B 4

BOO
V03-

```
UUU         UUU  VVV         VVV        111        RRRRRRRRRRRR        000000000     MMM         MMM
UUU         UUU  VVV         VVV        111        RRRRRRRRRRRR        000000000     MMM         MMM
UUU         UUU  VVV         VVV        111        RRRRRRRRRRRR        000000000     MMM         MMM
UUU         UUU  VVV         VVV     111111        RRR         RRR  000         000  MMMMMM   MMMMMM
UUU         UUU  VVV         VVV     111111        RRR         RRR  000         000  MMMMMM   MMMMMM
UUU         UUU  VVV         VVV     111111        RRR         RRR  000         000  MMMMMM   MMMMMM
UUU         UUU  VVV         VVV        111        RRR         RRR  000         000  MMM   MMM   MMM
UUU         UUU  VVV         VVV        111        RRR         RRR  000         000  MMM   MMM   MMM
UUU         UUU  VVV         VVV        111        RRR         RRR  000         000  MMM   MMM   MMM
UUU         UUU  VVV         VVV        111        RRRRRRRRRRRR     000         000  MMM         MMM
UUU         UUU  VVV         VVV        111        RRRRRRRRRRRR     000         000  MMM         MMM
UUU         UUU  VVV         VVV        111        RRRRRRRRRRRR     000         000  MMM         MMM
UUU         UUU  VVV         VVV        111        RRR   RRR        000         000  MMM         MMM
UUU         UUU  VVV         VVV        111        RRR   RRR        000         000  MMM         MMM
UUU         UUU  VVV         VVV        111        RRR   RRR        000         000  MMM         MMM
UUU         UUU     VVV   VVV           111        RRR      RRR     000         000  MMM         MMM
UUU         UUU     VVV   VVV           111        RRR      RRR     000         000  MMM         MMM
UUU         UUU     VVV   VVV           111        RRR      RRR     000         000  MMM         MMM
UUUUUUUUUUUUUUU        VVV           111111111     RRR         RRR     000000000     MMM         MMM
UUUUUUUUUUUUUUU        VVV           111111111     RRR         RRR     000000000     MMM         MMM
UUUUUUUUUUUUUUU        VVV           111111111     RRR         RRR     000000000     MMM         MMM
```

```
**FILE**ID**PQBTDRIVR                                                    B 12
```

```
PPPPPPPP      QQQQQQ    BBBBBBBB    TTTTTTTTTT  DDDDDDDD    RRRRRRRR      IIIIII    VV      VV  RRRRRRRR
PPPPPPPP      QQQQQQ    BBBBBBBB    TTTTTTTTTT  DDDDDDDD    RRRRRRRR      IIIIII    VV      VV  RRRRRRRR
PP      PP  QQ      QQ  BB      BB      TT      DD      DD  RR      RR      II      VV      VV  RR      RR
PP      PP  QQ      QQ  BB      BB      TT      DD      DD  RR      RR      II      VV      VV  RR      RR
PP      PP  QQ      QQ  BB      BB      TT      DD      DD  RR      RR      II      VV      VV  RR      RR
PP      PP  QQ      QQ  BB      BB      TT      DD      DD  RR      RR      II      VV      VV  RR      RR
PPPPPPPP    QQ      QQ  BBBBBBBB        TT      DD      DD  RRRRRRRR        II      VV      VV  RRRRRRRR
PPPPPPPP    QQ      QQ  BBBBBBBB        TT      DD      DD  RRRRRRRR        II      VV      VV  RRRRRRRR
PP          QQ  QQ  QQ  BB      BB      TT      DD      DD  RR  RR          II      VV      VV  RR  RR
PP          QQ  QQ  QQ  BB      BB      TT      DD      DD  RR  RR          II      VV      VV  RR  RR
PP          QQ    QQ    BB      BB      TT      DD      DD  RR    RR        II        VV  VV    RR    RR        ....
PP          QQ    QQ    BB      BB      TT      DD      DD  RR    RR        II        VV  VV    RR    RR        ....
PP            QQQQ  QQ  BBBBBBBB        TT      DDDDDDDD    RR      RR    IIIIII        VV      RR      RR      ....
PP            QQQQ  QQ  BBBBBBBB        TT      DDDDDDDD    RR      RR    IIIIII        VV      RR      RR      ....


