

# Amphenol

High Speed Interconnects



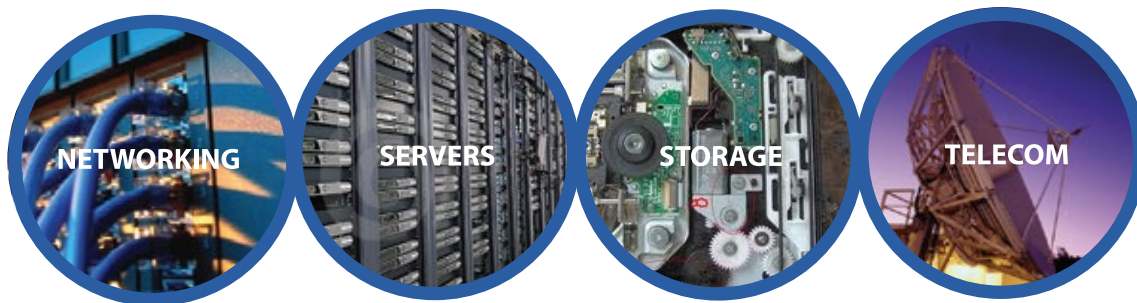
I/O Products

*Now you're connected*

# Amphenol High Speed Interconnects

## THE COMPANY

Amphenol is a global provider of interconnect solutions to the designers and manufacturers of worldwide networking systems. With our design creativity and cost effectiveness, Amphenol leads the way in interconnect development for internet equipment, infrastructure, enterprise networks, and appliances. Whether industry standard or specific designs are required, Amphenol provides customers with products capable of performing at the leading edge of today's high speed technology. Our expertise in understanding and supporting our customers' various design needs has earned Amphenol a reputation of excellence and quality among the world's leading users of high speed components.



## HIGH SPEED CONNECTORS











Amphenol offers a full range of high speed connectors with data rates ranging from 1 Gbps to 240 Gbps and beyond, meeting our customers' various high speed connector requirements. Products include the ExpressPort™ Series (SFP+, QSFP+), CXP, SFP, QSFP, Mini-SAS, Mini-SAS HD, XFP, CFP2, and CFP4.

## BENEFITS

- Increased platform density for scaling improved performance in a defined physical space
- Servers that can scale I/O and processing power independently
- Racks of servers that can be managed as one autonomous unit
- Servers that can share I/O resources
- True "plug-and-play" I/O connectivity
- Extensive range of SFP/IPF connector and cage solutions to support Fiber Channel, Infiniband, Ethernet, and Gigabit technology
- Next generation ExpressPort™ connectors provide premium level performance for SFP+ and QSFP+ interfaces
- Data speeds of ExpressPort™ connectors can reach up to 40 Gbps per channel



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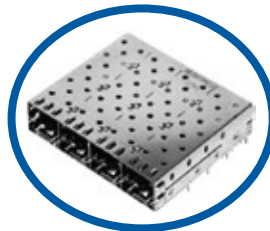


Amphenol's SFP interconnect system consists of a 20-position connector enclosed in a metal cage mounted to a host PCB.

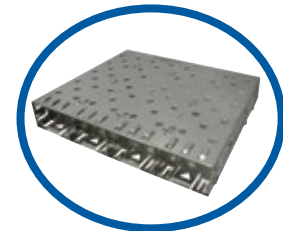
Amphenol's single port SFP connectors are rated up to 6 Gbps. The connector accepts multiple transceivers per INF-8074i and combines, transmits, and receives functions in a low cost, compact, and flexible format. The cages have a two-piece construction with enhanced transceiver mating tabs available in a press-fit version or a solder tail version. Longer and shorter pins are available as custom options. Single row versions (1xN) consist of SMT connectors used with a separate single row cage (press-fit or solder tail).



U77-A2114-2001



U77-A4114-2001



U77-A4113-0100

## Specification Highlights

The interconnect system is comprised of a cage assembly which is used with 20-position SFP connectors complying with MSA Agreement INF-8074i.

### General Characteristics

- RoHS Compliant
- Industry Standard Footprint
- Industry Standard EIA-364

### Mechanical Characteristics

- Accepts Multiple Transceivers per INF-8074i
- Compliant Press-Fit Pins or Solder Tails (1x1 Cages)
- Durability: 250 Mating Cycles min

### Electrical Characteristics

- Hot Swappable
- Operating Voltage: 3.3 V
- Operating Current: 0.5 A
- Differential Impedance: 100  $\Omega$  +/- 10  $\Omega$
- DWV: 300 V AC
- Insulation Resistance: 1000 M $\Omega$  min
- Contact Resistance: 70 m $\Omega$  max
- Spring Fingers for Superior EMI Grounding

### Packaging

- Tape and Reel Packaging: Connector or Cage
- Tray Packaging: Cage of all Sizes
- Bulk Packaging: Dust Cover

## Materials

- Cage
  - o Base Material: Copper Alloy
  - o Plating: Nickel or Tin
  - o Light Pipe: Optical Grade Polycarbonate
  - o Heat Sink: Aluminum Alloy
  - o Heat Sink Clip: Stainless Steel
  - o Dust Cover: Thermoplastic
  - o EMI Ground Tabs: Stainless Steel
- Connector
  - o Contact Base Material: Copper Alloy
  - o Contact Plating: Gold on Mating Area, Gold or Matte Tin on Termination
  - o Housings: Glass Reinforced, Lead-Free Solder Reflow Process Compatible Thermoplastic, UL94V-0 Rated

## Temperature Rating

- Operating Temperature: -55°C to +85°C
- Storage Temperature: -55°C to +105°C

## Configurations (Rows x Ports per Row)

- |       |       |
|-------|-------|
| • 1x1 | • 1x2 |
| • 1x4 | • 1x6 |

## Options

- Dust Cover
- Light Pipe
- Heat Sink (Standard Fin for Final Cage Combo)
- Enhanced EMI Performance Cage



U77-C6114-2011



U77-E1128-2001

# Ordering Information

## SFP Connector

UE75 - A 20 - X 0 0 X X

**UE75** SERIES DESIGNATION (RoHS)

**A**

### STYLE

A - R/A Single Surface Mount Connector

**20**

### NUMBER OF POSITIONS

20 - 20 Positions

**X**

### CONTACT PLATING

2 - 30  $\mu$ " Gold Plating on Mating Area; Gold Flash on Termination  
3 - 30  $\mu$ " Gold Plating on Mating Area; Matte Tin Plating on Termination  
5 - 15  $\mu$ " Gold Plating on Mating Area; Gold Flash on Termination  
6 - 15  $\mu$ " Gold Plating on Mating Area; Matte Tin Plating on Termination

### PACKAGING

J - Tape and Reel Packaging (480 per Reel)  
T - Tape and Reel Packaging (500 per Reel)

### OPTION 3

0 - Standard

### OPTION 2

0 - Standard

### OPTION 1

0 - Standard

## SFP Cage

U77 - X X X X X - X X X X

**U77** SERIES DESIGNATION

**X**

### STYLE

A - One Row  
C - One Row Cage; Light Pipe Combo (on Top)  
E - One Row Cage; Heat Sink Combo  
F - One Row Cage; 1 degree Angle (For 1x1 Only)

**X**

### NUMBER OF PORTS IN ROW

1 - Single in Row  
2 - Inline 1x2  
4 - Inline 1x4  
6 - Inline 1x6

**X**

### CHASSIS GROUNDING

1 - Metal Grounding Tabs  
2 - Inner and Outer Flexible Spring Fingers

**X**

### HEAT SINK / LIGHT PIPE OPTION

1 - No Heat Sink / Light Pipe  
2 - Heat Sink  
3 - Light Pipe (for 1xN Cage Only)

### PACKAGING

1 - Tray Packaging (ACC Re-Packed)  
T - Tape and Reel Packaging (for 1x1 Only)

### OPTION 1

0 - Standard  
1 - Cage With Light Pipe on Top  
8 - Cage with Half Moon Mid G-Pins

### DUST COVER OPTION

0 - Without Dust Cover  
D - With Dust Cover (Shipped Loose)

### PLATING

1 - Bright Tin (for Wave Solder)  
2 - Nickel  
3 - Matte Tin (for Reflow 245 degrees)

### PCB MOUNTING OPTION

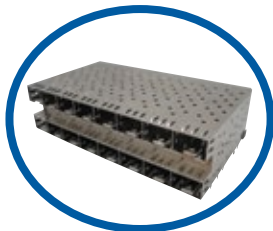
X - Various Options Available  
Consult Sales or Website for Details



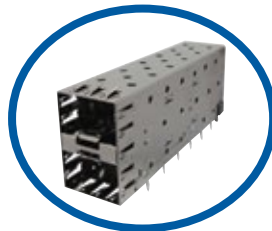
# SFP 2xN

Amphenol's SFP interconnect system consists of a 20-position connector enclosed in a metal cage mounted to a host PCB.

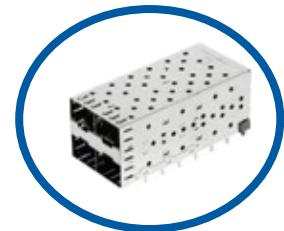
Amphenol's stacked SFP combos are rated up to 6 Gbps. The connector accepts multiple transceivers per INF-8074i and combines, transmits, and receives functions in a low cost, compact, and flexible format. The cages have a two-piece construction with enhanced transceiver mating tabs available in a press-fit version or a solder tail version. Longer and shorter pins are available as custom options. Stacked versions (2xN) consist of a 2-row cage with integrated 2-row connectors.



UE78-B8126-00321



UE78-L1126-00321



UE78-B2127-00321

## Specification Highlights

The interconnect system is comprised of a cage assembly which is used with 20-position SFP connectors complying with MSA Agreement INF-8074i.

### General Characteristics

- RoHS Compliant
- Industry Standard Footprint
- Industry Standard EIA-364

### Mechanical Characteristics

- Accepts Multiple Transceivers per INF-8074i
- Compliant Press-Fit Pins or Solder Tails (1x1 Cages)
- Durability: 250 Mating Cycles min

### Electrical Characteristics

- Hot Swappable
- Operating Voltage: 3.3 V
- Operating Current: 0.5 A
- Differential Impedance: 100  $\Omega$  +/- 10  $\Omega$
- DWV: 300 V AC
- Insulation Resistance: 1000 M $\Omega$  min
- Contact Resistance: 70 m $\Omega$  max
- Spring Fingers for Superior EMI Grounding

### Packaging

- Tape and Reel Packaging: Connector or Cage
- Tray Packaging: Cage of all Sizes
- Bulk Packaging: Dust Cover

## Materials

- Cage
  - o Base Material: Copper Alloy
  - o Plating: Nickel or Tin
  - o Light Pipe: Optical Grade Polycarbonate
  - o Heat Sink: Aluminum Alloy
  - o Heat Sink Clip: Stainless Steel
  - o Dust Cover: Thermoplastic
  - o EMI Ground Tabs: Stainless Steel
- Connector
  - o Contact Base Material: Copper Alloy
  - o Contact Plating: Gold on Mating Area, Gold or Matte Tin on Termination
  - o Housings: Glass Reinforced, Lead-Free Solder Reflow Process Compatible Thermoplastic, UL94V-0 Rated

## Temperature Rating

- Operating Temperature: -55°C to +85°C
- Storage Temperature: -55°C to +105°C

## Configurations (Rows x Ports per Row)

- |       |       |
|-------|-------|
| • 2x1 | • 2x2 |
| • 2x4 | • 2x5 |
| • 2x6 | • 2x8 |

## Options

- Dust Cover
- Light Pipe
- Heat Sink (Standard Fin for Final Cage Combo)
- Enhanced EMI Performance Cage



UE86-K2127-10321



UE78-B4127-00321

# Ordering Information

## SFP 2xN Combo (Cage / Connector)

UEXX - X X X 2 X - X X X X 1

UEXX

### SERIES DESIGNATION

UE78 - Standard SFP Cage and Connector (RoHS)

UE86 - Standard SFP Cage and Connector with Light Pipes (RoHS)

X

### STYLE

B - Stacked Connector and Cage Combo (UE78 Series)

D - 2xN, Small Light Pipe Openings (UE86 Series)

K - 2xN, Large Light Pipe Openings (UE86 Series)

L - 2xN, Low Profile Combo (No Light Pipe) (UE78 Series)

X

### NUMBER OF PORTS IN ROW

1 - 2x1

2 - 2x2

4 - 2x4

5 - 2x5

6 - 2x6

8 - 2x8

X

### EMI SHIELDING

1 - Standard

2 - Bottom Mylar Tape, No Mid Ground Pins

3 - No Mid Ground Pins

2

2 - Standard

### PACKAGING

1 - Tray Packaging (Stacked)

### PLATING OPTION: CAGE

1 - Bright Tin (for Wave Soldering)

2 - Nickel

3 - Matte Tin (for SMT Soldering)

### PLATING OPTION: CONNECTOR

X - Various Options Available

Consult Sales or Website for Details

### DUST COVER OPTION

0 - Without Dust Cover

D - With Dust Cover (Shipped Loose)

