Telecast FIBER SYSTEMS
A BELDEN BRAND

CopperHead™ Pro

Camera-Mountable FIber Optic Transceiver System

Convert any camcorder into a cost-effective "system" camera. Ideal for studios and live "I-Mag" events.

- **Uncompressed HD/SDI to 3Gb/s**
- **Camera Control**
- **Intercom**
- **Genlock/Return Video**
- **Distances to 30Km**
- **High-Quality Fiber transmission**

COMPACT & COST-EFFECTIVE

The CopperHead Pro is an advanced camera-mountable fiber system that converts "pro" camcorders into studio-ready HD camera chains, carrying all of the essential signals needed for multi-camera production over industry-standard fiber optic cable.

The low-profile Camera Unit mounts instantly to cameras with the industry's most popular battery-mounting systems.

The 1RU Base Station, usually located in a truck, control room or other production control area, can handle up to two cameras.

BEST QUALITY, LONGEST DISTANCE

Telecast's advanced fiber technology operates flawlessly at ranges up to 30Km, so the camera's uncompressed HD/SDI signal is delivered at the highest possible quality, no matter how far away the control room is.

TALLY, RETURN VIDEO & CAMERA "PAINT"

The system also provides for full camera "paint" control, intercom, tally, and a return video path that can be used for genlock or for return video to the viewfinder.

FIBER ADVANTAGE

Fiber is the solution to the problems of size, weight, limited distance and bandwidth, and the high cost of multi-camera shows using ordinary coax, triax or multicore cabling.

The Pro transmits all bidirectional signals digitally and optically, so you are assured of the highest quality video and audio—free from interference, grounding problems or drifting due to temperature variations.

When "dry" fiber is used (typically "tactical" cable or infrastructure fiber), the signals are transmitted over distances of 30Km or more. Mil-Spec "Tac" fiber is far lighter, smaller, and tougher then any copper cables.

When hybrid fiber cable is used, the link also provides power to the Camera Unit and the camera itself, for up to 2 Km.

Features

- All camera signals on 1 lightweight fiber cable
- Thin, low-profile Camera Unit
- Uncompressed studio-quality digital video
  - SD/SDI: 270 Mb/s (SMPTE 259)
  - HD/SDI
    - 1.5 Gb/s-to-3 Gb/s (SMPTE 292/424)
- Multi-kilometer distance capability
- Anton/Bauer® and "V" battery options
- Wide temp range, low power consumption
- Two fiber cable options
  - Tactical Fiber
    - Military Grade, battery/local power, 10+km
  - SMPTE Hybrid Fiber
    - "Power Wafer" 95W @ 240m (787 ft.)
    - "PowerPlus" 100W @ 2 km (1.2 miles)
- Durable, high-reliability design
- Made in U.S.A.

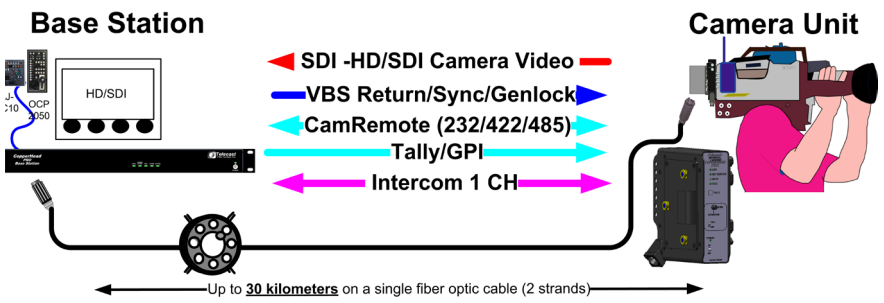
CopperHead Pro Camera Unit

Applications

- Live Image Magnification:
  - Houses Of Worship
  - Live Music
  - Corporate Events
- Studios / Flypacks
- Cross-Campus Production

FOR LIVE EVENT AND STUDIO USE

The system can be used in any multi-camera application, from small studios to large outside broadcast productions. It is especially popular for high-def (HD) image magnification (I-MAG) applications in houses of worship, music venues, and corporate events, from the smallest church to the largest arena or stadium.



