

FiberTEC™ 488 Operation Sheet with BSR Control Box

Part#: _____

NOTE: *Optical fiber pigtails are easily damaged. Never handle the device by the pigtail, but always grab the module by the metal housing.*

NOTE: *Clean the tip of the fiber optic pigtail with isopropyl alcohol and a lint free swab for best results.*

NOTE: *If your unit comes with a collimator, avoid having to remove the collimator from the fiber connector. This allows dirt to enter the collimator and it also may affect the optical beam quality.*

NOTE: *When inserting or removing the fiber tip from the collimator, or when making and breaking a fiber-to-fiber connection, the optical power should be OFF to prevent damage to the laser diode.*

NOTE: *The FTEC488 module exhibits extremely low power dissipation, and does not require a heatsink in normal room temperature conditions. For best performance and lifetime over the operating temperature range, the device should be mounted on a heatsink. The bottom of the package should make good contact with a metal heatsink. A small amount of thermal grease may be applied for better contact. The four corner screw holes can be used to attach to the heatsink. CAUTION: Do not overtorque the mounting screws. Screw the laser head on to the heatsink just until the screws are tight.*

The controller box provide by BSR on a loan/purchase arrangement is designed to easily allow you to control and operate your FTEC488 laser module. In your shipping container you should receive a total of three items:

FTEC488 Laser Head
DB9 connector cable
BSR Controller Box

On the rear of the box is the AC power cord, the interlock SYSTEM POWER switch and the SLEEP mode switch. No power will flow to the laser unless the interlock SYSTEM POWER key is turned from its vertical OFF position to the horizontal ON position. It is safest to always have the interlock key in the vertical OFF position when plugging the cord into an AC wall outlet.

Once the key is turned to LASER ON the controller box will supply power to the laser. There are two ways to interact with your FTEC488 module. You can quickly begin using the unit through the two power leads exiting the laser head. The second way is that you may power and control your unit through the DB9 connector.

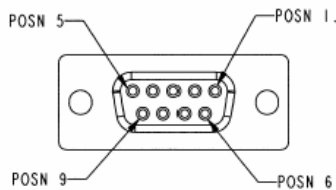
When using the power leads, with the interlock key on the controller set to OFF, insert the two leads from the laser head into the other side of the controller box into the large banana receptacles labeled +5V and GND. The red banana plug goes to +5V and the black banana plug goes to GND. Turning the interlock SYSTEM POWER key to ON provides power to these leads and turns on the laser, and lights the green LED on the laser head.

The FTEC488 will power up to the factory preset power output. Once warmed up the device will stay at this pre-assigned power level. It takes time for the thermoelectric coolers to stabilize the device, and if you have a power meter recording the output you may see large swings in output power. The time to stabilize varies from unit to unit, but all devices will be ready for use after a 15 minute warm up period. Typically all parameters except power stability are met after 5 minutes. In this mode the user has no control or feedback from the laser except to power it off and on through the interlock SYSTEM POWER key.

The BSR controller box may also be used to drive the unit through the DB9 connector.

NOTE: When using the DB9 connection, the power leads from the laser head should be left unconnected and covered so as to prevent shorting. If they and the DB9 are both connected, the unit will not be damaged, but not all functions will work properly.

NOTE: Make sure the DB9 cable does not have any crossed pins. All pins should be connected on a 1-1 correspondence.



PIN	FUNCTION
1	+5V
2	Voltage Reference Out
3	Sleep Mode Activation
4	GND
5	GND
6	+5V
7	Power Monitor Output
8	Power Set Input
9	NC

The DB9 pin descriptions are as follows.

Pin1 and Pin 6:

Positive terminal of the power supply. These should receive +5V +/-10%. The line should be as quiet as possible. If needed a pi-filter can be used. The power supply ripple should under 3%. (If you are not using the controller box, please note that upon power up the FTEC488 will probably draw its heaviest amperage. This may be as high as 2A, but only for a short period of time. As the thermoelectric coolers stabilize the device, the current should fall within the first minute or two to under 0.5A..)

Pin 2:

The VOLTAGE REF is a quiet 2.5V output generated internally. This output can be used in conjunction with pin 8, the POWER SET pin.

