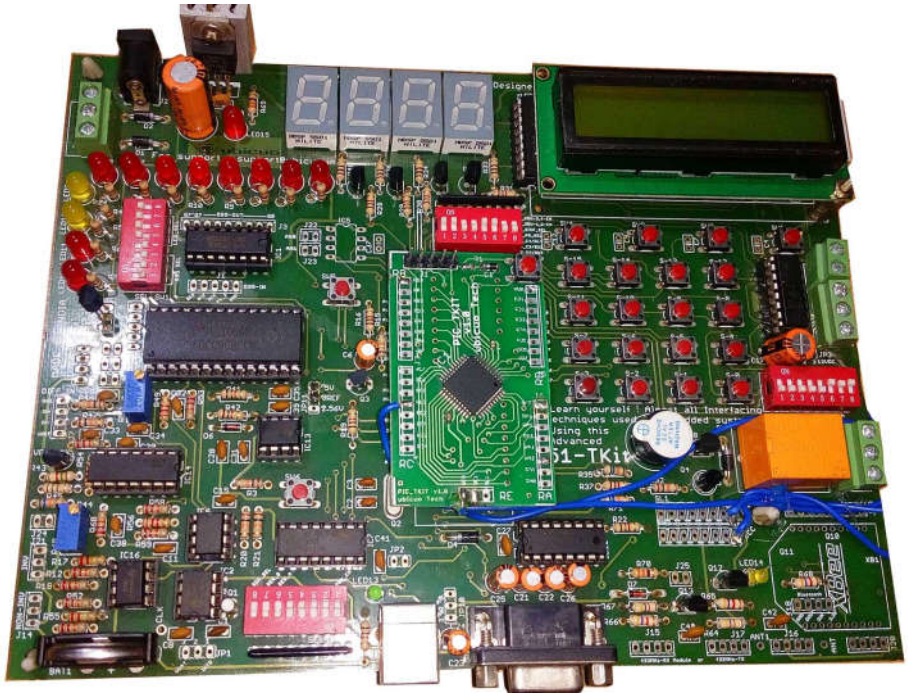
2018

Ubicuo Technologies

V1.4



[PIC TKIT USER MANUAL]

PIC TKit trainer kit is an advanced level trainer kit developed by Ubicuo Technologies, a GEOES INDIA venture. The kit is mainly focused on real embedded system enthusiasts who are interested in learning how basic things work in this area. We strongly recommend this kit for those who are interested in learning from scratch.

The Kit is equipped with PIC16F887 microcontroller which is an upgraded version with more features than its predecessor , can help acquire the basics of this field, similar to the role of a bicycle in helping to gain balance before moving on to bigger bikes. In this version, we have tried to include almost all basic interfacing techniques. Due to the hardware limitations of this controller, we have used several multiplexing techniques to accommodate maximum interfaces.

This user manual will guide you through the setup process during the development stages.