U.S. Patent #7,327,959

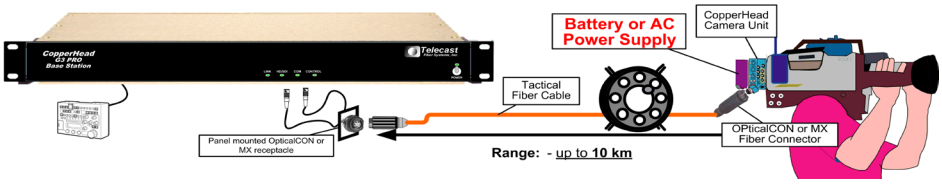
Three ways to connect

The CopperHead Pro can utilize Tactical or Hybrid fiber cable, depending on whether or not power is required at the camera. Robust, lightweight Mil-Spec "tactical" fiber cable is the perfect choice if battery or local power is available at the camera location. If local power is not available, SMPTE hybrid fiber cable with its internal copper wires can deliver plenty of power to the camera from the control room or other location. Either way, connectivity is accomplished seamlessly and with no signal degradation.

1. Connect with Tactical Fiber for highest reliability, longest range—up to 30 km (18.6 miles)*

Tougher than Coax

Telecast's TAC-series fiber cables have become the standard in field teleproduction for news, sports and EFP. Lightweight and flexible, they are tougher than coax, triax or any other copper cables, and stand up better to temperature extremes, vehicle traffic and flexing. Three sizes of Telecast OX-Frame™ reels give you the length you need.



Two rugged connector options

MX Expanded Beam Connectors

Telecast's miniature MX™ connectors are designed for "harsh environment" use. Using advanced expanded beam technology, this is the most dependable and compact multicore fiber optic connector available today. Quick hermaphroditic plugs mate directly with each other, without the need for coupling barrels, making it quick and easy to deploy and extend.

Need longer lengths?
Just add one or several reels of cable.

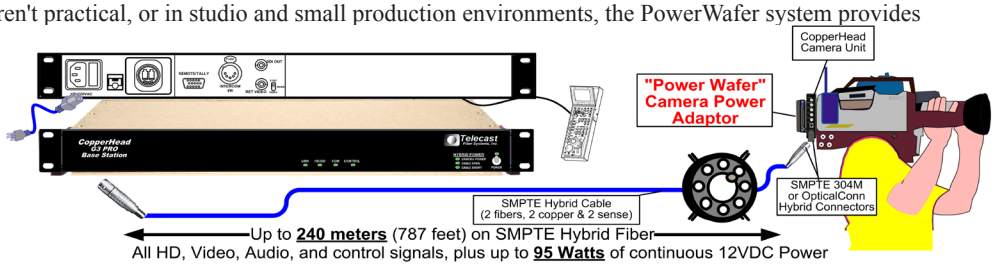
Neutrik OpticalCON® Connectors

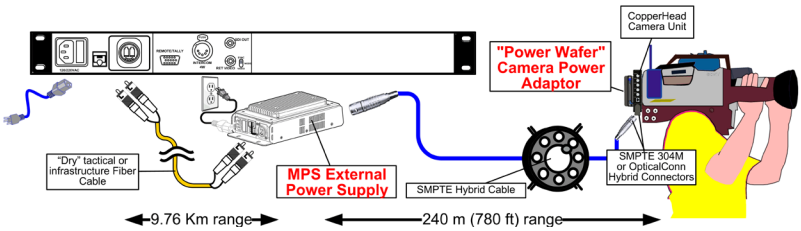
The hybrid OpticalCON system consists of a ruggedized all metal and dirt protected cable plug and chassis receptacle to increase reliability. This versatile connector is based on a standard optical LC-Duplex connection, insuring easy field servicing. In addition to use on tactical fiber, four integral copper conductors allow it to be used with SMPTE hybrid fiber cable to carry power (below).

