Processors & Controllers | V. Manikanta
CO-3 Home Assignment | 2200081837

⇒ To design a 4x4 keypad interfacing device with an 8051 microcontrol involves several steps:

→ components Needed:

i. 8051 Micro controller
ii. 4x4 keypad
iii. Pullup (or) pull down resistors.
iv. Connecting wires
v. Power supply for the micro controller

→ procedure:

i. Understanding the keypad:

- A 4x4 keypad has 16 keys arranged in a 4x4 matrix.
- Each key represents a unique combination of rows & columns.
- when a key is pressed, it connects one row with one column, creating a unique electrical connection

ii. Connections to the microcontroller:

- Connect the rows of the keypad to four GPIO pins on the 8051 M.C
- Connect the columns of the keypad to another four GPIO pins on the micro controller.
- Use pullup (or) pull down resistors on the column lines to ensure a stable logic state when no key is pressed.

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iii. Read keypad inputs:

- To read a keypress, you'll need to scan the keypad by sequentially activating each row while reading the columns.
- The process involves setting one row to low (0) & reading the four column values.
- we may need to use a loop to iterate through all rows & columns to detect a keypress.
- once a keypress is detected, you can identify the pressed key by its row and column coordinates.

iv. Coding in 8051 Assembly (or) C:

- write code for the 8051 H.C to scan the keypad.
- use appropriate I/O instructions (or) library functions to set the row pins & read the column pins.
- when a keypress is detected, store (or) process the key data as needed.

v. Display (or) process the key Data:

- Depending on your application, you can use the key data to control other devices display on an LCD, (or) send data to a computer (or) another microcontroller.
- Implement the specific functionality you need for your project using the key data.

vi. Testing and Debugging: 2200081837
- After writing the code & connecting the hardware, thoroughly test the keypad interfacing.
- Check for any issues with keypress detection, debouncing & data processing.
- Debug and make necessary adjustments as required.

vii. Power supply and Ground:
- Ensure that the microcontroller & keypad are properly powered & grounded.
- Connect the Vcc & GND ~~points~~ pins of both the microcontroller & the keypad to the appropriate power supply and ground connections.

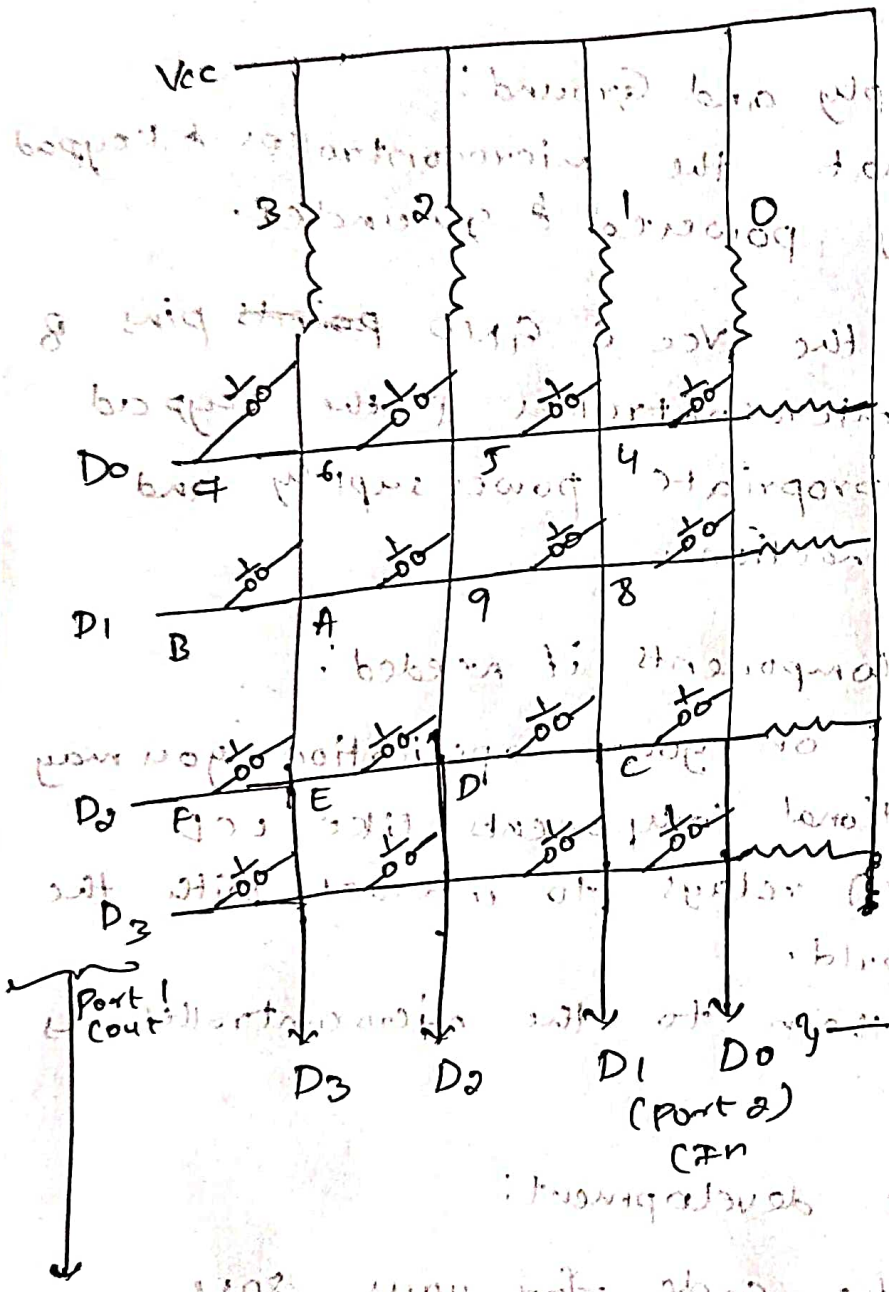
viii. External components if needed:
- Depending on your application, you may need additional components like LCD displays, (or) relays to interact with the outside world.
- connect them to the microcontroller as required.

ix. Software development:
- write the code for your 8051 microcontroller to handle keypad input, process the keypresses & perform the desired actions.

xx. Testing and integration: 2200081837

- Test the entire system to ensure the keypad interface works as expected within your larger project or application.

Matrix keyboard Connection to ports:



If all the rows are grounded & a key is pressed, one of the columns will have 0 since the key pressed provides the path to the ground

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Flowchart: