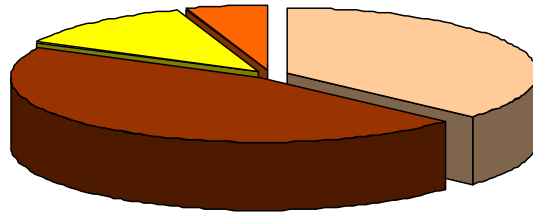


Announcement

Field-Terminated Fusion Splice-On Connector North American Market Forecast & Analysis 2014-2020





Field-Terminated Fusion Splice-On Connector North American Market Forecast & Analysis 2014-2020

Published: July 16, 2015
Text Pages: 348 pages in PDF
Also Included: Excel Market Forecast Data Base and PowerPoint Slides
Fee: USD 2,940

Field terminated fiber optic fusion *Splice On Connectors* (SOC) are installed for rapid repairs or for limited space situations where pre-terminated fiber cabling may be difficult, such as when the cable assembly needs to pass through small openings such as conduit. The connector offers a repeatable alternative termination solution for single-mode or multimode optical fiber.

This report presents the findings of the ElectroniCast market research study of the use of fiber optic fusion splice on connectors (SOC) in non-OEM field installations (inside or outside plant), attaching to an end of an optical fiber.

This report provides the SOC consumption value, quantity and average selling prices in the North American region, which consists of Canada, Mexico and the United States. History data are presented for 2014, plus the year-by-year forecast from 2015 through 2020 for each significant type of field-terminated splice-on connector.

The forecast for each connector type, in turn, is segmented into each selected communication application. Competitive market share estimates for the leading manufacturers of field-terminated fusion splice-on connectors are provided.

As the number of Fiber-To-The-Home (FTTH) subscribers increase, there is an increased awareness of the importance on construction for connecting the “drop” as well as the indoor connection. Traditionally the connection has been done with the mechanical splice at the outdoor cabinet or inside room of subscriber's house. It requires operators to take much care and time to handle 0.25mm diameter fiber. And in case of trouble, the mechanical splice connection is difficult and troublesome for investigation and repair.

Yield (quality) of the completed field-installed connector, which can add to additional “Truck-Rolls,” labor expertise (higher paid technicians) and labor time (field installable vs. “plugging”) is a concern. Therefore, for the purpose of less skill-needing construction and easier trouble investigation, there is an increased interest in the field installable fiber optic connector (mechanical splice type and fusion splice types). This market forecast covers the field-installable fusion splice- type fiber optic connectors in North America.

It is important to note, however, that these outdoor links indeed can incorporate pre-determined, designed link-lengths, especially with “Greenfield” and “Drop” applications. This is especially true with advanced fiber optic networks (experienced installations). The price of the field-installable connector versus the pre-terminated (cable assembly) is not necessarily the market driver. The following are some general opinions and assumptions of ElectroniCast:

- Indoors, controlled environments such as Central Offices/Head-Ends, LAN/Inside the Building (horizontal and riser), with the exception of multiple or undetermined cable lengths, have tended to use pre-terminated cable assemblies/patch cords and not use field installable fiber optic connectors. However, as technician skills improve as well as the products becoming more “fool-proof” there will be a continued increase in field installable fiber optic connectors.
- Military/Aerospace, Specialty, and modules/components relatively use less field installable types; however, as more applications increase their “green-field” (brand-new) use of optical fiber, opportunities for fusion splice-based field-termination connectors are present. Other/miscellaneous applications include, but not limited to the following: Industrial Environments, Electric Utility, Broadcast, Security, Transportation, and Oil/Gas/Energy
- Outdoor environments such as undetermined-length Telecommunication links (FTTx), some CATV links and LAN-to-LAN (or LAN) Building-to-Building, Campus links relatively incorporate more field-installable fiber optic connectors.

Connectors and Applications Covered in this Study The field terminated fusion splice-on fiber optic connector market forecast is built up from specific segments. The two major categories are connectors used with single-mode optical fiber and connectors used with multimode optical fiber, and are further segmented as shown in Table 1. The end applications for the selected fiber optic connectors are itemized in Table 2.

