



```

000000  TTTTTTTTTT  SSSSSSSS  DDDDDDDD  IIIIII  VV  VV  CCCCCCCC
000000  TTTTTTTTTT  SSSSSSSS  DDDDDDDD  IIIIII  VV  VV  CCCCCCCC
00      00      SS      DD      DD      VV  VV  CC
00      00      SS      DD      DD      VV  VV  CC
00      00      SS      DD      DD      VV  VV  CC
00      00      SS      DD      DD      VV  VV  CC
00      00      SS      DD      DD      VV  VV  CC
00      00      SS      DD      DD      VV  VV  CC
00      00      SS      DD      DD      VV  VV  CC
00      00      SS      DD      DD      VV  VV  CC
00      00      SS      DD      DD      VV  VV  CC
00      00      SS      DD      DD      VV  VV  CC
00      00      SS      DD      DD      VV  VV  CC
000000  TT      SSSSSSSS  DDDDDDDD  IIIIII  VV  VV  CCCCCCCC
G00000  TT      SSSSSSSS  DDDDDDDD  IIIIII  VV  VV  CCCCCCCC

```

```

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) 49  
(3) 60  
(4) 97

HISTORY : Detailed Current Edit History  
DECLARATIONS  
COMPLEX / COMPLEX giving COMPLEX result

```

0000 1      .TITLE  OTSS$DIVC - COMPLEX / COMPLEX DIVISION ROUTINE
0000 2      .IDENT  /1-003/      ; File: OTSDIVC.MAR
0000 3
0000 4
0000 5 *****
0000 6 *****
0000 7      *  COPYRIGHT (c) 1978, 1980, 1982, 1984 BY
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0000 18     *  THE INFORMATION IN THIS SOFTWARE IS SUBJECT TO CHANGE WITHOUT NOTICE
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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     FACILITY: MATH LIBRARY
0000 30     ++
0000 31     ABSTRACT:
0000 32
0000 33         Perform COMPLEX division
0000 34
0000 35     --
0000 36
0000 37     VERSION: 0
0000 38
0000 39     HISTORY:
0000 40
0000 41     AUTHOR:
0000 42         Jonathan Taylor, 28-Jun-77: Version 0
0000 43
0000 44     MODIFIED BY:
0000 45
0000 46
0000 47

```

OTS  
Sym

A  
B  
C  
D  
MTH  
OTS

PSE  
---  
\_OT

Pha  
---  
Ini  
Com  
Pas  
Sym  
Pas  
Sym  
Pse  
Cro  
Ass

The  
307  
The  
237  
1 p

Mac  
---  
\_S2  
O G  
The  
MAC

OTSSDIVC  
1-003

H 5  
- COMPLEX / COMPLEX DIVISION ROUTINE 16-SEP-1984 01:52:56 VAX/VMS Macro V04-00  
HISTORY ; Detailed Current Edit History 6-SEP-1984 11:27:31 [MTHRTL.SRC]OTSDIVC.MAR;1

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(2)

```
0000 49 .SBTTL HISTORY ; Detailed Current Edit History
0000 50
0000 51
0000 52 ; Edit History for Version 0 of OTSDIVC
0000 53 ;
0000 54
0000 55 ; 0-04 - Change FOR$FLAG_JACKET to MTH$FLAG_JACKET. TNH 17-July-78
0000 56 ; 1-001 - Update version number and copyright notice. JBS 16-NOV-78
0000 57 ; 1-002 - Include MTHJACKET at assembly time. JBS 07-DEC-78
0000 58 ; 1-003 - Add "_" to the PSECT directive. JBS 22-DEC-78
```

\*\*F

