8051 Advance Trainer
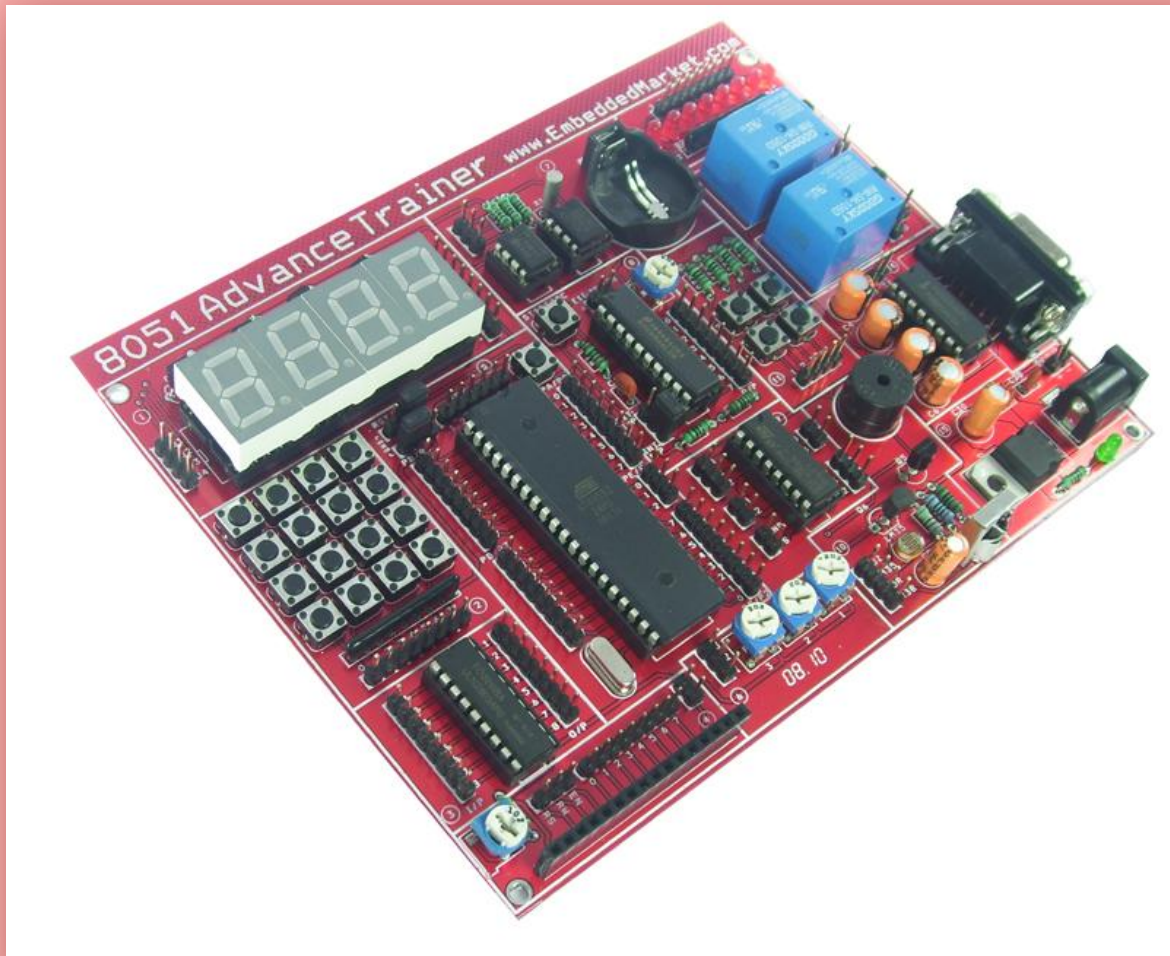

On Board Features of 8051 AdvanceTrainer with P89V51RD2 Microcontroller

1. RS232 interface
2. 38KHZ RC5 IR receiver
3. Buzzer
4. Light Sensor (LDR)
5. Temperature Sensor
6. Three Analog Inputs via presets
7. All port open 89V51RD2 Microcontroller
8. Four 7-Segment Display
9. Real time clock with DS1307
10. EEPROM 24C256
11. Eight LEDs
12. Two Relays
13. Four Switches
14. Eight bit Analog to Digital Converter
15. Matrix keypad 4x4
16. Stepper Motor driver ULN2803
17. LCD 16 character by 2 lines
18. DC Motor Driver L293D

8051 Advance Trainer

8051 Advance Trainer

1. About 8051 Advance Trainer

The 8051 Advance Trainer Board is designed for experiments with 89V51RD2 microcontroller which has 8051 core. Use this board as learning board or as experiment board or as product design workbench, it has all that is required.

There are two types of displays provided, one 16x2 alphanumeric LCD and other is 4 digit multiplexed 7-segment LED display. On input side, use the 4x4 matrix keypad and four separate keys.