Table 1
Field Terminated Fusion Splice-on Connectors Market Forecast
Product Category List

Single-Mode Fiber Optic Connector

ST Simplex
FC Simplex
SC Simplex
LC Simplex
MPO Multiple Fiber Connector
OTHER

Multimode Fiber Optic Connectors

ST Simplex
FC Simplex
SC Simplex
LC Simplex
MPO Multiple Fiber Connector
OTHER

Table 2
Field Terminated Fusion Splice-on Connectors Market Forecast
Application Category List

Telecommunications
Cable Television
Premises Networks and Other Non-Specified

The market data is detailed by the following Functions:

- Consumption (use) Value (US\$, Million)
- Quantity/Volume (Connectors by Thousand/Units)
- Average Selling Price (ASP – US\$, Each)

Information Base for the Market Forecast

Primary Research This study is based on analysis of information obtained through the middle of July 2015. During this period, ElectroniCast analysts performed interviews with authoritative and representative individuals in the fiber optics industry plus telecommunications, cable TV, datacom, military and aerospace and other communication industries, instrumentation/ laboratory – R&D and factory/manufacturing, from the standpoint of both suppliers and users of fusion and mechanical field terminated fiber optic connectors. The interviews were conducted principally with:

- Technicians and network planners that are actively involved in using mechanical splices, fusion splicers, and fiber optic connectors/field-terminated mechanical-type and fusion splice-on connectors.
- Engineers, marketing personnel and management at manufacturers of fiber optic connectors, fusion splicers, mechanical splices, ferrules and cables, cable assemblies, splice equipment/tools and installation apparatus, couplers/splitters, isolators, OADMs, DWDM, photonic switches, test/measurement equipment, Ethernet switches, modulators, collimators, attenuators, transceivers and receivers, as well as laser diodes and photodiodes, application-specific ICs, packages, substrate materials, AWGs/optical waveguide and other components used in the fabrication of optoelectronic transceivers
- 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, patents and Intellectual Property, 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 North American market for optical interconnect 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, 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 communication equipment usage and economic payback.

Cross-Correlation Increases Accuracy The quantities of network switches, optical fiber/cable, connectors, transceivers, transport terminals, optical add/drop MUX, VCSELs, couplers/splitters, isolators, 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 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 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, first applied on a major scale by Leonteff, of the US Department of Commerce, in the mid 1950s, was then adopted successfully by analyst/forecasting firms Quantum Science, Gnostic Concepts and (in 1981) by ElectroniCast.

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.

Proprietary Statement

All data and other information contained in this data base are proprietary to ElectroniCast and may not be distributed or provided in either original or reproduced form to anyone outside the client's internal employee organization, without prior written permission of ElectroniCast.

ElectroniCast, in addition to multiple-client programs, conducts proprietary custom studies for single clients in all areas of management planning and interest. Other independent consultants, therefore, are considered directly competitive. ElectroniCast proprietary information may not be provided to such consultants without written permission from ElectroniCast Consultants.

Field-Terminated Fusion Splice-On Connector North American Market Forecast & Analysis Table of Contents

- 1. Executive Summary
- 1.1 Overview
- 1.2 Fiber Optic Networks – Overview
- 1.3 Fiber Optic Fusion Splicer Market Trends
- 1.4 40/100G Ethernet Networks – MPO Connector North America Market Trends
- 1.5 Use of Fiber Optics in Harsh Environments
- 2. North American Market Forecast
- 2.1 Application Overview
- 2.2 Field Terminated Fusion Splice SC Connectors
- 2.3 Field Terminated Fusion Splice LC Connectors
- 2.4 Field Terminated Fusion Splice ST Connectors
- 2.5 Field Terminated Fusion Splice FC Connectors
- 2.6 Field Terminated Fusion Splice MPO Connectors
- 2.7 Field Terminated Fusion Splice OTHER Connectors
- 3. Competitive Environment
- 3.1 Company Profiles: SOC competitors and related companies
 - AFL
 - Aurora Optics Incorporated
 - Belden Incorporated
 - Clearfield, Inc.
 - CommScope Inc.
 - Corning Incorporated (Corning Cable Systems)
 - Diamond SA
 - Fiber Instruments Sales Inc. (FIS)
 - Furukawa/Fitel/OFS
 - Greenlee Textron Inc., a subsidiary of Textron Inc.
 - Hubbell Incorporated
 - ILSINTECH
 - Inno Instrument
 - LEMO Connectors
 - Leviton Manufacturing Co., Incorporated
 - SEIKOH GIKEN CO., Ltd.
 - Shenzhen Powerlink Electronic Technology Co. Ltd
 - Sumitomo Electric Lightwave
 - TE Connectivity Ltd.
 - Techwin (China) Industry Co., Ltd
 - 3M Interconnect Solutions
 - 3SAE Technologies Inc.
- 3.2 Market Share Estimates of the Leading SOC Manufacturers
- 4. Research Methodology
- 5. Definitions - Acronyms, Abbreviations, and General Terms
- 6. Market Forecast Data Base – Explanation of Excel File
- 6.1 Overview
- 6.2 Tutorial

