



```

MM      MM      TTTTTTTTTT  HH      HH      AAAAAA  00000000  SSSSSSSS
MM      MM      TTTTTTTTTT  HH      HH      AAAAAA  00000000  SSSSSSSS
MMMM    MMMM    TT          HH      HH      AA      AA  00      00  SS
MMMM    MMMM    TT          HH      HH      AA      AA  00      00  SS
MM      MM      TT          HH      HH      AA      AA  00      00  SS
MM      MM      TT          HH      HH      AA      AA  00      00  SS
MM      MM      TT          HHHHHHHHHH  AA      AA  00000000  SSSSSS
MM      MM      TT          HHHHHHHHHH  AA      AA  00000000  SSSSSS
MM      MM      TT          HH      HH      AAAAAAAAAA  00      00  SS
MM      MM      TT          HH      HH      AAAAAAAAAA  00      00  SS
MM      MM      TT          HH      HH      AA      AA  00      00  SS
MM      MM      TT          HH      HH      AA      AA  00      00  SS
MM      MM      TT          HH      HH      AA      AA  00000000  SSSSSSSS
MM      MM      TT          HH      HH      AA      AA  00000000  SSSSSSSS

```

```

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
LLLLLLLLLLLL  IIIIII  SSSSSSSS
LLLLLLLLLLLL  IIIIII  SSSSSSSS

```

(2)	52	HISTORY	: Detailed Current Edit History
(3)	63	DECLARATIONS	
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(8)	259	MTH\$GABS	
(9)	302	MTH\$HABS	

```

0000 1      .TITLE MTH$ABS      The ABS functions
0000 2      .IDENT /1-003/      ; File: MTHABS.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.
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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 : FACILITY: MATH LIBRARY
0000 30 :++
0000 31 : ABSTRACT:
0000 32 :   This module contains routines for the absolute value of
0000 33 :   INTEGER*2, INTEGER*4, REAL*4, REAL*8 (D and G types) and
0000 34 :   REAL*16 values.
0000 35
0000 36
0000 37 :--
0000 38
0000 39 : VERSION: 1
0000 40
0000 41 : HISTORY:
0000 42
0000 43 : AUTHOR:
0000 44 :   Jonathan M. Taylor, 14-JUL-77: Version 0
0000 45
0000 46 : MODIFIED BY:
0000 47
0000 48 :   Steven B. Lionel, 30-Jan-79: G and H functions
0000 49
0000 50 :

```

MTH\$ABS  
1-003

E 4

The ABS functions  
HISTORY ; Detailed Current Edit History

16-SEP-1984 01:01:55 VAX/VMS Macro V04-00  
6-SEP-1984 11:20:07 [MTHRTL.SRC]MTHABS.MAR;1

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(2)

