

Project 1: ICOM 4215 – Computer Architecture and Organization  
Fall 2010

The following file is provided for testing the first project:

Location of Instruction (hex)	Instruction	Opcode	Operand	Hex	Effect
00-01	LDI 25	01 100	000 0001 1001	6019	The accumulator gets a 00011001. Zero, Carry, Overflow and Negative flags are set to 0 (false). <b>Note:</b> the number in accumulator is 25.
02-03	STA r1	01 001	001 0000 0000	4900	Register 1 gets a 00011001. <b>Note:</b> the number on register 1 is a 25.
04-05	LDI -10	01 100	000 11110110	60F6	The accumulator gets a 11110110. Negative flag changes to a 1. <b>Note:</b> the number in the accumulator is a -10 following 2's complement notation.
06-07	STA r2	01 001	010 0000 0000	4A00	Register 2 gets a 11110110. <b>Note:</b> The number in register 2 is -10, following 2's complement notation.
08-09	LDI 2	01 100	000 0000 0010	6002	The accumulator gets a 00000010. Negative flag changes to 0. <b>Note:</b> The number in the accumulator is a 2.
0A-0B	STA r3	01 001	011 0000 0000	4B00	Register 3 gets a 00000010. <b>Note:</b> The number in register 3 is a 2.
0C-0D	STA [128]	01 011	000 1000 0000	5880	Memory location 128 gets a 00000010. <b>Note:</b> address 128 gets a 2.
0E-0F	ADDC A, r1	00 010	001 0000 000	1100	ALU adds 00000010 and 00011001 getting a 00011011. This is loaded into the Accumulator. All flags set to 0. <b>Note:</b> The ALU adds 2 plus 25 and results 27. This result is saved in the accumulator.
10-11	STA [129]	01 011	000 1000 0001	5881	Store 00011011 into memory location 129. <b>Note:</b> the contents of the alu, that is, a 27, is saved in address 129.
12-13	ADDC A, r2	00 010	010 0000 0000	1200	ALU adds 00011011 and 11110110 getting a 00010001. Carry flag set to 1. Overflow, Neg, Zero set to 0. <b>Note:</b> Add 27 plus -10 using 2's

					complement notation. Results in 17 with no overflow, but carry.
14-15	STA [130]	01 011	000 1000 0010	5882	Store 00010001 in memory location 130. <b>Note:</b> 17 is saved in address 130.
16-17	LDA [250]	01 010	000 1111 1010	50FA	Load Accumulator with contents of keyboard. The contents is unknown until user presses the key. The accumulator will contain the ascii code of the letter or character pressed.
18-19	STA r1	01 001	001 0000 0000	4900	Register 1 gets a ????. Note: the number on register 1 is unknown.
1A-1B	NEG A	00 100	000 0000 0000	2000	Twos complement of the contents of the accumulator. Carry and overflow flags are 0 but we do not know contents of Zero and Neg flags.
1C-1D	ADDC A, r2	00 010	010 0000 0000	1200	Add a number and its complement. Accumulator will have a zero. Zero flag is set. All other flags are zero.
1E-1F	BRA [34]	10 101	000 0010 0010	A822	Jump without condition to instruction located in address 22.
20-21	STA r1	01 001	001 0000 0000	4900	This instruction should not be executed. If executed, register 1 gets a 0.
22-23	LDI 78	01 100	00001001110	604E	Load Accumulator with 01001110. All flags to zero.
24-25	STA [252]	01 011	000 1111 1100	58FC	Display a N in firs display location, as well as in location 252 in memory. <b>Note:</b> the ascii code for a capital N is 78.
26-27	STOP	11 111	000 0000 0000	F800	Cease operation. No changes to anything.

Binario	- Hex
0110000000011001	6019
0100100100000000	4900
0110000011110110	60F6
0100101000000000	4A00
0110000000000010	6002

0100101100000000	4B00
0101100010000000	5880
0001000100000000	1100
0101100010000001	5881
0001001000000000	1200
0101100010000010	5882
0101000011111010	50FA
0100100100000000	4900
0010000000000000	2000
0001001000000000	1200
1010100000010110	A822
0100100100000000	4900
0110000001001110	604E
0101100011111100	58FC
1111100000000000	F800

Code

6019  
4900  
60F6  
4A00  
6002  
4B00  
5880  
1100  
5881  
1200  
5882  
50FA  
4900  
2000  
1200  
A816  
4900

604E  
58FC  
F800