



```

MM      MM      TTTTTTTTTT  HH      HH      CCCCCCCC  DDDDDDDD  AAAAAA  BBBB8888  SSSSSSSS
MM      MM      TTTTTTTTTT  HH      HH      CCCCCCCC  DDDDDDDD  AAAAAA  BBBB8888  SSSSSSSS
MMMM    MMMM    TT          HH      HH      CC          DD          DD  AA      AA  BB      BB  SS
MMMM    MMMM    TT          HH      HH      CC          DD          DD  AA      AA  BB      BB  SS
MM      MM      TT          HH      HH      CC          DD          DD  AA      AA  BB      BB  SS
MM      MM      TT          HH      HH      CC          DD          DD  AA      AA  BB      BB  SS
MM      MM      TT          HHHHHHHHHH  CC          DD          DD  AA      AA  BBBB8888  SSSSSS
MM      MM      TT          HHHHHHHHHH  CC          DD          DD  AA      AA  BBBB8888  SSSSSS
MM      MM      TT          HH      HH      CC          DD          DD  AAAAAAAAAA  BB      BB  SS
MM      MM      TT          HH      HH      CC          DD          DD  AAAAAAAAAA  BB      BB  SS
MM      MM      TT          HH      HH      CC          DD          DD  AA      AA  BB      BB  SS
MM      MM      TT          HH      HH      CC          DD          DD  AA      AA  BB      BB  SS
MM      MM      TT          HH      HH      CCCCCCCC  DDDDDDDD  AA      AA  BBBB8888  SSSSSSSS
MM      MM      TT          HH      HH      CCCCCCCC  DDDDDDDD  AA      AA  BBBB8888  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
LLLLLLLLLL  IIIIII  SSSSSSSS
LLLLLLLLLL  IIIIII  SSSSSSSS

```

(2)	51	HISTORY	; Detailed Current Edit History
(3)	59	DECLARATIONS	
(3)	87	MTHSCDABS - D COMPLEX*16 Absolute Value	

```
0000 1 .TITLE MTHSCDABS D COMPLEX*16 Absolute value
0000 2 .IDENT /1-002/ ; File: MTHCDABS.MAR Edit: RNH1002
0000 3
0000 4
0000 5
0000 6 *****
0000 7 *
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0000 25 *
0000 26 *
0000 27 *****
0000 28
0000 29
0000 30
0000 31 FACILITY: MATH LIBRARY
0000 32 ++
0000 33 ABSTRACT:
0000 34 Return the absolute value of the D COMPLEX*16 value.
0000 35
0000 36
0000 37 --
0000 38
0000 39 VERSION: 1
0000 40
0000 41 HISTORY:
0000 42
0000 43 AUTHOR:
0000 44 Steven B. Lionel, 20-July-1979
0000 45
0000 46 MODIFIED BY:
0000 47
0000 48
0000 49
```

MTH\$CDABS  
1-002

J 15  
D COMPLEX\*16 Absolute value  
HISTORY ; Detailed Current Edit History

16-SEP-1984 01:06:19 VAX/VMS Macro V04-00  
6-SEP-1984 11:20:47 [MTHRTL.SRC]MTHCDABS.MAR;1

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(2)

