FiberLAN Optical LAN Solution

Bandwidth Changes Everything!™
FiberLAN

FiberLAN is the most cost effective, efficient and environmentally friendly alternative to existing copper based Ethernet Switch LAN infrastructure available in the market today...

FiberLAN is a high-performance, high-density GPON based Optical LAN solution (OLS) delivering high speed Data, Voice and Video to the Office, Desktop, or Room delivering comprehensive connectivity for any Local Area Networking requirement – today and in the future...

Multi-floor Office/Building Complex
FiberLAN is well positioned to provide bandwidth relief as new applications to the desktop continue to explode and the emerging “Cloud-Computing” environment threatens to further restrict already clogged LAN arteries, new graphic intensive applications, video sharing and editing all place new constraints on the Legacy Copper Switched LAN.

Multi-building Campus
In the Multi-Building Campus environment where distance and operational cost are major considerations for delivering voice, video and high speed data, FiberLAN is the optimal solution!

Multi-floor Hotel
In the Hospitality Industry where space is limited and demands for High Speed Internet Access, Voice, Television and Security monitoring is increasing, FiberLAN provides optimal performance characteristics for the preferred LAN infrastructure.

Multi-building – Harsh – Environment - Industrial/Factory Complex)
Developed for Industrial, Factory or other harsh environments where high speed data, voice and security cameras are mandatory, but space, cooling and power are limited FiberLAN provides Passive Optical Splitters – suited for any environment.
Why Fiber Vs. Copper?

- Advances in technology move at an inconceivably fast pace from simple handheld personal devices, to computers, to company network architectures.
- Attempting to keep pace with these advances has led to a convoluted array of racks, wires, patch panels, and switches.
- Designing a new network infrastructure or refurbishing your existing network is a significant investment. There is no doubt you have considered the challenges of traditional network designs; capacity, efficiency, security, scalability, capital investment, and green initiatives.

- Superior Performance
  (Equipment is much smaller)
- Greater Distance (up to 12 miles)
- Unmatched Security
  (Significantly harder to tap than copper)

- Smaller or Reduced Footprint
- Fiber is Greener than Copper
- Fiber is Less Expensive than Copper-wire
- Fiber has a much smaller Cable Diameter
- Fiber has no cross-talk

Fiber Optic Cable Vs. Copper Cable in the Horizontal

<table>
<thead>
<tr>
<th>Riser Rated Cables</th>
<th>Corning Cable Systems ClearCurve™</th>
<th>Tier 1 Vendor Category 5e UTP</th>
<th>Tier 1 Vendor Category 6a UTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>10G Distance</td>
<td>40 km</td>
<td>45 m</td>
<td>100 m</td>
</tr>
<tr>
<td>Cable OD</td>
<td>2.9 mm</td>
<td>5.7 mm</td>
<td>7.5 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>4 lb / 100 ft</td>
<td>22 lb / 1000 ft</td>
<td>39 lb / 1000 ft</td>
</tr>
<tr>
<td>Minimum Bend Radius</td>
<td>5 mm</td>
<td>22.8 mm</td>
<td>30 mm</td>
</tr>
<tr>
<td>Tensile Strength (Installation)</td>
<td>48 lbf</td>
<td>25 lbf</td>
<td>25 lbf</td>
</tr>
</tbody>
</table>

Relative Bend Radius Comparison

Relative Cable Diameter Comparison
Introduction to GPON

GPON Overview

PON/GPON grew from a requirement for more bandwidth in the Service Provider Market. (Higher access speeds than DSL could deliver)

- More Bandwidth (2.5G Downstream and 1.2G Upstream)
- Higher Subscriber density
- Best replacement for aging copper infrastructure
- Environmentally friendly - green
- Reduce power and TCO cost
- Reduce reoccurring O&M cost

Proven Technology

- First standards developed in 1995
- ITU and IEEE standards based
- Billions of dollars invested in perfecting PON technology
- Fiber Broadband subscribers now surpass cable subscribers

GPON Connectivity - How it works

Legacy Copper-wire Switched LAN Network

- Traditional copper-wire switched LAN networks send radio frequency signals between switches and computers. In turn, the signals from multiple switches are accumulated at core switching and processing devices in the main communications room.

- Ethernet Switches connect via copper to each PC in a descending manner, from core, distribution and edge

- Typical copper based LAN speed for data transfer is 100mbps with newer systems capable of 1000mbps, the newest systems require four pair of wires to accommodate these high speeds and require sophisticated noise-cancelling processes

- These signals can not travel more than 300 feet from the switch to the computer and require significant power requirements
Zhone FiberLAN Infrastructure and Products

FiberLAN is the Next Generation LAN

• Zhone FiberLAN is a next generation Optical LAN Solution (OLS) built entirely on industry leading standards. This fully converged solution is scalable for a single or multilevel buildings, or large campus environments where customers are installing new facilities or upgrading their current LAN infrastructures.

• Designed as a layer 2 transport medium, Zhone FiberLAN delivers converged voice, video, and data services, at Gigabit levels to the end user, over a single strand of fiber; thus reducing your LAN infrastructure cabling and electronics to a fraction of what is required compared to a conventional Ethernet LAN solution.

