```
MMM          MMM  TTTTTTTTTTTTTTT   HHH          HHH  RRRRRRRRRRR     TTTTTTTTTTTTTTT   LLL
MMM          MMM  TTTTTTTTTTTTTTT   HHH          HHH  RRRRRRRRRRRR    TTTTTTTTTTTTTTT   LLL
MMM          MMM  TTTTTTTTTTTTTTT   HHH          HHH  RRRRRRRRRRRR    TTTTTTTTTTTTTTT   LLL
MMMMMM    MMMMMM        TTT         HHH          HHH  RRR         RRR       TTT         LLL
MMMMMM    MMMMMM        TTT         HHH          HHH  RRR         RRR       TTT         LLL
MMMMMM    MMMMMM        TTT         HHH          HHH  RRR         RRR       TTT         LLL
MMM   MMM   MMM         TTT         HHH          HHH  RRR         RRR       TTT         LLL
MMM   MMM   MMM         TTT         HHH          HHH  RRR         RRR       TTT         LLL
MMM   MMM   MMM         TTT         HHH          HHH  RRR         RRR       TTT         LLL
MMM         MMM         TTT         HHHHHHHHHHHHHHHH  RRRRRRRRRRR           TTT         LLL
MMM         MMM         TTT         HHHHHHHHHHHHHHHH  RRRRRRRRRRRR          TTT         LLL
MMM         MMM         TTT         HHHHHHHHHHHHHHHH  RRRRRRRRRRRR          TTT         LLL
MMM         MMM         TTT         HHH          HHH  RRR   RRR             TTT         LLL
MMM         MMM         TTT         HHH          HHH  RRR   RRR             TTT         LLL
MMM         MMM         TTT         HHH          HHH  RRR   RRR             TTT         LLL
MMM         MMM         TTT         HHH          HHH  RRR      RRR          TTT         LLL
MMM         MMM         TTT         HHH          HHH  RRR      RRR          TTT         LLL
MMM         MMM         TTT         HHH          HHH  RRR      RRR          TTT         LLL
MMM         MMM         TTT         HHH          HHH  RRR         RRR       TTT         LLLLLLLLLLLLLLLL
MMM         MMM         TTT         HHH          HHH  RRR         RRR       TTT         LLLLLLLLLLLLLLLL
MMM         MMM         TTT         HHH          HHH  RRR         RRR       TTT         LLLLLLLLLLLLLLLL
```

```
MM      MM  TTTTTTTTTT  HH      HH    SSSSSSSS    GGGGGGGG  NN      NN
MM      MM  TTTTTTTTTT  HH      HH    SSSSSSSS    GGGGGGGG  NN      NN
MMMM  MMMM      TT      HH      HH  SS            GG        NN      NN
MMMM  MMMM      TT      HH      HH  SS            GG        NN      NN
MM  MM  MM      TT      HH      HH  SS            GG        NNNN    NN
MM  MM  MM      TT      HH      HH  SS            GG        NNNN    NN
MM      MM      TT      HHHHHHHHHH    SSSSSS      GG        NN  NN  NN
MM      MM      TT      HHHHHHHHHH    SSSSSS      GG        NN  NN  NN
MM      MM      TT      HH      HH          SS    GG  GGGGGG  NN    NNNN
MM      MM      TT      HH      HH          SS    GG  GGGGGG  NN    NNNN
MM      MM      TT      HH      HH          SS    GG      GG  NN      NN      ....
MM      MM      TT      HH      HH          SS    GG      GG  NN      NN      ....
MM      MM      TT      HH      HH  SSSSSSSS      GGGGGG    NN      NN      ....
MM      MM      TT      HH      HH  SSSSSSSS      GGGGGG    NN      NN      ....