2. Connect and power the camera, over 750 ft., using the PowerWafer & SMPTE 311M Hybrid Fiber

When batteries or other local power supplies aren't practical, or in studio and small production environments, the PowerWafer system provides power to the camera, CopperHead Camera Unit, and other accessories at the camera position.

The PowerWafer can be connected to a Powered Base Station, or to an the external MPS power supply. The MPS power supply can be located over 9 Km from the Base Station.





The "PowerWafer"

The "PowerWafer" Adaptor, will operate to 750 feet on SMPTE Hybrid fiber, and deliver 95 watts of power to the camera and accessories. It can be paired with a powered Base Station or the MPS external power supply, using SMPTE 304M or OpticalCON connectors.

Power Wafer on Copperhead

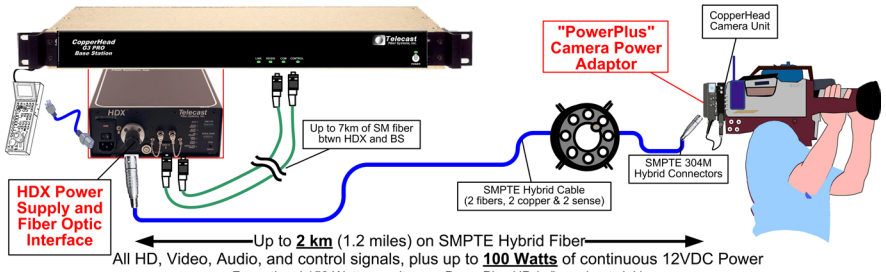
3. Power your camera over 2Km away with the PowerPlus and SMPTE 311M Hybrid Fiber

When you need longer range and/or more power at the camera, the PowerPlus/HDX combo is the solution. The PowerPlus simply attaches to the CopperHead Camera Unit in place of the battery. The "HDX" power supply is installed anywhere along the camera chain where AC power is available.

Up to 150 Watts of Continuous Power

In addition to providing 100W of power (150W momentary) for the camera and the CopperHead, 12 VDC (and optional 24 VDC) auxiliary power output connectors are provided on the PowerPlus "LP" for external accessories, such as viewfinders, prompters, or lights. 150W of Power is available with the higher power PowerPlus "HP" (larger heat sink fins).

PowerPlus "LP"

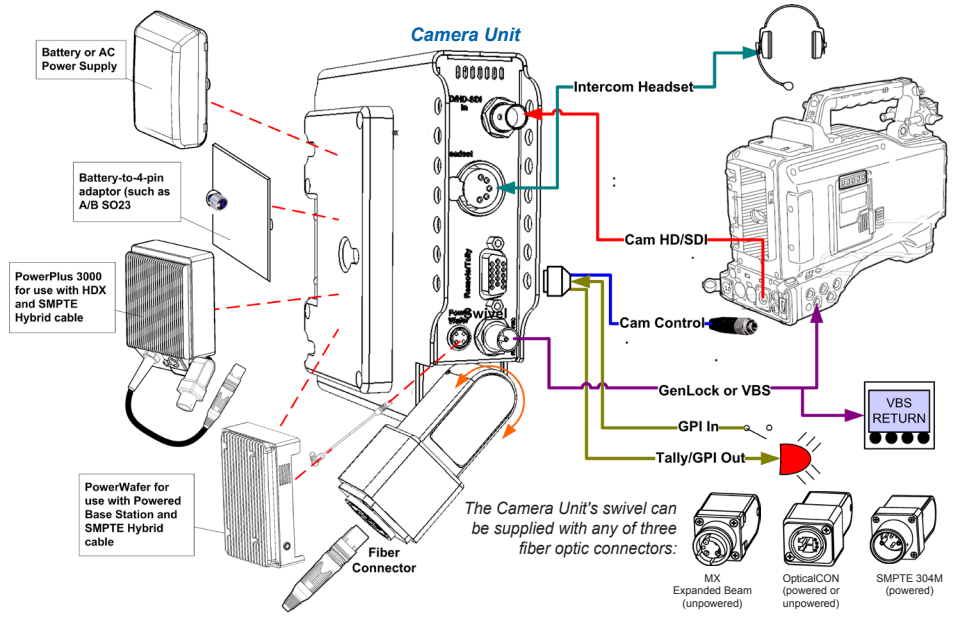


CopperHead Pro Camera Unit

The CopperHead Pro Camera Unit mounts to most professional camera battery mounting systems (Anton/Bauer, V-Mount), sandwiching between the camera and the battery or other power supply solution (such as the CopperHead PowerPlus or PowerWafer for use with SMPTE Hybrid fiber).

