Fiber Optic Products for Gyroscope Applications

# **OZ Optics Limited**

September 2024



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- **OZ Optics China**



# **Company Background**



- Founded in 1985
- **Corporate Headquarter Located in Ottawa, Canada**
- Manufacturing Facility in Ottawa / Canada, Izmir / Türkiye and Jiaxing / China

#### **Ten Product Groups:**

- Laser-to-Fiber Delivery Systems
- High Power Fiber Optic Components
- Polarization Maintaining Products
- Attenuators
- Opto-Electronic Packaging
- Fiber Optic Test Equipment
- Fiber Optic Sensor Systems
- Fiber Optics Components for Gyroscope
- OCT
- BioPhotonics
- Quantum



## Ottawa, Canada



## Izmir, Türkiye



## Jiaxing, China



# **Corporate Statements and Quality Policy**





#### **Our Vision**

Capture and expand market share
 Be the preferred supplier of choice
 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
- ✓ Commitments
- ✓ 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, continuous improvement and to abide by any applicable requirements.

Promote opportunities of professional development for all members of our company through education, training and personal challenge.

## **Over 467 employees worldwide**

## **OZ** Canada

OZ China



OZ Türkiye







243+ Employees

87+ Employees 137+ Employees







**Advanced Proprietary Processing Technology** 



Canada Certificate: FM 63463

China Certificate: FM 577647

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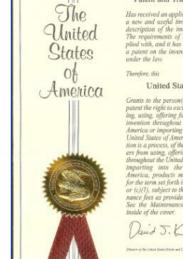
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Certificate of Registration

## ISO9001:2015 Certified



Turkey Certificate: FM 601414



#### The Director of the United States Patent and Trademark Office

Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted

#### United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America, and if the invention is a process, of the right to exclude ob-ers from using, offering for sale or selling throughout the United States of America, or importing into the United States of America, products made by that process, for the term set forth in 35 U.S.C. 154(a)(2) or (c)(1), subject to the payment of maintenance fees as provided by 35 U.S.C. 41(h). See the Maintenance Fee Notice on the



## **Broad Patent Portfolio**

## **OZ Optics is Lead by an Experienced Team:**

- Ömür Sezerman, Chairman, President & CEO Founder and CEO since inception (40 years) Zahide Sezerman, VP of Human Resources With OZ Optics since inception (40 years) **Garland Best, VP of Components Division** 33 years at OZ Optics **Gordon Youle, VP of Test Equipment Division** 26 years at OZ Optics **Saeed Pilevar, Senior VP of Business Development** 3 months at OZ Optics
- Onur Koca, General Manager of OZ Türkiye
  - 3 year at OZ Optics
- Bing Li, General Manager of OZ Optics China
   21 years at OZ Optics







**Experienced and Well-Trained Staff in Following Fields: Optical, Mechanical, Electronics & Software** 

## **CNC Machine Shop**



## Clean Room



## Femto-Second Laser Lab



## Laser Conditioning / Cleaving



## AR Coating



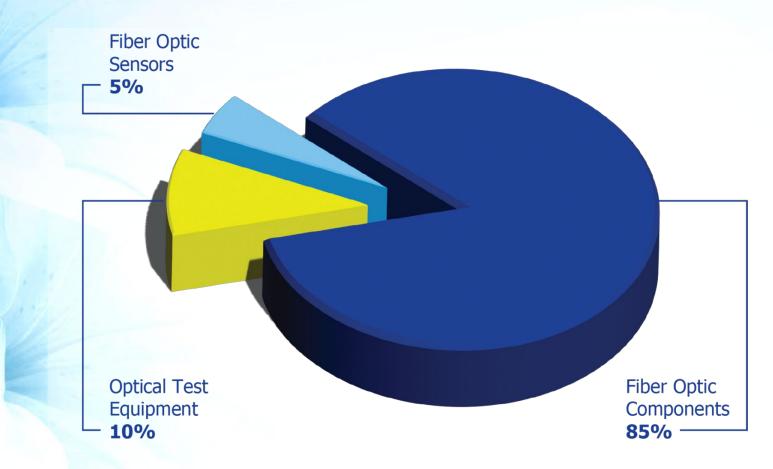
## **Core Competencies**



- Pioneer in Polarization Maintaining (PM) Components & Custom Test Equipment, Including Polarization Test Equipment and FTTH Equipment
- Leader in Wavelength Flattened, High Power & Low PDL Components
- Leader in High Power Fiber Optic Delivery Systems
- Widest Range in Attenuator Product Offering
- Fiber Optic Distributed Strain and Temperature Sensors
- Complete product line for OCT, Gyroscope & BioPhotonics applications & 2 Micron
- Now available: Spectrometers and Quantum Light Sources



