

Lumencor Light Engine Electrical Interface with TTL (DB-15HD) and RS-232

7 Channel Preliminary 11/20/09

This document describes the interface and control of the Light Engine using the TTL on/off enables and the enables and intensity control via RS-232/(optional USB). This document applies to the 7 channel light engine models. This document is targeted at an inclusive set of all the various configuration options that are available and describes the complete functions appropriate for the 7 channel light engine. For models with fewer channels, some features will not be available and the relevant commands should be ignored.

1.1 TTL and RS-232 Connector Pinouts and Signals.

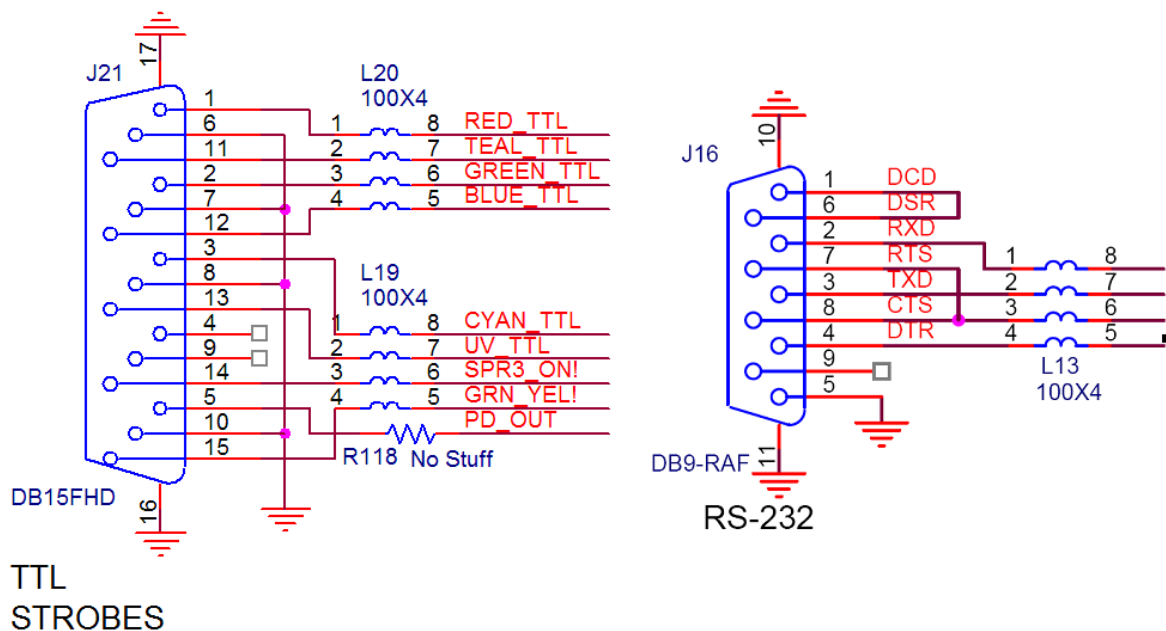


Figure 1

TTL: See figure 1 for TTL (5V/3.3V) enable color channel pin mapping. These signals are active low (i.e., a low enables or turns on a channel, a high disables or turns off a channel) with internal pull-ups compatible with an open-collector or bipolar drive.

Alternatively, there is a provision to invert the polarity of these TTL enables. (Active hi with internal pull-down) This is configured by Lumencor at time of manufacture and is not user selectable. The default configuration for these TTL enables are active low.

Note- If the Green Channel is enabled, then no other channels can be enabled simultaneously. If other channels are enabled, then the green channel enable will have priority.

The green and yellow channels both use the green enable. A separate signal (pin # 15) selects and positions the green and yellow excitation filters. A logic high selects the green filter, a logic low selects the yellow filter.

RS-232: See figure 1 for RS-232 Pinout. Pin 2 is host RX, pin 3 host TX. Default port parameters are 9600,8,N,1. This port can control both enables and intensity of each channel. Using an USB->RS-232 Adapter, (optional) USB controlled enables and intensities are also provided. See section 1.X.2 for the RS-232 command structure and bit definitions.

1.2 RS-232 Command Strings and Bit Definitions.

The following section defines the command strings and bit assignments. Bytes #s and bit #s are LSB=0. Bytes are expressed as hexadecimal. Bits not specifically defined here should remain as shown in the examples.

