

Telecast Fiber Solutions

CopperHead 3050 User Guide

M4010-9900-102

24 July 2014



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About CopperHead 3050

This chapter provides an overview of the CopperHead 3050 Transceiver System and includes the safety and warranty information about it.

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<i>Unpacking the CopperHead 3050 Transceiver System</i>	3
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About the CopperHead 3050 Transceiver System

The CopperHead 3050 Transceiver System is a camera video, audio, and intercom multiplexing system that installs itself between a portable video camera and its power source. It connects via a single fiber optic cable to a Base Station in a truck, studio or other video production setup. All video, audio and communications usually carried on multiple coax and audio cables are sent, bi-directionally, over a single lightweight fiber over distances as long as 5 km or more.

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

The camera battery or optional power source attaches to the Camera Unit, which in turn, attaches to the video camera. Batteries accommodated are Sony V, PAG, and Anton-Bauer.

- The CopperHead 3050 Transceiver System consists of two main components:
- The CopperHead 3050 Camera Unit – this unit has two options:
 - a) the battery physical interface system
 - b) the fiber connector

The CopperHead 3050 Base Station – this unit has three options:

- a) the power configuration
- b) the fiber connector
- c) the intercom module

Typically options are determined at the time of product order and the units are delivered pre-configured. Options can be field changed by qualified personnel. This User Guide describes each of the possible options.

Unpacking the CopperHead 3050 Transceiver System

Please consult your packing slip and purchase order to ensure 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 Grass Valley Technical Support.

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

Product Returns

In the unlikely event of damage to your CopperHead 3050 Transceiver System 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 Grass Valley Technical Support (see [Contact Us](#) on page 65).

If the problem cannot be remedied through a service telephone call, you will receive an RMA (Return of Merchandise Authorization) 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 3050 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.

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 3050 Transceiver System Base Stations CHG3-BS-3050-95VD-xxx-xxx are equipped with Dual Cartridge fuses located next to the AC Power receptacle at the left rear of the unit. Refer to [Connector Pin Assignments](#) on page 66 for specific fuse and location information.

NEVER operate the CopperHead 3050 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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Fiber Cable Overview

Fiber Optics and Fiber Optic Cable are the core technologies at the heart of the TelePort 3G System. The ability to multiplex and de-multiplex multiple ranges of fiber optic signals carrying SDI, Audio, and Data is what enables the TelePort 3G. The specific theory and operation of Fiber Optics is beyond the scope of this document.

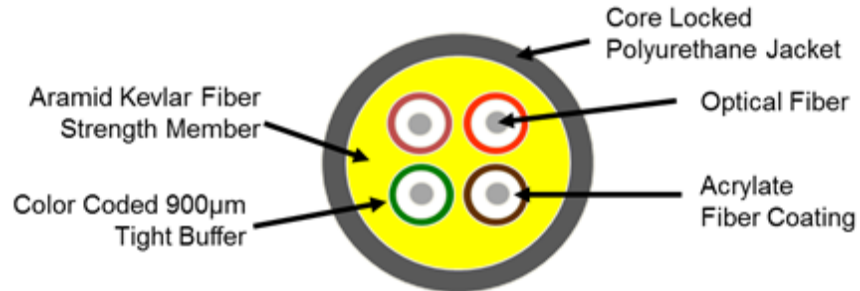


Fig. 2-1: Single Mode Fiber Optic Cable Cross-Section

Tactical Fiber cable is heavy duty, Kevlar protected and capable of carrying CopperHead signals extended distances. The cable can generally withstand a variety of environmental hazards such as being crushed or run-over. Tactical Fiber can be used in the field mounted on Portable Fiber Reels in lengths up to 2000 feet.

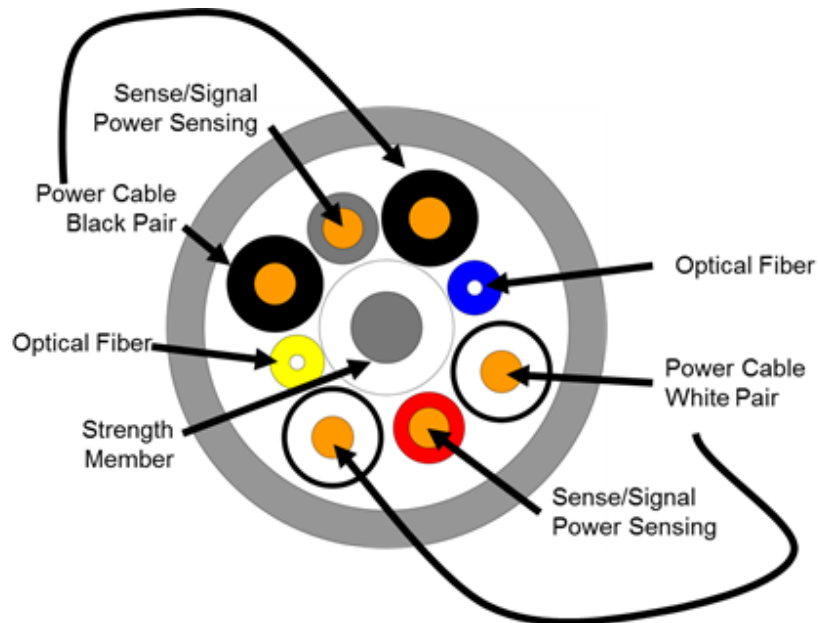


Fig. 2-2: Hybrid Fiber Optic Cable Cross-section

Hybrid Fiber Cable has the same Fiber Optic characteristics with the addition of copper cables. This allows the transmission of power through the cable. This increases weight and reduces operating distance. Hybrid Fiber Cable also includes a pair of Sense/Signal wires that allow systems to determine if there is an open or shorted cable. Hybrid Fiber Cable is also larger in diameter than Tactical Fiber Cable.

Fiber Optic Connector Types

Depending on the type of Fiber Optic Cable used, different Connector types can be configured. The following table summarizes the various types of connectors typically used in a CopperHead 3050 Transceiver System Transceiver System configuration and the allowed Fiber Optic Cable usage.

Connector Type	Tactical Fiber Use	Hybrid Fiber Use	Camera Unit Use	Base Station Use	Notes
ST Fiber Connectors	Yes	Not Typically	No	Yes	Less Expensive – not as durable as OpticalCON, SMPTE 304M or MX
ST Fiber Connectors with Molex Power Plug	No	Not Typically	No	Yes	Used with separate Fiber and Power cables
LC Connectors	No	No	No	No	Infrastructure and Internal Equipment Use
SMPTE 304M	No	Yes (up to 95V)	Yes	Yes	
OpticalCON Cable Connector (Neutrik)	Yes	Yes	Yes	Yes	
OpticalCON Panel Connector (Neutrik)	Yes	Yes	No	No	Infrastructure Use Only
MX Expanded Beam Connector	Yes	No	Yes	Yes	

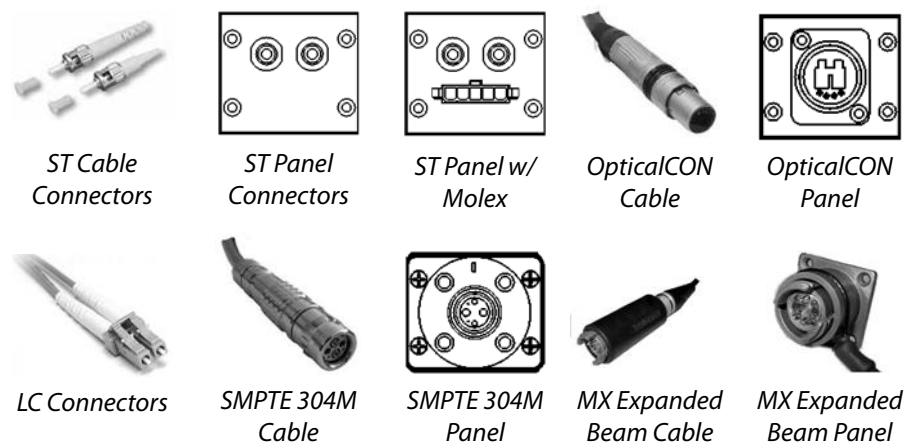


Fig. 2-3: Fiber Optic Connectors

Signal paths in the CopperHead 3050 Transceiver System

The CopperHead 3050 Transceiver System uses an optical fiber link between the Base Station and the Camera Unit to carry all of the required signals necessary for operation of the camera and associated production equipment. The Camera Unit multiplexes electrical signals from the camera and other remote sources and converts them to an optical signal for transmission over the fiber.

Simultaneously, an optical return signal is received at the Camera Unit from the Base Station. This signal is then converted to electrical analog information for use by the camera, camera operator, and auxiliary equipment at the camera location.

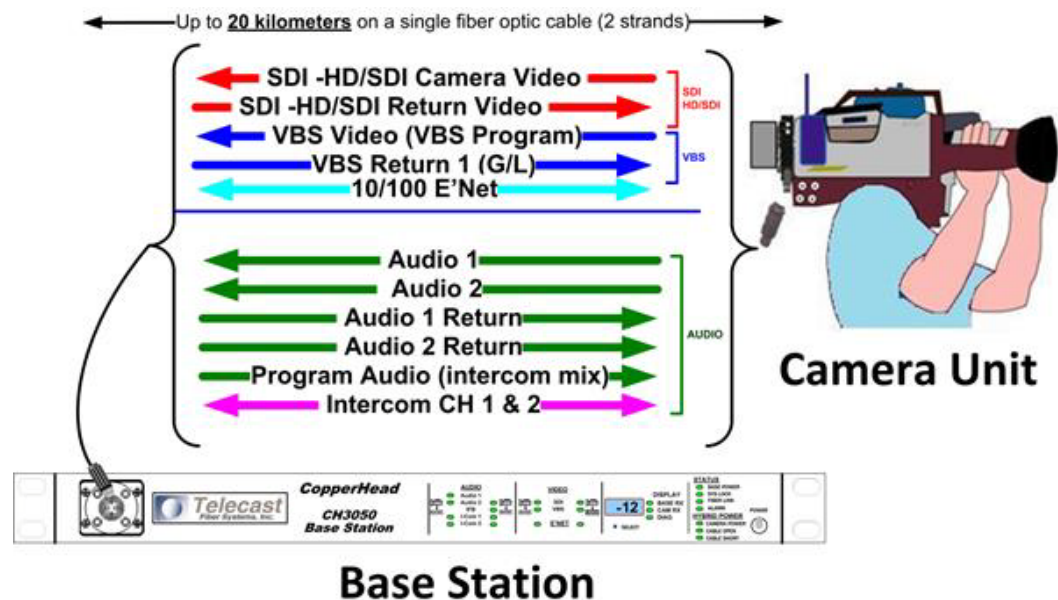
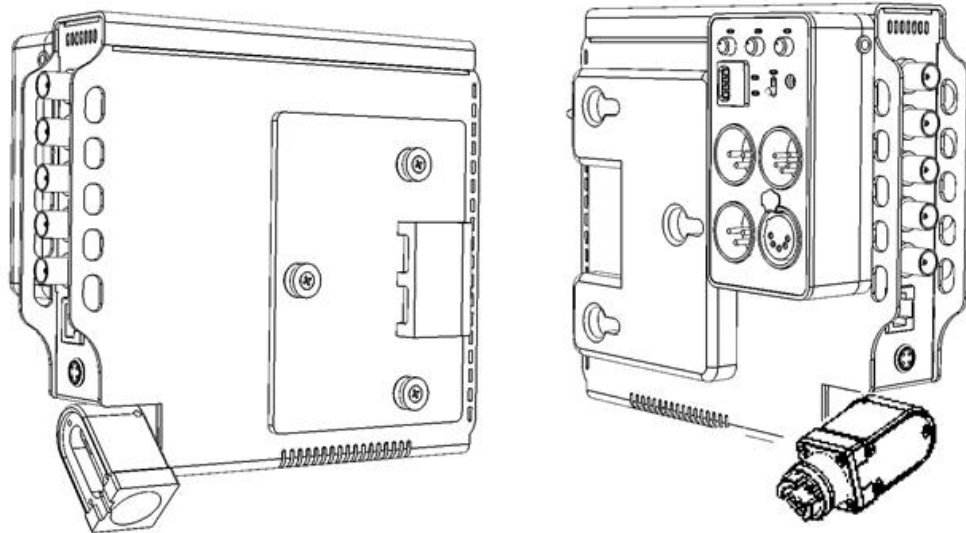


Fig. 2-4: Base Station to Camera Unit Connection

When you use the hybrid fiber cable option, the link also provides power to the Camera Unit and the camera itself. Only the single fiber link or hybrid fiber link is required between the Base Station and the Camera Unit.

CopperHead 3050 Transceiver System Components

CopperHead 3050 Camera Unit Overview



Camera Unit Front Side
(attached to the camera)

Back Side (attached to the
battery/power supply)

Fig. 2-5: Camera Unit Front and Back Side

The actual appearance of your CopperHead 3050 Camera Unit will vary depending on the battery mount and fiber cable connection options specified at the time of purchase.

CopperHead 3050 Base Station

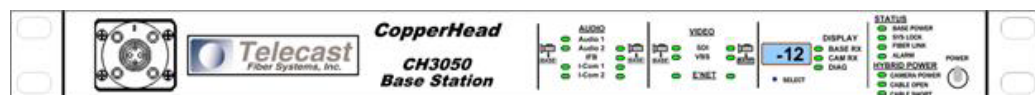


Fig. 2-6: CopperHead 3050 Base Station Front Panel

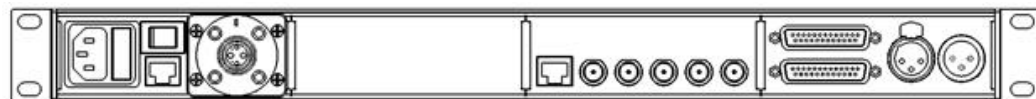


Fig. 2-7: CopperHead 3050 Base Station Connector or Back Panel

The actual appearance of your CopperHead 3050 Base Station will vary depending on the fiber cable connection and power options specified at the time of purchase.

CopperHead 3050 Transceiver System Additional Components

In addition to the CopperHead 3050 Camera Unit and Base Station, the system consists of:

- External Power Supply or Power Cord for the Base Station (depending the unit configuration)
- Hardware kits for rack mounting the Base Station
- Portable fiber reel with fiber per your purchase order
- Optional "Power Wafer" Camera Adaptor with optional external power supply
- Optional "PowerPlus" Camera Adaptor and Power Adaptor
- Optional Universal Camera Control Unit

For additional accessories see [Available Accessories](#) on page 76.

Note: You must use your own cables to make connections for the Base Station monitor, and other ancillary signals and equipment. See [Available Accessories](#) on page 76 for suggestions.

3

Detailed Description

This chapter describes in detail each element on the Camera Unit and Base Station of the CopperHead 3050 Transceiver System. Physical installation of the system and system connections and practical operation are covered in following chapters.

For an overall view of component location, see the CopperHead 3050 Transceiver System overall diagrams in [Diagrams](#) on page 82.

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CopperHead 3050 Camera Unit

CopperHead 3050 Camera Unit Back Side

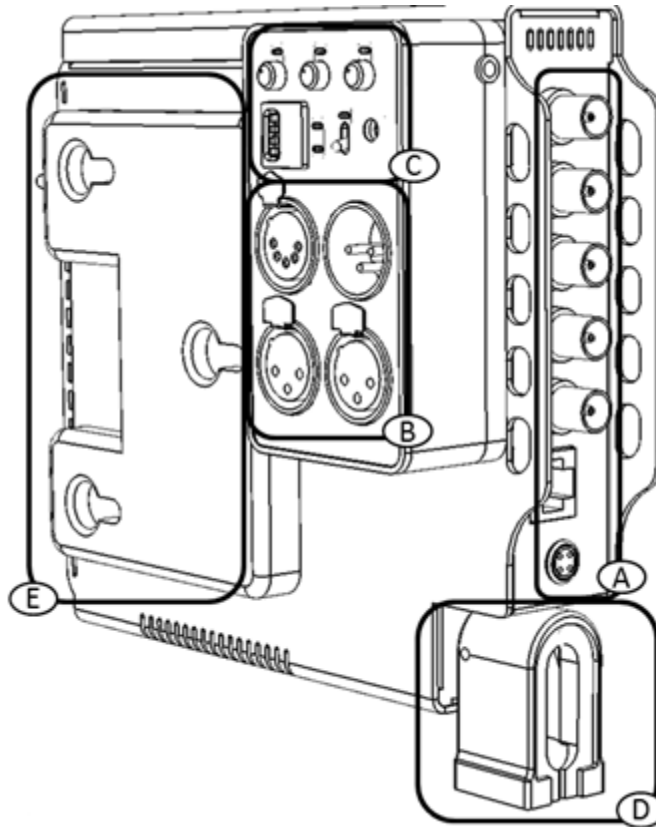


Fig. 3-1: CopperHead 3050 Camera Unit Back Side

The back side of the Camera Unit has five features:

- **Area A – Connector Panel** (see [Area A - Connector Panel](#) on page 13)
- **Area B - Audio/Intercom Connector Panel** (see [Area B - Audio/Intercom Connector Panel](#) on page 14)
- **Area C - Audio/Intercom Controls** (see [Area C - Intercom Controls](#) on page 14)
- **Area D – Fiber Connector** (see [Area D - Fiber Connector](#) on page 15)
- **Area E– Battery Mount** (see [Area E - Battery Mount](#) on page 16)

Area A - Connector Panel

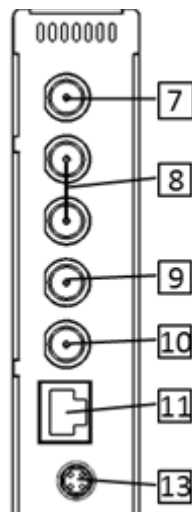


Fig. 3-2: Camera Rear Connector Panel

- **7: SD-HD/SDI In** (to Base Station)
- **8: SD-HD/SDI Digital Video Outputs A & B** (from Base Station)
- **9: VBS In** (to Base Station) VBS signal paths typically carry analog video
- **10: VBS Out** (from Base Station)
- **11: Ethernet** (100Mbps)
- **13: Power Wafer Connector**

For additional information about the signals carried on these connectors, see [Area D - Fiber Connector](#) on page 15.

Throughout this document component Key Numbers are coordinated with the overall system diagrams found in [Diagrams](#) on page 82.

Area B - Audio/Intercom Connector Panel

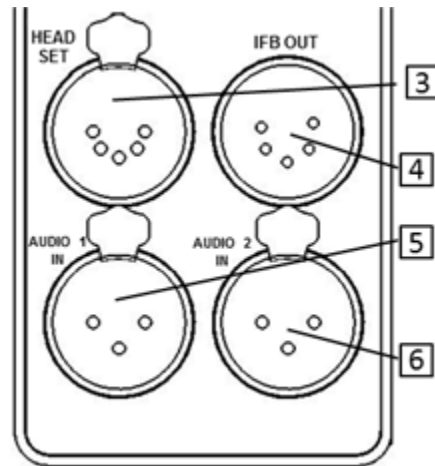


Fig. 3-3: Audio/Intercom Connector Panel

- **3 - Intercom Head Set Connector**
- **4 - IFB Out:** carries the IFB Circuit Signal typically for reporter use
- **5 - Audio 1 Input (Line Level) - (to Base Station):** typically audio program from camera line outputs
- **6 - Audio 2 Input (Line Level) - (to Base Station):** typically audio program from camera line outputs

For information on the Audio/Intercom Connector Panel operation, see [Set Up of the CopperHead 3050 Transceiver System for operation](#) on page 48.

