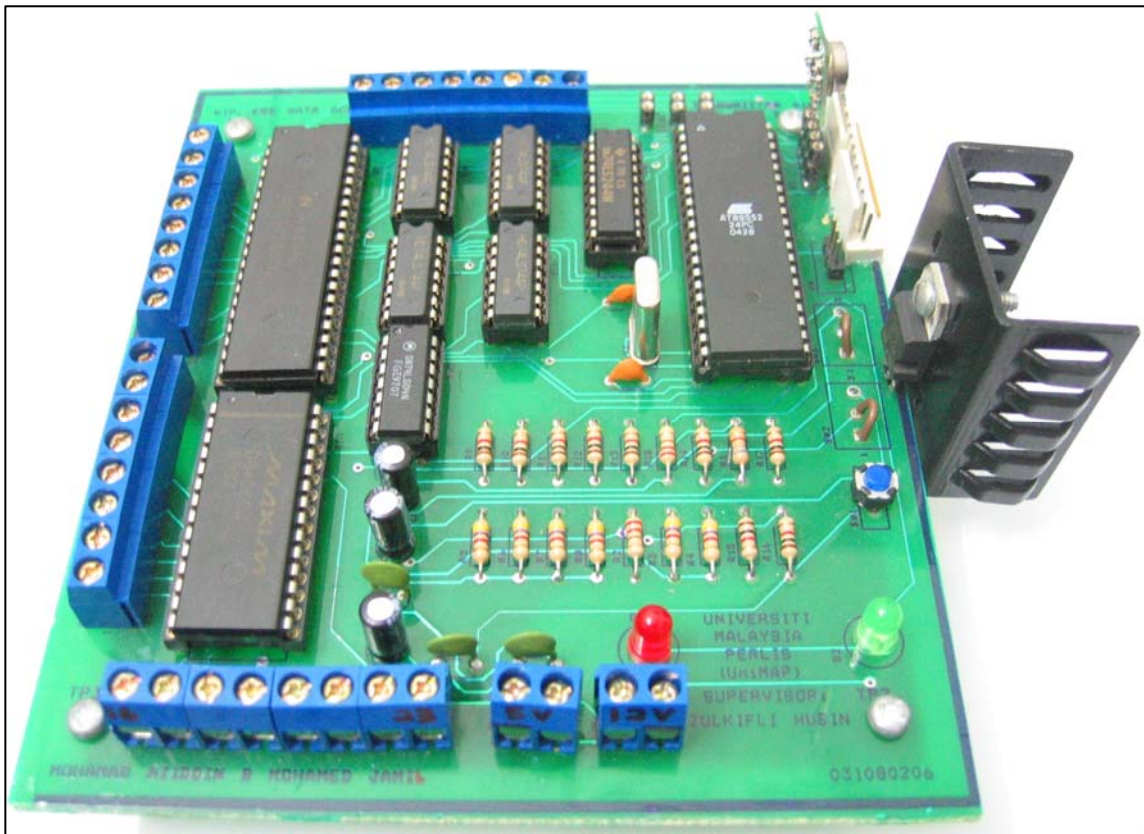


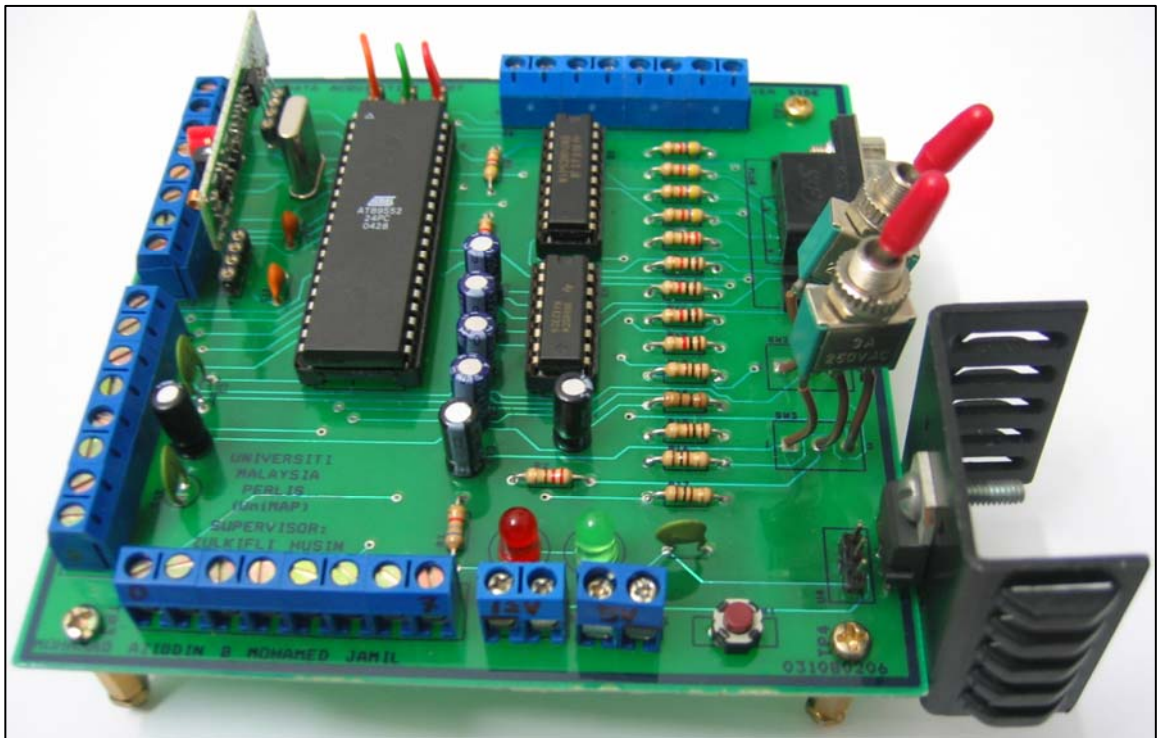
## CHAPTER 4

### RESULT