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  MTH$SGN - BASIC SGN function
0000     2          .IDENT  /1-006/                 ; File: MTHSGN.MAR
0000     3
0000     4 ;
0000     5 ;*****************************************************************************
0000     6 ;*                                                                           *
0000     7 ;*  COPYRIGHT (c) 1978, 1980, 1982, 1984 BY                                  *
0000     8 ;*  DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASSACHUSETTS.                   *
0000     9 ;*  ALL RIGHTS RESERVED.                                                     *
0000    10 ;*                                                                           *
0000    11 ;*  THIS SOFTWARE IS FURNISHED UNDER A LICENSE AND MAY BE USED AND COPIED    *
0000    12 ;*  ONLY IN  ACCORDANCE WITH  THE  TERMS  OF  SUCH  LICENSE  AND WITH THE   *
0000    13 ;*  INCLUSION OF THE ABOVE COPYRIGHT NOTICE. THIS SOFTWARE OR  ANY  OTHER    *
0000    14 ;*  COPIES THEREOF MAY NOT BE PROVIDED OR OTHERWISE MADE AVAILABLE TO ANY    *
0000    15 ;*  OTHER PERSON.  NO TITLE TO AND OWNERSHIP OF  THE  SOFTWARE IS  HEREBY    *
0000    16 ;*  TRANSFERRED.                                                             *
0000    17 ;*                                                                           *
0000    18 ;*  THE INFORMATION IN THIS SOFTWARE IS  SUBJECT TO CHANGE WITHOUT NOTICE    *
0000    19 ;*  AND  SHOULD  NOT  BE  CONSTRUED AS  A COMMITMENT BY DIGITAL EQUIPMENT   *
0000    20 ;*  CORPORATION.                                                             *
0000    21 ;*                                                                           *
0000    22 ;*  DIGITAL ASSUMES NO RESPONSIBILITY FOR THE USE  OR  RELIABILITY OF ITS    *
0000    23 ;*  SOFTWARE ON EQUIPMENT WHICH IS NOT SUPPLIED BY DIGITAL.                  *
0000    24 ;*                                                                           *
0000    25 ;*                                                                           *
0000    26 ;*****************************************************************************
0000    27 ;
0000    28
0000    29 ;++
0000    30 ; FACILITY: Math Library
0000    31 ;
0000    32 ; ABSTRACT:
0000    33 ;
0000    34 ;       This module returns a 1 is the input is positive, a -1 if the
0000    35 ;       input is negative, and a 0 if the input is 0.
0000    36 ;
0000    37 ; ENVIRONMENT: User Mode, AST Reentrant
0000    38 ;
0000    39 ;--
0000    40 ; AUTHOR: R. Will,       CREATION DATE: 30-Nov-78
0000    41 ;
0000    42 ; MODIFIED BY:
0000    43 ;
0000    44 ; VERSION 01
0000    45 ; 1-01  - Original
0000    46 ; 1-002 - Make edit number three digits in length.  JBS 07-DEC-78
0000    47 ; 1-003 - Add "_" to the PSECT directive.  JBS 22-DEC-78
0000    48 ; 1-004 - Clean up.  RW  11-Jul-79
0000    49 ; 1-005 - Add a JSB entry point.  JBS 16-AUG-1979
0000    50 ; 1-006 - Correct a typo in edit 005.  JBS 20-AUG-1979
```

```
                     0000     52          .SBTTL  DECLARATIONS
                     0000     53 ;
                     0000     54 ; INCLUDE FILES:
                     0000     55 ;
                     0000     56
                     0000     57 ;
                     0000     58 ; EXTERNAL DECLARATIONS:
                     0000     59 ;
                     0000     60          .DSABL  GBL                             ; Prevent undeclared
                     0000     61                                                  ; symbols from being
                     0000     62                                                  ; automatically global.
