

Telecast Fiber Solutions

CopperHead PowerWafer User Guide

M4002-9900-102

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A **BELDEN** BRAND

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Warranty information is available in the Support section of the Miranda Web site (www.miranda.com).

Title	CopperHead PowerWafer User Guide
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About CopperHead PowerWafer

This chapter provides an overview of the CopperHead PowerWafer and includes the safety and warranty information about it.

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About CopperHead PowerWafer

The CopperHead System is a fiber optic transmission system that enables camcorders to be used in live, multi-camera production environments.

The system uses a fiber optic cable to transport a variety of signals between a Camera Unit and a Base Station.

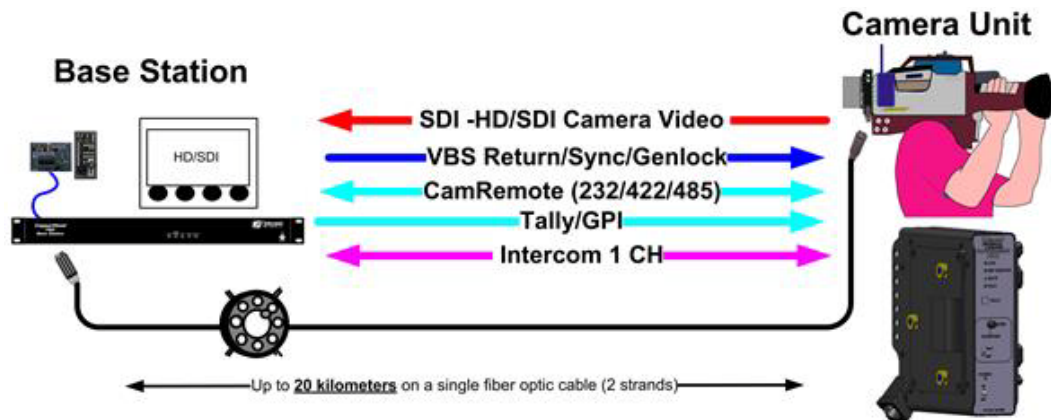


Fig. 1-1: CopperHead Signal Paths

The CopperHead Camera Unit is typically mounted to a camera that is placed in a studio, theatre, sports venue, or other live-event location. The system's Base Station is usually located in a truck, control room or other video production control area.

When "dry" fiber is used (typically lightweight "tactical" fiber cable), the signals are transmitted bi-directionally, over distances as long as 5 km or more.

When hybrid fiber cable is used, the link powers the Camera Unit and the camera itself.

CopperHead System Features

- The system makes any camcorder practical for multi-camera production.
- All camera signals are carried on one lightweight fiber cable.
- Can be run through building or campus infrastructure on two strands of Single Mode fiber.*
- Thin, lightweight, modular design.
- Studio quality uncompressed HD/SDI video up to 3 Gb/s.
- Multi-kilometer distance capability
- Anton/Bauer® Gold Mount and "V-Mount" battery options
- Wide temp range, low power consumption
- Durable, high reliability design
- Two fiber cable options
 - Tactical Fiber: Military Spec, battery/local power, 10+km
 - SMPTE Hybrid Fiber
 - Low voltage camera-mounted "PowerWafer": 95 watts to 300m (984 ft.)
 - High-voltage camera-mounted "PowerPlus": up to 150 watts to 2 km (1.2 miles)

Note: The CopperHead System is not readily compatible with active or passive CWDM multiplexing technologies, including Teleport or TeleThon systems.

Unpacking the CopperHead PowerWafer

Please consult your packing slip and purchase order to insure that you have received all of the expected components.

Inspect all components for scratches and other mechanical damage, and inspect the electrical connectors for bent or damaged pins and latches. Report any missing or damaged components to Miranda (see [Contact Us](#) on page 35). See [Product Returns](#) on page 3.

Leave the protective caps on the optical connectors whenever the fiber is disconnected.

Product Returns

In the unlikely event of damage to your CopperHead PowerWafer during shipping or delivery please note the damage with the delivery or shipping service and document the packaging and product where you see damage. If any component does not work correctly out of the box please contact Miranda (see [Contact Us](#) on page 35).

If the problem cannot be remedied through a service telephone call an RMA (Return of Merchandise Authorization) will be issued and you will receive an RMA number. Please note this RMA number inside and outside of all shipping boxes and on all documentation provided with the items to be returned.

About this User Guide

This CopperHead Fiber Optic Transceiver System can be delivered in a number of configurations depending on the Power and Battery Mount options selected. This user guide is designed to cover all of the various options and so not every page in this guide will apply to your specific system.

Throughout this guide a number of informational pointers are used to mark important or useful information.

Safety and Fiber Optic Systems

Optical Fiber Safety

Never look directly into the end of the optic fiber while either end of the system is operating.

Always use cable connector caps when the cables are not connected. This protects the connector from damage and the unlikely event of exposure to an operating optical link. Keeping the caps in place when the connectors are not in use will prevent dirt and dust from entering the connector and degrading the performance of the optical link.

Power Fuses

The CopperHead PowerWafer Base Stations CHG3-BS-3050-95VD-xxx-xxx are equipped with two fuses located next to the AC Power receptacle at the left rear of the unit. Refer to [Connectors and Accessories](#) on page 37 for specific fuse and location information.

NEVER operate the CopperHead CHG3-BS-3050-95VD-xxx-xxx Base Station without properly installed and rated fuses. Severe electrical and heat damage could result as well as personal injury or death.

2 System Overview

This chapter provides a system overview about the Fiber Cables and the Transceiver System.

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CopperHead System Configurations

The CopperHead system is available in a variety of configurations that maximize the advantages of either "dry" fiber cable, "hybrid" fiber cable, or a combination of the two.

Powered Systems using the PowerWafer

CopperHead Base Stations can be equipped with an internal power supply that, when used with SMPTE hybrid fiber cable and a PowerWafer at the Camera Unit, will deliver approximately 95 Watts of power to the camera and related accessories.

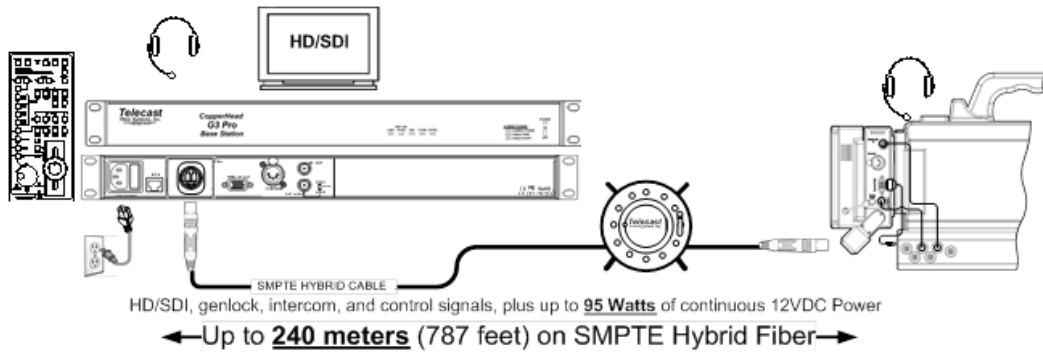


Fig. 2-1: Powered System Overview

The maximum range of the system is nominally 240 meters (787 feet)* when drawing 95 watts at the camera, but distances will vary depending on total power draw at the PowerWafer, as shown in Figure 2-2.