Initialization Command String for RS-232 Intensity and RS-232 OR TTL Enables:

The first two commands MUST be issued after every power cycle to properly configure controls for further commands.
57 02 FF 50- Set GPIO0-3 as open drain output
57 03 AB 50- Set GPIO5-7 push-pull out, GPIO4 open drain out

Channel Enable Command String:

Byte 1, Bit 0, controls Red. 0 enables, 1 disables.
Byte 1, Bit 1, controls Green. 0 enables, 1 disables.
Byte 1, Bit 2, controls Cyan. 0 enables, 1 disables.
Byte 1, Bit 3, controls UV. 0 enables, 1 disables.
Byte 1, Bit 5, controls Blue. 0 enables, 1 disables.
Byte 1, Bit 6, controls Teal. 0 enables, 1 disables.

Note- If the Green Channel is enabled, then no other channels can be enabled simultaneously. If other channels are enabled, then the green channel enable will have priority.

Examples:

4F 7E 50- Enables Red, Disables Green,Cyan,Blue,UV,Teal.
4F 7D 50- Enables Green, Disables Red,Cyan,Blue,UV,Teal.
4F 7B 50- Enables Cyan, Disables Red,Green,Blue,UV,Teal.
4F 5F 50- Enables Blue, Disables Red,Green,Cyan,UV,Teal.
4F 77 50- Enables UV, Disables Red,Green,Cyan,Blue,Teal.
4F 3F 50- Enables Teal, Disables Red,Green,Cyan,Blue,UV.
4F 7F 50- Disables All.
4F 5B 50- Enables Cyan and Blue, Disables all others.
4F 3E 50- Enables Red and Teal, Disables all others.

Green/Yellow Filter Select Command String:

Byte 1, Bit 4, controls Green/Yellow filter selection. 0 selects Yellow Filter, 1 selects Green Filter.

Examples:

4F 7D 50- Enables Green, Disables Red,Cyan,Blue,UV,Teal.
Selects Green Excitation Filter.
4F 6D 50- Enables Green, Disables Red,Cyan,Blue,UV,Teal.
Selects Yellow Excitation Filter.

IIC DAC Intensity Control Command Strings:

Byte 5 is the DAC IIC Address. Red, Green, Cyan and UV use IIC Addr = 18. Blue and Teal use IIC Addr = 1A.

Byte 3, Bit 3, selects RED DAC if IIC Addr =18. 1 selects.
Byte 3, Bit 2, selects GREEN DAC if IIC Addr =18. 1 selects.
Byte 3, Bit 1, selects CYAN DAC if IIC Addr =18. 1 selects.
Byte 3, Bit 0, selects UV DAC if IIC Addr =18. 1 selects.
Byte 3, Bit 1, selects TEAL DAC if IIC Addr =1A. 1 selects.
Byte 3, Bit 0, selects BLUE DAC if IIC Addr =1A. 1 selects.

Byte 2, Bits 3..0, Contain the high nibble of 8-bit DAC data.
Byte 1, Bits 7..4, Contain the low nibble of 8-bit DAC data.
Note- this 8-bit data is inverted. 0xFF is full off,
0X00 is full on.

Examples:

53 18 03 0F FF F0 50- Sets R,G,C,U DACS to 0xFF (Full off)
53 18 03 0F F0 00 50- Sets R,G,C,U DACS to 0x00 (Full on)
53 18 03 01 FA A0 50- Sets UV DAC to 0xAA
53 18 03 02 F5 50 50- Sets CYAN DAC to 0x55
53 18 03 04 F8 00 50- Sets GREEN DAC to 0x80
53 18 03 08 F6 60 50- Sets RED DAC to 0x66
53 1A 03 01 F4 40 50- Sets BLUE DAC to 0x44
53 18 03 05 F2 20 50- Sets UV and GREEN DACS to 0x22
53 1A 03 02 F6 60 50- Sets TEAL DACS to 0x66

Read IIC Temp Sensor Strings:

The IIC Temperature Sensor can be read with the following command string:

53 91 02 50- Reads the IIC Temp Sensor

Two bytes should be returned which contains the temperature data. The most significant 11 bits of the two bytes are used with a resolution of 0.125 deg C.

Examples:

[TX] 53 91 02 50- Command String to the IIC Temp Sensor.
[RX] 26 A0- Two bytes returned from Temp Sensor.

26 A0 (hex) = 0010 0110 1010 0000 (binary).
1st 11 MSb = 001 0011 0101 (binary)
001 0011 0101 (b) = 135 (h) = 309 (decimal)
309 * 0.125 = 38.625 deg C.

Reset Serial I/F and return to full Manual Strings:

Examples:

57 02 55 50- Set GPIO0-3 as input

57 03 55 50- Set GPIO4-7 as input

