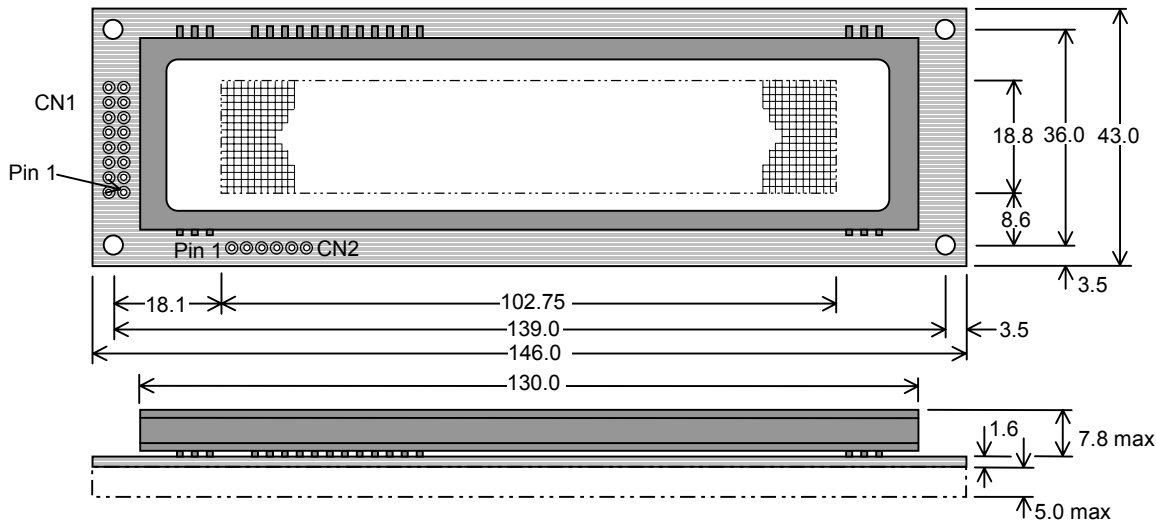


# Dot Graphic VFD Module

# GU140x16J-7000

- ❑ 140x16 Dot Graphic
- ❑ Single 5V Supply
- ❑ High Brightness Blue Green Display
- ❑ Operating Temp -40°C to +85°C
- ❑ 11 Multi Sized Fonts
- ❑ High Speed 8 Bit Parallel Interface
- ❑ Asynchronous RS232 Serial Interface

The module includes the Vacuum Fluorescent Display glass, VF drivers and micro-controller ICs with refresh RAM, character generator and interface logic. The high speed 8 bit parallel interface is 5V TTL/CMOS compatible suitable for connection to a host CPU bus. The asynchronous serial interface accepts baud rates up to 115,200 with none parity. The module is ready to receive ASCII characters without initialization commands.



Dimensions in mm & subject to tolerances. Mounting holes 3.2mm dia.

## ELECTRICAL SPECIFICATION

| Parameter            | Symbol | Value                 | Condition  |
|----------------------|--------|-----------------------|------------|
| Power Supply Voltage | VCC    | 5.0VDC +/- 5%         | GND=0V     |
| Power Supply Current | ICC    | 390mADC Typ.          | VCC=5V     |
| RS232 SIN High Input | VIH    | 3.0VDC min. 15VDC max | VCC=5V     |
| RS232 SIN Low Input  | VIL    | -15VDC min 0.5VDC max | VCC=5V     |
| SBUSY High Output    | VOH    | 4.0VDC min. Vcc max.  | VCC=5V     |
| SBUSY Low Output     | VOL    | 0VDC min 0.5VDC max   | VCC=5V     |
| Logic High Input     | VIH    | 0.8VDC min. Vcc max.  | VCC=5V     |
| Logic Low Input      | VIL    | 0VDC min 0.2VDC max   | VCC=5V     |
| Logic High Output    | VOH    | 3.8VDC min. Vcc max.  | IOH=-1.5mA |
| Logic Low Output     | VOL    | 0VDC min 0.6VDC max.  | IOL =1.6mA |

The power on rise time should be less than 100ms. Inrush current at power on can be 2 x ICC.

