



LO35 LED Light Source Product Family

For

Fiber Optic Light Guides

Features, Specifications, and Operation Instructions

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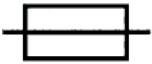



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For
Fiber Optic Light Guides**

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Table of Symbols

| | | | |
|-------------------------------------------------------------------------------------|------------------------------|--------------------------------------------------------------------------------------|-----------------------------|
|  | CE Mark |  | Alternating Current |
|  | Warning refer to user manual |  | Type BF |
|  | Off |  | Intensity |
|  | ON |  | Refer to user documentation |
|  | ETL Mark |  | Catalog Number |
|  | Fuse |  | Serial Number |
|  | WEEE mark |  | Manufactured by |

General Information and Warnings

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E-mail: info@fiberoptix.com**

The FTI light source has been engineered with safety as a priority. However, the user is cautioned to observe the following:

1. Read and follow all instructions in this manual.
2. Never look directly at the light port when the unit is on; your eyesight may be compromised.
3. Take care removing fiber optic components or handling the light source; some surfaces may be hot.
4. Do not use this unit near water or in an area with excessive moisture.
5. Do not operate this unit without a fiber optic cable inserted in the port; the unit is powerful enough to burn skin if within contact of the opening.
6. Do not place flammable materials near the unit.
7. Do not defeat the safety purpose of the 3-prong ground plug. Use only the approved power cord supplied with the unit. Route cord so it will not be pinched, severed or walked upon.
8. Do not defeat the purpose of the fuse. Replace only with the fuse type described in the manual and as marked on the unit.
9. Do not remove the cover. High voltage is present internally. Tampering with the electronics will void the warranty.
10. Keep all safety and operating instructions for future reference.
11. Do not block ventilation openings on this unit. Do not impede airflow.
12. If you wish to clean the unit, disconnect the power and use only standard detergent type cleaners; do not use solvents or petroleum distillates. Never "spill" liquid on the unit. Allow the unit to cool before cleaning.
13. Do not service the unit beyond what is described in this manual. Attempting repair of electronic or logic circuits without prior written approval of FTI will void the warranty. Should the light source fail at any time, return it to an authorized FTI service center.
14. For a Return Material Authorization, contact the FTI Customer Service department @ 800.433.5248

Product Description

The FTI light source family was designed to be backward compatible with previous FTI fiber optic accessories. Furthermore, with the proper adapter, the light sources can accept all major brands of fiber optic components. The FTI light source product family consists of three models LO35N9 having a 9A maximum drive level FTI PN FTIII24015, LO35F15 having a 15A maximum drive level FTI PN FTIII24016, and LO35T22 having a 22A maximum drive level FTI PN FTIII24017. This manual applies to all three models including all types and options. Switch mode operation is employed throughout the design for high efficiency low temperature operation.

Please Note: The FTI LED Light Source product family uses a unique light guide adapter configuration. Use only FTI supplied adapters.

Installation Guidelines

To insure proper operation of the light source, the following conditions must be met:

Minimum Clearance

| Rear | Sides and Top |
|--------------|---------------|
| 1.5" (37 mm) | .5" (12.5 mm) |

1. Do not block any air vents.
2. Proper ventilation must be provided at all times. Failure to do so may cause intermittent operation and/or failure of the electronics.
3. Avoid areas of excessive vibration.
4. **CAUTION:** Dust accumulation will restrict air flow which can damage the unit. (See Cleaning Section for recommendations)

Indications for Use

The units of the FTI light source product family are intended to provide white light to an accessory fiber optic light guide.

Use With Other Equipment

Any equipment connected to a light source must be certified to IEC/ISO standards appropriate to the equipment and application.

The user must not compromise the performance and safety requirements of the light source when used with, or near other equipment. The light source shall not be immediately adjacent to, beneath, or above other electrical equipment.

All electrical equipment generates and receives electromagnetic and radio frequency interference (RFI) from other equipment. Use of the light source near other equipment may adversely affect the function of the light source or other equipment. It is the user's responsibility to verify using the light source with or near other equipment will not adversely affect the performance of either unit.

Use of portable or other Radio Frequency (RF) telecommunications equipment may affect the performance of the light source.

