

# Electronics Row-Column Devices

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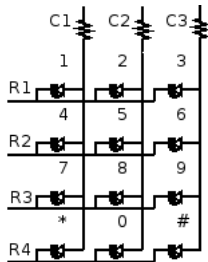
- Often switches and LEDs will be arranged in a matrix, such as on a keypad or dot-matrix display.

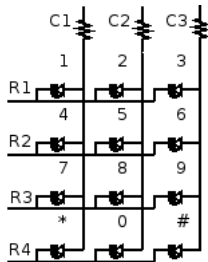
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- Rather than having a pin for each element, having pins for each row and column reduces the total number needed.

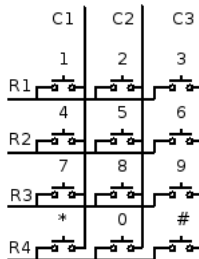
# Row-Column Devices

- Often switches and LEDs will be arranged in a matrix, such as on a keypad or dot-matrix display.
- Rather than having a pin for each element, having pins for each row and column reduces the total number needed.
- This requires *strobing* in order to work.

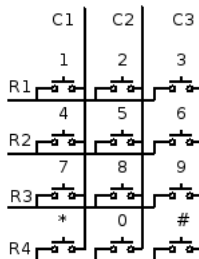




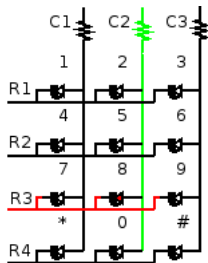
LED matrix

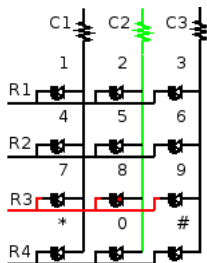






Telephone keypad





LED 8 lighted

# LED matrix operation

# LED matrix operation

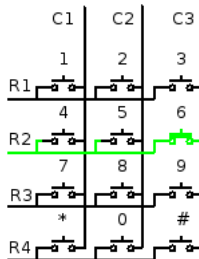
- 1 Set the bit for the first column HIGH, and all others LOW.

## LED matrix operation

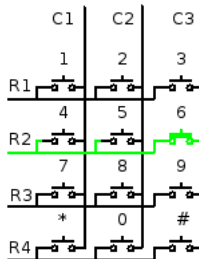
- 1 Set the bit for the first column HIGH, and all others LOW.
- 2 Set the bits for each of the rows LOW where you want an LED on, and set the others HIGH.

# LED matrix operation

- 1 Set the bit for the first column HIGH, and all others LOW.
- 2 Set the bits for each of the rows LOW where you want an LED on, and set the others HIGH.
- 3 Repeat for each column.







Key 6 pressed

# Keypad matrix operation

# Keypad matrix operation

- 1 Set the bit for the first column HIGH, and all others LOW.

# Keypad matrix operation

- 1 Set the bit for the first column HIGH, and all others LOW.
- 2 Read the bits for the rows.

## Keypad matrix operation

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- 2 Read the bits for the rows.

A HIGH indicates the row where a switch was pressed, and LOWs indicate rows where switches were not pressed.

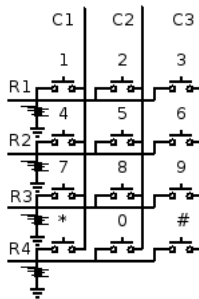
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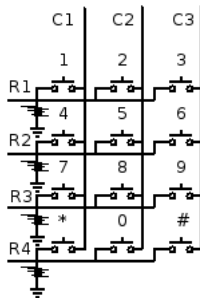
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**Note: Pulldown resistors will be needed on the rows, even though they are not shown.**







Telephone keypad with pulldown resistors on rows