The board is equipped with RS232 communication, low power demo purpose motor driver circuits and ADC. The ADC can read external analog input. On board variety of analog sensors are provided such as Light sensor) LDR, Temperature Sensor (LM35) and manual presets (variable resistance).
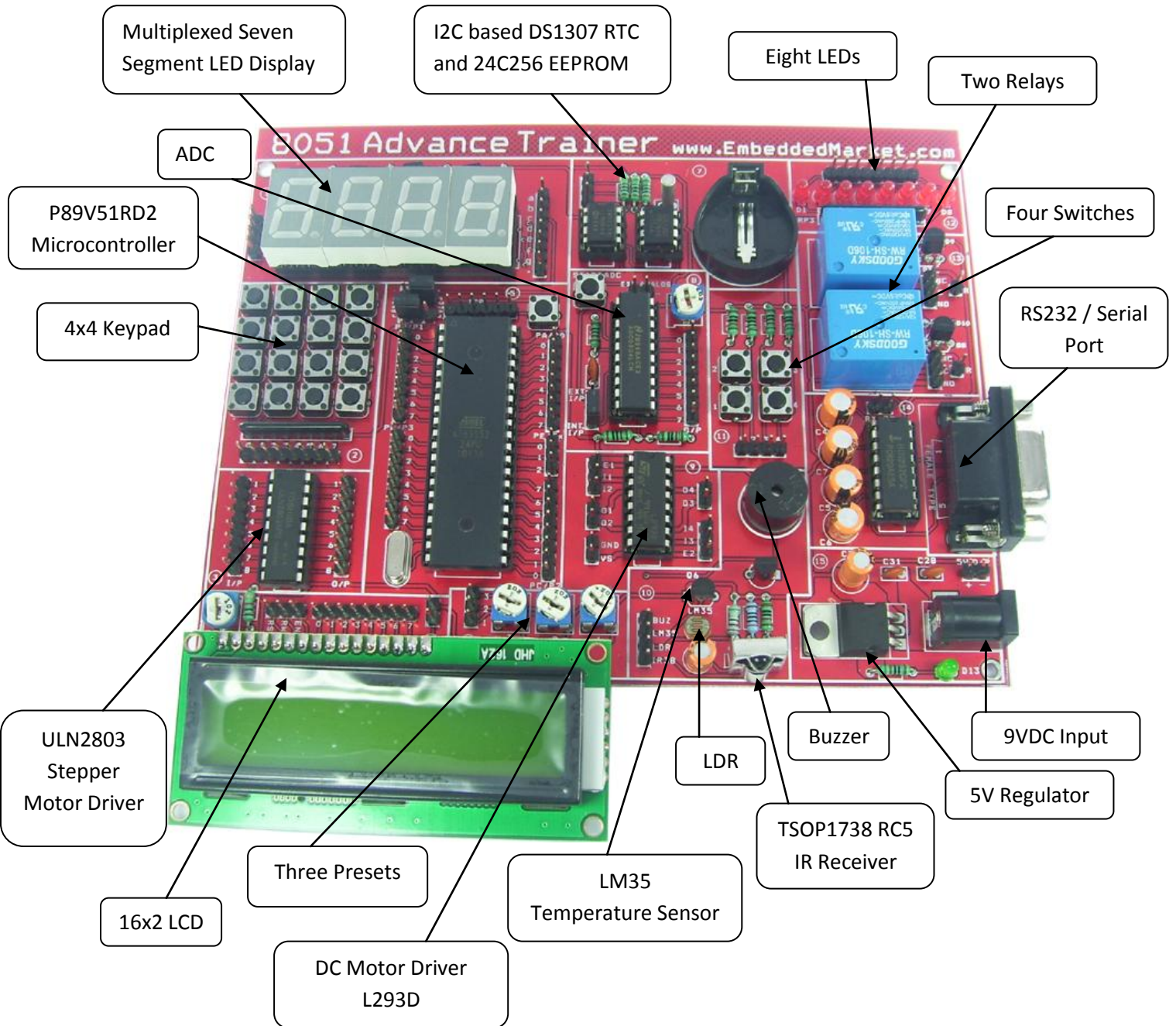
Use the on board buzzer to generate bip sound for audio indication. The TSOP1738 on the board detects 38KHz modulated IR input and can function as RC5 IR decoder. This allows remote controlled application development using 89V51RD2.

There are two advanced interfaces provided, DS1307 Real Time Clock and 24C256 EEPROM. Both are I2C based interfaces. The 89V51RD2 does not have built-in I2C lines, so a code based on bit-bang method can interface 89V51RD2 with these two interfaces.

Eight LEDs and Two relays make it complete development package to the board.
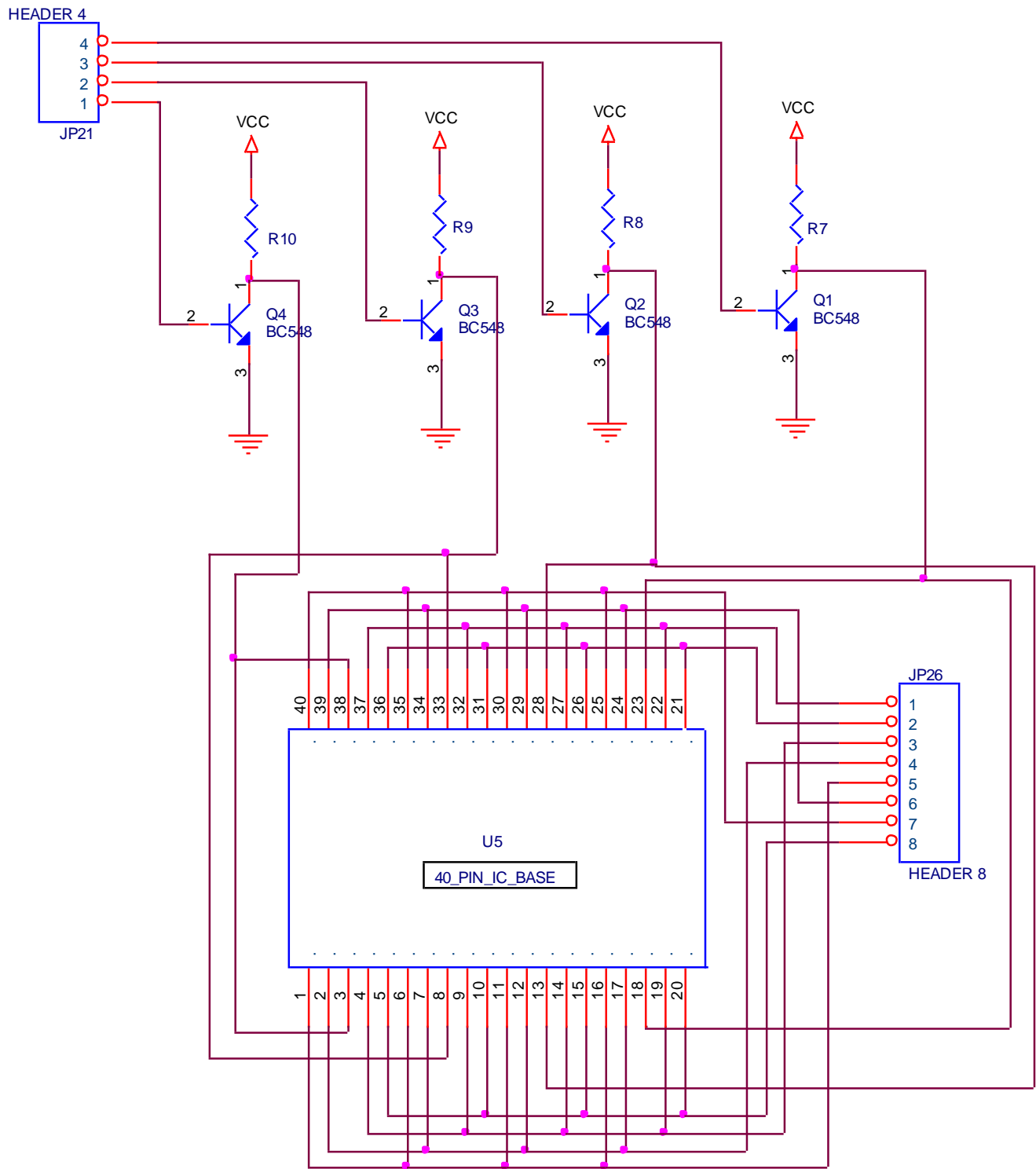
8051 Advance Trainer

