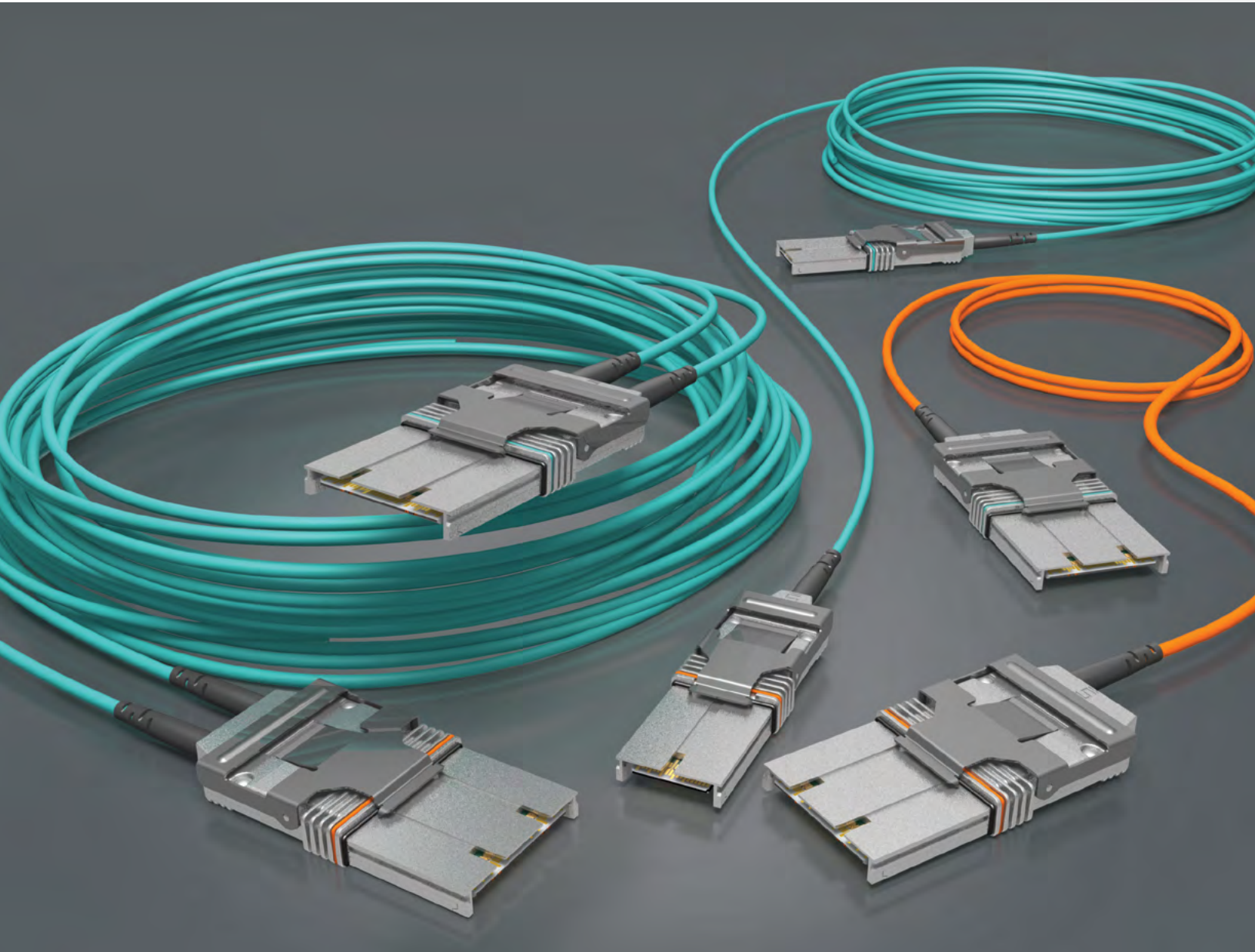


# PCIe<sup>®</sup> OVER FIBER GUIDE



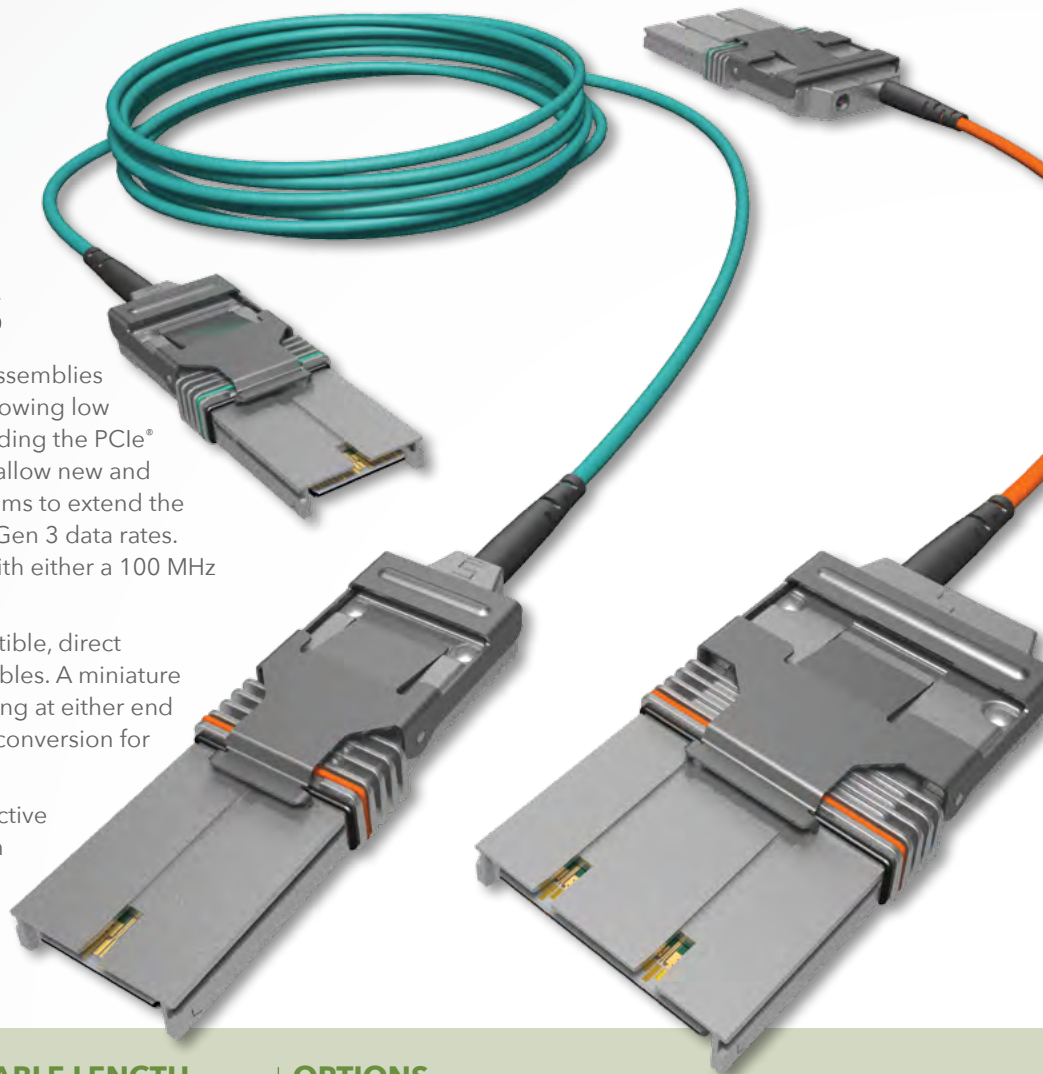
# PCIe®

## ACTIVE OPTICAL CABLE ASSEMBLIES

Samtec PCIEO Series Active Optical Cable Assemblies use a patented optical engine technology allowing low power consumption while significantly extending the PCIe® bus. These Active Optical Cable Assemblies allow new and existing PCIe® Expansion and Extension systems to extend the distance between ports up to 100 meters at Gen 3 data rates. The cable length can be easily customized with either a 100 MHz clock or with no clock.

