


```

000000  TTTTTTTTTT  SSSSSSSS  DDDDDDDD  IIIIII  VV  VV  CCCCCCCC  GGGGGGGG
000000  TTTTTTTTTT  SSSSSSSS  DDDDDDDD  IIIIII  VV  VV  CCCCCCCC  GGGGGGGG
00  00  SS  DD  DD  II  VV  VV  CC  GG
00  00  SS  DD  DD  II  VV  VV  CC  GG
00  00  SS  DD  DD  II  VV  VV  CC  GG
00  00  SS  DD  DD  II  VV  VV  CC  GG
00  00  SS  DD  DD  II  VV  VV  CC  GG
00  00  SS  DD  DD  II  VV  VV  CC  GG
00  00  SS  DD  DD  II  VV  VV  CC  GG
00  00  SS  DD  DD  II  VV  VV  CC  GG
00  00  SS  DD  DD  II  VV  VV  CC  GG
00  00  SS  DD  DD  II  VV  VV  CC  GG
000000  TTT  SSSSSSSS  DDDDDDDD  IIIIII  VV  VV  CCCCCCCC  GGGGGGGG
000000  TTT  SSSSSSSS  DDDDDDDD  IIIIII  VV  VV  CCCCCCCC  GGGGGGGG

```

```

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) 45
(3) 53
(4) 87

HISTORY ; Detailed Current Edit History
DECLARATIONS
G COMPLEX*16 / G COMPLEX*16 giving G COMPLEX*16 result

```

0000 1      .TITLE  OTSSDIVCG - G COMPLEX*16 / G COMPLEX*16 DIVISION ROUTINE
0000 2      .IDENT  /1-001/ ; File: OTSDIVCG.MAR
0000 3
0000 4
0000 5 *****
0000 6 *****
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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 G COMPLEX*16 division
0000 34
0000 35      --
0000 36
0000 37      AUTHOR:
0000 38          Steven B. Lionel, 12-July-1979
0000 39
0000 40      MODIFIED BY:
0000 41
0000 42
0000 43

```

OTSS\$DIVCG
1-001

K 6

- G COMPLEX*16 / G COMPLEX*16 DIVISION R 16-SEP-1984 01:53:43 VAX/VMS Macro V04-00 Page 2
HISTORY ; Detailed Current Edit History 6-SEP-1984 11:27:37 [MTHRTL.SRC]OTSDIVCG.MAR;1 (2)

0000 45 .SBTTL HISTORY ; Detailed Current Edit History
0000 46
0000 47
0000 48 ; Edit History
0000 49 ;
0000 50
0000 51 ; 1-001 - Adapted from OTSS\$DIVC version 1-003. SBL 12-July-1979

**F

```
0000 53      .SBTTL  DECLARATIONS
0000 54
0000 55      :
0000 56      : INCLUDE FILES:
0000 57      :
0000 58
0000 59      :
0000 60      : EXTERNAL SYMBOLS:
0000 61      :
0000 62
0000 63      :
0000 64      : MACROS:
0000 65      :
0000 66
0000 67      :
0000 68      : PSECT DECLARATIONS:
0000 69      :
00000000 70      .PSECT  _OTSSCODE      PIC,  USR,  CON,  REL,  LCL,  SHR,  -
0000 71      EXE,  RD,  NOWRT,  LONG
0000 72
0000 73      :
0000 74      : EQUATED SYMBOLS:
0000 75      :
00000004 0000 76      a      = 4      ; real part of dividend
0000000C 0000 77      b      = 12     ; imag part of dividend
00000014 0000 78      c      = 20     ; real part of divisor
0000001C 0000 79      d      = 28     ; imag part of divisor
0000 80
0000 81      :
0000 82      : OWN STORAGE:
0000 83      :
0000 84      : none
0000 85
```

```

0000 87      .SBTTL  G COMPLEX*16 / G COMPLEX*16 giving G COMPLEX*16 result
0000 88
0000 89      :++
0000 90      : FUNCTIONAL DESCRIPTION:
0000 91      :
0000 92      : OTSS$DIVCG_R3 - G COMPLEX*16 / G COMPLEX*16 giving G COMPLEX*16 result
0000 93      :
0000 94      :
0000 95      : The COMPLEX*16 result is computed as follows:
0000 96      :
0000 97      : 1) Let (a, b) represent the COMPLEX*16 dividend.
0000 98      : 2) Let (c, d) represent the COMPLEX*16 divisor.
0000 99      : 3) Let (r, i) represent the COMPLEX*16 quotient.
0000 100     :
0000 101     : Then:
0000 102     :
0000 103     :  $r = (ac + bd) / (cc + dd)$ 
0000 104     :  $i = (bc - ad) / (cc + dd)$ 
0000 105     :
0000 106     : CALLING SEQUENCE:
0000 107     :
0000 108     : Complex_quotient.wgc.w = OTSS$DIVCG_R3(dividend.rgc.v, divisor.rgc.v)
0000 109     :
0000 110     : INPUT PARAMETERS:
0000 111     :
0000 112     : Dividend and divisor parameters are represented as
0000 113     : FORTRAN G COMPLEX*16 numbers and are CALL BY VALUE.
0000 114     : Passing 128 bit quantities by value is a violation
0000 115     : of the VAX calling standard, but is excused because
0000 116     : this is a code support routine not meant to be
0000 117     : callable by users.
0000 118     :
0000 119     : IMPLICIT INPUTS:
0000 120     : NONE
0000 121     :
0000 122     : OUTPUT PARAMETERS:
0000 123     : NONE
0000 124     :
0000 125     : IMPLICIT OUTPUTS:
0000 126     : NONE
0000 127     :
0000 128     : FUNCTIONAL VALUE:
0000 129     :
0000 130     : The G COMPLEX*16 value returned is (a, b) / (c, d)
0000 131     : in registers R0-R3! This is a violation of the VAX
0000 132     : calling standard, but is excused because this is
0000 133     : a code support routine, not meant to be callable
0000 134     : by users.
0000 135     :
0000 136     : SIDE EFFECTS:
0000 137     :
0000 138     : Modifies registers R0-R3!
0000 139     : $$$_ROPRAND if either argument is a reserved operand.
0000 140     : $$$_FLTOVF if floating overflow
0000 141     : $$$_FLTDIV if divide by zero
0000 142     :--

```

