Telecast Fiber Solutions

PowerPlus 3000 User Guide

M4018-9900-102

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grass valley

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Title	PowerPlus 3000 User Guide
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Table of Contents

About PowerPlus 3000

This chapter provides an overview of the PowerPlus 3000 and includes the safety and warranty information about it.

About the PowerPlus 3000 System

The PowerPlus 3000 system is used with CopperHead links, delivering electrical current to a video camera equipped with a CopperHead Camera Unit by adding power to an SMPTE Hybrid cable. The system consists of a camera-mountable PowerPlus adaptor at the camera, and the HDX Power Supply, located some distance away (up to 2 km), and connected by SMPTE Hybrid cable.

All of the signals on the two strands of fiber connecting the CopperHead Camera Unit and the CopperHead Base Station are passed transparently through the PowerPlus and the HDX Power Supply.

The standard PowerPlus provides up to 100 watts of power to the camera and accessories. The High Profile PowerPlus can provide up to 150 watts.

The PowerPlus delivers a nominal 14 Volts to the camera through the battery plate, as well as to a 4-pin XLR connector for powering additional accessories.

For applications where 24 volt power is required at the camera, the 12/24 power option provides this voltage to two 3-pin Lemo connectors on the PowerPlus adaptor.
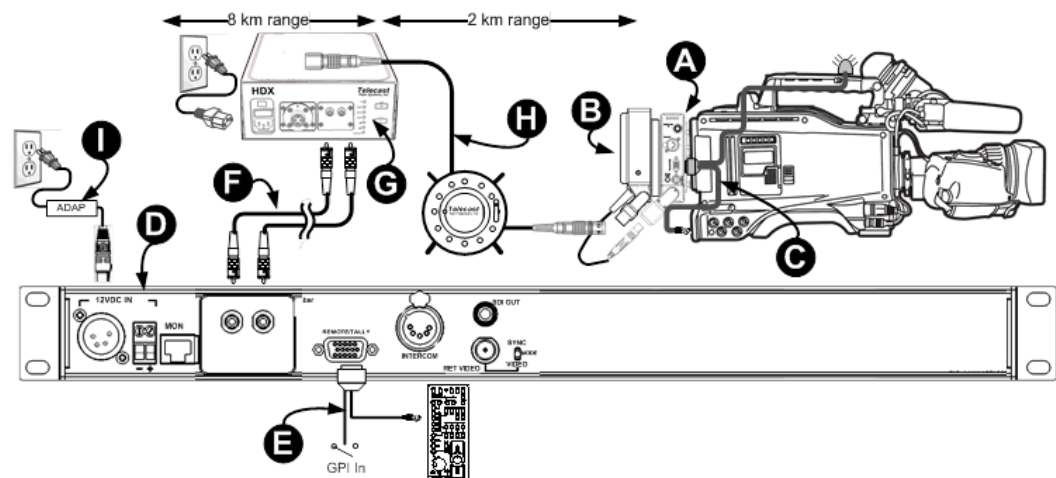

Fig. 1-1: CopperHead System Using PowerPlus and HDX

The first part of the fiber run can be made via "dry" tactical or infrastructure fiber, after which the HDX power supply is placed in line to provide a powered SMPTE hybrid fiber cable for the camera. Such a system is typically configured as shown in Figure 1-1 and includes the following components:

A. Camera Unit	**F**. Tactical fiber or Infrastructure fiber run
B. PowerPlus	**G**. HDX Power Supply
C. CHCR camera remote cable	**H**.SMPTE 311M hybrid fiber optic cable
D. DC-powered Base Station*.	**I**. ADAP 12VDC power supply
E. CHBR base remote cable	

The Base Station can be separated from the HDX power supply on "dry fiber" (**F**) by more than nine kilometers (5.6 miles) , where powered hybrid cable (H) can be run to the camera for another two km (1.2 miles).

Optical Fiber Safety

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

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

Power Fuses

The HDX is equipped with two fuses located next to the AC Power receptacle on the front of the unit. Refer to section HDX Fuse Holder on page 15 for specific fuse and location information.

Never operate the HDX without properly installed and rated fuses. Severe electrical and heat damage could result as well as personal injury or death.

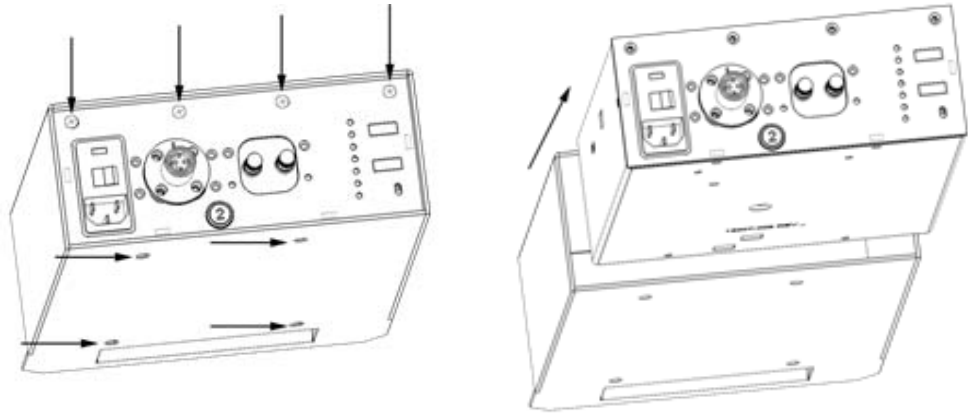# 2

Installation and Mounting

This chapter explains how to install and mount the PowerPlus 3000 device and how to attach the power supply and camera unit.