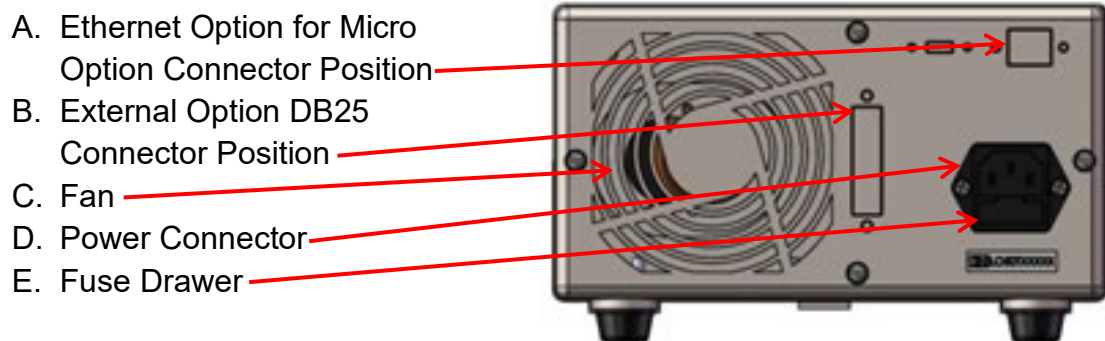
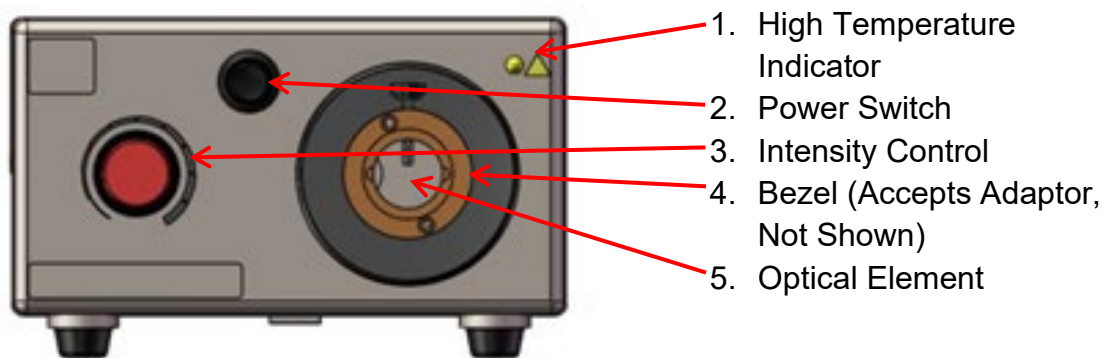
Use only FTI supplied components and/or cables with the light source. Use of other components and/or cables may adversely affect electrical emissions or immunity.

Do not use the turret as an off gate for the light, turret damage will occur. Only leave it at a detent position (port in line with the source of light).

Operation

The light source unit can be used around the world, operating with line voltages in the range 100 to 240 VAC and 50 or 60 cycle operation.

1. Make sure the power switch (2) on the front panel is in the “off” position.
2. Plug the power cord into the power connector (D) in the rear of the light source.
3. Plug the other end into an AC power source.
4. Inspect the optical element (5) to verify the element is clean. Clean per maintenance instructions if necessary.
5. Insert the appropriate adapter into the bezel, aligning the through-hole in the adapter with the thumbscrew in the top of the bezel. Tighten the screw to capture the adapter, but not too far as to obstruct the opening for the fiber optic component.
6. Insert the selected fiber optic component.
7. Make sure the captive thumbscrew on the bezel goes through the adapter and locks the input of the fiber optic component in place.
8. Toggle the power switch (2) to the “ON” position.
9. Adjust the light intensity with the intensity control knob (3) to desired setting.
10. To turn the unit off, toggle the power switch to the “OFF” position.
 - Note: After turning unit off, wait 6 seconds before turning it back on.



Lamp Intensity

Just like halogen lamps, LEDs degrade over their lifetime, most by an average of 15%. However, Halogen lamps degrading 15% over 200 hours (Halogen lamp life expectancy), LEDs will degrade 15% over 50,000 hours (LED life expectancy), with the intensity change over time barely noticeable.

Furthermore, LED arrays are not created equal. As proven by independent research, LED arrays, like their Halogen counterpart, may vary +/- 20% in maximum intensity, depending on the batch.

Additionally, color temperature can vary from unit to unit. This is considered normal, and is the result of the manufacturing process for LED "chips".

FTI LEDs are bin selected for color temperature and power, and should not vary by more than 5%.

Finally, heat plays a critical role in LED power and life. Make sure all vents are free from obstruction. Make sure the fan is running, and the unit is not in a restrictive enclosure. If the LED gets too hot, you could experience a dramatic decline in output, and the unit's temperature monitor may disrupt power to the lamp. Power will return to the LED once it has cooled down to safe levels.

Maintenance

LED Replacement

These chip arrays should last, on average, 50,000 hours. If a chip requires replacement, contact the factory for service.

