

Introduction

The LD320 is a high efficient LED driver that operates the LED backlights in Landmark 17" to 24" VHB (very high brightness) LCD modules. It can drive up to two LED strips with a maximum power of about 16 Watts per strip. Each LD320 is factory tuned to drive a specific VHB LCD module before shipping. Mismatching between the LD320 and the LCD module may damage the LED backlight. Please refer to page 2 for details.

The LD320 operates at a 12V DC supply voltage. The following table shows the maximum and the minimum values of the supply voltage, the operating temperature and humidity, as well as the storage temperature and humidity.

The LCD screen brightness is adjusted with a DC voltage (V_d) from 0 to about 3.3V. The maximum screen brightness occurs at $V_d = 0V$. As the V_d value increases to 3.3V, the LCD screen brightness decreases linearly versus the V_d value.

Absolute Maximum Rating

| Parameters | Min. | Max. | Units |
|--------------------------------------|------|------|-------|
| Supply Voltage (V_{in}) | 11.0 | 13.0 | Vdc |
| Operating Temperature Range | -30 | 85 | °C |
| Storage Temperature Range | -30 | 85 | °C |
| Operating Humidity (without dewdrop) | | 80% | R.H |
| Storage Humidity (without dewdrop) | | 95% | R.H |

Recommended Operating Conditions

| Parameters | Min. | Typ. | Max. | Units | Remark |
|-----------------------------|------|------|------|-------|--------|
| Supply Voltage (Vin) | 11.5 | 12 | 12.5 | Vdc | |
| LED String Voltage (Vf) | | | 40 | Vdc | |
| ON/OFF Control - OFF | 0 | 0 | 0.8 | Vdc | |
| - ON | 3 | 3.3 | 5.5 | Vdc | |
| Analog Dimming Voltage (Vd) | | | | | |
| Max. brightness | | 0 | | Vdc | |
| Min. brightness | | 3.3 | 3.5 | Vdc | Note 1 |

Note 1 - The screen brightness dimming ratio at 3.3V is about 12:1. When Vd value is increase to 3.4V, the dimming ratio reaches about 18:1. It is not recommend to have Vd over 3,5V which may degrade the LCD brightness uniformity.

LD320 LED Strip Driving Current Tuning

Each LD320 shipped is factory tuned to a specific driving current of the LED strips used in the VHB LCD module. This information is on the product label at the back of the board. For example, the label shown on the right side has the part number LD320-LMG237C. Below it has the current rating (2 x 600mA). Then the production date code "28/14". The LD320-LMG237C means that this drive board is tuned specifically to drive the backlight in the LMG237C LCD module. The current rating indicates that it can drives 2 LED strips with each strip current up to 600 mA.

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| LD320 - LMG237C (2 x 600 mA) 28/14 |
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Caution: If this driver board is used to drive the LED backlight of other LCDs, please make sure that the LED driving current rating specified on this label does not exceed the maximum LED current rating of the LED strip by 5% or more. Overdriving the strip beyond that level may cause severe damage to the LED strip.

