Fiber Optic Super Connectors

The Expanded Beam Solution

Fiber optic technology, fiber optic products, and the range fiber optic applications have certainly grown over the past several years. My first development project using fiber optics took place when I was still listening to music on cassettes. Fast forward 10 years and we were on the brink of Gigabit Ethernet. Gigabit Ethernet along with Fibre Channel were the two technology drivers that pushed fiber optics into the mainstream. Add another 5 years and we were in the middle of what would become the internet bubble. In the shadow of this activity, fiber optics also migrated and thrived in environments where not too long ago fiber would never have been considered. So what enabled this migration to take place?

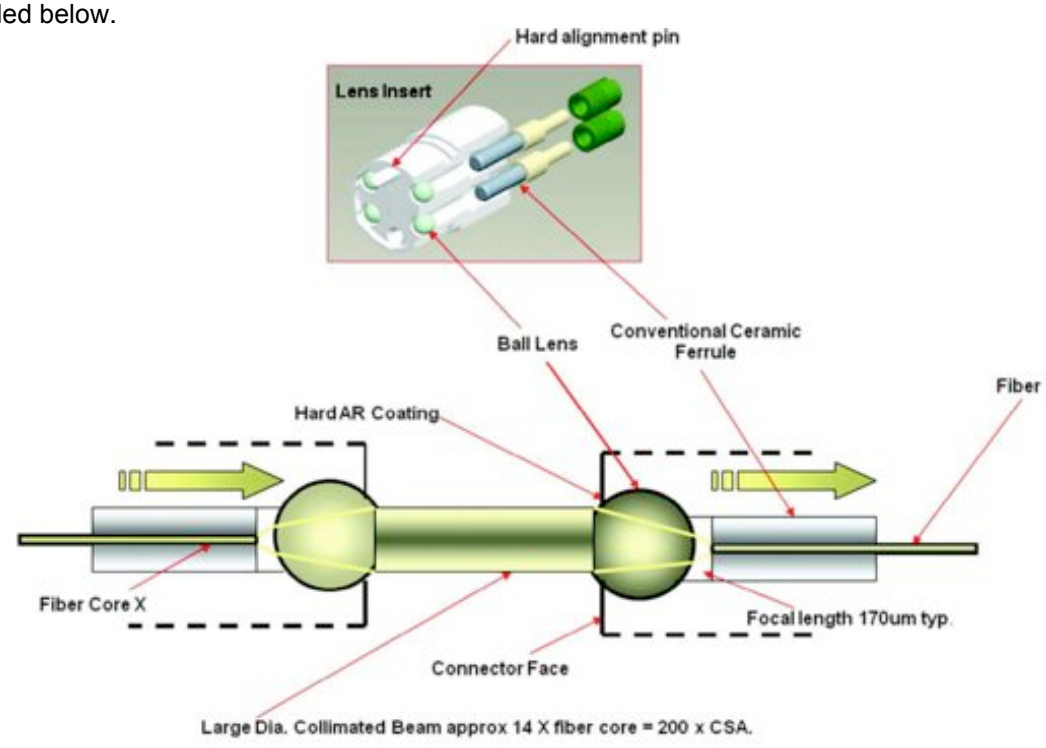
Expanded Beam Applications

Before discussing the technology, let's look at some of the new applications for expanded beam connectors: avionics, military vehicles, shipboard systems, the petrochemical industries, and a host of other industrial applications. These applications all require solid performance in high shock and vibration environments. They all must also provide a robust solution against fiber's historical foe: dirt/debris/contamination. The technology solution that addresses each of these requirements, and that has enabled fiber optics into harsh environments, is expanded beam connector technology. Not to discount the advances in cable strength and durability, but it still comes down to the basic fact that light must successfully propagate across the connector interface in order to have a successful link.

Connector Design and Technology

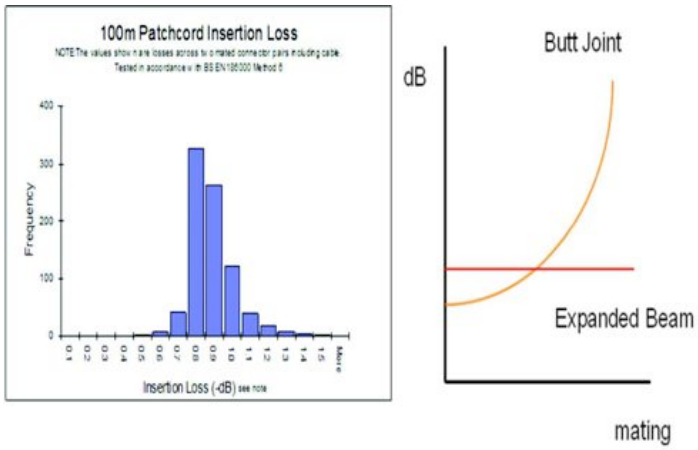
Let's start with a brief overview of expanded beam technology. The illustration above shows the key elements included in the connector, namely the standard ferrules, ball lens, lens insert and connector face. As shown, the light path is enlarged by over an order of magnitude to mitigate the impact of dirt and debris on the interface. This is the key attribute of the expanded beam interface.

A simple summary and comparison of both physical contact and expanded beam technologies is provided below.



Expanded Beam Advantages

The key aspect of the expanded beam solution is the consistent, repeatable insertion loss performance over mating cycles and environmental conditions. While the initial insertion loss may be fractionally higher than the physical contact solutions, over time this parameter remains constant versus the increase in IR seen with the physical contact. This is illustrated in the graph on page 24. In addition to this, the expanded beam connectors can easily be cleaned in the field with slightly more than a bottle of water and a shirt sleeve. A video demonstration of this cleaning process can be found on YouTube at: http://www.youtube.com/watch?v=fYzGMCthIY0&feature=related



Stratos offers a complete line of expanded beam products to address these applications. Options include channel counts, fiber types, and supported wavelengths.

An examples of the EMERSON EB connectors is shown below.

Where to buy?

Official representative:

SINUS Electronic GmbH
Herr Michael Russ
Schleifweg 6-10
DE-74257 Untereisesheim
Deutschland (West)
Telefon: 0049 (0) 7132 9969 0
Email: michael.russ@sinus-electronic.de
http://www.sinus-electronic.de

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