The swivel-mounted fiber connector can be an MX, OpticalCON or SMPTE 304M hybrid.

A standard 5-pin XLR headset plugs directly into the unit's integrated intercom circuit.

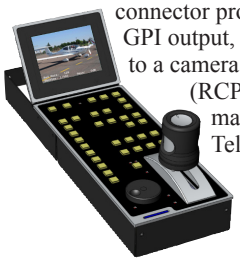


CopperHead Pro Base Station

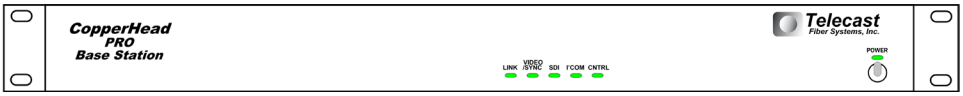
The CopperHead Pro Base Station is a lightweight 1RU frame located in your truck, control room, or "video village" position.

Truly "plug-and-play," no adjustments are required. Front panel LEDs give easy-to-understand visual confirmation of link status with the CopperHead Camera Unit, as well as signal status of local input signals and signals coming down the fiber from the Camera Unit.

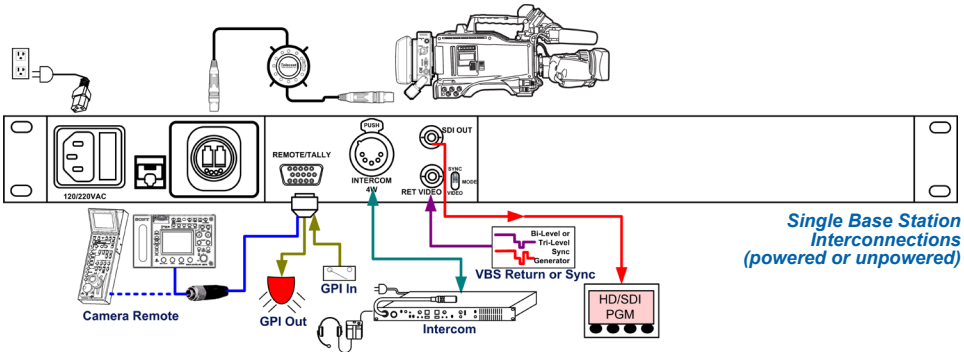
On the rear panel, standard connectors carry all video and intercom signals. A multipin DB15 connector provides Tally input and GPI output, as well as connectivity to a camera remote control panel (RCP), Use the camera maker's dedicated RCP or Telecast's RCP2050.



Telecast RCP2050 Universal Control Panel



Base Station Front Panel



Single Base Station Interconnections (powered or unpowered)

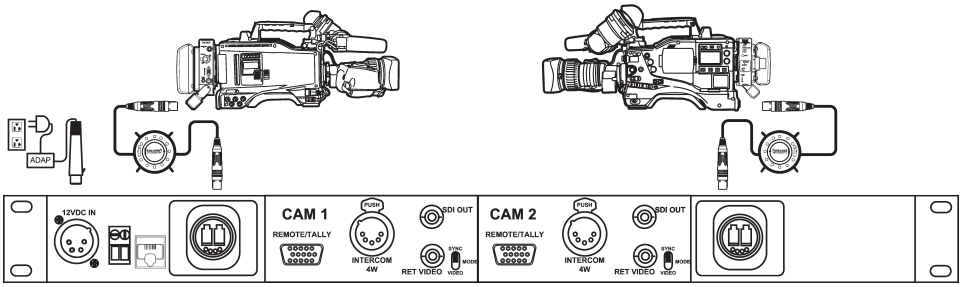
Intercom Interfaces

The CopperHead Pro Base Station carries one channel of intercom between the Camera Unit and Base Station, which can be equipped with RTS TW, Clear-Com or four-wire (4W) interfaces to plug easily into your facility's communications system.

