

CommScope® Fiber Solutions



Network Reliability Key for Business Success

Gigabit Ethernet is already making its way to employees' desktops. Smart IT departments recognize the critical need to be prepared for the explosion of bandwidth absorbing applications. The inevitable convergence of voice and video over IP based networks, visual collaboration at the desktop not the conference room, transparent intra-office mobility and the desire, proliferation and eventual need for real-time streaming visual content is quickly ushering in the digital decade.

Relief is on the way for desktop users but total network reliability is key for optimizing business productivity and success. As the bandwidth pipes are enlarged for the end user, much more bandwidth is needed in the backbone to handle the increasing load and to accommodate the burgeoning desktop traffic. At least ten times more is needed to ensure higher performance and solid backbone bandwidth reliability for tomorrow's competitive advantage. While the network is the key to competitive advantage, the foundation for network performance and reliability is the cabling infrastructure.

The good news is that the cabling technologies required to advance network performance are already available. CommScope has a complete integrated portfolio of copper and fiber solutions for the desktop and the building or campus backbone. Multiple choices and flexible options that deliver communications throughput and reliability to help every business handle today's pressures and tomorrow's challenges.

To avoid the potential for backbone bottlenecks, IT and communications managers can capitalize on three recent networking advancements. The first two are the IEEE 802.3 10 Gigabit Ethernet standard and new more affordable VCSEL short wave transceivers for transmitting and receiving across optical fiber. The third is global standards ratification of a new classification of laser optimized multimode fiber and a test procedure for characterizing this low cost alternative to singlemode fiber. For extended distance campus backbone connectivity, single-mode fiber with added performance and flexibility should be deployed.

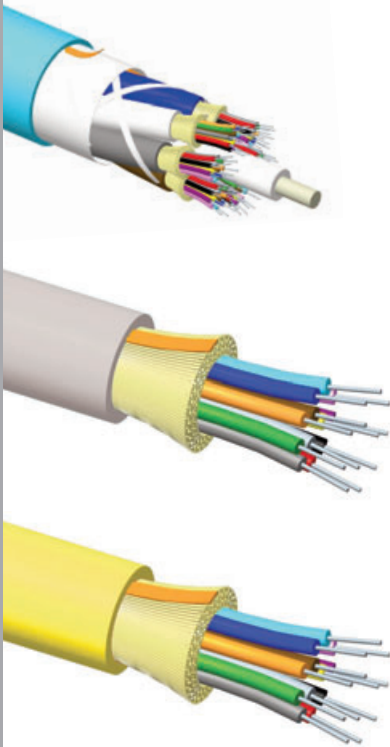
Fiber Solutions that Beat the Bandwidth Bottleneck

Every organization has its own route to a more efficient and profitable future. Factors including size, business sector, investment policy and legacy systems combine to determine what network infrastructure will best fit the business requirement. That is why the CommScope portfolio has more than one fiber cabling solution.

- CommScope LazrSPEED® Solution Next generation laser optimized 50µm multimode solution supporting up to 10 Gb/s over 550 meters using 850 nm VCSEL transceivers
- CommScope OptiSPEED® Solution 62.5µm multimode solution for modest bandwidth requirements and LED based applications
- CommScope TeraSPEED® Solution 100+ Gb/s full spectrum single-mode fiber solution with added bandwidth capacity in the E-band

These options offer complete, single source, end-to-end solutions created by the best engineers from CommScope Labs. Developers at the industry-leading CommScope Labs start with the aim of achieving superior yet flexible end-to-end connectivity and design every component to work in harmony to achieve this. While other suppliers assemble a collection of components from various sources, each component is designed from the outset to maximize performance and reliability.

CommScope, through its CommScope brand, can support most networking requirements with a complete line of patch panels, shelves and jumper configurations utilizing the global standard accepted ST and SC connectors, as well as the industry-leading small form factor connector of choice for 1 Gb/s and above – the LC. In addition, there is a full array of cable designs for indoor, indoor/outdoor and outside plant as well as composite configurations.



