

Telecast Fiber Solutions

CopperHead 3430AP User Manual

4042-99M00-101

9 February 2015



Copyright © 2015 by Grass Valley, A Belden Brand

All rights reserved. No part of this manual may be reproduced in any form by photocopy, microfilm, xerography or any other means, or incorporated into any information retrieval system, electronic or mechanical, without the written permission of Grass Valley, A Belden Brand.

- Document revision: 101
- Document part number: 4042-99M00-101

Change History

| Revision | Published | Description of Changes |
|----------------|-----------------|-----------------------------|
| 4042-99M00-100 | 29 July 2014 | Initial release |
| 4042-99M00-101 | 9 February 2015 | Correction of figure labels |

Notice

Because of continued product development, the accuracy of the information in this document may change without notice. The information and intellectual property contained herein is confidential between Grass Valley and the client and remains the exclusive property of Grass Valley. If you find any problems in the documentation, please report them to us in writing. Grass Valley does not warrant that this document is error-free.

Trademarks

Grass Valley is a registered trademark of Grass Valley, A Belden Brand.

Brand and product names mentioned in this manual may be trademarks, registered trademarks or copyrights of their respective holders. All brand and product names mentioned in this manual serve as comments or examples and are not to be understood as advertising for the products or their manufacturers.

Software License Agreement and Warranty Information

Contact Grass Valley for details on the software license agreement and product warranty.

Safety Compliance



This equipment complies with:

- CSA/UL/IEC/EN 60950-1, 2nd Ed., for Information Technology Equipment - Safety requirements



The power cord supplied with this equipment meets the appropriate national standards for the country of destination.

WARNING: An appropriately listed/certified mains power supply cord must be used for the connection of the equipment to the mains voltage at either 120V~ or 240V~.

CAUTION: These servicing instructions are for use by qualified personnel only.
To reduce the risk of electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

Disconnect all power supplies before servicing.

Electromagnetic Compatibility



This equipment has been tested for verification of compliance with FCC Part 15, Subpart B requirements for Class A digital devices.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



This equipment has been tested and found to comply with the requirements of the EMC directive 2004/108/CE:

- EN 55022 Conducted emissions, Class A
- EN 55022 Radiated emissions, Class A
- EN 61000-3-2 Harmonic current emission limits
- EN 61000-3-3 Voltage fluctuation and flicker limitations
- EN 61000-4-2 Electrostatic discharge immunity
- EN 61000-4-3 Radiated electromagnetic field immunity - RF
- EN 61000-4-4 EFT immunity
- EN 61000-4-5 Surge immunity
- EN 61000-4-6 Conducted immunity
- EN 61000-4-8 Power frequency magnetic field immunity
- EN 61000-4-11 Voltage dips, short-interruption and voltage variation immunity

Important Safeguards and Notices

This section provides important safety guidelines for operators and service personnel. Specific warnings and cautions appear throughout the manual where they apply. Please read and follow this important information, especially those instructions related to the risk of electric shock or injury to persons.

[fr] Mesures de sécurité et avis importants

La présente section fournit des consignes de sécurité importantes pour les opérateurs et le personnel de service. Des avertissements ou mises en garde spécifiques figurent dans le manuel, dans les sections où ils s'appliquent. Prenez le temps de bien lire les consignes et assurez-vous de les respecter, en particulier celles qui sont destinées à prévenir les décharges électriques ou les blessures.

Symbols and Their Meanings



The lightning flash with arrowhead symbol within an equilateral triangle alerts the user to the presence of dangerous voltages within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle alerts the user to the presence of important operating and maintenance/service instructions.



The earth ground symbol represents a protective grounding terminal. Such a terminal must be connected to earth ground prior to making any other connections to the equipment.



The fuse symbol indicates that the fuse referenced in the text must be replaced with one having the ratings indicated.



The presence of this symbol in or on Grass Valley equipment means that it has been designed, tested and certified as complying with applicable Canadian Standard Association (CSA) regulations and recommendations for USA/Canada.



The presence of this symbol in or on Grass Valley equipment means that it has been designed, tested and certified as complying with applicable Underwriters Laboratory (UL) regulations and recommendations for USA/Canada.



The presence of this symbol in or on Grass Valley equipment means that it has been designed, tested and certified as essentially complying with all applicable European Union (CE) directives.



The presence of this symbol in or on Grass Valley product means that it complies with safety of laser product applicable standards.

Safety of Laser Modules



This equipment incorporates modules containing Class 1 lasers. These modules are certified by the manufacturer to comply with:

- IEC/EN 60825-1 Safety of laser products
- IEC 60950-1 Safety of information technology equipment

[fr] Sécurité laser

L'appareil comprend des modules laser de classe 1. Ces modules sont certifiés conformes aux normes suivantes par le fabricant :

- IEC/EN 60825-1 Sécurité des appareils à laser
- IEC 60950-1 Sécurité du matériel informatique

Warnings



A warning indicates a possible hazard to personnel, which may cause injury or death. Observe the following general warnings when using or working on this equipment:

- Appropriately listed/certified mains supply power cords must be used for the connection of the equipment to the mains voltage at either 120 V AC or 240 V AC.
- This product relies on the building's installation for short-circuit (over-current) protection. Ensure that a fuse or circuit breaker for 120 V AC or 240 V AC is used on the phase conductors.

-
- Any instructions in this manual that require opening the equipment cover or enclosure are for use by qualified service personnel only.
 - Heed all warnings on the unit and in the operating instructions.
 - Do not use this equipment in or near water.
 - This equipment is grounded through the grounding conductor of the power cords. To avoid electrical shock, plug the power cords into a properly wired receptacle before connecting the equipment inputs or outputs.
 - Route power cords and other cables so they are not likely to be damaged.
 - Disconnect power before cleaning the equipment. Do not use liquid or aerosol cleaners; use only a damp cloth.
 - Dangerous voltages may exist at several points in this equipment. To avoid injury, do not touch exposed connections and components while power is on.
 - Do not wear rings or wristwatches when troubleshooting high current circuits such as the power supplies.
 - To avoid fire hazard, use only the specified fuses with the correct type number, voltage and current ratings as referenced in the appropriate locations in the service instructions or on the equipment. Always refer fuse replacements to qualified service personnel.
 - To avoid explosion, do not operate this equipment in an explosive atmosphere.
 - This product includes a backup battery. There is a danger of explosion if the battery is replaced incorrectly. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions. Before disposing of your Grass Valley equipment, please review the *Disposal and Recycling Information* appendix.
 - Have qualified service personnel perform safety checks after any service.

[fr] **Avertissements**

- Un cordon d'alimentation dûment homologué doit être utilisé pour connecter l'appareil à une tension de secteur de 120 V CA ou 240 V CA.
- La protection de ce produit contre les courts-circuits (surintensités) dépend de l'installation électrique du bâtiment. Assurez-vous qu'un fusible ou un disjoncteur pour 120 V CA ou 240 V CA est utilisé sur les conducteurs de phase.
- Dans le présent manuel, toutes les instructions qui nécessitent d'ouvrir le couvercle de l'équipement sont destinées exclusivement au personnel technique qualifié.
- Respectez tous les avertissements figurant sur l'appareil et dans les instructions d'utilisation.
- Ne pas utiliser cet appareil dans l'eau ou à proximité d'un point d'eau.
- Cet équipement est mis à la terre par le conducteur de mise à la terre des cordons d'alimentation. Pour éviter les chocs électriques, branchez les cordons d'alimentation sur une prise correctement câblée avant de brancher les entrées et sorties de l'équipement.
- Acheminez les cordons d'alimentation et autres câbles de façon à ce qu'ils ne risquent pas d'être endommagés.
- Coupez l'alimentation avant de nettoyer l'équipement. Ne pas utiliser de nettoyeurs liquides ou en aérosol. Utilisez uniquement un chiffon humide.
- Des tensions dangereuses peuvent exister en plusieurs points dans cet équipement. Pour éviter toute blessure, ne touchez pas aux connexions ou aux composants exposés lorsque l'appareil est sous tension.

- Avant de procéder à toute opération d'entretien ou de dépannage visant des circuits à courant élevé (e.g., les blocs d'alimentation), enlevez tous vos bijoux (notamment vos bagues et votre montre).
- Pour éviter tout risque d'incendie, utilisez uniquement les fusibles du type et du calibre indiqués dans la documentation ou sur l'équipement. Confiez le remplacement de fusibles au personnel technique qualifié.
- Ne pas utiliser cet appareil dans une atmosphère explosive.
- L'appareil renferme une pile. Pour réduire le risque d'explosion, vérifiez la polarité et ne remplacez la pile que par une pile du même type, recommandée par le fabricant. Mettez les piles usagées au rebut conformément aux directives du fabricant. Avant de vous défaire de l'équipement, assurez-vous d'avoir lu l'appendice *Disposal and Recycling Information*.
- Après tout travail d'entretien ou de réparation, faites effectuer des contrôles de sécurité par le personnel technique qualifié.

Cautions



A caution indicates a possible hazard to equipment that could result in equipment damage. Observe the following cautions when operating or working on this equipment:

- When installing this equipment, do not attach the power cord to building surfaces.
- To reduce the risk of electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel. Servicing should be done in a static-free environment.
- To prevent damage to equipment when replacing fuses, locate and correct the problem that caused the fuse to blow before re-applying power.
- Use only the specified replacement parts.
- Follow static precautions at all times when handling this equipment.
- Products that have no on/off switch, and use an external power supply must be installed in proximity to a main power outlet that is easily accessible.

[fr] Mises en garde

- Au moment d'installer l'équipement, ne fixez pas les cordons d'alimentation aux surfaces intérieures de l'édifice.
- Pour réduire le risque de choc électrique, n'effectuez pas de réparations autres que celles qui sont décrites dans le présent manuel, sauf si vous êtes qualifié pour le faire. Confiez les réparations à un technicien qualifié. La maintenance doit se réaliser dans un milieu libre d'électricité statique.
- Pour éviter d'endommager l'équipement lors du remplacement de fusibles, localisez la source de la panne et corrigez la situation avant de rétablir le courant.
- Employez uniquement les pièces de rechange recommandées par le fabricant.
- Veillez à toujours prendre les mesures de protection antistatique appropriées quand vous manipulez l'équipement.
- Les produits qui n'ont pas d'interrupteur marche-arrêt et qui disposent d'une source d'alimentation externe doivent être installés à proximité d'une prise de courant facile d'accès.

Electrostatic Discharge (ESD) Protection



Electrostatic discharge occurs when electronic components are improperly handled and can result in intermittent failure or complete damage adversely affecting an electrical circuit. When you remove and replace any card from a frame always follow ESD-prevention procedures:

- Ensure that the frame is electrically connected to earth ground through the power cord or any other means if available.
- Wear an ESD wrist strap ensuring that it makes good skin contact. Connect the grounding clip to an *unpainted surface* of the chassis frame to safely ground unwanted ESD voltages. If no wrist strap is available, ground yourself by touching the *unpainted* metal part of the chassis.
- For safety, periodically check the resistance value of the antistatic strap, which should be between 1 and 10 megohms.
- When temporarily storing a card make sure it is placed in an ESD bag.
- Cards in an earth grounded metal frame or casing do not require any special ESD protection.

[fr] Protection contre les décharges électrostatiques (DES)

Une décharge électrostatique peut se produire lorsque des composants électroniques ne sont pas manipulés de manière adéquate, ce qui peut entraîner des défaillances intermittentes ou endommager irrémédiablement un circuit électrique. Au moment de remplacer une carte dans un châssis, prenez toujours les mesures de protection antistatique appropriées :

- Assurez-vous que le châssis est relié électriquement à la terre par le cordon d'alimentation ou tout autre moyen disponible.
- Portez un bracelet antistatique et assurez-vous qu'il est bien en contact avec la peau. Connectez la pince de masse à une *surface non peinte* du châssis pour détourner à la terre toute tension électrostatique indésirable. En l'absence de bracelet antistatique, déchargez l'électricité statique de votre corps en touchant une surface métallique *non peinte* du châssis.
- Pour plus de sécurité, vérifiez périodiquement la valeur de résistance du bracelet antistatique. Elle doit se situer entre 1 et 10 mégohms.
- Si vous devez mettre une carte de côté, assurez-vous de la ranger dans un sac protecteur antistatique.

Les cartes qui sont reliées à un châssis ou boîtier métallique mis à la terre ne nécessitent pas de protection antistatique spéciale.

Restriction on Hazardous Substances (RoHS)

Grass Valley is in compliance with EU Directive RoHS 2002/95/EC governing the restricted use of certain hazardous substances and materials in products and in our manufacturing processes.

Grass Valley has a substantial program in place for RoHS compliance that includes significant investment in our manufacturing process, and a migration of Grass Valley product electronic components and structural materials to RoHS compliance.

It is our objective at Grass Valley to maintain compliance with all relevant environmental and product regulatory requirements. Detailed information on specific products or on the RoHS program at Grass Valley is available from Grass Valley Customer Support.

toc

Table of Contents

| | | |
|----------|--|-----------|
| 1 | Introduction | 1 |
| | The CopperHead 3430AP Fiber Optic Transceiver System | 1 |
| | Overview | 1 |
| | System Concepts | 2 |
| 2 | Detailed System Description | 3 |
| | CopperHead 3430AP Camera Unit | 3 |
| | Connectors, Indicators and Controls - Back Side | 4 |
| | Connectors and Indicators - Front and Right Side | 7 |
| | Controls and Indicators - Left Side | 9 |
| | Copperhead 3400 Base Station | 14 |
| | Front Panel | 14 |
| | Rear Panel | 18 |
| | HDX-Plus Power Unit | 21 |
| | HDX-Plus Power Output and Derating Chart | 25 |
| 3 | Installation and Connection | 27 |
| | Overview | 27 |
| | Mounting the CopperHead 3430AP Camera Unit to the Camera | 27 |
| | Connecting the CopperHead 3430AP Transceiver System | 28 |
| | Connection Overview of the CopperHead 3430AP Transceiver System | 29 |
| | Connections to the CopperHead 3400 Base Station | 30 |
| | Connectors into and out of the CopperHead 3400 Base Station | 30 |
| | Connections to the CopperHead 3430AP Camera Unit | 33 |
| 4 | Operation | 37 |
| | Set Up of the CopperHead 3430AP Transceiver System for Operation | 38 |
| | Connecting and Managing the Fiber Cable | 38 |
| | Powering the System | 40 |
| | Powering the CopperHead 3400 Base Station | 41 |
| | Powering the CopperHead 3430AP Camera Unit | 41 |
| | Intercom Usage | 42 |
| | Using the Digital Displays | 46 |
| | A Brief Guide to Measurement of Fiber Optic Signal Strength | 46 |
| | The CopperHead 3400 Base Station Digital Display | 47 |
| | The CopperHead 3430AP Camera Unit Digital Display | 51 |
| | Standard Operation | 53 |
| | Shutting Down the System | 53 |
| | Troubleshooting | 54 |

| | |
|--|-----------|
| Technical Specifications | 55 |
| Appendix A | 59 |
| Base Station Connectors | 59 |
| Camera Unit Connectors | 63 |
| Data 1 (Camera Control) Pinout Configurations | 65 |
| Base Station Breakout Data/GPI Cable - typical configuration | 66 |
| Appendix B | 67 |
| CopperHead 3430AP Accessories | 67 |
| Camera Signal Cables | 70 |
| Base Station Cables | 70 |
| Contact Us | 73 |
| Grass Valley Technical Support | 73 |
| Corporate Head Office | 73 |

1 Introduction

Chapter 1 is an introduction to the CopperHead 3430AP fiber optic transceiver system.

Topics

| | |
|------------------------------|---------------|
| <i>Overview</i> | <i>page 1</i> |
| <i>System Concepts</i> | <i>page 2</i> |

The CopperHead 3430AP Fiber Optic Transceiver System

Overview

The CopperHead 3430AP Transceiver System is a camera video, audio and data multiplexing system that installs the 3430 Camera Unit on the back of a professional camera with IDX or Anton Bauer plate, and connects via a single hybrid fiber optic cable to the HDX-Plus power supply. The HDX-Plus power supply then connects to a 3400 Base Station in a truck, studio or other video production setup. The CopperHead 3430/3400 Transceiver System can accommodate both single video channel and Dual link/3D links to the base station.

The signals carried over the Fiber Optic cable are described in the next section. The Camera Unit can be up to 2KM from the HDX-Plus power supply. The HDX-Plus power supply can be as much 10 kilometers from the 3400 base station.

The 3430 Camera Unit attaches to the professional camera battery mount. This battery mount is either Anton-Bauer or the Sony V-Mount standard battery mount. The type of mount must be specified at the time of purchase.

The CopperHead 3430AP Transceiver System consists of three main components:

- 1 The CopperHead 3430 Camera Unit – this unit has one option - the battery mount type.
- 2 The HDX-Plus power supply.
- 3 The CopperHead 3400 Base Station – this unit has three options:
 - a The base station can either be internally powered by AC or externally powered by a 12 VDC power supply
 - b The ST Fiber Connectors can be located on either the front or back panels of the Base Station. The location will be determined by the physical setup of your particular system.
 - c The system can be equipped with the TRS, Clear-Com or Four-Wire intercom standard.

Options are determined at the time of product order and the units are delivered preconfigured.

System Concepts

The Copperhead 3430AP Transceiver System utilizes 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.

