LAB #3: WRITING AND TESTING A SIMPLE PROGRAM

OBJECTIVE

Introduce students to writing and testing a program in HC11 assembly language and using the BUFFALO I/O routines to display/verify the results.

MATERIALS

- Axiom MC68HC11 EVBU kit

ASSIGNMENT

Write a program to compute the product of a 3-byte number (multiplicand) stored at memory locations $00-$02 and a 1-byte number (multiplier) stored at memory location $03. Save the 4-byte product at memory locations $04-$07.

The multiplication can be carried out in the following manner:

	MSB	MID	LSB	
	XX	XX	XX	**Multiplicand**
´			XX	**Multiplier**
		MSB	LSB	
		XX	XX	**P1**
	MSB	LSB		
	XX	XX		**P2**
MSB	LSB			
XX	XX			**P3**
MSB	MID-H	MID-L	LSB	
XX	XX	XX	XX	**Product**

The steps of the above algorithm can be summarized as follows:

1) Allocate memory (3 bytes) for multiplicand M
2) Allocate memory (1 byte) for multiplier N
3) Allocate memory (4 bytes) for product P
4) Allocate memory (2 bytes) for P1
5) Allocate memory (2 bytes) for P2
6) Allocate memory (2 bytes) for P3
7) Read Multiplicand LSB to accumulator A (ACCA)
8) Read Multiplier to accumulator B (ACCB)

9) Multiply ACCA and ACCB (the result is saved in register D)
10) Store ACCB to Product LSB
11) Store ACCA to P1 MSB
12) Read Multiplicand MID to ACCA
13) Read Multiplier to ACCB
14) Multiply ACCA and ACCB
15) Store D register to P2
16) Read Multiplicand MSB to ACCA
17) Read Multiplier to ACCB
18) Multiply ACCA and ACCB
19) Store D register to P3
20) Read P1 MSB to ACCA
21) Add P2 LSB
22) Store sum to Product MID-L
23) Read P2 MSB to ACCA
24) Add with carry P3 LSB
25) Store sum to Product MID-H
26) Read P3 MSB to ACCA
27) Add with carry, zero
28) Store sum to Product MSB

Variable memory allocation should start at memory location $00 and the code should be stored starting at memory location $0100.

PRE-LAB

1) Write and debug your code.
2) Generate the listing and S-record of your code. Bring a copy of your list file with you to the lab. You must always have a printout of the list file for any program you run on the EVBU board. A list file is an essential debugging tool.

IN-LAB

1) Download the S-record of your code to the EVBU board.
2) Demonstrate your code to the lab instructor.
3) Test your code by using the different values of Multiplicand and Multiplier provided by the instructor in the lab.