

Product Test Report

Part Number: PR-6507-0003

**Description: BrightLock 170W Output from OT, 795nm-IG, 1000 μ m x 51mm
Fiber-coupled Diode Module**


Unit Serial Number 1901124-S2

Test Date 02/20/2020

Tested by XY

This product passed final test and fully met the specifications

This product passed final test with contingency (Requires customer's waiver for shipping)

Test report reviewed by 

Test report review date 02/21/2020

Service Notes:

- *Module was returned with ~70% of the original output power*
- *Module had leaking issue at the copper tubing*
- *Customer requested to fix the plug leak and replace the fiber*
- *QPC fixed the plug leak at the copper tubing*
- *QPC replaced the fiber on the module*
- *QPC replaced two bars, which were destroyed during failure analysis, and performed the module realignment*
- *The tested output power from OT is 145W at 37A, which is about 85% of the original power, and about 20% higher than that as returned.*

Laser Safety Information



This product is a Class IV laser. When powered, the laser emits radiation that may be invisible, visible or both. Radiation from the laser is potentially hazardous. Avoid eye or skin exposure to direct or scattered radiation. Failure to follow instructions may result in serious injury or fire. Before powering, be sure that radiation from the laser or from any optical fibers connected to it will be safety contained. Consult ANSI Z136.1 (Standard for Safe Use of Lasers) for general safety guidance.

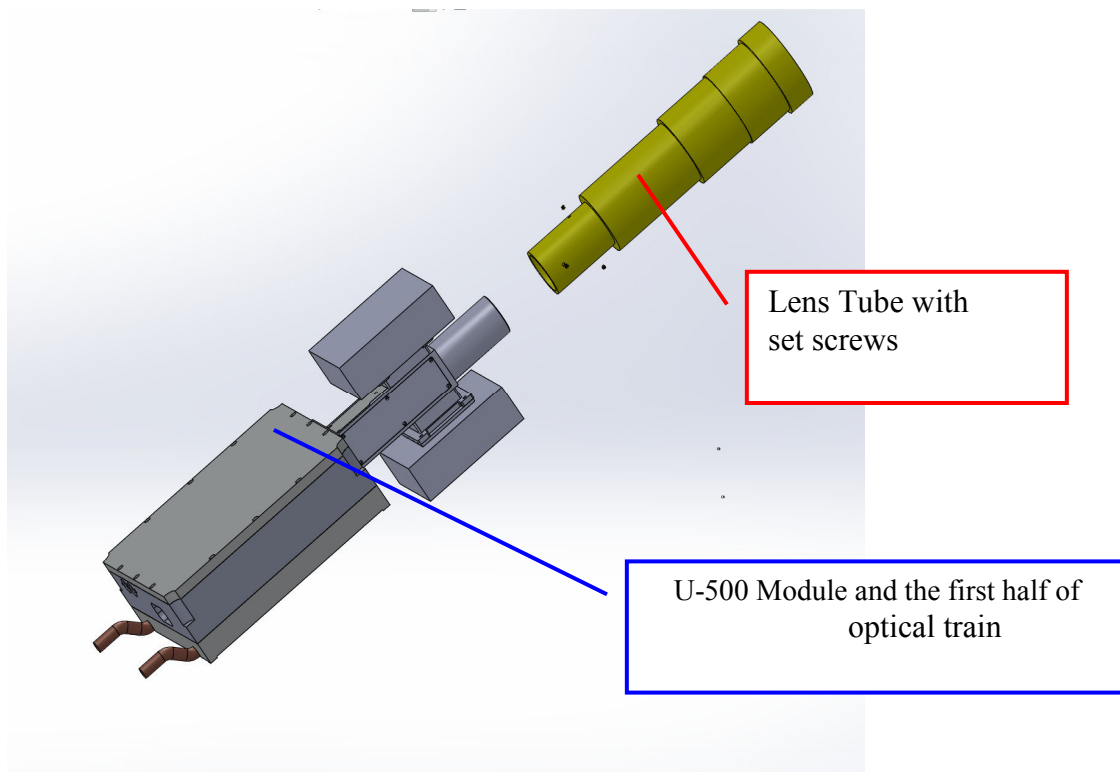
1. Optical Train Restoration

- The module and OT assembly is shipped in two parts.