For support, mail to us at : support@ubicuo.in

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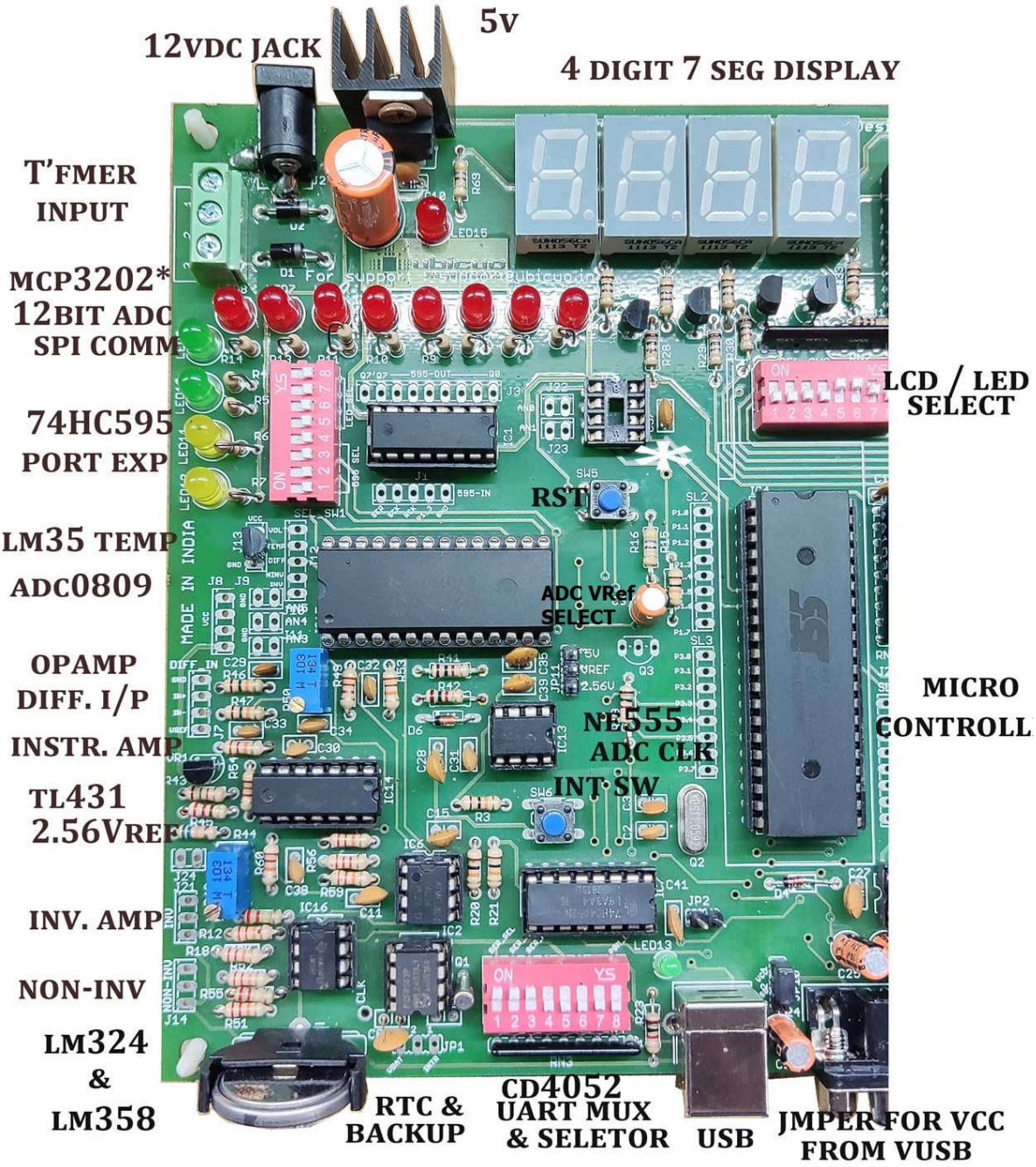
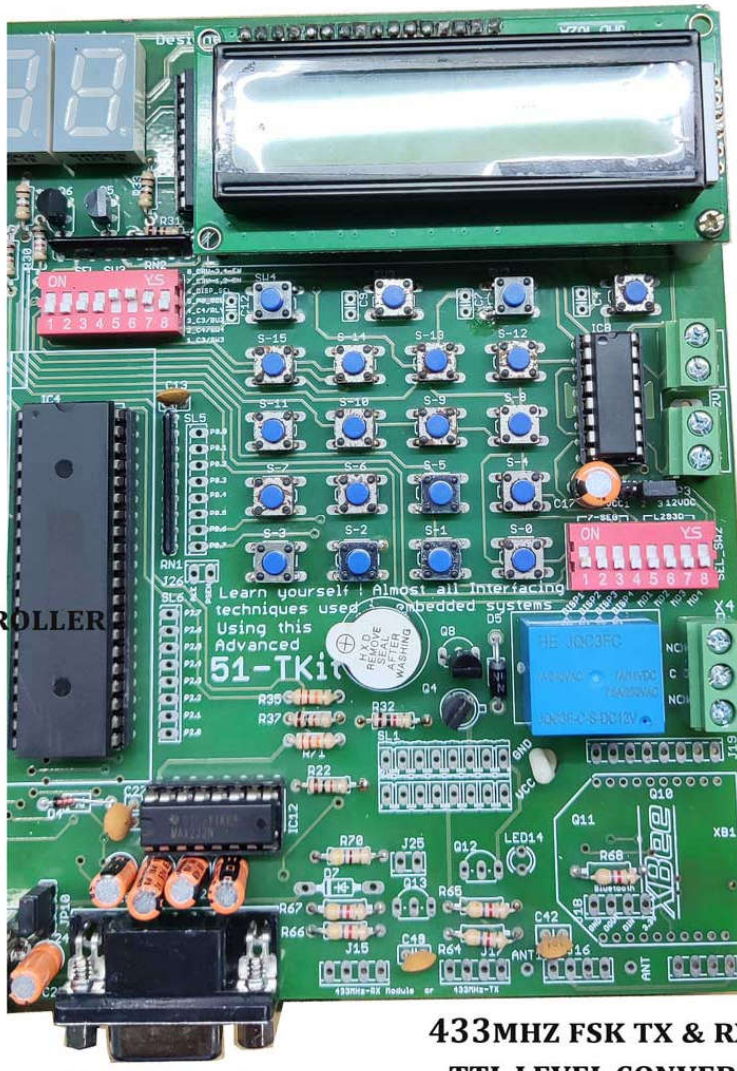
1. Board Layouts