Installing HDX into HDX-FR2

To install the HDX into the rack-mountable HDX-FR2 enclosure

1 Remove the eight screws and slide the HDX electronic module out of the sheath.

Fig. 2-1: Removing HDX screws and removing the sheath

2 Slide the HDX module into the FR2 frame and reinstall the eight screws as shown in Figure 2-2.
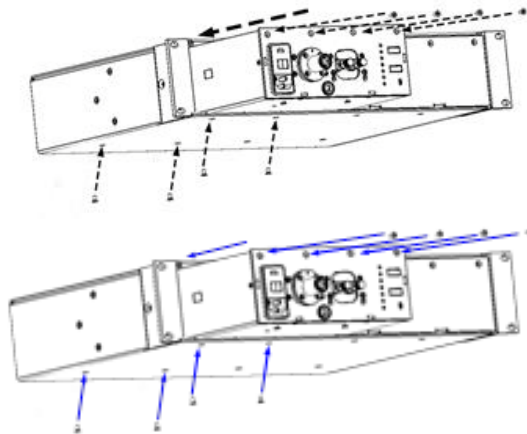
Fig. 2-2: Installing HDX in FR2 Frame

3 The fiber connectors can be relocated to the rear of the frame, as shown in Figure 2-3.

Fig. 2-3: Fiber Connectors on rear of HDX Frame

Mounting the PowerPlus
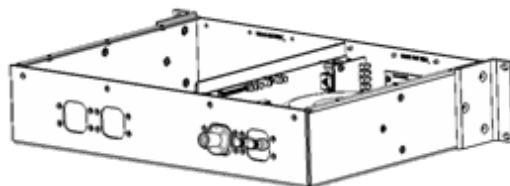
When mounting the CopperHead Camera Unit & PowerPlus, always position the camera so that the battery mounting plate at the rear of the camera is easy to access. Ensure that the camera is well supported and stable. If a battery is mounted, remove it.
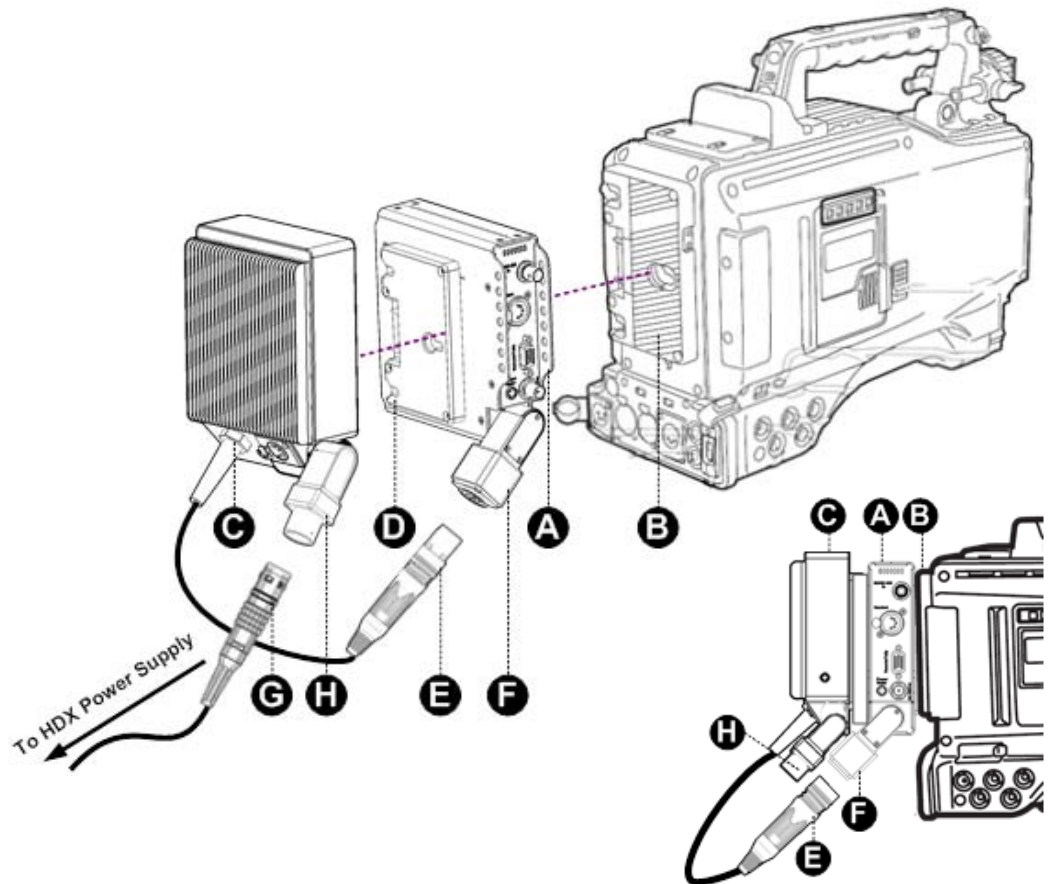
Fig. 2-4: Mounting the PowerPlus Unit to the CopperHead Camera Unit

To mount the camera unit

1 Attach the CopperHead Camera Unit (**A**) to the camera's battery mounting plate (**B**). The mounting is mechanically identical to attaching a battery to the camera.

