

Lourdes Alicia Garcia Peña - A01551772

Jorge Antonio Vizcarra Vega -

Julio César Almada Fuerte - A00226046

Career: ITE

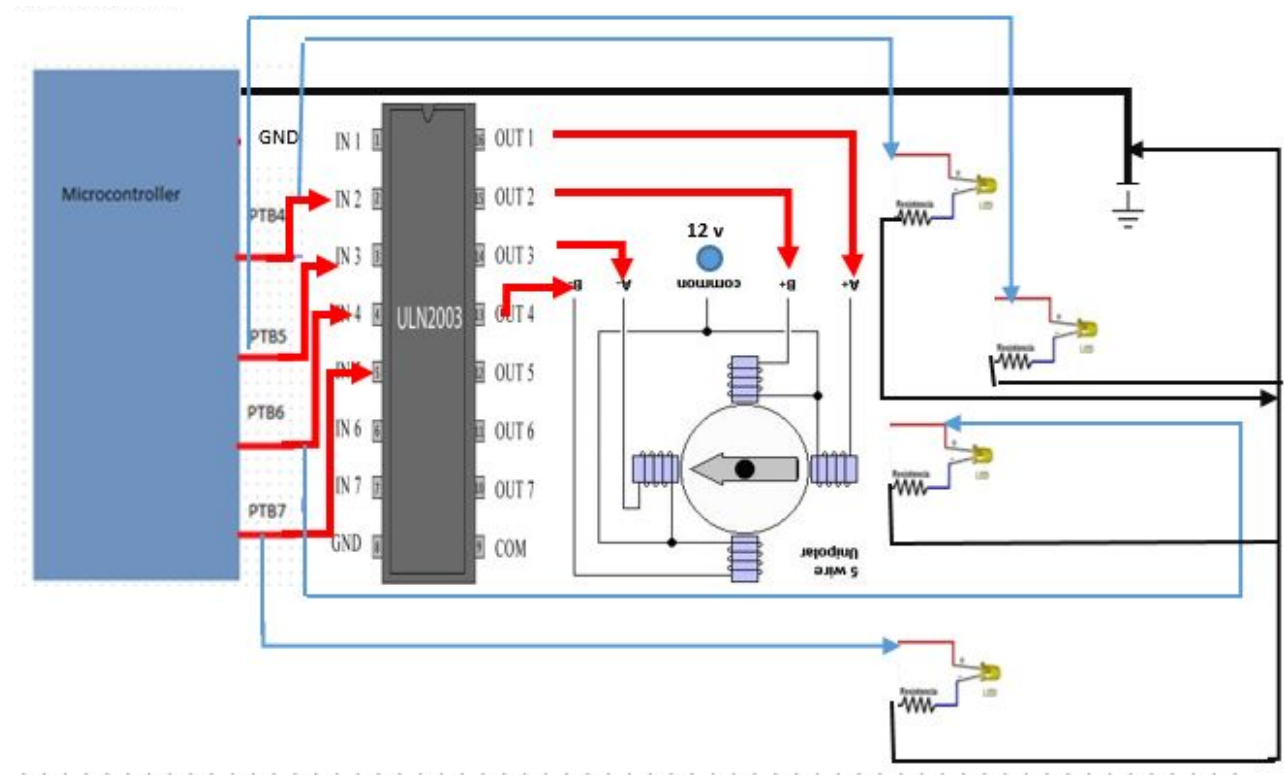
Practice 2: Stepper motor (Polling)

Description:

This practice is about moving a stepper motor using a microcontroller.

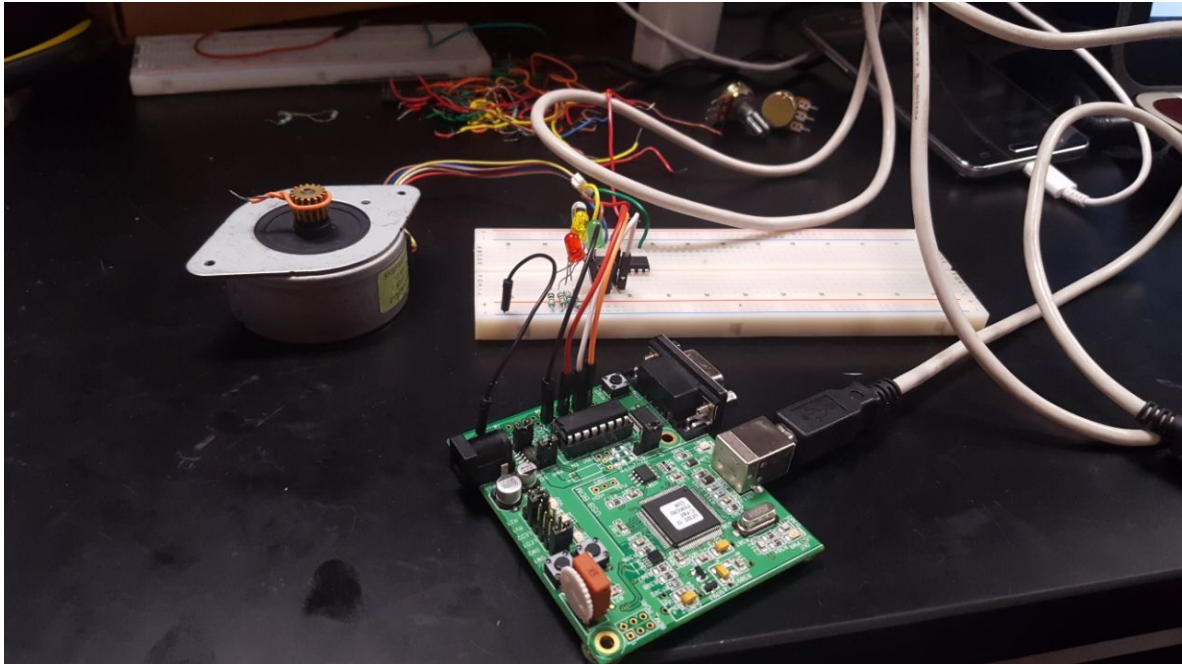
With the switch of the demo we could control the direction on which the motor moves and the velocity is controlled by a potentiometer. You have to use a timer to execute the necessary delays. No interruptions and for the software we had to use drivers.

