical name table creation
0000  ;              quota) quota item to the standalone configure process's
0000  ;              $CREPRC quota list.
0000  ;
0000  ;      V03-018 WMC0006         Wayne Cardoza             13-Oct-1983
0000  ;              Better error reporting on file open errors.
0000  ;
0000  ;      V03-017 DWT0126         David W. Thiel            12-Sep-1983
0000  ;              Define system time early without writing anything to
0000  ;              the system disk.  Set cluster-wide time when joining or
0000  ;              forming a cluster.
0000  ;              Use correct synchronization when deallocating the file
0000  ;              cache.
0000  ;              Remove temporary crock to force use of XQP with system
0000  ;              disk.
0000  ;
0000  ;      V03-016 RSH0058         R. Scott Hanna            24-Aug-1983
0000  ;              Add the routine SIP_LOOKUP_QFILE. This routine attempts
0000  ;              to open the disk quorum file using FILEREAD.
0000  ;
0000  ;      V03-015 TCM0001         Trudy C. Matthews         08-Aug-1983
```

```
0000   ;                  Take out a shared lock on the system disk as soon as locking
0000   ;                  is enabled.
0000   ;
0000   ;          V03-014 WMC0005         Wayne Cardoza           06-Aug-1983
0000   ;                  Logical names not available when STACONFIG started.
0000   ;                  STACONFIG needs all privileges.
0000   ;
0000   ;          V03-013 WMC0004         Wayne Cardoza           01-Aug-1983
0000   ;                  Boot with an XQP system disk.
0000   ;
0000   ;          V03-012 DWT0112         David W. Thiel          29-July-1983
0000   ;                  Add stand-alone configure invocation, lock state
0000   ;                  setting, and waiting for cluster formation.
0000   ;
0000   ;          V03-011 ACG0344         Andrew C. Goldstein,    21-Jul-1983  16:40
0000   ;                  Do mount of system disk in exec mode
0000   ;
0000   ;          V03-010 KDM0057         Kathleen D. Morse       12-Jul-1983
0000   ;                  Change SIP_SETTIME into a loadable, cpu-dependent
0000   ;                  routine, EXE$INIT_TODR.
0000   ;
0000   ;          V03-009 LJK0222         Lawrence J. Kenah       5-Jul-1983
0000   ;                  Correct bug in $ENQW call introduced in LJK0211.
0000   ;
0000   ;          V03-008 LJK0211         Lawrence J. Kenah       22-Jun-1983
0000   ;                  Several changes related to the new image activator and INSTALL
0000   ;
0000   ;                  Remove the code that handcrafts a known file entry for the
0000   ;                  ACP image. The process based XQP makes this unnecessary.
0000   ;
0000   ;                  Remove the code that initializes the various KFE lists. This
0000   ;                  is now done by INSTALL.
0000   ;
0000   ;                  Add code to take out a lock for the system ID resource.
0000   ;
0000   ;                  Change the name of a routine in the exec to FIL$INIWCB.
0000   ;
0000   ;          V03-007 WMC0003         Wayne Cardoza           10-May-1983
0000   ;                  Use EXE$SYS_SECTION to map system sections.
0000   ;
0000   ;          V03-006 WMC0002         Wayne Cardoza           09-May-1983
0000   ;                  Map the XQP image sections.
0000   ;
0000   ;          V03-005 JWH0204         Jeffrey W. Horn         28-Mar-1983
0000   ;                  Replace BOO$CRMPSC with EXE$LOAD_PAGED.
0000   ;
0000   ;          V03-004 WMC0001         Wayne Cardoza           08-Mar-1983
0000   ;                  Save the system boot time.
0000   ;                  If no TOY clock, increment time by 10 msec
0000   ;
0000   ;          V03-003 ACG53600        Andrew C. Goldstein,    10-Feb-1983  17:08
0000   ;                  Make time validation checks more liberal
0000   ;
0000   ;
0000   ;--
```

```
0000          .SBTTL  DECLARATIONS
0000          .nocross
0000
0000  ;
0000  ; MACROS:
0000  ;
0000  ;
0000  ; PROGRAM SECTION DEFINITION MACROS
0000  ;       ARGUMENTS ARE:
0000  ;               1) SECTION NAME (KEY WORD IS NAME)
0000  ;               2) ALIGNMENT    (KEY WORD IS ALIGN)
0000  ;
0000  ;       IN ALL CASE, ARGUMENTS ARE OPTIONAL
0000  ;
0000  ; MACRO TO GENERATE A PROGRAM SECTION FOR EXECUTABLE CODE
0000  ;
0000          .MACRO  PURE_SECT NAME=SIP_PURE,ALIGN=BYTE
0000
0000          .PSECT  NAME    EXE,RD,NOWRT,ALIGN
0000
0000          .ENDM   PURE_SECT
0000  ;
0000  ; MACRO TO GENERATE IMPURE DATA SEGMENT
0000  ;
0000          .MACRO  IMPURE_DATA  NAME=SIP_RWDATA,ALIGN=LONG
0000
0000          .PSECT  NAME    NOEXE,WRT,RD,ALIGN
0000
0000          .ENDM   IMPURE_DATA
0000  ;
0000  ; MACRO TO GENERATE A STRING WITH DESCRIPTOR
0000  ;
0000  ;       STRING_DESC <STRING>
0000  ;
0000  ; WHERE:
0000  ;       <STRING> IS THE STRING TO BE USED
0000  ;
0000          .MACRO  STRING_DESC ST,?L1,?L2
0000
0000          .LONG   L2-L1
0000          .LONG   L1
0000  L1:     .ASCII  \ST\
0000  L2:
0000
0000          .ENDM
0000
0000  ;
0000  ; MACRO TO GENERATE A LIST OF SELFRELATIVE WORD POINTERS
0000  ;
0000          .MACRO  OFFSET  LIST
0000          .IRP    $$$,<LIST>
0000          .WORD   <$$$-.-2>
0000          .ENDR
0000          .ENDM   OFFSET
0000
0000  ;
0000  ; EQUATED SYMBOLS:
```

```
                0000  ;
                0000                $ATRDEF                         ; FILE ATTRIBUTE DEFINITIONS
                0000                $BOODEF                         ; BOOT CONTROL BLOCK DEFINITIONS
                0000                $CCBDEF                         ; CHANNEL CONTROL BLOCK DEFINITIONS
                0000                $CLUBDEF                        ; CLUSTER BLOCK DEFINITION
                0000                $CLUDCBDEF                      ; CLUSTER QUORUM DISK CONTROL BLOCK DEFINITI
                0000                $DEVDEF                         ; DEVICE BIT DEFINITIONS
                0000                $DMPDEF                         ; SYSTEM DUMP FILE HEADER DEFINITONS
                0000                $DVIDEF                         ; $GETDVI ITEM LIST CODES
                0000                $DYNDEF                         ; STRUCTURE TYPE DEFINITIONS
                0000                $EMBDEF CR                      ; ERROR LOG MESSAGE BUFFER FORMAT
                0000                $ERLDEF                         ; ERROR LOG BUFFER DEFINITIONS
                0000                $FIDDEF                         ; FILE ID OFFSET DEFINITIONS
                0000                $IACDEF                         ; IMAGE ACTIVATOR INTERFACE BITS
                0000                $IHDDEF                         ; IMAGE FILE HEADER DEFINITIONS
                0000                $IHPDEF                         ; IMAGE HEADER PATCH DEFINITIONS
                0000                $IHSDEF                         ; IMAGE HEADER SYMBOLIC DEBUGGING DEFS
                0000                $IODEF                          ; DEFINE I/O FUNCTION CODES
                0000                $IPLDEF                         ; DEFINE INTERRUPT PRIORITY LEVELS
                0000                $ISDDEF                         ; IMAGE SECTION DESCRIPTIONS
                0000                $LCKDEF                         ; FLAG BITS FOR CALL TO $ENQW
                0000                $LNMDEF                         ; DEFINE LOG OFFSETS
                0000                $PCBDEF                         ; DEFINE PCB OFFSETS
                0000                $PFLDEF                         ; PAGE FILE OFFSET DEFINITONS
                0000                $PHDDEF                         ; DEFINE PROCESS HEADER OFFSETS
                0000                $PQLDEF                         ; PROCESS QUOTA DEFINITIONS
                0000                $PRDEF                          ; PROCESSOR REGISTER DEFINITIONS
                0000                $PRTDEF                         ; PAGE PROTECTION DEFINITIONS
                0000                $PRVDEF                         ; PRIVILEGE DEFINITIONS
                0000                $PSLDEF                         ; PSL DFINITIONS
                0000                $PTEDEF                         ; PAGE TABLE ENTRY DEFINITIONS
                0000                $PTRDEF                         ; POINTER CONTROL BLOCK OFFSETS
                0000                $RPBDEF                         ; DEFINE RPB OFFSETS
                0000                $SECDEF                         ; DEFINE PROCESS SECTION
                0000                $TQEDEF                         ; DEFINE TIMER QUEUE ENTRY OFFSETS
                0000                $UCBDEF                         ; UNIT CONTROL BLOCK DEFINITIONS
                0000                $VADEF                          ; DEFINE VIRTUAL ADDRESS FIELDS
                0000                $WCBDEF                         ; WINDOW CONTROL BLOCK DEFINITIONS
                0000
      00000002  0000                SIP_C_DUMPVER = 2               ; DUMP FILE HEADER VERSION
      000001C4  0000                SIP_C_MINPAGFIL = 2500-2048     ; MINIMUM PAGE FILE REQUIRED
                0000  ;
                0000  ; OFFSETS INTO FILE ATTRIBUTES ARRAY
                0000  ;
                0000                $OFFSET 0,POSITIVE,<-
                0000                <STATBLK,0>,-                   ; 8 BYTE STATISTICS BLOCK CONSISTING OF
                0000                FILELBN,-                       ; STARTING LBN OR 0 IF NOT CONTIG
                0000                FILESIZE,-                      ; SIZE OF FILE IN 512 BYTE BLOCKS
                0000                IMAGEVBN,-                      ; FIRST VBN IF IMAGE FORMAT
                0000                IMAGESIZE,-                     ; SIZE IF IMAGE FORMAT
                0000                RTRVLEN,-                       ; BYTE COUNT OF RETRIEVAL POINTERS
                0000                <RTRVPTRS,0>-                   ; FIRST RETRIEVAL POINTER
                0000                >
                0000        STATBLK:
                0000        FILELBN:
                0004        FILESIZE:
                0008        IMAGEVBN:
```

```
                                    000C       IMAGESIZE:
                                    0010       RTRVLEN:
                                    0014       RTRVPTRS:
                                    0000
                                    0000               .WEAK   XDT$START                ; IF DEBUGGING, THEN DEFINED
                                    0000
                                    0000               .cross
                                    0000
                                    0000       ;
                                    0000       ; OWN STORAGE:
                                    0000       ;
                                    0000               PURE_SECT
                                    0000
                                    0000       SIP_Q_TTNAME:
                                    0000               STRING_DESC     <OPA0>           ; DEVICE NAME FOR TERMINAL
                                    000C
                                    000C       SIP_Q_FIBDESC:
                000000CC'00000010'  000C               .LONG   SIP_C_FIB_SIZE,SIP_A_FIB ; DESCRIPTOR FOR FILE IDENT BLOCK
                                    0014       SIP_A_ATRLIST:
                        0010 0056   0014               .WORD   ATR$S_ASCNAME,ATR$C_ASCNAME ; ASCII NAME ATTRIBUTE
                        00000000'   0018               .LONG   SIP_A_ERLBUFFER          ; SET ADR TO STORE NAME HERE
                        00000000    001C               .LONG   0                        ; END OF ATTRIBUTE LIST
                                    0020
                                    0020       SIP_Q_STARTUP:                           ; STARTUP PROCESS NAME
                                    0020               STRING_DESC     <STARTUP>        ;
                                    002F
                                    002F
                                    002F       SIP_Q_SPOUTPUT:                          ; STARTUP PROCESS OUTPUT
                                    002F               STRING_DESC     <OPA0:>          ; CONSOLE
                                    003C       SIP_Q_SPOUTXDT:                          ; STARTUP PROCESS OUTPUT (DELTA)
                                    003C               STRING_DESC     <NLA0:>          ; NULL DEVICE
                                    0049
                                    0049       SIP_Q_SPIMAGE:                           ; STARTUP PROCESS IMAGE
                                    0049               STRING_DESC     <SYS$SYSTEM:LOGINOUT.EXE>       ; NORMAL LOGINOUT IMAGE
                                    0068
                                    0068       SIP_Q_PRVMSK:
                FFFFFFFF FFFFFFFF   0068               .LONG   -1,-1                    ; INITIAL PRIVILEGES
                                    0070
                                    0070       FAOERR: STRING_DESC  <%SYSINIT-E- !AC, status = !XL>
                                    0095       CRELNMERR:
63 20 6F 74 20 64 65 6C 69 61 66 00' 0095              .ASCIC  \failed to create system logical names\
6D 65 74 73 79 73 20 65 74 61 65 72  00A1
6D 61 6E 20 6C 61 63 69 67 6F 6C 20  00AD
                                73 65  00B9
                                   25  0095
                                    00BB       PAGFILERR:
6C 69 61 66 20 70 75 6B 6F 6F 6C 00' 00BB              .ASCIC  \lookup failure on paging file\
6E 69 67 61 70 20 6E 6F 20 65 72 75  00C7
               65 6C 69 66 20 67     00D3
                                   1D  00BB
                                    00D9       MSGFILERR:
6C 69 66 20 65 67 61 73 73 65 6D 00' 00D9              .ASCIC  \message file not found, or insufficient SPT to map it\
2C 64 6E 75 6F 66 20 74 6F 6E 20 65  00E5
63 69 66 66 75 73 6E 69 20 72 6F 20  00F1
20 6F 74 20 54 50 53 20 74 6E 65 69  00FD
               74 69 20 70 61 6D     0109
                                   35  00D9
```

```
                                      010F
                                      010F  ACPINIERR:
74 69 6E 69 20 50 43 41 31 31 46 00'  010F            .ASCIC  \F11ACP initialization error\
65 20 6E 6F 69 74 61 7A 69 6C 61 69   011B
                         72 6F 72 72 0127
                                  1B  010F
                                      012B
74 6E 75 6F 6D 20 72 6F 72 72 65 00'  012B  MOUERR: .ASCIC  \error mounting system device\
64 20 6D 65 74 73 79 73 20 67 6E 69   0137
                         65 63 69 76 65 0143
                                  1C  012B
                                      0148
                                      0148  LOCKERR:
6E 69 6B 61 74 20 72 6F 72 72 65 00'  0148            .ASCIC  \error taking out lock on system disk\
6F 20 6B 63 6F 6C 20 74 75 6F 20 67   0154
73 69 64 20 6D 65 74 73 79 73 20 6E   0160
                                  6B  016C
                                  24  0148
                                      016D
                                      016D  INIPAGFIL:                              ; ERROR INITIALIZING THE PAGE OR SWAP FILE
6F 20 65 6C 69 66 20 65 67 61 70 00'  016D            .ASCIC  \page file or swap file control block initialization error\
20 65 6C 69 66 20 70 61 77 73 20 72   0179
63 6F 6C 62 20 6C 6F 72 74 6E 6F 63   0185
61 7A 69 6C 61 69 74 69 6E 69 20 6B   0191
      72 6F 72 72 65 20 6E 6F 69 74   019D
                                  39  016D
                                      01A7
                                      01A7  RMSMAPERR:                              ; ERROR ON RMS FILE MAP
74 6F 6E 20 45 58 45 2E 53 4D 52 00'  01A7            .ASCIC  \RMS.EXE not found, or insufficient SPT to map it\
69 20 72 6F 20 2C 64 6E 75 6F 66 20   01B3
20 74 6E 65 69 63 69 66 66 75 73 6E   01BF
69 20 70 61 6D 20 6F 74 20 54 50 53   01CB
                                  74  01D7
                                  30  01A7
                                      01D8
                                      01D8  FILOPNERR:                              ; ANY FILE OPEN ERROR - MORE MESSAGES LATER
69 6E 65 70 6F 20 72 6F 72 72 65 00'  01D8            .ASCIC  /error opening file/
               65 6C 69 66 20 67 6E   01E4
                                  12  01D8
                                      01EB
                                      01EB  INIWCBERR:                              ; ERROR INITING A WINDOW CONTROL BLOCK
69 74 69 6E 69 20 72 6F 72 72 65 00'  01EB            .ASCIC  \error initializing a window control block\
69 77 20 61 20 67 6E 69 7A 69 6C 61   01F7
6C 6F 72 74 6E 6F 63 20 77 6F 64 6E   0203
               6B 63 6F 6C 62 20      020F
                                  29  01EB
                                      0215
69 6E 65 70 6F 20 72 6F 72 72 65 00'  0215  XQPERR: .ASCIC  /error opening or mapping F11BXQP/
6E 69 70 70 61 6D 20 72 6F 20 67 6E   0221
         50 51 58 42 31 31 46 20 67   022D
                                  20  0215
                                      0236
                                      0236  SYSID_LOCK_ERR:
6F 20 6F 74 20 65 6C 62 61 6E 75 00'  0236            .ASCIC  \unable to obtain lock for system ID resource\
66 20 6B 63 6F 6C 20 6E 69 61 74 62   0242
44 49 20 6D 65 74 73 79 73 20 72 6F   024E
      65 63 72 75 6F 73 65 72 20      025A
```

```
                                      2C  0236
                                          0263
                                          0263   SIP_CLU_MSG:
     20 6F 74 20 67 6E 69 74 69 61 77 00' 0263          .ASCIC  \waiting to form or join VAXcluster\
     6E 69 6F 6A 20 72 6F 20 6D 72 6F 66  026F
        72 65 74 73 75 6C 63 58 41 56 20  027B
                                      22  0263
                                          0286
                                          0286   INIKNOWNFIL:
     20 65 6C 69 66 20 6E 77 6F 6E 6B 00' 0286          .ASCIC  \known file list initialization error\
     6C 61 69 74 69 6E 69 20 74 73 69 6C  0292
     6F 72 72 65 20 6E 6F 69 74 61 7A 69  029E
                                      72  02AA
                                      24  0286
                                          02AB
                                          02AB   PAGFILNAM:
     59 53 2E 45 4C 49 46 45 47 41 50 00' 02AB          .ASCIC  \PAGEFILE.SYS\
                                      53  02B7
                                      0C  02AB
                                          02B8   SWPFILNAM:
     59 53 2E 45 4C 49 46 50 41 57 53 00' 02B8          .ASCIC  \SWAPFILE.SYS\
                                      53  02C4
                                      0C  02B8
                                          02C5   RMSFILNAM:
                 45 58 45 2E 53 4D 52 00' 02C5          .ASCIC  \RMS.EXE\
                                      07  02C5
                                          02CD   MSGFILNAM:
     3A 45 47 41 53 53 45 4D 24 53 59 53  02CD          .ASCII  \SYS$MESSAGE:SYSMSG.EXE\
           45 58 45 2E 47 53 4D 53 59 53  02D9
                                00000016  02E3          MSGFILNAMSZ=.-MSGFILNAM
                                          02E3
                                          02E3   ;
                                          02E3   ; ***** PAGE FILE MUST BE FIRST
                                          02E3   ;
                                          02E3   SIP_A_NAMES:
                               000002AB'  02E3          .LONG   PAGFILNAM                    ; FILENAME AND ERROR POINTER
                               000002B8'  02E7          .LONG   SWPFILNAM                    ;
                               000002C5'  02EB          .LONG   RMSFILNAM                    ;
                                00000000  02EF          .LONG   0                            ; END OF LIST
                                          02F3   ;
     46 3A 4D 45 54 53 59 53 24 53 59 53  02F3   XQPNAM: .ASCII  /SYS$SYSTEM:F11BXQP.EXE/
           45 58 45 2E 50 51 58 42 31 31  02FF
                                00000016  0309          XQPNAMSIZ = .-XQPNAM
                                          0309   ;
                                          0309   ;
                                          0309          IMPURE_DATA SIP_RWDATA_PAGE,PAGE
                                          0000   ;
                                          0000   ;      THIS BUFFER IS USED FOR THE QUORUM FILE LOOKUP AND TO READ
                                          0000   ;      THE SYSTEM DUMP FILE FOR ERROR LOG INFORMATION
                                          0000   ;
                                          0000   SIP_A_ERLBUFFER:                            ;
                                00000600  0000          .BLKB   <3*512>                      ; 3 PAGES
                                00000000  0600   SIP_A_INDEXFHDR = SIP_A_ERLBUFFER           ; INDEX FILE HEADER BUF (FIL$OPENFILE)
                                00000200  0600   SIP_A_FILEHDR   = SIP_A_ERLBUFFER+512       ; FILE HEADER BUFFER (FIL$OPENFILE)
                                          0600
                                          0600          IMPURE_DATA
                                          0000
```

```
                      0000   MSGFILFAB:      $FAB    FAC=GET,-               ; FILE ACCESS IS GET (READ)
                      0000                           FOP=<UFO>,-             ; USER FILE OPEN
                      0000                           FNA=MSGFILNAM,-         ; ADDRESS OF FILE NAME STRING
                      0000                           FNS=MSGFILNAMSZ,-       ;
                      0000                           RFM=FIX,-               ; FIXED RECORD FORMAT
                      0000                           MRS=512,-               ; MAXIMUM RECORD SIZE OF ONE PAGE
                      0000                           RTV=255,-               ; LET ACP COMPUTE LARGEST RETRIEVAL WINDOW
                      0000                           XAB=MSGFILXAB           ; EXTENDED ATTRIBUTE BLOCK
                      0050   MSGFILXAB:              $XABFHC                 ; EXTENDED ATTRIBUTE BLOCK FOR FILE HEADER
                      007C
                      007C   XQPFAB: $FAB            FAC=GET,-               ; FILE ACCESS IS GET (READ)
                      007C                           FOP=<UFO>,-             ; USER FILE OPEN
                      007C                           FNA=XQPNAM,-            ; ADDRESS OF FILE NAME STRING
                      007C                           FNS=XQPNAMSIZ,-         ;
                      007C                           RFM=FIX,-               ; FIXED RECORD FORMAT
                      007C                           MRS=512,-               ; MAXIMUM RECORD SIZE OF ONE PAGE
                      007C                           RTV=255                 ; LET ACP COMPUTE LARGEST RETRIEVAL WINDOW
                      00CC
                      00CC   SIP_A_FIB:                                      ; FILE IDENTIFICATION BLOCK
            00000000  00CC           .LONG   0                               ; ACCESS CONTROL INFORMATION
      0000 0000 0000  00D0           .WORD   0,0,0                           ; RETURNED FILE ID
      0000 0004 0004  00D6           .WORD   FID$C_MFD,FID$C_MFD,0           ; DIRECTORY ID OF MFD
            00000010  00DC           SIP_C_FIB_SIZE=.-SIP_A_FIB
                      00DC   SIP_L_TTCHAN:
            000000E0  00DC           .BLKL   1                               ; CHANNEL FOR TERMINAL HERE
                      00E0
                      00E0   SIP_Q_RETADR:                                   ; RETURN ADDRESS RANGE FROM EXPREG
            000000E8  00E0           .BLKQ   1
                      00E8   SIP_Q_TMPDESC:                                  ; TEMPORY STRING DESCRIPTOR
            000000F0  00E8           .BLKQ   1
                      00F0   SIP_Q_STATBLK:
            000000F8  00F0           .BLKQ   1                               ; STATISTICS BLOCK RETURNED BY FIL$OPENFILE
                      00F8   SIP_Q_RTRVBUF:                                  ; DESCRIPTOR FOR RTRV PTR BUFFER
            00000100  00F8           .BLKQ   1
                      0100   SIP_L_RTRVLEN:                                  ; RETURNED RTRV PTR BUFFER LENGTH
            00000104  0100           .BLKL   1
                      0104   SIP_A_OPENARG:                                  ; ARGUMENT LIST TO FIL$OPENFILE
            00000007  0104           .LONG   7                               ; 7 ARGUMENTS TO FIL$OPENFILE
           00000134'  0108           .LONG   SIP_L_DSKCHAN                   ; ADDRESS TO RETURN DISK CHANNEL
           000000E8'  010C           .LONG   SIP_Q_TMPDESC                   ; ADDRESS OF FILE NAME DESCRIPTOR
           00000000'  0110           .LONG   SIP_A_INDEXFHDR                 ; BUFFER ADDRESS FOR INDEX FILE HEADER
           00000200'  0114           .LONG   SIP_A_FILEHDR                   ; BUFFER ADDRESS FOR FILE HEADER
           000000F0'  0118           .LONG   SIP_Q_STATBLK                   ; ADDRESS TO RETURN STATISTICS BLOCK
                      011C                                                   ;     STARTING LBN IF CONTIG, 0 IF NOT
                      011C                                                   ;     FILE SIZE IN BLOCKS
           00000100'  011C           .LONG   SIP_L_RTRVLEN                   ; ADR TO RETURN RTRV PTR BUF LENGTH
           000000F8'  0120           .LONG   SIP_Q_RTRVBUF                   ; ADR OF RTRV PTR BUF DESCRIPTOR
                      0124
                      0124   SIP_L_ERRSEQ:
            00000000  0124           .LONG   0                               ; SAVED ERROR SEQUENCE NUMBER
                      0128                                                   ; FROM DUMP FILE HEADER
                      0128   SIP_A_FILATT:                                   ; LIST OF FILE ATTRIBUTE AREAS
                      0128   SIP_L_PAGATT:                                   ; PAGE FILE
            0000012C  0128           .BLKL   1
                      012C   SIP_L_SWPATT:                                   ; SWAP FILE
            00000130  012C           .BLKL   1
                      0130   SIP_L_RMSATT:                                   ; RMS
```

