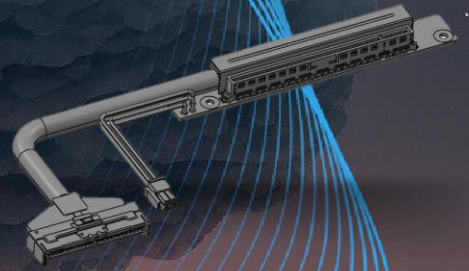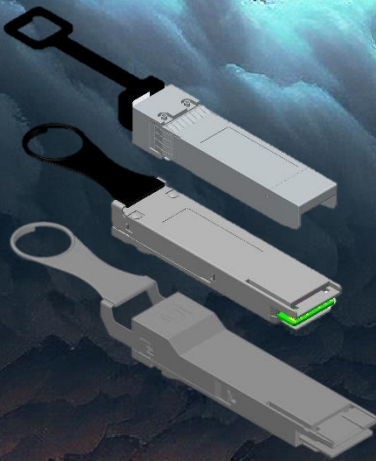ACES

genesis
connected solutions

# HSIO

*Connect the servers together to facilitate high-speed data transmission and reception.*

*BtB Mezzanine 85ohm connector*
*CEM16x to 2xMCIO74p / MCIO148p*
*External DACs, Loopbacks*

# genesis
connected solutions

## B2B Mezzanine 85ohm connector Supports PCIe Gen4

110-10008/10007/10013/10040 : Operation frequency up to 8Gbps, with mating height 28mm and 22mm options. Vertical board to board connectors which support customer's specific mezzanine application needs.

(110-10008: Female)
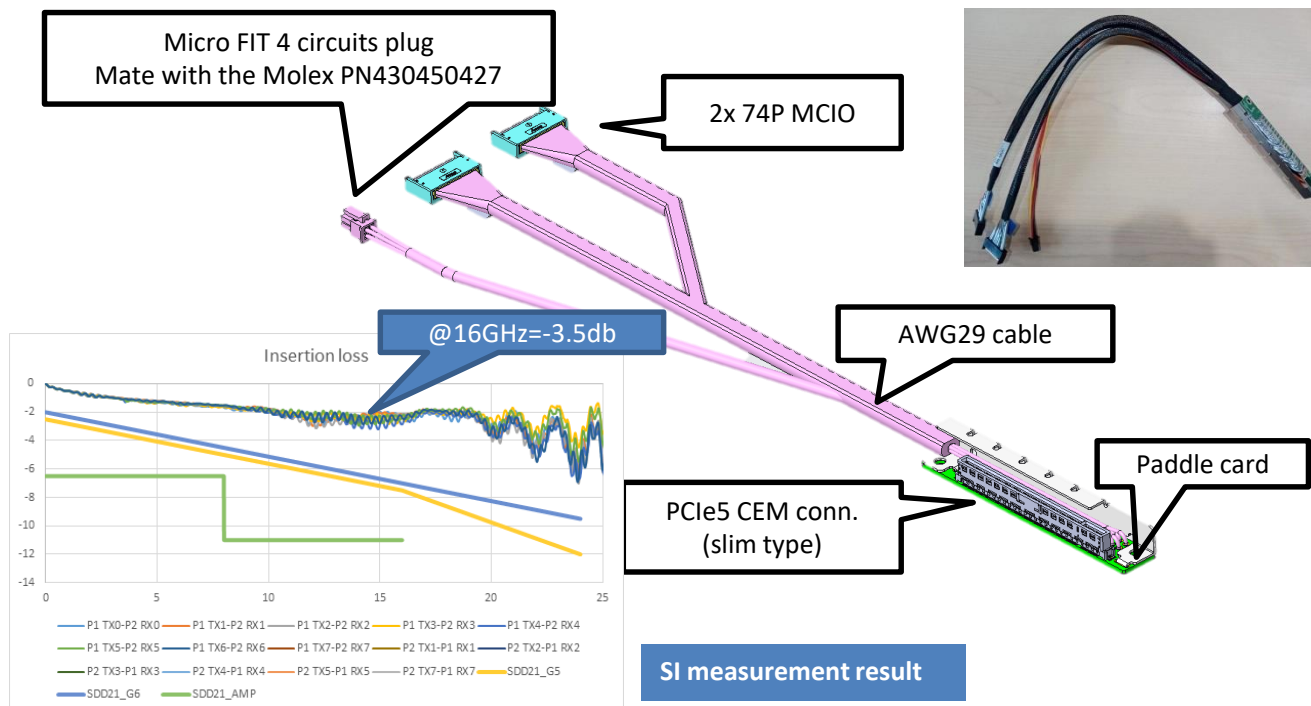
(110-10040: Male with metal shell)

