Objective:
Introduction to I2C bus using real time clock and digital temperature sensor.
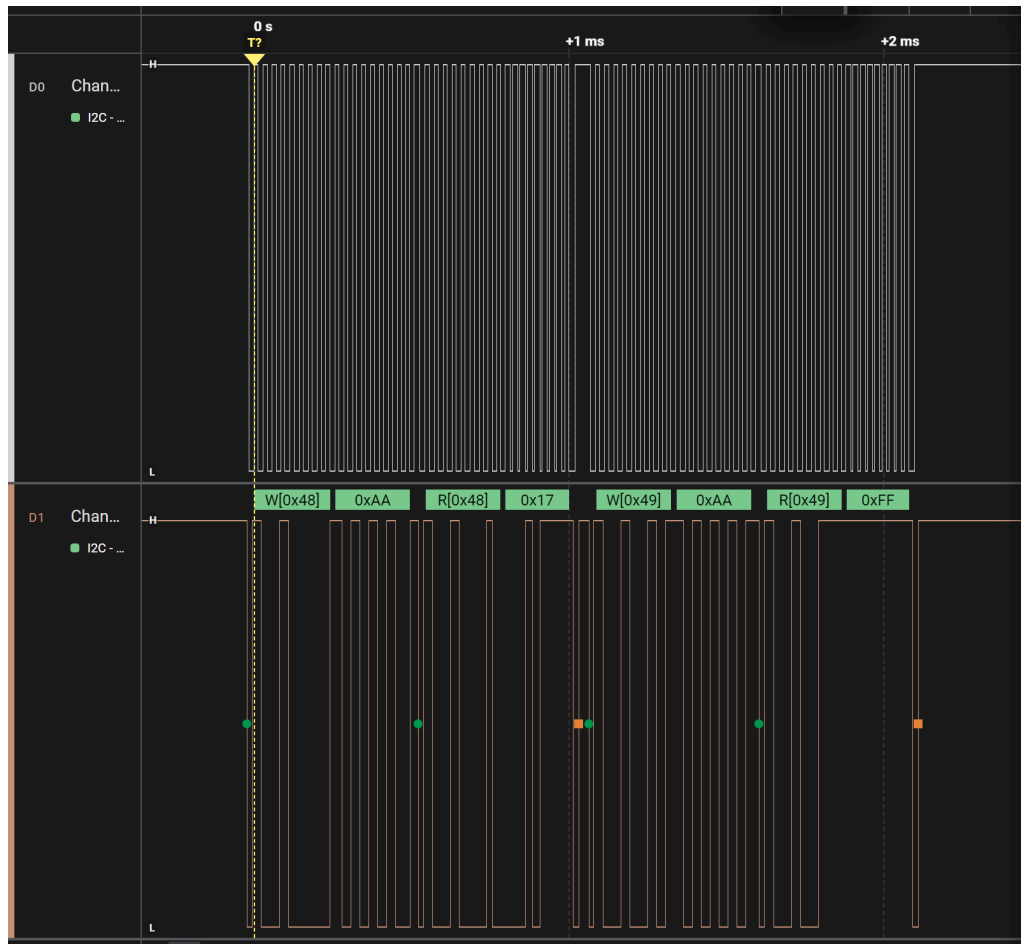
Summary:
In part one, we filled in the function to read the temperature off of the DS1621 device using a function in the I2C_soft.c file. We then set up the function to initialize the DS1621 device using a defined variable set to 0x48. Next we initialized the I2C and the DS1621 chip and added two variables to read the temperature in celsius and convert it to fahrenheit before printing it out to teraterm. Then we created another variable called DS1621_READ_Temp_Bad using an address other than 0x48 to be able to see a negative response on the logic analyzer compared to the 'ACK' response when the correct address is used.