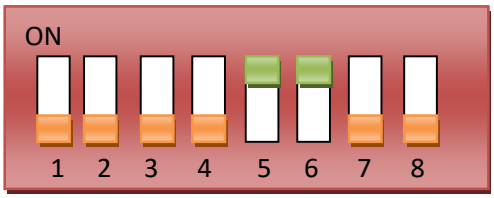


16X2 CHAR LCD IN 4 BIT MODE

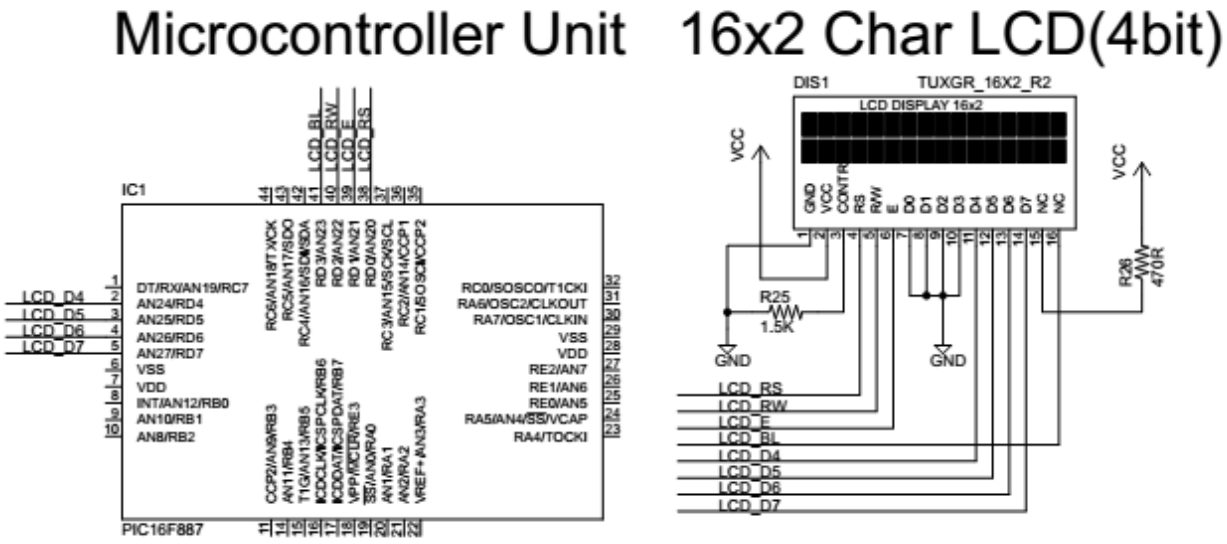


2. LCD Interfacing (In 4-bit Mode)

- The **Port 0** will connect to the **LCD module pins** only when both the **DISP_SEL (pin 6)** and **P0_SEL (pin 5)** of the **SELECTION SWITCH 3** is in the **ON position**.



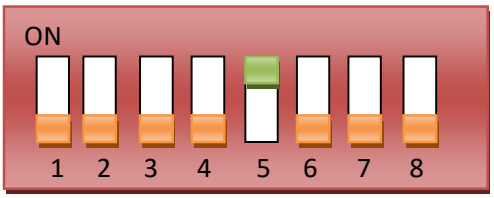
SEL_SW3



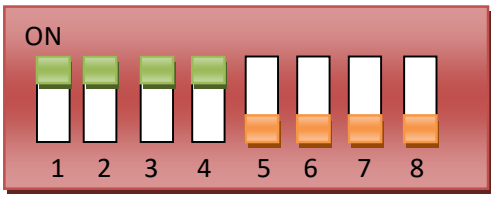
The above image shows the corresponding PIC's PORTD pins routed through the to the LCD in 4-bit mode.

3. 4-Digit , 7 SEGMENT LED Common Anode display

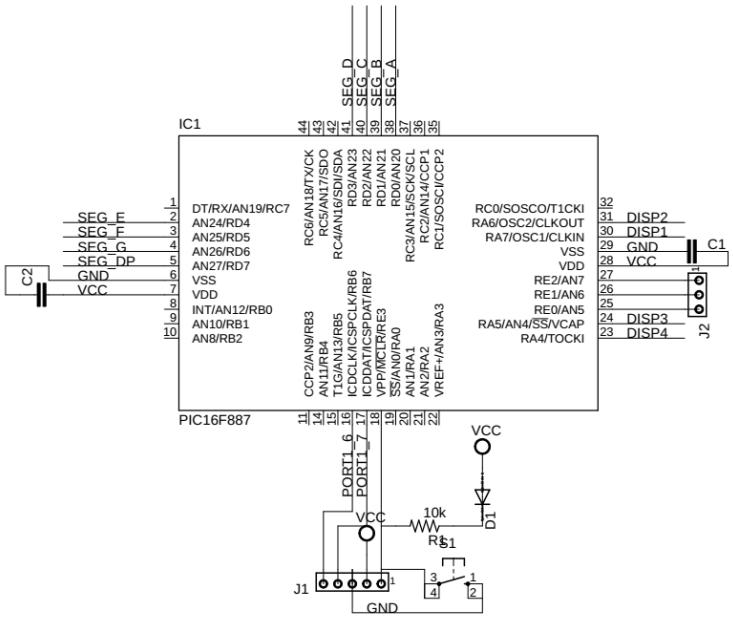
- The **Port D** will connect to the **7 SEGMENT LED** module's segment pins only when the **SELECTION SWITCH 3 , DISP_SEL (pin 6)** is in **OFF** and **P0_SEL (pin 5)** is in **ON state**.
- The **Switch 1,2,3,4** (DISP1, DISP2, DISP3, DISP4) must be **ON** and **5,6,7,8** (MD1, MD2, MD3, MD4) must be **OFF**, of the **SELECTION SWITCH 2.**

