MultiDyne
Video & Fiber Optic Systems

SilverBack-II

Camera-Back Fiber Optic Transceiver for most SDI hand-held Camera Systems

Features

- All signals on ONE Cable
- Bi-Directional 3G-SDI
- 10km Operation
- Intercom with IFB/PGM inject
- Optional SDI Send for dual stream/3D
- 2 Mic inputs with phantom and pre-amps
- Accepts Anton-Bauer and "V-mount" Battery plates
- Integrated Tally lamps
- Camera RCP Control
- 1 additional Data path (232/422)
- 2 GPIO's
- Integrated swivel for optical connector
- Top-mounted taps for mounting viewfinder
- Optional 15mm Iris Rod bracket for mounting flexibility
- lightweight, low-profile packaging

Applications

- D-SNG and News
- Sports and OB
- College campus
- Concert (I-Mag)
- Digital cinema
- Tele-Medicine
- 3-D Acquisition

All the Signals that You Need for D-SNG, News, Studio & Multi-Camera Production...Small and Lightweight...and Light on Your Budget

The new SilverBack-II has been completely re-designed to provide a full complement of bi-directional signals for most any digital camcorder on the market today. These include camera systems from GVG, Hitachi, Ikegami, Panasonic and Sony!

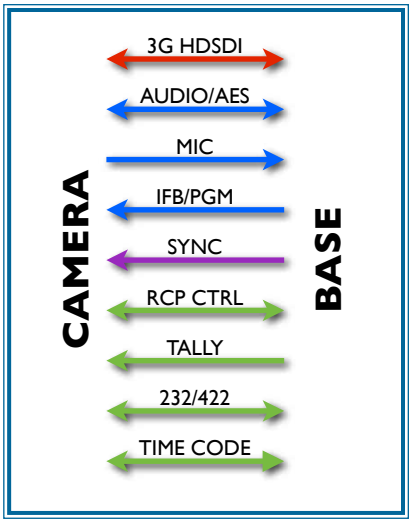
Starting with the case itself, every aspect of the new Silverback has been refined to keep overall size and weight as small as possible without sacrificing performance or operability. Each unit is milled from a block of aluminum and the result is a fiber transciever that becomes a seemless part of your camera without angles and sharp corners. The display uses high-intensity blue LEDs that are easy for the operator to see, but not intrusive.

But as beautiful as the exterior design is, the elegance is on the inside. Inside is all the signal transport you need for video acquisition without compromises. Do you prefer a color LCD viewfinder? The return HD/SD signal is there. Do you like to have a program earpiece for your stage manager? Do you need timecode for recording in the camera? How about extra data? It's all in there!

The base unit is a standard 1RU enclosure with LED status indicators for each signal on the front and BNC, XLRs and multipin connectors on the rear for quick integration into your OB van or facility.

The SilverBack-II. Your camera operators will love the size and weight. You'll love the signal quality and cost savings.

Designed and built in New York.

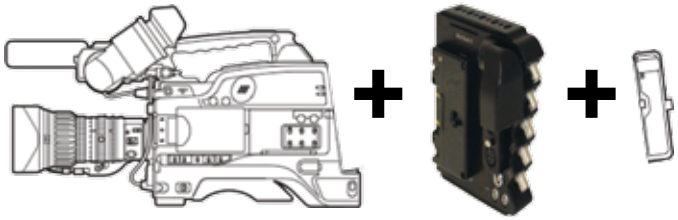


7 Year MultiDyne Warranty

Dual-Purpose your camcorders for live events and multi-camera!

Power

The SilverBack-II mounts between a professional broadcast camera and its battery with your choice of Anton-Bauer or “V-Mount” battery plates. Being only 1” thin and 2.5 pounds in weight, the SilverBack-II will not significantly alter the total weight or the center-of-gravity of the handheld camera. And with its energy-efficient design, power consumption is minimal, too.



If the system is being used in a more stationary environment, A local 12VDC supply could be used with a 4-pin adapter plate (Anton-Bauer part # SO-XLR) to power both the SIlverBack AND the camera.

Make the Connection

The tactical fiber optic cable that connects the SilverBack-II to the base unit has come a long way in the last two decades. Technology has made the singlemode glass fibers stronger and has come up with ways to make it less sensitive to tight bending. Advances in the compounds used to make the exterior jackets have also resulted in stronger, more reliable cables and new connectors are available that are easier to install, use and maintain. The result is cables that are far tougher than your typical coaxial cables at a fraction of the weight, with RF and EFI immunity, no grounding issues and the ability to provide years of reliable service.

We have reels from Schill that are used around the world in the harshest broadcast and industrial environments that can hold up to 1000 ft. (305m) of fiber cable.

There are four optical connector options for the SilverBack-II:

The opticalCON DUO connector from Neutrik is a two-fiber, LC based connector that has gained popularity in recent years. This small and innovative connector has a small “door” that closes over the internal LC termini pins when the connector is not being used. The receptacles can be mounted in standard XLR cut-outs.

