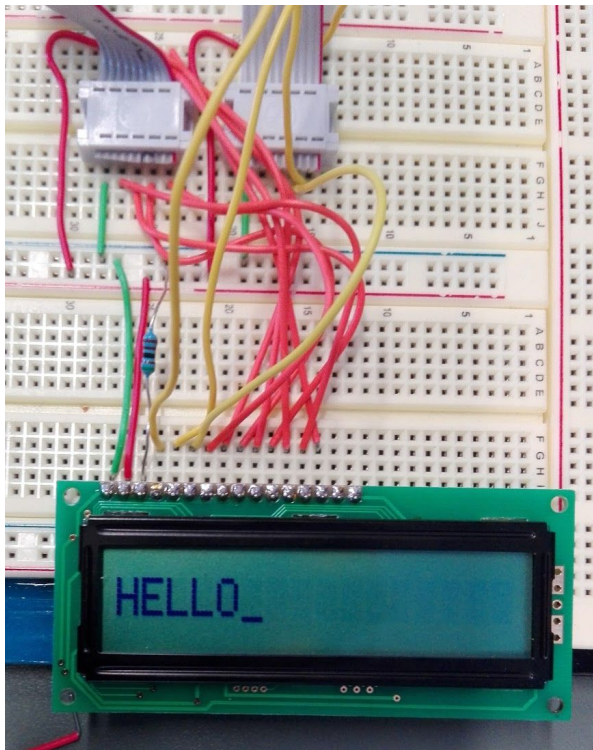


## Lab Session 5

### Introduction to microprocessor machine code programming

Edit FLASH Buffer																																	
Edit																																	
Addr	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	0123456789ABCDEF																
00000	74	38	11	36	11	50	74	0E	11	36	11	50	74	01	11	36	t8.6.Pt...6.Pt...6	^															
00010	11	50	74	06	11	36	11	50	74	48	11	43	11	50	74	45	.Pt...6.PtH.C.PtE																
00020	11	43	11	50	74	4C	11	43	11	50	74	4C	11	43	11	50	.C.PtL.C.PtL.C.P																
00030	74	4F	11	43	80	FE	F5	90	C2	A0	C2	A1	D2	A2	11	50	t0.C.....P																
00040	C2	A2	22	F5	90	D2	A0	C2	A1	D2	A2	11	50	C2	A2	22	..\".....P..\"																
00050	7B	32	7C	FF	DC	FE	DB	FA	22	FF	FF	FF	FF	FF	FF	FF	{2 .....\".....																
00060	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	.....																



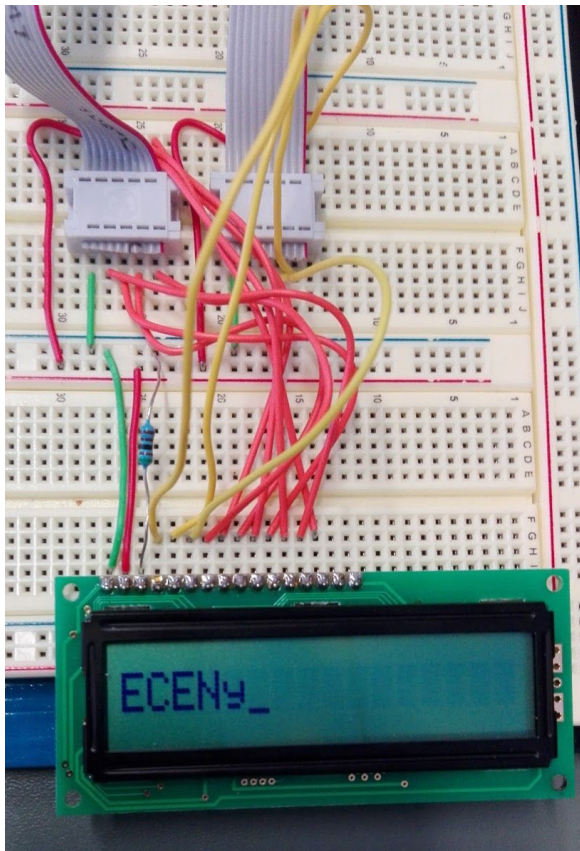
The above buffer is displaying a .hex file containing the machine instructions to display the ASCII string 'HELLO' on the external LCD screen.

This uses 2 main instructions

74, MOV A #data[2B] : Add 2 Bytes of immediate data to Accumulator

11, ACALL (P0) [2B, 2C] ACALL unconditionally calls a subroutine located at the indicated address, in this case PORT 0 i/o

Edit FLASH Buffer																																		
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Addr	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	01	2	3	4	5	6	7	8	9	A	B	C	D	E	F			
00000	74	38	11	36	11	50	74	0E	11	36	11	50	74	01	11	36	t	8	.	P	t	.	.	6	.	P	t	.	.	6	.			
00010	11	50	74	06	11	36	11	50	74	45	11	43	11	50	74	43	.	P	t	.	.	6	.	P	t	E	.	C	.	P	t	C		
00020	11	43	11	50	74	45	11	43	11	50	74	4E	11	43	11	50	.	C	.	P	t	E	.	C	.	P	t	N	.	C	.	P		
00030	74	79	11	43	80	FE	F5	90	C2	A0	C2	A1	D2	A2	11	50	t	y	.	C	.	.	.	.	.	.	.	.	.	.	.	P		
00040	C2	A2	22	F5	90	D2	A0	C2	A1	D2	A2	11	50	C2	A2	22	.	.	"	.	.	.	.	.	.	.	.	.	.	.	P	.	"	
00050	7B	32	7C	FF	DC	FE	DB	FA	22	FF	FF	FF	FF	FF	FF	FF	{	2		.	.	.	.	.	.	.	.	.	.	.	"	.	.	.
00060	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.



The Above buffer is displaying the edited .hex file to display the ASCII string 'ECENy'

To do this I editing the the absolute data following the 74 instructions, ie the data that is moved to the accumulator to be processed.

So I insert the ascii values at the 74 MOV A calls that are responsible for processing data to the LCD data line.