



```

000000  TTTTTT?TTT  SSSSSSSS  MM      MM  UU      UU  LL      CCCCCCCC  DDDDDDDD
000000  TTTTTTTTTT  SSSSSSSS  MM      MM  UU      UU  LL      CCCCCCCC  DDDDDDDD
00      00      TT      SS      MMMM  MMMM  UU      UU  LL      CC      DD      DD
00      00      TT      SS      MMMM  MMMM  UU      UU  LL      CC      DD      DD
00      00      TT      SS      MM  MM  UU      UU  LL      CC      DD      DD
00      00      TT      SSSSSS  MM      MM  UU      UU  LL      CC      DD      DD
00      00      TT      SSSSSS  MM      MM  UU      UU  LL      CC      DD      DD
00      00      TT      SS      MM      MM  UU      UU  LL      CC      DD      DD
00      00      TT      SS      MM      MM  UU      UU  LL      CC      DD      DD
00      00      TT      SS      MM      MM  UU      UU  LL      CC      DD      DD
00      00      TT      SS      MM      MM  UU      UU  LL      CC      DD      DD
000000  TT      SSSSSSSS  MM      MM  UUUUUUUUUU  LLLLLLLLLL  CCCCCCCC  DDDDDDDD
000000  TT      SSSSSSSS  MM      MM  UUUUUUUUUU  LLLLLLLLLL  CCCCCCCC  DDDDDDDD

```

```

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)	43
(3)	46
(4)	77

Edit History
DECLARATIONS
OTSSMULCD_R3 - D COMPLEX*16 Multiplication

```

0000 1      .TITLE  OTSSMULCD - D COMPLEX*16 Multiplication Routine
0000 2      .IDENT  /1-001/                               ; File: OTSMULCD.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 :++
0000 30 : FACILITY: Language-independent support library
0000 31 :
0000 32 : ABSTRACT:
0000 33 :
0000 34 :     A routine to provide compiled code support for D COMPLEX*16
0000 35 :     multiplication.
0000 36 :
0000 37 : ENVIRONMENT: User Mode, AST Reentrant
0000 38 :
0000 39 :--
0000 40 : AUTHOR: Steven B. Lionel, CREATION DATE: 13-July-1979
0000 41 :

```

OTS  
Sym  
A  
B  
C  
D  
MTH  
OTS  
  
PSE  
---  
\_OT  
  
Pha  
---  
Ini  
Com  
Pas  
Sym  
Pas  
Sym  
Pse  
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O G  
The  
MAC

OTSSMULCD  
1-001

- D COMPLEX\*16 Multiplication Routine F 7  
Edit History

16-SEP-1984 01:54:02  
6-SEP-1984 11:27:39

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

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(2)

\*\*F

0000 43 .SBTTL Edit History  
0000 44 ; 1-001 - Original. SBL 13-July-1979

```
0000 46      .SBTTL  DECLARATIONS
0000 47      :
0000 48      : INCLUDE FILES:
0000 49      :
0000 50      :
0000 51      :
0000 52      : EXTERNAL DECLARATIONS:
0000 53      :
0000 54      : .DSABL  GBL                ; Prevent undeclared
0000 55      :                                     ; symbols from being
0000 56      :                                     ; automatically global.
0000 57      :
0000 58      :
0000 59      : MACROS:
0000 60      :
0000 61      :
0000 62      :
0000 63      : EQUATED SYMBOLS:
0000 64      :
0000 65      :
0000 66      :
0000 67      : OWN STORAGE:
0000 68      :
0000 69      :
0000 70      :
0000 71      : PSECT DECLARATIONS:
0000 72      :
00000000 73      : .PSECT _CTSS$CODE PIC, USR, CON, REL, LCL, SHR, -
0000 74      : EXE, RD, NOWRT, LONG
0000 75
```