AND DISCUSSION

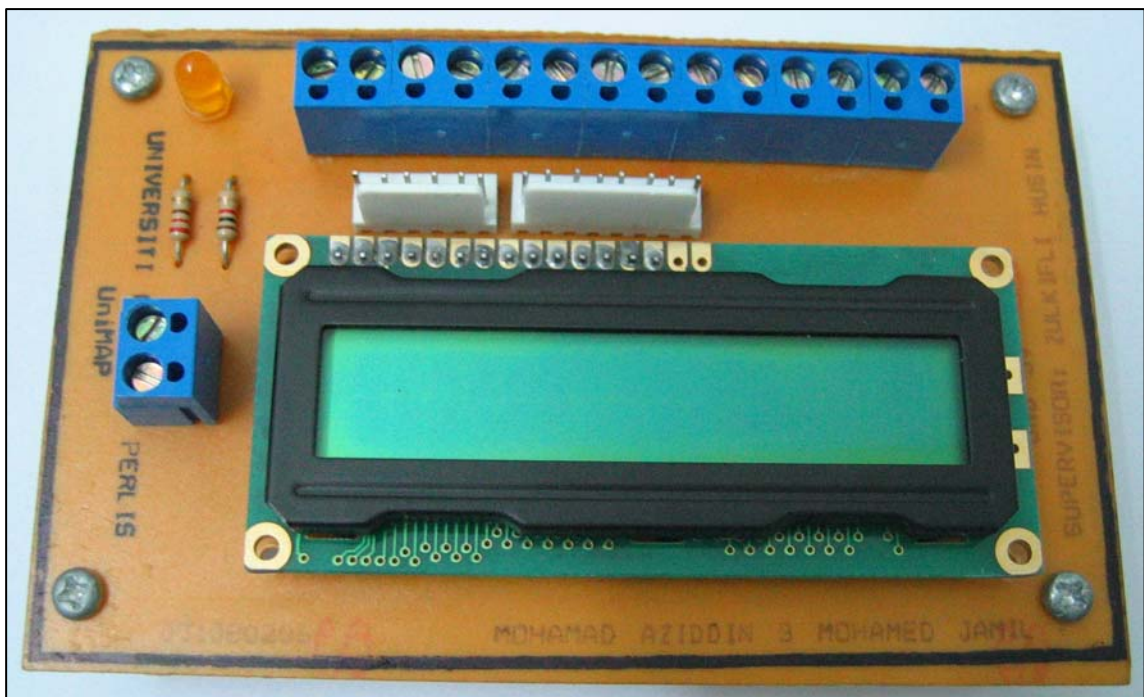
#### 4.1 Troubleshooting The Hardware and Software .