Detailed System Description



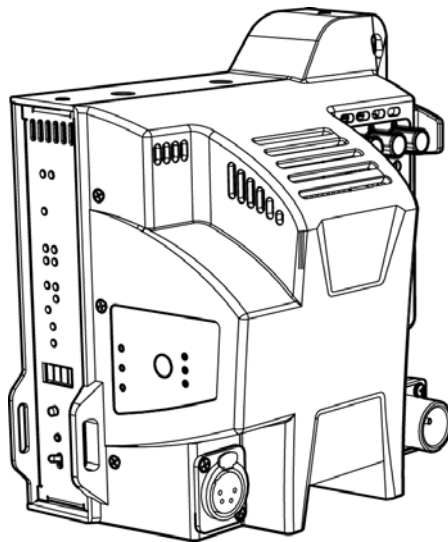
Chapter 2 describes the three components of the CopperHead 3430AP system: (1) the camera unit, (2) the base station and (3) the HDX-Plus power supply.

Topics

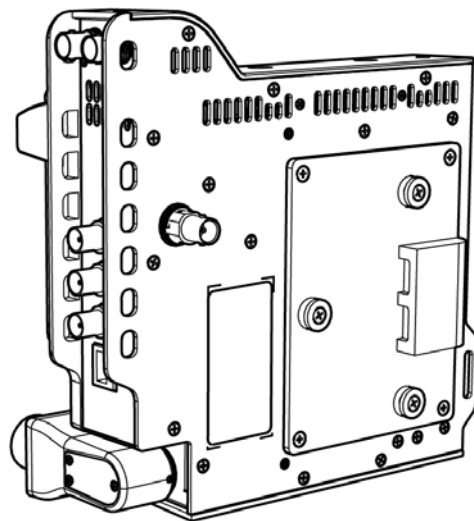
| | |
|---|----------------|
| <i>CopperHead 3430AP Camera Unit</i> | <i>page 3</i> |
| <i>Connectors, Indicators and Controls - Back Side</i> | <i>page 4</i> |
| <i>Connectors and Indicators - Front and Right Side</i> | <i>page 7</i> |
| <i>Copperhead 3400 Base Station</i> | <i>page 14</i> |
| <i>Front Panel</i> | <i>page 14</i> |
| <i>Rear Panel</i> | <i>page 18</i> |
| <i>HDX-Plus Power Unit</i> | <i>page 21</i> |
| <i>Optical Power Monitoring</i> | <i>page 23</i> |
| <i>HDX-Plus Power Output and Derating Chart</i> | <i>page 25</i> |

CopperHead 3430AP Camera Unit

The camera unit has controls, connectors and indicators in a variety of locations. The following diagrams and descriptions will assist you in locating those of interest.



Camera Unit Left Side & Back Side



Camera Unit Right Side and Front Side
(attached to the camera)

Fig. 2-1: CopperHead 3430AP Camera Unit

The actual appearance of your CopperHead 3430AP Camera Unit will vary depending on the battery mount option specified at the time of purchase.

Connectors, Indicators and Controls - Back Side

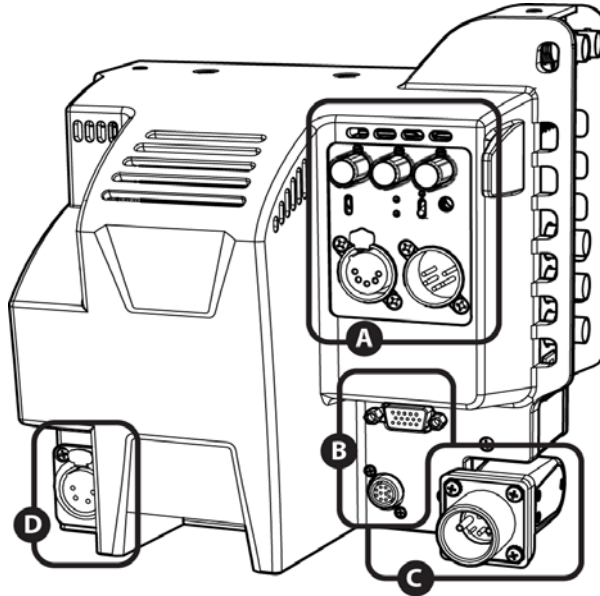


Fig. 2-2: Back Side Connectors, Indicators and Controls

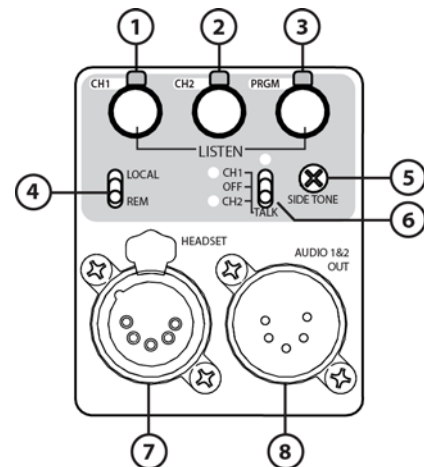
There are four areas of interest in this view:

- A) Audio/Intercom connector panel & controls
- B) Miscellaneous connectors
- C) Fiber connector
- D) 12 - 17 VDC power output

Each of these areas of interest is described in detail below.

Area A - Audio/Intercom connector panel & controls

- 1 Intercom 1 Monitor Level Control and activity indicator
- 2 Intercom 2 Monitor Level Control and activity indicator
- 3 Return Program Monitor Level Control and activity indicator
- 4 Intercom Local/Remote switch
- 5 Side tone control
- 6 Intercom talkback control
- 7 Intercom headset connector
- 8 Audio 1 & 2 Output Connector

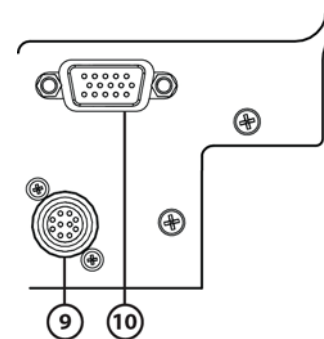


For information on Audio/Intercom operation, please see [Camera Unit Intercom Operation](#) on page 43.

Area B - Miscellaneous connectors

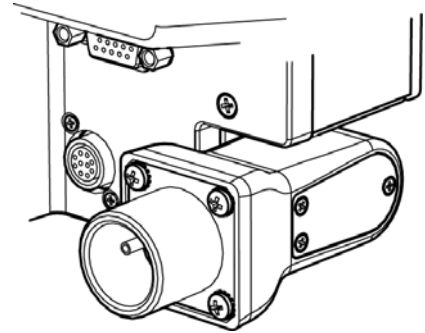
For information regarding available cables and customer-furnished cables please see the Appendices.

- 9 Camera Remote Connector (for optional Camera Remote Control unit). This connector also carries a Data Signal for Serial Communication (RS232/422/485)
(see Appendix A for wiring information)
- 10 Production DB15HD Connector for Tally, Intercom Trigger, 2nd GPI and Serial Communication (RS232/422/485)
(see Appendix A for wiring information)



Area C– Fiber Connector

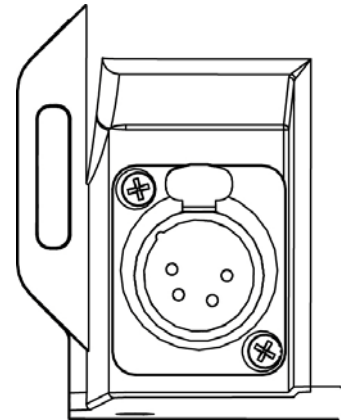
The CopperHead 3430AP Camera Unit is available only with the SMPTE 304M Hybrid Optical Connector.



Area D - Power Output

The 4-Pin 17 VDC Power Plug can provide up to 30 Watts of DC power to accessories attached to or near the camera position.

For information regarding available cables and customer-furnished cables, please see Appendix B.



Connectors and Indicators - Front and Right Side

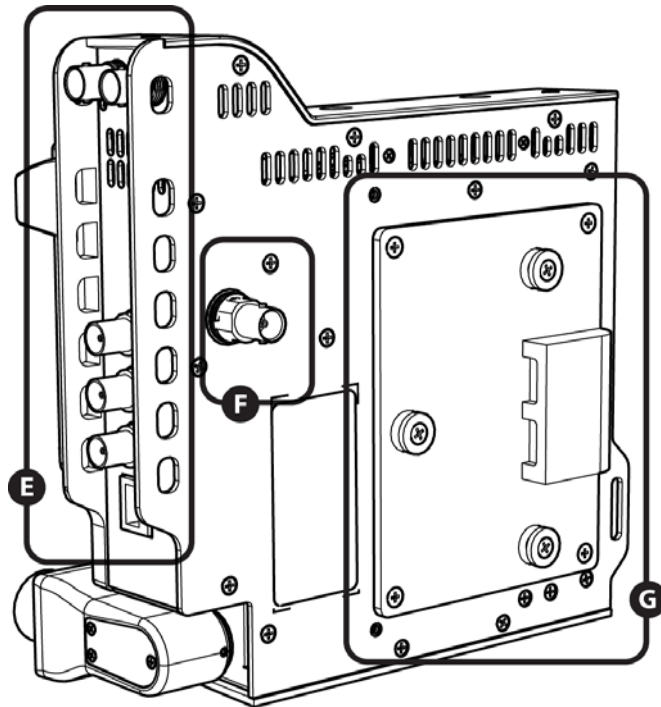


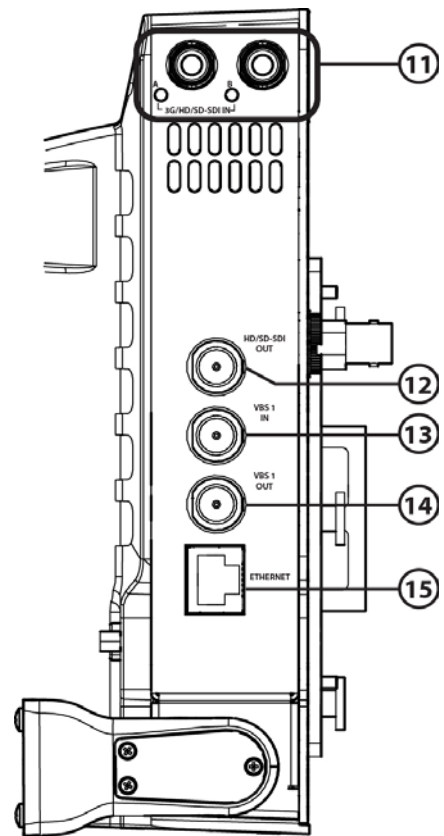
Fig. 2-3: Front and Right Side Connectors and Indicators

There are three areas of interest on the front and right sides of the CopperHead 3430AP Camera Unit:

- E) Connector panel (right side)
- F) Time code output connector (front side).
- G) Camera mounting plate (front side)

Area E - Connector panel

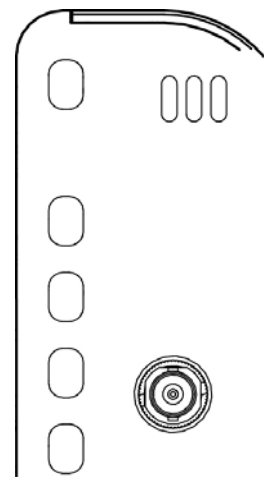
- 11 3D – Dual Link SDI Connectors A & B – Activity indicators are below each SDI connector (to Base Station). System can be used as single or dual link
- 12 SD-HD/SDI Digital Video Output (from Base Station)
- 13 VBS In (to Base Station). VBS signal paths typically carry analog video
- 14 VBS Out (from Base Station)
- 15 Ethernet (100Mbps)



Area F - Time code output

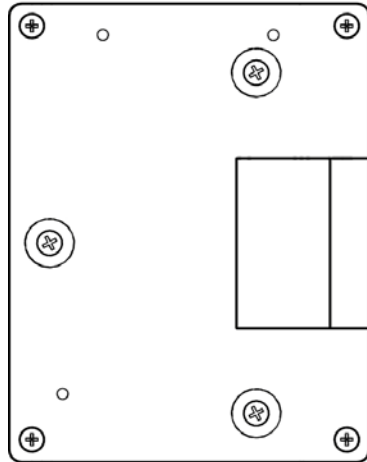
Time Code Out (from Base Station)

For time code synchronization of multi-camera productions, and/or video/audio synchronization.

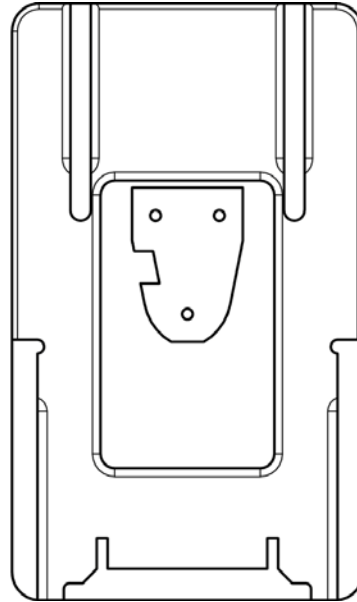


Area G - Camera mounting plate

The CopperHead 3430AP is shipped with either the Anton Bauer mount or the Sony V-mount.



Anton Bauer Camera Mounting Plate



V-type Camera Mounting Plate

Controls and Indicators - Left Side

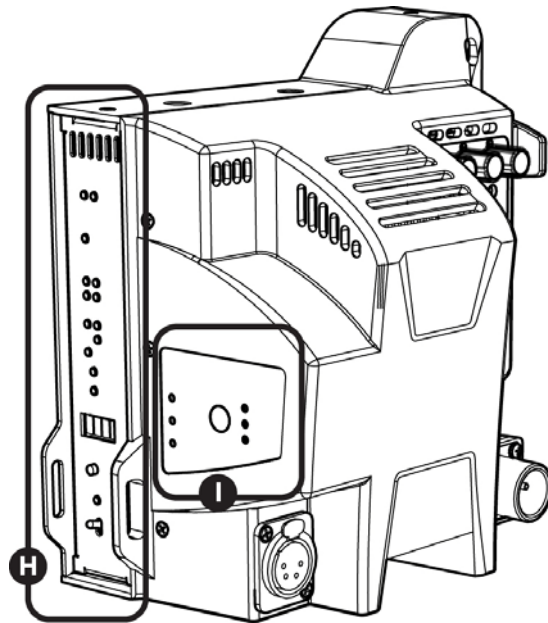


Fig. 2-4: Left Side Controls and Indicators

The left side of the camera unit has two areas of interest:

H) Signal/Data indicators

I) Fan Control switch and indicators

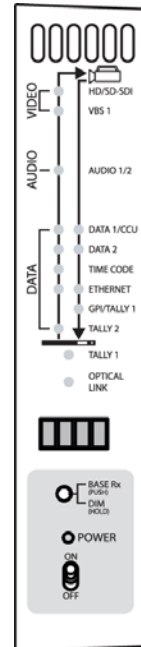
Area H - Signal/Data LED activity indicators

The CopperHead 3430AP 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. Note: the 3G/HD/SD-Dual Link Indicators are located on the opposite (left) side of the Camera Unit adjacent to the 3G/HD/SD-Dual Link SDI Connectors.

The arrow on the panel graphic indicates the direction of the signal - either to or from the camera unit.



16 HD/SD-SDI Digital Video Signal

Monitors camera SDI Video to Base Station and SDI return video to the Camera Unit (this is not the 3D-DLink signal)

17 VBS 1 – Analog Video Signal

VBS 1 is used for Return Video from the Camera Unit to the Base Station and Return Video from the Base Station to the Camera Unit

18 Program Audio Channels 1/2

Monitors return audio from Base Station to Camera Unit.

19 Data 1 / CCU

Data 1 - used for a serial control device (RS232, 422, 485)

CCU – used for Camera Control Unit

20 Data 2

Data 2 is typically used for an auxiliary device such as a robotic pan & tilt head. or a serial control device (RS232, 422, 485)

21 TC – Time Code Signal

Monitors Time Code to Camera

22 Ethernet Signal

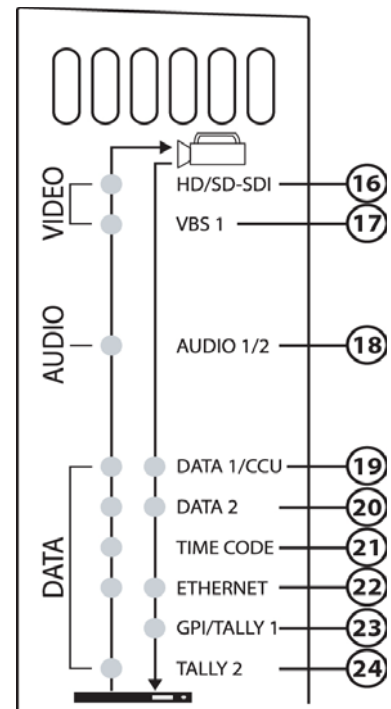
Monitors Ethernet to Base Station and return from Camera

23 GPI/Tally 1

Monitors GPI/TRIG Signal or TALLY 1 from camera.

24 Tally 2

Monitors TALLY 2 signal to camera unit.



25 Tally 1 Indicator Light

Indicates the status of the GPI/Tally 1 signal

- **Off** when the signal is not present
- **Bright Red** when the signal is present

26 Optical Link Indicator

Indicates the status of the optical connection from base to camera and camera to base

- **Green** when both the Base Station and camera control unit have optical power within normal range.
- **Red** when either the Base Station or camera control unit optical power is not within normal range.