### HEAT SINK / LIGHT PIPE OPTION

0 - No Heat Sink or Light Pipe

X - Various Options Available

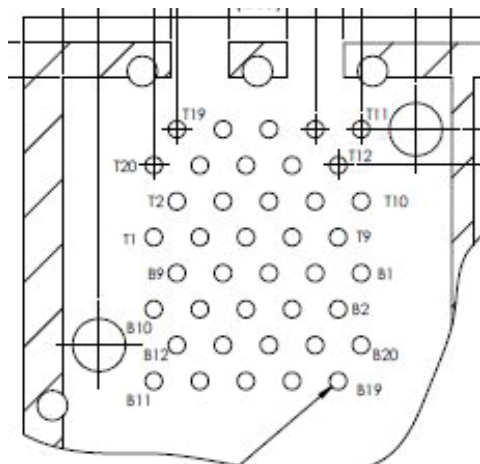
Consult Sales or Website for Details

### PCB MOUNTING OPTION

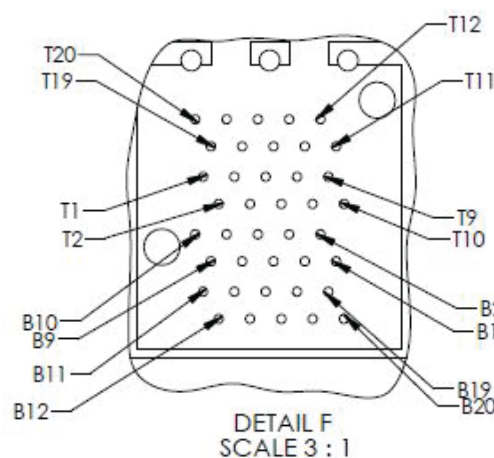
7 - Standard

X - Various Customer Specific Options Available

Consult Sales or Website for Details



UE78 Series Footprint



UE86 Series Footprint

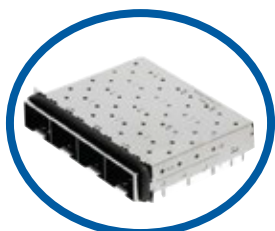
# ExpressPort™ SFP+ 1xN



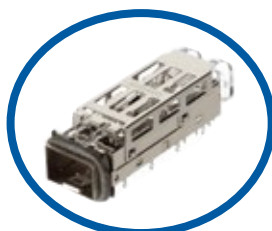
UE76-A20-3010T

Amphenol's ExpressPort™ SFP+ 1xN connector, when combined with the ExpressPort™ SFP+ cage, provides data transfer speeds of up to 16 Gbps. The design of the ExpressPort™ SFP+ connector minimizes impedance discontinuities and reflections at high data rates, and provides a 10 to 20 dB improvement in Near-End Crosstalk.

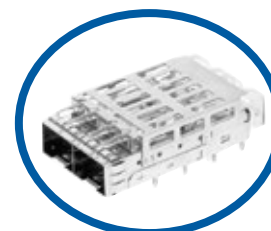
Amphenol's unique ExpressPort™ SFP+ cage construction features EMI shielding available in the form of metal spring fingers or elastomeric gaskets. These cages also eliminate ventilation holes near the front of the cage to prevent potential catch points for the mating module EMI springs. Additional features available include lightpipes (which can be purchased with cages or separately), heat sinks, and other custom features.



U77-A441M-2081



U77-C1419-2001



U77-C261M-2081

## Specification Highlights

The interconnect system is comprised of a cage assembly which is used with 20-position SFP+ connectors complying with SFF-8081 and SFF-8083. Ganged cages comply with industry standard SFF-8433.

### General Characteristics

- RoHS Compliant
- Industry Standard Footprint
- Industry Standard EIA-364

### Mechanical Characteristics

- Accepts Multiple Transceivers per SFF-8431
- Compliant Press-Fit Pins or Solder Tails (for 1x1 Cages)
- Durability: 250 Mating Cycles min

### Electrical Characteristics

- Hot Swappable
- Operating Voltage: 3.3 V
- Operating Current: 0.5 A
- Differential Impedance: 100  $\Omega$  +/- 10  $\Omega$
- DWV: 300 V AC
- Insulation Resistance: 1000 M $\Omega$  min
- Contact Resistance: 70 m $\Omega$  max

### Packaging

- Tape and Reel Packaging: Connector or 1x1 Cage
- Tray Packaging: Cage of all Sizes
- Bulk Packaging: Dust Cover

## Materials

- Cage
  - o Base Material: Copper Alloy
  - o Plating: Nickel or Tin
  - o Light Pipe: Optical Grade Polycarbonate
  - o Heat Sink: Aluminum Alloy
  - o Heat Sink Clip: Stainless Steel
  - o Dust Cover: Thermoplastic
- Connector
  - o Contact Base Material: Copper Alloy
  - o Contact Plating: Gold on Mating Area, Gold or Matte Tin on Termination
  - o Housings: Glass Reinforced, Lead-Free Solder Reflow Process Compatible Thermoplastic, UL94V-0 Rated

## Temperature Rating

- Operating Temperature: -55°C to +85°C
- Storage Temperature: -55°C to +105°C

## Configurations (Rows x Ports per Row)

- |       |       |
|-------|-------|
| • 1x1 | • 1x2 |
| • 1x3 | • 1x4 |
| • 1x6 |       |

## Options

- Dust Cover
- Round Light Pipe
- Heat Sink
- EMI Shielding
  - o Metal Spring Fingers
  - o Conductive Elastomeric Gasket





U77-C461M-2081



UE76-A20-3000

# Ordering Information

## ExpressPort™ SFP+ Connector

**UE76** SERIES DESIGNATION (RoHS)

**A**

### STYLE

A - R/A Single Surface Mount Connector

**20**

### NUMBER OF POSITIONS

20 - 20 Positions

**X**

### CONTACT PLATING

2 - 30 µ" Gold Plating on Mating Area; Gold Flash on Termination  
3 - 30 µ" Gold Plating on Mating Area; Matte Tin Plating on Termination  
5 - 15 µ" Gold Plating on Mating Area; Gold Flash on Termination  
6 - 15 µ" Gold Plating on Mating Area; Matte Tin Plating on Termination

UE76

A

20

X

X

X

X

X

### PACKAGING

J - Tape and Reel Packaging (480 per Reel)  
T - Tape and Reel Packaging (500 per Reel)

### OPTION 3

0 - Standard

### OPTION 2

0 - Standard  
1 - Resonance Cancellation Features

### OPTION 1

0 - Standard  
6 - 25 Gbps

## ExpressPort™ SFP+ Cage

**U77** SERIES DESIGNATION (RoHS)

**X**

### STYLE

A - One Row  
C - One Row Cage; Light Pipe Combo (on Top)  
E - One Row Cage; Heat Sink Combo (Fin)  
F - One Row Cage; 1 degree Angle (1x1 Only)

**X**

### NUMBER OF PORTS IN ROW

1 - Single in Row  
2 - Inline 1x2  
3 - Inline 1x3  
4 - Inline 1x4  
6 - Inline 1x6

**X**

### CHASSIS GROUNDING

3 - Metal Spring Fingers (No Bottom Latch Cover)  
4 - Elastomeric Gasket  
6 - Metal Spring Fingers (1 Piece Design Bottom Latch Cover)

**X**

### HEAT SINK / LIGHT PIPE OPTION

1 - No Heat Sink / Light Pipe Option  
2 - Heat Sink Option  
3 - Light Pipe Option (for 1xN Cage Only)

U77

X

X

X

X

X

X

X

X

### PACKAGING

1 - Tray Packaging (ACC Re-Packed)  
T - Tape and Reel Packaging (for 1x1 Only)

### OPTION 1

0 - Standard  
7 - Cage with Extra Bottom Spring Fingers,  
No Bottom Mid G-Pins  
8 - Cage with Half-Moon Mid G-Pins  
9 - Cage with Extra Bottom Spring Fingers  
and Half Moon Mid G-Pins

### DUST COVER OPTION

0 - Without Dust Cover  
D - With Dust Cover (Shipped Loose)

### PLATING

1 - Bright Tin (for Wave Solder)  
2 - Nickel  
3 - Matte Tin (for Reflow 245 degrees)

### PCB MOUNTING OPTION

X - Various Options Available  
Consult Sales or Website for Details



Amphenol's ExpressPort™ SFP+ 2xN Combo provides data transfer speeds of up to 16 Gbps per port. ExpressPort™ SFP+ 2xN Combos consist of an integrated stacked connector system and a cage with compliant press-fit pins.

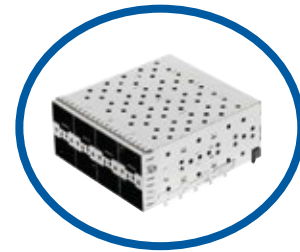
Amphenol's unique ExpressPort™ SFP+ cage construction features EMI shielding available in the form of an elastomeric gasket or metal spring fingers. These cages also eliminate ventilation holes near the front of the cage to prevent potential catch points for the mating module EMI springs.



UE86-K8427-20321



UE86-D1427-10321



UE86-D4627-10321

## Specification Highlights

The interconnect system is comprised of a 2-row stacked, 20-position, 0.8 mm pitch SFP+ connector and cage assembly as one unit with all press-fit construction.

### General Characteristics

- RoHS Compliant
- Press-fit Cage and Connector Combo for min 1.57 +/- 10% mm (0.0625") PCB Thickness
- Industry Standard EIA-364

### Mechanical Characteristics

- Card Entry Slot Accepts 1.0 mm Thick Integrated Circuit Cards
- Durability: 250 Mating Cycles min

### Electrical Characteristics

- Hot Swappable
- Operating Voltage: 3.3 V
- Operating Current: 0.5 A
- Differential Impedance: 100  $\Omega$  +/- 10  $\Omega$
- DWV: 300 V AC
- Insulation Resistance: 1000 M $\Omega$  min
- Contact Resistance: 70 m $\Omega$  max

### Packaging

- Tray Packaging: Cage and Connector Assembly
- Bulk Packaging: Dust Cover

### Materials

- Cage
  - o Base Material: Copper Alloy
  - o Plating: Nickel or Tin
  - o Light Pipe: Optical Grade Polycarbonate
  - o Dust Cover: Thermoplastic
- Connector
  - o Contact Base Material: Copper Alloy
  - o Contact Plating: Gold on Mating Area, Matte Tin on Termination
  - o Housings: Glass Reinforced, Lead-Free Solder Reflow Process Compatible Thermoplastic, UL94V-0 Rated

### Temperature Rating

- Operating Temperature: -55°C to +85°C
- Storage Temperature: -55°C to +105°C

### Configurations (Rows x Ports per Row)

- |       |       |
|-------|-------|
| • 2x1 | • 2x2 |
| • 2x4 | • 2x5 |
| • 2x6 | • 2x8 |

### Options

- Dust Cover
- Light Pipe
  - o 4 Light Pipes per 2x1
  - o 2 Inner Light Pipes per 2x1
  - o 2 Outer Light Pipes per 2x1
- EMI Shielding
  - o Metal Spring Fingers
  - o Conductive Elastomeric Gasket



UE86-K2427-10321



UE86-K442C-20321

# Ordering Information

## ExpressPort™ SFP+ 2xN Combo (Cage / Connector)

UE86 - X X X X X - X X X X 1

### UE86 SERIES DESIGNATION

UE86 - RoHS SFP+ Cage and Connector (Lead Free)

X

### STYLE

B - 2xN, No Light Pipe  
D - 2xN, Small Light Pipe Openings  
K - 2xN, Large Light Pipe Openings  
L - 2xN, Low Profile Combo (No Light Pipe)

X

### NUMBER OF PORTS IN ROW

1 - 2x1  
2 - 2x2  
4 - 2x4  
5 - 2x5  
6 - 2x6  
8 - 2x8

X

### CHASSIS GROUNDING

4 - Elastomeric Gasket  
5 - Elastomeric Gasket, Bottom Mylar Tape  
6 - Metal Spring Fingers

X

### MOUNTING TYPE: CONNECTOR

2 - Standard Press Fit Pins (12 Gbps)  
5 - Small Press Fit Pins for High Speed Termination (16 Gbps)

### PACKAGING

1 - Tray Packaging (Stacked)

1

### PLATING OPTION: CAGE

1 - Bright Tin  
2 - Nickel  
3 - Matte Tin

X

### PLATING OPTION: CONNECTOR

X - Various Options Available  
Consult Sales or Website for Details

X

### DUST COVER OPTION

0 - Without Dust Cover  
D - With Dust Cover (Shipped Loose)

X

### LIGHT PIPE OPTION

0 - No Light Pipe  
1 - 4 Light Pipes per 2x1  
2 - 2 Inner Light Pipes per 2x1  
3 - 2 Outer Light Pipes per 2x1

X

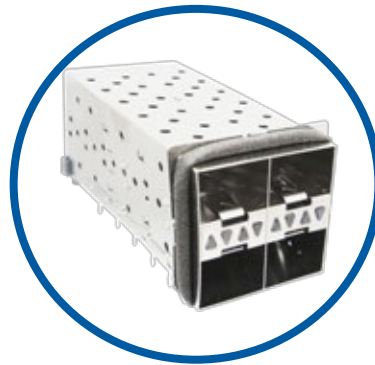
### MOUNTING TYPE: CAGE

7 - Standard 2xN Cage  
C - Enhanced EMI Cage

X

# UltraPort™ SFP+ Stacked

The UltraPort SFP+ interconnect system is comprised of a 20-position hot swappable I/O connector enclosed in a metal cage mounted to a host PCB. It supports 32Gbps applications with a backward compatibility for next generation Ethernet and Fibre Channel applications. Stacked versions (2XN) consist of a 2-row cage with integrated connectors. The entire assembly is press-fit pin compliant.