• As technology advances, so do ways to conserve energy and reduce operating costs. FiberLAN Optical technology replaces conventional copper and multimode cables used with traditional network infrastructures to a single mode fiber optic cable allowing you to eliminate the traditional workgroup switches, patch panels, and racks in the riser closets. FiberLAN Optical LAN Solution significantly reduces:
  • Power consumption by up to 85%.
  • Space requirements by up to 92%.
  • Capital costs related to network elements by up to 73%, while improving availability and manageability.
  • Cabling costs - single mode fiber is less expensive to procure than Multi Mode fiber or copper.

Zhone FiberLAN Fiber to the desktop Optical LAN Solution
Why Zhone FiberLAN? Optical LAN Solution

- Zhone Industry Leadership in GPON Globally
- Zhone Industry Leading GPON and AE Products deliver a “Carrier-grade” Optical LAN Solution for enterprise deployment
- Natural migration of existing Service Provider PON technology MXK OLT and zNID ONT for deployment in the enterprise
- Copper will be replaced by Fiber in the Building, and to the Desktop – for Government Business, Commercial, Enterprise and rooms in the hospitality industry.

- Eliminates the need for riser closets
- Eliminates dedicated cooling
- Reduces overall power cost
- Simplification of Moves, Adds and Changes
- Minimizes troubleshooting and maintenance issues
- Allows customer to “light-up” the fibers easily
- Eliminates cross-connects
- Reduces the maintenance cost associated with technical support dispatch
- Increases distance between Data Center to Desk Top
- Lower Overall Facilities Cost

Zhone 26XX Series ONT Desktop Terminal
Zhone FiberLAN
Application - Desktop Optical LAN Solution (OLS)

Multi-floor Building

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Zhone FiberLAN
Fiber to the Room Optical LAN Solution

Multi-floor Hotel

In the Hospitality Industry where space is limited and demands for High Speed Internet Access, Voice, Television and Security monitoring is increasing, FiberLAN provides optimal performance characteristics for the preferred LAN infrastructure.
Zhone FiberLAN
Fiber to the Office Optical LAN Solution

Multi-building Campus

In the Multi-Building Campus environment where distance and operational cost are major considerations for delivering voice, video and high speed data, FiberLAN is the optimal solution!

Zhone FiberLAN
Fiber to the Workstation Optical LAN Solution (OLS)

Multi-building – Harsh – Environment - Industrial/Factory Complex

Developed for Industrial, Factory or other harsh environments where high speed data, voice and security cameras are mandatory, but space, cooling and power are limited FiberLAN provides Passive Optical Splitters – suited for any environment!
Comparing FiberLAN to Copper Switch

Copper Switched Ethernet

Equipment Requirements

1024 Total Desktops
205 Desktops per floor

(5) Telco Equipment Racks
(10) Patch Panels
(3600) CAT 5e UTP Cables
(3600) CAT 5e UTP Patch Cables
(25) 48 Port Ethernet Switches
(10) 3000 VA UPS
HVAC – Clean Power per wiring closet
Air Conditioning per wiring closet

FiberLAN - Optical LAN Solution (OLS)

Equipment Requirements

1024 Total Desktops
205 Desktops per floor

2 Telco Equipment Racks
2 MXK 198 OLT
(16) 64 Port Passive Optical Splitters
(16) Fiber Optic Jumper Cables
(1024) Fiber Optic Riser Cables
(1024) zNID 26XX Desktop ONT’s
(1) UPS (Computer Room Only)
Air Conditioning (Computer Room Only)
Industry Leading Density, Scalability and Switching Capacity

MXK 1U OLT 1U SLMS
MXK – 194/198

- MXK 194 (1U high)
- Uplink Options
  - 8x FE/GE
  - SFP & Copper 10/100 BT ports
  - 2x 10GE (Optional)
  - XFP ports
- GPON Support
  - 4 Ports (SFP-based) w/ OMCI
- Web GUI

Zhone 26XX Series ONT Desktop Terminal

- GPON Uplink or
- 15km Active Ethernet Uplink
  - 2 – 4 Voice Ports (POTS)
  - 4 – 8 GE LAN Ports (4 w/ PoE Support)
  - Indoor/Desktop Design
  - Triple-Play QoS – Multicast video support
  - VoIP with CLASS 5 Feature set

Passive Optical Splitters

- No electronics
- No power
- High density
- Completely connectorized
- Reduced Facilities Cost
- Less Space
- No Cooling
- Riser cost can be eliminated
Benefits of FiberLAN

- Zhone’s Powerful Passive Optical LAN Solution provides compelling benefits over the traditional router/switch approach.

- Tremendous saving are realized in every aspect of a deployment including:
  - Equipment Cost
  - Power
  - Cooling
  - Installation
  - Management
  - Reduces Total Cable Count
  - Reduces overall Power Requirements
  - FiberLAN only requires power to the OLT in the computer room
  - Reduces and efficiently disperses power
  - Reduces cooling requirements
  - Reduces space requirements
  - FiberLAN eliminates wiring closets

The combination of capital and operational cost savings equate to significant benefits!