

LOGIC AND USE OF THE MULTIPLICATION WORKSHEET

The instructions required to execute a multiplication are not as numerous as those for division; nevertheless, the multiplication worksheet can help the programmer secure a product correctly signed and rounded to the proper number of decimal places with a minimum of programming effort. The multiplication is performed in the same area (BFIELD) used for division. The programmer must provide a sufficient number of digits in this area to accommodate the longest multiplication or division in the program.

The general logic and use of the multiplication worksheet is similar to that of the division worksheet. Instruction (4) provides for moving the sign from the low order digit of the product area (where it is developed by the multiply instruction) to the low order digit of the rounded product. Thus, if the product is known to be positive, it can be left unsigned and Instruction (4) can be omitted. Furthermore, if the low order digit of the desired product coincides with the low order digit of the product area (as, for example, when two whole numbers are multiplied and the product is desired as a whole number), the product must not be rounded and thus Instructions (3) and (4) must be omitted. These exceptions are noted on the worksheet. The worksheet will also call the programmer's attention to illogical demands with respect to the number of decimal places he wants in the product.

MULTIPLICATION WORKSHEET

Program _____ Date _____

<u>Name of Field</u>	<u>Length of Field</u>	<u>Decimal Places</u>
Multiplicand _____	A = _____	C = _____
Multiplier _____	B = _____	D = _____
Product _____	H _____	E = _____

Computation of Character Adjustments

F = B - 1 = _____

G = A + B = _____

H = G + E + 1 - C - D = _____

J = H - 1 = _____

C + D - E = _____ If 0, see exception (2). If minus or greater than G, check for illogical demand.

Required Constants

<u>Count</u>	<u>Label</u>	<u>OP Code</u>	<u>Contents</u>
1	BFIELD	DCW *	Count must be at least as great as G.
		DC *	
1	FIVE	DCW *	5

Instructions

<u>Number</u>	<u>OP Code</u>	<u>A-Address</u>	<u>B-Address</u>
1	ZA	_____ Multiplier	BFIELD + _____ F
2	M	_____ Multiplicand	BFIELD + _____ G
3	A	FIVE	BFIELD + _____ H
4	MZ	BFIELD + _____ G	BFIELD + _____ J

The product is located at BFIELD + J, is signed, and is H digits in length.

Exceptions

- 1) If the Product is known to be positive, omit Instruction (4). The product will be unsigned except when C + D - E = 0.
- 2) If C + D - E = 0, omit Instructions (3) and (4). The Product will be signed.

Checks for illogical demands

- 1) C + D - E should not be negative.
- 2) C + D - E must not be greater than G.