## OPTICAL and ENVIRONMENTAL SPECIFICATIONS

| Parameter                           | Value                           |
|-------------------------------------|---------------------------------|
| Display Area (XxY mm)               | 102.75 x 18.8                   |
| Dot Size/Pitch (XxY mm)             | 0.585 x 1.025 / 0.735 x 1.185   |
| Luminance                           | 1000 cd/m <sup>2</sup> Typ.     |
| 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 – Popular codes, more included

| Command                           | Code                          |
|-----------------------------------|-------------------------------|
| Write Character to Display        | 20H-FFH                       |
| BS, HT, LF, CR, Home, Display CLR | 08H, 09H, 0AH, 0DH, 0BH, 0CH  |
| Initialize Display                | 1BH 40H                       |
| Specify International Font        | 1BH 52H n                     |
| Vertical Scroll Mode              | 1FH 02H                       |
| Horizontal Scroll Mode            | 1FH 03H                       |
| Cursor Set                        | 1FH 24H xL xH yL yH           |
| Scroll Display Action             | 1FH 28H 61H 10H wL wH cL cH s |
| Display Blink                     | 1FH 28H 61H 11H p t1 t2 c     |
| Screen Saver                      | 1FH 28H 61H 40H p             |
| Bit Image Display Group           | 1FH 28H 66H 11H xL xH yL yH   |
| Font Magnified Display            | 1FH 28H 67H 40H x y           |
| Brightness Level Setting          | 1FH 58H n                     |

The module defaults to 5x7 font, cursor top left at power on.

## COMMON FONT

|    | 00 | 10 | 20 | 30 | 40 | 50 | 60 | 70 |
|----|----|----|----|----|----|----|----|----|
| 00 |    |    |    | 0  | 1  | 2  | 3  | 4  |
| 01 |    |    |    | 5  | 6  | 7  | 8  | 9  |
| 02 |    |    |    | *  | +  | =  | >  | ?  |
| 03 |    |    |    | #  | \$ | %  | &  | '  |
| 04 |    |    |    | (  | )  | [  | ]  | ^  |
| 05 |    |    |    | ~  | !@ | AB | CD | EF |
| 06 |    |    |    | GH | JK | LM | NO | 12 |
| 07 |    |    |    | 34 | 56 | 78 | 90 | AB |
| 08 |    |    |    | CD | EF | GH | JK | LM |
| 09 |    |    |    | NO | 12 | 34 | 56 | 78 |
| 0A |    |    |    | 90 | AB | CD | EF | GH |
| 0B |    |    |    | JK | LM | NO | 12 | 34 |
| 0C |    |    |    | 56 | 78 | 90 | AB | CD |
| 0D |    |    |    | EF | GH | JK | LM | NO |
| 0E |    |    |    | 12 | 34 | 56 | 78 | 90 |
| 0F |    |    |    | AB | CD | EF | GH | JK |

## INTERNATIONAL FONTS (n=0)

|    | 80 | 90 | A0 | B0 | C0 | D0 | E0 | F0 |
|----|----|----|----|----|----|----|----|----|
| 00 |    |    |    |    |    |    |    |    |
| 01 |    |    |    |    |    |    |    |    |
| 02 |    |    |    |    |    |    |    |    |
| 03 |    |    |    |    |    |    |    |    |
| 04 |    |    |    |    |    |    |    |    |
| 05 |    |    |    |    |    |    |    |    |
| 06 |    |    |    |    |    |    |    |    |
| 07 |    |    |    |    |    |    |    |    |
| 08 |    |    |    |    |    |    |    |    |
| 09 |    |    |    |    |    |    |    |    |
| 0A |    |    |    |    |    |    |    |    |
| 0B |    |    |    |    |    |    |    |    |
| 0C |    |    |    |    |    |    |    |    |
| 0D |    |    |    |    |    |    |    |    |
| 0E |    |    |    |    |    |    |    |    |
| 0F |    |    |    |    |    |    |    |    |

## PARALLEL INTERFACE – CN1

| Pin | Sig | Pin | Sig       |
|-----|-----|-----|-----------|
| 1   | GND | 8   | D1        |
| 2   | VCC | 9   | D2        |
| 3   | NC* | 10  | D3        |
| 4   | RS  | 11  | D4        |
| 5   | /WR | 12  | D5        |
| 6   | /RD | 13  | D6        |
| 7   | D0  | 14  | D7(PBUSY) |

\*Pin 3 can be changed to /RESET or PBUSY terminal by selection of Jumper JRB. RS is not used. Full specification available on request.

## SERIAL INTERFACE – CN2

| Pin | Async. Sig | Description      |
|-----|------------|------------------|
| 1   | VCC (5V)   | Power Supply I/P |
| 2   | SIN        | RS232 Data Input |
| 3   | GND        | GND              |
| 4   | SBUSY      | Busy Output      |
| 5   | NC         | -                |
| 6   | /RESET     | Reset Input      |

## CONTACT

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