The Fibreco Mini is a hermaphroditic exanded beam connector that uses lenses rather than pins and sockets to pass light from one connector to another. The advantage is that these connectors are VERY easy to clean and maintain. Being hermaphroditic, multiple reels can be connected together without the need for connecting “barrels” or adapters. The Mini is completely compatible with the MX connector.

The LEMO SMPTE hybrid connector or plain ST’s can also be specified.

All come with integrated caps with lanyards and a pedigree of durability and reliability.

Small Conveniences Make Huge Differences

One big issue with some modern camcorders is that there is no way to externally access or trigger the tally lights. On a crowded set or busy news shoot, this can be a big problem. The Silverback-II solves this with simple LED tally indicators on the user-panel and on the rear of the unit above the battery, that is triggered from a GPI at the base unit.

To facilitate mounting the SilverBack-II onto any current camera, the bottom of the camera unit can incorporate an optional dovetail with threads which allows existing accessories to be attached directly to the Silverback. The 15mm iris rod bracket is compatible with industry standard 60x15 rods.

Camera I/O

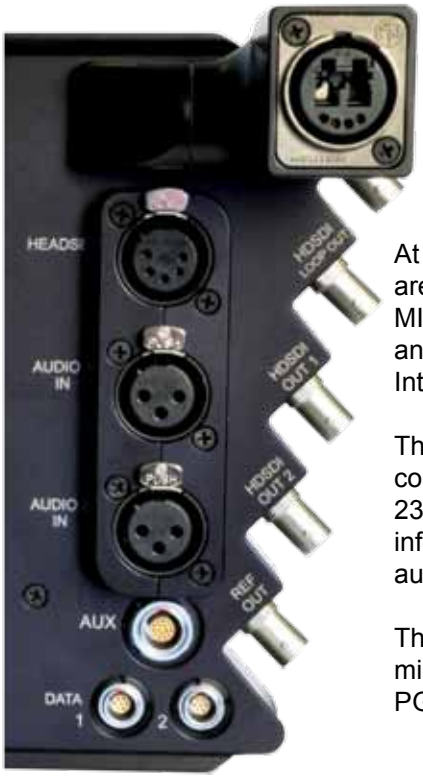
The operator control panel provides a simple interface by which the camera operator can quickly and easily check on system link and signal status and adjust audio and intercom levels.

Soft-touch buttons and blue LED back-lighting make these adjustments fast and easy.

Mic inputs 1 & 2 pre-amps and phantom power are controlled here via convenient soft switches and the levels are easily monitored with the VU meters.

Intercom talk and listen levels as well as the IFB/PGM listen level are located near the top. The LOCAL/REMOTE button allows the operator to trigger his mic via the VTR button on the lens.

Two LED tally indicators, one located near the bottom of the user panel and another above the battery, are triggered through the TALLY data path.



At the rear of the unit are XLR's for Audio MIC inputs 1 and 2 and a 5-pin XLR for Intercom.

Three Lemo data connectors provide 232/422 data, GPIO information and extra audio.

There is also a 1/8" mini for Talent IFB/ PGM.

Video connectors** include:

- SDI-1 in
- SDI-1 loop out (optional SDI 2 in)
- Return SDI-1 OUT
- Optional Return SDI-2
- Sync out

**these can be factory customized

Base I/0

The 1 RU base station front panel has LEDs to indicate the status for POWER and LINK as well as for video, audio and data presence.

Rear Connectivity for Video signals includes BNC connectors for SDI IN and OUT and SYNC/REF IN and LOOP OUT, TIMECODE IN and OUT, XLRs for MIC OUT and PGM AUDIO IN, as well as multipin connectors for 4-wire intercom, data, tally and GPIO's.

Specifications

Video, SDI (bi-directional)

Interface	SMPTE 259M, 292M, 310M
Data Rate	5Mb/sec to 3Gb/sec
Input Level	800mV peak to peak
Impedance (In/Out)	75 Ohms
Bit-error rate	10^{-12}
Jitter (pathological)	<280 pico secs

AES Audio

Input/Output	Balanced, AES3/AES3id
I/O Impedance	110 Ohm/75 Ohm (DIP Sw) +/-20%, 0.1MHz-6.0MHz
Min/Max Input	2-7 Vpp into 110 Ohms
Rise/Fall time	5-30ns for 10 Ohm
Jitter	< 20ns

Intercom/IFB

# of Channels	1 icom + 1 PGM listen
Interface	4-wire
Freq Response	200Hz-15kHz +/- 3dB
Max Distortion	<= 0.5%
Noise	< -60dBu
Max Gain	>= +24dB
Min Gain	<= -45dB

Analog Audio

# of Channels	2 w/ pre-amps
S/N	>90db
Frequency Response	< +/-0.1db (20Hz - 20kHz)
Distortion	< 0.05%
Level Adjust	28,16,10,4 dBu
Max I/O Level	28 dBu
Impedance In (bal)	600 Ohms +
Impedance Out (bal)	<10 Ohms
Icom level	4 dBu FS
Icom Impedance In	10 K Ohm
Icom Impedance Out	<50 Ohm

