

Real Time Clock Lab

The real time clock exercise will focus on the real time clock device that is emulated on the PIC microcontroller. The System Management GUI will be used in manual I²C mode to modify registers in the real time clock. Further functionality will be examined using the “Real Time Clock” tab of the System Management GUI.

Lab Setup Procedures

- [] Find JP200 labeled “Heater Enable.” Make sure that JP200 is open.
- [] Connect the +12V power supply to J100 labeled “+12VDC.”
- [] Verify that the fan is spinning and that the DS104 Power Led is on.
- [] Connect the PICkit Serial Analyzer to the PC using the provided USB cable.
- [] Ensure that the “Power” LED on the PICkit Serial Analyzer is on.
- [] Connect the PICkit Serial Analyzer to the PICDEM System Management Board connector P104 labeled “PICkit Serial.”
- [] Start the PICDEM System Management Software. (Click Start<Programs<Microchip System Management Board)

Initialize the Real Time Clock using the I²C Tab

Use the I²C tab to initialize each of the time registers on the emulated real time clock device. In Figure 1, shown below, the time registers are highlighted.

Real Time Clock Calendar: 0xA2	
Word Address	Register
0x00	Configure 1
0x01	Configure 2
0x02	Seconds
0x03	Minutes
0x04	Hours
0x05	Weekdays
0x06	Days
0x07	Months
0x08	Years
0x09	Minute Alarm
0x0A	Hour Alarm
0x0B	Day Alarm
0x0C	Week Alarm

Figure 1. Real Time Clock Calendar Register Map

- [] Click on the I2C tab.
- [] In the write area of the I2C tab, enter "A2" into the Slave Address[W] field. This field corresponds to the slave address of the address of the real time clock device and the Read bit (LSb) set to 0.
- [] Enter "02" into the Word Address field. The Word Address field is the first address that will be written. The first byte that should be written is the Seconds data, which is located at word address 0x02 (see Figure 1).
- [] In the top most Data field, enter '0.' This will initialize the seconds data to 0 seconds.
- [] Click on the next data field. Fill this data field with the value '0.' This will initialize the next address, 0x03, the minutes data, to 0 minutes.
- [] Click on the next data field. Fill the data field with the value '0.' This will initialize the next address, 0x04, the hours data, to 0 hour or midnight.
- [] Click on the next data field. Fill the data field with the value '6.' This will initialize the next address, 0x05, the Weekdays data with the value for Saturday. The value 0 = Sunday, 1 = Monday, 2 = Tuesday, and so on.
- [] Click on the next data field. Fill the data field with the value '1.' This will initialize the next address, 0x06, the days data with the value 1.
- [] Click on the next data field. Fill the data field with the value '1.' This will initialize the next address, 0x07, the Months data for the month of January.
- [] Click on the next data field. Fill the data field with the value '0.' This will initialize the next address, 0x08, the Years data for the year 2000.
- [] Click the execute button in the Write area of the I2C tab to write this data to the real time clock memory. If you followed the previous steps properly, you have initialized the real time clock to January 1, 2000 12:00:00 AM/00:00.
- [] Click on the Real Time Clock Tab and verify that the time and date match the output on the GUI.

The Real Time Clock Tab sends out periodic requests for data over the I²C bus and uses the PICkit Serial to generate the master communications. It reads all of the time values and updates the GUI

based on these values. This tab can also be used to write data. Clicking "Update RTC" will update the time data on the PIC microcontroller.