Three Product Groups > Over 1,000 Products > Leading Edge R&D



## Leading Technology Featured Products

## OL OPTICS UMITED

World's Largest Online Fiber Optic Catalog Most Products are in Stock



Polarization Maintaining Fiber Optic Components Patent Numbers: USA 7058275 7095931, 7295731, China 1672073





Fiber Optic Components Patent Numbers: Canada 2494133, USA 7058275, 7095931, 7295731, China 1672073 High Power, High Temperature Connectors and Patchcords OZPEN™ GO₂ Fiber Optics Cleaning Unit for High Power Components High Power Laser to Fiber **High Power Mode Field Adapters** Couplers, Collimators and Focusers High Power Optical Taps and **High Power Isolators Power Monitors High Power Splitters and** Shutters, Receptacies and Sieeve Thru Adapters with Sensors Wavelength Division Multiplexers (WDMs)

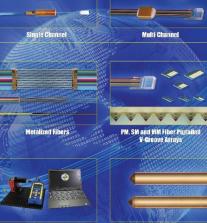
High Power

## Leading Technology Featured Products



**Fiber Optic Attenuators** Polarization Maintaining, Single Mode and Multi-Mode Fibers Variable Attenuators Electrically Controlled **Digital Variable MEMS Variable** Attenuators PM, SM and MM Fibers Single and Multi Channel Miniature **Reflective Style** Pigtailed Inline Variable Attenuators Variable Attenuators Variable Attenuators -Attenuating Filter Air Gap Plug Type Patchcords Variable Attenuators **Fixed Attenuators** 

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



Polarization Measurement Tapered, Lensed Fiber, System for V-Grooves Polished and Laser Shaped





#### Fiber Optic Components for 2 Micron Wavelengths



## **Featured Products**



**Fiber Optic Products** for Gyroscopes



Isolators

**Quantum Entangled Photons Sources** 1 1 4 - 11.1 🥗 🛄 🤅 🔊 🗞 🚺

Hyper-Entangled Photon Source Broadband Telecom Polarization-Entangled Photon Source Broadband Telecom



Bright Polarization-Entangled Photon Source Broadband Telecon Bright Polarization-Entangled Photon Source Narrowband Telecom



**Correlated Photon Pair Sources** Polarization-Entangled Photon Source Narrowband at 810 nm

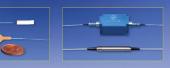


Polarization Entanglement Tomography Analyzer





SM and PM Fiber **Pintailed Circulators** 





## **Featured Products**

**High-Resolution** 

High and Low Power

Patchcords

Pigtail, Receptacle Style Collimators and Focusers

Wavelength Division Multiplexers

and Beam Splitters

**Fiber Optic Products for Biophotonics Applications** 



Universal Optical DNA Rapid Detection Systems for Pathogens





Fiber to Photodiode Couplers with Removable Filters



High Power Laser to Fiber Couplers





Fiber Optic U-Bracket



Assemblies



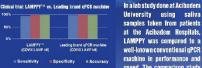
Turnkey, Ultra Stable Laser Modules

**Universal Optical DNA Rapid Detection System** For Pathogens Including: COVID-19, SARS, EBOLA, CHOLERA, SALMONELLA, ETC.



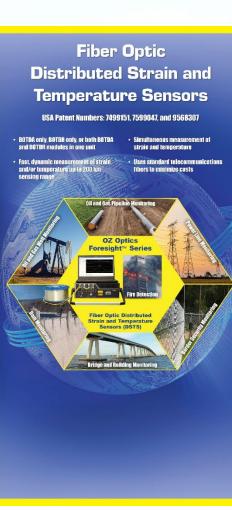
Features Use to detect viral, fungal, and bacterial DNA/RNA Rapid DNA/RNA detection (as little as 20 minutes) Highly sensitive and specific detection of low viral levels Intuitive software displays real time data during testing Melt analysis available with the included software Lid heater prevents evaporation and condensation Compact modular design allows for easy cleaning and maintenance Pair with an external battery for a portable and field-deployable system Test up to 8 samples simultaneously (higher throughput systems with up to 96 samples available upon request)