Serial Data

232,422,485	DC-3Mbps
232 In V	+/- 25V max, 2V min
232 Out V	+/- 5V @ 3Kohm, 1.6V
Sens.	
422,485 In V	-7V to 12V, 0.2V diff min
GPIO's	Normally Open, Form 1 SPST

Electro-Optical

Operating Wavelengths	1271-1591nm
TX Laser output power	-2 - 0dBm, Class 1
Receiver Sensitivity	-18 dBm
Fiber Compatibility	singlemode
Optical Connector	ST, SC, OpticalCon DUO or Fibreco EXB Mini
Distance limit	10 km

Mechanical, Environmental

Cam Unit	
Dimensions (LxWxH)	6" x 5" x 1.1"
Weight	2.5 lbs.
Base unit	
Dimensions (LxWxH)	17.5" x 10" x 1.75"
Weight	3 lbs.
Power Input (Base)	STD. IEC
Power Consumption	
Base	6.5 watts @100-240 VAC
Cam Unit	6.5 watts @12VDC
Temperature Range	-0° to +70°C
Humidity Range	0 to 95% RH Noncondensing

Ordering Information

Camera End	Select -AB for Anton Bauer battery mount or -V for V-plate battery mount
SLB2-TX-ST-AB	SilverBACK-II Camera Back Fiber Transceiver: 3G HD-SDI Camera Video, 4-Ch Audio, 2-Ch 4 Wire Intercom, Camera Control & Tally. Anton-Bauer battery mount and MIL ST Connector
SLB2-TX-ST-V	SilverBACK-II Camera Back Fiber Transceiver: 3G HD-SDI Camera Video, 4-Ch Audio, 2-Ch 4 Wire Intercom, Camera Control & Tally. "V-Plate" battery mount and MIL ST Connector
SLB2-TX-NOC-AB	SilverBACK-II Camera Back Fiber Transceiver: 3G HD-SDI Camera Video, 4-Ch Audio, 2-Ch 4 Wire Intercom, Camera Control & Tally. Anton-Bauer battery mount and Neutrik OpticalCon DUO fiber connector
SLB2-TX-EXB-AB	SilverBACK-II Camera Back Fiber Transceiver: 3G HD-SDI Camera Video, 4-Ch Audio, 2-Ch 4 Wire Intercom, Camera Control & Tally. Anton-Bauer battery mount and Expanded Beam fiber connector
SLB2-TX-311-AB	SilverBACK-II Camera Back Fiber Transceiver: 3G HD-SDI Camera Video, 4-Ch Audio, 2-Ch 4 Wire Intercom, Camera Control & Tally. Anton-Bauer battery mount and SMPTE 311M Connector
Base Unit	select ST, SC, NOC, EXB or 411
SLB2-RX-ST	The SilverBACK Fiber Transceiver: 3G HD-SDI Camera Video, 4-Ch Audio, 2-Ch 4 Wire Intercom, Camera Control & Tally. Stand-alone/ portable or rack mountable. Select optical connector type.
Interface Cable Kits	
SLB2-RCP-SON	Lemo to 8 Pin Hirose for Sony RCP Panels (RMB). Camera and RCP Side
SLB2-RCP-IKE	Lemo to 8 Pin Tajimi for Sony RCP Panels (RMB). Camera and RCP Side
SLB2-RCP-PAN	Lemo to 10 Pin Hirose for Panasonic RCP Panels (RMB). Camera and RCP Side
SLB2-RCP-HIT	Lemo to 4 Pin Hirose for Hitachi RCP Panels (RMB). Camera and RCP Side
SLB2-RCP-JVC	Lemo to 6 pin DIN for JVC RCP Panels (RMB). Camera and RCP Side
Accessories	
AUX-LEMO-BO	Breakout cable for AUX connector on CAM unit. Lemo (ECG.1B.316.CLN) to bare wire
AUX-DATA2-BO	Breakout cable for Data2 connector on CAM unit. Lemo (ECG.0B.307.CLN) to bare wire
Fiber Cables	(contact factory for infomation about reels and custom cable lengths)
CAT2S-NOP2-NOP2-500	500 feet (150m) of fiber cable terminated with Neutrik OpticalCon DUO connectors
CAT4S-EXP4-EXP4-500	500 feet (150m) of fiber cable terminated with Fibreco Expanded Beam MINI connectors
CAT2S-ST-ST-500	500 feet (150m) of fiber cable terminated with Militarized ST connector
BOT2S-NOB2-ST-2M	2m Neutrik OpticalCon receptacle to ST's or SC's
BOT4S-EXB4-ST-3M	3m Fibreco Expanded Beam MINI receptacle to ST's or SC's

