```
LLL                 IIIIIIIII     BBBBBBBBBBBB     RRRRRRRRRRRR      TTTTTTTTTTTTTTT  LLL
LLL                 IIIIIIIII     BBBBBBBBBBBB     RRRRRRRRRRRR      TTTTTTTTTTTTTTT  LLL
LLL                 IIIIIIIII     BBBBBBBBBBBB     RRRRRRRRRRRR      TTTTTTTTTTTTTTT  LLL
LLL                    III        BBB         BBB  RRR         RRR         TTT        LLL
LLL                    III        BBB         BBB  RRR         RRR         TTT        LLL
LLL                    III        BBB         BBB  RRR         RRR         TTT        LLL
LLL                    III        BBB         BBB  RRR         RRR         TTT        LLL
LLL                    III        BBB         BBB  RRR         RRR         TTT        LLL
LLL                    III        BBBBBBBBBBBB     RRRRRRRRRRRR            TTT        LLL
LLL                    III        BBBBBBBBBBBB     RRRRRRRRRRRR            TTT        LLL
LLL                    III        BBBBBBBBBBBB     RRRRRRRRRRRR            TTT        LLL
LLL                    III        BBB         BBB  RRR   RRR               TTT        LLL
LLL                    III        BBB         BBB  RRR   RRR               TTT        LLL
LLL                    III        BBB         BBB  RRR   RRR               TTT        LLL
LLL                    III        BBB         BBB  RRR      RRR            TTT        LLL
LLL                    III        BBB         BBB  RRR      RRR            TTT        LLL
LLL                    III        BBB         BBB  RRR      RRR            TTT        LLL
LLLLLLLLLLLLLLL     IIIIIIIII     BBBBBBBBBBBB     RRR         RRR         TTT        LLLLLLLLLLLLLLL
LLLLLLLLLLLLLLL     IIIIIIIII     BBBBBBBBBBBB     RRR         RRR         TTT        LLLLLLLLLLLLLLL
LLLLLLLLLLLLLLL     IIIIIIIII     BBBBBBBBBBBB     RRR         RRR         TTT        LLLLLLLLLLLLLLL
```

FILEID**LIBEMUL

```
LL              IIIIII    BBBBBBBB    EEEEEEEEEE  MM      MM  UU      UU  LL
LL              IIIIII    BBBBBBBB    EEEEEEEEEE  MM      MM  UU      UU  LL
LL                II      BB      BB  EE          MMMM  MMMM  UU      UU  LL
LL                II      BB      BB  EE          MMMM  MMMM  UU      UU  LL
LL                II      BB      BB  EE          MM  MM  MM  UU      UU  LL
LL                II      BB      BB  EE          MM  MM  MM  UU      UU  LL
LL                II      BBBBBBBB    EEEEEEEE    MM      MM  UU      UU  LL
LL                II      BBBBBBBB    EEEEEEEE    MM      MM  UU      UU  LL
LL                II      BB      BB  EE          MM      MM  UU      UU  LL
LL                II      BB      BB  EE          MM      MM  UU      UU  LL
LL                II      BB      BB  EE          MM      MM  UU      UU  LL              ....
LL                II      BB      BB  EE          MM      MM  UU      UU  LL              ....
LLLLLLLLLL      IIIIII    BBBBBBBB    EEEEEEEEEE  MM      MM  UUUUUUUUUU  LLLLLLLLLL      ....
LLLLLLLLLL      IIIIII    BBBBBBBB    EEEEEEEEEE  MM      MM  UUUUUUUUUU  LLLLLLLLLL      ....

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

Table of contents

```
0000     1          .TITLE  LIB$EMUL - Execute EMUL instruction
0000     2          .IDENT  /1-001/                 ; File: LIBEMUL.MAR Edit: SBL1001
0000     3
0000     4 ;
0000     5 ;*****************************************************************************
0000     6 ;*                                                                           *
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0000    24 ;*                                                                           *
0000    25 ;*                                                                           *
0000    26 ;*****************************************************************************
0000    27 ;
0000    28
0000    29 ;++
0000    30 ; FACILITY: General Utility Library
0000    31 ;
0000    32 ; ABSTRACT:
0000    33 ;
0000    34 ;       This module contains LIB$EMUL, which makes the VAX EMUL instruction
0000    35 ;       available as a callable procedure.
0000    36 ;
0000    37 ; ENVIRONMENT: Runs at any access mode, AST Reentrant
0000    38 ;
0000    39 ; AUTHOR: Steven B. Lionel, CREATION DATE: 8-July-1981
0000    40 ;
0000    41 ; MODIFIED BY:
0000    42 ;
0000    43 ; 1-001 - Original. SBL 8-July-1981
0000    44 ;--
```