Fuse Replacement

Under normal use, the fuse should not require replacement. The purpose of the fuse is to protect the electronics from failure due to inrush. Should it become necessary to change the fuse, replace the same type (2Amp/Fast Blow for 9Amp Unit or 3Amp/Fast Blow For 15A, 21Amp Units) to insure long life and best performance.

Cleaning

The housing has a durable finish that should retain its original luster for many years. Cleaning the exposed areas with a commercial glass cleaner or common household detergent will help maintain the finish.

Unplug and remove the power cord from the IEC connector on the back of the unit. Wipe the exposed areas of the housing with a soft cloth or paper towel moistened with general purpose cleaner.

CAUTION: Do not use excess water, treated cloth, harsh cleaning agents or sprays. Use cleaning fluid sparingly. If fluid spills into the interior, let the unit dry thoroughly before using.

Periodically, dust should be removed from the unit using a vacuum. Pay special attention to the air vents at the rear of the unit, and on the bottom of the chassis.

The optical element in the front light port should be inspected before use to verify there is no contamination. If contaminated, clean with soft cloth, or swab, and alcohol. Allow alcohol to dry completely before using light source.

Do not use the turret as an off gate for the light, turret damage will occur. Only leave it at a detent position (port in line with the source of light).

Troubleshooting

If you are unsuccessful at resolving the following conditions, contact FTI for a Return Material Authorization (RMA). Do not attempt to repair the light source. Tampering with the electronics will void the warranty.

Fan operates, but unit has low light output.

- The light source is running too hot. A thermal cutoff protects the circuitry from heat damage.
- Possible Causes
 - Inadequate Air Flow
 - Check air intakes and exhaust areas for dust or dirt accumulation.
 - Make sure minimum clearances are maintained. (See installation guidelines for clearance information).
 - Move the light source to a cooler ventilated location. NEVER enclose the light source without adequate ventilation.
 - Fan Failure
 - Fan will be visible through rear vent. Verify fan is rotating.
 - If fan is not rotating, contact the manufacturer for servicing.

Fan operates, light is not on.

- The chip may have failed. Contact the manufacturer for servicing.

Fan does not operate, light is on.

- The fan may have failed. Contact the manufacturer for servicing.

Fan and light are not working.

- Make sure the power cord is inserted completely into the IEC connector and also into the power source.
- Check the power switch. Make sure it is in the “ON” position.
- Check the power cord for damage.
- Check the fuse for continuity.
- Check the outlet for power.

Light Pulses

- If over temperature LED goes on when light is off, then an over temperature condition is occurring.
- If over temperature LED does not go on when the light is off, then an over current condition is occurring.

For over temperature check that the fan is operating and that there are no obstructions to the cooling airflow.

For overcurrent, reduce the intensity setting, unit may need high current trip point recalibration.

Fiber input is burning.

- Check the fiber type; it may be plastic and susceptible to burning. All standard FTI fiber optic light guides are made with glass fibers.
- Contamination on the fiber.
 - Verify fiber face is clean.
- Contamination of the light source optical element.
 - Verify optical element is clean.
- Light guide is damaged.
 - Replace light guide. FTI offers a repair service and replacement light guides. Contact FTI for more information.

Ask your light guide supplier about the epoxy used to manufacture the fiber optic input; some epoxy types cannot withstand the high photonic energy developed by this light source.

Product Specifications

Improvements may result in specification or feature changes without notice.

Family General Specifications

Physical Dimensions

Overall Height: 5.0" (121 mm)
Overall Width: 7.625" (205 mm)
Overall Depth: 7.75" (219 mm)
Unit Weight: 5lbs. (3.3 Kg) including cord

Adapter Receptacle: 1" (25.4mm) OD.
Adapters: FTI, Storz, ACMI, Wolf, Olympus, Pilling, Chiu, Schott, Fostec, Dolan Jenner, Volpi, Others

Power Requirements: 100-240 VAC, 50/60Hz

Classification: Class I
Electrical Safety: UL 153, UL 8750, CSA C22.2#12, CSA C22.2#250.13 CE

Lead Free Status / RoHS Status: Lead Free, RoHS Compliant

Controls and indicators:

Power Switch, Rocker Type (Front Panel)
Over Temperature Indicator LED (Front Panel)
Intensity Control, 0% Full CCW, 100% Full CW

LO35N9 Specifications

LED Used: SBT-90
LED Drive Current: 9 Amps
Power supply capacity:65W
Power Consumption: 50 Watts
Fuse (Rear Panel): 2A Type F Quick Blow