2. Hardware Details of 8051 Advance Trainer

Multiplexed Seven Segment LED Display

I2C based DS1307 RTC and 24C256 EEPROM

Eight LEDs

Two Relays

ADC

P89V51RD2 Microcontroller

Four Switches

4x4 Keypad

RS232 / Serial Port

ULN2803 Stepper Motor Driver

Buzzer

9VDC Input

LDR

5V Regulator

Three Presets

TSOP1738 RC5 IR Receiver

16x2 LCD

LM35 Temperature Sensor

DC Motor Driver L293D

8051 Advance Trainer

Sectional Schematics:
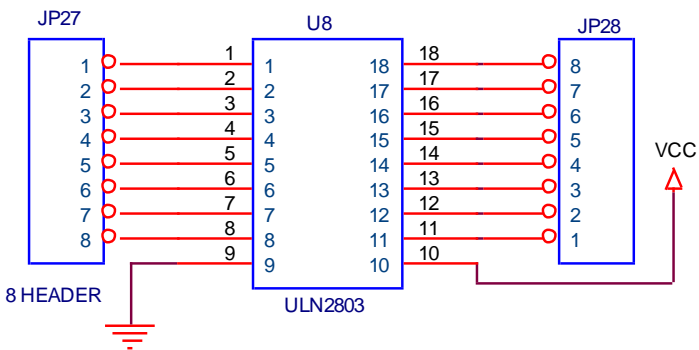
Section 1 – Seven Segment Displays

8051 Advance Trainer

Section 2 – Matrix Keypad
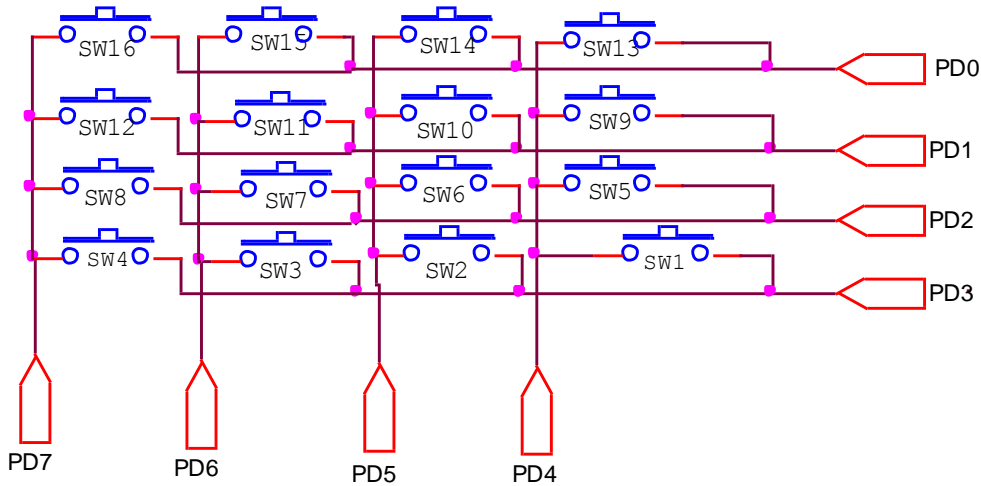
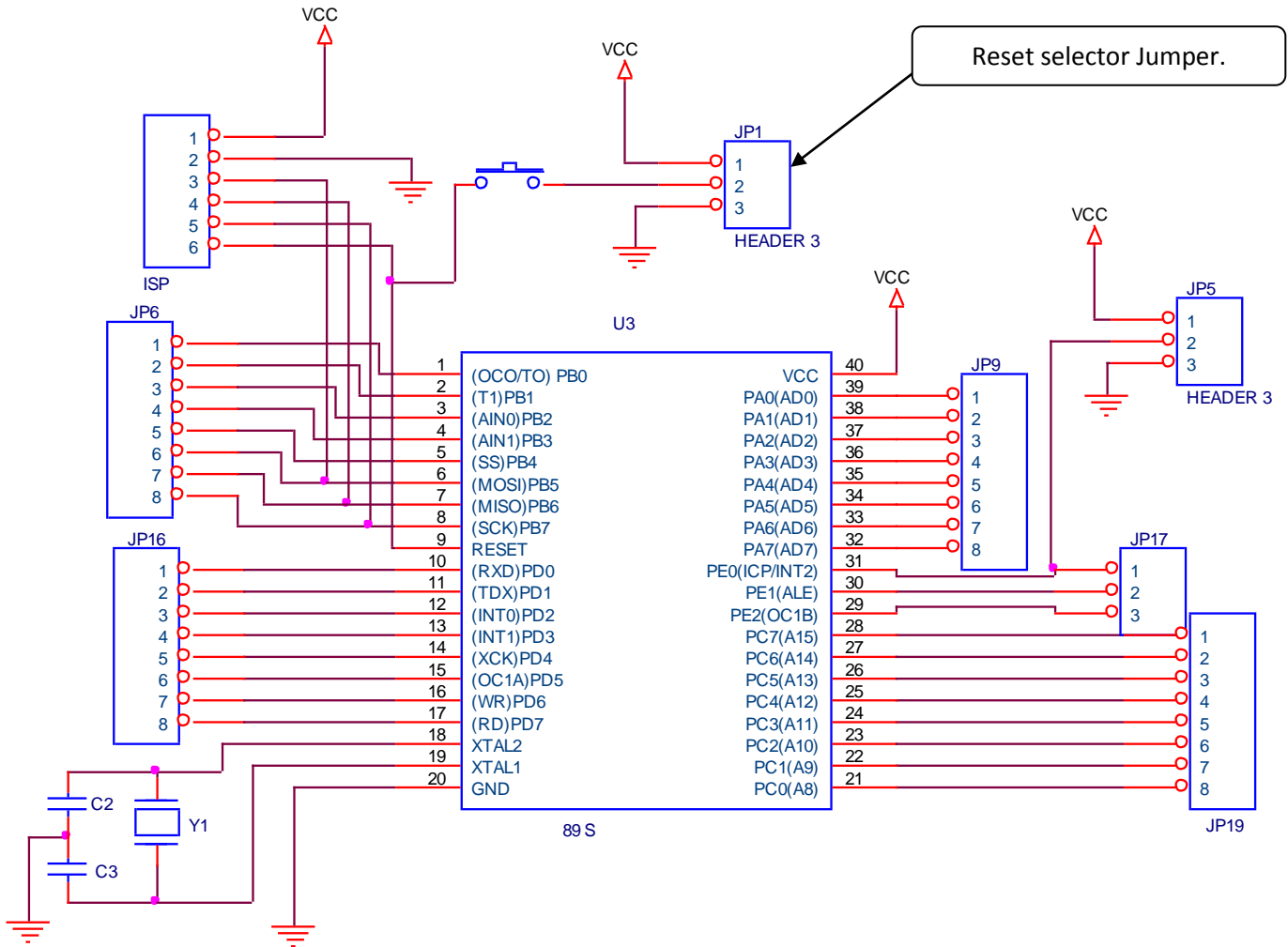
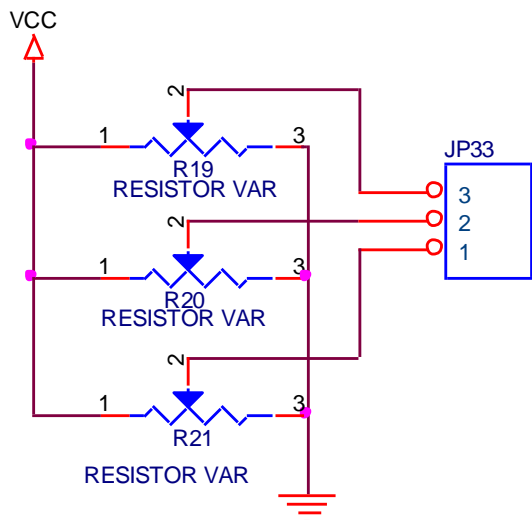## Section 3 – ULN2803 Stepper Motor / High Current Driver