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Transmit • Route • Receive

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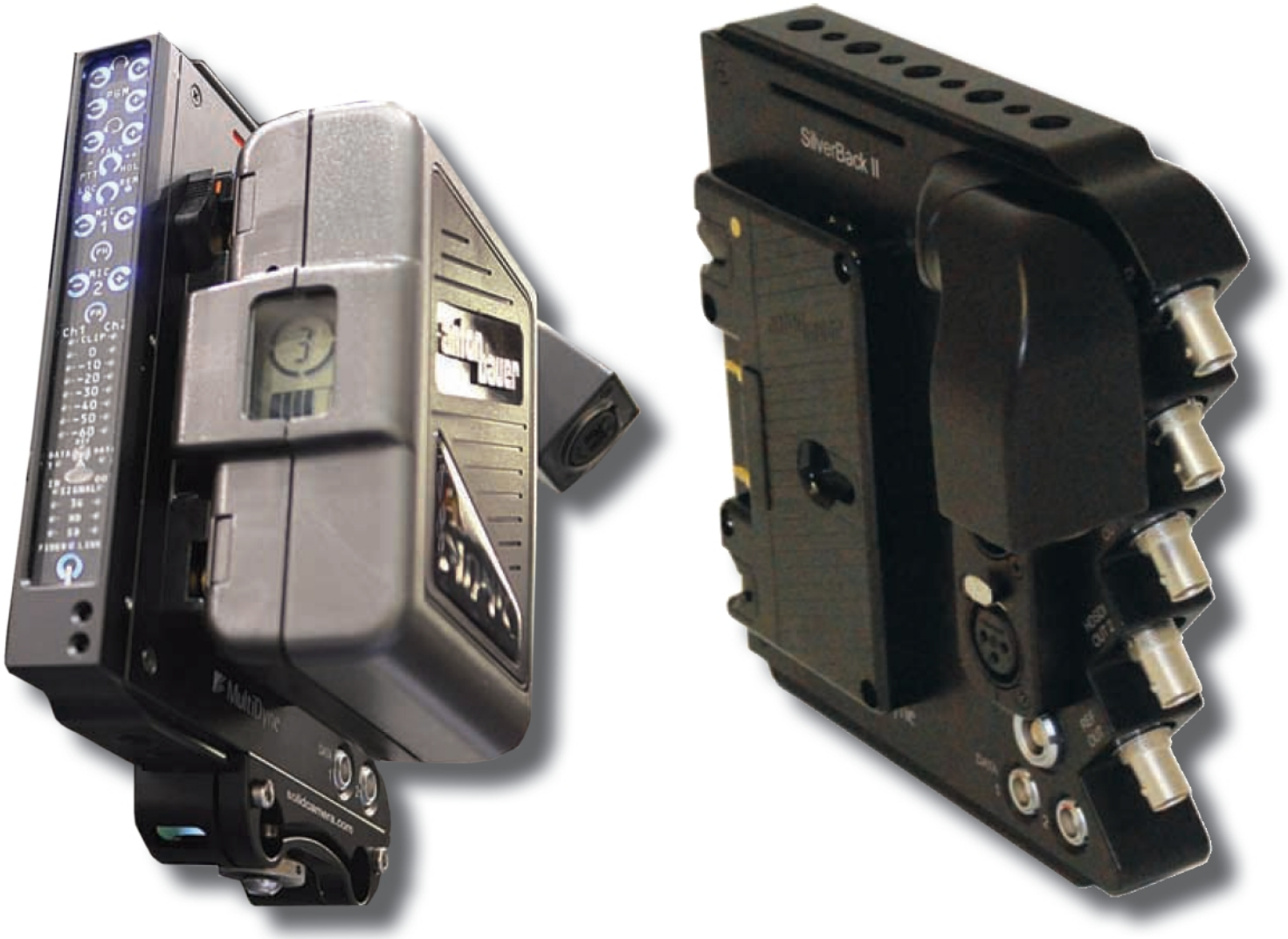
Camera-Back Fiber Optic Transmission System