Area C - Intercom Controls

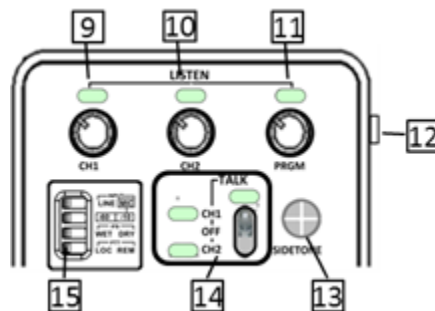


Fig. 3-4: Intercom Controls

- **9 - Intercom 1 Monitor Level Control and Activity Indicator**
- **10- Intercom 2 Monitor Level Control and Activity Indicator**
- **11 - Return Program Monitor Level Control and Activity Indicator**
- **12 - Intercom & Return Program Output:** mini-phone jack with no microphone functionality
- **13 - Sidetone Control**
- **14 - Intercom Talk Control**

- **15 - Intercom Local/Remote**
 - **LOCAL**- Switch 18 is enabled
 - **REMOTE**- Remote Push-to-Talk Switch enabled

For information on the Audio/Intercom Connector Panel operation, see [Set Up of the CopperHead 3050 Transceiver System for operation](#) on page 48.

Area D - Fiber Connector

The CopperHead 3050 Camera Unit is shipped with one of the three Fiber Connectors shown in [Figure 3-5](#).

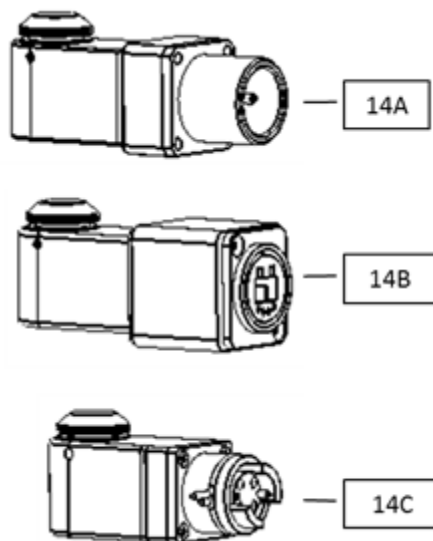


Fig. 3-5: Three types of Fiber Connectors

- **15A - SMPTE 304M**, powered
- **15B - OpticalCON**, powered or unpowered
- **15C - MX Expanded Beam**, unpowered

Area E - Battery Mount

The CopperHead 3050 Camera Unit is shipped with a variety of Battery Mount to camera types. The Anton Bauer mount and the Sony V-mount are the most common. PAG and other battery mount systems are available by special order. Please contact Grass Valley Technical Support (see [Contact Us](#) on page 65) or your authorized dealer.

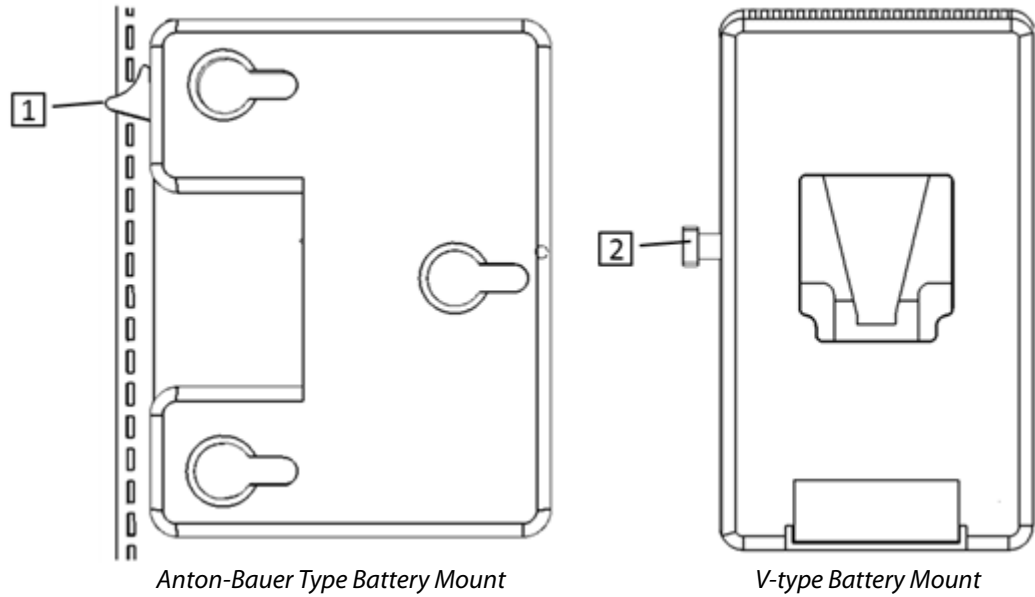


Fig. 3-6: Camera Unit Battery Mount

- 1, 2 - Battery release latch

CopperHead 3050 Camera Unit Front Side

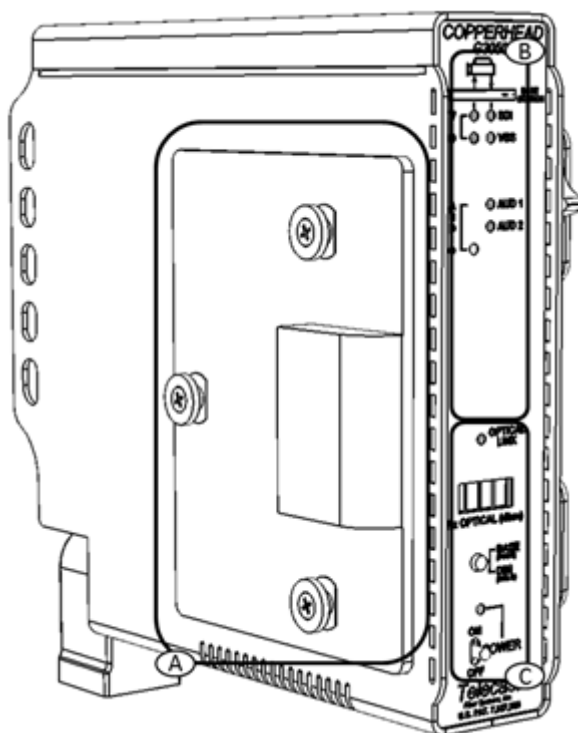


Fig. 3-7: CopperHead 3050 Camera Unit Front Side

The front side of the Camera Unit has three areas of interest:

- **A - Camera Mounting Plate** (see [Area A - Camera Mounting Plate](#) on page 18)
- **B - Signal/Data LED Activity Indicators** (see [Area B - Signal/Data Indicators](#) on page 18)
- **C - Digital Status Display & Power Switch** (see [Area C - Optical Link Signal Strength Indicator & Power Switch](#) on page 19)

Area A - Camera Mounting Plate

The CopperHead 3050 Camera Unit is shipped with a variety of Camera Mount to camera types. The Anton Bauer mount and the Sony V-mount are the most common. PAG and other battery mount systems are available by special order. Please contact Grass Valley Technical Support (see [Contact Us](#) on page 65) or your authorized dealer.

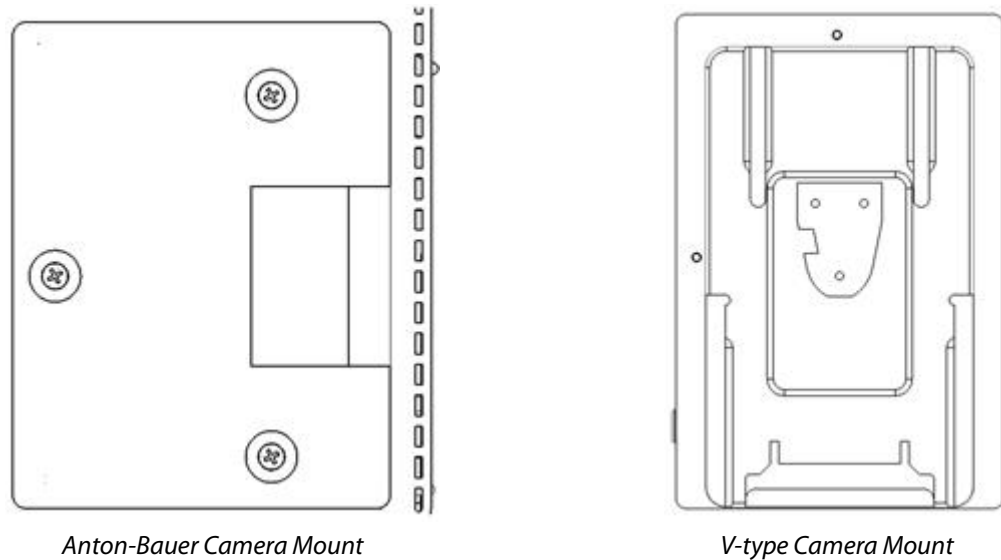


Fig. 3-8: CopperHead 3050 Transceiver System Camera Mount

Area B - Signal/Data Indicators

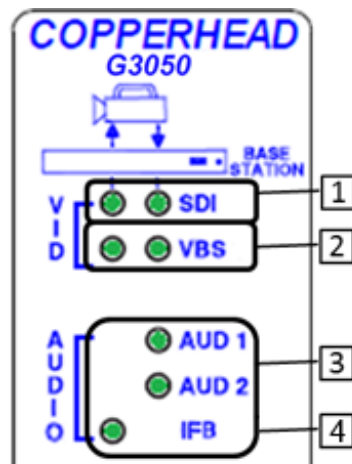


Fig. 3-9: CopperHead 3050 Transceiver System Camera Unit Indicator Panel

The CopperHead 3050 Transceiver System Camera Unit Indicator Panel has a series of LED displays that monitor the various signal paths between the Camera Unit and the Base Station.

- For signals remain constant, such as time code and video, the LED remains on as a steady Green.
- For signals that fluctuate (such as audio), the LED will reflect the varying signal activity.

- If the LED is off, either the signal has been lost or it is not in use.

The LED indicators on the left side of the panel indicate signal paths from the Base Station to the Camera Unit. Right side LEDs indicate signal paths from the Camera Unit to the Base Station

- **1 - SDI Digital Video Signal:** monitors camera SDI Video to Base Station and SDI return video to the Camera Unit
- **2 - VBS 1 - Analog Video Signals 1:** VBS 1 is used for Camera Monitor video from the Camera Unit to the Base Station. It is also used for Return Video to the Base Station from the Camera Unit
- **3 - Program Audio Channels 1-2:** monitors program audio from Camera Unit to Base Station. It is also used for Return Audio from Base Station to Camera Unit
- **4 - IFB Signal Path Monitor:** monitors an IFB circuit typically fed to and IFB amplifier and then to a reporter's earpiece

Area C - Optical Link Signal Strength Indicator & Power Switch

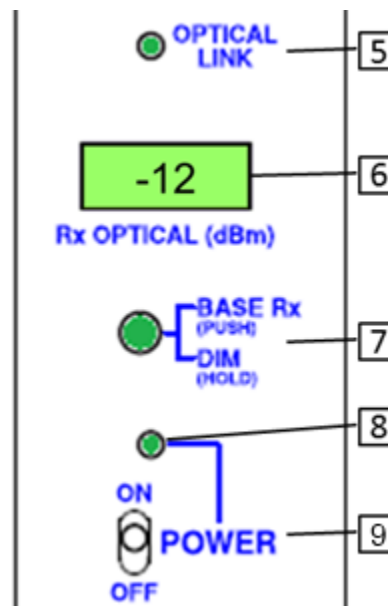


Fig. 3-10: Optical Link Signal Strength Indicator & Power Switch

- **5- Optical Link Indicator:** indicates the status of the optical connection from base to camera and camera to base
 - **Green:** both the Base Station and camera control unit have optical power within normal range.
 - **Red:** either the Base Station or camera control unit optical power is not within normal range.
- **6- Rx Optical Display (Digital Status Display):** four-character display in one of five modes (see [Using Digital Displays](#) on page 54)
- **7- Base Rx/Dim Push Button:** change four-character display mode.
 - Push and release changes display mode.
 - Push and hold adjusts LED indicator brightness

- **8- Power Indicator LED**

- Green indicates power is applied to the camera control unit.
- Blinking Green indicates a camera control unit error.

See [Using Digital Displays](#) on page 54.

- **9- Power On/Off Switch:** toggle switch to enable or disable camera power.

High voltage Base Station: enables or disables camera power.

- Low voltage Base Station: turns camera power on and off

CopperHead 3050 Base Station

The CopperHead 3050 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 [Diagrams](#) on page 82.

CopperHead 3050 Base Station Front Panel



Fig. 3-11: CopperHead 3050 Base Station Front Panel

- **A - Optical Connector** (see [Area A - Front Panel Optical Connector \(Optional\)](#) on page 21)
- **B - Audio/Ethernet Indicators** (see [Area B - Audio Indicators](#) on page 22)
- **C - Video Indicators** (see [Area C - Video/Data Indicators](#) on page 22)
- **D - Signal Strength Indicators/Setup** (see [Area D - Signal Strength Indicators/Setup](#) on page 23)
- **E - Status/Power Indicators** (see [Area E - Status/Power Indicators](#) on page 23)

Area A - Front Panel Optical Connector (Optional)

Area A of the CopperHead 3050 Base Station provides for the optional mounting of the Fiber Optical Connector on the front of the Base Station instead of the rear of the Base Station.

For information on how to convert the Base Station from Rear to Front Fiber Connector, see [Connections between the Base Station and the Camera Unit](#) on page 36.

Three types of Fiber Connectors are available for use with the CopperHead 3050 Base Station. Typically one of these Fiber Connectors is pre-configured at the time of delivery.

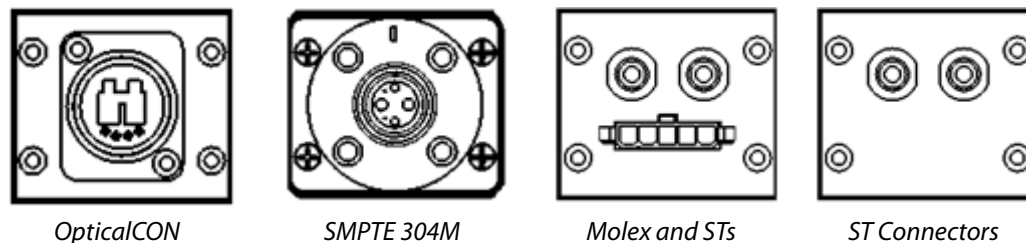


Fig. 3-12: Fiber Connector Types

Area B - Audio Indicators

LED Indicators to the left side of the label indicate signal paths from the Camera Unit to the Base Station. The right side LEDs indicate signal paths from the Base Station to the Camera Unit.

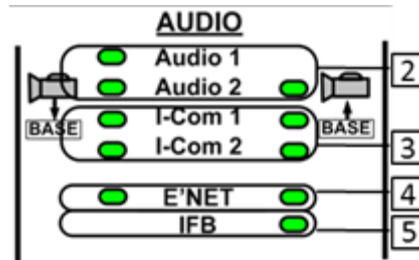


Fig. 3-13: Audio Indicators

- **2 - Program Audio Channels 1-2:** monitors Program audio from Camera Unit to Base Station and Return audio from Base Station to Camera Unit.
- **3 - Intercom Channels 1-2:** monitors Intercom audio from Camera Unit to Base Station and from Base Station to Camera Unit.
- **4 - Ethernet Signal:** indicates IP Data traffic to and from Camera Unit to and from Base Station.
- **5 - IFB Signal:** monitors IFB signal coming from Base Station to Camera Unit.

Area C - Video/Data Indicators

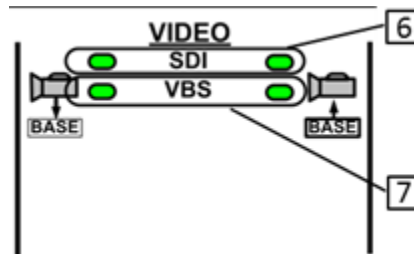


Fig. 3-14: Video/Data Indicators

- **6 - SDI Digital Video Signal:** monitors camera SDI video to Base Station and SDI return video to the Camera Unit.
- **7 - VBS 1-3 – Analog Video Signals 1-3:** VBS is typically used for Camera video from the Camera Unit to the Base Station, and Return video to the Camera Unit from the Base Station.

Area D - Signal Strength Indicators/Setup

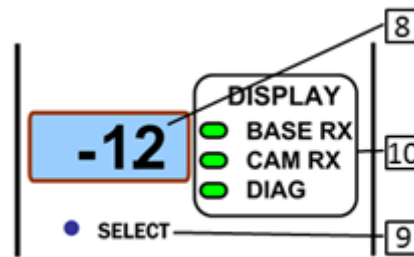


Fig. 3-15: Signal Strength Indicators/Setup

- **8- Signal Strength Readout in dBm:** this display changes between display modes when selected.
- **9- Select Button:** chooses between three modes of operation.
- **10 - Readout Function Indicator:**
 - **BASE RX** – Optical Link signal strength received at Base Station from Camera Unit
 - **CAM RX** – Optical Link signal strength received at Camera from Base Station
 - **DIAG** – Digital display is in Diagnostic mode

For details on how the setup/Diagnostic functions operate, see [The CopperHead 3050 Camera Unit Digital Display](#) on page 58.

Area E - Status/Power Indicators

Hybrid Power Indicators are present only on a hybrid power unit

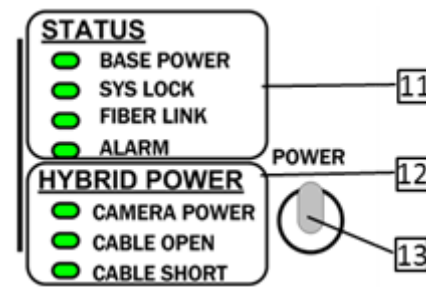


Fig. 3-16: Status/Power Indicators

- **11 - System Status Indicators:**
 - **BASE POWER** - indicates the status of all power levels in the Base Station:
 - Green when all power levels are normal
 - Red when any power level is not normal
 - **SYSTEM LOCK** - indicates that the Base Station is communicating with the Camera Unit:
 - Green when communicating with Camera Unit
 - Red when it is not communicating with the Camera Unit
 - **FIBER LINK** - indicates the optical power status of the Base Station and Camera Unit:

- Green when both the Base Station and Camera Unit optical power are within a normal range
- Red when both the Base Station and camera optical power are not within a normal range
- Orange when either the Base Station or camera optical power are not within a normal range
- **ALARM** - indicates that some error condition exists in either the Base Station or the Camera Unit:
 - Red if there is a Base Station error. Refer to the Base Station DIAG for details on the error (see [The CopperHead 3050 Base Station Digital Display](#) on page 54)
 - Orange if there is a Camera Unit error. Refer to CAM DIAG for details for the error (see [The CopperHead 3050 Camera Unit Digital Display](#) on page 58)
- **13 - Hybrid Power Indicators**

Note: Hybrid Power Indicators are present only on a hybrid power unit.

The Hybrid Power indicators are only applicable to units with the internal power supply (for configurations using the MPS power supply - see [MPS External Power Wafer Power Supply](#) on page 30).

- **CAMERA POWER** - indicates that high voltage is applied to the Hybrid Cable connector (OpticalCONN or SMPTE 304M), which powers the Power Wafer at the Camera Unit.
 - Green when high voltage is being supplied to the Hybrid cable connector
 - Off when there is no high voltage applied to the Hybrid cable connector
- **CABLE OPEN** - indicates that there is no hybrid cable connected to a Camera Unit equipped with a Power Wafer.
 - Green when the hybrid cable is properly connected from the Base Station to the Camera Unit equipped with Power Wafer
 - Red when there no cable connected to the camera or the cable is connected but open

High voltage will not be applied to the camera until the open condition is corrected.

- **CABLE SHORT** - indicates that the hybrid cable connected is shorted.
- **14 - Power Switch & Power Indicator**

Toggle switch to enable or disable Base Station power.

LED turns Green when ON/OFF switch is changed to the ON position. With a hybrid power system (power supplied by the Base Station), this switch will control power to the Camera and the Camera Unit

For the hybrid system to be properly powered, the AC Mains switch on the rear of Base Station must be in the ON position.

