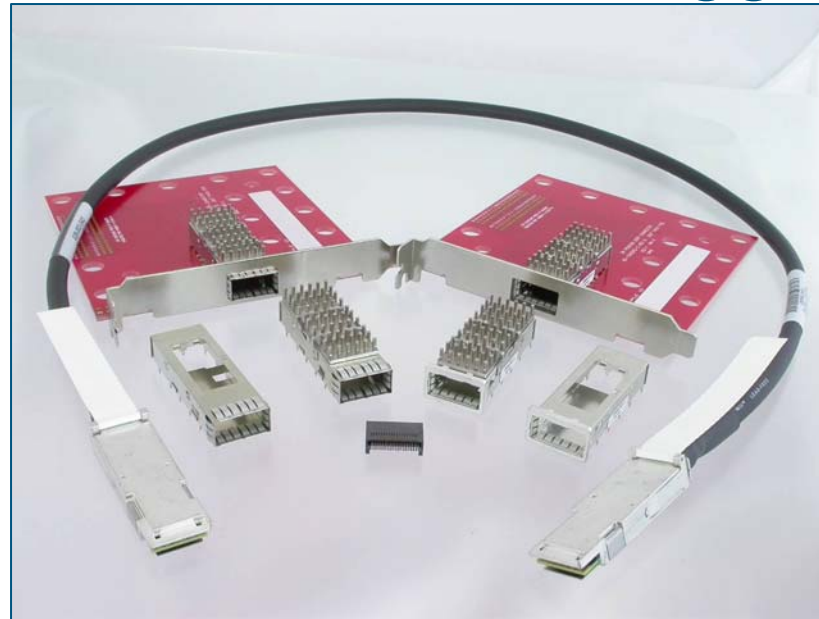
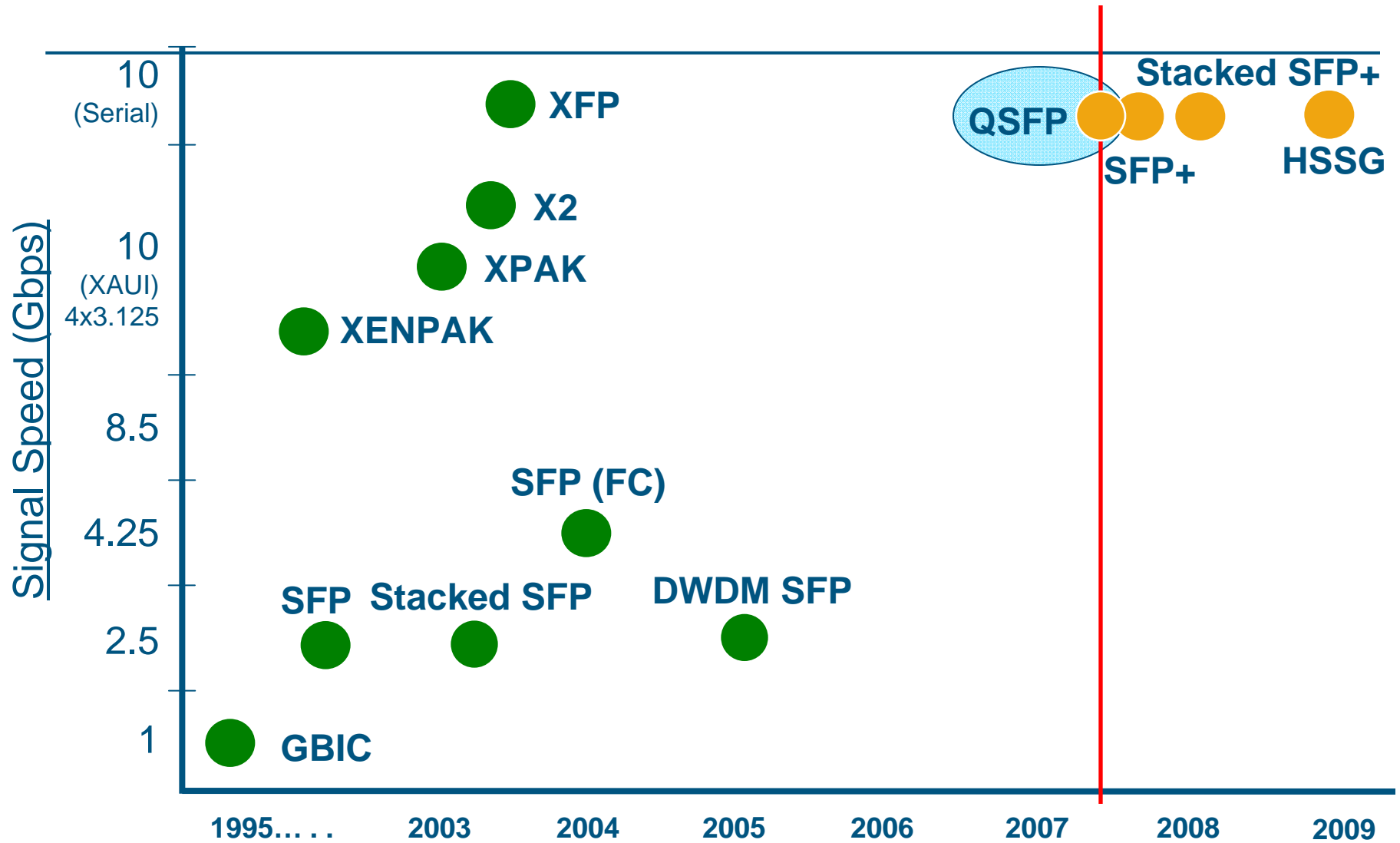