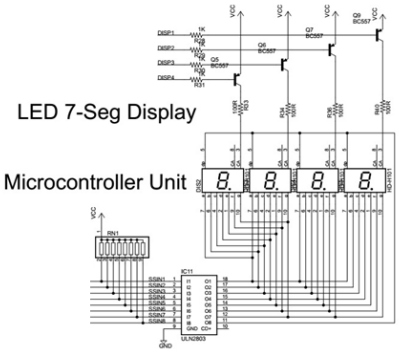


SEL_SW3



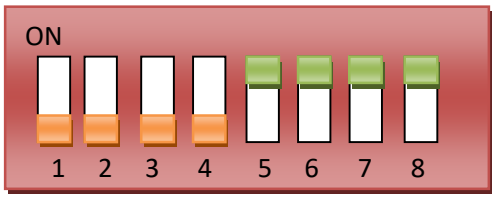
SEL_SW2





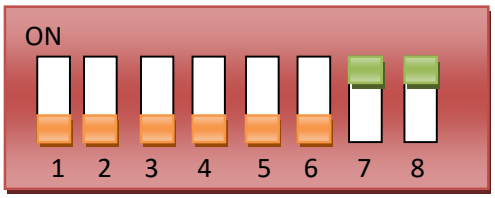
4. STEPPER MOTOR

- The stepper motor works when the **Switch 1,2,3,4** (DISP1, DISP2, DISP3, DISP4) is in **OFF** & **5,6,7,8** (MD1,MD2,MD3,MD4) is in **ON**, in **SELECTION SWITCH 2**.
- **Switch 7, 8** of the **SELECTION SWITCH 3** must be in **ON State**.



(IF CCP2(RC1) is used then Pin 5 in OFF)

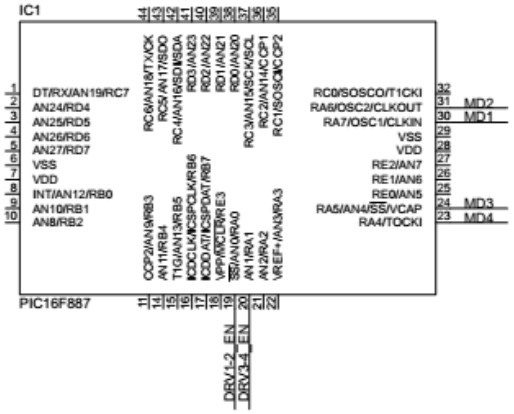
SEL_SW2



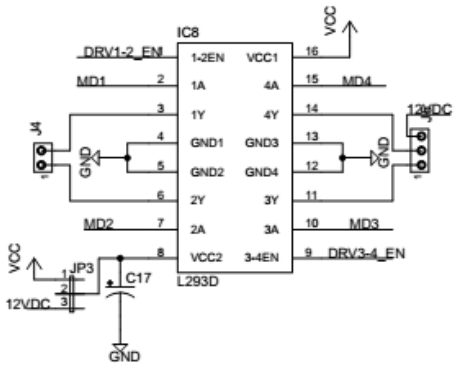
To Disable L293D Driver

SEL_SW3

Microcontroller Unit

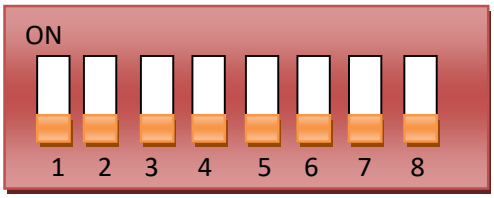


Stepper/DC Motor Driver

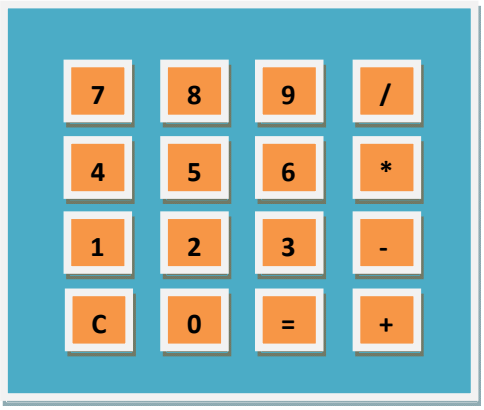


5. MATRIX KEYPAD

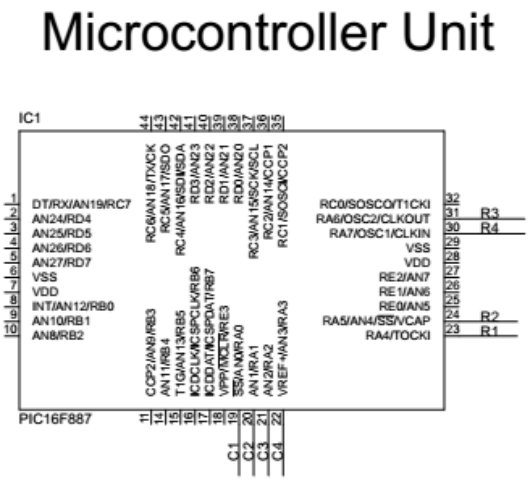
- The matrix keypad is connected to the PORT 2 pins & its recommend to keep all the switches of the **SELECTION SWITCH 2** in **OFF state**.