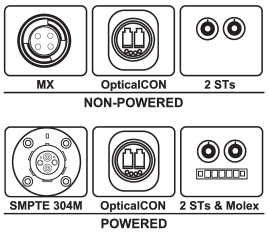
Two Base Station Power Options

Unpowered Fiber Output

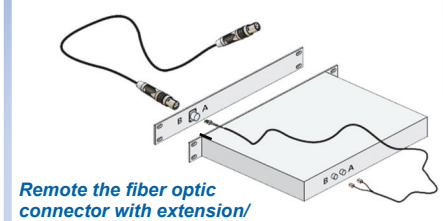
When used with Tactical fiber, or the MPS or HDX external power supplies, no power is provided on the fiber optic connector. The Base Station is powered from an external 12VDC 4-Pin XLR power source and is equipped with ST, MX, or "dry" OpticalCON fiber connectors. The unpowered Base Station can house modules to control one or two Camera Units.



Dual Base Station Rear Panel (unpowered only)



Fiber Connector Options



Remote the fiber optic connector with extension/ breakout cables.

Powered Fiber Output

The power-equipped Base Station is plugged directly into a 120/220VAC mains source, and when connected to a CopperHead Camera Unit equipped with a PowerWafer, will deliver 95 watts of power over approximately 750 feet of hybrid fiber/copper cable. Available connectors include OpticalCON, SMPTE 304, or ST's with Molex connectors. The powered Base Station can control just one Camera Unit.

System Components and Accessories

Camera Unit w/MX, OpticalCON or SMPTE 304M fiber connector

CHG3-CAM-PRO1-Δ[1]-Δ[2]

Standard Base Station (can house 1 or 2 camera modules - 12VDC only)

CHG3-BS-PROΔ[3]-Δ[4]-Δ[5]

Base Station w/internal Power Supply (single camera module only)

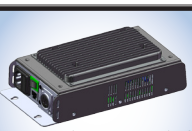
CH3-BS-PRO1-95VD-Δ[4]-Δ[5]

110/220VAC Adaptor (XLR4) (for 12VDC Base Station)

ADAP-AC-04

"Power Wafer" Camera Adaptor (for use with CH3-BS-PRO1-95VD)

CHG3-PW-95V-EGG–Δ[6]



External Power Supply for Power Wafer

CH3-MPS-95VD-Δ[7]-Δ[8]

Long Distance "Power Plus" Camera Adaptor for use with HDX (specify LP or HP)

PWRPLUS–Δ[6]-Δ[9]

PowerAdaptor for PowerPlus

HDX-LM-ST

Rack mount frame for 2 HDX units (HDXs not included)

HDX-FR-2

Small, Medium, and Large Reels for Tactical and Hybrid Fiber cable Assemblies

CASM/MD/XL

Tactical Fiber Assembly, MX Connectors

CAΔ[10]-Δ[11]T4S-MX

Tactical Fiber Cable Assembly, OpticalCON Connectors

CAΔ[10]-Δ[11]T2S-NEU

SMPTE 311M Hybrid Fiber Cable Assembly, OpticalCON connectors

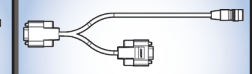
CAΔ[10]-Δ[11]SM311-NEU

SMPTE 311M Hybrid Fiber Cable Assembly, SMPTE 304M connectors

CAΔ[10]-Δ[11]SM311-SMPTE

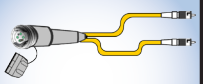
Base Station Base Remote Cable

CHBR-PRO-Δ[12]-PIG2



Camera Unit Remote Cable

CHCR-PRO-Δ[12]-PIG2



MX Receptacle Jam Nut Assembly Breakout to STs

CA-XX-X-Δ[13]-T2S-MX2R-ST2

Breakout Hybrid recept (OpticalCON or SMPTE 304) to STs & Molex

CA-XX-X-Δ[13]-T2S-Δ[8]PP-MST

Ordering Information

Δ1: Cam Unit Fiber Connector
- "-2MX" – MX
- "-NEU" – OpticalCON
- "-304M" – SMPTE 304M

