```
TTTTTTTTTTTTTTTT  RRRRRRRRRRRR        AAAAAAAAA        CCCCCCCCCCCC  EEEEEEEEEEEEEEEE
TTTTTTTTTTTTTTTT  RRRRRRRRRRRRR       AAAAAAAAA        CCCCCCCCCCCCC  EEEEEEEEEEEEEEEE
TTTTTTTTTTTTTTTT  RRRRRRRRRRRRR       AAAAAAAAA        CCCCCCCCCCCCC  EEEEEEEEEEEEEEEE
      TTT         RRR          RRR   AAA          AAA   CCC            EEE
      TTT         RRR          RRR   AAA          AAA   CCC            EEE
      TTT         RRR          RRR   AAA          AAA   CCC            EEE
      TTT         RRR          RRR   AAA          AAA   CCC            EEE
      TTT         RRR          RRR   AAA          AAA   CCC            EEE
      TTT         RRR          RRR   AAA          AAA   CCC            EEE
      TTT         RRRRRRRRRRRRR      AAA          AAA   CCC            EEEEEEEEEEEE
      TTT         RRRRRRRRRRRRR      AAA          AAA   CCC            EEEEEEEEEEEE
      TTT         RRRRRRRRRRRRR      AAA          AAA   CCC            EEEEEEEEEEEE
      TTT         RRR    RRR         AAAAAAAAAAAAAAAA   CCC            EEE
      TTT         RRR    RRR         AAAAAAAAAAAAAAAA   CCC            EEE
      TTT         RRR    RRR         AAAAAAAAAAAAAAAA   CCC            EEE
      TTT         RRR       RRR      AAA          AAA   CCC            EEE
      TTT         RRR       RRR      AAA          AAA   CCC            EEE
      TTT         RRR       RRR      AAA          AAA   CCC            EEE
      TTT         RRR          RRR   AAA          AAA      CCCCCCCCCCCC  EEEEEEEEEEEEEEEE
      TTT         RRR          RRR   AAA          AAA      CCCCCCCCCCCC  EEEEEEEEEEEEEEEE
      TTT         RRR          RRR   AAA          AAA      CCCCCCCCCCCC  EEEEEEEEEEEEEEEE
```

FILEID**TBKSTART

N 3

```
TTTTTTTTTT  BBBBBBBB    KK      KK    SSSSSSSS  TTTTTTTTTT    AAAAAA    RRRRRRRR    TTTTTTTTTT
TTTTTTTTTT  BBBBBBBB    KK      KK    SSSSSSSS  TTTTTTTTTT    AAAAAA    RRRRRRRR    TTTTTTTTTT
    TT      BB      BB  KK      KK  SS              TT      AA      AA  RR      RR      TT
    TT      BB      BB  KK      KK  SS              TT      AA      AA  RR      RR      TT
    TT      BB      BB  KK    KK    SS              TT      AA      AA  RR      RR      TT
    TT      BB      BB  KK    KK    SS              TT      AA      AA  RR      RR      TT
    TT      BBBBBBBB    KKKKKK        SSSSSS        TT      AA      AA  RRRRRRRR        TT
    TT      BBBBBBBB    KKKKKK        SSSSSS        TT      AA      AA  RRRRRRRR        TT
    TT      BB      BB  KK    KK            SS      TT      AAAAAAAAAA  RR  RR          TT
    TT      BB      BB  KK    KK            SS      TT      AAAAAAAAAA  RR  RR          TT
    TT      BB      BB  KK      KK          SS      TT      AA      AA  RR    RR        TT
    TT      BB      BB  KK      KK          SS      TT      AA      AA  RR    RR        TT
    TT      BBBBBBBB    KK      KK  SSSSSSSS        TT      AA      AA  RR      RR      TT
    TT      BBBBBBBB    KK      KK  SSSSSSSS        TT      AA      AA  RR      RR      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
```

