Fiber Optic Solutions for High-Speed Broadband CATV, FTTx, Wireless, Satellite & Multimedia Networks

EMCORE is a leading supplier of components, subsystems and systems for the broadband fiber optics market. Our long history of innovation and leadership in RF over fiber technology for HFC networks has enabled cable MSOs to enhance bandwidth to meet growing demand for high-speed Internet, HDTV, video-on-demand, interactive video and other advanced services. EMCORE is also a pioneer of innovative RF and microwave solutions for satellite signal transport and a provider of HD multimedia connectivity systems for the broadcast and professional audio-video markets. EMCORE’s latest products for wireless systems support emerging Distributed Antenna System (DAS) applications, enhancing bandwidth and linearity to enable delivery of reliable signals in areas where interference is high, or signals are normally weak. With our expertise in Indium Phosphide (InP) semiconductor wafer manufacturing, we are one of the few suppliers offering truly vertically-integrated products for the broadband network infrastructure.
EMCORE owns and operates its world-class 7,000 square foot InP semiconductor wafer fabrication plant, with class 1,000 clean room space, at our corporate headquarters in Alhambra, California. The plant supports EMCORE’s vertically-integrated manufacturing for its Laser, Transmitter and Receiver products, as well as 2.5 Gbps to 12.5 Gbps Telecom and Datacom devices.

EMCORE’s semiconductor wafer fabrication facility supports 2” and 3” wafer process for InP-based devices including laser, APD & PIN photodetectors. The plant features MOCVD reactors for 3x3” or 6x2” wafers, plus stepper, wafer track, ICP, RIE, diffusion, metal and dielectric deposition, and cleaving/dicing. Our strong, highly-experienced technical team has expertise in device design, epitaxial growth, wafer processing, device characterization, reliability and COB/TO/OSA sub-assembly for both development and manufacturing.

1310 nm and 1550 nm GPON DFB Laser Chips
EMCORE’s G1033 series of 1310 nm and 1550 nm GPON DFB laser diode chips are designed to provide the source laser for uncooled PON applications for triple-play voice, video and data applications. They are designed to perform the E/O conversion in a PON or GPON system.

10G 1310 nm Fabry-Perot Laser Chips
EMCORE’s G1033-201, 10G 1310 nm Fabry-Perot (FP) laser chip is designed for uncooled digital applications. This laser is ideally suited for low cost high-speed data communications designs.

10G Avalanche Photodiode, Coplanar Bottom Illuminated APD & 2.5G APD Bare Die
EMCORE’s PS-3072-408, 10G APD, coplanar bottom illuminated chip is designed for high-speed PON applications. It has high responsivity with low capacitance and is mounted on COB for ease of assembly into receiver modules. The PS-G1013-406, 2.5G APD top illuminated chip is designed for GPON ONU and 2.6 Gb/s applications. It has high responsivity and low capacitance with low noise equivalent power. Both designs are ideally suited for low cost high-speed data communications designs.
EMCORE designs and manufactures the most complete and advanced line of optical components, subsystems and systems for CATV broadband distribution networks. EMCORE’s CATV products support various network architectures and address the needs of transmitting and receiving signals in short-to-long-haul, forward- and return-path, and headend-to-hub-to-node configurations over 1310 nm and 1550 nm wavelengths.

EMCORE Broadband, through its Ortel heritage, was the first to implement linear fiber optic transmission for the cable industry and we continue to be a leader in providing RF over fiber products used in HFC networks for CATV industry. Our products enable increased data transmission distance, speed and bandwidth, with lower noise and power consumption. This empowers cable service operators to offer multiple advanced services to meet the expanding demand for high-speed Internet, HDTV, video-on-demand, interactive video, and Voice over IP (VoIP). EMCORE’s product portfolio includes forward and return-path analog and digital lasers, photodetectors and subassembly components, broadcast analog and digital fiber-optic transmitters, and Quadrature Amplitude Modulation (QAM) transmitters.
**Medallion 8000 Series Directly-Modulated CATV Transmitters**

