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Career: ITE

Practice 1: Rotabit

Description:

Use the pins from the microcontroller to send and receive digital signals. With a switch you most control 4 LEDS making a certain pattern, depending if this switch is pressed or not. If it is not pressed the LEDS will move from one to another in a specific order and when it reaches the last led it will restart from the start. If it is pressed the LEDS will do the same but when it reaches the last led it will bounce and it will start moving like a zig zag, from the first led to the last and backwards.

Connections

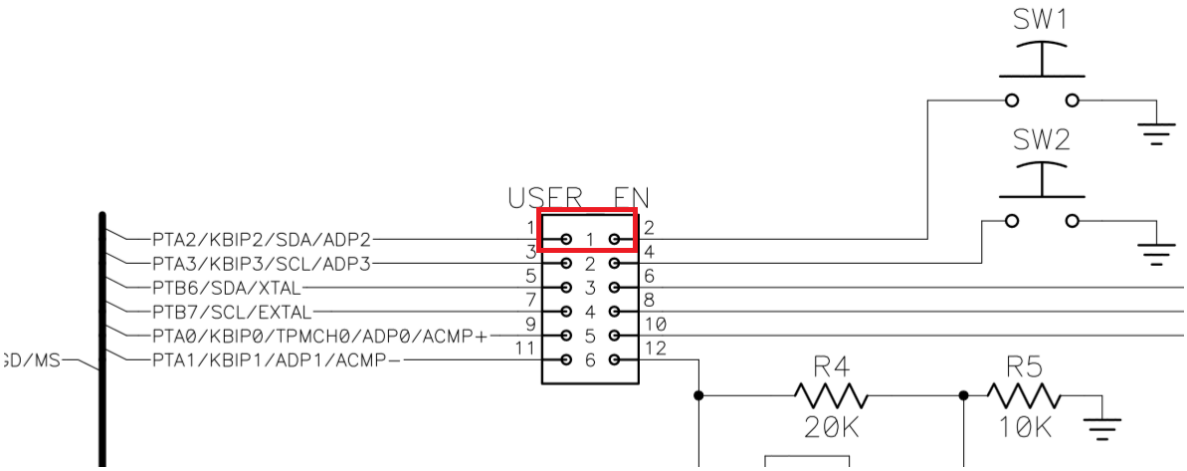
I/O PORT CONNECTOR

This port connector provides access to DEMO9S08QG8 I/O signals. Signal positions not shown listed are not connected on the board.

Figure 6: MCU I/O Port Connector

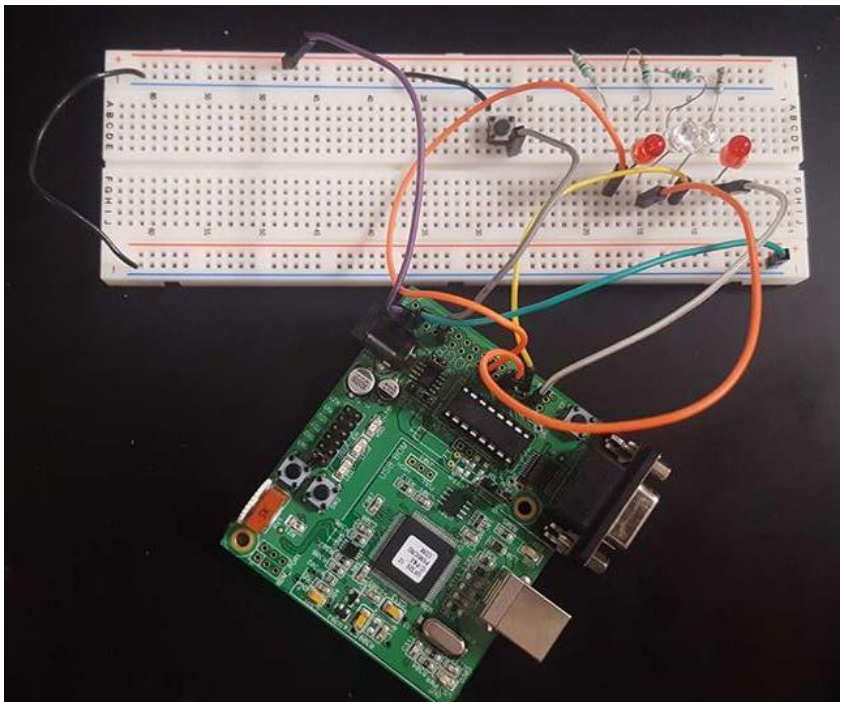
VDD	1	2	PTA5/RESET*/IRQ*/TCLK
VSS	3	4	PTA5/ RESET*/IRQ*/TCLK
PTB1/KBI1P5/ADC1P5/TXD1	5	6	PTA4/BKGD/MS/ACMP10
PTB0/KBI1P4/ADC1P4/RXD1	7	8	PTB7/SCL1/EXTAL
PTA2/KBI1P2/ADC1P2/SDA1	9	10	PTB6/SDA1/XTAL
PTA3/KBI1P3/ADC1P3/SCL1	11	12	
PTA5/ RESET*/IRQ*/TCLK	13	14	
PTA0/KBI1P0/ADC1P0/TPM1CH0/AMCP+	15	16	
PTB3/KBI1P7/ADC1P7/MOSI1	17	18	PTA1/KBI1P1/ADC1P1/ACMP1-
PTB4/MISO1	19	20	PTA0/KBI1P0/ADC1P0/TPM1CH0/AMCP+
PTB2/KBI1P6/ADC1P6/SPSCK1	21	22	
PTB5/TPM1CH1/SS1	23	24	
PTA1/KBI1P1/ADC1P1/ACMP1-	25	26	
PTB6/SDA1/XTAL	27	28	
PTB7/SCL1/EXTAL	29	30	
PTA4/BKGD/MS/ACMP10	31	32	