**Figure 4.1:** Transmitter Board

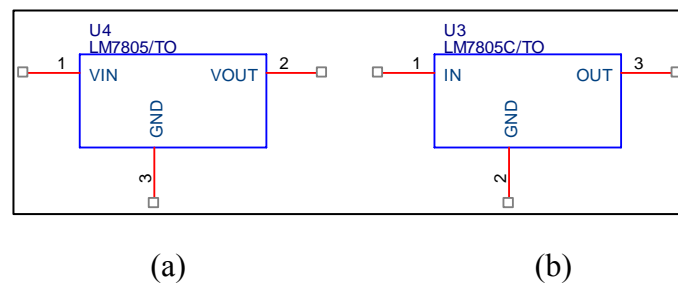


**Figure 4.2:** Receiver Board



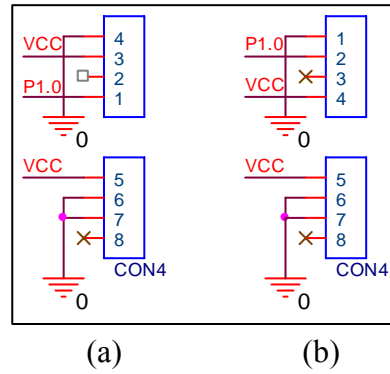
**Figure 4.3:** LCD Display Board

Figure 4.1, Figure 4.2 and Figure 4.3 are the result of the PCB fabrication. Before the overall system is functioning, the transmitter and receiver circuit are malfunction and need to be troubleshoot. An analysis is done on all circuits by examine the circuits diagram and its layout respectively. The first error detected is the IC LM7805 structure. This device acts as a voltage regulator which convert any voltage value supplied to the device and produce a constant 5V output voltage The typical pin configuration is the Voltage In (Vin) at pin 1 , Ground (GND) at pin 2 and Voltage Out (Vout) at pin 3. Unfortunately, the device is mistakenly selected which is the different type during the schematic drawing at Capture CIS. Its Vout is at pin 2 and GND is at pin 3. The solution is by drilling a new hole at the nearest device at the PCB and external wiring is done. This error has made an IC AT89S52 burned due to over voltage load.



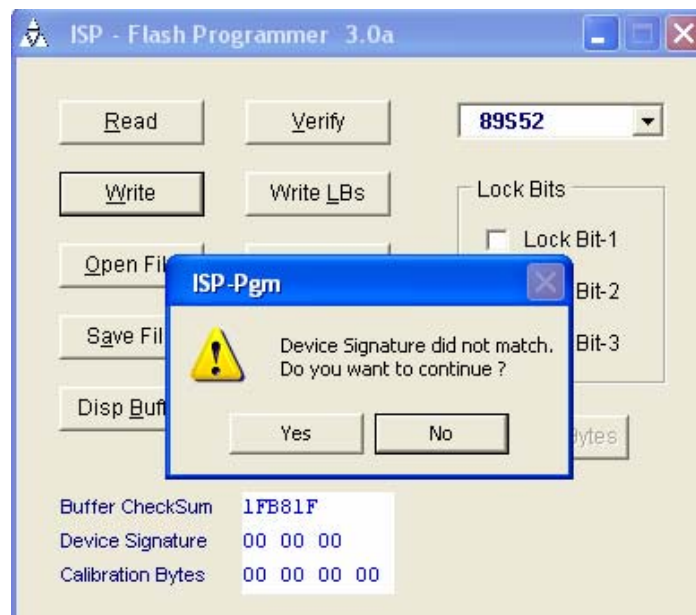
**Figure 4.4:** (a) The Selected Device      (b) The Desired Device