Δ2: Cam Unit Batt. Interface Plates
- "-AB-AB" – Two Gold Mounts
- "-AB-V" – AB to Cam, V to Batt
- "-V-AB" – V to Cam, AB to Batt
- "-V-V" – V-Mount On Both Sides

Δ3: Base Station Internal Interfaces
- "1" – Connect to single Cam Unit
- "2" - Connects to two Cam Units (12VDC models only)

Δ4: Base Station Fiber Connectors
- "-2ST" – STs
- "-NEU" – OpticalCON
- "-304M" – SMPTE 304M
- "-STM" – Fiber: STs, Power: Molex

Δ5: Base Station Intercom Interfaces
- "-4W" – Four-Wire
- "-2W-CC" – Clear-Com
- "-2W-RTS" – RTS

Δ6: Power Adaptor Interface Plate
- "-AB" – Gold Mount
- "-V" – V-Mount

Δ7: Power Supply Fiber Conns (Dry)
- "2ST" – STs
- "NEU" – OpticalCON

Δ8: Hybrid Fiber Conns (Wet)
- "-NEU" – OpticalCON
- "-304M" – SMPTE 304M

Δ9: PowerPlus "Dongle"
- "-1MXP" – MX Plug
- "-1NEU" – OpticalCON plug
- "-1304M" – SMPTE 304M Plug

Δ10: Fiber Cable Assemblies
- "-XX" – No Reel
- "-SM" – Small Reel
- "-MD" – Medium Reel
- "-XL" – Large Reel

Δ11: Fiber Cable Assembly Length
- "-010" – 100 feet (30.5m)
- "-02" – 200 feet (61m)
- "-05" – 500 feet (252m)
- "-10" – 1000 feet (304.5m)
- "-20" – 2000 feet (609m)

Δ12: Remote Cable Mfg Interface
- Hitachi - HK, Ikegami - IKE, JVC, Panasonic- PAN, Sony - SON & others*

Δ13: Base Fiber Extension Length
- "-3M" – 3 Meters
- "-10M" – 10 Meters

*** Contact Telecast or your dealer for more information.**

Specifications

Video, Digital (Camera-to-Base)

Interface ..... SMPTE 259M, 292M, 424M
Data Rate .....270 Mb/s, 1.5 Gb/s, 3 Gb/s
Input Level . 800 mV +/-10% (peak-to-peak, max)
Equalized cable lengths (Belden 1694A).....
270 MB/s: 250m
1.5 Gb/s.....230m
3 Gb/s.....140m
Input/Output Impedance. .....75 Ohms
Bit-Error Rate (pathological data) 10-12
270MB/s .....-24 dBm
1.5 Gb/s. .....-22 dBm
3 Gb/s .....-20 dBm
Jitter (SMPTE bars): 270MB/s & 1.5 Gb/s< 0.2 UI
3 Gb/s.....< 0.3 UI
Rise/Fall Times (20%-80% amplitude) . .....
270 Mb/s. .....< 1.5 ns to >0.4ns
1.5 Gb/s & 3 Gb/s. .....< 135 ps

Video, Analog (Base-to-Camera)

Interface..... RS170, NTSC, PAL
Frequency Response
Return VBS mode .....
30 Hz-4.2 MHz/8Mhz.....±0.15 dB / -3 dB
Tri-Level Sync Mode .....
4.2 MHz / 8Mhz ..... -4 dB / -14dB
Video Signal to Noise Ratio ..... ≥ 80 dB
Differential Gain / Phase..... < 2% / < 1°

Intercom Channel

Interface types (Base). .....
TW: RTS, Clear-Com (switchable)XLR 3 Fem.
Four-Wire .....XLR 5 Female
Frequency Response(20Hz - 20KHz)...+0.1/-3dB
Max Distortion (THD+N) ..... .< 0.1%
Signal/Noise Ratio ....>80dB

