OZ Optics Limited

Fiber Optic Test Equipment

June 2017
OZ Optics offers a wide range of standard test equipment, as well as a range of specialized equipment for polarization related measurements.

Features:

- Many types of optical sources are offered
- Fixed and tunable filters are available
- A variety of types of optical power meters are available
- Instruments for measuring polarization are offered
- Fixed or Variable Delay Lines for Polarization Compensation are offered
Company Profile

- Company founded in 1985;
- Corporate headquarters located in Ottawa, Canada;
- Manufacturing facility in Ottawa/Canada, Izmir/Turkey, and Jiaxing/China
- Seven Product Groups: Laser-to-Fiber Delivery Systems, High Power Fiber Optic Components, Polarization Maintaining Products, Attenuators, Opto-Electronic Packaging, Test Equipment, Fiber Optic Sensor Systems
- Sales offices in Canada, USA, Europe, Turkey and China
Three Product Groups:

- Fiber Optic Components: 70%
- Optical Test Equipment: 25%
- Fiber Optic Sensors: 5%

- Over 1,000 products
- Leading Edge R&D
OZ Optics Products

Global Leader in Fiber Optic Products since 1985

Polarization Maintaining
Fiber Optic Components

Patent Numbers, USA 7058275, 7059531, 7295731, China 1072073

- Polarization Maintaining Connectors / Patchcords
- Polarization Maintaining and Polarizing Splitters / Combiners / Fused Couplers / Switches
- All Fiber Manual and Electrically Driven Polarization Controllers / Scramblers
- PM Fiber Directional Taps / Power Monitors
- Manual / Electrically Controlled PM Fiber Pigtailed Variable Attenuators
- Fiber Pigtailed Polarizers
- PLC Splitters
- PM Fiber Pigtailed Circulators

High Power
Fiber Optic Components

Patent Numbers: Canada 2494133, USA 7058275, 7059531, 7295731, China 1072073

- High Power / Temperature Connectors & Patchcords
- High Power Isolators
- High Power Laser to Fiber Couplers / Collimators / Focusers
- High Power Mode Field Adapters
- High Power Optical Taps / Power Monitors
- CO₂ Cleaning for High Power Components
- High Power Splitters / WDM’s
- Shutters / Receptacles / Sleeve Turn Adapters with Sensors

OZ Optics Ltd.
Headquarters, Canada
Tel: +1-416-831-0981
Fax: +1-416-834-5099
sales@ozoptics.com

OZ Optics USA
California Division
Tel: +1-510-779-1248
Fax: +1-510-779-1726
ysaereman@ozoptics.com

OZ Optics China Ltd.
Tel: +86-571-8833-5078
Fax: +86-571-8833-5072
sales@ozoptics.com.cn
OZ Optics Products

Global Leader in Fiber Optic Products since 1985

Fiber Optic Components for Optoelectronic Packaging
Hermetically Sealable Patchcords with Glass or Metal Solder

- Single Channel
- Multi Channel
- Metalized Fibers
- PM/SM/MM Fiber Pigtails
- V-Groove Arrays
- Polarization Measurement System for V-Grooves
- Tapered/Launched Fiber Polished / Laser Stripped
- Glass Solder Pedestals
- Fiber Optic Ferrules

Fiber Optic Test Equipment

- Polarization Extinction Ratio Measurement Systems
- Power Motors with Smart Detector Heads
- Broadband Digital Variable Attenuators
- Optical Fiber Length Motors
- High Power Visual Fault Locators
- Fiber Optic Stable Sources
- Inline Optical Power Monitors/Meters
- Laser Diode Sources Single/Multimode
- Fiber Optic Smart Patchcords
- Fiber Optic Fault Finders
Product Innovation

Fiber Optic Distributed Strain and Temperature Sensors

- BOTDA only, BOTDA only, or both BOTDA and BOTDA modules in one unit
- Simultaneous measurement of strain and temperature
- Uses standard telecommunication fiber to minimize costs