# QSFP (Quad Small Form-factor Pluggable) Connectors



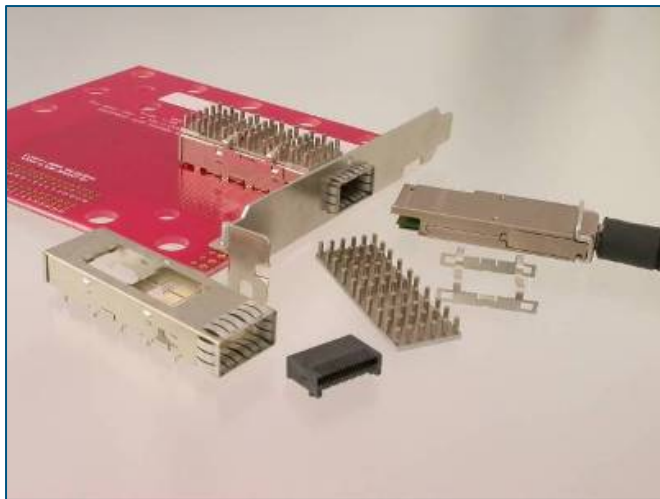
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logos, and company names mentioned herein may be trademarks of their respective owners.

# Pluggable I/O Roadmap



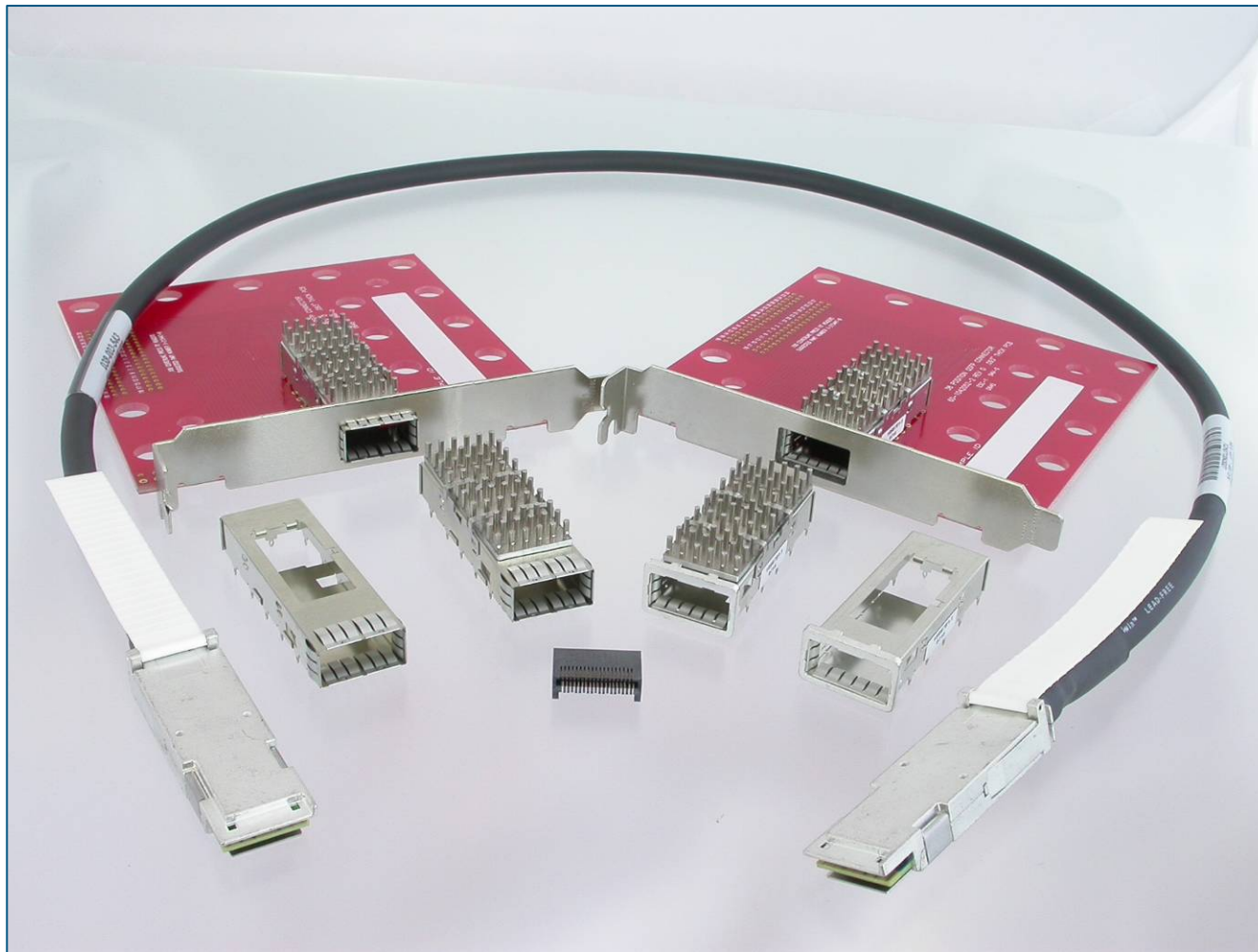