27 Rx Optical Display (Digital Status Display)

Four character display in one of five modes. See [The CopperHead 3430AP Camera Unit Digital Display](#) on page 51 for use of this Digital Status Display

28 Base Rx/Dim Push Button

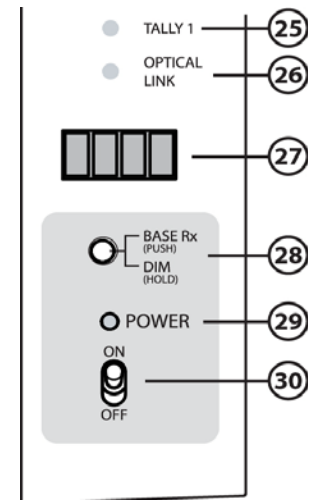
Change four character display mode. Push and release changes display mode. Push and hold adjusts LED indicator brightness

29 Power Indicator LED

- **Green** indicates power is applied to the camera control unit.
- **Blinking Green** indicates a camera control unit error. Refer to DIAG display mode for details – page 52

30 Power On/Off Switch

Toggle switch controls power to the CopperHead 3430AP Camera Unit, the 12 VDC output and the camera when using the Sony-V Mount (Camera power control is not available with the Anton-Bauer mount)

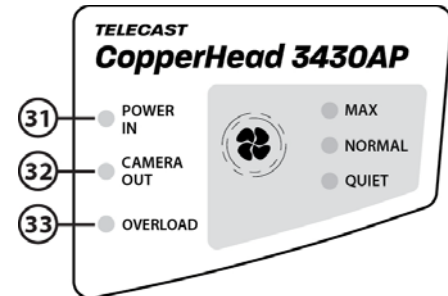


Area I – Power Indicators, and Fan Control Switch and Indicators

Power Indicators

31 POWER IN

- **BRIGHT GREEN** – CopperHead 3430AP Camera Unit is switched on and the HDX-Plus is operating at normal voltage
- **DIMLY LIT GREEN** – CopperHead 3430AP Camera Unit is switched off and the HDX-Plus is operating at standby voltage



32 CAMERA OUT

- **BRIGHT GREEN** – CopperHead 3430AP Camera Unit is switched on and the HDX-Plus is operating at normal voltage. The camera is receiving normal voltage.

33 OVERLOAD

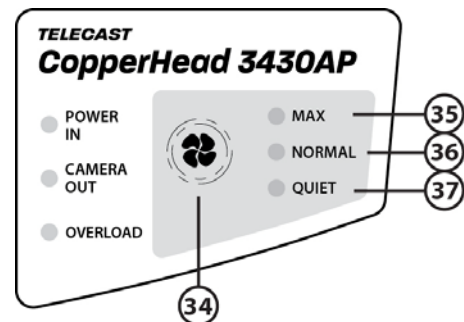
- **BRIGHT RED** – Maximum rated power output is reached
- **FLASHING RED** – Maximum rated power output is exceeded – the CopperHead 3430AP unit will shut down to protect the system and must be power cycled either at the Camera Unit or the HDX-Plus to restart the system.

Fan Operations

34 Fan Control Switch

Push switch selects between three settings; the LED corresponding to the selection is illuminated:

- **MAX** – Fan Speed is continuously at maximum speed
- **NORMAL** – Fan Speed initially set to lowest speed and then adjusts based on unit internal temperature – the temperature is never allowed to be close to the unit maximum operating temperature.
- **QUIET** – Similar to NORMAL setting except that the temperature IS allowed to be close to the unit maximum operating temperature.



35 MAX Indicator

Fan is operating at full speed.

36 NORMAL Indicator

Fan is operating in Normal mode and speed increases from minimum speed to full speed

over a temperature range of 55 degrees centigrade to 70 degrees centigrade. Speed increases more rapidly as unit first begins to increase in temperature.

37 QUIET Indicator

Similar to NORMAL mode except that fan speed increases slowly as unit increases temperature and then more rapidly as the unit approaches maximum allowable temperature.

Fan Diagnostic Mode

The fan switch allows entry into a LED test mode. Push and hold the FAN switch for about five seconds and the test will begin. At this point all of the LEDs will blink indicating that the fan system is functioning.

High Temperature Warning

If during regular operation (not the diagnostic mode described above) any of LEDs begin to blink slowly then the CopperHead unit has reached a temperature of 65 degrees centigrade. If during regular operation (not the diagnostic mode described above) any of LEDs begin to blink quickly then the CopperHead unit has reached a temperature of at least 70 degrees centigrade.

If the temperature reaches 70 degrees centigrade confirm that the fan is working correctly in the unit. If this high temperature is sustained for any period of time damage may occur to the system. The unit should be turned off and allowed to cool before restarting and the unit should be checked for malfunction as soon as possible.

Copperhead 3400 Base Station

The Copperhead 3400 Base Station is available with a number of options. The unit is ordered with a specified Power Module, Audio/Intercom Module and Fiber Connector.

Front Panel

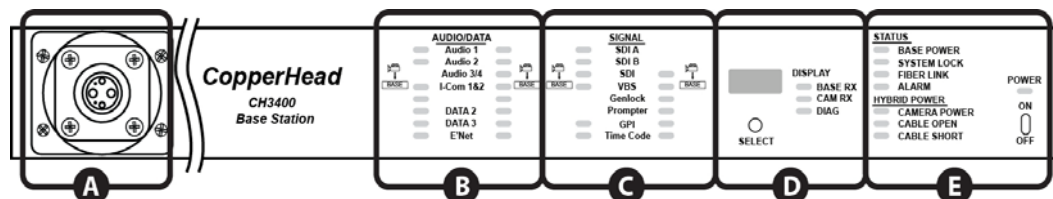


Fig. 2-5: Base Station Front Panel

The front panel of the Copperhead 3400 base station has five areas of interest:

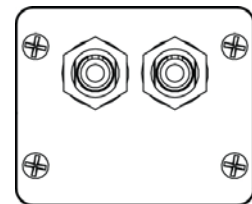
- A) Optical Connector
See this Page
- B) Audio/Data Indicators
See page 16
- C) Video/Data Indicators
See page 16
- D) Signal Strength Indicators/Setup
See page 17
- E) Status/Power Indicators
See page 17

Area A – Front Panel Optical Connector (Optional)

Area A of the Copperhead 3400 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. Front mounting of the optical connectors is normally specified at the time of ordering. Area A is provided with a blank panel when the normal rear mounting of the fiber connectors is specified.

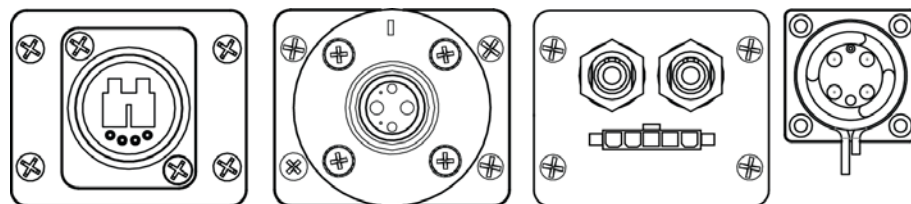
The Copperhead 3400 Base Station for use with the CopperHead 3430AP Camera Unit is normally delivered with two ST Fiber Optical connectors for connection to the HDX-Plus power supply.

As noted above existing Copperhead 3400 Base Station units with other types of connectors can be used with the 3430AP system with the addition of Fiber Connector jumper cables connecting ST connectors to one of the panel mounted connector types shown below. Please consult Grass Valley support for information regarding the appropriate jumper cable.



ST/UPC

The Copperhead 3400 Base Station may also be equipped with one of these other types of Fiber Connector. These types of connector are not normally specified for a new CopperHead 3430AP system.



Neutrik OpticalCOM

SMPTE 304M

ST/UPC with 5Pin Molex

MX

Fig. 2-6: 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 and right side LEDs indicate signal paths from the Base Station to the Camera Unit.

1 Program Audio Channels

Monitors Return audio from Base Station to Camera Unit. Channels 3/4 are n/a.

2 I-Comm (Intercom) Channels 1-2

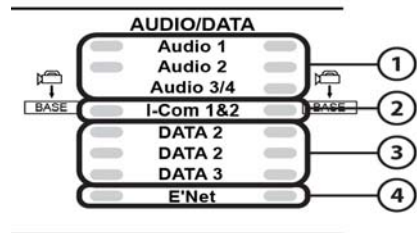
Monitors Intercom audio from Camera Unit to Base Station and from Base Station to Camera Unit

3 DATA 1-2 Signal

Monitors the serial Data signals to and from Base Station to and from the Camera Unit, DATA 3 is n/a.

4 E'Net (Ethernet) Signal

Indicates IP Data traffic to and from Camera Unit to and from Base Station



Area C – Video/Data Indicators

5 SDI A-B Signals

Monitors the 3G/HD/SD-0SDI Dual-Link signals from the CopperHead 3430AP Camera Unit

6 SDI Digital Video Signal

Monitors SDI return video to the Camera Unit.

7 VBS– Analog Video Signal

Monitors analog Camera video from the Camera Unit to the Base Station and Return video to the Camera Unit from the Base Station

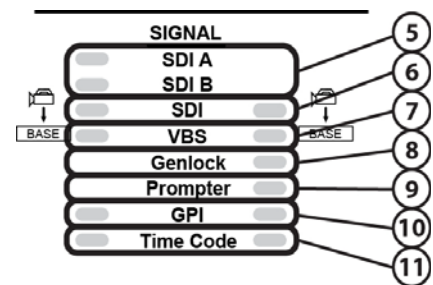
8 Genlock

N/A for the CopperHead 3430AP system.

9 Prompter

N/A for the CopperHead 3430AP system. Use the VBS signal path.

10 GPI



Monitors the Tally/GPI signals to and from Base Station and Camera Unit

11 Time Code

Monitors the house time code from the Base Station to the Camera Unit

Area D – Signal Strength Indicators/Setup

12 Signal Strength Readout in dBm

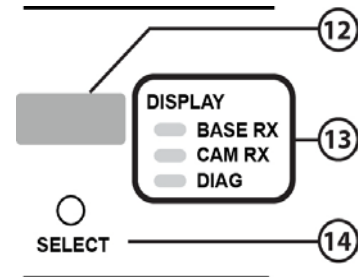
This display changes between display modes when selected

13 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



14 Select Button

Chooses between three modes of operation

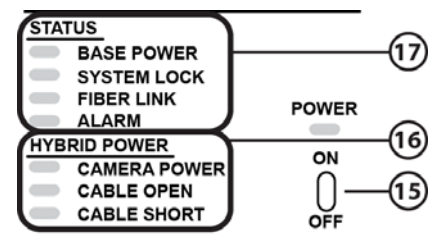
For details on how the setup/diagnostic functions operate, please see [The CopperHead 3400 Base Station Digital Display](#) on page 47.

Area E – Status/Power Indicators

15 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.



For an AC-powered base station to be properly powered, the AC Mains switch on the rear of Base Station must be in the ON position.

16 Hybrid Power Indicators

The Hybrid Power indicators are N/A in the CopperHead 3430AP system

17 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

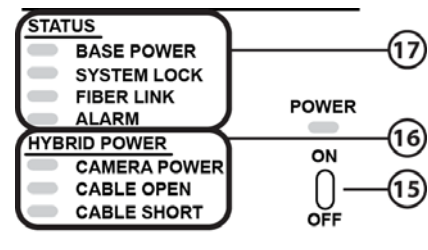
Note: Hybrid Power Indicators are present only on an AC-powered base station.

FIBER LINK - indicates the optical power status of the Base Station and camera

- **Green** when both the Base Station and camera optical power are within a normal range.
- **Orange** when either the Base Station or camera optical power is not within a normal range
- **Red** when both the Base Station and camera optical power are not within a normal range

ALARM - indicates that some error condition exists in either the Base Station or the camera.

- **Red** if there is a Base Station error. Refer to the Base Station DIAG for details on the error.
- **Orange** if there is a camera error. Refer to CAM DIAG for details for the error.



Rear Panel

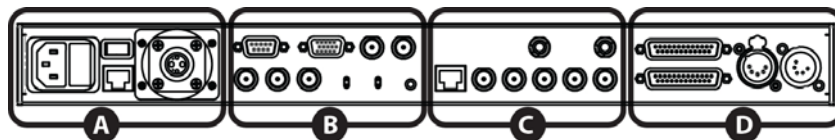


Fig. 2-7: Base Station Rear Panel

The rear panel of the Copperhead 3400 base station has four areas of interest:

A) Power & Fiber Connectors

See page 19.

B) Sync/Data/Control Connectors

See page 20.

C) Video/Ethernet Connectors

See page 20.

D) Audio/Intercom Connectors

See page 20.

Area A – Power & Fiber Connectors (Power Module)

The Copperhead 3400 Base Station for the CopperHead 3430AP system can be configured with Internal AC Power or external 12 Volt power. Multi-pin connector wiring suggestions are covered in the Appendix.

Power Options:

Internal Power

- 18 AC Power Receptacle and 4AMP Dual Fuse Assembly

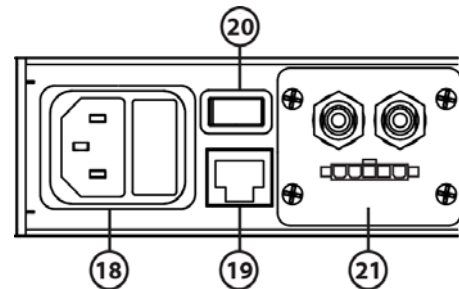
100-240V 50/60 Hz

See Page nnn for the Fuse Specification

- 19 For Future Use³

- 20 AC Mains Switch

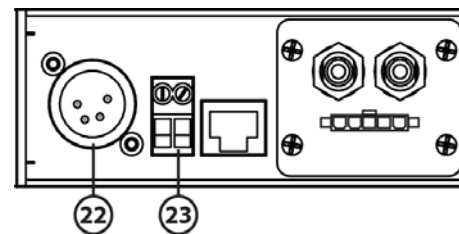
- 21 ST Connectors & Molex power connector



External Power

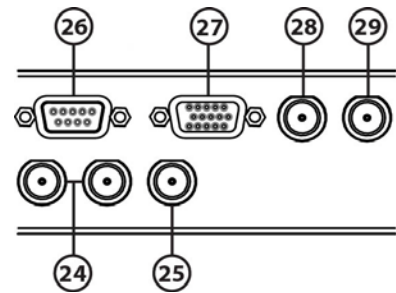
- 22 12V DC External Power Supply input connector (XLR 4 Pin)

- 23 12V DC Input – terminal block



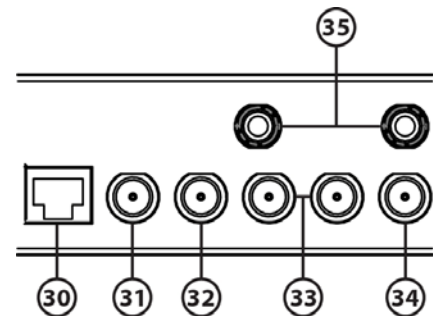
Area B – Sync/Data/Control Connectors

- 24 Sync/Black Burst input connector & Loop through
- 25 Video Prompter input to Camera (N/A for 3430AP)
- 26 Camera Remote Control Panel Connector
- 27 Data/GPI Multi-Pin Connector
- 28 Time Code In to Camera
- 29 Time Code Out from Camera (N/A for 3430AP)



Area C - Video/Ethernet Connectors

- 30 Ethernet connector – 10BaseT/100BaseT
- 31 VBS Output from Camera
- 32 VBS Return Video source Input to Camera
- 33 SDI Program from Camera Unit outputs 1-2
(N/A for 3430AP)
- 34 SDI Return Video source Input to Camera
- 35 3D/HD/SD-SDI Dual-Link from camera outputs A-B

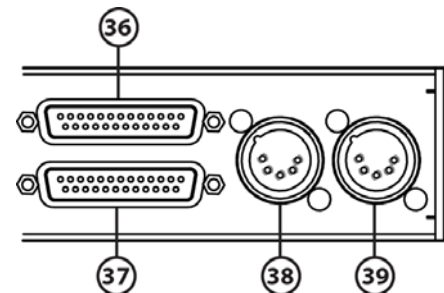


Area D – Audio/Intercom Connectors

The Copperhead 3400 Base Station can be configured with one of three different Intercom options. The connection and practical use of each of these options is covered in [Intercom Usage](#) beginning on page 42. Multi-pin connector wiring is covered in Appendix A.

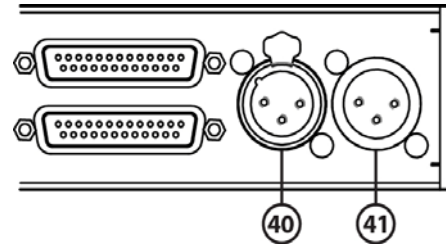
Four Wire Intercom Module

- 36 Audio In Multi-pin connector
- 37 Audio Out Multi-pin connector
- 38 Ch-1 Intercom connector
- 39 Ch-2 Intercom connector



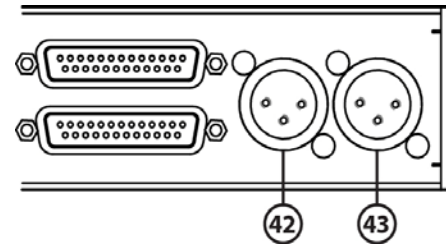
RTS TW Intercom Module

- 40 Intercom Input
- 41 Intercom Loop Through



Clear-Com Intercom Module

- 42 Ch-A Intercom Connector
- 43 Ch-B Intercom Connector



HDX-Plus Power Unit

The HDX-Plus Power Supply Unit is the required standard power supply for the CopperHead 3430AP Transceiver System. The HDX-Plus will supply up to 200 watts at 17 VDC to the Copper-Head 3430AP Camera Unit.

