



Fiber Optic Circulators Global Market Forecast and Analysis (2010-2015)

Published: April 18, 2011
Text Pages: 201
Also Included: Excel worksheets – Market Forecast
Fee: From \$4,200

Report Fee Structure:

- US \$4200 PDF by E-mail (Single user license): Individual purchaser can use report.
 - US \$4800 PDF by E-mail (Site license): Unlimited users within one corporate location, such as a regional office, can share report.
 - US \$5400 PDF by E-mail (Global license): Unlimited users within the purchasing corporation, for example all employees of a single company, can share report.
-

The deployment of optical fiber in the metro/access, the continuing demand for upgrading networks to accommodate rapidly increasing bandwidth requirements, plus the need for additional monitoring and testing of the optical fiber networks will drive the steady consumption of fiber optic circulators (component-level optical circulators).

As terrestrial national backbone and undersea systems approaching Tb/s capacities, advanced fiber-optic components, such as fiber optic circulators, are key in enabling DWDM systems with narrow channel spacing to achieve the large numbers of channels required. Fiber optic circulators are used with erbium-doped fiber amplifiers (EDFA), fiber optic sensor applications, dense WDM (DWDM), optical add/drop multiplexing (OADM), optical time domain reflectometers (OTDR fiber optic test equipment), SANs (Storage Area Networks), bi-directional transmission systems, dispersion compensators, and other devices.

This report by ElectroniCast Consultants provides a detailed fiber optic circulator market forecast for each year, 2010-2015 was published. The forecast is presented in terms of Quantity (number of units), Average Selling Prices (ASPs) per unit and Consumption Values. The forecast data for the following regions, plus a Global summary:

- America (South, Central and North America)
- EMEA (Europe, Middle East and Africa)
- APAC (Asia Pacific)

The forecasts are presented in the following application segments:

- Telecommunications
- Private Data Networks
- Cable TV
- Military/ Aerospace
- Specialty Applications

Additionally, the fiber optic circulator market is presented by the following port-count configurations:

- 3 - Ports
- 4 - Ports
- More than 4 - Ports (> 4 - Ports)

Fiber Optic Circulators are non-reciprocal devices, which means that changes in the properties of light passing through the device are not reversed when the light passes through in the opposite direction. The optical device is commonly used in a wide variety of systems, here are just a few examples: dispersion compensation, optical sensors, optical amplifiers, WDM systems, optical add/drops multiplexing (OADMs) and test/measurement instruments such as optical time-domain reflectometers (OTDRs), remote fiber (optic) test systems (RFTS) and other test equipment. Fiber optic circulator functionality is an excellent candidate for integrating with a transmitter and receiver into a single package. Circulators provide an ideal solution for coupling devices into a fiber optic network without the inherent 3dB loss of an optical coupler. Circulators directional functionality enable simultaneously adding and dropping signals from a fiber as well as coupling other optical signal processing devices.

Fiber optic circulators typically fall into two main classes: 4-port waveguide circulators based on Faraday rotation of propagating waves in a magnetized material, and 3-port "turnstile" or "Y-junction" circulators based on cancellation of waves propagating over two different paths near a magnetized material.

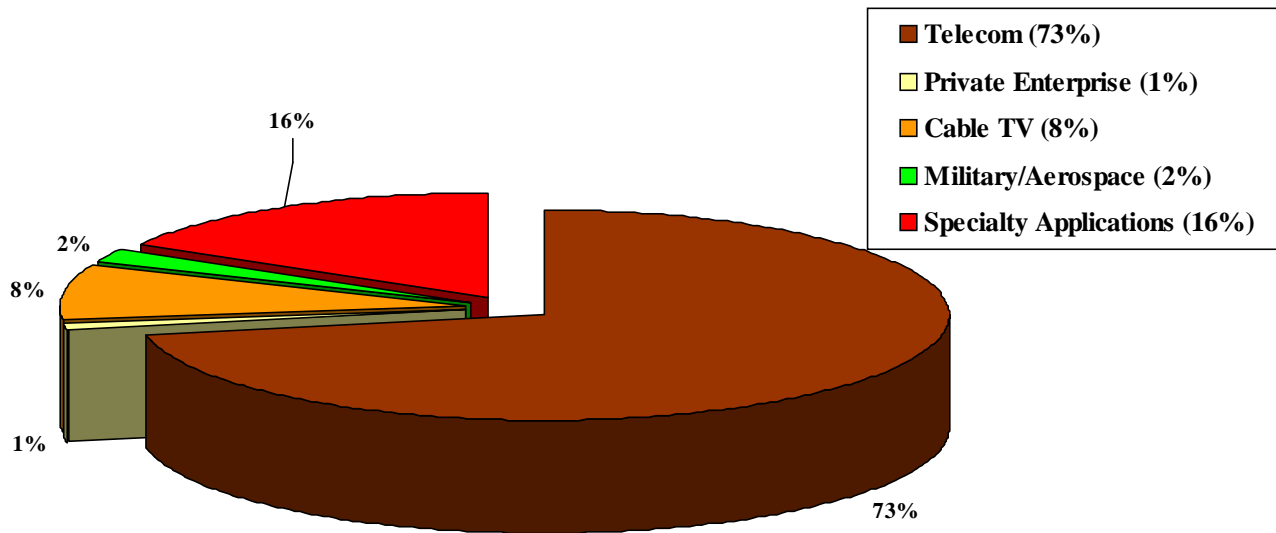
The global consumption value of fiber optic circulators: During 2010-2015, the value is forecast to increase at an average annual growth rate of 14.29 percent. The American region (South, Central and North America) led in market share, last year in 2010; however, the Asia Pacific region (APAC), led by "green-field" telecommunication build-outs is forecast to eventually grab the leadership role. The Europe, Middle East and Africa region (EMEA) use (consumption) of fiber optic circulators is forecast to lag behind.

