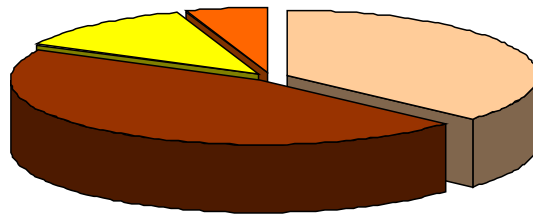


## Announcement

# Optical Isolators Global Market Forecast and Analysis 2015-2020

*A market review and forecast of free-space and in-line optical isolators  
used in communication and specialty applications*



**Release Date: February 24, 2016**



## **Optical Isolators Global Market Forecast and Analysis 2015-2020**

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This is the ElectroniCast global forecast of consumption of free-space and in-line (fiber-to-fiber) optical isolators used in communication and specialty applications.

This market study report provides the Consumption Value (US\$, million), Quantity (number/units), and Average Selling Prices (ASP \$, each). The value is determined by multiplying the number of units by the average selling price. The ASPs are based on the price of the optical isolator at the initial factory level. The market data are segmented into the following geographic regions, plus a Global summary:

- America (North America, Central and South America)
- Europe (Western & Eastern Europe, plus Middle Eastern countries)
- Asia Pacific (APAC)

The ElectroniCast global optical isolator market is segmented into the following major application categories:

- Telecommunications
- Private Enterprise Networks
- Cable TV
- Military/Aerospace (Commercial and MIL-SPEC)
- Specialty (intra-enclosure, test and measurement, harsh environment industrial, laboratory, other applications, and non-specific)

Optical isolators are passive devices that allow light to be transmitted in only one direction. They are most often used to prevent any light from reflecting back down the optical fiber, as this light would enter the source and cause backscattering and feedback problems. This is especially important for high data rate transceivers and transponders, or those devices requiring long span lengths between transceiver pairs. Optical feedback degrades signal-to-noise ratio and consequently bit-error rate. Ideally an isolator would pass all light in one direction and block all light in the reverse direction.

Optical isolators transmit light in the forward direction and blocks light from passing in the reverse direction. It is regarded an essential optical components in medical, industrial, and research lasers for blocking reflection beams that cause optical damage and noise. It is also used as a fiber optic communicative light intensifier to expand the lifespan of devices and improve transmission quality.

Inline fiber optical isolators are typically designed in pigtail fashion; therefore, they come with built-in fiber optic cable and (optional) connectors so that they may be integrated directly into a fiber optic system. Free space isolators, by contrast, usually do not have an integral connection system (some free-space units are available with pigtails); typically, they are directly mounted to the object that needs isolation.

Important specifications for optical isolators include center wavelength, isolation, insertion loss, and polarization dependant loss. Center wavelength is the center of the wavelength range in which the isolator is designed to function optimally. This characteristic is usually measured in nanometer (nm). Isolation, generally measured in decibels (db), is a measure of how effectively back reflections are prevented and the degree to which the isolator can transmit. Insertion loss is the attenuation caused by the insertion of an optical component. Polarization dependant loss is the attenuation caused by polarization.

Optical isolators are used in many applications in commercial, industrial, and laboratory settings. They are reliable devices when used in conjunction with fiber optic amplifiers, fiber optic ring lasers, fiber optic communication systems, and high-speed/ DWDM and coherent fiber optic links, laboratory R&D, sensors, gyro-systems, test/instrumentation measurement quality assurance applications in automation of manufacturing processes. Single polarization fiber optic isolators are also used with laser diodes, gyroscopic systems, various optical modular interfaces; laser diode integrated optic modulator interfaces and a variety of other mechanical control applications.

The fiber optics industry is now observing an increase in the consumption of the transmitter/receiver optical communication links and other relative devices, which facilitate a strong environment for the use of optical isolators.

Domestic consumption includes imported optical isolators (not embedded in modules/devices or higher level assembly when shipped), as well as isolators produced in domestic facilities for end use by that country or used in modules/devices produced for domestic consumption or export.