Section 4 – 16x2 LCD

Backlight On/Off Jumper

Data Lines D0 to D7

Control Lines RS, RW, EN
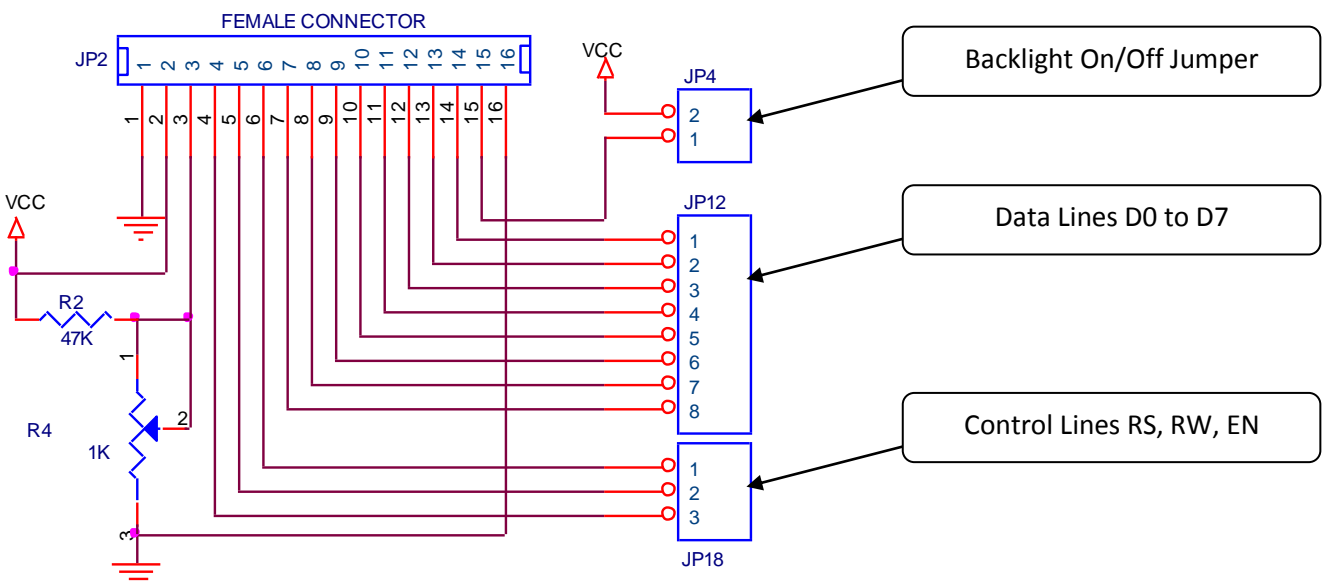
8051 Advance Trainer

Section 5 – P89V51RD2 Microcontroller with Port Pins Open for Interfacing
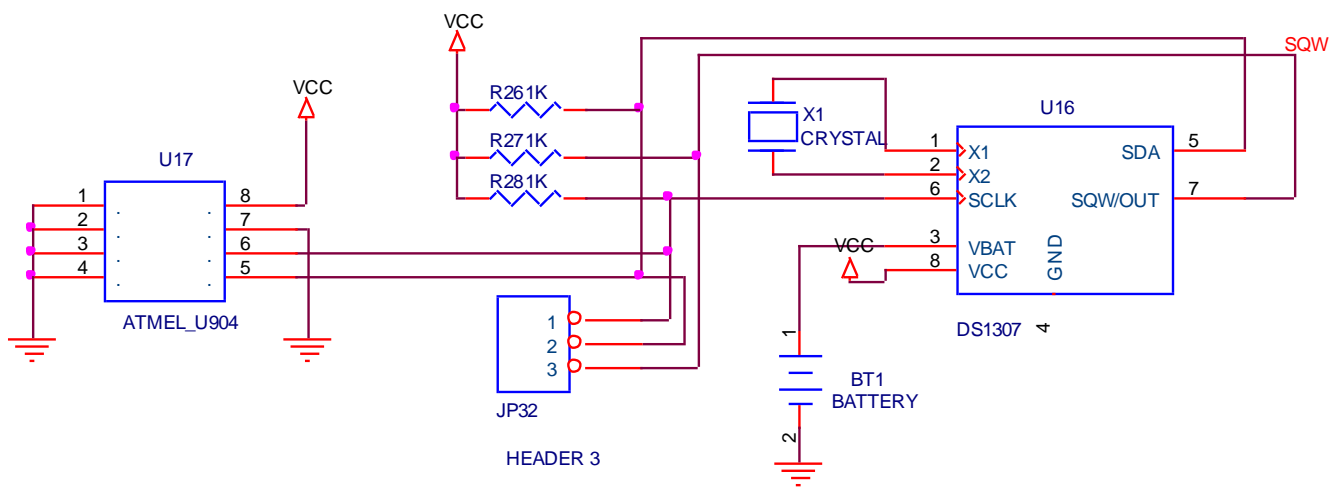

Reset selector Jumper.