# QSFP Connectors

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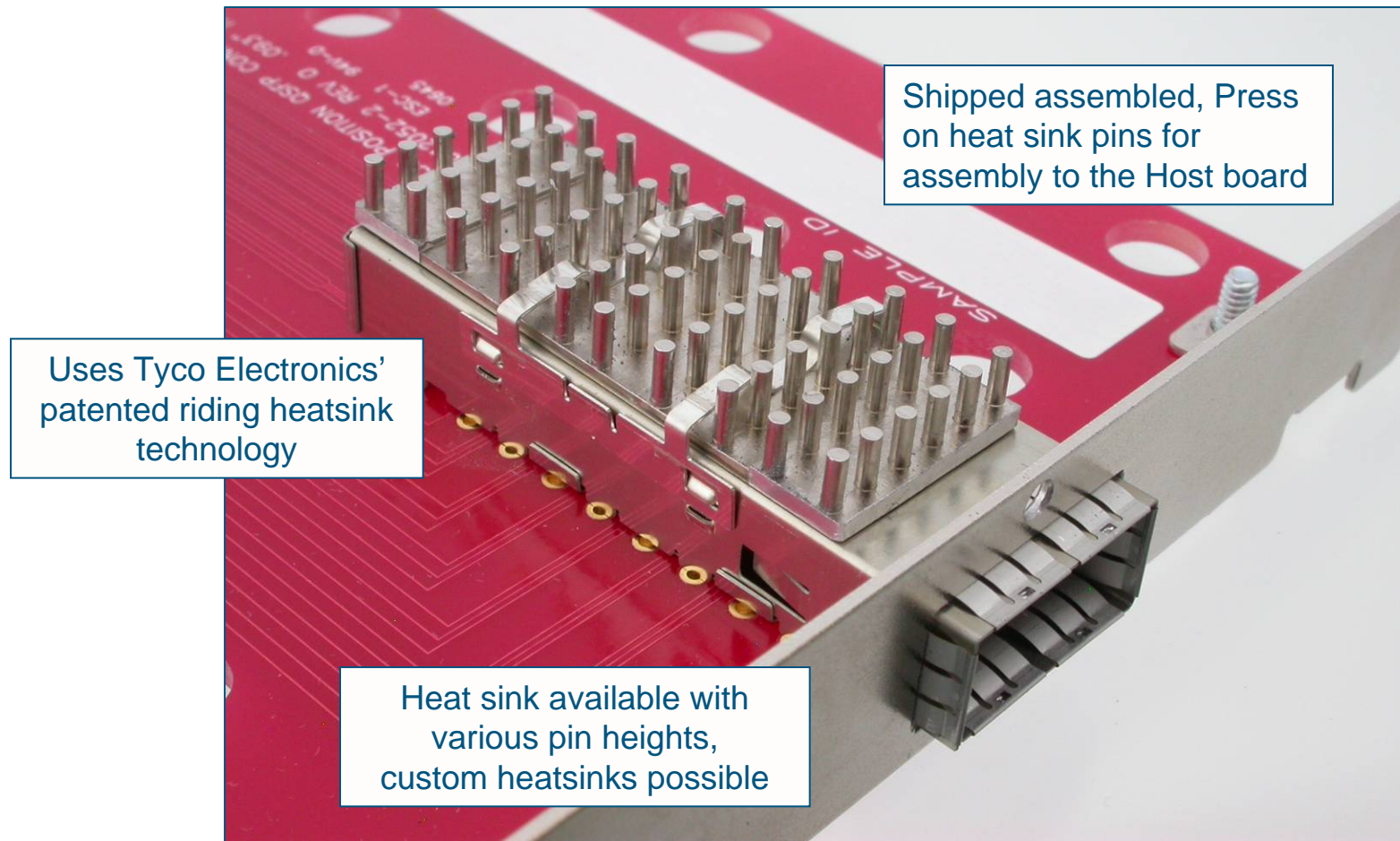


- 4 channels in a single QSFP port
- Each channel supports applications up to 10Gb/s for a total of 40 Gb/s per link
- Offers 3X the density of SFP, 4X density of XFP
- Port opening is size of XFP
- Follows SFF standard INF-8438
- Adopted by Infiniband for dual data rate (DDR)