OZ Optics

Global Leader in Fiber Optic Products since 1985

Fiber Optic Fault Finder for Optical Network Safeguard™

- Monitors and reports network health status in real time, 24 hours/day, 365 days/year
- Reduces revenue loss due to fiber plant outages
- Reports fault location, giving GPS coordinates with time stamp
- Lowers network operation and maintenance expenses
- User friendly interface via various wireless interfaces (Wi-Fi, GPRS, 3G, or RS-232)
- Early alert and outage reports via cellular phone, email, IM, SMS, or text messaging
Product Innovation
Company Profile

Over 470 employees worldwide:

- 260 in Ottawa and US
- 50 in Turkey
- 160 in China

OZ China

OZ Canada

OZ Turkey
Company Profile

OZ Optics is lead by an experienced team:

- Ömür Sezerman, Chairman, President & CEO
  - Founder and CEO since inception (32 years)
- Zahide Sezerman, VP of Human Resources
  - With OZ Optics since inception (32 years)
- Garland Best, VP of Components Division
  - 25 years at OZ Optics
- Gordon Youle, VP of Test Equipment Division
  - 18 years at OZ Optics
- Martin Powell, Operation Manager
  - 13 years at OZ Optics
- Sarah Miller, Controller
  - 4 years at OZ Optics
- Metin Sezerman, General Manager of OZ Turkey
  - 16 years at OZ Optics
- Bing Li, General Manager of OZ Optics China
  - 13 years at OZ Optics
Company Profile

- ISO 9001:2015 certified
- Broad patent portfolio
- Advanced proprietary processing technology
Company Profile

- Using our strong direct sales and distributors, we address the following markets:
OZ Optics has resellers and distributors in over 30 Countries & Regions and over 10,000 customers globally:

- Australia
- Austria
- Belgium
- Brazil
- Canada
- China
- Czech Rep.
- Denmark
- France
- Germany
- Greece
- Hong Kong
- India
- Ireland
- Israel
- Italy
- Japan
- Netherlands
- Luxembourg
- Norway
- Poland
- Portugal
- Singapore
- South Korea
- Spain
- Switzerland
- Sweden
- Taiwan
- Thailand
- Turkey
- United Kingdom
- United States
In-House Production Capabilities

- Experienced and well-trained staff in following fields:
  - optical, mechanical, electronics & software

CNC Machine Shop
AR Coating
Femtosecond Laser Lab
Clean Room
Laser Conditioning/Cleaving
Facility – Ottawa Headquarters

- 60,000 sq ft. – Manufacturing and R&D Facilities
- 15,000 sq ft. – Admin, Sales and Marketing
- 15,000 sq ft. – Training and Fitness Facility
- R&D, Product Design, Engineering, Final Assembly & QA
Facility – Ottawa Headquarters

Production Area

Meeting Room

Training Centre Building

Swimming Pool
OZ Optics – Turkey Factory

- Operational since 2000
- 33,000 sq ft. Manufacturing Facility
- Located in Free Trade Zone
- Low Tax Rates
- Sub Component Parts Manufacturing
- Cost Effective Manufacturing
- High Quality Labor
OZ Optics China

- Operational since 2009
- Wholly Foreign Owned Enterprise
- Subcomponent Parts Manufacturing
- Cost Effective Manufacturing
- High Quality Labor
- Extensive Training
  (3-6 months in OZ Canada)
OZ China Facility

Jiaxing, China

• Located in Economic Development Zone
• 500 sq meters – Admin, Sales and Marketing
• 1500 sq meters – Manufacturing Area
  ➢ 100 sq meters – Class 10,000 Clean Room
  ➢ 100 sq meters – ESD Working Area
Manufacturing Strategy

- **OZ Canada**
  - R&D
  - Design
  - Engineering

- **Sub-Components**
  - Made-in China
  - Made-in Turkey

- **World-Wide Sourcing**

- **Customer**
  - OZ CND Qualification
  - Customer Qualification

- **Final Assembly**
  - Quality Assurance

- **Customer Qualification**

- **Customer**
Industry Standards

All products manufactured are in strict accordance with international industry standards:

- Telecordia Compliance
- CE Compliance
- RoHS Compliance
- ISO 9001:2008 Certified (China and Turkey)
- ISO 9001:2015 Certified (Canada)
- Controlled Goods Directorate Registered
Core Competencies