LO35F15 Specifications

LED Used: CBT-90
LED Drive Current: 15 Amps

Power supply capacity:100W
Power Consumption: 75 Watts
Fuse (Rear Panel): 3A Type F Quick Blow

LO35T22 Specifications

LED Used: CBT-140
LED Drive Current: 22 Amps
Power supply capacity:100W
Power Consumption: 95 Watts
Fuse (Rear Panel): 3A Type F Quick Blow

Recommended Conditions

- Operating
 - Temperature 5°C to 40°C
 - Humidity 10% to 85% Relative Humidity, Non-Condensing
- Storage
 - Temperature 5°C to 50°C
 - Humidity 10% to 85% Relative Humidity, Non-Condensing

Types All Models

Taper large end diameter “5” 5mm, “8” 8mm or “14” 14mm (“14” default)

This sets the maximum diameter light guide that can be fully driven.

Fixed port “F” or Turret “T” (F is default)

Fixed port allows choosing from a large selection of light guide adaptors, virtually any light guide being produced can be interfaced to. Turret allows selecting up to four different adaptors by simply rotating the turret 90 degrees (detent stop positions)

Options All Models

“E” External Control Option

This option is provided by means of a DB-25 female connector that mounts to the rear panel of the unit. When installed into a basic unit the following signals are provided on the designated pins of the DB-25 connector.

Pin 13 External Intensity Ground: This is the ground pin for the external intensity signal.

Pin 25 External Intensity Signal Input: This is the external intensity input signal 0-+5 VDC is the working range, producing 0-100% light output respectively.

Pin 12 Internal Intensity Off Ground: This is the ground pin for the internal intensity off signal.

Pin 24 Internal Intensity Off Input: This turns the internal intensity off when tied to Internal Intensity Off Ground.

Pin 11 Disable / Slow Strobe Ground: This is the Ground pin for the Disable / Slow Strobe Ground Signal.

Pin 23 Disable / Slow Strobe Input: This shuts the light off when tied to the Disable / Slow Strobe Ground pin. This can be TTL, OC or Contact Switch. This can be strobed from ground to open / 5VDC for as short as 2ms (produces a 2ms light pulse at the current intensity setting).

Pin 10 Reference Voltage Ground: This is the reference voltage ground.

Pin 22 + 5.1 VDC Reference Voltage: This reference voltage is available at up to 5ma max. This would normally be used to excite an external intensity pot or provide a reference for voltage for a customer D/A to produce an external intensity signal.

Typical implementations and their function follow as Figure 1,2,3 Page 15.
(These represent a small fraction of all possible implementations)

This option is provided completely wired to support the microprocessor option as well as the high speed, high power strobe option. Each of those options will describe the available signals and their functions in their corresponding sections.