These Active Optical Cables are plug-compatible, direct replacements for passive or active copper cables. A miniature optical transceiver is located inside the housing at either end and performs the electrical-to-optical signal conversion for transmission over optical fiber.

Unlike other optical based solutions, these Active Optical Cables are truly interchangeable with existing copper cables as they support PCIe® auxiliary signals (CPWRON, CPERST#, CPRSNT# and CWAKE# sidebands), clock forwarding and electrical idle.



### DATA RATE/FORM FACTOR

- **4G3**  
x4 PCIe®, GEN 3
- **8G3**  
x8 PCIe®, GEN 3
- **H8G3**  
x4 PCIe® with x8 PCIe® form factor, GEN 3
- **4AG3**  
x4 PCIe® Host to x8 PCIe® Target, GEN 3
- **8AG3**  
x8 PCIe® Host to x4 PCIe® Target, GEN 3

### CABLE LENGTH

- **500 mm**  
Minimum
- **100 m**  
Maximum

### OPTIONS

- **100 MHz Clock Frequency**  
(Standard and No Sidebands)
- **No Clock Output**  
(Standard and No Sidebands)

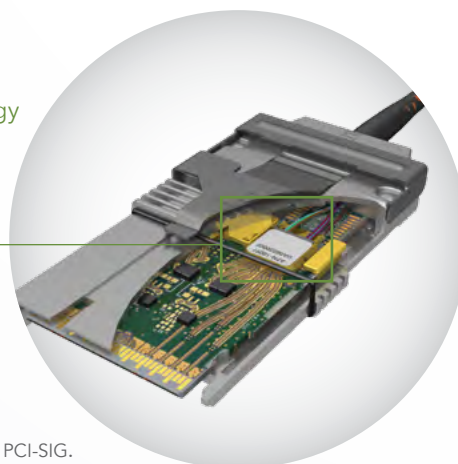
## COMMON FEATURES

- Full Active Optical Cable with Host and Target
- Half Cables with MTP end option
- Supports PCIe® auxiliary signaling (CPWRON, CPERST#, CPRSNT#, CWAKE#)
- Clock forwarding (constant clock only)\*
- 1 m to 50 m = OM2 cable, Over 50 m = OM3 cable
- Bit Error Rate better than 10<sup>-15</sup>
- Compatible with Dolphin and OSS cards (x8 only)

\*If the host uses Spread-spectrum Clocking (SSC), a clock isolation adaptor card is required at the host.

PCI-SIG®, PCI Express® and the PCIe® design marks are registered trademarks and/or service marks of PCI-SIG.