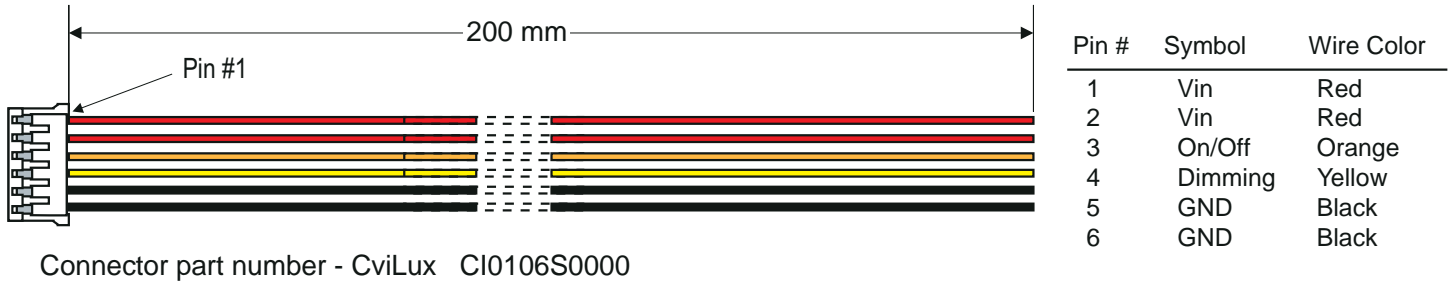
Connector Pin Assignments

| LD320 Input Connector CN1 (CviLux C10106M1HR0-LF) | | | | | |
|---|--------|--------------------------|--------------------|--------|--------------------|
| Pin # | Symbol | Function | Pin # | Symbol | Function |
| 1, 2 | Vin | +12 V DC Input | 4 | Vd | Brightness control |
| 3 | On/Off | Backlight on/off control | 5, 6 | Gnd | Ground |
| LD320 Output Connectors for LED strips - CN2, CN3 | | | JST SM02B-BHS-1-TB | | |

Note 2 - The brightness control input (pin #4) must be connected to a DC voltage between 0 - 3.5V. If left unconnected (floating), the LED backlight may operate at an unstable brightness.

Input Cable Harness - C320-CL06S

The following figure shows the cable harness plugged into the CN1 connector. On the right side, it shows the color of the wires for each pin. For example, pins #1 and #2 have red colored wires for the 12V power input (Vin)

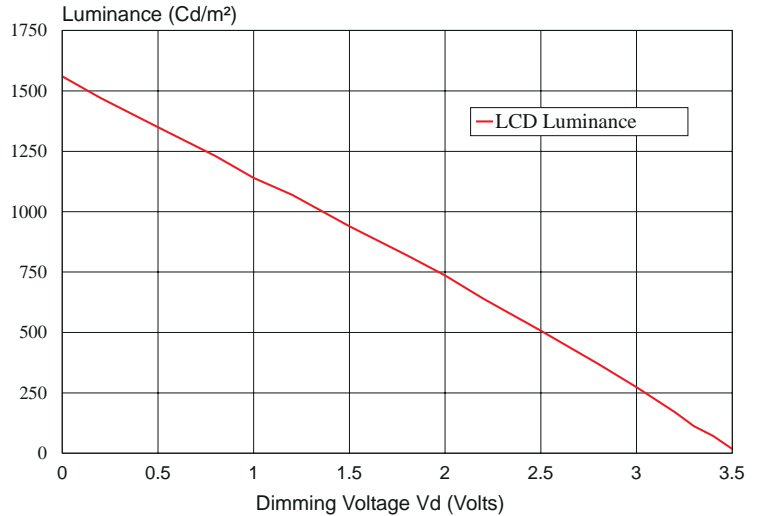


LCD Screen Brightness Adjustment

The LD320 uses a DC voltage ranging from 0 - 3.5V to control the LCD brightness. This dimming voltage Vd is fed into the drive board at Pin #4 of the CN1 connector.

The dimming characteristics with the Landmark 17" LMG256-170EG01 LCD module is shown in the figure on the right. At Vd = 0V, the LCD screen brightness is about 1,560 nits. As Vd increases to 3.3V, the brightness drops to about 112 nits. The dimming ratio is about 13.9:1.

LMG256-170EG01 Dimming Characteristics with LD320 drive board



In general, the dimming ratio at Vd = 3.3V is about 12:1 to 14:1. When the Vd value is increased to 3.4V, the dimming ratio can reach about 17:1 to 23:1. It is possible to obtain higher dimming ratio when the Vd is increased to 3.5V. However, at this level, the brightness of the top LED strip and the bottom LED strip in the backlight may differ significantly (for example, more than 15%), which can degrade the brightness uniformity of the LCD screen. As a result, it is not recommended to operate the LD320 with a dimming Vd over 3.5V.

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