TF-0284

The 12 keys keypad is widely used in many applications, some of those are telephones and ATM machines. There are many different types of keypads and the keypad whish would be explained here would a matrix method in order to find which key is pushed. This keypad does not have pins for Vdd or Vgnd, which means it does not require a direct connection to a voltage source to perform its task. Also this keypad has 7-pins and each pin would represent a row or a column. As this keypad has 12 key, it has 3 columns and for rows. The matrix of the keys related to pins is shown in Figure 1.

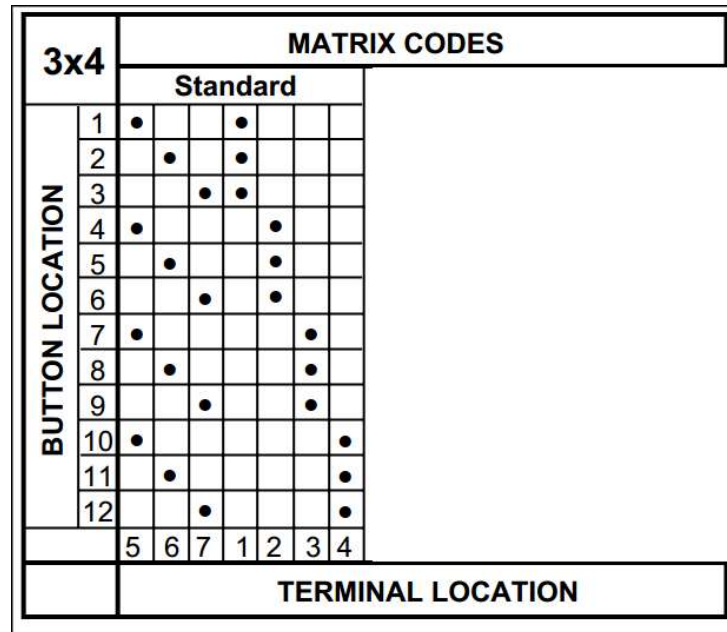
Figure 1

Keypad Properties:

The keypad has a 3-columns and 4-rows matrix orientation as seen in figure 1. If a key is pushed then the circuit would be shorted for those specific key pins. The short circuit would always be between a row pin and a column pin. Let suppose the rows 1-4 are represented by pins 1-4 and columns 1-3 are represented by pins 5-7. For example button 1 would be represented by pins 1 and 5, so if a voltage is applied to one of the pins and a voltammeter is connected to the other pin, when the button is pushed the voltammeter would read the input voltage. From Figure 1 it would be easy to construct a table that would show each button represents what character, and which pins are shorted if that button is pressed, which is provided in Table 1:

Key Number	Character	Culomn Pin	Row Pin
1	'1'	5	1
2	'2'	6	1
3	'3'	7	1
4	'4'	5	2
5	'5'	6	2
6	'6'	7	2
7	'7'	5	3
8	'8'	6	3
9	'9'	7	3
10	'*'	5	4
11	'0'	6	4
12	'#'	7	4

Table 1

Keypad Connection to Microcontroller:

The 4 rows of the keypad would be connected to the microcontroller pins directly without other connections. However, each of the 3 columns of the keypad would be connected into a pull up resistor (i.e. 18kΩ) which is connected into a voltage source and the microcontroller.

The microcontroller pins that are used are I/O ports, so they can be programmed and used in a different way. All the pins of the keypad are connected to make sure that it would be easy to detect which pin is pushed easily. The connections between the microcontroller and the keypad are provided in Figure 2.
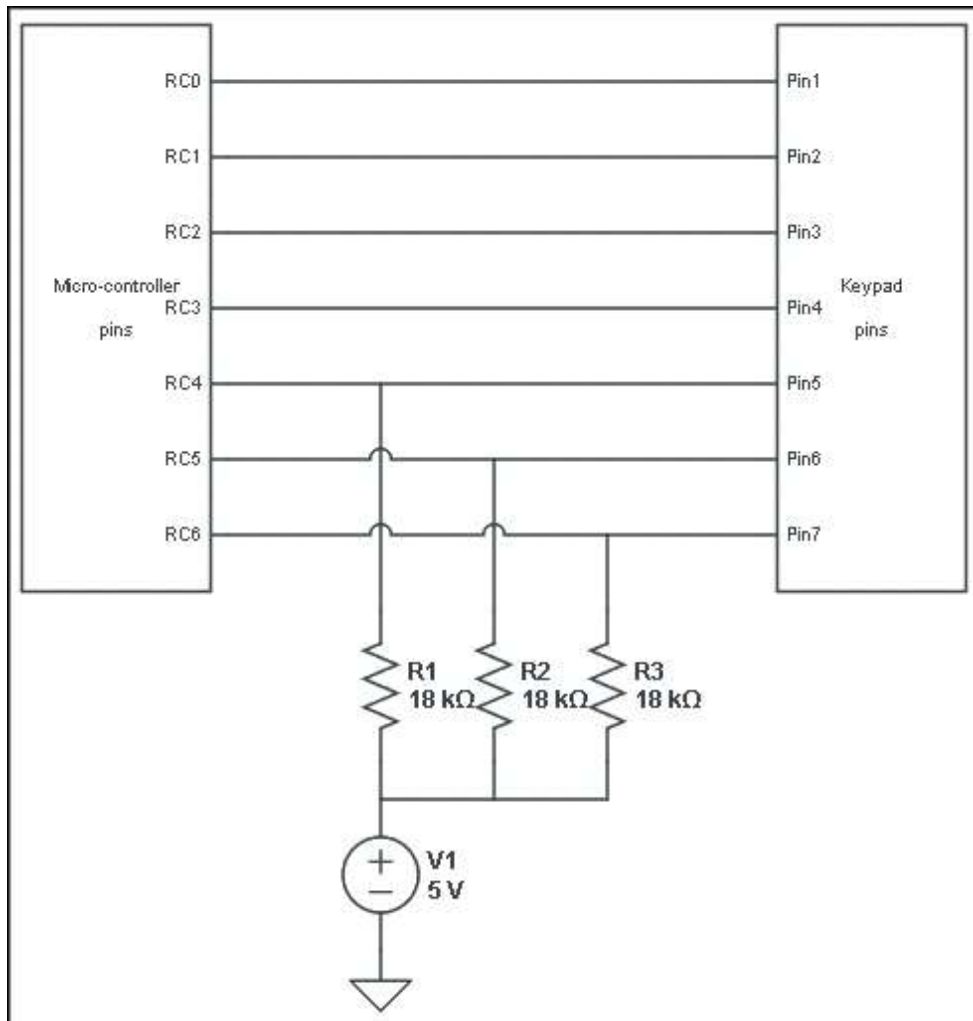

Figure 2