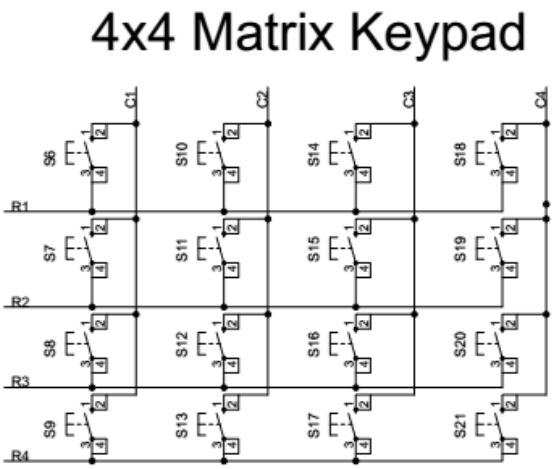


SEL_SW2



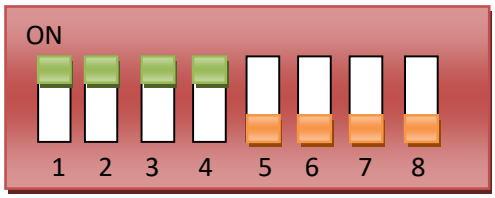
4*4 MATRIX KEYPAD Lay Out



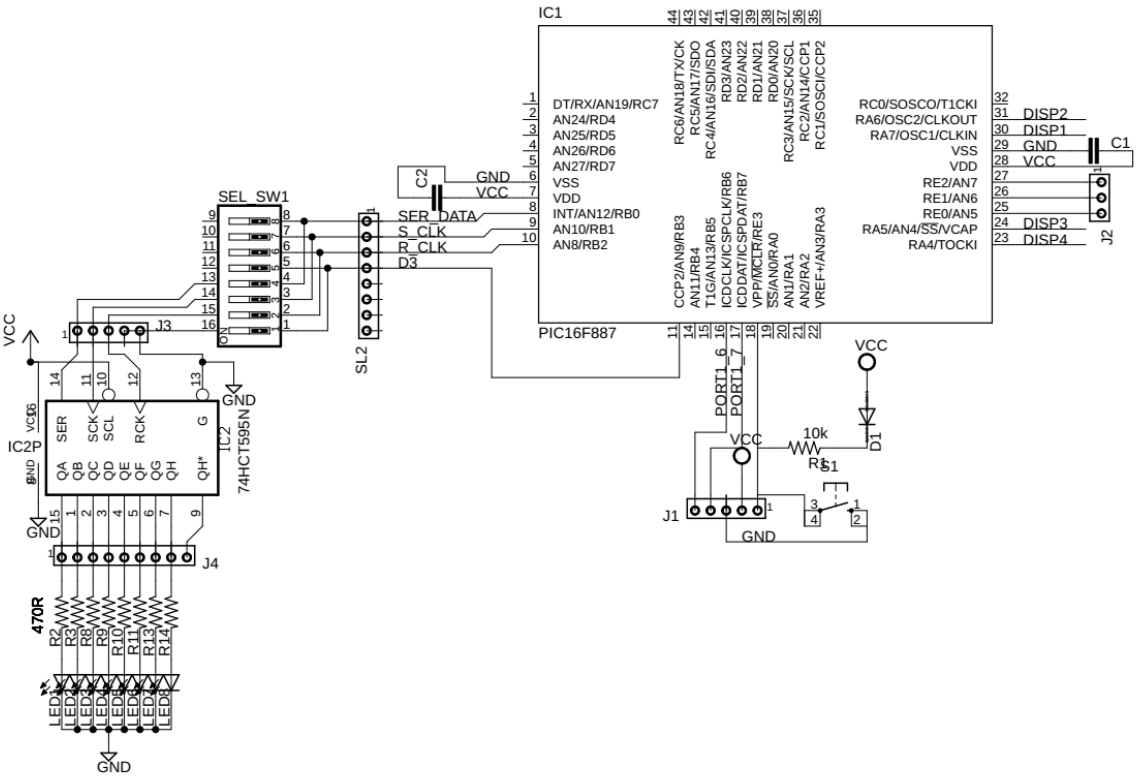


6. SHIFT REGISTER (Serial In Parallel Out, with Latch)

- For the port expansion technique, a 74595 shift register is interfaced to the PORT1 pins. It works only when **Switch 5,6,7,8** is in **OFF state** and **1,2,3,4** is in **ON state**, of the **SELECTION SWITCH 1**.