SilverBack II – System Overview

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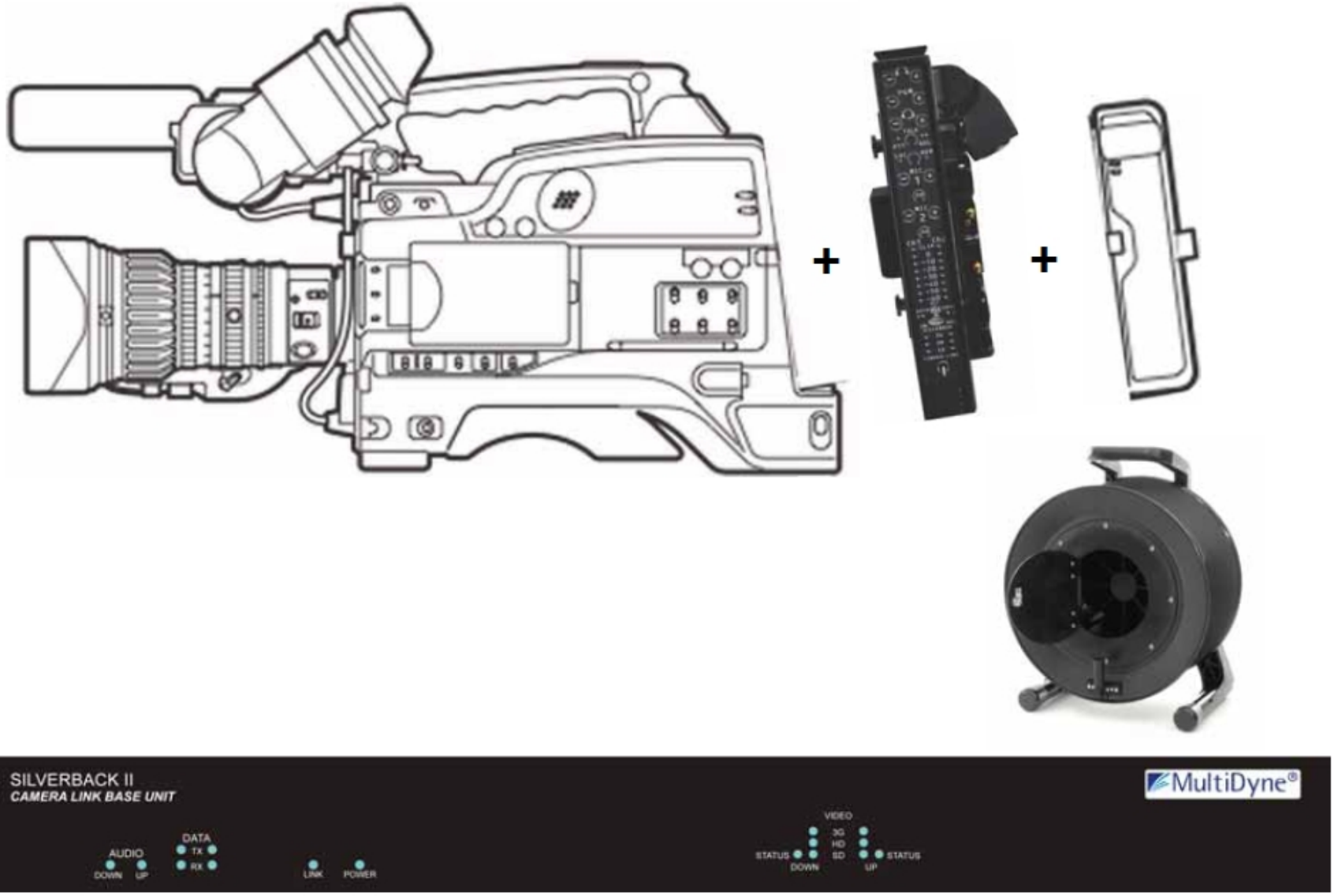
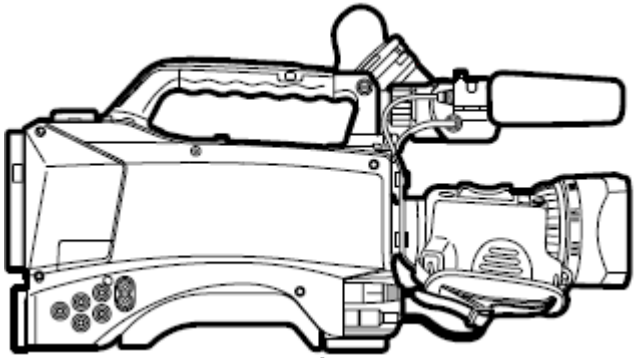


SilverBack II – System Features

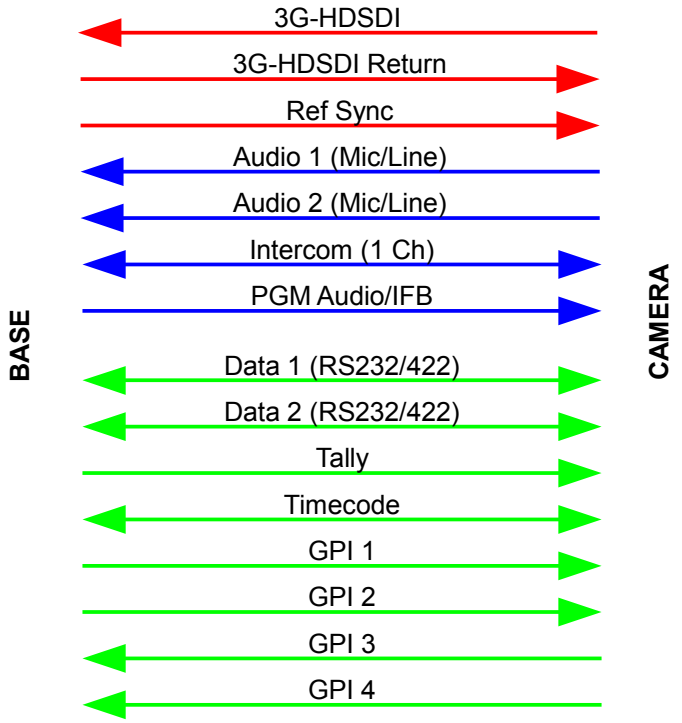
3G-HDSDI 1
3G-HDSDI Return
Ref Sync
Audio 1 (Mic/Line)
Audio 2 (Mic/Line)
Intercom (1 Ch)
PGM Audio/IFB
Data 1 (RS232/422/TTL)
Data 2 (RS232/422/TTL)
Tally
Timecode
GPI 1
GPI 2
GPI 3
GPI 4