2 Mount the PowerPlus (**C**) to the CopperHead Camera Unit battery mounting plate (**D**) exactly as you would mount a battery to the camera.

3 Connect the PowerPlus dongle (**E**) to the fiber optic swivel **F** on Camera Unit (**A**). Connect the SMPTE hybrid cable connector (**G**) from the HDX to the SMPTE receptacle (**H**) on the PowerPlus.

Connecting the HDX Power Supply and Camera Unit

Mount the PowerPlus (**C**) to the CopperHead Camera Unit (**A**) as shown in Mounting the PowerPlus on page 7, being sure to plug the PowerPlus' tactical fiber dongle (**E)** into the swivel-mounted fiber connector (**F**) on Camera Unit (**A**).
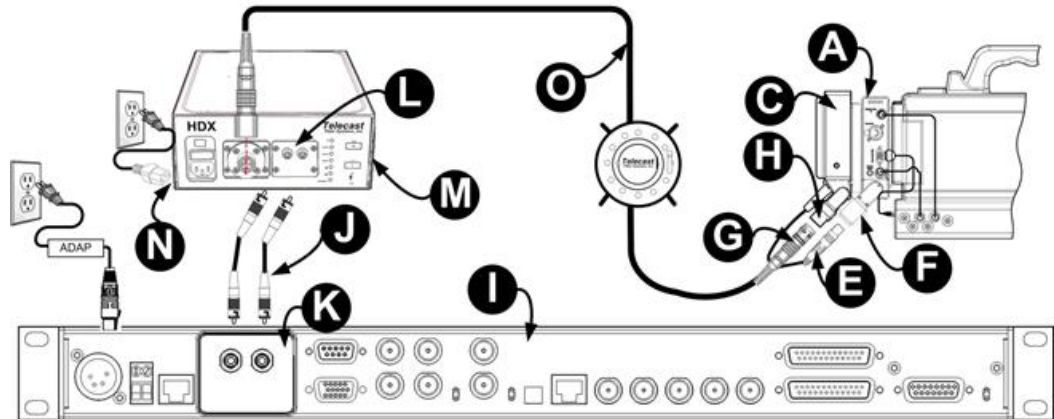

Fig. 2-5: SMPTE Hybrid Fiber between the HDX Power Supply and Camera Unit

- Connect dry (unpowered) fiber cable (**J**) between the fiber connector(s) (**K**) on Base Station (**I**) and the "dry" fiber connector(s) (**L**) on the HDX Power Supply (**M**).
- Connect the HDX Power Supply (**M**) to AC Mains (**N**).
- Connect a length of hybrid fiber cable (**O**) between the HDX Power Supply (**M**) and the swivel-mounted hybrid fiber connector H on the PowerPlus (**C**).

The hybrid fiber cable can be equipped with either SMPTE 304M (**G**) or OpticalCON* connectors. The camera and CopperHead Camera Unit will be powered via the hybrid cable (**O**) by the PowerPlus (**C**).

> **Note:** At HDX power levels (>95VDC), the powered OpticalCON connector is suitable for indoor (studio) camera links only (see PowerPlus Connectors on page 21).

PowerPlus 3000 Components

This chapter describes the components included with the PowerPlus 3000 system.

Camera Power Adaptor

The CopperHead PowerPlus 3000 power adaptor with standard "Low Profile" heat sink (Figure 3-1) provides a continuous 100 watts of 12VDC power (150 watts momentary) and fiber cable signal connectivity from Base Station to the Camera. It also provides an external power feed of 12VDC and optionally 24VDC for external accessories.

The PowerPlus can be equipped with a High Profile heat sink (Figure 3-1) for power requirements up to 150 Watts.

The PowerPlus unit is equipped with a fixed tactical fiber dongle that can be terminated with either an OpticalCON plug, an SMPTE 304M plug, or an MX plug. This dongle plugs into the complimentary swivel of the CopperHead Camera Unit.

The PowerPlus is connected to the HDX power supply using Hybrid fiber cable with SMPTE 304 connectors. See Mounting the PowerPlus on page 7.