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
```

```
00000001  0000          BOOT_UV1_SWITCH = 1            ; Build Micro-VAX I bootstrap emulator
00000001  0000          PQ              == 1
          0000          .NLIST  CND
          0000          .TITLE  PQBTDRIVR - QRDX BOOT DRIVER
          0000          .IDENT  'V03-006'
          0000
          0000     ;
          0000     ;****************************************************************************
          0000     ;*                                                                          *
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          0000     ;*                                                                          *
          0000     ;*                                                                          *
          0000     ;****************************************************************************
          0000     ;
          0000
          0000     ;++
          0000     ; FACILITY:     BOOTS
          0000     ;
          0000     ; ABSTRACT:
          0000     ;       This module contains the bootstrap device driver for the
          0000     ;       UDA 50 disks.
          0000     ;
          0000     ; ENVIRONMENT:  IPL 31, kernel mode, code must be PIC
          0000     ;
          0000     ; AUTHOR:  Kerbey T. Altmann,   CREATION DATE:  20-Nov-1981
          0000     ;
          0000     ; MODIFIED BY:
          0000     ;
          0000     ;       V03-006 KDM0073         Kathleen D. Morse       23-Aug-1983
          0000     ;               Added $BQODEF for use by new version of TIMEDWAIT macro.
          0000     ;
          0000     ;       V03-005 KDM0072         Kathleen D. Morse       18-Aug-1983
          0000     ;               Conditionalize assembly to build a driver for the
          0000     ;               QRDX controler.
          0000     ;
          0000     ;       V03-004 KDM0059         Kathleen D. Morse       13-Jul-1983
          0000     ;               Replace time-wait loops that use IPR TODR with the
          0000     ;               new TIMEDWAIT macro.
          0000     ;
          0000     ;       V03-003 KTA3064         Kerbey T. Altmann       03-Jul-1983
          0000     ;               Fix page boundary problem.
```

```
                 0000     61 ;
                 0000     62 ;        V03-002 KTA3059          Kerbey T. Altmann        23-Jun-1983
                 0000     63 ;                Add support for the boot device name.
                 0000     64 ;
                 0000     65 ;        V03-001 KTA3007          Kerbey T. Altmann        09-Oct-1982
                 0000     66 ;                Fix problem with setting VMB$V_SCS.
                 0000     67 ;
                 0000     68 ;--
```

```
                                     0000     70          .SBTTL  DECLARATIONS
                                     0000     71  ;
                                     0000     72  ; INCLUDE FILES:
                                     0000     73  ;
                                     0000     74
                                     0000     75          $BQODEF                                 ; Boot qio offset definitions
                                     0000     76          $BTDDEF                                 ; Boot device types
                                     0000     77          $IODEF                                  ; I/O function codes
                                     0000     78          $MSCPDEF                                ; MSCP definitions
                                     0000     79          $PRDEF                                  ; Processor registers
                                     0000     80          $PTEDEF                                 ; Page table entries
                                     0000     81          $RPBDEF                                 ; RPB offsets
                                     0000     82          $SSDEF                                  ; Status codes
                                     0000     83          $UBADEF                                 ; UBA definitions
                                     0000     84          $UBIDEF                                 ; 11/750 UBA definitions
                                     0000     85          $VADEF                                  ; Virtual addresses
                                     0000     86          $VMBARGDEF                              ; VMB argument list offsets
                                     0000     87
                                     0000     88  ;
                                     0000     89  ; EQUATED SYMBOLS:
                                     0000     90  ;
                                     0000     91
                           00000000  0000     92          UDAIP   = 0
                           00000002  0000     93          UDASA   = 2
                           00000001  0000     94          GO      = 1
                           00008000  0000     95          OWN     = 1@15
                           0000000B  0000     96          S1      = 11
                           0000000E  0000     97          S4      = 14
                                     0000    101
                                     0000    102  ;
                                     0000    103  ; OWN STORAGE:
                                     0000    104  ;
                                     0000    105
                                     0000    106  ;
                                     0000    107  ; Boot driver table entry