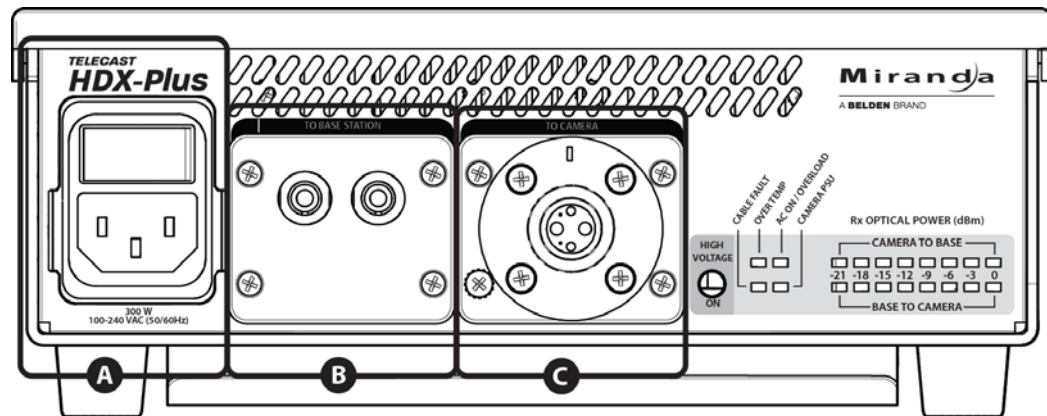


Fig. 2-8: HDX-Plus Front Panel

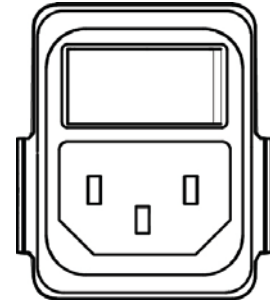
The HDX-Plus has three areas of interest:

- A) AC Power module - see page 22
- B) Fiber optic connectors - see page 22
- C) System indicators - see page 22

Area A - AC Power Module

The HDX-Power Plus can utilize 100-240 VAC (50/60kHz) power. The system will auto-detect the incoming voltage level

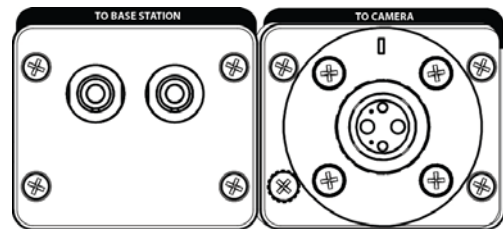
The power switch controls power on/off for the entire CopperHead 3430AP system.



Area B - Fiber Connectors

The HDX-Plus power supply connects to the Copperhead 3400 base station with a pair of ST Fiber connectors using Tactical Fiber Optic cable.

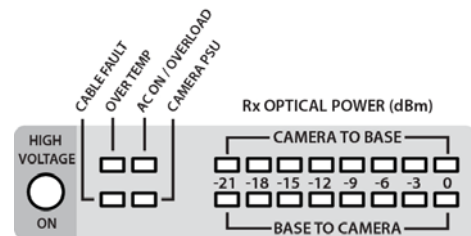
The HDX-Plus power supply connects to the CopperHead 3430AP Camera Unit using SMPTE 304M Hybrid connectors over Hybrid Fiber Optic cable.



Area C - System Indicators

The HDX-Plus power supply provides two types of indicators:

- The first group is power and cable integrity indicators.
- The second group is an Optical Power meter.



Power/Cable Integrity Indicators

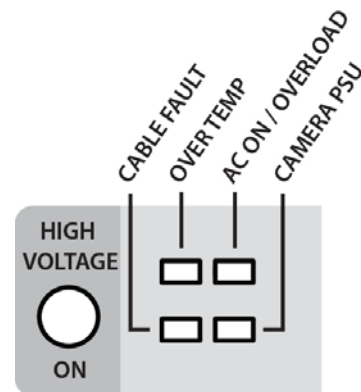
This area provides the following LED indicators:

HIGH VOLTAGE

- **Yellow** when system High Voltage is present

OVER TEMP

- **Orange** if the HDX-Plus cooling fan fails
- **Red** if the HDX-Plus senses internal high temperature
- **Flashing Red** if the HDX-Plus has shut down because of high temperature



AC ON/OVERLOAD

- **Green** when system normal operations or when the HDX-Plus has AC Power
- **Red** when the HDX-Plus power supply is overloaded
- **Off** when switch is off, no AC power or fuse is blown

CABLE FAULT

- **Red** if a high voltage short or open condition is detected

CAMERA PSU

- **Green** if the Camera Unit power supply is detected
- **Red** if the 3430 Camera Unit power supply is shut down due to an overload.

Optical Power Monitoring

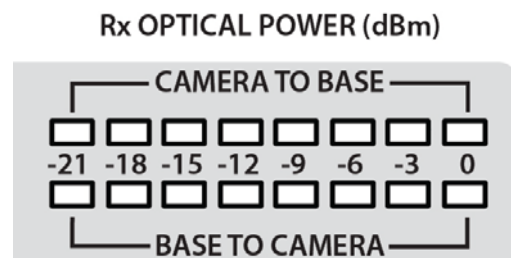
The HDX-Plus power supply provides Optical Power monitoring for both the Camera unit and the Base unit. The metering uses Multi-Colored LEDs with indicators covering a range of -21 dBm to 0 dBm. The CopperHead 3430AP Transceiver system is specified to operate at Optical Power levels above -22dBm.

The unit has two rows of LEDs:

- Top row indicates the optical power level at the camera unit
- Bottom row indicate optical power level at the base station

All of the indicator LEDs are multi-color:

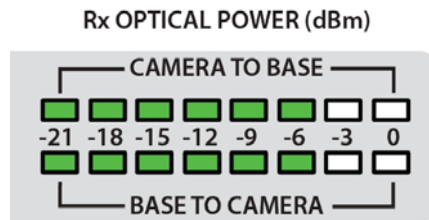
- Green - good power
- Yellow Orange - Marginal power
- Red - Insufficient power.



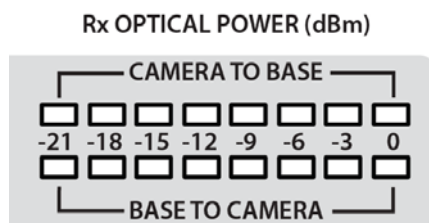
Note: The CopperHead 3430AP system is, of course, a digital system and therefore the link will operate properly at the lowest acceptable signal strength. If the signal strength dips below the minimum acceptable level the link will not operate.

Power Monitoring Scenarios

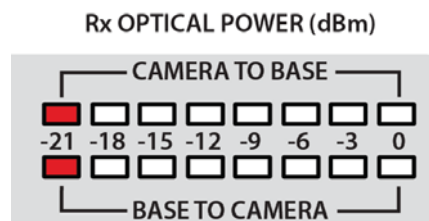
The following diagrams illustrate operational scenarios in which the Optical Power Indicator LEDs provide a visual indication of the CopperHead 3430AP fiber optical status.



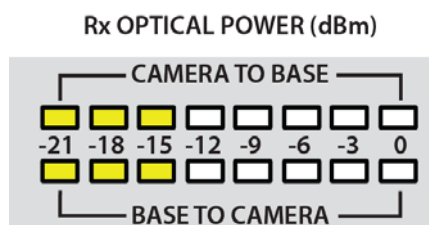
This scenario is a good operational situation. The -6 dBm reflects typical signal strength across a Fiber Optic cable run. The CopperHead 3430AP system will run perfectly at this signal strength.



This scenario shows a bad Fiber Optic link and no Optical Power in either direction. Check to see if there is a problem with the Fiber Optic connection or cable.

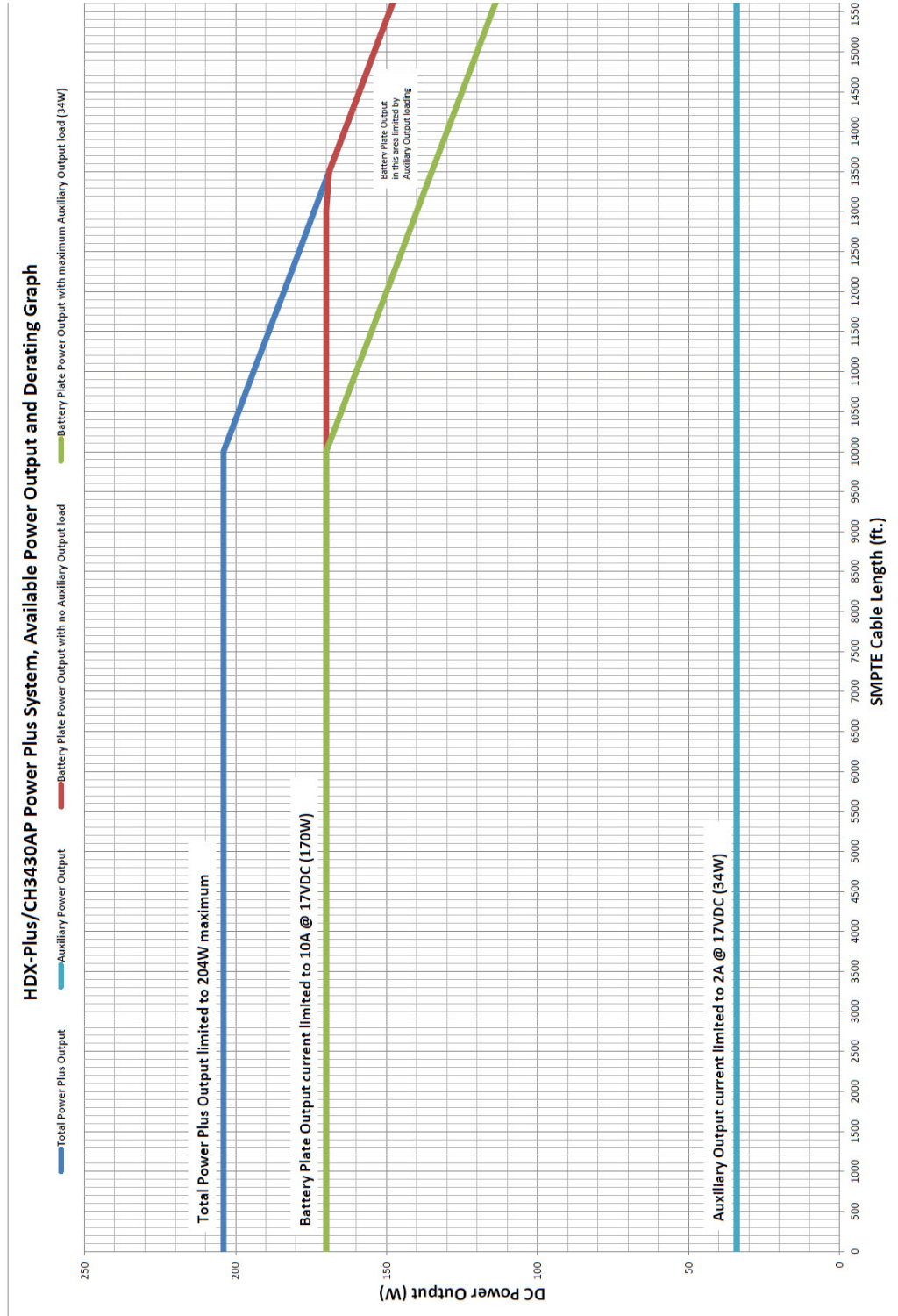


This scenario shows just enough Optical Power present to provide an operational link. Check the Fiber Optic cable run for possible damage or physical interference such as sharp bends in the cable. Also check the Fiber Optic connectors for dust, dirt or damage.



This scenario shows low Optical Power but more than adequate for a usable link. Keep an eye on the reading to make sure it is consistent. Check the cable run as above and check the Fiber Optic connectors for dust, dirt or damage.

HDX-Plus Power Output and Derating Chart



3 Installation and Connection

Chapter 3 describes the installation and connection of the CopperHead 3430AP system, including the Camera Unit and the base station.

Topics

| | |
|---|---------|
| <i>Overview</i> | page 27 |
| <i>Mounting the CopperHead 3430AP Camera Unit to the Camera</i> | page 27 |
| <i>Connecting the CopperHead 3430AP Transceiver System</i> | page 28 |
| <i>Connections to the CopperHead 3400 Base Station</i> | page 30 |
| <i>Connections to the CopperHead 3430AP Camera Unit</i> | page 33 |

Overview

This chapter describes the physical installation of the CopperHead 3430AP Transceiver System. The following areas are covered:

- Mounting of the CopperHead 3430AP Camera Unit to the camera
- Connecting the three components of the system – The Camera and Camera Unit, the HDX-Plus Power Supply and the CopperHead 3400 Base Station
- Detailed information for all system connections

Mounting the CopperHead 3430AP Camera Unit to the Camera

This example illustrates the mounting of an Anton Bauer battery system. Your system may differ.

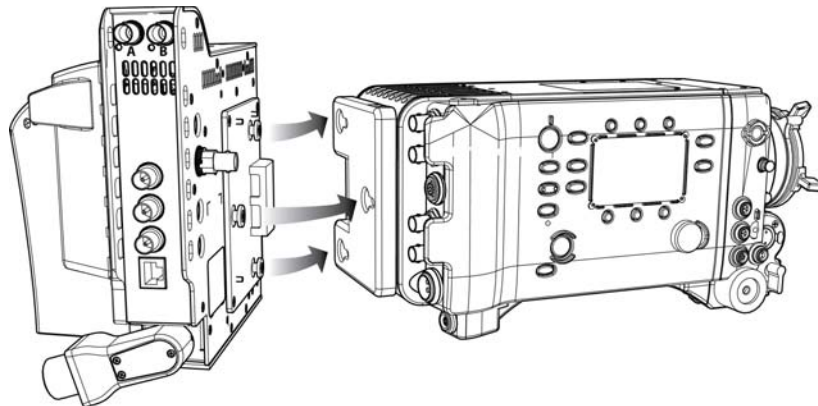


Fig. 3-1: Mounting the CopperHead 3430AP Camera Unit to the Camera

- 1 Position your camera 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.
- 2 Attach the CopperHead 3430AP Camera Unit to the camera battery mounting plate. The mounting is mechanically identical to attaching a battery. See [Camera Unit Connections](#) on page 35 for details of the camera unit-to-camera connections..

For configuration please see Chapter 4.

Connecting the CopperHead 3430AP Transceiver System

Prior to connecting your CopperHead 3430AP 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 any custom multi-pin cable sets required for your particular installation. Please see Appendix A for information regarding cables, signals and custom multi-pin cable fabrication.

Note that the use of any existing CopperHead 3400 Base Station without ST Fiber Connectors is not covered in this user guide.

Covered in this chapter are:

- 1 Overview of connections between the three main system components.
- 2 Connections between the CopperHead 3400 Base Station and the base video infrastructure & power components
- 3 Connections between the CopperHead 3430AP Camera Unit and the video camera & power components.

Note: The following fiber connection scenario does not take into account any customized cable and connector installations you may have at your facility. For assistance regarding more complex connection situations please contact Grass Valley or your local authorized dealer.

Connection Overview of the CopperHead 3430AP Transceiver System

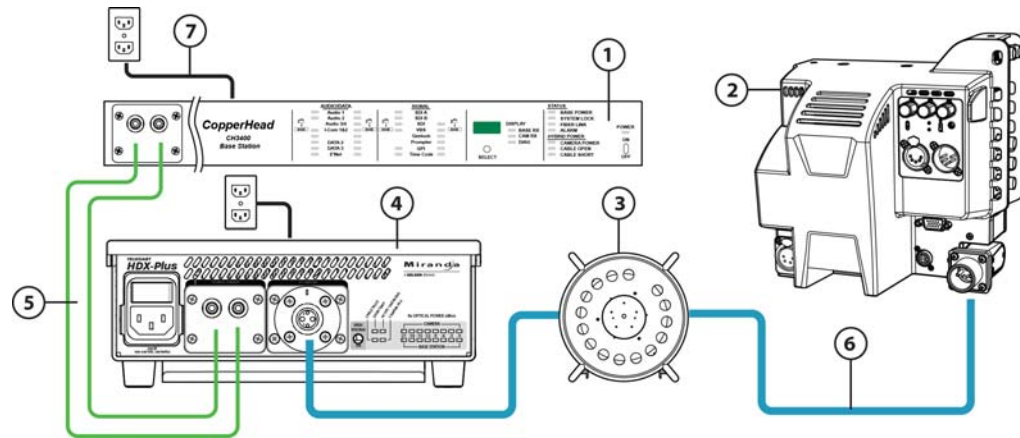


Fig. 3-2: Connection Overview of the CopperHead 3430AP Transceiver System

Between the Base Station (1) and the HDX-Plus Power Supply (4) connect a pair of ST Fiber Cables (5).

Power the HDX-Plus Power Supply locally by connecting to AC Power. Between the HDX-Plus (4) and the Camera Unit connect a length of SMPTE Hybrid Fiber Cable (6). Each end of the fiber cable will have an SMPTE 304M Connector (3).

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 3430AP Camera Unit (2).

The Base Station will be powered by connection to local AC power either directly to the AC Mains or by use of a 12 VDC external power supply depending on the model of CopperHead 3400 Base Station in use (7).