CopperHead 3050 Base Station Back Panel

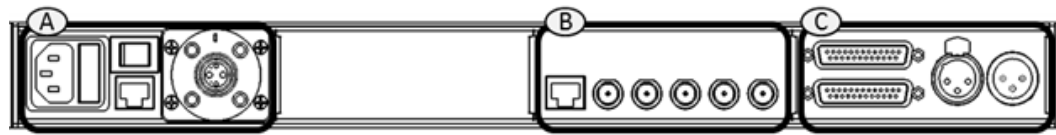


Fig. 3-17: CopperHead 3050 Base Station Back Panel

- **A - Power & Fiber Connectors** (see [Area A - Power & Fiber Connectors \(Power Module\)](#) on page 25)
- **B - Video/Ethernet Connectors** (see [Area B - Video/Ethernet Connectors](#) on page 27)
- **C - Audio/Intercom Connectors** (see [Area C - Audio/Intercom Connectors](#) on page 27)

Area A - Power & Fiber Connectors (Power Module)

The CopperHead 3050 Base Station can be configured with one of five different Power Module Options.

- The connection and practical use of each of these options is covered in [Connection of the System](#) on page 35.
- Multi-pin connector wiring suggestions are covered in [Multi-Pin Connectors: Suggested Wiring](#) on page 72.

External Power Options

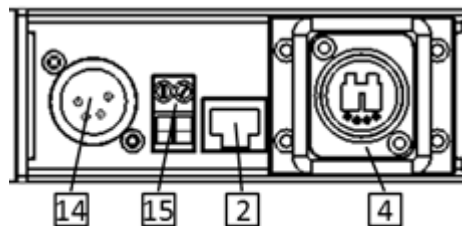


Fig. 3-18: External Power with OpticalCON Connector

- External Power with OpticalCON Connector
 - **14 - 12V DC External Power Supply input connector (XLR 4 Pin)**
 - **15 - 12V DC Input - terminal block**
See [Connector Pin Assignments](#) on page 66 for connection details.
 - **2 - For Future Use**
 - **4 - OpticalCON Connector**
- External Power with STs Connector
 - **4 - ST Fiber Connectors**

Internal Power Options

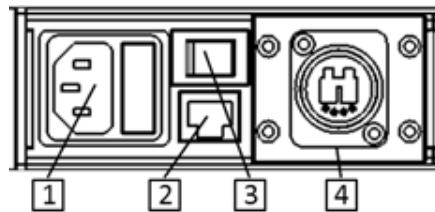


Fig. 3-19: Internal Power panels

- Internal Power with OpticalCON Connector
 - **1 - AC Power Receptacle and 4AMP Dual Fuse Assembly:** 100-240V 50/60 Hz See Page 8 for the Fuse Specification.
 - **2 - For Future Use**
 - **3 - AC Mains Switch**
 - **4 - OpticalCON Connector**
- Internal Power with STs and Molex Connectors

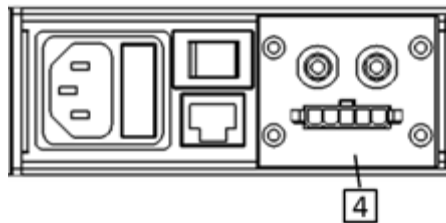


Fig. 3-20: Internal Power with STs and Molex Connectors

- **4 - STs Connector with Molex for Camera power**
- Internal Power with SMPTE 304M Connector

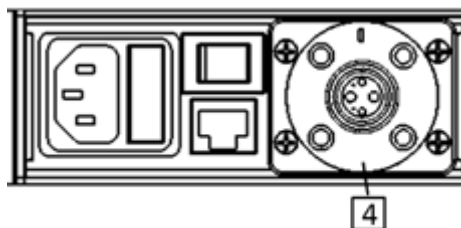


Fig. 3-21: Internal Power with SMPTE 304M Connector

- **4 - SMPTE 304M Connector**

Area B - Video/Ethernet Connectors

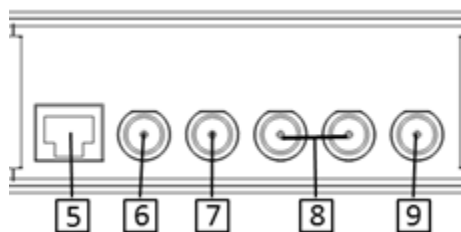


Fig. 3-22: Video/Ethernet Connectors

- 5 - Ethernet connector - 10BaseT/100BaseT
- 6 - VBS Output from Camera
- 7 - VBS Return Video source Input to Camera
- 8 - HD/SDI Program from Camera Unit outputs 1-2
- 9 - SDI Return Video source Input to Camera

Area C - Audio/Intercom Connectors

The CopperHead 3050 Base Station can be configured with one of three different Intercom Options:

- Four Wire Intercome Module (see [Four Wire Intercom Module](#) on page 27)
- RTS TW Intercom Module (see [RTS TW Intercom Module](#) on page 28)
- Clear-Com Intercom Module(see [Clear-Com Intercom Module](#) on page 28)

The connection and practical use of each of these options is covered in [Connection of the System](#) on page 35. Multi-pin connector wiring is covered in [Multi-Pin Connectors: Suggested Wiring](#) on page 72.

Four Wire Intercom Module

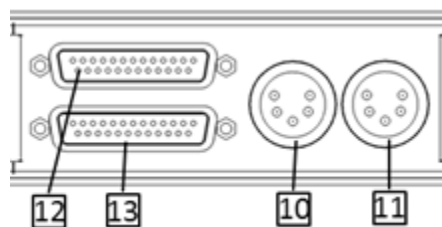


Fig. 3-23: Four Wire Intercom Module

- 10 - Ch-1 Intercom connector
- 11 - Ch-2 Intercom connector
- 12 - Audio In Multi-pin connector
- 13 - Audio Out Multi-pin connector

RTS TW Intercom Module

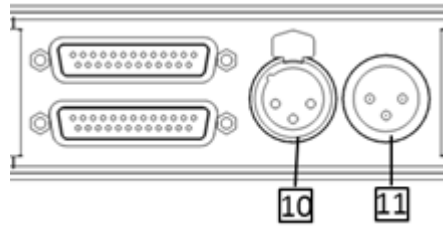


Fig. 3-24: RTS TW Intercom Module

- 10 - Intercom Input
- 11- Intercom Loop Through

Clear-Com Intercom Module

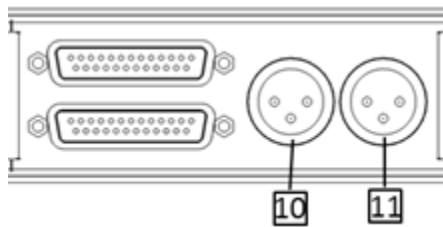


Fig. 3-25: Clear-Com Intercom Module

- 10 - Ch-A Intercom Connector
- 11 - Ch-B intercom Connector

Additional CopperHead 3050 Transceiver System Items

Your CopperHead 3050 Transceiver System may consist of one or more of the following items:

- Portable fiber reel with fiber per your purchase order
- Optional Universal Camera Control Unit (please refer to the User's guide supplied with this product)
- Optional "Power Wafer" Camera Adaptor
- Optional MPS External Power Wafer Power Supply
- Optional "PowerPlus" Camera Adaptor and Power Adaptor (please refer to the User's guide supplied with this product or refer to a Technical Bulletin available at <http://www.miranda.com/support>)
- Optional HDX Power Unit (please refer to the User's guide supplied with this product or refer to a Technical Bulletin available at <http://www.miranda.com/support>)

"Power Wafer" Camera Adaptor

The CopperHead 3050 Camera Unit can be powered by the optional "Power Wafer" Camera Adaptor. The Power Wafer replaces the local camera battery and any local AC power supply adaptor. The Power Wafer gets its power from the Hybrid fiber cable and the CopperHead 3050 Base Station equipped with the internal power supply or from the MPS external supply.

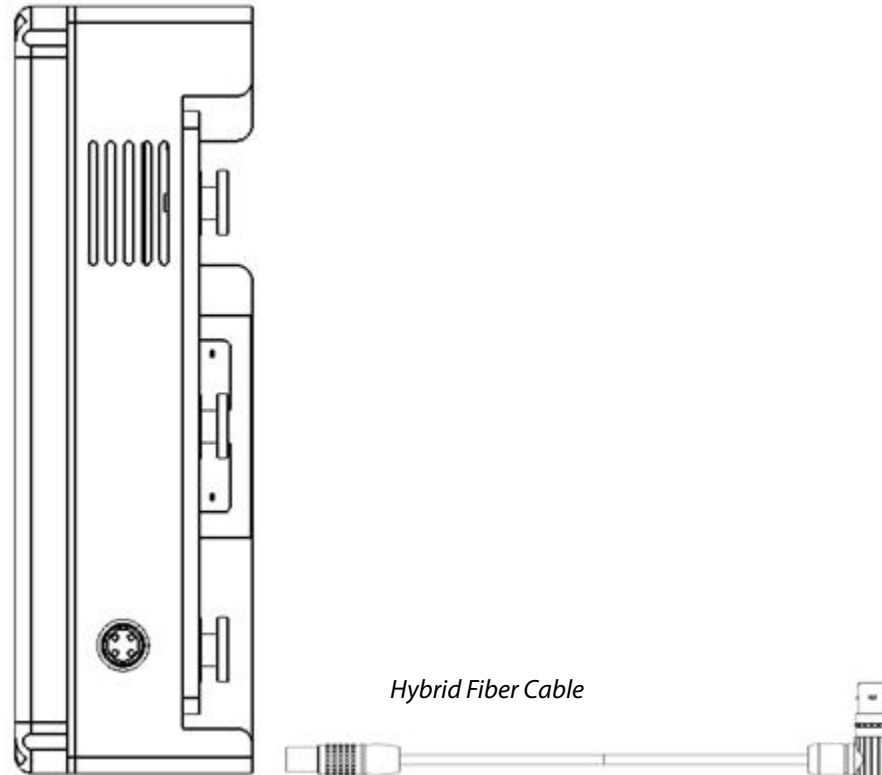


Fig. 3-26: Power Wafer and Hybrid Fiber Cable

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 the Camera Unit is powered directly from the 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 on [MPS External Power Wafer Power Supply](#) on page 30.

The Power Wafer replaces the battery or local battery mount AC adaptor ([Figure 3-26](#) displays the V-Mount Battery Mount option).

A short jumper cable carries power from the Camera Unit to the Power Wafer. The power comes to the camera on the power section of the Hybrid Fiber Cable.

MPS External Power Wafer Power Supply

The CopperHead MPS external power supply provides 95 watts of 12VDC power and fiber cable signal connectivity from the Base Station to the Camera. From the MPS unit to the camera can be configured using either a Hybrid OpticalCON connector or a SMPTE 304M connector. The length available is up to 780 feet or 240 meters.

From the MPS unit to the Base Station can be configured using a non-hybrid OpticalCON connector or two ST connectors. The length available is up to 5 kilometers (3 miles).

The MPS is powered locally with standard AC power. The unit is free standing.

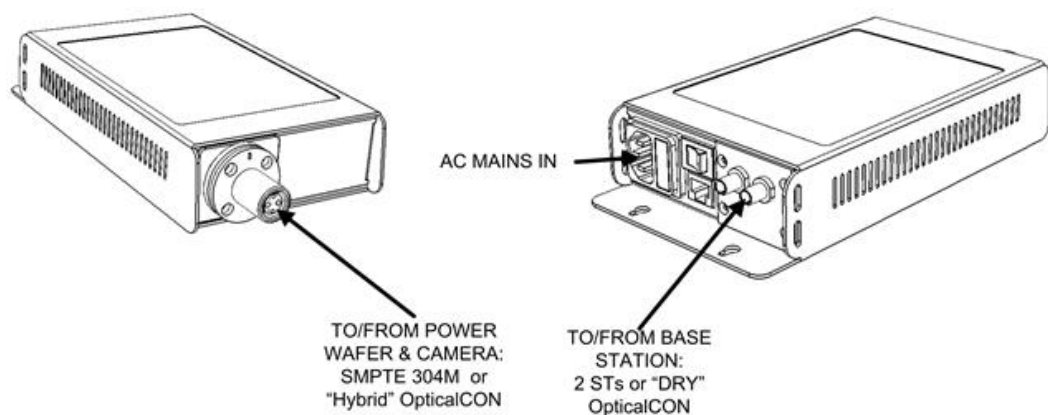


Fig. 3-27: MPS External Power Wafer Power Supply

All MPS Units require the Power Wafer to provide power to the Camera Unit. Four variations are available with a different set of fiber cable connectors. All MPS units provide 95 watts of 12VDC power.

Part Number	Fiber Connection to Camera	Fiber Connection to Base Station
CH2-MPS-95VD-2ST-NEU	OpticalCON	2 STs
CH2-MPS-95VD-2ST-304	SMPTE 304M	2 STs
CH2-MPS-95VD-NEU-NEU	OpticalCON (with power)	OpticalCON (no power)
CH2-MPS-95VD-NEU-304	SMPTE 304 (with power)	OpticalCON (no power)

4 Physical Installation

This chapter describes the physical installation of the CopperHead 3050 Transceiver System.

<i>Mounting the CopperHead 3050 Camera Unit to the Camera</i>	32
<i>Mounting the Power Wafer Unit</i>	33
<i>Relocation of the CopperHead 3050 Base Station Fiber connector</i>	34

Mounting the CopperHead 3050 Camera Unit to the Camera

This example illustrates the mounting of an Anton-Bauer battery mount system, but your system may differ. This case illustrates a configuration where the camera is powered locally at the camera position either by battery or by a local power source. This assumes a tactical fiber connection with no hybrid power on the cable.

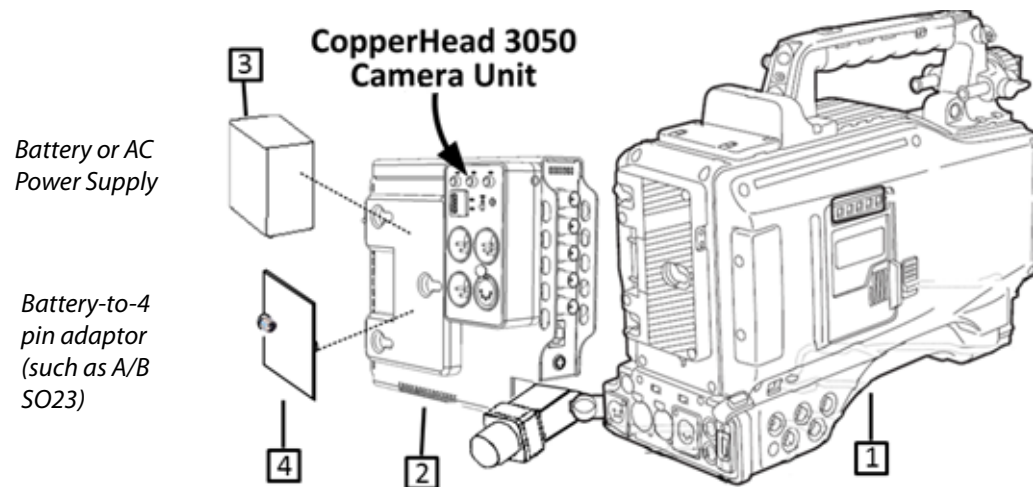


Fig. 4-1: Mounting the CopperHead 3050 Camera Unit to the Camera

- Position your camera (1) so that you can easily access the battery mounting plate at the rear of the camera. Ensure that the camera is well supported and stable. If a battery is mounted, remove it and put it to one side.
- Attach the CopperHead 3050 Camera Unit (2) to the camera battery mounting plate. The mounting is mechanically identical to attaching a battery. For instructions on how to attach the required cables between the camera and the 3050 Camera Unit, see [Connections to the CopperHead 3050 Camera Unit](#) on page 43.
- If you are powering the camera and 3050 Camera Unit by battery, mount the battery (3) to the CopperHead 3050 Camera Unit battery mounting plate (2) exactly as you would mount the battery to your camera.
- If you are powering the camera and 3050 Camera Unit by local power supply, mount the power supply (4-Pin) adaptor plate (4) to the CopperHead 3050 Camera Unit battery mounting plate (2) exactly as you would mount a battery to your camera. You will supply the external local power supply.

For configuration please see [Connection of the System](#) on page 35.

Mounting the Power Wafer Unit

This example illustrates the use of a camera with an Anton-Bauer battery mount system, but your system may differ. This case illustrates a configuration where the camera is powered through the Power Wafer option. The Power Wafer is powered through a Hybrid fiber cable, which is powered from the CopperHead 3050 Base Station or MPS External Power Supply.

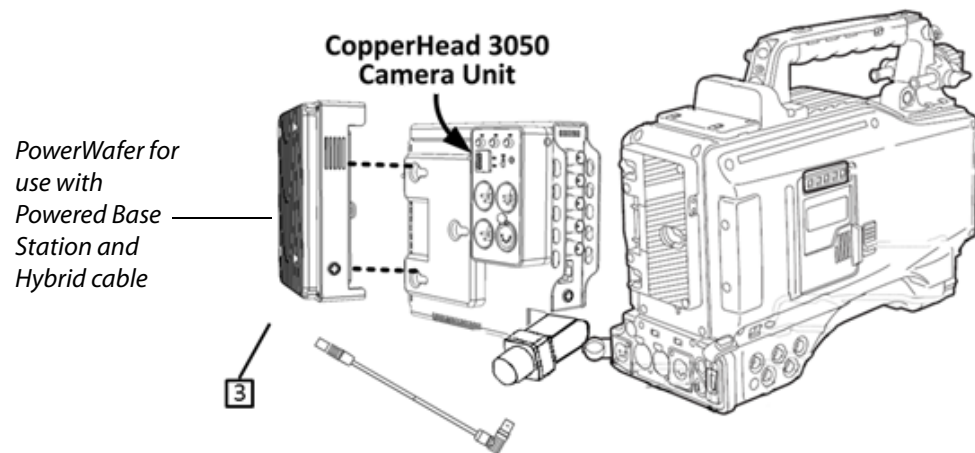


Fig. 4-2: Mounting the Power Wafer Unit to the CopperHead 3050 Camera Unit

- The CopperHead 3050 Camera Unit is mounted to the camera as described [Mounting the CopperHead 3050 Camera Unit to the Camera](#) on page 32.
- The Power Wafer (3) is attached to the CopperHead 3050 Camera Unit in place of the battery. It is attached in the same manner as the camera battery.
- When the Power Wafer is securely mounted to the CopperHead 3050 Camera Unit you must connect the supplied Power Wafer connector cable between the Power Wafer (1) and the Power Wafer connector on the Camera Unit (15).

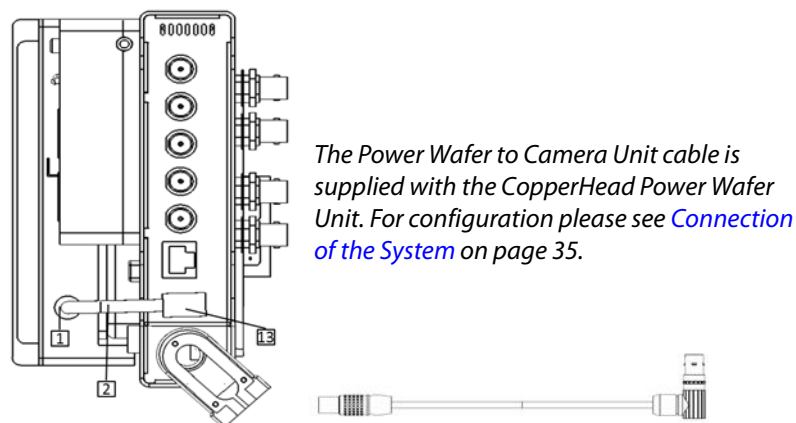


Fig. 4-3: Power Wafer to Camera Unit cable

Relocation of the CopperHead 3050 Base Station Fiber connector

The CopperHead 3050 Base Station may be configured with the Fiber Connector mounted either on the back or the front of the Base Station. You may order your Base Station in either configuration and it is possible to relocate the Fiber Connector from one position to the other in the field.