• Pioneer in Polarization Maintaining (PM) Components
• Leader in Wavelength Flattened, High Power & Low PDL Components
• Leader in High Power Fiber Optic Delivery Systems
• Custom Test Equipment, Including Polarization Test Equipment and FTTH Equipment
• Widest Range in Attenuator Product Offering
• Fiber Optic Distributed Strain and Temperature Sensors
• Complete product line for OCT applications & 2 Micron
Leading Technology

- **High Power Isolators**
  - power handling > 50W
  - low loss, low cost
  - turnkey solution

- **Pioneer in Polarization Maintaining (PM) Components**
  - wavelength flattened
  - high power & low PDL
  - PM test equipment

- **Leader in High Power Fiber Optic Delivery Systems**
  - specializes in custom design

- **Fiber Optic Sensor**
  - fast and simultaneous measurement of strain & temp
  - large structure health monitoring
OUR VISION
• Be the preferred Supplier of choice
• Capture and expand market share
• Maximize shareholder value

OUR MISSION
• To become the leading provider of innovative optical products to telecom and non-telecom sectors

OUR CORE VALUES
• Leadership
• Teamwork
• Boldness
• Commitment
• Innovation
• Rewards

OUR QUALITY POLICY
• Provide our Customers with a competitive advantage, leveraging performance, price and delivery, through a continuous process of Quality advancement in all areas of our Company
• Communicate effectively to our Customers, Suppliers and Shareholders our commitment to Quality and continuous improvement
• Promote opportunities of professional development for all members of our Company through education, training and personal challenge

Omür Sezerman
President

Omür Sezerman
President

26
Competitive Advantage

Superior Technology
Innovative Engineering

Exceptional Quality & Service

Competitive Pricing

Extensive Experience
In Fiber Optics Manufacturing

Global Presence

Success
Recent additions to the OZ line of Test and Measurement Equipment Includes:

- Benchtop Fiber length meter
- Benchtop Backreflection Meter for Visible and Near Infrared
- Benchtop ER Meter with touch screen display
- Non-Contact High Power Visible Fiber Optic Fault Finder
- High speed polarization controller and scrambler
- Bandwidth Tunable Variable Filter (manual and motorized version)
- Pocket Power Meters
- Smart patchcords for in-line monitoring
- 330ps Optical Delay Line (manual and motorized version)
- OEM laser diode sources
Many types of interfaces to OZ Optics instruments are offered, including:

- **USB**: standard (for speed and ease of use)
- **RS-232**: standard on Legacy products
- **SPI**: for embedded systems
- **GPIB**: for multi-instrument environments
- **Wireless**: for remote access

Custom interfaces are also available.
Polarization Extinction Ratio Meters

- Measure up to 40dB Extinction Ratio
- 0.3 Degree Angle Resolution
- Up to 2 Watts with removable fix no filters
- Broadband wavelength: 400-2050 nm
- USB or RS-232 interfaces available
Benchtop Polarization Extinction Ratio Meter

- Automatically Positions Fiber for Optimum Power
- Measures Angles to within 1°
- Measures up to 50dB ER and up to 2W
- Color touch screen display
- Removable receptacle
Highly Stable Polarized Sources

- As Good as 40dB Extinction Ratio
- Pigtail & Receptacle Versions
- 375 nm to 2050 nm Wavelengths (no isolator for <600 nm)
Fiber Optic Polarized Sources

- As Good as 40dB Extinction Ratio
- Pigtail & Receptacle Versions
- 635nm to 2050 nm Wavelengths
• Automatically Positions Fiber for Optimum Power
• Measures Angles to within 1°
• Measures up to 40dB ER
Polarization Measurement System for V-Groove PM Fiber Assemblies

- Automatically Positions Fiber for Optimum Power
- Measures Angles to within 1°
- Measures up to 40dB ER
Electrically Driven Polarization Controllers

- Continuous Control of Polarization
- No Insertion Losses or Return Losses
- > 100 Hz Response Speed
- Low activation loss
High-Speed Polarization Controller-Scrambler Optical Module