Market Forecast Data Base – Excel Spreadsheets

Data Figures – PowerPoint Slides

List of Figures

- 1.1.1 Mechanical Splice
- 1.1.2 Fusion Splice
- 1.1.3 Fiber Optic Connector Ferrules Polish Styles (PC, UPC, APC)
- 1.1.4 Fiber Optic Connector Ferrules Polish: 8 Degrees of Separation
- 1.1.5 Assorted Fusion Splice-on Field-Terminated Connectors from AFL
- 1.1.6 Small and Light Portable Fusion Splicer
- 1.1.7 Ribbon Fiber Cable
- 1.1.8 Ribbon Fiber Cable
- 1.1.9 Ribbon Fiber Cable
- 1.1.10 Fiber Optic Loose Tube Plenum Cable
- 1.1.11 Single-Mode (OS2) Ribbon Fiber Cable
- 1.1.12 Field Terminated Fusion Splice-on Connectors Value North America Forecast
- 1.1.13 Field Terminated Fusion Splice-on Connectors Quantity North America Forecast
- 1.1.14 High-Bandwidth Applications
- 1.1.15 Connector Sales/Distribution Product Flow
- 1.1.16 Harsh Environment Field-Deployable and Terminated Fiber Optic Connector
- 1.2.1 FTTP PON Architecture
- 1.2.2 Basic Data Center Topology
- 1.2.3 Multi-Tier Data Center Architecture
- 1.2.4 HFC Distribution System
- 1.3.1 Fiber Optic Fusion Splicer Global Consumption in 2014, By Region (\$, Million)
- 1.3.2 Fiber Optic Fusion Splicer Global Consumption in 2014, By Forecast (\$, Million)
- 1.4.1 40/100GbE MPO Connector North American Consumption Forecast (\$, Million)
- 1.4.2 40/100GbE MPO Connector, By Type North American Consumption Value
- 2.1.1 Pre-Terminated Fiber Optic Cable
- 2.1.2 Generic Components of a Typical Connector
- 2.1.3 Pre-Polished Field Installable Fiber Optic Connectors (Mechanical)
- 2.1.4 SC Multimode Field Installable Fiber Optic Connectors (Mechanical)
- 2.1.5 SC Multimode Field Installable Fiber Optic Connectors (Mechanical)
- 2.1.6 Fusion Splice Field Termination Connector Kit
- 2.1.7 Field Terminated Fusion Splice Connectors (SC Splice-on Connectors)
- 2.1.8 Field Terminated Fusion Splice Connector (SC Splice-on Connectors/UPC/SM)
- 2.1.9 Field Terminated Fusion Splice Connector (SC Splice-on Connectors/UPC/SM)
- 2.1.10 Field Terminated Fusion Splice Connectors/Specifications (LC, SC, ST, FC)
- 2.1.11 Field Terminated Fusion Splice Connectors (LC, SC, ST, FC)
- 2.1.12 Field Terminated Fusion Splice Connectors
- 2.1.13 Structure of the MPO Field Terminated Fusion Splice Connector
- 2.1.14 MPO Field Terminated Fusion Splice Connector and Fusion Splice Operation
- 2.1.15 MPO Fusion Spliced Field-Terminated Fiber Optic Connectors
- 2.1.16 Quad Small Form-Factor Pluggable (QSFP) MSA Solution
- 2.1.17 Splice-Cassette
- 2.2.1 Field Terminated Fusion Splice SC Connectors North America Forecast (\$, Million)
- 2.2.2 Field Terminated Fusion Splice SC Connectors North America Forecast (Quantity/Units)
- 2.2.3 Field Terminated Fusion Splice SC Connectors North America Forecast, Fiber/Type (\$M)
- 2.2.4 Field Terminated Fusion Splice SC Connectors North Amer. Forecast, Fiber/Type (Qty)
- 2.2.5 Field Terminated Fusion Splice SC Connectors North Amer. Forecast, Fiber/Type (ASP)
- 2.3.1 Field Terminated Fusion Splice LC Connectors North America Forecast (\$, Million)
- 2.3.2 Field Terminated Fusion Splice LC Connectors North America Forecast (Quantity/Units)
- 2.3.3 Field Terminated Fusion Splice LC Connectors North America Forecast, Fiber/Type (\$M)
- 2.3.4 Field Terminated Fusion Splice LC Connectors North Amer. Forecast, Fiber/Type (Qty)
- 2.3.5 Field Terminated Fusion Splice LC Connectors North Amer. Forecast, Fiber/Type (ASP)
- 2.4.1 Field Terminated Fusion Splice ST Connectors North America Forecast (\$, Million)
- 2.4.2 Field Terminated Fusion Splice ST Connectors North America Forecast (Quantity/Units)
- 2.4.3 Field Terminated Fusion Splice ST Connectors North America Forecast, Fiber/Type (\$M)
- 2.4.4 Field Terminated Fusion Splice ST Connectors North Amer. Forecast, Fiber/Type (Qty)
- 2.4.5 Field Terminated Fusion Splice ST Connectors North Amer. Forecast, Fiber/Type (ASP)
- 2.5.1 Field Terminated Fusion Splice FC Connectors North America Forecast (\$, Million)
- 2.5.2 Field Terminated Fusion Splice FC Connectors North America Forecast (Quantity/Units)
- 2.5.3 Field Terminated Fusion Splice FC Connectors North America Forecast, Fiber/Type (\$M)
- 2.5.4 Field Terminated Fusion Splice FC Connectors North Amer. Forecast, Fiber/Type (Qty)