PIN 1: I used it to connect the leds to the Demo card because they dont work with ground, They are connected to VDD.
PIN 19: For the first LED
PIN 23: For the second LED
PIN 27: For the third LED
PIN 29: For the fourth LED



SW1 to PTA2 : to enable the switch

Circuit built for this practice



It has an extra switch on the protoboard because I didn't knew how to make the ones on the Demo card work but I finally how to solve this problem

Decisions made:

For this practice I decided to make an array that would make the LEDS light up in a certain order, but this array was of 6 elements, so for the first part of the practice I

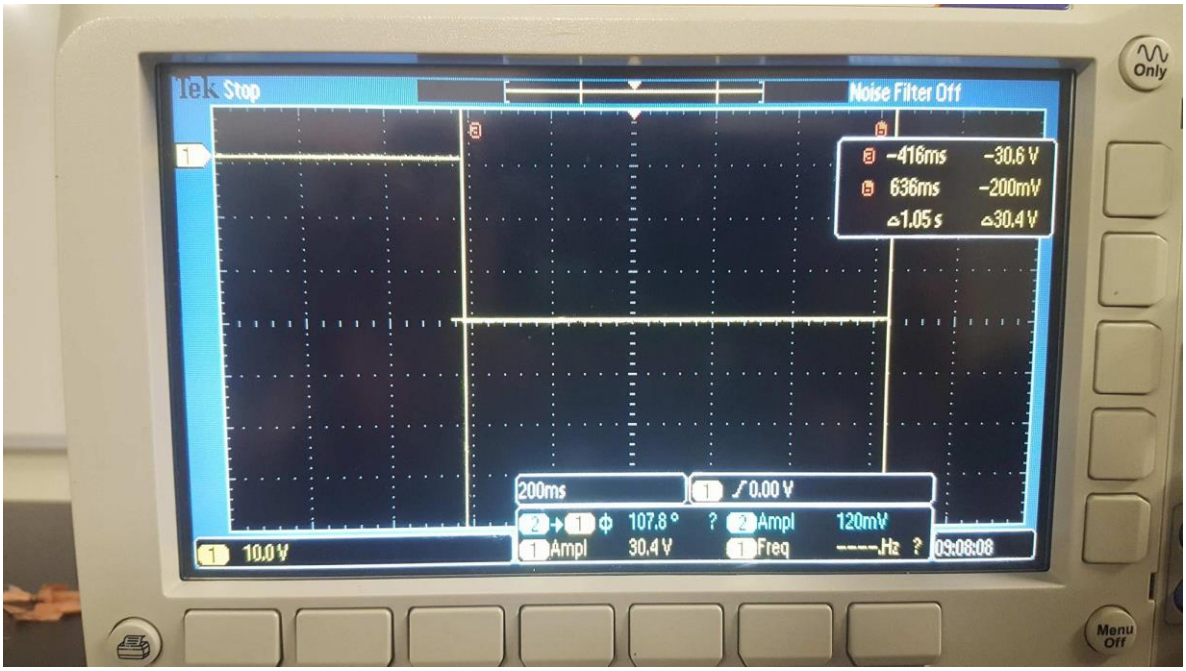
decided to just light up to use just the first 4 elements of the array, and for the zig zag the 6 elements to make the LEDS light up in a pattern that looks like a zig zag.

For the delay I adjusted the clock to 1024 seconds so that the LED could be on for a little more than a second. Then after all the Clock would reset.

Problems met during the development of the Project:

The major problem I had during this practice is that I didn't understood everything the professor asked for in the practice like breakpoints and all that. With professor Sinsel I understood many things but I still didn't feel like I could do it, but with the help of some friends I could understand more and finally I've got everything running and ready to go.
Also I had problems with the Demo card because some pins didn't work, I didn't knew how to connect some pins because of this I added an external switch but finally I understood how to connect the switches on the Demo Card.
The major problem I had was making the lights move in zig zag but finally I came with a simple solution that was making an array that could help me achieve the zig zag, but when running it had some glitches.

Oscilloscope:



For this practice we had to measure the time on which the LED was on so we use an oscilloscope to measure the time and the voltage on it. As you can see the time that matters here is the one on which the voltage is zero because that is how the LEDS work, finally one can observe that the time measured is of 1.05 seconds,

that happens because I configured the clock to 1024 mili seconds, so as it isn't that exact it has a little bit of error because of a lot of factors in the microcontroller.

Conclusion:

At first I was scared because I felt like I didn't knew anything about programming on C and even worst on a microcontroller, the theory lessons (the ones with professor Sinsel) were good but I didn't felt prepared for the lab part of microcontrollers. Well at the end I asked for the help of some friends that already had passed the course, but they only explained me how codewarrior worked and all that kind of stuff, like the questions made by the professor and how to connect the Demo and at the end I only used what we used with professor Sinsel and everything went uphill from there, I had some problems programming and with the logic but at last I got the work done. The only part in which I had a problem was the zig zag part I tried to come up with a cool code to make it go back in the array and it kind of worked but it wasn't enough so I made an array to solve that problem, but I still had some problems with the LEDS because they didn't worked exactly the way they had to, I finally understood what was happening when the professor came and checked our code so I already know what was the problem.