TB
VO

Table of contents

```
0000     1          .TITLE  TBKSTART
0000     2          .IDENT  'V04-000'
0000     3
0000     4  ;******************************************************************************
0000     5  ;*                                                                            *
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0000    23  ;*                                                                            *
0000    24  ;*                                                                            *
0000    25  ;******************************************************************************
0000    26
0000    27  ;++
0000    28  ; FACILITY: TRACEBACK
0000    29  ;
0000    30  ; ABSTRACT:
0000    31  ;       START UP MODULE FOR TRACEBACK FACILITY.
0000    32  ;
0000    33  ; ENVIRONMENT:
0000    34  ;       This startup routine is invoked by the DEBUG 'bootstrap'
0000    35  ;       when DEBUG is not running and when the user image has
0000    36  ;       caused an exception serious enough to warrant a traceback.
0000    37  ;       ROUTINE BEGINHERE CALLS TBK$DO_TRACE WITH THE SAME
0000    38  ;       ARGUMENT LIST THAT CLI SENT, except that rather than
0000    39  ;       one arg being the 'transfer vector' pointer, it is
0000    40  ;       the 'traceback arg list' pointer.
0000    41  ;
0000    42  ;       MODIFIED BY:
0000    43  ;               Dale Roedger, 20 July 1978:     07
0000    44  ; REVISION HISTORY:
0000    45  ;
0000    46  ;       000001  13-JAN-78       KGP     -Built this from DEBUG's DBGSTART
0000    47  ;       000002  23-feb-78       KGP     -Final polish to make traceback
0000    48  ;                                        conform to spec.
0000    49  ;       000003  24-feb-78       KGP     -We now EXIT if the error was
0000    50  ;                                        SEVERE (FATAL), CONTINUE otherwise.
0000    51  ;       000004  28-feb-78       KGP     -A 2 longword vector is statically
0000    52  ;                                        maintained in DBGBOOT to contain the
0000    53  ;                                        mapped address of the DST so that it
0000    54  ;                                        can be used on successive TRACEs.
0000    55  ;       000005  8-mar-78        KGP     -P-sect names are now TBK... instead of
0000    56  ;                                        overlapping with DEBUG's DBG... ones.
0000    57  ;       000006  15-JUN-78       DAR     PSECT attributes are changed to correspond
```

```
0000     58 ;                                   to the new building procedure.
0000     59 ;                                   TBK$CODE and TBK$SPLIT are BYTE, NOWRT, EXE
0000     60 ;        07      20-JUL-78      DAR Redefined PSECT's again this time for
0000     61 ;                                   the /SHARE option in the linker.
0000     62 ;--
```

```
                     0000     64          .SBTTL  DECLARATIONS
                     0000     65
                     0000     66 ;+
                     0000     67 ; Invoke data definition macros.
                     0000     68 ;-
                     0000     69          $IFDDEF                     ; image file definitions
                     0000     70          $SSDEF                      ; system error codes
                     0000     71          $STSDEF                     ; signal naming field definitions
                     0000     72
                     0000     73 ;+
                     0000     74 ; Equated symbols
                     0000     75 ;-
00000100             0000     76          buf_siz         =256        ; length of getmsg, FAO, and $PUT buffers
                     0000     77
                     0000     78 ;+
                     0000     79 ; Data Declarations
                     0000     80 ;-
                     0000     81
                     0000     82 ;+
                     0000     83 ; Special vector that contains the beginning and end address of
                     0000     84 ; TRACE's writable storage area. The third value in the vector is
                     0000     85 ; the transfer address of TRACE that is in this module.
                     0000     86 ;-
                 00000000     87          .PSECT  $TBK$ABS_ZERO LONG, PIC, SHR, EXE, NOWRT
                     0000     88
00000000'            0000     89          .ADDRESS writable_stor          ; lowest writable storage location
000001FF'            0004     90          .ADDRESS writable_stor + ^X1FF  ; highest writable location
00000002'            0008     91          .LONG    beginhere+2            ; start address of mapped TRACEBACK
                     000C     92
                 00000000     93          .PSECT  TBK$GLOBAL  LONG, PIC, NOSHR, NOEXE
                     0000     94
                     0000     95 writable_stor:
```

```
0000     97          .sbttl  beginhere       - called by DBGBOOT
0000     98
0000     99  ;++
0000    100  ; FUNCTIONAL DESCRIPTION:
0000    101  ;       This routine supplies the interface between the DEBUG
0000    102  ;       bootstrap and the BLISS routines which actually DO
0000    103  ;       TRACEBACK.  All we do here is accept the arguments
0000    104  ;       that we know DBGBOOT passes on, and pass them on to
0000    105  ;       TBK$DO_TRACE in the way that it expects them.
0000    106  ;
0000    107  ;       The real reason for the existence of this module is
0000    108  ;       because of the mucking with writable stor, etc, above.
0000    109  ;       This setup is copied directly from DEBUG so that the
0000    110  ;       bootstrap can invoke us in the same way it invoked DEBUG.
0000    111  ;
0000    112  ;       The argument list from CLI/DBGBOOT looks as follows:
0000    113  ;
0000    114  ;       AP --->  ----------------
0000    115  ;               |             4  |
0000    116  ;               |----------------|
0000    117  ;               |  address of    |
0000    118  ;               |  traceback     |
0000    119  ;               |   vector       |
0000    120  ;               |----------------|
0000    121  ;               | parsing info   |
0000    122  ;               |----------------|
0000    123  ;               | image header   |