(110-10007/10013: Male)
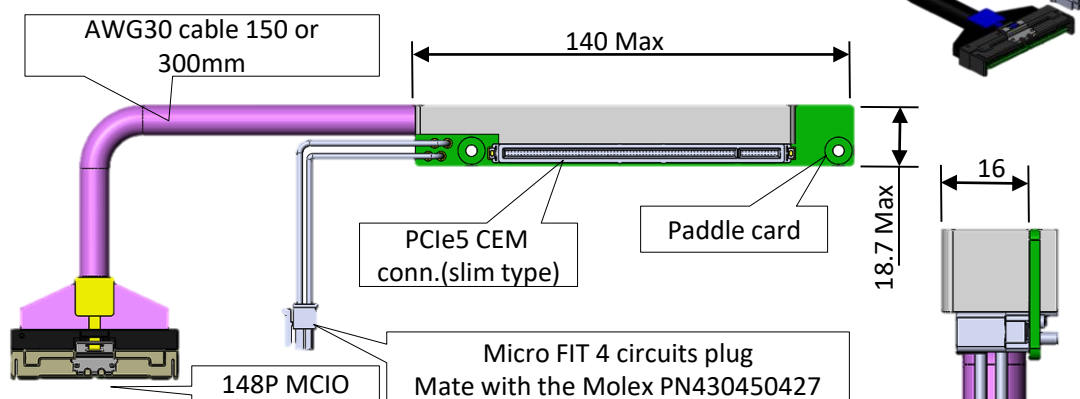
(110-10040 mates with 110-10007)

Benefits: In some cases space is very limited and cables are too short to be produced. Using BtB connectors provides large pin count(in this case 64pins→4x high speed connection) at lower cost than cable solution.
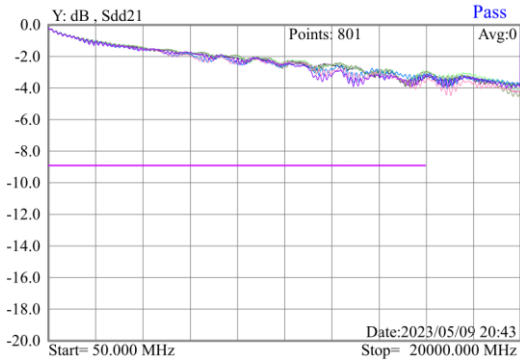
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# HSIO - CEM16x to 2xMCIO74p cable

Micro FIT 4 circuits plug
Mate with the Molex PN430450427

2x 74P MCIO

@16GHz=-3.5db

AWG29 cable

Paddle card

PCIe5 CEM conn.
(slim type)

Insertion loss

| | P1 TX0-P2 RX0 | P1 TX1-P2 RX1 | P1 TX2-P2 RX2 | P1 TX3-P2 RX3 | P1 TX4-P2 RX4 |
| P1 TX5-P2 RX5 | P1 TX6-P2 RX6 | P1 TX7-P2 RX7 | P2 TX1-P1 RX1 | P2 TX2-P1 RX2 |
| P2 TX3-P1 RX3 | P2 TX4-P1 RX4 | P2 TX5-P1 RX5 | P2 TX7-P1 RX7 | SDD21_G5 |
| SDD21_G6 | SDD21_AMP | | | |

