COMMSCOPE®

Rethinking the Fiber Termination Panel for More Efficient FTTH Growth

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Introduction

As technological advances in active equipment accelerate, the estimated lifespan of components like Optical Line Terminals (OLTs), switches and servers grows shorter. The general service life for active optoelectronics is about 10 years.[1] The FTTH fiber infrastructure, however, is a generational investment. As the structural skeleton of the FTTH network it needs to be stable yet adaptable. On average, passive infrastructure represents 75% of deployment costs on average[2], with a significant portion of that cost being driven by the civil works needed to deploy fiber to the home.

The contrasting dynamics between the quickly evolving active equipment in the central office (CO) and the highly stable FTTH fiber infrastructure present a significant challenge for network designers. As noted in a 2024 white paper by Ciena, "Regardless of modulation formats, broadband providers must ensure that future [passive optical network (PON) evolutions can use existing fiber cabling without original design manufacturer changes, considering the significant expense of installing fiber cabling."[3]

As demands in the network's coverage area evolve and new services come online, the fiber infrastructure must support the changes. That may mean adapting the topology to accommodate various split architectures; for example, increasing split ratios when migrating to a higher speed PON technology or reducing split ratios where bottlenecks can create traffic congestion. Additionally, the OSP must be able to handle upgraded active technologies and more trunk cables as fiber take rates increase and the network expands.

The critical link: the fiber termination panel

The critical intersection of this dynamic environment is the fiber termination panel where the active equipment inside the CO connects to the passive fiber infrastructure. This transition point in the FTTH network has become increasingly important for several reasons.

- Advances in active equipment are accelerating to meet the increases in subscriber growth, streaming services and IoT deployments. As the FTTH environment becomes more dynamic, telecoms require patching solutions that are more adaptable and configurable.
- The industry continues to struggle amid a chronic shortage of skilled technicians. Adapting to the gradual de-skilling of the labor force involves radically simplifying the fiber termination panel. Even in tier-2 and tier-3 networks, this component is complex; installing, managing and modifying it often requires skilled and experienced technicians.
- Lastly, telecoms are facing increasing pressure to reduce costs and increase ROI. As a result, they are re-evaluating the TCO of their equipment and facilities. More emphasis is being put on right-sizing bulky fiber termination panels, with tier-2 and tier 3-networks considering smaller, higher density solutions. The goal is to not only reduce the panel's footprint but also enable more deployment configurations in order to make the best use of the available floor and wall space.

[1] Expected Life time of Passive optical infrastructures; EuroCable, white paper; January 2021
[2] Full-fibre networks in Europe: state of play and future evolution; Analysis Mason, report; 3 May, 2023
[3] The evolution of the optical line terminal; Ciena Networks, white paper; Oct. 2024

Recently, CommScope engineers introduced a new fiber termination panel platform that addresses many of the challenges mentioned above, along with additional improvements in efficiency, scalability, and ease of installation.

The CommScope XPND™ Platform

With a modular design, compact footprint and interchangeable components, the CommScope XPND™ fiber platform enables telecoms to grow and respond to market changes—quickly, easily and cost-effectively—as they happen.

The platform consists of panels with interchangeable cassettes, modules and cables that work together to support virtually any configuration and application. Panels are shipped empty, and the cassettes and modules are ordered separately. As the network evolves, customers can add cassettes and modules, mixing and matching as needed, or preserve room for future growth. This pay-as-you-grow approach provides a more agile, cost-effective path forward, especially for smaller, growing networks.

The simplicity of totally open design

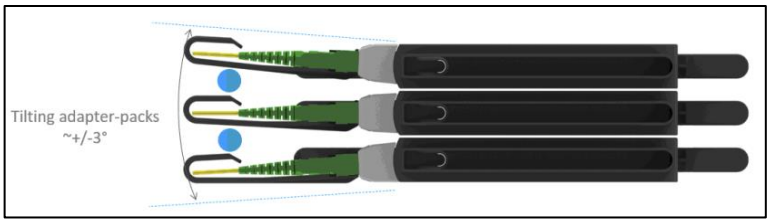
A core concept behind the CommScope XPND™ platform is its fully open design. Each empty panel is a blank canvas, ready to be populated with a virtually unlimited combination of interchangeable cassettes and modules. Add, remove or reconfigure the modular building blocks as your needs change. Purchase only the capacity and capabilities you need, when you need them. With the fully open design of the CommScope XPND™ portfolio, you can minimize SKUs and costs and maximize your opportunities.