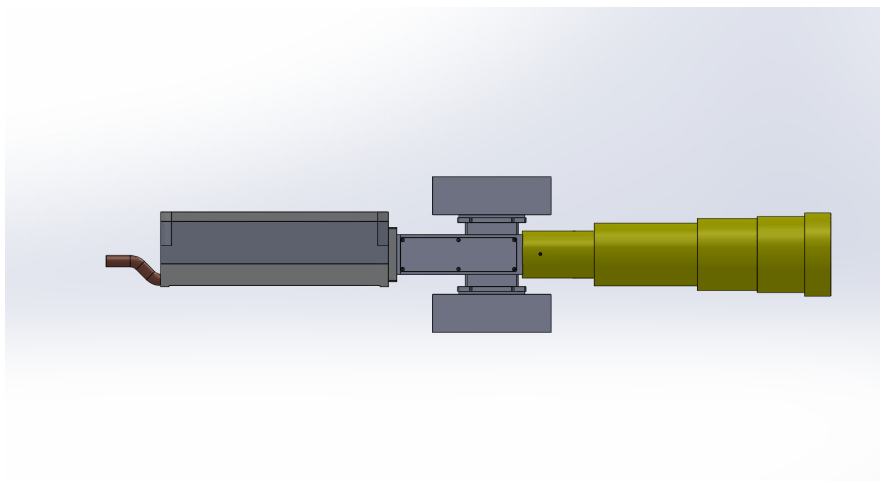
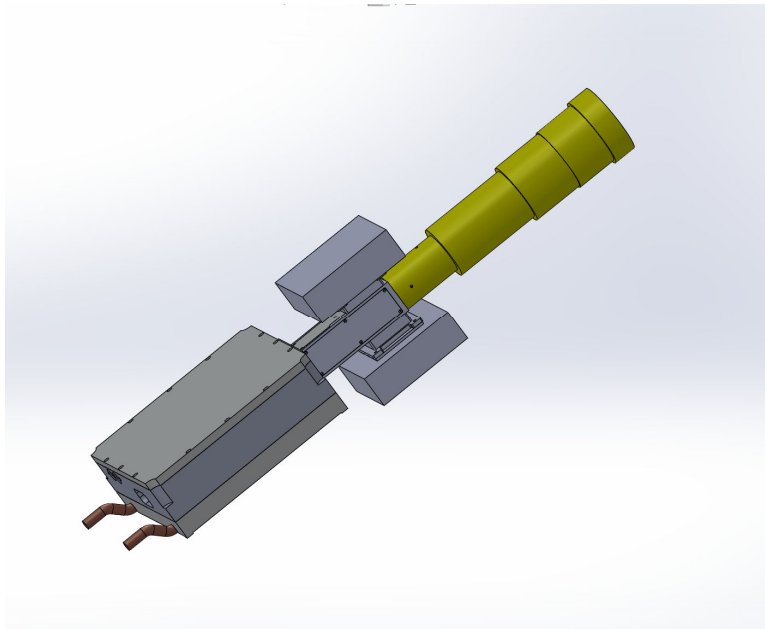
Part 1: U-500 Module and the first half of the OT (optical train)

Part 2: Second half of the OT - Lens tube with 4X4-40 set screws

The user needs to attach the second half of the OT to the first half prior to operation.



- Remove the four (4) 4-40 set screws from Part 2 using a **0.050” Hex Screwdriver**. Carefully and slowly feed the lens tube onto the first half of the Optical Train, until it reaches the bottom (hard stop). Hold the Tube in position and tighten the four (4) 4-40 setscrews to lock the lens tube in place. Now the Optical Train is fully restored.