**SI measurement result**

# CEM16x to MCIO148p cable

AWG30 cable 150 or 300mm

140 Max

18.7 Max

16

PCIe5 CEM
conn.(slim type)

Paddle card

148P MCIO

Micro FIT 4 circuits plug
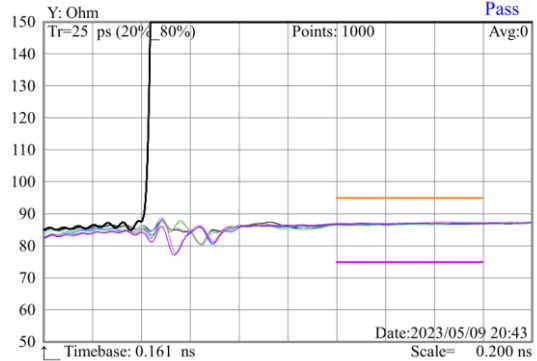Mate with the Molex PN430450427

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# CEM16x to 2xMCIO74p / MCIO148p

Cable SI measurement result (de-embedded), 29AWG 400mm sample

**Insertion_Losss**

**Differential_Impedance**
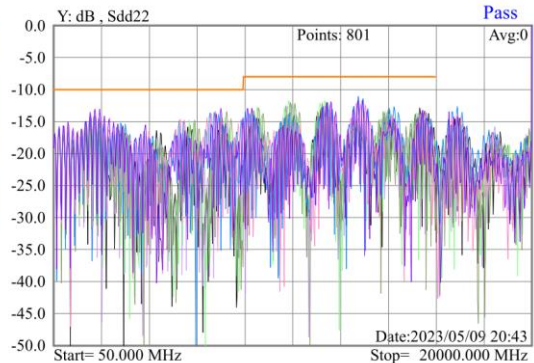
**Insertion Losss**

| Start Freq | End Freq | Spec Max | Spec Min | P3-Tx0 | P3-Tx1 |
|---|---|---|---|---|---|
| 50 | 50 | -- | -8.9 | -0.181 | -0.180 |
| 4000 | 4000 | -- | -- | -1.485 | -1.456 |
| 6000 | 6000 | -- | -- | -1.841 | -1.778 |
| 8000 | 8000 | -- | -- | -2.068 | -2.059 |
| 16000 | 16000 | -- | -8.9 | -3.198 | -3.063 |
| 50 | 16000 | -- | -8.90→-8.90 | -3.910 | -3.824 |
| MHz | MHz | dB | dB | Pass | Pass |

**Return_Loss**

**Return_Loss_SDD22**

**NEXT**

**FEXT**

*Result* (PCIe5 bandwidth:16GHz)

| | DDIL | DDRL | Impedance (Conn Area) | Impedance (Cable Area) | NEXT | FEXT | Result |
|---|---|---|---|---|---|---|---|
| Result | Pass | Pass | Pass | Pass | Pass | Marginal | Pass |
| @16GHz | -3.2dB/0.4m | | | | | | |

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# HSIO - Loopbacks

## SFP28/QSFP28/QSFPDD Loopbacks

- Attenuation value options: 0dB, 3dB, 6dB for different port tests requirement;
- Support custom EEPROM contents / custom pull tabs;