MT  
1-

```
0000 52      .SBTTL HISTORY      ; Detailed Current Edit History
0000 53
0000 54
0000 55 : Edit History for Version 1 of MTH$ABS
0000 56 :
0000 57 : 0-3  - REMOVE MTH$FLAG JACKET.  TNH 5-July-78
0000 58 : 0-4  - remove MTH$JACKET_HND.  TNH 26-July-78
0000 59 : 1-001 - Update copyright notice and version number.  JBS 16-NOV-78
0000 60 : 1-002 - Add G and H functions.  SBL 30-Jan-79
0000 61 : 1-003 - Correct a typo in a comment.  JBS 30-JUL-1979
```

```
0000 63      .SBTTL DECLARATIONS
0000 64
0000 65 :
0000 66 : INCLUDE FILES:
0000 67 :     NONE
0000 68 :
0000 69 :
0000 70 :
0000 71 : EXTERNAL SYMBOLS:
0000 72 :     NONE
0000 73 :
0000 74 :
0000 75 :
0000 76 : MACROS:
0000 77 :     NONE
0000 78 :
0000 79 :
0000 80 :
0000 81 : PSECT DECLARATIONS:
0000 82 :     .PSECT _MTH$CODE          PIC, SHR, LONG, EXE, NOWRT
0000 83 :
0000 84 :
0000 85 : EQUATED SYMBGLS:
0000 86 :     NONE
0000 87 :
0000 88 :
0000 89 :
0000 90 : OWN STORAGE:
0000 91 :     NONE
0000 92 :
```

```

0000 94      .SBTTL MTH$IIABS
0000 95
0000 96      :++
0000 97      : FUNCTIONAL DESCRIPTION:
0000 98      : Returns the absolute value of the argument.
0000 99      :
0000 100     :
0000 101     : CALLING SEQUENCE:
0000 102     : Absolute_value.wv.v = MTH$IIABS (arg.rw.r)
0000 103     :
0000 104     :
0000 105     :
0000 106     : INPUT PARAMETERS:
0000 107     : The one parameter is a one-word value and is call-by-reference.
0000 108     :
0000 109     :
0000 110     : IMPLICIT INPUTS:
0000 111     : NONE
0000 112     :
0000 113     : OUTPUT PARAMETERS:
0000 114     : NONE
0000 115     :
0000 116     : IMPLICIT OUTPUTS:
0000 117     : NONE
0000 118     :
0000 119     : COMPLETION CODES:
0000 120     : NONE
0000 121     :
0000 122     : SIDE EFFECTS:
0000 123     : Integer Overflow exception can occur.
0000 124     :
0000 125     :
0000 126     :--
0000 127
50  04 BC 4000 0000 128      .ENTRY MTH$IIABS, ^M<IV>
50  03 18 0002 129      MOVW @4(AP), R0      : R0 = arg
50  50 AE 0006 130      BGEQ 1$      : return if positive
0000 131      MNEGW R0, R0      : make positive
0000 132 1$: RET

```

```

000C 134      .SBTTL MTH$JIABS
000C 135
000C 136 :++
000C 137 : FUNCTIONAL DESCRIPTION:
000C 138 : Returns the absolute value of the argument.
000C 139 :
000C 140 :
000C 141 : CALLING SEQUENCE:
000C 142 : Absolute_value.wl.v =MTH$JIABS (arg.rl.r)
000C 143 :
000C 144 :
000C 145 :
000C 146 : INPUT PARAMETERS:
000C 147 : The one parameter is a longword value and is call-by-reference.
000C 148 :
000C 149 :
000C 150 : IMPLICIT INPUTS:
000C 151 : NONE
000C 152 :
000C 153 : OUTPUT PARAMETERS:
000C 154 : NONE
000C 155 :
000C 156 : IMPLICIT OUTPUTS:
000C 157 : NONE
000C 158 :
000C 159 : COMPLETION CODES:
000C 160 : NONE
000C 161 :
000C 162 : SIDE EFFECTS:
000C 163 : Integer Overflow exception can occur.
000C 164 :
000C 165 :
000C 166 :--
000C 167
000C 168
50 04 BC 4000 000C 169      .ENTRY MTH$JIABS      ^M<IV>
000E 170      MOVL @4(AP), R0      ; R0 = arg
50 03 18 0012 171      BGEQ 1$      ; return if positive
50 50 CE 0014 172      MNEGL R0, R0      ; make positive
0017 173 1$:      RET

```



```

0018 175          .SBTTL MTH$ABS
0018 176
0018 177      :++
0018 178      : FUNCTIONAL DESCRIPTION:
0018 179      : Returns the absolute value of the argument.
0018 180      :
0018 181      :
0018 182      : CALLING SEQUENCE:
0018 183      : Absolute_value.wf.v = MTH$ABS (arg.rf.r)
0018 184      :
0018 185      :
0018 186      : INPUT PARAMETERS:
0018 187      : The one argument is a single-precision floating-point value
0018 188      : and is call-by-reference.
0018 189      :
0018 190      :
0018 191      :
0018 192      : IMPLICIT INPUTS:
0018 193      : NONE
0018 194      :
0018 195      : OUTPUT PARAMETERS:
0018 196      : NONE
0018 197      :
0018 198      : IMPLICIT OUTPUTS:
0018 199      : NONE
0018 200      :
0018 201      : COMPLETION CODES:
0018 202      : NONE
0018 203      :
0018 204      : SIDE EFFECTS:
0018 205      : Reserved Operand exception can occur.
0018 206      :
0018 207      :
0018 208      :--
0018 209
0018 210
0018 211      .ENTRY MTH$ABS,      ^M<>
50 04 BC 0000 001A 212      MOVF @4(AP), R0      ; R0 = arg
50 8000 8F AA 001E 213      BICW #^X8000, R0    ; force positive
04 0023 214      RET