```
                        00000134  0130          .BLKL   1
                                  0134
                                  0134  SIP_L_DSKCHAN:
                        00000138  0134          .BLKL   1                       ; CHANNEL FOR DISK HERE
                                  0138
                                  0138  SIP_Q_LINBUF:
                       0084'0000  0138          .WORD   0,SIP_C_LINBUFSIZ       ; DESCRIPTOR FOR LINE BUFFER
                       00000140'  013C          .LONG   SIP_T_LINBUF
                                  0140
                                  0140  SIP_T_LINBUF:
                        000001C4  0140          .BLKB   132
                                  01C4
                        00000084  01C4  SIP_C_LINBUFSIZ=.-SIP_T_LINBUF
                                  01C4
                                  01C4  CREPRCERR:                              ; CREATE PROCESS ERROR
                              27' 01C4          .BYTE   CREERREND-.-1           ; LENGTH OF STRING
65 63 6F 72 70 20 65 74 61 65 72 63  01C5       .ASCII  \create process error on \
20 6E 6F 20 72 6F 72 72 65 20 73 73  01D1
                                  01DD  CREPRCNAM:                              ;
                        000001EC  01DD          .BLKB   15                      ;
                                  01EC  CREERREND:
                                  01EC
                                  01EC  SIP_Q_SPINPUT:                          ; STARTUP PROCESS INPUT
                        00000000  01EC          .LONG   0                       ; COUNT FOR STRING
                       00000001'  01F0          .LONG   EXE$GT_STARTUP+1        ; ADDRESS
                                  01F4
                                  01F4  XQP_GSDNAM:
      30 30 30 5F 50 51 58 53 59 53  01F4       .ASCII  /SYSXQP_000/
                        0000000A  01FE          XQP_GSDNAM_SIZ = .-XQP_GSDNAM
                                  01FE  XQP_GSD_DESC:
                        0000000A  01FE          .LONG   XQP_GSDNAM_SIZ
                       000001F4'  0202          .ADDRESS XQP_GSDNAM
                                  0206  XQP_NAME:
59 53 24 53 59 53 0000020E'010E0000'  0206      .ASCID /SYS$SYSTEM:F11BXQP.EXE/
50 51 58 42 31 31 46 3A 4D 45 54 53  0214
                     45 58 45 2E  0220
                                  0224  XQP_DEF:
59 53 24 53 59 53 0000022C'010E0000'  0224      .ASCID /SYS$SYSTEM:.EXE/
      45 58 45 2E 3A 4D 45 54 53  0232
                                  023B  XQP_INADDR:
               00000000 00000000  023B          .LONG 0,0
                                  0243  XQP_RETADDR:
               00000000 00000000  0243          .LONG 0,0
                                  024B  XQP_HEADER:
                        0000044B  024B          .BLKB 512
```

```
                               044B          .SUBTITLE       Data Used by $ENQW Request
                               044B  ;+
                               044B  ; The following data area is used by the $ENQW request that obtains a lock
                               044B  ; whose name contains the system ID
                               044B  ;-
                               044B
                               044B  LOCK_FLAGS = -                                  ; Flags used by $ENQW call
                               044B          LCK$M_SYSTEM ! -                        ;  Do not qualify lock name with UIC
                               044B          LCK$M_NOQUEUE ! -                       ;  There should be nothing to wait for
                               044B          LCK$M_CVTSYS ! -                        ;  The lock will be owned by the system
                     0000005C  044B          LCK$M_SYNCSTS
                               044B
                               044B  ; Lock status block. The lock ID will be stored in an exec data cell after
                               044B  ; the service successfully completes.
                               044B
                               044B  LOCK_STATUS_BLOCK:
                     0000044F  044B  LOCK_STATUS:    .BLKW   2
                     00000000  044F  LOCK_ID:        .LONG   0
                               0453
                               0453  ; The lock name begins with the facility name in ASCII. The guts of the lock
                               0453  ; name consists of the six-byte system ID. The "ID" suffix is a cute way of
                               0453  ; rounding the name up to multiple of four.
                               0453
44 49 5F 53 59 53 24 53 59 53  0453  LOCK_NAME:      .ASCII  /SYS$SYS_ID/
                     00000463  045D  SYS_ID:         .BLKB   6
                     00000010  0463  LOCK_NAME_SIZE = . - LOCK_NAME
                               0463
                               0463  LOCK_NAME_DESC:
                     00000010  0463          .LONG           LOCK_NAME_SIZE
                    00000453'  0467          .ADDRESS        LOCK_NAME
```

```
                                      046B   521            .SUBTITLE       Data Used To Create Stand-Alone Configure Process
                                      046B   522
                                      046B   523  ;
                                      046B   524  ; The following data is used in creating the stand-alone Configure Process
                                      046B   525  ;
                                      046B   526
                                      046B   527  ; Image name
                                      046B   528  ;
4E 4F 43 41 54 53 00000473'010E0000'  046B   529  STAC_IMAGE:       .ASCID  /STACONFIG.EXE/
         45 58 45 2E 47 49 46         0479
                                      0480   530
                                      0480   531  ; Input/output/error names
                                      0480   532  ;
3A 30 41 50 4F 5F 00000488'010E0000'  0480   533  STAC_OPER:        .ASCID  /_OPA0:/
                                      048E   534
                                      048E   535  ; Process privilege mask
                                      048E   536  ;
                FFFFFFFF FFFFFFFF     048E   537  STAC_PRV_MSK:     .LONG   -1,-1
                                      0496   538
                                      0496   539  ; Process name
                                      0496   540  ;
4E 4F 43 41 54 53 0000049E'010E0000'  0496   541  STAC_PRC:         .ASCID  /STACONFIG/
                        47 49 46      04A4
                                      04A7   542
                                      04A7   543  ; Process quotas
                                      04A7   544  ;
                                      04A7   545  STAC_QLIST:
                              01      04A7   546            .BYTE    PQL$_ASTLM
                        000000C8      04A8   547            .LONG    200
                              02      04AC   548            .BYTE    PQL$_BIOLM
                        000000C8      04AD   549            .LONG    200
                              03      04B1   550            .BYTE    PQL$_BYTLM
                        000186A0      04B2   551            .LONG    100000
                              04      04B6   552            .BYTE    PQL$_CPULM
                        00000000      04B7   553            .LONG    0
                              05      04BB   554            .BYTE    PQL$_DIOLM
                        000000C8      04BC   555            .LONG    200
                              0C      04C0   556            .BYTE    PQL$_ENQLM
                        000000C8      04C1   557            .LONG    200
                              06      04C5   558            .BYTE    PQL$_FILLM
                        000000C8      04C6   559            .LONG    200
                              07      04CA   560            .BYTE    PQL$_PGFLQUOTA
                        00005000      04CB   561            .LONG    20480
                              08      04CF   562            .BYTE    PQL$_PRCLM
                        000000C8      04D0   563            .LONG    200
                              09      04D4   564            .BYTE    PQL$_TQELM
                        000000C8      04D5   565            .LONG    200
                              0B      04D9   566            .BYTE    PQL$_WSDEFAULT
                        00000064      04DA   567            .LONG    100
                              0A      04DE   568            .BYTE    PQL$_WSQUOTA
                        00000200      04DF   569            .LONG    512
                              0E      04E3   570            .BYTE    PQL$_JTQUOTA
                        00000400      04E4   571            .LONG    1024
                              00      04E8   572            .BYTE    PQL$_LISTEND
                                      04E9   573
                                      04E9   574  SIP_CLU_TIMOUT:                          ; 100 milli-second quadword value
                FFFFFFFF FFF0BDC0     04E9   575            .LONG   -1000*1000,-1
```

```
                              04F1            .SUBTITLE       Data Used For Quorum disk
                              04F1
                              04F1  SIP_QD_CHAN:                            ; Quorum disk channel number
                    00000000  04F1            .LONG   0
                              04F5
                              04F5  SIP_QD_IOSB:                            ; I/O status block
                              04F5  SIP_QD_STATBUF:                         ; Statistics buffer
           00000000 00000000  04F5            .QUAD   0
                              04FD
                              04FD  SIP_QD_DESCR:                           ; Quorum disk name descriptor
                        0010  04FD            .WORD   CLUDCB$S_DISK_QUORUM
                         00'  04FF            .BYTE   DSC$K_DTYPE_T
                         00'  0500            .BYTE   DSC$K_CLASS_S
                   00000000'  0501            .LONG   CLU$GB_QDISK
                              0505
                              0505  SIP_QF_DESCR:                           ; Full quorum file name descriptor
                        0000  0505            .WORD   0
                         00'  0507            .BYTE   DSC$K_DTYPE_T
                         00'  0508            .BYTE   DSC$K_CLASS_S
                   00000521'  0509            .LONG   SIP_QF_BUFFER
                              050D
                              050D  SIP_QF_NAME:
52 4F 55 51 5D 30 30 30 30 30 30 5B  050D            .ASCII  /[000000]QUORUM.DAT;1/
         31 3B 54 41 44 2E 4D 55  0519
                    00000014  0521            SIP_QF_NAME_SIZE = .-SIP_QF_NAME
                              0521
                              0521  SIP_QF_BUFFER:
                    00000575  0521            .BLKB   64+SIP_QF_NAME_SIZE
                              0575
                              0575  SIP_QD_ITMLST:
                   00E8 0040  0575            .WORD   64,DVI$_FULLDEVNAM
                   00000521'  0579            .LONG   SIP_QF_BUFFER
                   00000505'  057D            .LONG   SIP_QF_DESCR
                    00000000  0581            .LONG   0
                    0585          .SBTTL  IMPURE DATA FOR $CRELNM AND $TRNLNM CALLS
                    0585
                    0585  SYS_COMMON_ITMLST:
          0003 0004 0585          .WORD   4,LNM$_ATTRIBUTES
          0000042F' 0589          .LONG   TERMINAL_CONCEALED_ATTR ;SYS$COMMON BOTH TERMINAL AND CONCEALED
          00000000  058D          .LONG   0
                    0591  SYS_SYSROOT_CMNSYS_LEN:
               0000 0591          .WORD   0
               0002 0593          .WORD   LNM$_STRING
                    0595  SYS_SYSROOT_CMNSYS:
          00000000  0595          .LONG   0
 00000000 00000000  0599          .QUAD   0
                    05A1
                    05A1  SYS_SYSDEVICE_ITMLST:
          0003 0004 05A1          .WORD   4,LNM$_ATTRIBUTES
          000005BD' 05A5          .LONG   SYS_SYSDEVICE_ATTR
          00000000  05A9          .LONG   0
                    05AD  SYS_SYSDEVICE_DEV_LEN:
               0020 05AD          .WORD   32
               0002 05AF          .WORD   LNM$_STRING
                    05B1  SYS_SYSDEVICE_DEV:
          00000000' 05B1          .LONG   SIP_A_ERLBUFFER
          000005AD' 05B5          .LONG   SYS_SYSDEVICE_DEV_LEN
          00000000  05B9          .LONG   0
                    05BD
                    05BD  SYS_SYSDEVICE_ATTR:
          00000000  05BD          .LONG   0
                    05C1
                    05C1  SYS_SYSDEVICE_DVI_LST:
               0020 05C1          .WORD   32
               00E8 05C3          .WORD   DVI$_FULLDEVNAM
          00000000' 05C5          .LONG   SIP_A_ERLBUFFER
          000005AD' 05C9          .LONG   SYS_SYSDEVICE_DEV_LEN
          00000000  05CD          .LONG   0
                    05D1
                    05D1  SYS_SYSROOT_ITMLST:
          0003 0004 05D1          .WORD   4,LNM$_ATTRIBUTES
          0000042F' 05D5          .LONG   TERMINAL_CONCEALED_ATTR ;TOPSYS BOTH TERMINAL AND CONCEALED
          00000000  05D9          .LONG   0
                    05DD  SYS_SYSROOT_TOPSYS_LEN:
               0000 05DD          .WORD   0
               0002 05DF          .WORD   LNM$_STRING
                    05E1  SYS_SYSROOT_TOPSYS:
          00000000  05E1          .LONG   0
          00000000  05E5          .LONG   0
          0003 0004 05E9          .WORD   4,LNM$_ATTRIBUTES
          00000433' 05ED          .LONG   NO_ATTR                 ;CMNSYS NEITHER TERMINAL NOR CONCEALED
          00000000  05F1          .LONG   0
              000B' 05F5          .WORD   SYS_COMMON_LENGTH
               0002 05F7          .WORD   LNM$_STRING
          0000033B' 05F9          .LONG   SYS_COMMON
 00000000 00000000  05FD          .QUAD   0
                    0605
                    0605  SYS_TOPSYS_ITMLST:
                    0605  SYS_TOPSYS_DIRNAM_LEN:
               0000 0605          .WORD   0
               0002 0607          .WORD   LNM$_STRING
```

```
                        0609    668 SYS_TOPSYS_DIRNAM:
               00000000 0609    669          .LONG   0
      00000000 00000000 060D    670          .QUAD   0
```

```
                                           0615                .SBTTL  PURE DATA FOR $CRELNM AND $TRNLNM CALLS
                                           0615
                                           0615                PURE_SECT
                                           0309
                                           0309  CMNSYS:
5D 2E 4E 4F 4D 4D 4F 43 53 59 53 00'  0309                .ASCIC  /SYSCOMMON.]/
                                  0B  0309
                                           0315
                                           0315  LNM_FILE_DEV:
49 46 24 4D 4E 4C 0000031D'010E0000'  0315                .ASCID  /LNM$FILE_DEV/
                   56 45 44 5F 45 4C  0323
                                           0329
                                           0329  LNM_SYSTEM_DESC:
59 53 24 4D 4E 4C 00000331'010E0000'  0329                .ASCID  /LNM$SYSTEM/
                         4D 45 54 53  0337
                                           033B
                                           033B  SYS_COMMON:
   3A 4E 4F 4D 4D 4F 43 24 53 59 53  033B                .ASCII  /SYS$COMMON:/
                            0000000B  0346  SYS_COMMON_LENGTH = . - SYS_COMMON
                                           0346
                                           0346  SYS_COMMON_DESC:
4F 43 24 53 59 53 0000034E'010E0000'  0346                .ASCID  /SYS$COMMON/
                         4E 4F 4D 4D  0354
                                           0358
                                           0358  SYS_MESSAGE:
3A 54 4F 4F 52 53 59 53 24 53 59 53  0358                .ASCII  /SYS$SYSROOT:[SYSMSG]/
             5D 47 53 4D 53 59 53 5B  0364
                            00000014  036C  SYS_MESSAGE_LEN = . - SYS_MESSAGE
                                           036C
                                           036C  SYS_MESSAGE_DESC:
45 4D 24 53 59 53 00000374'010E0000'  036C                .ASCID  /SYS$MESSAGE/
                      45 47 41 53 53  037A
                                           037F
                                           037F  SYS_SHARE:
3A 54 4F 4F 52 53 59 53 24 53 59 53  037F                .ASCII  /SYS$SYSROOT:[SYSLIB]/
             5D 42 49 4C 53 59 53 5B  038B
                            00000014  0393  SYS_SHARE_LEN = . - SYS_SHARE
                                           0393
                                           0393  SYS_SHARE_DESC:
48 53 24 53 59 53 0000039B'010E0000'  0393                .ASCID  /SYS$SHARE/
                            45 52 41  03A1
                                           03A4
                                           03A4  SYS_SYSDEVICE_DESC:
59 53 24 53 59 53 000003AC'010E0000'  03A4                .ASCID  /SYS$SYSDEVICE/
                45 43 49 56 45 44 53  03B2
                                           03B9
                                           03B9  SYS_DISK_DESC:
49 44 24 53 59 53 000003C1'010E0000'  03B9                .ASCID  /SYS$DISK/
                               4B 53  03C7
                                           03C9
                                           03C9  SYS_SYSROOT_DESC:
59 53 24 53 59 53 000003D1'010E0000'  03C9                .ASCID  /SYS$SYSROOT/
                      54 4F 4F 52 53  03D7
                                           03DC
                                           03DC  SYS_SYSTEM:
3A 54 4F 4F 52 53 59 53 24 53 59 53  03DC                .ASCII  /SYS$SYSROOT:[SYSEXE]/
             5D 45 58 45 53 59 53 5B  03E8
```

```
                         00000014  03F0   SYS_SYSTEM_LEN = . - SYS_SYSTEM
                                   03F0
                                   03F0   SYS_SYSTEM_DESC:
59 53 24 53 59 53 000003F8'010E0000'  03F0          .ASCID  /SYS$SYSTEM/
                      4D 45 54 53  03FE
                                   0402
                                   0402   SYS_TOPSYS_DESC:
4F 54 24 53 59 53 0000040A'010E0000'  0402          .ASCID  /SYS$TOPSYS/
                      53 59 53 50  0410
                                   0414
                                   0414   SYSUAFALT:
          54 4C 41 46 41 55 53 59 53  0414          .ASCII  /SYSUAFALT/
                         00000009  041D   SYSUAFALT_LEN = . - SYSUAFALT
                                   041D
                                   041D   SYSUAF_DESC:
46 41 55 53 59 53 00000425'010E0000'  041D          .ASCID  /SYSUAF/
                                   042B
                         00000001  042B   EXEC_MODE:        .LONG   PSL$C_EXEC
                                   042F
                                   042F   TERMINAL_CONCEALED_ATTR:
                         00000300  042F                     .LONG   LNM$M_TERMINAL!LNM$M_CONCEALED
                                   0433
                         00000000  0433   NO_ATTR:          .LONG   0
                                   0437
                                   0437   SYS_MESSAGE_ITMLST:
                        0002 0014  0437          .WORD   SYS_MESSAGE_LEN,LNM$_STRING
                        00000358'  043B          .LONG   SYS_MESSAGE
                00000000 00000000  043F          .QUAD   0
                                   0447
                                   0447   SYS_SHARE_ITMLST:
                        0002 0014  0447          .WORD   SYS_SHARE_LEN,LNM$_STRING
                        0000037F'  044B          .LONG   SYS_SHARE
                00000000 00000000  044F          .QUAD   0
                                   0457
                                   0457   SYS_SYSTEM_ITMLST:
                        0002 0014  0457          .WORD   SYS_SYSTEM_LEN,LNM$_STRING
                        000003DC'  045B          .LONG   SYS_SYSTEM
                00000000 00000000  045F          .QUAD   0
                                   0467
                                   0467   SYSUAF_ITMLST:
                        0002 0009  0467          .WORD   SYSUAFALT_LEN,LNM$_STRING
                        00000414'  046B          .LONG   SYSUAFALT
                00000000 00000000  046F          .QUAD   0
                                   0477
```

```
0477          .SBTTL  SYSTEM INITIALIZATION PROCESS
0477   ;++
0477   ; FUNCTIONAL DESCRIPTION:
0477   ;
0477   ;       THIS PROCESS IS INITIATED BY THE OPERATING SYSTEM AFTER
0477   ;       IT HAS BEEN BOOT STRAPPED AND PROCESSOR INITIALIZTION
0477   ;       HAS BEEN COMPLETED. THE FOLLOWING FUNCTIONS ARE
0477   ;       PERFORMED:
0477   ;
0477   ;               1) THE PER-SYSTEM ROOT LOCK IS CREATED
0477   ;               2) CLUSTER INITIALIZATION
0477   ;                  IF NO CLUSTER:
0477   ;                       ENABLE UNCONSTRAINED LOCKING
0477   ;                  IF CLUSTER:
0477   ;                       STALL ROOT LOCK REQUESTS
0477   ;                       CREATE STAND-ALONE CONFIGURE PROCESS
0477   ;                       WAIT FOR CLUSTER TO FORM
0477   ;               3) SYSTEM LOGICAL NAMES ARE CREATED
0477   ;               4) PAGEFILE, SWAPFILE, AND RMS ARE INITIALIZED
0477   ;               5  MERGE FILE SYSTEM XQP.
0477   ;               6) THE SYSTEM DISK IS MOUNTED (ACP STARTED UP)
0477   ;               7) THE SYSTEM MESSAGE FILE IS OPENED AND MAPPED
0477   ;               8) STARTUP PROCESS IS INITIATED, WHICH NOW STARTS UP
0477   ;                  JOBCTL, OPCOM, AND ERRFMT.
0477   ;
0477   ;
0477   ; CALLING SEQUENCE:
0477   ;
0477   ;       NONE-ENTERED DIRECTLY FROM THE IMAGE ACTIVATOR
0477   ;
0477   ; INPUT PARAMETERS:
0477   ;
0477   ;       NONE
0477   ;
0477   ; IMPLICIT INPUTS:
0477   ;
0477   ;       LOGICAL NAME "SYS$SYSDEVICE" IS ASSIGNED TO THE SYSTEM DISK
0477   ;       FIL$GQ_CACHE CONTAINS A DESCRIPTOR FOR THE FIL$OPENFILE CACHE
0477   ;
0477   ; OUTPUT PARAMETERS:
0477   ;
0477   ;       NONE
0477   ;
0477   ; IMPLICIT OUTPUTS:
0477   ;
0477   ;       FILE ADDRESS ARE STORED, THE SPECIFIED PROCESSES ARE CREATED
0477   ;
0477   ;
0477   ; COMPLETION CODES:
0477   ;
0477   ;
0477   ; SIDE EFFECTS:
0477   ;
0477   ;       NONE
0477   ;
0477   ;--
0477           PURE_SECT
```

```
                            0477
                            0477   SIP_START:
                    0000    0477           .WORD   0                               ; ENTRY MASK
                            0479           $CMKRNL_S               -
                            0479                   W^SIP_GET_SYSID_LOCK            ; OBTAIN LOCK FOR SYSTEM ID NAME
                            0486
                            0486           $CMKRNL_S W^SIP_SETTIME                 ; SET THE INTERNAL SYSTEM TIME
                            0493
                            0493           $CMKRNL_S               -
                            0493                   W^SIP_CLUSTER_INIT              ; CLUSTER RELATED INITIALIZATION
                            04A0
         0000'CF    00  FB  04A0           CALLS   #0,W^LOCKDOWN                   ; LOCK PAGES THAT MUST BE LOCKED
                            04A5
                            04A5   ;
                            04A5   ; CREATE THE SYSTEM LOGICAL NAMES. AN ASSUMPTION MADE IS THAT AN INDEX 0
                            04A5   ; TRANSLATION EXISTS FOR SYS$SYSDEVICE IF THE LOGICAL NAME IS SUCCESSFULLY
                            04A5   ; TRANSLATED.
                            04A5   ;
                            04A5
                            04A5           $TRNLNM_S -                             ; GET TRANSLATION ATTR OF THE SYSTEM DISK
                            04A5                   ITMLST = SYS_SYSDEVICE_ITMLST,-
                            04A5                   LOGNAM = SYS_SYSDEVICE_DESC,-
                            04A5                   TABNAM = LNM_FILE_DEV
               7E 50    E9  04BE           BLBC    R0,5$                           ; QUIT ON FAILURE
                            04C1
      FFFFFCFF 8F       CA  04C1           BICL2   #^C<LNM$M_TERMINAL!LNM$M_CONCEALED>,-
      000005BD'EF           04C7                   SYS_SYSDEVICE_ATTR              ; CLEAR UN-NEEDED ATTRIBUTES
                            04CC
                            04CC           $GETDVIW_S -                            ; GET FULL DEVICENAME OF THE SYSTEM DISK
                            04CC                   EFN = #1,-                      ;
                            04CC                   IOSB = W^SIP_Q_STATBLK,-
                            04CC                   ITMLST = SYS_SYSDEVICE_DVI_LST,-
                            04CC                   DEVNAM = SYS_SYSDEVICE_DESC
               52 50    E9  04EA           BLBC    R0,5$                           ; QUIT ON FAILURE
                            04ED
  000005B1'FF    5F 8F  91  04ED           CMPB    #^A\_\,@SYS_SYSDEVICE_DEV
                    0C  12  04F5           BNEQ    2$
      000005B1'EF       D6  04F7           INCL    SYS_SYSDEVICE_DEV               ; DISCARD LEADING "_"
      000005AD'EF       B7  04FD           DECW    SYS_SYSDEVICE_DEV_LEN
                            0503
                            0503   2$:     $CRELNM_S -                             ; SET UPTODATE TRANSLATION OF THE SYSTEM DIS
                            0503                   ITMLST = SYS_SYSDEVICE_ITMLST,-
                            0503                   LOGNAM = SYS_SYSDEVICE_DESC,-
                            0503                   ACMODE = EXEC_MODE,-            ;
                            0503                   TABNAM = LNM_SYSTEM_DESC
               1E 50    E9  051E           BLBC    R0,5$                           ; QUIT ON FAILURE
                            0521
                            0521           $CRELNM_S -                             ; SET UPTODATE TRANSLATION OF THE SYSTEM DIS
                            0521                   ITMLST = SYS_SYSDEVICE_ITMLST,-
                            0521                   LOGNAM = SYS_DISK_DESC,-
                            0521                   ACMODE = EXEC_MODE,-            ;
                            0521                   TABNAM = LNM_SYSTEM_DESC
                            053C
               03 50    E8  053C           BLBS    R0,10$                          ; CONTINUE IF TRANSLATION EXISTS
                  00F0  31  053F   5$:     BRW     CRELNM_FATAL                    ; ELSE GENERATE ERROR
                            0542
                            0542   ;
```

