


```
CCCCCCCC 000000 BBBB8888 MM MM UU UU LL QQQQQQ
CCCCCCCC 000000 88888888 MM MM UU UU LL QQQQQQ
CC        00      00  BB      BB MMMM MMMM UU UU LL
CC        00      00  BB      BB MMMM MMMM UU UU LL
CC        00      00  BB      BB MM  MM  UU UU LL
CC        00      00  BB      BB MM  MM  UU UU LL
CC        00      00  BB888888 MM  MM  UU UU LL
CC        00      00  88888888 MM  MM  UU UU LL
CC        00      00  BB      BB MM  MM  UU UU LL
CC        00      00  BB      BB MM  MM  UU UU LL
CC        00      00  BB      BB MM  MM  UU UU LL
CC        00      00  BB      BB MM  MM  UU UU LL
CCCCCCCC 000000 88888888 MM  MM  UUUUUUUUUU LLLLLLLLLL
CCCCCCCC 000000 88888888 MM  MM  UUUUUUUUUU LLLLLLLLLL
```

```
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) 52
(3) 65
(4) 95

HISTORY ; Detailed Current Edit History
DECLARATIONS
COB\$MULQ_R8

```

0000 1      .TITLE COB$MULQ_R8      COBOL Multiply Quadwords
0000 2      .IDENT /1-006/          ; File: COB$MULQ.MAR
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: COBOL ARITHMETIC
0000 32 ++
0000 33 ABSTRACT:
0000 34 This module contains the routine which multiplies two
0000 35 quadwords, producing a quadword result.
0000 36
0000 37 --
0000 38
0000 39
0000 40 VERSION: 1
0000 41
0000 42 HISTORY:
0000 43
0000 44 AUTHOR:
0000 45 John Sauter, 22-DEC-78
0000 46
0000 47 MODIFIED BY:
0000 48
0000 49
0000 50

```

COBSMULQ_R8
1-006

COBOL Multiply Quadwords
HISTORY ; Detailed Current Edit History

K 15

15-SEP-1984 23:46:26 VAX/VMS Macro V04-00
6-SEP-1984 10:48:20 [COBRTL.SRC]COBMULQ.MAR;1

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(2)

```
0000 52      .SBTTL HISTORY          ; Detailed Current Edit History
0000 53
0000 54
0000 55 : Edit History for Version 1 of COBMULQ
0000 56 :
0000 57 : 1-001 - Original from Architecture Handbook, page 6-28.
0000 58 : 1-002 - Correct some comments. JBS 26-DEC-78
0000 59 : 1-003 - Make the entry point symbol global. JBS 03-JAN-1979
0000 60 : 1-004 - Minor cleanups. MLJ 10-Mar-1979
0000 61 : 1-005 - Make overlapping input and output operands work correctly.
0000 62 : RKR 24-SEPT-79
0000 63 : 1-006 - Cosmetic changes. RKR 21-OCT-79
```

```
0000 65      .SBTTL  DECLARATIONS
0000 66
0000 67 :
0000 68 : INCLUDE FILES:
0000 69 :
0000 70 :
0000 71 :
0000 72 : EXTERNAL SYMBOLS:
0000 73 :     NONE
0000 74 :
0000 75 :
0000 76 :
0000 77 : MACROS:
0000 78 :     NONE
0000 79 :
0000 80 :
0000 81 :
0000 82 : PSECT DECLARATIONS:
0000 83 :     .PSECT  _COB$CODE      PIC, SHR, LONG, EXE, NOWRT
0000 84 :
0000 85 :
0000 86 : EQUATED SYMBOLS:
0000 87 :     NONE
0000 88 :
0000 89 :
0000 90 :
0000 91 : OWN STORAGE:
0000 92 :     NONE
0000 93 :
```