EXTERNAL OPTION

WIRED FOR EXTERNAL 0-5 VDC INTENSITY CONTROL
AND EXTERNAL DISABLE / SLOW STROBE

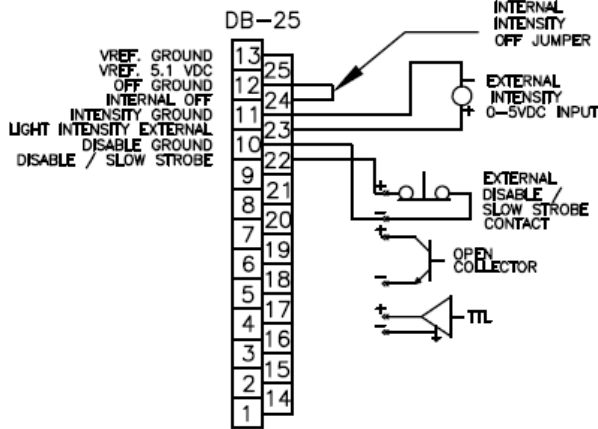


Figure 1

EXTERNAL OPTION

WIRED FOR EXTERNAL DISABLE / SLOW STROBE
USING INTERNAL INTENSITY CONTROL

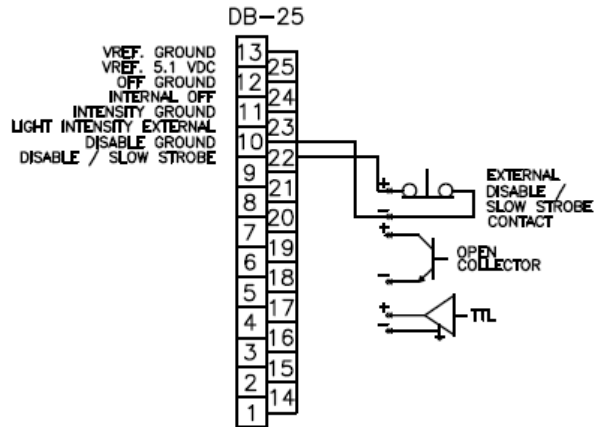


Figure 2

EXTERNAL OPTION

WIRED FOR EXTERNAL INTENSITY CONTROL
AND EXTERNAL DISABLE / SLOW STROBE

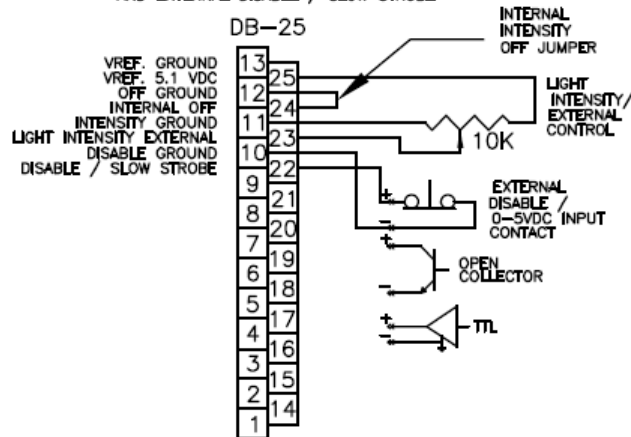


Figure 3

“M” Micro Processor Option

This option requires the external control option.

This option is provided by means of an additional circuit board module that is equipped with a microprocessor. The capabilities of the module are described in the following:

RS232 or RS485 communications are available, jumper selectable. Ethernet communications can be provided as an additional option to the Microprocessor option.

0 - +5 VDC intensity output, intensity can be set to a voltage via the communications link. This will produce a 0% - 100% intensity output.

Voltage reference input for providing a precise source for the intensity voltage output generator. +5.1 VDC typical as supplied by DB25 connector.

Slow strobe output for providing a timed slow strobe pulse based on a value set via the communications link. Pulse range is from 1- 65536 milliseconds.

High speed strobe output for providing a timed high speed strobe pulse based on a value set via the communications link. Pulse Range is from 0-1000 microseconds.

Logic strobe input to trigger the slow or high speed strobe events based on which one has been selected. This is a falling edge triggered signal.

The above signals are provided on pins of the external control option DB-25 pin connector. The pinouts and signals are defined in the following:

Pin 7 This is the high speed strobe output ground.

Pin 19 This is the high speed strobe output. A preset timed pulse duration is output when the logic strobe input is taken low / ground. (0-1000 microseconds)

Pin 6 This is the slow strobe output ground.

Pin 18 This is the slow speed strobe output. A preset timed pulse duration is output when the logic strobe input is taken low / ground. (0-65536 milliseconds)

Pin 5 This is the logic strobe input ground.

Pin 17 This is the logic strobe input, taking this low / ground will produce a high speed strobe output pulse or a slow speed strobe output pulse based on which one has been selected.

Pin 4 This is the intensity output ground pin.

Pin 16 This is the intensity output pin used to provide a 0- 5 VDC output signal based a digital value transmitted over the communications link. (0%-100% intensity output range)

Pin 3 This is the voltage reference input ground pin.

Pin 15 This is the voltage reference input pin used by the intensity output voltage generator. Typical value is + 5.1VDC as supplied by the DB25 connector.

Pin 2 This is the RS232 or RS485 ground pin

Pin 14 This is the RS232 receive or RS485 Y/A pin.

Pin 1 This is the RS232 Transmit or RS485 Z/B pin.

Typical implementations and their function follow as Figure 4,5,6 Page 18.
(These represent a small fraction of all possible implementations)

An inter-module bus allows sensing presence of high speed strobe option, sensing over temperature condition, overcurrent condition and shutting down the LED Driver. These conditions as well as other parameters and settings are reported back via the communications link.

