```
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  MM      MM    IIIIII    NN      NN     11
MM      MM  TTTTTTTTTT  HH      HH  MM      MM    IIIIII    NN      NN     11
MMMM  MMMM      TT      HH      HH  MMMM  MMMM      II      NN      NN   1111
MMMM  MMMM      TT      HH      HH  MMMM  MMMM      II      NN      NN   1111
MM  MM  MM      TT      HH      HH  MM  MM  MM      II      NNNN    NN     11
MM  MM  MM      TT      HH      HH  MM  MM  MM      II      NNNN    NN     11
MM      MM      TT      HHHHHHHHHH  MM      MM      II      NN  NN  NN     11
MM      MM      TT      HHHHHHHHHH  MM      MM      II      NN  NN  NN     11
MM      MM      TT      HH      HH  MM      MM      II      NN    NNNN     11
MM      MM      TT      HH      HH  MM      MM      II      NN    NNNN     11
MM      MM      TT      HH      HH  MM      MM      II      NN      NN     11      ....
MM      MM      TT      HH      HH  MM      MM      II      NN      NN     11      ....
MM      MM      TT      HH      HH  MM      MM    IIIIII    NN      NN   111111    ....
MM      MM      TT      HH      HH  MM      MM    IIIIII    NN      NN   111111    ....

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

```
                        .TITLE  MTH$MIN1        IMIN1, JMIN1, and AMIN1 functions
                        .IDENT  /1-002/         ; File: MTHMIN1.MAR

                ;
                ;**********************************************************************
                ;*                                                                    *
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                ;**********************************************************************
                ;
                ;
                ; FACILITY: MATH LIBRARY
                ;++
                ; ABSTRACT:
                ;       This module contains the minimum value functions which take
                ;       floating-point arguments.
                ;
                ;
                ;--
                ;
                ; VERSION: 0
                ;
                ; HISTORY:
                ;
                ; AUTHOR:
                ;       Jonathan M. Taylor, 12-JUL-77: Version 0
                ;
                ; MODIFIED BY:
                ;
                ;
```

```
0000     50          .SBTTL  HISTORY          ; Detailed Current Edit History
0000     51
0000     52
0000     53 ; Edit History for Version 0 of MTHMIN1
0000     54 ;
0000     55 ; 0-4    - Remove MTH$FLAG_JACKET.  TNH 26-July-78
0000     56 ; 0-5    - Fix access violation.  TNH 16-Aug-78
0000     57 ; 1-001  - Update version number and copyright notice.  JBS 16-NOV-78
0000     58 ; 1-002  - Add "_" to the PSECT directive.  JBS 22-DEC-78
```

```
                     60          .SBTTL  DECLARATIONS
                     61
                     62 ;
                     63 ; INCLUDE FILES:
                     64 ;       oerr.mar
                     65 ;
                     66
                     67 ;
                     68 ; EXTERNAL SYMBOLS:
                     69 ;       NONE
                     70 ;
                     71
                     72 ;
                     73 ; MACROS:
                     74 ;       NONE
                     75 ;
                     76
                     77 ;
                     78 ; PSECT DECLARATIONS:
            00000000 79          .PSECT  _MTH$CODE       PIC, SHR, LONG, EXE, NOWRT
                     80
                     81 ;
                     82 ; EQUATED SYMBOLS:
                     83 ;       NONE
                     84 ;
                     85
                     86 ;
                     87 ; OWN STORAGE:
                     88 ;       NONE
                     89 ;
```