# QSFP Product Family

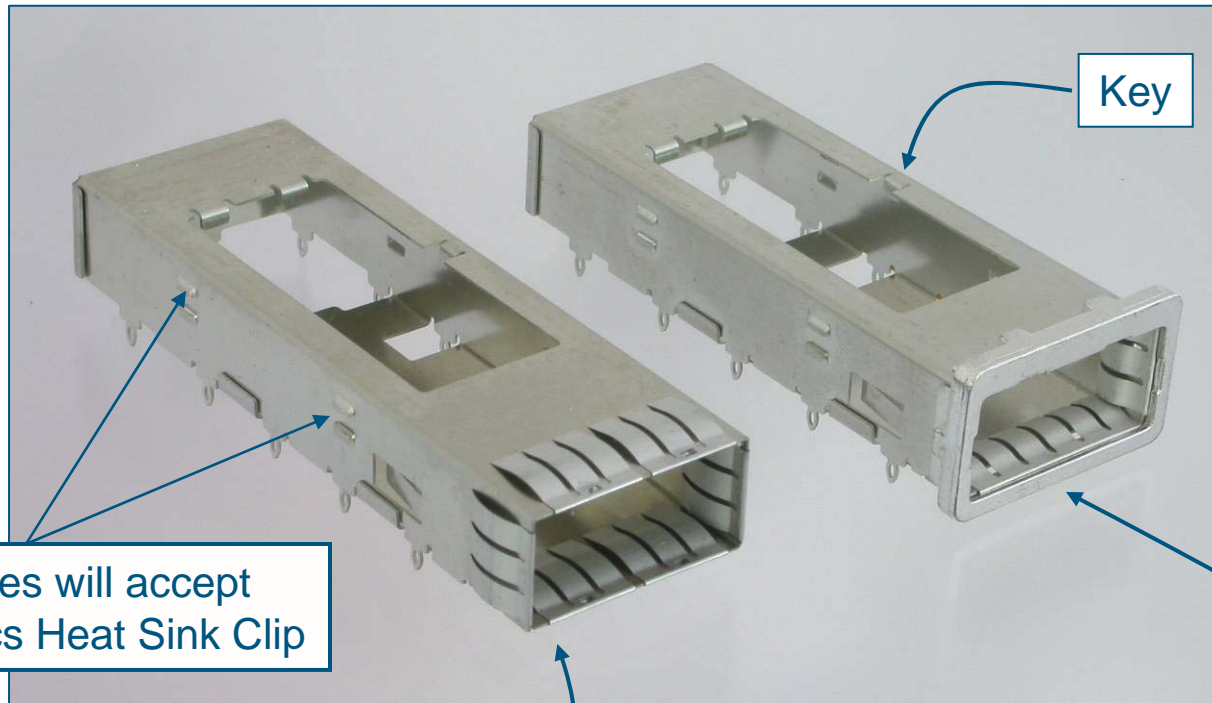


# QSFP Cage/Heat Sink Assembly, 1888631-1



Max height of assembly is 15.2mm from Host Board surface

# Two styles of EMI containment



Cage Assemblies will accept Tyco Electronics Heat Sink Clip

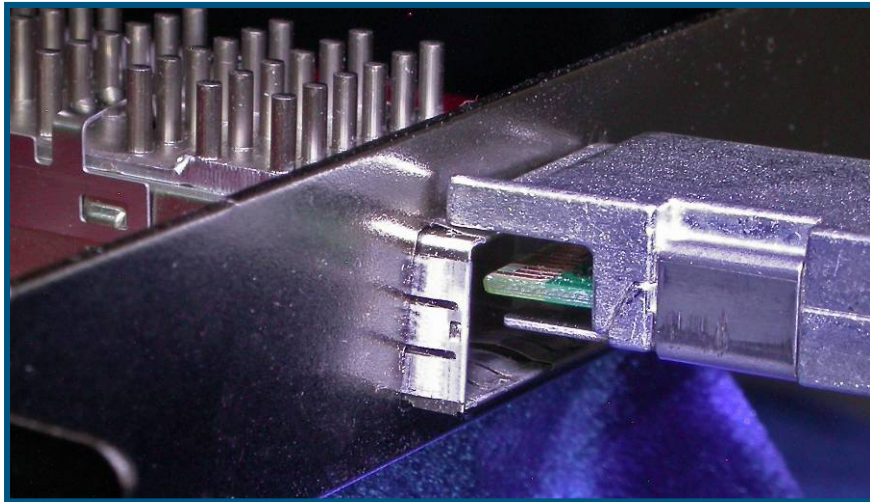
## Thru Bezel, 1888617-1

- Port Spacing: 21.0mm
- Design consistent with SFP Cages

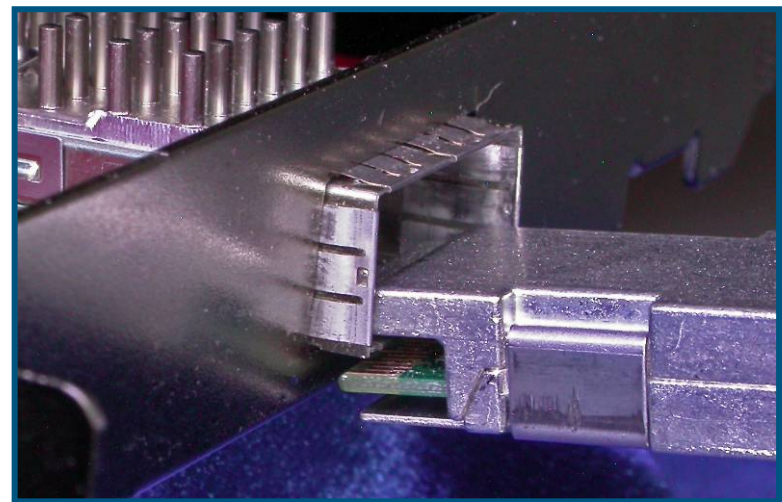
## Behind Bezel: 1888781-1

- Port Spacing: 23.5mm
- Design consistent with XFP Cages (gasket to be applied)
- Cage does not extend through bezel, for stub-free module insertion

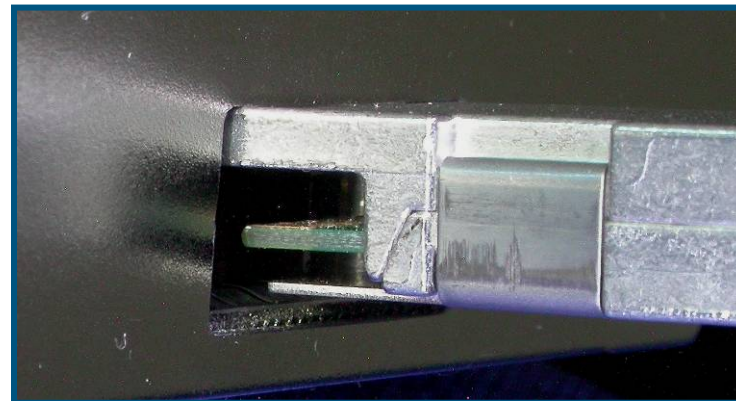
# Advantage of Behind-Bezel with Plug Insertion