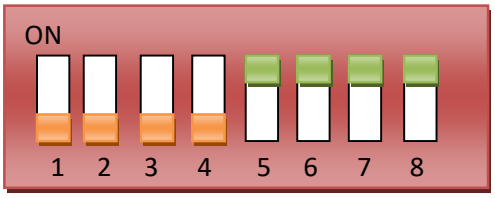


SEL_SW1

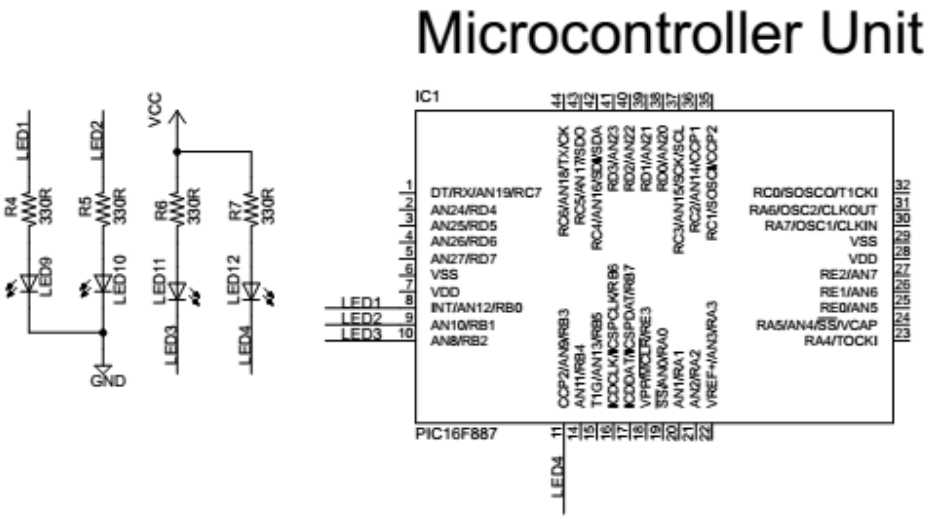


7. LED on PORT pin

- The LED become ON when the **Switch 1,2,3,4** is in **OFF state** and **5,6,7,8 is in the ON state**, of the **SELECTION SWITCH 1**.

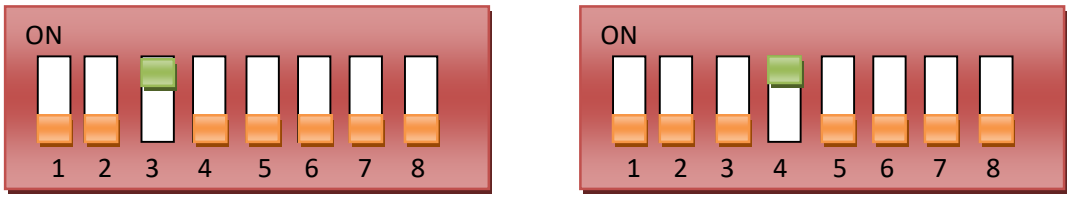


SEL_SW1



8. BUZZER on GPIO pin

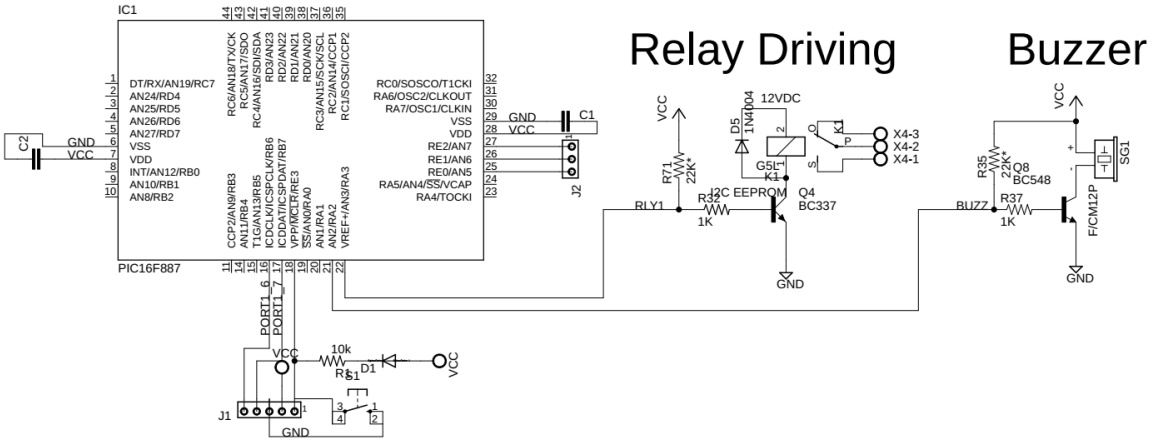
- The **buzzer** will become **ON** only when the **Switch 3** of the **SELECTION SWITCH 2** become **ON**.