CommScope LazrSPEED Solution

Our CommScope LazrSPEED Solution boosts performance to a blistering 10 Gb/s while reducing costs by eliminating expensive opto-electronics previously needed to achieve 10 Gb/s speeds on multimode fiber. The CommScope LazrSPEED technology was the world's first multimode fiberoptic solution to support 10 Gb/s serial transmission at 850 nanometers at distances up to 550 meters – more than enough to connect an in-building backbone. With this extended reach, single point administration topology becomes a real low cost design alternative and more campus backbones can be supported at 10 Gb/s over a much lower cost multimode alternative to single-mode.

Laser-optimized multimode fiber provides an ideal pathway for photon travel. The additional bandwidth and larger core size of these fibers virtually eliminates the need for expensive, high-precision lasers, combiners, splitters, and filters. LazrSPEED fibers can transmit at 10 Gb/s using only a single VCSEL transceiver. The result has been shown to reduce total cost of ownership up to 30 percent over conventional fibers requiring a specific complex generation of opto-electronics, and multiple operational wavelengths. Laser-optimized multimode fiber in the LazrSPEED cable minimizes differential mode delay (DMD), ensuring that photons traveling along various pathways arrive at the detector at the right time. By minimizing this form of dispersion, LazrSPEED technology enables high-speed, high reliability transmission over distances of hundreds of meters with added insurance of optimal operation using multiple commercially available short wave laser sources.

The CommScope Labs legacy of innovation includes the pioneering development of DMD fiber characterization and its subsequent global standards acceptance. This breakthrough leadership is recognized by UL with the prestigious DMD test facility accreditation.

To further reduce total cost of ownership, the LazrSPEED Solution is backward compatible with legacy LAN applications. It allows you to continue running your existing applications from 10 Kb/s to 10 Gb/s. (Ethernet, Fast Ethernet, Gigabit Ethernet, FDDI, ATM, SONET, Fiber Channel and Token Ring). The LazrSPEED Solution offers 3 fiber choices:

- LazrSPEED 150 (OM2+) for economical fiber-to-the-desk deployment, supporting 10 Gb/s for 150 meters and 1 Gb/s for up to 800 meters
- LazrSPEED 300 (OM3) for building backbone applications supporting 10 Gb/s for 300 meters and 1 Gb/s for up to 1000 meters
- LazrSPEED 550 (OM4) for short / medium campus backbone applications supporting 10 Gb/s for 550 meters and 1 Gb/s for up to 1100 meters

Multimode Applications Support

APPLICATIONS SUPPORTED	LazrSPEED 550	LazrSPEED 300	LazrSPEED 150	OptiSPEED 62.5 micron 200 / 500 MHz.km	Standard 50 micron 500 / 500 MHz.km
10GBASE-S 850 nm	550 m	300 m	150 m	32 m	82 m
10GBASE-LX4 1310 nm	300 m	300 m	300 m	300 m*	300 m*
1000BASE-SX 850 nm	1100 m	1000 m	800 m	300 m	550 m
1000BASE-LX 1310 nm	550 m	550 m	550 m	550 m*	550 m*
100BASE-SX 850 nm	300 m	300 m	300 m	300 m	300 m
100BASE-FX 1310 nm	2000 m	2000 m	2000 m	2000 m	2000 m
10G Fiber Channel 850 nm	535 m	300 m	150 m	32 m	82 m
1G Fiber Channel 850 nm	1000 m	900 m	750 m	300 m	500 m

* Requires mode conditioning patch cords

CommScope Fiber Solution Options

- Riser, plenum and LSZH rated distribution cables
- Interlocking armored cables
- Loose tube All-Dry and central core cables (gel filled tubes)
- Tight buffered, and loose tube All-Dry Indoor/Outdoor cables
- Full range of single-mode/multimode composite cables
- 1.6 mm and 3.0 mm patch cords with LC, SC, ST, and hybrids
- LC connector – the industry-leading SFF connector
- Full range of configurable shelves and panels, with preloaded and preterminated options

The CommScope OptiSPEED 62.5 μ m Multimode Fiber Solution

The CommScope OptiSPEED Solution continues to address the 62.5 μ m multimode installed base, i.e. existing networks which require change or significant extensions. In addition, it focuses on small to medium sized organizations with moderate bandwidth requirements running LED based applications.