Thru Bezel top of module stubs



Thru Bezel pc board stubs



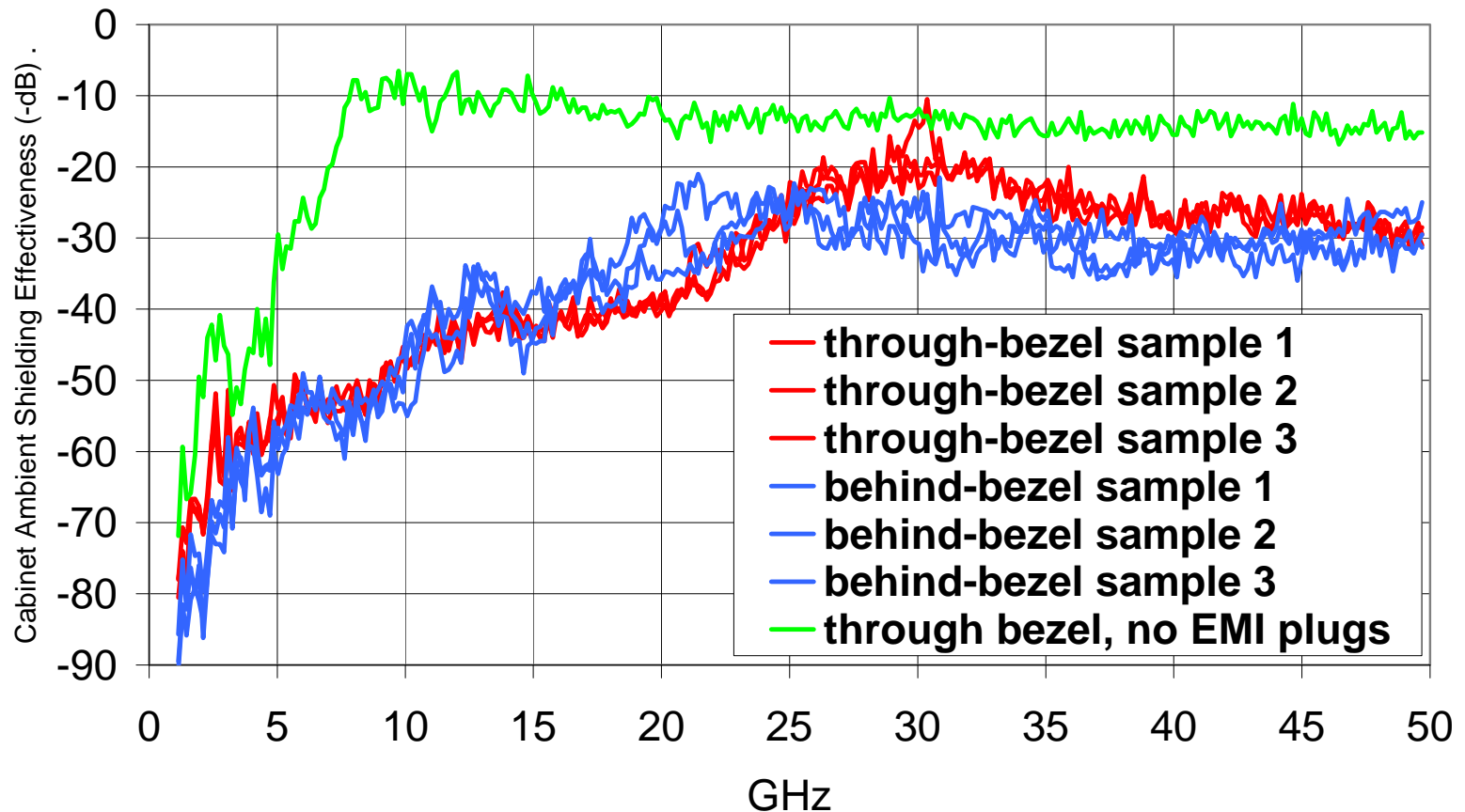
Behind Bezel stub free

# Feature Comparison

<u>Feature</u>	<u>Thru Bezel</u>	<u>Behind Bezel</u>
Minimum Port Spacing (mm)	21.5	22.5
Bezel location, Switches (Cutout to Host Board Tolerance)	±0.1	±0.2
PCI Compatible	No	Yes
Permits larger Bezel location cutout tolerance for Belly to Belly Applications	-	See XFP Spec (INF-8077i)
Requires a customer supplied EMI Gasket	No	Yes
Stub free module insertion	No	Yes

# EMI Comparison – Thru vs Behind Bezel

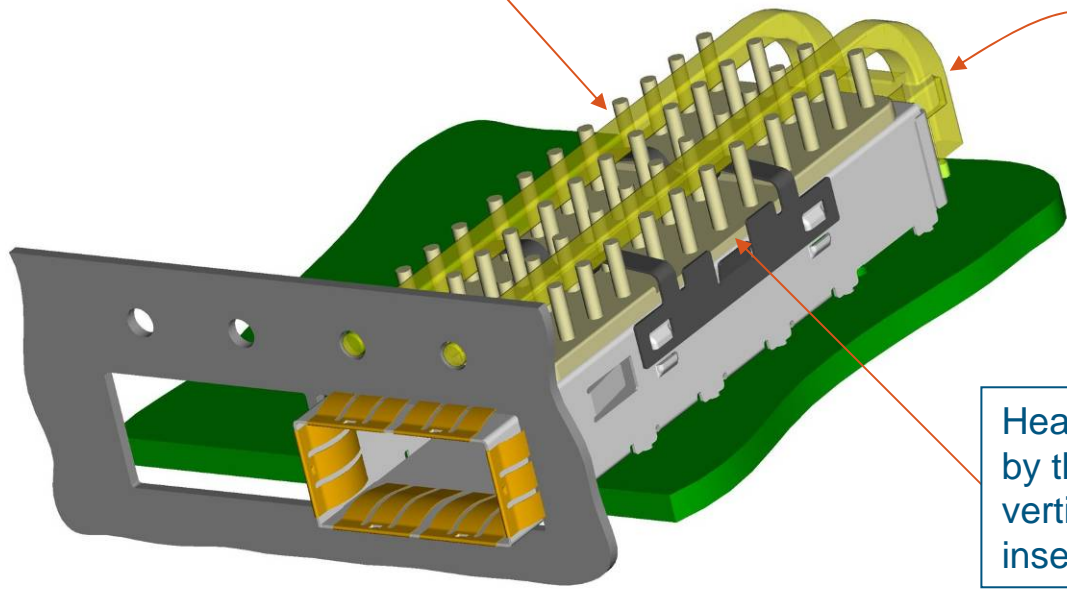
QSFP through bezel, **red**, pn 1888617-1, vs.  
QSFP behind bezel, **blue**, pn 1888781-1,  
both measured mated to EMI plugs, pn 1888810-2.