## Specification Highlights

The UltraPort SFP+ interconnect system is comprised of a 20-position, 2-row integrated connector.

### General Characteristics

- RoHS Compliant
- Industry Standard Footprint
- Industry Standard EIA-364
- Packaging: Tape and Reel
- Halogen Free

### Mechanical Characteristics

- Durability: 250 Mating Cycles min

### Electrical Characteristics

- Hot Swappable
- Allows Module Swapping
- Operating Voltage: 30V AC
- Operating Current: 0.5 A
- Spring Contacts for Superior EMI Grounding
- Contact Resistance: 10 mΩ max
- Insulation Resistance: 1000MΩ min
- DWV: 300V DC for 60 Seconds
- Differential Impedance: 100Ω+/-10Ω

### Packaging

- Tray Packaging: Cage and Connector Assembly

### Materials

- Cage
  - Base Material: Copper Alloy
  - Plating: Nickel
  - Spring Clip: Copper Alloy, Nickel Plating
- Connector
  - Contact Base Material: Gold
  - Contact Plating: Nickel on Mating Area, Tin-Lead Over Nickel on Termination
  - Housings: Glass Reinforced, Thermoplastic
  - UL94V-0 Rated

### Temperature Rating

- Operating Temperature: -55°C to +85°C
- Storage Temperature: -55°C to 105°C

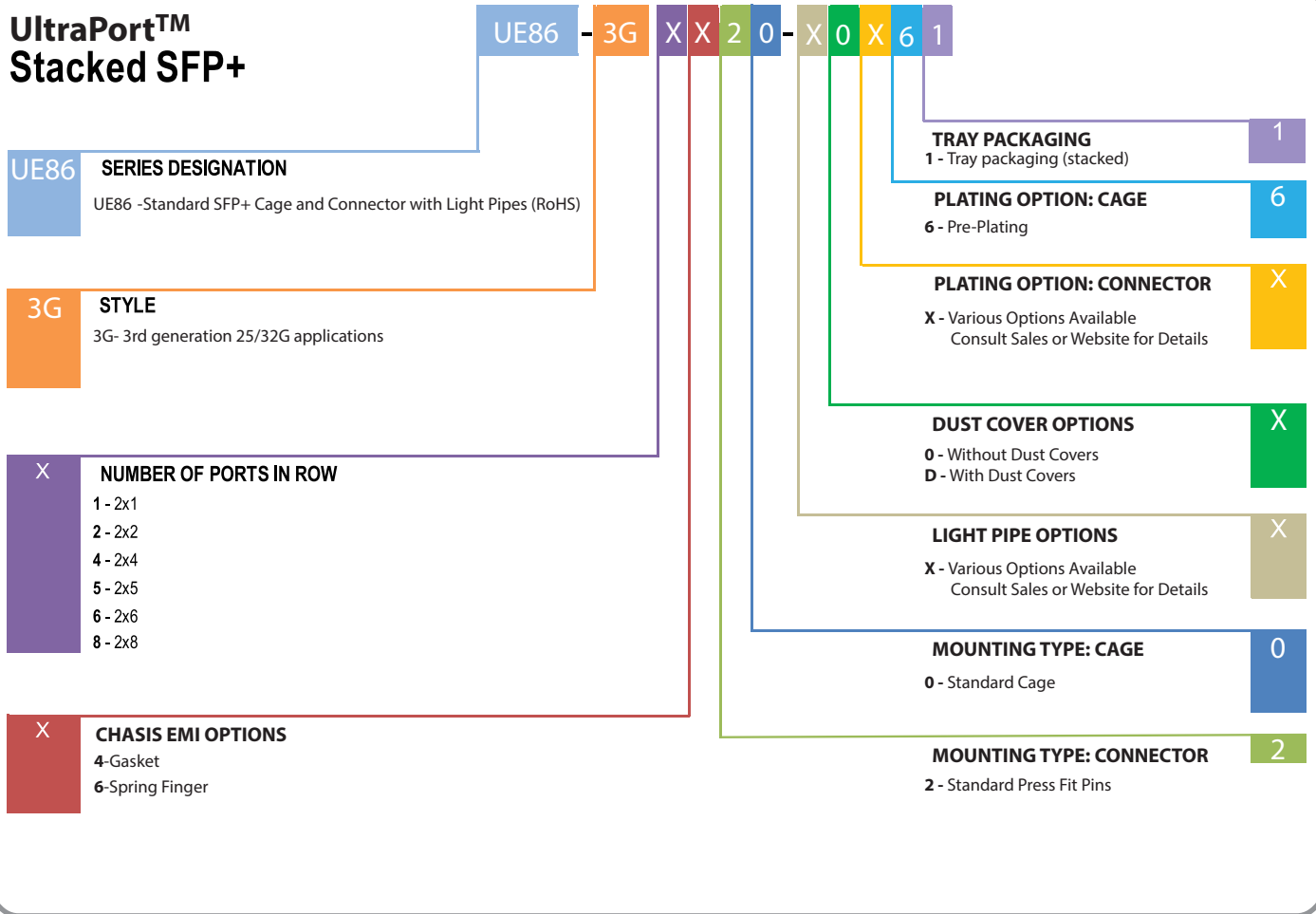
### Configurations (Rows x Ports per Row)

- |       |       |
|-------|-------|
| • 2x1 | • 2x2 |
| • 2x4 | • 2x5 |
| • 2x6 | • 2x8 |

### Options

- Thermoplastic Dust Covers

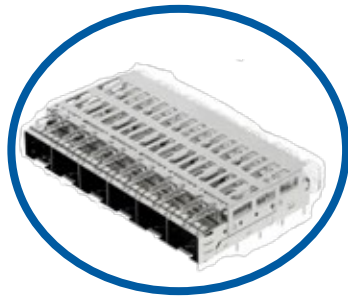
## UltraPort™ Stacked SFP+





# UltraPort™ SFP+ SMT Connector and Cages

The UltraPort SFP+ interconnect system is comprised of a 20-position hot swappable I/O connector enclosed in a metal cage mounted to a host PCB. It supports 32Gbps applications with a backward compatibility for next generation Ethernet and Fibre Channel applications. Amphenol's UltraPort SFP+ connector shares the same exceptional mating interface and EMI cage dimensions as the SFP+ form factor. The cages are built for use with several board thicknesses and assembly processes to accommodate server and switch applications with great cost savings. The connector accepts multiple transceivers per INF-8081 and combines, transmits, and receives functions in a low cost, compact and flexible format. We offer a wide variety of cage configurations, which have a two-piece construction with enhanced transceiver mating tabs available in press-fit or solder tail versions.



U77-3GA6X1M-X091



UE76-3G20-X600T

## Specification Highlights

The UltraPort SFP+ interconnect system is comprised of a 20-position hot swappable I/O connector. It supports 32 Gbps applications with a backward compatibility for next generation Ethernet and Fibre Channel applications

### General Characteristics

- RoHS Compliant
- Industry Standard Footprint
- Industry Standard EIA-364
- Halogen Free

### Electrical Characteristic

- Operating voltage: 30 V AC
- Rated current: 0.5 A
- Dielectric withstanding voltage: 300V AC
- Insulation resistance: 1000 MΩ
- Differential impedance: 100Ω +/-10Ω

### Packaging

- Tape and Reel

### Materials

- Cage:
  - o Base Material: Copper alloy
  - o Plating: Nickel plating, bright tin or matte tin over nickel
- Connector:
  - o Base Material: Copper alloy
  - o Plating: Gold over Nickel in contact areas
  - o Housing: Lead-free solder reflow process compatible thermoplastic, UL 94 V-0 rated

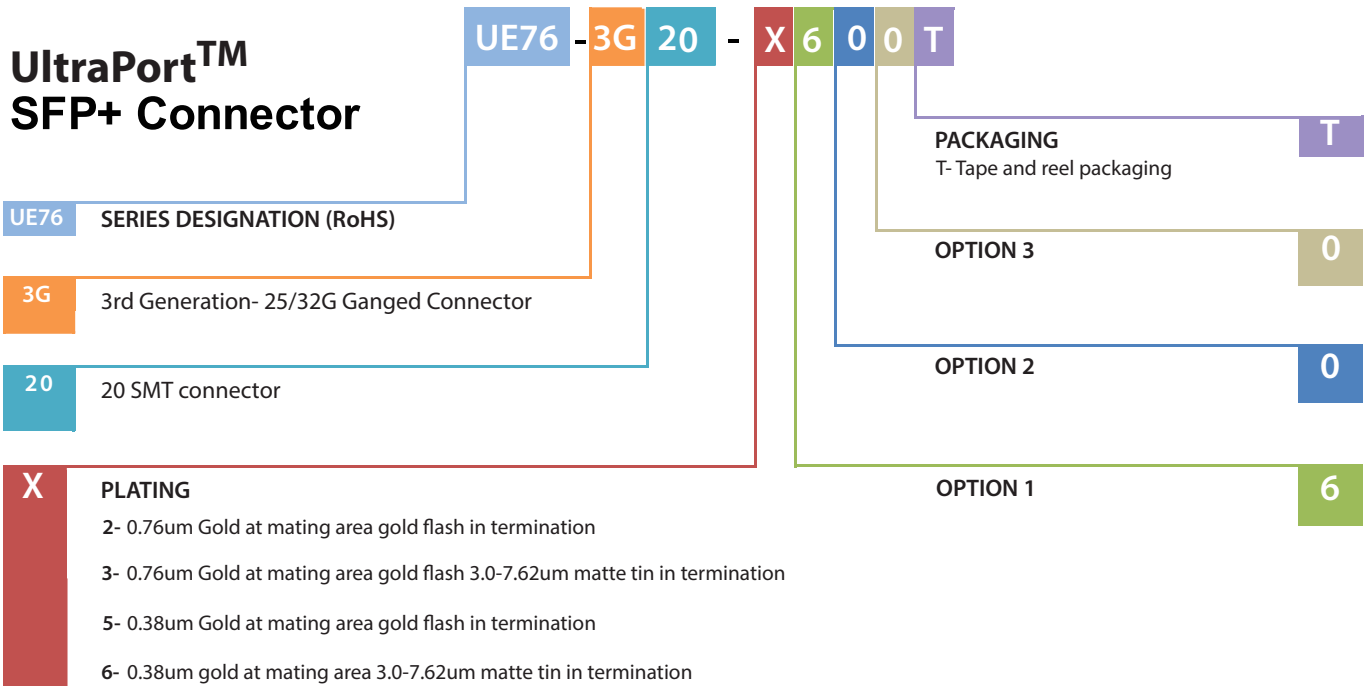
### Temperature Rating

- Operating temperature: -55° to +85°
- Storage temperature: -55° to +85°

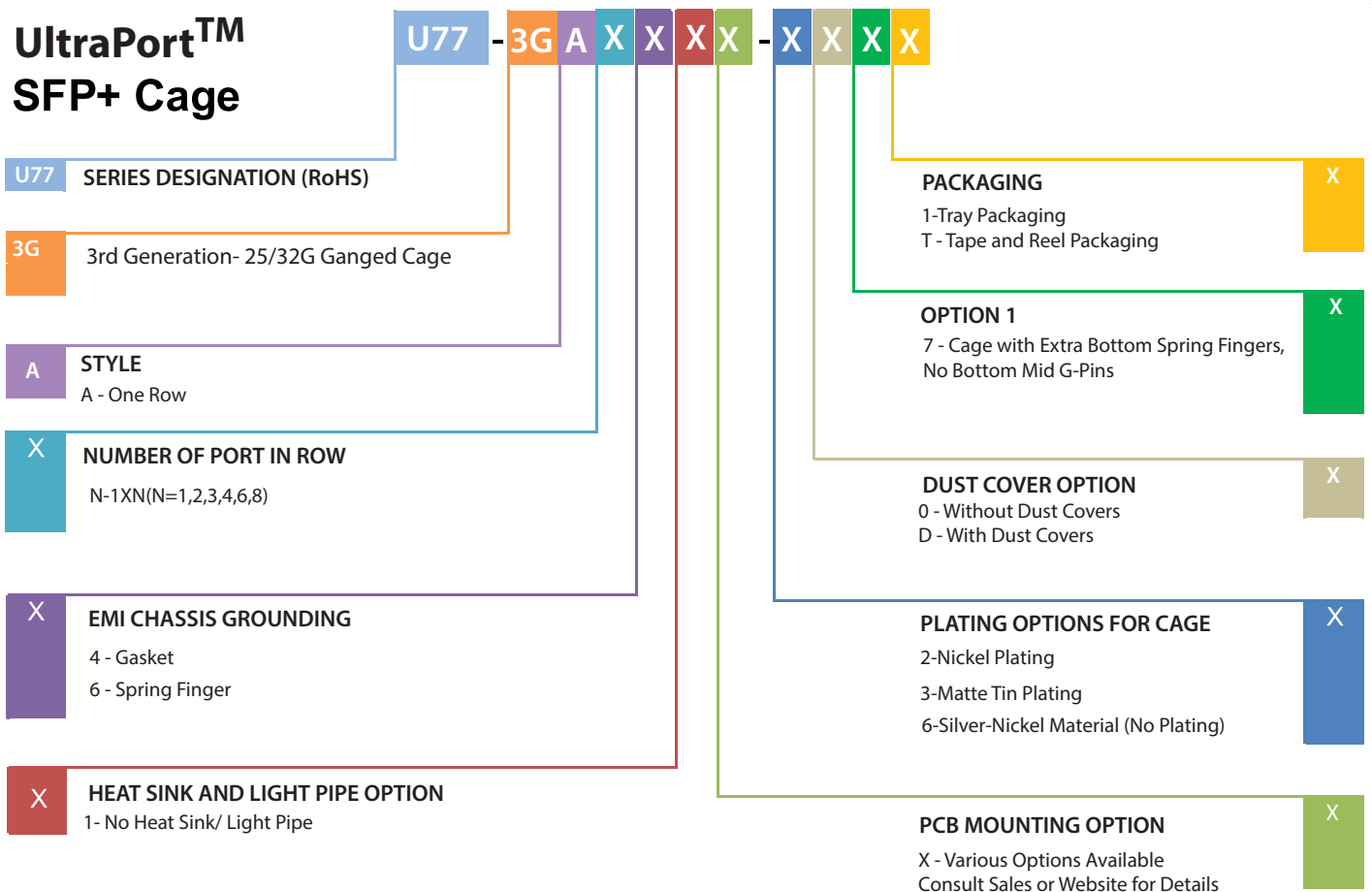
### Configurations (Rows x Ports/Row)