Our CommScope OptiSPEED Solution delivers certified 1 Gb/s performance with 6 LC connections for distances up to 300 meters (1000BASE-SX) or 550 meters (1000BASE-LX). That's four more connections per channel over the standards specifications for enhanced flexibility. And due to increased port density, the LC connector saves space and simplifies administration by dramatically reducing closet and floor space requirements. Designed by CommScope Labs, our 200 MHz.km multimode fiber provides 25 percent more bandwidth than industry-standard 160 MHz.km fiber. The performance of CommScope fiber technology keeps you competitive with a rock-solid quality that your business can rely on through design innovations that can save you money from the first day your SYSTIMAX fiber solution is installed.

The CommScope TeraSPEED Zero Water Peak Single-mode Fiber Solution

The CommScope TeraSPEED Solution and zero water peak single-mode (ZWP-SM) fiber is designed to cost-effectively future-proof enterprise and metro campus backbones for next generation equipment. Conventional single-mode fiber has until now been perceived as a universal media with unlimited bandwidth. Conventional single-mode fiber is however limited to operation in two narrow wavelength "windows" at 1310 nm and 1550 nm. Laser operation in between those windows is precluded due to the high attenuation "water peak" that occurs in the 1400 nm region with traditional manufacturing methods.

CommScope TeraSPEED ZWP-SM fiber is designed to operate over the entire wavelength range from 1280 nm to 1625 nm – removing the water peaks (high attenuation) in the 1400 nm window – increasing the useable wavelength range over conventional single-mode fiber by more than 50%. By utilizing the expanded available wavelengths, TeraSPEED full spectrum fiber delivers a cost-effective upgrade path allowing up to 16 channels of CWDM (Coarse Wave Division Multiplexing), the best value option to pack more channels on a single fiber, and up to 400 channels of DWDM (Dense Wave Division Multiplexing). In addition, this full spectrum fiber provides customers with future proofing options: if optical electronics move to higher serial speeds or shift to an increased number of wavelengths, TeraSPEED fiber provides support for both. TeraSPEED fiber cables are ITU-T G.652.D compliant and support legacy transport equipment and applications. With bandwidth requirements continuing to grow at exponential rates, the TeraSPEED Solution provides future proof choices for customers by supporting enterprise campus and metro backbone migrations to higher speeds either serially or via multiple wavelengths.

The CommScope TeraSPEED ZWP-SM Solution follows the success of the CommScope LazrSPEED Solution, which overcame the limitations of conventional multimode fiber to offer support for the best value 10 Gb/s option up to 550 meters for the enterprise building backbones. By overcoming the water peak limitations of conventional single-mode fiber, the TeraSPEED ZWP-SM fiber solution once again demonstrates CommScope Labs' commitment to delivering optical media solutions for cost effective future-proofing.

CommScope® Multimode Fiber Solutions

LazrSPEED® 150, 300 and 550 Specifications	
Physical characteristics	
Core Diameter	50.0 ± 2.5 µm
Cladding Diameter	125.0 ± 1.0 µm
Core/Clad Offset	≤ 1.5 µm
Coating Diameter (Uncolored)	245 ± 10 µm
Coating Diameter (Colored)	254 ± 7 µm
Coating/Cladding Concentricity Error, max	6 µm
Clad Non-Circularity	≤ 1%
Mechanical characteristics	
Proof Test	100 kpsi (0.69 Gpa)
Coating Strip Force	0.3 - 2.0 lbf (1.3 - 8.9 N)
Dynamic Fatigue Parameter (nd)	≥ 18
Macrobending, max.	0.50 dB
Optical characteristics, general	
Numerical Aperture	0.200 ± 0.015
Point Defects, Max.	0.15 dB
Zero Dispersion Wavelength	1297-1316 nm
Zero Dispersion Slope	0.105 ps/[km·nm-nm]
Environmental characteristics	
Temperature Dependence	≤ 0.10 dB
	-76°F to 185°F (-60°C to 85°C)
Temperature Humidity Cycling	≤ 0.10 dB
	14°F to 185°F (-10°C to 85°C) up to 95% RH
Water Immersion, 73.4°F (23°C)	≤ 0.20 dB
Heat Aging, 185°F (85°C)	≤ 0.20 dB
LazrSPEED® Optical Characteristics, wavelength specific	
Max. Attenuation, both Loose Tube and Tight Buffer Cable	
Bandwidth, OFL	
Bandwidth, Laser	
Differential Mode Delay	
1 Gbps Ethernet Distance	
10 Gbps Ethernet Distance	