Connections to the CopperHead 3400 Base Station

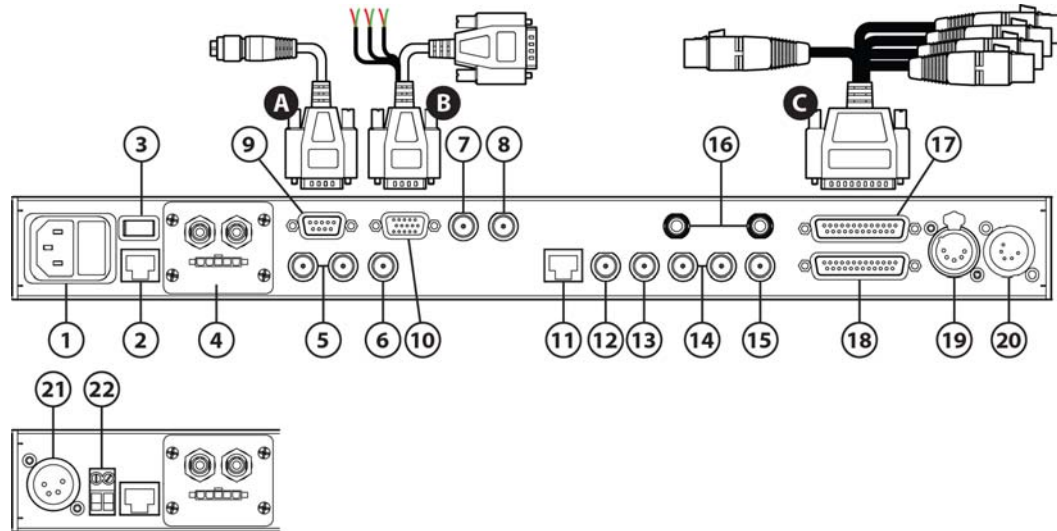


Fig. 3-3: CopperHead 3430AP Base Unit Connections

Multi-Pin Cable Assemblies Used with the CopperHead 3400 Base Station

A Camera Remote Control (Remote) Connector–

Connect either your Camera Remote Control or the Grass Valley Universal Controller – CHRCP-2050A or CHRCP-2050-LCD.

See Appendix B for a list of Grass Valley-supplied cables

B Data/GPI Connector

Connect a Remote Pan/Tilt/Zoom Control Unit and connect to one GPI Out and two GPI inputs. Usage of GPI/Os other than Tally and Intercom control is outside of the scope of this User Guide.

Serial Control devices using RS232/422/485 can be controlled over this signal path. See page 61 for wiring details

C Audio In Connector

Connect Intercom Program Audio and four Production Audio Channel outputs.

See page 61 for wiring details

Connectors into and out of the CopperHead 3400 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. . Connectors that are present on the CopperHead 3400

Base Station but not used in the camera configuration are noted as Not Available (NA). Key numbers refer to the diagram above.

1 & 21 Power In

Connect a standard 3 conductor AC Cable (IECPlug) 100-240V 50/60 Hz standard or a 12V DC ADAP power source (4 Pin)

4 Fiber Connector

(This connector can be mounted on the Base Station Front Panel – see page 15)

Connect the ST fiber connectors from the HDX-Plus power saupply.

5 Sync In/Loop

BNC Connector – standard Genlock/Sync/Tri-Level sync signal. The loop-through is self-terminating.

6 Prompter In

N/A in 3430AP configuration

7 Time Code In

BNC Connector – Standard time code signal sent to camera – typically originating from a “house” time code generator feed available at the Base Station. On remote productions the primary camera may be used to originate the system time code feed (signal would return to base station via connector 8 and then be distributed to other cameras through the associated Copperhead Base Stations

8 Time Code Out

N/A in 3430AP configuration.

9 Multi-Pin Connector A

DB9 – 9 pin serial connector connected to an optional Camera Remote Control Panel



Power to the Base Unit (and the Camera Unit & Camera) must be turned off when connecting the Camera Remote Control Panel – connecting with the power on can seriously damage your equipment.

10 Multi-Pin Connector B

DB15 – 15 pin serial connector connected to a breakout of Tally and GPI signal connectors. Typically this connector will be connected to the Camera Tally system originating at the Production Switcher or the Tally Management system used in your production environment. Additional custom GPI contact closures can be configured.

See page 66 for a typical configuration.

11 Ethernet Connector – 10Bt/100Bt capable

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 Envi-

ronment IP network.

12 VBS Out

BNC Connector -Typically used for SD Monitoring Video return from the Camera

13 VBS In

BNC Connector – Typically used to send SD return video to the camera – an example is monitor out from the production switcher. Also used for Prompter feed.

14 SDI Out 1 & 2 (this carries the HD feed (not the 3D/Dual Link) from the camera)

N/A in 3430AP configuration.

15 SDI In

BNC Connector – Typically used to send HD return video to the camera – an example is program out from the Production Switcher

16 SDI Out A & B (this carries the dual 3D/Dual Link signals from the camera)

BNC Connectors

17 Audio In - Multi-Pin Connector

DB25 – 25 pin Connector follows the Tascam TDIF standard. The CopperHead 3430AP 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. Please see Page 93 for sample wiring.

18 Audio Out - Multi-Pin Connector

DB25 – 25 pin Connector follows the Tascam TDIF standard. The CopperHead 3430AP Transceiver System accommodates up to two Audio Channels at Line Level. This connector handles return audio to the Camera location. Please see Page 94 for sample wiring.

19 & 20 Intercom Connectors #1 & #2

XLR 3 pin or 5 pin Connector depending on configuration. One of three options will be installed (4-wire intercom, RTS or Clear-Com). Please see Chapter 6 for information on using each of the Intercom Options.

22 12V Terminal Block

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.

23 12V Terminal Block

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 (21).

Connections to the CopperHead 3430AP Camera Unit

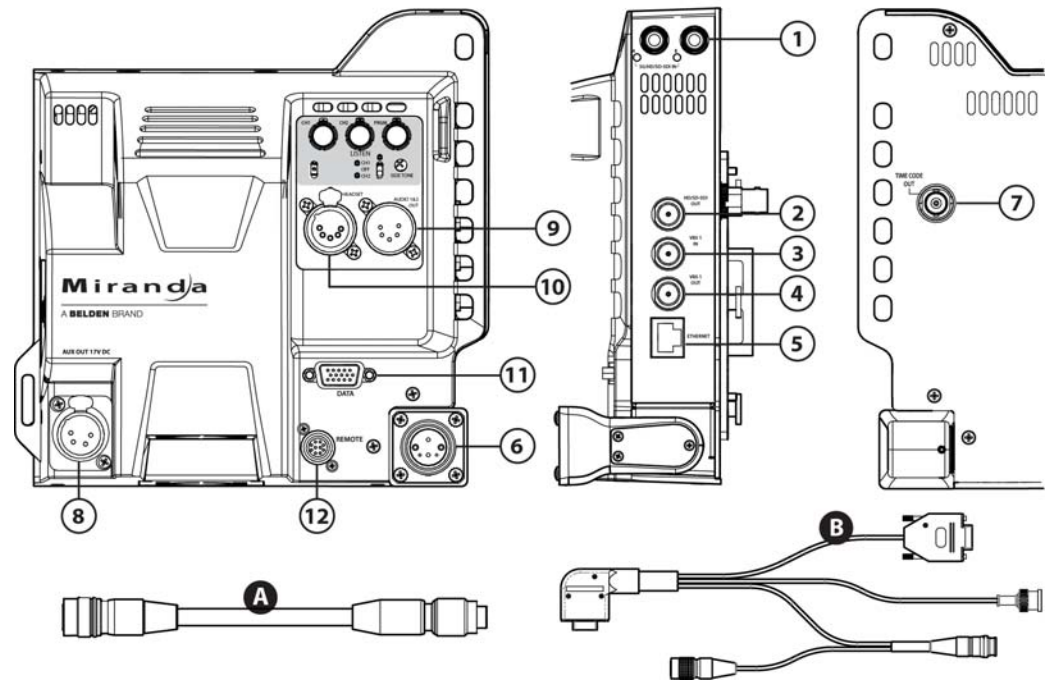


Fig. 3-4: CopperHead 3430AP Camera Unit Back Side Connections

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.

Multi-Pin Cable Assemblies Used with the CopperHead 3430AP Camera Unit

A) Camera Remote Control (Remote) Connector

Connect this to the CCU input on your camera. The Grass Valley-supplied cable has a red sleeve at the end to be connected to the CopperHead 3430AP Camera Unit.

See Appendix B for a list of Grass Valley supplied cables.

B) Data/GPI/Tally Connector

This connector carries a number of control, GPI and Tally signals.

See page 63 for wiring details

Connectors into and out of the CopperHead 3430AP Camera Unit Back Side

1 3G/HD/SD Dual Link Inputs

BNC Connectors – Carries 3D/Dual Link camera video from the Camera(s) to the Camera Unit. This requires BNC jumper cables between the Camera Unit and the Camera (s).

2 HD/SD - SDI Output

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.

3 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.

4 VBS Out

BNC Connector – Carries SD Analog video from the Base Station the Camera Unit. Typically this will feed an analog viewing monitor or prompter at the camera location.

5 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.

6 Fiber Connector

Swivel Mounted SMPTE 304M Fiber Optic Cable receptacle.

7 Time Code Out

BNC Connector – Carries Time Code signal from the Camera Unit to the Camera. This is master time code *from* the Base Station. This requires a short BNC jumper cable between the Camera Unit and the Camera.

8 Aux Power Output

XLR 4 Pin Female Connector – Provides 17 VDC power to accessories on or near the camera. Insure that the total power consumption of 30 watts is not exceeded.

9 Audio 1 & 2 Out

XLR 5 Pin Male Connector – Provides Return Audio Out from camera for Channels 1 & 2. Typically connected to a local monitor at the camera position.

10 Intercom Headset Out

XLR 5 Pin Female Connector – Provides two channels of two-way intercom and the Intercom Program audio feed

11 Data Connector

Multi-Pin Connector B – DB15 15 Pin Serial Connector. This carries serial control signals for lens and remote pan & tilt units as well as GPI, Intercom Trigger (GPI) and Tally signals. Miranda Technologies Inc. supplies a number of pre-configured breakout cables for use

with this connector. See Appendix B for details of available cables.

12 Camera Remote Connector

Multi-Pin Connector A– 10 Pin Hirose Connector. This is normally a Grass Valley supplied cable. It connects the Camera Unit to the Camera CCU in to allow operation of the Camera Remote Control Panel. See Appendix B for details of available cables.



Power to the Camera Unit & Camera must be turned off when connecting the Camera Remote Control Panel Cable– connecting with the power on can seriously damage your equipment.

Camera Unit Connections

The following diagrams show example connections between the CopperHead 3430AP Camera Unit and the Camera. Your setup may not require all connections shown.

Camera Unit (Side and Front Panel Connectors) to Camera Connections

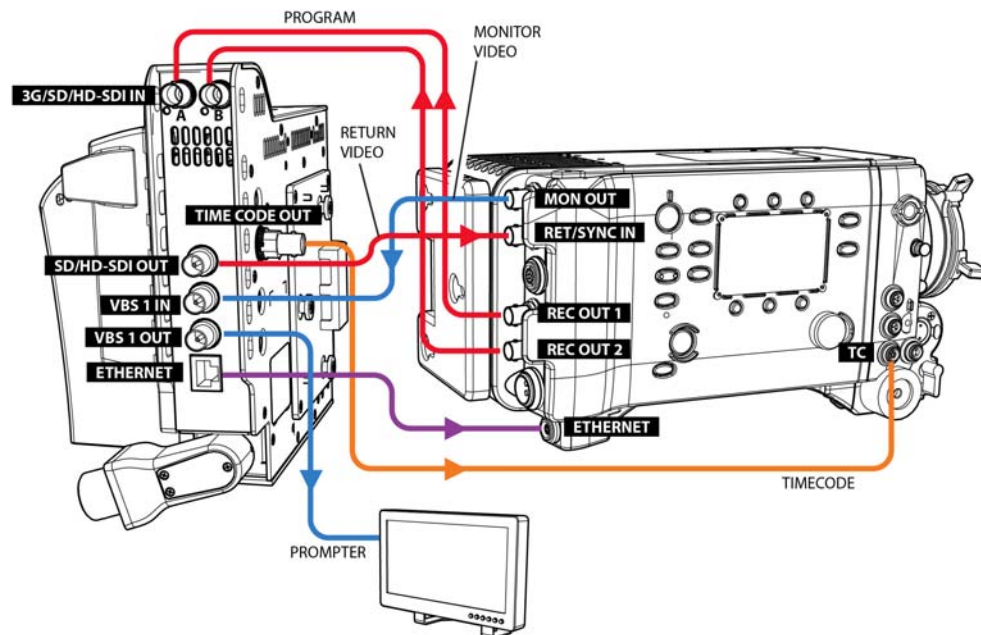


Fig. 3-5: Camera Unit to Camera Connections (Side and Front Panel Connectors)

Camera Unit (Rear Panel Connectors) to Camera Connections

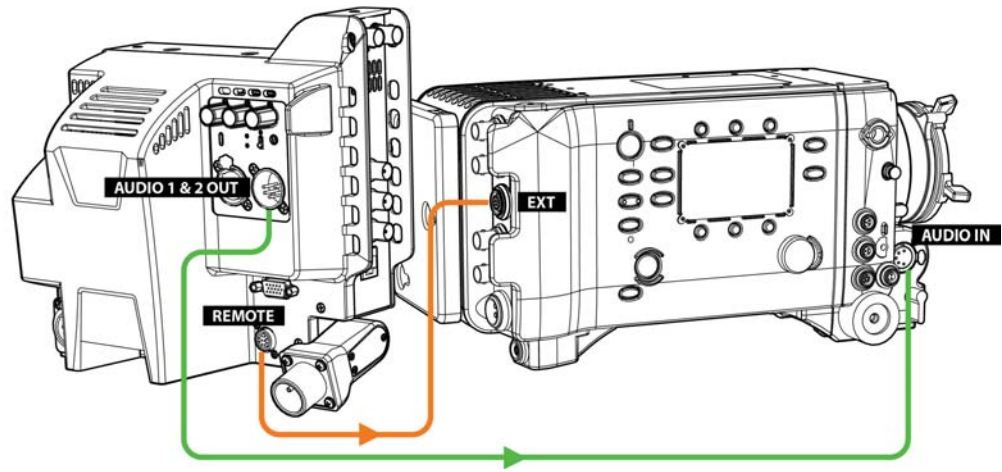


Fig. 3-6: Camera Unit to Camera Connections (Rear Panel Connectors)

4 Operation

Chapter 4 describes the set-up and operation of the CopperHead 3430AP transceiver system.

Topics

| | |
|---|---------|
| <i>Operation of the CopperHead 3430AP Transceiver System</i> | page 37 |
| <i>Set Up of the CopperHead 3430AP Transceiver System for Operation</i> | page 38 |
| <i>Connecting and Managing the Fiber Cable</i> | page 38 |
| <i>Powering the System</i> | page 40 |
| <i>Intercom Usage</i> | page 42 |
| <i>Using the Digital Displays</i> | page 46 |
| <i>The CopperHead 3400 Base Station Digital Display</i> | page 47 |
| <i>The CopperHead 3430AP Camera Unit Digital Display</i> | page 51 |
| <i>Standard Operation</i> | page 53 |
| <i>Shutting Down the System</i> | page 53 |
| <i>Troubleshooting</i> | page 54 |

Operation of the CopperHead 3430AP Transceiver System

This chapter describes in detail the operation of CopperHead 3430AP 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.

The following topics are covered:

- 1 Set up of the CopperHead 3430AP Transceiver System
- 2 Connecting and Managing the Fiber Cable
- 3 Connecting the Fiber Cable
- 4 Powering the System
- 5 Understanding Intercom usage with the CopperHead 3430AP
- 6 Using the Digital Displays
- 7 Standard Operation
- 8 Shutting Down the System
- 9 Troubleshooting

Set Up of the CopperHead 3430AP Transceiver System for Operation

This section provides an overview of setup of the CopperHead 3430AP Transceiver System for operation. The following sections provide additional detail on each aspect of setup and operation.

It is important that you do an initial setup and test of your CopperHead 3430AP Transceiver System as soon as you receive it, in order to confirm proper operation and to provide training to you and your team prior to an actual production.

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

- 1 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 3400 Base Station or the CopperHead 3430AP 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.

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.

- 2 When setting up the CopperHead 3430AP Camera Unit and associated Camera you will need to do the following:
 - a. Make sure all cables running between the CopperHead 3400 base station and the HDX-Plus power supply and local AC power cords are properly managed and secured..
 - b. Mount the camera and CopperHead 3430AP Camera Unit as shown on Page nnn
 - c. Connect all required cables according to Chapter 3. The order in which you connect the cables makes no difference. BUT...
 - d. Turn OFF the camera power before connecting the camera remote control cable to the camera unit and camera.
 - e. Set up the intercom talk back switches and level controls as desired. Please see [Intercom Usage](#) on page 42 for details on Intercom operation with the CopperHead 3430AP Camera Unit.
- 3 Deploy the Fiber Cable (see the next section) – you are now ready to power up the system.