List of Figures - Continued

- 2.5.5 Field Terminated Fusion Splice FC Connectors North Amer. Forecast, Fiber/Type (ASP)
- 2.6.1 Field Terminated Fusion Splice MPO Connectors North America Forecast (\$, Million)
- 2.6.2 Field Terminated Fusion Splice MPO Connectors North America Forecast (Quantity/Units)
- 2.6.3 Field Terminated Fusion Splice MPO Connectors North Amer. Forecast, Fiber/Type (\$M)
- 2.6.4 Field Terminated Fusion Splice MPO Connectors North Amer. Forecast, Fiber/Type (Qty)
- 2.6.5 Field Terminated Fusion Splice MPO Connectors North Amer. Forecast, Fiber/Type (ASP)
- 2.7.1 Field Terminated Fusion Splice OTHER Connectors North America Forecast (\$, Million)
- 2.7.2 Field Terminated Fusion Splice OTHER Connectors North America Forecast (Qty/Units)
- 2.7.3 Field Terminated Fusion Splice OTHER Connectors North America Forecast, Type (\$M)
- 2.7.4 Field Terminated Fusion Splice OTHER Connectors North America Forecast, Type (Qty)
- 2.7.5 Field Terminated Fusion Splice OTHER Connectors North Amer. Forecast, Type (ASP)
- 3.1.1 Fusion Splice-On Connectors - Variety
- 3.1.2 Fusion Splice-On Connectors - MPO
- 3.1.3 Single Fiber Core Alignment Fusion Splicer
- 3.1.4 Fusion Splice/Specialty Single-Mode Connector
- 3.1.5 Aerospace Fusion Splicer – Explosion-proof miniature fusion splicer
- 3.1.6 MEMS Variable Optical Attenuator (VOA)
- 3.1.7 MTP® Compatible Splice-On Connector
- 3.1.8 Field Terminated Fusion Splice Connectors
- 3.1.9 SOC Parts
- 3.1.10 Fusion Splicer – Compatible with Splice-On Connectors
- 3.1.11 Field Terminated Fusion Splice Connectors – Variety
- 3.1.12 Schematic of MPO connector/single fiber connector(s) “Fan-Out”
- 3.1.13 Core Alignment Fusion Splicer
- 3.1.14 Ribbon Fusion Splicer
- 3.1.15 Comparison of FTTH Fusion Splice on Connectors (SOCs)
- 3.1.16 Comparison of FTTH Fusion Splice on Connectors (SOCs)
- 3.1.17 Comparison of FTTH Fusion Splice on Connectors (SOCs)
- 3.1.18 Single Fiber Core-to-Core Fusion Splicer
- 3.1.19 LC Splice-On Connectors (SOC), Singlemode UPC 0.9mm
- 3.1.20 Fusion Splicer Product Line
- 3.1.21 Core Alignment Fusion Splicer
- 3.1.22 Splice-On-Connectors - Variety
- 3.1.23 SC PC Single-mode Fusion Splice On Fiber Fast/Quick Connector
- 3.1.24 8-Fiber MPO Splice-On Connector for 40G/100G Data Centers
- 3.1.25 Field Terminated Fusion Splice Connectors - Variety
- 3.1.26 Fusion Splice on Connector
- 3.27 Field Installable Fiber Optic Connector (Mechanical-Type)
- 4.1 ElectroniCast Market Research & Forecasting Methodology