```
                          0542   ; CREATE LOGICAL NAMES FOR SYS$COMMON AND SYS$SYSROOT.
                          0542   ;
                          0542
56   000005AD'EF    3C    0542   10$:   MOVZWL  SYS_SYSDEVICE_DEV_LEN,R6; SIZE OF DEVICE NAME TRANSLATION
57   000005B1'EF    D0    0549          MOVL    SYS_SYSDEVICE_DEV,R7    ; ADDRESS OF DEVICE NAME TRANSLATION
     53    57   56  C1    0550          ADDL3   R6,R7,R3                ; ADDRESS OF FIRST BYTE BEYOND DEVICE
                          0554                                          ; NAME TRANSLATION
                          0554
51   00000000'EF    DE    0554   20$:   MOVAL   FIL$GT_TOPSYS,R1        ; TOP LEVEL SYSTEM DIRECTORY IF ANY
           50   81  9A    055B          MOVZBL  (R1)+,R0                ; GET SIZE OF STRING
                0D  13    055E          BEQL    30$                     ; BRANCH IF NO TOP LEVEL DIRECTORY
      83    5B  8F  90    0560          MOVB    #^A/[/,(R3)+            ; BEGIN DIRECTORY STRING
     63    61   50  28    0564          MOVC3   R0,(R1),(R3)            ; MOVE THE TOP LEVEL DIRECTORY NAME
     83  5D2E   8F  B0    0568          MOVW    #^A/.]/,(R3)+           ; AND THE SEPARATOR
                          056D
     56    53   57  C3    056D   30$:   SUBL3   R7,R3,R6                ; GET SIZE OF THE EQUIVALENCE NAME
000005DD'EF     56  B0    0571          MOVW    R6,SYS_SYSROOT_TOPSYS_LEN; STORE THE LENGTH IN THE ITEM LIST
000005E1'EF     57  D0    0578          MOVL    R7,SYS_SYSROOT_TOPSYS   ; STORE THE ADDRESS IN THE ITEM LIST
                          057F          $CRELNM_S -                     ; CREATE SYS$SYSROOT LOGICAL NAME
                          057F                  ACMODE = EXEC_MODE,-    ;
                          057F                  ITMLST = SYS_SYSROOT_ITMLST,-
                          057F                  LOGNAM = SYS_SYSROOT_DESC,-
                          057F                  TABNAM = LNM_SYSTEM_DESC
           A2 50    E9    059A          BLBC    R0,5$                   ; GENERATE ERROR MESSAGE ON FAILURES
                          059D
     53    57   56  C1    059D          ADDL3   R6,R7,R3                ; ADDRESS OF FIRST BYTE BEYOND
                          05A1                                          ; SYS$SYSROOT CONSTRUCTED EQUIVALENCE
     51  FD64   CF  DE    05A1          MOVAL   CMNSYS,R1               ; COMMON SYSTEM ROOT IF ANY
           50   81  9A    05A6          MOVZBL  (R1)+,R0                ; GET SIZE OF STRING
  FF A3    61   50  28    05A9          MOVC3   R0,(R1),-1(R3)          ; COPY THE COMMON SYSTEM ROOT NAME
     56    53   57  C3    05AE          SUBL3   R7,R3,R6                ; GET SIZE OF EQUIVALENCE NAME
00000591'EF     56  B0    05B2          MOVW    R6,SYS_SYSROOT_CMNSYS_LEN; SET EQUIVALENCE NAME SIZE IN ITEM LIST
00000595'EF     57  D0    05B9          MOVL    R7,SYS_SYSROOT_CMNSYS   ; SET EQUIVALENCE NAME ADDR IN ITEM LIST
                          05C0          $CRELNM_S -                     ; CREATE SYS$COMMON LOGICAL NAME
                          05C0                  ACMODE = EXEC_MODE,-
                          05C0                  ITMLST = SYS_COMMON_ITMLST,-
                          05C0                  LOGNAM = SYS_COMMON_DESC,-
                          05C0                  TABNAM = LNM_SYSTEM_DESC
           54 50    E9    05DB          BLBC    R0,CRELNM_FATAL         ; GENERATE ERROR MESSAGE ON FAILURES
                          05DE
                          05DE   ;
                          05DE   ; CREATE LOGICAL NAMES FOR SYS$MESSAGE, SYS$SHARE, AND SYS$SYSTEM.
                          05DE   ;
                          05DE
                          05DE          $CRELNM_S -                     ; CREATE SYS$MESSAGE LOGICAL NAME
                          05DE                  ACMODE = EXEC_MODE, -
                          05DE                  ITMLST = SYS_MESSAGE_ITMLST,-
                          05DE                  LOGNAM = SYS_MESSAGE_DESC,-
                          05DE                  TABNAM = LNM_SYSTEM_DESC
           38 50    E9    05F7          BLBC    R0,CRELNM_FATAL         ; GENERATE ERROR MESSAGE ON FAILURES
                          05FA
                          05FA          $CRELNM_S -                     ; CREATE SYS$SHARE LOGICAL NAME
                          05FA                  ACMODE = EXEC_MODE, -
                          05FA                  ITMLST = SYS_SHARE_ITMLST,-
                          05FA                  LOGNAM = SYS_SHARE_DESC,-
                          05FA                  TABNAM = LNM_SYSTEM_DESC
           1C 50    E9    0613          BLBC    R0,CRELNM_FATAL         ; GENERATE ERROR MESSAGE ON FAILURES
```

```
                              0616          $CRELNM_S -                     ; CREATE SYS$SYSTEM LOGICAL NAME
                              0616                  ACMODE = EXEC_MODE, -
                              0616                  ITMLST = SYS_SYSTEM_ITMLST,-
                              0616                  LOGNAM = SYS_SYSTEM_DESC,-
                              0616                  TABNAM = LNM_SYSTEM_DESC
                 08 50    E8  062F          BLBS    R0,CRELNM_DONE          ; GENERATE ERROR MESSAGE ON FAILURES
                              0632
                              0632  ;
                              0632  ; FAILED TO CREATE THE SYSTEM LOGICAL NAMES.
                              0632  ;
                              0632
                              0632  CRELNM_FATAL:
          51    FA5F CF   DE  0632          MOVAL   W^CRELNMERR,R1          ; ERROR MESSAGE TEXT
                   0BBF   30  0637          BSBW    SIP_FATAL               ; REPORT ERROR AND QUIT
                              063A
                              063A  ;
                              063A  ; SUCCESSFULLY CREATED THE SYSTEM LOGICAL NAMES.
                              063A  ;
                              063A
                              063A  CRELNM_DONE:                            ; SUCCESSFULLY CREATED LOGICAL NAMES
 17 00000000'EF   00000000'8F E1  063A          BBC     #EXE$V_SYSUAFALT,EXE$GL_FLAGS,10$ ; BR IF NORMAL NAME FOR SYSUAF
                              0646          $CRELNM_S -                     ; EQUATE SYSUAF TO ALTERNATE NAME
                              0646                  ITMLST = W^SYSUAF_ITMLST,-
                              0646                  LOGNAM = W^SYSUAF_DESC,-
                              0646                  TABNAM = W^LNM_SYSTEM_DESC
                              065D
                              065D  ;
                              065D  ; THE FILE SYSTEM AND RMS ARE NOT YET AVAILABLE, USE THE BOOTSTRAP
                              065D  ; FIL$OPENFILE CODE TO "OPEN" THE FILES THAT MUST BE PRESENT BEFORE
                              065D  ; THE FILE SYSTEM CAN BE INITIALIZED.
                              065D  ;
                    56    7C  065D  10$:    CLRQ    R6                      ; R6 = SIZE OF ATTRIBUTE REGION
                              065F                                          ; R7 = ADDRESS OF ATTRIBUTE REGION
          58    0128'CF   DE  065F          MOVAL   W^SIP_A_FILATT,R8       ; ARRAY OF FILE ATTRIBUTE POINTERS
          59    FC7B CF   DE  0664          MOVAL   W^SIP_A_NAMES,R9        ; ARRAY OF FILE NAME POINTERS
   03 00000000'EF    00'  E1  0669          BBC     S^#EXE$V_PAGFILDMP,EXE$GL_FLAGS,30$ ; BRANCH IF DUMP
                              0671                                          ; IS NOT IN PAGE FILE
                 89    88  D1  0671          CMPL    (R8)+,(R9)+             ; SYSBOOT "OPENED" PAGEFILE.SYS
                              0674                                          ; DON'T BOTHER DOING IT AGAIN
                 51    89  D0  0674  30$:    MOVL    (R9)+,R1                ; ADR OF ASCIC FILE NAME STRING
                       03  12  0677          BNEQ    32$                     ; PROCESS IT
                     00A8  31  0679          BRW     50$                     ; BRANCH IF THIS IS THE END
                 50    81  9A  067C  32$:    MOVZBL  (R1)+,R0                ; SIZE IN R0, ADR IN R1
            00E8'CF    50  7D  067F          MOVQ    R0,W^SIP_Q_TMPDESC      ; STORE FILE NAME DESCRIPTOR
                 1C    56  D1  0684          CMPL    R6,#RTRVPTRS+8          ; ENOUGH ROOM IN RTRV BUFFER
                              0687                                          ; FOR FILE ATTRIBUTES AND AT LEAST
                              0687                                          ; ONE RETRIEVAL POINTER?
                    2D    18  0687          BGEQ    36$                     ; BRANCH IF YES
                              0689  ;
                              0689  ; NEED TO ALLOCATE (MORE) SPACE FOR FILE ATTRIBUTES
                              0689  ;
      52    00E4'CF    01  C1  0689  34$:    ADDL3   #1,W^SIP_Q_RETADR+4,R2  ; FIRST ADDRESS OF NEXT PAGE TO
                              068F                                          ; BE EXPANDED INTO.  1 IF NO
                              068F                                          ; RTRV PTR BUFFER ALLOCATED YET.
                              068F          $EXPREG_S -
                              068F                  REGION=#0 -             ; GET THE NEXT PAGE IN P0 SPACE
```

```
                            068F                  PAGCNT=#1 -                    ; 1 PAGE
                            068F                  RETADR=W^SIP_Q_RETADR          ; RETURN ADDRESS RANGE
            56  0200 C6  DE 06A0          MOVAL   512(R6),R6                     ; FILE ATTRIBUTES BUFFER IS NOW
                            06A5                                                 ; 1 PAGE BIGGER (ASSUMING IT WAS
                            06A5                                                 ; ALLOCATED ADJACENT TO THE CURRENT BUF)
                            06A5
            52  00E0'CF  D1 06A5          CMPL    W^SIP_Q_RETADR,R2              ; DID WE ALLOCATE THE ADJACENT PAGE?
                     0A  13 06AA          BEQL    36$                            ; BRANCH IF YES
            57  00E0'CF  D0 06AC          MOVL    W^SIP_Q_RETADR,R7              ; SET NEW STARTING ADDRESS
            56  0200 8F  3C 06B1          MOVZWL  #512,R6                        ; AND SIZE FOR FILE ATTRIBUTES BUFFER
     00F8'CF    56   14  C3 06B6  36$:    SUBL3   #RTRVPTRS,R6,W^SIP_Q_RTRVBUF ; SET UP SIZE AND ADDRESS
     00FC'CF    57   14  C1 06BC          ADDL3   #RTRVPTRS,R7,W^SIP_Q_RTRVBUF+4 ; OF RTRV PTR BUFFER
                            06C2          $DASSGN_S W^SIP_L_DSKCHAN              ; FIL$OPENFILE ASSIGN CHANNEL EACH CALL
                            06CE                                                 ; LEAVE IT ASSIGNED AFTER LAST CALL
 00000000'EF    0104'CF  FA 06CE          CALLG   W^SIP_A_OPENARG,FIL$OPENFILE ; GET RETRIEVAL POINTERS
                            06D7                                                 ; FOR SPECIFIED FILE
                  1D 50  E8 06D7          BLBS    R0,40$                         ; BRANCH IF SUCCESSFUL
        0000'8F      50  B1 06DA          CMPW    R0,#SS$_NOSUCHFILE
                     08  13 06DF          BEQL    38$                            ; IGNORE NO SUCH FILE
            51  FAF3 CF  DE 06E1          MOVAL   W^FILOPNERR,R1
                   0B1B  30 06E6          BSBW    SIP_SYSMSG                     ; DISPLAY ERROR
            67       01  CE 06E9  38$:    MNEGL   #1,FILELBN(R7)                 ; SET IMPOSSIBLE STARTING LBN
                  04 A7  D4 06EC          CLRL    FILESIZE(R7)                   ; SET SIZE=0
                  10 A7  D4 06EF          CLRL    RTRVLEN(R7)                    ; NO RETRIEVAL POINTERS
            50       14  D0 06F2          MOVL    #RTRVPTRS,R0                   ; NO. OF BYTE USED FOR ATTRIBUTES
                     18  11 06F5          BRB     44$
                            06F7  ;
                            06F7  ; SUCCESS RETURN FROM FIL$OPENFILE
                            06F7  ;
            67  00F0'CF  7D 06F7  40$:    MOVQ    W^SIP_Q_STATBLK,STATBLK(R7) ; STORE STATISTICS BLOCK
       10 A7    0100'CF  D0 06FC          MOVL    W^SIP_L_RTRVLEN,RTRVLEN(R7) ; AND RTRV PTR BYTE COUNT
       50    10 A7   14  C1 0702          ADDL3   #RTRVPTRS,RTRVLEN(R7),R0 ; FORM BYTE COUNT USED IF ALL
                            0707                                                 ; THE RETRIEVAL POINTERS FIT IN
                            0707                                                 ; THE SPECIFIED BUFFER SPACE.
                56   50  D1 0707          CMPL    R0,R6                          ; WAS THERE ENOUGH SPACE?
                     03  15 070A          BLEQ    44$                            ; BRANCH IF NOT, GET MORE SPACE
                   FF7A  31 070C          BRW     34$                            ; AND TRY THE FIL$OPENFILE AGAIN
                            070F  ;
                            070F  ; R0 = THE NUMBER OF BYTE USED FOR THE FILE ATTRIBUTES FOR THIS FILE
                            070F  ;
          08 A7      01  D0 070F  44$:    MOVL    #1,IMAGEVBN(R7)                ; INIT IMAGE ATTRIBUTES
       0C A7      04 A7  D0 0713          MOVL    FILESIZE(R7),IMAGESIZE(R7) ; AS IF NOT AN IMAGE FILE
                88   57  D0 0718          MOVL    R7,(R8)+                       ; STORE THE POINTER TO THE
                            071B                                                 ; ATTRIBUTES FOR THIS FILE
                57   50  C0 071B          ADDL    R0,R7                          ; UPDATE BUFFER ADDRESS
                56   50  C2 071E          SUBL    R0,R6                          ; AND SIZE
                   FF50  31 0721          BRW     30$                            ; GO PROCESS THE NEXT FILE
                            0724
            57  0130'CF  D0 0724  50$:    MOVL    W^SIP_L_RMSATT,R7              ; RMS FILE ATTRIBUTES
            50  0134'CF  3C 0729          MOVZWL  W^SIP_L_DSKCHAN,R0             ; CHANNEL TO READ FROM
            51    18 A7  D0 072E          MOVL    RTRVPTRS+4(R7),R1              ; LBN OF FIRST BLOCK OF FILE
            53       21  D0 0732          MOVL    #IO$_READLBLK,R3               ; FUNCTION CODE
            52    0C A7  D0 0735          MOVL    IMAGESIZE(R7),R2               ; ACTUAL LAST VBN IN FILE
                   060D  30 0739          BSBW    SIP_IMAGE_ATT                  ; GET IMAGE ATTRIBUTES
                  0A 50  E9 073C          BLBC    R0,52$                         ; BRANCH IF ERROR
       08 A7    51   01  C1 073F          ADDL3   #1,R1,IMAGEVBN(R7)             ; SAVE STARTING VBN OF IMAGE
       0C A7    52   51  C3 0744          SUBL3   R1,R2,IMAGESIZE(R7)            ; SAVE BLOCKS OF IMAGE TO MAP
```

