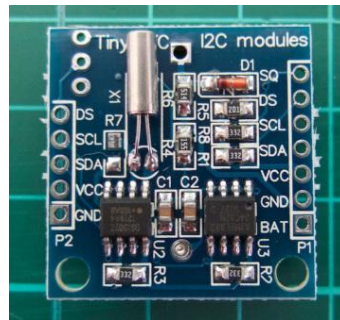# Using an Arduino to build a Real Time Clock
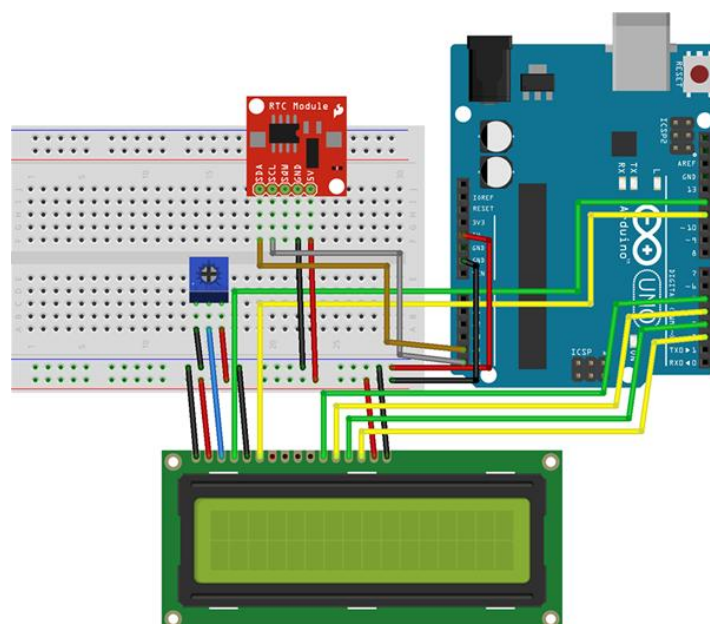
By Kevin Mc Donald ZS6KMD

This month I will be showing you how to build a Real Time Clock for the radio Shack. Although there are many tutorials out there for RTC use, my intention here is to teach you how to set up the RTC module to maintain accurate time and to set up an LCD display to show the time. You could build an LCD clock without using the RTC module, but that would be a pointless exercise because as soon as the power went out or your battery ran down, you would have to reset the clock each time. Using the RTC module brings a higher level of accuracy as well as a battery backup (built in) of the time settings.

What you will learn is the code required to access the DS1307 RTC module, the code for setting the time and simple code you can build on to create additional features for you clock, such as an alarm clock.

Pictured above is the DS1307 RTC module which incorporates an I2C converter ensuring that the supply rail 5V from the Arduino (KMDuino in this case) matches the required 3.3V rail for the RTC module. The only pins we will be using are SCL, SDA, VCC and GND on P2. You will need to connect the Arduino in the following manner. Take a wire from A4 on the Arduino to SDA on the DS1307 module; take a wire from A5 on the Arduino to SCL on the DS1307. Take a wire from GND to GND and 5V to VCC. That does it for the connections to the DS1307 module. At this stage you can leave the battery out of the module, we will insert it once we have completed the construction of the entire project.

Next we will start with wiring up the Arduino to the LCD. We will be using a standard 16X2 LCD module for this project. Using the diagram provided, connect the wiring making sure that the GND and positive wires are in the right place. Switch on the Arduino and you should see something on the LCD screen, adjust the potentiometer until you see a row of squares. That means you have a working screen.

Now we need to set the correct time on the RTC module. Insert the battery in the DS1307 module. Open up the Arduino IDE software. Using a fresh IDE screen, copy and paste the code available on my website under RTC Clock into the IDE. Scroll down to the date and time settings and edit them for today and the current time. Add approximately 30 seconds to the current time as it will take a few seconds to compile and upload the settings to the module. Click upload and we are done, unless you need to change time zones or change for daylight savings, then you will need to do this again.
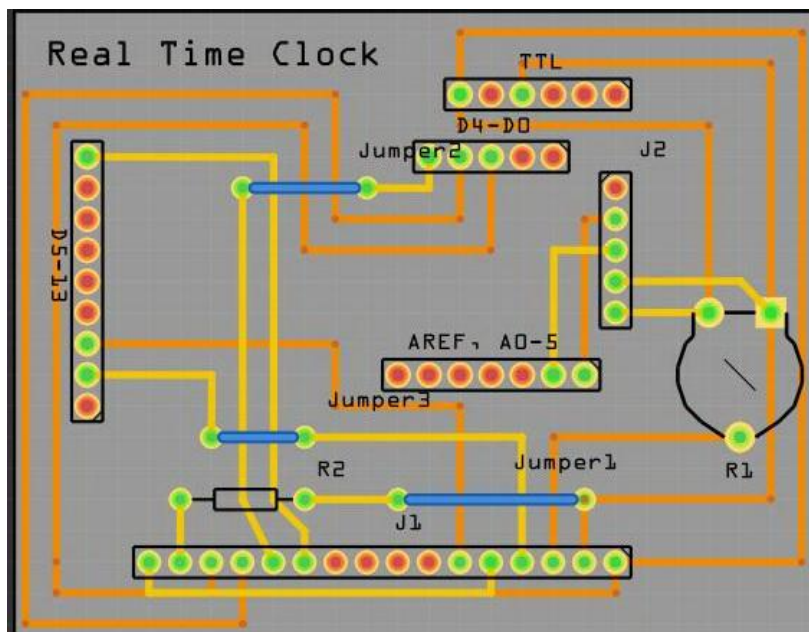
At this stage you still don't see the date and time on the LCD as we need to still load the Arduino with the code for that. The code is available on the website under Time Display and as always links to the software is listed at the bottom of the project. Copy this into a fresh IDE and upload it to your Arduino. You will now have a time display like the one at the top of the article. Well done, all that remains now is to clean it up a bit, build it into a box and add a power supply. Using an old 5V Cell Phone charger works well for this project. Remember that if the power fails, your time will still be set so when it is restored you are still okay.

Links:

RTC Settings: http://www.zs6kmd.za.net/RTC_Settings.txt

RTC Clock: http://www.zs6kmd.za.net/RTC_Clock.txt

I have designed a double sided PCB for this project which is available through our project service; please send an email to projects@zs6kmd.za.net to order one.

Please send us pictures of your completed clock as well as any stories you may have of building your project to projects@zs6kmd.za.net, we would love to include them in future articles

Happy Building