```
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       HHHHHHHHHHHHHHH  RRRRRRRRRRR         TTT         LLL
MMM       MMM           TTT       HHHHHHHHHHHHHHH  RRRRRRRRRRRR        TTT         LLL
MMM       MMM           TTT       HHHHHHHHHHHHHHH  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         LLLLLLLLLLLLLLL
MMM       MMM           TTT       HHH          HHH  RRR         RRR     TTT         LLLLLLLLLLLLLLL
MMM       MMM           TTT       HHH          HHH  RRR         RRR     TTT         LLLLLLLLLLLLLLL
```

FILEID**MTHDFLOOR

```
MM      MM  TTTTTTTTTT  HH      HH  DDDDDDDD    FFFFFFFFFF  LL          OOOOOO      OOOOOO    RRRRRRRR
MM      MM  TTTTTTTTTT  HH      HH  DDDDDDDD    FFFFFFFFFF  LL          OOOOOO      OOOOOO    RRRRRRRR
MMMM  MMMM      TT      HH      HH  DD      DD  FF          LL          OO    OO    OO    OO  RR      RR
MMMM  MMMM      TT      HH      HH  DD      DD  FF          LL          OO    OO    OO    OO  RR      RR
MM  MM  MM      TT      HH      HH  DD      DD  FF          LL          OO    OO    OO    OO  RR      RR
MM  MM  MM      TT      HH      HH  DD      DD  FF          LL          OO    OO    OO    OO  RR      RR
MM      MM      TT      HHHHHHHHHH  DD      DD  FFFFFFFF    LL          OO    OO    OO    OO  RRRRRRRR
MM      MM      TT      HHHHHHHHHH  DD      DD  FFFFFFFF    LL          OO    OO    OO    OO  RRRRRRRR
MM      MM      TT      HH      HH  DD      DD  FF          LL          OO    OO    OO    OO  RR  RR
MM      MM      TT      HH      HH  DD      DD  FF          LL          OO    OO    OO    OO  RR  RR
MM      MM      TT      HH      HH  DD      DD  FF          LL          OO    OO    OO    OO  RR    RR      ....
MM      MM      TT      HH      HH  DD      DD  FF          LL          OO    OO    OO    OO  RR    RR      ....
MM      MM      TT      HH      HH  DDDDDDDD    FF          LLLLLLLLLL    OOOOOO      OOOOOO  RR      RR    ....
MM      MM      TT      HH      HH  DDDDDDDD    FF          LLLLLLLLLL    OOOOOO      OOOOOO  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
```