List of Tables

- 1.1.1 Field Terminated Fusion Splice-on Connectors Market Forecast Product Category List
- 1.1.2 Field Terminated Fusion Splice-on Connectors Market Forecast Application Category List
- 1.1.3 Field Terminated Fusion Splice-on Connectors North America Forecast, Fiber Type (\$M)
- 1.1.4 Field Terminated Fusion Splice-on Connectors North Amer. Forecast, Fiber Type (Qty)
- 1.1.5 Field Terminated Fusion Splice-on Connectors North America Forecast, Type (\$Million)
- 1.1.6 Field Terminated Fusion Splice-on Connectors North America Forecast, Type (Qty, Units)
- 1.1.7 Field Terminated Fusion Splice-on Connectors North America Forecast, Application (\$M)
- 1.1.8 Field Terminated Fusion Splice-on Connectors North America Forecast, Application (Qty)
- 1.2.1 OM3- and OM4-Specified Distances for Ethernet
- 1.2.2 40G/100G - Physical Layer Specifications
- 1.2.3 Internet Service Providers in Canada
- 2.1.1 Field Terminated Fusion Splice-on Connectors Market Forecast Product Category List
- 2.1.2 Field Terminated Fusion Splice-on Connectors Market Forecast Application Category List
- 2.1.3 Field Terminated Fusion Splice Connectors North America Forecast, by Type (\$Million)
- 2.1.4 Field Terminated Fusion Splice Connectors North America Forecast, by Type (Qty/Units)
- 2.1.5 Field Terminated Fusion Splice Connectors North Amer. Telecom Forecast, by Type (\$M)
- 2.1.6 Field Terminated Fusion Splice Connectors North Amer. Telecom Forecast, by Type (Qty)
- 2.1.7 Field Terminated Fusion Splice Connectors North America CATV Forecast, by Type (\$M)
- 2.1.8 Field Terminated Fusion Splice Connectors North America CATV Forecast, by Type (Qty)
- 2.1.9 Field Terminated Fusion Splice Conn. North Amer. Premises/Other Forecast, Type (\$M)
- 2.1.10 Field Terminated Fusion Splice Conn. North Amer. Premises/Other Forecast, Type (Qty)
- 3.1.1 Fusion Splice Connectors – Compatible Splice Machines
- 3.1.2 Fusion Splice Connectors – Compatible Splice Machines
- 3.1.3 Fusion Splice Connectors – Product Offering
- 3.1.4 Fusion Splice Connectors – Product Offering
- 3.2.1 Field-Terminated Fusion Splice-On Connector Selected Manufacturers Market Shares
- 6.1.1 Applications Data Base Category List
- 6.1.2 Product Data Base Category List