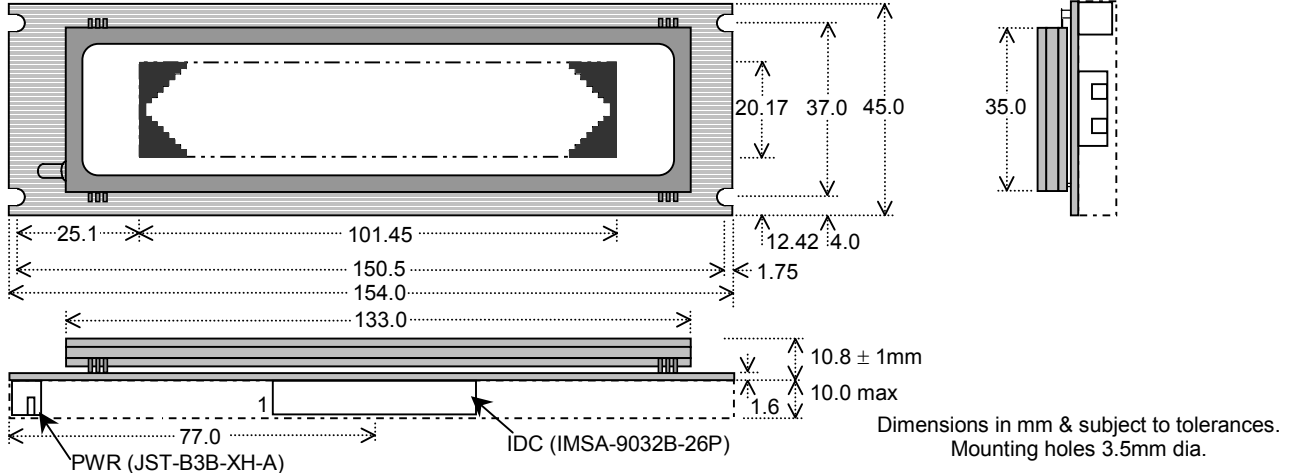


# Dot Graphic VFD Module

# GU160X32-820

- 160 x 32 Dot Graphic
- Graphic + Kanji 8x16 & 16x16 Font
- Operating Temp -40°C to +85°C
- Single 5V Supply.
- 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	Vcc	5.0VDC +/- 5%	GND=0V
Power Supply Current	Icc	550mADC typ.	Vcc= 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 VDC max.	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 Icc.

## OPTICAL and ENVIRONMENTAL SPECIFICATIONS

Parameter	Value
Display Area (XxY mm)	101.45 x 20.17
Dot Size/Pitch (XxY mm)	0.485 x 0.485/0.635 x 0.635
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

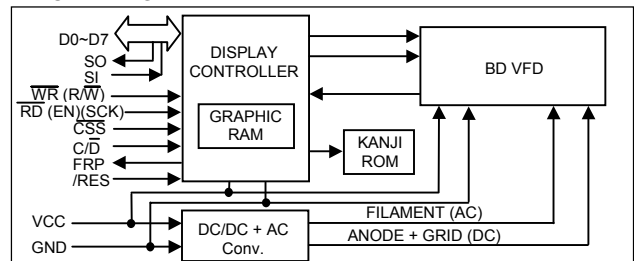
## SOFTWARE COMMANDS

Instruction	C/I/D	Command Byte	No. Bytes
Set Display On/Off / Layer Merge	1	20H-2FH	2
Set Display Brightness	1	40H-4FH	1
Display Clear	1	50H-5FH	1
Display Area Set	1	62H-6FH	3
Character Display Address Set	1	68H-6DF	2
Graphic Display X Address Set	1	64H-65H	2
Graphic Display Y Address Set	1	60H-61H	2
Graphic Display Horizontal Shift	1	70H-7FH	2
Graphic Display Vertical Shift	1	B0H-BFH	2
Character Display Horizontal Shift	1	A0H-AEH	2
Character Display Vertical Shift	1	90H-9FH	2
Address Increment	1	80H-8FH	1
Character Display Start Address	1	D8H-DBH	3
Graphic Display Start Address	1	D4H-D7H	3
ROM Data Transfer Set	1	E0H-EFH	3
Write Data	0	00H-FFH	3

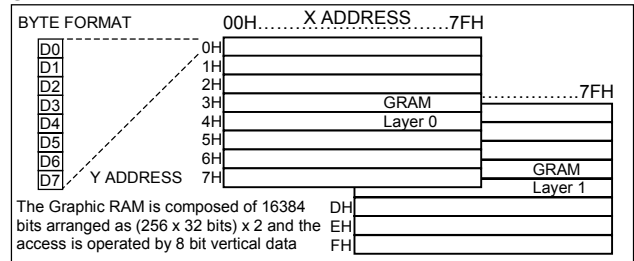
## SCROLLING GRAPHIC DISPLAY

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.

## BLOCK DIAGRAM



## GRAPHIC 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/W	X	18	GND
19	C/D	C/D	C/D	20	GND
21	/RD	EN	SCK	22	GND
23	/CSS	/CSS	/CSS	24	GND
25	FRP	FRP	FRP	26	/RES

## 3 PIN POWER CONNECTOR

Pin	Sig
1	Vcc
2	Test (Factory only)
3	GND

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

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

## CONTACT

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Subject to change without notice.  
 IUK Doc Ref: 03884 Iss:1 15Apr02