```
                          0749 52$:     $CMKRNL_S       W^SIP_KERNELRTN ; EXECUTE THIS AT KERNEL ACCESS MODE
                          0756          $CMEXEC_S       SIP_XQP_MERGE
          08 50     E8    0765          BLBS    R0,60$
    51    FAA9 CF   9E    0768          MOVAB   W^XQPERR,R1
             0A94   30    076D          BSBW    SIP_SYSMSG
    7E    0134'CF   3C    0770 60$:     MOVZWL  W^SIP_L_DSKCHAN,-(SP)   ; GET CHANNEL ASSIGNED TO SYSTEM DISK
               01   DD    0775          PUSHL   #1                      ; BUILD ARG LIST
               5E   DD    0777          PUSHL   SP                      ; FOR $CMEXEC CALL
       00000000'EF  9F    0779          PUSHAB  MOUNT_SYSTEM            ; SYSTEM DISK MOUNT ROUTINE
 00000000'GF   04   FB    077F          CALLS   #4,G^SYS$CMEXEC         ; GO MOUNT SYSTEM DISK
          08 50     E8    0786          BLBS    R0,65$                  ; BR IF MOUNT WENT OK
    51    F99E CF   9E    0789          MOVAB   W^MOUERR,R1             ; SET ERROR MESSAGE
             0A73   30    078E          BSBW    SIP_SYSMSG              ; OUTPUT SYSTEM MESSAGE
                          0791 65$:
                          0791 ;
                          0791 ; STORE THE SYSTEM TIME AND THE SYSGEN PARAMETERS IN THE SYSTEM IMAGE
                          0791 ; ON THE SYSTEM DISK.  THIS IS DONE AFTER THE SYSTEM DISK IS MOUNTED IN
                          0791 ; ORDER TO AVOID WRITING TO THE DISK PRIOR TO MOUNTING IT.
                          0791 ;
                          0791          $SETIME_S                       ; UPDATE TIME AND SYSGEN PARAMETERS
                          079A ;
                          079A ; DEALLOCATE THE FIL$OPENFILE CACHE, WE NOW HAVE THE FILE SYSTEM UP
                          079A ;
                          079A          $CMKRNL_S W^SIP_CACHE_DALC      ; DONE WITH FIL$OPENFILE CACHE
                          07A7 ;
                          07A7 ; IF THERE IS A TOP LEVEL SYSTEM DIRECTORY, ASK THE FILES ACP FOR ITS
                          07A7 ; REAL NAME SO THAT THIS NAME WILL APPEAR IN THE SYSTEM WIDE LOGICAL
                          07A7 ; NAMES RATHER THAN "SYSX".
                          07A7 ;
                          07A7 SIP_GET_TOPSYS:
 51   00000000'EF   9E    07A7          MOVAB   FIL$GT_TOPSYS,R1        ; TOP LEVEL SYSTEM DIRECTORY STRING
          56   81   9A    07AE          MOVZBL  (R1)+,R6                ; SIZE OF STRING IF PRESENT
               03   12    07B1          BNEQ    5$                      ; BRANCH IF NO TOP LEVEL DIR
             0087   31    07B3          BRW     20$
                          07B6
    58    0000'CF   9E    07B6 5$:      MOVAB   W^SIP_A_ERLBUFFER,R8    ; FORM ADDRESSES FOR 2
      57   56 A8    9E    07BB          MOVAB   ATR$S_ASCNAME(R8),R7    ; FILE NAME SCRATCH BUFFERS
    67   61    56   28    07BF          MOVC3   R6,(R1),(R7)            ; FORM NAME OF DIRECTORY TO LOOK UP
 83   5249442E 8F   D0    07C3          MOVL    #^A/.DIR/,(R3)+         ; TACK ON THE FILE TYPE
    83    313B 8F   B0    07CA          MOVW    #^A/;1/,(R3)+           ; AND VERSION NUMBER
               67   9F    07CF          PUSHAB  (R7)                    ; FORM DESCRIPTOR FOR DIR NAME
            06 A6   9F    07D1          PUSHAB  6(R6)                   ; SIZE OF NAME + 6 CHARS
          50   5E   D0    07D4          MOVL    SP,R0                   ; ADDRESS OF NAME DESCRIPTOR
                          07D7          $QIOW_S -
                          07D7                  CHAN=W^SIP_L_DSKCHAN -  ; CHANNEL
                          07D7                  FUNC=#IO$_ACCESS -      ; FUNCTION CODE = ACCESS
                          07D7                  EFN=#1 -                ; EVENT FLAG TO WAIT FOR
                          07D7                  IOSB=W^SIP_Q_STATBLK -  ; I/O STATUS BLOCK
                          07D7                  P1=W^SIP_Q_FIBDESC -    ; FILE ID BLOCK DESCRIPTOR
                          07D7                  P2=R0 -                 ; FILE NAME DESCRIPTOR TO LOOK UP
                          07D7                  P5=#SIP_A_ATRLIST       ; ATTRIBUTE LIST ADDRESS
          5E   08   C0    07FE          ADDL    #8,SP                   ; CLEAN OFF NAME DESCRIPTOR
            14 50   E9    0801          BLBC    R0,10$                  ; BRANCH IF I/O DID NOT GET QUEUED
       0F 00F0'CF   E9    0804          BLBC    W^SIP_Q_STATBLK,10$     ; BRANCH IF I/O FAILED
 68   0056 8F  2E   3A    0809          LOCC    #^A/.7,#ATR$S_ASCNAME,(R8) ; FIND THE END OF THE DIR NAME
               07   13    080F          BEQL    10$                     ; BRANCH IF NO NAME RETURNED
    56   51    58   C3    0811          SUBL3   R8,R1,R6                ; GET SIZE OF NAME
```

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              57   58   D0  0815        MOVL    R8,R7                        ; AND ADDRESS
     00000605'EF   56   B0  0818   10$: MOVW    R6,SYS_TOPSYS_DIRNAM_LEN; SET SIZE OF EQUIVALENCE NAME
     00000609'EF   57   D0  081F        MOVL    R7,SYS_TOPSYS_DIRNAM     ; SET ADDRESS OF EQUIVALENCE NAME
                            0826        $CRELNM_S -                      ; CREATE LOGICAL NAME FOR SYS$TOPSYS
                            0826                ITMLST = W^SYS_TOPSYS_ITMLST,-
                            0826                LOGNAM = W^SYS_TOPSYS_DESC,-
                            0826                TABNAM = W^LNM_SYSTEM_DESC
                            083D
                            083D  ;
                            083D  ; OPEN AND CREATE GLOBAL SECTIONS FOR THE XQP
                            083D  ;
                            083D
                            083D   20$: $OPEN   FAB = W^XQPFAB               ; OPEN IT
                 44 50  E9  0848        BLBC    R0,40$                       ; ERROR OPENING FILE
                            084B        $QIOW_S CHAN = XQPFAB+FAB$L_STV,- ; READ IMAGE HEADER
                            084B                FUNC = #IO$_READVBLK,-
                            084B                IOSB = W^SIP_Q_STATBLK,-
                            084B                P1   = W^SIP_A_ERLBUFFER,-
                            084B                P2   = #512,-
                            084B                P3   = #1
                 18 50  E9  0874        BLBC    R0,40$                       ; ERROR READING FILE
        50    00F0'CF   3C  0877        MOVZWL  W^SIP_Q_STATBLK,R0
                 10 50  E9  087C        BLBC    R0,40$
                            087F        $CMKRNL_S W^SIP_MAPXQP               ; GO MAP XQP IN KERNEL MODE
                 08 50  E8  088C        BLBS    R0,50$
        51    F982 CF   9E  088F   40$: MOVAB   W^XQPERR,R1
                 096D   30  0894        BSBW    SIP_SYSMSG
                            0897   50$:
                            0897  ;
                            0897  ; NOW OPEN AND MAP THE SYSTEM WIDE MESSAGE FILE (SYS$MESSAGE:SYSMSG.EXE)
                            0897  ;
                            0897        $OPEN   FAB=W^MSGFILFAB              ; OPEN THE FILE
                 54 50  E9  08A2        BLBC    R0,74$                       ; BRANCH IF ERROR
        50    000C'CF   3C  08A5        MOVZWL  W^MSGFILFAB+FAB$L_STV,R0 ; CHANNEL TO READ FROM
              51   01   D0  08AA        MOVL    #1,R1                        ; READ VIRTUAL BLOCK 1
              53   31   D0  08AD        MOVL    #IO$_READVBLK,R3             ; FUNCTION CODE
   52    00000060'EF    D0  08B0        MOVL    MSGFILXAB+XAB$L_EBK,R2   ; END OF FILE BLOCK NUMBER
         00000064'EF    B5  08B7        TSTW    MSGFILXAB+XAB$W_FFB      ; UNLESS FIRST FREE BYTE = 0
                   02   12  08BD        BNEQ    72$
                   52   D7  08BF        DECL    R2                           ; IN WHICH CASE IT IS ONE TOO BIG
                 0485   30  08C1   72$: BSBW    SIP_IMAGE_ATT                ; GET IMAGE ATTRIBUTES
                 32 50  E9  08C4        BLBC    R0,74$                       ; BRANCH IF ERROR
              52   51   C2  08C7        SUBL    R1,R2                        ; NUMBER OF BLOCKS TO ACTUALLY MAP
                   2D   15  08CA        BLEQ    74$                          ; BRANCH IF NOTHING TO MAP
                            08CC  ;
                            08CC  ; MAP THE MESSAGE FILE AS A SYSTEM SECTION
                            08CC  ;
         00000000'EF    DF  08CC        PUSHAL  EXE$GL_SYSMSG                ; LOCATION TO STORE SYSTEM
                            08D2                                             ; ADDRESS AT WHICH SYSMSG IS MAPPED
                   0F   DD  08D2        PUSHL   #PRT$C_UR                    ; PROTECTION FOR PAGES
                   52   DD  08D4        PUSHL   R2                           ; PAGE COUNT TO MAP
         7E   51   01   C1  08D6        ADDL3   #1,R1,-(SP)                  ; STARTING VBN TO MAP
   7E    0000000C'EF    3C  08DA        MOVZWL  MSGFILFAB+FAB$L_STV,-(SP) ; CHANNEL ON WHICH SYSMSG IS OPEN
                   05   DD  08E1        PUSHL   #5                           ; NO. OF ARGUMENTS IN THE ARG LIST
              50   5E   D0  08E3        MOVL    SP,R0                        ; ADDRESS OF ARGUMENT LIST
                            08E6        $CMKRNL_S W^EXE$SYS_SECTION,(R0)         ; MAP THE SECTION
              5E   18   C0  08F3        ADDL    #<6*4>,SP                    ; CLEAN OFF ARGUMENT LIST
```

```
                    08 50   E8  08F6            BLBS    R0,90$                         ; BRANCH IF SUCCESSFUL
            51    F7DC CF   9E  08F9       74$: MOVAB   W^MSGFILERR,R1                 ; "FAILED TO OPEN OR MAP SYSMSG.EXE"
                     0903   30  08FE            BSBW    SIP_SYSMSG                     ; ISSUE A WARNING DIAGNOSTICE
                                0901       90$:                                        ;
    01EC'CF   00000000'EF   9A  0901            MOVZBL  EXE$GT_STARTUP,W^SIP_Q_SPINPUT  ; SET CORRECT COUNT IN DESCR
            50    F721 CF   9E  090A            MOVAB   W^SIP_Q_SPOUTPUT,R0            ; STARTUP PROCESS OUTPUT
         00   00000000'8F   D1  090F            CMPL    #XDT$START,#0                  ; DEBUGGING WITH DELTA?
                       05   13  0916            BEQL    95$                            ; BRANCH IF NOT
            50    F720 CF   9E  0918            MOVAB   W^SIP_Q_SPOUTXDT,R0            ; USE DIFFERENT OUTPUT FOR DELTA
                                091D       95$: $CREPRC_S      INPUT=W^SIP_Q_SPINPUT,- ; INPUT FROM STARTUP FILE
                                091D                           OUTPUT=(R0),-           ; OUTPUT TO CONSOLE TERMINAL
                                091D                           ERROR=(R0),-            ; ERRORS ALSO
                                091D                           BASPRI=#4,-             ; BASE PRIORITY
                                091D                           IMAGE=W^SIP_Q_SPIMAGE,- ; RUN LOGIN IMAGE
                                091D                           UIC=#^X10004,=          ; RUN IN UIC [1,4]
                                091D                           STSFLG=#<1@6>,-         ; FLAG FOR AUTO LOGIN
                                091D                           PRVADR=W^SIP_Q_PRVMSK,- ; ALL PRIVILEGES
                                091D                           QUOTA=PQL$AB_SYSPQL,-   ; QUOTA LIST
                                091D                           PRCNAM=W^SIP_Q_STARTUP  ; NAME IS STARTUP
                    47 50   E8  0953            BLBS    R0,100$                        ; BR IF SUCCESS
                       3F   BB  0956            PUSHR   #^M<R0,R1,R2,R3,R4,R5>         ; SAVE REGISTERS
            50    F6C4 CF   7E  0958            MOVAQ   W^SIP_Q_STARTUP,R0             ; GET PROCESS NAME DESCRIPTOR
01DD'CF   0F   00  04 B0 60 2C  095D            MOVC5   (R0),@4(R0),#0,#15,W^CREPRCNAM ; COPY NAME INTO MESSAGE
            51    01C4'CF   9E  0966            MOVAB   W^CREPRCERR,R1                 ; SET ADDR OF MESSAGE
                 50    6E   D0  096B            MOVL    (SP),R0                        ; SET FAILURE STATUS VALUE
                     0893   30  096E            BSBW    SIP_SYSMSG                     ; PRINT THE MESSAGE
                       3F   BA  0971            POPR    #^M<R0,R1,R2,R3,R4,R5>         ; RESTORE REGISTERS
                                0973            $GETMSG_S R0,SIP_Q_TMPDESC,SIP_Q_LINBUF ; GET STATUS MESSAGE
         50   000000E8'EF   3C  098C            MOVZWL  SIP_Q_TMPDESC,R0               ; GET SIZE OF MESSAGE
         51   00000140'EF   9E  0993            MOVAB   SIP_T_LINBUF,R1                ; GET ADDR OF MESSAGE
                     088B   30  099A            BSBW    SIP_TYPOUT                     ; TYPE IT ON CONSOLE
                                099D      100$:
                            04  099D            RET                                    ; THATS ALL FOR NOW
```

```
                                 099E         .SUBTITLE       SIP_GET_SYSID_LOCK - Obtain Lock for System ID
                                 099E   ;+
                                 099E   ; Functional Description:
                                 099E   ;
                                 099E   ;       This routine obtains a system-owned lock whose name contains the
                                 099E   ;       system ID. If this system is to join a cluster, a test will be made
                                 099E   ;       for a unique system ID when this system's lock data base is merged
                                 099E   ;       into the cluster-wide data base. The lock is system wide because the
                                 099E   ;       various sublocks that will use this as a parent are locking system
                                 099E   ;       wide data structures.
                                 099E   ;
                                 099E   ;       If $ENQW returns an error, a message will be issued and the SYSINIT
                                 099E   ;       image will go away, preventing further system initialization
                                 099E   ;
                                 099E   ;       Locking is enabled before this lock is requested and sub-locks are
                                 099E   ;       enabled after the lock is granted.
                                 099E   ;
                                 099E   ; Calling Sequence:
                                 099E   ;
                                 099E   ;       CALLS   #0, SIP_GET_SYSID_LOCK
                                 099E   ;
                                 099E   ; Environment:
                                 099E   ;
                                 099E   ;       This routine must execute in kernel mode
                                 099E   ;
                                 099E   ; Input Parameters:
                                 099E   ;
                                 099E   ;       none
                                 099E   ;
                                 099E   ; Output Parameters:
                                 099E   ;
                                 099E   ;       none
                                 099E   ;
                                 099E   ; Implicit Output:
                                 099E   ;
                                 099E   ;       If the lock request is successful, the lock ID is stored in the
                                 099E   ;       exec cell called EXE$GL_SYSID_LOCK for use as a parent ID by other
                                 099E   ;       lock requests.
                                 099E   ;
                                 099E   ;       If the lock request fails, the image exits (and initialization
                                 099E   ;       terminates) after an error message is typed.
                                 099E   ;-
                                 099E
                                 099E   SIP_GET_SYSID_LOCK:
                          0000   099E           .WORD   0                               ; Save no registers
                                 09A0
                                 09A0   ; Enable locking
                                 09A0
              00000000'GF   94   09A0           CLRB    G^LCK$GB_STALLREQS
                                 09A6
                                 09A6   ; Take out an exclusive lock with the system ID as the lock name
                                 09A6
 0000045D'EF  00000000'GF   D0   09A6           MOVL    G^SCS$GB_SYSTEMID, SYS_ID       ; Move first four bytes of ID
 00000461'EF  00000000'GF   B0   09B1           MOVW    G^SCS$GB_SYSTEMIDH, SYS_ID + 4  ;  and the last two bytes, too
                                 09BC
                                 09BC           $ENQW_S         EFN = #32,-
                                 09BC                           LKMODE = #LCK$K_EXMODE,-
```

```
                              09BC                   LKSB = LOCK_STATUS_BLOCK,-
                              09BC                   FLAGS = #LOCK_FLAGS,-
                              09BC                   RESNAM = LOCK_NAME_DESC,-
                              09BC                   ACMODE = #PSL$C_EXEC
                              09E3
                16 50    E9   09E3          BLBC    R0, ERROR                        ; Abort image if an error occurs
                              09E6
                              09E6    ; Store the lock ID where other folks can find it and return success
                              09E6
  00000000'GF   0000044F'EF  D0  09E6       MOVL    LOCK_ID, G^EXE$GL_SYSID_LOCK     ; Store the lock ID
                              09F1
                              09F1    ; Enable sub-locking, but not creation of additional roots
                              09F1
        00000000'GF      02  90  09F1       MOVB    #2,G^LCK$GB_STALLREQS
                              09F8
                50      00'  3C  09F8       MOVZWL  S^#SS$_NORMAL,R0                 ; Indicate success
                             04  09FB       RET                                      ;  and return
                              09FC
                              09FC    ERROR:
           51     F836 CF    9E  09FC       MOVAB   SYSID_LOCK_ERR, R1               ; Store error message address
                  07F5       31  0A01       BRW     SIP_FATAL                        ; This is the death step
```

```
                     0A04          .SUBTITLE       SIP_CLUSTER_INIT - Cluster related initialization
                     0A04  ;+
                     0A04  ; Functional Description:
                     0A04  ;
                     0A04  ;       This routine performs cluster related initializations.
                     0A04  ;
                     0A04  ;       If the node is not even going to participate in a cluster, locking
                     0A04  ;       is enabled and the routine returns.
                     0A04  ;
                     0A04  ;       If the node will participate in a cluster:
                     0A04  ;
                     0A04  ;       1.  The stand-alone configure process is created.  The purpose of
                     0A04  ;           this process is to configure communications drivers supporting
                     0A04  ;           SCS and the disk driver supporting the disk potentially
                     0A04  ;           containing the quorum file.
                     0A04  ;
                     0A04  ;       2.  A bit is set triggering cluster formation/joining.
                     0A04  ;
                     0A04  ;       3.  Wait for a cluster to be joined or formed.  It is assumed that
                     0A04  ;           locking is enabled as a side effect of joining or forming the
                     0A04  ;           cluster.
                     0A04  ;
                     0A04  ;       4.  Time is updated to set a consistent, cluster-wide time.
                     0A04  ;
                     0A04  ;
                     0A04  ; Calling Sequence:
                     0A04  ;
                     0A04  ;       CALLS   #0, SIP_CLUSTER_INIT
                     0A04  ;
                     0A04  ; Environment:
                     0A04  ;
                     0A04  ;       This routine must execute in kernel mode
                     0A04  ;
                     0A04  ; Input Parameters:
                     0A04  ;
                     0A04  ;       none
                     0A04  ;
                     0A04  ; Output Parameters:
                     0A04  ;
                     0A04  ;       none
                     0A04  ;
                     0A04  ; Implicit Output:
                     0A04  ;
                     0A04  ;-
                     0A04
                     0A04  SIP_CLUSTER_INIT:
            003C     0A04          .WORD   ^M<R2,R3,R4,R5>
                     0A06
                     0A06          IFCLSTR 2$                                      ; Branch if cluster system
                     0A0E  ;
                     0A0E  ; This system will never participate in a cluster; enable unrestricted locking
                     0A0E  ;
   00000000'GF  94   0A0E          CLRB    G^LCK$GB_STALLREQS
          00E8  31   0A14          BRW     30$
                     0A17
                     0A17  ; Create the stand-alone configure process
                     0A17  ;
```

```
                          0A17  2$:     $CREPRC_S       IMAGE = W^STAC_IMAGE,-
                          0A17                          INPUT = W^STAC_OPER,-
                          0A17                          OUTPUT = W^STAC_OPER,-
                          0A17                          ERROR = W^STAC_OPER,-
                          0A17                          PRVADR = W^STAC_PRV_MSK,-
                          0A17                          QUOTA = W^STAC_QLIST,-
                          0A17                          PRCNAM = W^STAC_PRC,-
                          0A17                          BASPRI = #8,-
                          0A17                          UIC = #^x10004
            03 50    E8   0A4B          BLBS    R0,3$                           ; Branch on success
             00BA    31   0A4E          BRW     100$                            ; Can't create process
                          0A51  3$:
                          0A51
                          0A51  ; Tell the connection manager to proceed with cluster formation/creation
                          0A51  ;
    50   00000000'GF  D0  0A51          MOVL    G^CLU$GL_CLUB,R0                ; Address of CLUster Block
 1C A0   00080000 8F  C8  0A58          BISL2   #CLUB$M_INIT,CLUB$L_FLAGS(R0)   ; Set initialization flag
                          0A60
                          0A60  ; Output message indicating that we are waiting to join/form a cluster
                          0A60  ;
    51      F7FF CF   9E  0A60          MOVAB   W^SIP_CLU_MSG,R1                ; Address of counted string
       50        81   9A  0A65          MOVZBL  (R1)+,R0                        ; Character count
               07BD   30  0A68          BSBW    SIP_TYPOUT
                          0A6B
                          0A6B  ; Loop waiting for node to join cluster
                          0A6B  ;
                          0A6B  10$:    $SETIMR_S       EFN=#0,DAYTIM=W^SIP_CLU_TIMOUT
              09 50   E9  0A7A          BLBC    R0,15$                          ; Branch on error
                          0A7D          $WAITFR_S       EFN=#0                  ; Wait for time-out
               009C   30  0A86  15$:    BSBW    SIP_LOOKUP_QFILE                ; Perform quorum file lookup
    50   00000000'GF  D0  0A89          MOVL    G^CLU$GL_CLUB,R0                ; Address of CLUster Block
  D6 1C A0       00   E1  0A90          BBC     #CLUB$V_CLUSTER, -              ; Loop until node is a
                          0A95                  CLUB$L_FLAGS(R0),10$            ;   cluster member
                          0A95                                                  ; If it was not already, start
               01AD   30  0A95          BSBW    SIP_START_QUORUM_TIMER          ; ...the quorum disk timer
                          0A98  ;
                          0A98  ; When the cluster if formed or joined, the locking will be enabled --
                          0A98  ; i.e., it is enabled when we reach this point.  Take out a lock on the
                          0A98  ; system disk.
                          0A98  ;
    54   00000000'GF  D0  0A98          MOVL    G^CTL$GL_PCB,R4                 ; PCB address
         00000000'GF  16  0A9F          JSB     G^SCH$IOLOCKW                   ; Lock I/O data base for writing
              50     01   D0  0AA5      MOVL    #LCK$K_CRMODE,R0                ; Signal shared lock
                     51   D4  0AA8      CLRL    R1                              ; Don't return lock status block
    55   00000000'GF  D0  0AAA          MOVL    G^EXE$GL_SYSUCB,R5              ; System disk UCB address
          3C A5      01   88  0AB1      BISB2   #DEV$M_CLU, UCB$L_DEVCHAR2(R5)  ; It is cluster accessible.
         00000000'GF  16  0AB5          JSB     G^IOC$LOCK_DEV                  ; Take out lock on system disk
                          0ABB  ;
                          0ABB  ; The UCB for the system disk was created with a reference count of 1 to
                          0ABB  ; avoid having the first $ASSIGN try to take out a lock on it before locking
                          0ABB  ; is enabled. If SYSINIT fails for any reason (e.g. failure to mount the
                          0ABB  ; system disk), this extra reference count will prevent the device lock from
                          0ABB  ; being released in the last channel $DASSGN. Decrement the reference count
                          0ABB  ; to avoid this scenario.
                          0ABB  ;
              5C A5   B7  0ABB          DECW    UCB$W_REFC(R5)                  ; Decrement reference count
                 50   DD  0ABE          PUSHL   R0                              ; Save LOCK_DEV status
```

```
           00000000'GF   16  0AC0               JSB     G^SCH$IOUNLOCK                  ; Unlock the I/O data base
                             0AC6               SETIPL  #0                              ; Restore IPL
                50  8E   D0  0AC9               MOVL    (SP)+,R0                        ; Retrieve LOCK_DEV status
                 34 50   E9  0ACC               BLBC    R0,90$                          ; Branch if LOCK_DEV failed
                             0ACF       ;
                             0ACF       ; Set internal cluster-wide system time using data that was stored in the CLUB
                             0ACF       ; when the cluster was formed/joined.
                             0ACF       ;
        7E   00000000'GF   7D  0ACF             MOVQ    G^EXE$GQ_SYSTIME,-(SP)          ; Current system time
        50   00000000'GF   D0  0AD6             MOVL    G^CLU$GL_CLUB,R0                ; Address of CLUB
           6E   009C C0   C2  0ADD              SUBL2   CLUB$Q_NEWTIME_REF(R0),(SP)     ; Subtract local time corresponding
        04 AE   00A0 C0   D9  0AE2              SBWC    CLUB$Q_NEWTIME_REF+4(R0),4(SP)  ;  cluster time
           6E   0094 C0   C0  0AE8              ADDL2   CLUB$Q_NEWTIME(R0),(SP)         ; Add cluster time corresponding to
        04 AE   0098 C0   D8  0AED              ADWC    CLUB$Q_NEWTIME+4(R0),4(SP)      ;  reference base
                     6E   7F  0AF3              PUSHAQ  (SP)                            ; Address of new system time
        00000000'GF  01   FB  0AF5              CALLS   #1,G^EXE$SETIME_INT             ; Establish cluster-wide time intern
                5E   08   C0  0AFC              ADDL2   #8,SP                           ; Clear stack
                50   00'  3C  0AFF      30$:    MOVZWL  S^#SS$_NORMAL,R0                ; Indicate success
                          04  0B02              RET                                     ;  and return
                              0B03
                              0B03      ;
                              0B03      ; Error locking system disk - this is fatal.
                              0B03      ;
          51   F641 CF   9E  0B03      90$:    MOVAB   W^LOCKERR,R1                    ; Message address
                    06EE  31  0B08              BRW     SIP_FATAL                       ; No recovery possible
                              0B0B
                              0B0B      ; Error creating stand-alone configure process
                              0B0B      ;
                      50  DD  0B0B      100$:   PUSHL   R0                              ; Save failure status
          50   0496'CF   7E  0B0D              MOVAQ   W^STAC_PRC,R0                   ; Get process name descriptor
01DD'CF   0F   00   04 B0   60   2C  0B12       MOVC5   (R0),@4(R0),#0,#15,W^CREPRCNAM  ; Copy name into message
          51   01C4'CF   9E  0B1B              MOVAB   W^CREPRCERR,R1                  ; Message address
                      01  BA  0B20              POPR    #^M<R0>                         ; Failure status value
                    06D4  31  0B22              BRW     SIP_FATAL                       ; This is the death step
```

```
                         0B25          .SUBTITLE       SIP_LOOKUP_QFILE - Perform quorum file lookup
                         0B25   ;+
                         0B25   ; Functional Description:
                         0B25   ;
                         0B25   ;       This routine attempts to assign a channel to the quorum disk, get
                         0B25   ;       the quorum file logical block number, and store it in the cluster
                         0B25   ;       quorum disk control block (CLUDCB).
                         0B25   ;
                         0B25   ; Calling Sequence:
                         0B25   ;
                         0B25   ;       BSBW    SIP_LOOKUP_QFILE
                         0B25   ;
                         0B25   ; Environment:
                         0B25   ;
                         0B25   ;       This routine must execute in kernel mode
                         0B25   ;
                         0B25   ; Input Parameters:
                         0B25   ;       none
                         0B25   ;
                         0B25   ; Output Parameters:
                         0B25   ;       none
                         0B25   ;-
                         0B25
                         0B25   SIP_LOOKUP_QFILE:
                         0B25
  54   00000000'GF   D0  0B25           MOVL    G^CLU$GL_CLUB,R4                ; Get CLUB address
     53   00B4 C4    D0  0B2C           MOVL    CLUB$L_CLUDCB(R4),R3            ; Get CLUDCB address
              44     13  0B31           BEQLU   1$                              ; If zero, there is no quorum file
           1C A3     D5  0B33           TSTL    CLUDCB$L_QFLBN(R3)              ; Have we already found it?
              3F     12  0B36           BNEQU   1$                              ; Br if yes
                         0B38   ;
                         0B38   ; Get the full device name, store it in the CLUB, and form the full quorum
                         0B38   ; file specification.
                         0B38   ;
         00B8 C4     95  0B38           TSTB    CLUB$T_QDNAME(R4)               ; Is name already in CLUB?
              73     12  0B3C           BNEQU   3$                              ; Br if yes
              18     BB  0B3E           PUSHR   #^M<R3,R4>                      ; Save CLUDCB and CLUB pointers
        10    20     3A  0B40           LOCC    #^A/ /,#CLUDCB$S_DISK_QUORUM,-  ; Locate end of quorum disk name
      00000000'GF        0B43                   G^CLU$GB_QDISK
        10    50     A3  0B48           SUBW3   R0,#CLUDCB$S_DISK_QUORUM,-      ; Adjust descriptor size
         04FD'CF         0B4B                   W^SIP_QD_DESCR
                         0B4E           $GETDVIW_S      EFN = #0,-              ; Get full device name
                         0B4E                           DEVNAM = W^SIP_QD_DESCR,-
                         0B4E                           ITMLST = W^SIP_QD_ITMLST,-
                         0B4E                           IOSB = W^SIP_QD_IOSB
           08 50     E9  0B6A           BLBC    R0,7$                           ; Br if error
     50   04F5'CF    3C  0B6D           MOVZWL  W^SIP_QD_IOSB,R0                ; Get completion status
           05 50     E8  0B72           BLBS    R0,2$                           ; Br if success
              18     BA  0B75   7$:     POPR    #^M<R3,R4>                      ; Restore registers
            00CA     31  0B77   1$:     BRW     6$
  50   0505'CF   02  A3  0B7A   2$:     SUBW3   #2,W^SIP_QF_DESCR,R0            ; Get adjusted size
       0522'CF   50  28  0B80           MOVC3   R0,W^SIP_QF_BUFFER+1,-          ; Put name in CLUB
         00B9 C4         0B85                   CLUB$T_QDNAME+1(R4)
            53   6E  7D  0B88           MOVQ    (SP),R3                         ; Restore CLUDCB and CLUB pointers
     50   0505'CF    3C  0B8B           MOVZWL  W^SIP_QF_DESCR,R0               ; Get size
  00B8 C4   50   02  83  0B90           SUBB3   #2,R0,CLUB$T_QDNAME(R4)         ; Put adjusted size in CLUB
50   00000521'8F   50  C1  0B96         ADDL3   R0,#SIP_QF_BUFFER,R0            ; Get address to put file name
```

```
        0505'CF   14   A0  0B9E        ADDW    #SIP_QF_NAME_SIZE,W^SIP_QF_DESCR ; Add file name size into descr
                  14   28  0BA3        MOVC3   #SIP_QF_NAME_SIZE,-              ; Move file name into buffer
     60  050D'CF           0BA5                W^SIP_QF_NAME,(R0)