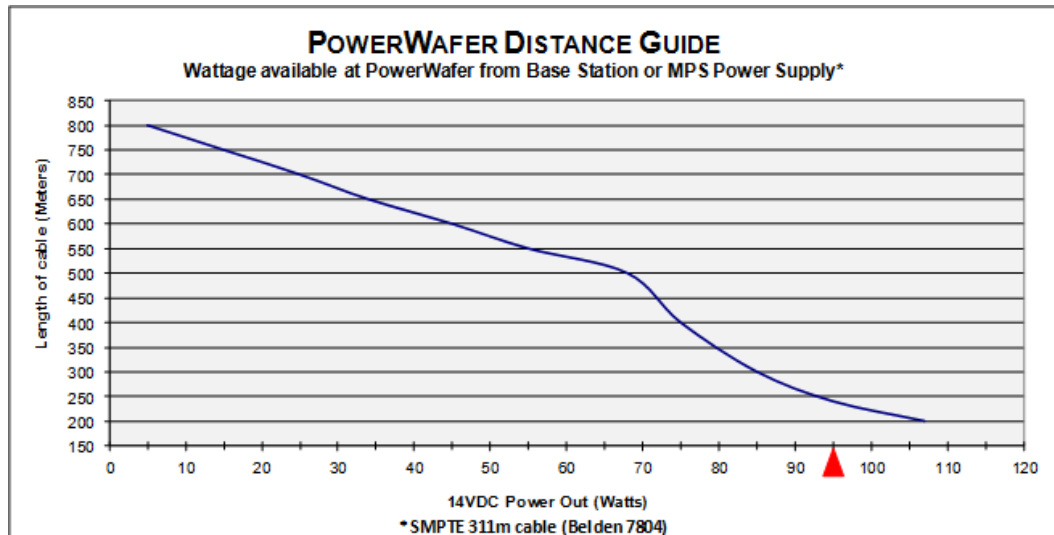

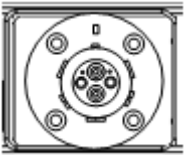

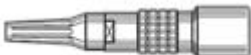
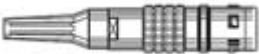


Fig. 2-2: PowerWafer Distance Chart

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

In powered fiber configurations, the Camera Unit, Base Station and hybrid fiber cable can be equipped with one of two types of fiber connectors:

Panel Connectors		Cable Plugs	
OpticalCON	SMPTE 304M	OpticalCON	SMPTE 304M
			<p><i>Female</i></p>  <p><i>Male</i></p> 

PowerWafer, Direct to Base Station

When connected directly to an AC-powered Base Station using SMPTE hybrid fiber cable, the system delivers up to 95 watts of power to the camera and accessories. Such a system is typically configured as shown in [Figure 2-3](#), and includes the following components:

- A: Camera Unit
- B: AC-powered Base Station with internal camera power supply
- C: PowerWafer
- D: CHCR camera remote cable
- E: CHBR base remote cable
- F: Hybrid fiber optic cable

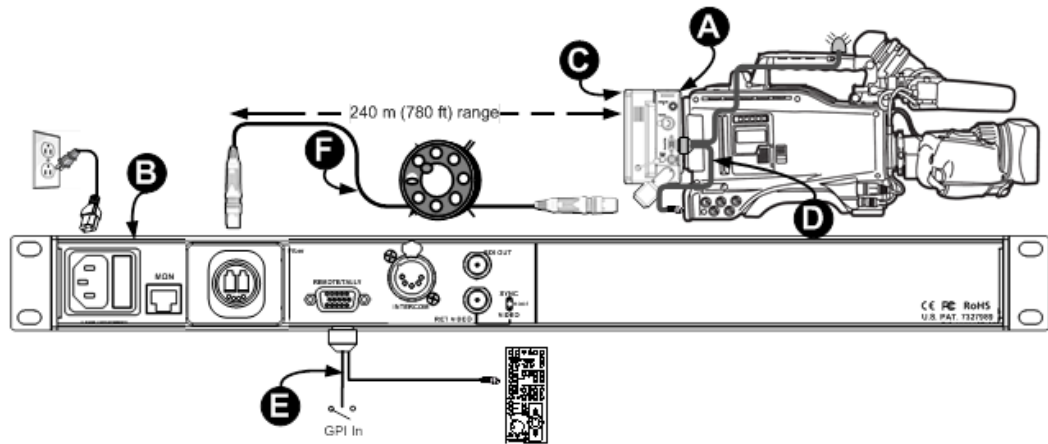


Fig. 2-3: Direct Connect to Base Station with Power Wafer

Power Wafer, Remote Panel-Mounted Fiber Connector

The hybrid fiber receptacle may be mounted a distance from the Base Station if the station is equipped with a pair of inexpensive ST fiber connectors and a Molex receptacle to carry power, as shown in [Figure 2-4](#). A breakout cable can be used to connect the hybrid fiber receptacle to Base Station, or infrastructure wiring can be used.

- A: Camera Unit
- B: Power Wafer
- C: CHCR camera remote cable
- D: AC-powered Base Station with internal camera power supply
- E: CHBR base remote cable
- F: ST & Molex breakout cable or campus/building infrastructure
- G: Hybrid fiber optic cable

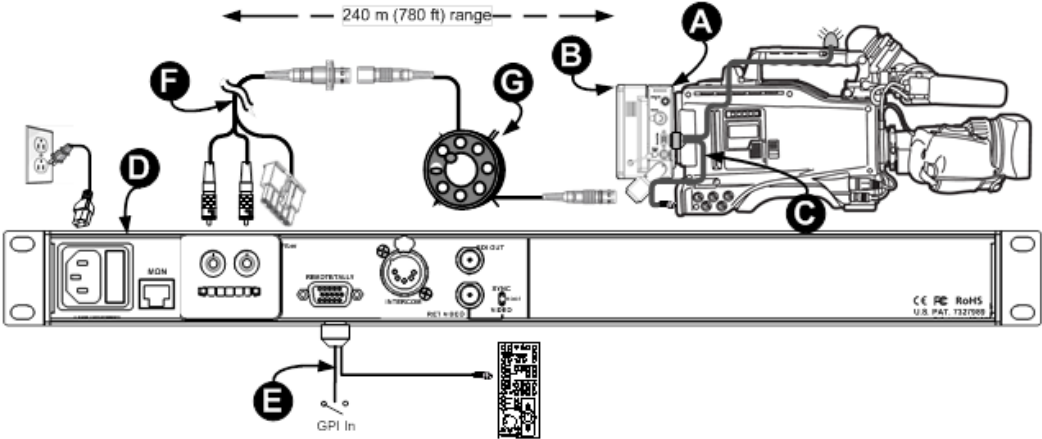


Fig. 2-4: Powered Base Station with Fiber Receptacle Extension

PowerWafer, with MPS Power Supply

Systems can be configured so that the majority of the fiber run is made via "dry" tactical or infrastructure fiber, after which a "throwdown" MPS Power Supply is placed in line to provide powered SMPTE hybrid fiber cable to the camera. In this configuration, as shown in Figure 2-5, the Base Station can be separated from the MPS power supply by more than nine kilometers (5.6 miles), where powered cable can be run to the camera for 240 meters (780 feet), providing up to 95 watts of power to the camera and accessories.