## Market Research Methodology Information Base

This study is based on analysis of information obtained continually over the past two decades, but updated through the middle of February 2016. During this period, ElectroniCast analysts performed interviews with authoritative and representative individuals in the fiber optics, telecommunications, datacom, cable TV and other communication industries, from the standpoint of both suppliers and users of fiber optic transmission links. The interviews were conducted principally with:

- Engineers, marketing personnel and management at manufacturers of fiber optic collimators, specialty fiber, connectors, isolators, couplers, DWDM filter modules, dispersion compensators, photonic switches, attenuators, modulators, transmitters/receivers, OADMs and other related optical communication components.
- Engineers, marketing, purchasing personnel and market planners at major users of passive and active optical components, such as telecommunication transmission, switching, distribution and apparatus equipment, regional and interexchange (IXC) telephone companies, alternative local carriers, data communications equipment companies, cable TV system suppliers, military/aerospace OEMs, utilities and a number of other end users of fiber optic communication components and technology.

The interviews covered issues of technology, pricing, contract size, reliability, documentation, installation/maintenance crafts, standards, supplier competition and other topics.

A full review of published information was also performed to supplement information obtained through interviews. The following sources were reviewed:

- Professional technical journals and papers; Trade press articles
- Technical conference proceedings
- Additional information based on previous ElectroniCast market studies, including the Fiber Optic Forecast Service Data Base, the Fiber Optic Cable Forecast, the Optical Amplifier and Component Global Forecast, the Intraenclosure Optical Interconnect Forecast, the Fiber Optic Installation Apparatus Forecast, the Fiber Optic Coupler Forecast, the Fiber Optic Circulator, Attenuator, Isolator, Filter, Collimators, DWDM, Switch, Optical Add/Drop Multiplexers, Transmitters/Receivers, SONET/SDH, and other related component Market Forecasts
- Personal knowledge of the research team

In analyzing and forecasting the complexities of the Global market for fiber optic communication components, it is essential that the market research team have a good and a deep understanding of the technology and of the industry. ElectroniCast members who participated in this report were qualified.

### Bottom-up Methodology

ElectroniCast forecasts are developed initially at the lowest detail level and then summed to successively higher levels. The background market research focuses on the amount of each type of product used in each application in the base year (2015), and the prices paid at the first transaction from the manufacturer. This forms the base year data. ElectroniCast analysts then forecast the growth rates in component quantity use in each application, along with price trends, based on competitive, economic and technology forecast trends, and apply these to derive long term forecasts at the lowest application levels. The usage growth rate forecasts depend heavily on analysis of overall end user trends toward digital broadband communication equipment usage and economic payback.

Cross-Correlation Increases Accuracy ElectroniCast, each year since 1985, has conducted extensive research and updated their forecasts of each fiber optic component category. As technology and applications have advanced, the number of component subsets covered by the forecasts has expanded impressively. The quantities of fiber optic transmitters/receivers, modulators, isolators, circulators, couplers, DWDM filters, attenuators, optical amplifiers and other optical communication components used in a particular application are interrelated. Since ElectroniCast conducts annual updates in each component field, accurate current quantity estimates are part of the corporate database. These quantities are cross-correlated as a "sanity check".

The calculation and analysis data spreadsheet technique is based upon input/output analysis, leveraging the quantitative consumption quantity, price and value of each item in each application at all levels to achieve reasonable quantitative conclusions. This interactive analysis concept was first applied on a major scale by Leonteff of the US Department of Commerce in the mid 1950s, and then adopted successfully by analyst/forecasting firms Quantum Science, Gnostic Concepts and (in 1981) by ElectroniCast.

### Director of Study

Stephen Montgomery, MBA in Technology Management, President at ElectroniCast Consultants. He joined ElectroniCast in 1990 and has specialized in photonics and fiber optic components market & technology forecasting at ElectroniCast for over 25-years. He has given numerous presentations and published a number of articles on optical communication markets, technology, applications and installations. He is a member of the Editorial Advisory Board of LIGHTWAVE magazine (PennWell Publishing) and writes a monthly article covering the optical communication industry for OPTCOM Magazine in Japan (Kogyo Tsushin Co., Ltd.).

## About ElectroniCast

ElectroniCast, founded in 1981, specializes in forecasting technology and global market trends in fiber optics communication components and devices, as well providing market data on light emitting diodes used in lighting.

As an independent consultancy we offer multi-client and custom market research studies to the world's leading companies based on comprehensive, in- depth analysis of quantitative and qualitative factors. This includes technology forecasting, markets and applications forecasting, strategic planning, competitive analysis, customer-satisfaction surveys and marketing/sales consultation. ElectroniCast, founded as a technology-based independent consulting firm, meets the information needs of the investment community, industry planners and related suppliers.

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