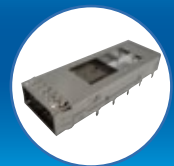
- 1x1
- 1x2
- 1x4
- 1x6

## UltraPort™ SFP+ Connector



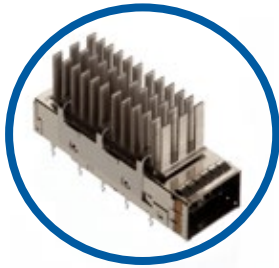
## UltraPort™ SFP+ Cage



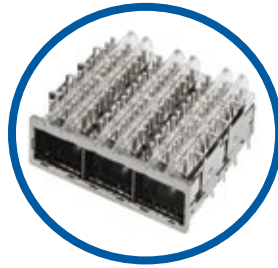


U90-C101-1000

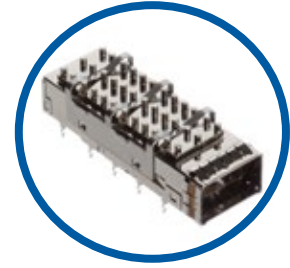
The ExpressPort™ QSFP+/QSFP interconnect system is comprised of a 38 position 0.8mm pitch SMT connector, and a press-fit cage designed to comply with the Quad Small Form-factor Pluggable(QSFP) Transceiver intended for external connections. High speed serial interconnect application include clusters, servers, and storage devices.



U90-XXX1-1XXX



U90-G351-101A



U90-XXX1-1XXX

## Specification Highlights

The QSFP interconnect system is comprised of a press-fit cage assembly which is used with 38-position connectors complying with QSFP Transceiver Specifications.

### Signal Integrity Characteristics

QSFP, ExpressPort™ QSFP+

- Return Loss: -12 dB
- Near-End Isolation: -30 dB (frequencies up to 3 GHz)
- Insertion Loss: -1 dB max
- Rise Time for Impedance Measurement: 35 ps
- Within Pair Skew: 1 ps
- NEXT:  $\leq 2\%$

### Packaging

- Tape and Reel Packaging: Connector or 1x1 Cage
- Tray Packaging: Cage of all Sizes
- Bulk Packaging: Dust Cover

### Temperature Rating

- Operating Temperature: -40°C to +85°C
- Storage Temperature: -40°C to +85°C

### Configurations (Rows x Ports per Row)

- 1x1 • 1x2 • 1x3 • 1x4 • 1x6

### Options

- Dust Cover
- Light Pipe
  - Round 1.4 mm
  - Square 2.6x2.6 mm
- Heat Sink
- Cage Design
  - Through or Behind the Bezel

### Materials

- Cage
  - Base Material: Copper Alloy
  - Plating: Nickel or Tin
  - Light Pipe: Optical Grade Polycarbonate
  - Heat Sink: Aluminum Alloy
  - Heat Sink Clip: Stainless Steel
  - Dust Cover: Thermoplastic
- Connector
  - Contact Base Material: Copper Alloy
  - Contact Plating: Gold on Mating Area, Matte Tin on Terminations and Grounding Tabs
  - Housings: Glass Reinforced, Lead-Free Solder Reflow Process Compatible Thermoplastic, UL94V-0 Rated

### Mechanical Characteristics

- Cage is Keyed According to QSFP MSA
  - QSFP+: SFF-8436
  - E-Series: SFF-8672
- Durability: 250 Mating Cycles min
- Connector Insertion Force: 40 N max
- Connector Withdrawal Force: 30 N max

### Electrical Characteristics

- Hot Swappable
- Operating Voltage: 30V
- Operating Current: 0.5A
- Differential Impedance: 100  $\Omega$  +/- 10 $\Omega$
- DWV: 300 V AC
- Insulation Resistance: 1000M $\Omega$  min
- Contact Resistance: 70 m $\Omega$  max



U90-G351-101A



FS1-R38-2000

# Ordering Information

## Connectors: QSFP ExpressPort™ QSFP+

FS1-X38-X0XX-XX

### FS1 SERIES DESIGNATION (RoHS)

**X38** R38 - 38 Position Connector (QSFP 10G, ExpressPort™ QSFP+ 12G+ & 16G)

### X PLATING

2 - 30 µ" Gold Plating on Mating Area; Matte Tin Plating on Termination  
3 - 15 µ" Gold Plating on Mating Area; Matte Tin Plating on Termination

**0** 0 - Standard

### SPECIAL

QSFP+ (12 Gbps and Up)

**00** - No Resonance Dampening, No Hold Down Tabs

**01** - No Resonance Dampening, Hold Down Tabs

QSFP+ (16 Gbps)

**10** - Resonance Dampening, No Hold Down Tabs

**11** - Resonance Dampening, Hold Down Tabs

**10** - Resonance Dampening, No Hold Down Tabs

### OPTIONS

**00** - QSFP Connector

**0A** - Connector with Hold Down Tabs

**A2** - QSFP+ Connector

## Cages: QSFP ExpressPort™ QSFP+

U90-XX1-1XX

### U90 SERIES DESIGNATION (RoHS)

### X STYLE

**A** - One Row Cage 0°, Through the Bezel (No Light Pipe)  
**C** - One Row Cage 1°, Through the Bezel (1x1 Only, No Light Pipe)  
**D** - One Row Cage 0°, Hybrid with Elastomeric Gasket  
**G** - One Row Cage 0°, Behind the Bezel  
**H** - One Row Cage 0°, Through the Bezel with Optional Light Pipe  
**K** - One Row Cage 0°, Through the Bezel with No Heat Sink Opening  
**L** - One Row Cage 0°, No Pins on Back Wall  
**P** - One Row Cage 0°, Behind the Bezel with Low Profile Heat Sink and Clip  
**R** - One Row Cage 0°, Through the Bezel with Low Profile Heat Sink  
**T** - One Row Cage 0°, Through the Bezel with Low Profile Heat Sink and Clip and Optional Light Pipe

### X NUMBER OF PORTS IN ROW

**1** - 1x1  
**3** - 1x3  
**4** - 1x4  
**6** - 1x6

### X HEAT SINK OPTION

**1** - No Heat Sink or Clip Shipped  
**2** - Fin Style (Black Oxide) Heat Sink and Clip (H = 6.5 mm)  
**3** - Fin Style (Black Oxide) Heat Sink and Clip (H = 4.2 mm)  
**4** - Fin Style (Black Oxide) Heat Sink and Clip (H = 13.5 mm)  
**5** - Pin Style (Nickel Plated) Heat Sink and Clip (H = 6.5 mm)  
**6** - Pin Style (Nickel Plated) Heat Sink and Clip (H = 4.2 mm)  
**7** - Pin Style (Nickel Plated) Heat Sink and Clip (H = 13.5 mm)  
**D** - Pin-Fin Style (Black Oxide) Heat Sink and Clip (H = 6.5 mm)  
**E** - Pin-Fin Style (Black Oxide) Heat Sink and Clip (H = 4.2 mm)  
**F** - Pin-Fin Style (Black Oxide) Heat Sink and Clip (H = 13.5 mm)  
**N** - Pin-Fin Style (Nickel Plated) Heat Sink and Clip (H = 6.5 mm)  
**P** - Pin-Fin Style (Nickel Plated) Heat Sink and Clip (H = 4.2 mm)  
**R** - Pin-Fin Style (Nickel Plated) Heat Sink and Clip (H = 13.5 mm)

### PACKAGING

**1** - Tray Packaging  
**T** - Tape and Reel Packaging (1x1 Only)  
**A** - Tray Packaging Heat Sink and Clip or Light Pipe Shipped Assembled

### LIGHT PIPE OPTION

**0** - Without Light Pipe  
**1** - Round 1.4 mm Outlet Light Pipe, No EMI gasket  
**3** - Square 2.6x2.6 mm Outlet Light Pipe, No EMI gasket

### DUST COVER OPTION

**0** - Without Dust Cover  
**D** - With Dust Cover (Shipped Loose)

### PLATING

**1** - Nickel

### APPLICATION

**1** - Press Fit Pins (2.5 mm Long)

# ExpressPort™ QSFP+ (Stacked)

The QSFP+ Stacked Combo interconnect system consists of a 2-row, 38 position, 0.8 mm pitch connector designed to be compatible with the Quad Small Form-factor Pluggable (QSFP) Transceiver Specifications. The connector system is capable of data rates up to 16 Gbps per channel (four channels) and is intended for external connections (38 positions per port). High speed serial interconnect applications include clusters, servers, and storage devices.



U90-B105-4061-120



U90-B105-4061-120  
(front view)

## Specification Highlights

The interconnect system is comprised of a 2-row, 38-position, 0.8 mm pitch connector and cage assembly as one unit complying with SFF-8436.

### General Characteristics

- RoHS Compliant
- Industry Standard Footprint
- Press-fit Cage and Connector Combo for min 1.57 mm (0.0625") PCB thickness

### Mechanical Characteristics

- Durability: 250 Mating Cycles min
- Insertion Force: 40 N max
- Withdrawal Force: 30 N max

### Electrical Characteristics

- Operating Voltage: 30 V
- Operating Current: 0.5 A
- DWV: 300 V AC
- Insulation Resistance: 1000 MΩ min
- Contact Resistance: 80 mΩ max

### Packaging

- Tray Packaging: Cage of all Sizes

## Materials

- Cage
  - o Base Material: Copper Alloy
  - o Plating: Nickel
  - o Light Pipe: Optical Grade Polycarbonate
  - o Heat Sink: Aluminum Alloy
  - o Heat Sink Clip: Stainless Steel
  - o Dust Cover: Thermoplastic
- Connector
  - o Contact Base Material: Copper Alloy
  - o Contact Plating: Gold on Mating Area, Matte Tin on Terminations and Grounding Tabs
  - o Housings: Glass Reinforced, Lead-Free Solder Reflow Process Compatible Thermoplastic, UL94V-0 Rated

## Temperature Rating

- Operating Temperature: -40°C to +85°C
- Storage Temperature: -40°C to +85°C

## Configurations (Rows x Ports per Row)

- 2x1
- 2x2
- 2x3
- 2x4
- 2x6

## Options

- Dust Cover
- Heat Sink
- Light Pipe
- EMI Shielding



## Stacked QSFP+

U90-BXXX-4XX1-XX0

**U90** SERIES DESIGNATION (RoHS)

**B** STYLE  
B - Standard

**X** NUMBER OF PORTS IN ROW  
1 - 2x1  
2 - 2x2  
3 - 2x3  
4 - 2x4  
6 - 2x6

**X** HEAT SINK OPTION  
0 - No Heat Sink or Clip Shipped  
X - Options Available Upon Request  
Contact Sales for Details

**X** APPLICATION  
5 - Press Fit Pins (2 mm Long)  
X - Options Available Upon Request  
Contact Sales for Details

**4** CAGE AND CONNECTOR CONTACT PLATING  
4 - 0.76 µm Min. Gold over 1.27-3.81 µm of Nickel on Mating Area;  
0.381-1.52 µm of Matte Tin Over 1.27-3.81 µm of Nickel on  
Press Fit Tail Area; Nickel Plating for Cage

**X** DUST COVER OPTION  
0 - Without Dust Cover  
D - With Dust Cover (Shipped Loose)

**CONNECTOR FOOT PRINT**

0 - Standard

**VENT HOLES AND EMI COVER**

0 - With Large Vent Holes and EMI Cover  
1 - With Large Vent Holes, No EMI Cover  
2 - With Small Vent Holes and EMI Cover  
3 - With Small Vent Holes, No EMI Cover  
4 - With Rectangular Vent Holes and EMI Cover  
5 - With Rectangular Vent Holes, No EMI Cover  
6 - With Large Vent Holes and Heat Sink

**EMI GASKET**

1 - Chomerics 1273 Conductive Elastomer  
2 - Chomerics S6305 Conductive Elastomer  
3 - Through the Bezel

**PACKAGING**

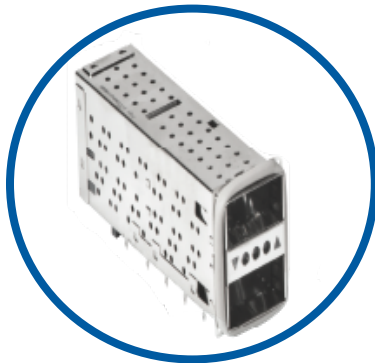
1 - Tray Packaging

**LIGHT PIPES OPTION**

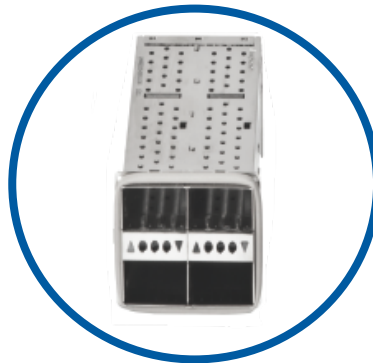
6 - With Light Pipes (Triangular Outlet); Left Arrow Pointing  
Bottom Outlet and Right Arrow Pointing Top Port  
7 - Without Light Pipes  
8 - With Light Pipes; Left Arrow Pointing Top Port and  
Right Arrow Pointing Bottom Port

# UltraPort™ QSFP+ Stacked

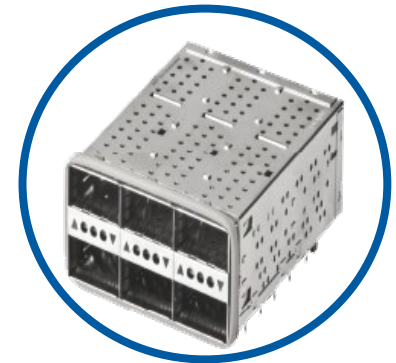
The UltraPort™ QSFP+ interconnect system is comprised of a 38-position, 0.8mm pitch connector built for use in high speed serial applications. Each port offers 4 channels to increase port density which contributes to more board real estate and immense cost savings. High speed serial interconnect applications include clusters, servers, and storage devices.



