

The MTP[®] Connector

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The MTP connector is a multifiber connector that contains up to twelve optical fibers within a single ferrule. This design allows the use of ribbonized fiber to achieve very high density. This density is directly translated into money savings due to the reduced need for optical hardware, and because less telecommunications room real estate is required. As shown by the adapters in Figure 1, an MTP connector takes up less space on a panel than SC duplex connectors. As customers are now migrating from the SC connector to smaller form factor connectors, such as the MT-RJ, the MTP promises to be the next step in high-density applications.

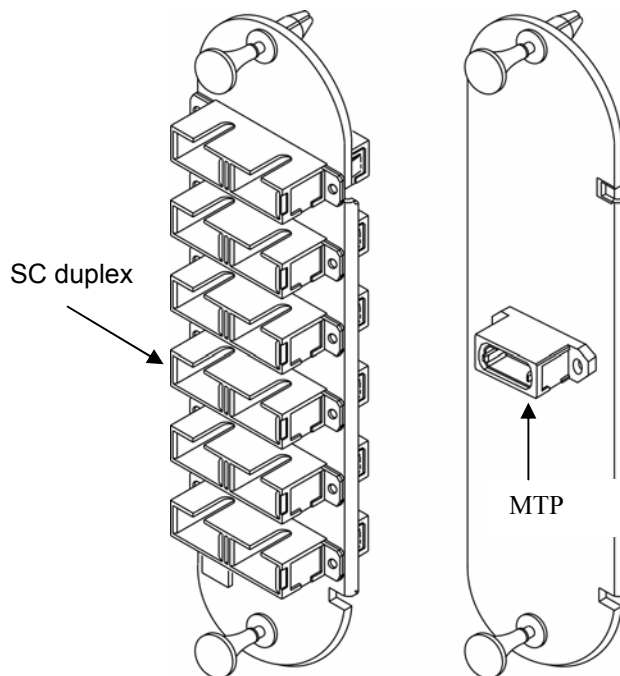


Figure 1: Two 12-fiber panels with adapters, SC duplex compared to MTP

Applications Engineering Note

TIA/EIA-604-5, *Fiber Optic Intermateability Standard, Type MPO (FOCIS 5)* describes the dimensions and tolerances required for intermateability between manufacturers' products. Connectors and adapters from different manufacturers that are compliant to this document should be capable of intermating. MPO is a generic name for the MTP connector, and MPO and MTP connectors that are compliant to FOCIS 5 can intermate. Other twelve-fiber connector types that are not compliant to FOCIS 5 are not intermateable with MTP/MPO connectors or adapters. IEC 1754-7/A2, *Fiber Optic Connector Interfaces Part 7: Type MPO Connector Family* provides similar information for the international market.

The MTP connector is currently available in four, eight, and twelve fiber varieties. Each variety is terminated upon ribbonized fiber of the same fiber count. The twelve-fiber version is the most common type seen in North America, and obtains the higher density. Products are under development that will contain more than twelve fibers in one connector.

MTP endfaces are aligned by the use of precision guidepins. One connector in the mated pair has guidepins; the other connector has two guidepin holes. The guidepins insert into the guidepin holes, aligning the two connectors. Attempting to mate two pinless connectors or two pinned connectors is not recommended, and will not produce the desired optical performance.

The ferrule of the multimode MTP has a flat endface similar to those of MT-RJ ferrules. The single-mode MTP ferrule, however, has an angled end-face to achieve low reflectance. The angled endfaces are able to line up properly in a connector pair due to the orientation of the MTP connectors in the adapters.

MTP connectors are currently designed to mate in a key up to key down fashion. The key of one connector will face 180 degrees from the key of the other connector in the pair. This is currently the only way that these connectors will mate. Figure 2 shows the typical mating of two MTP connectors with an MTP adapter.

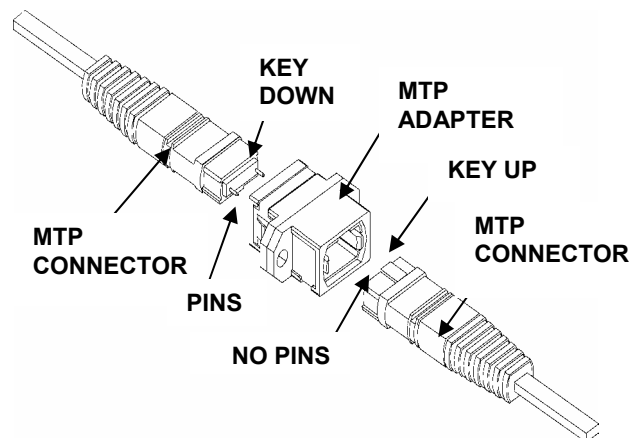


Figure 2: MTP Connectors Mating Key Up to Key Down

Applications Engineering Note

“Key up” is used to denote standard connector placement and “key down” is used to denote connector insertion 180 degrees from normal. Some panels may orient the adapter so that the keyway (and therefore the connector key) faces left or right in a panel.

