

# 4x4 Keypad



# **User's Manual**

### **V1.0**

## September 2009

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#### 1. INTRODUCTION



Keypad is an array of switch. There will be 2 wires connected each time a button is pressed. For example; when button '1' is pressed, pin col1 and row1 is connected. There is no connection between rows and also columns. The button make it connect.

To scan which button is pressed, users need to scan it column by column and row by row. Make rows as input and columns as output. For example; set all columns by default. 1<sup>st</sup> scan, clear (logic low) column 1 and scan row1-row4 low logic, this will determine which button is pressed in column1. If one of those buttons is pressed, record it and jump out from the scanning loop and continue with the action required. If none button is pressed in column1, set it back to default (logic high) and clear column2. Scan row1-row4 again and this will scan button press of '2', '5', '8' and '0'. And this process is being repeated until all four columns being completed scanned.

For keypad wiring, keypad pins need to pull up or pull down to avoid floating case happen. Pull up normally connect to 5V and pull down is connect to ground.

4x4 Keypad pin can directly connect to microcontroller or keypad decoder IC for decode purpose. However, DIY scanning of keypad consumes a lot of understanding in programming and more program space. The better way to interface a keypad to the PIC is to use a keypad encoder in between the keypad and the microcontroller. One of the Keypad Encoder is the



MMC74C922. Simply hook up all the row and the column pins directly to the encoder and it will output a HIGH pulse on the Data Available pin whenever a key is pressed. After that, the encoder will output 4 bits of data to the PIC. Please refer MMC74C922 datasheet for more information.

Below is example keypad which connects directly to a PIC microcontroller.



Figure 1: 4x4 Keypad connection to microcontroller



#### 2. WARRANTY

- Product warranty is valid for 6 months.
- ▶ Warranty only applies to manufacturing defect.
- > Damage caused by mis-use is not covered under warranty.
- > Warranty does not cover freight cost for both ways.

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