# Cage/Heat Sink/ Light Pipe Assembly

Pin spacing chosen to permit a dual or single light pipe to pass thru the heat sink

Shipped assembled, Press on heat sink pins for assembly to the Host board



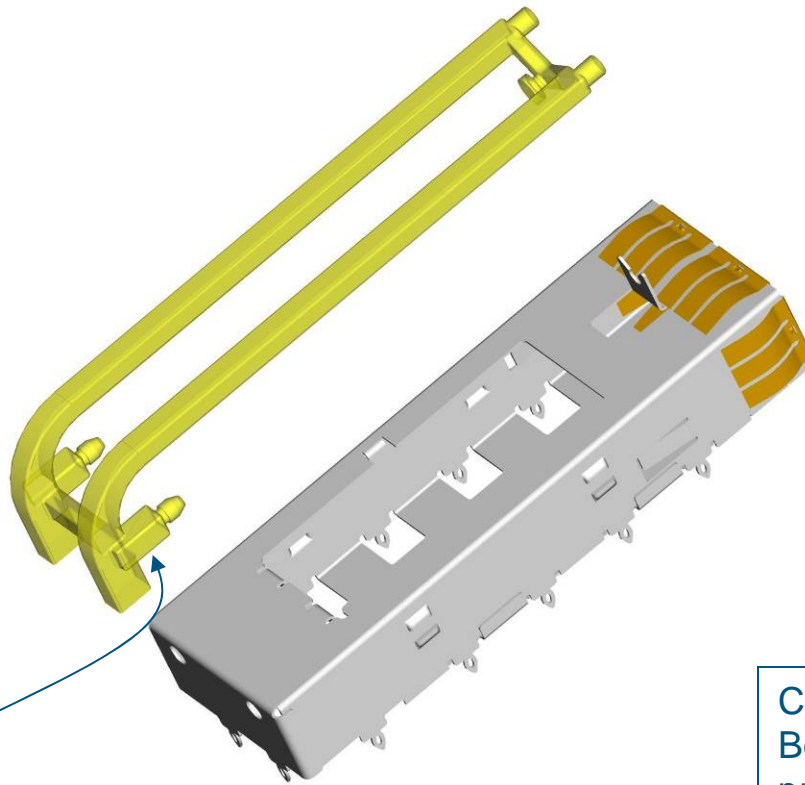
light pipe is rigidly fastened to the cage

Heat sink will be unobstructed by the light pipe as it moves vertically when a module is inserted into the cage

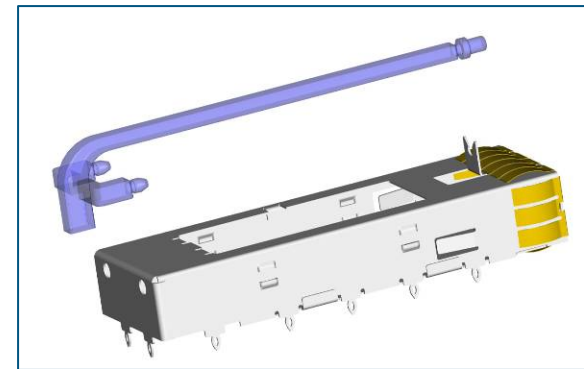
Available with Thru-bezel or Behind-Bezel cage

# Cage/Light Pipe Kits

Light pipe shipped unassembled to cage



Squeeze to insert or remove light pipe

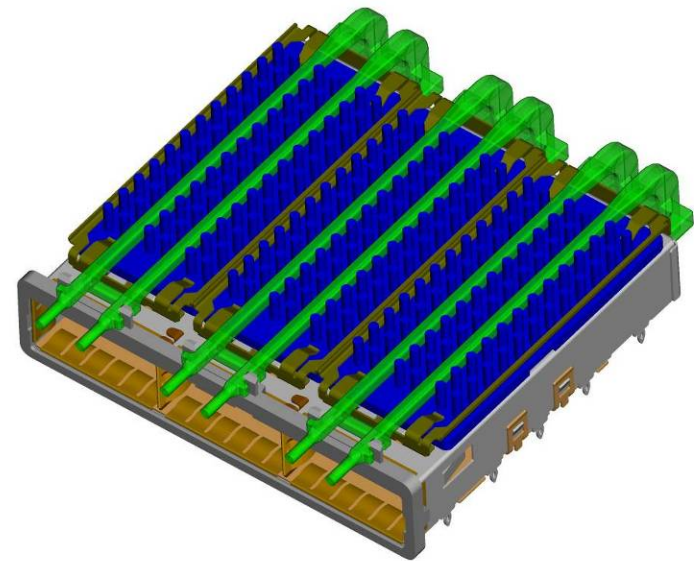
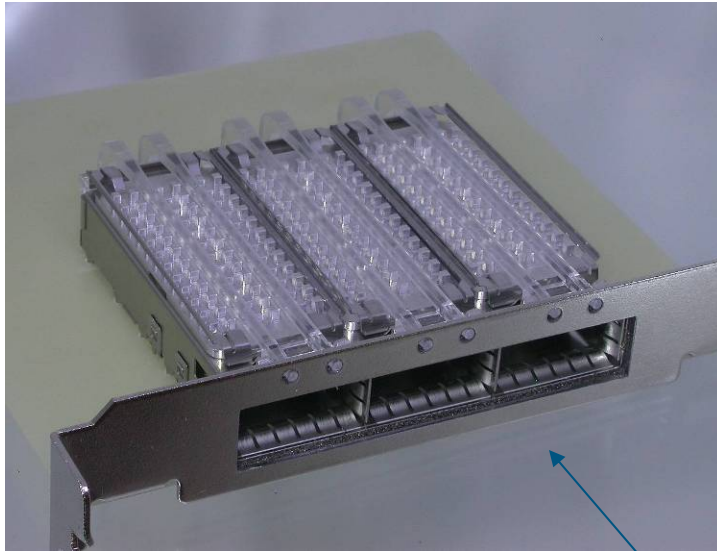


