Panduit® Splitter Tray for Enterprise Passive Optical LAN

PANDUIT™
TECHNICAL REFERENCE
TR126

Purpose

Enterprise communication network owners and architects are increasingly interested in network design strategies that allow them to meet the needs of their organization more efficiently. This includes designing and deploying architectures that reduce both capital and operating expenses. Based upon the cost efficiencies realized by Passive Optical Network architectures in Fiber to the Home (FTTH) deployments, several equipment manufacturers have started positioning PON solutions for the enterprise or LAN (Local Area Network) environment. This network architecture, which differs from a traditional switched Ethernet architecture, is often called Enterprise PON or Passive Optical LAN (POL) and is starting to attract the attention of network owners within specific segments including the government/military, education, commercial real estate (office), big box retail stores, residential complex (multi-dwelling units) and health care (hospital) facilities. Most generally, Enterprise PON (EPON) is a cost-effective architecture for larger scale, higher port count deployments.

EPON topologies are comprised of an Optical Line Terminal (OLT), an optical splitter, and an Optical Network Terminal (ONT). The passive optical splitter is the element that replaces the active equipment between the main equipment room and the user interface. This is shown below in Figure 1.

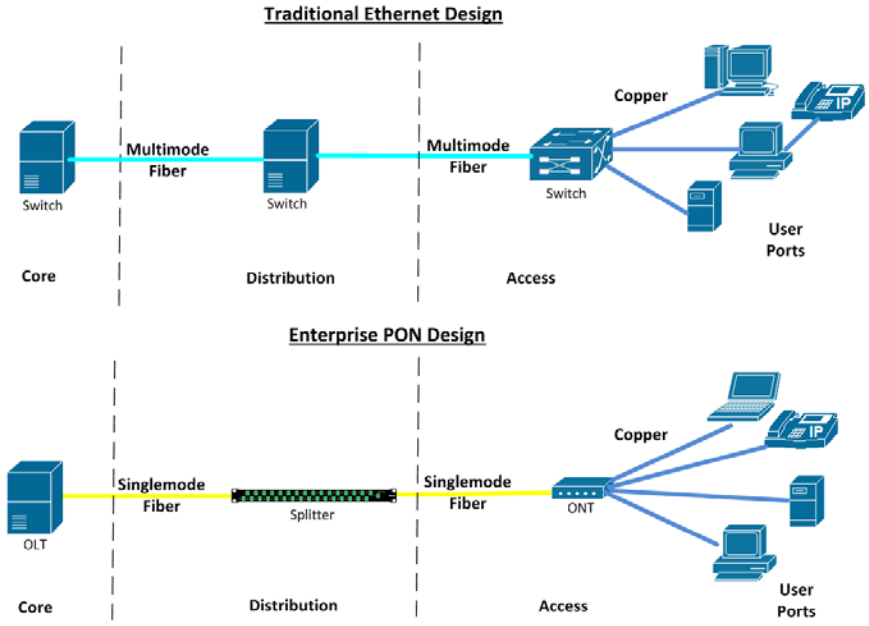


Figure 1. Traditional Ethernet vs. Enterprise PON Networks

The distribution layer of an Enterprise PON network consists of an OLT and a PON Splitter. The splitter takes one OLT signal and equally divides the optical power up to thirty-two times (32x) to serve up to thirty-two (32) ONTs. The ONT in the diagram can then support up to eight individual user interfaces. The result of the signal splitting allows Enterprise PON to support many end devices with minimal cable infrastructure.

What is a Fiber Splitter?

An optical splitter is a passive element in the channel that splits the power from one individual fiber to many fibers. Typical split ratios are 1 x 8, 1 x 16 and 1 x 32. The signal is split using one of two technologies: Planar Lightwave Circuit (PLC) or Fused Biconic Tapered (FBT). PLC technology is superior to FBT technology due to the wider range of operating wavelengths, physical size, lower failure rate, and lower insertion loss. Panduit has chosen to utilize the PLC technology in their optical splitters. Although it eliminates the need for active equipment, the splitter does carry a large insertion loss, dependent upon the split ratio; that needs to be considered during the design stage of any Enterprise PON network.