    00000000'GF   16       0BA9        JSB     G^CNX$DISK_CHANGE                ; Tell connection manager
                  18   BA  0BAF        POPR    #^M<R3,R4>                       ; Restore CLUDCB and CLUB pointers
                           0BB1  ;
                           0BB1  ; Assign a channel to the quorum disk and use the channel number to
                           0BB1  ; get the quorum disk UCB.
                           0BB1  ;
     52   04F1'CF   3E     0BB1  3$:   MOVAW   W^SIP_QD_CHAN,R2                 ; R2 is channel word pointer
       55   0C A3   D0     0BB6        MOVL    CLUDCB$L_UCB(R3),R5              ; Get the quorum disk UCB address
              24    12     0BBA        BNEQU   4$                               ; Br if we have it
                           0BBC        $ASSIGN_S DEVNAM = W^SIP_QF_DESCR,-      ; Assign channel to quorum disk
                           0BBC                  CHAN = (R2)
            76 50   E9     0BCB        BLBC    R0,6$                            ; Br if error
            55 62   3C     0BCE        MOVZWL  (R2),R5                          ; Get channel number
55   00000000'9F 55 C3     0BD1        SUBL3   R5,@#CTL$GL_CCBBASE,R5           ; Form CCB address
            55 65   D0     0BD9        MOVL    CCB$L_UCB(R5),R5                 ; Get UCB address
     0C A3   55     D0     0BDC        MOVL    R5,CLUDCB$L_UCB(R3)              ; Store UCB address in CLUDCB
                           0BE0  ;
                           0BE0  ; The quorum disk may not be mounted. Check to see if the volume valid
                           0BE0  ; bit is set in the UCB.
                           0BE0  ;
   28 64 A5   0B    E0     0BE0  4$:   BBS     #UCB$V_VALID,UCB$L_STS(R5),5$    ; Br if volume is valid
                           0BE5  ;
                           0BE5  ; The volume is not valid, issue a PACKACK QIO.
                           0BE5  ;
                           0BE5        $QIOW_S EFN  = #0,-                      ; Issue packack QIO
                           0BE5                CHAN = (R2),-
                           0BE5                FUNC = #IO$_PACKACK,-
                           0BE5                IOSB = W^SIP_QD_IOSB
            3F 50   E9     0C02        BLBC    R0,6$                            ; Br if error on qio request
     50   04F5'CF   3C     0C05        MOVZWL  W^SIP_QD_IOSB,R0                 ; Get I/O status
            37 50   E9     0C0A        BLBC    R0,6$                            ; Br if I/O error
                           0C0D  ;
                           0C0D  ; Do the file lookup with FILEREAD.
                           0C0D  ;
               03   DD     0C0D  5$:   PUSHL   #3                               ; Don't use cache or root directory
               7E   7C     0C0F        CLRQ    -(SP)                            ; We don't want retrieval pointers
          04F5'CF   DF     0C11        PUSHAL  W^SIP_QD_STATBUF                 ; Address of 2 longword block to
                           0C15                                                 ; return LBN of the first block
                           0C15                                                 ; and the file size. (in blocks)
          0200'CF   DF     0C15        PUSHAL  W^SIP_A_FILEHDR                  ; Address of file hdr buffer
          0000'CF   DF     0C19        PUSHAL  W^SIP_A_INDEXFHDR                ; Address of index file hdr buffer
          0505'CF   DF     0C1D        PUSHAL  W^SIP_QF_DESCR                   ; Address of file name descriptor
               62   DF     0C21        PUSHAL  (R2)                             ; Address of channel number
    00000000'GF  08 FB     0C23        CALLS   #8,G^FIL$OPENFILE_1              ; Open quorum file
            17 50   E9     0C2A        BLBC    R0,6$                            ; Br if error
                           0C2D  ;
                           0C2D  ; We have found the quorum file. Store the logical block number in the CLUDCB.
                           0C2D  ;
          04F5'CF   D0     0C2D        MOVL    W^SIP_QD_STATBUF,-               ; Store LBN in CLUDCB
            1C A3          0C31                CLUDCB$L_QFLBN(R3)
               02   B0     0C33        MOVW    #CLUDCB$M_QS_READY,-             ; State is now READY
            20 A3          0C35                CLUDCB$W_STATE(R3)
             000B   30     0C37        BSBW    SIP_START_QUORUM_TIMER           ; Start the quorum disk timer
                           0C3A        $DASSGN_S CHAN = (R2)                    ; Deassign channel
```

```
05  0C44  1535 6$:      RSB
```

```
                           0C45         .SUBTITLE       SIP_START_QUORUM_TIMER - Start the quorum disk timer
                           0C45  ;+
                           0C45  ; Functional Description:
                           0C45  ;
                           0C45  ;      This routine starts the quorum disk timer by inserting the quorum
                           0C45  ;      TQE in the system time queue. It first checks to see if it has
                           0C45  ;      already been placed in the queue and if not requests an immediate
                           0C45  ;      timeout.
                           0C45  ;
                           0C45  ; Calling Sequence:
                           0C45  ;
                           0C45  ;      BSBW    SIP_START_QUORUM_TIMER
                           0C45  ;
                           0C45  ; Environment:
                           0C45  ;
                           0C45  ;      This routine must execute in kernel mode
                           0C45  ;
                           0C45  ; Input Parameters:
                           0C45  ;
                           0C45  ;      none
                           0C45  ;
                           0C45  ; Output Parameters:
                           0C45  ;
                           0C45  ;      none
                           0C45  ;-
                           0C45
                           0C45  SIP_START_QUORUM_TIMER:
55   00000000'GF   D0      0C45         MOVL    G^CLU$GL_CLUB,R5                ; Get CLUB address
     55   00B4 C5   D0      0C4C         MOVL    CLUB$L_CLUDCB(R5),R5            ; Get CLUDCB address
                15   13      0C51         BEQLU   1$                              ; If zero, there is no quorum file
       55    14 A5   D0      0C53         MOVL    CLUDCB$L_TQE(R5),R5             ; Get TQE
                65   D5      0C57         TSTL    TQE$L_TQFL(R5)                  ; Is it in queue already?
                0D   12      0C59         BNEQU   1$                              ; Br if yes
50   00000000'GF   7D      0C5B         MOVQ    G^EXE$GQ_SYSTIME,R0             ; Request an immediate timeout
     00000000'GF   16      0C62         JSB     G^EXE$INSTIMQ                   ; Insert in queue
                     05      0C68  1$:    RSB
```

```
                 0C69  ;++
                 0C69  ; FUNCTIONAL DESCRIPTION:
                 0C69  ;
                 0C69  ;          Merge the XQP into this process.
                 0C69  ;
                 0C69  ; INPUT PARAMETERS:
                 0C69  ;
                 0C69  ;          None
                 0C69  ;
                 0C69  ; OUTPUTS:
                 0C69  ;
                 0C69  ;          R0 = STATUS CODE
                 0C69  ;
                 0C69  ;--
                 0C69  SIP_XQP_MERGE:
           0000  0C69           .WORD 0
                 0C6B           $IMGACT_S NAME = XQP_NAME,-
                 0C6B                     DFLNAM = XQP_DEF,-
                 0C6B                     INADR = XQP_INADDR,-
                 0C6B                     IMGCTL = #IAC$M_MERGE+IAC$M_EXPREG,-
                 0C6B                     RETADR = XQP_RETADDR,-
                 0C6B                     HDRBUF = XQP_HEADER
      10 50  E9  0C96           BLBC    R0,10$
                 0C99           $IMGFIX_S
      06 50  E9  0CA0           BLBC    R0,10$
00000243'FF  17  0CA3           JMP     @XQP_RETADDR
             04  0CA9  10$:     RET
```

```
                         0CAA           .SBTTL  SIP_MAPXQP - Create global sections for XQP
                         0CAA   ;++
                         0CAA   ; FUNCTIONAL DESCRIPTION:
                         0CAA   ;
                         0CAA   ;       Create the global sections needed to map the XQP into processes
                         0CAA   ;       The SYSGEN parameter controls whether or not they are resident sections.
                         0CAA   ;
                         0CAA   ; INPUT PARAMETERS:
                         0CAA   ;
                         0CAA   ;       XQP IMAGE HEADER
                         0CAA   ;
                         0CAA   ; OUTPUTS:
                         0CAA   ;
                         0CAA   ;       RO = STATUS CODE
                         0CAA   ;
                         0CAA   ;--
                         0CAA
                         0CAA   SIP_MAPXQP:
                   003C  0CAA           .WORD   ^M<R2,R3,R4,R5>
       52   0000'CF  3C  0CAC           MOVZWL  W^SIP_A_ERLBUFFER+IHD$W_SIZE,R2 ; OFFSET IN IMAGE HEADER TO ISD
 52   00000000'8F    C0  0CB1           ADDL    #SIP_A_ERLBUFFER,R2             ; ADDRESS OF FIRST ISD
               62    B5  0CB8   10$:    TSTW    ISD$W_SIZE(R2)                  ; ARE WE DONE
               2D    13  0CBA           BEQL    25$                             ; YES
               24    19  0CBC           BLSS    20$                             ; ERROR - THERE CAN'T BE THIS MANY ISD'S
        00000000'EF  D5  0CBE           TSTL    XQP$GL_DZRO                     ; HAVE WE ALREADY SEEN DZRO
               1C    12  0CC4           BNEQ    20$                             ; YES - IT WAS SUP[POSED TO BE LAST
        00020405 8F  D3  0CC6           BITL    #ISD$M_DZRO ! ISD$M_VECTOR ! ISD$M_GBL ! ISD$M_FIXUPVEC -
              08 A2      0CCC                   ,ISD$L_FLAGS(R2)
               12    12  0CCE           BNEQ    20$                             ; ILLEGAL ISD TYPES
        55    02 A2  3C  0CD0           MOVZWL  ISD$W_PAGCNT(R2),R5             ; PAGES IN THIS SECTION
     11 08 A2    01  E1  0CD4           BBC     #ISD$V_CRF,ISD$L_FLAGS(R2),30$ ; A NORMAL SECTION
   00000000'EF   55  D0  0CD9           MOVL    R5,XQP$GL_DZRO                  ; REMEMBER HOW BIG DZRO IS
                 5E  11  0CE0           BRB     50$                             ; NEXT
                         0CE2   ;
 50   00000000'8F    D0  0CE2   20$:    MOVL    #SS$_BADIMGHDR,R0
                     04  0CE9   25$:    RET
                         0CEA   ;
 50   0000C001 8F    D0  0CEA   30$:    MOVL    #<SEC$M_GBL!SEC$M_PERM!SEC$M_SYSGBL>,R0 ; DEFAULT CHARACTERISTICS
04 00000000'EF 00000000'8F E1 0CF1      BBC     #EXE$V_XQP_RESIDENT,EXE$GL_STATIC_FLAGS,40$ ;CHECK SYSGEN PARAMETER
           00 50    0D   E2  0CFD       BBSS    #SEC$V_RESIDENT,R0,40$  ; REQUEST A RESIDENT SECTION
                         0D01   40$:    $CRMPSC_S -                     ; MAP A GLOBAL SECTION
                         0D01                   FLAGS  = R0,-
                         0D01                   GSDNAM = XQP_GSD_DESC,-
                         0D01                   VBN    = ISD$L_VBN(R2),-
                         0D01                   CHAN   = XQPFAB+FAB$L_STV,-
                         0D01                   ACMODE = #PSL$C_EXEC,-
                         0D01                   PAGCNT = R5
            BE 50    E9  0D28           BLBC    R0,25$
        00000000'EF  D6  0D2B           INCL    XQP$GL_SECTIONS                 ; COUNT THIS SECTION
 20     00000000'EF  91  0D31           CMPB    XQP$GL_SECTIONS,#32
               A8    13  0D38           BEQL    20$                             ; TOO MANY ISD'S
        000001FD'EF  96  0D3A           INCB    XQP_GSDNAM+XQP_GSDNAM_SIZ-1 ; NEXT GLOBAL SECTION NAME
                         0D40   ;
        53    62     3C  0D40   50$:    MOVZWL  ISD$W_SIZE(R2),R3
        52    53     C0  0D43           ADDL    R3,R2
            FF6F     31  0D46           BRW     10$                             ; NEXT ISD
```

```
                        0D49            .SBTTL  SIP_IMAGE_ATT - Read header, get image attributes
                        0D49       ;++
                        0D49       ; FUNCTIONAL DESCRIPTION:
                        0D49       ;
                        0D49       ;        READ THE IMAGE HEADER OF AN IMAGE AND RETURN THE COUNT OF
                        0D49       ;        IMAGE HEADER BLOCKS AND THE HIGHEST VBN THAT IS PART OF THE
                        0D49       ;        IMAGE, I.E. EXCLUDING SYMBOL TABLE AND PATCH STUFF.
                        0D49       ;
                        0D49       ; INPUT PARAMETERS:
                        0D49       ;
                        0D49       ;        R0 = CHANNEL TO READ FROM
                        0D49       ;        R1 = DISK ADDRESS TO READ (LBN OR VBN)
                        0D49       ;        R2 = LAST VBN IN FILE
                        0D49       ;        R3 = FUNCTION CODE (READ LOGICAL OR READ VIRTUAL)
                        0D49       ;
                        0D49       ; OUTPUTS:
                        0D49       ;
                        0D49       ;        R0 = STATUS CODE
                        0D49       ;        R1 = HEADER BLOCK COUNT
                        0D49       ;        R2 = LAST VIRTUAL BLOCK NUMBER IN IMAGE
                        0D49       ;             EXCLUDING DEBUG SYMBOL TABLE AND PATCH AUDIT TRAIL TEXT.
                        0D49       ;        R3 = IMAGE HEADER ADDRESS
                        0D49       ;
                        0D49       ;--
                        0D49
                        0D49       SIP_IMAGE_ATT:
                        0D49            $QIOW_S -                               ; READ THE IMAGE HEADER
                        0D49                    EFN  = #1 -                     ; EVENT FLAG
                        0D49                    CHAN = R0 -                     ; CHANNEL TO READ ON
                        0D49                    FUNC = R3 -                     ; READ VIRTUAL OR LOGICAL
                        0D49                    IOSB = W^SIP_Q_STATBLK -        ; I/O STATUS BLOCK ADDRESS
                        0D49                    P1   = W^SIP_A_ERLBUFFER -      ; BUFFER TO READ INTO
                        0D49                    P2   = #512 -                   ; NUMBER OF BYTES TO READ
                        0D49                    P3   = R1                       ; DISK BLOCK TO READ
          13 50    E9   0D6E            BLBC    R0,100$                         ; BRANCH IF ERROR
50     00F0'CF    3C   0D71            MOVZWL  W^SIP_Q_STATBLK,R0              ; GET I/O STATUS
          0B 50    E9   0D76            BLBC    R0,100$                         ; BRANCH IF ERROR
53     0000'CF    DE   0D79            MOVAL   W^SIP_A_ERLBUFFER,R3            ; HEADER BUFFER ADDRESS
           0004    30   0D7E            BSBW    BOC$IMAGE_ATT                   ; GET IMAGE ATTRIBUTES
      50    00'    D0   0D81            MOVL    S^#SS$_NORMAL,R0
                   05   0D84       100$: RSB
```

```
                          0D85             .SBTTL  BOO$IMAGE_ATT - Get image attributes from image header
                          0D85       ;++
                          0D85       ; Functional Description:
                          0D85       ;
                          0D85       ;         BOO$IMAGE_ATT returns to the caller some attributes of the image
                          0D85       ;
                          0D85       ; Calling Sequence:
                          0D85       ;
                          0D85       ;         BSBW    BOO$IMAGE_ATT
                          0D85       ;
                          0D85       ; Inputs:
                          0D85       ;
                          0D85       ;         R2 = Size of file in blocks
                          0D85       ;         R3 = Address of image header block (first one only)
                          0D85       ;
                          0D85       ; Outputs:
                          0D85       ;
                          0D85       ;         R1 = Number of image header blocks at the front of the image
                          0D85       ;         R2 = Size of image in blocks excluding the blocks at the end
                          0D85       ;              containing local symbols, global symbols, or patch text
                          0D85       ;
                          0D85       ;--
                          0D85
                          0D85       BOO$IMAGE_ATT::
    50    04 A3     3C    0D85               MOVZWL  IHD$W_SYMDBGOFF(R3),R0  ; ANY SYMBOL TABLE INFORMATION?
             0D     13    0D89               BEQL    20$                     ; BRANCH IF NOT
   51      6043     9E    0D8B               MOVAB   IHS$L_DSTVBN(R0)[R3],R1 ; ADR OF 1ST VBN IN DEBUG SYMBOL TABLE
             19     10    0D8F               BSBB    40$                     ; PROCESS IT
51    04 A043       9E    0D91               MOVAB   IHS$L_GSTVBN(R0)[R3],R1 ; ADR OF 1ST VBN IN GLOBAL SYMBOL TABLE
             12     10    0D96               BSBB    40$                     ; PROCESS IT
    50    08 A3     3C    0D98       20$:    MOVZWL  IHD$W_PATCHOFF(R3),R0   ; ANY PATCH CONTROL INFORMATION?
             07     13    0D9C               BEQL    30$                     ; BRANCH IF NOT
51    20 A043       9E    0D9E               MOVAB   IHP$L_PATCOMTXT(R0)[R3],R1 ; ADR OF 1ST VBN OF PATCH COMMAND TEXT
             05     10    0DA3               BSBB    40$                     ; PROCESS IT
   51    10 A3      9A    0DA5       30$:    MOVZBL  IHD$B_HDRBLKCNT(R3),R1  ; GET IMAGE HEADER BLOCK COUNT
                    05    0DA9               RSB
                          0DAA       ;
                          0DAA       ; SEE IF VBN IS NON ZERO AND THEN IF IT IS SMALLER THAN THE CURRENT SMALLEST
                          0DAA       ;
51    61     01     C3    0DAA       40$:    SUBL3   #1,(R1),R1              ; FETCH VBN - 1
             08     19    0DAE               BLSS    50$                     ; BRANCH IF NO VBN IS PRESENT
      51     52     D1    0DB0               CMPL    R2,R1                   ; IS IT SMALLER THAN THE CURRENT ONE
             03     15    0DB3               BLEQ    50$                     ; BRANCH IF NOT
      52     51     D0    0DB5               MOVL    R1,R2                   ; YES, USE IT
                    05    0DB8       50$:    RSB
```

```
0DB9         .SBTTL  SYSTEM INITIALIZATION KERNEL LEVEL
0DB9   ;++
0DB9   ; FUNCTIONAL DESCRIPTION:
0DB9   ;
0DB9   ;       THIS ROUTINE IS CALLED TO PERFORM SYSTEM INITIALIZATION
0DB9   ;       FUNCTIONS WHICH REQUIRE KERNEL LEVEL ACCESS.
0DB9   ;       THE FOLLOWING ARE PERFORMED:
0DB9   ;
0DB9   ;               1) SET UP THE KNOWN FILE DATA BASE
0DB9   ;               2) INIT THE PAGING FILE
0DB9   ;               3) INIT THE SWAP FILE
0DB9   ;               4) MAP RMS INTO SYSTEM SPACE
0DB9   ;               6) RECOVER UNLOGGED ERROR LOG ENTRIES FROM CRASH DUMP
0DB9   ;                  AND MAKE SURE THEY ARE PROPERLY LOGGED.
0DB9   ;
0DB9   ; CALLING SEQUENCE:
0DB9   ;
0DB9   ;       ENTER VIA THE CHANGE MODE TO SYSTEM SERVICE
0DB9   ;
0DB9   ; INPUT PARAMETERS:
0DB9   ;
0DB9   ;       NONE
0DB9   ;
0DB9   ; IMPLICIT INPUTS:
0DB9   ;
0DB9   ;       LOCATION "SIP_A_FILATT" CONTAINS A LIST OF ADDRESSES OF
0DB9   ;       FILE ATTRIBUTES BUFFERS FOR:
0DB9   ;               1) PAGE FILE
0DB9   ;               2) SWAP FILE
0DB9   ;               3) RMS
0DB9   ;
0DB9   ;       THE FORMAT OF THE ATTRIBUTES BUFFERS IS:
0DB9   ;               .LONG   STARTING LBN IF CONTIGUOUS, 0 IF NOT, -1 IF NO SUCH FILE
0DB9   ;               .LONG   SIZE OF FILE IN 512 BYTE BLOCKS
0DB9   ;               .LONG   FIRST VBN IF IMAGE FORMAT
0DB9   ;               .LONG   SIZE IF IMAGE FORMAT
0DB9   ;               .LONG   BYTE COUNT OF RETRIEVAL POINTERS THAT FOLLOW
0DB9   ;               .LONG   BLOCK COUNT FOR RTRV PTR 1
0DB9   ;               .LONG   LBN FOR RTRV PTR 1
0DB9   ;               ...
0DB9   ;               ...
0DB9   ;               ...
0DB9   ;               .LONG   BLOCK COUNT FOR RTRV PTR N
0DB9   ;               .LONG   LBN FOR RTRV PTR N
0DB9   ;
0DB9   ; OUTPUT PARAMETERS:
0DB9   ;
0DB9   ;       NONE
0DB9   ;
0DB9   ; IMPLICIT OUTPUTS:
0DB9   ;
0DB9   ;       NONE
0DB9   ;
0DB9   ; COMPLETION CODES:
0DB9   ;
0DB9   ;       RO IS RETURNED TRUE OF FALSE DEPENDING ON
0DB9   ;       INITIALIZATION SUCESS OR FAILURE
```

```
                                       0DB9  ;
                                       0DB9  ; SIDE EFFECTS:
                                       0DB9  ;
                                       0DB9  SIP_KERNELRTN:
                                 0FFC  0DB9          .WORD   ^M<R2,R3,R4,R5,R6,R7,R8,R9,R10,R11> ; ENTRY MASK
             53    00000000'9F    D0   0DBB          MOVL    @#MMG$GL_GPTE,R3          ; GET BASE ADDRESS OF GPTE
      04 A3   00000000'9F    02   78   0DC2          ASHL    #2,@#SGN$GL_MAXGPGCT,4(R3); SET THE GLOBAL PAGE TABLE ENTRY
                                       0DCB                                            ; MAX CNT
             50    00000000'EF    D0   0DCB          MOVL    EXE$GL_SYSUCB,R0          ; PICK UP ADDRESS OF SYSTEM UCB
                   01080000 8F    CA   0DD2          BICL    #<DEV$M_FOR!DEV$M_MNT>,-; CLEAR FOREIGN AND MOUNTED FORM INIT IN
                         38 A0         0DD8                  UCB$L_DEVCHAR(R0)         ; SYSTEM DISK UCB CHARACTERISTICS WORD
             51    00000000'EF    D0   0DDA          MOVL    SCH$GL_CURPCB,R1          ; GET CURRENT PROCESS PCB ADDRESS
                2C A0    60 A1    D0   0DE1          MOVL    PCB$L_PID(R1),UCB$L_PID(R0) ; ALLOCATE SYSTEM DEVICE
```

```
                          0DE6            .SUBTITLE       SIP_INITPAGFIL          Initialize PAGEFILE.SYS
                          0DE6    ;
                          0DE6    ;  Now initialize PAGEFILE.SYS if it exists
                          0DE6    ;
                          0DE6
                          0DE6    ;
                          0DE6    ; The following register conventions are used in INITPAGFIL
                          0DE6    ;
                          0DE6    ;       R5 = Address of the first block of the dump header
                          0DE6    ;       R6 = Address of the Boot Control Block
                          0DE6    ;       R7 = Number of blocks of page file to permanently reserve for
                          0DE6    ;            a dump file header.  0 if dump file is not in the page file
                          0DE6    ;            4 if the dump file is in the page file.
                          0DE6    ;       R8 = Number of blocks of page file to initially mark "in use"
                          0DE6    ;            because the dump is in the page file and is supposed to
                          0DE6    ;            be analyzed before the pages are released to the page file.
                          0DE6    ;       R9 = Contents of SIP_L_PAGATT, 0 if page file contains the dump.
                          0DE6    ;            The page file attributes block address if not.
                          0DE6    ;
                          0DE6    SIP_INITPAGFIL:
                          0DE6    ;
                          0DE6    ; Since the dump file may be at the front of the page file,
                          0DE6    ; we will read the 3 header blocks of the dump file and
                          0DE6    ; process some information now.  Later the "restore error log"
                          0DE6    ; code will not have to read or update the dump.  It will only
                          0DE6    ; have to process and save the error log entries if any.
                          0DE6    ;
              57    7C    0DE6            CLRQ    R7                      ; Init for separate dump and page files
     59    0128'CF  D0    0DE8            MOVL    W^SIP_L_PAGATT,R9       ; Page file attribute block address
              03    12    0DED            BNEQ    5$                      ; Branch if separate page and dump files
         57   04    D0    0DEF            MOVL    #4,R7                   ; Dump is in page file
                          0DF2                                            ; never page to first 4 blocks
 56    00000000'EF  D0    0DF2    5$:     MOVL    EXE$GL_BOOTCB,R6        ; Address of Boot Control Block
     55    0000'CF  9E    0DF9            MOVAB   W^SIP_A_ERLBUFFER,R5    ; Buffer to read into
           0134'CF  DD    0DFE            PUSHL   W^SIP_L_DSKCHAN         ; Channel to read disk
              21    DD    0E02            PUSHL   #IO$_READLBLK           ; Read function
     7E   03   09   9C    0E04            ROTL    #9,#3,-(SP)             ; Assume reading 3 pages
       03    1C A6  D1    0E06            CMPL    BOO$L_DMP_SIZE(R6),#3   ; Is dump file at least that big?
              02    18    0E0C            BGEQ    10$                     ; Branch if yes
              6E    D4    0E0E            CLRL    (SP)                    ; No blocks to be read
              65    9F    0E10    10$:    PUSHAB  (R5)                    ;
           20 A6    DD    0E12            PUSHL   BOO$L_DMP_MAP(R6)       ; Virtual to logical map for dump file
           18 A6    DD    0E15            PUSHL   BOO$L_DMP_VBN(R6)       ; Starting VBN of dump file
              06    DD    0E18            PUSHL   #6                      ; 6 arguments to RWVB
                          0E1A    ;
                          0E1A    ; At this point there is an argument list at the top of the stack
                          0E1A    ; for the call to QIO_RWVB.  This argument list is kept until
                          0E1A    ; exiting this "paragraph" when a write of the first block of the
                          0E1A    ; dump header may be needed.
                          0E1A    ;
           0124'CF  D4    0E1A            CLRL    W^SIP_L_ERRSEQ          ; Zero saved sequence number
           10 AE    D5    0E1E            TSTL    16(SP)                  ; Any blocks to read?
              6E    13    0E21            BEQL    60$                     ; Branch if not
     10B7'CF  6E    FA    0E23            CALLG   (SP),W^QIO_RWVB         ; Issue QIO Read Virtual Block
           10 AE    D4    0E28            CLRL    16(SP)                  ; Init for no write of page
           63 50    E9    0E2B            BLBC    R0,60$                  ; Skip if error reading file
     02    06 A5    B1    0E2E            CMPW    DMP$W_DUMPVER(R5),#SIP_C_DUMPVER ; Must be known dump version
```

```
                5D   12  0E32        BNEQ    60$                        ; Branch if earlier system or garbage
        50  64  A5   D2  0E34        MCOML   DMP$L_SYSVER(R5),R0        ; Get complement of system version
        68  A5  50   D1  0E38        CMPL    R0,DMP$L_CHECK(R5)         ; Does check match?
                53   12  0E3C        BNEQ    60$                        ; Branch if earlier system or garbage
                         0E3E   ;
                         0E3E   ; The dump file header looks OK, indicate that we can save error log
                         0E3E   ; entries if any are present.
                         0E3E   ;
    0124'CF     65   D0  0E3E        MOVL    DMP$L_ERRSEQ(R5),W^SIP_L_ERRSEQ ; Save sequence number
                07   13  0E43        BEQL    20$                        ; Branch if already zero on disk
                65   D4  0E45        CLRL    DMP$L_ERRSEQ(R5)           ; Save these ERL entries only once
   10 AE    01  09   9C  0E47        ROTL    #9,#1,16(SP)               ; Indicate that block is to be written
                         0E4C   ;
                         0E4C   ; See if the dump is in the page file and if it should be preserved
                         0E4C   ;
                59   D5  0E4C   20$:  TSTL    R9                         ; Separate dump and page files?
                4F   12  0E4E        BNEQ    65$                        ; Branch if yes
2F 00000000'EF  00'  E1  0E50        BBC     S^#EXE$V_SAVEDUMP,EXE$GL_FLAGS,50$ ; Branch if not
                         0E58                                           ; supposed to preserve the dump
    2A 04 A5    00   E0  0E58        BBS     #DMP$V_OLDDUMP,DMP$W_FLAGS(R5),50$ ; Don't preserve dump
                         0E5D                                           ; if already analyzed once.
 50   0164 C5   07   CB  0E5D        BICL3   #7,DMP$L_CRASHERL+EMB$K_LENGTH+EMB$L_CR_CODE(R5),R0
                         0E63                                           ; Fetch crash code, zero severity
  00000000'8F   50   D1  0E63        CMPL    R0,#BUG$_OPERATOR          ; "Operator Requested Shutdown?"
                1B   13  0E6A        BEQL    50$                        ; Branch if yes, don't preserve
                         0E6C   ;
                         0E6C   ; Loop through the memory descriptors and calculate the number of pages
                         0E6C   ; of dump to preserve.
                         0E6C   ;
                         0E6C        ASSUME  DMP$C_NMEMDSC EQ RPB$C_NMEMDSC
            51  08   9A  0E6C        MOVZBL  #DMP$C_NMEMDSC,R1          ; Max # of memory descriptors
         52  24  A5  9E  0E6F        MOVAB   DMP$L_MEMDSC(R5),R2        ; Get adr of memory descriptors
 50   62   18   00   EF  0E73   30$:  EXTZV   #DMP$V_PAGCNT,#DMP$S_PAGCNT,(R2),R0 ; Get page cnt for this mem
                09   13  0E78        BEQL    40$                        ; BR if no more memory descriptors used
            58  50   C0  0E7A        ADDL2   R0,R8                      ; Accumulate total # of pages
                         0E7D        ASSUME  DMP$C_MEMDSCSIZ EQ RPB$C_MEMDSCSIZ
            52  08   C0  0E7D        ADDL2   #DMP$C_MEMDSCSIZ,R2        ; Get next memory descriptor
            F0  51   F5  0E80        SOBGTR  R1,30$                     ; Loop once for each memory descriptor
                58   D5  0E83   40$:  TSTL    R8                         ; Any dump blocks to preserve?
                0A   14  0E85        BGTR    60$                        ; Branch if yes
   10 AE    01  09   9C  0E87   50$:  ROTL    #9,#1,16(SP)               ; Note that we must write the block
   00 04 A5     01   E2  0E8C        BBSS    #DMP$V_EMPTY,DMP$W_FLAGS(R5),60$ ; Mark dump empty for SDA
                         0E91                                           ; so it will not try to analyze
                         0E91                                           ; a (partially) overwritten dump
                59   D5  0E91   60$:  TSTL    R9                         ; Address of page file attributes buffer
                0A   12  0E93        BNEQ    65$                        ; Branch if SYSINIT looked up page file
                         0E95   ;
                         0E95   ; Dump file is in page file.  SYSBOOT "opened" PAGEFILE.SYS and called
                         0E95   ; it the dump file.  So the retrieval information and the file size
                         0E95   ; are in the boot control block fields for the dump file.
                         0E95   ;
        52  20  A6   D0  0E95        MOVL    BOO$L_DMP_MAP(R6),R2       ; Address of page file mapping data
        54  1C  A6   D0  0E99        MOVL    BOO$L_DMP_SIZE(R6),R4      ; Size of page file
                08   11  0E9D        BRB     70$                        ;
        52  10  A9   DE  0E9F   65$:  MOVAL   RTRVLEN(R9),R2             ; Address of page file mapping data
        54  04  A9   D0  0EA3        MOVL    FILESIZE(R9),R4            ; Size of page file
     50    54   07   CB  0EA7   70$:  BICL3   #7,R4,R0                   ; A zero length file is also useless
```

```
          50    58    C2  0EAB          SUBL    R8,R0                   ; Enough room left in page file
000001C4 8F    50    D1  0EAE          CMPL    R0,#SIP_C_MINPAGFIL     ; after reserving the dump portion
                08    18  0EB5          BGEQ    80$                     ; Branch if yes
                58    D5  0EB7          TSTL    R8                      ; No, then don't preserve the dump
                27    13  0EB9          BEQL    100$                    ; Branch if too small anyway
                58    D4  0EBB          CLRL    R8                      ; No dump data preserved
                C8    11  0EBD          BRB     50$
          02CF    30  0EBF  80$:    BSBW    SIP_INIWCB              ; Allocate and init a window control block
                          0EC2  ;
                          0EC2  ; Set up argument list to BOO$INITPAGFIL on the stack. Ignore returned
                          0EC2  ; page file index. Default MAXVBN parameter. Use WCB address returned
                          0EC2  ; by SIP_INIWCB.
                          0EC2  ;
          7E    57    7D  0EC2  90$:    MOVQ    R7,-(SP)                ; Count of blocks to mark "in use"
                          0EC5                                          ; Starting VBN - 1 for page file
                7E    7C  0EC5          CLRQ    -(SP)                   ; Default these two parameters
                52    DD  0EC7          PUSHL   R2                      ; Store WCB address
                54    DD  0EC9          PUSHL   R4                      ;  ... and file size
00000000'GF    06    FB  0ECB          CALLS   #6,G^BOO$INITPAGFIL     ; Allocate and initialize a PFL
          15    50    E8  0ED2          BLBS    R0,120$                 ; Go on to next step if successful