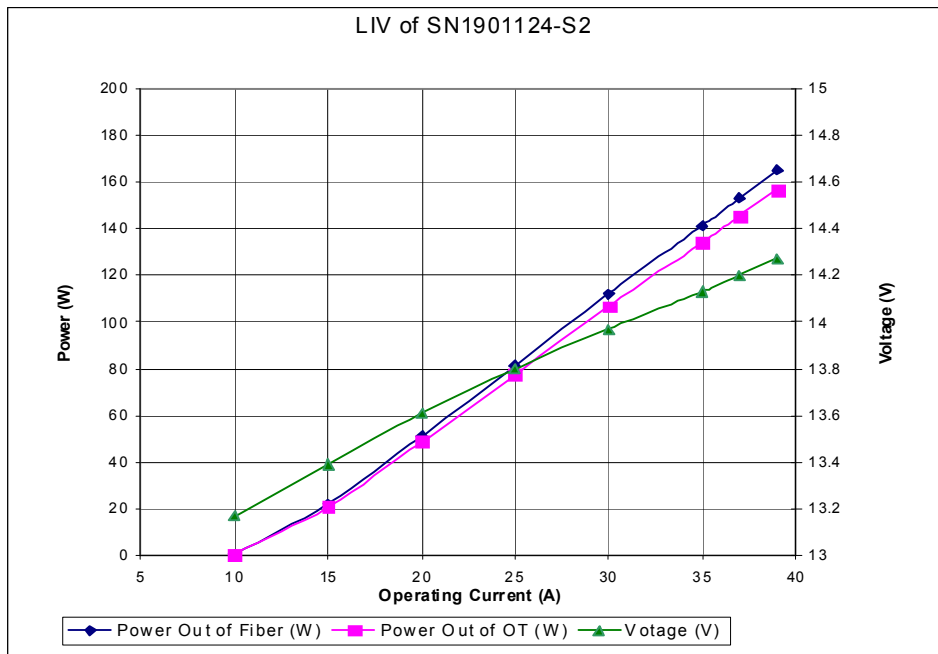


2. Power and Voltage Drop vs. Drive Current (LIV)

- Chiller temperature was set so that 25°C module base temperature was achieved at 145 W output power from Optical Train.
- The voltage drop was measured between the two lugs of the module.
- Optical powers were measured from the tip of AR coated 1000 micron core fiber with a NA of 0.22, and from the Optical Train (OT), respectively.

Note: Do not operate the module with current exceeding the maximum tested value

Current (A)	10	15	20	25	30	35	37	39	
Power Out of Fiber (W)	0.8	22	51.2	81.5	112	141	153	165	
Power Out of OT (W)	0.7	20.8	48.7	77.6	106.6	134	145.3	156.5	
Voltage (V)	13.17	13.39	13.61	13.8	13.97	14.13	14.2	14.27	



- **Module was returned with ~70% of the original output power (P out of OT = 118W at 37A, original P out of OT = 170.5W at 37A)**
- **QPC replaced two bars in the module**