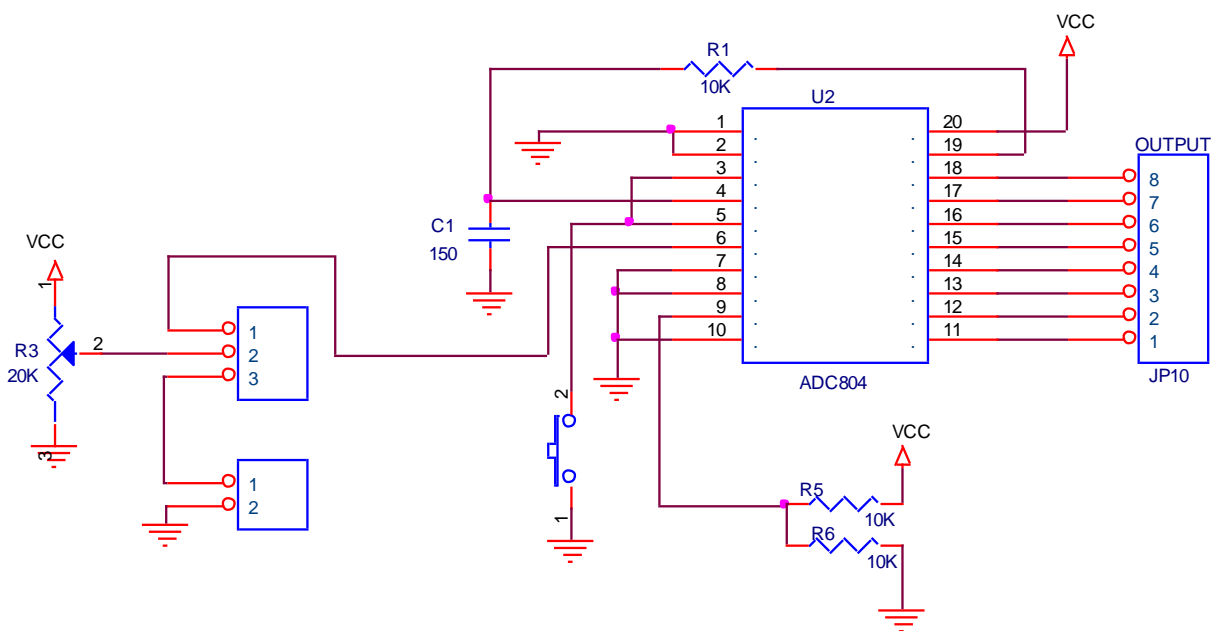## Section 6 – Presets (Variable resistance)

8051 Advance Trainer

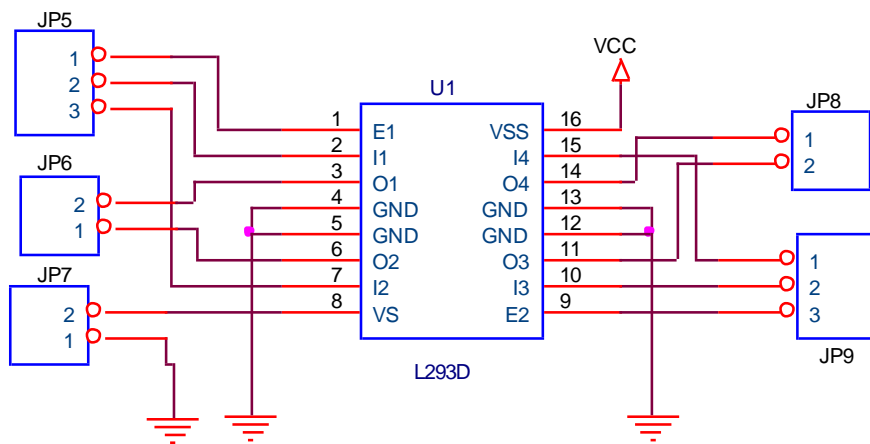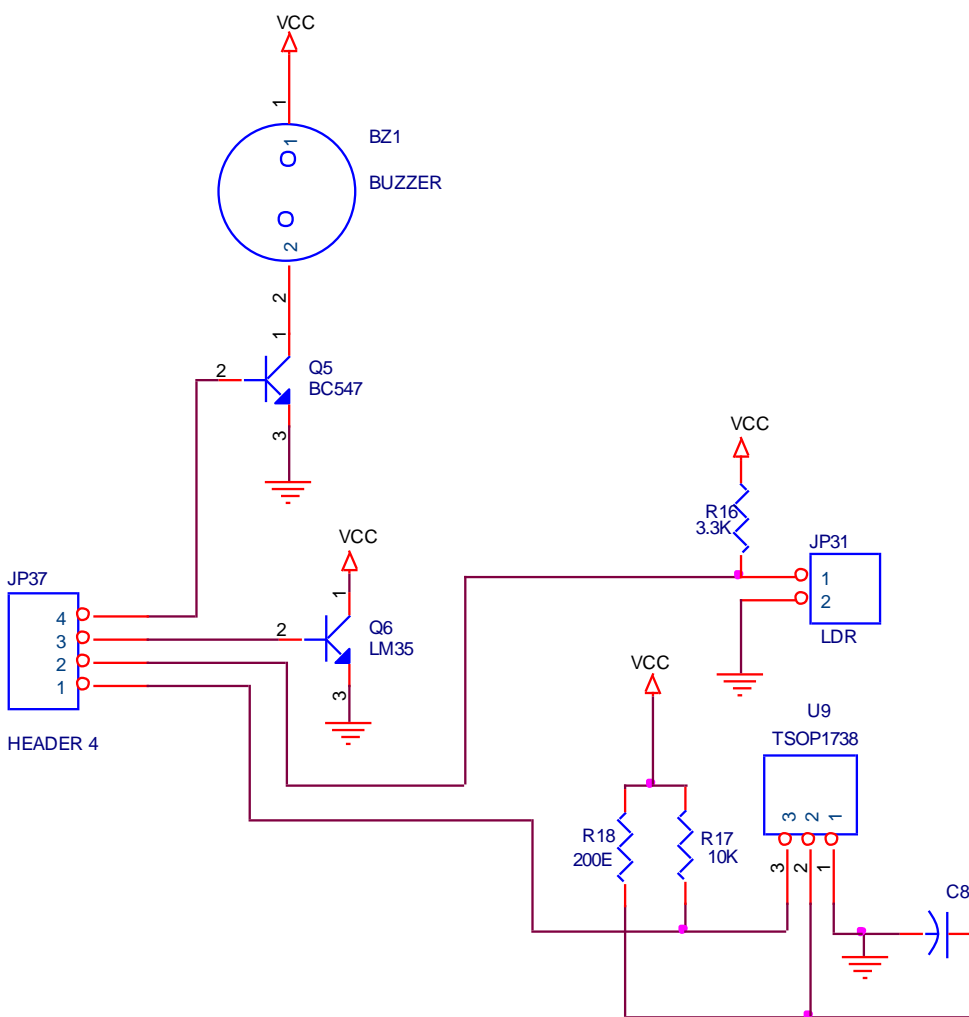## Section 7 – I2C Based RTC & EEPROM

