

ANNOUNCEMENT

Handheld Optical Time Domain Reflectometer

Global Market Forecast & Analysis

2018-2028



10-Year Global Market Forecast –

Handheld OTDRs and Multiple Test Units with OTDR Modules



25th Annual OTDR Market Forecast

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10-Year Market Forecast

Optical Fiber Testing – An optical time-domain reflectometer (OTDR) is an optoelectronic instrument used to characterize an optical fiber. The optical-time domain reflectometer is considered at the core of fiber optic characterization.

This report provides our estimates and forecast of global consumption of hand-held OTDR fiber optic test units, associated supplemental (add-on) modules, and Multi-Test Platforms, which are initially used with OTDR add-on modules.

This report provides an analysis (review) and a 10-year forecast (2018-2028) of the worldwide market consumption segmented into the following geographic regions:

- North America
- Europe
- Asia Pacific Region (APAC)
 - China (Mainland)
 - Rest of Asia Pacific
- Rest of the World

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

- Telecommunications
- Private Enterprise Networks
- Cable TV
- Military
- Specialty (Sensor, Industrial, Laboratory, rental units, other applications and non-specific/miscellaneous)

The optical time-domain reflectometer (OTDR) is used as a troubleshooting device to find faults, splices, and bends in fiber optic cables, with an eye toward identifying light loss. Light loss is especially important in fiber optic cables because it can interfere with the transmission of data. An OTDR can detect such light loss and pinpoint trouble areas, facilitating the maintenance and repair process.

Last year, Telecommunications applications, led in relative market share of the worldwide consumption value of handheld OTDRs and multi-test units with initial OTDR use and add-on OTDR modules.

The fastest annual growth, however, is forecasted for the consumption of OTDRs in the Private Networks, due to the increase optical fiber deployment in LANs (local area networks), campus (LAN extension inter-building, LAN-to-LAN and redundant lines), and (very large) Data Centers (DCs), driven by critical high-speed data applications. Private networks require an OTDR solution to accommodate a single-mode or multimode application and test scenario from relatively short to longer distances. With the exception of Military, ElectroniCast counts the use of OTDRs by the Government sector in the Private Network category.

Cable TV operations, Military/Aerospace applications, as well as various specialty/other applications are also quantified in this report of the study. ElectroniCast defines the use of handheld OTDRs in Specialty applications, as units testing the deployment of Sensors, which are not used in the other applications). Specialty applications also include the use of OTDRs in used in Industrial, Laboratory, rental units, other applications and non-specific/miscellaneous.

Product Categories covered in this ElectroniCast market forecast:

- OTDR devices, including pre-installed (initial) capability (embedded/dedicated or module); this category includes multiple test function units, which includes OTDR capabilities
- Supplementary OTDR modules, which can be added-on (plug into) existing handheld OTDR or multiple test function units/platform devices

The market forecast data are segmented by the following functions:

- Consumption Value (US\$, million)
- Quantity (number/by 1,000 units)
- Average Selling Prices (ASP \$, each)

Information Base for the Market Forecast

Primary Research This study is based on analysis of information obtained continually since 1994, but updated through February 2019. During this period, ElectroniCast analysts performed interviews with authoritative and representative individuals in the fiber optics industry plus private networks, telecommunications, military/aerospace and other communication industries, instrumentation/laboratory – R&D and factory/manufacturing, from the standpoint of both suppliers and users of fiber optic test units. The interviews were conducted principally with:

- Engineers, marketing personnel and management at manufacturers of fiber optic test equipment, fiber optic sensors, fiber optic fusion splice equipment, mechanical splice, connectors, transceivers, as well as laser diodes and photodiodes, application-specific ICs, packages, ferrules and cables, substrate materials, optical waveguide and other components used in the fabrication of optoelectronic transceivers, optical fiber, fiber optic cable assemblies and installation apparatus.
- Design group leaders, engineers, marketing personnel and market planners at major users and potential users of cable, cable assemblies, connectors, installation apparatus, passive devices and transceivers, such as telecommunication transmission, switching and distribution equipment producers, data communications equipment producers (switches, hubs, routers), computer and workstation producers, weapon system, aircraft and spacecraft electronic equipment producers, optical instrumentation system producers and others.
- Other industry experts, including those focused on standards activities, trade associations, and investments.

The interviews covered issues of technology, R&D support, pricing, contract size, reliability, documentation, installation/maintenance crafts, standards, supplier competition and other topics. Customers also were interviewed, to obtain their estimates of quantities received and average prices paid, as a crosscheck of vendor estimates. Customer estimates of historical and expected near term future growth of their application are obtained. Their views of use of new technology products were obtained.

The analyst then considered customer expectations of near-term growth in their application, plus forecasted economic payback of investment, technology trends and changes in government regulations in each geographical region, to derive estimated growth rates of quantity and price of each product subset in each

application. These forecasted growth rates are combined with the estimated baseline data to obtain the long-range forecasts at the lowest detailed level of each product and application.

Secondary Research 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
- Product literature
- Company profile and financial information
- Additional information based on previous ElectroniCast market studies
- Personal knowledge of the research team

In analyzing and forecasting the complexities of the world region markets for fiber optic test and measurement products, 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 (last year), 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 optical communication equipment usage and economic payback.

Cross-Correlation Increases Accuracy The quantities of fiber optic test equipment, fiber optic fusion splice devices/equipment, fiber cable, connectors, sensors, transceivers, transport terminals, optical add/drop MUX, photonic switches and other products used in a particular application are interrelated. Since ElectroniCast conducts annual analysis and forecast updates in each fiber optic related product field, accurate current quantity estimates in each application are part of this corporate database. These quantities are cross-correlated as a “sanity check.”

ElectroniCast, each year since 1985, has conducted extensive research and updated our multiple-client 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.

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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Market Forecast Data Base – Microsoft Excel Spreadsheets:

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|----------------------------------|
| Global |
| North America |
| Europe |
| APAC |
| People's Republic of China (PRC) |
| Rest of APAC |
| Rest of the World |

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