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## 4x4 Matrix Membrane Keypad

This 16-button keypad provides a useful human interface component for microcontroller projects. Convenient adhesive backing provides a simple way to mount the keypad in a variety of applications.

### Features

- Ultra-thin design
- Adhesive backing
- Excellent price/performance ratio
- Easy interface to any microcontroller

### Key Specifications

- Maximum Rating: 24 VDC, 30 mA,  
Life Expectancy: 1 million closures  
Bounce time:  $\leq 5$  ms  
Insulation Resistance: 100M Ohm, @ 100V  
Dielectric Withstand: 250VRms (@ 60Hz, 1min)
- Interface: 8-pin access to 4x4 matrix
- Operating temperature: 32 to 122 °F  
(0 to 50°C).
- Dimensions:  
Keypad, 2.7 x 3.0 in (6.9 x 7.6 cm)  
Cable: 0.78 x 3.5 in (2.0 x 8.5 cm)

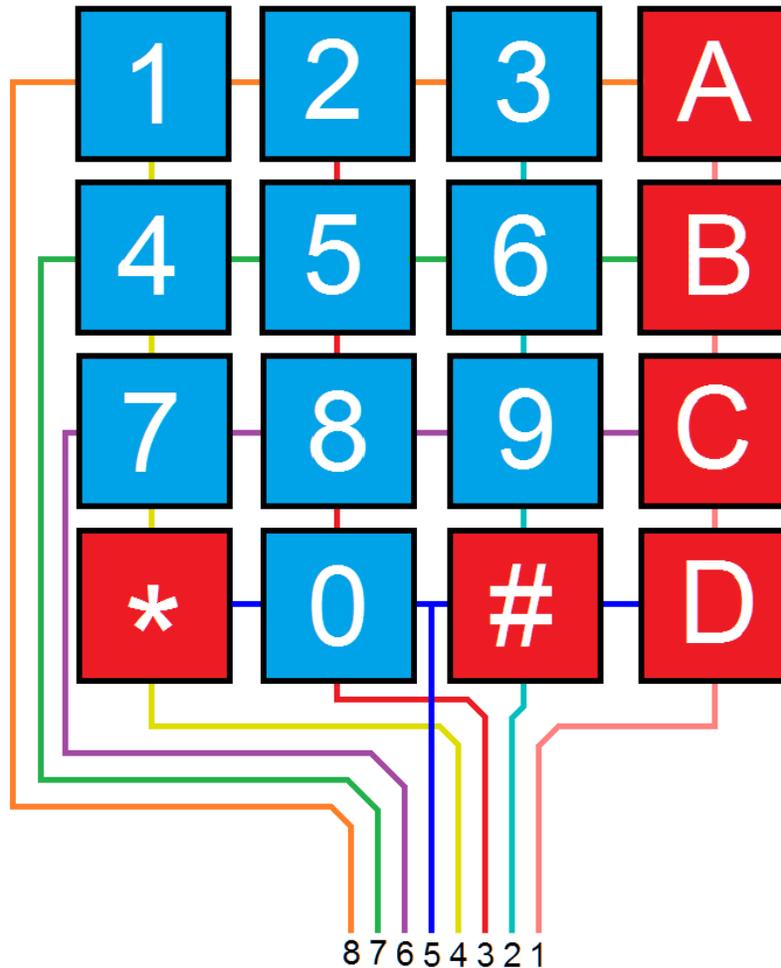
### Application Ideas

- Security systems
- Menu selection
- Data entry for embedded systems



## How it Works

Matrix keypads use a combination of four rows and four columns to provide button states to the host device, typically a microcontroller. Underneath each key is a pushbutton, with one end connected to one row, and the other end connected to one column. These connections are shown in Figure 1.



**Figure 1: Matrix Keypad Connections**

In order for the microcontroller to determine which button is pressed, it first needs to pull each of the four columns (pins 1-4) either low or high one at a time, and then poll the states of the four rows (pins 5-8). Depending on the states of the columns, the microcontroller can tell which button is pressed.

For example, say your program pulls all four columns low and then pulls the first row high. It then reads the input states of each column, and reads pin 1 high. This means that a contact has been made between column 4 and row 1, so button 'A' has been pressed.