```
0000 60      .SBTTL  DECLARATIONS
0000 61
0000 62 :
0000 63 : INCLUDE FILES:
0000 64 :
0000 65 :     MTHJACKET.MAR                ; Math jacketing macro
0000 66 :
0000 67 :
0000 68 : EXTERNAL SYMBOLS:
0000 69 :
0000 70 :     none
0000 71 :
0000 72 :
0000 73 : MACROS:
0000 74 :
0000 75 :     none
0000 76 :
0000 77 :
0000 78 : PSECT DECLARATIONS:
0000 79 :
00000000 80 :     .PSECT  _OTSS$CODE          PIC, SHR, LONG, EXE, NOWRT
0000 81 :                                     ; Program section for OTSS$ code
0000 82 :
0000 83 :
0000 84 : EQUATED SYMBOLS:
0000 85 :
00000004 0000 86 :     a      = 4                  ; real part of dividend
00000008 0000 87 :     b      = 8                  ; imag part of dividend
0000000C 0000 88 :     c      = 12                 ; real part of divisor
00000010 0000 89 :     d      = 16                 ; imag part of divisor
0000 90 :
0000 91 :
0000 92 : OWN STORAGE:
0000 93 :
0000 94 :     none
0000 95
```

```
0000 97 .SBTTL COMPLEX / COMPLEX giving COMPLEX result
0000 98
0000 99 :++
0000 100 : FUNCTIONAL DESCRIPTION:
0000 101 :
0000 102 : COMPLEX / COMPLEX giving COMPLEX result
0000 103 :
0000 104 :
0000 105 : The COMPLEX result is computed as follows:
0000 106 :
0000 107 : 1) Let (a, b) represent the COMPLEX dividend.
0000 108 : 2) Let (c, d) represent the COMPLEX divisor.
0000 109 : 3) Let (r, i) represent the COMPLEX quotient.
0000 110 :
0000 111 : Then:
0000 112 :
0000 113 :  $r = (ac + bd) / (cc + dd)$ 
0000 114 :  $i = (bc - ad) / (cc + dd)$ 
0000 115 :
0000 116 : CALLING SEQUENCE:
0000 117 :
0000 118 : Complex_quotient.wfc.w = OTSSDIVC(dividend.rfc.v, divisor.rfc.v)
0000 119 :
0000 120 : INPUT PARAMETERS:
0000 121 :
0000 122 : Dividend and divisor parameters are represented as standard
0000 123 : FORTRAN COMPLEX numbers and are CALL BY VALUE.
0000 124 :
0000 125 : IMPLICIT INPUTS:
0000 126 : NONE
0000 127 :
0000 128 : OUTPUT PARAMETERS:
0000 129 : NONE
0000 130 :
0000 131 : IMPLICIT OUTPUTS:
0000 132 : NONE
0000 133 :
0000 134 : FUNCTIONAL VALUE:
0000 135 :
0000 136 : The COMPLEX value returned is (a, b) / (c, d)
0000 137 :
0000 138 : SIDE EFFECTS:
0000 139 :
0000 140 : SSSARITH is SIGNALed by hardware on floating zero divide
0000 141 : SSSARITH is SIGNALed by hardware on floating overflow
0000 142 :--
```