Datas & GPI/Tally

Connector..... DB15HD
Data 1 Camera Control.....RS232/422/485
Data rate - RS422 or RS485..... 0 to 1 Mb/s
Data rate - RS232 ..... 0 to 100 kb/s
Jitter (sample asynchronous) ..... 80 nsec
Data 2:.....RS422
Data rate .....0 to 1 Mb/s
Jitter (sample asynchronous) .....80 nsec
Tally/GPI Inputs:
On: .....TTL Low or Short to GND
Off: .....TTL High or Open
Tally Outputs.....
Relay: ..... 2 pos. FormA, SPST, nrmlly open
Max Switching Voltage 125VDC, 150VAC,
Max relay current ..... 1 Amp
12VDC Out..... Max current 250mA

Electro-Optical

Operating Wavelengths
Camera to Base (SDI) .....1300 nm (Fiber A)
Camera-to-Base (Data/Comms) .....
.....1300nm (Fiber B)
Base to Camera (VBS, Data, Comms) .....
..... 1550nm (Fiber B)
TX Laser output power .....-6 dBm
RX Sensitivity,
270MB/s ..... -24 dBm
1.5 Gb/s .....-22 dBm
3.0 Gb/s ..... -20 dBm
Fiber Compatibility ..... Single Mode only
Optical Connector Options - Camera Unit:
Local Power, PowerPlus... .....
.....MX, OpticalCON, SMPTE 304M
PowerWafer: ....SMPTE 304M or OpticalCON
Optical Connector Options - Base Station:
Unpowered (Tac fiber) .....ST or OpticalCON
Powered (PowerWafer/Hybrid fiber):
.....SMPTE 304M, OpticalCON, or ST/Molex

Distance Limit *see note below

Tactical Fiber (Local Power at Camera):
"Dry" fiber (1.5Gb/s) 16 db optical loss (≈ 30 km*)
SMPTE 311M Hybrid Fiber
w/PowerWafer 240m (787 ft): 95W@12VDC*
with HDX & PowerPlus .....
..... 2km (6562 ft.): 100W Cont./150W Peak*

Mechanical/Environmental

Dimensions (WxLxD)
Camera Unit ..... 2.5" x 6.5" x 2.2"
Base Station ..... 17.5" x 9" x 1.75"
PowerWafer..... 5" x 6.12" x 2.2"
PowerPlus (LP 100W) 5" x 6" x 2.5" (3.7 HP)
HDX ..... 13" x 3.5" x 8.5"
MPS Power Supply ..... 9.7" x 2.5" x 4.5"

Weight
Camera Unit .....1.5 lb.
Base Station .....5.0 lb.
PowerWafer .....1.5 lb.
PowerPlus .....LP: 2.3 lb.....HP: 2.5 lb.
MPS Power Supply .....3.0 lb.
HDX .....10.5 lb.

Power Consumption
Camera unit .....8 watts@10-18VDC
Base Station (Tac Fiber):
Power Consumption .10 watts@10-18VDC
Power Connector .....4-Pin XLR
Base Station (Hybrid Fiber):
Power .110-120/220-240 VAC, 50 to 60Hz
Power Consumption ..... 250 watts max @120VAC
Temperature Range .....-25° to +55°C
Humidity Range.... 0 to 95% RH, Noncondensing

Compliance

Laser Safety ..... Class 1 Laser 21 CFR 1040.10
EMI/RFI ..... IEC/EN 60825-1
RoHS

* The maximum cable length varies due to optical loss that can depend on cable quality, dirt/dust/contamination on connectors, and number of fiber interconnects. When using hybrid cable for power, the size of the hybrid cable, as well as the power draw of the camera, lens, and accessories are also factors.

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CHPRO120328v3Bjh

Represented by:

324 Clark Street; Worcester, MA 01606 USA
Phone: (508)754-4858 FAX: (508)752-1520
telecast-sales@belden.com
www.telecast-fiber.com