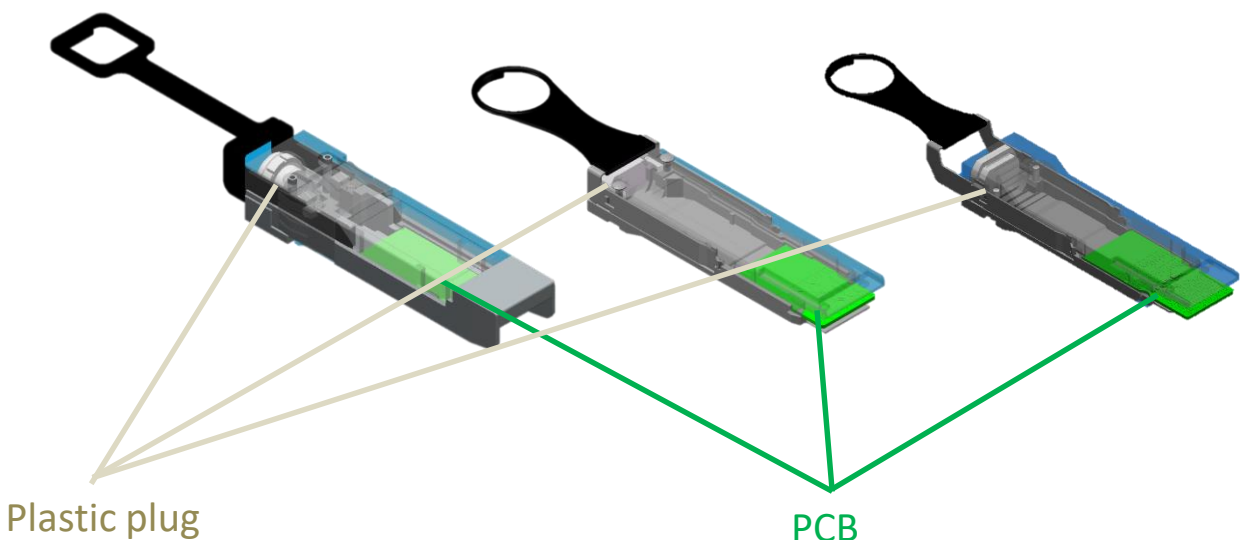## Power dissipation loopbacks

- For thermal simulation/test requirement;
- Typical: SFP28 1watt, QSFP28 4watt, QSFPDD 12watt. Different power dissipation values can be customized to needs;

| Product | Part Series |
|---------|-------------|
| SFP | 320-10462-xx |
| QSFP | 320-10418-xx |
| QSFPDD | 320-10420-xx |

**QSFPDD56**  **QSFP28/56**  **SFP+/28/56**

Plastic plug

PCB

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# External Series – QSFP DD

## Overview

ACES QSFP DD cable assembly can cover the Quad Small Form-factor Double Density 8x pluggable (QSFP DD) passive cable assembly series. The QSFP DD passive cable assembly mates with the 0.80mm (0.31 inch) centerline Z-Axis Pluggable connectors.

| Cable Type | Data Rate | Channel |
|---|---|---|
| QSFP DD 112 Active | 800G PAM 4 | 8x |
| QSFP DD 56 Active | 400G PAM 4 | 8x |
| QSFP DD | 400G PAM 4 | 8x |

## Products & Features

- Compliant with QSFP-DD MSA specification.
- 32AWG-28AWG, 0.5-2.5 meters
- Data Rate: Up to 800 Gbps (8x112Gbps), 400 Gbps (8x56Gbps)
- Temperature Range: 0°C ~ 70°C
- Excellent Signal Integrity with low insertion loss and low crosstalk
- Compliance: QSFP-DD MSA specification
  - QSFP-DD CMIS 12C
  - IEEE 802.3cd
  - 200GBASE-CR4
  - InfiniBand HDR
  - ROHS

## Applications

- Servers
- Storage
- Cellular Infrastructure
- Central Office Equipment
- Multi-platform Service Systems (DSL, cable data)
- Routers
- Switches

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# External Series – OSFP

## Overview

ACES 112Gbps PAM 4 Interconnect System and Cable Assembly series provide single-port, 8-lane DAC for high-density switch applications.

| Cable Type | Data Rate | Channel |
|------------|-----------|---------|
| OSFP RHS 56 | 400G PAM 4 | 8x |
| OSFP 56 | 400G PAM 4 | 8x |