Consumption is based on the geographical (region) location where the fiber optic circulator is first used into a higher-level sub-component, component, or apparatus. All values and prices, reported by ElectroniCast Consultants, are at factory as-shipped

levels, and are in current dollars, which include the effect of a forecasted 5 percent annual inflation rate over the forecast period.

Telecommunications Leads in Fiber Optic Circulator Consumption The fastest annual growth of the worldwide consumption value of fiber optic circulators is forecast to be in the Telecommunications application. Telecommunications is set to maintain its dominant market share lead throughout the forecast period, with the Specialty applications (R&D laboratory, sensors, test equipment, oil/gas, other) maintaining the position of second-place. Figure 1 shows the consumption value market share (%) of the fiber optic circulator market last year (2010), segmented by application.

Figure 1
Fiber Optic Circulator Global Application Market Share (%)
(2010)



Source: ElectroniCast Consultants

Table of Contents

1.	Fiber Optic Circulator Market Forecast – Executive Summary	1-1
1.1	Market and Technology Overview	1-1
1.2	Fiber Optic Networks – Overview	1-19
1.3	Fiber Optics Industry: Decade-to-Decade	1-57
1.4	Use of Fiber Optics in Harsh Environments	1-66
2.	Market and Technology Analysis	2-1
2.1	Global Summary	2-1
2.2	America Market Forecast Data Tables	2-13
2.3	EMEA Market Forecast Data Tables	2-19
2.4	APAC Market Forecast Data Tables	2-25
3.	Fiber Optic Circulator Competitors (nearly 40) - Descriptions	3-1
4.	Optical Communication Trends	4-1
4.1	Fiber Network Technology Trends	4-1
4.2	Components	4-18
4.2.1	Overview	4-18
4.2.2	Transmitters and Receivers	4-19
4.2.3	Optical Amplifiers	4-20
4.2.4	Dispersion Compensators	4-21
4.2.5	Fiber Cable	4-22
4.3	Devices and Parts	4-24
4.3.1	Overview	4-24
4.3.2	Emitters and Detectors	4-25
4.3.3	VCSEL & Transceiver Technology Review	4-26
4.3.4	Optoelectronic Application-Specific Integrated Circuits (ASICs)	4-35
4.3.5	Modulators	4-35
4.3.6	Packages	4-39
4.3.7	Optoelectronic Integrated Circuits	4-39
5.	Methodology	5-1
5.1	Research and Analysis Methodology	5-1
5.2	Assumptions of Fiber Optic Component Global Market Forecast	5-5
6.	Definitions: Acronyms, Abbreviations, and General Terms	6-1
7	Market Forecast Data Base – Overview and Tutorial	7-1
7.1	Overview	7-1
7.2	Tutorial	7-3
Addendum: <u>EXCEL – Data Base Spreadsheets</u>		
Complete Market Forecast (2010-2015)		
Global		
America		
EMEA		
APAC		

List of Figures

1.1.1	4-Port Fiber Optic Circulator Application	1-2
1.1.2	Fiber Optic Circulator Use in DWDM/OADM Application	1-3
1.1.3	Polarization Maintaining Optical Circulator	1-4
1.1.4	UDWDM 2500 Channel Filter Module	1-14
1.2.1	Broadband Business Services Market Forecast Structure	1-20
1.2.2	North America Multi-protocol Label Switching (MPLS)	1-35
1.2.3	North America Internet Access	1-36
1.2.4	FTTP PON Architecture	1-37
1.2.5	Next-Generation Wholesale Broadband Network	1-41
1.3.1	Evolution of Research Emphasis during Technology Life Cycle	1-65
1.4.1	USA- Base Defense Budget (Proposed vs. Actual)	1-77
3.1	Polarization Independent Optical Circulator	3-2

