

## FiberTec™ with Pins Operation Sheet

This FTEC module has its interface through the circuitboard pins on the bottom of the package. The pinout is shown below. Note the differences if you have a 405nm FTEC module. When looking at the top of the module and the fiber exiting from the left, pin#1 is the lower left hand corner, and pin#16 is the upper left hand corner.

Pin No.	Name	Type	Description
1	NC	Passive	No connection
2	NC	Passive	No connection
3	GND	Active	Ground
4	Set	Analog input	Constant current or constant power setting , Max ~2.5V
5	VTEC	Analog Output	Indicates Relative Voltage Across TEC, 1.5V -> 0V across TEC, 3.0V -> Max. TEC Voltage
6	APC	Active	Connect to Pin 8, Module function Automatic Power Control.
7	ACC	Active	Connect to Pin 8, Module function Constant Current Control.
8	CC	Active	Control Common
9	VCC	Power	5V +/- 10%. <b>NOTE: 6.5V +/- 10% for 405nm FTEC.</b>
10	GND	Active	Ground
11	Temp Set	Active	Temperature Setting Input
12	Temp. Range	Digital Output	Indicates when thermistor temperature is within +/-0.1C of target temperature.
13	Alarm	Digital Output	Indicates OPEN or SHORT circuit from thermistor
14	GND	Active	TEC Voltage GND.
15	NC	Passive	No connection.
16	VT	Power	3.3V +/-10%.

**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 connector. This allows dirt to enter the collimator and also may affect the optical beam quality.*

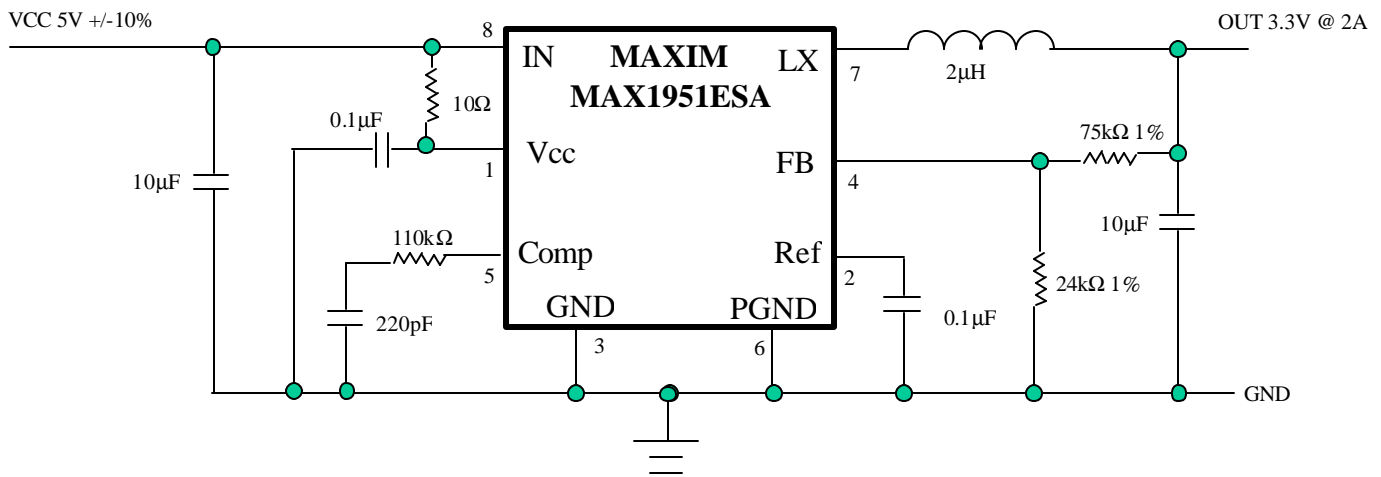
**NOTE:** *When inserting or removing the fiber tip from the collimator, or when making and breaking a fiber-to-fiber connection, the optical power should be OFF to prevent damage to the laser diode.*

**NOTE:** *The 405nm FTEC module must be mounted on a heatsink. The bottom of the package in the front of the module, underneath the fins, should make solid contact with a metal heat-sink. A small amount of thermal grease is recommended. For best lifetime performance, it is recommended that other FTEC modules be mounted on a heat-sink.*

**NOTE:** *To prevent ESD damage to the module, a properly grounded wrist strap should be worn when making connections to the pins.*

To begin using your FTEC immediately, there are three connections that have to be made. The first is to decide if you wish to operate in APC or ACC mode. For APC mode, connect pin#6 to pin #8. For ACC mode, connect pin#7 to pin#8. The lowest noise and short term power stability is achieved through the ACC mode, but the output power is more sensitive to the voltage on SET pin#4.

The second is to bring power to the module. Connect the positive terminus of the laser driver supply (5V+/-10%, 6.5V +/-10% for the 405nm) to pin# 9 and connect the GND to pins# 3 and # 10. For FTEC modules, the TEC and the laser driver have to be run off of separate power supplies. The TEC is run off of 3.3V +/-10%. If a 3.3V supply is not readily available, 3.3V may be derived from the 5V supply with a DC-DC converter chip. It should be able to source 2A of current. The following chip layout from Maxim, the MAX1951ESA, is recommended to create a 3.3V source from your 5V supply. For supplies other than bench-top units, extra filtering may be necessary.



**NOTE:** Do not operate the FTEC without providing power to the TEC. Its best to power up the TEC first before bringing power to the laser driver.

After turning on the power, the FTEC will stabilize the TEC and power output in a few minutes. When the temperature of the TEC has reached its set value the voltage on pin #12 will go HI as an indication. The laser chip temperature is set at the value on the final test report and you can confirm this by noting the voltage output on pin#5. The chip temperature of the laser may be changed by varying the input resistance on pin#11. Please consult Blue Sky Research for further details.

The third step is to bring a voltage to pin#4 the Set pin. This voltage varies the output power in APC mode or the drive current in ACC mode. The pin draws no current and the voltage ranges from 0 to about 2V, depending on the laser and the mode of operation. The final test report for your FTEC will list the voltage in APC mode and ACC mode for which the device produces its rated output power. In addition, the variance of voltage with power for this pin, in both APC and ACC mode, are graphed with the final test report. In the ACC mode, the FTEC will maintain a constant current to the laser. In the APC mode the FTEC works to maintain a constant  $P_{out}$ .

**NOTE:** When going between either mode, first turn the pin#4 SET voltage all the way to 0V and then power down the unit. This will prevent any current damage upon power up in the subsequent mode. Anytime the FTEC is powered up the SET voltage should begin at 0V and go up from there.

**NOTE:** *Care must be used not to drive this pin over voltage levels indicated in the graphs to prevent damage to the module.*

The FTEC with pins may be modulated up to a 1kHz rate. The drive voltage is typically a square wave swinging around GND. The pk-pk voltage is around +/-250 mV. There may be some variation among modules so its best to start with the amplitude driver at a minimum value and slowly raise the pk-pk voltage until the desired performance is achieved.

Further information may be found in our application section of our website, <http://www.blueskyresearch.com/technicalnotes.htm>. Thank you and enjoy your FTEC module!