## Products & Features

- RHS or Non-RHS plug bodies are available.
- 32AWG-28AWG, 0.5-3.5 meters
- Temperature Range: 0°C ~ 70°C
- Data Rate: Up to 800Gbps (8 x112Gbps), 400Gbps (8 x 56Gbps)
- Excellent Signal Integrity with low insertion loss and low crosstalk
- Compliance:  OSFP MSA specification
  OSFP CMIS I2C
  IEEE 802.3cd 200GBASE-CR4
  ROHS

## Applications

- High-density Switches

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# External Series – QSFP

## Overview

ACES QSFP series passive cable assembly that can deliver data rates as high as 200 Gbps with a variety of lengths or customized options for greater design flexibility.

| Cable Type | Data Rate | Channel |
|------------|-----------|---------|
| QSFP 56 | 200G PAM 4 | 4x |
| QSFP 28 | 100G NRZ | 4x |
| QSFP+ | 40 NRZ | 4x |

## Products & Features

- Compliant to SFF-8636/SFF-8679/SFF-8665
- 26AWG-30AWG, 0.5-5 meters (QSFP56 up to 3 meters)

## Applications

- Networking Equipment
- Routers and Switches
- Servers
- Storages
- Telecommunications Hardware

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# External Series – SFP DD

## Overview

ACES SFP DD cable assemblies provide a 2-lane electrical interface, transmitting 28G NRZ and 56G PAM-4, up to 50 or 100 Gbps aggregate. Also backward compatible with SFP.

| Cable Type | Data Rate | Channel |
|---|---|---|
| SFP DD 56 | 100G PAM 4 | 2x |

## Products & Features

- Compliant with SFP DD MSA specification
- 32AWG-28AWG, 0.5-3 meters
- Temperature Range: 0°C ~ 70°C
- Compliance: SFP-DD MSA specification
  SFP-DD MIS I2C
  IEEE 802.3cd 100GBASE-CR2
  ROHS
- Excellent signal integrity with low insertion loss and low crosstalk.

## Applications

- Networking Equipment
- Routers and Switches
- Servers
- Storages
- Telecommunications Hardware

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# External Series – SFP

## Overview

ACES SFP series cable assembly supporting 10G NRZ to 100G PAM 4 DAC applications.

| Cable Type | Data Rate | Channel |
|------------|-----------|---------|
| SFP 112 | 100G PAM 4 | 1x |
| SFP 56 | 50G PAM 4 | 1x |
| SFP 28 | 25G NRZ | 1x |
| SFP+ | 10G NRZ | 1x |

## Products & Features

### SFP28/SFP56 Direct Attach Cables
- Up to 10Gbps NRZ/25Gbps NRZ/56Gbps/112Gbps PAM4
- 26AWG-30AWG options, 0.5-5 meters (SFP56 up to 3m)

### SFP+ Direct Attach Cables (1Gbps-10Gbps)
- SFP MSA/SFF-8418/SFF-8419/SFF-8432/SFF-8472/SFF-8083
- 24AWG-30AWG, customized length up to 7 meters.

## Applications

- Networking Equipment
- Routers and Switches
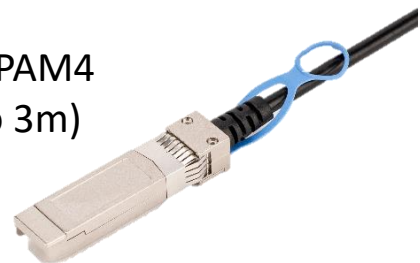- Servers
- Storages
- Telecommunications Hardware

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# External Series – Mini SAS HD

## Overview

ACES External Mini-SAS HD Cable Assembly series is a high-speed interface capable, support SAS and PCIe specifications.

