

Camera-Mountable Fiber Optic System For 3D & Dual-Link Teleproduction



Make 3D or Dual-Link production easy with four HD/SDI paths, three datas, ethernet and sync, all on one fiber cable.

Cutting-edge 3D and Dual-Link production requires the highest bandwidth ever required between a camera location and its engineering station.

Connecting with heavy, fragile copper cables can be distance-limiting and unreliable.

The CopperHead 3400 (CH3400) puts all of the signals needed for 3D or Dual-Link production onto a single, robust lightweight fiber cable, eliminating the problems of copper on any studio or remote production.

3D Rigs: The CH3400 mounts to any two-camera 3D Beam Splitter or Side-by-Side rig, creating an easy, flexible link from your camera to a truck, control room or flypack.

The compact Camera Unit accepts a 1.5 or 3 Gb/s HD/SDI signal from each camera, as well as providing an additional 1.5 Gb/s HD/SDI path each way for monitoring and 3D return. Bidirectional data paths include two RS422/485/232 paths for camera control, a separate RS232 for 3D rig control. A 10/100 ethernet path, genlock, intercom and bidirectional audio paths are also provided.

The entire system runs on tactical fiber cable or on a SMPTE hybrid fiber cable if local power is not available at the camera rig.

Dual-Link E-Cinema: The CH3400 is the easy way to extend the distance between the Dual-Link camera on-set and Video Village.

Dual Link HD/SDI, return HD/SDI and camera control are just some of the paths provided by the CH3400 for your high-end TV, movie or commercial production.

Since the CopperHead 3400 transmits all signals digitally and optically, you are assured of the highest quality signals—free from interference, grounding problems or drifting due to temperature variations.

CopperHead 3400 is your solution

to the size, weight and transmission problems of ordinary bundles of copper cabling. You will save time and effort, and insure that your production gets done fast, right, on time, and on budget.

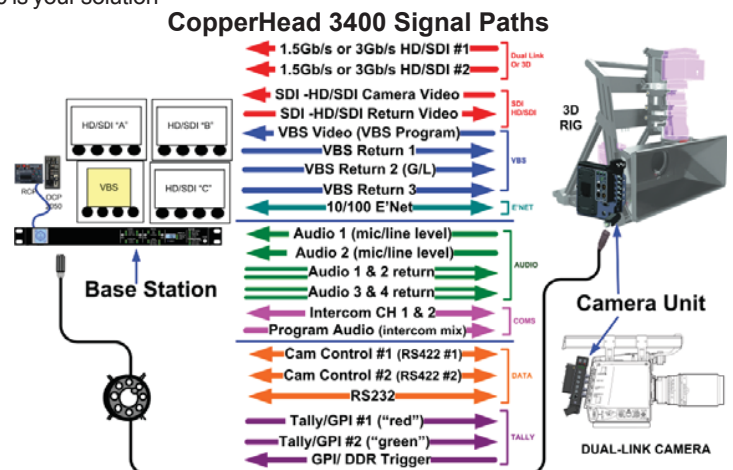
Features

- All camera signals on one lightweight fiber cable
- Long distance range (multiple kilometers)
- Three uncompressed HD/SDI signals from camera to base:
 - Two 1.5-to 3.0 Gb/s paths for Dual-Link or 3D cameras
 - One 1.5 Gb/s path for monitoring and/or menus
- Four bidirectional data streams:
 - Two RS422 paths
 - One RS232 path
 - One 10/100 Ethernet path
- Genlock
- Two-way audio & intercom
- Anton/Bauer® and "V" battery options
- Wide temp range, low power consumption
- Two fiber cable options:
 - Tactical Fiber: Military Spec, battery/local power, 10+ km
 - Hybrid Fiber (SMPTE 311M):
 - "PowerWafer" - Low voltage — 95 watts to 240m (787 ft.)
 - "PowerPlus" - High voltage — 100/150 watts to 2 km (1.2 miles)

Applications

- 3D video rigs: Broadcast Sports, Live Event, E-Cinema, and TV Production
- 2D Dual-Link 4:4:4 E-Cinema and Broadcast TV Production
- High-Speed video camera links for slow-motion sports and action coverage (2D)

• US Patent #7,327,959



Two fiber cable options - Three ways to connect

The CopperHead can utilize either of the two fiber optic cable styles found in the broadcast industry, depending on whether power is required at the camera. You can choose the lighter, more robust Mil-Spec "tactical" fiber cable and power the camera locally, or two options that utilize SMPTE hybrid fiber with its internal copper wires delivering power to the camera. Either way, connectivity is accomplished seamlessly and with no signal degradation:



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

Tactical Fiber Cable

1. Connect with Telecast "TAC" cable for highest reliability, longest range — up to 6 miles (10 km)*

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™ "harsh environment" connectors use advanced expanded beam technology, making them the most dependable and compact multicore fiber optic connector available today. Hermaphroditic plugs mate directly with each other, without the need for coupling barrels, making it quick and easy to



Neutrik opticalCON® Connectors

This ruggedized all-metal 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).