- Continuous Control of Polarization
- No Insertion Losses or Return Losses
- Response speed up to 30 kHz
- Inline and Low activation loss
- Compact and PCB mountable
Polarization Dependent Loss Emulator

• 0.05dB To 10dB Polarization Dependent Loss
• Fixed Or Manually Variable PDL
• Broad Wavelength Range, Compact, And Low Cost
• PMD Free optional ( <0.1 ps)
• Very low wavelength dependence
Highly Stable Laser Diode Source

• Stable to ±0.001dB @ 1550 nm with FC/APC
• 375nm to 2050 nm Wavelengths (no Isolator for <600 nm)
• Built in TE Cooler and Isolator
Light Sources

• Stable to ±0.01dB, LED, LD Source @ 1550 nm with FC/APC

• 635nm to 2050nm Wavelengths

• TE Cooled Versions Available with OZ-X000 and HIFOSS styles
Laser Diode/LED Source

- 1, 2, or 3 wavelengths in one unit
- Selectable power levels
- Continuous or modulated output
- MM, SM, or PM versions available
- Long battery life (more than 40 hours)
Laser Diode/LED Source

- Insertion loss measurement
- Fiber identification using internal modulation
- Splicing and connection testing
- FTTX/PON
- Quality assurance
Ultra Stable OEM Laser Diode Source

- Output powers to > 100 mW
- Power stability to better than 0.025 dB * depending on the wavelength
- Wavelength stability to < 0.1 nm
- Wavelengths from 375 to 2100 nm available
- External modulation to 50 MHz available
Ultra Stable OEM Laser Diode Source

- Multimode, Singlemode, or PM fiber versions
- Free Space, Pigtail or receptacle styles
- Guaranteed lifetime 18 months or 5000 hours
- Power control via external analog voltage
- Custom versions available
Ultra Stable OEM Laser Diode Source

- Multimode, Singlemode, or PM fiber versions
- Free Space, Pigtail or receptacle styles
- Guaranteed lifetime 18 months or 5000 hours
- Power control via external analog voltage
- Custom versions available
Ultra Stable OEM Laser Diode Source

- Insertion loss or attenuation measurement
- High power or remote fiber delivery system
- Materials evaluation and testing
- Life science illumination
- Laser scanning microscopy
- Red/Green/Blue illumination systems
Ultra Stable Narrow Linewidth Source

- 1550nm narrow and single longitudinal
  Single mode, or PM fiber versions
- Selectable peak wavelength on C-band:ITU-T, DWDM
- Pigtailed or receptacle styles
- Low RIN and High SMSR
- Wavelength tunable and power modulation options are available
Benchtop Fiber Length Meter

- Measures lengths from a few mm up to 500 m
- No dead zone. Can measure fibers less than 1 cm long
- Better than 2 mm resolution and <0.1 % measurement error
- Works with singlemode, multimode, polarization maintaining and specialty fibers
- Color touch screen display
Backreflection Meter

- Sensitive to – 70dB
- 1300/1550nm Dual Wavelength Source
- Also Measures Insertion Losses
- RS-232 or USB Interfaces available
Benchtop Backreflection Meter for Visible & Near Infrared Wavelengths

- Sensitive to – 70dB
- Wide wavelength offering for special applications: 635-1625nm
- Built in Broadband SLED for improved stability
- Optional Insertion Loss measurement capability
- Color touch screen and USB Interface available
Digital Variable Reflectors

- Test Sensitivity to Backreflection
- -1.5dB to -60dB Backreflection
- RS-232 or USB Interfaces available
Digital Variable Attenuators

- 0.01dB Resolution, Fast Response Time
- 0.6dB to 60dB Attenuation Range
- Low PDL and High Power Capability
- RS-232 or USB Interface
- Wavelength Flatness in L, C, S Band
Digital Tunable Filters

- < 1.2nm Line Width, 0.1nm Resolution
- 50nm Tuning Range, Fast Response Time
- RS-232 or USB Interfaces available
Manually Adjustable Polarization Insensitive Variable Bandwidth Tunable Filters Module

- 45 nm tuning range with 1 to 18 nm continuously adjustable bandwidth
- Independently tunable both wavelength and bandwidth (Flat-top), polarization insensitive
- High out-of-band suppression
- SM, PM and Multimode version