The second error that is detected is the DB9 connector at the receiver circuit. This device is used as the connector for the ISP program loader and the serial RS232 communication. The error is that the connector is placed facing inside the circuit where it actually must be facing outside the board. Therefore, to overcome this error, another drill is done at the correct position and the pin is reconfigured to be compatible with the exact configuration. The next error encountered is the RF module RLP434A's placement on the circuit which the pin 1 until pin 4 is arrange in reverse sequence. This had made the wireless communication is disable for data transmission. Thus, the mistaken routes are being cut and the new routes are created by using wire wrap in order to rearrange the sequence back in order.



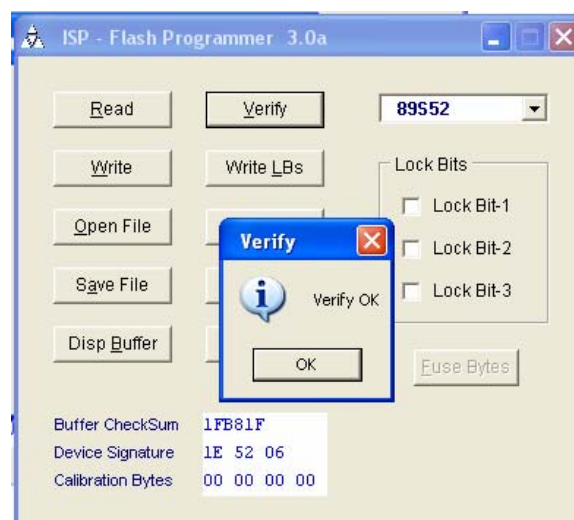
**Figure 4.5:** (a)The Error Position (b)The Desired Position

Based on Figure 4.2, it is shown that the receiver board is the only board that is capable to perform the SPI-Flash programming. But, as a program file in HEX format is attempted to be executed, the software informed that it is unable to respond with the microcontroller. Thus, the board is being troubleshoot again but this time it focus on the loader circuit.

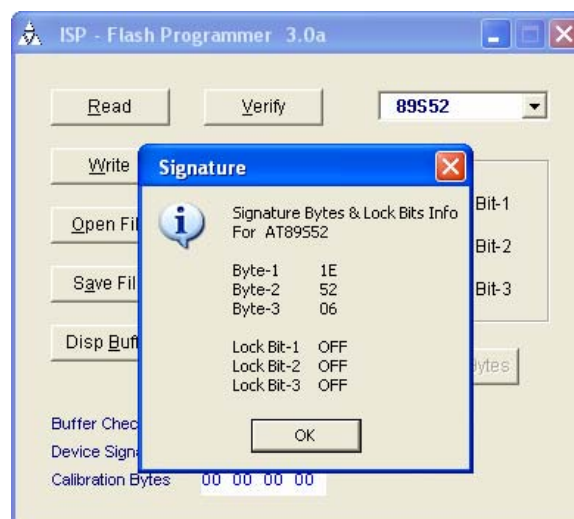


**Figure 4.6:** Error During First Download Program

After a long period of troubleshooting, the problem is solved which the error is the resistance values for the resistors between pin selectors of pin 1.5, 1.6 and 1.7 from the microcontroller. The resistors being soldered on the board are  $1k\Omega$  while the values must be around  $100\Omega$ . Therefore, the solution is to discard the soldered resistors and install the new  $100\Omega$  resistors at the respective place. As a result, the board is capable of performing as an SPI-Flash programmer. This can be verify by clicking verify or signature on the software downloader panel.



