WHITE PAPER

New Techniques
for Reducing Time and
Cost of MDU Installations

ADC®

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A critical goal for bringing the promise of fiber to residential subscribers is to install flexible and reliable fiber-to-the-premises (FTTP) architectures at the lowest possible cost. Multiple Dwelling Units (MDUs) present particular challenges in this, as the need to deal with conduits and widely varying layouts requires substantial time to both plan and conduct an FTTP installation. A new technique, known as Rapid Fiber, provides significant advantages in achieving this, substantially reducing both the time and cost of conducting MDU installations. This paper will explore the qualitative and quantitative advantages of using Rapid Fiber when compared to current techniques. Although the immense variability in MDU construction creates differences in the complexity, costs, and time associated with an installation, Rapid Fiber is an inherently flexible technique and its benefits carry across a wide range of constructions. Using Rapid Fiber techniques with appropriate hardware will provide cost-effective bandwidth delivery by:

- Reducing the overall cost of an installation, providing for greater return on capital investments
- Reducing the amount of planning time required for an installation, thanks to the increased flexibility of Rapid Fiber hardware.
- Reducing the complexity of an installation by providing a solution for cable storage, slack storage, connector parking, and splice management requirements
- Reducing or eliminating the number of splices and splice technicians required for an installation.
- Providing faster installation times allowing companies to begin providing services sooner.
- Reducing the amount of hardware needed by eliminating splice cases
- Allowing installations to be completed by a smaller service team, with most tasks requiring only one to two people.

This paper explains the benefits of implementing Rapid Fiber hardware and techniques beginning at the fiber distribution hub (FDH) and working to the optical network terminal (ONT). Using Rapid Fiber throughout the installation will streamline the connection process by reducing labor and splicing time and expenses, enabling faster deployments and, more importantly, a greater—and faster—return on investment for providers.

Planning the MDU Installation

In any type of MDU, the ability of a Rapid Fiber fiber distribution terminal (FDT) to store excess cable (up to 200 feet) simplifies planning an installation. After determining the length of any horizontal runs, the height of each floor, and adding an error factor for additional bends or turns in the cable path, a planner can determine exactly how many FDTs with each cable length (100-500 feet) that the installation will require. Using other methods requires either detailed analysis of the length of cable between each FDT and the FDH, or requires cutting cables to length on-site. Either technique can lead to the need for a "do-over" if the length is not correct. With Rapid Fiber, the need to plan for slack storage is eliminated. In addition, the Rapid Fiber FDH is available with a parking lot feature, which eliminates the need for planning any connector parking. Finally, splice management can be eliminated from the planning process—the only splice required is connecting the feeder cable to the FDH.

Conducting the MDU Installation

The significant advantage to a Rapid Fiber MDU system is the speed of installation. If the fiber network installers can be in and out of the building as quickly as the construction workers, it creates a huge incentive for the building owner to decide on a FTTP architecture. In practice, Rapid Fiber allows installers to complete their work and leave the building much sooner than construction workers in greenfield deployments, and with minimal disruption to tenants in brownfield deployments. There are several reasons why this occurs:

- Installers do not need to cut cables to length, have slack storage, or deal with cable storage during the installation. The spool on the Rapid FDT pays out exactly as much cable as is needed, and stores its own slack (up to 200 feet).
- Eliminating the need to set up, strip and clean fibers, align a splice, fuse the fibers, and then apply a splice protector or sleeve—simply clean and plug a connector.
- Cable pulling can be accomplished with only one worker.

For more detail on how Rapid Fiber can be installed faster and for less cost, let's look at a few examples:

Large High-Rise MDU

Stub-Pull Configuration: Consider a large high-rise MDU with 23 floors and 15 units per floor. A 432-fiber indoor FDH is located on the lower level with three 144-fiber stubs. Fiber distribution terminals (FDTs) reside on each floor of the building that route 12 or 24 fibers down to the indoor FDH where they are typically spliced in. In this example, 432 fibers would be spliced between the FDH and the FDTs. 345 individual drop cables would then run from the FDTs to the ONTs, creating another splice point.

Loop-Through Configuration: Consider a large high-rise MDU with 23 floors and 15 units per floor. A 432-fiber indoor FDH is located on the lower level. Several 72-fiber or larger distribution cables are pulled between the FDH and FDTs on higher floors. On each floor, one of the cables is routed through the FDT, opened, two of the 12-fiber ribbons are opened and 15 individual fibers routed to the splice tray in the FDT. In this example, 345 fibers would be spliced between the FDH and the FDTs. 345 individual drop cables would then run from the FDTs to the ONTs, creating another splice point as it is not possible to predict the exact length of each drop. Per-splice costs are also increased because the splicing technician spends additional time routing cables through the FDT and opening them.

Rapid Fiber Configuration: Now, let's create the same infrastructure using Rapid Fiber architecture. In this case, an FDT again resides on each floor, but an MT connector is mounted on the stub of each. The fiber is deployed from each FDT to the indoor FDH, also with built-in 12-fiber MT connectors. Each connection is easily plugged into the FDH from every floor. Installing fiber into an MDU is a simple matter of mounting the enclosures and making Rapid Fiber connections with the cables. Since distances vary from each FDT to the FDH, a built-in fiber spool is designed on the FDT. The spool holds up to 500 feet of fiber cable. Therefore, the cable is easily spooled out to the FDH and plugged in, while any extra cable remains on the spool. The box containing the spool is small—about 9 inches x 6 inches x 3.5 inches (height x width x depth) for 12 and 24 fibers – and can be locked down with a shroud to cover and protect the excess fiber.

Direct cost savings are substantial. In addition to saving on splice cost—which can be as high as $40 per splice when fully burdened with setup time, capital and maintenance costs, etc.—early installations of Rapid Fiber have shown a substantial reduction—as much as 10% in labor time for non-splicing technicians as well. This leads to remarkable cost savings on a per-unit basis:

Item	Non-Rapid-Fiber	Rapid Fiber	Savings
Splicing costs	$50,150 (1254 splices)	$50 (12 splices)	$49,650
Non-splicing labor costs	$3500	$3275	$250
Total Savings			**$56,875**
Per Living Unit			**$146**

Advantage: Rapid Fiber

The Rapid Fiber approach to a FTTP infrastructure is made possible by new advances in connector technology, drop cables, and FDTs. When compared with traditional spliced architectures, Rapid Fiber provides significant cost savings advantages, as well as savings in time and manpower.

Rapid Fiber architectures enable more cost-effective, easy-to-manage, reliable FTTP networks. ADC is in the forefront of these new developments—providing solutions that will meet the unique challenges of bringing fiber directly to every subscriber.

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