```

0000 77      .SBTTL OTSSMULCD_R3 - D COMPLEX*16 Multiplication
0000 78      :+
0000 79      : FUNCTIONAL DESCRIPTION:
0000 80      :
0000 81      :     This routine calculates the D COMPLEX*16 product of
0000 82      :     two D COMPLEX*16 values.
0000 83      :
0000 84      : CALLING SEQUENCE:
0000 85      :
0000 86      :     product.wdc.v = OTSSMULCD_R3 (multiplier.rdc.v, multiplicand.rdc.v)
0000 87      :
0000 88      : INPUT PARAMETERS:
0000 89      :
0000 90      :     multiplier                - D COMPLEX*16 passed by VALUE!
0000 91      :     Comprised of:
0000 92      :     a = 4                      ; Offset of real part of multiplier
00000004 0000 93      :     b = 12                     ; Offset of imaginary part of multiplier
0000000C 0000 94      :     multiplicand              - D COMPLEX*16 passed by VALUE!
0000 95      :     Comprised of:
00000014 0000 96      :     c = 20                     ; Offset of real part of multiplicand
0000001C 0000 97      :     d = 28                     ; Offset of imaginary part of multiplicand
0000 98      :
0000 99      : IMPLICIT INPUTS:
0000 100     :
0000 101     :     NONE
0000 102     :
0000 103     : OUTPUT PARAMETERS:
0000 104     :
0000 105     :     NONE
0000 106     :
0000 107     : IMPLICIT OUTPUTS:
0000 108     :
0000 109     :     NONE
0000 110     :
0000 111     : FUNCTION VALUE:
0000 112     :
0000 113     :     The D COMPLEX*16 product is returned in registers R0 through R3!
0000 114     :     This is a violation of the VAX calling standard, but is allowed
0000 115     :     because this is a compiled code support routine.
0000 116     :
0000 117     : SIDE EFFECTS:
0000 118     :
0000 119     :     Modifies registers R0-R3!
0000 120     :     Possible error signals are:
0000 121     :     $$$ ROPRAND      - Reserved operand
0000 122     :     MTH$_FLOOVEMAT  - Floating overflow
0000 123     :
0000 124     :--
0000 125     :
0030 0000 126     .ENTRY OTSSMULCD_R3, ^M<R4, R5>
0002 0002 127     MTH$FLAG_JACKET          ; Establish math error handler
6D 00000000'GF 9E 0002
0009 0009          MOVAB G^MTH$$JACKET_HND, (FP)
0009 0009          ; set handler address to jacket
0009 0009          ; handler
0009 128 :+
    
```

```

0009 129 :      Complex multiplication is defined as:
0009 130 :
0009 131 :      real part = ac-bd
0009 132 :      imaginary part = ad+bc
0009 133 :
50 14 AC 04 AC 65 0009 134 :      MULD3 a(AP), c(AP), R0 ; R0-R1 = ac
54 1C AC 0C AC 65 000F 135 :      MULD3 b(AP), d(AP), R4 ; R4-R5 = bd
50 54 62 0015 136 :      SUBD2 R4, R0 ; R0-R1 = ac-bd
52 1C AC 04 AC 65 0018 137 :      MULD3 a(AP), d(AP), R2 ; R2-R3 = ad
54 14 AC 0C AC 65 001E 138 :      MULD3 b(AP), c(AP), R4 ; R4-R5 = bc
52 54 60 0024 139 :      ADDD2 R4, R2 ; R2-R3 = ad+bc
04 0027 140 :      RET ; Return with product in R0-R3
0028 141
0028 142
.END

```



OTSSMULCD  
Symbol table

- D COMPLEX\*16 Multiplication Routine J 7

16-SEP-1984 01:54:02  
6-SEP-1984 11:27:39

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

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OTS  
1-C

```

A      = 00000004
B      = 0000000C
C      = 00000014
D      = 0000001C
MTHSSJACKET_HND ***** X 01
OTSSMULCD_RS 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		
_OTSSCODE	00000028 ( 40.)	01 ( 1.)	PIC	USR	CON	REL	LCL	SHR	EXE	RD	NOWRT	NOVEC	LONG		

```

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

```

Phase	Page faults	CPU Time	Elapsed Time
Initialization	30	00:00:00.09	00:00:00.78
Command processing	120	00:00:00.78	00:00:04.96
Pass 1	83	00:00:00.62	00:00:02.94
Symbol table sort	0	00:00:00.00	00:00:00.00
Pass 2	41	00:00:00.46	00:00:02.56
Symbol table output	2	00:00:00.02	00:00:00.09
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	280	00:00:02.02	00:00:11.46

The working set limit was 900 pages.  
 2250 bytes (5 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.  
 202 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\$:OTSMULCD/OBJ=OBJ\$:OTSMULCD MSRCS:MTHJACKET/UPDATE=(ENHS:MTHJACKET)+MSRC

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

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The image displays a grid of 100 small terminal windows, each showing a different system log or diagnostic output. The windows are arranged in a 10x10 grid. Many windows contain the text 'OTSPWCC LIS' or 'OTSDIUC LIS'. Other visible text includes 'MHTAN LIS', 'MTHVECTOR LIS', 'OTSMULCG LIS', 'OTSPWCGJ LIS', 'OTSPWDD LIS', 'OTSPWGG LIS', 'OTSPWJ LIS', and 'OTSPWDLJ LIS'. The windows also show various data tables, error messages, and system status indicators.