                     0000     63
                     0000     64 ;
                     0000     65 ; MACROS:
                     0000     66 ;
                     0000     67
                     0000     68 ;
                     0000     69 ; EQUATED SYMBOLS:
                     0000     70 ;
00000004             0000     71          input_addr = 4
                     0000     72 ;
                     0000     73 ; OWN STORAGE:
                     0000     74 ;
                     0000     75
                     0000     76 ;
                     0000     77 ; PSECT DECLARATIONS:
                     0000     78 ;
                 00000000     79          .PSECT _MTH$CODE PIC, USR, CON, REL, LCL, SHR, -
                     0000     80                      EXE, RD, NOWRT, LONG
                     0000     81
```

```
                     0000    83          .SBTTL  MTH$SGN  - BASIC SGN function
                     0000    84 ;++
                     0000    85 ; FUNCTIONAL DESCRIPTION:
                     0000    86 ;
                     0000    87 ;       This routine returns a 1 if the input is positive, a -1 if the
                     0000    88 ;       input is negative, and a 0 if the input is 0.
                     0000    89 ;
                     0000    90 ; CALLING SEQUENCE:
                     0000    91 ;
                     0000    92 ;       CALL sign.wl.v = MTH$SGN (x.rf.r)
                     0000    93 ;       note: this works for f and d data types because for both f and d
                     0000    94 ;       the sign and exponent are in the same place, and all we are interested
                     0000    95 ;       in is the sign and the value 0.  The value zero is represented in both
                     0000    96 ;       f and d as a 0 sign and a 0 exponent.
                     0000    97 ;
                     0000    98 ; INPUT PARAMETERS:
                     0000    99 ;
00000004             0000   100          input_addr = 4
                     0000   101 ;
                     0000   102 ; IMPLICIT INPUTS:
                     0000   103 ;
                     0000   104 ;       NONE
                     0000   105 ;
                     0000   106 ; OUTPUT PARAMETERS:
                     0000   107 ;
                     0000   108 ;       NONE
                     0000   109 ;
                     0000   110 ; IMPLICIT OUTPUTS:
                     0000   111 ;
                     0000   112 ;       NONE
                     0000   113 ;
                     0000   114 ; FUNCTION VALUE:
                     0000   115 ; COMPLETION CODES:
                     0000   116 ;
                     0000   117 ;       a 1, 0, or -1 depending on the input sign
                     0000   118 ;
                     0000   119 ; SIDE EFFECTS:
                     0000   120 ;
                     0000   121 ;       NONE
                     0000   122 ;
                     0000   123 ;--
                     0000   124
                4000 0000   125          .ENTRY MTH$SGN , ^M<IV>          ; Entry point
                     0002   126
          04 BC      53 0002   127          TSTF    @input_addr(AP)          ; compare the input parameter to 0
             05      14 0005   128          BGTR    1$                       ; positive
             07      19 0007   129          BLSS    2$                       ; negative
                     0009   130
             50      D4 0009   131          CLRL    R0                       ; input was 0
                     04 000B   132          RET
                     000C   133
     50      01      D0 000C   134 1$:      MOVL    #1,R0                    ; positive
                     04 000F   135          RET
                     0010   136
     50      01      CE 0010   137 2$:      MNEGL   #1,R0                    ; negative
                     04 0013   138          RET
```

```
                     0014   140          .SBTTL  MTH$SGN_R1 - JSB entry point
                     0014   141 ;++
                     0014   142 ; FUNCTIONAL DESCRIPTION:
                     0014   143 ;
                     0014   144 ;       This routine returns a 1 if the input is positive, a -1 if the
                     0014   145 ;       input is negative, and a 0 if the input is 0.
                     0014   146 ;
                     0014   147 ; CALLING SEQUENCE:
                     0014   148 ;
                     0014   149 ;       sign.wl.v = JSB MTH$SGN (x.rf.v)
                     0014   150 ;       note: this works for f and d data types because for both f and d
                     0014   151 ;       the sign and exponent are in the same place, and all we are interested
                     0014   152 ;       in is the sign and the value 0.  The value zero is represented in both
                     0014   153 ;       f and d as a 0 sign and a 0 exponent.
