CPLD-LCD Interfacing

Avadhoot Khairnar

JHD 162A

| PIN No.	Name	Function
1	VSS	Ground
2	VCC	Supply Voltage for Logic
3	VEE	Supply Voltage for LCD Contrast
4	RS	Register Select
5	R/W	Read/Write
6	E	Chip Enable
7	D0	Data Bit 0
8	D1	Data Bit 1
9	D2	Data Bit 2
10	D3	Data Bit 3
11	D4	Data Bit 4
12	D5	Data Bit 5
13	D6	Data Bit 6
14	D7	Data Bit 7
15	A (LED+)	Anode for LED Backlight
16	K (LED-)	Cathode for LED Backlight
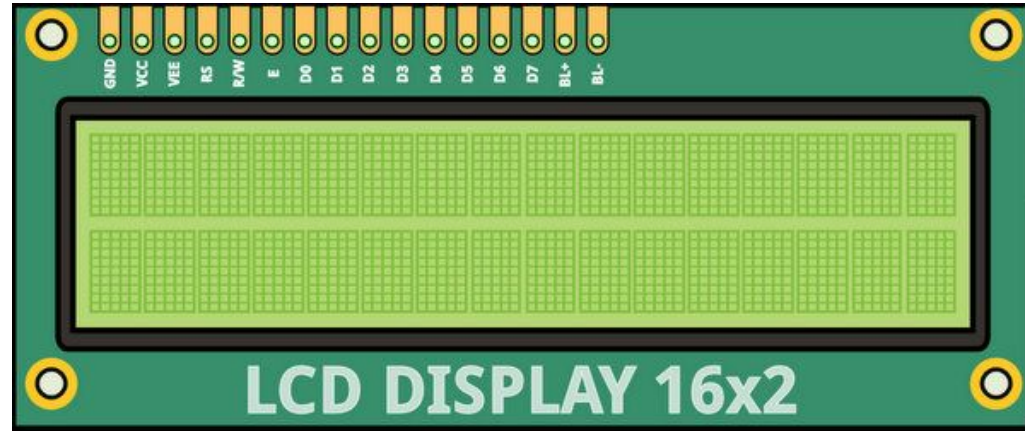
JHD162A 16×2 Character LCD[1]

Timing Diagram

- Operation of various logic circuits through a diagram.
- How logic circuit responds to input signals in relation to time.
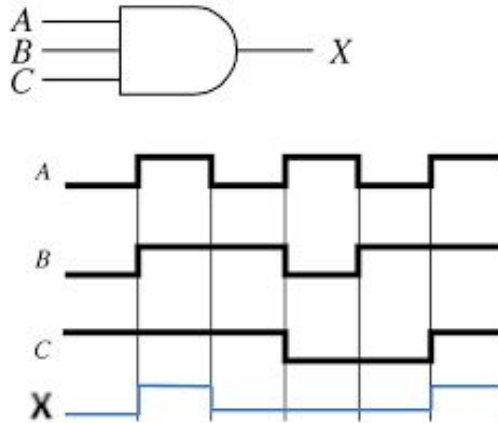
Source: Internet