EMCORE’s Medallion 8000 is a rack-mount directly-modulated DWDM CATV optical transmitter specifically designed for CATV or wideband applications that require both CATV and DBS signals to be transmitted up to a 30 km length of fiber. The Medallion 8000 supports full 79-channel NTSC analog signals and/or a combination of QAM and DBS signals (with reduced channel analog CATV). It can be selected as a fixed fiber length option to support from 0 – 10 km, 5 – 15 km, 10 – 20 km or 15 – 25 km with 18 dBm SBS suppression maximum, or it can be ordered as a fiber length selectable option. This option allows the user to set the Medallion 8000 for best optimized CSO at any fiber length from 0 – 30 km with 1 km increments with up to 20 dBm SBS suppression.

**Medallion 6000 Series Externally-Modulated CATV Transmitters**

**L-Type/D-Type/S-Type/F-Type/N-Type Transmitters**

The Medallion 6000 series is a family of state-of-the-art high-performance 1550 nm externally-modulated CATV fiber optic transmitters optimized for varying network applications. Packaged in a convenient 1 RU housing, this line of optical transmitters couples high optical output power, up to 11.0 dBm, with low optical linewidth resulting in unmatched performance. The optical modulator, combined with proprietary pre-distortion circuitry, provides superior CTB and CSO performance with SBS suppression levels of greater than 21 dBm through 40 km of fiber. Advanced features such as built-in field adjustable SBS control allow these transmitters to be quickly optimized in the field for any link or application without the need to procure specifically tuned transmitters.

**J-Type and I-Type Transmitters for Japanese & International Markets**

Providing all the core capabilities of the Medallion 6000 series, J-Type Medallion transmitters are specially optimized to support fiber optic links of up to 150 km for the Japanese market place and other markets with similar requirements. The J-Type series is designed as a high-performance solution for CATV applications, or where the simultaneous transport of CATV and SAT-IF FM signals is required. The SAT-IF signals can be applied anywhere in the 950 to 2800 MHz band.

I-Type Medallion transmitters are optimized for international network applications that employ an 85 MHz forward / reverse path split frequency. This line of optical transmitters couples high optical output power, up to two ports 10.0 dBm, with low optical linewidth resulting in unmatched performance. I-Type transmitters are specially designed and optimized to support fiber optic links of up to 150 km for the international marketplace.

**1550 nm Transmitter Highlights**

**Medallion 8000**
- Available on 100 GHz spaced ITU DWDM C-Band channels
- Optimized RF integration of predistorter, amplifiers, and EMCORE laser
- Advanced SBS suppression technology
- Fixed or fiber length selectable options
- RoHS compliant

**Medallion 6000**
- Single or dual optical outputs
- QAM Loading to 1003 MHz
- Dual power supplies, redundant & hot-swappable
- Front panel RF test point
- SNMP control interface and WEB GUI
- Vacuum fluorescent status display
- OMI/RF gain adjustment
- AGC select: CW, video, manual (No AGC)
- Industry-leading field adjustable SBS suppression

**Applications**
- High power distribution networks
- High-performance supertrunking links
- Redundant ring architectures
- FTTx networks
- RFoG applications
- SAT-IF transport
- DWDM node splitting
**Medallion 7000 Series CATV Amplifiers**

The Medallion 7000 series are high-performance CATV fiber amplifiers optimized for the superior output power stability and exceptionally low noise figures demanded by CATV applications.

The Medallion 7200 is an Erbium-Ytterbium Doped Fiber Amplifier (EYDFA) packaged in a convenient 2 RU housing and the Medallion 7100 is a Erbium Doped Fiber Amplifier (EDFA) packaged in a 1 RU housing. Both of these fiber amplifiers provide very stable optical outputs over a wide operating temperature range. Internally they are supported with input and output isolators for enhanced system stability and performance.