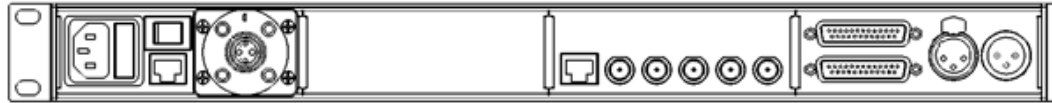


Fig. 4-4: CopperHead 3050 Base Station with Rear Mounted Fiber Connector



Fig. 4-5: CopperHead 3050 Base Station with Front Mounted Fiber Connector

The Fiber Connector relocation process can be completed by a qualified Grass Valley Fiber technician in about 15 minutes or less. If you perform this task yourself, you should budget about one hour.

For a complete illustrated step-by-step procedure, go to <http://www.miranda.com/support> and click on the *CopperHead 3050 Technical Notes* link or Grass Valley support directly.

5 Connection of the System

Prior to connecting your CopperHead 3050 Transceiver System please ensure that each of the required cables is available for use. This includes standard video, audio and data cables as well as custom multi-pin cable sets required for your particular installation.

Please see the [Available Accessories](#) on page 76 for information regarding cables, signals, and custom multi-pin cable fabrication.

<i>Connections between the Base Station and the Camera Unit</i>	36
<i>Connections to the CopperHead 3050 Base Station</i>	40
<i>Connections to the CopperHead 3050 Camera Unit</i>	43
<i>Camera Unit Connection Example</i>	45

Connections between the Base Station and the Camera Unit

The following table summarizes the various Fiber Cable connection options between the CopperHead 3050 Transceiver System Base Station and the Camera Unit.

Cable Type	Base Station Power	Camera Unit Power	Distance Range Between Camera and Base
Tactical Fiber	Internal	Local Battery or AC Power	Up to 10 KM (This range can be extended to greater than 20 KM through use of the optional High Power Laser - must be ordered at time of purchase)
SMPTE Hybrid Fiber	Internal	Power Wafer Camera Adaptor	240 meters
SMPTE Hybrid Fiber	External – Wafer Power Supply 95 Watts ¹	Power Wafer Camera 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	CopperHead PowerPlus Camera Adaptor	5 KM between base and power supply 3.2 KM between power supply and camera

- The external Wafer Power Supply must be equipped with the required Fiber Cable connectors depending on your system requirements.
- The external HDX Power Supply provides two ST Fiber Connectors for connection between the HDX and the Base Station and a SMPTE 304M Connector for connection between the HDX and the Camera Unit.

The following fiber connection scenarios do not take into account any customized cable and connector installations you may have at your facility. For assistance regarding more complex connection situations, contact Grass Valley, a Belden Brand (see [Contact Us](#) on page 65) or your local authorized dealer.

Camera Powered: Tactical Fiber between Base Station and Camera Unit

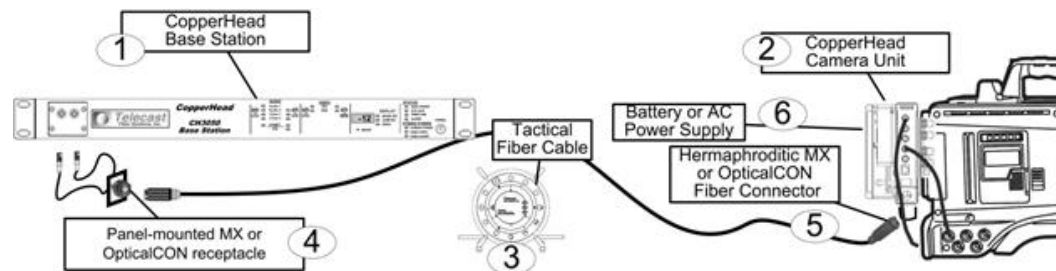


Fig. 5-1: Tactical Fiber between the Base Station and Camera Unit

Between the Base Station (1) the Camera Unit (2), connect a length of Tactical Fiber Cable (3). At each end of the fiber cable, there is either an OpticalCON (4) or MX Fiber Connector (5).

The Base Station connector (4) may be mounted either on the front or back of the Base Station. The camera must be powered by local power, either a Battery or a local AC Power Supply (6).

Note: Your configuration may have the OpticalCON or MX Fiber Connector directly mounted on the Base Station Chassis.

PowerWafer Scenarios #1 and #2

- **PowerWafer Scenario #1:** Hybrid Fiber direct between Powered Base Station and Camera Unit on page 37
- **PowerWafer Scenario #2:** Infrastrucure Copper & Fiber between Powered Base Station and Camera Unit on page 37

Hybrid Fiber direct between Powered Base Station and Camera Unit

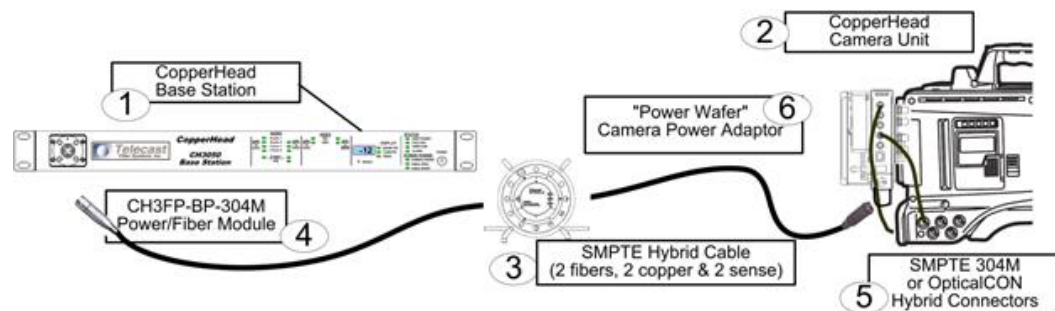


Fig. 5-2: SMPTE Hybrid Fiber between the Base Station (powered) and Camera Unit

Between the Base Station (1) and the Camera Unit (2) connect a length of SMPTE Hybrid Fiber Cable (3). At each end of the fiber cable, there is either an OpticalCON or SMPTE 304M Connector (4) and (5).

The Base Station connector (4) may be mounted either on the front or back of the Base Station. The camera will be powered by the CopperHead Power Wafer Camera Power Supply (6).

Infrastrucure Copper & Fiber between Powered Base Station and Camera Unit

Infrastructure Wiring Built-In to a Facility using OpticalCON Connectors

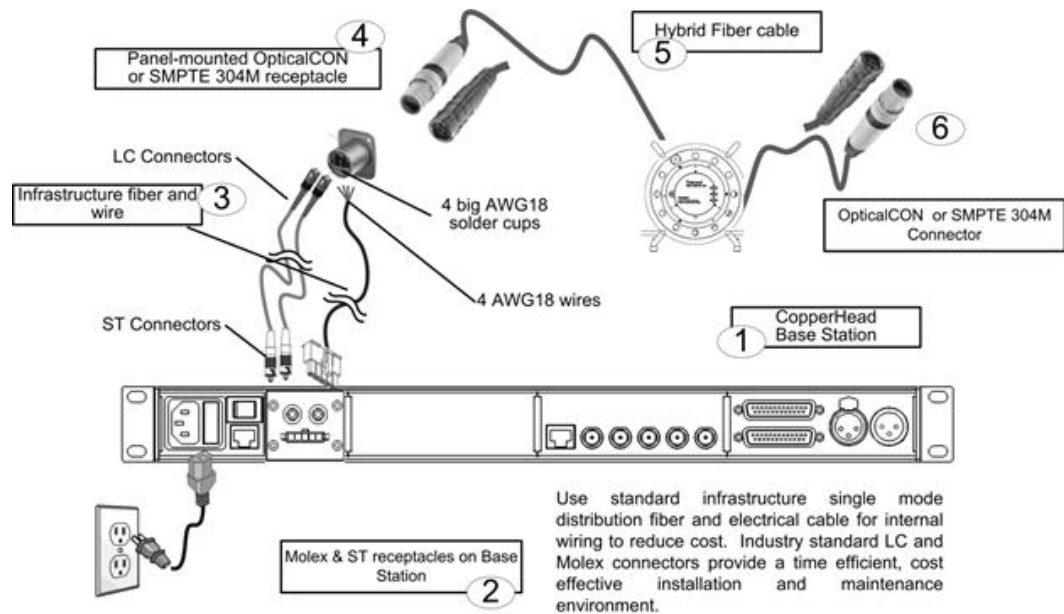


Fig. 5-3: SMPTE Hybrid Fiber between Base Station and Camera Unit (Infrastructure Wiring)

Panel mounted fiber connectors can be used for permanent installations such as communications closets, truck connector panels, and sports facilities. A panel mounted OpticalCON or SMPTE 304M receptacle (4) is connected to the Base Station (1) through infrastructure grade wiring. Two LC Fiber Optic connectors and four soldered AWG18 copper power wires (3) connect to the Base Station through a Molex and ST receptacle (2). Between the panel mounted receptacle and the Camera Unit is standard Hybrid Fiber Optic cable (5). This cable is matched to the panel mounted receptacle with either an OpticalCON or SMPTE 304M connector (4) to (6).

SMPTE Hybrid Fiber between the MPS Power Unit and Camera Unit

ST Fiber Connectors between Base Station and External Power Unit Camera powered by Power Wafer.

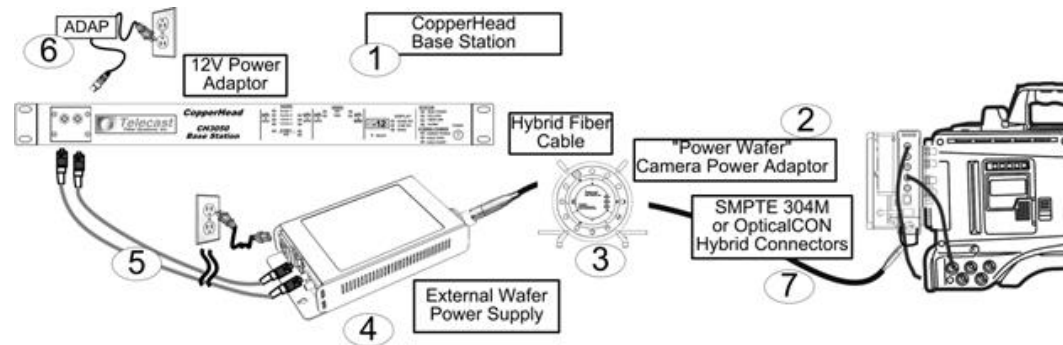


Fig. 5-4: SMPTE Hybrid Fiber between the MPS Power Unit and Camera Unit

Between the Base Station (1) and the External Wafer Power Supply (4), connect a pair of ST Fiber Cables (5).

Power the External Wafer Power Supply locally by connecting to AC Power. Between the External Wafer Power Supply (4) and the Camera Unit, connect a length of SMPTE Hybrid Fiber Cable (3). At each end of the fiber cable, there will be either an OpticalCON or SMPTE 304M Connector (7).

The Base Station connector (1) may be mounted either on the front or back of the Base Station. The camera will be powered by the CopperHead Power Wafer Camera Power Supply (2).

The Base Station will be powered by connection to local AC power (6).

Connections to the CopperHead 3050 Base Station

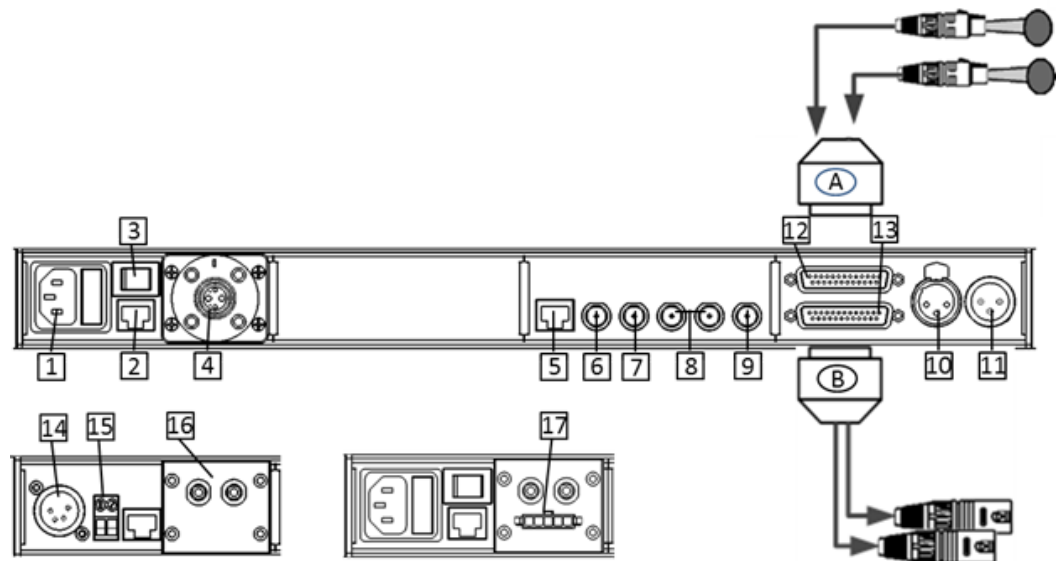


Fig. 5-5: CopperHead 3050 Base Unit Connections

Multi-pin cable assemblies used with the CopperHead 3050 Base Station:

- **A - Audio In Connector:** Connect Intercom Program Audio and IFB Intercom Audio (see [Base Station 25-Pin Audio Input Cable](#) on page 73).
- **B - Audio Out Connector:** Carries audio back from the camera location - connect to an audio processing chain or monitors (see [Base Station 25-Pin Audio Output Cable](#) on page 74).

Connectors into and out of the CopperHead 3050 Base Station

This information duplicates some of that from above sections. It is presented here to provide a single list of all Base Station connections. Key numbers refer to the diagram above and to the Overview Diagram found in [Diagrams](#) on page 82.

Diagram #	Description
1 & 14	Power In Connect a standard 12V DC ADAP power source (4 Pin) or a standard 3 conductor AC Cable (IEC Plug) 100-240V 50/60 Hz
4	Fiber Connector This connector can be mounted on the Base Station Front Panel (see Relocation of the CopperHead 3050 Base Station Fiber connector on page 34). Connect the fiber connector from either the Fiber Cable connected directly to the camera or from the external power unit designated for your system. The type of Fiber Connector will vary depending on your system configuration.

Diagram #	Description
5	<p>Ethernet Connector – 10Bt/100Bt capable</p> <p>Designed to carry IP traffic data between the Base Station and the Camera Unit. A laptop PC or other device such as a Wireless Access Point can be connected to the Production Environment IP network.</p>
6	<p>VBS Out</p> <p>BNC Connector -Typically used for SD Monitoring Video return from the Camera</p>
7	<p>VBS In</p> <p>BNC Connector – Typically used to send SD return video to the camera – an example is monitor out from the Production Switcher</p>
8	<p>SDI Out 1 & 2 (this carries the HD feed from the camera)</p> <p>BNC Connectors – Two identical video feeds from the camera – typically one may be used for local HD monitoring and one is fed to the Production Switcher environment.</p>
9	<p>SDI In</p> <p>BNC Connector – Typically used to send HD return video to the camera – an example is program out from the Production Switcher</p>
10 & 11	<p>Intercom Connectors #1 & #2</p> <p>XLR 3 pin or 5 pin Connector depending on configuration. One of three options will be installed (4-wire intercom, RTS or Clear-Com).</p>
12	<p>Audio In- Multi-Pin Connector</p> <p>DB25 – 25 pin Connector follows the Tascam TDIF standard. The CopperHead 3050 Transceiver System accommodates up to two Audio Channels at Line Level. This connector handles return audio to the Camera location as well as intercom Program Audio. See Multi-Pin Connectors: Suggested Wiring on page 72.</p>
13	<p>Audio Out- Multi-Pin Connector</p> <p>DB25 – 25 pin Connector follows the Tascam TDIF standard. The CopperHead 3050 Transceiver System accommodates up to two Audio Channels at Line Level. This connector handles Program audio from the Camera location. See Multi-Pin Connectors: Suggested Wiring on page 72 for sample wiring.</p>
15	<p>12V Terminal Block</p> <p>Terminal Block – bare wire connector. This can be used in place of the ADAP power connection in installations that have 12V power distributed as part of their infrastructure. Do not use this at the same time as the ADAP power connection.</p>

Connection of the System

Connectors into and out of the CopperHead 3050 Base Station

Diagram #	Description
16	ST Fiber Connectors (used in place of connector 4) Two ST Connector receptacles – Used as the Fiber Optic connection typically when infrastructure wire or with one of the two external power supply option (MPS or HDX Power Adaptors)
17	Molex Power Connectors (used in place of 4 and only if so configured with ST Fiber Connectors) Five Conductor Molex Connectors provide power to the Hybrid Fiber Optic Cable. Typically installed with infrastructure wiring with cable leading from Molex connector to a panel mounted OpticalCON receptacle.

Connections to the CopperHead 3050 Camera Unit

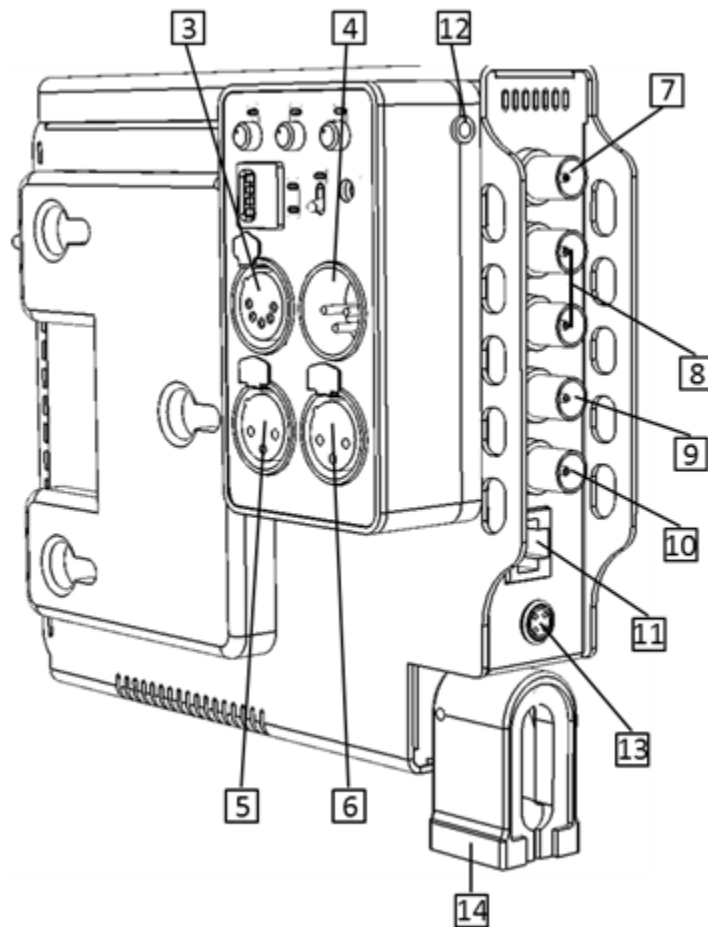


Fig. 5-6: CopperHead 3050 Camera Unit Back Side Connections

This information duplicates some of that from above sections. It is presented here to provide a single list of all Camera Unit connections. Key numbers refer to the diagram above and to the Overview Diagram found in [Diagrams](#) on page 82.