```

OFF0 0000 144      .ENTRY OTSS$DIVCG_R3, ^M<R4,R5,R6,R7,R8,R9,R10,R11>
      0002 145      MTH$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
      0009
      0009 146
      0009 147 ; Perform scaling of all operands before division
      0009 148 ;
51 14 AC 0B 04 EF 0009 149      EXTZV #4, #11, c(AP), R1      ; R1 = c(AP)<exp> 0,1,...3777
50 1C AC 0B 04 EF 000F 150      EXTZV #4, #11, d(AP), R0      ; R0 = d(AP)<exp> 0,1,...3777
      51 50 B1 0015 151      CMPW R0, R1          ; R0 = MAX (c<exp>, d<exp>)
      50 03 14 0018 152      BGTR 2$
      50 51 B0 001A 153      MOVW R1, R0
      50 50 AE 001D 154 2$: MNEGW R0, R0          ; R0 = scaling exponent 0,3777,3776,....,1
      50 50 04 9C 0020 155      ROTL #4, R0, R0      ; build a floating scale factor
      51 D4 0024 156      CLRL R1
      0026 157          ; scale all operands
58 14 AC 50 45FD 0026 158      MULG3 R0, c(AP), R8      ; R8-R9 gets c
5A 1C AC 50 45FD 002C 159      MULG3 R0, d(AP), R10     ; R10-R11 gets d
54 04 AC 50 45FD 0032 160      MULG3 R0, a(AP), R4      ; a
52 0C AC 50 45FD 0038 161      MULG3 R0, b(AP), R2      ; b
      003E 162
      50 58 54 45FD 003E 163      MULG3 R4, R8, R0        ; R0 = ac
      56 5A 52 45FD 0043 164      MULG3 R2, R10, R6      ; R7 = bd
      50 56 40FD 0048 165      ADDG2 R6, R0          ; R0 = ac+bd
      54 5A 44FD 004C 166      MULG2 R10, R4        ; R4 = ad
      52 58 44FD 0050 167      MULG2 R8, R2          ; R2 = bc
      52 54 42FD 0054 168      SUBG2 R4, R2          ; R2 = bc - ad
      58 58 44FD 0058 169      MULG2 R8, R8          ; R8 = cc
      5A 5A 44FD 005C 170      MULG2 R10, R10       ; R10 = dd
      58 5A 40FD 0060 171      ADDG2 R10, R8        ; R8 = cc + dd
      50 58 46FD 0064 172      DIVG2 R8, R0          ; R0 = (ac+bd) / (cc+dd)
      52 58 46FD 0068 173      DIVG2 R8, R2          ; R2 = (bc-ad) / (cc+dd)
      006C 174
      04 006C 175      RET          ; (R0-R1, R2-R3) = (r, i)
      006D 176
      006D 177
      .END

```


OTSS\$DIVCG
Symbol table

A = 00000004
B = 0000000C
C = 00000014
D = 0000001C
MTH\$\$JACKET_HND ***** X 01
OTSS\$DIVCG_R3 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 | 0000006D (109.) | 01 (1.) | PIC USR CON REL LCL SHR EXE RD NOWRT NOVEC LONG |

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

| Phase | Page faults | CPU Time | Elapsed Time |
|------------------------|-------------|-------------|--------------|
| Initialization | 33 | 00:00:00.08 | 00:00:00.69 |
| Command processing | 105 | 00:00:00.70 | 00:00:03.82 |
| Pass 1 | 78 | 00:00:00.76 | 00:00:02.95 |
| Symbol table sort | 0 | 00:00:00.00 | 00:00:00.00 |
| Pass 2 | 47 | 00:00:00.52 | 00:00:01.85 |
| Symbol table output | 2 | 00:00:00.01 | 00:00:00.01 |
| 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 | 269 | 00:00:02.12 | 00:00:09.41 |

The working set limit was 750 pages.
3071 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\$:OTSDIVCG/OBJ=OBJ\$:OTSDIVCG MSRC\$:MTHJACKET/UPDATE=(ENH\$:MTHJACKET)+MSRC

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

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