All signals on a single strand of fiber

SilverBack II – System Features

- Bi-Directional Video – 3Gbps
- 2 Mic/Line Audio
  - Camera to Base
- Intercom
  - 4-Wire, 1 Channel
  - 2-Wire Optional
- PGM Audio/Talent IFB
  - Base to Camera
- Reference
- Tally
  - Integrated Tally Lamps
- 2 Bi-Directional Data Channels
  - RS232, RS422, TTL
  - RCP/Paint Applications
    - Cable sets available for Sony, Panasonic, JVC, Ikegami
- 2 GPIO
- Timecode
- Fiber Connectivity Options
  - ST, OpticalCon, SMPTE 311, Expanded Beam
- Power Options
  - Battery (Anton Bauer or V-Mount), “Juice”, HUT
- All signals on 1 Fiber using CWDM



SilverBack II – Fiber Connectivity Options

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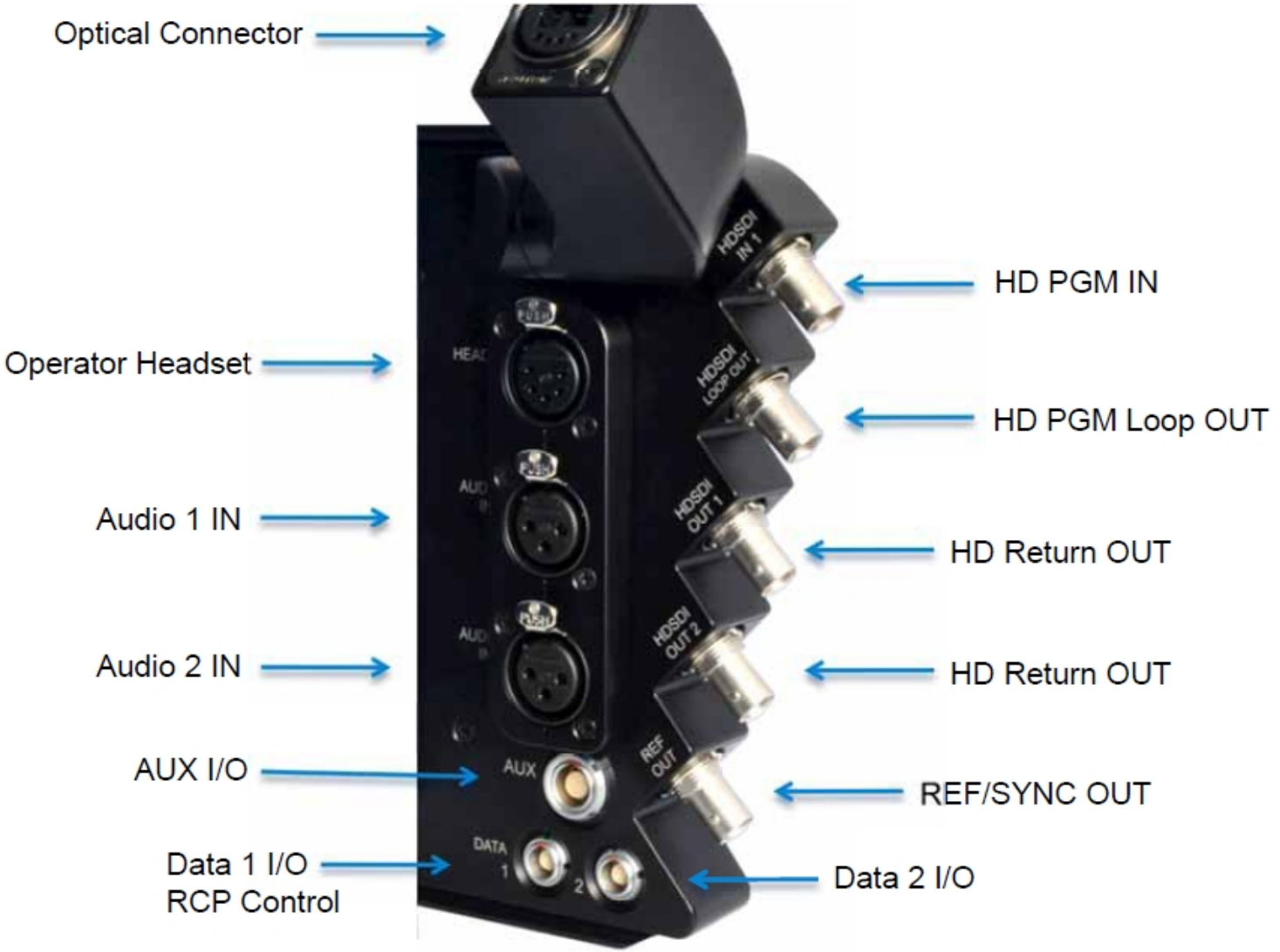
Fiber Only