In part two, we set up the real time clock device similar to the temperature device in part one. We added a variable called 'second' that would read the 'second' register from the DS3231 device. We repeated this step for minute, hour, day of the week, day, month and year. We then added an if statement that would read the time and date as well as the temperature and print it to teraterm every second.
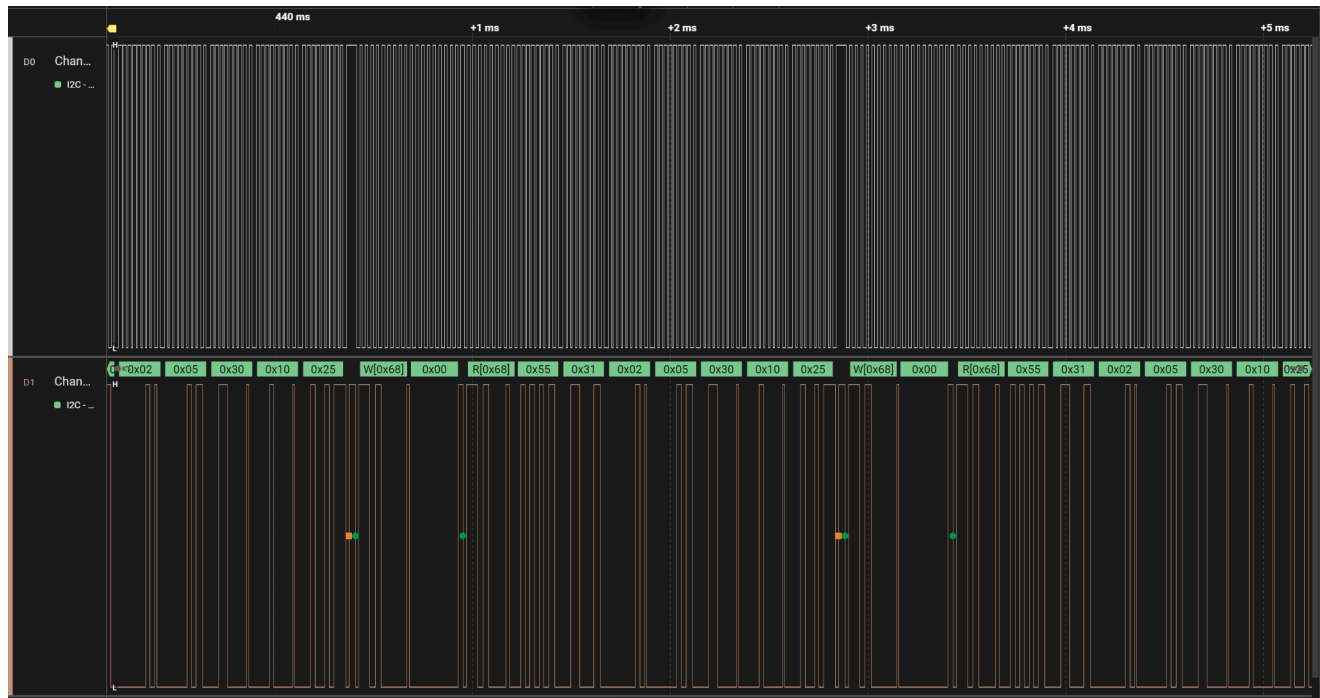
In part three, we set up a time that the DS3231 device would reset to when the correct button was pressed. To accomplish this we used the I2C_Write function for the second, minute, hour, day of the week, day, month and year.

In part four, we chose a reset button on the remote control using the code from lab 10. When the correct button was pressed, we called the setup time function to reset the time and date to the values chosen in part three.
Data Collected:

The first waveform demonstrates a good (ACK) versus bad (NAK) response from the device. The device was set to 0x48 so this would be the good response on the waveform.

The second waveform is of the Device initialized to 0x68 which is used for setup time.

Conclusion:

The I2C bus provides a simple and easy to use hardware connection to transfer data to and from various input-output devices. We used the SDA and SCL pins of the PIC18F4620 to connect to the DS1621 and DS3231 devices and used those connections to read the values off of the two devices. Understanding the difference between the read and write functions was very important in the coding process. Knowing the proper address for the device on the I2C was also very important in understanding the code.