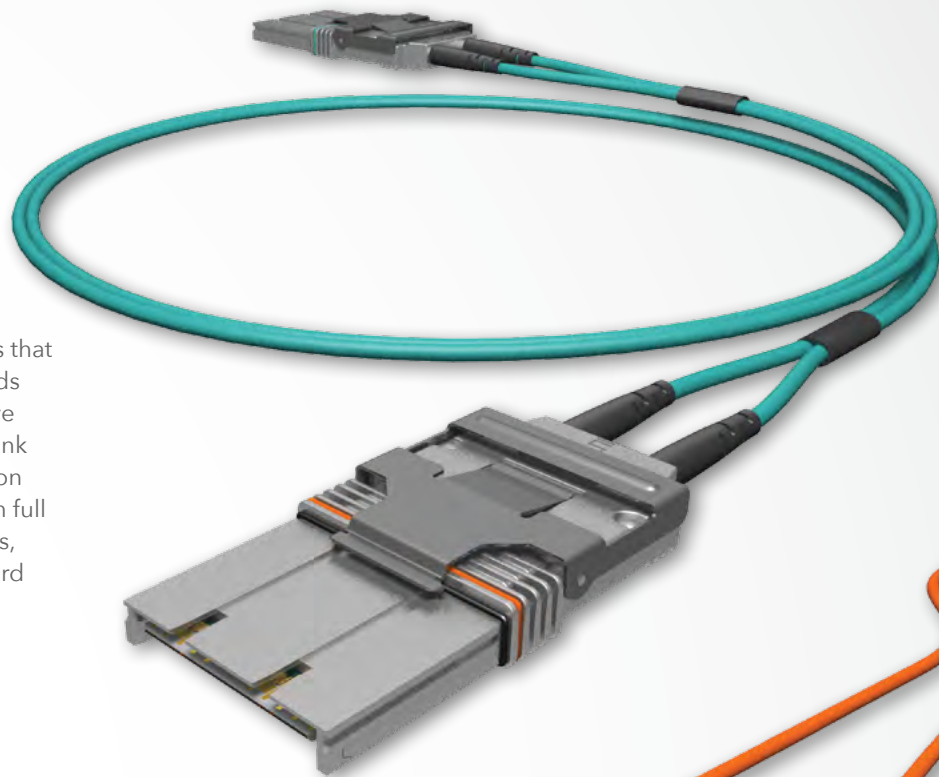
Patented optical engine technology





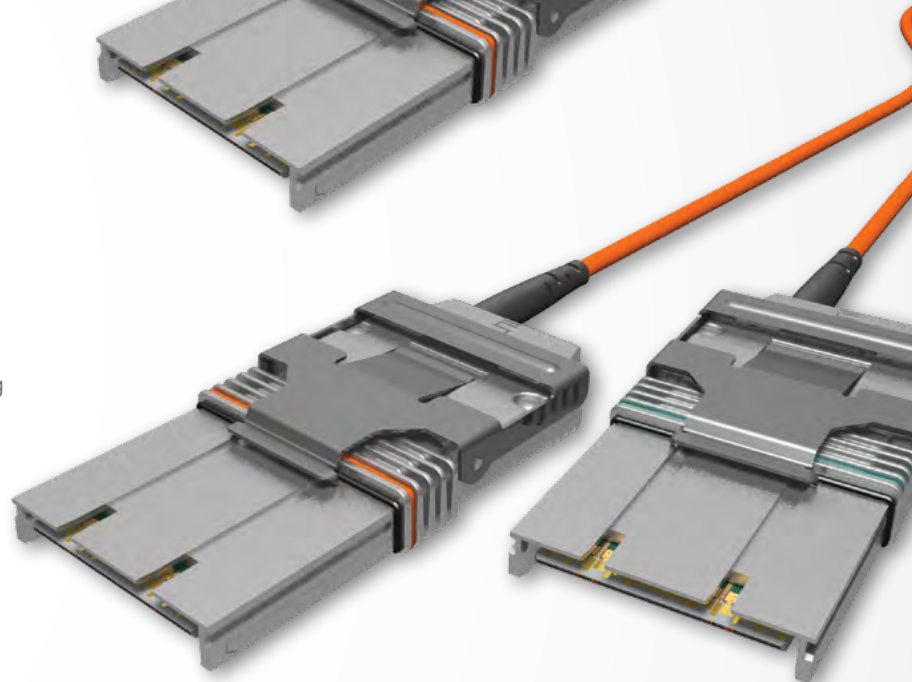
## PCIe® x8 ACTIVE OPTICAL CABLES

The x8 PCIEO offering consists of 8 full duplex channels that operate at PCIe® Gen 3. Although the cable is backwards compatible with Gen 1 and Gen 2 data rates, issues have been observed with IDT switches that can result in the link negotiating inconsistently. Link lengths of up to 100 m on OM3 are supported. Standard products are offered with full host to target configurations. "Half" cable configurations, which break the optical link via a pair of industry standard MPO cables, are also available to enable connection to structured cabling or connections through a bulkhead.