The distance between the HDX power adaptor and the camera can be up to 2 km (1.2 miles) using Hybrid fiber cable and the distance between the HDX power adaptor and Base Station can be up to 8 km (4.3 miles).
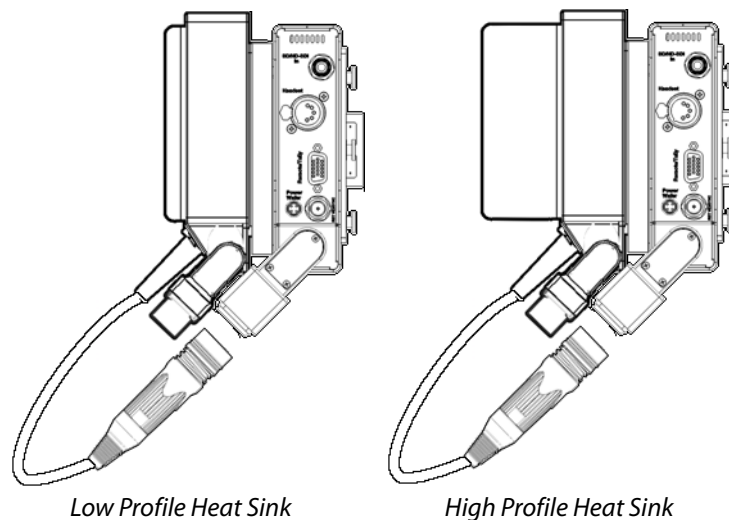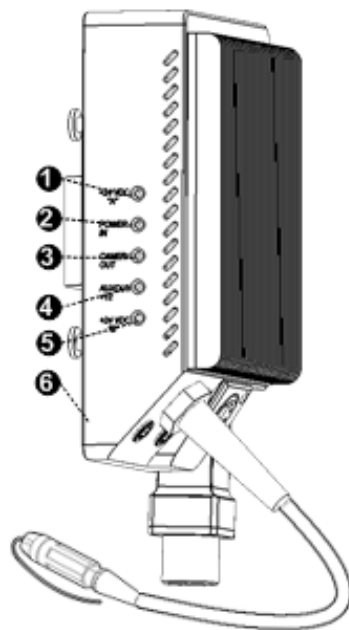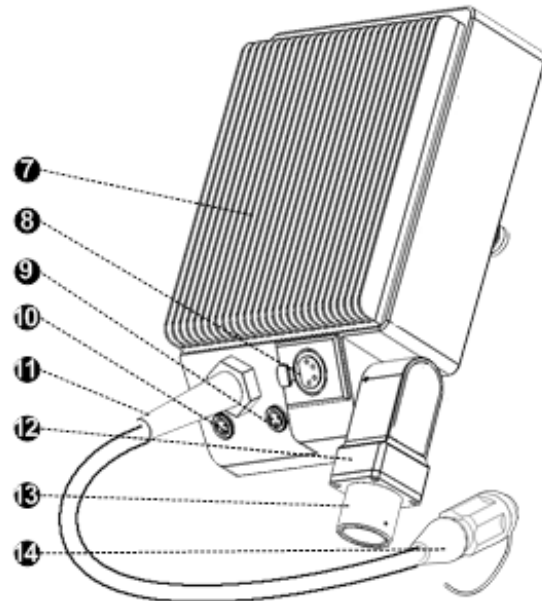

Low Profile Heat Sink   High Profile Heat Sink

Fig. 3-1: PowerPlus 3000with Heat Sinks mounted to CopperHead Camera Unit

PowerPlus 3000 LED Indicators

PowerPlus 3000 Connectors

Fig. 3-2: PowerPlus 3000 LED Indicators and Connectors

No.	Description	No.	Description
PowerPlus 3000 LED Indicators			
1	**24 Volt DC "A":** 24VDC is available on connector at v Power In	4	**Auxilliary +12 Volt Output:** 12VDC is being supplied to 4-pin XLR connector V
2	**Power In:** Power is being received from the HDX power supply • **Red** - initial safety handshaking in progress, full power not engaged. • **Green** - safety handshaking completed, full power being received from HDX power supply.	5	**24 Volt DC "B":** 24VDC is available on connector X
3	**Camera Out:** 12VDC is being supplied to the battery plate	6	**Battery Plate:** Used to mount the PowerPlus to the CopperHead Camera Unit (Anton/Bauer or V-Mount)
PowerPlus 3000 Connectors			
7	**Heat Sink:** • **LP**- Low Profile Heat Sink rated for 100 Watts (shown) • **HP** - High Profile Heat Sink rated for 150 Watts (not shown)	11	**Tactical Fiber Dongle:** Fixed tactical fiber cable connects to the CopperHead Camera Unit.

No.	Description	No.	Description
8	**12 Volt Auxiliary Output**: 4-Pin XLR output connector for 12 Volt accessories	12	**SMPTE Swivel**: Adjustable swivel for Hybrid Fiber receptacle am.
9	**24 Volt Auxiliary Output B:** 3-pin connector for 24 Volt accessories.	13	**Hybrid Fiber Receptacle** (SMPTE 304M shown): Connect the SMPTE hybrid cable here. This cable connects to the HDX. Available with the following termination: • SMPTE 304M plug (shown) • OpticalCON Connector*
10	**24 Volt Auxiliary Output** A: 3-pin connector for 24 Volt accessories	14	**Tactical Fiber Connector** (MX shown): Dry fiber connector at the end of the dongle, matching the connector on the swivel of the mating CopperHead Camera Unit. Available with the following termination: • MX plug (shown) • OpticalCON Connector ("dry") • SMPTE 304M plug ("dry")

*At HDX power levels (>95VDC), the powered OpticalCON connector is suitable for indoor (studio) camera links only (see PowerPlus Fiber Connectors on page 23).