P-U95-Z105-XXX1-XX1



P-U95-Z205-XXX1-XX1



P-U95-Z305-XXX1-XX1

## Specification Highlights

The UltraPort™ QSFP+ interconnect system is comprised of a 38-position, 0.8mm pitch connector built for use in high speed serial applications and supports 32 Gbps per channel. Each port offers 4 channels to increase port density.

### General Characteristics

- RoHS Compliant
- Industry Standard Footprint
- Belly-to-belly Mount
- Combos are tray packed
- Dust cover for front face is available (bulk packed)

### Connector Mechanical Characteristics

- Insertion force: 40 N maximum
- Withdrawal force: 30 N maximum
- Durability: 250 mating cycles

### Connector Electrical Characteristics

- Maximum current: 0.5A per contact
- Maximum voltage: 30V per contact
- LLCr: 80 mΩ max
- Insulation Resistance: 1000 MΩ at 100V DC for 60 seconds
- DWV: 300V minimum DC for 60 seconds

### Available Configurations (Rows x Ports/Row)

- 2x1, 2x2, 2x3, 2x4

### Material Requirements

Electrical connector chicklets:

- Contact area to have 15 μ" and 30 μ" gold option, over 50 μ" nickel on mating area
- Press fit termination to have 100-300 μ" nickel
- Molding body LCP

Housing: Glass-reinforced thermoplastic, UL 94 V-0 rated

Cage: Copper alloy, tin over nickel or nickel only plating

### Temperature Rating

Temperature rise: Meets the requirement of 30° C ΔT

Operating and storage temperature: -40° to +85° C

### Available Options

- Various EMI Shielding Options
- Heat Sinks
- Light Pipes
- Dust Covers
- Through and Behind the Bezel and Hybrid Cage Options

### Supports Multiple Data Transfer Protocols

- Infiniband : 4x SDR/DDR/QDR/HDR
- 100 Gigabit Ethernet

## UltraPort™ Stacked QSFP+

**U95** SERIES DESIGNATION (RoHS)

**Z** STYLE  
Z-Standard

**X** NUMBER OF PORTS IN ROW  
1 - 2x1  
2 - 2x2  
3 - 2x3  
4 - 2x4  
6 - 2x6

**0** HEAT SINK OPTION  
0 - No Heat Sink or Clip Shipped

**5** APPLICATION  
5 - Press Fit Pins (2 mm Long)

**X** CAGE AND CONNECTOR CONTACT PLATING  
4 - 0.76 µm Min. Gold over 1.27-3.81 µm of Nickel on Mating Area;  
0.381-1.52 µm of Matte Tin Over 1.27-3.81 µm of Nickel on  
Press Fit Tail Area; Nickel Plating for Cage

**X** DUST COVER OPTION  
0 - Without Dust Cover  
D - With Dust Cover

**CONNECTOR FOOT PRINT**

1-Standard

**VENT HOLES AND EMI COVER**

0 - With Large Vent Holes and EMI Cover  
2 - With Small Vent Holes and EMI Cover  
4 - With Rectangular Vent Holes and EMI Cover

**EMI GASKET**

1 - Chomerics 1273 Conductive Elastomer  
2 - Chomerics S6305 Conductive Elastomer  
3 - Through the Bezel

**PACKAGING**

1 - Tray Packaging

**LIGHT PIPES OPTION**

6 - With Light Pipes (Triangular Outlet); Left Arrow Pointing  
Bottom Outlet and Right Arrow Pointing Top Port  
7 - Without Light Pipes  
8 - With Light Pipes; Left Arrow Pointing Top Port and  
Right Arrow Pointing Bottom Port



VENT HOLE FOR PART NUMBER  
U95-Z205-XX71-X01



VENT HOLE FOR PART NUMBER  
U95-Z205-XX71-X21



VENT HOLE FOR PART NUMBER  
U95-Z205-XX71-X41



VENT HOLE FOR PART NUMBER  
U95-Z205-XX61-X01



VENT HOLE FOR PART NUMBER  
U95-Z205-XX61-X21



VENT HOLE FOR PART NUMBER  
U95-Z205-XX61-X41



VENT HOLE FOR PART NUMBER  
U95-Z205-XX81-X01



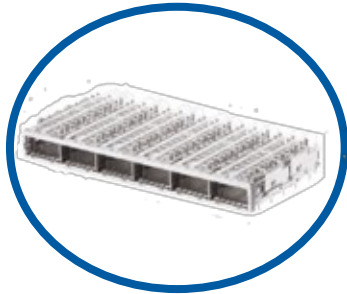
VENT HOLE FOR PART NUMBER  
U95-Z205-XX81-X21



VENT HOLE FOR PART NUMBER  
U95-Z205-XX81-X41

# UltraPort™ QSFP+ SMT Connector and Cages

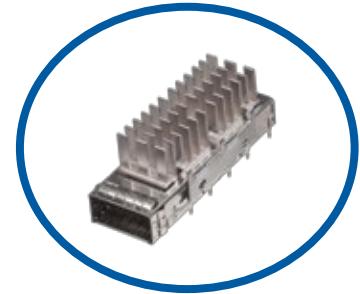
The UltraPort™ QSFP+ interconnect system is comprised of a 38-position, 0.8mm pitch connector built for use in high speed serial applications. Each port offers 4 channels to increase port density which contributes to more board real estate and immense cost savings. The UltraPort™ QSFP+ connector supports next generation 100G+ applications and transmits up to 40 Gbps per-serial-lane making it the fastest connector in the QSFP+ market. It features a stamped and formed contact design providing improved mechanical durability and resonance dampening features for superior performance. The design minimizes crosstalk and transmission line impedance discontinuity across the connector interface at speeds up to 32 Gbps.



U95-T6X1-1XXX



FS1-Z38-20Z6-10



U95-T1X1-1XXX

## Specification Highlights

### General Characteristics

- RoHS Compliant
- Industry Standard Footprint (SFF 8665)
- Belly-to-belly Mount

### Available Configurations (Rows x Ports/Row)

- 1x1,1x2,1x3,1x4,1x6

### Connector Mechanical Characteristics

- Insertion force: 40 N maximum
- Withdrawal force: 30 N maximum
- Durability: 300 mating cycles

### Connector Electrical Characteristics

- Maximum current: 0.5A per contact
- Maximum voltage: 30V per contact
- LLCR: 80 mΩ max
- Insulation Resistance: 1000 MΩ at 100V DC for 60 seconds
- DWV: 300V minimum DC for 60 seconds

### Available Options

- Various EMI Shielding Options
- Heat Sinks
- Light Pipes
- Dust Covers
- Through and Behind the Bezel and Hybrid Cage Options

### Material Requirements

#### Contacts:

- Base material : Phosphor Bronze
- Contact Normal Force : 60g nominal
- Formed edge
- Plating :
  - o Mating area : 30 microinches (0.76 μm) μ" min Gold over 50 μ" (1.27μm) min Nickel
  - o Solder tails :100 microinches (2.54 μm) μ" min Tin over 50 μ" (1.27μm) min Nickel
- Housing: Black color, glass-reinforced, lead-free solder reflow process compatible thermoplastic, UL94V-0 rated
- Resonance dampening feature: Conductive polymer

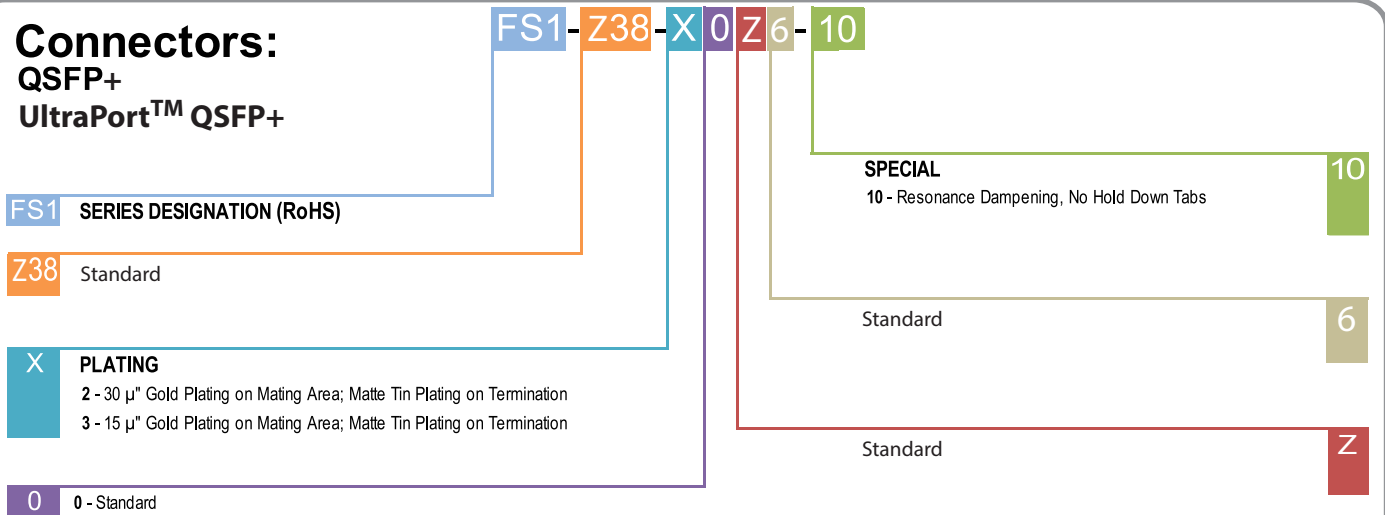
### Temperature Rating

Temperature rise: Meets the requirement of 30° C ΔT  
Operating and storage temperature: -40° to +85° C

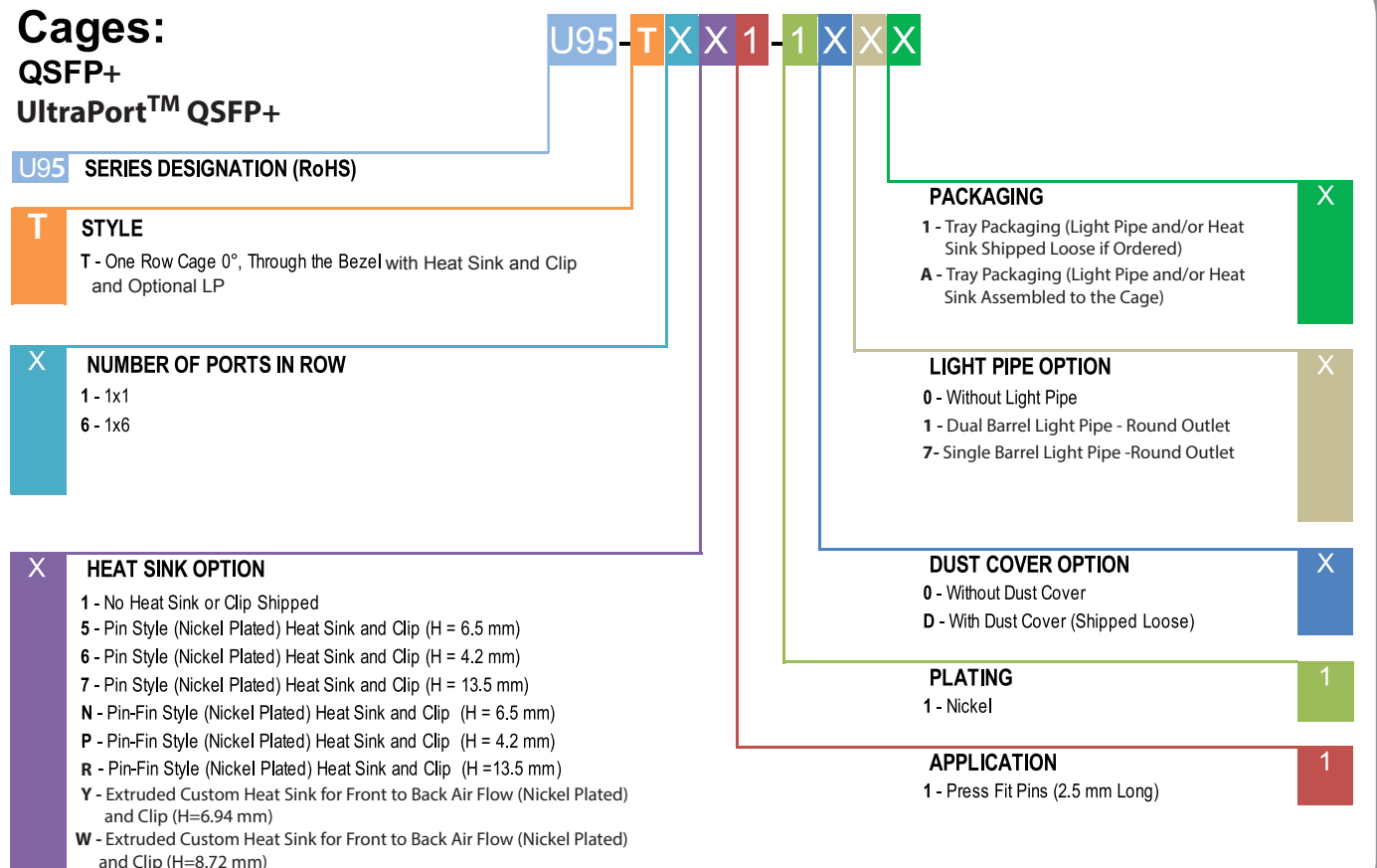
### Signal Integrity

- Insertion loss : Max 1.0 dB at 16 GHz
- Return loss : Less than -10 dB at 18 GHz
- Common mode conversion : Less than 7.0 dB at 18 GHz
- NEXT (Near End Cross Talk) less than 50 dB range of 1MHz to 20GHz
- FEXT (Far End Cross Talk) less than 30 dB range of 1MHz to 20GHz