Pin 3:

The SLEEP pin allows you to disable the drive voltage to the pump laser while still maintaining the temperature settings of the unit. Grounding the pin to 0V places the laser in SLEEP mode, and a +5V or floating input returns the laser to normal operation. This pin may be hardwired with a switch or driven with a TTL interface. Placing the device in SLEEP allows the unit to come back to operating conditions within 2-3 minutes instead of waiting for the required cold-start warm-up period.

Pin 4 and Pin 5:

The negative or GND terminal of the power supply goes to both of these pins.

Pin 7:

The FTEC488 module taps a small fraction of the output 488nm light for monitoring. The voltage on this pin relative to GND is a measure of the PD monitor current. This allows you to track the total output from the laser as it varies over time or temperature. The voltage typically ranges from 0 to 500mV at full power.

Pin 8:

The POWER SET pin allows you to adjust the power out of the FTEC488. Typically a range from 0 to 1V will drive the laser from no power to full power. For best power stability the voltage should come from a quiet source. If its jumping by millivolts that can have an impact on power stability. Its best to take the quiet VOLTAGE REF from pin 2 into a trimpot (typically 100k) to adjust the power.

NOTE: *Be careful not to apply excessive voltage to this pin. The data sheet for each device lists the voltage at nominal power. Driving the voltage more than 10% above this level may cause excessive drive current to go through the pump laser.*

NOTE: *In a cold start situation its best to wait one minute, for the internal temperatures to stabilize, before applying the full voltage.*

Pin 9:

This pin is designated for future TTL modulation capabilities. No modulation capabilities are presently available. Future versions of the FTEC488 will allow for up to 200 kHz of modulation.

The BSR controller box has made all these connections for you. To use the DB9, make sure the interlock key is in the OFF position, and then plug in the AC power cord. Attach the DB9 cable between the controller box and the FTEC488 laser head. Make sure the separate power leads are disconnected from the controller box and covered to prevent shorting.

There is a trimpot labeled POWER ADJ near the DB9 connector. The trimpot is a 100k pot between the VOLTAGE REFERENCE pin #2 and GND. It's a 10 turn pot so as to prevent overdriving the laser. The output of the pot goes to pin#8 to control the laser power. In addition, the output of the pot goes to the smaller set of banana receptacles labeled VSET TEST. You can attach a voltmeter here to read the setting voltage for pin#8 that corresponds to a certain output power.

Next to the interlock key is the SLEEP mode switch. As described above the SLEEP mode can power down the drive current to the pump while maintaining the correct temperatures on the laser and crystal. The switch is labeled which position is SLEEP and which position is normal LASER ON operation.

With the POWER ADJ trimpot at the MIN position, turn the interlock key to bring power to the unit. The green LED light on the laser head will turn on. Slowly turn the trimpot until you reach the desired output power. At this stage the temperatures of the pump laser and crystal are not yet stable. Thus the 488nm output will not be stable in power and you may need to adjust the trimpot accordingly. As the unit stabilizes, keep turning the trimpot until the desired power is reached. You will notice that the power will fluctuate for a minute or two when you change the power setting by a large amount.

Included with your unit should be a graph of VSET voltage and POWER MON voltage vs. output power. You can use VSET voltage to roughly set the desired power output. Once the laser has stabilized you can monitor the power output through the smaller banana receptacles labeled PD MON TEST. Due to the nature of the FTEC488 laser system, there may always be a small power fluctuation at a given VSET level.

Further information may be found in our application section of our website,

<http://www.blueskyresearch.com/technicalnotes.htm>

Thank you and enjoy your FiberTec module!

APPENDIX

Controller Box Schematic

The controller box is quite straightforward in design. An AC-DC converter, (Cosel LCA15 family or equivalent), converts the wall plug AC to +5V with enough current to drive the FTEC488. The 5V goes to the key switch as a system interlock. A basic pi-filter provides additional line filtering of the noise before powering the laser. The 5V is available either to the large banana plugs or the DB9 connector. The power adjustment through the DB9 is done manually with the trimpot. The trimpot runs between the VREF output of pin 2 and GND. This is a nice safety feature as one cannot run the VSET value to greater than that set by the factory. It is also a quiet voltage source. None of these components are critical. However, for the inductor, make sure that you use one that can handle 2A or so of current without a large voltage drop.