0000    124  ;               |  information   |
0000    125  ;               |----------------|
0000    126  ;               |  image file    |
0000    127  ;               |  information   |
0000    128  ;               ------------------
0000    129  ;
0000    130  ;       The traceback vector contains four parameters.
0000    131  ;       They are ordered as in the picture below:
0000    132  ;
0000    133  ;               ------------------
0000    134  ;               | PC when fault  |
0000    135  ;               | occurred       |
0000    136  ;               |----------------|
0000    137  ;               | FP when fault  |
0000    138  ;               | occurred       |
0000    139  ;               |----------------|
0000    140  ;               | FP when user   |
0000    141  ;               | prog called    |
0000    142  ;               | initially      |
0000    143  ;               |----------------|
0000    144  ;               |  address of    |
0000    145  ;               | signal array   |
0000    146  ;               |----------------|
0000    147  ;               | symbol table   |
0000    148  ;               | 'begin' addr   |
0000    149  ;               |----------------|
0000    150  ;               | symbol table   |
0000    151  ;               |  'end' addr    |
0000    152  ;               ------------------
0000    153  ;
```

```
                        ;
                        ; CALLING SEQUENCE:
                        ;       CALLS #4, beginhere
                        ;
                        ; INPUTS:
                        ;       THE ARGUMENT LIST FROM CLI
                        ;
                        ; IMPLICIT INPUTS:
                        ;       NONE
                        ;
                        ; OUTPUTS:
                        ;       R0, if we decide to RESIGNAL.
                        ;
                        ; IMPLICIT OUTPUTS:
                        ;       NONE
                        ;
                        ; ROUTINE VALUE:
                        ;       WHATEVER IS IN R0
                        ;
                        ; SIDE EFFECTS:
                        ;       A TRACEback is produced.
                        ;       The decision is made as to whether to EXIT back
                        ;       to CLI or RESIGNAL the condition.
                        ;--
                        
00000000                        .PSECT  TBK$CODE BYTE, PIC, SHR, EXE, NOWRT
                        
                        beginhere::
0000 0000               .WORD   0
                        ;+
                        ; Note that the following few instructions write into the argument list
                        ; passed to this routine from CLI. This disguises the fact that DEBUG
                        ; is around.
                        ;-
                        
50   04 AC    D0        MOVL    4(AP),R0                ; Pick up address of traceback vector
      80    DD          PUSHL   (R0)+                   ; Pass on PC when fault occurred
      80    DD          PUSHL   (R0)+                   ; Pass on FP when fault occurred
      80    DD          PUSHL   (R0)+                   ; Pass on initial FP of image
      80    DD          PUSHL   (R0)+                   ; Pass on ptr to signal array
      50    DD          PUSHL   R0                      ; Pass on address of 2 longword vector
                                                        ; where symbol table mapped addresses
                                                        ; are stored across TRACE invocations.
      0C AC    DD       PUSHL   12(AP)                  ; push the address of the
                                                        ; image header information prepared
                                                        ; by the image activator.
50   10 AC    D0        MOVL    16(AP), R0              ; get the address of the image file
51   02 A0    3C        MOVZWL  ifd$w_filnamoff(R0),R1
   7E   51    50  C1    ADDL3   R0,R1,-(SP)             ; and push onto stack
   7E   08 A0   3C      MOVZWL  ifd$w_chan(R0),-(SP)    ; push the channel number also
00000000'EF    06  FB    CALLS   #6, TBK$DO_TRACEB       ; and do TRACEBACK.
                        
                        ;+
                        ; DO_TRACEB returns the same exception name we passed
                        ; it, above.  Now we force an EXIT if the condition
                        ; severity level was SEVERE (or FATAL), or return
                        ; so that the bootstrap can allow the image to CONTINUE.
```

```
                                002A   211 ; otherwise.  (by simply passing on our SS$_CONTINUE)
                                002A   212 ;-
                                002A   213
        04   50   03   00   ED  002A   214          CMPZV   #STS$V_SEVERITY,#STS$S_SEVERITY,R0,#STS$K_SEVERE
                         04   13  002F   215          BEQL    FORCE_EXIT
                   50    01   3C  0031   216          MOVZWL  #SS$_CONTINUE,R0        ; The bootstrap will arrange to have
                         04       0034   217          RET                             ;  the image continue running.
                                  0035   218
                                  0035   219 FORCE_EXIT:
         50   10000000 8F   C8  0035   220          BISL2   #^X10000000,R0          ;  Set 'already printed' bit in exception
                                  003C   221          $EXIT_S R0                      ;  name and exit with that as code.
                                  0045   222
                                  0045   223 .END    BEGINHERE
```

```
BEGINHERE                       00000000 RG    04
BUF_SIZ                       = 00000100
FORCE_EXIT                      00000035 R     04
IFD$W_CHAN                    = 00000008
IFD$W_FILNAMOFF               = 00000002
SS$_CONTINUE                  = 00000001
STS$K_SEVERE                  = 00000004
STS$S_SEVERITY                = 00000003
STS$V_SEVERITY                = 00000000
SYS$EXIT                        ********  GX   04
TBK$DO_TRACEB                   ********   X   04
WRITABLE_STOR                   00000000 R     03
```

