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Fiber Optic Connectors in Military and Commercial Applications

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Abstracts

Bishop & Associates has just released a new 13-chapter research report exploring the rapidly evolving technology and interface components supporting data transmission via optical fiber. This report includes a tutorial addressing the basics of optical transmission, as well as a review of current and recently announced connectors offered by leading suppliers. Typical applications in both military and commercial are discussed.

Fiber optic links offers nearly unlimited high-speed bandwidth, improved signal density and immunity to EMI, and crosstalk; all factors that are highly desirable in today’s advanced communications and computing equipment. Fiber strands the size of a hair can convey hundreds of high-speed signals replacing bulky and heavy copper cables. The ability to transmit signals many kilometers without amplification was immediately adopted by the telecom industry in long-haul applications, but wide market adoption in additional market segments has stumbled due primarily to cost.

The immanent demise of copper has been predicted many times over the years, but a combination of advanced chip technology together with improvements in design for signal integrity has allowed engineers to find ways to expand the practical bandwidth of copper. Costs associated with the required electro-optic conversion process together with connectors that require skilled technicians to successfully terminate discouraged broad market conversion to fiber.

As we reach system requirements for 10+ Gb/s channels, fiber is again gaining attention as a viable alternative. High-performance copper cable assembles suffer as length increases. Precision passive cable assemblies can improve performance, but add cost and are available from a limited supplier base. Active copper cables with integrated signaling conditioning features improve high-speed and distance

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characteristics but also add more cost as well as consume power. Fiber optic links are beginning to approach cost parity with copper in many applications.

In addition to a variety of standard fiber optic connector types, manufacturers have introduced new products that provide system designers more options than ever before. Small form factor pluggable modules including SFP+ and QSFP+ enable the choice of copper or fiber I/O at any point from initial installation to future upgrades without modifying the equipment. Active optical cables mate with standard copper connectors on the I/O panel, but convert the signal to optical for transmission via fiber. Chapters in this report review both of these technologies and their implications on future system design.

The expanding universe of fiber optic components is providing increased design flexibility to new as well as upgraded equipment.

Some of the issues addressed in this market research report include:

What are the most popular standard fiber optic connectors currently available in the market today?

What factors have delayed widespread implementation of fiber in computing and military applications?

How do formal and defacto industry standards influence the selection of fiber optic links?

What is the development status of true fiber optic backplane assemblies? Does market demand exist for optic backplanes in the foreseeable future?

What progress has been made in the integration of fiber optic components on silicon chips (silicon photonics)?

Who are the leading suppliers of fiber optic connectors? What products do they offer?

At what distance and data rate does fiber links become a more practical choice over copper?

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Are active fiber cable assemblies a long-term solution to bandwidth and cable bulk problems?

What requirements are driving renewed interest in fiber in military applications?

Are fiber optic links viable today for “in-box” applications?

Will RF over fiber become a significant market over the next 5 years?

Which emerging markets or technologies may drive the future development of high-speed I/O links opening potentially new applications for fiber?

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