- A: Camera Unit
- B: Power Wafer
- C: CHCR camera remote cable
- D: DC-powered Base Station
- E: CHBR base remote cable
- F: Tactical fiber or Infrastructure fiber run
- G: MPS Power Supply
- H: Hybrid fiber optic cable
- I: ADAP 12VDC power supply

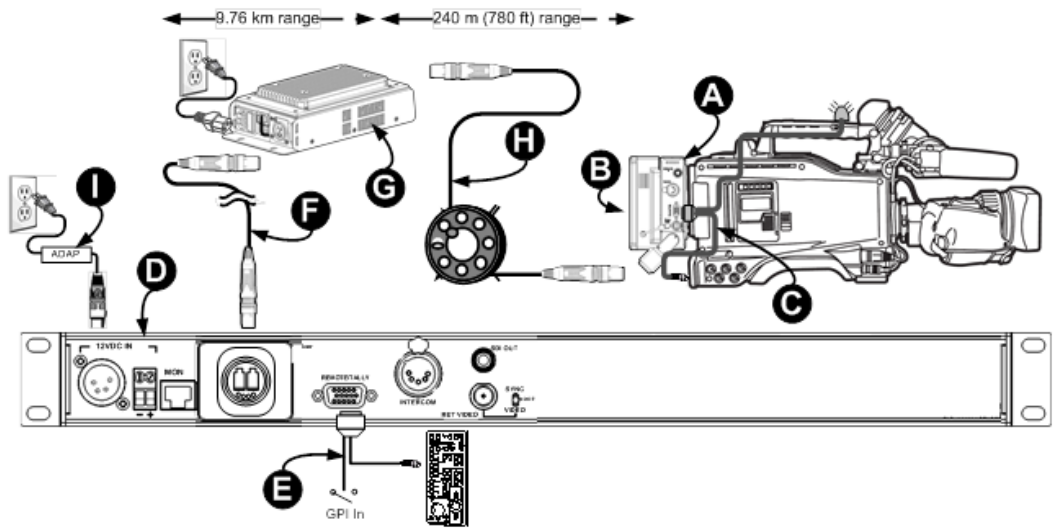


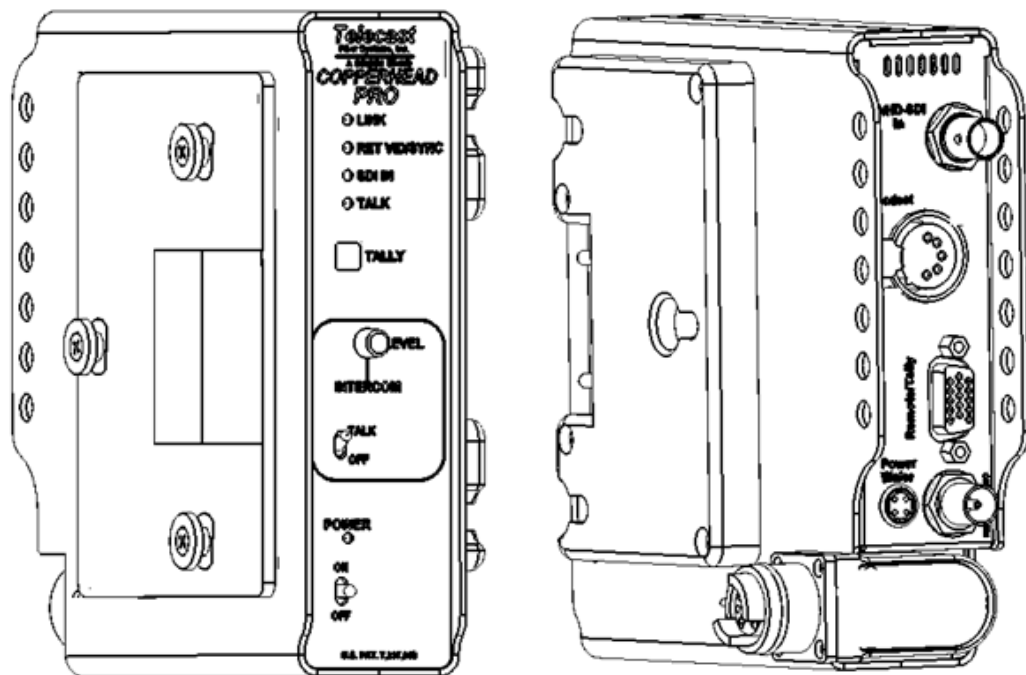
Fig. 2-5: System using MPS Power Supply

CopperHead Transceiver System Components

The CopperHead Camera Unit fits between the battery or optional power supply and the camera. The Camera Unit is configured at time of purchase with mounting plates to accommodate the appropriate camera battery type.

The camera battery or optional power source attaches to Camera Unit, which in turn, attaches to the video camera. Batteries accommodated are Anton/Bauer Gold Mount and Sony "V" Mount. Other camera mounting plates may be available by special order. Please contact Miranda (see [Contact Us](#) on page 35) or your authorized dealer.

The Camera Unit is equipped with a swivel-mounted fiber optic connector, which can be ordered with an OpticalCON, MX or SMPTE 304M connector. For more information, see [Parts and Accessories](#) on page 38.



Camera Unit Front
(attaches to the camera)


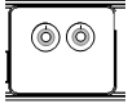


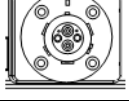

Camera Unit Rear (attaches to
battery or power supply)

Fig. 2-6: Camera Unit Front and Rear

The actual appearance of your CopperHead Camera Unit will vary depending on the battery mount and fiber cable connector options specified at the time of purchase.

Base Station Overview

The CopperHead Base Station is a one rack-unit high device that provides all of the inputs for signals going to the CopperHead Camera Unit, as well as the outputs for the signals coming from Camera Unit. Base Station is available in a variety of configurations. The options are:

Power Supply	Single or Double	Fiber Connector
<p>12 Volt DC Input: “Dry Fiber” No Internal camera power supply Does not supply power to Camera Unit via SMPTE hybrid fiber cable Is typically used with Tactical fiber cable and/or infrastructure cabling Available in “Dual” configuration for interface and control of two Camera Units in a single one RU device.</p> <p>120/220 Volt AC Input – “Powered Fiber” Includes internal power supply for Camera Unit. Supplies power to Camera Unit via SMPTE hybrid fiber cable Not available in “Dual” configuration. Can only interface and control a single Camera Unit.</p>	<p>Single Configuration Interface and control a single Camera Unit. Available in 12 Volt DC and 120/220 VAC models</p>	<p>Six different fiber connectors are available for the CopperHead Base Station. See Rear Panel Section B - Optical Connector on page 20 for details</p>
	<p>Dual Configuration Interface and control two Camera Units in a one RU device. Available in 12 Volt DC only. Not available for 120/220 VAC models</p>	<p>OpticalCON (dry)</p> 
	<p>Two STs</p> 	
	<p>MX (Expanded Beam)</p> 	
	<p>OpticalCON (powered)</p> 	
	<p>SMPTE 304M</p> 	
	<p>Two STs and Molex</p> 	

Types of Base Stations

The actual appearance of your CopperHead Base Station will vary depending on the fiber cable connectors and power option specified at the time of purchase.

Single "Dry" Station

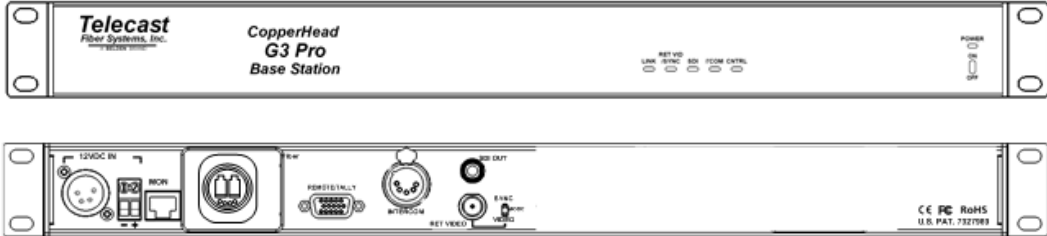


Fig. 2-7: Single "Dry" Base Station - Front Panel (top) and Rear Panel (bottom)

Dual Unpowered Base Station

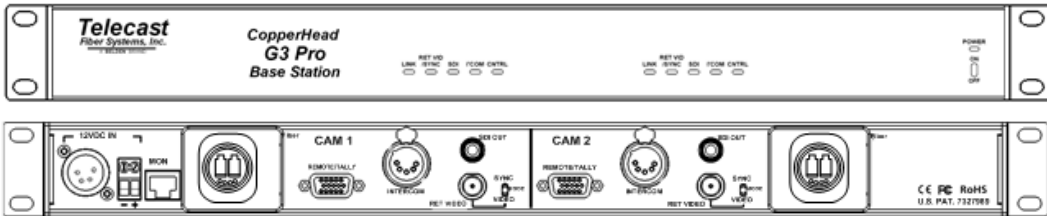


Fig. 2-8: Dual Unpowered Base Station - Front Panel (top) and Rear Panel (bottom)

Powered Base Station

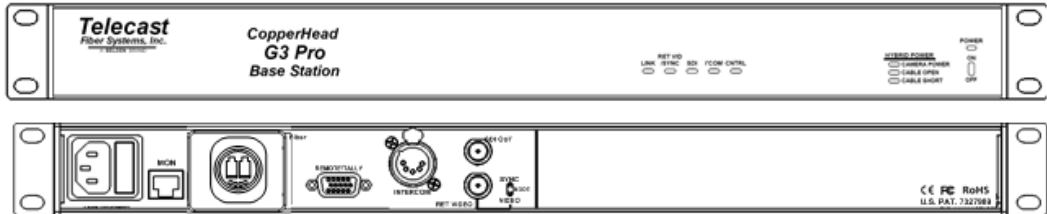


Fig. 2-9: Powered Base Station - Front Panel (top) and Rear Panel (bottom)

CopperHead System Components



This chapter describes the main system components in the CopperHead PowerWafer system.