**EXTERNAL OPTION PLUS
MICROPROCESSOR OPTION**

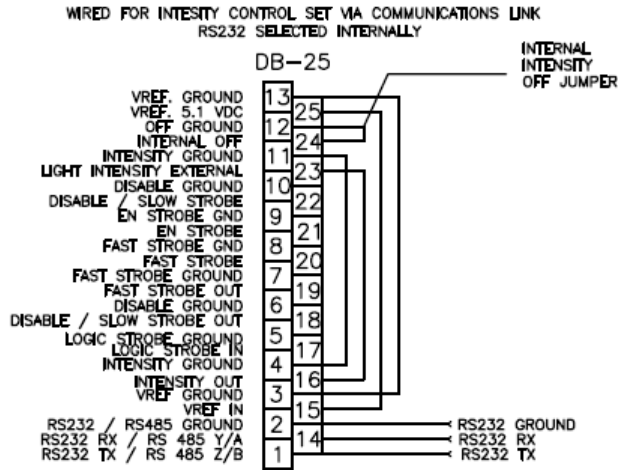


Figure 4

**EXTERNAL OPTION PLUS
MICROPROCESSOR OPTION**

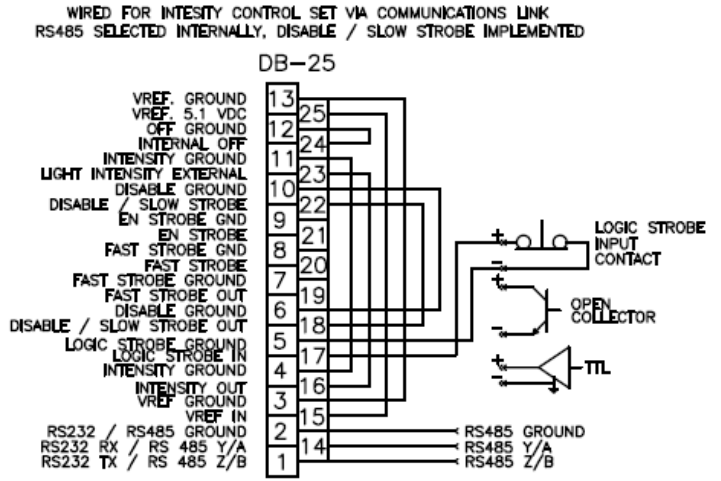


Figure 5

**EXTERNAL OPTION PLUS
MICROPROCESSOR OPTION**

WIRED FOR INTENSITY CONTROL SET VIA COMMUNICATIONS LINK
RS485 SELECTED INTERNALLY, FAST STROBE IMPLEMENTED (HIGH SPEED STROBE OPTION REQUIRED)

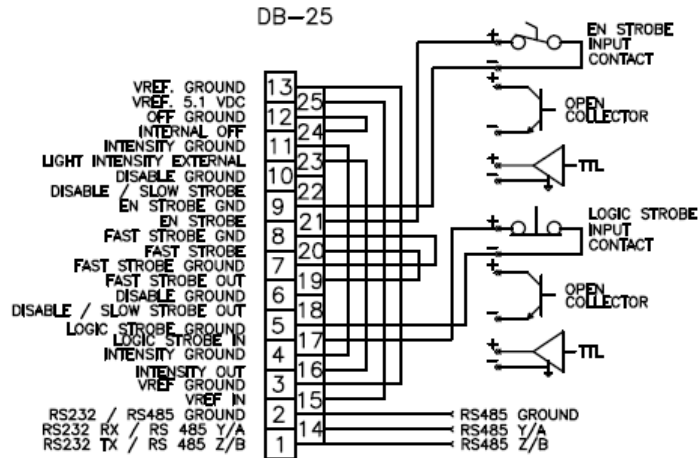


Figure 6

Note: Some RS485 modules may require reversing the Y/A, Z/B connections for proper operation.

Programming the Microprocessor Option

Message Structure

\ Lead in character, start of message
uuu Decimal unit ID Range = 0-255
, End of decimal input marker
y Lowercase single alpha command
nnnn Decimal parameter Range = 0-255, 0-65536
, End of decimal input marker
<CR> Carriage return, end of message

Response Messages

uuu Decimal unit ID Range = 0-255
y Command received
nnnn Parameter received
<CR><LF> Carriage return and line feed

Bad Parameter

uuu Decimal unit ID Range = 0-255
y Command received
? Parameter not valid
<CR><LF> Carriage return and line feed

Bad Command

uuu Decimal unit ID Range = 0-255
? Command not valid
<CR><LF> Carriage return and line feed

Global Commands

Unit ID 1-255 are unit specific commands, Unit ID 0 is a global command. When setting unit ID only that unit is allowed to be connected and Global ID is used. This is the case for Enable Unit ID change and Set Unit ID commands. All other commands may be used globally with all units connected. In Global mode responses are not generated.