**Figure 4.7:** Verification Passed



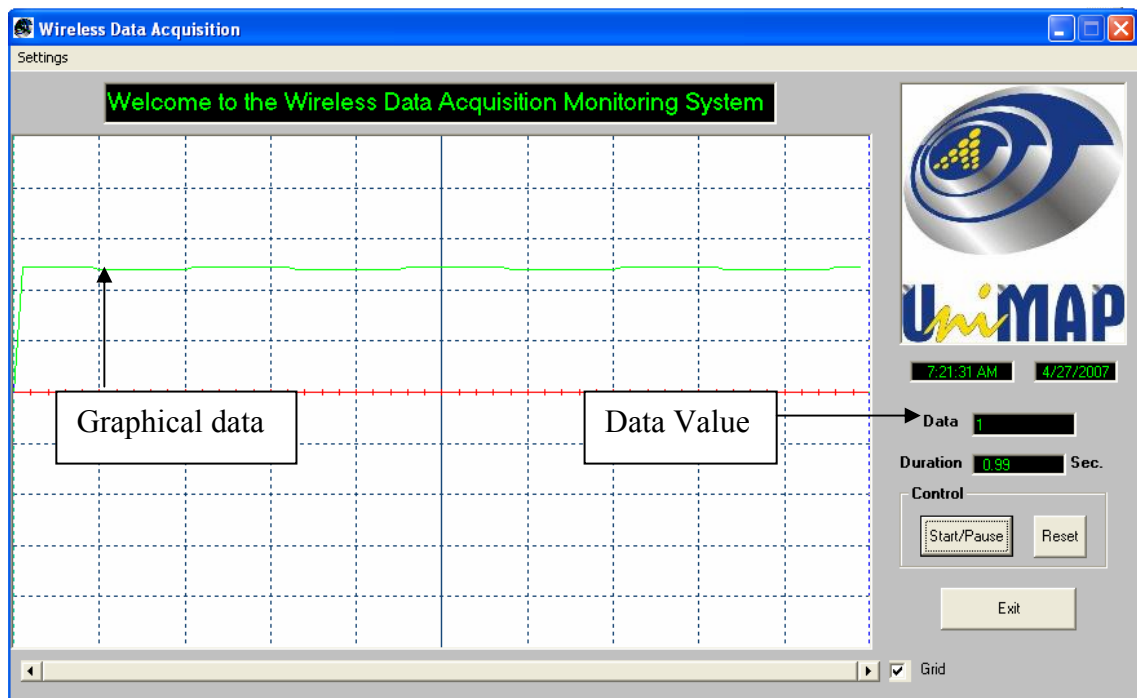
**Figure 4.8:** Signature Passed

## 4.2 Result

As the board is able to download the HEX file, the entire hardware is being integrated and the program is being downloaded into the respective transmitter and receiver microcontroller. One major error has been detected on the transmitter part where the ADC is failed to generate the digital output. So, another troubleshoot is done to identify the problem. After a lot of analysis, problem is that the program to activate the ADC is instable. The programming is based on the ADC0816 datasheet and the books references. The pressure is stress on this matter, examine the program one by one and finally the problem is solved. Moreover, the display devices are functioning which is the LCD and the GUI as shown at Figure 4.8 and Figure 4.9 while Figure 4.10 shows the data being saved in a notepad.



**Figure 4.9:** LCD Board Functioning



**Figure 4.10:** GUI panel Functioning

File	Edit	Format	View	Help
4/27/2007	7:20:52	AM	0	
4/27/2007	7:20:58	AM	1	
4/27/2007	7:21:03	AM	1	
4/27/2007	7:21:08	AM	0	
4/27/2007	7:21:13	AM	0	
4/27/2007	7:21:18	AM	0	
4/27/2007	7:21:23	AM	1	
4/27/2007	7:21:28	AM	1	
4/27/2007	7:21:33	AM	1	
4/27/2007	7:21:38	AM	1	

**Figure 4.11:** Data Obtained being Saved In A Notepad