| Cable Type | Data Rate | Channel |
|---|---|---|
| Mini SAS HD PCIe | PCIe 5 | 4x |
| Mini SAS HD | SAS 4 | 4x |

## Products & Features

- SFF-8644, 4x 36pos supporting 12G/24G applications.
- 26AWG-30AWG, 0.5-5 meters
- The CMI pinout version is available.
- Hybrid/Y cables
- Support SAS 3.0 & 4.0 specifications.
- Compliant with SFF-8643.
- Data rates: 6 to 24Gbps (SAS 4.0)
- Wire AWG: internal  30/32 AWG
            external 26/28 AWG
- Impedance for 100 Ohm
- RoHS compliant

## Applications

- Servers
- Storage racks
- Switches
- RAIDs
- Workstations

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# MiniSAS HD-MiniSAS HD, SAS4/PCIe5 Active Redriver cable

Simple Low Cost, Ultra Low Power SAS4/PCIe5 Cable for robust performance in moderate lengths. These cables balance the need for a cost/power/performance segment of the market between passive cables and expensive retimer/optical cables. These cables allow the system to grow as your datacenter expands in both size and speed.

## Overview

Redrivers offer a very low 5-20X cheaper price target compared to retimers which are used in expensive optical cables
Redrivers offer an ultra low power target as the chip technology is simple and efficient. The power is less than 1.2Watts on each end of the cable, keeping the overall system power budget manageable.
Length can increase by 1-4 meters with a shrinking in gauge size and at the same time to allow more air flow, less weight, and improved rack appearance.

## Product Features

The following are the key features of the Product.
- Data rate: 6-24Gbps(SAS 4.0), 8-32Gbps(PCIe Gen5)
- 4 Pairs of TX and 4 Pairs of RX per module
- **Less than 1.2W power dissipation each end**
- Simple EEPROM management
- Single 3.3V power supply
- BER < $10^{-8}$
- Hot pluggable
- RoHS2 compliant
- I2C management interface
- Operating case temperature range: 0 to +70C

## Supported Standards

The following are the supported standards of the Product
- SFF-8643
- Serial Attached SCSI 4.0; PCI Express 5.0

## Product Selection (more available)

| Part Number - SAS4 | Length | AWG |
|---|---|---|
| 320-10533-06 | 6m | 30 |
| 320-10533-08 | 7m | 30 |
| 320-10533-09 | 8m | 30 |

| Part Number – PCIe5 | Length | AWG |
|---|---|---|
| 320-10664-02 | 4m | 30 |
| 320-10664-04 | 5m | 28 |
| 320-10664-05 | 6m | 28 |
| 320-10664-06 | 7m | 28 |

## Mechanicals

| Cable Gauge | Cable "OD" | Static Bend Radius "R" | Dynamic Bend Radius "R" |
|---|---|---|---|
| 30 AWG | 6.7MM | 33.5MM | 67MM |
| 28 AWG | 7.3MM | 36.5MM | 73MM |

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# 800G QSFPDD – QSFPDD Active Electrical Cable, 112G Active Retimer

Low Cost, Low Power 112G PAM4 Active Retimer Cable for robust performance in moderate lengths. These cables balance the need for a cost/power/performance segment of the market between passive cables and expensive/high power optical cables. These cables allow the system to grow as your datacenter expands in both size and speed.