HDX Power Supply

The HDX Power Supply unit is required when using the PowerPlus Camera Adaptor. The HDX can be used as a free-standing unit or rack mounted, using the HDX-FR-2 for mounting one or two HDX units.

The HDX unit sends power via a SMPTE hybrid fiber cable to the PowerPlus, where it is converted to 12VDC and optionally to 24VDC). See Connecting the HDX Power Supply and Camera Unit on page 8 for details on connecting the HDX to a CopperHead system.

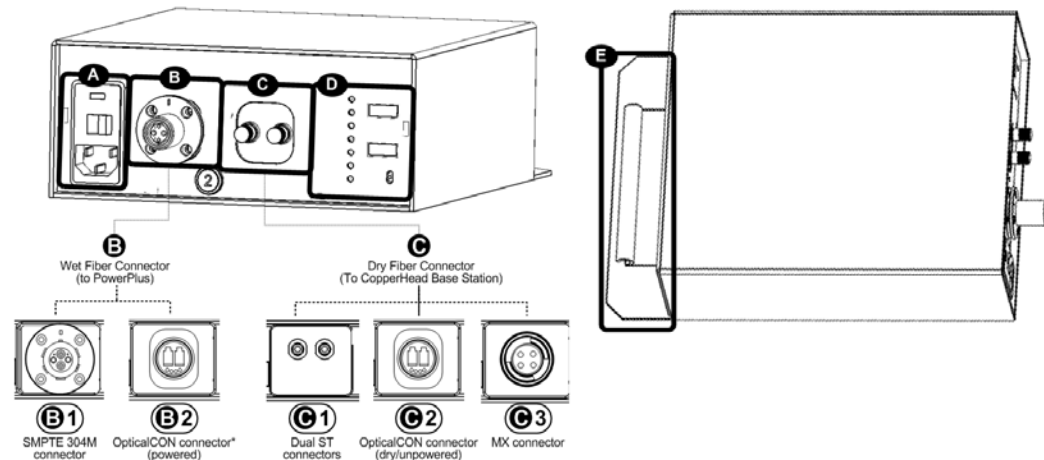*Fig. 3-3: HDX Front Panel and Stand-alone unit with handles*

The HDX has five features:

- **A**: **AC Power Input Module and Switch and Fuse Holder:** Power Switch and connector for AC Mains.

  > **Note:** Removable fuse module must be set for correct voltage (110VAC or 220VAC). See HDX Fuse Holder on page 15.

- **B**: **"Wet" Hybrid Fiber Connector:** the SMPTE hybrid cable connects from here to the PowerPlus at the camera. Two options are available:
  - B1 SMPTE 304M connector (standard)
  - B2 OpticalCON connector (indoor use only)*
- **C**: **"Dry" Fiber connector(s):** the CopperHead Base Station is connected here. This interface can be equipped with a variety of fiber connectors:
  - C1 Two ST connectors
  - C2 OpticalCON connector
  - C3 MX connector
- **D**: **Status Indicators:** these indicators show the status of the HDX's power system. For more details, see Important Note on page 24.
- **E: HDX Integrated Handle:** stand-alone unit can be carried or hung from this robust handle.

*At HDX power levels (>95VDC), the powered OpticalCON connector is suitable for indoor (studio) camera links only (see Important Note on page 24).
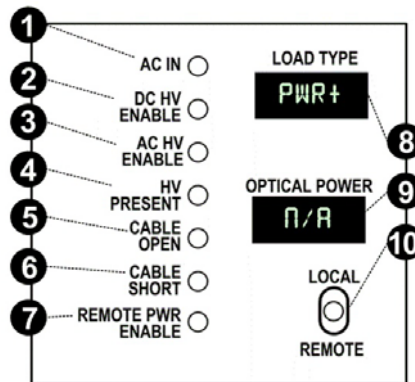
HDX Status Indicators

Fig. 3-4: HDX Displays

- **1- AC IN - MAINS:** AC Input power is present
- **2 - DC HV ENABLE:** DC "Sense" voltage from PowerPlus is present
- **3 - AC HV ENABLE:** AC "Sense" voltage from PowerPlus is present (not used with PowerPlus)
- **4 - HV Present:** DC voltage is available on Hybrid connector
- **5 - CABLE OPEN:** There is no electrical connection to the PowerPlus unit.
- **6 - CABLE SHORT:** A short circuit is detected in the SMPTE Hybrid Cable. High voltage is disabled until this condition is corrected

- **7 - REMOTE PWR ENABLE:** Not used with PowerPlus
- **8 - LOAD TYPE:** Indicates the type of load or camera being used:
  - **N/A** - No load detected
  - **PWR+** - PowerPlus detected
  - **Note:** Upon power Up, this displays firmware version for two seconds
- **9 - Optical Power:** Not used with PowerPlus.
- **10 - Local Remote:** Not used with PowerPlus.