Connections

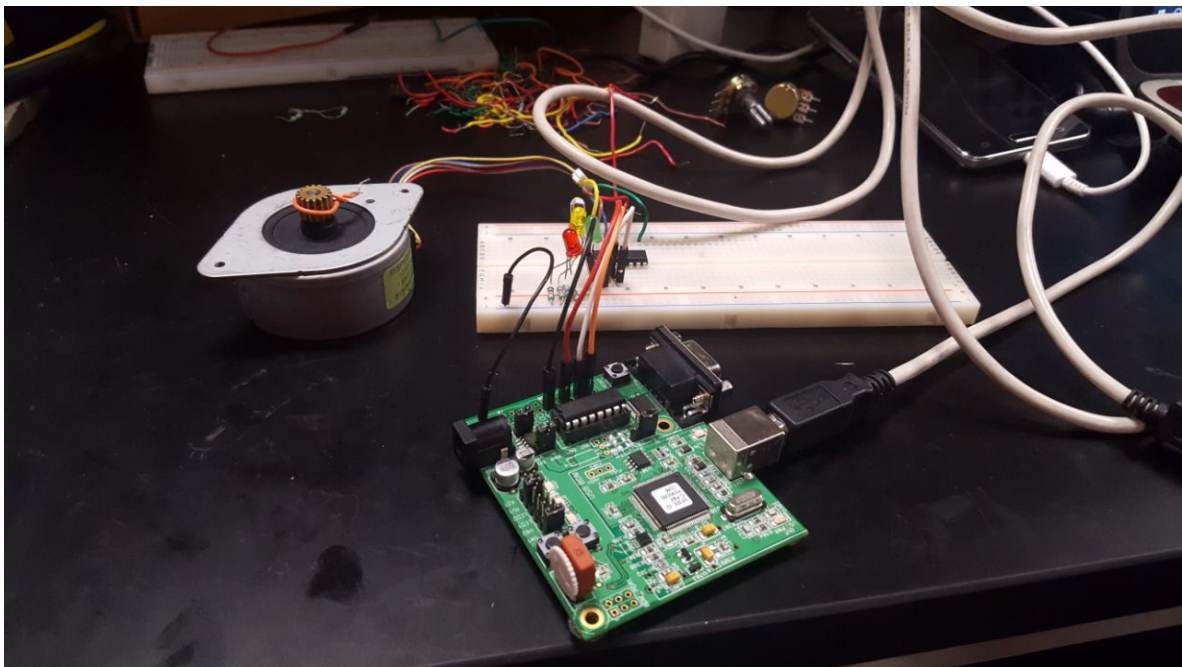


Circuit built for this practice

Left direction:



Right direction



Decisions taken:

We decided to use the clock SRTISC with delay of 8 ms because the minimum speed required for the motor was 5 seconds per revolution, which means that a half step motor gives 8 half step to complete a revolution. Calculating: $(5 \text{ seconds}) / (8 \text{ steps}) = 625 \text{ ms per half step}$. Thus, we would send in the output the bits in order to move the motor at 5 seconds per revolution.

For the function delay() we evaluated the values read by the ADC, which come from the potentiometer. Hence, the delay would vary according to the potentiometer, giving then a different speed to the motor.

About hardware, we used a step motor which demanded a significant amount of current, in the beginning we the IC ULN2003 but we did not notice there was a wire making a short circuit and it burned. So, immediately we built our Darlington transistor arrays.

Problems met during the development of the Project:

We did not know what the drivers were, so we had to work on it when the teacher arrived because no one knew what to do, and with his help we could have a significant.

Also, we had some problems while testing the motor because we did not find the specifications of the motor and we burned the integrated circuit we had so we had to build another circuit. The clock was not that precise because we used the timer SRTISC, but we did many calculations and we did leave it close to the desired values.

Conclusion:

Julio:

With this project I learned so much doing the drivers, I learned much more on those 2 hours than in the object oriented programming class, it was really interesting, also it was kind of easy to do because we did it first with leds and we had everything done in one night but at the time of testing it with the motor we had some problems. I am grateful with our teacher because he was really patient and really helped me do the drivers. Finally we delivered and I am proud of our work.

Lourdes:

It was a bit more difficult than the last practice, but fortunately we could reuse some of the code, but this time was made by layers which was something new for me. Nevertheless, we had to finish on time, so we divided the tasks and I was on charge of the hardware and programming the speed of the motor. What I will improve for next time will be to use the new timer we learned to avoid to have more precise periods.

Jorge:

At the end of this practice I learned how to control a stepper motor, the hardest part of this was make a code using layers because it was a new methodology for coding, however, once we practice coding we achieve the main objective of this practice. The hardware used for control the stepper motor was an integrated circuit that is an darlington transistors array, the first time we connected the stepper motor we burned the integrated because a bad connection, so we had to use another integrated circuit.