 Wireless communication with dual-band Wi-Fi and Bluetooth connectivity • A fraction of the cost of gPCR based systems OZ Optics also offers private labelling for volume OEM applications



LAMPPY was compared to a well-known conventional gPCR machine in performance and speed. The comparison study

was carried out with a sample size of 262 using the COVIX LAMP-based kill on both Instruments and then verified with the KrosQuanT SARS-COV-2 (2019 nCOV) Real Time PCR Diagnostic Kit on a leading brand conventional qPCR machine



Fiber Optic Sensors for

## **Pipeline Monitoring**

USA Patent Numbers: 7499151, 7599047, and 9568307

 Pipeline leakage detection BOTDA only, BOTDR only, or both BOTDA and BOTDR modules in one unit Fast, dynamic measurement of strain and/or temperature up to 200 km sensing range

 Sensitive detection of corrosion / erosion, cracks and buckling Simultaneous measurement of strain and temperature

Uses standard telecommunication fiber to minimize costs



**Corrosion and Erosion Monitorin** 



**Fire Detection** 



## **Featured Products**

#### Fiber Optic Sensors for **Fire Detection**

#### USA Patent Numbers: 7499151, 7599047, and 9568307

BOTDA only, BOTDB only, or both BOTDA
 Simultaneous measurement of
 and BOTDR modules in one unit
 strain and temperature

 Fast, dynamic measurement of strain and/or temperature up to 200 km Uses standard telecommunications liber to minimize costs







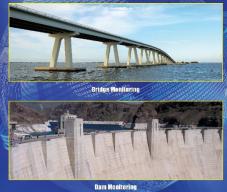
Fiber Optic Sensors for Bridges, **Dams and Buildings** 

#### USA Patent Numbers: 7499151, 7599047, and 9568307

BOTDA only, BOTDR only, or both BOTDA Simultaneous measurement of and BOTDR modules in one unit strain and temperature

sensing ran

 Fast, dynamic measurement of strain and/or temperature up to 200 km Uses standard telecommunications fibers to minimize costs





**Fiber Optic Sensors for** Power Line and Smart Power **Generator Monitoring** 

#### USA Patent Numbers: 7499151, 7599047, and 9568307

BOTDA only, BOTDR only, or both BOTDA Simultaneous measurement of and BOTDR modules in one unit strain and temperature Fast, dynamic measurement of strain and/or temperature up to 200 km

sensing ra

 Uses standard telecommunication fiber to minimize costs



lerground Power Line Monitoring **Power Line Monitoring** 



**Optical Ground Wire (OPGW)** 



**Gas Generator Monitorin** 



USA Patent Numbers: 7499151, 7599047, and 9568307

BOTDA only, BOTDR only, or both BOTDA and BOTDR modules in one unit

 Simultaneous measurement of strain and temperature

Fast, dynamic measurement of strain and/or temperature up to 200 km sensing rang

Uses standard telecommunication fiber to minimize costs



Border Security Monitoring



Highway Health Monitoring



# **Industry Standards**

All Products Manufactured are in Strict Accordance with International Industry Standards:

- ISO 9001:2015 Certified (Canada, China and Türkiye)
- **REACH Compliance**
- RoHS Compliance
- CE Compliance
- Telecordia Compliance
- Controlled Goods Directorate Registered
- Critical Supplier for F35 and F18 Project
- TSCA (Toxic Substance Control Act) Compliance
- CHEMSHERPA Compliance
- IEC 61010 Compliance

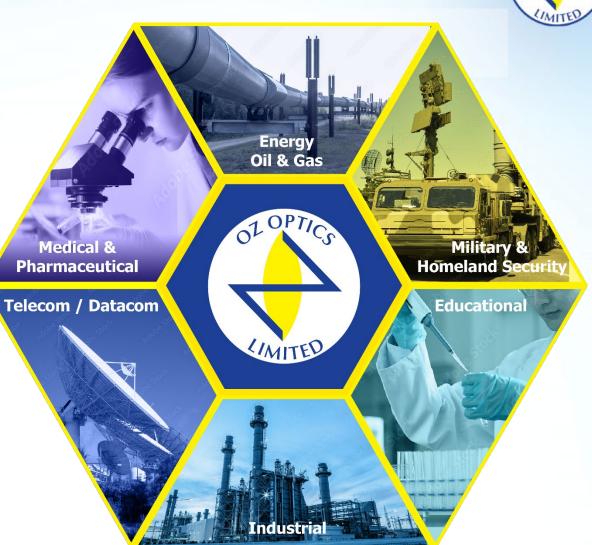


## Marketing Strategy Application Market



Using our strong direct sales and distributors, we address the following markets:

- Energy Oil and Gas
- Military and Homeland Security
- Educational
- Industrial
- Telecom / Datacom
- Medical & Pharmaceutical



## Marketing Strategy Application Market

By leveraging the technology and expertise gained since its inception, OZ Optics has attracted a broad range of customers in the telecom / datacom, medical, military, security, industrial, construction, aerospace, power utilities, petrochemical and educational sectors.