                                     0000    108  ;
                                     0000    109
                                     0000    122          $BOOT_DRIVER    DEVTYPE = BTD$K_UDA,-   ; Device type (QRDX)
                                     0000    123                          SIZE = UD_DRVSIZ,-      ; Driver size
                                     0000    124                          ADDR = START,-          ; Driver starting address
                                     0000    125                          ENTRY = UD_DRIVER,-     ; Driver entry point
                                     0000    126                          UNIT_INIT = UD_INIT,-   ; Driver unit init entry
                                     0000    127                          UNIT_DISC = UD_DISC,-   ; Driver disconnect entry
                                     0000    128                          DRIVRNAME = DSKDRVNAME,- ; Driver disk name
                                     0000    129                          AUXDRNAME = PRTDRVNAME,- ; Driver port name
                                     0000    130                          DEVNAME = DEVNAME       ; Boot device name
                                     0000    132
                                     0000    133  START:
                                     0000    134  DSKDRVNAME:
58 45 2E 52 45 56 49 52 44 55 44 00' 0000    135          .ASCIC  /DUDRIVER.EXE/          ; Disk class driver filename
                                 45  000C
                                 0C  0000
                                     000D    136  PRTDRVNAME:
58 45 2E 52 45 56 49 52 44 55 50 00' 000D    137          .ASCIC  /PUDRIVER.EXE/          ; Port driver filename
                                 45  0019
                                 0C  000D
                              55 44  001A    138  DEVNAME:.ASCII  /DU/                   ; Boot device name
                              001C   144         .SBTTL  QRDX Bootstrap device initialization
                              001C   146
                              001C   147 ;++
                              001C   148 ;
                              001C   149 ; Inputs:
                              001C   150 ;
                              001C   151 ;         R9 -->  RPB
                              001C   152 ;         AP -->  VMB argument list
                              001C   153 ;
                              001C   154 ; Outputs:
                              001C   155 ;
                              001C   156 ;         R0 - status code
                              001C   157 ;
                              001C   158 ;--
                              001C   159
                              001C   160 UD_INIT:
                              001C   161         .ENABLE LSB
                        01FC  001C   162         .WORD   ^M<R2,R3,R4,R5,R6,R7,R8>
                              001E   163
             50    38    DB   001E   164         MFPR    #PR$_MAPEN, R0             ; Get the mapping status
                0B 50    E8   0021   165         BLBS    R0,10$                     ; If virtual, skip some set up
                              0024   166 ;
                              0024   167 ; Set up the SYSTEMID for the local UDA.
                              0024   168 ;
           51    34 A9    D0  0024   169         MOVL    RPB$L_IOVEC(R9),R1         ; Point to iovec
               00'A1      94  0028   170         CLRB    B^<BOO$GB_UMR_DP-BOO$AL_VECTOR>(R1) ; Set for Direct Data Path
                              002B   171         ASSUME  VMB$V_LOAD_SCS EQ 0
       2C AC      01      D0  002B   172         MOVL    #1,VMB$L_FLAGS(AP)         ; Set a flag to load SCS code
                              002F   180
                              002F   181 ;
                              002F   182 ; Set up an interrupt vector.
                              002F   183 ;
    1E A9     01FC 8F     B0  002F   184 10$:    MOVW    #<127*4>,RPB$W_ROUBVEC(R9) ; Use the highest possible
         57     54 A940   D0  0035   210         MOVL    RPB$L_CSRPHY(R9)[R0],R7 ; Get correct address of device CSR
         52     0150'CF   9E  003A   211         MOVAB   W^INTTBL,R2             ; Get the address of the init table
02 A2    52   FF000000 8F  CB  003F   212         BICL3   #^C<^XFFFFFF>,R2,2(R2)  ; Start address of init table into tbl
                              0048   213                                         ; transfer only 24 bits
                12 50     E9  0048   214         BLBC    R0,15$                  ; If clr, then physical address
     51    52    15   09  EF  004B   215         EXTZV   #VA$V_VPN,#VA$S_VPN,R2,R1 ; Convert VA to virtual page number
           51    50 B941  D0  0050   216         MOVL    @RPB$L_SVASPT(R9)[R1],R1 ; Get the physical page number
  02 A2    15    09   51  F0  0055   217         INSV    R1,#VA$V_VPN,#VA$S_VPN,2(R2) ; Set physical address of init tbl
                      0F  11  005B   218         BRB     20$                     ;
24 AC    57   FFFC0000 8F  CB  005D   219 15$:    BICL3   #^C<^X3FFFF>,R7,-       ; Low 18 bits is CSR of boot device
                              0066   220                 VMB$B_SYSTEMID(AP)      ;
      28 AC     8000 8F   B0  0066   221         MOVW    #^x3000,VMB$B_SYSTEMID+4(AP);
          02 A2      10'  C0  006C   222 20$:    ADDL2   S^#<RING-INTTBL>,2(R2)  ; Finally get real phys adr of ring
          58    02 A7     B0  0070   223         MOVW    UDASA(R7),R8            ; Controller online?
