Size Matters: When it comes to FTTH deployment in MDUs, less is more.

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Business White Paper

3M

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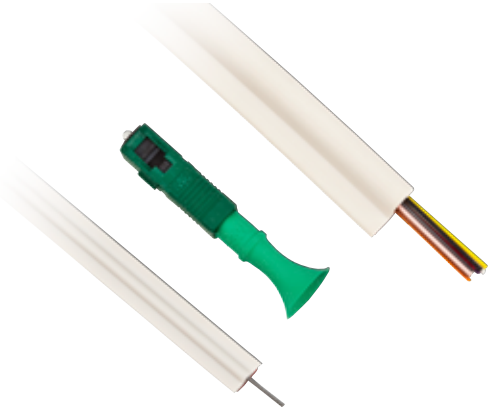
Introduction

Since the dawn of residential telephone service, consumers have demanded more aesthetically pleasing products from the communications industry. From sleeker home phones to the disappearing cable box to shrinking modems, size – or lack thereof – has been a critical driver of innovation. It's not enough to provide excellent products and services; they have to look good, too. Consumers want triple play and high-speed broadband services, but they don't want to see clunky components strewn about their homes. Meanwhile, the omnipresent need to improve product performance and services while reducing cost continues to motivate the highly competitive communications industry.

Nowhere is this trifecta of drivers more apparent than in the hot multi-family dwelling (MDU) market. Since 2006, when deployment of fiber optic networks to apartments and condominiums began in earnest in North America, industry suppliers quickly responded to the demand for high-performing, unobtrusive, cost-effective network hardware.

In the race for MDU subscribers, some providers have chosen to take fiber all the way into the living unit, for various business reasons. Among them, fiber-to-the-home (FTTH) deployment in MDUs provides greater bandwidth and a better customer experience. It also avoids the often complicated problem of finding space in the building for shared, 19-inch rack-mounted optical network terminals (ONTs). And, it can be more cost effective because individual living-unit ONTs are only deployed as individual subscribers sign up for service. In addition, the cost to power the ONTs is paid directly by the consumer rather than the building owner, as is the case with a shared, rack-mounted ONT.



Yet, FTTH in MDUs is fraught with its own set of challenges. In brownfield MDUs in particular, size matters. By their very nature, MDUs are comprised of compact living spaces where bulky hardware eats up space and stands out visually. Moreover, the architectural design of MDUs produces apartment layouts with many corners and turns, further compounding the issue of running fiber cable through the home without compromising signal performance.

Three major developments have led to aesthetically pleasing deployment of fiber inside the MDU living unit while preserving signal quality and reducing costs. The desktop ONT, bend-insensitive fiber and adhesive-backed fiber pathway drop cable solutions together deliver high-quality service with minimal visual impact.

3M™ One Pass Fiber Pathway Installation

The MDU Network Solution

Dawn of the Desktop ONT

When North American service providers first began deploying FTTH in MDUs, ONTs designed for single-family homes were the most likely option. Mounted on the outside of a house, single-family ONTs serve one family. However, the outside plant option isn't feasible for MDUs – the last thing building owners want is dozens of boxes clinging to exterior walls, especially of valuable, high-rent properties. These same ONTs are also too unsightly for use inside the living unit and too expensive since single-family ONTs have to be ruggedized in order to withstand the elements – features no longer necessary if used indoors. Providers adapted by placing re-designed ONTs inside closets – usually a utility or coat closet – just inside each living unit. The closeted ONT turned out to be a workable but less than optimal solution. Among the disadvantages:

Many apartments and condos have small closets, and ONTs take up precious storage space — undesirable to many subscribers.

The ONT requires a power source, usually unavailable in a closet, requiring the installation of new electrical wiring and outlets. That added to service installation time and cost, as well as inconvenience to residents.

And, running coaxial or Cat. 5 cable from the closet ONT to the subscriber's TVs, phones and computers can require lengthy cable feeds, adding cost.

Service providers and their suppliers quickly responded by developing the desktop ONT. First used in the U.S. in 2009, the desktop ONT is significantly smaller and lighter and than its single-family counterpart. Looking much like a wireless router, a device most tenants were familiar with, the desktop ONT could be placed in open living areas without objection.