## Connectors: QSFP+ UltraPort™ QSFP+



## Cages: QSFP+ UltraPort™ QSFP+







Amphenol's CXP connector comes in a one-piece press-fit assembly system with twelve channels of up to 20 Gbps, resulting in 240 Gbps of total bandwidth - the fastest and most dense I/O on the market today. This allows our CXP to go beyond the 100 Gigabit Ethernet IEEE 802.3ba and the Infiniband CXP12x QDR standards. It also enables pluggable copper or optical cables to increase the flexibility of system-level hardware for end users. The CXP interconnect system is ideal for network switches, routers, servers, and storage devices.



U91-A121-100A-30



U91-A121-100A-30  
(bottom view)



U91-A1A1-100A-30

## Specification Highlights

The CXP interconnect system is comprised of an 84 position, 2-row press-fit connector, and a cage assembly as one unit complying with SFF-8642.

### General Characteristics

- RoHS Compliant
- Industry Standard Footprint
- Industry Standard EIA-364

### Mechanical Characteristics

- Insertion Force for an MSA Compliant Transceiver: 150 N max
- Unmating Force: 50 N max
- Durability: 250 Mating Cycles min

### Electrical Characteristics

- Hot Swappable
- Operating Voltage: 30 V
- Operating Current: 0.5 A
- Differential Impedance: 100  $\Omega$  +/- 10  $\Omega$
- DWV: 300 V AC
- Insulation Resistance: 1000 M $\Omega$  min

### Packaging

- Tray Packaging: Cage and Connector Assembly
- Bulk Packaging: Dust Cover

## Materials

- Cage
  - o Base Material: Zinc Alloy
  - o Plating: Nickel
  - o Heat Sink: Aluminum Alloy
  - o Heat Sink Clip: Stainless Steel
  - o Cage Cover: Stainless Steel
  - o Mounting Screw: AISI 1010 Steel
  - o Dust Cover: Thermoplastic
- Connector
  - o Contact Base Material: Copper Alloy
  - o Contact Plating: Gold on Mating Area, Matte Tin on Termination
  - o Housings: Glass Reinforced, Lead-Free Solder Reflow Process Compatible Thermoplastic, UL94V-0 Rated

## Temperature Rating

- Operating Temperature: -40°C to +85°C
- Storage Temperature: -55°C to +105°C

## Configurations

- 1x1
- Custom Solutions Available

## Options

- Dust Cover
- Heat Sink
- EMI Shielding
  - o Conductive Elastomeric Gasket
  - o Metal Spring Fingers
- Keying
  - o Key #1 (Left) InfiniBand™
  - o Key #2 (Right) Ethernet



Dust Cover

# Ordering Information

## CXP Combo (Cage / Connector)

U91 - X 1 X X - 1 X X X - 3 X

### U91 SERIES DESIGNATION (RoHS)

X

#### STYLE

- A - One Row 0°, Standard Footprint
- D - One Row 0°, Enhanced Footprint
- E - One Row 0°, Long Connector, Belly-to-Belly Application
- F - One Row 0°, Short Connector, Belly-to-Belly Application

1

#### NUMBER OF PORTS IN ROW

- 1 - 1x1

X

#### HEAT SINK OPTION

- 1 - No Heat Sink or Clip Shipped
- 2 - Square Pin (Black Oxide) Heat Sink, and Clip
- 5 - Round Pin (Black Oxide) Heat Sink, and Clip
- A - Square Pin (Nickel Plated) Heat Sink, and Clip
- D - Round Pin (Nickel Plated) Heat Sink, and Clip
- G - Square Pin (Chromate Passivation) Heat Sink, and Clip
- K - Round Pin (Chromate Passivation) Heat Sink, and Clip

X

#### KEYING

- 0 - No Key
- 1 - Key #1 (Left) InfiniBand™
- 2 - Key #2 (Right) Ethernet

1

#### CAGE PLATING

- 1 - Nickel

### MOUNTING SCREWS

- 0 - No Screws
- 1 - With Mounting Screws (Standard Length of M2 x 0.4, 6 mm long)

### CONTACT PLATING

- 3 - Mating Area Plating 0.76 µm Gold Over 1.27 µm to 3.81 µm of Nickel; Press Fit Tail Area Plating 0.381 µm to 1.52 µm of Matte Tin Over 1.27 µm to 3.81 µm of Nickel

### PACKAGING

- 1 - Tray Packaging
- A - Tray Packaging: Heat Sink and Clip Shipped Assembled

### LIGHT PIPE OPTION

- 0 - Without Light Pipe
- X - Various Options Available  
Consult Sales or Website for Details

### DUST COVER OPTION

- 0 - Without Dust Cover
- D - With Dust Cover (Shipped Loose)



FS2-SF2-16C1

The Mini-SAS external I/O connector system consists of a die-cast metal cage and a Compact MultiLane SMT Connector, featuring proven “cut edge” style contacts. Providing four serial send/receive channels per port, this connector system is designed to satisfy the needs for gigabit serial data transmission applications with signal speeds across the connector interface of 6 Gbps per channel.

The cage is mounted separately to the body so that the stress imposed by insertion and removal of the cable plug does not affect the signal/body solder joints. The connector is available with unique solder hold-down tabs designed to provide additional mechanical robustness in demanding applications.



FS1-SF4-14E1



FS2-S02-14F1



FS1-S02-14E2-LP

## Specification Highlights

The Mini-SAS interconnect system is comprised of a cage assembly which is used with 26-position, 0.8mm pitch connectors complying with SFF-8086 and SFF-8088.

### Mechanical Characteristics

- Co-Planarity Specification: 0.1 mm
- Connector Insertion Force: 55.5 N max
- Connector Withdrawal Force: 49.0 N max
- Durability: 250 Mating Cycles min
- Reverse Keying for Active Copper Cables per SAS 2.0

### Electrical Characteristics

- Operating Voltage: 30 V
- Operating Current: 0.5 A
- Differential Impedance: 100  $\Omega$  +/- 10  $\Omega$
- DWV: 300 V AC
- Insulation Resistance: 1000 M $\Omega$  min
- Contact Resistance: 80 m $\Omega$  max
- Near-End Isolation: -40 dB (frequencies up to 3 GHz)
- Insertion Loss: 1.0 dB max (frequencies up to 1.6 GHz)
- Rise Time for Impedance Measurement: 50 ps
- Within Pair Skew: 5 ps

### Packaging

- Tape and Reel Packaging: Connector
- Tray Packaging: Cage
- Bulk Packaging: Mounting Screw or Dust Cover

### Materials

- Cage
  - o Base Material: Zinc Alloy
  - o Plating: Nickel
  - o Mounting Screw: AISI 1010 Steel
  - o Light Pipe: Optical Grade Polycarbonate
  - o Dust Cover: Thermoplastic
- Connector
  - o Contact Base Material: Copper Alloy
  - o Contact Plating: Gold on Mating Area, Matte Tin on Termination
  - o Housings: Glass Reinforced, Lead-Free Solder Reflow Process Compatible Thermoplastic, UL94V-0 Rated

### Temperature Rating

- Operating Temperature: -55°C to +85°C
- Storage Temperature: -55°C to +85°C

### Configurations (Rows x Ports per Row)

- 1x1                      • 1x2
- 1x4

### Options

- Dust Cover
- Light Pipe
- EMI Shielding
  - o Conductive Elastomeric Gasket
  - o Soft Shield Foam Gasket
  - o Stainless Steel Gasket
- Cage Inclination from Printed Circuit Board
  - o 0 degree Angle
  - o 1 degree Angle (PCI Applications)
- Keying



FS1-R26-2000



FS2-SF1-12C1

# Ordering Information

## Mini-SAS Connector

FS1 - R26 - X 0 0 X

### FS1 SERIES DESIGNATION (RoHS)

### R26 STYLE

R26 - 26 position connector

### X PLATING

2 - 30  $\mu$ " Gold in Mating Area; 100  $\mu$ " Matte Tin on Tails over Nickel Underplate  
3 - 15  $\mu$ " Gold in Mating Area; 100  $\mu$ " Matte Tin on Tails over Nickel Underplate

### OPTIONS

0 - Standard Connector  
1 - Connector with Hold Down Tabs

0 - Standard

0 - Standard

## Mini-SAS Cage

FSX - S XX - 1 X XX - XX

### FSX SERIES DESIGNATION

FS1 - Standard  
FS2 - With SAS 2.0 Guide Keyway  
FSA - With SAS 2.1 Guide Keyway

### S S - Shell

### XX SIZE

01 - 1x, 1 degree  
F1 - 1x, 0 degree  
02 - 2x, 1 degree  
F2 - 2x, 0 degree  
F4 - 4x, 0 degree

### 1 PLATING

1 - Nickel (RoHS)

### X KEYING

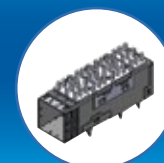
0 - No Key  
1 - Key #1  
2 - Key #2  
4 - Key #4 Universal SAS Port  
6 - Key #6  
7 - Key #7  
24 - Key #2 and #4 (SAS Out)  
46 - Key #4 and #6 (SAS In)  
D22 - Left Port Key #2 & #4 / Right Port Key #2 & #4  
D66 - Left Port Key #4 & #6 / Right Port Key #4 & #6  
D26 - Left Port Key #2 & #4 / Right Port Key #4 & #6  
D62 - Left Port Key #4 & #6 / Right Port Key #2 & #4

### LIGHT PIPE OPTION

Blank - No Light Pipe  
LP - 2 Barrel Light Pipes (1 Light Pipe per Port)

### OPTIONS

C1 - Conductive Elastomer Gasket, 8 mm Long Mounting Screw, No Lock Washer  
C2 - Conductive Elastomer Gasket, No Mounting Screw  
C3 - Conductive Elastomer Gasket, 10 mm Long Mounting Screw with Lock Washer  
E1 - Stainless Steel Gasket, 8 mm Long Mounting Screw, No Lock Washer  
E2 - Stainless Steel Gasket, No Mounting Screw  
E3 - Stainless Steel Gasket, 10 mm Long Mounting Screw with Lock Washer  
F1 - Foam Gasket, 8 mm Long Mounting Screw, No Lock Washer  
F2 - Foam Gasket, No Mounting Screw  
F3 - Foam Gasket, 10 mm Long Mounting Screw with Lock Washer



Amphenol's Mini-SAS High Density Interconnect is the next generation SAS system, with 4x, 8x, and 16x cable-plugging options to provide faster data transmission and more bandwidth for end users. The Mini-SAS HD connector system has a 2-row, right-angle connector with 12 Gbps per channel. Each connector handles 4 lanes of data for up to 48 Gbps of total bandwidth. Ganged options are also available up to a 1x4 configuration for up to 192 Gbps of total bandwidth. This connector will mate with active copper and optical cable assemblies, as well as active pluggable modules for extended-length applications in data centers. Main applications for Mini-SAS HD include HBA Servers, storage devices, switches, and rack-mounted computers.



U92-A110-1001-30



U92-A210-1001-30



U92-A410-1001-30

## Specification Highlights

The Mini-SAS HD interconnect system is comprised of a 36-position, 2-row press-fit connector, and a stamped and formed cage assembly as one unit complying with SFF-8644.