SMPTE Hybrid Fiber Cable

When batteries or other local power supplies aren't practical, or in studio and small production environments, the CopperHead offers two solutions for use with industry-standard SMPTE hybrid fiber cables to provide power to the camera, CopperHead Camera Unit, and other accessories at the camera position.

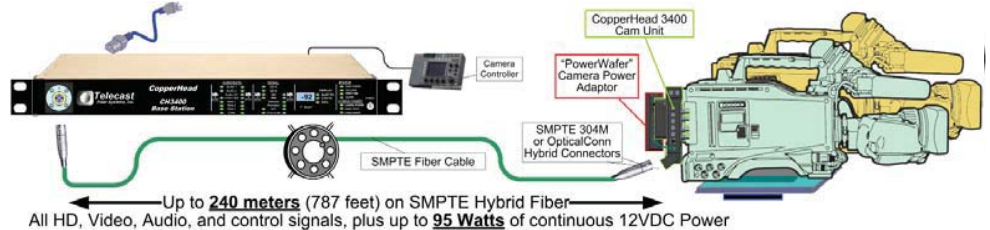
2. PowerWafer (Standard Range): Connect up to 800 ft. with Fiber/Copper Hybrid Fiber

The CH3400-BS-95VD internally-powered Base Station, combined with the CH3400-CAM Camera Unit and the "PowerWafer" adaptor will operate on



Power Wafer on Copperhead

SMPTE Hybrid fiber up to 800 feet, and deliver 95 watts of power to the camera and accessories. Use SMPTE 304M or opticalCON connector.



3. PowerPlus (Long Range): Connect up to 2km with 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.

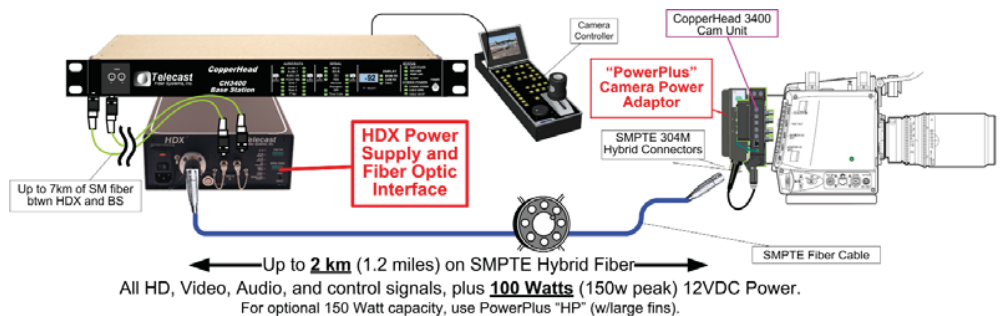


PowerPlus "LP"

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) power outputs are provided on the PowerPlus for external accessories, such as viewfinders, prompters, or lights. 150W of Power is available with the higher power PowerPlus "HP" (larger heat sink fins).

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CopperHead 3400 Camera Unit Configuration

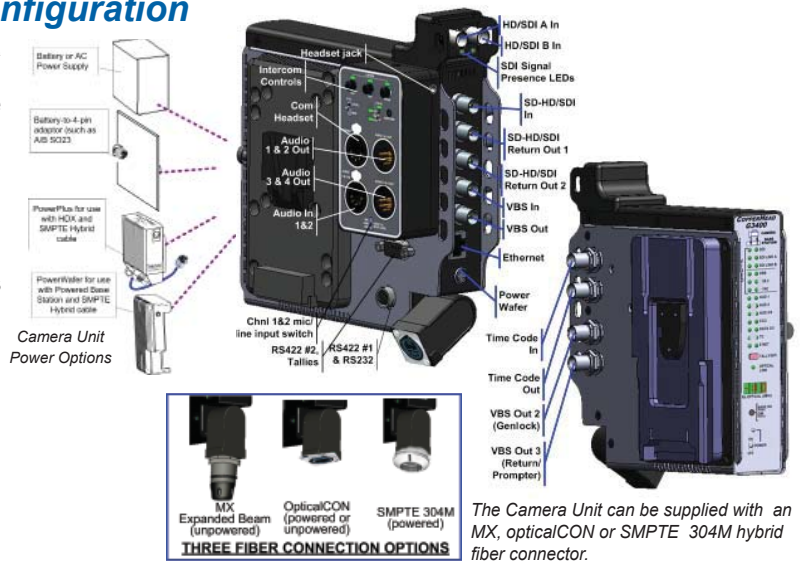
The CopperHead 3400 Camera Unit mounts to any camera or device equipped with a professional battery system (Anton/Bauer, V-Mount, or PAG), sandwiching between the camera and the battery or other power supply solution (such as the CopperHead PowerPlus or Power Wafer for use with SMPTE Hybrid fiber).