```

```

0024 216      .SBTTL MTH$DABS
0024 217
0024 218      :++
0024 219      : FUNCTIONAL DESCRIPTION:
0024 220      :   Return the absolute value of the argument.
0024 221      :
0024 222      :
0024 223      : CALLING SEQUENCE:
0024 224      :   Absolute_value.wd.v =MTH$DABS (arg.rd.r)
0024 225      :
0024 226      :
0024 227      :
0024 228      : INPUT PARAMETERS:
0024 229      :   The one parameter is a double-precision floating-point value
0024 230      :   and is call-by-reference.
0024 231      :
0024 232      :
0024 233      : IMPLICIT INPUTS:
0024 234      :   NONE
0024 235      :
0024 236      : OUTPUT PARAMETERS:
0024 237      :   NONE
0024 238      :
0024 239      : IMPLICIT OUTPUTS:
0024 240      :   NONE
0024 241      :
0024 242      : COMPLETION CODES:
0024 243      :   NONE
0024 244      :
0024 245      : SIDE EFFECTS:
0024 246      :   Reserved Operand exception can occur.
0024 247      :
0024 248      :
0024 249      :--
0024 250
0024 251
0024 252      .ENTRY MTH$DABS,      ^M<>
50  50  04 BC 0000 0024 253      MOVD  @4(AP), R0      : R0/R1 = arg
50  8000 8F AA 002A 254      BICW  #^X8000, R0     : force positive
002F 255      RET
0030 256
0030 257

```

```

0030 259      .SBTTL MTH$GABS
0030 260
0030 261 :++
0030 262 : FUNCTIONAL DESCRIPTION:
0030 263 :   Return the absolute value of the argument.
0030 264 :
0030 265 :
0030 266 : CALLING SEQUENCE:
0030 267 :   Absolute_value.wg.v =MTH$GABS (arg.rg.r)
0030 268 :
0030 269 :
0030 270 :
0030 271 : INPUT PARAMETERS:
0030 272 :   The one parameter is a G floating-point value
0030 273 :   and is call-by-reference.
0030 274 :
0030 275 :
0030 276 : IMPLICIT INPUTS:
0030 277 :   NONE
0030 278 :
0030 279 : OUTPUT PARAMETERS:
0030 280 :   NONE
0030 281 :
0030 282 : IMPLICIT OUTPUTS:
0030 283 :   NONE
0030 284 :
0030 285 : COMPLETION CODES:
0030 286 :   NONE
0030 287 :
0030 288 : SIDE EFFECTS:
0030 289 :   Reserved Operand exception can occur.
0030 290 :
0030 291 :
0030 292 :--
0030 293
0030 294
0030 295      .ENTRY MTH$GABS,      ^M<>
50 04 BC 0000 0032 296      MOVG  @4(AP), R0      ; R0/R1 = arg
50 8000 8F AA 0037 297      BICW  #^X8000, R0     ; force positive
0030 298      RET
0030 299
0030 300