<i>Base Station</i>	16
<i>PowerWafer Camera Adaptor</i>	22
<i>MPS External PowerWafer Power Supply</i>	23
<i>HDX Power Supply</i>	25

Base Station

The CopperHead Base Station is available with a number of options. The unit is ordered with a specified Power Module, Audio/Intercom Module and Fiber Connector. For an overall view of component location please see the overall diagrams in Error! Reference source not found..

Base Station Front Panel



Fig. 3-1: Base Station Front Panel - single unit, 120/220 VAC power w/internal hybrid power supply

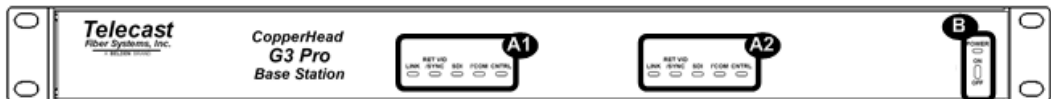


Fig. 3-2: Base Station Front Panel - dual unit, 12 VDC power

The front of Base Station has three areas of interest:

- **A:** Signal Status Indicators (see [Front Panel Section A - Signal Status Indicators](#) on page 16)
If Dual Base Station, A1 and A2. Otherwise, A2 only.
- **B:** Power Switch and Indicator (see [Front Panel Section B- Power Switch and Indicator](#) on page 17)
- **C:** Hybrid Power Status Indicators (see [Front Panel Section C- Hybrid Power Status Indicators](#) on page 18)

Note: These indicators only appears on Base Stations equipped with internal hybrid power supply.

Front Panel Section A - Signal Status Indicators

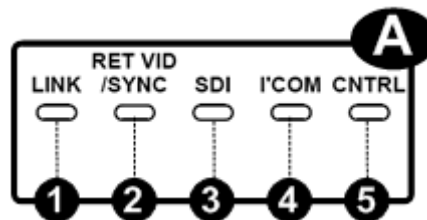


Fig. 3-3: Base Station Status Indicators

- **1: Link**
Indicates the status of the data link from Camera Unit to Base Station. This is a good indicator of adequate optical link.
 - GREEN when Base Station has a data "lock" with Camera Unit.

- RED when Base Station is not "locked" to Camera Unit.
- **2: Return Video/Sync**
Indicates the presence of the analog video signal (VBS) at Base Station's "VBS In" BNC. This VBS can be used for return "program" video or for genlock to the camera.
- **3: SDI Presence**
Illuminates GREEN to indicate the presence of digital SDI video from Camera Unit. This will stay illuminated GREEN as long as there is adequate optical power being received at Base Station. See Error! Reference source not found. for more information.
- **4: Intercom**
Illuminates GREEN to indicate audio activity on the Intercom channel.
- **5: Control**
Illuminates GREEN when camera control data is being transmitted between Camera Unit and Base Station.

Front Panel Section B- Power Switch and Indicator

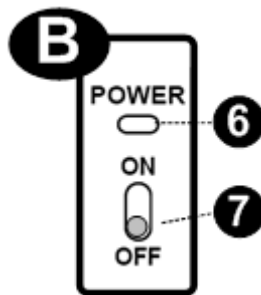


Fig. 3-4: Base Station Power Switch

- **6: Power**
Indicates that power is applied to Base Station.
 - GREEN when Base Station is fully powered.
 - RED when there is power connected to Base Station, but Base Station is not turned on.
- **7: Power Switch**
Used to turn Base Station on and off. With a hybrid power system (power supplied by Base Station) this switch will control power to the camera and Camera Unit.

Front Panel Section C- Hybrid Power Status Indicators

This section is optional, and only appears on CopperHead Base Stations equipped with internal power supplies designed to work with a CopperHead Camera Unit connected to a PowerWafer.

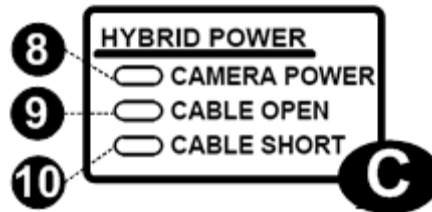


Fig. 3-5: Base Station Hybrid Power Status Indicators

- **8: Camera Power**
Illuminates GREEN when high voltage is being supplied to Camera Unit.
- **9: Cable Open**
Illuminates RED to indicate that the SMPTE hybrid cable is open or there is no SMPTE hybrid cable connected.
High voltage will not be applied to the hybrid connector until the open condition is corrected.
- **10: Cable Short**
Illuminates RED to indicate that the SMPTE hybrid cable has a short circuit in it.
High voltage will not be applied to the hybrid connector until the "short" condition is corrected or the cable is replaced.

Base Station Rear Panel

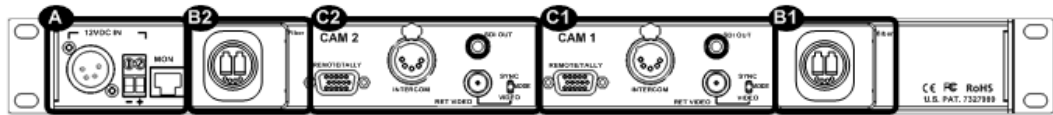


Fig. 3-6: CopperHead Base Station Back Panel (Dual model shown)

- **A:** Power Connector (see [Rear Panel Section A - Power Connector](#) on page 19)
- **B:** Optical Connectors (see [Rear Panel Section B - Optical Connector](#) on page 20)
- **C:** Signal Connectors (see [Rear Panel Section C - Signal Connectors](#) on page 20)

Rear Panel Section A - Power Connector

The CopperHead Base Station can be configured for DC or AC power.

12VDC Power Interface

This power interface is used on CopperHead Base Stations that are not equipped with internal power supplies. This type of Base Station is typically used with Camera Units powered locally with a battery or a local power supply at the camera.