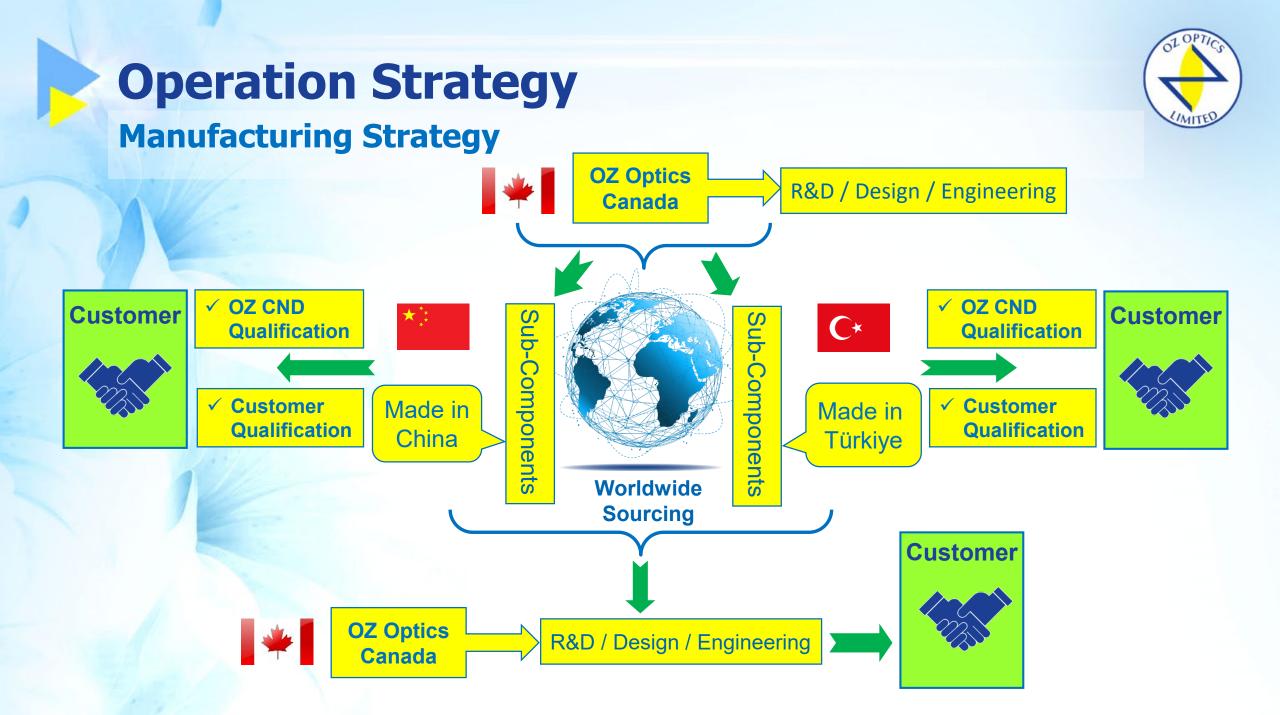


## **Marketing Strategy** Global Sales Network



OZ Optics has resellers and distributors in over 30 Countries and Regions with over 10,000 customers worldwide:





# **Marketing & Operation Strategy** Exceptional **Success** Ô uring

Globa Presence

**Superior Technology Innovative Engineering** 

**Competitive Advantage** 

- **Competitive Pricing**
- **Global Presence**
- **Extensive Experience In Fiber Optics Manufacturing**
- **Exceptional Quality and Service**





**OZ OPTICS CANADA** (Headquarters)



**OZ OPTICS TÜRKIYE** (Türkiye Factory)



**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 Facilities







## **Facility - Ottawa Headquarters**



**Production Area** 











OL OPTICS

## Facility - Türkiye Factory (Izmir, Türkiye)

- **Operational Since 2000**
- **33,000 sq ft. Manufacturing Facility**
- Located in Free Trade Zone
- Low Tax Rates
- Sub Component Parts Manufacturing
- High Quality Labor
- AR Coating Machine & Clean Room onsite