```

```

003D 302          .SBTTL MTH$HABS
003D 303
003D 304 :++
003D 305 : FUNCTIONAL DESCRIPTION:
003D 306 :   Return the absolute value of the argument.
003D 307 :
003D 308 :
003D 309 : CALLING SEQUENCE:
003D 310 :   CALL MTH$HABS (Absolute_value.wh.r, arg.rh.r)
003D 311 :
003D 312 :
003D 313 :
003D 314 : INPUT PARAMETERS:
003D 315 :   The input parameter is a H floating-point value
003D 316 :   and is call-by-reference.
003D 317 :
003D 318 :
003D 319 : IMPLICIT INPUTS:
003D 320 :   NONE
003D 321 :
003D 322 : OUTPUT PARAMETERS:
003D 323 :   The output parameter is an H floating-point value
003D 324 :   and is call-by-reference.
003D 325 :
003D 326 : IMPLICIT OUTPUTS:
003D 327 :   NONE
003D 328 :
003D 329 : COMPLETION CODES:
003D 330 :   NONE
003D 331 :
003D 332 : SIDE EFFECTS:
003D 333 :   Reserved Operand exception can occur.
003D 334 :
003D 335 :
003D 336 :--
003D 337
003D 338
003D 339          .ENTRY MTH$HABS,      ^M<>
04 BC 08 BC 0000 003F 340          MOVH  @8(AP), @4(AP) ; result = arg
04 BC 8000 8F AA 0045 341          BICW  #^X8000, @4(AP) ; force positive
004B 342          RET
004C 343
004C 344
004C 345          .END

```

MTH\$ABS  
Symbol table

The ABS functions

M 4

16-SEP-1984 01:01:55 VAX/VMS Macro V04-00  
6-SEP-1984 11:20:07 [MTHRTL.SRC]MTHABS.MAR;1

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MTH\$ABS	00000018	RG	01
MTH\$DABS	00000024	RG	01
MTH\$GABS	00000030	RG	01
MTH\$HABS	0000003D	RG	01
MTH\$IABS	00000000	RG	01
MTH\$JABS	0000000C	RG	01

↑-----↑  
! Psect synopsis !  
↑-----↑

<u>PSECT name</u>	<u>Allocation</u>	<u>PSECT No.</u>	<u>Attributes</u>										
. ABS .	00000000 ( 0.)	00 ( 0.)	NOPIC	USR	CON	ABS	LCL	NOSHR	NOEXE	NORD	NOWRT	NOVEC	BYTE
_MTH\$CODE	0000004C ( 76.)	01 ( 1.)	PIC	USR	CON	REL	LCL	SHR	EXE	RD	NOWRT	NOVEC	LONG

↑-----↑  
! Performance indicators !  
↑-----↑

<u>Phase</u>	<u>Page faults</u>	<u>CPU Time</u>	<u>Elapsed Time</u>
Initialization	41	00:00:00.08	00:00:00.93
Command processing	126	00:00:00.49	00:00:01.68
Pass 1	69	00:00:00.65	00:00:02.90
Symbol table sort	0	00:00:00.00	00:00:00.00
Pass 2	70	00:00:00.67	00:00:03.11
Symbol table output	2	00:00:00.02	00:00:00.02
Psect synopsis output	2	00:00:00.03	00:00:00.08
Cross-reference output	0	00:00:00.00	00:00:00.00
Assembler run totals	312	00:00:01.94	00:00:08.72

The working set limit was 900 pages.  
3381 bytes (7 pages) of virtual memory were used to buffer the intermediate code.  
There were 10 pages of symbol table space allocated to hold 6 non-local and 2 local symbols.  
345 source lines were read in Pass 1, producing 25 object records in Pass 2.  
0 pages of virtual memory were used to define 0 macros.

↑-----↑  
! Macro library statistics !  
↑-----↑

<u>Macro library name</u>	<u>Macros defined</u>
_\$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\$:MTHABS/OBJ=OBJ\$:MTHABS MSRC\$:MTHABS/UPDATE=(ENH\$:MTHABS)



A grid of 10 columns and 10 rows of small, low-contrast terminal screens. Each screen displays a different menu or utility interface. The screens are arranged in a regular grid pattern across the page.

Visible titles on the screens include:

- MTH4OVP LIS
- MTHABS LIS
- MTHAINT LIS
- MTHAMOD LIS
- MTHERR SOL
- MTHASIN LIS
- MTHCDABS LIS
- MTHATAN LIS
- MTHATANH LIS
- MTHCDLOG LIS
- MTHBITOPS LIS
- MTHALOG LIS
- MTHJACKET MAR
- MTHDEF FOR
- MTHACOS LIS
- MTHANTNT LIS
- MTHCABS LIS
- MTHCDEXP LIS