**Medallion 7100 1RU**

All Medallion 7000 series fiber amplifiers offer a full range of flexible configurations and a rich set of features. These include remote management capability through SNMPv2, Telnet and a resident web server. The Medallion 7000 series also supports MIBs specified by SCTE (Society of Cable Television Engineers) for this product class. For local management, an RS-232 port is standard, along with a convenient front panel control menu provided on a Vacuum Fluorescent Display (VFD). Optional integrated WDM filters are available for FTTx/RFoG applications.

**Optical Switches**

**Medallion 2100 Optical A/B Switch**

The Medallion 2100 Optical A/B Switch is a high-performance solution for network protection and optical redundancy. It provides an automatic or manual fiber switching function to protect the network from inadvertent service outages due to up-stream optical signal degradation. If the primary fiber’s optical signal power level falls below the desired optical trip threshold, the unit automatically switches to the secondary fiber, thus eliminating the need for intervention of a system operator. The Medallion 2100 is capable of manual switching or can be switched remotely via SNMP, Telnet or through a web browser, adding optical protection to many system applications. The Medallion 2100 is available in configurations of 1 to 4 independent optical switches per chassis.

The Medallion 2100 series is designed as a low power, cost effective, high performance switching solution for applications that demand reliable and rapid response to changing network conditions.

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**1550 nm EDFA Highlights**

- High saturation output power
  - Up to 27 dBm – Medallion 7100
  - Up to 42 dBm – Medallion 7200
- Dual power supplies, redundant & hot-swappable – AC or DC
- Front panel optical input & output monitor ports
- SNMPv2 control interface
- Low noise figure for CATV
- Wide input dynamic range
- Very stable output power over a wide operating temperature range

**Applications**

- CATV supertrunking
- Redundant ring architectures
- High power distribution networks
- FTTx networks

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**Switching Highlights**

- Automatic, manual and remote switching
- Auto-switching time less than 25ms
- SNMP control interface
- Front panel Vacuum Florescent Display (VFD) and LED indicators
- 1 RU rack-mount enclosure with choice of single- or dual-redundant AC or DC power supplies

**Applications**

- Fiber optical protection switching
- Redundant ring architectures
- FTTx networks

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**CATV 1550 nm Optical Amplification**

**ERBIUM DOPED FIBER AMPLIFIERS, OPTICAL SWITCHING**
EMCORE is a leading provider of fiber optic components for the transmission of analog video, voice and data signals over high-speed fiber optics. Our products, including bare die (or chip), TOSA, DFB CWDM and DWDM lasers, and PIN and avalanche photodiodes (APD), support a wide variety of broadband, satellite, wireless and telecom applications.

EMCORE lasers utilize Genuine Ortel Technology which has symbolized the highest quality in linear high-speed photonics. EMCORE leverages our Ortel heritage in linear fiber optics, combined with our vertically-integrated infrastructure and high-volume manufacturing to deliver the highest quality fiber optic components available today.

DOCSIS 3.1 1550 & 1310 nm Laser Modules

EMCORE’s 1752A, 1550 nm and 1616A, 1310 nm DOCSIS 3.1 lasers are designed specifically for CATV applications and are compliant with the new DOCSIS 3.1 standard. These lasers support operational bandwidth up to 1.2 GHz and feature low adiabatic chirp to maximize signal quality in short and long lengths of fiber. The lasers operate over an industrial temperature range with excellent inherent linearity to minimize degradation of broadcast signals.

1900 Series Coaxial TO-56 DFB Lasers

EMCORE’s 1933, 1935 and 1955 coaxial TO-56 DFB lasers offer a low cost solution for linear fiber optic links. They can be cooled with external thermo-electric coolers for high stability, or run without TEC’s to reduce power consumption. These DFB lasers are packaged in a compact, hermetic assembly with monitor photodiode and isolator for flexible integration into various transmitter designs.