It can be supplied with an MX, OpticalCON or SMPTE 304M hybrid fiber connector.

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

Five switches control:

- Power (On/Off)
- Audio Input Level (Mic/Line)
- Mic Gain
- Optical Power Meter Select (Local/Remote)
- Intercom Ch1 and Ch2 (Talk/Listen)

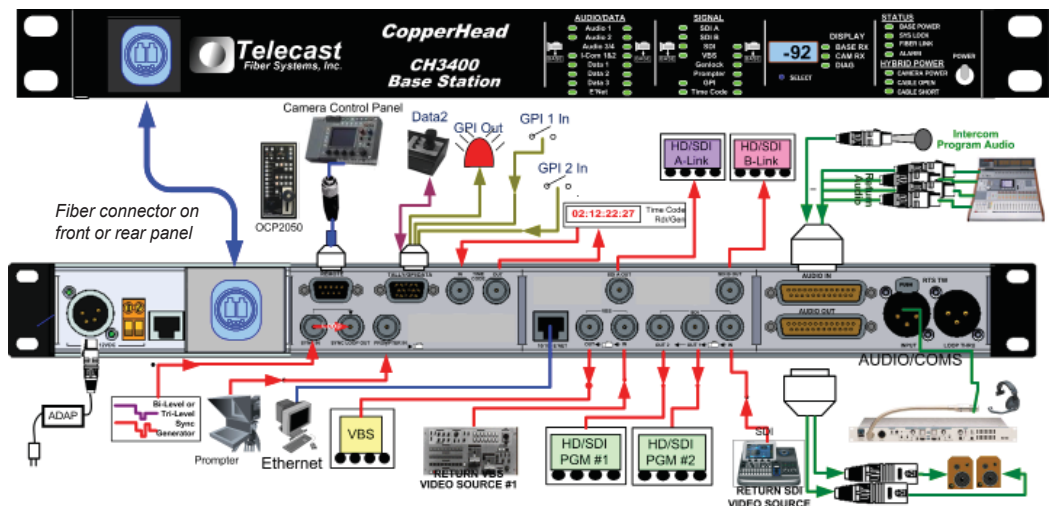


The Camera Unit can be supplied with an MX, opticalCON or SMPTE 304M hybrid fiber connector.

CopperHead 3400 Base Station

The CopperHead 3400 Base Station is a lightweight 1RU frame located in your truck, control room, or "video village" position. Truly "plug-and-play," no front panel adjustments are required. Bi-color 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. Multipin DB25 connectors carry audio in and out.



The fiber connector can be mounted on the Base Station's front or rear panel.

Two Base Station Power Options, Six Fiber Connector Choices

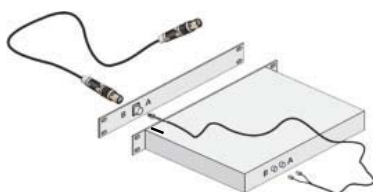
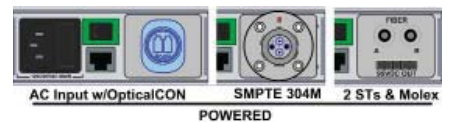
Unpowered

When used with Tactical fiber, or the external HDX or MPS power supplies for long-range or high-powered applications, the Base Station is powered from an external 12VDC power source (via 4-Pin XLR connector) and is equipped with an OpticalCON, MX, or two ST connectors.