Solution

Panduit has developed a family of one rack unit (1RU) PON Splitter Trays that can be combined with existing Panduit solutions to create an end-to-end Enterprise PON infrastructure. Panduit will offer: 1 x 8, 1 x 16, 1 x 32, 2 x 8, 2 x 16 and 2 x 32 splitters using SC APC connectivity in a 1RU form factor that fits into the standard 19" rack spacing. The offering will also include two input fiber variations; one that is pre-terminated with SC-APC connectors and the other which allows for fusion splicing. The 2 x N splitters accommodate a second input fiber for those Enterprise PON deployments where a diverse fiber path and OLT port redundancy is desired. Panduit PON Splitter Trays will be manufactured with the following specifications:

Standard Compliance (Meets or Exceeds)	***EIA-568-C.3, TIA-604-3A, (FOCIS-3), ROHS***	
Wavelength Range	*1260-1650nm*	
Maximum Insertion Loss	1 x 8	11.3dB
	1 x 16	14.3dB
	1 x 32	17.6dB
	2 x 8	11.6dB
	2 x 16	14.9dB
	2 x 32	18.2dB
Minimum Splitter Uniformity*	1 x 8	1.0dB
	1 x 16	1.5dB
	1 x 32	2.0dB
	2 x 8	1.0dB
	2 x 16	1.5dB
	2 x 32	2.0dB
Minimum Return Loss	>50dB	
Minimum Directivity*	>50dB	
Operating Temperature	0°C to +50°C	
Storage Temperature	0°C to +50°C	

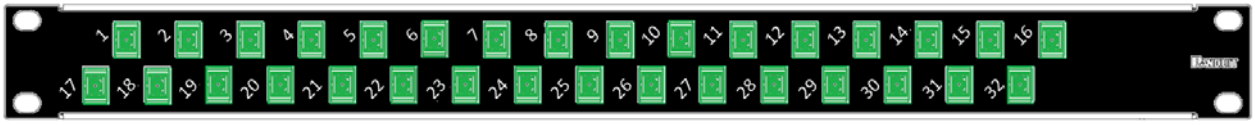
* Splitter Uniformity –The difference in the maximum loss between any two channel, when splitting the output of a single fiber into two or more fibers.

**Directivity –The amount of power observed at a given input port with respect to an initial input power

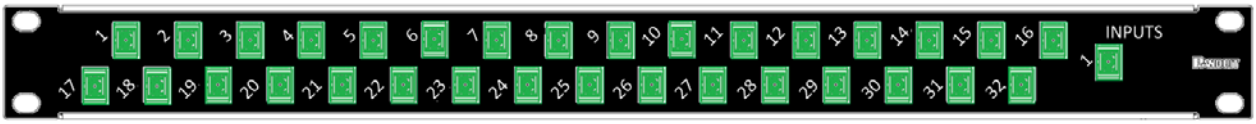
The following show the nine configurations of PON Splitter Trays offered:

32 Port Options

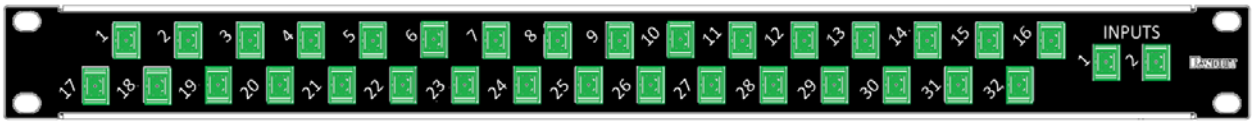
Splicing



Single Input



Redundant Input



16 Port Options

Splicing

Single Input

Redundant Input

8 Port Options

Splicing

Single Input

Redundant Input

The following part number matrix can be utilized to assist in ordering the correct splitter for your application.

part number

Character	1	2	3	4	5	6	7	8	9	10	11	12	13
Example	F	C	P	9	S	P	-	1	0	8	3	G	G

1 – Fiber Product
F = Fiber
2 – Product Line
C = Cassette
3 – Product Line Subcategory
P = Passive optical LAN splitter
4 – Fiber Type
9 = OS2 singlemode fiber
5 – Splice or Pre-Terminated
S = Splice-ready
P = Pre-terminated

6 – Application
P = POL application only
7 – Dash
8, 9, 10 – Splitter Ratio
108 = 1x8 splitter
116 = 1x16 splitter
132 = 1x32 splitter
208 = 2x8 splitter
216 = 2x16 splitter
232 = 2x32 splitter

11, 12 – Adapter Connectivity
3G = SC-APC simplex adapter connectivity
13 – Manufacture
G = General/non-custom version

Summary

Enterprise PON deployments are becoming more numerous throughout the industry, especially in government/military, education, commercial real estate (office), big box retail stores, residential complex (multi-dwelling units) and health care (hospital) facilities. Panduit has developed a family of 1RU PON splitter trays that can be combined with existing Panduit solutions to create an end-to-end Enterprise PON infrastructure.