Facility - China Factory (Jiaxing, China)

- **Operational Since June 2010**
- Wholly Foreign Owned Enterprise
- Cost Effective Manufacturing
- High Quality Labor
- Supply Chain Integration









## **Branch Network** Facility - China Factory (Jiaxing, China)

- Located in Economic Development Zone
- 4000+ sq meters Total Area
- 500 sq meters Administration, Sales and Marketing
- 3500 sq meters Manufacturing Area
- √ 500 sq meter Class 10,000 Clean Room
- √ 300 sq meter ESD Working Area





# **OZ Optics China**

## **Zhejiang OZ Optics Technologies Co., Ltd**

- **Operational since June 2010**
- Wholly Foreign Owned Enterprise
- NPI & Production Line Setup
- On-site Training by OZ CND
- Began Mass Production in September 2010
- Completed Main Facility Expansion in 2019













# **Fiber Optic Coils for Gyroscopes**

**DTS0194: Fiber Optic Coils for Gyroscopes** 

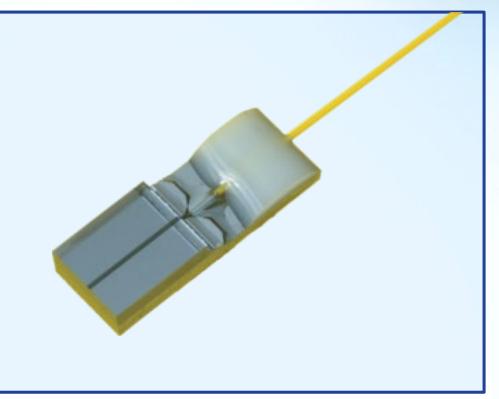
- High Performance for Tactical Grade, Navigation Grade and Strategic Grade Fiber Optic Gyroscopes (FOGS)
- Fully Customized Design And Manufacturing Capability
- High Symmetry High Stability and Reliability
- Low Polarization Crosstalk (PM Only)
- Low Temperature Sensitivity / Low Shupe Error
- Low Vibration Sensitivity
- Design, Testing and Integration Service Available

# **Fiber Pigtailed V-Groove Arrays**

## **DTS0083: V-Groove Assemblies**

- Up to 96 Fibers in a Single Array
- 127, 250, 500 Micron & Custom Spacings
- SMF, MMF & PMF



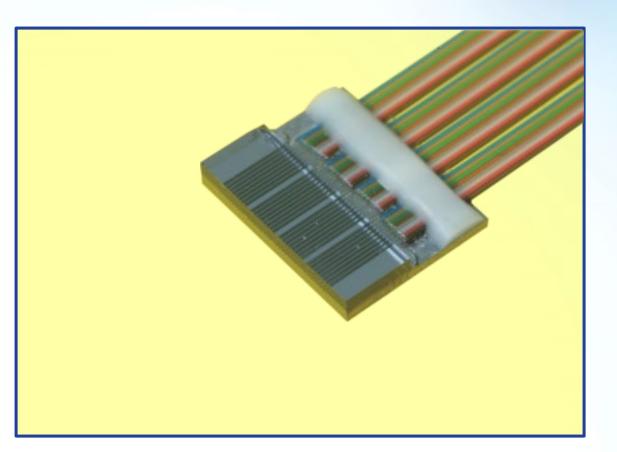




# **Fiber Pigtailed V-Groove Arrays**

**DTS0083: V-Groove Assemblies** 

- Up to 96 Fibers in a Single Array
- 127, 250, 400, 500 Micron & Custom Spacings
- SMF, MMF & PMF

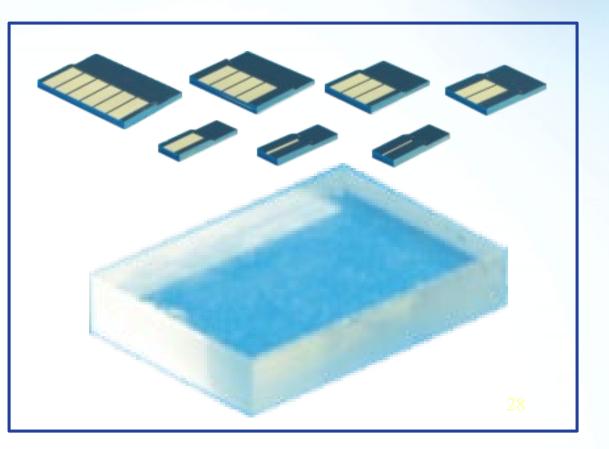




# **V-Groove Substrates**



- **DTS0077: V-Groove Chips** 
  - Up to 96 Fiber Substrates
  - Better than 0.5 Micron Accuracy
  - Use with Either UV or Thermal Epoxies



