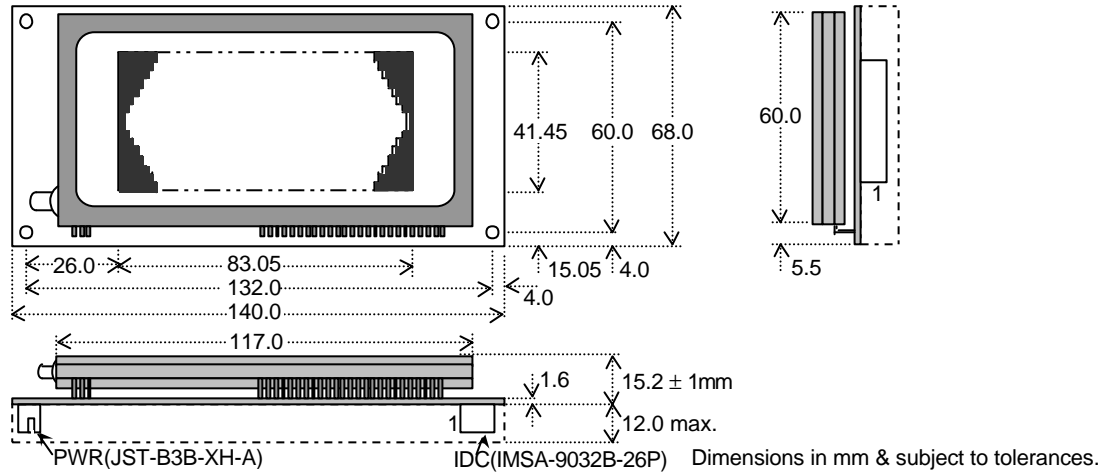


# Dot Graphic VFD Module

# GU128X64-800A

- 128 x 64 Dot Graphic
- Operating Temp -40°C to +85°C
- Single 5V Supply.
- High Brightness Blue Green Display
- Selectable Parallel (i80/M68)/Serial Interface
- Twin Screen Graphic RAM
- 16 Level Brightness Control Function

The module includes the Vacuum Fluorescent Display glass, driver and control ASIC, with integral refresh Graphic RAM and logic for parallel and synchronous serial interfaces. The high speed 8 bit parallel interface is 5V CMOS compatible suitable for connection to a host CPU bus. Brightness control and power down functions are provided. A full data sheet is available.

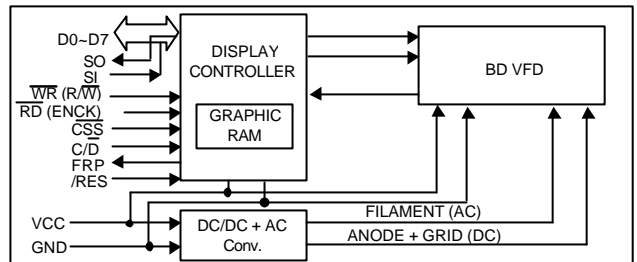


## ELECTRICAL SPECIFICATION

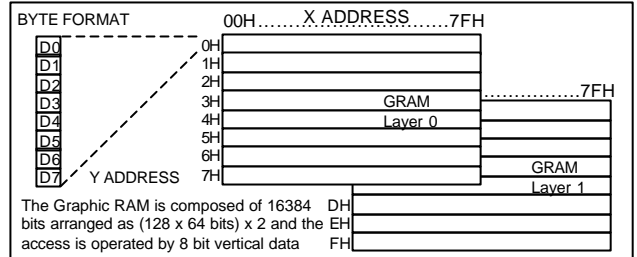
| Parameter            | Symbol          | Value         | Condition                |
|----------------------|-----------------|---------------|--------------------------|
| Power Supply Voltage | V <sub>CC</sub> | 5.0VDC +/- 5% | GND=0V                   |
| Power Supply Current | I <sub>CC</sub> | 750mADC typ.  | V <sub>CC</sub> =5V      |
| Logic High Input     | V <sub>IH</sub> | 4.0 VDC min.  | I <sub>IH</sub> = 2uA    |
| Logic Low Input      | V <sub>IL</sub> | 1.0 VDC max.  | I <sub>IL</sub> = -600uA |
| Logic High Output    | V <sub>OH</sub> | 4.7 VDC min.  | I <sub>OH</sub> = -300uA |
| Logic Low Output     | V <sub>OL</sub> | 0.3 VDCmax.   | I <sub>OL</sub> = 300uA  |
| Reset Input Voltage  | V <sub>RH</sub> | 4.0 VDC min.  | I <sub>RH</sub> = 5uA    |
| Reset Input Voltage  | V <sub>RL</sub> | 0.6 VDCmax.   | I <sub>RL</sub> = -600uA |

The power on rise time should be less than 100ms. The inrush current at power on can be 2 x I<sub>CC</sub>.