Section 8 – ADC0804

8051 Advance Trainer

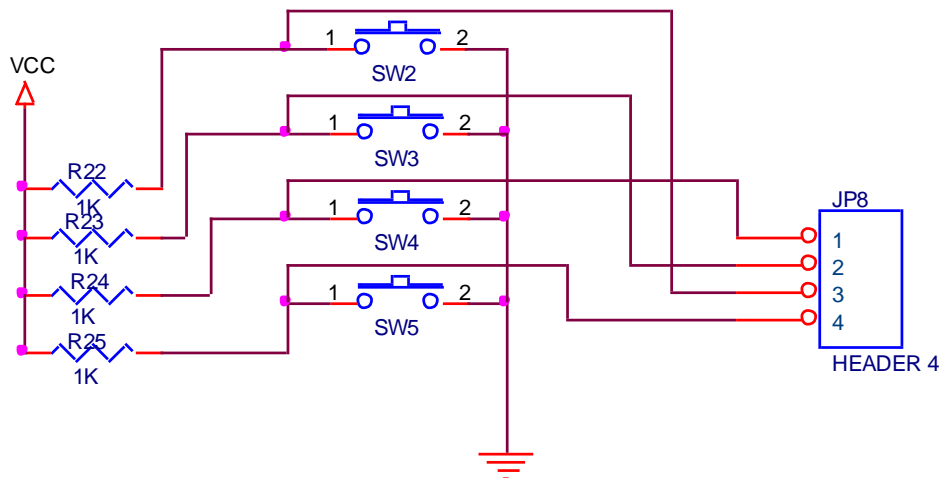## Section 9 – DC Motor Driver L293D

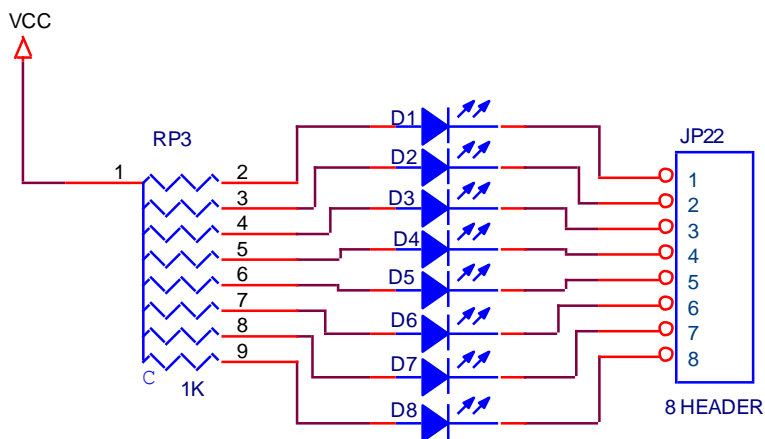## Section 10 – LDR, LM35, Buzzer, TSOP1738