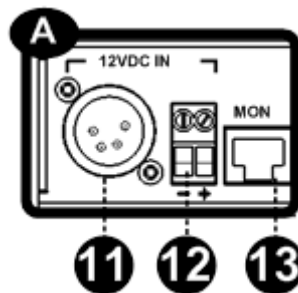


Fig. 3-7: 12VDC Power Connector

- **11:** 12V DC Power input connector (XLR 4 Pin).
- **12:** 12V DC Input - terminal block

This can be used in lieu of the 4-pin XLR or in parallel as a redundant input. See Error! Reference source not found.for pin-out details

- **13:** For Future Use (RJ45)

AC Power Connector Interface

This power interface is used on CopperHead Base Stations that are equipped with an internal power supply. This type of Base Station is typically used with Camera Units powered with a PowerWafer via SMPTE Hybrid cable

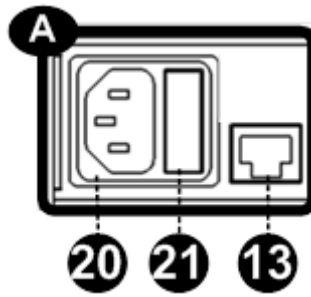
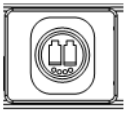
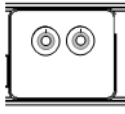

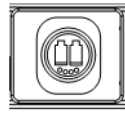
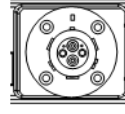
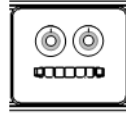


Fig. 3-8: AC Mains Connector

- **20:** AC Power Receptacle 100-240V 50/60 Hz
- **21:** 3.15 amp dual fuse assembly
Two 4 amp fuses (5 x 20mm).fuses are in operation at all times – both the AC Line Hot and the AC Line Neutral are fused.
- **13:** For Future Use (RJ45)

Rear Panel Section B - Optical Connector

The fiber optic connector is used to connect Base Station directly to Camera Unit or to the external MPS or HDX power supply configured with your system. The type of fiber connector will vary depending on your system configuration. Six types of fiber optic connectors are available for use with the CopperHead Base Station.

"Dry" (unpowered) fiber connectors			Fiber Connectors with Copper for Power		
					
A: OpticalCON (dry)	B: STs	C: MX	D: OpticalCON (powered)	E. SMPTE 304M	F. STs & Molex

Rear Panel Section C - Signal Connectors

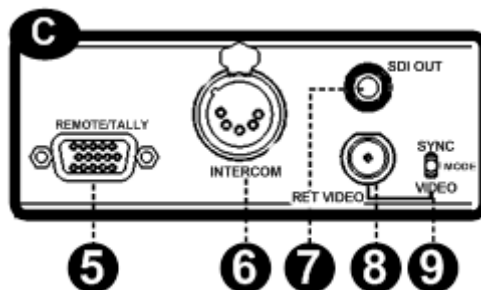


Fig. 3-9: Rear Panel Signal Connectors

- **5: Connector for Camera Remote Control Panel and Tally input (DB15HD)**
Connect CHBR-PRO cable here, specified for your particular Camera Remote Control Panel.

See [Error! Reference source not found.](#) to specify the correct cable for your Camera Remote Control Panel

- **6: Base Station Intercom Connector**

Connect your house intercom system here:

- XLR3: Two-wire (Clear-Com or RTS)
- XLR5M: Four-wire (matrix-style)

Two 4 amp fuses (5 x 20mm).fuses are in operation at all times – both the AC Line Hot and the AC Line Neutral are fused.

For more information, see [Intercom Pinouts](#) on page 41.

- **7: SD/SDI or HD/SDI Output**

Digital video from camera's SDI output

- **8: VBS Return Input**

Analog composite video signal sent to Camera Unit.

- **9: VBS Return Input Switch**

Switches the VBS Return Input connector to be optimized for one of two uses:

- **A: Sync In:** Genlock/Sync/Tri-Level sync signal.
- **B: Composite Video In:** Typically used to send analog VBS return video to the camera or an external monitor.

PowerWafer Camera Adaptor

The CopperHead Camera Unit can be powered by the optional "PowerWafer" Camera Adaptor. The PowerWafer replaces the local camera battery and any local AC power supply adaptor. The PowerWafer gets its power from the use hybrid fiber cable and the CopperHead Base Station equipped with the internal power supply or from the MPS external power supply.

Up to 95 watts of power can be delivered to the camera, Camera Unit and camera powered accessories. Up to 780 feet (240 meters) of cable can be used when Camera Unit is powered directly from Base Station.

The use of an external power supply can extend Base Station to Camera range and increase camera power flexibility. The MPS "Throw Down" device or Wafer Power Adaptor provides this functionality. This unit is described in [MPS External PowerWafer Power Supply](#) on page 23.

The PowerWafer replaces the battery or local battery mountable AC adaptor (shown with the Anton/Bauer "Gold Mount" option).

- **1: Heat Sink**
- **2: Battery Mounting Plate (Anton/Bauer Gold Mont or "V-Mount")**
- **3: Power Input Connector**

High voltage power is carried from Base Station to Camera Unit. A short jumper cable (CH3CP-INF-2FAG) carries the high voltage power from Camera Unit to the PowerWafer's power input connector, where it is converted to 12VDC power. The 12VDC power is delivered back to the camera via the battery mounting plate.

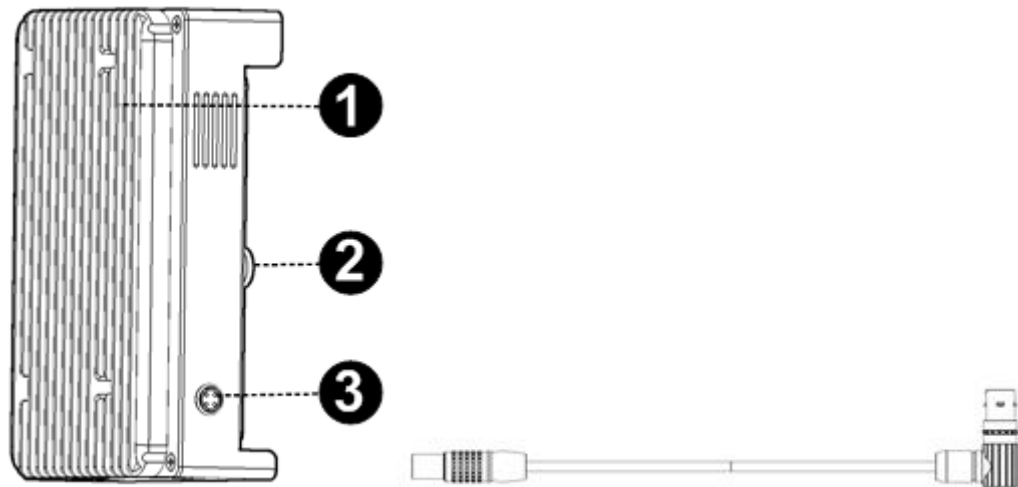


Fig. 3-10: PowerWafer Power Adaptor and Jumper Cable

MPS External PowerWafer Power Supply

The CopperHead MPS external power supply provides 95 watts of 12VDC power and fiber connectivity from Base Station to Camera Unit equipped with a CopperHead PowerWafer. Connectivity between the MPS unit to the camera can be configured using either a Hybrid OpticalCON connector or a SMPTE 304M connector. The nominal distance between them is 240 meters (780 feet).

Connectivity between the MPS unit and Base Station uses "dry" fiber and can be configured with a "dry" OpticalCON connector or two ST connectors. The MPS is powered locally with standard AC power. The unit is free standing (see [MPS External PowerWafer Power Supply](#) on page 23).

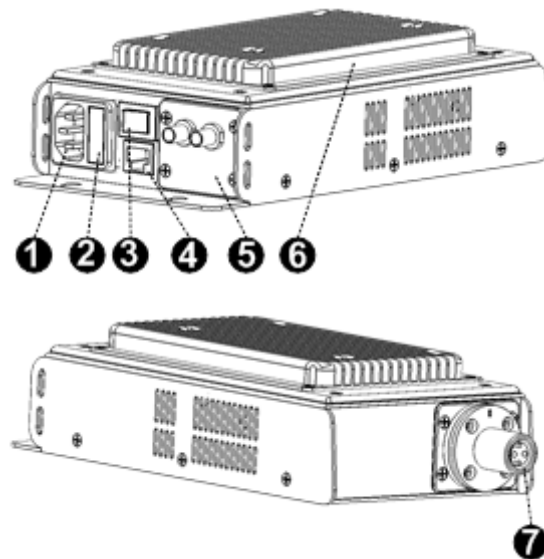


Fig. 3-11: MPS Power Supply, Front and Rear

- **1: AC Power Receptacle: 100-240V 50/60 Hz**
- **2: Fuse compartment**
Two 4 amp fuses (5 x 20mm).fuses are in operation at all times – both the AC Line Hot and the AC Line Neutral are fused.
For more information, see [Intercom Pinouts](#) on page 41.
- **3: Power Switch**
- **4: For Future Use (RJ45)**
- **5: "Dry" Fiber Optic Connection to CopperHead Base Station**
This removable plate can be equipped with two ST connectors or a "dry" OpticalCON connector. See [Figure 3-12](#).
- **6: Heat Sink**
- **7: Powered Fiber Optic Connection to CopperHead Camera Unit**
This removable plate can be equipped with a SMPTE 304M connector or a powered OpticalCON connector. See [Figure 3-13](#).