Powered

When used in the standard-range powered configuration, the Base Station is plugged directly into a 120/220VAC mains source. This power-equipped Base Station will deliver 95 watts of power over approximately 780 feet of SMPTE 311M hybrid fiber/copper cable to a CopperHead Camera Unit equipped with a "PowerWafer." Fiber connector options are: OpticalCON, SMPTE 304M, or two ST's with a Molex connector.



Remote the fiber optic connector with MXRV or CH3BFC extension/breakout cables.

Two Audio/Intercom Interfaces

The CopperHead 3400 Base Station carries two channels of intercom between the Camera Unit and Base Station, which can be equipped with dual a Clear-Com/4-wire or an RTS/4-Wire interface to plug easily into your facility's communications system.



System Components and Accessories

 <p>Camera Unit w/MX, OpticalCON or SMPTE 304M fiber connector CHG3-CAM-3400-Δ¹-Δ²</p>	 <p>Standard Base Station 2 STs or opticalCON connector CHG3-BS-3400-Δ³-Δ⁴</p>	 <p>Base Station w/internal Power Supply CH3-BS-3400-95VD-Δ³-Δ⁴</p>	 <p>AC Adaptor (for CHG3-BS-3400 Base Station) ADAP-AC-02</p>	 <p>"PowerWafer" Camera Adaptor (for use with CH3-BS-3400-95VD-BS-95VD) CHG3-PW-95V-EGG-Δ⁵</p>	 <p>External Power Supply for PowerWafer CH3-MPS-95VD-Δ⁶-Δ⁷</p>
 <p>Long Distance "PowerPlus" Camera Adaptor for use with HDX (specify LP or HP) PWRPLUS-Δ⁵-Δ⁸</p>	 <p>Power Adaptor for PowerPlus HDX-LM-ST</p>	 <p>Rack mount frame for 2 HDX units (HDXs not included) HDX-FR-2</p>	 <p>Small, Medium, and Large Reels for Tactical and Hybrid Fiber cable Assemblies CASM/MD/XL</p>	 <p>Tactical Fiber Assembly, MX Connectors CAΔ⁹-Δ¹⁰T4S-MX</p>	 <p>Tactical Fiber Cable Assembly, OpticalCON Connectors CAΔ⁹-Δ¹⁰T4S-NEU</p>
 <p>SMPTE 311M Hybrid Fiber Cable Assembly, OpticalCON connectors CAΔ⁹-Δ¹⁰SM311-NEU</p>	 <p>SMPTE 311M Hybrid Fiber Cable Assembly, SMPTE 304M connectors CAΔ⁹-Δ¹⁰SM311-SMPTE</p>	 <p>Base Station DB25-to-XLR Audio Breakout Cables CH3BA-DB25-Δ¹¹</p>	 <p>MX Receptacle Jam Nut Assembly Breakout to STs MXRV-4-08-Δ¹²</p>	 <p>opticalCON receptacle to STs and Molex 39-01-4051 CH3BFC-NEU-2ST/MOL-08-Δ¹²</p>	 <p>SMPTE Hybrid 304M plug to STs and Molex 39-01-4051 CH3BFC-304M-2ST-08-Δ¹</p>

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" – Gold Mount to Cam, V-Shoe to Batt
 - "-V-AB" – V-Mount to Cam, Gold Mount to Batt
 - "-V-V" – V-Mount On Both Sides
 - Δ3: Base Station Fiber Connectors
 - "-2ST" – STs
 - "-NEU" – OpticalCON
 - "-304M" – SMPTE 304M
 - "-STM" – Fiber: STs, Power: Molex
 - Δ4: Base Station Intercom Interfaces
 - "-4W" – Four-Wire
 - "-CC" – Clear-Com
 - "-RTS" – RTS two-wire
 - Δ5: Power Adaptor Interface Plate
 - "-AB" – Gold Mount
 - "-V" – V-Mount
 - Δ6: Power Supply Fiber Conns (Dry)
 - "2ST" – STs
 - "NEU" – OpticalCON
 - Δ7: Power Supply Fiber Conns (Wet)
 - "-NEU" – OpticalCON
 - "-304M" – SMPTE 304M
 - Δ8: PowerPlus "Dongle"
 - "-1MXP" – MX Plug
 - "-1NEU" – OpticalCON plug
 - "-1304M" – SMPTE 304M Plug
 - Δ9: Fiber Cable Assemblies
 - "-XX" – No Reel
 - "-SM" – Small Reel
 - "-MD" – Medium Reel
 - "-XL" – Large Reel
 - Δ10: 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)
 - Δ11: Base Audio Breakout Cables
 - "-I-5XL3F" – Audio Input: 5 XLR3F connectors
 - "-O-2XL3M" – Audio Output: 5 XLR3F connectors
 - Δ12: Base Fiber Extension Length
 - "-3M" – 3 Meters
 - "-10M" – 10 Meters
- * Contact Telcast Systems or your authorized CopperHead dealer for more information.