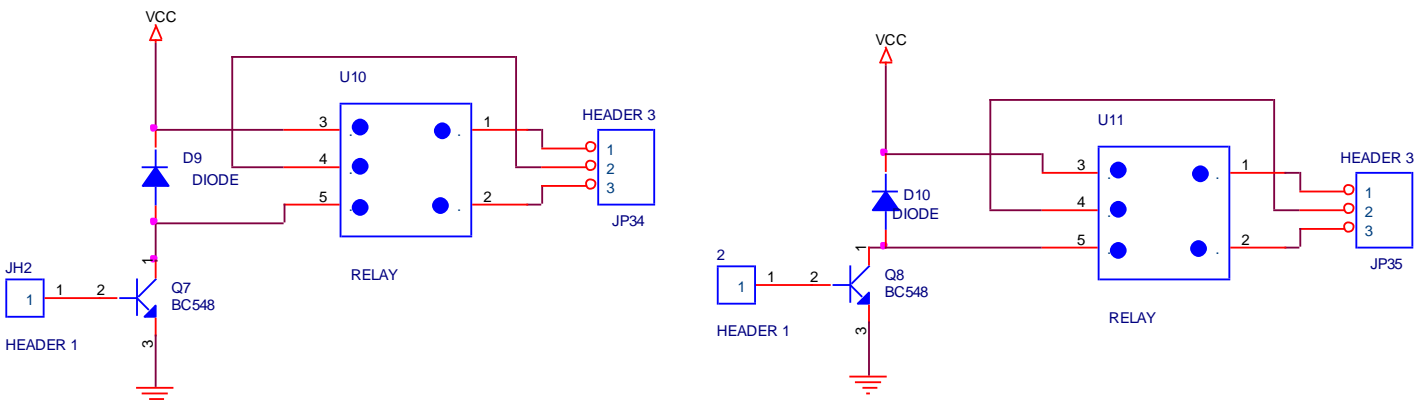# 8051 Advance Trainer

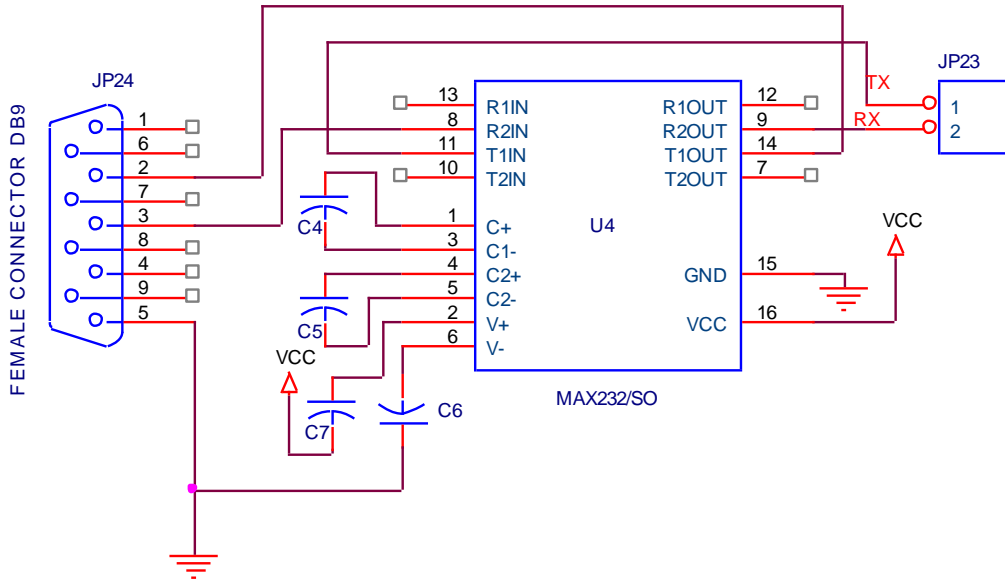## Section 11 – Switches

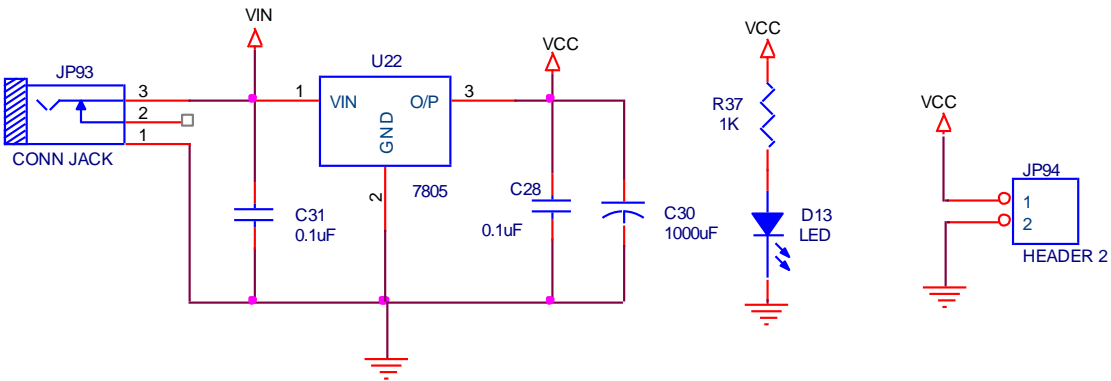## Section 12 – LEDs

Section 13 – Relays

Note - Use 1K resistance in series between the Port Pin of 89V51RD2 and the base pin of BC548 (marked as R on the board). This resistance is included with the product.

Section 14 – RS232 / Serial Port

Section 15 – Power Section

8051 Advance Trainer

3. Process to program P89V51RD2 microcontroller

The 8051 Advance Trainer comes with P89V51RD2 microcontroller on the board.

Note –Product pictures shows AT89S52 on the board but the product comes with P89V51RD2

To Program P89V51RD2, use the USB Programmer included with the product. Below are the instructions about usage of this programmer –
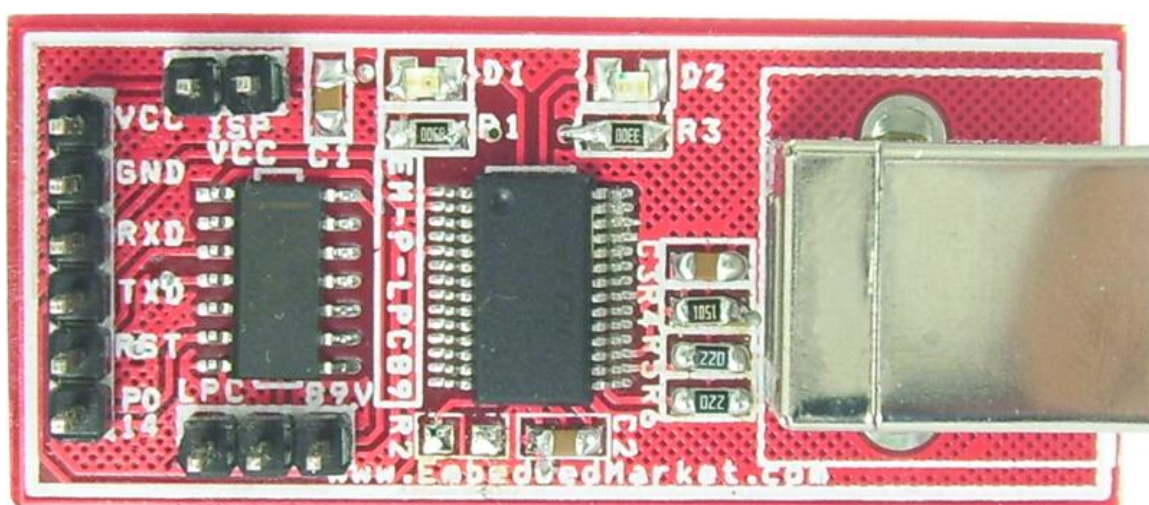
This programmer has dual applications. It can program P89V51RD2 as well as LPC2138 ARM7 controllers.

Thus below notes includes details of P89V51RD2 and for LPC2138 Programming

In both cases, the controllers are programmed "In-Circuit" i.e. the controllers need not to be removed from the board / circuit. Controllers are programmed and automatically they switch back to run mode once done.

Read below details for Programming steps:

8051 Advance Trainer

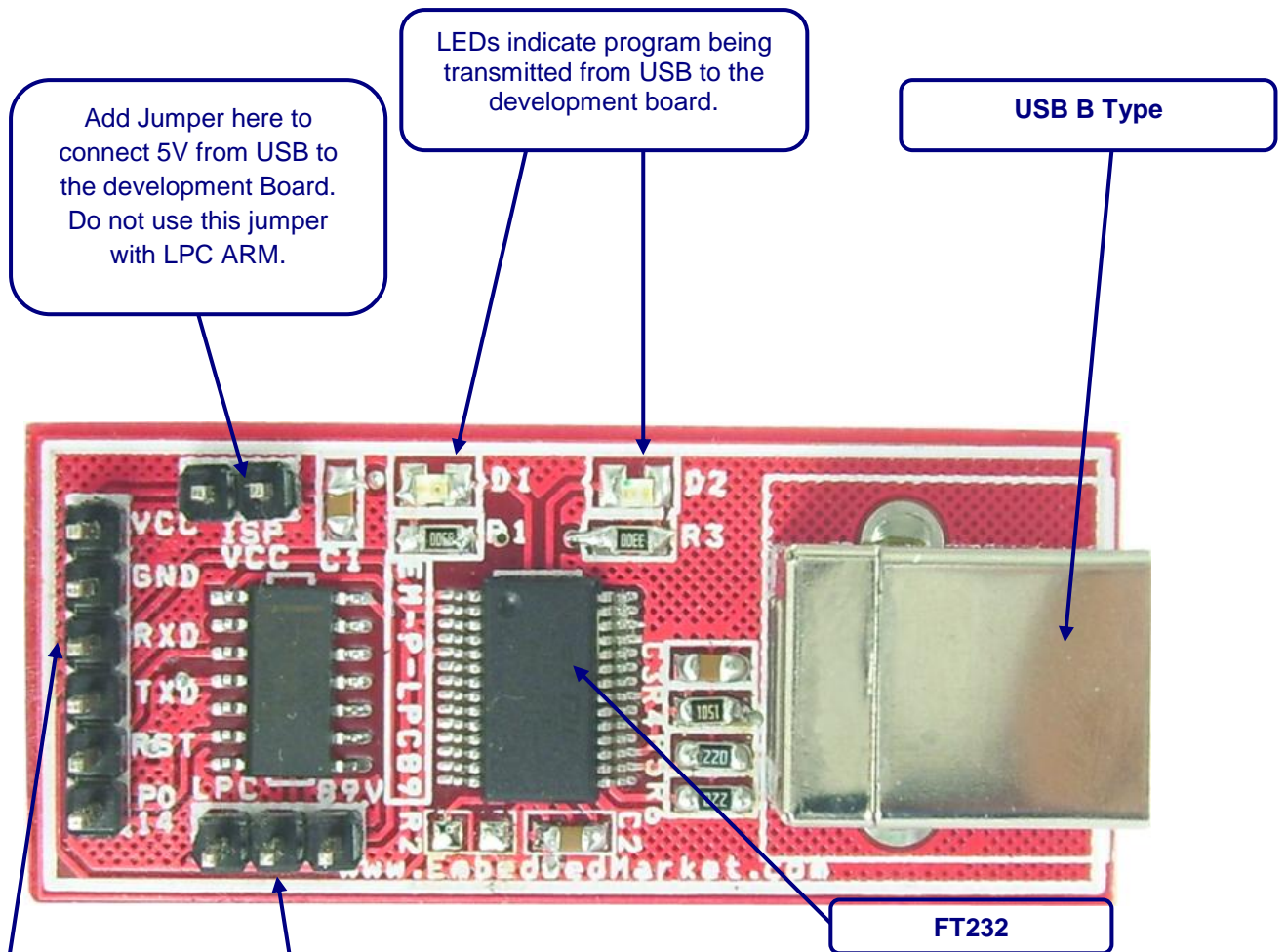Add Jumper here to connect 5V from USB to the development Board. Do not use this jumper with LPC ARM.