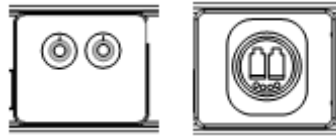


Fig. 3-12: MPS "dry" fiber connector options

The "dry" connection y to the CopperHead Base Station can be equipped with two ST connectors or a "dry" OpticalCON connector.

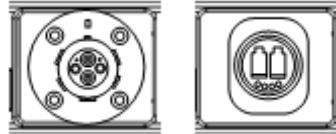


Fig. 3-13: MPS powered fiber connector options

The powered connection V to the CopperHead Camera Unit can be equipped with a SMPTE 304M connector or a powered OpticalCON connector.

Part Number	Dry Unpowered Fiber Connection to Base Station (y)	Powered Fiber Connection to Camera (V)
CH2-MPS-95VD-2ST-NEU	2 STs	OpticalCON
CH2-MPS-95VD-2ST-304	2 STs	SMPTE 304M
CH2-MPS-95VD-NEU-NEU	OpticalCON	OpticalCON
CH2-MPS-95VD-NEU-304	OpticalCON	SMPTE 304

HDX Power Supply

The HDX Power Supply Unit is required when using the PowerPlus Camera Adaptor. The HDX can be used as a free-standing unit or rack mounted, using the HDX-FR-2 for mounting two HDX units. See **PowerPlus 300 User Guide** for details on connecting the HDX to a CopperHead system.

The unit sends power via a SMPTE hybrid fiber cable to the PowerPlus, where it is converted to 12VDC and optionally to 24VDC).

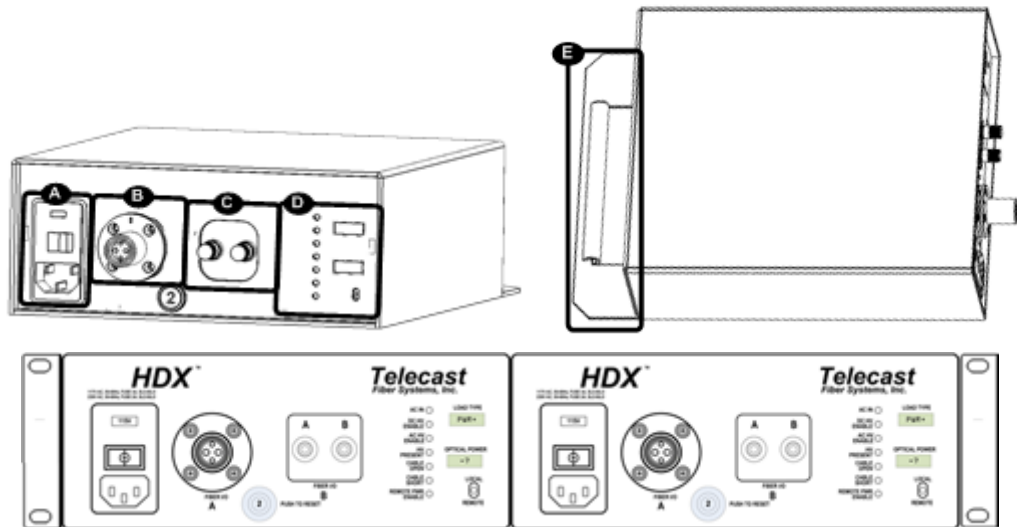


Fig. 3-14: HDX device setups

The HDX has five features:

- **A: AC Power Input Module and Switch**
Power Switch and connector for AC Mains.
- **B: "Wet" SMPTE 304M Hybrid Fiber Connector**
The SMPTE hybrid cable is connected here. This cable connects to the PowerPlus at the camera. This mating connector pair always uses SMPTE 304M connectors.
- **C: "Dry" Fiber connector(s).**
The CopperHead Base Station is connected here. This interface can be equipped with a variety of fiber connectors:
 - Two ST connectors
 - MX connector
 - OpticalCON connector
- **D: Status Indicators**
These indicators show the status of the HDX's power system (see [HDX Status Indicators](#) on page 26).
- **E: HDX Integrated Handle**
Stand-alone unit can be carried or hung from this robust handle

HDX Status Indicators

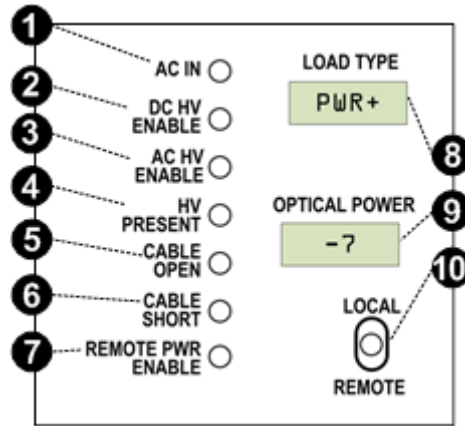


Fig. 3-15: HDX Displays

- **1: AC IN - MAINS**
AC Input power is present
- **2: DC HV ENABLE**
DC "Sense" voltage from PowerPlus is present
- **3: AC HV ENABLE**
AC "Sense" voltage from PowerPlus is present
- **4: HV Present**
AC or DC voltage is available on Hybrid connector
- **5: CABLE OPEN**
No camera cable connected
- **6: CABLE SHORT**
Camera cable non-functional due to short
- **7: REMOTE PWR ENABLE**
 - Displays red if local/remote sw in remote position and opt power ≤ -27 dBm
 - Displays green if local/remote sw in remote position and opt power ≥ -24 dBm gates HV power
- **8: LOAD TYPE**
Indicates the type of load or camera being used:
 - N/A - No load detected
 - PWR+ - PowerPlus detected
- **9: Optical Power**
Not used with PowerPlus.
- **10: Local Remote**
Not Used With PowerPlus.

4

Camera Unit and Power Supply Installation

This chapter explains how to mount the Camera Unit and deploy CopperHead PowerWafer system.

<i>Mounting the Copperhead Camera Unit with the PowerWafer</i>	28
<i>Deployment of the CopperHead System</i>	32
<i>Insuring a Positive Fiber Link</i>	32

Mounting the Copperhead Camera Unit with the PowerWafer

When mounting the CopperHead Camera Unit, always position the camera so that the battery mounting plate at the rear of the camera is easy to access. Insure that the camera is well supported and stable. If a battery is mounted remove it and put it to one side. The camera model shown here is for illustrative purposes only - your camera may differ.

The PowerWafer allows the camera and Camera Unit to be powered via hybrid fiber cable, which is powered from the CopperHead Base Station or MPS External Power Supply.