0000 51 .SBTTL HISTORY ; Detailed Current Edit History  
0000 52  
0000 53  
0000 54 ; Edit History  
0000 55 :  
0000 56 : 1-001 - Adapted from MTH\$CABS version 1-002. SBL 20-July-1979  
0000 57 : 1-002 - Changed shared external references to G^ RNH 25- Sep-81

```
0000 59      .SBTTL  DECLARATIONS
0000 60
0000 61      :
0000 62      : INCLUDE FILES:
0000 63      :
0000 64      :
0000 65      :
0000 66      : EXTERNAL SYMBOLS:
0000 67      :
0000 68      :     .DSABL  GBL
0000 69      :     .EXTRN  MTH$DSQRT_R5
0000 70      :
0000 71      :
0000 72      : MACROS:
0000 73      :
0000 74      :
0000 75      :
0000 76      : PSECT DECLARATIONS:
0000 77      :     .PSECT  _MTH$CODE          PIC, SHR, LONG, EXE, NOWRT
0000 78      :
0000 79      :
0000 80      : EQUATED SYMBOLS:
0000 81      :
0000 82      :
0000 83      :
0000 84      : OWN STORAGE:
0000 85      :     NONE
0000 86      :
0000 87      :     .SBTTL  MTH$CDABS - D COMPLEX*16 Absolute Value
0000 88      :
0000 89      : ++
0000 90      : FUNCTIONAL DESCRIPTION:
0000 91      :
0000 92      :     MTH$CDABS computes the absolute value of a COMPLEX number (r, i)
0000 93      :     as follows:
0000 94      :
0000 95      :     result = ABS(MAX*SQRT'((MIN/MAX)**2 + 1))
0000 96      :
0000 97      : CALLING SEQUENCE:
0000 98      :     result.wdc.v = MTH$CDABS (arg.rdc.r)
0000 99      :
0000 100     :
0000 101     : INPUT PARAMETERS:
0000 102     :
0000 103     :     arg = 4 ; The address of the D COMPLEX*16 argument.
0000 104     :
0000 105     : IMPLICIT INPUTS:
0000 106     :     NONE
0000 107     :
0000 108     : OUTPUT PARAMETERS:
0000 109     :
0000 110     :
0000 111     : IMPLICIT OUTPUTS:
0000 112     :     NONE
0000 113     :
0000 114     : COMPLETION CODES:
0000 115     :     NONE
```

```

0000 116 :
0000 117 : FUNCTION VALUE:
0000 118 :
0000 119 : D Floating absolute value is returned in R0-R1.
0000 120 :
0000 121 : SIDE EFFECTS:
0000 122 : Signals: Invalid Operand if r or i are undefined (-0.0).
0000 123 : Floating overflow if r and i are both large.
0000 124 : --
0000 125 :
0000 126 :
003C 0000 127 .ENTRY MTH$CDABS, ^M<R2,R3,R4,R5>
0002 128 MTH$FLAG_JACKET ; resignal
6D 00000000'GF 9E 0002 MOVAB G^MTH$$JACKET_HND, (FP)
0009 ; set handler address to jacket
0009 ; handler
0009
54 04 AC D0 0009 129 MOVL arg(AP), R4 ; Get address of argument
50 84 7D 000D 130 MOVQ (R4)+, R0 ; Get real part
52 64 7D 0010 131 MOVQ (R4), R2 ; Get imaginary part
55 50 08 07 EF 0013 132 EXTZV #7, #8, R0, R5 ; Get exponent of real part
55 52 08 07 ED 0018 133 CMPZV #7, #8, R2, R5 ; Is imaginary part bigger?
54 50 7D 001D 134 BGEQ REALLO ; Yes, that is correct
50 52 7D 001F 135 MOVQ R0, R4 ; Swap values
52 54 7D 0022 136 MOVQ R2, R0
0025 137 MOVQ R4, R2
0028 138
0028 139 REALLO:
0028 140
0028 141 ; at this point R0-R1 contains MIN (the smaller of |ri and |ii), and
0028 142 ; R2-R3 contains MAX (the larger of |ri and |ii).
0028 143 :
52 73 0028 144 TSTD R2 ; divisor zero?
50 1B 13 002A 145 BEQL ZERO ; yes, answer is zero
50 52 66 002C 146 DIVD2 R2, R0 ; R0-R1 = MIN/MAX
50 50 64 002F 147 MULD2 R0, R0 ; R0-R1 = (MIN/MAX)**2
50 08 60 0032 148 ADDD2 #1, R0 ; R0-R1 = (MIN/MAX)**2 + 1
7E 52 7D 0035 149 MOVQ R2, -(SP) ; Save maximum
00000000'GF 16 0038 150 JSB G^MTH$DSQRT_R5 ; R0-R1 = SQRT((MIN/MAX)**2+1)
50 6E 64 003E 151 MULD2 (SP), R0 ; R0-R1 = MAX*SQRT((MIN/MAX)**2+1)
0041 152 ; Floating overflow could happen
50 8000 8F AA 0041 153 BICW #^X8000, R0 ; R0-R1 = ABS(...)
04 0046 154 RET ; with result in R0-R1
0047 155
0047 156 ZERO:
50 7C 0047 157 CLRQ R0 ; answer is zero
04 0049 158 RET
004A 159
004A 160
004A 161
004A 162 .END

```

MTH\$CDABS  
Symbol table

D COMPLEX\*16 Absolute value

M 15

16-SEP-1984 01:06:19  
6-SEP-1984 11:20:47

VAX/VMS Macro V04-00  
[MTHRTL.SRC]MTHCDABS.MAR;1

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(3)

ARG	=	00000004		
MTH\$\$JACKET_HND	*****		X	01
MTH\$CDABS	00000000		RG	01
MTH\$DSQRT_R5	*****		X	00
REALLO	00000028		R	01
ZERO	00000047		R	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	0000004A ( 74.)	01 ( 1.)	PIC	USR	CON	REL	LCL	SHR	EXE	RD	NOWRT	NOVEC	LONG

+-----+  
! Performance indicators !  
+-----+

Phase	Page faults	CPU Time	Elapsed Time
Initialization	33	00:00:00.07	00:00:00.93
Command processing	130	00:00:00.65	00:00:04.97
Pass 1	87	00:00:00.66	00:00:05.19
Symbol table sort	0	00:00:00.00	00:00:00.00
Pass 2	42	00:00:00.47	00:00:02.02
Symbol table output	2	00:00:00.02	00:00:00.12
Psect synopsis output	3	00:00:00.01	00:00:00.07
Cross-reference output	0	00:00:00.00	00:00:00.00
Assembler run totals	299	00:00:01.88	00:00:13.30

The working set limit was 900 pages.  
2685 bytes (6 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 0 local symbols.  
222 source lines were read in Pass 1, producing 11 object records in Pass 2.  
1 page of virtual memory was used to define 1 macro.

+-----+  
! 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\$:MTHCDABS/OBJ=OBJ\$:MTHCDABS MSRC\$:MTHJACKET/UPDATE=(ENH\$:MTHJACKET)+MSRC