Commands

i Intensity followed by a value of 0-255 for intensity, 0 = none, 255 = 100%
d DC:DC Converter control, 0 = Off, 1 = On
r Reset, 0 = all parameters to default, 1 = Reset Status Register

- e Enable Unit ID change, 1 = enable, 0 = disable
- u Set Unit ID, 0-255
- o Set slow strobe pulse, 2-65535 representing milliseconds
- h Set high speed strobe pulse, 2-1000 representing microseconds
- p Immediately pulse the selected strobe for the time specified, 0 slow strobe, 1 high speed strobe
- w Write Parameters, Status and Control into EEPROM, 0 = write default values, 1 = write current values
- s Report Status, 0 required as a default parameter. The response message is the normal response plus an eight digit bit status byte reported in binary to indicate conditions set in the unit. The representation is shown below.

Reported in positive logic form:

- D7 1 = high speed strobe module present, 0 = not present
- D6 1 = high speed strobe time enabled, 0 = not enabled
- D5 1 = slow speed strobe time enable, 0 = not enabled
- D4 1 = Unit ID Change enable bit set, 0 = not enabled, normal
- D3 unused, set to 0)
- D2 1 = high speed strobe timing fault (not implemented, set to 0)
- D1 1 = overcurrent detected, 0 = normal
- D0 1 = over temperature detected, 0 = normal

“E” Ethernet Option

This option requires the microprocessor option. The module along with the application software allows for an Ethernet based communications link. See Appendix A for configuration information for the port.

“S” High Speed High Current Strobe Option

This option requires the external control option and can operate with just the base unit or with the base unit and microprocessor option. This unit provides the ability to overdrive the LED for very short time intervals in order to produce extremely high light outputs. The module can be directly enabled and strobed or it can be strobed by the microprocessor. The pinouts and functions are available on the DB25 connector of the external control option and are described in the following.

Pin 9 This is the enable strobe ground pin.

Pin 21 This is the enable strobe input pin, taking this low / ground will enable the high speed strobe for operation.

Pin 8 This is the fast strobe ground pin.

Pin 20 This is the fast strobe input pin. Taking this low / ground will initiate a fast strobe pulse, for as long as held low if the microprocessor option is not present or for the preset pulse duration if the microprocessor option is being used. The strobe discharges a capacitor to produce the intense current drive pulses. Maintaining the strobe line active longer than the available strobe times, simply discharge the capacitor and no further current is provided.

Overdrive is set at 250% of the Model Max. drive level.

The strobe frequency can be from 0 to 5000 HZ. The duration can be from 2u sec to 200 u sec. This must be constrained such that Frequency * Duration is a number less than 0.01.

Typical wiring implementations are shown in the following as Figure 7,8 Page 22. (These represent a small fraction of all possible implementations)