                2D    10  0ED5          BSBB    CHECK_CACHE             ; Can FIL$OPENFILE cache be deallocated?
          E8    50    E8  0ED7          BLBS    R0,90$                  ; If so, try again
    51     F28F CF    9E  0EDA          MOVAB   W^INIPAGFIL,R1          ; Otherwise, report an error message
          0317    30  0EDF          BSBW    SIP_FATAL               ;  and abort the startup sequence
                          0EE2  ;
                          0EE2  ; Page file does not exist, or is too small to be useful
                          0EE2  ;
    51     F1D5 CF    9E  0EE2  100$:   MOVAB   PAGFILERR,R1            ; Display paging file error message
          031A    30  0EE7          BSBW    SIP_SYSMSG              ;
                          0EEA  ;
                          0EEA  ; All exits from the init page file logic must flow through here in
                          0EEA  ; order to conditionally write the first dump header block back
                          0EEA  ; and unconditionally clean the argument list off the stack.
                          0EEA  ;
00000000'EF    58    D0  0EEA  120$:   MOVL    R8,EXE$GL_SAVEDUMP      ; Note count of blocks reserved
          10    AE    D5  0EF1          TSTL    16(SP)                  ; Write the dump file header?
                09    13  0EF4          BEQL    140$                    ; Branch if not
    14    AE    20    D0  0EF6          MOVL    #IO$_WRITELBLK,20(SP)   ; Change read to write
    10B7'CF    6E    FA  0EFA          CALLG   (SP),W^QIO_RWVB         ; Write the block
          5E    1C    C0  0EFF  140$:   ADDL    #7*4,SP                 ; Clean argument list off stack
                10    11  0F02          BRB     SIP_INITSWPFIL
```

```
                        0F04           .SUBTITLE       CHECK_CACHE
                        0F04
                        0F04    ;+
                        0F04    ; This routine checks whether there is a FIL$OPENFILE cache to be deallocated.
                        0F04    ; The reason why this routine is necessary here is that the BOO$INITxxxFIL
                        0F04    ; procedures cannot use the local nonpaged pool allocation routine. Those
                        0F04    ; procedures are shared with SYSGEN and cannot know about such specialized
                        0F04    ; items as this cache in nonpaged pool.
                        0F04    ;
                        0F04    ; If the cache is still allocated, it is deallocated and a success status
                        0F04    ; is returned.
                        0F04    ;
                        0F04    ; Input Parameter:
                        0F04    ;
                        0F04    ;       R0 low bit clear
                        0F04    ;
                        0F04    ; Status Code:
                        0F04    ;
                        0F04    ;       R0 low bit set    => FILEREAD cache successfully deallocated
                        0F04    ;
                        0F04    ;       R0 low bit clear  => FILEREAD cache was already  deallocated
                        0F04    ;                               (previous error stands)
                        0F04    ;-
                        0F04
                        0F04    CHECK_CACHE:
       00000000'GF  D5  0F04            TSTL    G^FIL$GQ_CACHE          ; Cache still allocated?
                07  13  0F0A            BEQL    10$                     ; Branch if not -- original error stands
  000011D9'EF   00  FB  0F0C            CALLS   #0,SIP_CACHE_DALC       ; Otherwise, deallocate the cache
                    05  0F13    10$:    RSB                             ;  and return to caller
```

```
                             0F14          .SUBTITLE       SIP_INITSWPFIL          Initialize SWAPFILE.SYS
                             0F14   ;
                             0F14   ;  Now initialize SWAPFILE.SYS if it exists
                             0F14   ;
                             0F14
                             0F14   SIP_INITSWPFIL:
       00000000'GF     B5    0F14          TSTW    G^SGN$GW_SWPFILES         ; If requested number of swap files is
                3D     13    0F1A          BEQL    SIP_INITRMS               ;  zero, then skip this entire section
     54   012C'CF      D0    0F1C          MOVL    W^SIP_L_SWPATT,R4         ; Address of swap file attributes buffer
  50    04 A4    07    CB    0F21          BICL3   #7,FILESIZE(R4),R0        ; If file is empty or does not exist
                31     13    0F26          BEQL    SIP_INITRMS               ;  then skip to the next step
  7E   00000000'GF     3C    0F28          MOV_WL  G^SWP$GW_SWPINC,-(SP)     ; Get value of SWPALLOCINC parameter
             8E 50     D1    0F2F          CMPL    R0,(SP)+                  ; File size must be at least as large
                25     1F    0F32          BLSSU   SIP_INITRMS               ; ... so skip to next step if too small
     52     10 A4      9E    0F34          MOVAB   RTRVLEN(R4),R2            ; Address of mapping data
              0256     30    0F38          BSBW    SIP_INIWCB                ; Allocate and init a window control block
                             0F3B   ;
                             0F3B   ; Set up argument list to BOO$INITSWPFIL on the stack. Ignore returned
                             0F3B   ; page file index. Default MAXVBN parameter. Use WCB address returned
                             0F3B   ; by SIP_INIWCB.
                             0F3B   ;
                7E     7C    0F3B   10$:   CLRQ    -(SP)                     ; Default last two parameters
                52     DD    0F3D          PUSHL   R2                        ; Store WCB address
             04 A4     DD    0F3F          PUSHL   FILESIZE(R4)              ;  ... and file size
  00000000'GF   04     FB    0F42          CALLS   #4,G^BOO$INITSWPFIL       ; Allocate and initialize a PFL
             0D 50     E8    0F49          BLBS    R0,SIP_INITRMS            ; Go on to next step if successful
                B6     10    0F4C          BSBB    CHECK_CACHE               ; Can FIL$OPENFILE cache be deallocated?
             EA 50     E8    0F4E          BLBS    R0,10$                    ; If so, try again
     51    F218 CF     9E    0F51          MOVAB   W^INIPAGFIL,R1            ; Otherwise, report an error message
              02A0     30    0F56          BSBW    SIP_FATAL                 ;  and abort the startup sequence
```

```
                                   0F59          .SBTTL  SIP_INITRMS - Install RMS Image
                                   0F59  ;
                                   0F59  ;       INSTALL RMS IMAGE AS A PAGEABLE SYSTEM SECTION
                                   0F59  ;
                                   0F59
                                   0F59  SIP_INITRMS:
         54   0130'CF     D0       0F59          MOVL    W^SIP_L_RMSATT,R4             ; ADDRESS OF RMS FILE ATTRIBUTES BUF
            56   0C A4    D0       0F5E          MOVL    IMAGESIZE(R4),R6              ; ANY PAGES TO MAP?
                    28    15       0F62          BLEQ    10$                           ; BRANCH IF NOT, ERROR
   28 00000000'EF    00'  E1       0F64          BBC     S^#EXE$V_SYSPAGING,EXE$GL_FLAGS,30$ ; BRANCH IF NOT
                                   0F6C                                                ; PAGING SYSTEM SPACE
            52   10 A4    9E       0F6C          MOVAB   RTRVLEN(R4),R2                ; ADDRESS OF MAPPING DATA
                  021E    30       0F70          BSBW    SIP_INIWCB                    ; MAKE A WINDOW CONTROL BLOCK
             00000000'EF  DF       0F73          PUSHAL  MMG$GL_RMSBASE                ; ADDRESS TO STORE BASE OF SECTION
                    0F    DD       0F79          PUSHL   S^#PRT$C_UR                   ; PROTECTION FOR RMS PAGES
                    56    DD       0F7B          PUSHL   R6                            ; NUMBER OF PAGES TO MAP
                 08 A4    DD       0F7D          PUSHL   IMAGEVBN(R4)                  ; STARTING VBN TO MAP
                    52    DD       0F80          PUSHL   R2                            ; WINDOW CONTROL BLOCK ADDRESS
      00000000'EF    05   FB       0F82          CALLS   #5,EXE$SYS_SECTION            ; MAP RMS AS A SYSTEM SECTION
                 5B 50    E8       0F89          BLBS    R0,60$                        ; BRANCH IF SUCCESSFUL
         51    F217 CF    9E       0F8C  10$:    MOVAB   W^RMSMAPERR,R1                ; FAILED TO MAP RMS
                  0265    30       0F91          BSBW    SIP_FATAL                     ; ISSUE FATAL DIAGNOSTIC
                                   0F94  ;
                                   0F94  ; IF SYSPAGING = 0 (NOT PAGING THE PAGED PORTION OF THE SYSTEM CODE),
                                   0F94  ; THEN CREATE SOME (WRITABLE) ADDRESS SPACE FOR RMS AND READ IT IN.
                                   0F94  ; RMS WILL STILL PAGE IN THE SYSTEM WORKING SET WHICH MEANS THAT THE
                                   0F94  ; SYSTEM WORKING SET MUST BE LARGE IF THE PAGES ARE TO STAY IN MEMORY.
                                   0F94  ;
    51    00000000'EF    56   C1   0F94  30$:    ADDL3   R6,BOO$GL_SPTFREL,R1          ; ALLOCATE SPT FOR RMS PAGES
          00000000'EF    51   D1   0F9C          CMPL    R1,BOO$GL_SPTFREH             ; ENOUGH LEFT?
                         E7   14   0FA3          BGTR    10$                           ; BRANCH IF NOT
          00000000'EF    51   D0   0FA5          MOVL    R1,BOO$GL_SPTFREL             ; RECORD THE ALLOCATION
                   51    56   C2   0FAC          SUBL    R6,R1                         ; FIRST SPT INDEX
              52   51    09   78   0FAF          ASHL    #9,R1,R2                      ; FORM SYSTEM VA OF RMS
                00 52    1F   E2   0FB3          BBSS    #VA$V_SYSTEM,R2,35$           ; OR IN THE SYSTEM BIT
                                   0FB7  35$:
                                   0FB7  ;
                                   0FB7  ; SET UP THE ARGUMENT LIST FOR THE READ VIRTUAL CALL
                                   0FB7  ;
               0134'CF    DD       0FB7          PUSHL   W^SIP_L_DSKCHAN               ; CHANNEL FOR THE I/O REQUEST
                    21    DD       0FBB          PUSHL   #IO$_READLBLK                 ; FUNCTION CODE
         7E    56    09   78       0FBD          ASHL    #9,R6,-(SP)                   ; BYTE COUNT TO READ (MAY BE > 65KB)
                    52    DD       0FC1          PUSHL   R2                            ; VA TO READ INTO
                 10 A4    DF       0FC3          PUSHAL  RTRVLEN(R4)                   ; VIRTUAL TO LOGICAL MAP
                 08 A4    DD       0FC6          PUSHL   IMAGEVBN(R4)                  ; STARTING VBN IN IMAGE
                                   0FC9  ;
                                   0FC9  ; NOW FILL IN THE SPT WITH DEMAND ZERO ENTRIES
                                   0FC9  ;
    51    00000000'FF41   DE       0FC9          MOVAL   @MMG$GL_SPTBASE[R1],R1        ; ADDRESS OF FIRST SPT ENTRY
         81    0E    1B   78       0FD1  40$:    ASHL    #PTE$V_PROT,S^#PRT$C_URKW,(R1)+ ; STORE THE NEXT PTE
                 F9 56    F5       0FD5          SOBGTR  R6,40$                        ; LOOP THROUGH ALL PAGES
         10B7'CF     06   FB       0FD8          CALLS   #6,W^QIO_RWVB                 ; READ RMS
                 AC 50    E9       0FDD          BLBC    R0,10$                        ; BRANCH IF ERROR
      00000000'EF    52   D0       0FE0          MOVL    R2,MMG$GL_RMSBASE             ; SET RMS BASE ADDRESS
00000000'EF   00000000'EF D0       0FE7  60$:    MOVL    MMG$GL_RMSBASE,CTL$GL_RMSBASE ; SET RMS BASE FOR THIS PROCESS
         51   00000000'EF D0       0FF2          MOVL    EXE$GL_SYSUCB,R1              ; GET SYSTEM DEVICE UCB ADDRESS
                 2C A1    D4       0FF9          CLRL    UCB$L_PID(R1)                 ; DEALLOCATE SYSTEM DEVICE
```

```
                          0FFC       .SBTTL  RESTORE ERROR LOG BUFFERS
                          0FFC  ;
                          0FFC  ;        THE FOLLOWING LOOKS AT THE FIRST 3 PAGES OF THE DUMP FILE.  IF THERE
                          0FFC  ;        IS INFORMATION IN THE FILE, IT THEN LOOKS FOR ERROR LOG ENTRIES THAT
                          0FFC  ;        REMAINED IN THE BUFFERS AT THE TIME OF THE CRASH.  THESE ARE REMOVED
                          0FFC  ;        AND PLACED IN THE CURRENT ERROR LOG BUFFERS.  THE ERROR LOG ENTRY
                          0FFC  ;        FOR THE BUG_CHECK WILL BE CONTAINED IN THE ERROR LOG BUFFER PAGES
                          0FFC  ;        IN THE DUMP (PAGES 2 AND 3), IF THE DUMP WAS FOR A SYSTEM PRIOR TO
                          0FFC  ;        RELEASE 2.0.  RELEASE 2.0 AND SUBSEQUENT RELEASES PLACE BUG_CHECK
                          0FFC  ;        ERROR LOG IN THE FIRST PAGE OF THE DUMP FILE.  THIS WAS DONE BECAUSE
                          0FFC  ;        THE ERROR LOG BUFFERS COULD BE FULL AND THE BUG_CHECK INFORMATION LOST.
                          0FFC  ;
                          0FFC  RESTORERL:                                        ; RESTORE ERROR LOG INFORMATION
       54   0000'CF   9E  0FFC          MOVAB   W^SIP_A_ERLBUFFER,R4              ; BUFFER TO READ INTO
            0124'CF   D5  1001          TSTL    W^SIP_L_ERRSEQ                    ; TEST SAVED SEQUENCE NUMBER
                 03   12  1005          BNEQ    10$                               ; BRANCH IF ERROR LOG ENTRIES TO SAVE
               00A3   31  1007          BRW     NOERL                             ; NO ERROR LOG ENTRIES
       55        02   D0  100A  10$:    MOVL    #2,R5                             ; SET NUMBER OF ERROR LOG BUFFERS
       54   0200 C4   9E  100D  20$:    MOVAB   512(R4),R4                        ; POINT TO NEXT BUFFER
       5B     01 A4   9A  1012          MOVZBL  ERL$B_MSGCNT(R4),R11              ; GET COUNT OF COMPLETED MSGS IN BUFFER
                 5F   13  1016          BEQL    80$                               ; NO, TRY NEXT BUFFER
       57        64   9A  1018          MOVZBL  ERL$B_BUSY(R4),R7                 ; GET COUNT OF INCOMPLETE MSGS IN BUFFER
       5B        57   C0  101B          ADDL    R7,R11                            ; GET TOTAL # OF MESSAGES TO SCAN
       57   01F4 8F   3C  101E          MOVZWL  #<512-ERL$C_LENGTH>,R7            ; SET BYTES IN BUFFER
 56   08 A4   04 A4   C3  1023          SUBL3   ERL$L_NEXT(R4),ERL$L_END(R4),R6 ; EMPTY BUFFER SIZE
       57        56   D1  1029          CMPL    R6,R7                             ; CHECK FOR REASONABLE POINTERS
                 49   1A  102C          BGTRU   80$                               ; NO, TRY NEXT BUFFER
       57        56   C2  102E          SUBL    R6,R7                             ; COMPUTE ALLOCATED SPACE IN BUFFER
       5A        0C   9A  1031          MOVZBL  #ERL$C_LENGTH,R10                 ; SET INITIAL OFFSET IN ERL BUFFER
       58      644A   9E  1034  30$:    MOVAB   (R4)[R10],R8                      ; COMPUTE MESSAGE BASE ADDRESS
       58        04   C0  1038          ADDL    #EMB$K_LENGTH,R8                  ; POINT PAST MESSAGE HEADER
       59     FC A8   3C  103B          MOVZWL  EMB$W_SIZE(R8),R9                 ; GET MESSAGE SIZE
                 36   13  103F          BEQL    80$                               ; NULL - ERROR
       57        59   C2  1041          SUBL    R9,R7                             ; CHECK FOR FIT IN ALLOCATED BUFFER
                 31   19  1044          BLSS    80$                               ; NO SKIP REST OF BUFFER
              FF A8   95  1046          TSTB    EMB$B_VALID(R8)                   ; IS THIS A VALID MESSAGE?
                 26   13  1049          BEQL    40$                               ; BRANCH IF NOT
       01     FE A8   91  104B          CMPB    EMB$B_BUFIND(R8),#1               ; FURTHER CHECK MESSAGE VALIDITY
                 26   1A  104F          BGTRU   80$                               ; BR IF NOT TO SKIP BUFFER
       59        04   C2  1051          SUBL    #EMB$K_LENGTH,R9                  ; SIZE OF BUFFER TO ALLOCATE
       51        59   D0  1054          MOVL    R9,R1                             ; SIZE OF BUFFER TO ALLOCATE
          00000000'EF 16  1057          JSB     ERL$ALLOCEMB                      ; ALLOCATE BUFFER FOR MESSAGE
            11   50   E9  105D          BLBC    R0,40$                            ; SKIP IF NO SPACE
                 3F   BB  1060          PUSHR   #^M<R0,R1,R2,R3,R4,R5>            ; SAVE MOVC REGISTERS
     62   68     59   28  1062          MOVC3   R9,(R8),(R2)                      ; COPY MESSAGE ENTIRELY
                 3F   BA  1066          POPR    #^M<R0,R1,R2,R3,R4,R5>            ; RESTORE MOVC REGISTERS
          00000000'EF 16  1068          JSB     ERL$RELEASEMB                     ; MARK MESSAGE COMPLETE
       59        04   C0  106E          ADDL    #EMB$K_LENGTH,R9                  ; SIZE OF MESSAGE BUFFER W/HEADER
       5A        59   C0  1071  40$:    ADDL    R9,R10                            ; POINT TO NEXT MESSAGE
            BD   5B   F5  1074  50$:    SOBGTR  R11,30$                           ; GET NEXT MESSAGE IF ANY
            93   55   F5  1077  80$:    SOBGTR  R5,20$                            ; NEXT BUFFER
       54   0000'CF   9E  107A          MOVAB   W^SIP_A_ERLBUFFER,R4              ; GET ADDRESS OF FIRST PAGE FROM DUMP
       54     70 A4   9E  107F          MOVAB   DMP$L_CRASHERL+EMB$K_LENGTH(R4),R4 ; GET ADR OF CRASH ERL ENTRY
       59     FC A4   3C  1083          MOVZWL  EMB$W_SIZE(R4),R9                 ; GET SIZE OF ERL ENTRY
       59        04   C2  1087          SUBL    #EMB$K_LENGTH,R9                  ; SET SIZE OF BUFFER TO ALLOCATE
       51        59   D0  108A          MOVL    R9,R1                             ; REMEMBER SIZE
          00000000'EF 16  108D          JSB     ERL$ALLOCEMB                      ; ALLOCATE SPACE IN ERROR LOG BUFFER
```

```
            0E 50   E9 1093          BLBC    R0,90$                   ; BR ON ERROR, NO SPACE AVAILABLE
               3F   BB 1096          PUSHR   #^M<R0,R1,R2,R3,R4,R5>   ; SAVE MOVC REGISTERS
      62    64 59   28 1098          MOVC3   R9,(R4),(R2)             ; COPY ERL ENTRY INTO ERROR LOG BUFFER
               3F   BA 109C          POPR    #^M<R0,R1,R2,R3,R4,R5>   ; RESTORE MOVC REGISTERS
       00000000'EF  16 109E          JSB     ERL$RELEASEMB            ; MARK MESSAGE COMPLETE
00000000'EF 0124'CF D0 10A4    90$:  MOVL    W^SIP_L_ERRSEQ,ERL$GL_SEQUENCE  ; RESTORE CURRENT SEQUENCE MESSAGE
                       10AD    NOERL:                                  ;
       00000000'EF  16 10AD          JSB     ERL$COLDSTART            ; LOG STARTUP
                       10B3    ;
                       10B3    ; INITIALIZATION KERNEL ROUTINE COMPLETE
                       10B3    ;
          50    01  3C 10B3          MOVZWL  #1,R0                    ; GIVE SUCCESS
                    04 10B6          RET
```

```
                       10B7          .SBTTL  QIO_RWVB - Read or Write Virtual Block
                       10B7  ;++
                       10B7  ; Functional Description:
                       10B7  ;       This routine maps the specified virtual blocks to logical blocks
                       10B7  ;       and reads or writes the desired number of bytes to or from the
                       10B7  ;       specified location in memory.
                       10B7  ;
                       10B7  ; Calling sequence:
                       10B7  ;       CALLG   arglist,QIO_RWVB
                       10B7  ;
                       10B7  ; Inputs:
                       10B7  ;       QIO_RWVB_VBN(AP)     = Virtual Block Number
                       10B7  ;       QIO_RWVB_MAP(AP)     = Mapping info for virtual to logical mapping:
                       10B7  ;               # of bytes of retrieval pointers following
                       10B7  ;               count of LBN's in first rtrv ptr
                       10B7  ;               starting LBN in first rtrv ptr
                       10B7  ;               count of LBN's in second rtrv ptr
                       10B7  ;               starting LBN in second rtrv ptr
                       10B7  ;
                       10B7  ;               ...
                       10B7  ;
                       10B7  ;               count of LBN's in last rtrv ptr
                       10B7  ;               starting LBN in last rtrv ptr
                       10B7  ;       QIO_RWVB_BUF(AP)     = Buffer Address to read into
                       10B7  ;       QIO_RWVB_BYTCNT(AP) = Byte count to read (up to 31 bits)
                       10B7  ;       QIO_RWVB_FUNC(AP)    = #IO$_READLBLK or #IO$_WRITELBLK
                       10B7  ;       QIO_RWVB_CHAN(AP)    = Channel assigned to disk
                       10B7  ;
                       10B7  ; Outputs:
                       10B7  ;       R0 = Status
                       10B7  ;       R1 altered
                       10B7  ;       All other registers preserved
                       10B7  ;
                       10B7  ;--
                       10B7
                       10B7          $OFFSET 4,POSITIVE,<-
                       10B7          QIO_RWVB_VBN,-
                       10B7          QIO_RWVB_MAP,-
                       10B7          QIO_RWVB_BUF,-
                       10B7          QIO_RWVB_BYTCNT,-
                       10B7          QIO_RWVB_FUNC,-
                       10B7          QIO_RWVB_CHAN -
                       10B7          >
                       0004  QIO_RWVB_VBN:
                       0008  QIO_RWVB_MAP:
                       000C  QIO_RWVB_BUF:
                       0010  QIO_RWVB_BYTCNT:
                       0014  QIO_RWVB_FUNC:
                       0018  QIO_RWVB_CHAN:
                       10B7
                       10B7  QIO_RWVB:
                 0FFC  10B7          .WORD   ^M<R2,R3,R4,R5,R6,R7,R8,R9,R10,R11>
                       10B9          ASSUME  QIO_RWVB_MAP EQ QIO_RWVB_VBN+4
    53   04 AC    7D   10B9          MOVQ    QIO_RWVB_VBN(AP),R3     ; R3 = VBN, R4 = Map
    56   0C AC    D0   10BD          MOVL    QIO_RWVB_BUF(AP),R6     ; R6 = Buffer address
                       10C1
                       10C1          ASSUME  QIO_RWVB_FUNC EQ QIO_RWVB_BYTCNT+4
```

```
          59    10 AC   7D  10C1              MOVQ    QIO_RWVB_BYTCNT(AP),R9  ; R9 = byte count, R10 = function
          5B    18 AC   D0  10C5              MOVL    QIO_RWVB_CHAN(AP),R11   ; R11 = RPB adr or channel
   55     84    FD 8F   78  10C9              ASHL    #-3,(R4)+,R5            ; R5 = # of rtrv ptr quad words
                            10CE                                              ; R4 = adr of 1st rtrv ptr
          50       84   7D  10CE     10$:     MOVQ    (R4)+,R0                ; R0 = # of LBN's in this rtrv ptr
                            10D1                                              ; R1 = Starting LBN in this rtrv ptr
          53       50   C2  10D1              SUBL    R0,R3                   ; Is desired VBN covered
                            10D4                                              ; by this retrieval pointer?
                   05   19  10D4              BLSS    20$                     ; Branch if yes
                F5 55   F5  10D6              SOBGTR  R5,10$                  ; No, get the next rtrv ptr
                   30   11  10D9              BRB     60$                     ; Desired VBN beyond EOF
       53       7340    9E  10DB     20$:     MOVAB   -(R3)[R0],R3            ; R3 = R3 + R0 - 1
                            10DF                                              ; Number of blocks from the
                            10DF                                              ; beginning of this rtrv ptr
          51       53   C0  10DF              ADDL    R3,R1                   ; Adjust starting LBN
          50       53   C2  10E2              SUBL    R3,R0                   ; and LBN count
                   03   11  10E5              BRB     40$
          50       84   7D  10E7     30$:     MOVQ    (R4)+,R0                ; Get the next rtrv ptr
                            10EA         ;
                            10EA         ; R0 = number of blocks that can be read in this portion
                            10EA         ; R1 = starting LBN to read from
                            10EA         ;
                   59   DD  10EA     40$:     PUSHL   R9                      ; Save desired byte count
     50   50       09   78  10EC              ASHL    #9,R0,R0                ; # of bytes that can be read
          50       59   D1  10F0              CMPL    R9,R0                   ; If fewer are needed
                   03   15  10F3              BLEQ    50$                     ; Then read the smaller number
          59       50   D0  10F5              MOVL    R0,R9                   ; Otherwise read all we can
          6E       59   C2  10F8     50$:     SUBL    R9,(SP)                 ; Note how much is left to be read
          58       51   D0  10FB              MOVL    R1,R8                   ; Starting LBN of read request
                   11   10  10FE              BSBB    QIO_RWLB                ; Read or write the file
          59       8E   D0  1100              MOVL    (SP)+,R9                ; Recover byte left to be read
                   0B   15  1103              BLEQ    90$                     ; Branch if all done
                08 50   E9  1105              BLBC    R0,90$                  ; Branch if read error
                DC 55   F5  1108              SOBGTR  R5,30$                  ; Get the next retrieval pointer
     50      0000'8F    3C  110B     60$:     MOVZWL  #SS$_ENDOFFILE,R0       ; Indicate EOF error
                        04  1110     90$:     RET
```

```
                              1111          .SBTTL  QIO_RWLB - Read or Write Logical Block
                              1111  ;++
                              1111  ; Functional Description:
                              1111  ;       This routine reads/writes the specified logical block numbers
                              1111  ;       from/to the boot disk.
                              1111  ;
                              1111  ; Calling Sequence:
                              1111  ;       BSBW    QIO_RWLB
                              1111  ;
                              1111  ; Inputs:
                              1111  ;       R6  = Buffer address (updated)
                              1111  ;       R8  = Logical block number (updated)
                              1111  ;       R9  = Byte count to transfer (up to 31 bits)
                              1111  ;       R10 = #IO$_READLBLK or #IO$_WRITELBLK
                              1111  ;       R11 = Channel assigned to disk
                              1111  ; Outputs:
                              1111  ;       R0 = Status
                              1111  ;       R1,R6-R9 altered
                              1111  ;       All other registers preserved
                              1111  ;--
              0000007F        1111          IOSIZE=127
                              1111  QIO_RWLB:
           5E    08    C2     1111          SUBL    #8,SP                           ; Reserve an IOSB
     57  FE00    8F    3C     1114  10$:    MOVZWL  #IOSIZE*512,R7                  ; Assume maximum transfer
           59    57    D1     1119          CMPL    R7,R9                           ; Minimize with file size
                 03    15     111C          BLEQ    20$                             ; Smaller than remaining file size
           57    59    D0     111E          MOVL    R9,R7                           ; Set to remaining file size
           50    5E    D0     1121  20$:    MOVL    SP,R0                           ; Address of IOSB
                              1124          $QIOW_S -
                              1124                  EFN = #0 -                      ; Event flag
                              1124                  CHAN = R11 -                    ; Channel
                              1124                  FUNC = R10 -                    ; Read or write logical block
                              1124                  IOSB = (R0) -                   ; I/O Status block address
                              1124                  P1 = (R6) -                     ; Buffer address
                              1124                  P2 = R7 -                       ; Byte count to transfer
                              1124                  P3 = R8                         ; Logical block number
              08 50    E9     1141          BLBC    R0,50$                          ; Branch if error
           50    6E    3C     1144          MOVZWL  (SP),R0                         ; Get completion status
              33 50    E8     1147          BLBS    R0,90$                          ; Branch if completed successfully
                 20    13     114A          BEQL    70$                             ; Branch if I/O is still in progress
                              114C  ;
                              114C  ; Error from QI/O
                              114C  ;
       0000'8F   50    B1     114C  50$:    CMPW    R0,#SS$_INSFWSL                 ; Insufficient working set?
                 3A    12     1151          BNEQ    100$                            ; Branch if not, report error
    57   57  FF  8F    78     1153          ASHL    #-1,R7,R7                       ; Try again with half the byte count
  57   000001FF  8F    CA     1158          BICL    #^X1FF,R7                       ; Use an integral number of pages
                 C0    12     115F          BNEQ    20$                             ; Branch if something left to transfer
                 2A    11     1161          BRB     100$                            ; Couldn't even transfer 1 page
                              1163  ;
                              1163  ; The following magic with event flag 0 and the IOSB is to take care
                              1163  ; of the case that the event flag was set for some reason other than
                              1163  ; the completion of this particular I/O request.  In that case, the
                              1163  ; only real completion information is the IOSB itself.  The sequence
                              1163  ; must be to clear the event flag, check the IOSB, and then wait again
                              1163  ; for the event flag.
                              1163  ;
```

```
                             1163  2318 60$:     $WAITFR_S #0                            ; Wait for event flag
                             116C  2319 70$:     $CLREF_S #0                             ; Clear the event flag
              50    6E   3C  1175  2320          MOVZWL  (SP),R0                         ; Fetch I/O status
                    E9   13  1178  2321          BEQL    60$                             ; Branch if I/O not completed
              10    50   E9  117A  2322          BLBC    R0,100$                         ; Branch if error
                             117D  2323 ;
                             117D  2324 ; I/O completed successfully, see if there is any more to do
                             117D  2325 ;
    51    57    F7 8F    78  117D  2326 90$:     ASHL    #-9,R7,R1                       ; Block count
              58    51   C0  1182  2327          ADDL    R1,R8                           ; Starting LBN for next piece
              56    57   C0  1185  2328          ADDL    R7,R6                           ; Starting Buf Adr for next piece
              59    57   C2  1188  2329          SUBL    R7,R9                           ; Count bytes tranferred
                    87   14  118B  2330          BGTR    10$                             ; Branch if another transfer to do
              5E    08   C0  118D  2331 100$:    ADDL    #8,SP                           ; Clean off IOSB
                         05  1190  2332          RSB                                     ; and return
```

```
                                1191      .SBTTL  SIP_INIWCB - ALLOCATE AND INIT A WINDOW CONTROL BLOCK
                                1191 ;
                                1191 ; INPUTS:
                                1191 ;
                                1191 ;        R2 = ADDRESS OF MAPPING DATA
                                1191 ;                # of bytes of retrieval pointers following
                                1191 ;                count of LBN's in first rtrv ptr
                                1191 ;                starting LBN in first rtrv ptr
                                1191 ;                count of LBN's in second rtrv ptr
                                1191 ;                starting LBN in second rtrv ptr
                                1191 ;
                                1191 ;                ...
                                1191 ;
                                1191 ;                count of LBN's in last rtrv ptr
                                1191 ;                starting LBN in last rtrv ptr
                                1191 ;
                                1191 ; OUTPUTS:
                                1191 ;
                                1191 ;        R2 = WINDOW CONTROL BLOCK ADDRESS
                                1191 ;        R0,R1,R3 ALTERED
                                1191 ;        R4,R5 PRESERVED
                                1191 ;        RETURNS IN LINE ONLY IF SUCCESSFUL
                                1191 ;        FATAL ERROR IF FAIL TO ALLOCATE A WINDOW
                                1191 ;