                     0014   154 ;
                     0014   155 ; INPUT PARAMETERS:
                     0014   156 ;
                     0014   157 ;       R0 contains the argument
                     0014   158 ;
                     0014   159 ; IMPLICIT INPUTS:
                     0014   160 ;
                     0014   161 ;       NONE
                     0014   162 ;
                     0014   163 ; OUTPUT PARAMETERS:
                     0014   164 ;
                     0014   165 ;       NONE
                     0014   166 ;
                     0014   167 ; IMPLICIT OUTPUTS:
                     0014   168 ;
                     0014   169 ;       NONE
                     0014   170 ;
                     0014   171 ; FUNCTION VALUE:
                     0014   172 ; COMPLETION CODES:
                     0014   173 ;
                     0014   174 ;       a 1, 0, or -1 depending on the input sign
                     0014   175 ;
                     0014   176 ; SIDE EFFECTS:
                     0014   177 ;
                     0014   178 ;       NONE
                     0014   179 ;
                     0014   180 ;--
                     0014   181 MTH$SGN_R1::                                ; R0 has argument
     50    53        0014   182          TSTF    R0                        ; compare the input parameter to 0
     05    14        0016   183          BGTR    1$                        ; positive
     07    19        0018   184          BLSS    2$                        ; negative
                     001A   185
     50    D4        001A   186          CLRL    R0                        ; input was 0
           05        001C   187          RSB
                     001D   188
50   01    D0        001D   189 1$:      MOVL    #1,R0                     ; positive
           05        0020   190          RSB
                     0021   191
50   01    CE        0021   192 2$:      MNEGL   #1,R0                     ; negative
           05        0024   193          RSB
                     0025   194
                     0025   195          .END
```

```
INPUT_ADDR      = 00000004
MTH$SGN           00000000 RG    01
MTH$SGN_R1        00000014 RG    01
```

Psect synopsis

```
PSECT name                      Allocation          PSECT No.  Attributes
----------                      ----------          ---------  ----------
.  ABS  .                       00000000  (    0.)  00 (  0.)  NOPIC   USR   CON   ABS   LCL NOSHR NOEXE NORD  NOWRT NOVEC BYTE
_MTH$CODE                       00000025  (   37.)  01 (  1.)    PIC   USR   CON   REL   LCL   SHR   EXE   RD  NOWRT NOVEC LONG
```

Performance indicators

Phase	Page faults	CPU Time	Elapsed Time
Initialization	32	00:00:00.10	00:00:00.54
Command processing	135	00:00:00.48	00:00:03.29
Pass 1	66	00:00:00.48	00:00:02.18
Symbol table sort	0	00:00:00.00	00:00:00.00
Pass 2	46	00:00:00.42	00:00:02.13
Symbol table output	2	00:00:00.01	00:00:00.01
Psect synopsis output	2	00:00:00.02	00:00:00.02
Cross-reference output	0	00:00:00.00	00:00:00.00
Assembler run totals	285	00:00:01.51	00:00:08.19

```
The working set limit was 750 pages.
1970 bytes (4 pages) of virtual memory were used to buffer the intermediate code.
There were 10 pages of symbol table space allocated to hold 3 non-local and 4 local symbols.
195 source lines were read in Pass 1, producing 11 object records in Pass 2.
0 pages of virtual memory were used to define 0 macros.
```

Macro library statistics

Macro library name	Macros defined
_255DUA28:[SYSLIB]STARLET.MLB;2	0

```
0 GETS were required to define 0 macros.

There were no errors, warnings or information messages.

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

MTHJMIN0
LIS

MTHMSG
LIS

MTHIMIN0
LIS

MTHMAX1
LIS

MTHJIDNNT
LIS

MTHMSGDEF
LIS

MTHJIHNNT
LIS

MTHSGN
LIS

MTHJMAX0
LIS

MTHMOD
LIS

MTHSIGNAL
LIS

MTHSQRTR2
LIS

MTHJNINT
LIS

MTHSINCOS
LIS

MTHSQRT
LIS

MTHININT
LIS

MTHRANDOM
LIS

MTHJIGNNT
LIS

MTHMIN1
LIS

MTHJISIGN
LIS

MTHSIGN
LIS

MTHSINH
LIS