SEL_SW3

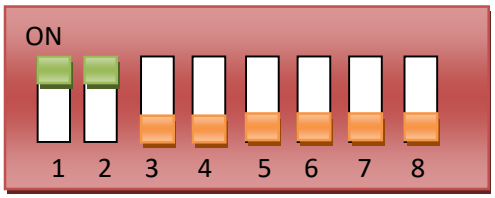
9. RELAY on GPIO pin

- The **Relay** will become **ON** only when the **Switch 4** of the **SELECTION SWITCH 2** become **ON**

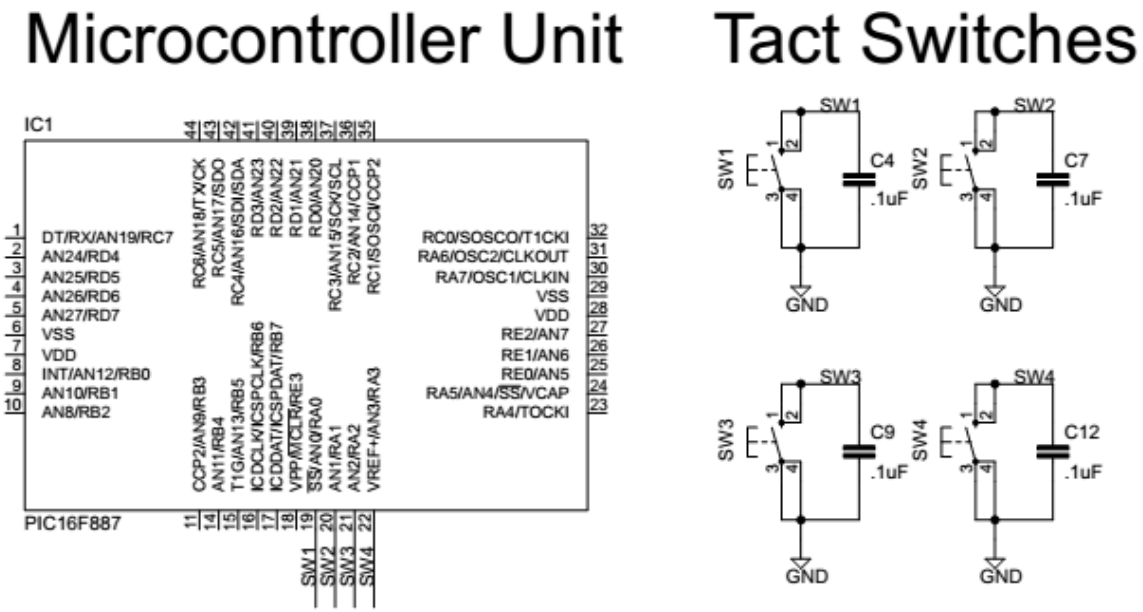


10. SWITCH

- **The SWITCH 3** and **SWITCH 4** work only when the **switch 3, 4** must be **OFF** and **switch 1, 2** must be **ON**, of the **SELECTION SWITCH 3.**