Table of contents

(2) 54 DECLARATIONS
(3) 86 MTH$DFLOOR - greatest integer double routine
(4) 144 MTH$DFLOOR_R3 - greatest integer double routine

```
0000     1          .TITLE  MTH$DFLOOR - Greatest integer routine for double
0000     2          .IDENT  /1-007/                 ; File: MTHDFLOOR.MAR   Edit: RXW1007
0000     3
0000     4 ;
0000     5 ;*****************************************************************************
0000     6 ;*                                                                           *
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0000    24 ;*                                                                           *
0000    25 ;*                                                                           *
0000    26 ;*****************************************************************************
0000    27 ;
0000    28
0000    29 ;++
0000    30 ; FACILITY: Math Library
0000    31 ;
0000    32 ; ABSTRACT:
0000    33 ;
0000    34 ;       This routine finds the largest integer less than the input
0000    35 ;       value, i.e. it truncates toward negative infinity
0000    36 ;       for data type double.
0000    37 ;
0000    38 ; ENVIRONMENT: User Mode, AST Reentrant
0000    39 ;
0000    40 ;--
0000    41 ; AUTHOR:R. Will,         CREATION DATE: 1-Dec-78
0000    42 ;
0000    43 ; MODIFIED BY:
0000    44 ;
0000    45 ; VERSION 00
0000    46 ; 1-001 - Original
0000    47 ; 1-002 - Add "" to the PSECT directive.  JBS 22-DEC-78
0000    48 ; 1-003 - Put MTH$AINT code in line.  RW 26-MAR-79
0000    49 ; 1-004 - Fix bug for -1 < input < 0.  RW  11-Jul-79
0000    50 ; 1-005 - Add a JSB entry point.  JBS 25-JUL-1979
0000    51 ; 1-006 - Change name to MTH$DFLOOR.  JBS 27-JUL-1979
0000    52 ; 1-007 - Disable IV in JSB routine.  RW  10-Dec-79
```

```
                        54          .SBTTL  DECLARATIONS
                        55 ;
                        56 ; INCLUDE FILES:
                        57 ;
                        58
                        59 ;
                        60 ; EXTERNAL DECLARATIONS:
                        61 ;
                        62          .DSABL  GBL                             ; Prevent undeclared
                        63                                                  ; symbols from being
                        64                                                  ; automatically global.
                        65 ;
                        66 ; MACROS:
                        67 ;
                        68
                        69          $PSLDEF                                 ; define PSL
                        70
                        71 ;
                        72 ; EQUATED SYMBOLS:
                        73 ;
                        74
                        75 ;
                        76 ; OWN STORAGE:
                        77 ;
                        78
                        79 ;
                        80 ; PSECT DECLARATIONS:
                        81 ;
00000000                82          .PSECT _MTH$CODE PIC, USR, CON, REL, LCL, SHR, -
                        83                      EXE, RD, NOWRT, LONG
                        84
```

```
                                        0000     86          .SBTTL  MTH$DFLOOR  - greatest integer double routine
                                        0000     87 ;++
                                        0000     88 ; FUNCTIONAL DESCRIPTION:
                                        0000     89 ;
                                        0000     90 ;       This routine finds the floor by truncating, and then if the
                                        0000     91 ;       input value is negative and not an integer subtracting 1.
                                        0000     92 ;
                                        0000     93 ; CALLING SEQUENCE:
                                        0000     94 ;
                                        0000     95 ;       CALL result_int.wd.v = MTH$DFLOOR (input.rd.r)
                                        0000     96 ;
                                        0000     97 ; INPUT PARAMETERS:
                                        0000     98 ;
                              00000004  0000     99          input_addr = 4                  ; address of the double number
                                        0000    100                                         ; to get the floor of
                                        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 ;       the double value of the greatest integer
                                        0000    118 ;
                                        0000    119 ; SIDE EFFECTS:
                                        0000    120 ;
                                        0000    121 ;       NONE
                                        0000    122 ;
                                        0000    123 ;--
                                        0000    124
                                000C    0000    125          .ENTRY  MTH$DFLOOR, ^M<R2, R3>          ; entry point
                                        0002    126
                          50    04 BC   0002    127          MOVD    @input_addr(AP), R0             ; R0/R1 = input argument
52   52   08      00      50   74      0006    128          EMODD   R0, #0, #1, R2, R2              ; R2/R3 = fraction_part (arg)
                     50      52   62      000C    129          SUBD2   R2, R0                  ; R0/R1 = integer_part (arg)
                                        000F    130
                             07   14      000F    131          BGTR    40$                     ; if > 0, have correct answer
                                        0011    132
                             52   73      0011    133          TSTD    R2                      ; look at fraction part
                             03   18      0013    134          BGEQ    40$                     ; if > 0 then 0 < input < 1 and
                                        0015    135                                         ;  we have the correct answer
                                        0015    136                                         ; if = 0 then input was integer
                                        0015    137                                         ;  and we have correct answer
                                        0015    138
                     50      08   62      0015    139          SUBD2   #1,R0                   ; subtract 1 from truncated
                                        0018    140                                         ; negative non-integer
                                        0018    141
                             04   0018    142 40$:     RET
```

```
                                0019   144          .SBTTL  MTH$DFLOOR_R3  - greatest integer double routine
                                0019   145 ;++
                                0019   146 ; FUNCTIONAL DESCRIPTION:
                                0019   147 ;
                                0019   148 ;       This is the JSB entry point to MTH$DFLOOR.
                                0019   149 ;
                                0019   150 ; CALLING SEQUENCE:
                                0019   151 ;
                                0019   152 ;       JSB result_int.wd.v = MTH$DFLOOR_R3 (input.rd.v)
                                0019   153 ;
                                0019   154 ; INPUT PARAMETERS:
                                0019   155 ;
                                0019   156 ;       R0 and R1 contain the input value
                                0019   157 ;
                                0019   158 ; IMPLICIT INPUTS:
                                0019   159 ;
                                0019   160 ;       NONE
                                0019   161 ;
                                0019   162 ; OUTPUT PARAMETERS:
                                0019   163 ;
                                0019   164 ;       NONE
                                0019   165 ;
                                0019   166 ; IMPLICIT OUTPUTS:
                                0019   167 ;
                                0019   168 ;       NONE
                                0019   169 ;
                                0019   170 ; FUNCTION VALUE:
                                0019   171 ; COMPLETION CODES:
                                0019   172 ;
                                0019   173 ;       the double value of the greatest integer
                                0019   174 ;
                                0019   175 ; SIDE EFFECTS:
                                0019   176 ;
                                0019   177 ;       IV is disabled temporarily
                                0019   178 ;
                                0019   179 ;--
                                0019   180
                                0019   181 MTH$DFLOOR_R3::                                ; entry point
                                0019   182
                          7E    DC   0019   183          MOVPSL  -(SP)                     ; Save current PSL
                          20    B9   001B   184          BICPSW  #PSL$M_IV                 ; Disable integer overflow
52   52   08   00          50    74   001D   185          EMODD   R0, #0, #1, R2, R2        ; R2/R3 = fraction_part (arg)
                          50    52   62   0023   186          SUBD2   R2, R0                    ; R0/R1 = integer_part (arg)
                                     0026   187
                          07    14   0026   188          BGTR    40$                       ; if > 0, have correct answer
                                     0028   189
                          52    73   0028   190          TSTD    R2                        ; look at fraction part
                          03    18   002A   191          BGEQ    40$                       ; if > 0 then 0 < input < 1 and
                                     002C   192                                            ;  we have the correct answer
                                     002C   193                                            ; if = 0 then input was integer
                                     002C   194                                            ;  and we have correct answer
                                     002C   195
                    50    08   62   002C   196          SUBD2   #1,R0                     ; subtract 1 from truncated
                                     002F   197                                            ; negative non-integer
                                     002F   198
52   8E   FFFFFFDF    8F    CB   002F   199 40$:       BICL3   #^C<PSL$M_IV>, (SP)+, R2   ; Clear all but right byte
                          52    B8   0037   200          BISPSW  R2                        ; Restore previous IV
```

```
                                                G 5

 05  0039   201          RSB
     003A   202
     003A   203          .END
```

```
INPUT_ADDR      = 00000004
MTH$DFLOOR        00000000 RG    02
MTH$DFLOOR_R3     00000019 RG    02
PSL$M_IV        = 00000020
```