Connecting and Managing the Fiber Cable

Connecting and managing the Fiber Cable between the CopperHead 3430AP Camera Unit and CopperHead 3400 base station or an intermediate power supply requires you to perform four tasks:

- 1 Plan the route the Fiber Cable will take between the Camera Unit and HDX-Plus power supply, and the Base Station and power supply
- 2 Run the Fiber Cable along the planned route
- 3 Connect the Fiber Cable Connectors at each end

- 4 Power up the HDX-plus power supply, the Camera Unit and the Base Station, and check the Fiber Optic Cable Link and signal strength

Planning the Fiber Cable Route

Obviously the longer the planned cable run the more planning required. It also makes a difference whether you are running Tactical Fiber Cable or Hybrid Fiber Cable as these affect both the length and the type of exposure the cable can endure.

When planning your cable route take into the consideration the following:

- 1 Possible obstacles that might cause you to run short of cable – you may need to take a more indirect, but achievable route
- 2 Possible hazards to the cable – while tactical fiber is extremely durable it is not immune to damage. An obvious hazard is running the cable across a lawn scheduled to be cut during your live production. Make sure the empty roadway at 6AM will not be filled with heavy equipment when it comes time to retrieve your cable
- 3 Possible interference (physical) with the cable that might cause it to bend or kink to an extent that unacceptable signal loss occurs.
- 4 Safety hazards – make sure that the cable will not cause a tripping or tangling hazard with people, animals or vehicles.
- 5 Decide whether the Fiber Cable is to be unspooled from the Base Station location or the Camera location. Typically the reel is kept close to the base station. However if there is a chance the Camera location may need to move further away from the Base Station after initial placement it makes sense to place the reel at the camera end. Make sure there is enough free cable coming out of the stationary end of the cable reel to accommodate a well-managed connection to the camera.

Planning the cable route requires common sense and the ability to foresee the unforeseen.

Running the Fiber Cable

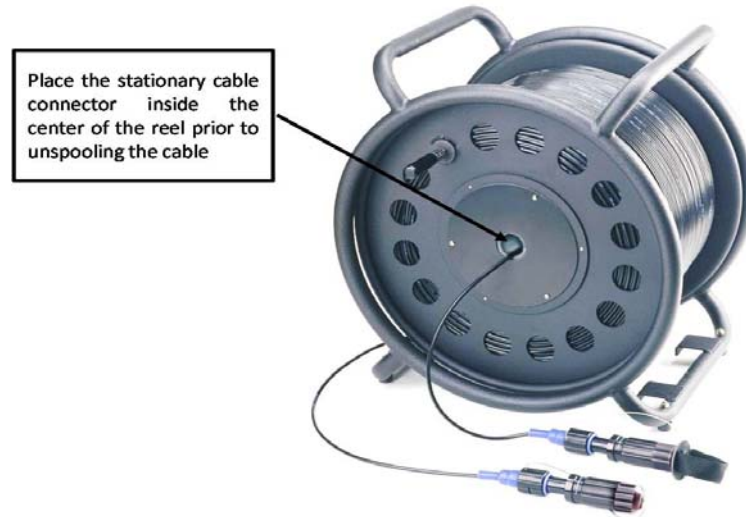
Do the following when running your Fiber Cable:

- 1 Make sure that both ends of the Fiber Cable are securely capped. In this case the concern is dirt and damage. ANY dirt in the connector can adversely affect Fiber Optical performance and potentially cause you to lose the use of your camera while the problem is diagnosed and remedied.
- 2 If the cable run is long or if you will lose sight of the spooling out cable reel make sure you have appropriate assistance in running out the cable. When retrieving the cable, assistance to prevent the cable end from being caught or tangled up could be critical. Don't start reeling in the cable on your own and assume the Connector end will make it back to home base safely.
- 3 When unspooling the cable ALWAYS make sure the stationary end (the end that goes to the Base Station or Power Supply) is securely contained within the reel. A loose Connector can bang around and be damaged and NEVER connect the stationary end of the Fiber

Operation

Operation of the CopperHead 3430AP Transceiver System

Cable to the Base Station or Power Supply and the start unspooling the Fiber Cable. Severe damage to the cable could occur due to extreme spiraling of the connected portion of the cable.



- 4 Prior to connecting the Fiber Connectors to the Base Station and Camera Unit inspect both connectors. If required, clean with dry compressed air or with technical wipes that have been moistened with isopropyl alcohol. Fingerprints or other dirt on the optical connector end surfaces will reduce the optical signal level on the fiber. If the connectors have been properly capped during storage and movement you will not likely have a problem. However if a connector has been dropped or dragged through dirt or exposed to dust cleaning is recommended.
- 5 Once the Fiber Cable has been connected it is time to secure the Fiber Cable run. Make sure there are no cable hazards in the run. Secure the cable with cable guards and/or gaffers tape to insure safety.
- 6 Now the system can be powered on. Plugging in Fiber Cable connectors with the power on will not damage the system but is not recommended because of the chance of possible eye damage.
- 7 When re-spooling the Fiber Cable on to the spool, guide it across the entire width of the spool so that it winds evenly and the possibility of cinching or kinks is greatly reduced.

Powering the System

The CopperHead 3400 Base Station and the CopperHead 3430AP Camera Unit each have a power up routine which tests the equipment and performs a system diagnostic.

Powering the CopperHead 3400 Base Station

| | |
|--|--|
| Base Station Main Power | 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. 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. |
| Base Station Power | 2 Turn on the Front Panel Power Switch located at the front right. #15 on the overall diagram. The power monitor indicator turns from red to green. |
| Four Character Display LED Indicator progression | 3 The 4 character display indicates TEST and all front panel LEDs turn red, then green, then orange, then off. |
| REV display | 4 The LED color test is followed by REV and the revision of the display microcontroller firmware. |
| Scrolling | 5 The REV indication is followed by "miranda.com" scrolling across the 4 character display. If there's no scrolling, please contact Grass Valley - A Belden Brand support for assistance. |
| PAUSE | 6 The scroll is followed by about a 3 second interval used to synchronize all the microcontrollers in the base station |
| Diagnostics | 7 The front panel will cycle through the diagnostics displays – See Section 6.5 |
| Current Status Displayed | 8 After the 3 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. |

Powering the CopperHead 3430AP Camera Unit

| | |
|--|--|
| Camera Unit power | 1 Turn on the camera unit power switch |
| Camera Power | 2 Turn on the camera power. |
| Four Character Display LED Indicator progression | 3 On power-on, the four character display indicates the current Revision Version (REVA). Your unit will reflect the current Revision Version. After the revision display the current Fiber Link strength is displayed. A typical display is 0 to -27. This indicates Fiber link strength of from 0 to -27 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 below, beginning on page 46.

Intercom Usage

The CopperHead 3400 Base Station is delivered pre-configured for compatibility with one of three standard intercom systems:

- 1 Clear-Com Intercom
- 2 RTS intercom
- 3 Standard Four Wire Intercom

Wiring for each of these options is described in Appendix A.

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.

Intercom controls and indicators are found on the rear of the CopperHead 3430AP Camera Unit and provide the following functionality:

- 1 Headset volume control for two Intercom channels and Program audio.
- 2 Sidetone adjustment to control the volume of the operator's voice heard on the intercom headset. It does not affect the mic volume on the intercom channel.
- 3 Control of the Push-To-TALK (PTT) function for each Intercom Channel, either locally or through a remote PTT switch.
- 4 LEDs show audio activity on the two Intercom and Program audio channels.

Note that intercom beltpacks cannot be plugged into the CopperHead 3430AP Camera Unit. Only an intercom headset can be plugged into the Camera Unit.

Camera Unit Intercom Operation

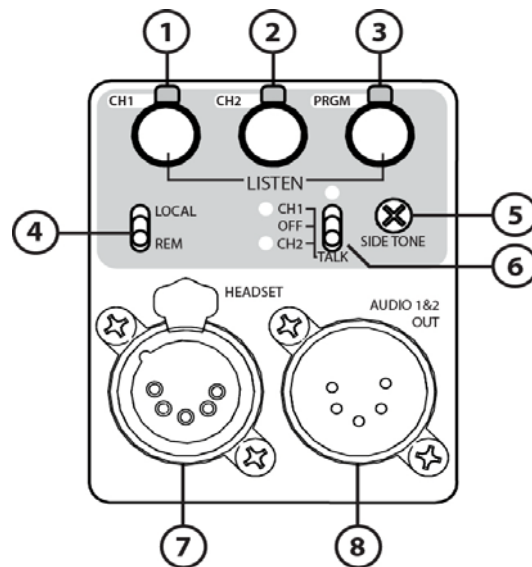


Fig. 4-1: Audio Interface Box Detail (Camera Unit)

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 (#6, 7, 8). The LISTEN indicator LEDs indicate activity on the Intercom channel(s) and the Program audio feed, and illuminate even if your LISTEN control knobs are turned down.

TALK:

The Intercom TALK toggle switch (#11) 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 (#11) 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** (do not press and hold) 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.

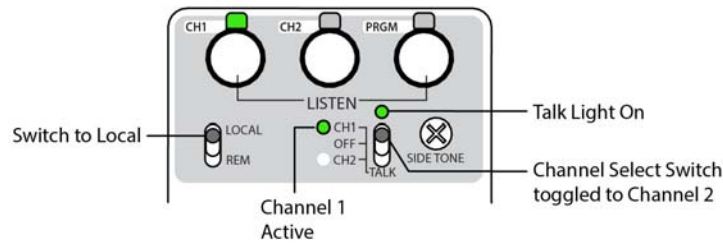


Fig. 4-2: Local Activation of Channel 1 Talk Back

Figure 4-2 shows the intercom LEDs with the mic open and audio activity on channel 1.

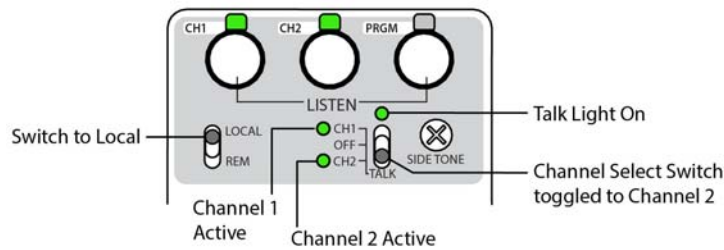


Fig. 4-3: Local Activation of Both Intercom Channels

Figure 4-3 shows the intercom LEDs with the mic open and audio activity on channels 1 and 2.

Intercom Remote Push-To-Talk

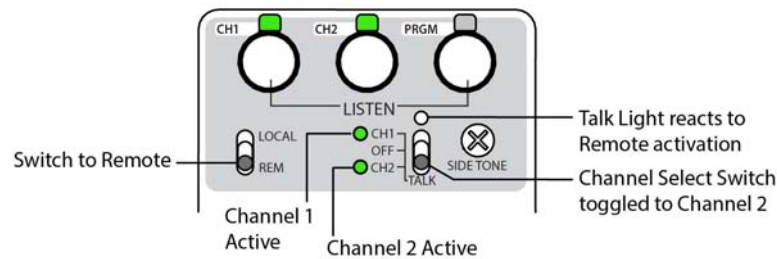


Fig. 4-4: Remote Activation of Intercom Talk Back

When a Push-To-TALK (PTT) switch is required in a remote location (such as on a tripod panhandle or a camera boom), a remote PTT switch can be connected to the 15-pin "Signal/Data" connector. See Appendix NNN for an example of a breakout cable with a remote PTT switch.

To activate a Remote PTT switch, switch the INTERCOM LOCAL/REMOTE switch to REM.

Using the TALK toggle switch, select the intercom channel(s) that you wish to talk to. The CH1 and/or CH2 LED(s) will illuminate to indicate selected channel(s).

When the remote PTT switch is toggled, the TALK indicator will illuminate, indicating the mic is open on the selected channel(s). The TALK indicator will go out when the remote PTT switch is toggled again.

The Remote PTT switch will operate in Momentary or Latching modes.

Intercom Sidetone

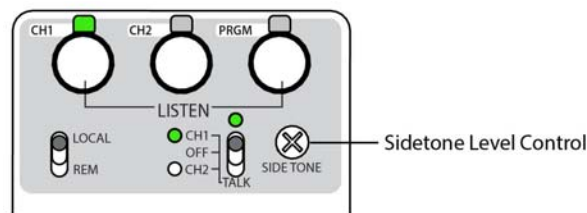


Fig. 4-5: Setting Intercom Sidetone

The SIDETONE control allows adjustment of the headset mic audio level in the headset's earcups. Use a "Tweaker" type screwdriver to adjust the sidetone level until the operator's voice is at a comfortable level.

Using the Digital Displays

A Brief Guide to Measurement of Fiber Optic Signal Strength

The CopperHead 3430AP Transceiver System operates within a defined fiber optic link margin, based on two factors:

- Output (or “launch”) power of the optical transmitter at each end of the link: typically -7dBm*
- Sensitivity of the optical detector at each end of the link: typically -22 dBm.

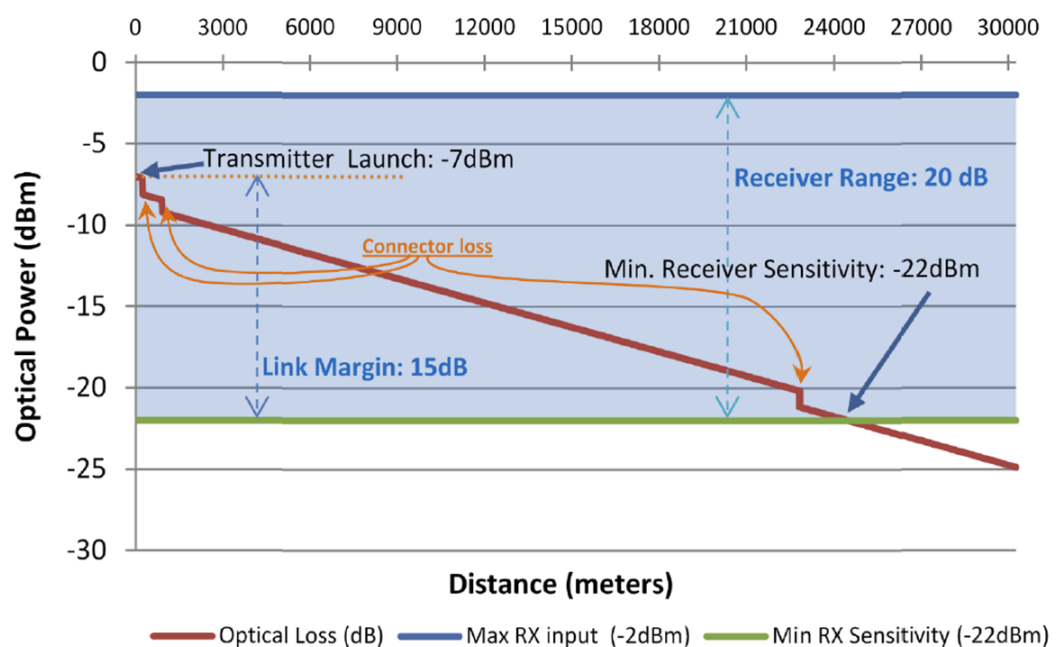


Fig. 4-6: Optical Link Power Disbursement

The overall link margin (or dynamic range) of the CopperHead 3430AP system (the difference between the transmitter’s output power and the receiver’s sensitivity) is typically 15dB .

That margin is consumed by two main factors:

- Optical loss over the length of the fiber cable, typically 0.5dB per kilometer
- Optical loss at connection points, typically 1 dB per connector

The CopperHead 3430AP Transceiver System provides direct digital readout of the fiber optic link signal strength for both the base-to-camera link and the camera-to-base link.

The digital readouts on both the CopperHead 3400 base station and the CopperHead 3430AP camera unit provide direct signal strength measurements in dBm. These readouts also provide a wide range of diagnostic information. The use of the digital readouts is described below.

*The unit “dBm” is an abbreviation for the optical power measured in decibels referenced to one milliwatt (mW).

The CopperHead 3400 Base Station Digital Display

The base station digital display has three functions selected by the Display Mode Selector (#xx on the Overview Diagram). These functions are indicated by the Display Mode LEDs.

