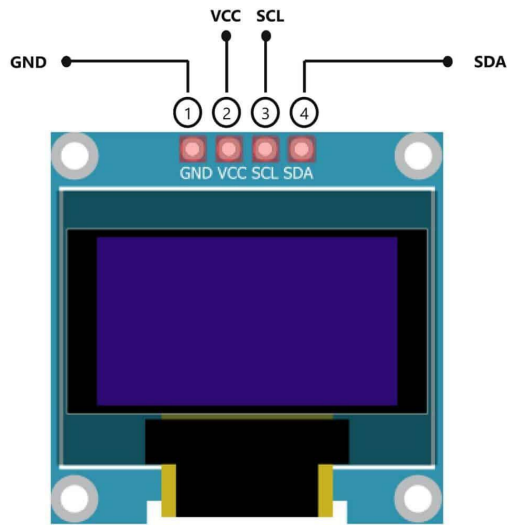
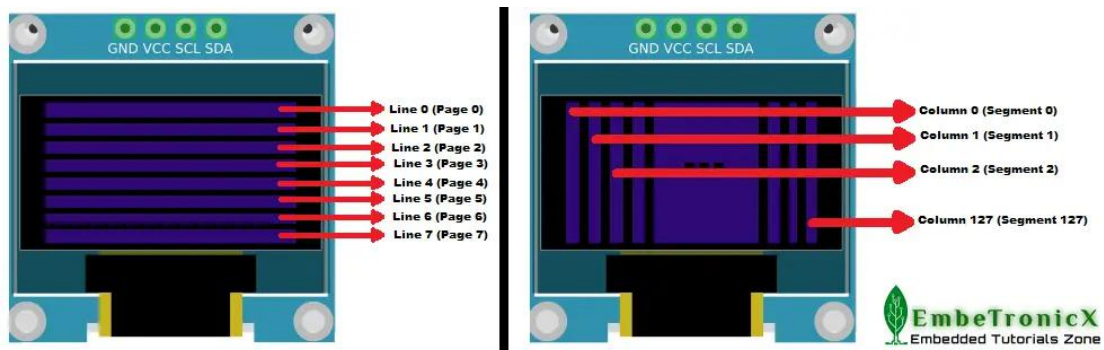


Tổng quan về SSD1306

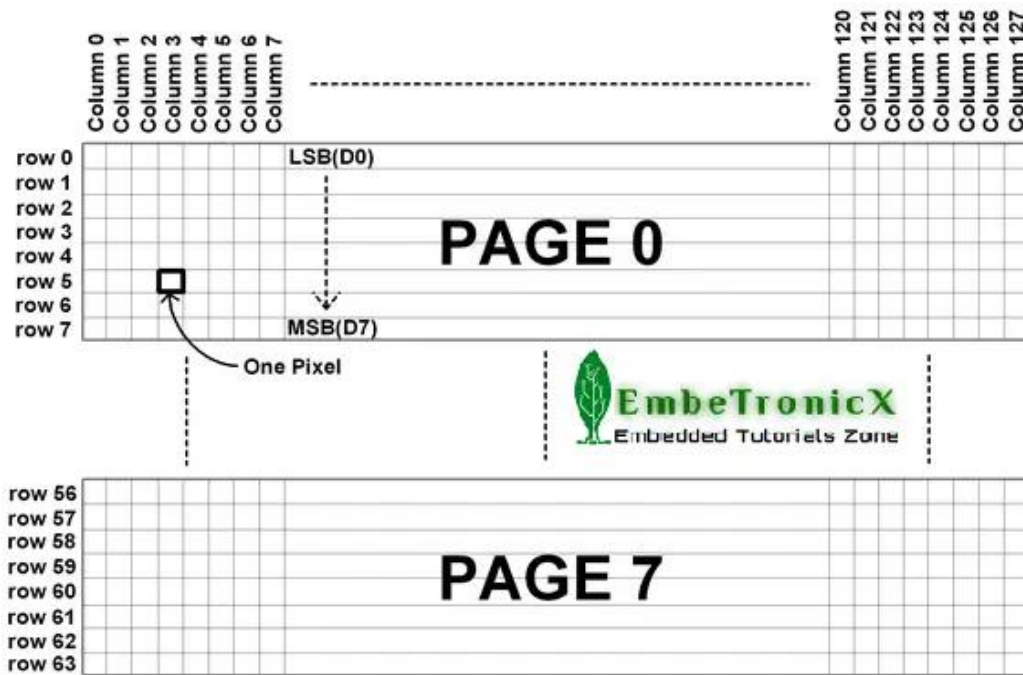


Display Technology	OLED (Organic LED)
MCU Interface	I2C / SPI
Screen Size	0.96 Inch Across
Resolution	128×64 pixels
Operating Voltage	3.3V – 5V
Operating Current	20mA max
Viewing Angle	160°
Characters Per Row	21
Number of Character Rows	7

SSD1306 có độ phân giải 128x64 và được chia vào 8(0-7) pages. Mỗi page chứa 128(0-127) columns(segments). Và mỗi column chứa 8 bits.