### General Characteristics

- RoHS Compliant
- Industry Standard Footprint
- Industry Standard EIA-364

### Mechanical Characteristics

- Durability: 250 Mating Cycles min

### Electrical Characteristics

- Hot Swappable
- Operating Voltage: 30 V
- Operating Current: 0.5 A
- Differential Impedance: 100  $\Omega$  +/- 10  $\Omega$
- DWV: 300 V AC
- Insulation Resistance: 1000 M $\Omega$  min
- EMI Spring Fingers for Superior EMI Performance

### Packaging

- Tray Packaging: Cage and Connector Assembly
- Bulk Packaging: Dust Cover or Mounting Screw

### Materials

- Cage
  - o Base Material: Copper Alloy
  - o Plating: Nickel
  - o Heat Sink: Aluminum Alloy
  - o Heat Sink Clip: Stainless Steel
  - o Dust Cover: Thermoplastic
  - o Mounting Screw: AISI 1010 Steel
  - o EMI Spring Finger: Copper Alloy with Nickel Plating
- Connector
  - o Contact Base Material: Copper Alloy
  - o Contact Plating: Gold on Mating Area, Matte Tin on Termination
  - o Housings: Glass Reinforced, Lead-Free Solder Reflow Process Compatible Thermoplastic, UL94V-0 Rated

### Temperature Rating

- Operating Temperature: -40°C to +85°C
- Storage Temperature: -55°C to +105°C

### Configurations (Rows x Ports per Row)

- 1x1
- 1x2
- 1x4

### Options

- Dust Cover
- Heat Sink
- Light Pipe





U92-A410-1001-30

# Ordering Information

## Mini-SAS HD Combo (Cage / Connector)

U92-A X X X - 1 X X X - X X

### U92 SERIES DESIGNATION (RoHS)

#### A STYLE

A - One Row Cage 0 degrees

#### X NUMBER OF PORTS IN ROW

1 - 1x1  
2 - 1x2  
4 - 1x4

#### X HEAT SINK OPTION

1 - No Heat Sink or Clip Shipped  
2 - Fin Style (Black Oxide) Heat Sink and Clip  
5 - Pin Style (Nickel Plated) Heat Sink and Clip  
A - Fin Style (Nickel Plated) Heat Sink and Clip  
D - Pin-Fin Style (Black Oxide) Heat Sink and Clip  
G - Pin Style (Black Oxide) Heat Sink and Clip  
K - Pin Style (Chromate Passivation) Heat Sink and Clip  
N - Pin-Fin Style (Nickel Plated) Heat Sink and Clip

#### X EMI Shielding

0 - Standard EMI Fingers  
1 - Extended EMI Fingers

#### 1 CAGE PLATING

1 - Nickel

#### MOUNTING SCREWS

0 - No Screws  
1 - Mounting Screws (Standard Length of  
M2 x 0.4, 4.3 mm Long)

#### CONTACT PLATING

3 - Mating Area Plating 0.76 µm Gold Over 1.27 µm to  
3.81 µm of Nickel; Press Fit Tail Area Plating  
0.381 µm to 1.52 µm of Matte Tin Over 1.27 µm to  
3.81 µm of Nickel  
7 - Same as 3, but with enhanced chicklet

#### PACKAGING

1 - Tray Packaging  
T - Tape and Reel Packaging  
A - Tray Packaging Heat Sink and Clip or Light Pipe  
Shipped Assembled

#### LIGHT PIPE OPTION

0 - Standard  
2 - 2 Round Light Pipes Per Port, on Top of the Cage

#### DUST COVER OPTION

0 - Without Dust Cover  
D - With Dust Cover (Shipped Loose)



The XFP interconnect system is capable of a 10 Gbps data rate and is intended for external I/O connections. High speed serial interconnect applications include clusters, servers, and storage devices. Its single row cage configuration requires less space and is a lower cost alternative to parallel-optics VSR. XFP also requires less than one-third the power and physical space of an MSA interconnect with parallel interface. It has a single footprint for all links, and is hot-pluggable.

The ExpressPort™ XFP+ Connector is designed to extend performance to 14 Gbps. Several EMI shielding options such as an elastomeric gasket or mylar tape are also available.



U79-A1G1-2001



U79-A141-2D01

## Specification Highlights

The XFP interconnect system is comprised of a press-fit cage assembly which is used with 30-position, 0.8 mm pitch SMT connectors complying with INF-8077i.

### Mechanical Characteristics

- Insertion Force: 40 N max (Cage and Connector)
- Withdrawal Force: 30 N max (Cage and Connector)
- Cage Retention: 180 N min (Latch Strength)
- Durability: 250 Mating Cycles min

### Electrical Characteristics

- Operating Voltage: 30 V
- Operating Current: 0.5 A
- Differential Impedance: 100  $\Omega$  +/- 5  $\Omega$
- DWV: 300 V AC
- Insulation Resistance: 1000 M $\Omega$  min
- Contact Resistance: 70 m $\Omega$  max
- Near-End Isolation: -40 dB
- Insertion Loss: 1.0 dB max

### Packaging

- Tape and Reel Packaging: Connector or Cage
- Tray Packaging: Cage
- Bulk Packaging: Dust Cover

### Materials

- Cage
  - o Base Material: Copper Alloy
  - o Plating: Nickel
  - o Front Flange: Zinc Alloy
  - o Heat Sink: Aluminum Alloy
  - o Heat Sink Clip: Stainless Steel
  - o Dust Cover: Thermoplastic
- Connector
  - o Contact Base Material: Copper Alloy
  - o Contact Plating: Gold on Mating Area, Gold or Matte Tin on Termination
  - o Housings: Glass Reinforced, Lead-Free Solder Reflow Process Compatible Thermoplastic, UL94V-0 Rated

### Temperature Rating

- Operating Temperature: -40°C to +85°C
- Storage Temperature: -40°C to +85°C

### Options

- Heat Sink
- Dust Cover
- EMI Shielding
  - o Conductive Elastomeric Gasket at Back of Cage
  - o Mylar Tape

## XFP Connector

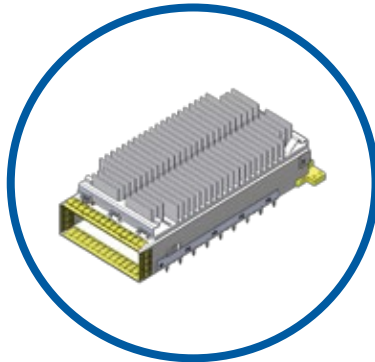
<b>UE7X</b>	<b>A</b>	<b>30</b>	<b>X</b>	<b>0</b>	<b>0</b>	<b>X</b>	<b>T</b>	
<b>SERIES DESIGNATION (RoHS)</b> UE75 - Standard XFP Connector UE76 - ExpressPort™ XFP+ Connector								<b>PACKAGING</b> T - Tape and Reel Packaging (500 per Reel)
<b>A</b>	<b>STYLE</b> A - R/A Single Surface Mount Connector							<b>LUBRICANT OPTION</b> 0 - Non Lubricated 1 - Lubricant Added
<b>30</b>	<b>NUMBER OF POSITIONS</b> 30 - 30 Positions (Single XFP)							0 - Standard
<b>X</b>	<b>CONTACT PLATING</b> 2 - 30 μ" Gold Plating on Mating Area; Gold Flash on Termination 3 - 30 μ" Gold Plating on Mating Area; Matte Tin Plating on Termination 5 - 15 μ" Gold Plating on Mating Area; Gold Flash on Termination 6 - 15 μ" Gold Plating on Mating Area; Matte Tin Plating on Termination							<b>OPTION 1</b> 0 - Standard

## XFP Cage

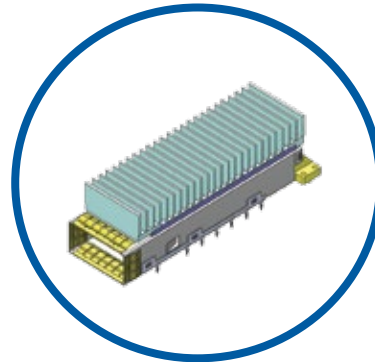
<b>U79</b>	<b>A</b>	<b>1</b>	<b>X</b>	<b>1</b>	<b>2</b>	<b>X</b>	<b>X</b>	<b>X</b>	
<b>SERIES DESIGNATION</b>									<b>PACKAGING</b> 1 - Tray Packaging (Heat Sink and Clip Shipped Separately) T - Tape and Reel (Heat Sink and Clip Shipped Separately) B - Tray Packaging (Clip Shipped Assembled to Cage)
<b>A</b>	<b>STYLE</b> A - 1 Row								<b>OPTION 1</b> 0 - Standard 1 - High Conductivity Rear Lower EMI Gasket 2 - Mylar Tape Attached to Bottom Cage Wall
<b>1</b>	<b>NUMBER OF PORTS IN ROW</b> 1 - Single in Row								<b>DUST COVER OPTION</b> 0 - Without Dust Cover D - With Dust Cover (Shipped Loose)
<b>X</b>	<b>HEAT SINK OPTION</b> 0 - No Heat Sink, Only Clip is Shipped 1 - No Heat Sink or Clip Shipped 2 - Standard Height Fin Heat Sink (7 mm) and Clip 3 - PCI Height Fin Heat Sink (4.2 mm) and Clip 4 - Tall Fin Heat Sink (13.5 mm) and Clip G - 45° Standard Height Fin Heat Sink (7mm) and Clip								<b>PLATING</b> 2 - Nickel
<b>1</b>	1 - Standard								

# CFP2 / CFP4

The CFP2 and CFP4 (surface mount receptacle connector) are considered as a candidate of future generation of multi hundred Gbps system. Both are 0.6mm pitch with the CFP2 having 104 positions and the CFP4 having 56 positions. They are rated for 28 Gbps per channel with resonance dampening for improved signal integrity. Both the CFP2 and CFP4 have a plug connector on the mating interface that improves accuracy and aids in achieving high speed performance.



P-U20-KCFP2-1XXX



P-U98-C1X1-X0XX

## Specification Highlights

The CFP2 and CFP4 interconnect systems are comprised of insert molding assemblies for top side contacts and press-fit cage assemblies. Both CFP2 and CFP4 have a plug connector on the mating interface that improves accuracy and aids in achieving high speed performance.

### General Characteristics

- Complies with IEEE and ITU-T applications
- 0.6mm contact pitch
- CFP2 has 104 positions, CFP4 has 56 positions.
- Rated for 25 Gbps per ch. with resonance dampening for improved signal integrity.
- Module and host systems are hot pluggable, not damaged by insertion/removal
- Integrated kickout spring with cage assembly for CFP4

### Materials

- Cage
  - oBase Material: Copper Alloy
  - oPlating: Nickel
  - oHeat Sink: Aluminum Alloy
  - oHeat Sink Clip: Stainless Steel
  - oDust Cover: Thermoplastic
  - oConnector cover: Zinc Alloy
- Connector
  - oContact Base Material: Phosphor Bronze
  - oContact Plating: Gold on Mating Area, Matte Tin on Termination
  - oHousings: Glass Reinforced, Lead-Free Solder Reflow Process Compatible Thermoplastic, UL94V-0 Rate d
  - oResonance Dampening Feature: Conductive Polymer

### Electrical Characteristics

- Operating Voltage: 3.3 V
- Operating Current: 1.875A

### Key Features

- Two piece electrical connector for superior electrical performance and superior mechanical integrity
- Supports LC, MTP12 and MTP24 optical connector types
- Alternative solutions to limitations of QSFP+: thermal, jitter budget and reach

### Mechanical Characteristics

- Maximum Insertion Force: 80N (Cage and Connector)
- Maximum Extraction Force: 80N (Cage and Connector)
- Minimum Cage Retention: 180N
- Minimum Module Retention: 90 N
- Durability: 200 Mating Cycles min

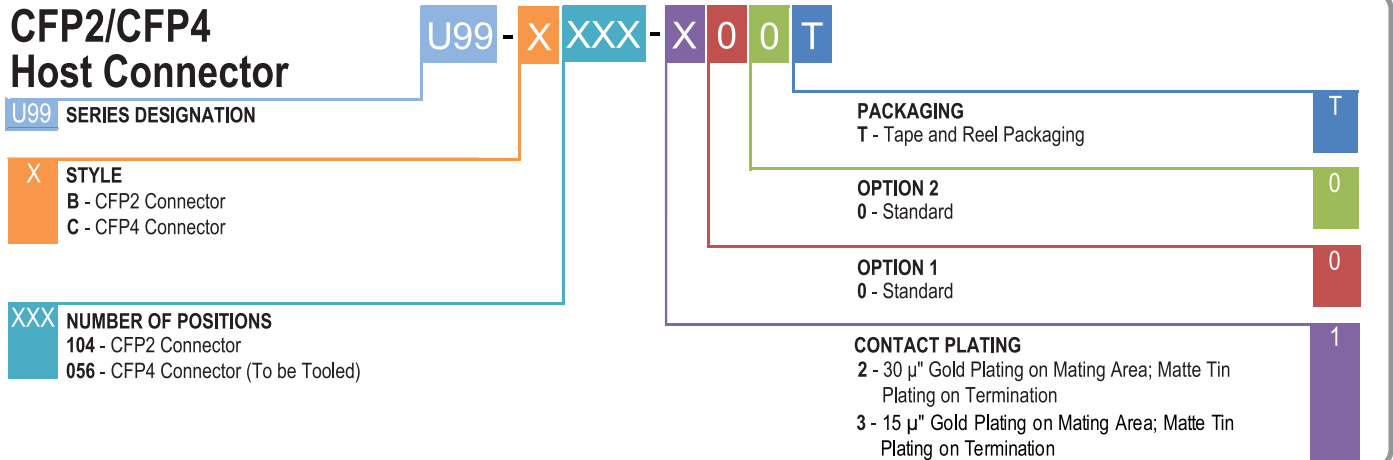
### Applications

- Supports 40Gbit/s and 100Gbit/s interfaces for Ethernet (IEEE802.3), Telecommunication (ITU-T) and other optical networking applications
- Supports single mode and multimode fiber optics
- Accommodates a wide range of power dissipations and applications
- Nominal signalling rate of 25Gbit/s per ch.