Single

Cage to be assembled to Host Board using "Flat Rock Tooling" prior to assembling the light pipe

# Ganged QSFP Cages for higher density

- Offered in 1x3 and 1x4 configurations, for higher density

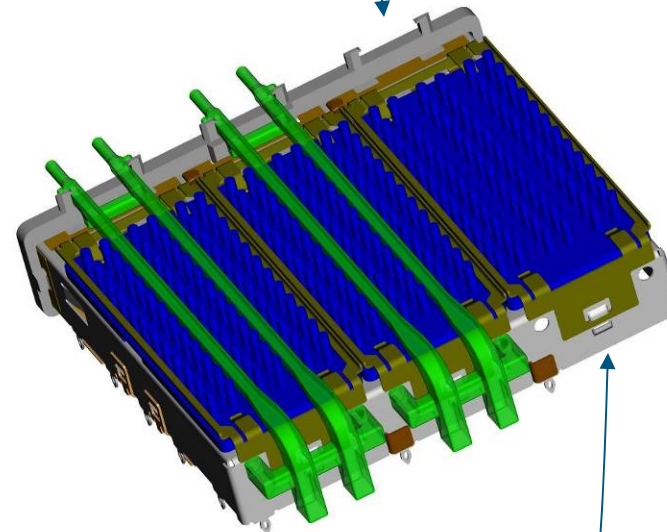
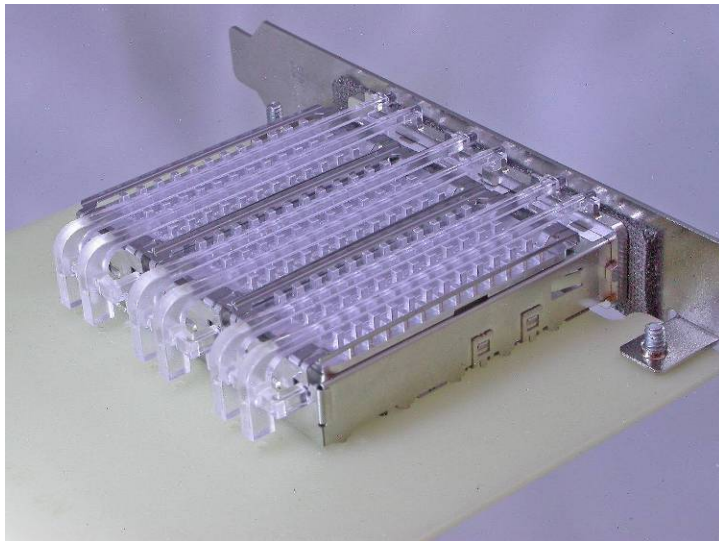


- Port spacing = 19mm
- Overall width =  
60mm (Behind bezel)  
59mm (Thru bezel)

Behind bezel flange for stub-free mating and clean look at the faceplate

# Rear View, 1X3 Ganged

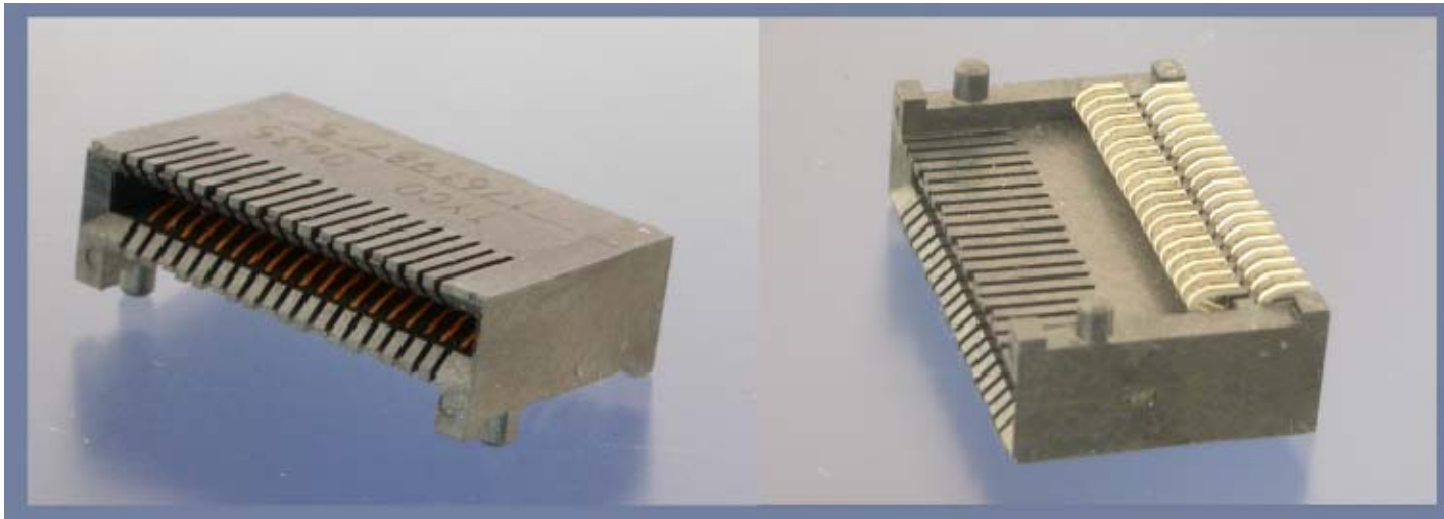
Tabs for lightpipe retention and positioning



Individual heatsinks and clips for each port

# Connector, 1761987-9

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- EVERCLEAR connector design in 38 position
- Meets the requirements of Figure 14 in the QSFP Specification
- Designed to maintain tight coplanarity of SMT tails (within 0.1mm)
- Tape and Reel Packaging