```
                        .SBTTL  DECLARATIONS
                ;
                ; LIBRARY MACRO CALLS:
                ;
                        $SSDEF                  ; Define SS$ symbols
                ;
                ; EXTERNAL DECLARATIONS:
                ;
                        .DSABL  GBL             ; Force all external symbols to be declared
                ;       NONE
                ;
                ; MACROS:
                ;
                ;       NONE
                ;
                ; EQUATED SYMBOLS:
                ;
                ;       NONE
                ;
                ; OWN STORAGE:
                ;
                ;       NONE
                ;
                ; PSECT DECLARATIONS:
                ;
00000000        .PSECT _LIB$CODE PIC, USR, CON, REL, LCL, SHR, -
                                EXE, RD, NOWRT, LONG
                
```

```
                                        .SBTTL  LIB$EMUL - Execute EMUL instruction
                                ;++
                                ; FUNCTIONAL DESCRIPTION:
                                ;
                                ;       This procedure makes the VAX EMUL instruction available as
                                ;       a callable procedure.
                                ;
                                ;       The multiplicand argument is multiplied by the multiplier
                                ;       argument giving a double-length result.  The addend argument
                                ;       is sign-extended to double-length and added to the result, and
                                ;       then the product argument is replaced by the final result.
                                ;
                                ;       For more information, see the VAX-11 Architecture Handbook.
                                ;
                                ; CALLING SEQUENCE:
                                ;
                                ;       status.wlc.v = LIB$EMUL (multiplier.rl.r, multiplicand.rl.r,
                                ;                                addend.rl.r, product.wq.r)
                                ;
                                ; FORMAL PARAMETERS:
                                ;
00000004                        ;       multiplier = 4          ; The address of the longword integer multiplier.
                                ;
00000008                        ;       multiplicand = 8        ; The address of the longword integer multiplicand.
                                ;
0000000C                        ;       addend = 12             ; The address of the longword integer addend.
                                ;
00000010                        ;       product = 16            ; The address of a quadword integer for the
                                ;                               ; product result.
                                ;
                                ; IMPLICIT INPUTS:
                                ;
                                ;       NONE
                                ;
                                ; IMPLICIT OUTPUTS:
                                ;
                                ;       NONE
                                ;
                                ; COMPLETION STATUS:
                                ;
                                ;       SS$_NORMAL, normal successful completion
                                ;
                                ; SIDE EFFECTS:
                                ;
                                ;       NONE
                                ;
                                ;--
                                
                        4000    .ENTRY LIB$EMUL, ^M<IV>         ; Entry point
                                
10 BC   0C BC   04 BC   08 BC   7A      EMUL    @multiplicand(AP), @multiplier(AP), -
                                                @addend(AP), @product(AP)
                                
                    50  01      D0      MOVL    #SS$_NORMAL, R0         ; The EMUL can not fail
                                04      RET
                                
                                        .END                            ; End of module LIB$EMUL
```

```
ADDEND                          = 0000000C
LIB$EMUL                          00000000 RG    02
MULTIPLICAND                    = 00000008
MULTIPLIER                      = 00000004
PRODUCT                         = 00000010
SS$_NORMAL                      = 00000001
```

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
_LIB$CODE                       0000000F  (   15.)  02 (  2.)    PIC   USR   CON   REL   LCL   SHR   EXE   RD  NOWRT NOVEC LONG
```

Performance indicators

Phase	Page faults	CPU Time	Elapsed Time
Initialization	29	00:00:00.05	00:00:01.48
Command processing	102	00:00:00.28	00:00:02.20
Pass 1	179	00:00:02.41	00:00:10.72
Symbol table sort	0	00:00:00.42	00:00:02.64
Pass 2	40	00:00:00.47	00:00:03.02
Symbol table output	3	00:00:00.02	00:00:00.02
Psect synopsis output	2	00:00:00.01	00:00:00.01
Cross-reference output	0	00:00:00.00	00:00:00.00
Assembler run totals	357	00:00:03.67	00:00:20.10

```
The working set limit was 1200 pages.
19637 bytes (39 pages) of virtual memory were used to buffer the intermediate code.
There were 30 pages of symbol table space allocated to hold 412 non-local and 0 local symbols.
131 source lines were read in Pass 1, producing 12 object records in Pass 2.
8 pages of virtual memory were used to define 7 macros.
```

Macro library statistics

Macro library name	Macros defined
_255DUA28:[SYSLIB]STARLET.MLB;2	4

```
469 GETS were required to define 4 macros.

There were no errors, warnings or information messages.

MACRO/ENABLE=SUPPRESSION/DISABLE=(GLOBAL,TRACEBACK)/LIS=LIS$:LIBEMUL/OBJ=OBJ$:LIBEMUL MSRC$:LIBEMUL/UPDATE=(ENH$:LIBEMUL)
```

LIBEMODH
LIS

LIBEMODD
LIS

LIBESTEMU
LIS

LIBEF
LIS

LIBEMULAT
LIS

LIBFFS
LIS

LIBFINCVT
LIS

LIBE2AREV
LIS

LIBFAO
LIS

LIBEMODG
LIS

LIBEXTV
LIS

LIBEDIV
LIS

LIBESTABL
LIS

LIBFFC
LIS

LIBEMODF
LIS

LIBEMUL
LIS

LIBFILSCA
LIS

LIBEXTZV
LIS

LIBEBCASC
LIS

LIBFAOL
LIS