3.2	Polarization Independent Optical Circulator	3-6
3.3	Optical Circulator	3-9
3.4	Product Coverage	3-14
3.5	Product Offering	3-16
3.6	Fiber Optic Circulator	3-17
3.7	Fiber Optic Circulator	3-18
4.3.3.1	Genealogy of VCSELs	4-28
4.3.3.2	Typical Intra-Office Interconnections	4-32
4.3.7.1	Trend of Transceiver Packaging Density, Gigabits/Cubic Inch	4-45
5.1.1	Market Research & Forecasting Methodology	4-3

List of Tables

1.1.1	Fiber Optic Circulator Global Forecast, By Region (\$, Million)	1-5
1.1.2	Fiber Optic Circulator Global Forecast, By Application (\$, Million)	1-6
1.1.3	Fiber Optic Circulator Global Forecast, By Port-Count (\$, Million)	1-7
1.2.1	Minimum & Ideal Speeds Necessary for Popular Applications	1-27
2.1.1	Fiber Optic Circulator Global Forecast, By Application (\$, Million)	2-4
2.1.2	Fiber Optic Circulator Global Forecast, By Application (Quantity/Units)	2-5
2.1.3	ElectroniCast Market Forecast Fiber Optic Circulator Component Categories	2-7
2.1.4	ElectroniCast Market Forecast Fiber Optic Circulator Application Categories	2-8
2.1.5	Global Total Consumption Forecast: Fiber Optic Circulators (Value, Quantity, ASPs)	2-9
2.1.6	Global Total Consumption Forecast: 3-Port Fiber Optic Circulators (Value, Quantity, ASPs)	2-10
2.1.7	Global Total Consumption Forecast: 4-Port Fiber Optic Circulators (Value, Quantity, ASPs)	2-11
2.1.8	Global Total Consumption Forecast: >4-Port Fiber Optic Circulators (Value, Quantity, ASPs)	2-12
2.2.1	Fiber Optic Circulator America Forecast, By Application (\$, Million)	2-13
2.2.2	Fiber Optic Circulator America Forecast, By Application (Quantity/Units)	2-14
2.2.3	America Total Consumption Forecast: Fiber Optic Circulators (Value, Quantity, ASPs)	2-15
2.2.4	America Total Consumption Forecast: 3-Port Fiber Optic Circulators (Value, Quantity, ASPs)	2-16
2.2.5	America Total Consumption Forecast: 4-Port Fiber Optic Circulators (Value, Quantity, ASPs)	2-17
2.2.6	America Total Consumption Forecast: >4-Port Fiber Optic Circulators (Value, Quantity, ASPs)	2-18
2.2.1	Fiber Optic Circulator EMEA Forecast, By Application (\$, Million)	2-19
2.2.2	Fiber Optic Circulator EMEA Forecast, By Application (Quantity/Units)	2-20
2.2.3	EMEA Total Consumption Forecast: Fiber Optic Circulators (Value, Quantity, ASPs)	2-21
2.2.4	EMEA Total Consumption Forecast: 3-Port Fiber Optic Circulators (Value, Quantity, ASPs)	2-22
2.2.5	EMEA Total Consumption Forecast: 4-Port Fiber Optic Circulators (Value, Quantity, ASPs)	2-23
2.2.6	EMEA Total Consumption Forecast: >4-Port Fiber Optic Circulators (Value, Quantity, ASPs)	2-24
2.2.1	Fiber Optic Circulator APAC Forecast, By Application (\$, Million)	2-25
2.2.2	Fiber Optic Circulator APAC Forecast, By Application (Quantity/Units)	2-26
2.2.3	APAC Total Consumption Forecast: Fiber Optic Circulators (Value, Quantity, ASPs)	2-27
2.2.4	APAC Total Consumption Forecast: 3-Port Fiber Optic Circulators (Value, Quantity, ASPs)	2-28
2.2.5	APAC Total Consumption Forecast: 4-Port Fiber Optic Circulators (Value, Quantity, ASPs)	2-29
2.2.6	APAC Total Consumption Forecast: >4-Port Fiber Optic Circulators (Value, Quantity, ASPs)	2-30
2.4.7	Countries Classified in the APAC Region	2-31
4.1.1	IEEE 802.3ba 40G/100G - Physical Layer Specifications	4-10
7.1.1	Data Base Categories, by Component Type	7-2
7.1.2	Data Base Categories, by Application	7-3