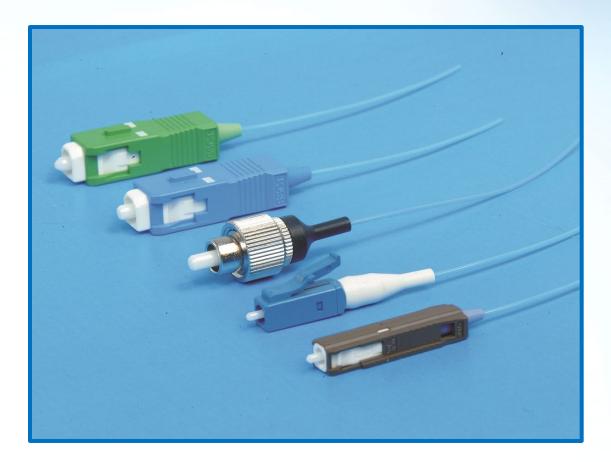




# **Polarization Maintaining Patchcords**

**DTS0071:** Polarization Maintaining Fiber Patchcords and Connectors

- Up to 30 dB Polarization Extinction Ratios
- < 0.3 dB Insertion Loss, up to 60 dB Backreflection
- FC/SPC, FC/UPC, FC/APC, SC, ST, LC, MU, E2000, DMI and Custom Connectors



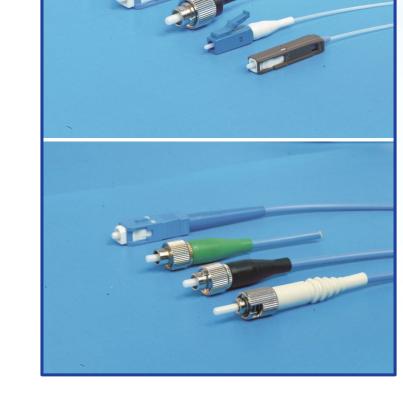


# Singlemode or Multimode Fiber Optic Patchcords



**DTS0130: Singlemode or Multimode Fiber Optic Patchcords** 

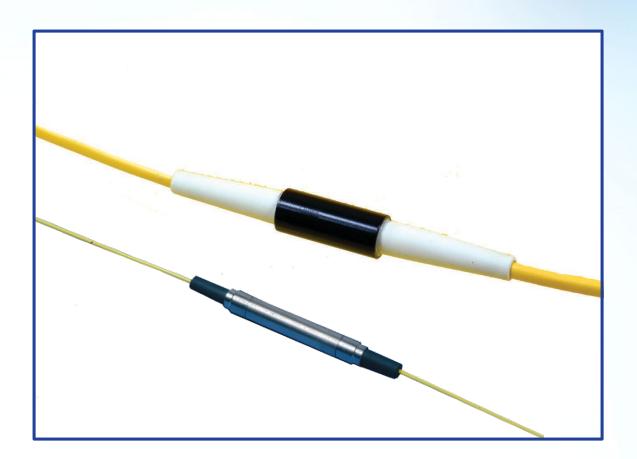
- Low Insertion Loss < 0.2 dB
- **Excellent Repeatability**
- FC/PC, SC, ST, LC, MU, E2000 Termination Available
- Custom Ferrule Termination Available
- Designed to Meet Telcordia Specification
- Large Selection of Cabling
- Operating Wavelengths from 200 to 2000 nm
- Two Micron to 1500 Micron Diameter Core Sizes Available



# **Fiber Pigtailed Isolators**

**DTS0016: Isolators – Fiber Optic** 

- ≤ 0.8 dB IL, as
  Good as 60 dB Isolation
- -40 dB, -50 dB, -60 dB Back Reflection SMF & PMF
- 532 to 2050 nm Wavelengths





# **Fiber Optics Polarizers**

**DTS0018: Polarizers - Fiber Optic** 

- Up to 30 dB Extinction Ratios
- **Based on Free Space Optics**
- 0.6 dB Insertion Loss, Low Cost, Compact
- -40, -40 to -60 dB, -60 dB Backreflection Levels
- 400 2050 nm Wavelengths