1600 Series 1310 nm 14-pin Butterfly DFB Lasers

EMCORE’s 1612, 1615 and 1622, 1310 nm forward path DFB laser modules are designed for both broadcast and narrowcast analog applications. These highly linear devices feature optical output power options up to 100 mW with superior distortion performance over an enhanced temperature range of -40° C to +85° C.

1700 Series 1550 nm DWDM 14-pin Butterfly DFB Lasers

EMCORE’s 1751, 1754 and 1782, 1550 nm laser modules feature a distributed feedback chip that has been designed specifically for RF QAM and CATV applications. They feature low adiabatic chirp to maximize signal quality in short and long lengths of fiber. The laser’s excellent inherent linearity minimizes degradation of broadcast signals caused by QAM channels.

7840A DOCSIS 3.1 Low Noise Optical Receiver

The 7840A DOCSIS 3.1 Low Noise Optical Receiver is a best-in-class single-mode fiber pigtailed module featuring a low noise, impedance-matched broadband photodiode and RF amplification. The device receives optical analog and/or digital signals for a range of video broadcast options and delivers the corresponding RF electrical output. The wide bandwidth supports the delivery of any combination of analog and digital channels up to 1.2 GHz of spectrum.
The increasing dependence on wireless networks for social media, texting, email, and uploading and downloading of apps, music, videos and photos has created greater demand for deployment of cost-effective, integrated wireless Distributed Antenna Systems (DAS). Wireless systems providers are building systems in subway tunnels, stadiums, high-speed trains and cruise ships. EMCORE’s linear DFB Lasers, Optical Receivers and Fiber Optic Links integrate extremely well into these systems, enhancing bandwidth to enable the delivery of consistent, reliable signals in areas where interference is high, or signals are weak.

### 1764 1550 nm C-Band DWDM DFB Laser

EMCORE’s 1764 1550 nm laser module is a DWDM laser that features a distributed-feedback (DFB) device that has been designed specifically for RF and wireless applications. The 1764 laser has a wide temperature range for reliable performance in harsh node environments and narrow transmitter designs. It also features low adiabatic chirp to maximize signal quality in short and long lengths of fiber. The 1764 is available in all C-Band ITU grid wavelengths.

### 1615A 1310 nm DFB Laser Module

Also designed for both wireless and distributed antenna system applications, the 1615A 1310 nm DFB Laser Module is a highly-linear device that delivers superior distortion performance over an enhanced temperature range of -40°C to +85°C.

### 7830W 3 GHz Optical Receiver

EMCORE’s 7830W 3 GHz optical receiver is a singlemode fiber pigtailed module featuring a low-noise, impedance-matched broadband photodiode and RF amplification. The device receives optical analog and/or digital signals for a range of video broadcast options, and delivers the corresponding RF electrical output.

### 3 GHz & 6 GHz Fiber Optic Links for Wireless

EMCORE’s 3 GHz and 6 GHz Fiber Optic Links (FOL) for wireless signals are cost-effective, high-performance broadband transmitter, receiver, and transceiver modules designed for wireless interfacility link applications. Each module is packaged in a rugged cast metal housing and optional 50 Ohm SMA or 50/75 Ohm BNC connectors are available for versatile interface applications. Transmit and receive alarms/indicator simplify installation and provide operational status.

The optional FOL-CC-5-1U 1 RU 19” rack-mount unit is an EIA-310D standard design to hold up to five FOL modules. It has a built-in universal dual power supplies, front panel indicators for visual indications of power supply operation and cumulative lin status.
Optiva Platform Satellite & Microwave
Fiber Optic Transport System

Platform Overview
EMCORE’s Optiva platform includes a wide range of SNMP managed fiber optic transmitters, receivers, optical amplifiers, RF and optical switches and passive devices, video, audio, data and Ethernet products that provide high-performance fiber optic transmission from 1 MHz to 40 GHz. These units can be used to construct transparent inter- and intra-facility links from 1 meter to >100 km for RF satellite and microwave signal transport, antenna remoting, video transport, electronic warfare systems and many other high-dynamic-range applications.