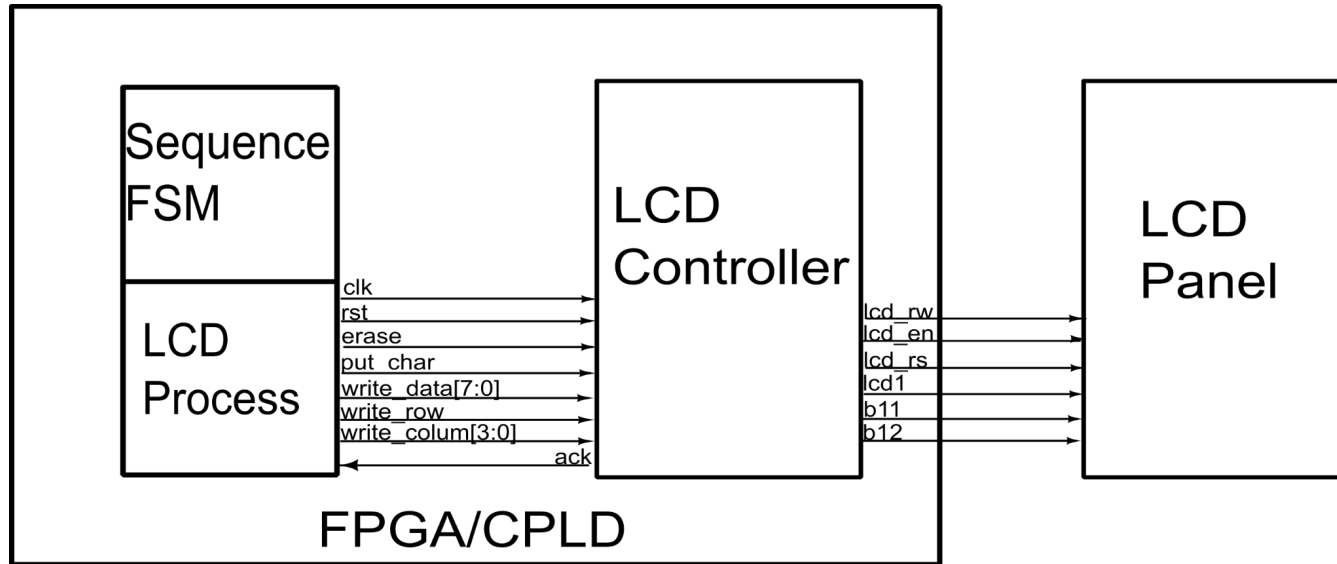# So how do we write a character on LCD?
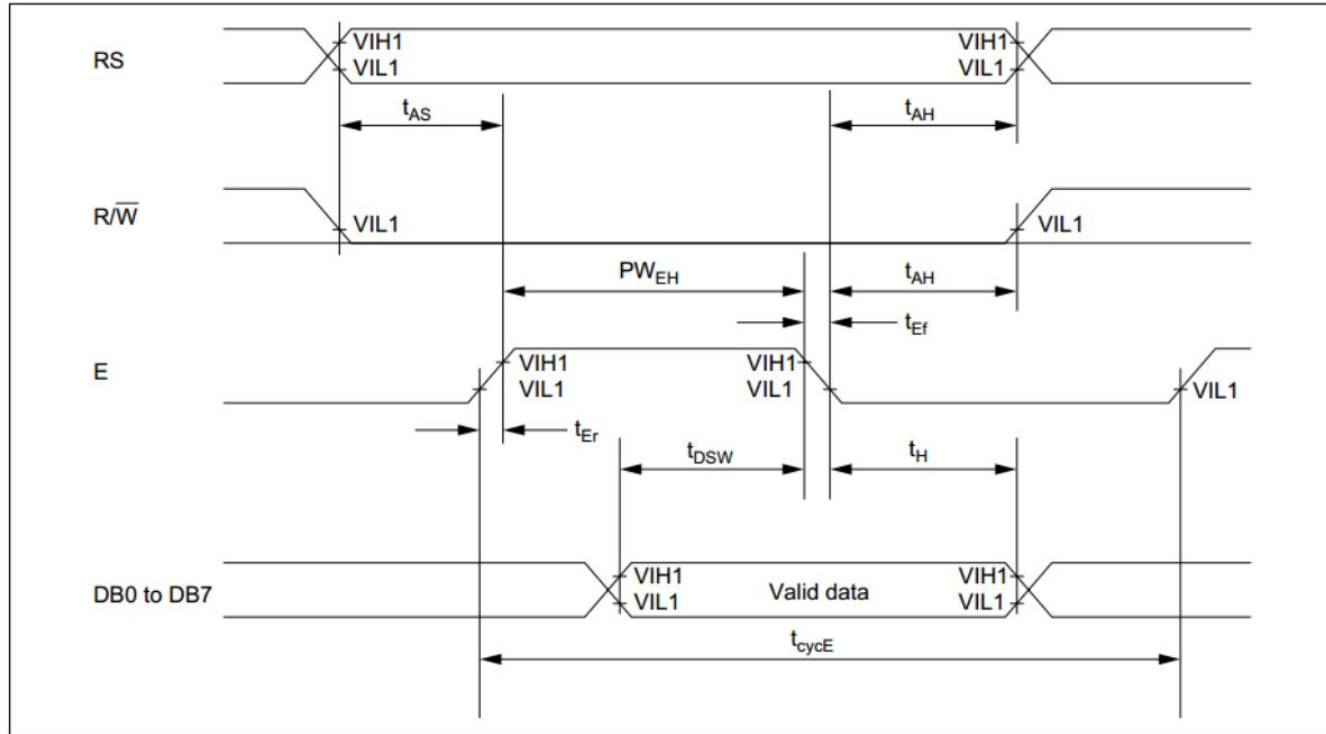
So how do we write a character on LCD?