OptiSPEED® Specifications	
Physical characteristics	
Core Diameter	62.5 ± 2.5 µm
Cladding Diameter	125.0 ± 1.0 µm
Core/Clad Offset	≤ 1.0 µm
Coating Diameter (Uncolored)	245 ± 10 µm
Coating Diameter (Colored)	254 ± 7 µm
Coating/Cladding Concentricity Error, max	6 µm
Clad Non-Circularity	≤ 1%
Mechanical characteristics	
Proof Test	100 kpsi (0.69 Gpa)
Coating Strip Force	0.3 - 2.0 lbf (1.3 - 8.9 N)
Dynamic Fatigue Parameter (nd)	≥ 18
Macrobending, Max. (100 turns @ 75 mm mandrel)	0.50 dB max. @ 850 nm and 1,300 nm
Optical characteristics, general	
Numerical Aperture	0.275 ± 0.015
Point Defects, Max.	0.15 dB
Zero Dispersion Wavelength	1,320-1,365 nm
Zero Dispersion Slope	0.11 ps/[km·nm ²] from 1320-1348 nm
Backscatter Coefficient	-68.0/-75.7 dB @ 850/1300 nm
Index of Refraction	1.496/1.491 @ 850/1300 nm
Environmental characteristics	
Temperature Dependence -76°F to 185°F (-60°C to 85°C)	≤ 0.10 dB
Temperature Humidity Cycling 14°F to 185°F (-10°C to 85°C) up to 95% RH	≤ 0.20 dB
Water Immersion, 73.4°F (23°C)	≤ 0.20 dB
Heat Aging, 185°F (85°C)	≤ 0.20 dB
OptiSPEED® Optical Characteristics, wavelength specific	
Max. Attenuation, Loose Tube Cable	
Max. Attenuation, Tight Buffer Cable	
Bandwidth, OFL	
Group Refractive Index	
1 Gb Ethernet Distance	

CommScope® Single-mode Fiber Solutions

TeraSPEED® Specifications		
Physical characteristics		
Core Diameter	8.3 μm	
Cladding Diameter	125.0 ± 0.7 μm	
Core/Clad Offset	≤ 0.5 μm	
Coating Diameter (Uncolored)	245 ± 10 μm	
Coating Diameter (Colored)	254 ± 7 μm	
Coating/Cladding Concentricity Error, max	12 μm	
Clad Non-Circularity	≤ 1%	
Mechanical characteristics		
Proof Test	100 kpsi (0.69 Gpa)	
Coating Strip Force	0.3 - 2.0 lbf (1.3 - 8.9 N)	
Fiber Curl	≥ 4 m	
Dynamic Fatigue Parameter (nd)	≥ 18	
Macrobanding, Max.	0.05 dB	
Optical characteristics, general		
Point Defects, Max.	0.10 dB	
Cut-off Wavelength	≤ 1260	
Zero Dispersion Wavelength	1,302-1,322 nm	
Zero Dispersion Slope, Max.	0.090 ps/[km-nm-nm]	
Polarization Mode Dispersion	≤ 0.06 ps/sqrt (km)	
Link Design Value		
Environmental characteristics		
Temperature Dependence	≤ 0.05 dB -76°F to 185°F (-60°C to 85°C)	
Temperature Humidity Cycling	≤ 0.05 dB 14°F to 185°F (-10°C to 85°C) up to 95% RH	
Water Immersion, 73.4°F (23°C)	≤ 0.05 dB	
Heat Aging, 185°F (85°C)	≤ 0.05 dB	
TeraSPEED® Optical Characteristics, wavelength specific		
Max. Attenuation, Loose Tube Cable	0.34 dB	KEY
	0.31 dB	1310 nm
	0.22 dB	1385 nm
Max. Attenuation, Tight Buffer Cable	0.50 dB	1550 nm
	0.50 dB	
	0.50 dB	
Mode Field Diameter	9.2 ± 0.3 μm	
	9.6 ± 0.6 μm	
	10.4 ± 0.5 μm	
Group Refractive Index	1.466	
	1.466	
	1.467	
Dispersion, Max	3.5 ps/(nm-km)	
	18 ps/(nm-km)	



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