

# The Path Less Traveled

Providers are discovering the benefits of fiber pathways with MPO connectors for MDU fiber deployments.

By Adam Krozel / 3M Communication Markets Division

**T**he multiple-dwelling-unit (MDU) market continues to present an enormous opportunity for service providers to expand their subscriber bases. As service providers increase their emphasis on deploying fiber optic services to MDUs, suppliers have responded with the development of network components to meet the unique needs of the MDU market. This evolution has, in turn, influenced a progression of advancements in fiber-to-the-home (FTTH) deployment methods, especially those that address the special requirements of brownfield MDUs.

Fiber drop cable and cable pathway systems specifically geared toward the brownfield MDU market were first introduced in 2009. These products were designed to address the engineering challenges, high installation costs and aesthetic concerns associated with FTTH installations in MDUs. The flexible, low-profile, adhesive-backed fiber pathways are preloaded with bend-insensitive fiber, allowing a one-step installation process. A system of this kind can be installed around the perimeter of a hallway or living unit in just one pass. The pathways have helped providers simplify installations, reduce labor costs and reduce the visual impact of FTTH deployments – a significant concern of many MDU residents and potential subscribers, particularly in high-end buildings.

Now, providers are realizing the enhanced benefits of using fiber pathways that are preterminated with multifiber push-on (MPO) connectors. MPO connectors improve upon the benefits pathway solutions already offer. Faster installations, additional cost savings

and improved aesthetics can be achieved with an MPO-connectorized pathway. One MPO connector replaces 12 discrete SC/APC connectors, which can speed up deployment. An MPO-terminated pathway also eliminates the need for a fiber distribution terminal (FDT) on each floor, thus reducing equipment costs, minimizing visual impact and saving space – a win for both providers and MDU subscribers/residents.

## A CONNECTOR REINVENTED

As defined by the TIA FOCIS-5 standard, an MPO-style connector is a compact array connector that can support up to 72 optical fibers in a single connection and ferrule, although a 12-fiber configuration is the most common. The connectors were introduced in the early 1990s for use with high-density fiber applications, primarily in interoffice data network environments. The first generation of connectors, however, did not prove to be the most reliable solution. It was not unusual for first-generation MPO connectors to fall short of GR-1435-specifications for multifiber connectors. Many of the connectors exhibited high optical loss at temperature extremes and poor mechanical durability.

Vendors responded by redesigning their MPO products, resulting in a new generation of connectors that are better performing and more rugged than earlier connectors. Today's MPO connectors generally deliver much lower insertion loss. Thanks to the advent of single-mode (SM), premium performance ferrule technology, typical attenuation values below 0.15 dB (0.35 dB Max/

channel) can be achieved. Features vary by manufacturer, but many of today's premium MPO connectors also offer improved mating durability via housing redesign, improved strain relief, and novel guide pin chamfer/radius designs that prevent guide hole damage in the opposing MPO connector. Most SM MPO connectors now are factory terminated with polishing processes that ensure precise fiber geometry and optical contact.

With these improvements and the desire for increased fiber density, MPO connectors have been rediscovered. MPO technology is now commonly found in data center and high-performance computing physical layer installations. In fact, MPO is the specified transceiver interface per IEEE 40/100G standards. More recently, communications service providers have begun to realize the benefits of MPO technology as a cost-effective, plug-and-play connectorization strategy for deploying fiber optics in MDU residential housing.

In an example of a configuration available today, riser-rated MPO-to-MPO cables are used to connect a fiber pathway on each floor to the fiber distribution hub (FDH), typically located in the basement of an MDU building. The fiber pathway connects to the riser cable via a 12-fiber MPO connector or connectors housed in a small wall box or collector on alternating floors. The pathway then runs around the perimeter of the hallway, delivering fiber to small point-of-entry boxes located above each living unit's doorway.

### A BETTER PATHWAY

Fiber pathway products have already been proven to reduce equipment and labor costs and improve aesthetics compared with previous, labor-intensive methods. Traditional methods include installing crown molding or latch raceway along hallway walls or hiding microduct behind walls or above ceilings. Those methods require installing a conduit first, then pulling fiber through it. Alternatively, fiber cable is sometimes simply stapled to the wall, which is not an option for buildings with concrete walls or



The new 3M One Pass Fiber Pathway with MPO Connector allows termination of six or 12 fibers in one step. The product also eliminates the need for large fiber distribution terminals on every floor, a significant material savings.

where residents/owners care about aesthetics. A fiber pathway allows a quick, one-step installation that doesn't require carpentry work or drilling. The pathways are hardly noticeable and, when painted, practically disappear into the wall.

Adding a 12-fiber MPO connector further simplifies installation and improves aesthetics. An MPO-connectorized fiber pathway can reduce installation costs compared with more common methods. How so? The MPO connector eliminates the need for a bulky FDT on every floor and can reduce related labor costs because one MPO connector replaces 12 discrete SC/APC connectors. FDTs are replaced with smaller, much less expensive boxes that house the MPO adapters.

Consider this example scenario: XYZ service provider deploys FTTH service to a 240-unit residential tower with 12 units on each of its 20 floors. Deploying service to every unit would typically require one FDT per floor at around \$200 apiece. In addition, the typical installation would require 240 discrete fiber terminations at the building's FDTs.

By comparison, XYZ could use an MPO-connectorized pathway. Instead of FDTs, this solution requires a small wall box on each floor, costing about \$30. This instantly saves about \$3,400 in materials. In addition, the provider

saves installation time because 12 fibers at a time can be connected in seconds with a single MPO connector. Eschewing the FDT also minimizes footprint and saves space in the communications closet. Or, if the current FDT is placed in a visible area, such as a stairwell, eliminating it can help satisfy building owners/residents/property managers who are concerned about network equipment impacting the interior decor of their buildings.

In addition to the benefits brought about by MPO connectors, XYZ retains all the benefits of the original fiber pathway product: easy, one-step installation that requires minimal installer training; low visual impact of the fiber cable itself; and no-mess installation that eliminates the need for carpentry work and minimizes disturbance to residents.

The trend toward smaller, flexible components that are aesthetically pleasing to homeowners marked a major shift in the way fiber is deployed in MDUs. Now MPO connectors have improved the fiber pathway, offering additional benefits to both service providers and their subscribers. ❖

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