Diagram #	Description
3	Intercom Headset Out XLR 5 Pin Female Connector – Provides two channels of two-way intercom and the Intercom Program audio feed
4	IFB Signal Out XLR 3 Pin Male Connector – Provides IFB Audio Out from Base Station. Typically connected to an IFB audio belt unit for IFB feed to talent.
5	Audio 1 Input XLR 3 Pin Female Connector – Line level audio input. Typically fed by a short audio jumper cable from the Camera Audio 1 output

Connection of the System

Connections to the CopperHead 3050 Camera Unit

Diagram #	Description
6	Audio 2 Input XLR 3 Pin Female Connector – Line level audio input. Typically fed by a short audio jumper cable from the Camera Audio 2 output
7	HD-SD/SDI Input BNC Connector – Carries camera video from the Camera to the Camera Unit. This requires a short BNC jumper cable between the Camera Unit and the Camera.
8	HD-SD/SDI Outputs #1 & #2 BNC Connector – Carries return video from the Base Station to the Camera Unit. Typically this will feed a camera viewfinder or an HD viewing monitor at the camera location.
9	VBS In BNC Connector – Carries SD Analog video from the Camera to the Camera Unit. This requires a short BNC jumper cable between the Camera Unit and the Camera. Can be used to provide technical monitoring from camera as with superimposed camera menus and other information.
10	VBS Out BNC Connector – Carries SD Analog video from the Base Station the Camera Unit. Typically this will feed an analog viewing monitor at the camera location.
11	Ethernet Out RJ45 Connector – Carries IP Data. Typically connects to a Laptop computer or perhaps a wireless access point at the camera location. Any IP traffic controlled equipment can be handled through this signal path.
12	Intercom Headset Connector Mini-phone Jack – Provides listen only Intercom audio.
13	Power Wafer Connector Multi-Pin Connector C – Supplies power to the Camera Unit from the Power Wafer (if so configured). This cable is supplied with the Power Wafer Power Adaptor.
14	Fiber Connector Swivel Mounted Fiber Optic Cable receptacle – specific connector depends on your configuration.

Camera Unit Connection Example

Your CopperHead 3050 Camera Unit and your camera will look something like this once you have connected the various signal paths. Each camera setup will be different depending on your model.

See the following section for an overview of Camera Unit to Camera & Peripheral Equipment connections.

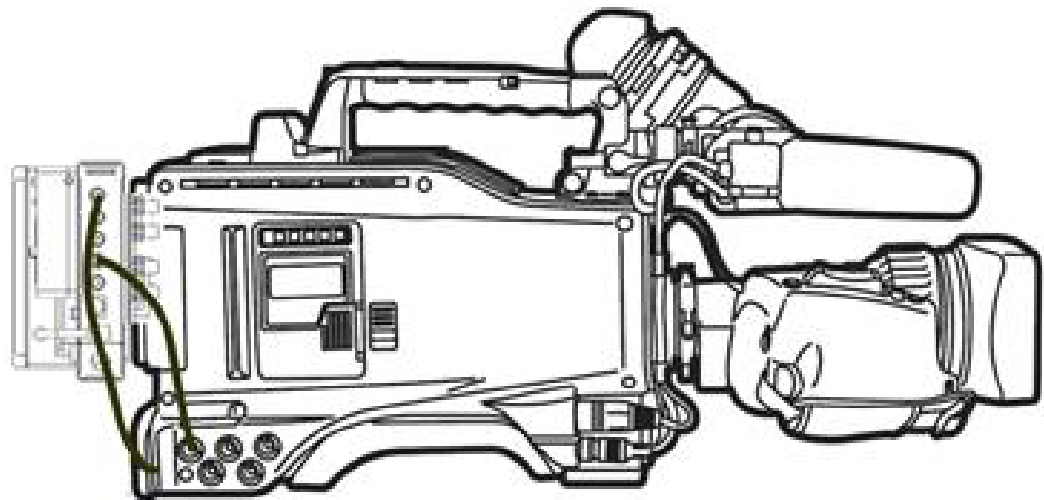


Fig. 5-7: Camera Unit (Power Adaptor or Battery Facing Side) to Camera Connections

Camera Unit Video Connections

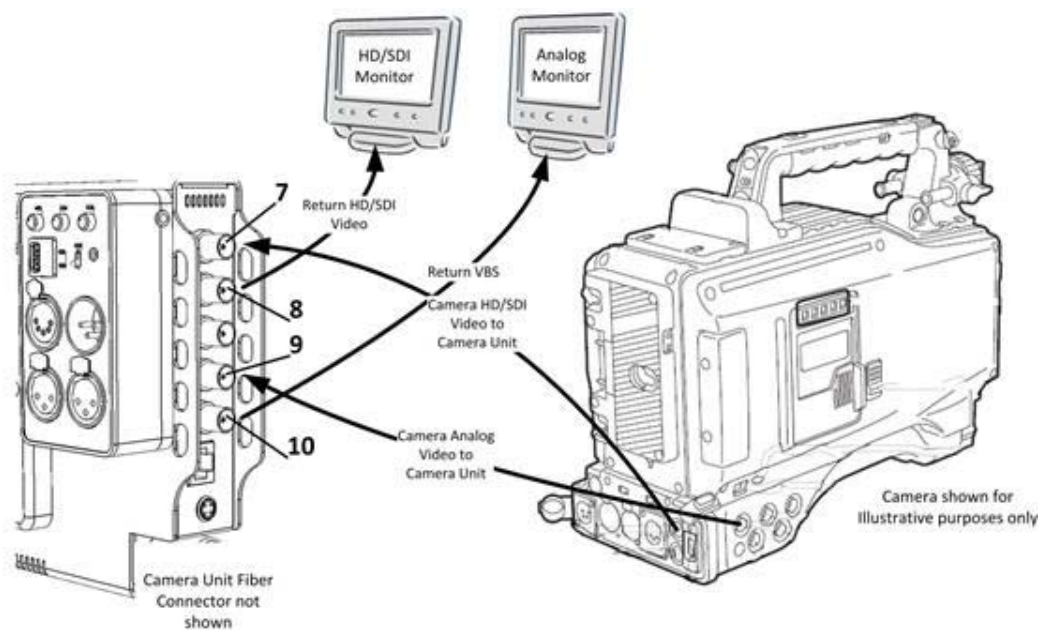


Fig. 5-8: Camera Unit Video Connections

Camera Unit Audio and Intercom Connections

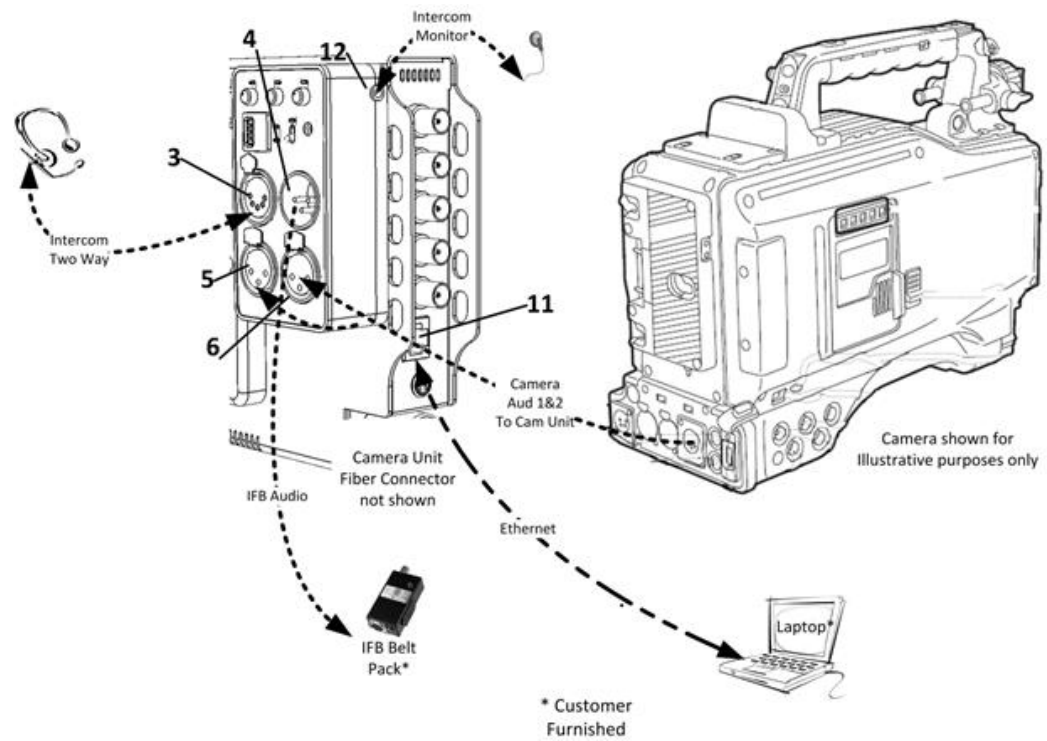


Fig. 5-9: Camera Unit Audio and Data/Control Connections

6 Operation of the System

This chapter describes in detail the operation of CopperHead 3050 Transceiver System. Please keep in mind that a wide variety of options and variations are available in using this product and so not every possible operational environment can be described.

Variations in camera type, battery and powering, fiber cable connections, and intercom allow for an enormous number of slightly different operational modes.

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Set Up of the CopperHead 3050 Transceiver System for operation

This section explains how to setup the CopperHead 3050 Transceiver System for operation. It is important that you do an initial setup and test your CopperHead 3050 Transceiver System as soon as you receive in order to confirm proper operation. You also need to provide training prior to an actual production.

Use the following list of items as an overall checklist for setup.

- It is **highly recommended** that you do not attempt to power up the system until all connections are made and in particular the Fiber Optic Cable has been connected at both ends. If you need to power up either the CopperHead 3050 Base Station or Camera Unit, make sure that the Fiber Connectors are securely capped. This will protect them from damage or dirt and protect you from eye damage.
- If it is the first time setting up the CopperHead 3050 Base Station, or your setup is not permanent (in a remote truck, stadium control room or similar), connect all required cables according to [Connections to the CopperHead 3050 Base Station](#) on page 40. The order in which you connect the cables makes no difference.
 - Make sure to connect the Camera Remote Control cable to the Base Station and Remote Control Panel when the Base Station power is turned off.
 - Keep Fiber Optic cable connectors capped until actually connecting the Fiber Cable.
- When setting up the CopperHead 3050 Camera Unit and associated Camera, you must do the following:
 - If your unit is so configured, setup the external power supply as required. For the MPS power supply used with the CopperHead 3050 Power Wafer, see [MPS External Power Wafer Power Supply](#) on page 30. Make sure all cables running between the CopperHead 3050 Base Station and the Power Supply and local AC power cords are properly managed and secured.
 - Mount the Camera and CopperHead 3050 Camera Unit (see [Mounting the CopperHead 3050 Camera Unit to the Camera](#) on page 32).
 - Connect all required cables according to [Connections to the CopperHead 3050 Camera Unit](#) on page 43. The order in which you connect the cables makes no difference.
 - Set up the Intercom Talk Back switches and level controls as desired (see [Understanding Intercom Usage with the CopperHead 3050](#) on page 50).
- Deploy the Fiber Cable.

You should 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 65).
- You are now ready to Power Up the system (see [Powering the System](#) on page 49).

Powering the System

The CopperHead 3050 Transceiver System Base Station and the CopperHead 3050 Transceiver System Camera Unit each have a power up routine which tests the equipment and performs a system diagnostic.

To power the CopperHead 3050 Transceiver System Base Station:

- 1 Turn on the Base Station Power Mains Switch located at the rear left (when facing the back of the Base Station-- #3 on the overall diagram, see [Base Station Connectors](#) on page 67). This switch is only on Base Station units with internal power. The front panel power light will come on and be Red until the next step.
- 2 Turn on the Front Panel Power Switch located at the front right(#15 on the overall diagram -- see [Base Station Connectors](#) on page 67). The power monitor indicator turns from Red to Green.
- 3 The four-character display indicates TEST and all front panel LEDs turn, Red, then Green, then orange, then off.
- 4 The LED color test is followed by REV and the revision of the display microcontroller firmware.
- 5 The REV indication is followed by **miranda.com** scrolling across the four-character display.
If there's no scrolling, please contact Grass Valley, a Belden Brand support for assistance (see [Contact Us](#) on page 65).
- 6 The scroll is followed by a three-second pause which synchronizes all the microcontrollers in the Base Station.
- 7 The front panel will cycle through the diagnostics displays (see [Using Digital Displays](#) on page 54).
- 8 After the three-second pause, all the front panel displays update with current status. If the Camera Unit is not powered on the camera related status lights will show Red.

To power the CopperHead 3050 Transceiver System Camera Unit:

- 1 Turn on the Camera Unit Power Switch.
- 2 Turn on the Camera Power and also any peripheral equipment connected to the camera or the CopperHead 3050 Transceiver System Camera Unit such as monitors and microphones.
- 3 On Power-On, the four-character display indicates the current Revision Version (REVA). Your unit will display the current Revision Version, followed by the Fiber Link strength (a typical display for Fiber Link strength is -8 to -13 which indicates Fiber link strength of from -8 to -13 dBm).

Both the Camera Unit and the Base Station have a digital display selector button which allows multiple functions for the digital display. These functions are described in [Measuring Fiber Optic Signal Strength](#) on page 54.

Understanding Intercom Usage with the CopperHead 3050

The CopperHead 3050 Transceiver System is delivered pre-configured with one of three intercom options:

- Standard Four Wire Intercom
- Clear-Com Intercom
- RTS intercom

Wiring for each of these options is described in [Multi-Pin Connectors: Suggested Wiring](#) on page 72.

The operation of your specific intercom system is beyond the scope of this User's Guide. Please see the documentation provided with your intercom or consult your intercom provider.

User settings for the Intercom system occur on the CopperHead 3050 Camera Unit at the top of the Audio Interface box on the back (not camera facing) side of the Camera Unit. Please see the [Diagrams](#) on page 82 - Reference Numbers 9-15.

This Audio Interface box provides the following functionality:

- Volume control through the Intercom headsets for two Intercom channels and for Program audio carried on the Intercom line.
- Side Tone setting control. Side tone is the volume of your voice heard on your local intercom headset. It does not affect how others on the intercom line hear you.
- LEDs provide activity monitoring of traffic on the two Intercom channels and Program audio. These are activity only monitors and do not represent audio levels.

In addition to the Intercom controls, a 4-switch panel allows adjustment of various Audio Input and IFB settings.

Note: The CopperHead 3050 Camera Unit acts as the last component of any intercom beltpack chain. An Intercom beltpack cannot be plugged into the CopperHead 3050 Camera Unit. Only an intercom headset can be plugged into the Camera Unit.

CopperHead 3050 Camera Unit Intercom Operation

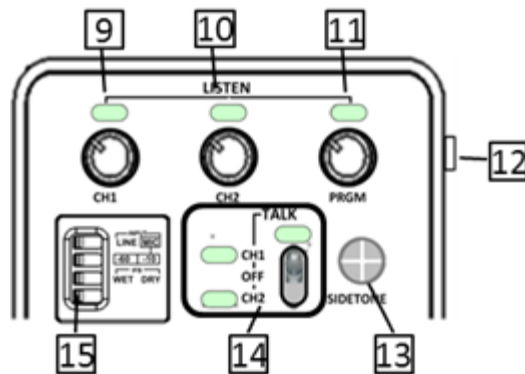


Fig. 6-1: Audio Interface Box Detail (Camera Unit)

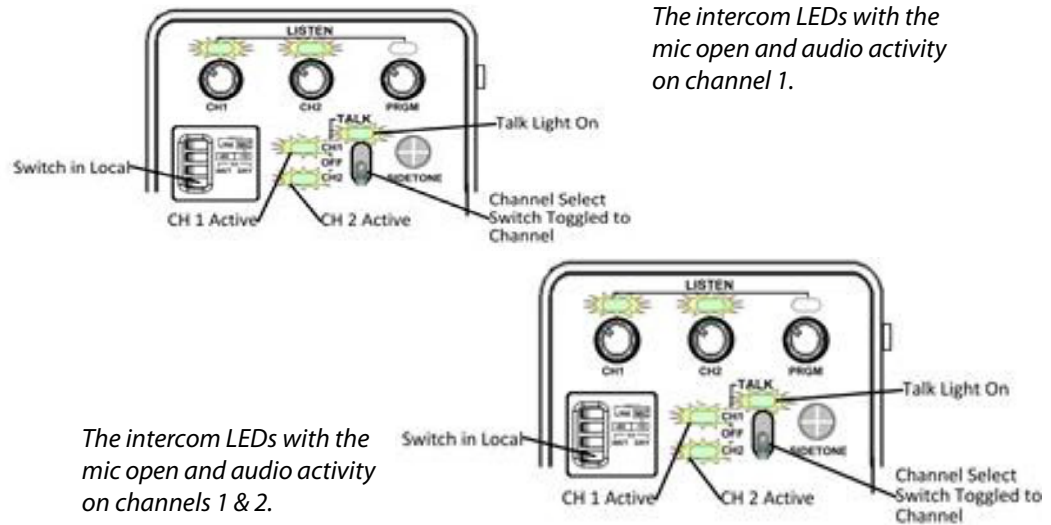
- **LISTEN:**

To set listening level for an intercom channel or the PROGRAM Audio, adjust the desired LISTEN control knobs at the top of the Audio Interface box (Figure 6-1: #14, 15, 16). The LISTEN indicator LEDs indicate activity on the Intercom channel(s) and the Program audio feed. These LEDs illuminate even if your LISTEN control knobs are turned down.

- **TALK:**

The Intercom TALK toggle switch (Figure 6-1, #18) opens the headset microphone onto Intercom Channel 1, Channel 2, or both channels. This switch does not control which Intercom audio channel is heard in the headset.

- **Momentary Mode:** To activate the headset mic, press and hold the TALK toggle switch (#18) up (for Channel 1) or down (for Channel 2). The corresponding Green talk LED will remain lit while the TALK switch is held. The microphone is turned off when the TALK switch is released and the TALK indicator turns off.
- **Latching Mode** (for Hands-free Conversation): Press the TALK toggle switch quickly, up (for Channel 1) or down (for Channel 2). The mic will turn on and remain on, as will the corresponding Green TALK LED. To turn the mic off, push the TALK toggle switch again quickly in the same direction (up or down). The talk indicator will also turn off.



The intercom LEDs with the mic open and audio activity on channel 1.

The intercom LEDs with the mic open and audio activity on channels 1 & 2.

Fig. 6-2: Local Activation of Channel 1 Talk Back and Both Intercom Channels

The middle position allows both channels to remain in the OFF position.

Adjusting Intercom Sidetone



Fig. 6-3: Setting Intercom Side Tone

The intercom SIDE TONE adjustment controls the level of your own voice that you hear locally in your headset. It does not affect how others on the intercom circuit hear you. With the TALK control activated on CH1 and/or CH2, use a "Tweaker" type screwdriver to adjust the Side Tone Level until you are comfortable with the level of your own voice in your headset.

CopperHead 3050 Camera Unit Audio/Intercom/IFB 4-Switch Panel

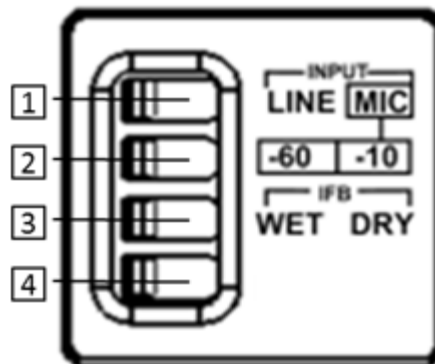


Fig. 6-4: Audio/Intercom/IFB switch panel

1 Audio Input LINE/MIC Switch

- Left position sets audio inputs to line level (+4dB)
- Right position switches audio inputs to MIC level and enables Switch #2

2 MIC Input Level Switch

- Left position sets MIC input level to -60dB
- Right position sets MIC input level to -10dB

3 IFB WET/DRY Switch

- Left position sets IFB output XLR3M connector to Powered ("Wet"), which will provide power to an IFB beltpack (or "talent amplifier) via the audio cable
- Right position sets IFB connector to Unpowered ("Dry")

4 For Future Use

Using Digital Displays

Measuring Fiber Optic Signal Strength

The decibel (dB) is a logarithmic unit of measurement that expresses the magnitude of a physical quantity (usually power or intensity) relative to a specified or implied reference level. Since it expresses a ratio of two quantities with the same unit, it is a dimensionless, relative unit. A decibel is one tenth of a bel, a seldom-used unit. Typically dB has been employed in Audio Measurement and Fiber Optics among many uses.