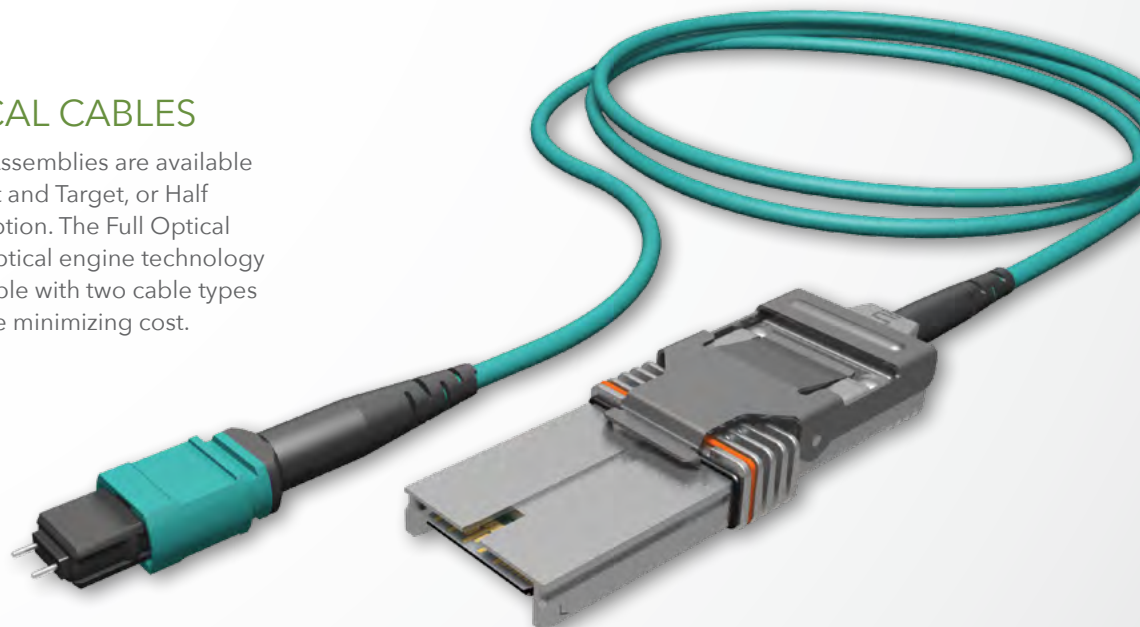
## PCIe® H8 ACTIVE OPTICAL CABLES

H8 PCIEO Series Cables offer 4 bidirectional PCIe® channels in a x8 form factor. This is a cost-effective way to get an active optical upgrade for 4 channel needs utilizing an 8 channel adaptor card. This also enables existing applications to benefit from PCIe® over Fiber capabilities with reduced power consumption. If full x8 bandwidth is needed later, the system can easily be upgraded by only switching to a PCIEO 8G3 cable.



## PCIe® x4 ACTIVE OPTICAL CABLES

PCIEO Series Active Optical Cable Assemblies are available as Full Optical Assemblies, with Host and Target, or Half Optical Assemblies with MTP end option. The Full Optical Assembly uses Samtec's patented optical engine technology within each PCIEO end and is available with two cable types to allow optimum performance while minimizing cost.