CommScope XPND™ panels have a standard depth of just 12 inches. The compact footprint helps maximize per square-foot value while taking up less space and providing more deployment options. One solution can satisfy most interconnect and cross-connect applications, including:

- Central office
- Indoor cabinets
- Outdoor cabinets
- Huts
- Controlled environmental vaults (CEVs)
- Customer premises applications

A streamlined architecture and intuitive operation enable personnel of any skill level to deploy and manage the CommScope XPND™ platform without extensive product training. Cassettes are accessible from the front or rear of the panel and fibers can be routed left or right out of the panel.

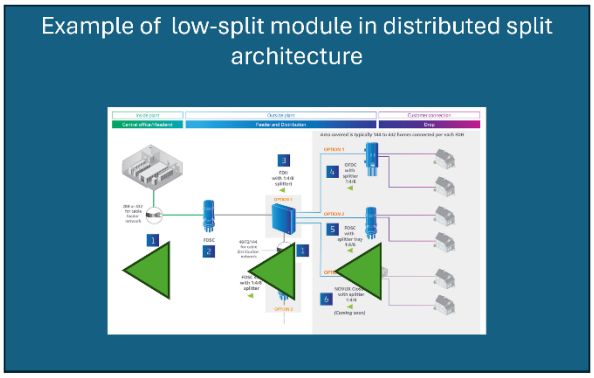
Cassettes also incorporate a unique, patented adapter tilting feature. This design enables the installer to separate adapter rows, pivoting them up and down to allow more room for finger access to individual connectors while protecting fiber bend radius.



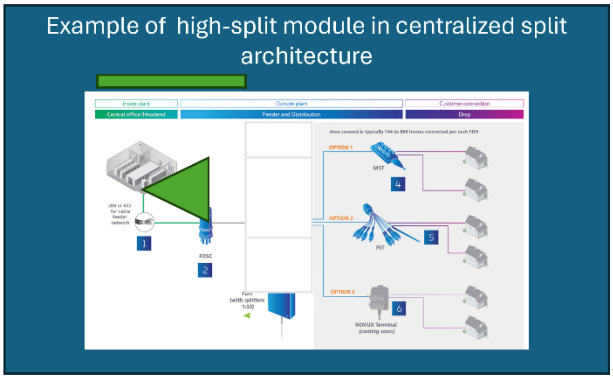
Panel cassettes and modules are available in a variety of configurations with cassettes accommodating up to 48 SC (96 LC) fiber terminations per RU. The CommScope XPND™ platform includes patch/splice

cassettes as well as fiber pass-through adapter packs. Both are available with singlemode SC and LC connectors and APC or UPC options. SC connectorized cassettes feature 12 adapters (12 fiber ports) and those with LC connectors offer 12 duplex adapters (24 fiber ports).

With high and low count splitter modules, the CommScope XPND™ portfolio also enables a variety of FTTH architectures from the central office. For example, centralized designs (for nearby homes) and distributed designs for homes further away. Low count splitters (1x2 to 1x8) can be used in a distributed split architecture, where the next stage splitter is implemented in an outside plant cabinet or remote terminal. Higher-count splitters (1x16 to 1x64) use pigtails and can be used in a centralized split ("home run") architecture, where point-to-point fiber connections connect each home passed to a port on the splitter.



A 1:2 splitter is used in the central office with subsequent splits in the terminals/closures in the fiber infrastructure.



A 1:32 complete split inside and many "homerun" cables, one fiber per home, outside.

How will you XPND?

The outside fiber plant is a generational investment. It must be stable with the ability to adapt to changes in the active equipment, network service areas and FTTX architectures. These changes affect every FTTH network but in vastly different ways, including resource requirements, stage of development and market dynamics. As a result, every network operator must have the flexibility to grow, reconfigure and manage their fiber based on their needs.

The fiber termination panel connecting the active equipment to the passive fiber infrastructure is a key transition point that significantly affects the operator's ability to expand and adapt quickly and efficiently. With current solutions often being bulky, complex and rigid, fiber termination solutions need to be redesigned. The CommScope XPND™ fiber platform provides operators with the agility, fiber density and ease of use needed to make the most of their opportunities.

For more information on the CommScope XPND™ fiber platform, contact your CommScope representative or visit the CommScope XPND™ solution resource page on the CommScope website.