The LED Status Indicators will illuminate under "Normal" and Error" conditions as shown:

	Normal	Not Connected	Cable Short
AC IN	Green	Green	Green
DC HV ENABLE	Green	Red	Red
AC HV ENABLE	Unlit	Red	Red
HV PRESENT	Green	Unlit	Unlit
CABLE OPEN	Unlit	Red	Unlit
CABLE SHORT	Unlit	Unlit	Red
REMOTE PWR ENABLE	Unlit	Unlit	Unlit

HDX Fuse Holder

The correct fuses must be used for the appropriate AC Mains power supply:

- **115VAC**: Fuse 3A, "Slo-Blo"
- **220VAC**: Fuse 2A, "Slo-Blo"

HDX Fuse Holder must be flipped if switching between 110VAC and 220VAC, as shown in Figure 3-5.

HDX Fuse Holder   Using Short Fuses
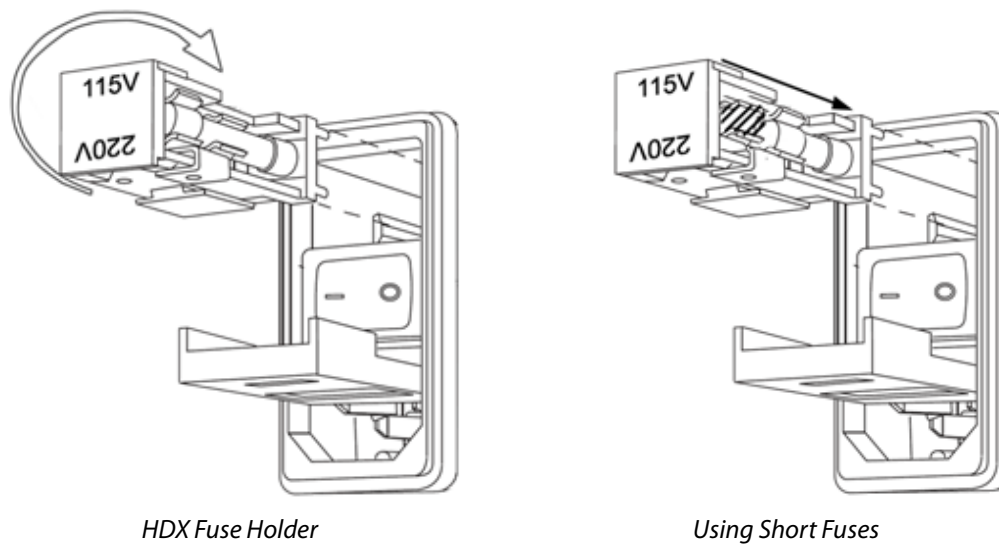
Fig. 3-5: HDX Fuse Holder

The fuse holder can hold two 1/4" x 1-1/4" (3AG) or shorter 5 x 20mm (metric) fuses. If using the shorter fuses, be sure the fuse is positioned "forward" towards the HDX power supply, as shown in Figure 3-5.

4 Specifications

Electro-Optical

Fiber Compatibility
Powered Fiber Between HDX and PowerPlus
Hybrid Fiber/Copper Cable ....SMPTE 311M cable
Hybrid Optical Connector Options
   Standard .... SMPTE 304M
   Special Order.. OpticalCON§

Dry Fiber
PowerPlus ("Dongle" to CopperHead)....................SMPTE 304M, OpticalCON, or MX
HDX (to CopperHead Base Station) ....Dual STs, OpticalCON, or MX

Power

PowerPlus
Input (from HDX): 320VDC
Output:
   Low Profile ....100W continuous (150 momentary) @14 VDC
   High Profile ....150W continuous @14 VDC
   12VDC Power Connector. .... Battery Plate, 4-Pin XLR
   24VDC Power Connector (optional) ....3-pin Fischer

HDX:
Power Req .... 110-120/220-240 VAC, 50 to 60Hz
Power Consumption.. 250 watts max @120VAC
Safety Interlock ....32VAC Pilot, 5VDC Sense return
Main Output (to PowerPlus): 320VDC

Distance Limit *see note below
   HDX w/PowerPlus ....2km (6562 ft.): 100W Cont./150W Peak*

Mechanical/Environmental

Dimensions (HxWxD)
PowerPlus LP (100W) ....5" x 6" x 2.5"
PowerPlus HP (150W) ....5" x 6" x 3.7"
HDX..3.5" x 8.25" x 10"
FR-2 ....3.5" x 16.5" x 12" (2RU high, rack mountable)

Weight
   PowerPlus.. LP: 2.3 lb.......HP: 2.5 lb.
   HDX.. 10.5 lb.

Temperature Range ....-25° to +55°C

Humidity Range ....0 to 95% RH, Noncondensing

§ At HDX power levels (>95VDC), the powered OpticalCON connector is suitable for indoor (studio) camera links only, under specific conditions according to IEC 60664-1 "Pollution Degree 1," where there is zero humidity, zero expected condensation and zero conductive pollution. The powered OpticalCON connector is NOT suitable for outdoor/field use where humidity/condensation may be present. For detailed information ask for the Neutrik White Paper "OpticalCON Camera Applications Using Hybrid SMPTE Cables Where Voltage Exceeds 50V".