LEDs indicate program being transmitted from USB to the development board.

USB B Type

FT232

Selection Jumper:

For LPC ARM Programming: Add Jumper between Left pin and Center.

**For P89VXX Programming:** Add Jumper between Right pin and Center.

Programming Header:

1. Vcc – 5V (Do not use for LPC ARM)

2. GND- Common Ground between this programmer & the development board

3. RXD – Connect to RX line of the microcontroller. (RX0 in case of LPC ARM)

4. TXD – Connect to TX line of the microcontroller. (TX0 in case of LPC ARM)

5. RST – Connect to RESET line of the microcontroller

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How to Program?

1. On the USB programmer, set jumper to 89V Side, as shown in above picture.

2. Using the 6 pin female to single pin female connector, connect GND, RXD, TXD, RST of the Programmer to GND, P3.0, P3.1, RST of the 8051 Advance Trainer Board.
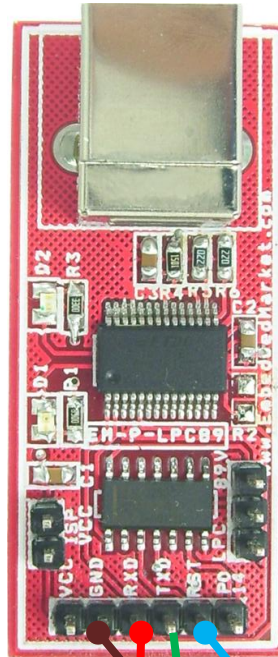

On 8051 Advance Board -

1. GND is second pin on the connectors marked as ISP

2. P3.0 to RXD

3. P3.1 to TXD

4. RST is sixth pin on the connector marked as ISP

8051 Advance Trainer
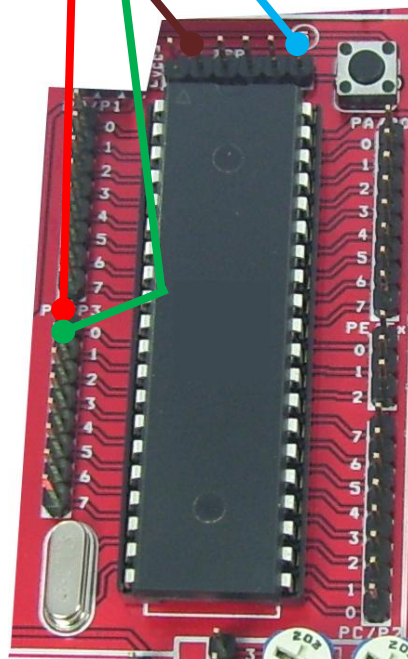
3. On the 8051Advance Board, Set RST SEL Jumpers to VCC Side.

4. Connect A to B Type USB cable (also called as USB cable for printer) from the programmer to your PC / Laptop

5. If you have connected this Programmer for the first time then you may need to install the drivers. Download the drivers matching with the operating system installed on your PC / Laptop. The download link is : http://www.ftdichip.com/Drivers/VCP.htm

6. After installing the drivers, you may download the FlashMagic Software from link: http://www.flashmagictool.com/

7. Install the FlashMagic software and start it from program menu.

8. In FlashMagic, Select the microcontroller's name, COM Port number, Baud Rate

9. In FlashMagic, click Options=>Advanced Options menu
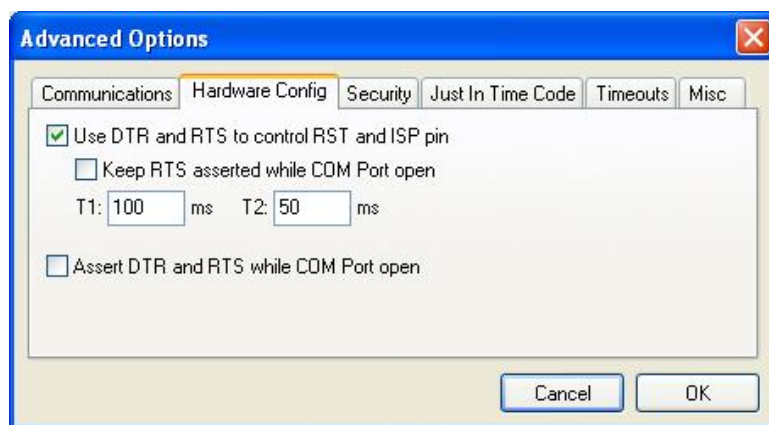
10. Click OK once done with the selection in "Advanced Options".

11. Click "Browse" to select the hex file and click "Start" button in FlashMagic software to begin the Programming process. Hex file is the output file of your program.

8051 Advance Trainer

4. Important information

1. The "8051 Advance Trainer" product is designed for experiments and is not suitable to be used in life support and mission critical products.

2. Manufactured by:

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   205 Decision Tower
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   Ph: +91 20 24228818

   For Support- Login to your account at EmbeddedMarket.com and post Support request via Support request Link

   Email for Sales – sales@embeddedmarket.com
   Website – www.EmbeddedMarket.com

3. For Product Customization & Bulk orders, contact sales@embeddedmarket.com