Psect synopsis

PSECT name	Allocation	PSECT No.	Attributes
. ABS .	00000000 (0.)	00 (0.)	NOPIC USR CON ABS LCL NOSHR NOEXE NORD NOWRT NOVEC BYTE
ABS	00000000 (0.)	01 (1.)	NOPIC USR CON ABS LCL NOSHR EXE RD WRT NOVEC BYTE
TBKABS_ZERO	0000000C (12.)	02 (2.)	PIC USR CON REL LCL SHR EXE RD NOWRT NOVEC LONG
TBK$GLOBAL	00000000 (0.)	03 (3.)	PIC USR CON REL LCL NOSHR NOEXE RD WRT NOVEC LONG
TBK$CODE	00000045 (69.)	04 (4.)	PIC USR CON REL LCL SHR EXE RD NOWRT NOVEC BYTE

Performance indicators

Phase	Page faults	CPU Time	Elapsed Time
Initialization	32	00:00:00.07	00:00:01.37
Command processing	158	00:00:00.67	00:00:05.38
Pass 1	213	00:00:04.41	00:00:17.35
Symbol table sort	0	00:00:00.67	00:00:02.23
Pass 2	56	00:00:00.89	00:00:02.71
Symbol table output	3	00:00:00.03	00:00:00.03
Psect synopsis output	1	00:00:00.03	00:00:00.03
Cross-reference output	0	00:00:00.00	00:00:00.00
Assembler run totals	465	00:00:06.77	00:00:29.10

```
The working set limit was 1200 pages.
23720 bytes (47 pages) of virtual memory were used to buffer the intermediate code.
There were 30 pages of symbol table space allocated to hold 462 non-local and 0 local symbols.
223 source lines were read in Pass 1, producing 17 object records in Pass 2.
11 pages of virtual memory were used to define 10 macros.
```

Macro library statistics

Macro library name	Macros defined
_255DUA28:[SYS.OBJ]LIB.MLB;1	1
_255DUA28:[SYSLIB]STARLET.MLB;2	6
TOTALS (all libraries)	7

531 GETS were required to define 7 macros.

There were no errors, warnings or information messages.

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

0402 AH-BT13A-SE
VAX/VMS V4.0

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MAP

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LIS

TTYDEF
SDL

TTYMACS
MAR

TBKSTART
LIS