#### Miniature Inline Polarization Maintaining Splitters/Taps/Combiners DTS0091: Miniature Inline Polarization Maintaining Splitters/Taps/Combiners



- Splits Polarized Light Into 2 PM or SM Fibers
- 0.6 dB IL, -40, -40 to -60 dB, -60 dB Backreflection
- 1x2 style Version Standard version
- 600 2050 nm Versions



# **Polarization Maintaining Fused Couplers**



**DTS0092:** Polarization Maintaining Fused Fiber Couplers/Splitters

- **Splits Polarized Light Into 2 PM Fibers**
- 50/50 to 99/1 Split Ratios
- 0.6 dB IL, -40, -40 to -60 dB, -60 dB Backreflection
- 1x2 & 2x2 Versions Available
- 800 2050 nm Versions

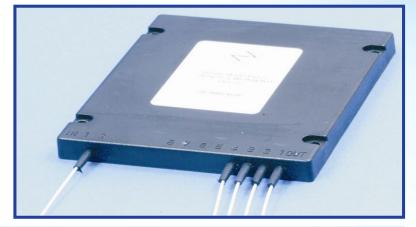


### **Fused Fiber Optic Couplers**

#### **DTS0033: Fused Couplers – Fiber Optic**

- 1x2, 2x2 & 1xN Couplers Available 0.5 dB Typical Excess Losses, SMF, PMF & MMF
- 488 to 2050 nm Wavelengths







# **Wavelength Division Multiplexers**

#### **DTS0089: Wavelength Division Multiplexers**

- < 1.0 dB Insertion losses, 65 dB Isolation
- **Up to 2 Watt Power Handling**
- 0.6 dB IL, -40, -40 to -60 dB, -60 dB Backreflection
- **Combines Red/Green/Blue Visible Wavelengths**
- Two, Three, and Four Wavelength Versions
- MM, SM and PM Fiber Versions







### **Bare Fiber Adaptors**

**DTS0003: Bare Fiber Adaptors** 

BARE-03-82-M

- **Used to Hold Bare Fibers**
- FC, SC, ST, SMA Connectors Available with Spring Loaded and Magnetic Clips Versions
- Reusable, Inexpensive









- Measure up to 40 dB 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**

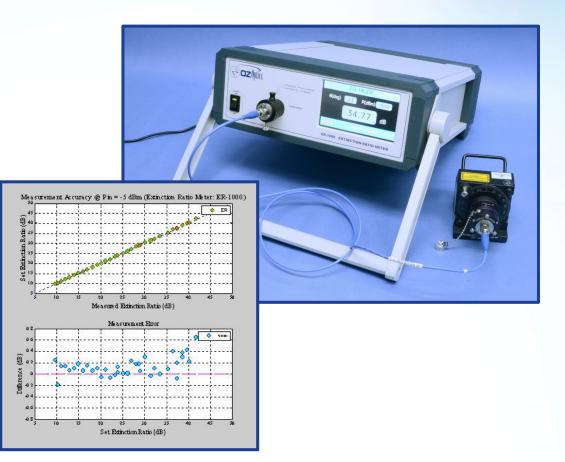




### **Benchtop Polarization Extinction Ratio Meter** DTS0142: Benchtop Polarization Extinction Ratio Meter

Automatically Positions Fiber for Optimum Power

- Measures Angles to Within 1°
- Measures up to 50 dB ER and up to 2 W
- Color Touch Screen
- Removable Receptacle



### **Highly Stable Polarized Sources** DTS0041: Highly Stable Polarized Source



- As Good as 40 dB Extinction Ratio
- **Pigtail & Receptacle Versions**
- 375 to 2050 nm Wavelengths



# Fiber Optic Polarized Sources

#### **DTS0073: Polarized Fiber Optic Source**

- As Good as 40 dB Extinction Ratio
- **Pigtail & Receptacle Versions**
- 635 to 2050 nm Wavelengths





### **Polarization Measurement System for V-Groove PM Fiber Assemblies**

**DTS0068:** Polarization Measurement System for V-Groove PM Fiber Assemblies

- **Manual Tuning**
- Semi Automatically Positions Fiber for Optimum Power
- Measures Angles to within 1°
- Measures up to 40 dB ER