- 1 BASE RX – Base Station Optical Power or Signal Strength that is being generated at the Base Station and sent to the Camera Unit. Displayed in units of –dBm.
- 2 CAM RX – Optical Power or Signal Strength generated by the Camera Unit as measured at the Base Station. Displayed in units of –dBm.
- 3 DIAG – One of four diagnostics sub-modes available to the Base Station
 - a TEMP – displays the operating temperature in degrees Centigrade of each circuit board that reports temperature.
 - b POWR – displays the power level from monitored circuit boards
 - c REV – displays microcontroller firmware version from each circuit board with a microcontroller
 - d 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 | Typical Readout | Base Station Digital Display Activity Explanation |
|---|-----------------|--|
| <i>(assumes after initial power-up - see page nnn for a description of the power-up sequence)</i> | | |
| BASE RX (Base Station Receive Signal Strength) BASE RX LED LIT | | |
| BASE RX | -9 | Indicates that the Base Station signal strength is -9 dBm (typical power rating – value will reflect actual link strength at the time. |
| BASE RX | n/a | Indicates that there is no active fiber link between the base station and the camera unit |
| Push the Display Select button once to advance to CAM RX | | |
| CAM RX (Camera Unit Receive Signal Strength) CAM RX LED LIT | | |
| CAM RX | -9 | Indicates that the Base Station signal strength is -9 dBm (typical power rating – value will reflect actual link strength at the time |
| CAM RX | n/a | Indicates that there is no active fiber link between the base station and the camera unit |
| | | |

Operation

Operation of the CopperHead 3430AP Transceiver System

| Display Mode | Typical Readout | Base Station Digital Display Activity Explanation |
|--------------|-----------------|--|
| | | Push and hold the Display Select Button and the system advances to Diagnostics mode – DIAG LED is lit. You main join the diagnostic display cycle at any sub-mode – the diagnostics cycle through Temperature, Power, Revision and Camera Status |
| | | <i>DIAGNOSTIC MODE Temperature (TEMP)</i> |
| 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 | DIS | The Display Power Supply temperature will be displayed |
| DIAG/TEMP | TEMP | Indicates the display is in the TEMP sub-mode |
| DIAG/TEMP | 39c | Temperature display in Centigrade for Power Supply circuit board (representative temperature – your unit may vary) |
| DIAG/TEMP | MAIN | The Base Station main circuit board temperature will be displayed |
| DIAG/TEMP | TEMP | Repeats that the display is in the TEMP sub-mode |
| DIAG/TEMP | 33c | Temperature display in Centigrade for Base Station circuit board |
| 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 | 30c | Temperature display in Centigrade for Power Supply circuit board |
| | | This temperature display cycle repeats until the Display Mode Selector is pushed |
| | | <i>DIAGNOSTIC MODE Power Supply Voltage Status (POWER)</i> |
| DIAG/POWER | | A quick push of the Display Mode Selector advances to the Power (POWR) diagnostic sub-mode. Digital Display Characters are Green when <i>all</i> power levels are normal and Red when <i>any</i> power level is outside normal level |
| 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 | DISP | Indicates that the LED Display 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 |

| Display Mode | Typical Readout | Base Station Digital Display Activity Explanation |
|--------------|-----------------|---|
| DIAG/POWER | MAIN | indicates that the Base Station main 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 | 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 |
| | | <i>DIAG?POWER Exception</i> |
| DIAG/POWR | 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 and contact support at Miranda Technologies |
| | | <i>DIAGNOSTIC MODE Microcontroller Board Revision Version (REV)</i> |
| DIAG/REV | | A quick push of the Display Mode Selector advances to the next 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 December 1, 2013. Your system may have different REV versions) |
| DIAG/REV | DISP | Indicates the Display microcontroller board is revision is being queried |
| DIAG/REV | REV | Indicates that sub-mode is REV |
| DIAG/REV | TSQ2 | Indicates that the REV for the DISP board is TSQ2 |
| DIAG/REV | AUD | Indicates the audio microcontroller board is revision is being queried |
| DIAG/REV | REV | Indicates that sub-mode is REV |
| DIAG/REV | REVE | Indicates that the REV for the AUD board is REVE |
| DIAG/REV | VBS | Indicates the VBS microcontroller board is revision is being queried |
| DIAG/REV | REV | Indicates that sub-mode is REV |
| DIAG/REV | REXH | Indicates that the REV for the VBS board is REXH |
| 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 | REXF | Indicates that the REV for the PS board is REXF |
| 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 | REXI | Indicates that the REV for the BASE board is REXI |
| | | <i>This display cycle repeats until the Display Mode Selector is pushed</i> |
| | | <i>DIAGNOSTIC MODE Camera Unit Error Status (CAM)</i> |

Operation

Operation of the CopperHead 3430AP Transceiver System

| Display Mode | Typical Readout | Base Station Digital Display Activity Explanation |
|--------------|-----------------|---|
| | | 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 <i>No</i> fault |
| DIAG/CAM | ERR | Indicates that the Camera Unit is reporting <i>Some</i> fault |
| | | <i>This display cycle repeats until the Display Mode Selector is pushed</i> |

The CopperHead 3430AP Camera Unit Digital Display

The camera unit digital display has SEVEN 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.

- 1 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.
- 2 BOPT – Optical power (Remote OPTical) or signal strength generated by the base station as measured at the camera unit. Displayed in units of –dBm.
- 3 DIAGNOSTICS - one of five sub-modes:
 - a TEMP – displays operating temperature in degrees Centigrade of each circuit board that reports temperature
 - b FAN – displays and allows testing of various fan operating modes.
 - c POWR – displays power level from monitored circuit boards
 - d REV – displays microcontroller firmware version from each circuit board with a microcontroller
 - e LED Brightness – Allows the adjustment of the camera unit LED brightness

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 expected readouts in each of the above camera unit display modes. By following the sequence you can understand what the various readouts and four character abbreviations mean for the system.

| Readout | Camera Unit Digital Display Activity Explanation |
|---------|--|
| | After power up sequence, system defaults to Camera Unit Optical Signal Strength – push the display select button and the system displays Base Station link strength. Push and hold button to enter diagnostics mode. |
| | COPT (Camera Unit Optical Signal Strength) |
| -9 | Indicates that the camera unit signal strength is -9 dBm (typical power rating – displayed value will reflect actual link strength at the time) |
| N/A | Indicates that there is no active fiber link between the base station and the camera unit |
| | BOPT (Base Station Signal Strength) |
| | A Quick push of the BASE Rx/DIM Selector advances to the BOPT mode |
| -9 | Indicates that the camera unit signal strength is -9 dBm (typical power rating – displayed value will reflect actual link strength at the time) |
| N/A | Indicates that there is no active fiber link between the base station and the camera unit |
| | DIAGNOSTIC MODE Temperature (TEMP) |

Operation

Operation of the CopperHead 3430AP Transceiver System

| Readout | Camera Unit Digital Display Activity Explanation |
|---------|---|
| | 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 |
| MAIN | The main Camera Unit controller board temperature will be displayed |
| TEMP | Repeats that the display is in the TEMP mode |
| 36C | Temperature display in Centigrade for Camera Unit main circuit board |
| | DIAGNOSTIC MODE Fan (FAN) |
| FAN | When FAN appears and the Select button is held the cooling fan will cycle through the MAX, NORMAL and QUIET modes. This function duplicates the Fan Control on the Indicator side of the Camera Unit. |
| | 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 |
| MAIN | Indicates that the 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 noted here were current as of December 1, 2013. Your system may have different REV versions) |
| REV | Indicates that the mode is REV |
| OBOX | Indicates the OBOX microcontroller board revision is being queried |
| REY | Indicates that the REV for the Audio Interface Box board is REY |
| REV | Indicates that the mode is REV |
| MAIN | Indicates the MAIN microcontroller board revision is being queried |
| REVI | Indicates that the REV for the BASE Camera Unit controller board is REVI |
| REV | Indicates that the mode is REV |
| UBUS | Indicates the UBUS microcontroller board revision is being queried |
| REVI | Indicates that the REV for the UBUS board is REVI |

The BASE Rx/DIM accesses the camera unit dimming function. In order 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 first change in direction and when it reaches the limit of that direction it will begin to go in the opposite direction (bright to dim, dim to bright).

| | |
|---|------|
| The four-character Digital Display will indicate maximum brightness with this readout, designating “eyes open.” | <00> |
| The four-character Digital Display will indicate minimum brightness with this readout, designating “eyes closed.” | <-> |

Standard Operation

This section is devoted to a number of “Best Practices” for use of the CopperHead 3430AP Transceiver System. Specific information on how to operate the system has been presented in the sections above.

- 1 Protect the Fiber Optic Cable and the Fiber Optic Connectors. **Always** keep these capped unless there are being connected.
- 2 Read the section on planning the Fiber Run – it may come in handy – Page nnn.
- 3 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. While 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. The system is, of course, digital and so the Signal Strength is either just good enough or usually much better than that. When it is no longer strong enough the signal stops.
- 4 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. Reading this User Guide is a good start but hands-on is the best way to understand how it will work, and more importantly, what to do to ensure proper operation.
- 5 If your production is a Multi-Camera shoot with Time Code synchronized between all cameras, it is a good idea to periodically confirm that proper Time Code is being returned from the various cameras and that a switch has not been changed in error at a camera location.

Shutting Down the System

System shutdown is simple. The only cautions relate to the fiber cable and to 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 one and the same.
- 2 To avoid the possibility of 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 avoid the possibility of 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 surface.
- 5 When re-spooling the cable take your time so as 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, then simply power off and disconnect and cap the fiber cable.

Troubleshooting

Troubleshooting any technical issues with the CopperHead 3430AP 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 – some of them obvious but sometimes forgotten.

- 1 Check all your cables – any lost connections or bad connectors?
- 2 Confirm signal type is on the proper signal path – It is possible to physically connect analog signals to digital signal paths on the CopperHead 3200 Transceiver System signals will not pass through the system unless they are the correct type. An SDI signal will not pass through the Analog or VBS paths and an Analog signal will not pass through an SDI path. If the wrong type of signal is incorrectly connected the signal monitor indicator may light up because an electrical voltage is present on the line but no signal will pass through.
- 3 Check your power – are the Power Supplies working?
- 4 If there is a power problem, check the fuses.
- 5 Take advantage of the various diagnostic tools provided in the CopperHead 3400 Base Station and CopperHead 3430AP Camera Unit.
 - a Is the Fiber Optic Signal Strength within an acceptable range? The product specification calls for strength of -22 dBm or greater but the system will often work at strengths lower than this – though not guaranteed to do so – Use the Four Character Digital Displays to check signal strength. Remember to check at both ends, both local and remote power. It is useful to know that the Base Station is putting out good power but the Camera Unit is not receiving it.
 - b Observe all of the LED warning and alarm lights on the Base Station and follow up based on what you observe.
 - c 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 of severe bends or kinks.
- 6 If the digital display indicates an error and displays a Hexadecimal error code you should contact Grass Valley support to assist in diagnosing the problem. Note the exact error code so you can report it to Grass Valley support. The hexadecimal errors indicate problems with the power supplies and the internal boards. In general, there is not much you can do as an end user if one of these rare error messages is displayed.

The Digital Display will indicate ERR and then the actual error code will display. This is a typical error code: 0002 – this indicates 10 to 16 volt status may be out of range.

Technical Specifications



Video, Digital (bi-directional)

InterfaceSMPTE 259M, 292M
Data rate.....270 Mbps or 1.5 Gbps

Video, Digital (Dual Link/3D Camera-to-base)

InterfaceSMPTE 310M, 259M, 292M, 297M, 424M
Data rate.....19.4 Mbps to 3.0 Gbps

Video, Digital (all)

Input level.....800 mV p-p
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)

InterfaceRS170, NTSC, PAL
Frequency response:
 30 Hz-4.2 MHz ± 0.15 dB
 8 MHz..... -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 Ω /30 Ω

Audio

Number of channels2
Type Balanced, line level

| | |
|---------------------------|-------------------------------|
| Impedance | >15 k Ω |
| Maximum input level | 24 dBu |
| Quantization..... | 24 bits, 128x (oversampled) |
| Sample rate | 48 kS/sec |
| Frequency response | \pm 0.1 dB, 20 Hz to 20 KHz |

Intercom

| | |
|-----------------------------------|------------------------------|
| Number of channels | 2 |
| Interface types (base)..... | RTS, Clear-Com, or Four-wire |
| Frequency response | 200 - 18 KHz \pm 3dB |
| Max distortion..... | \leq 0.5% |
| Noise..... | <-60 dBu |
| Max gain (RTS or Clear-Com)..... | \geq 24 dB |
| Min gain (RTS or Clear-Com) | \leq -45 dB |

GPI/Tally

| | |
|-----------------------------------|--|
| Number, base-to-camera unit..... | 2 |
| Number, camera-unit-to-base | 1 |
| Inputs: | |
| On | TTL Low or short to GND |
| Off | TTL high or open |
| Output | 2 position Form A relay, normally open |
| Max switching voltage | 125 VDC, 150 VAC |
| Max current | 1 amp |

Data

| | |
|-----------------------------------|---------------|
| RS-422 or RS-485..... | 0 to 1 Mb/s |
| RS-232 | 0 to 100 Kb/s |
| Jitter (sample-synchronous) | .80 ns |

Electro-Optical

| | |
|---|-----------------|
| Operating wavelengths..... | 1300 nm/1550 nm |
| Tx laser output power | -6 dBm/0 dBm |
| Rx sensitivity, HD/SDI | 22 dBm |
| Fiber compatibility | Single-mode |
| Optical connector options - Camera unit | SMPTE 304M |
| Optical connector options - base station..... | |

Distance limit

| | |
|------------------------------|--------------------------------------|
| SMPTE 311M hybrid fiber..... | 2 Km (6562 ft): 100W cont./150W peak |
|------------------------------|--------------------------------------|

Note: See the Available Power Output and Derating Chart for the HDX-Plus/CH3430AP Power Plus system on page 25. 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.

Mechanical/Environmental

Power consumption - camera unit 8 W @ 10-18 VDC

Operating temperature range -25°C to 55°C

Cooling fan speed- 2 fans per frame..... Low (max 20 dB w/camera), High, Auto and Off

Note: When the fan status is Low or Off, an LED indicates if the temperature is too high

Operating humidity range 0 to 95% RH, non-condensing

Appendix A


Appendix A shows the connector pin assignments for all connectors on the CopperHead 3430AP transceiver system.

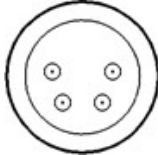
Topics

| | |
|--|---------|
| Base Station Connectors | page 59 |
| Camera Unit Connectors | page 63 |
| Data 1 (Camera Control) Pinout Configurations | page 65 |
| Base Station Breakout Data/GPI Cable - typical configuration | page 66 |


Base Station Connectors

Reference Numbers refer to the overview diagrams at the end of this user guide

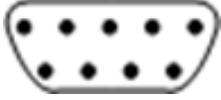
| AC Power Input Connector - Models CHG3-BS-3400-95VD-xxx-xxx | |
|---|--|
|  <p>Base Station #1 Standard IEC C14 receptacle</p> | <p>Panel-mounted AC power receptacle: 110/220 VAC</p> <p>Two 4 amp fuses (5 x 20mm).fuses are in operation at all times</p> <p>– both the AC Line Hot and the AC Line Neutral are fused. Replacement: Littlefuse 218 or equivalent</p> |


| 12VDC Input Power Connectors - Models CHG3-BS-3400-2ST / 2MX / NEU | | | | | | | | | | | |
|--|--|-----|--------|---|--------|---|--------|---|--------|---|---------------|
|  <p>Base Station #20 XLR4 Male</p> | <table border="1"> <thead> <tr> <th>Pin</th> <th>Signal</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Ground</td> </tr> <tr> <td>2</td> <td>Unused</td> </tr> <tr> <td>3</td> <td>Unused</td> </tr> <tr> <td>4</td> <td>+power 12 VDC</td> </tr> </tbody> </table> <p>Base Station Power Connector Wiring</p> <p>This matching connector is from either an ADAP-AC-04 or a customer-supplied 12VDC power supply</p> <p>This connector is wired in parallel with terminal block #21 (below)</p> | Pin | Signal | 1 | Ground | 2 | Unused | 3 | Unused | 4 | +power 12 VDC |
| Pin | Signal | | | | | | | | | | |
| 1 | Ground | | | | | | | | | | |
| 2 | Unused | | | | | | | | | | |
| 3 | Unused | | | | | | | | | | |
| 4 | +power 12 VDC | | | | | | | | | | |

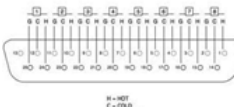
12VDC Input Power Connectors - Models CHG3-BS-3400-2ST / 2MX / NEU

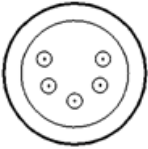
|  <p>Base Station #21 Terminal Block</p> | Pin | Signal |
|---|-----|------------------------|
| | 1 | Minus Voltage terminal |
| | 2 | Plus Voltage terminal |
| <p>Base Station 12 VDC Terminal Block wiring This connector is wired in parallel with XLR4 male # 20 (above)</p> | | |


Base Station Camera Remote Connector



|  <p>Base Station #9 DB9 Female</p> <p>Format select (Pin 2) Floating for RS-422 or TTL Tie to GND (pin 3) for RS-232 Tie to +12VDC (pin 4) for RS-485</p> | Pin | Function |
|--|-----|--|
| | 1 | Data 1 -422 In, -485 I/O |
| | 2 | Data 1 Format Select (see choices to the left) |
| | 3 | GND (Ground) |
| | 4 | +12 VDC Bias for Data 1 Format Select |
| | 5 | Data 1 -422 out |
| | 6 | Data 1 232 In, +422 IN, +485 I/O |
| | 7 | - 12 VDC Camera Control Data Power Ground |
| | 8 | +12 VDC Camera Control Data Power |
| | 9 | Data 1 232 Out, +422 Out |
| <p>Base Station Camera Remote Connector Wiring Please see Appendix XX for a list of Miranda-supplied cables.</p> | | |

| Base Station Tally/GPI/Data Connector | | |
|--|------------------------|--|
|  <p>Base Station #10 DB15HD Female</p> <p>Format select (Pin 10) Floating for RS-422 or TTL Tie to GND (pin 5/7) for RS-232 Tie to +12VDC (pin 15) for RS-485</p> | Pin | Function |
| | 1 | Data 2 -422 Out |
| | 2 | Data 2 -422 In, -485 I/O |
| | 3 | Unused |
| | 4 | GPI 1 In (Tally Red) |
| | 5 | GND |
| | 6 | Data 2 232 OUT, +422 Out |
| | 7 | GND |
| | 8 | Data 2 232 In, +422 In, +485 I/O |
| | 9 | GPI2 In (Tally Green) |
| | 10 | Data2 Format (see choices to the left) |
| | 11 | Data 3 RS232 In |
| | 12 | Data 3 RS232 Out |
| | 13 | GPI OUT A |
| | 14 | GPI OUT B |
| 15 | +12VDC Bias for Format | |
| Base Station Tally/GPI Connector Wiring | | |


| Base Station Audio Input & Output | | | | | | |
|---|------------------------|----------------------|---------|-----------------|------|--------|
|  <p>Base Station #18 & #19 DB25 Female (x2)</p> | Audio In #18 | Audio Out #19 | Channel | DB25 Pin Number | | |
| | | | | Hot | Cold | Ground |
| | Return Audio 1 IN | Cam Audio 1 OUT | 1 | 24 | 12 | 25 |
| | Return Audio 2 IN | Cam Audio 2 OUT | 2 | 10 | 23 | 11 |
| | Return Audio 3 IN | Not Used | 3 | 21 | 9 | 22 |
| | Return Audio 4 IN | 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 | | | |
| Base Station Audio 25 pin Connector Wiring | | | | | | |