![Variable Bandwidth Tunable Filter @ 1550 nm](image-url)
Motor Driven Adjustable Polarization Insensitive Variable Bandwidth Tunable Filters Module

- 45 nm tuning range with 1 to 18 nm continuously adjustable bandwidth
- Independently tunable both wavelength and bandwidth (Flat-top), polarization insensitive
- Built-in microcontroller with RS-232, IIC, or SPI interface
- High out-of-band suppression
- SM and PM version
Polarization Maintaining Fiber Switch

- > 20 dB Polarization ER
- Latching and Non-Latching versions
- < 0.6 dB loss
- Now offering MEMS based 1 x N optical Switches (Non-Latching)
Differential Polarization Delay Lines

- Varies the Delay Between Two Polarizations
- ±50psec Delay, 0.1psec Resolution
- < 1.2dB Losses over the Delay Range
Variable Optical Delay Lines

- Motor Driven Version is Available
- Over 330ps Delay Range, < 1dB IL
- As Fine as 0.003ps Resolution
Variable Optical Delay Lines

- Motor Driven Version is Available
- Over 330ps Delay Range, < 1dB IL
- As Fine as 0.003ps Resolution
Variable Optical Delay Lines

- Motor Driven Version is Available
- Over 330ps Delay Range, < 1dB IL
- As Fine as 0.003ps Resolution
Variable Optical Delay Lines

- Motor Driven Version is Available
- Over 330ps Delay Range, < 1dB IL
- As Fine as 0.003ps Resolution
Variable Optical Delay Lines

- Motor Driven Version is Available
- Over 330ps Delay Range, < 1dB IL
- As Fine as 0.003ps Resolution
Variable Optical Delay Lines

- Motor Driven Version is Available
- Over 330ps Delay Range, < 1dB IL
- As Fine as 0.003ps Resolution
Variable Optical Delay Lines

- Motor Driven Version is Available
- Over 330ps Delay Range, $< 1$dB IL
- As Fine as 0.003ps Resolution
Variable Optical Delay Lines

- Motor Driven Version is Available
- Over 330ps Delay Range, < 1dB IL
- As Fine as 0.003ps Resolution
Variable Optical Delay Lines

- Motor Driven Version is Available
- Over 330ps Delay Range, < 1dB IL
- As Fine as 0.003ps Resolution
Polarization Rotators / Analyzers

- Motor Driven Version is Available, 1dB IL
- Fiber to Fiber & Fiber to Photodiode Versions
- -40, -50, -60dB Backreflection Levels
Polarization Rotators / Analyzers

- Motor Driven Version is Available, 1dB IL
- Fiber to Fiber & Fiber to Photodiode Versions
- -40, -50, -60dB Backreflection Levels
Polarization Rotators / Analyzers

- Motor Driven Version is Available, 1dB IL
- Fiber to Fiber & Fiber to Photodiode Versions
- -40, -50, -60dB Backreflection Levels
Polarization Rotators / Analyzers

- Motor Driven Version is Available, 1dB IL
- Fiber to Fiber & Fiber to Photodiode Versions
- -40, -50, -60dB Backreflection Levels
Polarization Rotators / Analyzers

- Motor Driven Version is Available, 1dB IL
- Fiber to Fiber & Fiber to Photodiode Versions
- -40, -50, -60dB Backreflection Levels
Motor Driven Version is Available, 1dB IL

Fiber to Fiber & Fiber to Photodiode Versions

-40, -50, -60dB Backreflection Levels
Non Contact High Power Visible Fiber Optic Fault Finder

- High Visibility
- Higher Output up to 30mw
- Available with 520nm (green) or 635nm (red)
- Non-contact fiber and suitable with bare fiber adapter
Pen & Pocket Size Fault Locators

- Detect Breaks in Fiber Optic Cables
- Use as an End-To-End Fiber Identifier, 635nm
- Up to 30mW (Bench-top version)
- Up to 40 hours of battery operation
Pen & Pocket Size Fault Locators

- Detect Breaks in Fiber Optic Cables
- Use as an End-To-End Fiber Identifier, 635nm
- 0.5 mW for pen-sized version
Pen & Pocket Size Fault Locators