                                1191 SIP_INIWCB:
            51    82      D0    1191          MOVL    (R2)+,R1                ;SIZE OF RETRIEVAL POINTER
   53  00000000'EF        D0    1194          MOVL    EXE$GL_SYSUCB,R3        ;SYSTEM UCB ADDRESS
       00000000'GF        16    119B          JSB     G^FIL$INIWCB            ;ALLOCATE AND INIT THE WINDOW
             01 50        E9    11A1          BLBC    R0,10$                  ;BRANCH IF FAILED
                          05    11A4          RSB
                                11A5
      51   F042 CF        9E    11A5 10$:     MOVAB   W^INIWCBERR,R1          ; ERROR INITING WINDOW CONTROL BLOCK
              004C        30    11AA          BSBW    SIP_FATAL               ;
```

```
                                    11AD          .SBTTL  ALLOCATE NON-PAGED DYNAMIC MEMORY
                                    11AD  ;++
                                    11AD  ; Functional Description:
                                    11AD  ;       This routine allocates and zeroes the specified number of
                                    11AD  ;       bytes of non-paged dynamic memory.  If the allocation fails
                                    11AD  ;       it deallocates the FIL$OPENFILE cache if has not already been
                                    11AD  ;       deallocated and tries again.
                                    11AD  ;
                                    11AD  ; Calling Sequence:
                                    11AD  ;       BSBW    SIP_ALONONPAGED
                                    11AD  ;
                                    11AD  ; Inputs:
                                    11AD  ;       R1 = Desired number of bytes to allocate
                                    11AD  ;
                                    11AD  ; Outputs:
                                    11AD  ;       R0 = Status
                                    11AD  ;       R1 = No. of bytes allocated if successful
                                    11AD  ;       R2 = Address of block allocated if successful
                                    11AD  ;            Block is zeroed
                                    11AD  ;       All other registers preserved
                                    11AD  ;--
                                    11AD
                                    11AD  SIP_ALONONPAGED:
                         3A    BB   11AD          PUSHR   #^M<R1,R3,R4,R5>            ; REMEMBER SIZE FOR RETRY
                                    11AF                                              ; SAVE OTHERS FROM MOVC5
            00000000'GF        16   11AF  10$:    JSB     G^EXE$ALONONPAGED           ; ALLOCATE NON-PAGED MEMORY
                    11 50      E8   11B5          BLBS    R0,30$                      ; BRANCH IF SUCCESSFUL
            00000000'GF        D5   11B8          TSTL    G^FIL$GQ_CACHE              ; CACHE STILL ALLOCATED?
                       13      13   11BE          BEQL    40$                         ; BRANCH IF NOT, ALLOC ERROR
                 D9'AF 00      FB   11C0          CALLS   #0,B^SIP_CACHE_DALC         ; DEALLOCATE FIL$OPENFILE CACHE
                    51 6E      D0   11C4          MOVL    (SP),R1                     ; RECOVER SIZE TO ALLOCATE
                       E6      11   11C7          BRB     10$                         ; AND TRY AGAIN
                       07      BB   11C9  30$:    PUSHR   #^M<R0,R1,R2>               ; SAVE RETURN INFO FROM MOVC5
    62    51    00    62 00    2C   11CB          MOVC5   #0,(R2),#0,R1,(R2)          ; ZERO THE ALLOCATED BLOCK
                       07      BA   11D1          POPR    #^M<R0,R1,R2>               ; RECOVER STATUS, SIZE, ADR
                    5E 04      C0   11D3  40$:    ADDL    #4,SP                       ; CLEAN OFF SAVED SIZE TO ALLOCATE
                       38      BA   11D6          POPR    #^M<R3,R4,R5>               ; RESTORE OTHER REGISTERS
                       05           11D8          RSB
                                    11D9
                                    11D9          .SBTTL  DEALLOCATE FIL$OPENFILE CACHE
                                    11D9  ;
                                    11D9  ; KERNEL MODE ROUTINE TO DEALLOCATE THE FIL$OPENFILE CACHE
                                    11D9  ;
                                    11D9  SIP_CACHE_DALC:
                     000C           11D9          .WORD   ^M<R2,R3>
         51  00000000'GF       7D   11DB          MOVQ    G^FIL$GQ_CACHE,R1           ; R1 = SIZE, R2 = ADR OF CACHE
                       0F      13   11E2          BEQL    10$                         ; BRANCH IF NOT PRESENT
            00000000'GF        7C   11E4          CLRQ    G^FIL$GQ_CACHE              ; DISABLE THE CACHE
                    50 52      D0   11EA          MOVL    R2,R0
            00000000'GF        16   11ED          JSB     G^EXE$DEANONPGDSIZ          ; DEALLOCATE FIL$OPENFILE CACHE
                    50 00'     D0   11F3  10$:    MOVL    S^#SS$_NORMAL,R0            ; INDICATE SUCCESSFUL COMPLETION
                       04           11F6          RET
```

```
                        11F7         .SBTTL  SIP ERROR/MESSAGE OUTPUT
                        11F7   ;++
                        11F7   ; FUNCTIONAL DESCRIPTION:
                        11F7   ;
                        11F7   ;       THIS MODULE IS CALL TO DISPLAY AN ERROR FOR THE
                        11F7   ;       SYSTEM INITIALIZATION PROCESS.
                        11F7   ;
                        11F7   ; CALLING SEQUENCE:
                        11F7   ;
                        11F7   ;       BSB     SIP_FATAL                       ; DISPLAY ERROR AND EXIT
                        11F7   ;       BSB     SIP_SYSMSG                      ; TO DISPLAY A SYSTEM ERROR AND RETURN
                        11F7   ;       BSB     SIP_ROMSG                       ; TO DISPLAY AN ERROR WITH VALUE IN RO
             2F   10    11F7           BSB     SIP_TYPOUT                      ; TYPE OUT A MESSAGE
                        11F9   ;
                        11F9   ; INPUT PARAMETERS:
                        11F9   ;
                        11F9   ; FOR SIP_FATAL AND SIP_SYSMSG:
                        11F9   ;
                        11F9   ;       R0 IS ERROR CODE
                        11F9   ;       R1 IS ADDRESS OF COUNTED MESSAGE STRING
                        11F9   ;
                        11F9   ; CALL AT SIP_TYPOUT WITH:
                        11F9   ;
                        11F9   ;       R0 = BYTE COUNT
                        11F9   ;       R1 = ADDRESS OF STRING
                        11F9   ;
                        11F9   ; OUTPUT PARAMETERS:
                        11F9   ;
                        11F9   ;       THE MESSAGE IS DISPLAYED AND AN IMAGE EXIT IS EFFECTED IF
                        11F9   ;       ENTERED AT SIP_FATAL.
                        11F9   ;--
                        11F9   ;
                        11F9   SIP_FATAL:
             50   DD    11F9           PUSHL   R0                              ; SAVE ERROR
             07   10    11FB           BSB     SIP_SYSMSG                      ; OUTPUT MESSAGE
00000000'9F  01   FB    11FD           CALLS   #1,@#SYS$EXIT                   ; TAKE EXIT WITH STATUS
                        1204   ;
                        1204   ;
                        1204   ; ROUTINE TO PRINT MESSAGE WITH SYSTEM ERROR CODE
                        1204   ;
                        1204
                        1204   SIP_SYSMSG:
             05   BB    1204           PUSHR   #<^M<R0,R2>>                    ; SAVE ARGUMENT AND A REGISTER
             51   DD    1206           PUSHL   R1                              ; PUSH ADDRESS OF THE TEXT STRING
    52  013A'CF   DE    1208           MOVAL   W^SIP_Q_LINBUF+2,R2             ; GET THE BUFFER DESCRIPTOR
        72   62   B0    120D           MOVW    (R2),-(R2)                      ; SET BUFFER LENGTH
             62   7F    1210           PUSHAQ  (R2)                            ; ADDRESS OF BUFFER DESCRIPTOR
             62   3F    1212           PUSHAW  (R2)                            ; PLACE TO RETURN LENGTH
        EE58 CF   9F    1214           PUSHAB  W^FAOERR                        ; FORMAT STRING
00000000'9F  05   FB    1218           CALLS   #5,@#SYS$FAO                    ; FORMAT THE MESSAGE
        50   62   3C    121F           MOVZWL  (R2),R0                         ; GET LENGTH
    51   04  A2   D0    1222           MOVL    4(R2),R1                        ; BUFFER ADDRESS
             04   BA    1226           POPR    #^M<R2>                         ; RESTORE CALLER R2
                        1228                                                   ; FALL INTO TYPE OUT
                        1228
                        1228   SIP_TYPOUT:                                     ;
             03   BB    1228           PUSHR   #^M<R0,R1>                      ; SAVE BUFFER AND COUNT
```

```
                  122A              $ASSIGN_S  W^SIP_Q_TTNAME,W^SIP_L_TTCHAN ; ASSIGN A CHANNEL TO TERMINAL
34 50     E9      123B              BLBC    R0,30$                          ; BR IF ERROR ASSIGNING CHANNEL
   03     BA      123E              POPR    #^M<R0,R1>                      ; RESTORE COUNT AND BUFFER
                  1240              $QIOW_S #0,W^SIP_L_TTCHAN,-             ; EVENT FLAG 0, TERMINAL CHANNEL
                  1240                      #IO$_WRITEVBLK,-                ; WRITE OPERATION
                  1240                      ,,,-                            ; NO I/O STATUS,AST ADDRESS OR PARAMETER
                  1240                      (R1),R0,-                       ; BUFFER ADDRESS IN R1,R0 CONTAINS COUNT
                  1240                      #0,#32                          ; NULL PARAMETER PLUS CARRAIGE CONTROL
10 50     E9      125F              BLBC    R0,30$                          ; BR IF ERROR WRITING TERMINAL
                  1262              $DASSGN_S W^SIP_L_TTCHAN                ; REMOVE TERMINAL ASSIGNMENT
01 50     E9      126E              BLBC    R0,30$                          ; BR ON DEASSIGN ERROR
          05      1271              RSB                                     ; RETURN TO CALLER
                  1272      30$:    $CMKRNL_S B^100$                        ; GET TO KERNEL MODE
                  127E      ;
                  127E      ; FATAL ERROR ROUTINE
                  127E      ;
        0000      127E      100$:   .WORD   0                               ; ERROR ATTEMPTING OUTPUT TO TERMINAL
                  1280              BUG_CHECK  SYSTRMERR,FATAL              ; REPORT FATAL ERROR
```

```
                        1284          .SBTTL  SIP_SETTIME  -  SET SYSTEM TIME TO CORRECT VALUE AT STARTUP
                        1284  ;++
                        1284  ; FUNCTIONAL DESCRIPTION:
                        1284  ;
                        1284  ;       THIS ROUTINE CALLS THE LOADABLE, CPU-DEPENDENT ROUTINE, EXE$INIT_TODR,
                        1284  ;       TO INITIALIZE THE TIME-OF-DAY REGISTER AND SYSTEM TIME.
                        1284  ;
                        1284  ; INPUT PARAMETERS:
                        1284  ;
                        1284  ;       NONE
                        1284  ;
                        1284  ; IMPLICIT INPUTS:
                        1284  ;
                        1284  ;       TIME-OF-DAY PROCESSOR CLOCK.
                        1284  ;
                        1284  ; OUTPUT PARAMETERS:
                        1284  ;
                        1284  ;       R0,R1 - DESTROYED
                        1284  ;
                        1284  ; IMPLICIT OUTPUTS:
                        1284  ;
                        1284  ;       EXE$GQ_SYSTIME - SET TO CURRENT TIME IN 100 NANOSECOND UNITS SINCE
                        1284  ;                        17-NOV-1858  00:00:00.
                        1284  ;
                        1284  ;--
                        1284
                        1284 SIP_SETTIME:                                   ; SET CORRECT TIME
                0000    1284          .WORD   0                             ; ENTRY MASK
      00000000'EF  16   1286          JSB     EXE$INIT_TODR                 ; CALL CPU-DEPENDENT ROUTINE
         50   00'  3C   128C          MOVZWL  S^#SS$_NORMAL,R0              ; INDICATE SUCCESS
                   04   128F          RET                                   ;
                        1290
                        1290          .END    SIP_START
```

```
                                                         B  4
SYSINIT                        - SYSTEM INITIALIZATION PROCESS          16-SEP-1984 02:10:02  VAX/VMS Macro V04-00        Page  58
Symbol table                                                             5-SEP-1984 04:04:48  [SYSINI.SRC]SYSINIT.MAR;1        (28)

$$.TAB                    = 0000007C R      04      DMP$L_SYSVER              = 00000064
$$.TABEND                 = 000000CC R      04      DMP$S_PAGCNT              = 00000018
$$.TMP                    = 00000000                DMP$V_EMPTY               = 00000001
$$.TMP1                   = 00000001                DMP$V_OLDDUMP             = 00000000
$$.TMP2                   = 000000CF                DMP$V_PAGCNT              = 00000000
$$T1                      = 00000001                DMP$W_DUMPVER             = 00000006
ACPINIERR                   0000010F R      02      DMP$W_FLAGS               = 00000004
ATR$C_ASCNAME             = 00000010                DSC$K_CLASS_S               ********   X   04
ATR$S_ASCNAME             = 00000056                DSC$K_DTYPE_T               ********   X   04
BOO$GL_SPTFREH              ********   X    02      DVI$_FULLDEVNAM           = 000000E8
BOO$GL_SPTFREL              ********   X    02      EMB$B_BUFIND              = FFFFFFFE
BOO$IMAGE_ATT               00000D85 RG     02      EMB$B_VALID               = FFFFFFFF
BOO$INITPAGFIL              ********   X    02      EMB$K_LENGTH              = 00000004
BOO$INITSWPFIL              ********   X    02      EMB$L_CR_CODE             = 000000F4
BOO$L_DMP_MAP             = 00000020                EMB$W_SIZE                = FFFFFFFC
BOO$L_DMP_SIZE            = 0000001C                ERL$ALLOCEMB                ********   X   02
BOO$L_DMP_VBN             = 00000018                ERL$B_BUSY                = 00000000
BUG$_OPERATOR               ********   X    02      ERL$B_MSGCNT              = 00000001
BUG$_SYSTRMERR              ********   X    02      ERL$COLDSTART               ********   X   02
CCB$L_UCB                 = 00000000                ERL$C_LENGTH              = 0000000C
CHECK_CACHE                 00000F04 R      02      ERL$GL_SEQUENCE             ********   X   02
CLU$GB_QDISK                ********   X    04      ERL$L_END                 = 00000008
CLU$GL_CLUB                 ********   X    02      ERL$L_NEXT                = 00000004
CLUB$L_CLUDCB             = 000000B4                ERL$RELEASEMB               ********   X   02
CLUB$L_FLAGS              = 0000001C                ERROR                       0000C[illegible] R     02
CLUB$M_INIT               = 00080000                EXE$ALONONPAGED             *****[illegible] X   02
CLUB$Q_NEWTIME            = 00000094                EXE$DEANONPGDSIZ            ***[illegible]   X   02
CLUB$Q_NEWTIME_REF        = 0000009C                EXE$GL_BOOTCB               **[illegible]      02
CLUB$T_QDNAME             = 000000B8                EXE$GL_FLAGS                *[illegible]       02
CLUB$V_CLUSTER            = 00000000                EXE$GL_SAVEDUMP             **[illegible]      [illegible]
CLUDCB$L_QFLBN            = 0000001C                EXE$GL_STATIC_FLAGS         *[illegible]       02
CLUDCB$L_TQE              = 00000014                EXE$GL_SYSID_LOCK           ***[illegible]   X   02
CLUDCB$L_UCB              = 0000000C                EXE$GL_SYSMSG               ***[illegible]** X   02
CLUDCB$M_QS_READY         = 00000002                EXE$GL_SYSUCB               ********   X   02
CLUDCB$S_DISK_QUORUM      = 00000010                EXE$GQ_SYSTIME              ********   X   02
CLUDCB$W_STATE            = 00000020                EXE$GT_STARTUP              ********   X   04
CMNSYS                      00000309 R      02      EXE$INIT_TODR               ********   X   02
CNX$DISK_CHANGE             ********   X    02      EXE$INSTIMQ                 ********   X   02
CREERREND                   000001EC R      04      EXE$SETIME_INT              ********   X   02
CRELNMERR                   00000095 R      02      EXE$SYS_SECTION             ********   X   02
CRELNM_DONE                 0000063A R      02      EXE$V_PAGFILDMP             ********   X   02
CRELNM_FATAL                00000632 R      02      EXE$V_SAVEDUMP              ********   X   02
CREPRCERR                   000001C4 R      04      EXE$V_SYSPAGING             ********   X   02
CREPRCNAM                   000001DD R      04      EXE$V_SYSUAFALT             ********   X   02
CTL$GL_CCBBASE              ********   X    02      EXE$V_XQP_RESIDENT          ********   X   02
CTL$GL_PCB                  ********   X    02      EXEC_MODE                   0000042B R     02
CTL$GL_RMSBASE              ********   X    02      FAB$C_BID                 = 00000003
DEV$M_CLU                 = 00000001                FAB$C_BLN                 = 00000050
DEV$M_FOR                 = 01000000                FAB$C_FIX                 = 00000001
DEV$M_MNT                 = 00080000                FAB$C_SEQ                 = 00000000
DIR...                    = 00000001                FAB$L_ALQ                 = 00000010
DMP$C_MEMDSCSIZ           = 00000008                FAB$L_FOP                 = 00000004
DMP$C_NMEMDSC             = 00000008                FAB$L_STV                 = 0000000C
DMP$L_CHECK               = 00000068                FAB$V_CHAN_MODE           = 00000002
DMP$L_CRASHERL            = 0000006C                FAB$V_FILE_MODE           = 00000004
DMP$L_ERRSEQ              = 00000000                FAB$V_GET                 = 00000001
DMP$L_MEMDSC              = 00000024                FAB$V_LNM_MODE            = 00000000
```

```
                                                     C  4
SYSINIT                         - SYSTEM INITIALIZATION PROCESS        16-SEP-1984 02:10:02  VAX/VMS Macro V04-00         Page  59
Symbol table                                                            5-SEP-1984 04:04:48  [SYSINI.SRC]SYSINIT.MAR;1         (28)

FAB$V_UFO                  = 00000011                   LOCKERR                    00000148 R     02
FAB$W_GBC                  = 00000048                   LOCK_FLAGS               = 0000005C
FAOERR                       00000070 R     02          LOCK_ID                    0000044F R     04
FID$C_MFD                  = 00000004                   LOCK_NAME                  00000453 R     04
FIL$GQ_CACHE                 ********   X   02          LOCK_NAME_DESC             00000463 R     04
FIL$GT_TOPSYS                ********   X   02          LOCK_NAME_SIZE           = 00000010
FIL$INIWCB                   ********   X   02          LOCK_STATUS                0000044B R     04
FIL$OPENFILE                 ********   X   02          LOCK_STATUS_BLOCK          0000044B R     04
FIL$OPENFILE_1               ********   X   02          MMG$GL_GPTE                ********   X   02
FILELBN                      00000000                   MMG$GL_RMSBASE             ********   X   02
FILESIZE                     00000004                   MMG$GL_SPTBASE             ********   X   02
FILOPNERR                    000001D8 R     02          MOUERR                     0000012B R     02
IAC$M_EXPREG               = 00000020                   MOUNT_SYSTEM               ********   X   02
IAC$M_MERGE                = 00000010                   MSGFILERR                  000000D9 R     02
IHD$B_HDRBLKCNT            = 00000010                   MSGFILFAB                  00000000 R     04
IHD$W_PATCHOFF             = 00000008                   MSGFILNAM                  000002CD R     02
IHD$W_SIZE                 = 00000000                   MSGFILNAMSZ              = 00000016
IHD$W_SYMDBGOFF            = 00000004                   MSGFILXAB                  00000050 R     04
IHP$L_PATCOMTXT            = 00000020                   NOERL                      000010AD R     02
IHS$L_DSTVBN               = 00000000                   NO_ATTR                    00000433 R     02
IHS$L_GSTVBN               = 00000004                   PAGFILERR                  000000BB R     02
IMAGESIZE                    0000000C                   PAGFILNAM                  000002AB R     02
IMAGEVBN                     00000008                   PCB$L_PID                = 00000060
INIKNOWNFIL                  00000286 R     02          PQL$AB_SYSPQL              ********   X   02
INIPAGFIL                    0000016D R     02          PQL$_ASTLM               = 00000001
INIWCBERR                    000001EB R     02          PQL$_BIOLM               = 00000002
IO$_ACCESS                 = 00000032                   PQL$_BYTLM               = 00000003
IO$_PACKACK                = 00000008                   PQL$_CPULM               = 00000004
IO$_READLBLK               = 00000021                   PQL$_DIOLM               = 00000005
IO$_READVBLK               = 00000031                   PQL$_ENQLM               = 0000000C
IO$_WRITELBLK              = 00000020                   PQL$_FILLM               = 00000006
IO$_WRITEVBLK              = 00000030                   PQL$_JTQUOTA             = 0000000E
IOC$LOCK_DEV                 ********   X   02          PQL$_LISTEND             = 00000000
IOSIZE                     = 0000007F                   PQL$_PGFLQUOTA           = 00000007
ISD$L_FLAGS                = 00000008                   PQL$_PRCLM               = 00000008
ISD$L_VBN                  = 0000000C                   PQL$_TQELM               = 00000009
ISD$M_DZRO                 = 00000004                   PQL$_WSDEFAULT           = 0000000B
ISD$M_FIXUPVEC             = 00000400                   PQL$_WSQUOTA             = 0000000A
ISD$M_GBL                  = 00000001                   PR$_IPL                  = 00000012
ISD$M_VECTOR               = 00020000                   PRT$C_UR                 = 0000000F
ISD$V_CRF                  = 00000001                   PRT$C_URKW               = 0000000E
ISD$W_PAGCNT               = 00000002                   PSL$C_EXEC               = 00000001
ISD$W_SIZE                 = 00000000                   PTE$V_PROT               = 0000001B
LCK$GB_STALLREQS             ********   X   02          QIO_RQLB                   00001111 R     02
LCK$K_CRMODE               = 00000001                   QIO_RWVB                   000010B7 R     02
LCK$K_EXMODE               = 00000005                   QIO_RWVB_BUF               0000000C
LCK$M_CVTSYS               = 00000040                   QIO_RWVB_BYTCNT            00000010
LCK$M_NOQUEUE              = 00000004                   QIO_RWVB_CHAN              00000018
LCK$M_SYNCSTS              = 00000008                   QIO_RWVB_FUNC              00000014
LCK$M_SYSTEM               = 00000010                   QIO_RWVB_MAP               00000008
LNM$M_CONCEALED            = 00000100                   QIO_RWVB_VBN               00000004
LNM$M_TERMINAL             = 00000200                   RESTOREREL                 00000FFC R     02
LNM$_ATTRIBUTES            = 00000003                   RMSFILNAM                  000002C5 R     02
LNM$_STRING                = 00000002                   RMSMAPERR                  000001A7 R     02
LNM_FILE_DEV                 00000315 R     02          RPB$C_MEMDSCSIZ          = 00000008
LNM_SYSTEM_DESC              00000329 R     02          RPB$C_NMEMDSC            = 00000008
LOCKDOWN                     ********   X   02          RTRVLEN                    00000010
```

```
                                                              D  4
SYSINIT                          - SYSTEM INITIALIZATION PROCESS       16-SEP-1984 02:10:02  VAX/VMS Macro V04-00         Page  60
Symbol table                                                            5-SEP-1984 04:04:48  [SYSINI.SRC]SYSINIT.MAR;1        (28)

RTRVPTRS                           00000014                SIP_Q_FIBDESC                 0000000C R      02
SAVABS...                        = 0000001C                SIP_Q_LINBUF                  00000138 R      04
SCH$GL_CURPCB                      ********    X   02      SIP_Q_PRVMSK                  00000068 R      02
SCH$IOLOCKW                        ********    X   02      SIP_Q_RETADR                  000000E0 R      04
SCH$IOUNLOCK                       ********    X   02      SIP_Q_RTRVBUF                 000000F8 R      04
SCS$GB_SYSTEMID                    ********    X   02      SIP_Q_SPIMAGE                 00000049 R      02
SCS$GB_SYSTEMIDH                   ********    X   02      SIP_Q_SPINPUT                 000001EC R      04
SEC$M_GBL                        = 00000001                SIP_Q_SPOUTPUT                0000002F R      02
SEC$M_PERM                       = 00004000                SIP_Q_SPOUTXDT                0000003C R      02
SEC$M_SYSGBL                     = 00008000                SIP_Q_STARTUP                 00000020 R      02
SEC$V_RESIDENT                   = 0000000D                SIP_Q_STATBLK                 000000F0 R      04
SGN$GL_MAXGPGCT                    ********    X   02      SIP_Q_TMPDESC                 000000E8 R      04
SGN$GW_SWPFILES                    ********    X   02      SIP_Q_TTNAME                  00000000 R      02
SIP_ALONONPAGED                    000011AD R      02      SIP_SETTIME                   00001284 R      02
SIP_A_ATRLIST                      00000014 R      02      SIP_START                     00000477 R      02
SIP_A_ERLBUFFER                    00000000 R      03      SIP_START_QUORUM_TIMER        00000C45 R      02
SIP_A_FIB                          000000CC R      04      SIP_SYSMSG                    00001204 R      02
SIP_A_FILATT                       00000128 R      04      SIP_TYPOUT                    00001228 R      02
SIP_A_FILEHDR                    = 00000200 R      03      SIP_T_LINBUF                  00000140 R      04
SIP_A_INDEXFHDR                  = 00000000 R      03      SIP_XQP_MERGE                 00000C69 R      02
SIP_A_NAMES                        000002E3 R      02      SS$_BADIMGHDR                 ********    X   02
SIP_A_OPENARG                      00000104 R      04      SS$_ENDOFFILE                 ********    X   02
SIP_CACHE_DALC                     000011D9 R      02      SS$_INSFWSL                   ********    X   02
SIP_CLUSTER_INIT                   00000A04 R      02      SS$_NORMAL                    ********    X   02
SIP_CLU_MSG                        00000263 R      02      SS$_NOSUCHFILE                ********    X   02
SIP_CLU_TIMOUT                     000004E9 R      04      STAC_IMAGE                    0000046B R      04
SIP_C_DUMPVER                    = 00000002                STAC_OPER                     00000480 R      04
SIP_C_FIB_SIZE                   = 00000010                STAC_PRC                      00000496 R      04
SIP_C_LINBUFSIZ                  = 00000084                STAC_PRV_MSK                  0000048E R      04
SIP_C_MINPAGFIL                  = 000001C4                STAC_QLIST                    000004A7 R      04
SIP_FATAL                          000011F9 R      02      STATBLK                       00000000
SIP_GET_SYSID_LOCK                 0000099E R      02      SWP$GW_SWPINC                 ********    X   02
SIP_GET_TOPSYS                     000007A7 R      02      SWPFILNAM                     000002B8 R      02
SIP_IMAGE_ATT                      00000D49 R      02      SYS$ASSIGN                    ********   GX   02
SIP_INITPAGFIL                     00000DE6 R      02      SYS$CLREF                     ********   GX   02
SIP_INITRMS                        00000F59 R      02      SYS$CMEXEC                    ********   GX   02
SIP_INITSWPFIL                     00000F14 R      02      SYS$CMKRNL                    ********   GX   02
SIP_INIWCB                         00001191 R      02      SYS$CRELNM                    ********   GX   02
SIP_KERNELRTN                      00000DB9 R      02      SYS$CREPRC                    ********   GX   02
SIP_LOOKUP_QFILE                   00000B25 R      02      SYS$CRMPSC                    ********   GX   02
SIP_L_DSKCHAN                      00000134 R      04      SYS$DASSGN                    ********   GX   02
SIP_L_ERRSEQ                       00000124 R      04      SYS$ENQW                      ********   GX   02
SIP_L_PAGATT                       00000128 R      04      SYS$EXIT                      ********    X   02
SIP_L_RMSATT                       00000130 R      04      SYS$EXPREG                    ********   GX   02
SIP_L_RTRVLEN                      00000100 R      04      SYS$FAO                       ********    X   02
SIP_L_SWPATT                       0000012C R      04      SYS$GETDVIW                   ********   GX   02
SIP_L_TTCHAN                       000000DC R      04      SYS$GETMSG                    ********   GX   02
SIP_MAPXQP                         00000CAA R      02      SYS$IMGACT                    ********   GX   02
SIP_QD_CHAN                        000004F1 R      04      SYS$IMGFIX                    ********   GX   02
SIP_QD_DESCR                       000004FD R      04      SYS$OPEN                      ********   GX   02
SIP_QD_IOSB                        000004F5 R      04      SYS$QIOW                      ********   GX   02
SIP_QD_ITMLST                      00000575 R      04      SYS$SETIME                    ********   GX   02
SIP_QD_STATBUF                     000004F5 R      04      SYS$SETIMR                    ********   GX   02
SIP_QF_BUFFER                      00000521 R      04      SYS$TRNLNM                    ********   GX   02
SIP_QF_DESCR                       00000505 R      04      SYS$WAITFR                    ********   GX   02
SIP_QF_NAME                        0000050D R      04      SYSID_LOCK_ERR                00000236 R      02
SIP_QF_NAME_SIZE                 = 00000014                SYSUAFALT                     00000414 R      02
```

```
SYSUAFALT_LEN                  = 00000009                      XQPNAMSIZ                      = 00000016
SYSUAF_DESC                      0000041D R       02           XQP_DEF                          00000224 R       04
SYSUAF_ITMLST                    00000467 R       02           XQP_GSDNAM                       000001F4 R       04
SYS_COMMON                       0000033B R       02           XQP_GSDNAM_SIZ                 = 0000000A
SYS_COMMON_DESC                  00000346 R       02           XQP_GSD_DESC                     000001FE R       04
SYS_COMMON_ITMLST                00000585 R       04           XQP_HEADER                       0000024B R       04
SYS_COMMON_LENGTH              = 0000000B                      XQP_INADDR                       0000023B R       04
SYS_DISK_DESC                    000003B9 R       02           XQP_NAME                         00000206 R       04
SYS_ID                           0000045D R       04           XQP_RETADDR                      00000243 R       04
SYS_MESSAGE                      00000358 R       02
SYS_MESSAGE_DESC                 0000036C R       02
SYS_MESSAGE_ITMLST               00000437 R       02
SYS_MESSAGE_LEN                = 00000014
SYS_SHARE                        0000037F R       02
SYS_SHARE_DESC                   00000393 R       02
SYS_SHARE_ITMLST                 00000447 R       02
SYS_SHARE_LEN                  = 00000014
SYS_SYSDEVICE_ATTR               000005BD R       04
SYS_SYSDEVICE_DESC               000003A4 R       02
SYS_SYSDEVICE_DEV                000005B1 R       04
SYS_SYSDEVICE_DEV_LEN            000005AD R       04
SYS_SYSDEVICE_DVI_LST            000005C1 R       04
SYS_SYSDEVICE_ITMLST             000005A1 R       04
SYS_SYSROOT_CMNSYS               00000595 R       04
SYS_SYSROOT_CMNSYS_LEN           00000591 R       04
SYS_SYSROOT_DESC                 000003C9 R       02
SYS_SYSROOT_ITMLST               000005D1 R       04
SYS_SYSROOT_TOPSYS               000005E1 R       04
SYS_SYSROOT_TOPSYS_LEN           000005DD R       04
SYS_SYSTEM                       000003DC R       02
SYS_SYSTEM_DESC                  000003F0 R       02
SYS_SYSTEM_ITMLST                00000457 R       02
SYS_SYSTEM_LEN                 = 00000014
SYS_TOPSYS_DESC                  00000402 R       02
SYS_TOPSYS_DIRNAM                00000609 R       04
SYS_TOPSYS_DIRNAM_LEN            00000605 R       04
SYS_TOPSYS_ITMLST                00000605 R       04
TERMINAL_CONCEALED_ATTR          0000042F R       02
TQE$L_TQFL                     = 00000000
UCB$L_DEVCHAR                  = 00000038
UCB$L_DEVCHAR2                 = 0000003C
UCB$L_PID                      = 0000002C
UCB$L_STS                      = 00000064
UCB$V_VALID                    = 0000000B
UCB$W_REFC                     = 0000005C
VA$V_SYSTEM                    = 0000001F
XAB$C_FHC                      = 0000001D
XAB$C_FHCLEN                   = 0000002C
XAB$L_EBK                      = 00000010
XAB$L_NXT                      = 00000004
XAB$W_FFB                      = 00000014
XDT$START                        ********   GX    00
XQP$GL_DZRO                      ********    X    02
XQP$GL_SECTIONS                  ********    X    02
XQPERR                           00000215 R       02
XQPFAB                           0000007C R       04
XQPNAM                           000002F3 R       02
```