                     06   12  0074   224         BNEQ    21$                     ; Br if no, initialize controller
                   00BE   30  0076   225         BSBW    SET_CONTROLLER_CHARS    ; Set controller characteristics
                  71 50   E8  0079   226         BLBS    R0,40$                  ; continue if success
                              007C   227 21$:                                    ; If failure, re init once
                              007C   229 ;
                              007C   230 ; Now go thru the ridiculously complicated startup sequence.  This is a
                              007C   231 ; fugue in four parts.
                              007C   232 ;
             58    02     D0  007C   233         MOVL    #2,R8                   ; Make two tries at this
        53    0150'CF     9E  007F   234 RETRY:  MOVAB   W^INTTBL, R3
```

```
          52      0B   D0  0084            MOVL    #S1, R2                  ; Step flag
                  67   B4  0087            CLRW    UDAIP(R7)                ; Poke the controller's CSR
                           0089  ;
                           0089  ; Wait 10 seconds
                           0089  ;
                           0089  TIME:     TIMEDWAIT TIME=#1000*1000,-      ; Wait for 10 seconds
                           0089                    INS1=<MOVW      UDASA(R7),R4>,- ; Check the status register
                           0089                    INS2=<BLSS      25$>,- ; Bit 15 set is the error indicator
                           0089                    INS3=<BBS       R2,R4,25$>,- ; Done with this step?
                           0089                    DONELBL=25$              ; Label for exiting wait loop
               0D 50   E8  00BC            BLBS    R0,26$                   ; Br if not timed out
                           00BF
               BD 58   F5  00BF  ERROR:    SOBGTR  R8,RETRY                 ; Try once again
      50     20D4 8F   3C  00C2            MOVZWL  #SS$_DEVINACT,R0         ; Set failure status
                       04  00C7            RET
                           00C8
             80000000      00C8  VALID:    .LONG   ^X80000000               ; Sign bit set
                           00CC
                  54   B5  00CC  26$:      TSTW    R4                       ; Check status register for error
                  EF   19  00CE            BLSS    ERROR                    ; Br if error
                           00D0
         02 A7    83   B0  00D0  30$:      MOVW    (R3)+,UDASA(R7)          ; Send the controller the next step
         B1 52    0E   F3  00D4            AOBLEQ  #S4,R2,TIME              ; Set for next step
                           00D8  ;
                           00D8  ; Initialization complete.  Write the packet address in the ring.
                           00D8  ; Writing the addresses must be deffered until this point because the
                           00D8  ; hardware zeroes the entire ring as a memory write check.
                           00D8  ;
                           00D8
        00000040'8F        C1  00D8            ADDL3   #<RSPPKT-RING>,-
    60'AF     52'AF            00DE                     B^INTTBL+2,B^RD         ; Response packet
                  0C'      C1  00E2            ADDL3   S^#<CMDPKT-RING>,-
    64'AF     52'AF            00E4                     B^INTTBL+2,B^CD         ; Command packet
                           00E8
                  4D   10  00E8            BSBB    SET_CONTROLLER_CHARS     ; Set controller characteristics
               27 50   E9  00EA            BLBC    R0,50$                   ; Exit if error
                           00ED
                           00ED  ;
                           00ED  ; Now bring the device on-line
                           00ED  ;
                           00ED
           65     01   D0  00ED  40$:      MOVL    #1,(R5)                  ; Set command ref number
    04 A5      64 A9   9A  00F0            MOVZBL  RPB$W_UNIT(R9),4(R5)     ; Put unit number in cmd packet field
        08 A5     09   9A  00F5            MOVZBL  #MSCP$K_OP_ONLIN,8(R5)   ; Set opcode to bring drive online
  52    00989680 8F    D0  00F9            MOVL    #<10000*1000>,R2         ; Set large wait time 100 secs
             00F2      30  0100            BSBW    IO                       ; Send it out
               0E 50   E9  0103            BLBC    R0,50$                   ; Br if failure
           50     08   88  0106            BISB    #8,R0                    ; Fixup success to reflect media type
   0A 01AE'CF     07   E1  0109            BBC     #MSCP$V_UF_RMVBL,W^RSPPKT+MSCP$W_UNT_FLGS,55$
           50     10   88  010F            BISB    #16,R0                   ; Fixup success to reflect removable
           05     11       0112            BRB     55$                      ;
      50     0084 8F   3C  0114  50$:      MOVZWL  #SS$_DEVOFFLINE,R0       ; Change status to unit offline
                           0119  55$:
                           0119
                  16   EF  0119            EXTZV   #MSCP$V_MTYP_D1,-
                  05       011B                     #MSCP$S_MTYP_D1,-
              01BC'CF      011C                     W^RSPPKT+ -
```

```
                 51        011F   312                MSCP$L_MEDIA_ID,R1      ; Pull out 2nd device character
        51   51  08   78   0120   313       ASHL     #8,R1,R1                ; Stick it in high byte
                 1B   EF   0124   314       EXTZV    #MSCP$V_MTYP_D0,-