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


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

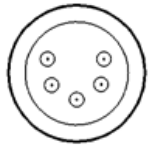
| RTS Intercom | | |
|---|------------|-------------------------------|
|  <p>Base Station #16 XLR3 Female</p> | Pin | Signal |
| | 1 | Ground |
| | 2 | + VDC Power & Channel 1 Audio |
| | 3 | Power |
| Base Station RTS Intercom Input Wiring | | |
|  <p>Base Station #17 XLR3 Male</p> | Pin | Signal |
| | 1 | Ground |
| | 2 | + VDC Power & Channel 1 Audio |
| | 3 | Power |
| Base Station RTS Intercom Loop-Thru Wiring | | |

Camera Unit Connectors

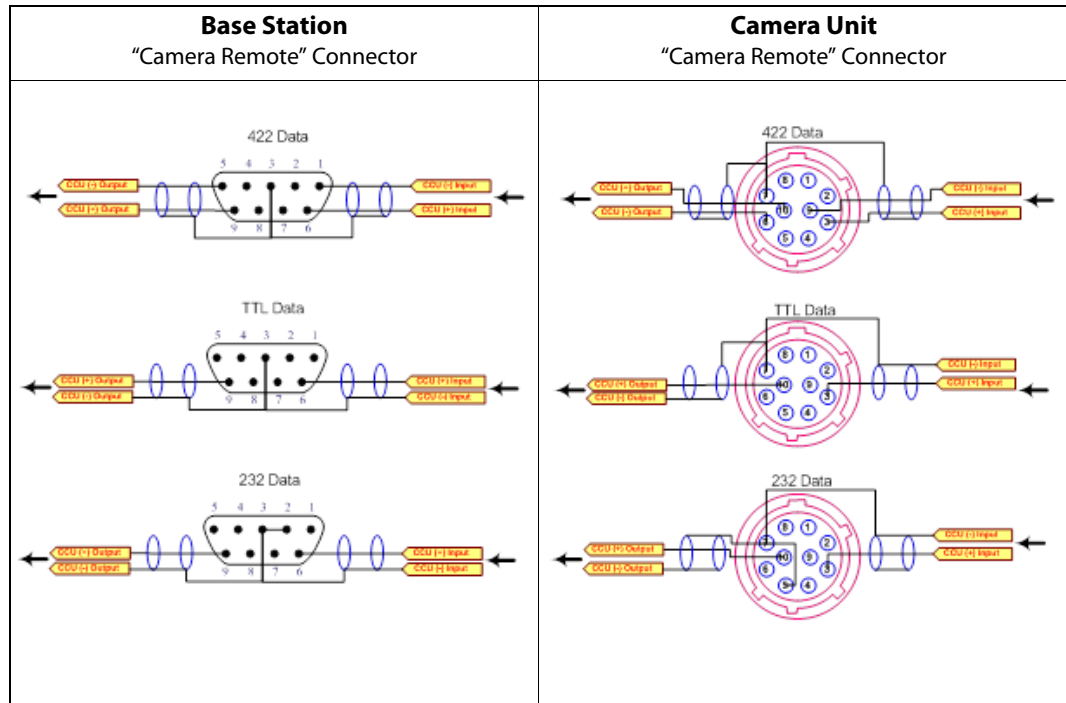
| Camera Remote: Data 1 (Camera Control) and Data 3 (RS232) | | |
|---|--------------------------------|--|
|  <p>Camera Unit Hirose 10-pin Female</p> <p>Format select (Pin 5) Floating for RS-422 or TTL Tie to GND for RS-232 Tie to +12VDC (pin 15) for RS-485</p> | Pin | Function |
| | 1 | +12VDC Input Power (also Camera Control Data Format Select Bias) |
| | 2 | 12VDC Input Power – Ground |
| | 3 | Camera Control Data (+) Input or Bi-directional Camera Control Data I/O |
| | 4 | 232 Data Input (Data 3) |
| | 5 | Camera Control Data Format Select (see choices to left) |
| | 6 | Camera Control Data (-) Output |
| | 7 | Ground (Camera Control Data Shields, 232 Data Common) |
| | 8 | 232 Data Output (Data 3) |
| | 9 | Camera Control Data (-) Input |
| 10 | Camera Control Data (+) Output | |
| Camera Unit Camera Remote Connector Wiring (Mating connector - Hirose HR10A-10P-10P) | | |

| Camera Unit Production/Signal | | |
|---|------------------------------------|--|
|  <p>Camera Unit #9 DB15HD Female</p> <p>Format select (Pin 10) Floating for RS-422 or TTL Tied to GND for RS-232 Tied to +12VDC for RS-485</p> | Pin | Function |
| | 1 | Data 2 -422 Out |
| | 2 | Data 2 -422 In, -485 I/O |
| | 3 | Intercom Microphone Trigger |
| | 4 | GPI In |
| | 5 | GND |
| | 6 | Data 2 232 OUT, +422 Out |
| | 7 | GND |
| | 8 | Data 2 232 In, +422 In, +485 I/O |
| | 9 | Not Used |
| | 10 | Data2 Format (see choices to the left) |
| | 11 | GPI 2 OUT B (Green) |
| | 12 | GPI 2 OUT A (Green) |
| | 13 | GPI 1 OUT B (Red) |
| | 14 | GPI 1 OUT A (Red) |
| 15 | +12VDC (100mA max) Bias for Format | |
| Camera Unit Production DB15HD Connector Wiring | | |

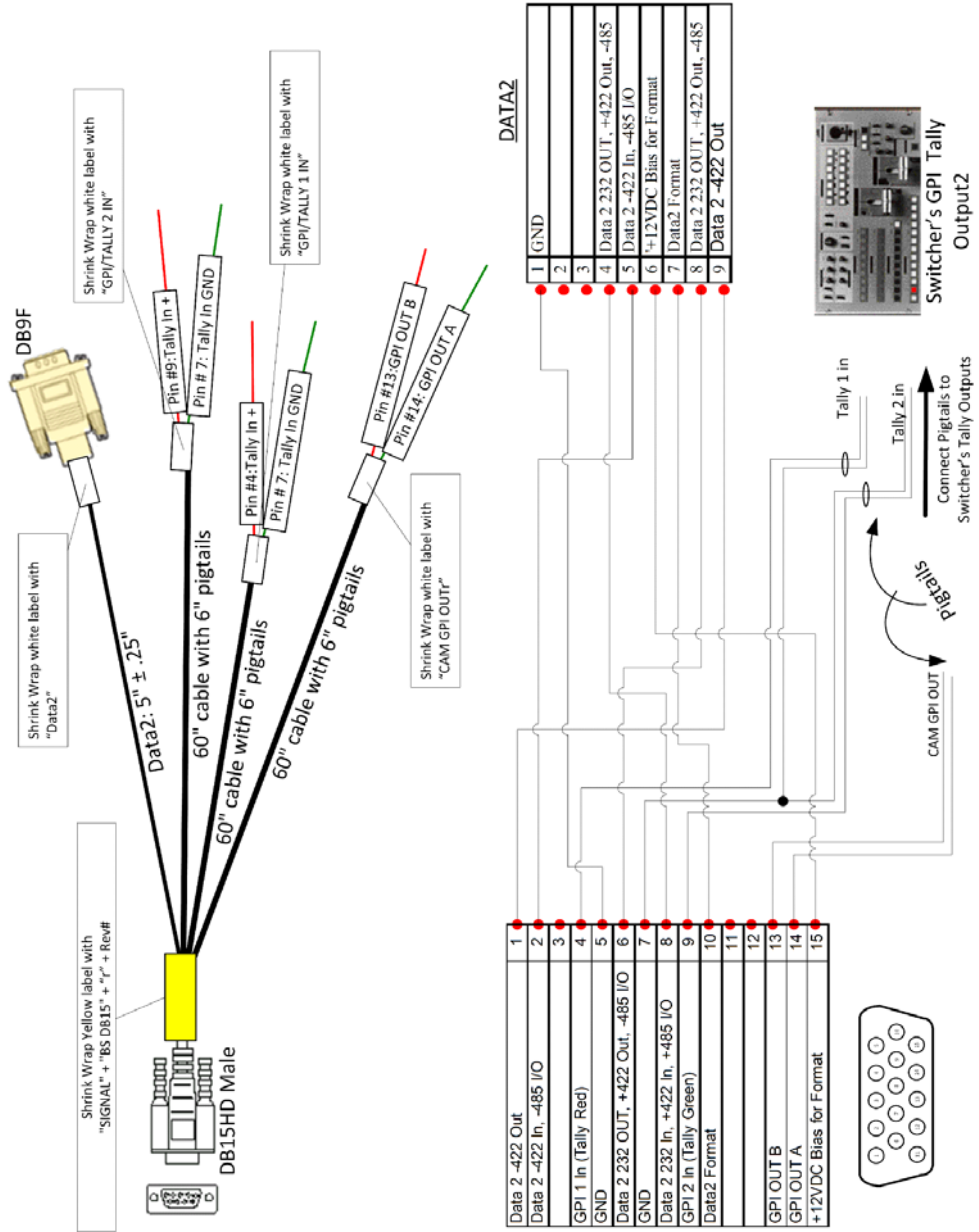
| Camera Unit Camera Headset | | |
|--|------------|--------------------------|
|  <p>Camera Unit #3 XLR5 Female</p> | Pin | Function |
| | 1 | Mic Ground (shield) |
| | 2 | + Mic Input |
| | 3 | - Earphone output ground |
| | 4 | + Earphone Output |
| | 5 | + Earphone Output |
| Camera Unit Headset Connector Wiring (RTS standard monaural headset pinout) | | |

| Camera Unit Audio Output | | |
|--|------------|---------------------|
|  <p>Camera Unit #4 XLR5 Male</p> | Pin | Function |
| | 1 | Ground |
| | 2 | Channel A/C (-) OUT |
| | 3 | Channel A/C (+) OUT |
| | 4 | Channel B/D (-) OUT |
| | 5 | Channel B/D (+) OUT |
| Camera Unit Audio 1 & 2 Connector Wiring | | |

Data 1 (Camera Control) Pinout Configurations



Base Station Breakout Data/GPI Cable - typical configuration



B

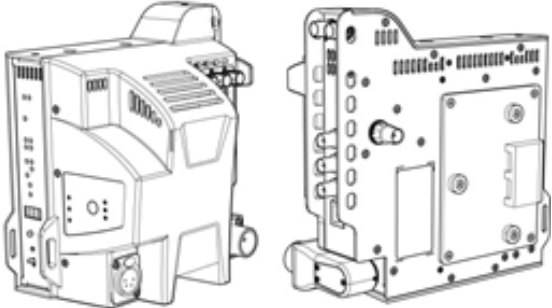
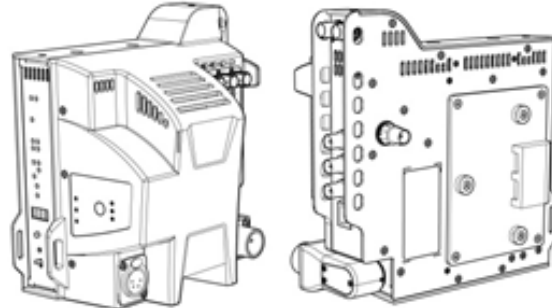
Appendix B



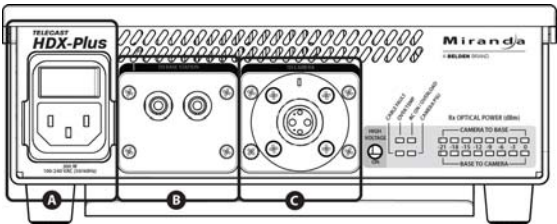



Appendix B shows all accessories available for the CopperHead 3430AP Transceiver System.

Topics



[CopperHead 3430AP Accessories](#) page 67
[Camera Signal Cables](#) page 70
[Base Station Cables](#) page 70

CopperHead 3430AP Accessories

| Item Number/Description | Image |
|--|--|
| <p>CHG3-CAM-3430AP-304-AB</p> <p>Camera Unit with Anton-Bauer battery mount</p> |  |
| <p>CHG3-CAM-3430AP-304-V</p> <p>Camera Unit with V-Battery mount</p> |  |

| Item Number/Description | Image |
|--|--|
| <p>CHG3-BS-3400-2ST-XXX (4W,CC,RTS)</p> <p>Standard Base Station with 2 STs and External Power Supply</p> |  |
| <p>CHG3-BS-3400-95VD-STM-XXX (4W,CC,RTS)</p> <p>Base Station with 2 STs and Internal AC Power Supply</p> |  |
| <p>HDXP-304M-ST2</p> <p>HDX-Plus Power Supply</p> |  |
| <p>ADAP-AC-02</p> <p>Base Station AC Adaptor (for CH Series 3400-BS-2ST)</p> |  |
| <p>CAXX-XSM311-SMPTE</p> <p>SMPTE 311M Hybrid Fiber Cable Assembly, SMPTE 304M connectors</p> |  |
| <p>CH3BFC-304M-2ST-08-XX</p> <p>SMPTE Hybrid 304M plug to STs and Molex</p> |  |

| Item Number/Description | Image |
|--|--|
| <p>CASM/MD/XL Tactical Fiber on Reel</p> |  |
| <p>CHG3-AUD-RTS/CC/4W 2-Channel Intercom Modules: 4-wire, RTS, or Clear-Com</p> |  |
| <p>CH3CS-BO-XX Camera Signal Breakout Cable</p> |  |
| <p>CHCR-XXX Camera Remote Cable (specify camera model)</p> |  |
| <p>CHBR-XXXX Camera Remote Cable, 10 foot (specify remote model)</p> |  |
| <p>CH3CS-26P Camera Signal Cable 26-pin Multi-core</p> |  |

| Item Number/Description | Image |
|---|---|
| CHRCP-2050-LCD Universal Camera Control Panel w/ TFT-LCD Display |  |
| CHRCP-2050A Universal Camera Control Panel |  |

Camera Signal Cables

| Cable Description | Item Number | Cable is Wired with Connectors | Typical Equipment Used with Cable |
|-------------------|------------------------|--------------------------------|-------------------------------------|
| Breakout cable | CH3CS-3400-BO-BF1-D9F1 | DB15HD to BNC-F, DB9F | Ext Intercom Trigger, Ext Tally I/O |

Base Station Cables

| Cable Description | Item Number | Cable is Wired with Connectors | Typical Equipment Used with Cable |
|-------------------|------------------------|--------------------------------|-----------------------------------|
| Audio Input | CH3BAI-DB25-5XL3F | DB25 to 5 XLR3-F | Audio input sources |
| Audio Output | CH3BAO-DB25-2XL3M | DB25 to 2 XLR3-M | Audio output devices |
| Data.Tally | CH3BS-3400-BO-GPI-DATA | DB15HD to DB9 F and pigtails | Data2 and Tally I/Os |



Grass Valley Technical Support

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

Americas

Office hours: 9:00 a.m. – 9:00 p.m. (EST)

Telephone: 1-800-547-8949
+1 530 478 4148

Fax: +1-514-335-1614

support@grassvalley.com

Asia

Office hours: 9:30 a.m. – 6:00 p.m. (GMT+8)

Telephone: +852 2539 6987

Fax: +852 2539 0804

asiatech@grassvalley.com

Europe, Middle East, Africa, UK

Office hours: 9:00 a.m. – 6:00 p.m. (GMT)

Telephone: +44 118 952 3444

Fax: +44 118 952 3401

eurotech@grassvalley.com

China

Office hours: 9:30 a.m. – 6:00 p.m. (GMT+8)

Telephone: +86-10-5873-1814

asiatech@grassvalley.com

Playout Automation - Europe, Middle East, Africa, UK

Office hours: 9:00 a.m. – 5:30 p.m. (GMT)

Telephone: +44 870 5 00 4350

Fax: +44 870 5 00 4333

automationsupport@grassvalley.com

Malaysia

Telephone: +60 3 2247 1808

asiatech@miranda.com

France

Office hours: 9:00 a.m. – 5:00 p.m. (GMT+1)

Telephone: +33 1 55 86 87 88

Fax: +33 1 55 86 00 29

eurotech@grassvalley.com

EMERGENCY After Hours (Global)

Toll Free: 1-800-547-8949 (US and Canada)

Telephone: +1 514 333 1772

+1 530 478 4148

Corporate Head Office

Grass Valley - A Belden Brand

3499 Douglas-B.-Floreani, St-Laurent, Quebec, Canada H4S 2C6

Telephone: 514-333-1772

Fax: 514-333-9828

www.grassvalley.com