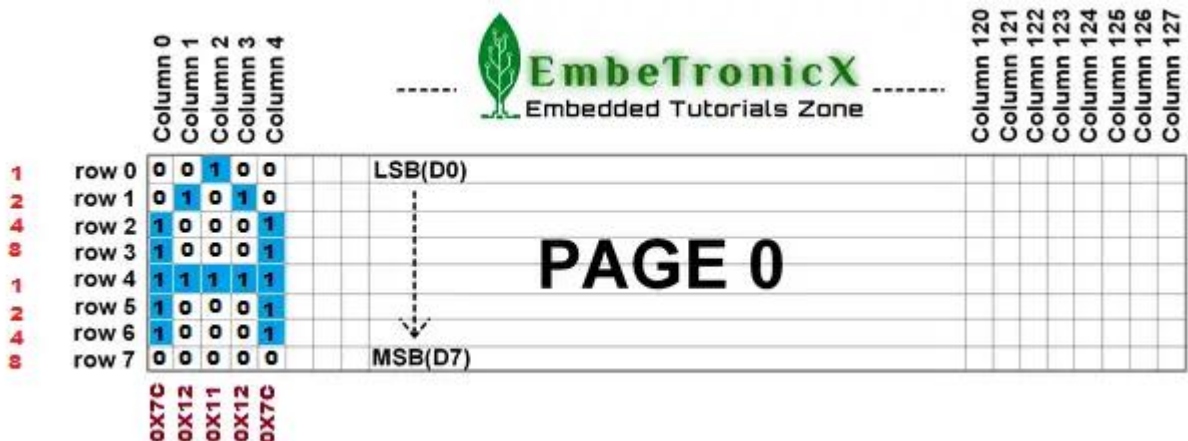


Và SSD1306 được built-in 1KB **Graphic Display Data RAM (GDDRAM)** để giữ những bit parern cho màn hình.



Giả sử muốn print chữ A có kích thước 5x8 từ vị trí 0x0

- Đầu tiên, dịch chuyển cursor đến vị trí 0x0
- Sau đó, thực hiện ghi lần lượt 0x7C, 0x12, 0x11, 0x12, 0x7C



SSD1306 có 2 chế độ gửi nhận dữ liệu

- Command
- Data được ghi vào trong GDDRAM

Send command 0xAE

1. Send the Start condition
2. Send the Slave address with R/W bit
3. Send the Control Byte (0x00)
4. Send the Command byte (0xAE)
5. Send the Stop condition

Write 0xFF to display

1. Send the Start condition
2. Send the Slave address with R/W bit
3. Send the Control Byte (0x40)
4. Send the Command byte (0xFF)
5. Send the Stop condition

SSD1306 Command Table

Command	Command	Description
0x00	COMMAND	This command is used to indicate the next data byte is acted as a command.
0x40~0x7F	Display Start Line	This command sets the Display Start Line register to determine the starting address of display RAM
0xAE	Display OFF	This command is used to turn OFF the OLED display panel.
0xAF	Display ON	This command is used to turn ON the OLED display panel.
0x20	Memory Addressing Mode	If horizontal address increment mode is enabled by command 20h, after finishing read/write one column data, it is incremented automatically to the next column address.
0x2E	Deactivate Scroll	This command deactivates the scroll.
0x2F	Activate Scroll	This command activates the scroll if it is configured before.
0x21	Column Address	This command is used to define the current read/write column address in graphic display data RAM.
0x22	Page Address	This command is used to define the current read/write Line(Page as per data sheet) address in graphic display data RAM.
0x81	Contrast Control	This command sets the Contrast Setting of the display. The chip has 256 contrast steps from 00h to FFh. The segment output current increases as the contrast step value increases.
0xA0	Segment Re-map	This command sets the column address 0 is mapped to SEG0.
0xA1	Segment Re-map	This command sets the column address 127 is mapped to SEG0.

0xA6	Normal Display	This command sets the display to normal mode. In the normal display, a RAM data of 1 indicates an “ON” pixel.
0xA7	Inverse Display	This command sets the display to inverse mode. In the normal display, a RAM data of 0 indicates an “ON” pixel.
0xA8	Multiplex Ratio	This command sets the display multiplex ratio.
0xC0/0xC8	COM Output Scan direction	0xC0 - Normal mode (RESET) Scan from COM0 to COM[N -1] 0xC8- Remapped mode. Scan from COM[N-1] to COM0 Where N is the Multiplex ratio.
0xD3	Display Offset	This command sets vertical shift by COM from 0d~63d.
0xD5	Display Clock Divide Ratio/Oscillator Frequency	This command sets the display Clock Divide Ratio and Oscillator Frequency.
0x26/0x27	Continuous Horizontal Scroll	0x26 - Right horizontal scroll 0x27 - Left horizontal scroll
0x29/0x2A	Continuous Vertical and Horizontal Scroll	0x29 - Vertical and Right Horizontal Scroll 0x2A - Vertical and Left Horizontal Scroll