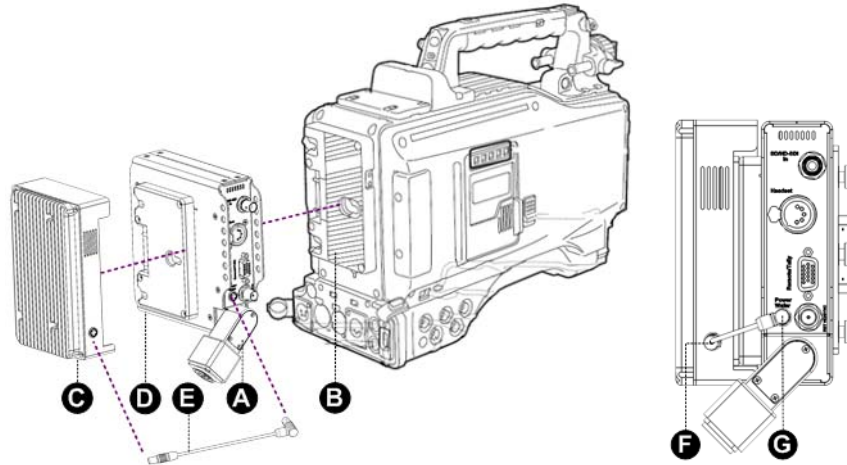


Fig. 4-1: The PowerWafer Unit and the Cable

To attach the PowerWafer Cable

- 1 Attach the CopperHead Camera Unit **A** to the camera battery mounting plate **B**. The mounting is mechanically identical to attaching a battery.
 For instructions for attaching the required cables between the camera and the Camera Unit, refer to any of the **CopperHead User Guides**.
- 2 Mount the PowerWafer **C** to the CopperHead Camera Unit battery mounting plate **D** exactly as you would mount the battery to the camera.
- 3 Connect the supplied PowerWafer connector cable **E**. (model CH3CP-INF-FAG2) between the PowerWafer **C** and the PowerWafer connector on Camera Unit **A**.
- 4 For best results, plug the straight connector **F** into the PowerWafer and the connector with the Right Angle **G** into the Copperhead Camera Unit.

The following table summarizes the various fiber cable connection options between the Copperhead Base Station and Camera Unit.

Cable Type	Base Station Power	Camera Unit Power	Distance Range Between Camera and Base
Tactical Fiber	12VDC	Local Battery or AC Power	Up to 10 KM
SMPTE Hybrid Fiber	120/220VAC with Internal Camera Power Supply	PowerWafer Adaptor	240 meters

Cable Type	Base Station Power	Camera Unit Power	Distance Range Between Camera and Base
SMPTE Hybrid Fiber	External MPS Power Supply 95 Watts ¹	PowerWafer Adaptor	5 KM between base and power supply 240 meters between power supply and camera
SMPTE Hybrid Fiber	External HDX Power Supply - 150 Watts ²	PowerPlus Adaptor	5 KM between base and power supply 3.2 KM between power supply and camera

Note: The external MPS power supply must be equipped with the required fiber cable connectors depending on your system requirements. See [MPS External PowerWafer Power Supply](#) on page 23 for a description of the various options

SMPTE Hybrid Fiber between Base Station (powered) and Camera Unit

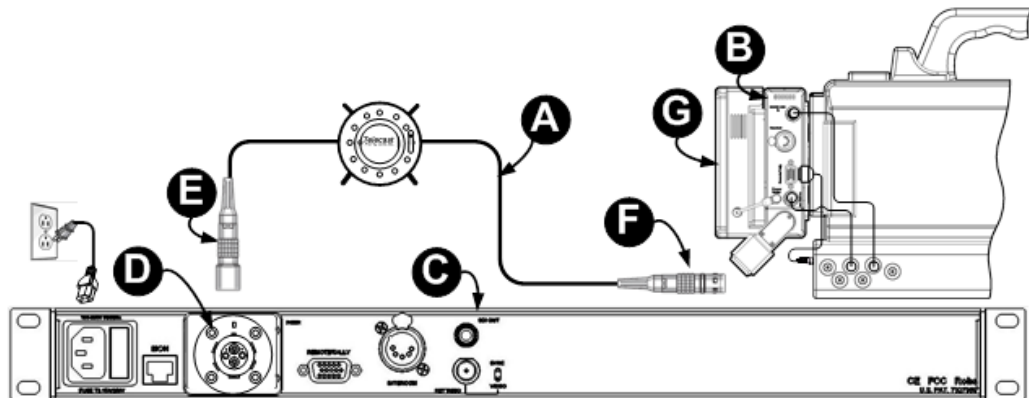


Fig. 4-2: SMPTE Hybrid Fiber between Base Station (powered) and Camera Unit

Connect a length of SMPTE Hybrid fiber cable **A** between Camera Unit **B** and the fiber receptacle **C** on the back of Base Station **D**.

At each end of the fiber cable will be either an OpticalCON or SMPTE 304M Hybrid fiber connector **E** and **F**.

The camera will be powered by the CopperHead PowerWafer Camera Power Supply **G**.

Hybrid Fiber between Base Station and Camera Unit (Infrastructure Wiring)

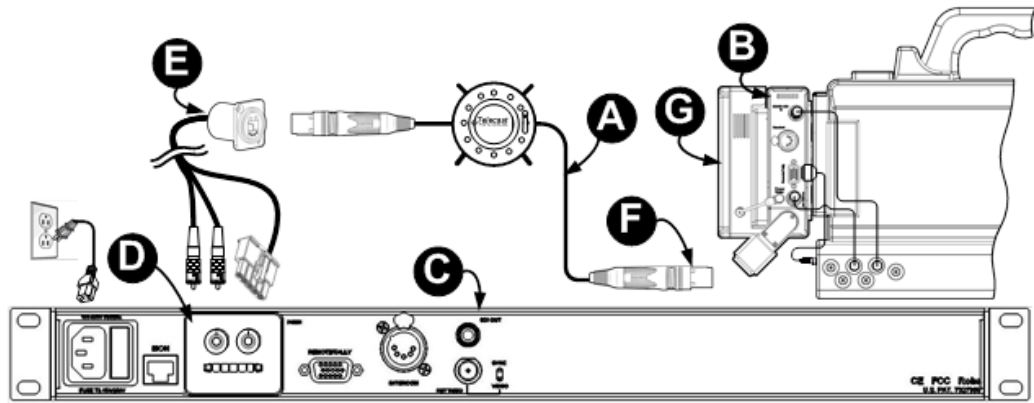


Fig. 4-3: Hybrid Fiber between Base Station and Camera Unit (Infrastructure Wiring)

A remotely-mounted fiber connector can be used for permanent installations such as communications closets, truck connector panels and within/between buildings. A panel (D) with two STs (fiber) and a Molex connector (power) is mounted on Base Station (C). Infrastructure fiber and copper wiring from Base Station connects to a remote panel-mounted OpticalCON or SMPTE 304M receptacle (E). The standard hybrid fiber optic cable (A) connects the panel-mounted receptacle and Camera Unit (B), equipped with a PowerWafer (G).

Hybrid Fiber Cable between MPS Power Unit and Camera Unit

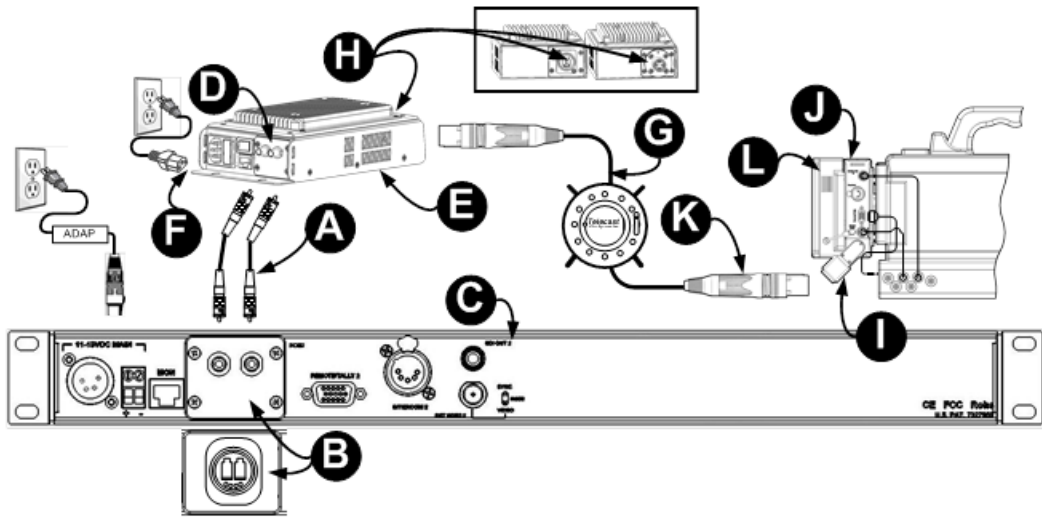


Fig. 4-4: Hybrid Fiber cable between the MPS Power Supply and Camera Unit

Dry fiber can be used between Base Station and the MPS External Power Unit, and the camera can be powered by the MPS over powered hybrid fiber.