Specifications

Video, Digital (A-Link & B-Link)
 Interface SMPTE 424M, 292M, 259M
 Data Rate 3 Gb/s, 1.5 Gb/s, or 270 Mb/s

Video, Digital (bidirectional)
 Interface SMPTE 259M, 292M
 Data Rate 270 Mb/s or 1.5 Gbits/s

Video, Digital (all)
 Input Level 800 mV (peak to peak)
 Input/Output Impedance 75 Ohms
 Output Impedance 75 Ohms
 Bit-Error Rate (@ -22 dBm) 10⁻¹²
 Jitter (pathological data) < 0.2 UI
 Rise/Fall Times < 270 ps

Video, Analog (bidirectional)
 Interface RS170, NTSC, PAL
 Frequency Response
 30 Hz-4.2 MHz ±0.25 dB
 8MHz -3 dB
 Video Signal to Noise Ratio ≥ 70 dB
 Differential Gain < 2%
 Differential Phase < 2°

Ethernet
 Data Support 10BaseT/100BaseT
 Connector Twisted Pair RJ45
 Cable compatible UTP 100-ohm Cat5
 Input/Output Impedance 10 kΩ/30 Ω

Audio, Camera to Base
 Number of Channels 2
 Input Level at Camera Unit: switchable
 Line: +4dB, MIC: -60dB or -10dB

Impedance >15KΩ
 Maximum Input Level 24 dBu
 Sampling 24 bits, 128x (oversampled), 48ks/sec
 Frequency Response ±0.1 dB, 20 Hz to 20 KHz
 Output at Base Station Line Level

Audio, Base to Camera (Return/IFB)
 Number of Channels 4
 Input Level at Base Station Line Level
 Output at Camera Unit Line Level

Intercom
 Number of channels 2
 Interface types (Base) RTS, Clear-Com or Four-Wire
 Frequency Response 200 - 18KHz ± 3dB
 Max Distortion ≤ 0.5%
 Noise < -60dBu
 Max Gain (RTS or Clear-Com) ≥ 24dB
 Min Gain (RTS or Clear-Com) ≤ -45dB

Electro-Optical
 Operating Wavelength, standard 1310 nm
 Nominal Optical Loss Budget Values
 TX Laser output power (std./opt) .. -6 dBm/0 dBm
 RX Sensitivity, HD/SDI -22 dBm
 Fiber Compatibility Single Mode
 Optical Connector Options - Camera Unit:
 Local Power: MX or opticalCON
 Remote Power:
 Short Range Power SMPTE 304M or opticalCON
 Long Range Power SMPTE 304M
 Optical Connector Options - Base Station:
 Unpowered Cable (Tac fiber): ST or opticalCON
 Remote Power-carrying Cable (Hybrid fiber/wire):
 Standard Power SMPTE 304M,
 OpticalCON, or STs+Molex

Distance Limit *

Tactical Fiber (Local Power at Camera):
 Standard laser 15dB optical loss (≥ 5 km*)
 Optional DFB laser 19dB optical loss (≈ 30 km*)

SMPTE 311M Hybrid Fiber:
 Standard Internal Power Supply w/PowerWafer
 ≈ 300m (984 ft): 95W @ 12VDC*
 Long Range: HDX w/PowerPlus
 LP ≈ 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"
 Power Wafer 5" x 6.12" x 2.2"
 PowerPlus LP (100W) 5" x 6" x 2.5"
 PowerPlus HP (150W) 5" x 6" x 3.7"
 HDX 13" x 3.5" x 8.5"

Weight
 Camera Unit 1.5 lb
 Base Station 5.0 lb
 PowerWafer 1.5 lb
 PowerPlus LP: 2.3 lb HP: 2.5 lb
 HDX 10.5 lb

Power Consumption
 Camera unit 8 watts@10-18VDC
 Base Station (Tac Fiber) 10 watts@10-18VDC
 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
 Other RoHS

* The maximum cable length varies due to optical cable quality, dirt/dust/contamination on connectors, and the number of inline connectors. Hybrid cable power range may depend on the size of the hybrid cable, as well as the power draw of the camera, lens, viewfinder, and other accessories are also factors.

Represented by:



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