



# Signature Core™ Fiber Optic Cabling System

## Frequently Asked Questions

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building a smarter,  
unified business foundation

Connect. Manage. Automate.

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### Q: What is Signature Core™?

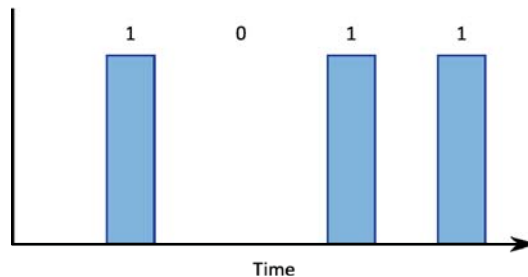
**A:** The Panduit® Signature Core™ Fiber Optic Cabling System is the next generation in multimode fiber (MMF) optical connectivity. Signature Core™ MMF is an ultra high performance laser-optimized, OM4 MMF designed to compensate for modal and chromatic dispersion enabling greater reach and/or higher optical link budgets. Signature Core™ delivers the ultimate in design flexibility, optical performance and signal integrity far beyond the requirements for 10/40/100 Gb/s Ethernet, and 8 and 16 Gb/s Fibre Channel, ensuring consistent performance and reliability of critical systems.

### Q: What is chromatic dispersion?

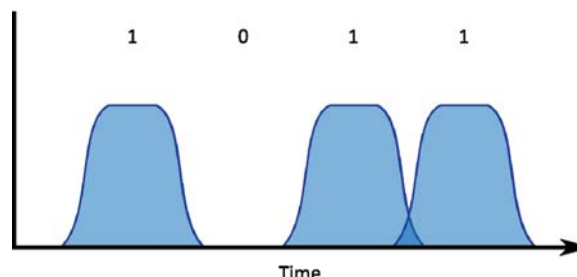
**A:** Modal dispersion is the broadening of an input signal as the optical power of the signal is split into different optical paths, or modes, in the core of the fiber, and each mode travels down the length of the fiber at different speeds.

Chromatic dispersion is a broadening of the input signal as it travels down the length of the fiber caused by the fact that different wavelengths of laser light travel at different speeds.

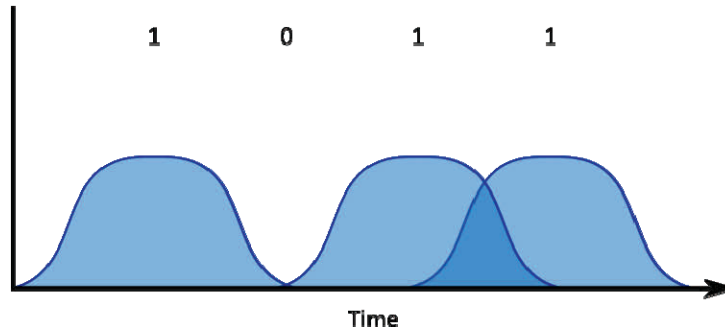
Below is a representation of a stream of 1s and 0s as it would enter a multimode fiber:



When the pulses emerge from the fiber at the other end, they are distorted as a result of modal and chromatic dispersion.



Eventually, as the distance lengthens or the speed of the pulses increase, e.g., 10G to 40G Ethernet, the effects of dispersion make it difficult and nearly impossible to distinguish the individual pulses.



The pulse spreading is caused by both modal and chromatic distortion and is one of the main factors that limits the data rate and reach of a multimode fiber system. Although modal dispersion has historically been more of an impact on performance than chromatic dispersion, improvements in the fiber manufacturing process have reduced its impact leaving chromatic dispersion as the most important distortion impacting performance at higher data rates. The effect of chromatic distortion becomes more and more of a problem as the data rate increases and the reach becomes longer and longer. This is one of the reasons why chromatic distortion was not an issue in the past: the speeds were slow enough so that it had negligible impact. This is not the case today with 10G, 40G, and 100G Ethernet, and 8G and 16G Fibre Channel.

### Q: How does Signature Core™ improve system performance?

**A:** Signature Core™ improves system performance by considering the entire fiber link as a system rather than simply a collection of individual components. The effects of chromatic dispersion can then be compensated by modifying the multimode fiber's design. The result is a standards compliant system with minimum total dispersion.

### Q: What are the benefits of Signature Core™?

**A:** There are multiple benefits that the one can take advantage of when deploying Signature Core™:

**Saves data center capital expenditures** – Greater reach allowing the use of multimode fiber in applications that may have required singlemode fiber

**Flexibility** – Improved power budget increases design options for technology growth in existing and new installations, and allows implementation of data center architectures that you need to support your business

**Future proof** – No worry migration to 40 and 100 Gb/s Ethernet and 16 and 32 Gb/s Fibre Channel

**Network reliability** – Provides increased headroom performance allowing for more connectors in the link

**Q: What can I expect to see in increased reach?**

**A:** The extended reach provided by Signature Core™ is dependant on the protocol and the speed. See the table below for the reach that Signature Core™ can provide.