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

PSECT name                      Allocation          PSECT No.  Attributes
----------                      ----------          ---------  ----------
.  ABS  .                       00000000  (     0.)  00 (  0.)  NOPIC   USR   CON   ABS   LCL NOSHR NOEXE NORD   NOWRT NOVEC BYTE
$ABS$                           0000001C  (    28.)  01 (  1.)  NOPIC   USR   CON   ABS   LCL NOSHR   EXE   RD     WRT NOVEC BYTE
SIP_PURE                        00001290  (  4752.)  02 (  2.)  NOPIC   USR   CON   REL   LCL NOSHR   EXE   RD   NOWRT NOVEC BYTE
SIP_RWDATA_PAGE                 00000600  (  1536.)  03 (  3.)  NOPIC   USR   CON   REL   LCL NOSHR NOEXE   RD     WRT NOVEC PAGE
SIP_RWDATA                      00000615  (  1557.)  04 (  4.)  NOPIC   USR   CON   REL   LCL NOSHR NOEXE   RD     WRT NOVEC LONG

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

Phase                    Page faults    CPU Time       Elapsed Time
-----                    -----------    --------       ------------
Initialization                    29    00:00:00.11    00:00:00.66
Command processing               140    00:00:00.72    00:00:04.10
Pass 1                           819    00:00:39.67    00:01:55.96
Symbol table sort                  0    00:00:05.04    00:00:08.74
Pass 2                           417    00:00:09.30    00:00:21.37
Symbol table output                1    00:00:00.39    00:00:01.02
Psect synopsis output              0    00:00:00.03    00:00:00.05
Cross-reference output             0    00:00:00.00    00:00:00.00
Assembler run totals            1408    00:00:55.26    00:02:31.91

The working set limit was 2550 pages.
213249 bytes (417 pages) of virtual memory were used to buffer the intermediate code.
There were 180 pages of symbol table space allocated to hold 3236 non-local and 115 local symbols.
2533 source lines were read in Pass 1, producing 38 object records in Pass 2.
97 pages of virtual memory were used to define 90 macros.

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

Macro library name                           Macros defined
------------------                           --------------
_$255$DUA28:[SYS.OBJ]LIB.MLB;1                         28
_$255$DUA28:[SYSLIB]STARLET.MLB;2                      55
TOTALS (all libraries)                                 83

3648 GETS were required to define 83 macros.

There were no errors, warnings or information messages.

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

0389 AH-BT13A-SE
VAX/VMS V4.0

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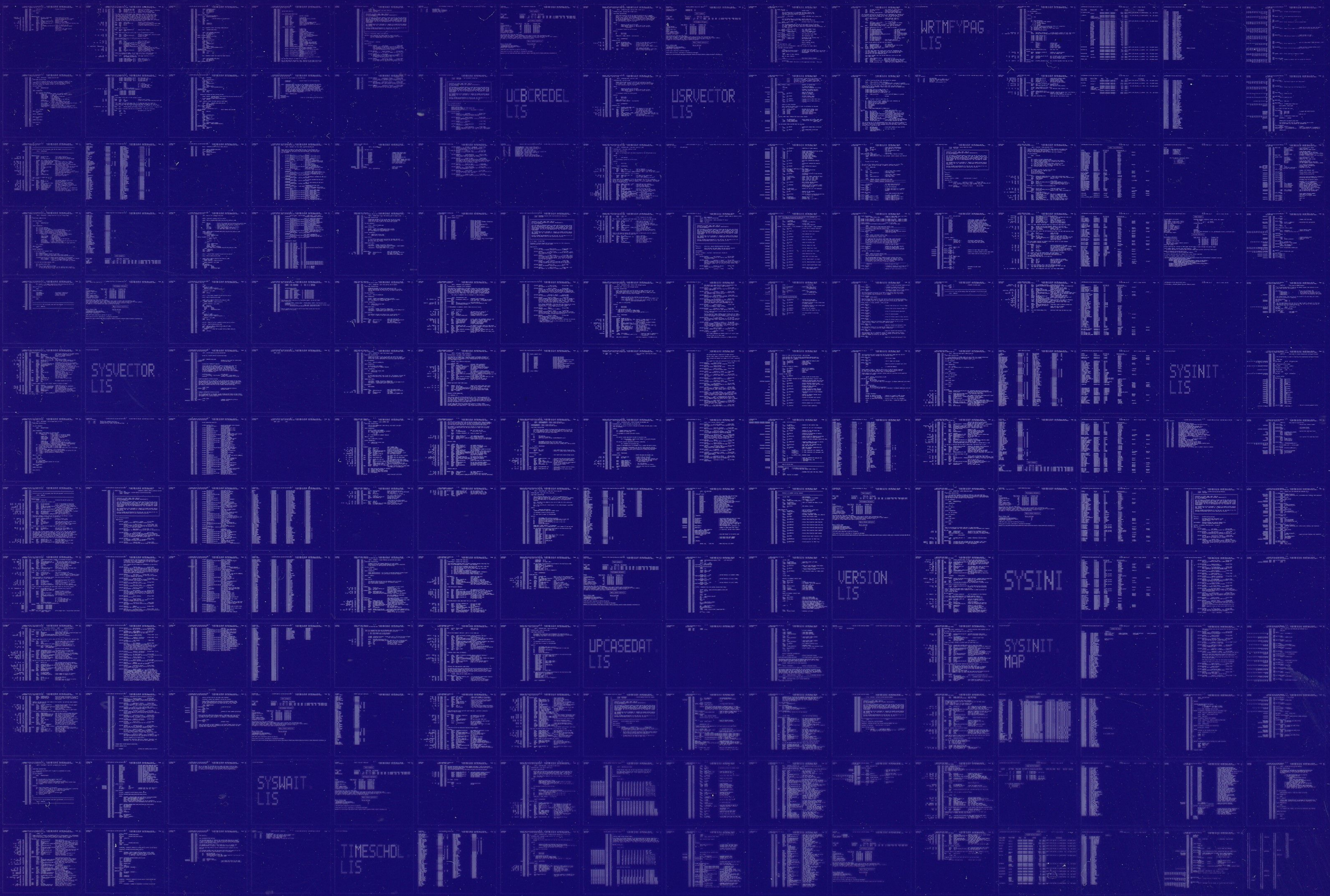

WRTMFYPAG
LIS

UCBCREDEL
LIS

USRVECTOR
LIS

SYSVECTOR
LIS

SYSINIT
LIS

VERSION
LIS

SYSINI

UPCASEDAT
LIS

SYSINIT
MAP

SYSWAIT
LIS

TIMESCHDL
LIS

0390 AH-BT13A-SE
VAX/VMS V4.0

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SYSLOA780
MAP

SYSLOA790
MAP

SCSLOA
MAP

SYSMOU
LIS

SYSLOAUV1
MAP

SYSLOAWS1
MAP

CSP
MAP

790DEF
MDL

SYSLOA

CLUSTRLOA
MAP

SYSLOA730
MAP

SYSLOA750
MAP