Proper measurement of signal strength requires an absolute measurement and the dBm provides this measurement. Since it is referenced to the milliwatt, it is an absolute unit, used when measuring absolute power. By comparison, the decibel (dB) is used for quantifying the ratio between two values, such as signal-to-noise ratio

The CopperHead 3050 Transceiver System operates within a defined range of Fiber Optic Link signal strength. The minimum recommended signal strength is -22 dBm or better. Typically the system should operate at levels between -8 dBm and -20 dBm. The standard CopperHead 3050 laser output strength is -6 dBm. Cable length affects signal strength as does the number of connections between the Camera Unit and the Base Station. For example, using a Power Supply such as the MPS or HDX produces a minimal signal loss through each connection.

The digital readouts on both the CopperHead 3050 Base Station and Camera Unit provide direct signal strength measurements in dBm. These readouts also provide a wide range of diagnostic information (below).

The CopperHead 3050 Base Station Digital Display

The Base Station digital display has three functions selected by the Display Mode Selector (see #14 on the diagram in [CopperHead 3050 Transceiver System Base Station Back Panel](#) on page 83). These functions are indicated by the Display Mode LEDs.

- **BASE RX** – Base Station Optical Power or Signal Strength that is being received at the Base Station. Displayed in units of –dBm. The acceptable range for operation is -7dBm down to -22dBm. *
- **CAM RX** – Optical Power or Signal Strength being received at the Camera Unit. Displayed in units of –dBm. The acceptable range for operation is -7dBm down to -22dBm. *
- **DIAG** – One of four diagnostics modes:
 - **TEMP** – displays operating temperature in degrees Centigrade of each circuit board that reports temperature
 - **POWR** – displays power level from monitored circuit boards
 - **REV** – displays microcontroller firmware version from each circuit board with a microcontroller
 - **CAM** – displays the error status reported by the Camera Unit

To select the different display modes, push the Display Mode Selector. The transition from one mode to another may take a moment with the transition into the Diagnostic mode taking slightly longer. The Selector is cyclical rotating through each of the modes. Once in

the Diagnostic mode, a quick push of the Selector cycles through the various diagnostic sub-modes described above.

The following table describes the expected readouts in each of the above Base Station display modes. By following the sequence, you can understand what the various readouts and four-character abbreviations mean for the system.

Display Mode	Readout	Base Station Digital Display Activity Explanation
(assumes after initial power up - see Page xx for a description of the Power Up sequence)		
BASE RX (Base Station Receive Signal Strength)		
BASE RX	-9	Indicates that the Base Station signal strength is -9 dBm
BASE RX	OPT	Indicates that the Display is showing Optical link signal strength
BASE RX	-9	Repeat of the Base Station signal strength
BASE RX	OPT	Repeat that the display is showing Optical link signal strength
		This display cycle repeats itself and depending on timing may start with either OPT of the strength measurement
CAM RX (Camera Unit Receive Signal Strength)		
CAM RX	COPT	Sequence starts with COPT to indicate camera optical signal strength
CAM RX	-9	Indicates that the signal strength from the Camera Unit is -13 dBm
CAM RX	OPT	Indicates that the Display is showing Optical link signal strength Note: the only way to distinguish between BASE RX and CAM RX is to check the Display Mode LED indicator
CAM RX	-9	Repeat of the Camera Unit signal strength
CAM RX	OPT	Repeat that the display is showing Optical link signal strength
		This display cycle repeats itself and depending on timing may start with either OPT of the strength measurement - COPT does not reappear in the repeating cycle
DIAGNOSTIC MODE Temperature (TEMP)		
DIAG		When first entering the Diagnostic mode the DIAG display mode indicator LED will blink - the first sub-mode is TEMP (Temperature). The Digital Display Characters will glow Green when the temperature is normal and Red when outside of normal range.
DIAG/TEMP	TEMP	Indicates the display is in the TEMP sub-mode
DIAG/TEMP	PS	The Power Supply (PS) temperature will be displayed
DIAG/TEMP	TEMP	Repeats that the display is in the TEMP sub-mode
DIAG/TEMP	37C	Temperature display in Centigrade for Power Supply circuit board
DIAG/TEMP	BASE	The Base Station main circuit board temperature will be displayed
DIAG/TEMP	TEMP	Repeats that the display is in the TEMP sub-mode

Display Mode	Readout	Base Station Digital Display Activity Explanation
DIAG/TEMP	47C	Temperature display in Centigrade for Base Station circuit board
DIAG/TEMP	PS	The Power Supply (PS) temperature will be again displayed
DIAG/TEMP	TEMP	Repeats that the display is in the TEMP sub-mode
DIAG/TEMP	36C	Temperature display in Centigrade for Power Supply circuit board Note: the PS temperature has dropped one degree
		This display cycle repeats until the Display Mode Selector is pushed
DIAGNOSTIC MODE Power Supply Voltage Status (POWER)		
DIAG/POWER		A quick push of the Display Mode Selector advances to the Power (POWER) diagnostic sub-mode. Digital Display Characters are Green when all power levels are normal and Red when any power level is outside normal level
DIAG/POWER	POWR	Indicates the display is in the POWER sub-mode
DIAG/POWER	BASE	Indicates that the Base Station main controller board is being measured
DIAG/POWER	POWER	Indicates the display is in the POWER sub-mode
DIAG/POWER	OK	Indicates that the item is in an OK State
DIAG/POWER	DISP	Indicates that the LED Display controller board is being measured
DIAG/POWER	POWER	Indicates the display is in the POWER sub-mode
DIAG/POWER	OK	Indicates that the item is in an OK State
DIAG/POWER	CHAR	Indicates that the Four-character controller board is being measured
DIAG/POWER	POWR	Indicates the display is in the POWER sub-mode
DIAG/POWER	OK	Indicates that the item is in an OK State
DIAG/POWER	AUD	Indicates that the Audio controller board is being measured
DIAG/POWER	POWR	Indicates the display is in the POWER sub-mode
DIAG/POWER	OK	Indicates that the item is in an OK State
DIAG/POWER	VBS	Indicates that the VBS (analog Video) controller board is being measured
DIAG/POWER	POWR	Indicates the display is in the POWER sub-mode
DIAG/POWER	OK	Indicates that the item is in an OK State
DIAG/POWER Exception		
DIAG/POWER	ERR	Instead of OK, the display will show ERR if a power level is outside of normal - ERR is followed by a Hexadecimal code. Please note the error code. A list of Hexadecimal codes is available in a Technical Bulletin at www.miranda.com .
DIAGNOSTIC MODE Microcontroller Board Revision Version (REV)		

Display Mode	Readout	Base Station Digital Display Activity Explanation
DIAG/REV		A quick push of the Display Mode Selector advances to the Power (POWR) diagnostic sub-mode. This sub-mode displays the microcontroller firmware revision of every board in the Base Station that has a microcontroller. Note: the REV versions noted here were current as of August 1, 2010. Your system may have different REV versions
DIAG/REV	REV	Initial display of REV after Display Mode Selector being advances
DIAG/REV	DISP	Indicates the Display microcontroller board is revision is being queried
DIAG/REV	REV	Indicates that sub-mode is REV
DIAG/REV	REVC	Indicates that the REV for the DISP board is REVC
DIAG/REV	VBS	Indicates the VBS microcontroller board is revision is being queried
DIAG/REV	REV	Indicates that sub-mode is REV
DIAG/REV	REVA	Indicates that the REV for the VBS board is REVA
DIAG/REV	BASE	Indicates the Base Station main microcontroller board is revision is being queried
DIAG/REV	REV	Indicates that sub-mode is REV
DIAG/REV	REVA	Indicates that the REV for the BASE board is REVA
DIAG/REV	AUD	Indicates the audio microcontroller board is revision is being queried
DIAG/REV	REV	Indicates that sub-mode is REV
DIAG/REV	REVA	Indicates that the REV for the AUD board is REVA
DIAG/REV	PS	Indicates the power supply microcontroller board is revision is being queried
DIAG/REV	REV	Indicates that sub-mode is REV
DIAG/REV	REVD	Indicates that the REV for the DISP board is REVD
		This display cycle repeats until the Display Mode Selector is pushed

DIAGNOSTIC MODE Camera Unit Error Status (CAM)

A quick push of the Display Mode Selector advances to the Camera Unit (CAM) diagnostic sub-mode. This mode displays the error status of the Camera Unit. The Digital Display Characters are Green if Camera Unit shows no error and Red if the Camera Unit does have an error. This is a high-level view of the Camera Unit error status. For further information go to the Camera Unit diagnostic display.

DIAG/CAM	CAM	Indicates that the sub-mode is CAM
DIAG/CAM	OK	Indicates that the Camera Unit is reporting No fault
DIAG/CAM	ERR	Indicates that the Camera Unit is reporting Some fault
		This display cycle repeats until the Display Mode Selector is pushed

The CopperHead 3050 Camera Unit Digital Display

The Camera Unit Digital Display has six functions selected by the BASE Rx/DIM Selector (#11 on the Overview Diagram). These functions are indicated only by the activity in the Digital Display.

- **COPT** – Camera Unit Optical Power or Signal Strength (Local OPTical) that is being generated at the Camera Unit and sent to the Base Station. Displayed in units of –dBm.
- **BOPT** – Base Power (Base OPTical) or Signal Strength generated by the Base Station as measured at the Camera Unit. Displayed in units of –dBm.
- **TEMP** – displays operating temperature in degrees Centigrade of each circuit board that reports temperature
- **POWR** – displays power level from monitored circuit boards
- **REV** – displays microcontroller firmware version from each circuit board with a microcontroller
- **LED Brightness** – Allows the adjustment of the brightness of the Camera Unit LED indicators

To select the different display modes push the BASE Rx/DIM Selector. The transition from one mode to another may take a moment with the transition into the LED Brightness mode taking slightly longer. The Selector is cyclical rotating through each of the modes.

The following table describes the sequence, abbreviations, and expected readouts in each of Camera Unit’s alpha-numeric display modes.

Readout	Camera Unit Digital Display Activity Explanation
(assumes after initial power up - see Page xx for a description of the Power Up sequence)	
COPT (Camera Unit Optical Signal Strength)	
-3	Indicates that the Base Station signal strength is -9 dBm
OPT	Indicates that the Display is showing Optical link signal strength
-13	Repeat of the Base Station signal strength
OPT	Repeat that the display is showing Optical link signal strength
	This display cycle repeats itself and depending on timing may start with either OPT of the strength measurement
BOPT (Base Station Signal Strength)	
A Quick push of the BASE Rx/DIM Selector advances to the BOPT mode	
BOPT	Sequence starts with BOPT to indicate base optical signal strength
BOPT	Indicates in the base optical signal strength cycle
-9	Indicates that the signal strength from the Base Station is -9 dBm
	This display cycle repeats itself and depending on timing may start with either OPT of the strength measurement - BOPT does not reappear in the repeating cycle
DIAGNOSTIC MODE Temperature (TEMP)	
A Quick push of the BASE Rx/DIM Selector advances to the TEMP mode	
TEMP	Sequence starts with TEMP to indicate the display mode is temperature
BASE	The main Camera Unit controller board temperature will be displayed - does not refer to Base Station

Readout	Camera Unit Digital Display Activity Explanation
TEMP	Repeats that the display is in the TEMP mode
61C	Temperature display in Centigrade for Camera Unit main circuit board

DIAGNOSTIC MODE Power (POWR)

A Quick push of the BASE Rx/DIM Selector advances to the POWR mode

LBUS	Indicates that the LBUS controller board is being measured
POWR	Indicates the display is in the POWER sub-mode
OK	Indicates that the item is in an OK State
UBUS	Indicates that the UBUS controller board is being measured
POWR	Indicates the display is in the POWER sub-mode
OK	Indicates that the item is in an OK State
OBOX	Indicates that the Audio Interface Box controller board is being measured
POWR	Indicates the display is in the POWER sub-mode
OK	Indicates that the item is in an OK State
BASE	Indicates that main Camera Unit controller board is being measured
POWR	Indicates the display is in the POWER sub-mode
OK	Indicates that the item is in an OK State

DIAGNOSTIC MODE Microcontroller Board Revision Version (REV)

A Quick push of the BASE Rx/DIM Selector advances to the REV mode. This mode displays the microcontroller firmware revision of every board in the Camera Unit that has a microcontroller.

Note: the REV versions is current as of August 1, 2010. Your system may have different REV versions

REV	Indicates that mode is REV
OBOX	Indicates the OBOX microcontroller board is revision is being queried
REVA	Indicates that the REV for the Audio Interface Box board is REVA
REV	Indicates that mode is REV
BASE	Indicates the BASE microcontroller board is revision is being queried
REVA	Indicates that the REV for the BASE Camera Unit controller board is REVA
REV	Indicates that mode is REV
UBUS	Indicates the UBUS microcontroller board is revision is being queried
REVA	Indicates that the REV for the UBUS board is REVA

The BASE Rx/DIM accesses the Camera Unit dimming function. To change the brightness of the Camera Unit LEDs, push and hold the BASE Rx/DIM selector (this may take a few moments). The dimming is cyclical - it will change from bright to dim, and then dim to bright).

Display	Description
<00>	Indicates maximum brightness with this readout
<-->	Indicates minimum brightness with this readout

Best Practices

- Take the possibility of Laser Eye damage seriously.
- Protect the Fiber Optic Cable and the Fiber Optic Connectors. **Always** keep these capped unless there are being connected.
- Once the system is set up and running, do not ignore the Optical Power Signal Strength Readouts at either the Camera or the Base Station. When the Alarm functions of the system are very good, so is the tolerance for optical Signal Strength reduction. By monitoring -dBm levels, you can take preventative action to stop a signal and possibly an On-Air or Recording loss. When the Signal Strength is no longer strong enough, the signal stops.
- If introducing new equipment (cameras, switchers, etc.) or new operators, be sure to do a test run with everything as it will be during the actual production.
- Be careful during System tear down to prevent damage to the equipment.

Shutting Down the System

When shutting down the system, take special care with the Fiber Cable and with the Camera Remote Control Panel Cable.

- 1 Camera Power and Camera Unit Power may be turned off at any time. If your system utilized Hybrid Power, these are the same.
- 2 To prevent looking directly into an active fiber optic port or cable, turn both the Camera Unit and the Base Station off before disconnecting the fiber from either point.
- 3 To prevent damaging the Camera or Camera Remote Control Panel, turn both the Camera Unit and the Base Station off before disconnecting the Control Cable from the Control Panel, the Base Station, the Camera Unit, or the Camera itself.
- 4 Protect all cables from dirt, water entry, and being dragged across the ground or other surfaces.
- 5 When re-spooling the cable, take your time to avoid cable snags, crimps, or damage to the connectors. Re-spool evenly across the reel.
- 6 If the Base Station is a permanent or semi-permanent installation, power off and disconnect and cap the Fiber Cable.

Troubleshooting

Troubleshooting any technical issues with the CopperHead 3050 Transceiver System is similar to any piece of television production gear with the obvious exception of the core Fiber Optic technology. Here is a list of things to look out for and check:

- 1 Check all your cables for any bad connections or bad connectors.
- 2 Check the Power Supplies and check the fuses.
- 3 Take advantage of the various diagnostic tools provided in the CopperHead 3050 Base Station and Camera Unit:
 - Is the Fiber Optic Signal Strength within an acceptable range? Although the product specification calls for strength of -22 dBm or greater, the system can work at a lower signal strength, although there is no guarantee. Use the Four-character Digital Displays to check signal strength. Remember to check both the local and the remote power. It can be useful to know that the Base Station is putting out good power, but the Camera Unit is not receiving it.
 - Observe all of the LED warning and alarm lights on the Base Station and take appropriate action.
 - If signal strength is degraded from the time of system checkout at a particular location, walk the Fiber Cable and see that it is intact and has no damage due to severe bends or kinks.
- 4 If the digital display indicates an error and displays a Hexadecimal error code, take note of the exact error code and contact Grass Valley support to assist in diagnosing the problem (see [Contact Us](#) on page 65). The hexadecimal errors indicate problems with the power supplies and the internal boards.

7 Specifications

Video, Digital (bi-directional)

Interface SMPTE 259M, 292M
 Data Rate..... 270 Mb/s or 1.5 Gbits/s
 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 (bi-directional)

Interface RS170, NTSC, PAL
 Frequency Response
 30 Hz-4.2 MHz ±0.15 dB
 8MHz. -3 dB
 Video Signal to Noise Ratio ? 72 dB
 Differential Gain < 2%
 Differential Phase..... < 1°

Ethernet

Data Support..... 10BaseT/100BaseT
 Connector..... Twisted Pair RJ45
 Cable compatible..... UTP 100-ohm Cat5
 Input/Output Impedance 10 k?/30?

Audio

Number of Channels..... 1-to-4
 Type. Balanced, line level
 Impedance > 15K?
 Maximum Input Level 24 dBu
 Quantization..... 24 bits, 128x (oversampled)
 Sample Rate..... 48kS/sec
 Frequency Response ±0.1 dB, 20 Hz to 20 KHz

Intercom

Number or 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

IFB

Number or channels..... 1
 Frequency Response 50 - 16KHz ± 2dB
 Max Distortion ≤ 0.5%
 Noise < -60dBu
 Base Station (IFB Input):
 Input: Line-Level
 Connector DB25 Female
 Type..... electronically balanced, direct coupled
 Impedance..... 24 k ohms
 Level +4 dBu, nominal
 Camera Unit (IFB Output):
 Connector: 3pin XLR Male
 Beltpack compatible (wet)..Clear Com, RTS, Studio Tech
 Type: electronically balanced, capacitor coupled
 Load (wet) ... intended to drive 600 ohm or greater load

Electro-Optical

Operating Wavelengths..... 1300 nm/1550 nm
 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 (Tac fiber)..... ST or OpticalCON
 Remote Power (Hybrid fiber):
 Standard Power.....
 SMPTE 304M, OpticalCON, or STs & Molex

Distance Limit *see note below

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

Specifications

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):

Power Consumption 10 watts@10-18VDC

Power Connector..... 4-Pin XLR

Base Station (Hybrid Fiber):

Power Req 110-120/220-240 VAC, 50 to 60Hz

Power Consumption250 watts max @120VAC

Temperature Range..... -25° to +55°C

MPS Power Supply (Hybrid Fiber):

Power Req 110-120/220-240 VAC, 50 to 60Hz

Power Consumption 200 watts max@120VAC (1.6amps)

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.



Grass Valley Technical Support

For technical assistance, please contact the Grass Valley Technical Support center nearest you:

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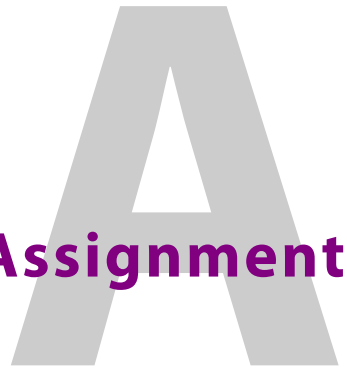
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Connector Pin Assignments









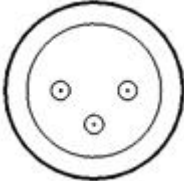
This chapter explains how the connectors work on the CopperHead 3050 Camera Unit and the Base Station.