* 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 and condition of the hybrid cable, as well as the power draw of the camera, lens, viewfinder, and other accessories are also factors.

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Parts and Accessories
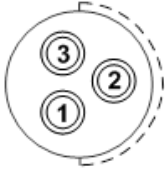
This appendix describes the various parts and accessories for the PowerPlus 3000 system.

Electrical Connectors

PowerPlus Connectors

	Pin	Signal
PowerPlus 12VDC Output Connector		
PowerPlus #8 XLR 4-pin Female (Ext View)	1	GND
	2	Unused
	3	Unused
	4	+ Power 12 VDC
PowerPlus 24VDC Output Connectors (optional)		
PowerPlus # 9 & #10 Fischer 3-pin Female (Ext View)	1	GND
	2	+24 VDC
	3	Unused
	Mating connectors: • Fischer S-102-A-052-130 (straight) • Fischer WSO-102-A0520130 (right angle)	

HDX Power Supply Connector
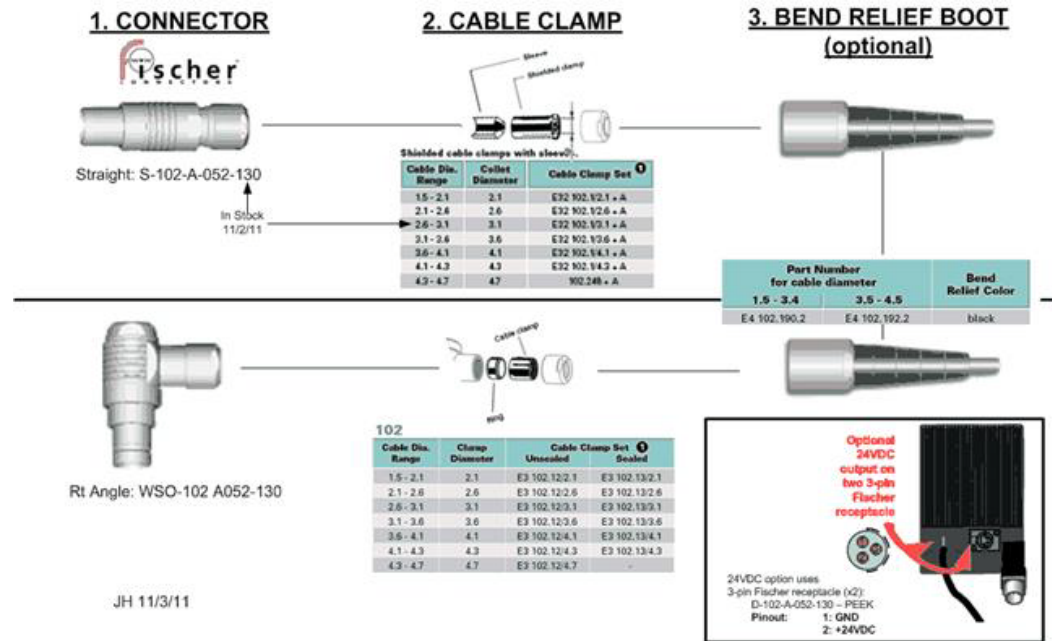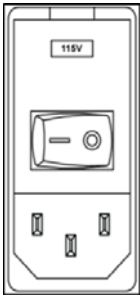
Fig. A-1: 24VDC Connectors – compatible plugs
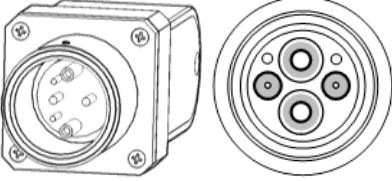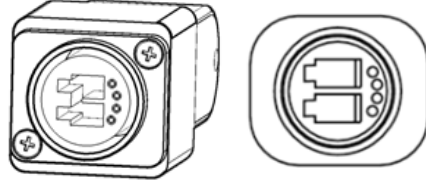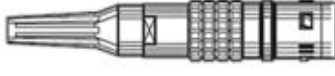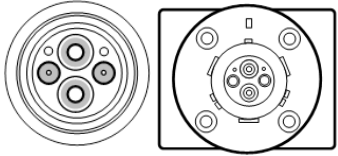
HDX Power Supply Connector

AC Power Input Connector

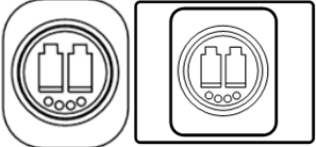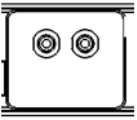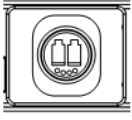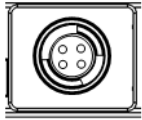| Item	Description
AC Power Interface IEC C14 receptacle	Panel Mounted AC Power Receptacle: 110/220 VAC
	Fuses: the removable fuse holder can hold two 1/4" x 1-1/4" (3AG) or shorter 5 x 20mm (metric) fuses.
	• 120 VAC: Two 3 amp slo-blo fuses • 220 VAC: Two 2 amp slo-blo fuses
	NOTE: Removable fuse module must be set for correct voltage (110VAC or 220VAC). See HDX Fuse Holder on page 15.

