Electronics
Row-Column Devices

Terry Sturtevant

Wilfrid Laurier University

February 13, 2019
# 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.
Often switches and LEDs will be arranged in a matrix, such as on a keypad or dot-matrix display.
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.
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.
Row-Column Devices

LED matrix operation
Keypad matrix operation

Terry Sturtevant

Electronics Row-Column Devices
LED matrix
Telephone keypad
Row-Column Devices

LED matrix operation
Keypad matrix operation

Terry Sturtevant

Electronics Row-Column Devices
LED 8 lighted
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.
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.
Signals to light ‘8’ LED
Row-Column Devices

LED matrix operation
Keypad matrix operation

PWM makes it possible to dim the LED as well.

Terry Sturtevant
PWM makes it possible to dim the LED as well.
Keypad matrix operation

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

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.

Repeat for each column.

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

1. Set the bit for the first column HIGH, and all others LOW.
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.
Keypad matrix operation

1. Set the bit for the first column HIGH, and all others LOW.
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.
3. Repeat for each column.

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

1. Set the bit for the first column HIGH, and all others LOW.
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.
3. Repeat for each column.

Note: Pulldown resistors will be needed on the rows, even though they are not shown.
Row-Column Devices

LED matrix operation
Keypad matrix operation

Terry Sturtevant

Electronics Row-Column Devices
Telephone keypad with pulldown resistors on rows
Key 6 pressed
Row-Column Devices

LED matrix operation

Keypad matrix operation

Terry Sturtevant  Electronics  Row-Column Devices
Signals when ‘6’ key is pressed