Connect "dry" (unpowered) single mode fiber cable (A) between the fiber connector(s) (B) on Base Station (C) and the "dry" fiber connector(s) (D) on the MPS Power Supply (E).

Connect the MPS Power Supply (E) to AC Mains (F). Connect a length of hybrid fiber cable (G) between the powered connector (H) on the MPS Power Supply (E) and the swiveled fiber connector (I) on Camera Unit (J). The hybrid fiber cable can be equipped with either OpticalCON or SMPTE 304M connectors (K). The camera and Camera Unit will be powered via the hybrid cable by the PowerWafer (L).

The "dry" fiber connectors (D) on the MPS Power Supply (E) and the "dry" fiber connector(s) (B) on Base Station (C) can be equipped with one of two connector options:

- Two ST connectors (shown)
- OpticalCON connector

The powered fiber connectors (H) on the MPS Power Supply (E) and the fiber connector I on Camera Unit (J) be equipped with one of two connector options:

- Two ST connectors (shown)
- OpticalCON connector

Other fiber optic connectors are available by special order. Contact Miranda (see [Contact Us](#) on page 35) or your CopperHead dealer for more information.

Deployment of the CopperHead System

The CopperHead system is available with many different variations, including different battery mounting plates, powering options, fiber cable connectors and intercom system interfaces. This allows for many permutations that are all slightly different. Hence, not every possible operational environment can be described.

However, the following steps are recommended:

- 1 Set up and test your Copperhead system immediately to confirm proper operation and to provide training to you and your team prior to an actual production.
- 2 Do not attempt to power up the system until the fiber optic cable has been connected at both ends.
- 3 Install Camera Unit and battery or power supply (see [Mounting the Copperhead Camera Unit with the PowerWafer](#) on page 28).
- 4 Connect all Camera Unit and Base Station cables (see any of the **CopperHead User Guides**).

The order in which you connect the cables makes no difference. However, to prevent damage other sensitive electronics (such as camcorders and Remote Control Panels):

- Make sure to connect the CHCR Camera Remote Control cable to the camera when the camera is powered off.
- Make sure to connect the CHBR Base Remote Cable to the remote control panel when Base Station power is turned off.

- 5 Deploy the fiber cable.

Read the Using Fiber Optics Guide for information on how to manage and deploy your fiber optics cabling, safety precautions, tips & tricks, and recommendations for creating complex fiber optic networks. You can find a copy of this document on the Support portal (see [Contact Us](#) on page 35).

Insuring a Positive Fiber Link

To insure a positive Fiber Link

- 1 Connect the fiber cable connectors at each end.
- 2 Power up Camera Unit and Base Station or power supply and check the LED "Link" indicators on each device.
- 3 Confirm that the LED "Link" indicators on Camera Unit and Base Station are both illuminated GREEN. If so, all signals should now be passing between Camera Unit and Base Station.

5 Specifications

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	
Standard Internal Power Supply w/PowerWafer	
.....	240m (787 ft): 95W @ 12VDC*
Long Range: HDX w/PowerPlus	2km (6562 ft.): 100W Cont./150W Peak*

Mechanical/Environmental

Dimensions (WxLxD)

PowerWafer	5" x 6.12" x 2.2"
MPS Power Supply	9.7" x 2.5" x 4.5"

Weight

PowerWafer	1.5 lb.
MPS Power Supply	3.0 lb.

Power Consumption

Base Station (Hybrid Fiber):

Power Req	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

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



Technical Support

For technical assistance, please contact the Miranda Technical support centre nearest you:

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Related documentation

To access the most recent updates to this document, or to access other Miranda user documentation, please visit the **Miranda Support Portal**:

<http://www.miranda.com/support/>

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For customer service or sales information, please contact a Miranda Technologies Partnership's sales office. Visit our web site at <http://www.miranda.com/contact.php?link=worldwide> to find office nearest to you.

Miranda's corporate headquarters

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Connectors and Accessories



This appendix lists the specification for the CopperHead PowerWafer parts and accessories.

MPS Power Supply Connector 38
Parts and Accessories 38

MPS Power Supply Connector

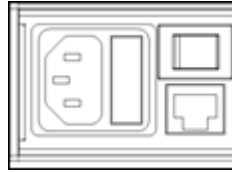







Fig. A-1: MPS Power Interface IEC C14 Receptacle

- **Panel Mounted AC Power Receptacle:** 110/220 VAC
- **Fuses:** Two 3.15 amp slo-blo fuses (5 x 20mm). Littlefuse Series 218, part #02183.15 or equivalent.

Parts and Accessories

Graphic	Description	Graphic	Description
	PWRWFR-95VD Power Wafer Camera Adaptor (for use with CH Series Pro-BS-95VD)		CH2-MPS-95VD External Power Supply for PowerWafer
	CH3CP-INF-2FAG PowerWafer-to-Camera Unit jumper cable		CHRCP-2050A Universal Camera Control Panel
	CASM/MD/XL Tactical Fiber on Reel: Small (SM), Medium (MD), or Large (XL)		

Graphic	Description	Graphic	Description
	<p>CAXX-MX Tactical Fiber Assembly, MX Connectors</p>		<p>CAXX-XT25-NOC Tactical Fiber Cable Assembly, OpticalCON Connectors</p>
	<p>CAXX-XSM311-NOC SMPTE 311M Hybrid Fiber Cable Assembly, OpticalCON connectors</p>		<p>CAXX-XSM311-SMPTE SMPTE 311M Hybrid Fiber Cable Assembly, SMPTE 304M connectors</p>
	<p>MXRE MX Receptacle Flange Mount Assembly Breakout to STs</p>		<p>MXRV MX Receptacle Jam Nut Assembly Breakout to STs</p>
	<p>CH3BFC-NOC-2ST/MOL OpticalCON receptacle to STs and Molex 39-01-4051</p>		<p>CH3BFC-NOC-NOC OpticalCON receptacle to OpticalCON Plug</p>
	<p>CH3BFC-304M-2ST SMPTE Hybrid 304M plug to STs and Molex 39-01-4051</p>		<p>CH3BFC-304M-NOC SMPTE Hybrid 304M plug to OpticalCON Plug</p>

B

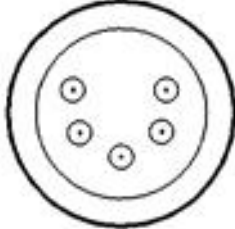
Intercom Pinouts

This appendix lists the pinouts for the 4-Wire and Clear-Com Intercoms.


<i>4-Wire Intercom</i>	42
<i>Clear-Com Intercom</i>	42

4-Wire Intercom

This cable is end-user supplied.

Base Station Four Wire Intercom Output Wiring	Pin	Function	Impedance	Signal
 <p>Base Station #16 & #17 XLR5 Male</p>	1	Ground		
	2	+ Input	600 Ohm	Line: +8 dBm
	3	- Input	Input	Mic: -32 dBm
	4	+ Output	≥ 600 Ohm	+8 dBm
	5	- Output	Load	

Clear-Com Intercom

Base Station Clear-Com Intercom Output Wiring	Pin	Signal
 <p>Base Station #16 & #17 XLR3 Female (x2)</p>	1	Ground
	2	+ VDC Power
	3	Power