Smaller than a typical cable modem, the desktop ONT is worthy of displaying next to the flat-screen TV, where it can take advantage of existing power outlets and apartment wiring, reducing installation time and cost. Desktop ONTs cost less and use up to 30 percent less power than their single-family counterparts, an added benefit for subscribers or building owners.

Cost-effective and aesthetically pleasing, the desktop ONT marks a significant step forward in FTTH deployment to MDUs.

A New Bend on Fiber

An equally important innovation dovetailed with the advent of the desktop ONT: bend-insensitive fiber.

Conventional fiber optic cable can withstand a minimum bend radius of 30 mm – roughly speaking, it can bend around a soda can at best. Any tighter of a bend and it begins to experience unacceptable levels of attenuation. In MDUs with multiple sharp corners and tight spaces, installing fiber cable within the acceptable bend radius often proves difficult, leading to two scenarios: The cable cannot be installed flush to the wall or baseboard around corners, producing unsightly gaps; or, the technician ignores the minimum bend requirement, leading to service complaints.

In 2002, the first bend-insensitive fiber cable was launched in the U.S. It was capable of a 10 mm bend radius without affecting signal performance. Since then, manufacturers have improved upon first-generation bendable fiber, developing fiber with allowable bend radii of 7.5 mm and even as little as 5 mm, which can easily achieve a 90-degree bend.

Bend-insensitive fiber cable has found its true calling in MDUs, where service providers began deploying it in the U.S., along with desktop ONTs, in 2009. The ability of bend-insensitive fiber to hug the wall around the multiple sharp corners found in apartments and condos has significantly increased the aesthetic appeal of FTTH deployment. It also saves costs in terms of installation time and reducing the occurrence of damaged cable and service interruptions.

Drop-Dead Invisible

Despite the advancement of the desktop ONT and bend-insensitive fiber cable, service providers deploying FTTH in MDUs still face the challenge of running fiber strands from the hallway node into the living unit. Traditionally, in older buildings, pathways for routing cables in hallways didn't exist or were too congested with existing wiring and new ones had to be constructed. These pathways were often bulky, expensive, craft-sensitive crown moldings or square latch moldings (also called trunking). Once the pathways were built, drop cables were placed one at a time to complete the two-step, time-consuming installation process.

To create pathways inside the apartment unit, ruggedized drop cables are often stapled along ceilings, door frames and baseboards. In addition to being unsightly to many tenants, the long-term viability of this method for deploying drop cables is up for debate among cable manufacturers and industry experts. Some manufacturers say careful stapling using a rounded crown staple does not damage the fiber; others advise against stapling altogether. Moreover, in some situations, such as concrete walls and floors, stapling is simply mechanically impossible.

What to do? The stapling question can be avoided altogether by using an adhesive-backed cable pathway and bend-insensitive drop cable solution. The newly released 3M™ One Pass Mini Fiber Pathway combines a 900-micron, ultra bend-insensitive fiber into a thin, low-profile cable pathway that adheres to the wall in just one pass.

An extension of the 3M™ One Pass Fiber Pathway used in MDU hallways, the One Pass Mini is a drop-cable solution specifically designed for the MDU living unit. It allows for quick, easy installation of fiber cable, no staples required. The One Pass Mini adheres to just about any painted or wallpapered surface. Flat and low profile, extending just 2 mm from the wall, the One Pass Mini offers minimal visual impact compared to round, jacketed fiber cable, which can appear bulky. Plus, the One Pass Mini can be painted to blend in with apartment décor.

Moreover, unlike other drop cable systems, the 3M solution is factory terminated on one end and can be cut to length on the other. That means there is minimal cable slack to wrap and hide in a storage box, thus avoiding yet another potential eyesore. The installer quickly and easily terminates the cut end with a field-mount connector, such as the 3M™ No Polish Connector.

Summary

Together, the development of desktop ONTs, bend-insensitive fiber and the 3M One Pass Pathways have created a new fiber deployment solution, custom-made to address the unique challenges of FTTH deployment inside brownfield MDU living units. As service providers continue to chase this competitive market, which remains ripe with opportunity, these three important advances can give providers the advantages of an aesthetic appeal customers' demand along with quick, easy installation and cost savings.

3M™ One Pass Mini Fiber Pathway Installation

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