EXTERNAL OPTION PLUS
HIGH SPEED HIGH CURRENT OPTION
 WIRED FOR EXTERNAL ENABLE AND STROBE, RS485 SELECTED INTERNALLY

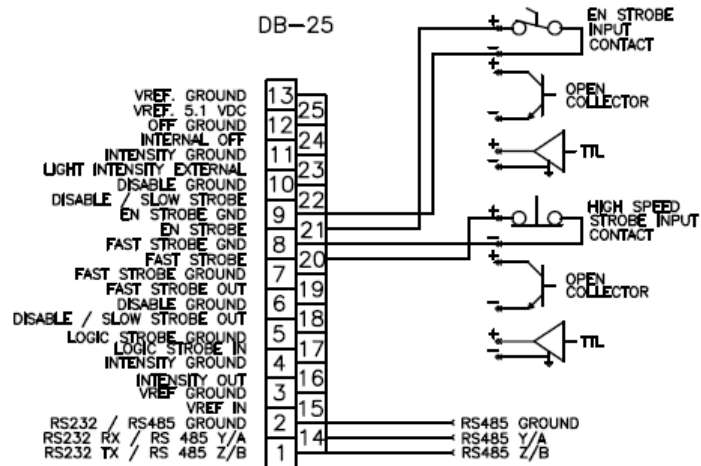


Figure 7

EXTERNAL OPTION PLUS
HIGH SPEED HIGH CURRENT OPTION AND MICROPROCESSOR OPTION

WIRED FOR INTENSITY CONTROL SET VIA COMMUNICATIONS LINK
 RS485 SELECTED INTERNALLY, FAST STROBE IMPLEMENTED

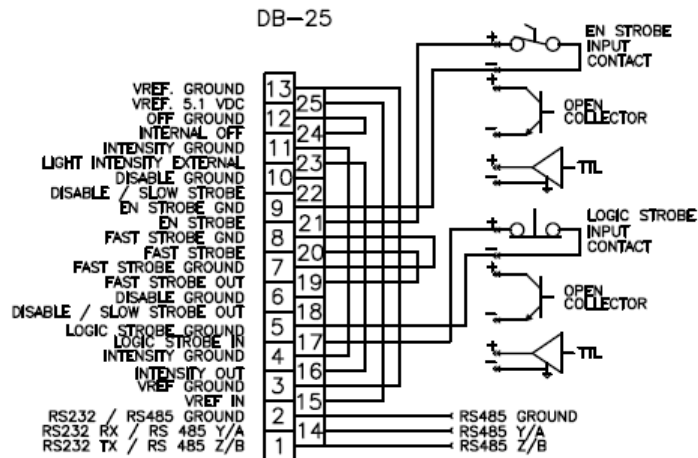


Figure 8

“W” Counterweight Option

This consists of a rectangular steel bar that has been powder coated with the same finish as the light source chassis. It is fastened to the bottom rear of the unit to provide additional stability in applications requiring “Goose Neck” light guides. The weight of this option is: 1.3 pounds (0.6Kg).

Customer Support

FTI maintains support services to assist you. Please contact your representative for support. You may also contact us directly by phone, facsimile, mail or e-mail at:

Fiberoptics Technology, Inc
1 Quasset Road
Pomfret, CT 06258 USA
800.433.5248 toll-free within US and Canada
+001 860.928.0443 International
Monday - Friday 8AM - 5PM EST USA
+001 860.928.7665 Facsimile
E-mail: info@fiberoptix.com

Be sure to have your part number and serial number available, as well as a complete description of the problem or situation for the quickest, most accurate assistance.

Service/RMA Policy

There are no user serviceable parts in this product. Service required for any reason must be performed by FTI or an authorized service representative. All service outside warranty will be performed with purchaser's approval, and changed according to normal service charges in effect at the time.

To return any item, whether for warranty repair or chargeable servicing, an RMA number (Return Material Authorization) must be obtained from FTI. This number must be clearly visible on the shipping label. All shipping must be prepaid.

If the light source was used in a biohazard environment, you may also be asked to supply a certification stipulating the conditions of service, including a list of materials the light source may have been exposed to. This unit must be clean and decontaminated before shipment. FTI reserves the right to return any product contaminated with blood or other organic material without repair.

All units will ship prepaid using our shipping method of choice. Alternate shipping methods will be shipped freight collect.

Warranty

FTI warrants its family of light sources to be free from defects in material and workmanship for a period of two years from date of shipment unless stated otherwise in a specific separate published warranty.

If any FTI product is found to have defects in material or workmanship, the purchaser should notify FTI promptly and request an RMA number. After an RMA number is assigned, purchaser may return defective products prepaid to the originating FTI facility.

FTI, at its sole discretion, will repair or replace FTI products found to be defective, and return said products, prepaid. FTI's correction of any defects, by the grant of credit, repair, or replacement, shall constitute fulfillment of all obligations and liability to the purchaser hereunder.

FTI is not responsible for damage to product caused by abuse or neglect, unauthorized installation, maintenance, use, repair, or adjustment. Any of the aforementioned actions shall make this warranty null and void and shall relieve FTI from any further responsibility hereunder.

FTI shall not be liable for an incidental, special, or consequential damage in any claim action, suit or proceeding arising under this warranty or any other part of the agreement of sale between FTI and the purchaser, nor shall there be any liability hereunder for labor claims, loss of profits or good will, repairs or other expenses incidental to replacement.

The foregoing warranty is in lieu of all other representations and warranties expressed or implied, written or oral, including warranties of merchantability or fitness of the goods for a particular purpose, unless exception is offered in writing by an officer of FTI, or separate published warranty is cited for specific product groups.

The warranty is void if:

- We determine the product has been subjected to neglect or misuse or has been installed following procedures not in accordance with our instruction manual.
- Unauthorized repairs or modifications have occurred.
- The warranty seal has been broken or the serial number label has been altered

Our obligation is limited to repair or replacement, FOB Pomfret CT. We will not be held responsible for consequential damages, transportation, installation, adjustment or other expenses arising in connection with our products or parts.

This warranty is in lieu of all other statements or guaranties, written or implied by FTI or our authorized representatives.

Liability

Any warranty implied under State Law shall be limited to two years from original delivery to original purchaser. Specifically excluded from FTI liability is damage resulting from acts of any deity, malicious mischief, vandalism, riots, wars, improper installation or neglect in the operation or maintenance of the unit or misunderstanding of the properties of the unit. Under no circumstances shall FTI be obligated for consequential or other damages of any kind or description, losses or expenses in connection with or by reason of the use of, or inability to use this unit for any reason. The stated warranty provides the purchaser with specific legal rights, and there may be additional rights which vary from State to State. Some states, for example, do not allow exclusion of consequential damage.

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