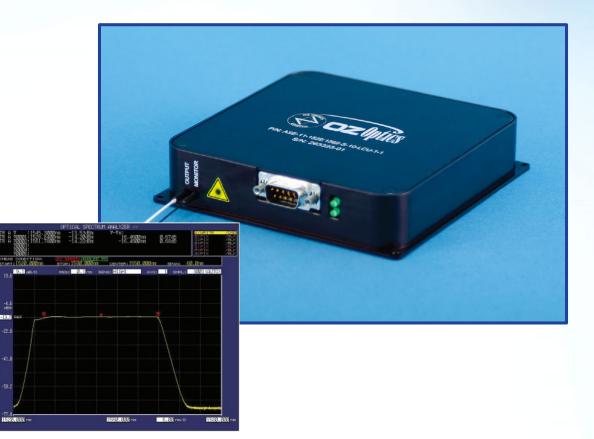
**60068 – Polarization Measurement System for V-Groove PM Fiber Assemblies** 



# **ASE Flat Spectrum C-Band Module - OEM**

#### **DTS0083: ASE Flat Spectrum C-Band Module - OEM**

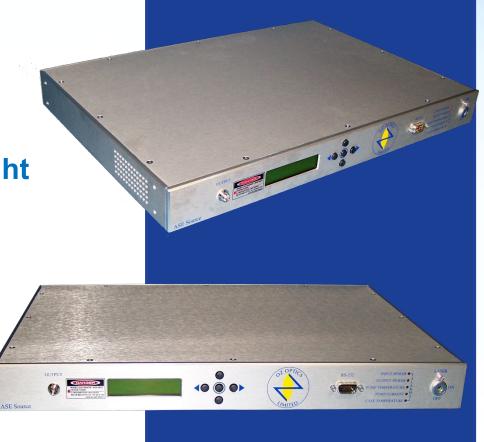
- High output power up to 13 dBm on C-band
- Flat Spectral Bandwidth Ripple < +/-0.5 dB
- High Stability
- PUMP TEC and Current Driver Included
- Optional Built-in Attenuator
- High Performance to Cost Ratio



### ASE Broadband Light Source DTS0106: ASE Broadband Light Source

- High Output Power from 13 to 27 dBm
- Wide Spectral Bandwidth: C-Band, L-Band or Both
- High Stability and Unpolarized Output Light
- USB and RS-232 Interface
- Optional Built-in Attenuator and Optical Power Monitor
- High Performance to Cost Ratio







### **Power Meter with Smart Detector Heads**

**DTS0057: Optical Power Meter with Smart Detector Head** 

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





# **Power Meter with Smart Detector Heads**

**DTS0057: Optical Power Meter with Smart Detector Head** 

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



# **Power Meter with Smart Detector Heads**



**DTS0057: Optical Power Meter with Smart Detector Head** 

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





# **Handheld Optical Power Meter**

#### **DTS0103: Handheld Optical Power Meter**

- Wide Dynamic Range
- Wide Wavelength Range
- Long Battery Life
- Interchangeable Optical Connectors
- RS-232 and USB Interfaces Available



### **Pocket Optical Power Meter**

#### **DTS0150: Pocket Optical Power Meter**

- Slim and Compact
- Wide Wavelength Range
- Interchangeable Optical Connectors Available
- Long Battery Lifetime
- Rechargeable Battery or AC Adaptor
- USB, RS-232 and Other Interfaces Offered Upon Demand
- OEM Version with No Display for Embedded System



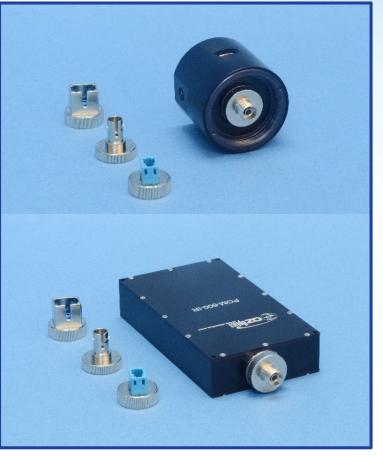


### Low Cost Smart Detector Head/Optical Power Monitor



**DTS0155: Low Cost Smart Detector Head/Optical Power Monitor** 

- Low Cost
- Slim and Compact
- Built-in InGaAs Detector for IR Range or Si Detector for Visible
- Interchangeable Optical Connectors Available
- Calibrated and Uncalibrated Versions Available
- Customer May Perform Their Own Calibration
- USB and RS-232 Interfaces



# Thank You for Choosing OZ Optics

Please Contact Our Sales Department: Tel: 613-831-0981 ext. 3370 Toll Free: 1-800-361-5415 Email: sales@ozoptics.com