Fiber Connectors

PowerPlus Fiber Connectors

PowerPlus Powered Fiber Connector Options (Swivel)	
SMPTE 304M Receptacle	OpticalCON Receptacle Indoor only: Pollution Degree 1 (see Important Note on page 24)
PowerPlus Unpowered Fiber Connector Options (Dongle)	
	MX Plug
	OpticalCON Plug
	SMPTE 304M Plug

HDX Fiber Connectors

HDX Powered Fiber Connector Options		
SMPTE 304M Panel Mounted Plug	OpticalCON Receptacle Indoor only: Pollution Degree 1 (see Important Note on page 24).	
HDX Unpowered Fiber Connector		
ST Receptacles	OpticalCON Receptacle	MX Receptacle

Important Note

Regarding Use of Powered OpticalCON connector with PowerPlus & HDX System

At HDX power levels (>95VDC), the powered OpticalCON connector is suitable for indoor (studio) camera links only, under specific conditions according to IEC 60664-1 "Pollution Degree 1," where there is zero humidity, zero expected condensation and zero conductive pollution.

The powered OpticalCON connector is NOT suitable for outdoor/field use where humidity/condensation may be present. For detailed information, ask for the Neutrik White Paper "*OpticalCON Camera Applications Using Hybrid SMPTE Cables Where Voltage Exceeds 50V*".

PowerPlus 3000/HDX Parts & Accessories

PWRPLS3

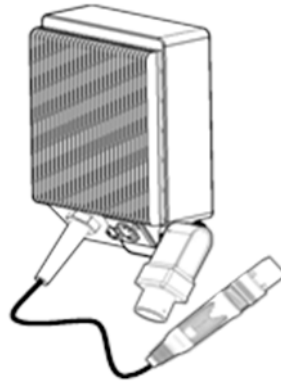Long Distance "PowerPlus" Camera Adaptor for use with HDX (specify LP or HP).

Fig. A-2: PWRPLS3

HDX

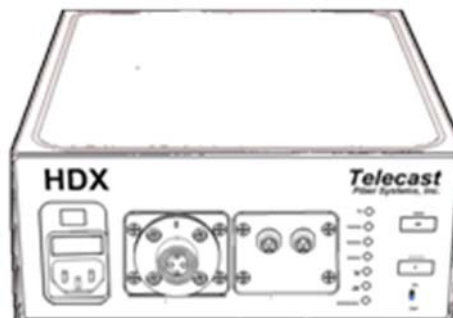Power Supply for PowerPlus Power Adaptor.

Fig. A-3: HDX

HDX-FR-2

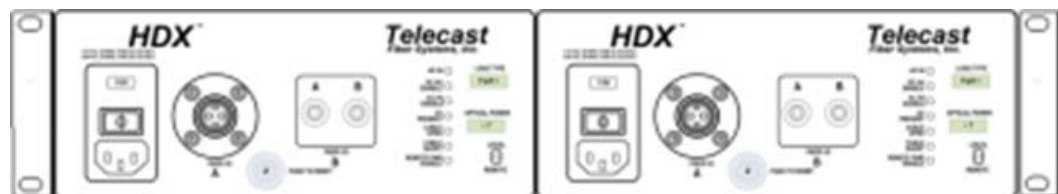Rack mount frame kit for one or two2 HDX units (HDX power supplies not included).

Fig. A-4: HDX-FR-2

Part Numbering Matrix

Part	Number	Description
Product	PWRPLS3	
Power Output	12	12VDC output, 100 Watts Max, Low Profile Heat Sink.
	12-HP	12VDC output, 150 Watts Max, High Profile Heat Sink (High Power/High Profile).
	12-24	12VDC and 24VDC output, 100 Watts Max, Low Profile Heat Sink
	12-24-HP	12-24-HP 12VDC and 24VDC output, 150 Watts Max, High Profile Heat Sink (High Power/High Profile).
Dongle	MX	MX Mini Expanded Beam
	NEU	OpticalCON Duo, unpowered
	304	SMPTE 304M male, unpowered
Battery Mount	V	V-Shoe (Sony)
	AB	Gold Mount (Anton/Bauer)

HDC Part Numbering Matrix

Part	Number	Description
Product	HDX	
Powered Connector	LM	SMPTE 304M female - Lemo
	FIS	SMPTE 304M female - Fischer
Dry Connector	ST	2 STs
	LC	2 LCs
	MX	MX Expanded Beam (2 channels only)
	NEU	Neutrik OpticalCON Duo (dry)
	NEU4	Neutrik OpticalCON Quad (2 channels only)
Special Options	RC	Remote camera power shutoff control
	LD3	Grass Valley LDK Cameras only
	PAN	Panasonic Cameras only
	HIT-RC	Hitachi Cameras only