LCD Controller module

- Piece of code written in VHDL(FSM)

DISCLAIMER

ASSUME LCD CONTROLLER AS BLACKBOX FOR NOW

LCD Controller signals

- Two operations are supported by the controller, namely, an erase operation and a put_char operation.

- LCD Controller has the following interface:

  - If you wish to write an ASCII character (look it up) to the LCD at row i and column j.

  - You will present the 8-bit ASCII character to write_data

  - Row and Column id to the write_row, and write_column inputs of the controller.

  - You will then set put_char high.

  - If you observe `ack` from the Lcd Controller as high (on a rising edge of clock), you can then assume that the Lcd Controller has accepted your request and move on (make put char low if you don't wish to write more characters).
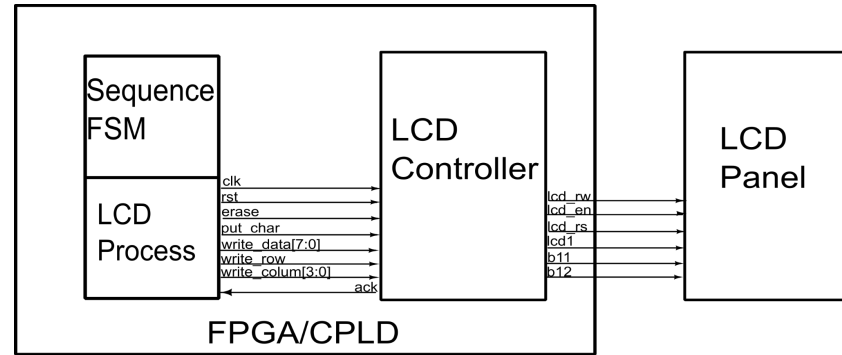
- If you wish to clear the LCD at row i and column j, do the same thing as in the put_char case, except that you will make erase high and provide the row and column id to the controller. In this case, write_data is ignored.

- If both erase and put_char are high, then erase has preference.
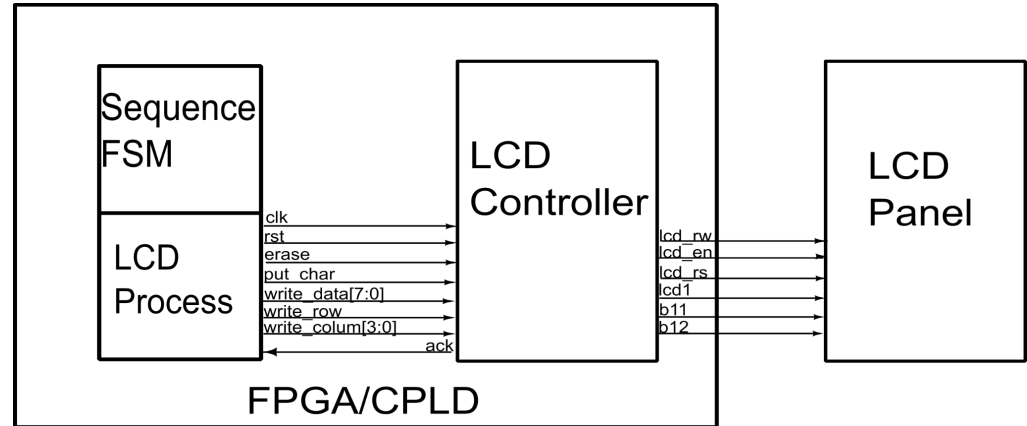
Experiment-7 Sequential Circuit-3