Note: In future applications, a key up to key up mating may be possible. This type of mating would require a non-standard adapter, and a connector ferrule that has a flat endface.

The typical insertion loss performance for both multimode and single-mode MTP connectors is 0.75 dB average. New high performance multimode and single-mode products have been designed for the OEM market. The insertion loss performance of the multimode version is 0.5 dB maximum. The Elite™ MTP, an eight-fiber single-mode connector, has a 0.35 dB maximum insertion loss at 1550 nm. Histograms of insertion loss and reflectance values (Figure 3) show sample distributions of the Elite product.

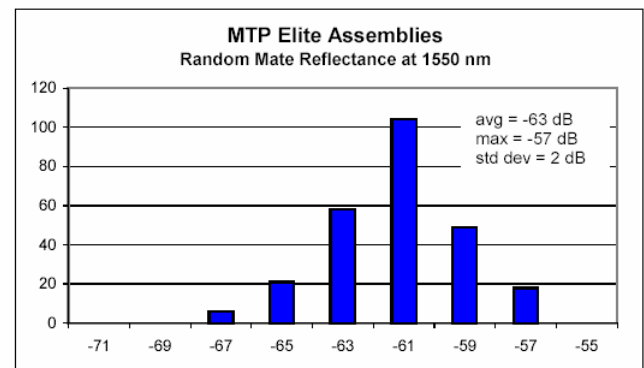
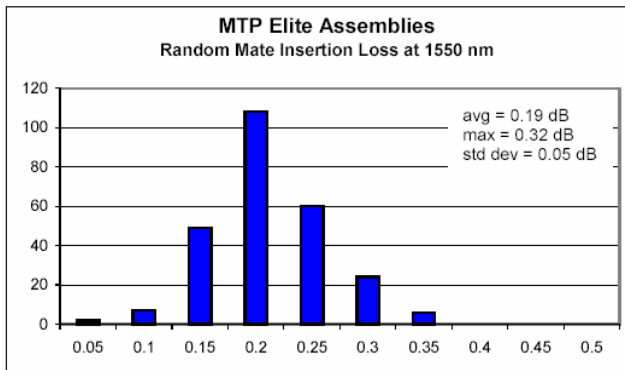


Figure 3: Insertion loss and reflectance performance for a sample distribution of the ELITE MTP connector

Tight tolerances for the ferrule and ribbon dimensions are required to obtain premium performance. Equally important, special polishing and processing steps are required. Corning Cable Systems uses Varsity™ eight-fiber ribbon in their Elite MTP assemblies. Varsity ribbon is needed to obtain Elite type results with bag-of-parts MTP products.

Due to the high density, ribbon interconnect cable terminated with the MTP connector is well suited for the premises environment. Pre-terminated MTP trunks can be used for the building backbone, and then broken out for connection to equipment that is currently shipped with simplex or duplex connectors. Review Corning Cable Systems Application Engineering Note 69 for the outline of a typical Plug’N’Play system.

For field termination, Corning Cable Systems offers a no epoxy, no polish UniCam MTP connector that can be installed in about five minutes. Pre-polished at the factory, this connector is well suited for the quick termination of ribbon fibers or for field-restoration of damaged pre-terminated assemblies. Currently, the UniCam MTP is available for 50/125 and 62.5/125 fiber types. Testing of a field terminated MTP link is outlined in Corning Cable Systems Application Engineering Note 78.

Applications Engineering Note

A few vendors offer electronics with MTP optical ports; these MTP ports always contain alignment pins. Pinless MTP connectors must be used at MTP transceiver ports; therefore, both connectors of an MTP jumper are typically pinless. A new method for parallel optics, defined in OIF-VSR4-03.0 *Very Short Reach (VSR) OC-192 4 Fiber Interface Based on Parallel Optics*, makes use of low cost VCSEL sources to transmit at high speeds over short distances utilizing twelve-fiber ribbon and the MTP connector. An outline of this system type is described in Corning Cable Systems Application Engineering Note 76.

TIA/EIA is in the process of developing a document describing the layout of an MTP system. This technical service bulletin, TSB-136, is in draft form now and expected to be published in 2003.

The MTP connector and ribbon interconnect cable offer a high density, cost-effective solution. Please contact Corning Cable Systems for more information on specific products and for high density system design involving the MTP connector and ribbon cable.

Note: MTP is a registered trademark of USConec., Ltd