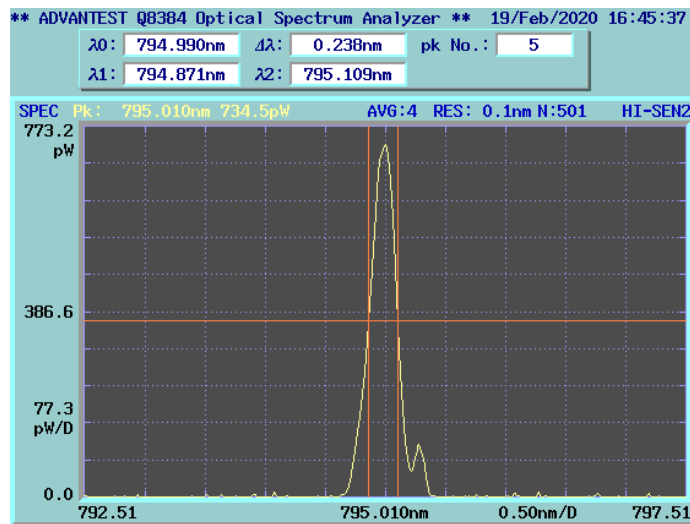
3. Optical Spectrum

3.1 Measurement Conditions

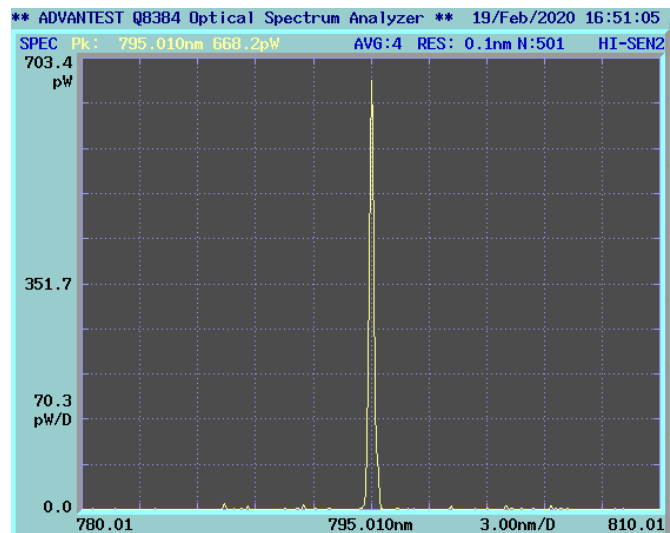
$T_b = 25^\circ\text{C}$; $P=145 \text{ W}$ from Optical Train

Centroid of Spectrum: 794.990 nm

Spectral Width (FWHM): 0.238 nm



Span=5nm

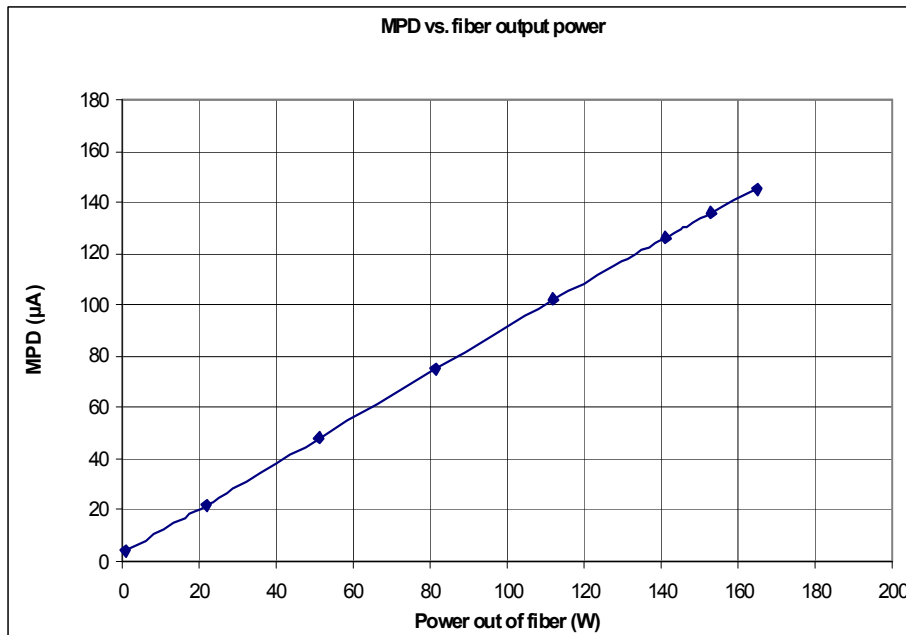


Span=30nm

4. MPD Data

- A photodiode is installed in the module to monitor the diode power.
- The fiber output power vs. photodiode output current is calibrated.
- The photodiode output signal can be measured by using a multi-meter set for “ μA ” measurement
- MPD output connection definitions:
 - Pin 5 on 15-pin connector: “+”
 - Pin 6 on 15-pin connector: “-”