                 05        0126   315                 #MSCP$S_MTYP_D0,-
            01BC'CF        0127   316                W^RSPPKT+ -
                 52        012A   317                MSCP$L_MEDIA_ID,R2      ; Pull out 1st device character
        51  4040 8F   A8   012B   318       BISW     #^X4040,R1              ; Make ASCII characters
   FEE4 CF   52  51   A9   0130   319       BISW3    R1,R2,DEVNAME           ; Set into driver name
                      04   0136   320       RET
                           0137   321
                           0137   323 ;
                           0137   324 ; small routine to use so that the controller characteristics can be set
                           0137   325 ;
                           0137   326
                           0137   327 SET_CONTROLLER_CHARS:
                           0137   328
        55  016C'CF   9E   0137   329       MOVAB    W^CMDPKT,r5                 ; Get the address of command packet
            65   01   D0   013C   330       MOVL     #1,(R5)                     ; Set command ref number
              04 A5   D4   013F   331       CLRL     4(R5)                       ; No unit
         08 A5   04   9A   0142   332       MOVZBL   #MSCP$K_OP_STCON,8(R5)      ; Set opcode to set controller chars
              0C A5   7C   0146   333       CLRQ     12(R5)                      ; Clear data area
              14 A5   7C   0149   334       CLRQ     20(R5)                      ; To stop timeouts
               009F   31   014C   335       BRW      IO_STANDARD_WAIT            ; Send it out and return
                           014F   337
                           014F   338       .DISABLE LSB
              00000150     014F   339       .=<.+1>&-2
                           0150   340 ;
                           0150   341 ; RINGS
                           0150   342 ;
                           0150   343 ;
                  8000     0150   344 INTTBL: .WORD   OWN               ; Step 1 pattern
              00000000     0152   345         .LONG   0                 ; Step 2 & 3 pattern
                  0001     0156   346         .WORD   GO
                           0158   347
             0000 0000     0158   348         .WORD   0,0               ; Reserved
                  0000     015C   349 CMDINT: .WORD   0                 ; Command status word
                  0000     015E   350 RSPINT: .WORD   0                 ; Response status word
                           0160   351 RING:
              00000000     0160   357 RD:     .LONG   0                         ; QBUS address of response ring
              00000000     0164   358 CD:     .LONG   0                         ; QBUS address of command ring
                           0168   360 ;
                  0030     0168   361         .WORD   48                ; Length of message
                  0001     016A   362         .WORD   1                 ; ID
                  0001     016C   363 CMDPKT: .WORD   1
              0000019C     016E   364         .BLKW   23                ; Full envelope
                           019C   365 ;
              000001A0     019C   366         .BLKW   2
              000001D0     01A0   367 RSPPKT: .BLKW   24
```

```
                  01D0   373         .SBTTL  QRDX Bootstrap device QIO
                  01D0   375
                  01D0   376 ;++
                  01D0   377 ;
                  01D0   378 ; Inputs:
                  01D0   379 ;
                  01D0   380 ;       R3      - base address of adapter's register space
                  01D0   381 ;       R5      - lbn for current piece of transfer
                  01D0   382 ;       R6      - contains 0
                  01D0   383 ;       R7      - address of the device's CSR
                  01D0   384 ;       R8      - size of transfer in bytes
                  01D0   385 ;       R9      - address of the RPB
                  01D0   391 ;       R10     - starting address of transfer
                  01D0   392 ;       ** R2   - PTE as address for VA in R10
                  01D0   394 ;       R11     - LBN at start of transfer
                  01D0   395 ;
                  01D0   396 ;       FUNC(AP)- I/O operation (IO$_READLBLK or IO$_WRITELBLK only)
                  01D0   397 ;       SIZE(AP)- Size of transfer in bytes
                  01D0   398 ;       MODE(AP)- Address interpretation mode (0 = physical, 1 = virtual)
                  01D0   399 ;
                  01D0   400 ; Implicit inputs:
                  01D0   401 ;
                  01D0   402 ;       RPB$W_UNIT      - RPB field containing boot device unit number
                  01D0   403 ;
                  01D0   404 ; Outputs:
                  01D0   405 ;
                  01D0   406 ;       R0 - status code
                  01D0   407 ;
                  01D0   408 ;               SS$_NORMAL      - successful transfer
                  01D0   409 ;               SS$_NOSUCHDEV   - unsupported device
                  01D0   410 ;               SS$_CTRLERR     - fatal controller error
                  01D0   411 ;
                  01D0   412 ;       R3 - must be preserved
                  01D0   413 ;
                  01D0   414 ;
                  01D0   415 ;--
                  01D0   416
        00000010  01D0   417 FUNC = 16
        00000014  01D0   418 MODE = 20
                  01D0   419
                  01D0   420 UD_DRIVER:                              ; UDA50 device driver.