```

003C 0000 144 .ENTRY OTSSDIVC, ^M<R2,R3,R4,R5> ; disable integer overflow
      0002 145 MTH$FLAG_JACKET ; establish math error handler
      0002
6D 00000000'GF 9E 0002 MOVAB G^MTH$$JACKET_HND, (FP)
      0009 ; set handler address to jacket
      0009 ; handler
      54 0C AC 7D 0009 MOVQ c(AP), R4 ; R4/R5 = divisor
      000D 146
      000D 147 ; Perform scaling of all operands before division
      000D 148
      000D 149
52 54 08 07 EF 000D 150 EXTZV #7, #8, R4, R2 ; R2 = R4<exp> 0,1,...377
51 55 08 07 EF 0012 151 EXTZV #7, #8, R5, R1 ; R1 = R5<exp> 0,1,...377
      52 51 B1 0017 152 CMPW R1, R2 ; R1 = MAX (c<exp>, d<exp>)
      14 03 14 001A 153 BGTR 2$
      51 52 B0 001C 154 MOVW R2, R1
      51 51 8E 001F 155 2$: MNEGB R1, R1 ; R1 = scaling exponent 0,377,376,....,1
51 51 07 9C 0022 156 ROTL #7, R1, R1 ; build a floating scale factor
      0026 157 ; scale all operands
      54 51 44 0026 158 MULF R1, R4 ; c
      55 51 44 0029 159 MULF R1, R5 ; d
52 04 AC 51 45 002C 160 MULF3 R1, a(AP), R2 ; a
      51 08 AC 44 0031 161 MULF b(AP), R1 ; b
      0035 162
50 54 52 45 0035 163 MULF3 R2, R4, R0 ; R0 = ac
53 55 51 45 0039 164 MULF3 R1, R5, R3 ; R3 = bd
      50 53 40 003D 165 ADDF R3, R0 ; R0 = ac+bd
      52 55 44 0040 166 MULF R5, R2 ; R2 = ad
      51 54 44 0043 167 MULF R4, R1 ; R1 = bc
      51 52 42 0046 168 SUBF R2, R1 ; R1 = bc - ad
      54 54 44 0049 169 MULF R4, R4 ; R4 = cc
      55 55 44 004C 170 MULF R5, R5 ; R5 = dd
      55 54 40 004F 171 ADDF R4, R5 ; R5 = cc + dd
      50 55 46 0052 172 DIVF R5, R0 ; R0 = (ac+bd) / (cc+dd)
      51 55 46 0055 173 DIVF R5, R1 ; R1 = (bc-ad) / (cc+dd)
      0058 174
      04 0058 175 RET ; (R0, R1) = (r, i)
      0059 176
      0059 177 .END
    
```



OTSS\$DIVC  
Symbol table

- COMPLEX / COMPLEX DIVISION ROUTINE<sup>L 5</sup>

16-SEP-1984 01:52:56  
6-SEP-1984 11:27:31

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

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(5)

A = 00000004  
B = 00000008  
C = 0000000C  
MTH\$\$JACKET\_HND \*\*\*\*\* X 01  
OTSS\$DIVC 00000000 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 |  |  |
| _OTSS\$CODE | 00000059 ( 89.) | 01 ( 1.)  | PIC        | USR | CON | REL | LCL | SHR   | EXE   | RD   | NOWRT | NOVEC | LONG |  |  |

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

| Phase                  | Page faults | CPU Time    | Elapsed Time |
|------------------------|-------------|-------------|--------------|
| Initialization         | 29          | 00:00:00.09 | 00:00:01.09  |
| Command processing     | 123         | 00:00:00.63 | 00:00:04.95  |
| Pass 1                 | 82          | 00:00:00.65 | 00:00:03.63  |
| Symbol table sort      | 0           | 00:00:00.00 | 00:00:00.00  |
| Pass 2                 | 46          | 00:00:00.55 | 00:00:01.97  |
| Symbol table output    | 2           | 00:00:00.02 | 00:00:00.02  |
| Psect synopsis output  | 2           | 00:00:00.01 | 00:00:00.01  |
| Cross-reference output | 0           | 00:00:00.00 | 00:00:00.00  |
| Assembler run totals   | 286         | 00:00:01.97 | 00:00:11.69  |

The working set limit was 750 pages.  
3048 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 1 local symbols.  
237 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\$:OTSDIVC/OBJ=OBJ\$:OTSDIVC MSRC\$:MTHJACKET/UPDATE=(ENH\$:MTHJACKET)+MSRC\$:

0264 AH-BT13A-SE  
VAX/VMS V4.0

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The image displays a grid of 100 small panels, each containing technical diagrams and text. The panels are arranged in a 10x10 grid. Many panels have labels such as 'OTSMULCD LIS', 'OTSPOWGC LIS', 'OTSDIUC LIS', 'OTSPOWDD LIS', 'OTSPOWCC LIS', 'OTSPOWCJ LIS', 'MHTAN LIS', 'MTHVECTOR LIS', 'OTSDIUCG LIS', 'OTSPOWCJ LIS', 'OTSPOWDLJ LIS', 'MHTANH LIS', 'OTSMULCG LIS', 'OTSPOWCGJ LIS', 'OTSPOWDJ LIS', 'OTSDIUCD LIS', and 'OTSPOWDC LIS'. Each panel contains a mix of text, small diagrams, and data tables.