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 NOWRT NOVEC BYTE
_MTH$CODE	0000003A (58.)	02 (2.)	PIC USR CON REL LCL SHR EXE RD NOWRT NOVEC LONG

Performance indicators

Phase	Page faults	CPU Time	Elapsed Time
Initialization	34	00:00:00.08	00:00:01.53
Command processing	110	00:00:00.47	00:00:02.81
Pass 1	117	00:00:00.97	00:00:04.88
Symbol table sort	0	00:00:00.03	00:00:00.04
Pass 2	49	00:00:00.46	00:00:01.47
Symbol table output	2	00:00:00.01	00:00:00.01
Psect synopsis output	2	00:00:00.02	00:00:00.03
Cross-reference output	0	00:00:00.00	00:00:00.00
Assembler run totals	316	00:00:02.05	00:00:10.82

The working set limit was 900 pages.
4361 bytes (9 pages) of virtual memory were used to buffer the intermediate code.
There were 10 pages of symbol table space allocated to hold 42 non-local and 2 local symbols.
203 source lines were read in Pass 1, producing 13 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

98 GETS were required to define 4 macros.

There were no errors, warnings or information messages.

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

MTHDCOSH LIS

MTHDMIN LIS

MTHDLOG LIS

MTHDSINCO LIS

MTHDATANH LIS

MTHDNINT LIS

MTHDSQRT LIS

MTHDCONJG LIS

MTHDINT LIS

MTHDMAX1 LIS

MTHDSIGN LIS

MTHDIM LIS

MTHDMOD LIS

MTHDSINH LIS

MTHDEXP LIS

MTHDFLOOR LIS

MTHDPROD LIS