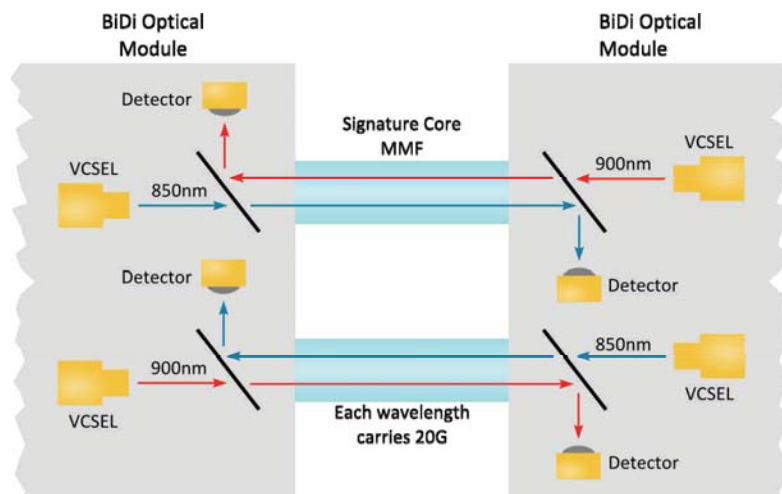
		Reach (m)		
		OM3	OM4	Signature Core
Ethernet	10G	300	400	560
	40G	100	150	200
	40G BiDi	100	125*	150
	100G	100	150	200
Fibre Channel	4G	380	400	500
	8G	150	190	260
	16G	100	125	200

\*This reach requires an engineered link with ≤1.0db of connector insertion loss.

**Q: What is “40G BiDi”?**

**A:** “40G BiDi” optical modules that are replacements for traditional 40GBASE-SR4 optical modules. BiDi is shorthand for “bidirectional”. They are available from Cisco.

The advantage of BiDi over the typical 40GBASE-SR4 module is that BiDi modules use duplex fibers terminated with LC connectors. This is the same infrastructure used for 10G Ethernet (10GBASE-SR). 40GBASE-SR4 uses 8 multimode fibers requiring a 12-fiber MPO connector.



40G Ethernet BiDi optical modules are able to support 40G over 2 fibers because it uses two lasers, with different wavelengths (850nm and 900nm), pointing in opposite directions. The lasers run at 20 Gbps for a total bandwidth of 40 Gbps.

The Signature Core™ Fiber Optic Cabling System is the only multimode optical fiber that allows Cisco’s 40F BiDi module to be used out to 150m and completely replace existing 40GBASE-SR4 modules.

### **Q: Is Signature Core™ standards compliant?**

**A:** Yes. Signature Core™ is fully standards compliant and meets or exceeds all of the requirements of both domestic and international standards (TIA 493-AAAC/D and IEC 60793-2-10).

### **Q: Are there intermateability problems with Signature Core™?**

**A:** None at all. Signature Core™ fiber is produced using the same process as typical OM3 and OM4 multimode fibers and can be mixed with those fiber types without any problems. Of course, the extra reach provided by Signature Core™ is reduced when used with non-Signature Core™ fibers. To find out how the reach will be impacted by mixing Signature Core™ and OM3/OM4 fiber, please read *Mixing Signature Core Multimode Optical Fiber with OM3 and OM4*.

### **Q: What products will be available from Panduit that use Signature Core™?**

**A:** Panduit will be providing a wide array of products based on the Signature Core technology, such as: MTP high density, and tethered cassettes; patch cords and pigtails; reference cords; hydra assemblies; MTP cable assemblies; and, MTP trunks.

## Real-World Solutions

*With a proven reputation for excellence and innovation, Panduit and our partners work with you to overcome challenges and implement real-world solutions that create a competitive business advantage. Panduit offers the broadest range of solutions, from data centers and intelligent buildings to manufacturing operations, to help you build a **smarter, unified business foundation**.*



### Technology Leadership

Panduit develops innovative physical infrastructure solutions that meet the rapidly changing needs of our clients, from hardware and software to advisory services. This commitment is supported by investment in advanced research, solutions-focused product development, world-class manufacturing, and collaboration with customers at the forefront of technology.



### Partner Ecosystem

Our best-in-class partner ecosystem offers a comprehensive portfolio of services that span the project lifecycle, from planning and design to delivery, deployment, maintenance, and operation. Panduit business partners – distributors, and certified architects, consultants, engineers, designers, system integrators, and contractors – are qualified to help you achieve your objectives and realize predictable and measurable results.



### Strategic Alliances

Panduit cultivates long-term strategic alliances with industry leaders, including Cisco Systems, EMC, IBM, and Rockwell Automation, to develop, optimize, and validate solutions for our customers. This investment in people and resources helps solve our customers' greatest business challenges.



### Global Business Commitment

Panduit is committed to delivering a consistently high level of quality and service the world over. With a presence in more than 100 countries, local Panduit sales representatives and technical specialists offer guidance and support that bring value to your business. Our global supply chain, which includes manufacturing, customer service, logistics, and distribution partners, provides prompt response to your inquiries and streamlines delivery to any worldwide destination.



### Sustainability

With a commitment to environmental sustainability, Panduit develops and implements solutions that protect, replenish, and restore the world in which we live. This commitment is demonstrated by Panduit's LEED Gold certified World Headquarters, leveraging the Unified Physical Infrastructure<sup>SM</sup> approach to enable convergence of critical building systems to drive energy efficiency and ongoing operational improvement.

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