                  01D0   421
                  01D0   422 ;
                  01D0   423 ; Translate the I/O function code into a device-dependent function
                  01D0   424 ; code for this disk.
                  01D0   425 ;
                  01D0   426
A0 AF    21    90 01D0   427         MOVB    #MSCP$K_OP_READ, -      ; Assume read
                  01D4   428                 CMDPKT+MSCP$B_OPCODE
20    10 AC    D1 01D4   429         CMPL    FUNC(AP),#IO$_WRITELBLK ; Check for write function
         04    12 01D8   430         BNEQ    20$                     ; No, do read
96 AF    22    90 01DA   431         MOVB    #MSCP$K_OP_WRITE, -     ; Set write function code
                  01DE   432                 CMDPKT+MSCP$B_OPCODE
A6 AF    55    D0 01DE   433 20$:    MOVL    R5,CMDPKT+MSCP$L_LBN    ; Set the logical block number
92 AF    58    D0 01E2   434         MOVL    R8,CMDPKT+MSCP$L_BYTE_CNT ; Set the byte count
92 AF    5A    D0 01E6   439         MOVL    R10,CMDPKT+MSCP$B_BUFFER ; Set the starting adr of xfer
92 AF    52    D0 01EA   440         MOVL    R2,CMDPKT+MSCP$B_BUFFER+4 ; Set the PTE if R10 is VA
```

```
                                 01EE
                                 01EE     IO_STANDARD_WAIT:
      52    000F4240 8F     D0   01EE             MOVL      #<1000*1000>,R2             ; Set minimum wait time
             54   02 A7     B0   01F5     IO:     MOVW      UDASA(R7),R4                ; Controller offline?
                     5E     12   01F9             BNEQ      ERROR1                      ; Yep, error out
    FF64 CF     8000 8F     A8   01FB             BISW      #OWN, CD+2                  ; Set controller ownership
    FF59 CF     8000 8F     A8   0202             BISW      #OWN, RD+2                  ; Ditto
                  54 67     B0   0209             MOVW      UDAIP(R7),R4                ; Tell controller to read
             54   02 A7     B0   020C             MOVW      UDASA(R7),R4                ; Any problems?
                     47     12   0210             BNEQ      ERROR1                      ; Yes
                                 0212             TIMEDWAIT TIME=R2,-                   ; loop until ready
                                 0212                       INS1=<TSTW      RD+2>,- ;
                                 0212                       INS2=<BGEQ      30$>,-
                                 0212                       DONELBL=30$
                  19 50     E9   023D             BLBC      R0,ERROR1                   ; Br if timed out
    FF1B CF     8000 8F     A8   0240             BISW      #OWN, RD+2                  ; No, set controller ownship
 50 FF5D CF     05   00     EF   0247             EXTZV     #MSCP$V_ST_MASK,#MSCP$S_ST_MASK,RSPPKT+MSCP$W_STATUS,R0
                                 024E                                                   ; Any drive errors?
                     05     13   024E             BEQL      10$                         ; Br if no
               50    01     D1   0250             CMPL      #1,R0                       ; Invalid command?
                     04     12   0253             BNEQ      ERROR1                      ; Br if no, ignore invalid command
                                 0255                                                   ; which is caused by multiple onlines
                                 0255     10$:
                                 0255
                                 0255     ;
                                 0255     ; Transfer is complete. Return with success status code.