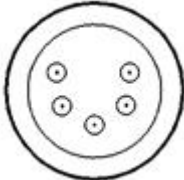
This appendix contains the following sections:

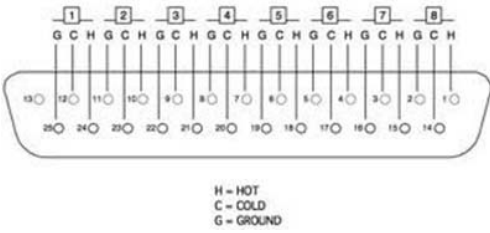
<i>Base Station Connectors</i>	67
<i>Camera Unit Connectors</i>	70

Base Station Connectors



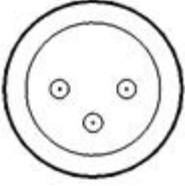

Item	Description
AC Power Input Connector- Models CHG3-BS-3050-95VD-xxx-xxx	
 <p data-bbox="462 604 776 667">Base Station #1 Standard IEC C14 receptacle</p>	<p data-bbox="816 415 1412 546">Panel Mounted AC Power Receptacle: 110/220 VAC Two 4 amp fuses (5 x 20mm). Fuses are in operation at all times – both the AC Line Hot and the AC Line Neutral are fused.</p>
12VDC Input Power Connectors – Models CHG3-BS-3050-2ST/2MX/NEU	
 <p data-bbox="526 884 714 940">Base Station #20 XLR4 Male</p>	<ul data-bbox="816 737 1084 848" style="list-style-type: none"> • Pin 1: Ground • Pin 2: Unused • Pin 3: Unused • Pin 4: + Power 12 VDC <p data-bbox="816 856 1421 919">This matching connector is from either an ADAP-AC-04 or a customer-supplied 12VDC power supply.</p> <p data-bbox="816 928 1421 987">This connector is wired in parallel with terminal block #21 (below).</p>
 <p data-bbox="526 1108 704 1165">Base Station #21 Terminal block</p>	<ul data-bbox="816 1010 1166 1066" style="list-style-type: none"> • Pin 1: Minus Voltage Terminal • Pin 2: Plus Voltage Terminal <p data-bbox="816 1075 1421 1134">This connector is wired in parallel with XLR4 Male #20 (above).</p>
95VDC output: Model CHG3-BS-3050-95VD-STM-xxx	
 <p data-bbox="516 1329 721 1423">Base Station #23 Mating connector: Molex 39-01-4051</p>	<ul data-bbox="816 1234 1156 1318" style="list-style-type: none"> • Pin 1: 95VDC + OUT (White*) • Pin 2: 95VDC + OUT (Black*) • Pin 5: Ground (Green) <p data-bbox="816 1327 1193 1352">*Tied together at terminal lug end</p>
Clear-Com Intercom	
 <p data-bbox="500 1732 737 1789">Base Station #16 & 17 XLR3 Female (x2)</p>	<ul data-bbox="816 1486 1047 1570" style="list-style-type: none"> • Pin 1: Ground • Pin 2: +VDC Power • Pin 3: Power
RTS Intercom	

Item	Description
 <p data-bbox="527 550 711 609">Base Station #16 XLR3 Female</p>	<ul style="list-style-type: none"> • Pin 1: Ground • Pin 2: +VDC Power & Channel 1 Audio • Pin 3: Channel 2 Audio
 <p data-bbox="527 844 711 903">Base Station #17 XLR3 Male</p>	<ul style="list-style-type: none"> • Pin 1: Ground • Pin 2: +VDC Power & Channel 1 Audio • Pin 3: Channel 2 Audio

4-Wire Intercom				
	Pin	Function	Imedance	Signal
 <p data-bbox="495 1268 743 1327">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	+8 dBm
	5	- Output	Ohm Load	

Audio Input & Output						
	Audio In #18	Audio Out #19	Channel	DB25 Pin Number		
				Hot	Cold	Ground
 <p>H = HOT C = COLD G = GROUND</p> <p>Base Station #18 & #19 DB25 Female (x2)</p>	Return Audio 1 In	Cam Audio 1 Out	1	24	12	25
	Return Audio 2 In	Cam Audio 2Out	2	10	23	11
	Not Used	Not Used	3	21	9	22
	Not Used	Not Used	4	7	20	8
	Intercom Program In	Not Used	5	18	6	19
	Not Used	Not Used	6	4	17	5
	Intercom CH 1 In	Intercom CH 1 Out	7	15	3	16
	Intercom CH 2 In	Intercom CH 2 Out	8	1	14	2
				Not Connected	13	

Camera Unit Connectors

Item	Description
Power Wafer	
 <p>Camera Unit #15 Lemo 4-pin Female</p>	<ul style="list-style-type: none"> • Pin 1: 95VDC+ • Pin 2: 95VDC- • Pin 3: Not Used • Pin 4: Not Used <p>Mating connector: Lemo FGG.0B.304.CLAD42 (right angle)</p>
Camera Headset	
 <p>Camera Unit #3 XLR5 Female</p>	<ul style="list-style-type: none"> • Pin 1: MIC Ground (shield) • Pin 2: + MIC Input • Pin 3: - Earphone Output Ground • Pin 4: + Earphone Output • Pin 5: + Earphone Output
IFB	
 <p>Camera Unit #4 XLR5 Male</p>	<p>Wet</p> <ul style="list-style-type: none"> • Pin 1: Ground • Pin 2: + 22VDC modulated with IFB audio +Hot (nominal -10 dBu) • Pin 3: IFB Audio -Cold <p>Dry</p> <ul style="list-style-type: none"> • Pin 1: Ground • Pin 2: IFB Audio +Hot (nominal -10 dBu) • Pin 3: IFB Audio -Cold
Audio Input	
 <p>Camera Unit #5 & #6 XLR3 Female</p>	<ul style="list-style-type: none"> • Pin 1: Chassis ground (cable shield) • Pin 2: Positive polarity terminal ("hot") • Pin 3: Return terminal ("cold")



Multi-Pin Connectors: Suggested Wiring

This chapter provides sample wiring for the Input and Output audio connectors.

<i>Base Station 25-Pin Audio Input Cable</i>	73
<i>Base Station 25-Pin Audio Output Cable</i>	74

Base Station 25-Pin Audio Input Cable

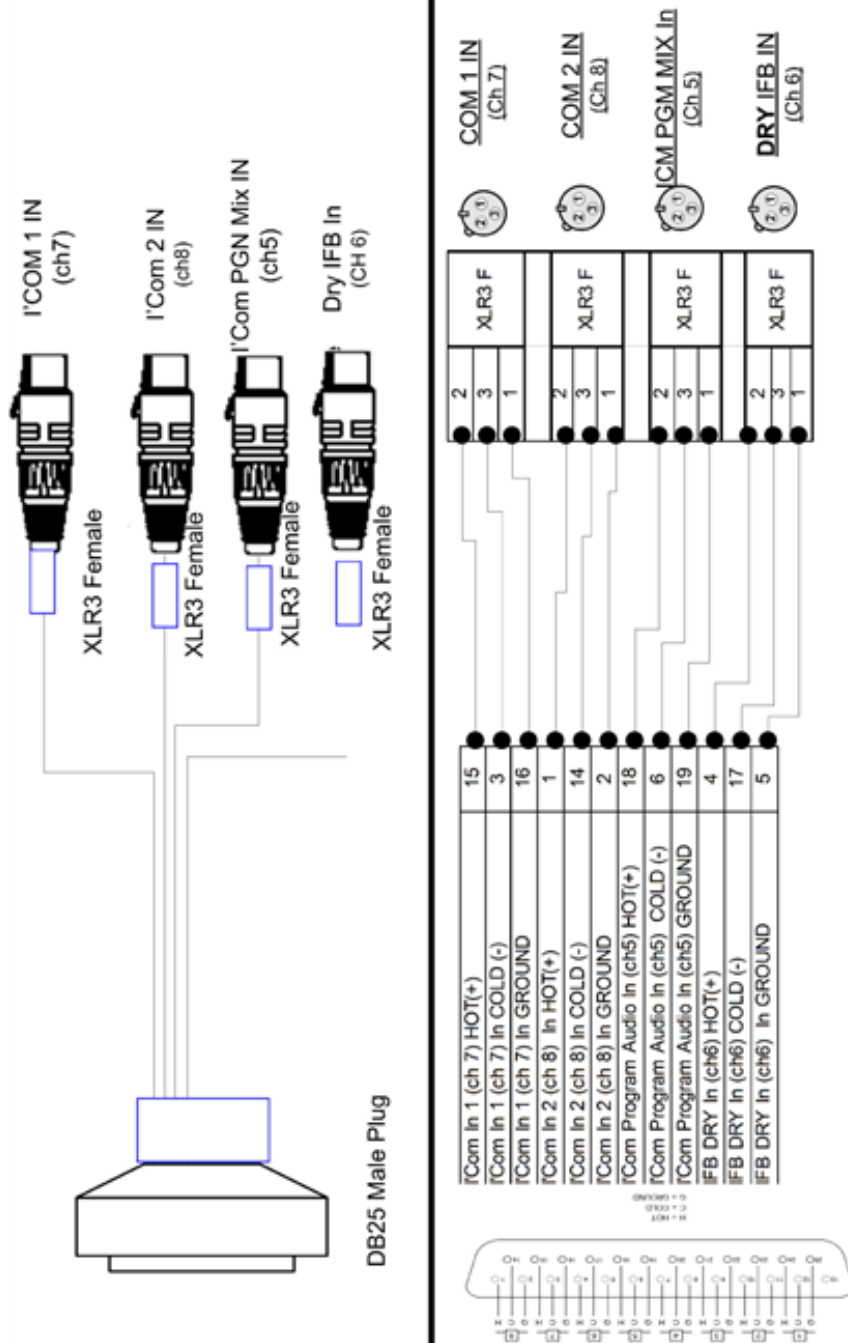


Fig. B-1: Base Station 25-Pin Audio Input Cable

Base Station 25-Pin Audio Output Cable

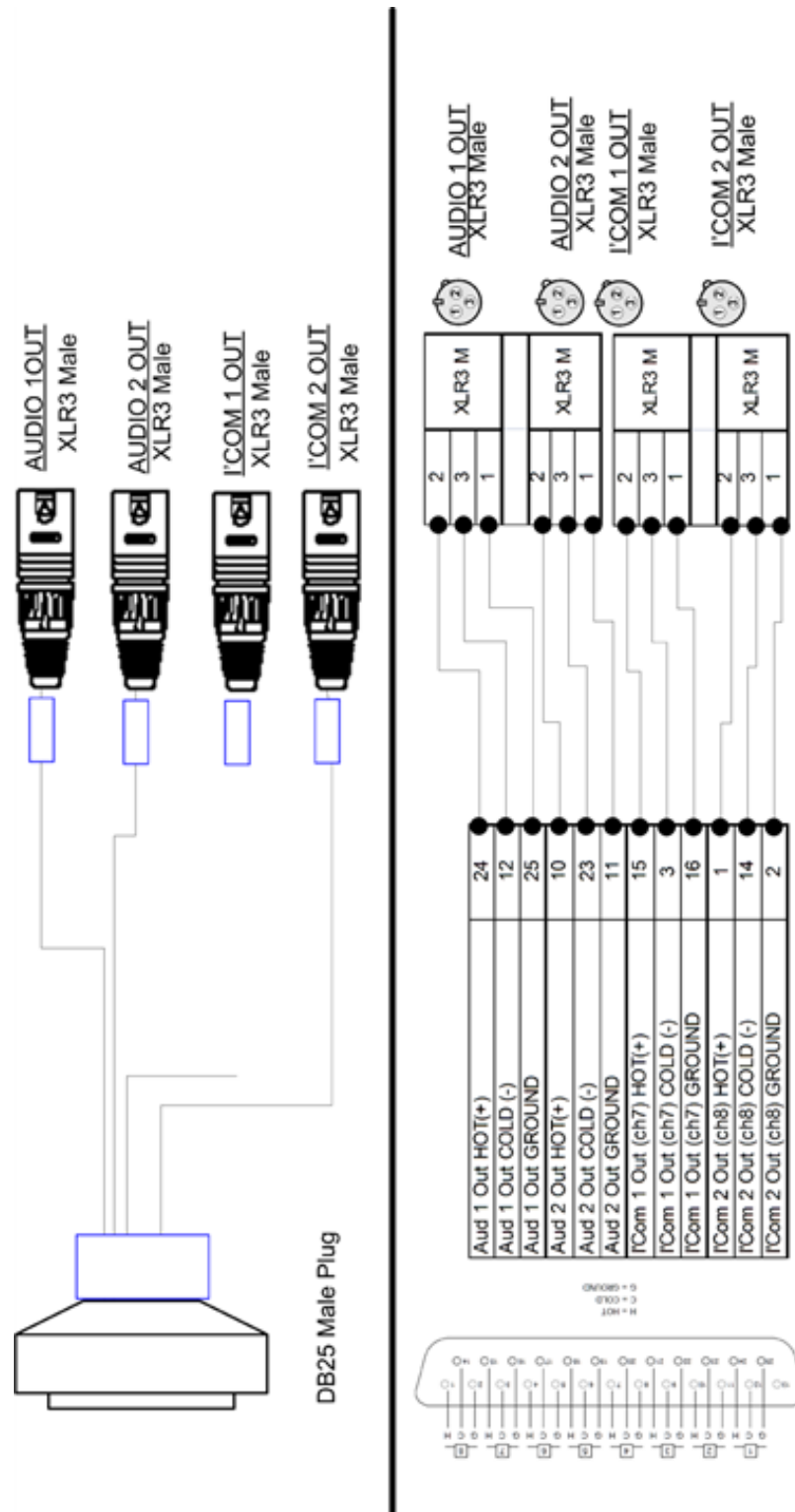


Fig. B-2: Base Station 25-Pin Audio Output Cable


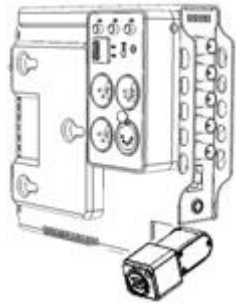





Available Accessories

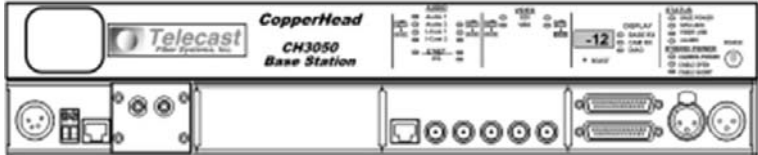
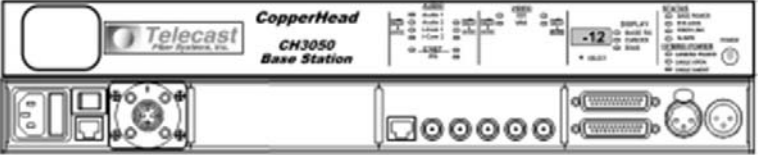
This appendix lists the accessories that are available for the CopperHead 3050 system.

<i>Units and Connectors</i>	77
<i>Adaptors and Plugs</i>	79
<i>Plates, Panels, and Cables</i>	81
<i>Available Accessories – Cable Numbers</i>	81

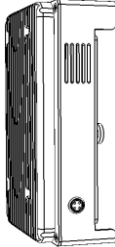





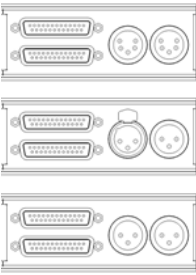


Units and Connectors

Item Number/ Description	Picture	Item Number/ Description	Picture
CH3-CAM-3050-MX		CAXX-MX	
Camera Unit w/MX Connector: Tac Fiber only		Tactical Fiber Assembly, MX Connectors	
CH3-CAM-3050-NEU		CAXX-XT2S-NOC	
Camera Unit w/ OpticalCON connector: Tac or SMPTE Hybrid Fiber		Tactical Fiber Cable Assembly, OpticalCON Connectors	
CH3-CAM-3050-304M		CAXX-XSM311-NOC	
Camera Unit w/SMPTE 304M connector: Tac or SMPTE Hybrid Fiber		SMPTE 311M Hybrid Fiber Cable Assembly, OpticalCON connectors	
CAXX-XSM311-SMPTE		MXRE	
SMPTE 311M Hybrid Fiber Cable Assembly, SMPTE 304M connectors		MX Recepta cle Flange Mount Assembly Breakout to STs	




Wider Illustrations

Item Number/ Description	Picture
<p>CH3-BS-2ST or – NEU</p> <p>Standard Base Station 2 STs or OpticalCON connector</p>	
<p>CH3-BS-95VD-304 or NEU or –STM</p> <p>Base Station w/internal Power Supply</p>	

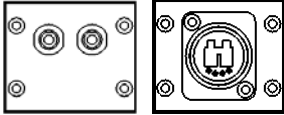
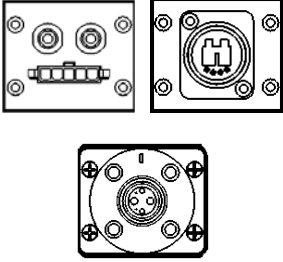
Adaptors and Plugs

Item Number/ Description	Picture	Item Number/ Description	Picture
PWRWFR-95VD-FSR-AB		MXRV	
Power Wafer Camera Adaptor (for use with CH Series 3050-BS-95VD)		MX Receptacle Jam Nut Assembly Breakout to STs	
ADAP-AC-02		CH3BFC-NOC-2ST/MOL-08-XX	
Base Station AC Adaptor (for CH Series 3050-BS-2ST)		OpticalCON receptacle to STs and Molex 39-01-4051	
CASM/MD/XL		CH3BFC-NOC-NOC-08-XX	
Tactical Fiber on Reel: Small (SM), Medium (MD), or Large (XL)		OpticalCON receptacle to OpticalCON Plug	
CHG3-AUD-RTS/CC/4W		CH3BFC-304M-2ST-08-XX	
2-Channel Intercom Modules: 4-wire, RTS, or Clear-Com		SMPTE Hybrid 304M plug to STs and Molex 39-01-4051	
PWRPLUS-1MX/NO		CH3BFC-304M-NOC-08-XX	
Long Distance "PowerPlus" Camera Adaptor for use with HDX (specify LP or HP)		SMPTE Hybrid 304M plug to OpticalCON Plug	

Wider Illustrations

Item Number/ Description	Picture
<p>CH2-MPS-95VD-2ST-XXX or CH2-MPS-95VD-NEU-XXX Power Supply for Power Wafer Power Adaptor</p>	
<p>HDX-2-ST Power Supply for PowerPlus Power Adaptor</p>	
<p>HDX-FR-2 Rack mount frame for 2 HDX units</p>	

Plates, Panels, and Cables

Item Number/ Description	Picture	Item Number/ Description	Picture
CH3BFP-ST/NOC		CH3BFP-STMOL/NOC/304M	
Base Fiber Plates – unpowered ST or OpticalCON		Base Fiber Plates - powered: ST /Molex or OpticalCON or 304M	

Available Accessories – Cable Numbers

Base Station Audio Cables

Cable Description	Item Number	Cable is Wired with Connectors	Typical Equipment used With Cable
Audio Input	CH3BAI-3050-D25-4XL3F	DB25 to 4 XLR3-F	Audio input sources
Audio Output	CH3BAO-DB25-4XL3M	DB25 to 4 XLR3-M	Audio output devices

For information on these and other cable configurations, please contact Grass Valley, a Belden Brand (see [Contact Us](#) on page 65) or your local CopperHead 3050 dealer.

D Diagrams

This appendix contains diagrams that describe the main features of the CopperHead 3050 Transceiver System Base Station and Camera Unit.