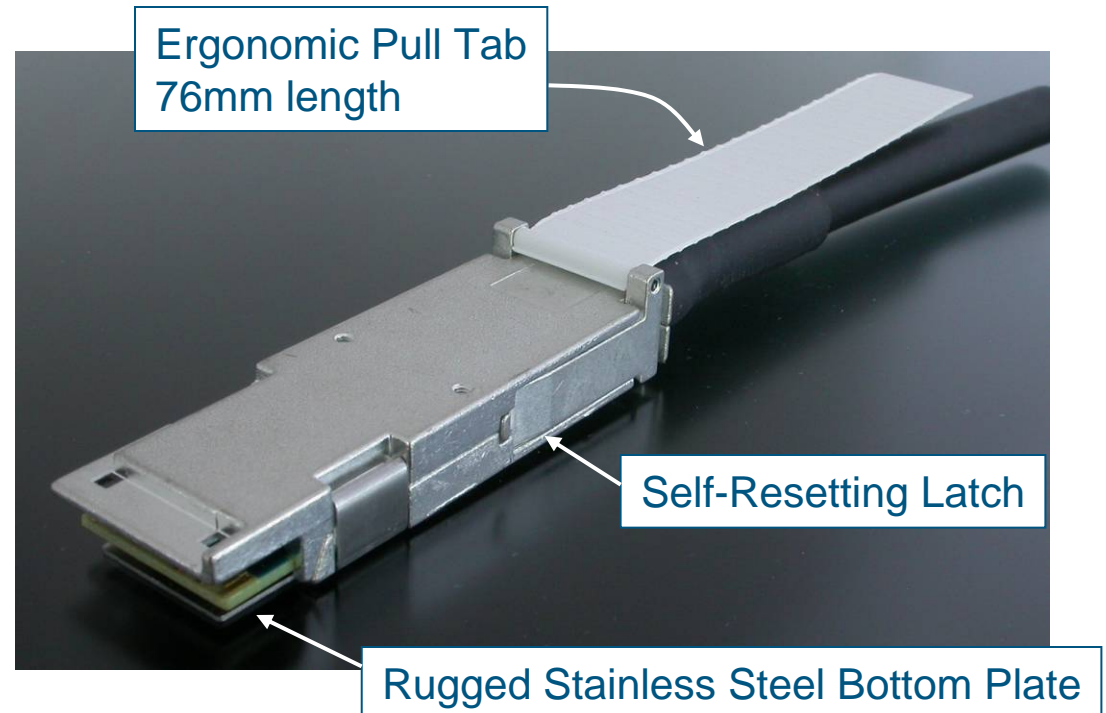
# QSFP

## Direct Attach Cable Assemblies

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- Cable wire size 28 or 26 AWG
- Active or passive equalization
- Various lengths are available
- Breakout cables to SFP, IBTA 4X or HSSDC2 Plugs are possible

New: PARALIGHT active optical cable assemblies



# PARALIGHT

## Active Optical Cable Assemblies

### Advantages

#### Standards

- INFINIBAND SDR, DDR Std.
- 10Gb Ethernet



**Tyco Electronics Light Bending IP**

- No Equipment Upgrades
- Functions like Standard Electrical Cable
- 200 Meters Plus Reach
- Low Latency
- No EMI
- No Cleaning
- No Eye Safety Issues
- Hot Pluggable
- Optical Cable Advantages
  - 1/3 Size of Typical Copper Cable
  - Fiber cable requires 1/7 the space in size
  - 1/10 Weight of Copper Cable
  - Flexible in All Directions
  - Ease of Cable Management
  - Increased Air Flow

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# TE Pluggable I/O Website Advantages





Refer to Tyco Electronics' website for full selection of Pluggable I/O products...

Overviews

Part feature selection

Data sheets

[www.tycoelectronics.com/products/pluggableIO](http://www.tycoelectronics.com/products/pluggableIO)

Product Line	Form Factor	Features	Document(s)
<a href="#">Pluggable Connectors, Cages, Transceivers &amp; Accessories</a>			
	QSF SFP X2 XFP	Full product line including cages, connectors, copper cables and plugs Supports Fibre Channel, Fast/Gigabit Ethernet, ATM/SONET/SDH and InfiniBand standards	
<a href="#">QSFP (Quad Small Form Factor Pluggable)</a>			
	QSFP	Four-channel package Capable of 10Gb/s per channel Supports Ethernet, Fibre Channel, SONET/SDH, and InfiniBand Full product line including cages, connectors, copper cables and plugs Heatsink and lightpipe options	<a href="#">Overview</a> <a href="#">Data Sheet</a>
<a href="#">SFP (Small Form Factor Pluggable)</a>			
	SFP	Supports Fibre Channel, Fast/Gigabit Ethernet, ATM/SONET/SDH and InfiniBand standards Full product line including cages, connectors, copper cables and plugs SFP uses 20 position connector Cages available in multiple configurations, including heatsink and lightpipe options	<a href="#">Overview</a>
<a href="#">SFP+ (Small Form Factor Pluggable)</a>			
	SFP+	Meets the performance requirements of SFF (Small Form-Factor) specification SFF-8431 Supports 8G Fibre Channel and 10G Ethernet applications	<a href="#">Overview</a>
<a href="#">X2 Products</a>			
	X2	X2 uses 70 position SMT connector, extension of 20 position SFP connector design Connector used in all XAUI-based applications (XENPAK, XPAK, X2) Rail system provides mechanical guidance and retention of transceiver	<a href="#">Overview</a>
<a href="#">XFP 10 Gigabit Serial Pluggable Products</a>			
	XFP	Supports higher speed applications up to 10 Gb/s: OC192/STM-64; 10G Ethernet; 10x Fibre Channel Cage designed with riding heatsink for thermal dissipation XFP uses 30 position SMT connector, extension of 20 position SFP connector design	<a href="#">Overview</a>