                                 0255     ;
               50    01     3C   0255             MOVZWL    #SS$_NORMAL,R0              ; SET COMPLETION CODE
                            05   0258             RSB                                   ; AND RETURN
                                 0259
                                 0259     ;
                                 0259     ; Error occured during transfer.  Return and retry.
                                 0259     ;
                                 0259
                                 0259     ERROR1:
           50    0054 8F    3C   0259             MOVZWL    #SS$_CTRLERR,R0             ; Set failure status
                            05   025E             RSB                                   ; Return to BOOTDRIVR
```

```
                        025F           .SBTTL  QRDX Bootstrap device disconnect
                        025F
                        025F   ;++
                        025F   ; This routine disconnect the boot device after a bugcheck dump.
                        025F   ; It sends an AVAIL packet to the controller, in effect doing a
                        025F   ; dismount of the system device.  It is designed to be called
                        025F   ; only from BUGCHECK immediately after the dump has finished.
                        025F   ; It assumes virtual mapping turned on.
                        025F   ;
                        025F   ; Inputs:
                        025F   ;
                        025F   ;       R9 -->  RPB
                        025F   ;
                        025F   ; Outputs:
                        025F   ;
                        025F   ;       R0 - status code
                        025F   ;
                        025F   ;--
                        025F
                        025F   UD_DISC:
                        025F           .ENABLE LSB
                  0090  025F           .WORD   ^M<R4,R7>
                        0261
           08     9A    0261           MOVZBL  #MSCP$K_OP_AVAIL,-          ; Make drive AVAILable
      FF0E CF           0263                   CMDPKT+MSCP$B_OPCODE
  57    58 A9     D0    0266           MOVL    RPB$L_CSRVIR(R9),R7         ; Get correct address of device CSR
           82     10    026A           BSBB    IO_STANDARD_WAIT            ; Send it out
                  04    026C           RET
                        026D
             0000026D   026D   UD_DRVSIZ=.-START
                        026D
                        026D           .END
```

```
$TABLE                  = 00000000 R     02     SET_CONTROLLER_CHARS      00000137 R     03
BOO$AL_VECTOR             ********    X  03     SS$_CTRLERR             = 00000054
BOO$GB_UMR_DP             ********    X  03     SS$_DEVINACT            = 000020D4
BOOT_UV1_SWITCH         = 00000001              SS$_DEVOFFLINE          = 00000084
BQO$C_TENUSEC           = 0000003E              SS$_NORMAL              = 00000001
BQO$L_UBDELAY           = 00000042              START                     00000000 R     03
BTD$K_UDA               = 00000011              TIME                      00000089 R     03
CD                        00000164 R     03     UDAIP                   = 00000000
CMDINT                    0000015C R     03     UDASA                   = 00000002
CMDPKT                    0000016C R     03     UD_DISC                   0000025F R     03
DEVNAME                   0000001A R     03     UD_DRIVER                 000001D0 R     03
DSKDRVNAME                00000000 R     03     UD_DRVSIZ               = 0000026D
ERROR                     000000BF R     03     UD_INIT                   0000001C R     03
ERROR1                    00000259 R     03     VA$S_VPN                = 00000015
FUNC                    = 00000010              VA$V_VPN                = 00000009
GO                      = 00000001              VALID                     000000C8 R     03
INTTBL                    00000150 R     03     VMB$B_SYSTEMID            00000024
IO                        000001F5 R     03     VMB$C_ARGBYTCNT           0000003C
IO$_WRITELBLK           = 00000020              VMB$L_CI_HIPFN            00000030
IO_STANDARD_WAIT          000001EE R     03     VMB$L_FLAGS               0000002C
MODE                    = 00000014              VMB$L_HI_PFN              00000010