## BLOCK DIAGRAM



## GRAPHIC RAM



## OPTICAL and ENVIRONMENTAL SPECIFICATIONS

| Parameter                           | Value                           |
|-------------------------------------|---------------------------------|
| Display Area (XxY mm)               | 83.05 x 41.45                   |
| Dot Size/Pitch (XxY mm)             | 0.5 x 0.5/0.65 x 0.65           |
| Luminance                           | 350 cd/m <sup>2</sup> Min.      |
| Colour of Illumination              | Blue-Green (Filter for colours) |
| Operating Temperature               | -40°C to +85°C                  |
| Storage Temperature                 | -40°C to +85°C                  |
| Operating Humidity (non condensing) | 20 to 80% RH @ 25°C             |

## SOFTWARE COMMANDS

| Instruction                       | C/D | Command Byte | No. Bytes |
|-----------------------------------|-----|--------------|-----------|
| Set Display On/Off / Layer Merge  | 1   | 20H-2FH      | 2         |
| Set Display Brightness            | 1   | 40H-4FH      | 1         |
| Clear Display                     | 1   | 52H-5FH      | 1         |
| Set Cursor XY Address             | 1   | 60H-67H      | 3         |
| Set Display Start X Address       | 1   | 70H-7FH      | 2         |
| Set Write Address Mode            | 1   | 80H-8FH      | 1         |
| Scroll Display Vertically Up/Down | 1   | B0H-BFH      | 1         |
| Read Cursor XY Address            | 1   | D4H-D7H      | 3         |
| Write Data                        | 0   | 00H-FFH      | 1         |

## TIMING PARAMETERS (min)

| i80/M68 Parameters       | Time  | Serial Parameters                         | Time  |
|--------------------------|-------|---|-------|
| Write /WR/EN Cycle Time  | 400ns | SCK Cycle Time                            | 200ns |
| Write /WR/EN Pulse Width | 100ns | SCK Pulse Width                           | 80ns  |
| Set Up To Write /WR/EN   | 30ns  | Set Up To SCK, /CSS='L'                   | 40ns  |
| Hold after Write /WR/EN  | 20ns  | Delay After 8 <sup>th</sup> bit, /CSS='H' | 150ns |

## SCROLLING GRAPHIC DISPLAY

The pattern in GRAM can be scrolled around the display. Horizontal scroll is achieved by increment/decrement of the Display Start X Address. The vertical scroll process considers layer 0, then layer 1 as a continuous 128 bit high vertical area within RAM.

## IDC DATA CONNECTOR

| Pin | i80  | M68   | Serial | Pin | Sig  |
|-----|------|-------|--------|-----|------|
| 1   | D7   | D7    | X      | 2   | GND  |
| 3   | D6   | D6    | X      | 4   | GND  |
| 5   | D5   | D5    | X      | 6   | GND  |
| 7   | D4   | D4    | X      | 8   | GND  |
| 9   | D3   | D3    | X      | 10  | GND  |
| 11  | D2   | D2    | X      | 12  | GND  |
| 13  | D1   | D1    | SO     | 14  | GND  |
| 15  | D0   | D0    | SI     | 16  | GND  |
| 17  | /WR  | /R/WR | X      | 18  | GND  |
| 19  | C/D  | C/D   | C/D    | 20  | GND  |
| 21  | /RD  | /ENCK | SCK    | 22  | GND  |
| 23  | /CSS | /CSS  | /CSS   | 24  | GND  |
| 25  | FRP  | FRP   | FRP    | 26  | /RES |

Subject to change without notice.  
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## 3 PIN POWER CONNECTOR

| Pin | Sig                 |
|-----|---------------------|
| 1   | V <sub>CC</sub>     |
| 2   | Test (Factory only) |
| 3   | GND                 |

## PCB JUMPERS (O)pen (L)ink

| Interface    | J1    | J2 |
|--------------|-------|----|
| Serial       | O / L | L  |
| i80 Parallel | O     | O  |
| M68 Parallel | L     | O  |

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