```
                     0000     91          .SBTTL  MTH$IMIN1, MTH$JMIN1, MTH$AMIN1
                     0000     92
                     0000     93 ;++
                     0000     94 ; FUNCTIONAL DESCRIPTION:
                     0000     95 ;       Use routine MINF to compute the minimum of n arguments,
                     0000     96 ;       n is greater than or equal to 1.  Return the result converted
                     0000     97 ;       to the proper type.
                     0000     98 ;
                     0000     99 ;
                     0000    100 ; CALLING SEQUENCE:
                     0000    101 ;       Minimum.ww.v = MTH$IMIN1 ([arg.rf.r])
                     0000    102 ;       Minimum.wl.v = MTH$JMIN1 ([arg.rf.r])
                     0000    103 ;       Minimum.wf.v = MTH$AMIN1 ([arg.rf.r])
                     0000    104 ;
                     0000    105 ;
                     0000    106 ;
                     0000    107 ; INPUT PARAMETERS:
                     0000    108 ;       The n parameters are single-precision floating-point values
                     0000    109 ;       and are call-by-reference.
                     0000    110 ;
                     0000    111 ;
                     0000    112 ; IMPLICIT INPUTS:
                     0000    113 ;       NONE
                     0000    114 ;
                     0000    115 ; OUTPUT PARAMETERS:
                     0000    116 ;       NONE
                     0000    117 ;
                     0000    118 ; IMPLICIT OUTPUTS:
                     0000    119 ;       NONE
                     0000    120 ;
                     0000    121 ; COMPLETION CODES:
                     0000    122 ;       NONE
                     0000    123 ;
                     0000    124 ; SIDE EFFECTS:
                     0000    125 ;       Reserved Operand and Integer Overflow exceptions can occur.
                     0000    126 ;
                     0000    127 ;
                     0000    128 ;--
                     0000    129
                     0000    130
                     0000    131
                     0000    132
           4000      0000    133          .ENTRY  MTH$IMIN1,      ^M<IV>
     11      10      0002    134          BSB     MINF            ; R0 = min arg
50   50      49      0004    135          CVTFW   R0, R0          ; INTEGER*2 it
             04      0007    136          RET
                     0008    137
           4000      0008    138          .ENTRY  MTH$JMIN1,      ^M<IV>
     09      10      000A    139          BSB     MINF            ; R0 = min arg
50   50      4A      000C    140          CVTFL   R0, R0          ; INTEGER*4 it
             04      000F    141          RET
                     0010    142
           0000      0010    143          .ENTRY  MTH$AMIN1,      ^M<>
     01      10      0012    144          BSB     MINF            ; R0 = min arg
             04      0014    145          RET
                     0015    146
                     0015    147 ;+
```

```
                     0015   148 ; MINF returns smallest of the REAL*4 args.
                     0015   149 ;-
                     0015   150
                     0015   151 MINF:
    51    6C    9A   0015   152             MOVZBL  (AP), R1                ; R1 = number of args
          8C    D5   0018   153             TSTL    (AP)+                   ; AP -> first arg adr
    50    9C    50   001A   154 1$:         MOVF    @(AP)+, R0              ; get trial min
          08    11   001D   155             BRB     3$                      ; check arg count
50    00 BC    51   001F   156 2$:         CMPF    @0(AP),R0               ; if this arg is less then trial min
          F5    19   0023   157             BLSS    1$                      ; then it becomes trial min
          8C    D5   0025   158             TSTL    (AP)+                   ; else ignore it
       F5 51    F5   0027   159 3$:         SOBGTR  R1, 2$                  ; check arg count
                05   002A   160             RSB
                     002B   161
                     002B   162
                     002B   163             .END
```

```
MINF                00000015 R      01
MTH$AMIN1           00000010 RG     01
MTH$IMIN1           00000000 RG     01
MTH$JMIN1           00000008 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                       0000002B  (   43.)  01 (  1.)    PIC   USR   CON   REL   LCL   SHR   EXE   RD  NOWRT NOVEC LONG
```

Performance indicators

Phase	Page faults	CPU Time	Elapsed Time
Initialization	31	00:00:00.10	00:00:01.50
Command processing	133	00:00:00.55	00:00:03.54
Pass 1	68	00:00:00.46	00:00:02.71
Symbol table sort	0	00:00:00.00	00:00:00.00
Pass 2	44	00:00:00.38	00:00:01.59
Symbol table output	2	00:00:00.02	00:00:00.11
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	282	00:00:01.53	00:00:09.47

```
The working set limit was 750 pages.
1762 bytes (4 pages) of virtual memory were used to buffer the intermediate code.
There were 10 pages of symbol table space allocated to hold 4 non-local and 3 local symbols.
163 source lines were read in Pass 1, producing 16 object records in Pass 2.
0 pages of virtual memory were used to define 0 macros.
```

Macro library statistics

```
Macro library name                      Macros defined
------------------                      --------------
_$255$DUA28:[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$:MTHMIN1/OBJ=OBJ$:MTHMIN1 MSRC$:MTHMIN1/UPDATE=(ENH$:MTHMIN1)
```

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