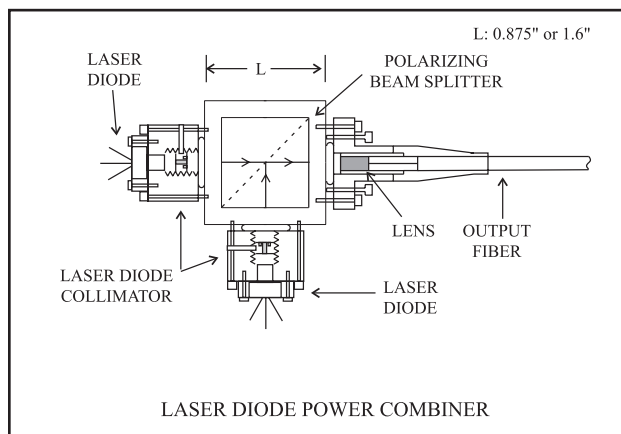
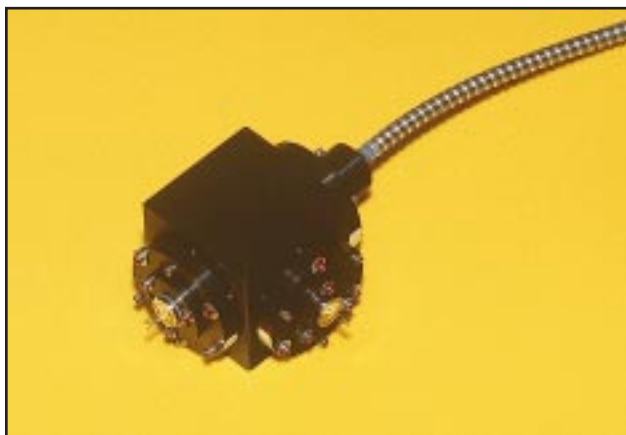




# OZ OPTICS LTD.

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## LASER DIODE POWER COMBINER



OZ Optics introduces a new coupler designed to combine two polarized laser diode outputs into a single fiber. The output fiber can be singlemode, multimode or polarization maintaining fiber. Fiber-to-fiber polarization combiners / splitters are also available.

The device utilizes a polarizing beam splitter in reverse, to act as a combiner. The laser diode outputs are collimated, and then attached onto the combiner. The collimated laser diode outputs are rotated until the maximum light comes out of the splitter / combiner output. The combined beam is then focused into the output fiber using OZ Optics' patented tilt adjustment technique.

A second version of the power combiner utilizes a dichroic splitter instead of a polarization beam splitter to combine the diode beams. This method has the advantage that the polarization axes of the two diode beams can be oriented in the same direction. This is useful when one needs to launch the two input signals along the same axis of a polarization maintaining fiber. However, this method is only possible when the wavelengths of the two diodes differ by at least 40nm.

Laser diode power combiners come in a small, rugged package and are available either with female receptacles to accept different connectors (NTT-FC, AT&T-ST, etc.), or pigtail style, with the fiber directly attached. Pigtail style combiners are recommended for optimum stability, minimum insertion losses, and low backreflection. Receptacle

style systems are best suited for applications where the output coupler is used with a multimode fiber. If a receptacle style combiner is used with a singlemode fiber, then the user may have to adjust the alignment to maximize coupling efficiency. Receptacle style systems with better repeatability are available, but at the expense of lower coupling efficiencies.

The coupling efficiency from each diode is about 75-90% for multimode fibers and 45%-55% for singlemode fibers. The typical backreflection level returning to the laser diode is -20dB. Backreflection levels of -25dB, -40dB, and -60dB are available for pigtail style combiners. This is accomplished by polishing the fibers at an angle and positioning the fiber off center with respect to the lens axis. For -60dB backreflection levels, the fiber ends are AR coated to reduce reflections. Applications include Erbium doped fiber amplifiers, coherent telecommunications and medical surgery.

Oz Optics also supplies laser diode to fiber couplers with photodiodes. They are available in two configurations. In one setup, the photodiode acts as a monitor photodiode, measuring the reference power from the laser diode. The second setup instead uses the photodiode to detect light returning from the fiber. Such a setup is also known as an optical transceiver.

## ORDERING INFORMATION:

### Part Number

**ULBS-11 X-F-W-PBS**

**ULBS-11P-a/b-F-W-PBS-LB-X-JD-L**

**ULBS-12P-a/b-FD-W-S/R-LB-X-JD-L**

**TRBS-12P-a/b-FD-W-S/R-LB-X-JD-L**

**WDM-11 X-F-W1/W2**

**WDM-11P-a/b-F-W1/W2-LB-X-JD-L**

### Description

Laser diode polarization power combiner with an output connector receptacle.

Pigtail style laser diode polarization power combiner.

Laser diode to fiber coupler with a monitor photodiode.

Laser diode transceiver module.

Connector receptacle style laser diode power combiner with a dichroic splitter.

Pigtail style laser diode power combiner using a dichroic splitter.

Where: X is the connector type for receptacle style combiners. For pigtail style combiners, they refer to the male connector on the fiber end (3 for NTT-FC, 5 for SMA 905, 8 for AT&T-ST connectors, X for bare fiber, etc.),

a,b are the fiber core and cladding diameters, respectively, in microns,

W,W1,W2 are the diode wavelengths in nm,

S/R is the desired split ratio (50/50 and 90/10 are standard)

F is the output fiber type (S for singlemode, M for multimode, P for polarization maintaining fiber),

LB is the desired backreflection level (25dB, 40dB or 60dB for pigtail style systems only).

JD is the fiber jacket type (1 for uncabled fiber, 3 for 3mm OD loose tube Kevlar, 3A for 3mm OD armored cable, and 5A for 5mm OD armored cable.),

L is the fiber length in meters.

**Example:** A customer requires a pigtail style power combiner to combine the light from two 670nm laser diodes. The customer wants low (-40dB) backreflection back into the diodes. The output fiber is a two meter long, 3.0mm O.D kevlar cabled, 4/125 singlemode fiber, terminated with a male NTT-FC connector. Oz Optics' part number: **ULBS-11P-4/125-S-670-PBS-40-3-3-2.**

**Example 2:** A 90/10 beam splitter is used to split the signal from an 830nm laser diode. Ninety percent of the light is coupled into a 2 meter long, 3.0mm OD cabled PM fiber, terminated with an FC connector. The remaining 10 percent is reflected to a monitoring photodiode. In this manner, one can independently monitor the output power emitted by the laser diode before it enters the fiber. Oz Optics part number: **ULBS-12P-5/125-PD-830-90/10-25-3-3-2.**