- Detect Breaks in Fiber Optic Cables
- Use as an End-To-End Fiber Identifier, 635nm
- Up to 30mW, Inexpensive
Power Meter with Smart Detector Heads

- 85dB Dynamic Range, Fast Response Time
- 400 - 2050nm Wavelengths (not calibrated for > 1700nm), Built-in Attenuator
- Dual Detector Head Capability
- RS-232 or USB Interfaces available
Power Meter with Smart Detector Heads

- 85dB Dynamic Range, Fast Response Time
- 400 - 2050nm Wavelengths (not calibrated for > 1700nm), Built-in Attenuator
- Dual Detector Head Capability, USB or RS232 Port
Power Meter with Smart Detector Heads

- 85dB Dynamic Range, Fast Response Time
- 400 - 2050nm Wavelengths (not calibrated for > 1700nm), Built-in Attenuator
- Dual Detector Head Capability, USB or RS232 Port
Power Meter with Smart Detector Heads

- 85dB Dynamic Range, Fast Response Time
- 400 - 2050nm Wavelengths (not calibrated for > 1700nm), Built-in Attenuator
- Dual Detector Head Capability, USB or RS232 Port
Smart Detector Head Accessories

- Integrating spheres for high power measurements
- Optical filters
- Attenuators
- Lenses
- Custom designs
Calibrated Power Meter
Wide Wavelength Range, up to 2 Watts Power
SM and PM Fiber Versions
Pocket Optical Power Meter

- Slim and compact
- Wide wavelength range
- Interchangeable optical connectors available
- Long battery lifetime
- Rechargeable battery or AC adaptor
- USB and Bluetooth interfaces
- OEM version with no display for embedded system
Mini Power Meter

- Calibrated Power Meter
- Measures up to 10 mW
- Small size
- Low Cost
- Good for FTTX applications
Handheld Optical Power Meter

- Wide dynamic range
- Wide wavelength range
- Long battery life
- Interchangeable optical connectors
- RS-232, GPIB, and USB Interfaces available
Handheld Optical Power Meter

- Fiber optic assembly and testing
- Quality control
- Network installation
- Component and system troubleshooting
- Education
Smart Patchcord

• Low cost
• Miniature size
• Continuous fiber – no interruptions to optical path
• RS-232, USB, or wireless communications
• High power handling
Smart Patchcord

- Low insertion loss and return loss
- Specialty fiber and PM versions available
- High extinction ratios for PM versions
- Versions available for any wavelength
Smart Patchcord

- Monitoring in FTTX networks
- Channel balancing in WDM systems
- Dynamic amplifier gain monitoring
- Polarization stabilization
- PMD compensation
- Real-time in-line test and measurement
Smart Patchcord

• Monitoring in FTTX networks
Wireless Fiber™ (Smart Patchcord)

- Monitoring in FTTH networks
OZ- Guard™ Fiber Optic Fault Finder

- Provide continuous real-time fiber optic health monitoring for your network.
- Automatic determination of faults
- Transforms data into actionable information
- Sends time and location stamped alerts via email, SMS and IM
- Escalates alarms until problem solved
Polarization Dependant Loss Test Sets

- Broadband & Wavelength Sweep Capability
- Insensitive to Input Power Drift
- Fast Measurements
- 0.001dB Resolution
Polarization Dependant Loss Test Sets

- Broadband & Wavelength Sweep Capability
- Insensitive to Input Power Drift
- Fast Measurements
- 0.001dB Resolution
Environmental Test Set

- Long Duration Testing for Reliability Studies
- Multiple Wavelength Configurations
- Insertion Loss
- Optional ORL or PDL Measurements
OZ Optics welcomes the opportunity to provide custom designs. Our optical and electronics expertise can solve tough test and measurement problems.

Custom software for specialized monitoring and control applications can also be provided.
Your solution provider for existing and next generation fiber optic components and test equipment

Please Contact Our Sales Dept:
Tel: 613-831-0981 ext 3370
Toll Free: 1-800-361-5415
Email: sales@ozoptics.com.
Thank You for Choosing OZ!