MSCP$B_BUFFER           = 00000010              VMB$L_LO_PFN              0000000C
MSCP$B_OPCODE           = 00000008              VMB$Q_FILECACHE           00000004
MSCP$K_OP_AVAIL         = 00000008              VMB$Q_NODENAME            00000034
MSCP$K_OP_ONLIN         = 00000009              VMB$Q_PFNMAP              00000014
MSCP$K_OP_READ          = 00000021              VMB$Q_UCODE               0000001C
MSCP$K_OP_STCON         = 00000004              VMB$V_LOAD_SCS          = 00000000
MSCP$K_OP_WRITE         = 00000022
MSCP$L_BYTE_CNT         = 0000000C
MSCP$L_LBN              = 0000001C
MSCP$L_MEDIA_ID         = 0000001C
MSCP$S_MTYP_D0          = 00000005
MSCP$S_MTYP_D1          = 00000005
MSCP$S_ST_MASK          = 00000005
MSCP$V_MTYP_D0          = 0000001B
MSCP$V_MTYP_D1          = 00000016
MSCP$V_ST_MASK          = 00000000
MSCP$V_UF_RMVBL         = 00000007
MSCP$W_STATUS           = 0000000A
MSCP$W_UNT_FLGS         = 0000000E
OWN                     = 00008000
PQ                      = 00000001   G
PR$_MAPEN               = 00000038
PRTDRVNAME                0000000D R     03
RD                        00000160 R     03
RETRY                     0000007F R     03
RING                      00000160 R     03
RPB$L_CSRPHY            = 00000054
PPB$L_CSRVIR            = 00000058
RPB$L_IOVEC             = 00000034
RPB$L_SVASPT            = 00000050
RPB$W_ROUBVEC           = 0000001E
RPB$W_UNIT              = 00000064
RSPINT                    0000015E R     03
RSPPKT                    000001A0 R     03
S1                      = 0000000B
S4                      - 0000000E
```

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

PSECT name                 Allocation          PSECT No.  Attributes
----------                 ----------          ---------  ----------
.  ABS  .                  00000000  (     0.)  00 (  0.)  NOPIC    USR    CON    ABS    LCL NOSHR NOEXE NORD   NOWRT NOVEC BYTE
$ABS$                      0000003C  (    60.)  01 (  1.)  NOPIC    USR    CON    ABS    LCL NOSHR   EXE   RD     WRT NOVEC BYTE
BOOTDRIVR_4                00000028  (    40.)  02 (  2.)  NOPIC    USR    CON    REL    LCL NOSHR   EXE   RD     WRT NOVEC BYTE
BOOTDRIVR_2                0000026D  (   621.)  03 (  3.)  NOPIC    USR    CON    REL    LCL NOSHR   EXE   RD     WRT NOVEC BYTE

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

Phase                    Page faults    CPU Time       Elapsed Time
-----                    -----------    --------       ------------
Initialization                   14    00:00:00.07    00:00:00.24
Command processing               70    00:00:00.57    00:00:01.94
Pass 1                          364    00:00:14.70    00:00:18.69
Symbol table sort                 0    00:00:02.49    00:00:02.72
Pass 2                           72    00:00:02.75    00:00:03.72
Symbol table output              10    00:00:00.11    00:00:00.13
Psect synopsis output             3    00:00:00.02    00:00:00.03
Cross-reference output            0    00:00:00.00    00:00:00.00
Assembler run totals            533    00:00:20.71    00:00:27.49

The working set limit was 1350 pages.
86032 bytes (169 pages) of virtual memory were used to buffer the intermediate code.
There were 90 pages of symbol table space allocated to hold 1567 non-local and 17 local symbols.
523 source lines were read in Pass 1, producing 16 object records in Pass 2.
24 pages of virtual memory were used to define 21 macros.

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

Macro library name                        Macros defined
------------------                        --------------
DISK$STARWORK03:[GAMACHE.UV1ROM.VMS]LIBUV1.ML       7
DISK$STARWORK03:[GAMACHE.UV1ROM.OBJ]VMB.MLB;3       4
SYS$SYSROOT:[SYSLIB]STARLET.MLB;2                   7
TOTALS (all libraries)                             18

1717 GETS were required to define 18 macros.

There were no errors, warnings or information messages.

MAC/LIS=LIS$:PQBTDRIVR/OBJ=OBJ$:PQBTDRIVR VMS$:BOOUV1SWT+VMS$:PUBTDRIVR+OBJ$:VMB/LIB+VMS$:LIBUV1/LIB
```

0430 AH-BT13A-SE
VAX/VMS V4.0

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UV1ROM

PQBTDRIVR
LIS

QVSS
LIS

SEARCHMSG
LIS

VMBUVAX1
MAP

SETUSER
LIS

VMBUVAX1
LIS

BOOTDRUV1
LIS

FILERDUV1
LIS

BOOTIOUV1
LIS

CONIO
LIS

NETBOOT
LIS