Simple LCD Display

Objective

This project provides an outline for how to set up a PIC18F45k20 microcontroller to a 2-line16 character LCD display. Generally an LCD display will have two modes a 4-bit and an 8-bit, in this project I detail how to setup and use the 8-bit mode.

Requirements

The following hardware and software

Hardware	Software
• Breadboard • Assorted Jumper Wires • PIC18F45K20 microcontroller • PICKIT 3 programmer • LCD display	• MPLAB X v2.20 • XC8(v1.33) compiler for MPLAB X • Digi-key Schem – Amazon (see Reference 2)

Functional Descriptions

There are two important functions involved in setting up and using an LCD screen: The first function involves the ability to send a command to the screen. These commands will configure the operating mode, cursor position, write mode, etc. You can view the full list by going to the website link provided in the references section. The second important function involves the ability to send characters to be display on the LCD.

There are three control lines on the LCD unit: RS, EN, and RW. The registers connected to these lines must be manipulated to determine whether you are sending a command or writing onto the LCD itself.

In order to **send** a command to the LCD you must use the following configuration:

```
rs = 0, rw = 0; en = 0
```
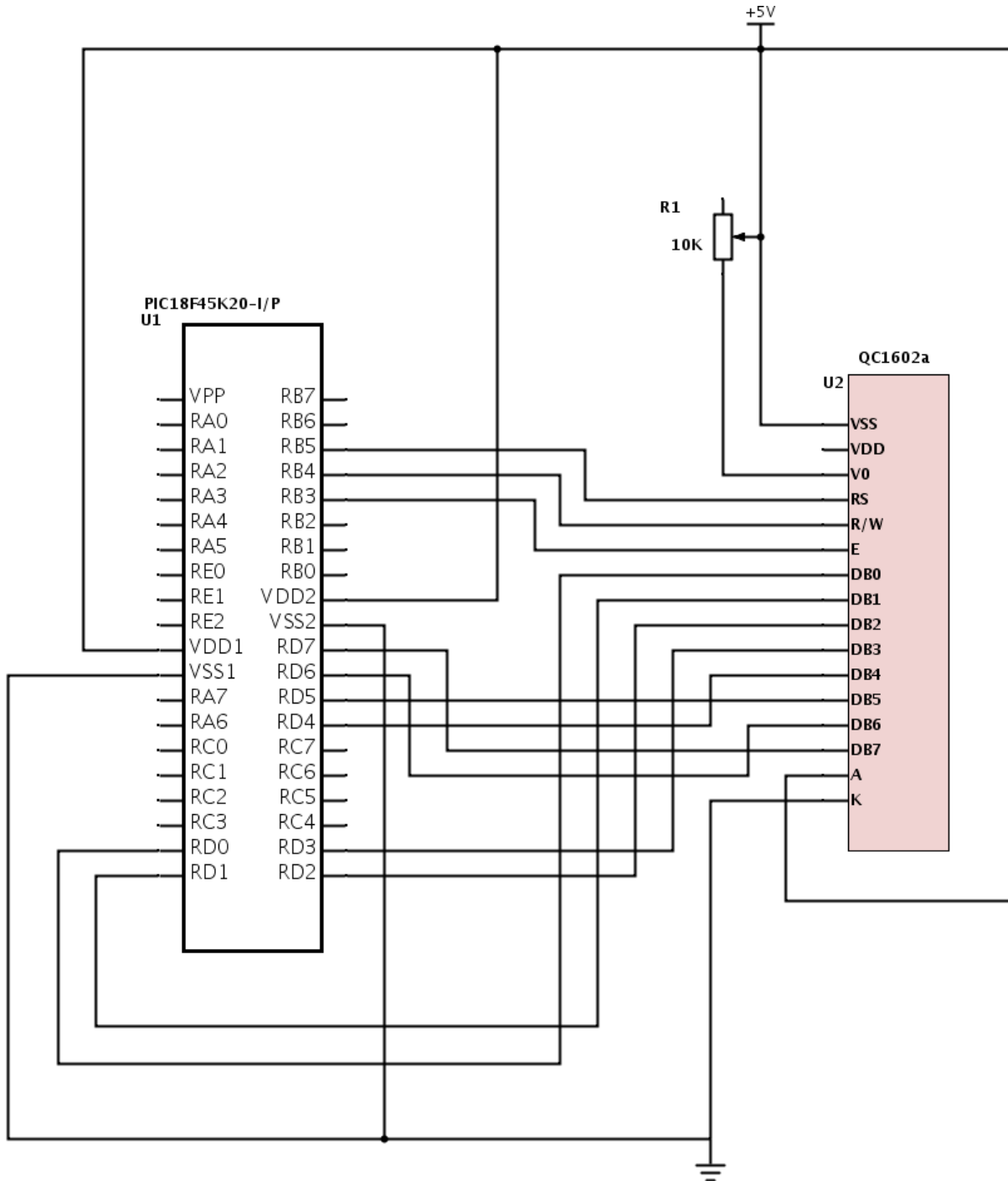
In order to **write** to the LCD the bits must be in the configuration:

```
rs = 1, rw = 0, en = 1
```

In order to ensure that the LCD properly operates, it is required to add a small amount of delay between commands, as we transmit characters to the device. In our example we apply 1-400 milliseconds of delay. It is highly recommended that you briefly review the LCD command set to become more familiar with the device. Note that different types of LCDs require different set of commands.

Initialization: In our example, the initialization consists of setting an 8-bit interface with a 2-line functionality (0x38). We then make the cursor invisible and clear the screen (0x0C) and (0x01) and finally set the cursor on the top first character of the top line (0x80). For more information please see the code.

Schematic

References

1. Geocities HD44780 Commands: http://www.geocities.com/dinceraydin/lcd/commands.htm
2. http://www.amazon.com/Char-line-display-backlight-MTC-C162DPRN-2N/dp/B00GMTP1SO