- Display the sequence "covid" on LCD character by character
- Take 5 bit input from switches
- Display output = 1 on LED 4 once "covid" sequence is detected
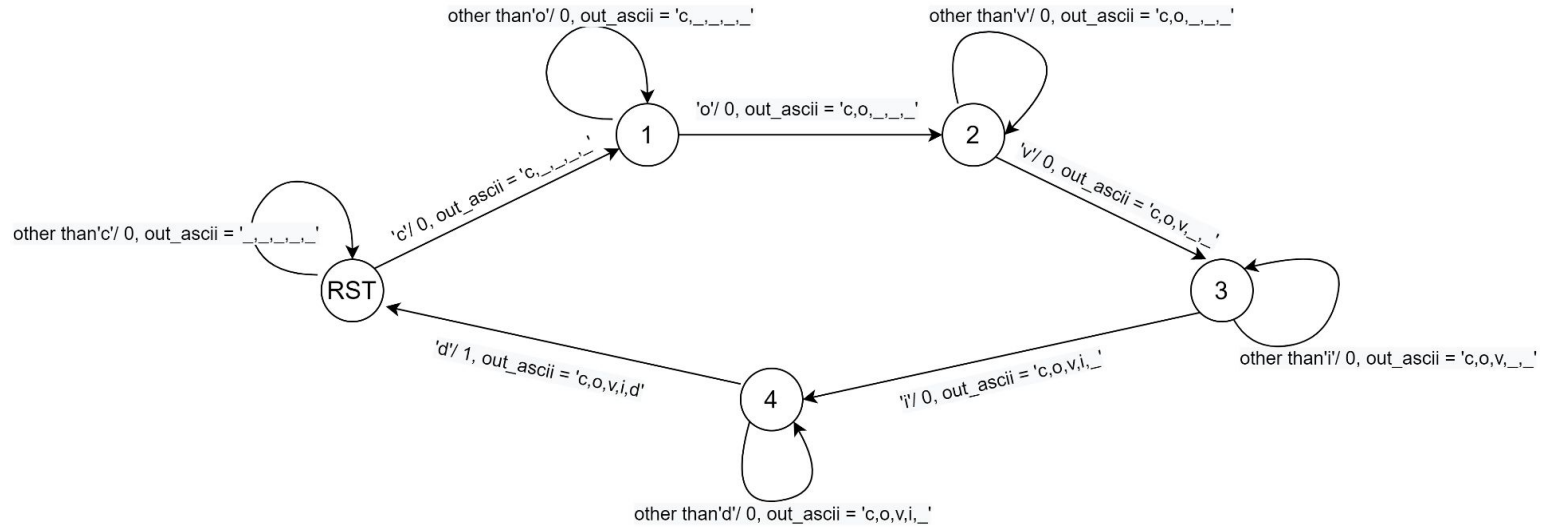
DISCLAIMER

TEST YOUR LCD WITH LCD TEST FILE

Pin Planning

On-board Clock

Frequency	Pin No.
External	91
50 MHz	89
1 Hz	18

Pin Name	Pin No	Pin Name	Pin No
lcd_rw	PIN_72	lcd1[2]	PIN_84
lcd_en	PIN_74	lcd1[3]	PIN_86
lcd_rs	PIN_70	lcd1[4]	PIN_88
b11	PIN_102	lcd1[5]	PIN_94
b12	PIN_104	lcd1[6]	PIN_96
lcd1[0]	PIN_76	lcd1[7]	PIN_98
lcd1[1]	PIN_80		

THANK YOU