## Data Sheet: PCIe® x8 Active Optical Cable Assemblies

| Specification                 | Symbol            | Units | Min. | Typical     | Max.              | Notes   |
|-------------------------------|-------------------|-------|------|-------------|-------------------|---|
| Data Rate per Channel         |                   | GT/s  | 1    | 2.5/5.0/8.0 | 8.0               | Optimized for Gen 3 applications; 10 Gbps data rates also supported |
| Differential Input Amplitude  | V <sub>DI</sub>   | mV    | 250  |             | 1200              | Peak-to-Peak Differential   |
| Differential Output Amplitude | V <sub>DO</sub>   | mV    | 340  |             | 700               | Peak-to-Peak Differential   |
| Power Supply Voltage          | V <sub>CC1</sub>  | V     | 3.15 | 3.3         | 3.45              | Supplied through pins B14, B15 and B16                              |
| Power Supply Current          | I <sub>CC1</sub>  | mA    |      | 370         | 540               | Host  |
|                               |                   |       |      | 470         | 625               | Target  |
| Power Consumption             | P <sub>DISS</sub> | W     |      | 1.2         | 1.9               | Host  |
|                               |                   |       |      | 1.5         | 2.2               | Target  |
| Bit Error Rate                | BER               |       |      |             | 10 <sup>-15</sup> | Active Optical Assembly   |
| Operating Case Temperature    | T <sub>CASE</sub> | °C    | 0    |             | 70                | Case Temperature  |
| Operating Humidity            |                   | %RH   | 5    |             | 90                | Non-condensing  |
| Storage Temperature Range     | T <sub>STO</sub>  | °C    | -40  |             | 85                |   |
| Link Distance                 | m                 |       | 0.5  |             | 100               | Cable is capable of 300 m but is system dependent                   |

## Data Sheet: PCIe® x4 and H8 Active Optical Cable

| Specification                 | Symbol            | Units | Min. | Typical     | Max.              | Notes   |
|-------------------------------|-------------------|-------|------|-------------|-------------------|---|
| Data Rate per Channel         |                   | GT/s  | 1    | 2.5/5.0/8.0 | 8.0               | Optimized for Gen 3 applications; 10 Gbps data rates also supported |
| Differential Input Amplitude  | V <sub>DI</sub>   | mV    | 250  |             | 1200              | Peak-to-Peak Differential   |
| Differential Output Amplitude | V <sub>DO</sub>   | mV    | 340  |             | 700               | Peak-to-Peak Differential   |
| Power Supply Voltage          | V <sub>CC1</sub>  | V     | 3.15 | 3.3         | 3.45              | Supplied through pins B14 and B15                                   |
| Power Supply Current          | I <sub>CC1</sub>  | mA    |      | 190         | 280               | Host  |
|                               |                   |       |      | 230         | 270               | Target  |
| Power Consumption             | P <sub>DISS</sub> | W     |      | 0.6         | 1.0               | Host  |
|                               |                   |       |      | 0.8         | 1.3               | Target  |
| Bit Error Rate                | BER               |       |      |             | 10 <sup>-15</sup> | Active Optical Assembly   |
| Operating Case Temperature    | T <sub>CASE</sub> | °C    | 0    |             | 70                | Case Temperature  |
| Operating Humidity            |                   | %RH   | 5    |             | 90                | Non-condensing  |
| Storage Temperature Range     | T <sub>STO</sub>  | °C    | -40  |             | 85                |   |
| Link Distance                 | m                 |       | 0.5  |             | 100               | Cable is capable of 300 m but is system dependent                   |

**Class 1 LASER PRODUCT**  
per IEC 60825-1 Ed. 2 (2007)

Complies with FDA performance standards for laser products except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007.

Samtec PCIe® Adapter cards are listed on the PCI Express® 2.0 Integrators List; however as with all PCIe® based systems, there is a risk of interoperability issues with specific systems. Samtec recommends discussing your system with our Optical Group prior to final design. Please contact [optics@samtec.com](mailto:optics@samtec.com).

PCI-SIG®, PCI Express® and the PCIe® design marks are registered trademarks and/or service marks of PCI-SIG.

For more information visit:  
[www.samtec.com/active-optics](http://www.samtec.com/active-optics) or contact Samtec's Optical Group at [optics@samtec.com](mailto:optics@samtec.com)