Optiva is a completely modular, hot-swappable platform with a variety of rack-mount and compact tabletop, or wall-mountable enclosure options. EMCORE’s complete line of Optiva insert cards removes the distance limitations of copper-based coaxial systems at cost and performance levels suited for headends, satellite earth stations, military operations centers, and much more.

Optiva RF & Microwave Highlights
- 3 RU 19” 16-slot rack-mount enclosure -Supports up to 16 hot-swappable card modules
- 1 RU 19” 6-slot and 1- or 2-slot compact enclosures available
- Mini-hub outdoor enclosure supports up to 10 card modules
- Dual-redundant hot-swappable power supplies
- SNMP monitoring and control

Optiva Card Module Options
- 1310 nm, 1550 nm, CWDM, DWDM
- Redundancy switching units and RF splitters
- RF and optical switches and passive devices
- Optical amplifiers (EDFA)
- Video, data, audio
- Ethernet 10/100/1000
IF, L- AND S-BAND FIBER OPTIC TRANSPORT

Optiva OTS-1L2, 3 GHz Dual Wideband Fiber Optic Links

The Optiva OTS-1L2 is a dual RF fiber optic link that accepts two RF inputs and provides two RF outputs with a single plug-in pair. This dual-density card increases the chassis capacity by a factor of two. OTS-1L2 transmitters and receivers are optimized to perform in the 50 MHz to 3 GHz frequency range providing transparent signal transportation for satellite antenna applications.

Optiva OTS-1L Series Satcom Band Fiber Optic Links

The Optiva OTS-1L series is optimized to provide transparent IF, L- and S-Band signal transport for a variety of satellite antenna and interfacility link applications. Series options include CWDM, DWDM and 1310/1550 nm models supporting links up to 100 km. The unique features of the OTS-1L series include simple push button peaking for optimum performance and our patented SmartGain Control, which ensures consistent performance over varied signal level conditions.

Optiva OTS-2L10, 10 MHz / L-Band Fiber Optic Links

Optiva OTS-2L10, 10 MHz / L-Band Fiber Optic Links are optimized to provide transparent, simultaneous 10 MHz and L-Band signal transport for VSAT antenna applications. The Optiva OTS-2L10 provides excellent isolation of the 10 MHz reference signal from L-Band signals at the transmitter and receiver with very low phase noise, which facilitates greater flexibility to locate VSAT antennas for optimum performance. Connections is via 50 Ohm SMA and the OTS-2L10 includes receiver DC output for the BUC upconverter with transmitter and receiver RF power monitoring via LED, SMA & SNMP.

50 MHz-40 GHz ULTRA-WIDEBAND FIBER OPTIC TRANSPORT

OTS-2 Series Microwave Band Fiber Optic Links

The OTS-2 Series Unamplified or Amplified (Tx, Rx Fixed Gain) Microwave Band Fiber Optic Links are a family of SNMP managed fiber optic transmitters and receivers that provide high-performance 50 MHz – 40 GHz transport within the Optiva modular platform. 18, 22 and 40 GHz options are available.

Optiva microwave units are tailored to the requirements of higher frequency applications such as microwave antenna signal distribution, electronic warfare systems, broadband delay lines, signal processing, and phased array antennas. Utilizing EMCORE’s high-performance, ultra-low Relative Intensity Noise (RIN) source laser and high optical input power capable photodiodes, these modules provide high-dynamic-range. The system operates at a nominal wavelength of 1550 nm. Wavelength selected lasers on the ITU grid are also available to support multichannel DWDM applications.
EMCORE has developed customer qualified FTTP components and subsystems to support deployments of fiber optics-based access networks for homes and businesses. Our FTTP products include RFOG optical transceivers, analog fiber optic transmitters for video overlay with high-power Erbium Doped Fiber Amplifiers (EDFA), plus analog and digital lasers, photodiodes, and video receivers.