## Overview

ACES 800G QSFPDD AEC(active electrical cable) offers an alternative to the expensive optical cables when the use case is to bridge 1-4m space. With the embedded Retimer's CTLE(continuous time linear equalizer), CDR(clock data recovery) functional blocks, it can support 8 lanes of 112G PAM4 signal transmission in both directions. Compared to traditional DACs, length can increase with a shrinking in gauge size and at the same time to allow more air flow, less weight, and improved rack appearance.
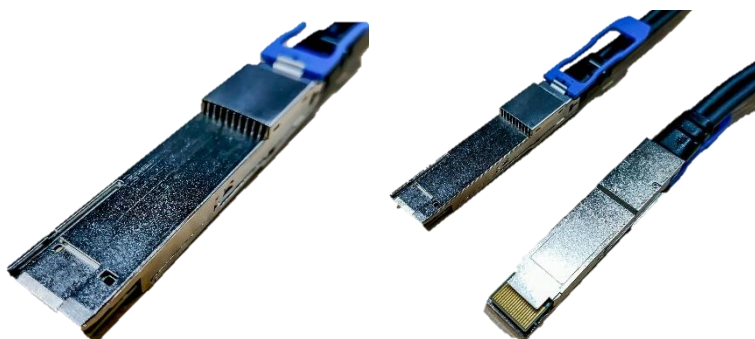
## Product Features

The following are the key features of the Product.

- 800G to 800G data rate
- 8 Lanes of TX and 8 Lanes of RX per module
- 112Gbps (PAM4)
- **Less than 9W power dissipation each end**
- Support CMIS architecture
- Single 3.3V power supply
- BER < $10^{-8}$
- Hot pluggable
- QSFPDD type2A plug style
- RoHS2 compliant
- I2C management interface
- Operating case temperature range: 0 to +70C

## Supported Standards

The following are the supported standards of the Product

- QSFPDD MSA
- IEEE Ethernet 802.3

## Product Selection (more available)

| Part Number | Length | AWG |
|---|---|---|
| 320-10xxx-01 | 3m | 30 |
| 320-10xxx-02 | Xm | 30 |
| 320-10xxx-03 | Xm | 28 |
| 320-10xxx-04 | Xm | 28 |

## Mechanicals

| Cable Gauge | Cable "OD" | Static Bend Radius "R" | Dynamic Bend Radius "R" |
|---|---|---|---|
| 30 AWG | 6.7MM | 33.5MM | 67MM |
| xx AWG | xMM | xMM | xMM |

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# OSFP – OSFP Active ,
# 112G Active 800G Repeater

Simple Low Cost, Ultra Low Power 112G PAM4 Cable for robust performance in moderate lengths. These cables balance the need for a cost/power/performance segment of the market between passive cables and expensive retimer/optical cables. These cables allow the system to grow as your datacenter expands in both size and speed.

## Overview

Repeaters offer a very low 5-20X cheaper price target compared to retimers which are used in expensive optical cables

Repeaters offer an ultra low power target as the chip technology is simple and efficient. The power is less than 1.2Watts on each end of the cable, keeping the overall system power budget manageable.

Length can increase by 1-3 meters with a shrinking in gauge size and at the same time to allow more air flow, less weight, and improved rack appearance.

## Product Features

The following are the key features of the Product.

- 800G to 800G data rate
- 8 Lanes of TX and 8 Lanes of RX per module
- 112Gbps (PAM4)
- **Less than 1.2W power dissipation each end**
- Simple EEPROM management
- Single 3.3V power supply
- BER < $10^{-8}$
- Hot pluggable
- RHS or Non-RHS available plug style
- RoHS2 compliant
- I2C management interface
- Operating case temperature range: 0 to +70C

## Supported Standards

The following are the supported standards of the Product

- OSFP MSA – RHS or Non-RHS available
- IEEE Ethernet 802.3

## Product Selection (more available)

| Part Number | Length | AWG |
|---|---|---|
| 320-10xxx-01 | 2m | 30 |
| 320-10xxx-02 | 2.5m | 30 |
| 320-10xxx-03 | 3m | 28 |
| 320-10xxx-04 | 3.5m | 28 |

## Mechanicals

| Cable Gauge | Cable "OD" | Static Bend Radius "R" | Dynamic Bend Radius "R" |
|---|---|---|---|
| 30 AWG | 6.7MM | 33.5MM | 67MM |
| 28 AWG | 7.3MM | 36.5MM | 73MM |

## PM Contact:

TF Chiang: ext.6344, email: tf.chiang@acesconn.com

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