```

0000 95      .SBTTL COB$MULQ_R8
0000 96
0000 97      :++
0000 98      : FUNCTIONAL DESCRIPTION:
0000 99      :
0000 100     : Multiplies two quadwords, producing a quadword result.
0000 101     : There is no check for overflow; the low-order 64 bits
0000 102     : are returned.
0000 103     :
0000 104     : CALLING SEQUENCE:
0000 105     :
0000 106     : JSB COB$MULQ_R8 (multiplier.rq.r, multiplicand.rq.r, product.wq.r)
0000 107     :
0000 108     : Arguments are passed in R6, R7 and R8.
0000 109     :
0000 110     : INPUT PARAMETERS:
0000 111     :
0000 112     : MULTIPLIER.rq.r      Value to the right of the *
0000 113     : MULTIPLICAND.rq.r   Value to the left of the *
0000 114     :
0000 115     : IMPLICIT INPUTS:
0000 116     :
0000 117     : All of the trap bits in the PSL are assumed off.
0000 118     :
0000 119     : OUTPUT PARAMETERS:
0000 120     :
0000 121     : PRODUCT.wq.r          The result of the multiply.
0000 122     :
0000 123     : IMPLICIT OUTPUTS:
0000 124     :
0000 125     : NONE
0000 126     :
0000 127     : COMPLETION CODES:
0000 128     :
0000 129     : NONE
0000 130     :
0000 131     : SIDE EFFECTS:
0000 132     :
0000 133     : Destroys registers R0 through R8.
0000 134     :
0000 135     :--
0000 136     :
0000 137     COB$MULQ R8::
54  00 67 66 7A 0000 138     EMUL      (R6), (R7), #0, R4 ; Multiply low half - Result to R4,R5
50  67 04 A6 C5 0005 139     MULL3    4(R6), (R7), R0 ; Form cross products
51  04 A7 66 C5 000A 140     MULL3    (R6), 4(R7), R1 ;
03  50 51 C0 000F 141     ADDL2   R1, R0 ; Sum cross products
03  66 1F E1 0012 142     BBC     #31, (R6), 10$ ; Compensate for unsigned bias
03  50 67 C0 0016 143     ADDL2   (R7), R0 ;
03  67 1F E1 0019 144 10$: BBC     #31, (R7), 20$ ; Compensate for unsigned bias
03  50 66 C0 001D 145     ADDL2   (R6), R0 ;
05  55 50 C0 0020 146 20$: ADDL2   R0, R5 ; Add in cross product
05  68 54 7D 0023 147     MOVQ    R4, (R8) ; Return result
05  0026 148     RSB ; Return
0027 149     :
0027 150     .END

```

COB\$MULQ_RB
Symbol table

COBOL Multiply Quadwords

N 15

15-SEP-1984 23:46:26
6-SEP-1984 10:48:20

VAX/VMS Macro V04-00
[COBRTL.SRC]COBMULQ.MAR;1

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(4)

COB\$MULQ_RB 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
COB\$CODE	00000027 (39.)	01 (1.)	PIC USR CON REL LCL SHR EXE RD NOWRT NOVEC LONG

! Performance indicators !

Phase	Page faults	CPU Time	Elapsed Time
Initialization	29	00:00:00.03	00:00:00.43
Command processing	116	00:00:00.30	00:00:02.21
Pass 1	66	00:00:00.24	00:00:02.12
Symbol table sort	0	00:00:00.00	00:00:00.00
Pass 2	41	00:00:00.20	00:00:00.89
Symbol table output	1	00:00:00.00	00:00:00.00
Psect synopsis output	3	00:00:00.01	00:00:00.02
Cross-reference output	0	00:00:00.00	00:00:00.00
Assembler run totals	258	00:00:00.79	00:00:05.67

The working set limit was 900 pages.
1644 bytes (4 pages) of virtual memory were used to buffer the intermediate code.
There were 10 pages of symbol table space allocated to hold 1 non-local and 2 local symbols.
150 source lines were read in Pass 1, producing 8 object records in Pass 2.
0 pages of virtual memory were used to define 0 macros.

! 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\$:COBMULQ/OBJ=OBJ\$:COBMULQ MSRC\$:COBMULQ/UPDATE=(ENH\$:COBMULQ)

0063 AH-BT13A-SE
VAX/VMS V4.0

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This image displays a grid of 144 small, faded screenshots of COBOL programs, arranged in 12 rows and 12 columns. Each screenshot shows a different program, with its title visible in the top-left corner. The titles include:

- COBPAUSE LIS
- COBMSG LIS
- COBHANDLE LIS
- COBINTAR LIS
- COBINTER LIS
- COBMILQ LIS
- COBPOSERA LIS
- COBIOEXCE LIS
- COBIMAGE LIS
- COBKEY LIS
- COBINUSE LIS

The screenshots themselves are mostly illegible due to fading, but they appear to contain various types of data, including lists, tables, and text-based reports. The overall appearance is that of a collection of program outputs or a library of sample programs.