<i>CopperHead 3050 Transceiver System Base Station Back Panel</i>	83
<i>CopperHead 3050 Transceiver System Camera Unit</i>	83
<i>Camera Unit Indicators and Controls</i>	84
<i>Base Station Front Panel Indicators</i>	84
<i>Block Diagrams</i>	85

CopperHead 3050 Transceiver System Base Station Back Panel

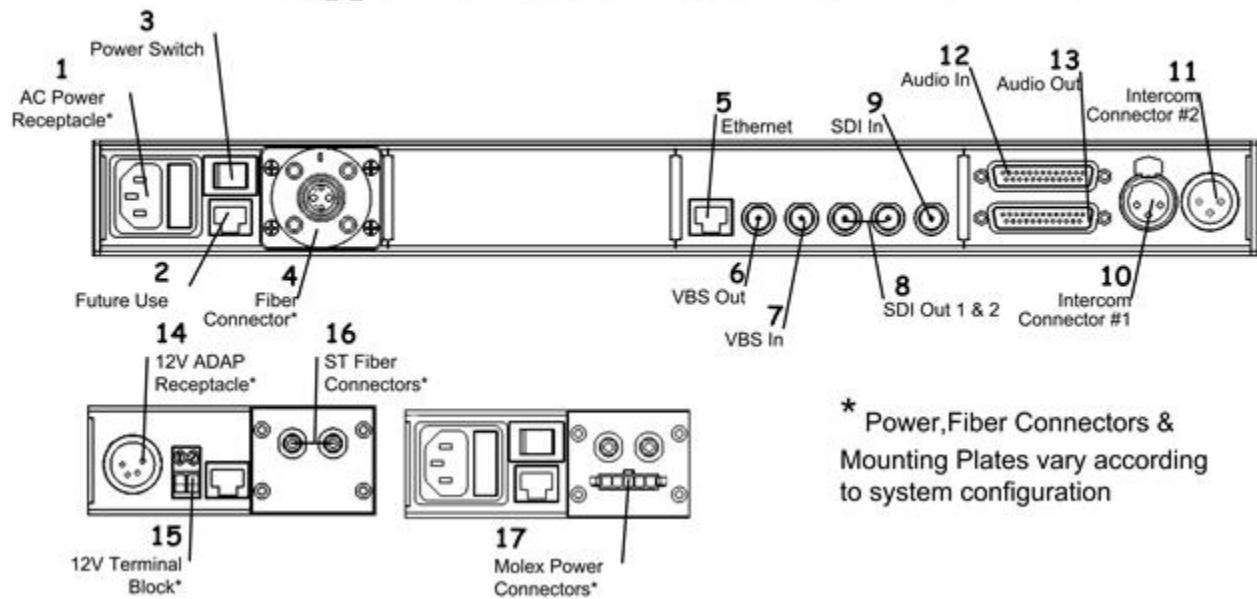


Fig. D-1: CopperHead 3050 Transceiver System Base Station Back Panel

CopperHead 3050 Transceiver System Camera Unit

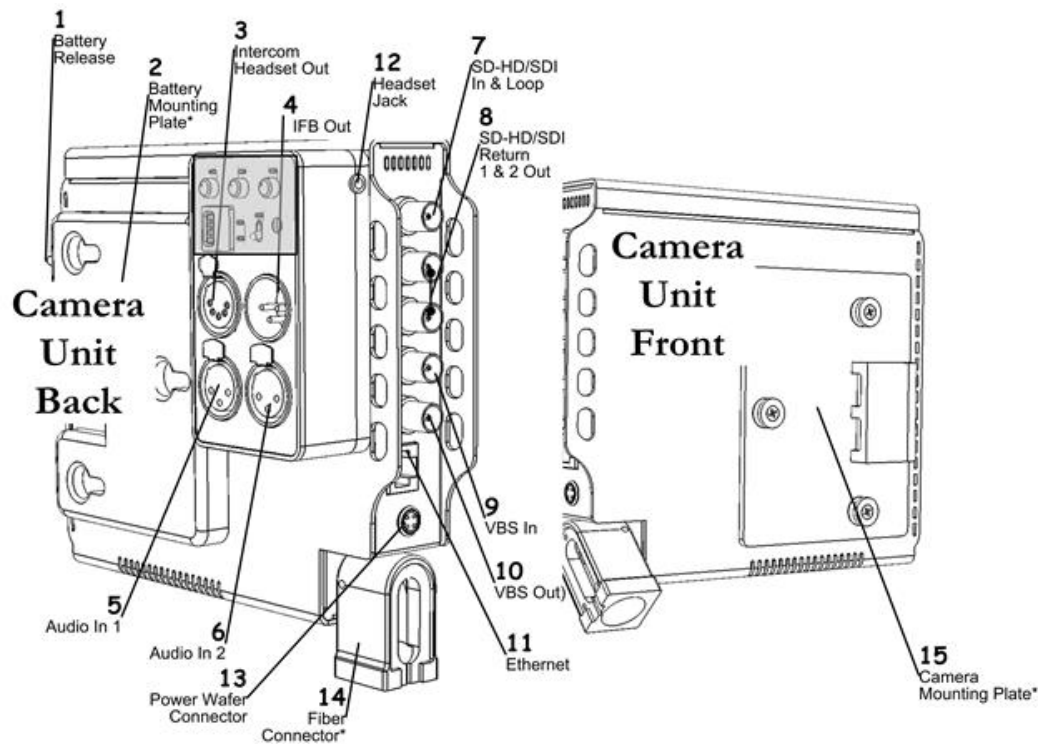


Fig. D-2: Camera Unit

Camera Unit Indicators and Controls

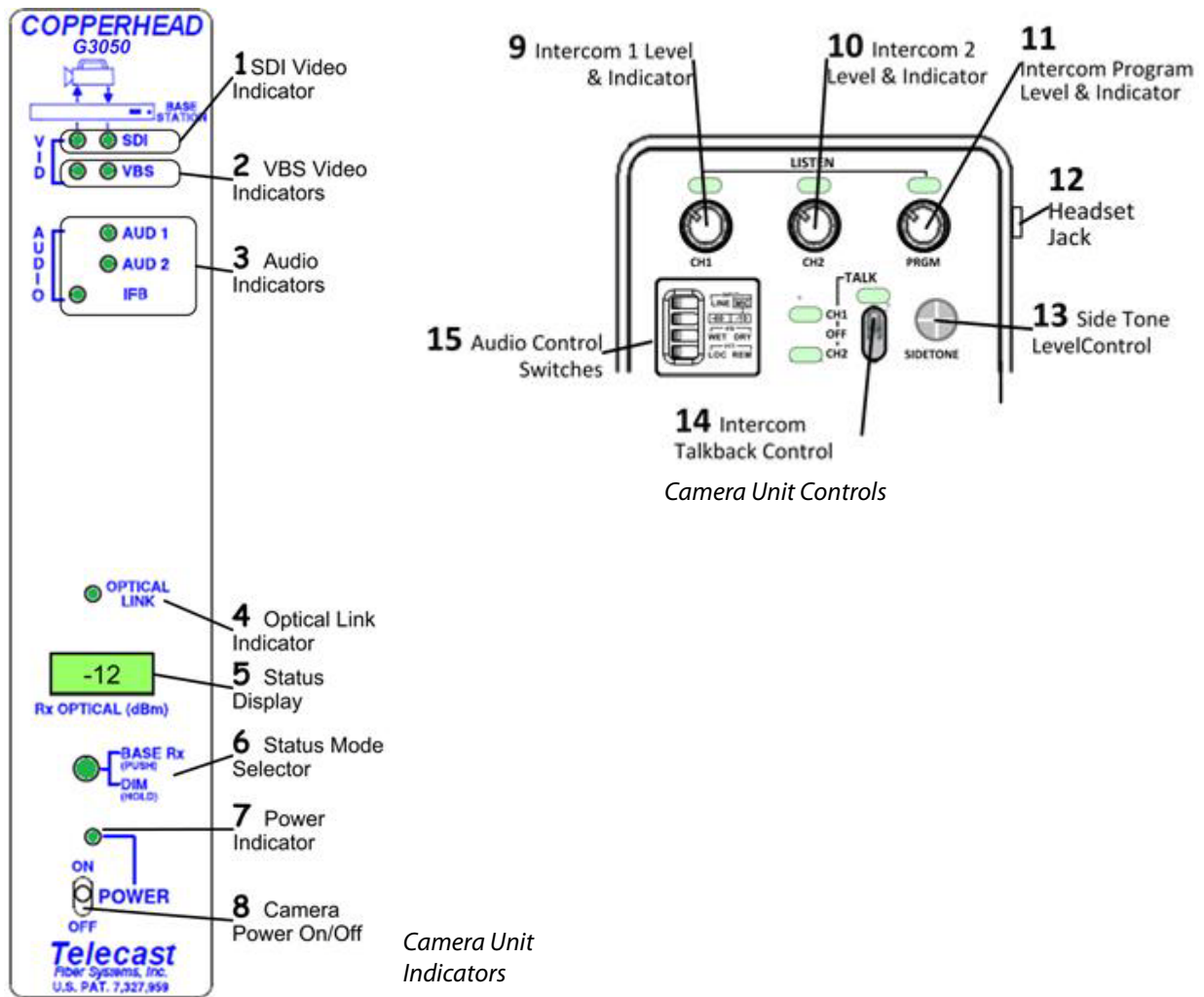


Fig. D-3: Camera Unit Indicators and Controls

Base Station Front Panel Indicators

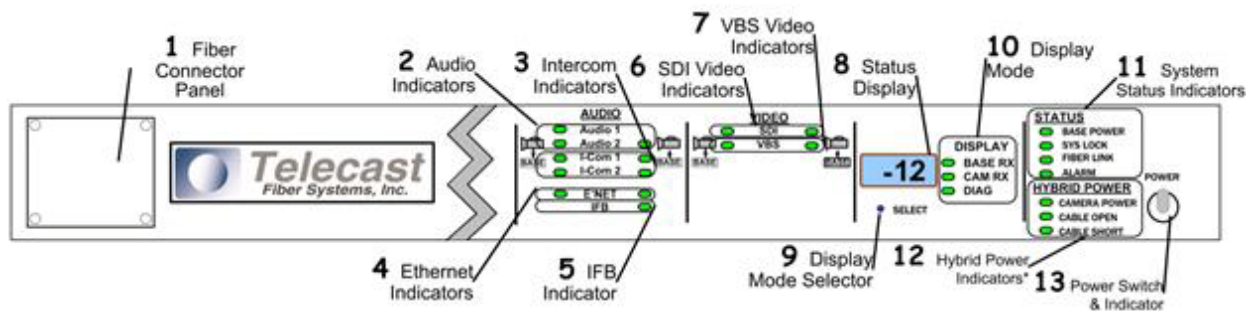


Fig. D-4: Base Station Front Panel Indicators

Block Diagrams

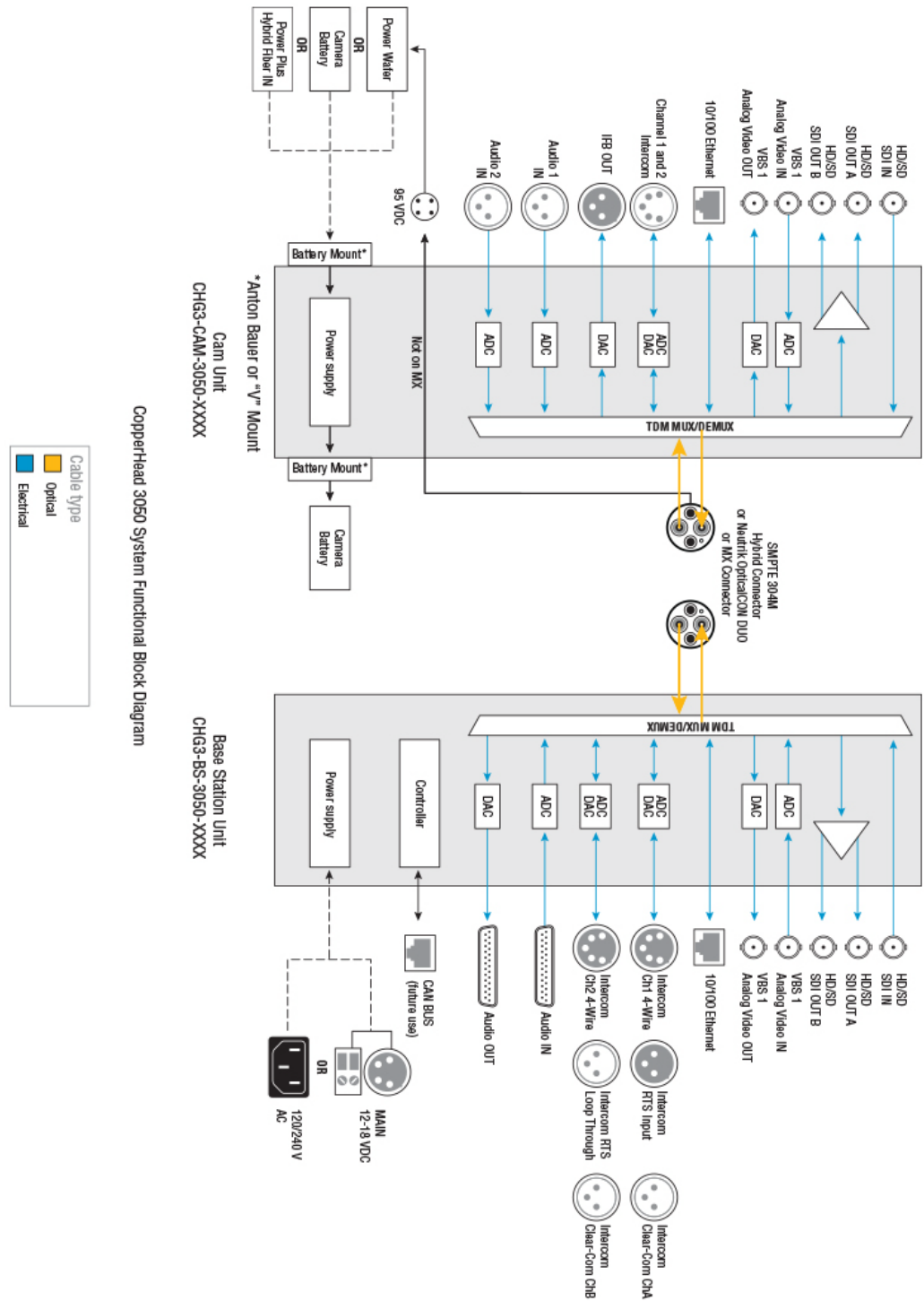


Fig. D-5: CopperHead 3050 Functional Block Diagram

High Powered Version

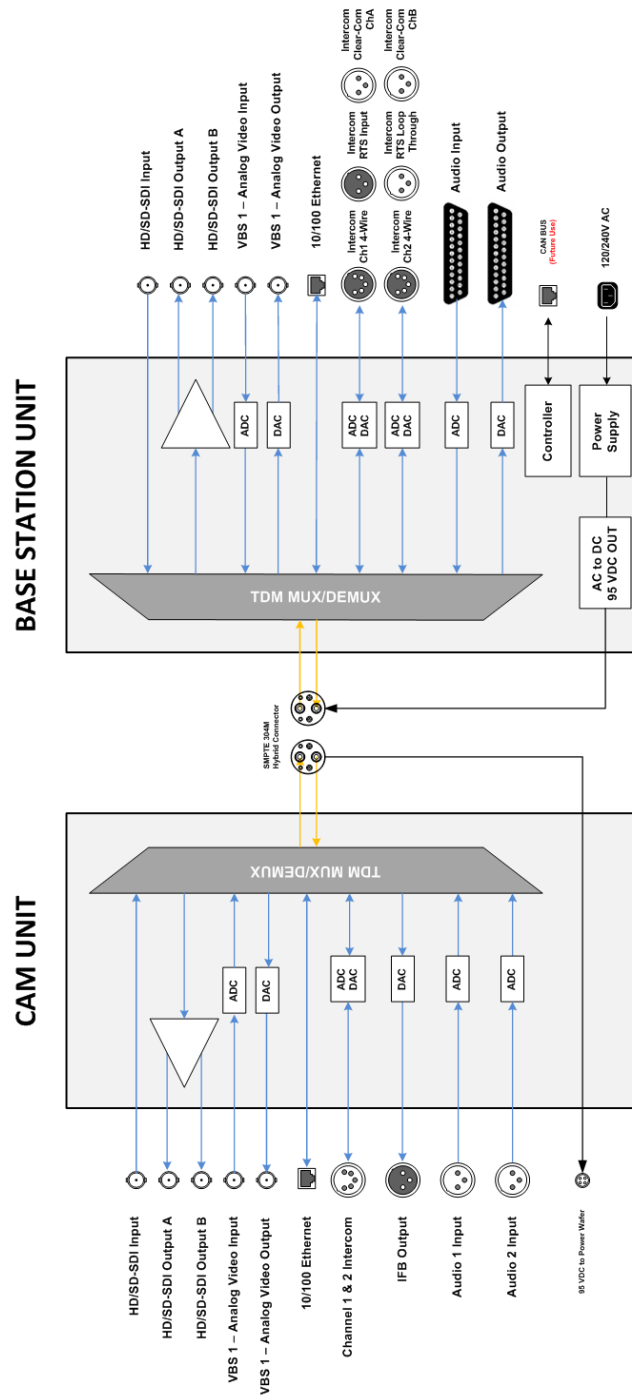


Fig. D-6: CopperHead 3050 High Powered Version

Low Powered Version

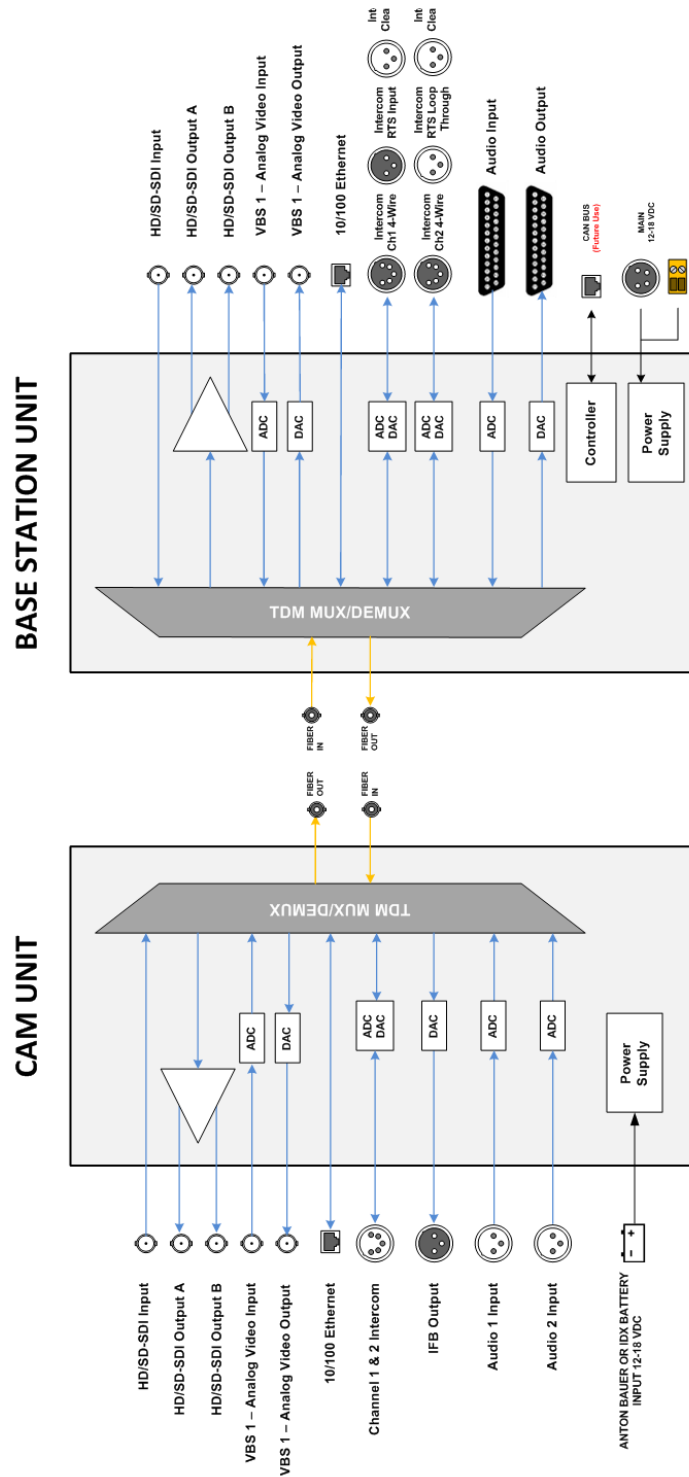


Fig. D-7: CopperHead 3050 Low Powered Version