**RFOG Optical Transceivers, Lasers & Photodiodes**

EMCORE’s RFOG transceivers supports 1310/1590/1610 nm burst mode analog return-path conversion for triple-play voice, video and data signals in SFU (Single Family Unit) and MDU (Multi-Dwelling Unit) applications. They feature a 1 GHz or 2.7 GHz bandwidth downstream receiver that supports digital or QAM upstream transmission.

EMCORE RFOG lasers include 1310 nm, 1590 nm, 1610 nm DFB or Fabry-Perot (FP) lasers modules with integrated WDM (dual core module), plus a photodiode with WDM filter. EMCORE RFOG components are compatible with Passive Optical Networks (PON).

**FTTP Highlights**

- **RFOG Transceiver**
  - Supports 1310/1590/1610 nm burst mode analog return-path
  - Supports digital or QAM upstream
  - SFU and high-power output MDU options available
  - PON compatible

**Applications**

- Fiber-To-The-Node
- Fiber-To-The-Premise
- SFU and MDU
- PON and RFOG networks

**End-to-End FTTx with Radio Frequency over Glass (RFOG)**

[Diagram showing end-to-end FTTx with RFOG components and subsystems.]
Optiva Multimedia Transport & Genesis XD Multimedia Matrix Switching Platforms

Optiva Multimedia Transport Platform
Opticomm-EMCORE’s Optiva platform offers next-generation High-Definition transport and distribution solutions to the professional audio/video, broadcast, cable, corporate and government markets. It is cost-effective and flexible, supporting both analog and digital requirements, and is customizable to accommodate precise video, audio and data transport needs. Almost any configuration is available over a single fiber. All cards are hot-swappable and may be housed in 19" racks, or as standalone units using ruggedized desktop racks.

Genesis XD Multimedia Matrix Switching Platform
Opticomm-EMCORE’s Genesis XD (GXD) is an all-in-one multimedia matrix solution that converts, scales, switches and distributes video, audio and data for small-to-large connectivity applications. GXD’s massive 40 Gbps backplane accommodates uncompressed 4K UHD resolutions now and 8K resolutions later, allowing it to serve as a staple for installers that want a flexible and reliable connectivity platform.

Next-Generation Video, Audio and Data Transport

Optiva Multimedia Highlights
- 3G HD / HD-SDI / SDI video over fiber, CATx / HDBaseT
- 4K UHD DVI / HDMI / VGA video over fiber, CATx / HDBaseT
- Audio, component and composite video, contact closure over fiber
- Ethernet / USB and serial data over fiber
- Remote management and control to any SNMP-based management software
- Future-proof due to proprietary daisy-chain technology, allowing for easy expansion and optimization of bandwidth

Applications
- Broadcasting / IPTV / CATV
- Mobile video and digital signage
- Security and surveillance
- Military and government video
- Educational / video conferencing
- Medical imaging

For more information on Opticomm-EMCORE Multimedia Transport Solutions, please visit www.opticomm.com

www.emcore.com
EMCORE’s Innovation & Technology Leadership

EMCORE is a vertically-integrated manufacturer that pioneered the MOCVD (Metal-Organic Chemical Vapor Deposition) process for both development and production of many of the compound semiconductor-based materials and devices in use today. EMCORE owns and operates a world-class 7,000 square foot Indium Phosphide (InP) semiconductor wafer fabrication plant at our corporate headquarters in Alhambra, California.

EMCORE’s vertical integration and highly-linear fiber optics capability based on “Genuine Ortel Technology”, positions us for leadership in the development of enabling technologies for current and future high-speed, broadband CATV and telecommunications networks. EMCORE’s combination of semiconductor manufacturing expertise and advanced photonics design capability has enabled us to achieve strong market presence in the CATV-HFC, telecommunications, RFOG, FTTx and satellite communications markets.

Quality Management - ISO 9001 Certified

EMCORE’s various manufacturing processes involve extensive quality assurance systems and performance testing. Our manufacturing facilities have all acquired and maintain ISO 9001 certification.

How To Contact
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