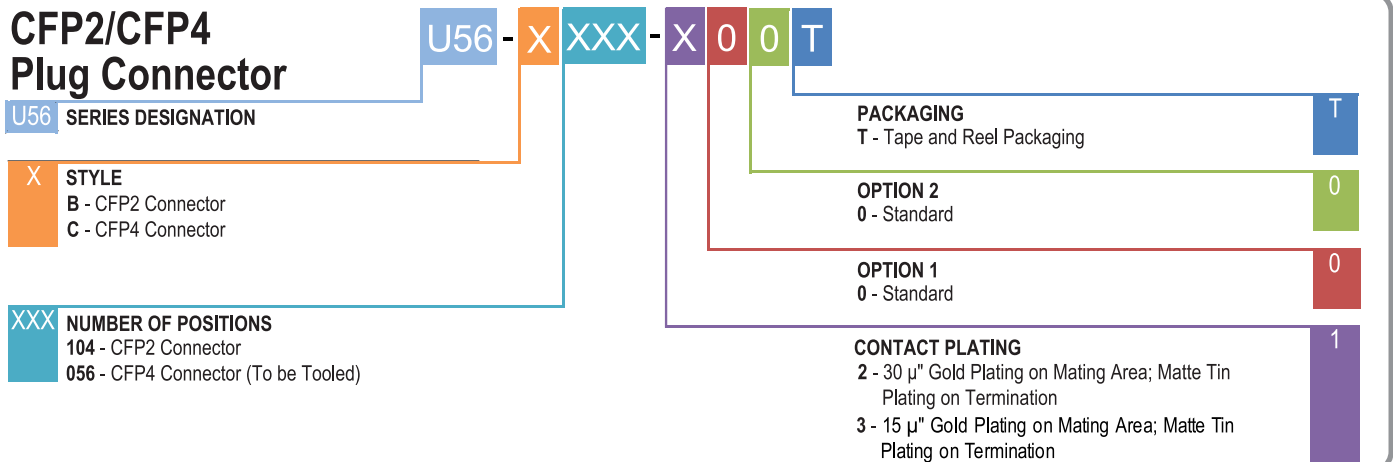
### Options

- Heat Sink and Clip
  - oStandard: Aluminum Alloy
  - oCustom designs available
- EMI Gasket
- Connector Cover
- Dust Cover

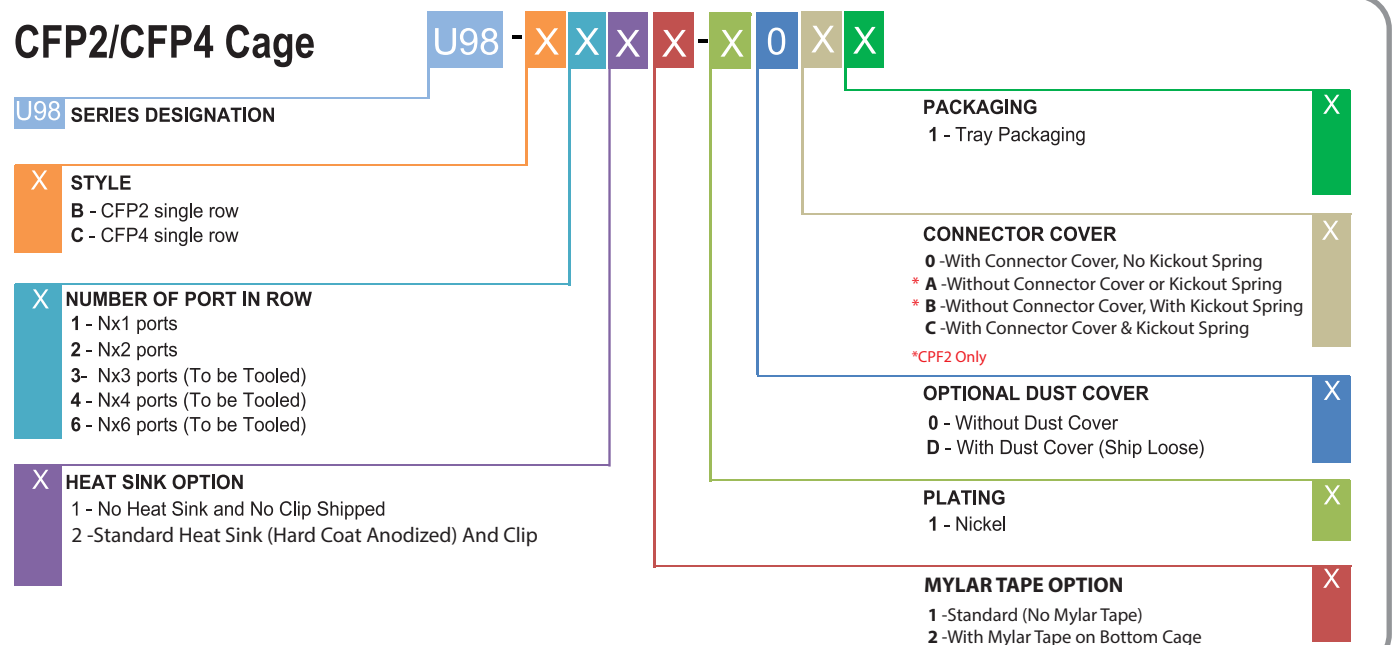
## CFP2/CFP4 Host Connector

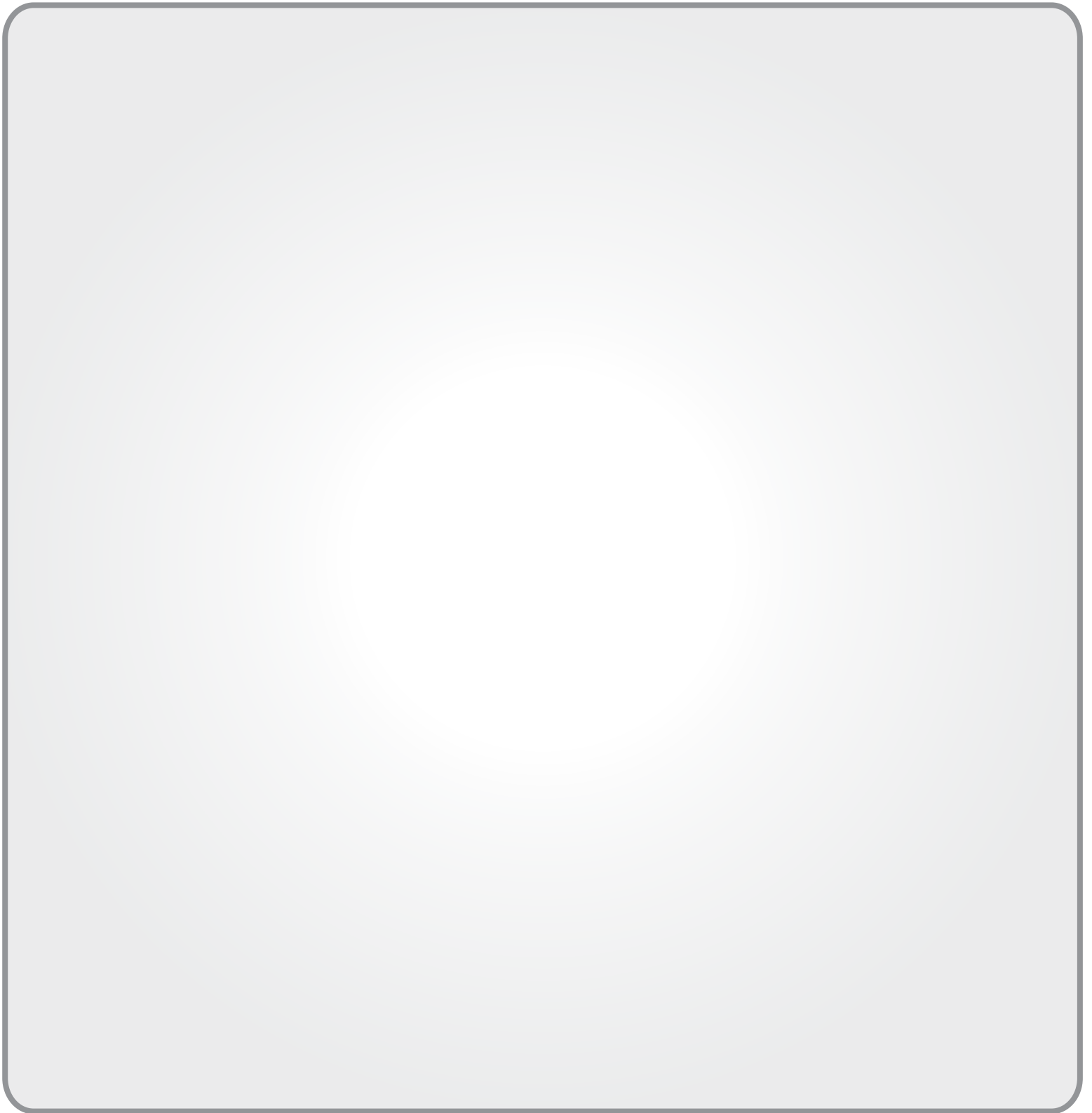


## CFP2/CFP4 Plug Connector

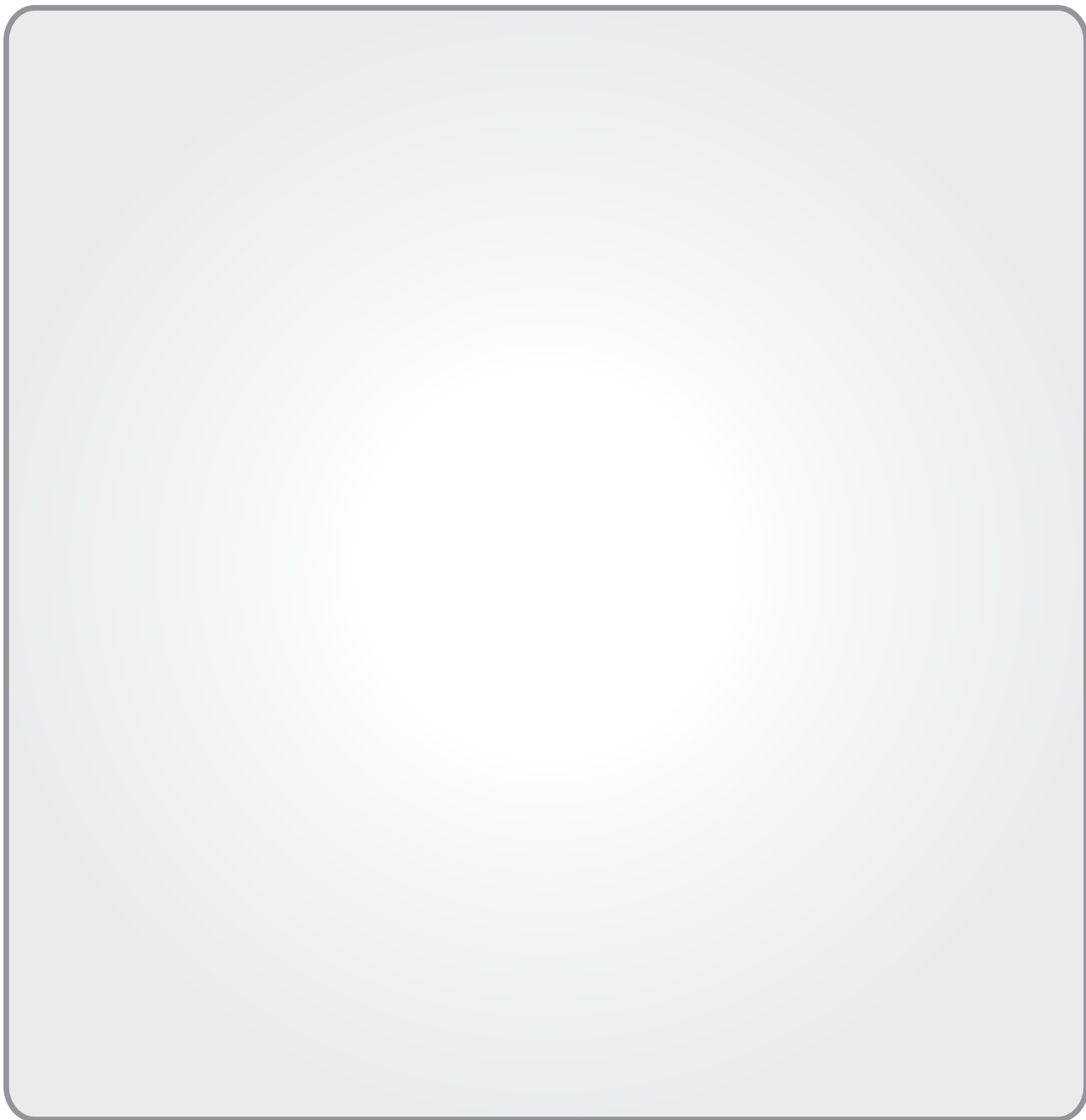


## CFP2/CFP4 Cage









# Amphenol

## High Speed Interconnects

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