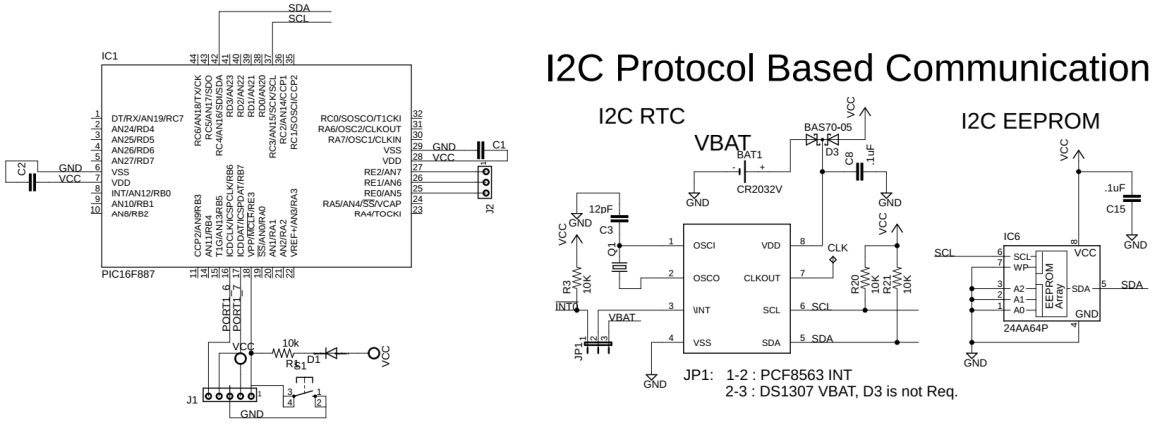


SEL_SW3

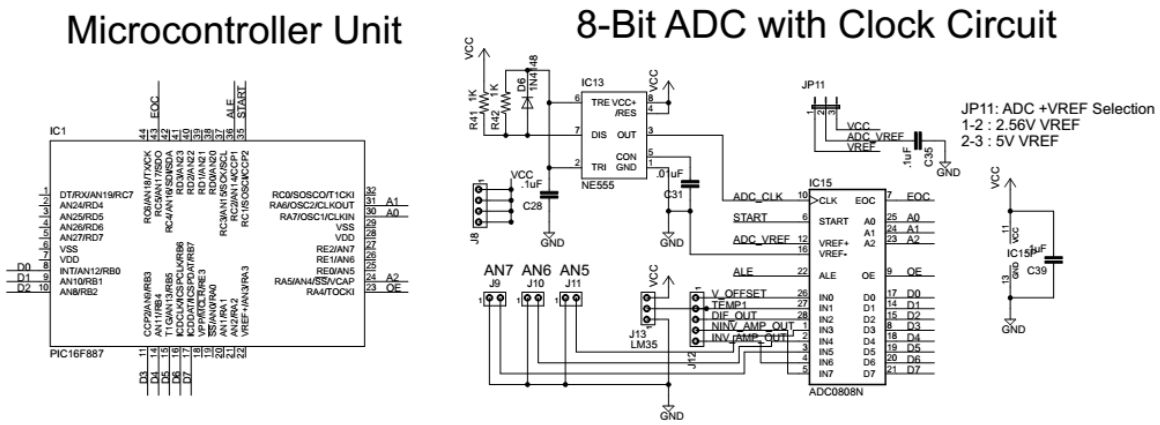


11. I2C Protocol Based Communication

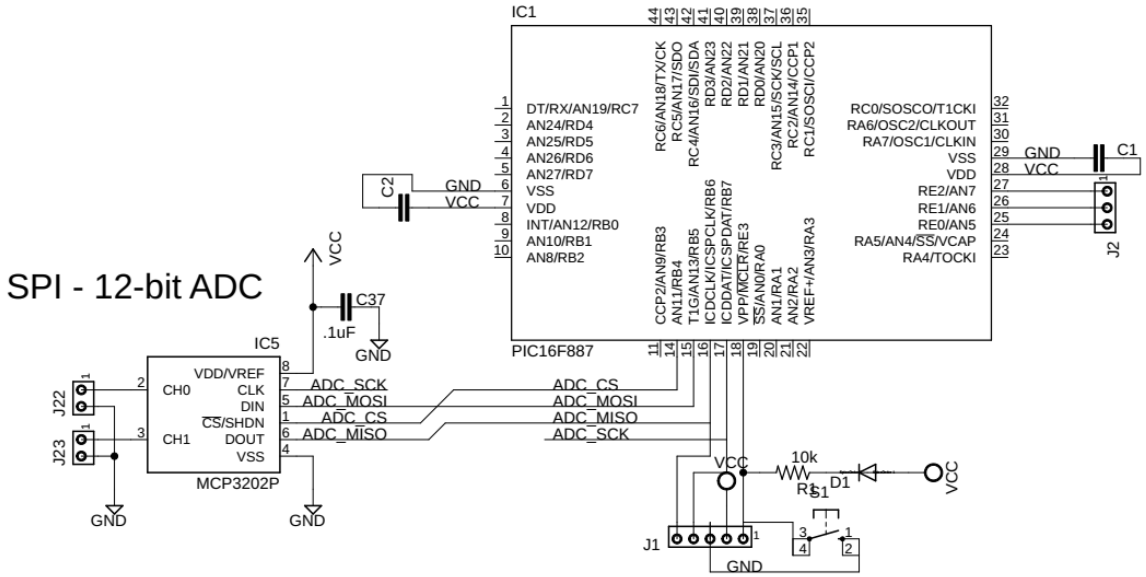
The I2C Protocol Based Communication includes RTC and EEPROM



12. ADC 0808 8-BIT ADC WITH CLOCK CIRCUIT



13. SPI based 12-bit ADC interface (Optional)



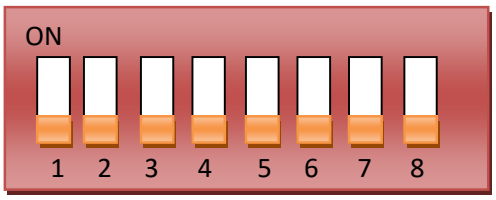
Due to non availability and higher cost, this IC may not be populated on the PCB. Later user can insert the IC to the specified base , according to the requirement.

14. SERIAL COMMUNICATION

The board is supported with various mode of communications that utilizes the UART module. The modes are selected using the SEL_SW4. Only any one of the following mode of communication can be selected at time.

TTL UART or RC7 & RC6 as GPIO

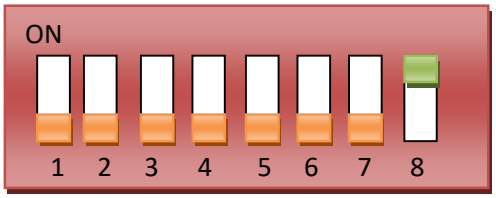
In this case the UART multiplexing is disabled and the pins can be, connector.



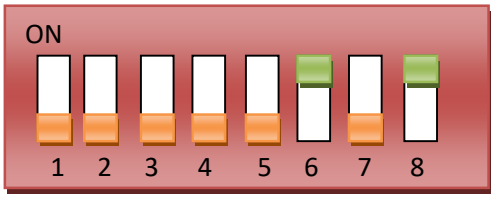
SER_SEL -8
SER_B -7
SER_A -6

SEL_SW4 (SERIAL MUX is Disabled)

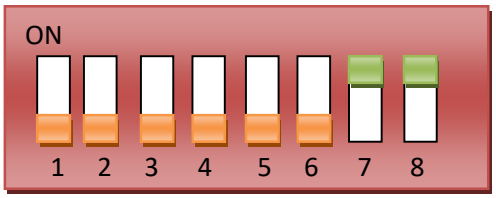
RS232



433MHz Wireless Module



Zigbee & Bluetooth Modules



USB Communication