Driver Current (A)	10	15	20	25	30	35	37	39
Power ex fiber(W)	0.8	22	51.2	81.5	112	141	153	165
MPD (μA)	4	22	48	75	102	126	136	145



5. Aiming Beam Data

- Wavelength: **635** nm

Power out of the delivery fiber: **1mW at 3.0 V DC** input

- Wire connection definitions
 - Pin 14 on 15-pin connector: “+”
 - Pin 15 on 15-pin connector: “-”

6. Dumping power from the PBS due to polarization impurity out of fiber

The measured power dumped by the PBS (polarization Beam splitter) through one of the Optical Train beam dump windows is <10W at 145W output from the OT.

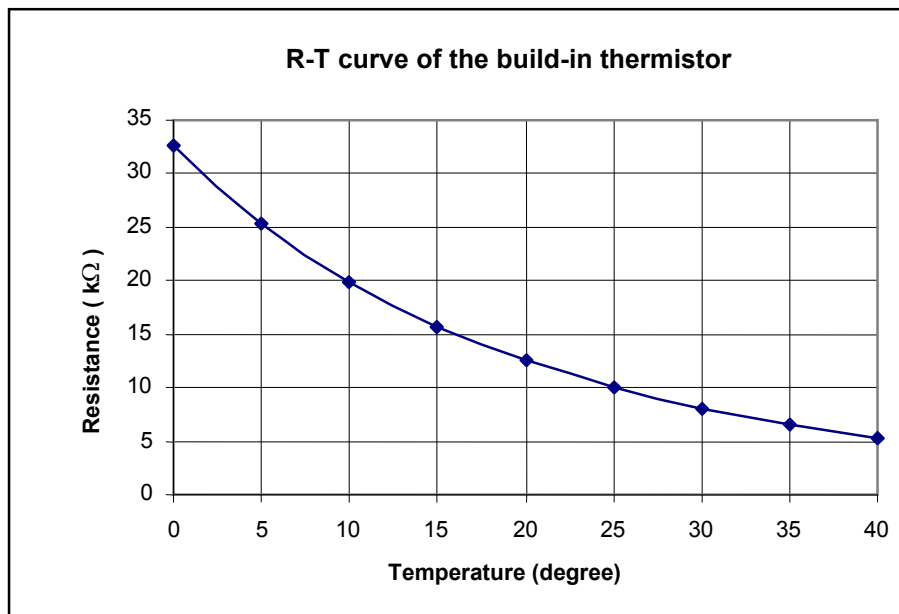
7. Circular Polarization out of the Optical Train

A $\frac{1}{4}$ Waveplate in the OT has been adjusted to get the best Circular Polarization, limited to the measurement accuracy, the measured Purity of Circular Polarization is better than 98%.

8. Thermistor R-T Curve

- A NTC 10 KΩ thermistor is installed on the module base plate to monitor the base plate temperature, which is connected to the Pin 1 and 2 of the D-sub connector.

Resistance vs. temperature of NTC 10KΩ Thermistor



NOTE:

The temperature can be calculated from the measured resistance by using the following formula:

$$\begin{aligned}
 A &= 0.001129148 \\
 B &= 0.000234125 \\
 C &= 8.77E-08 \\
 D &= \text{Resistance } (\Omega) \\
 E &= 1 / [A + B * \text{LN}(D) + C * \{\text{LN}(D)\}^3] \\
 F &= E - 273.15 = \text{Temperature (Celsius)}
 \end{aligned}$$