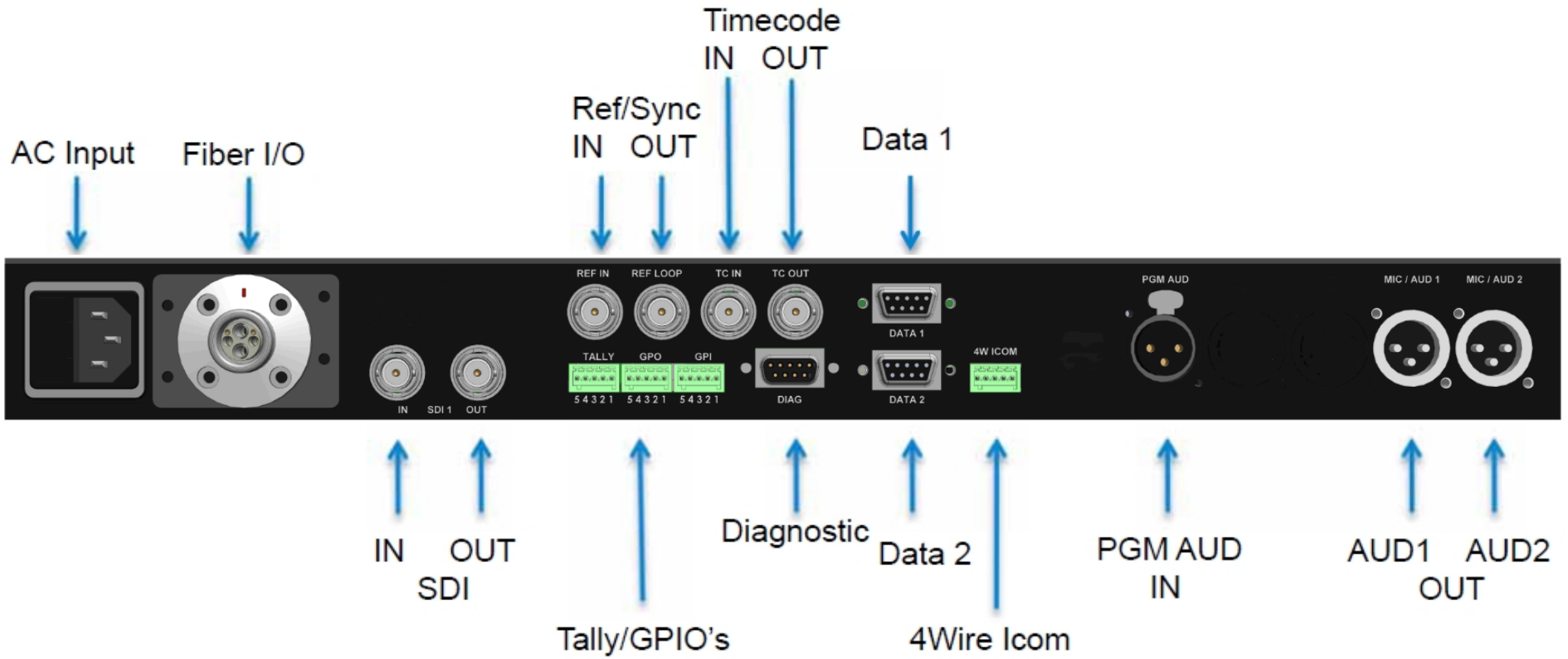
Fiber Only
Or Powered

SilverBack II – Connectivity



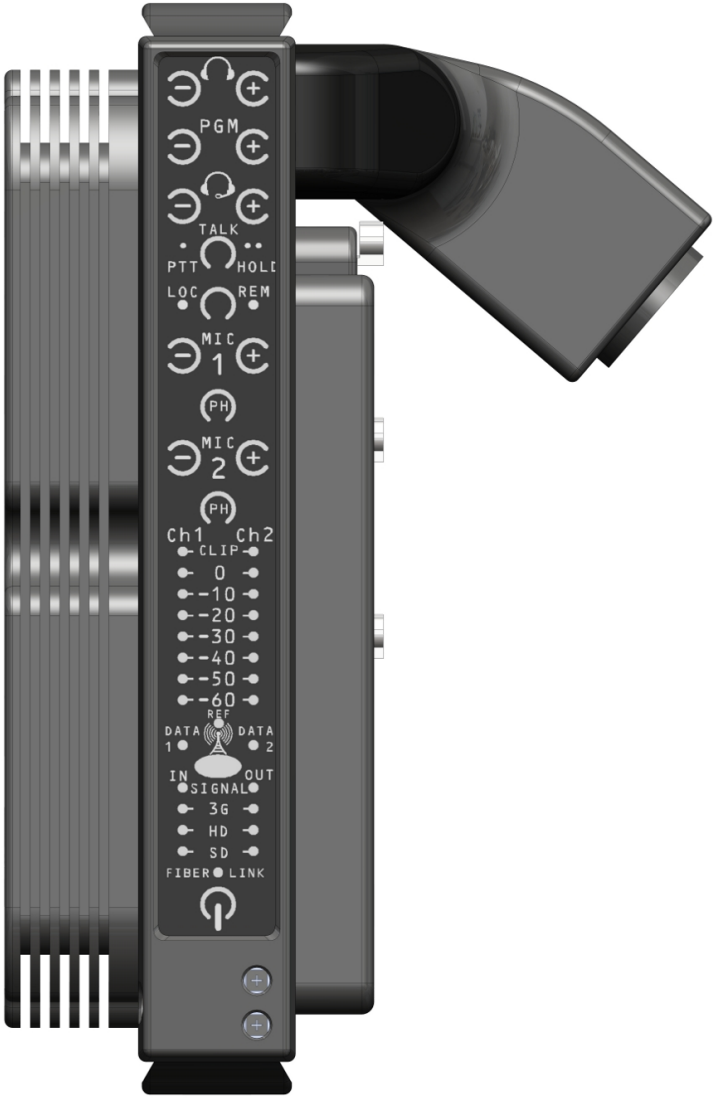
Camera Unit Connections

SilverBack II – Connectivity



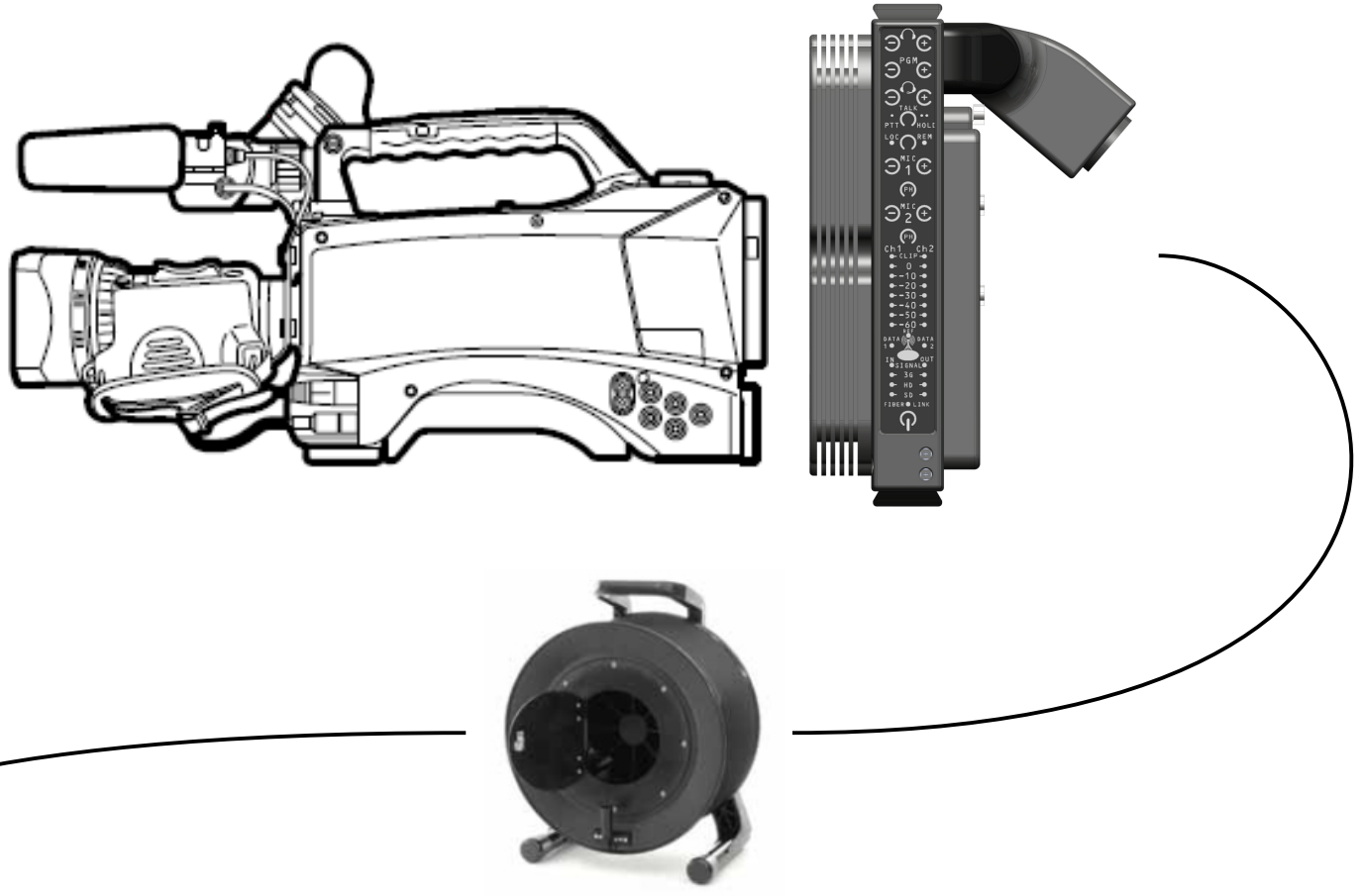
Base Unit Connections

SilverBack II – Juice Power Option



Camera Unit with “Juice” Power Block

SilverBack II – Juice Power Options



Base Powered Juice

SilverBack II – Juice Power Features

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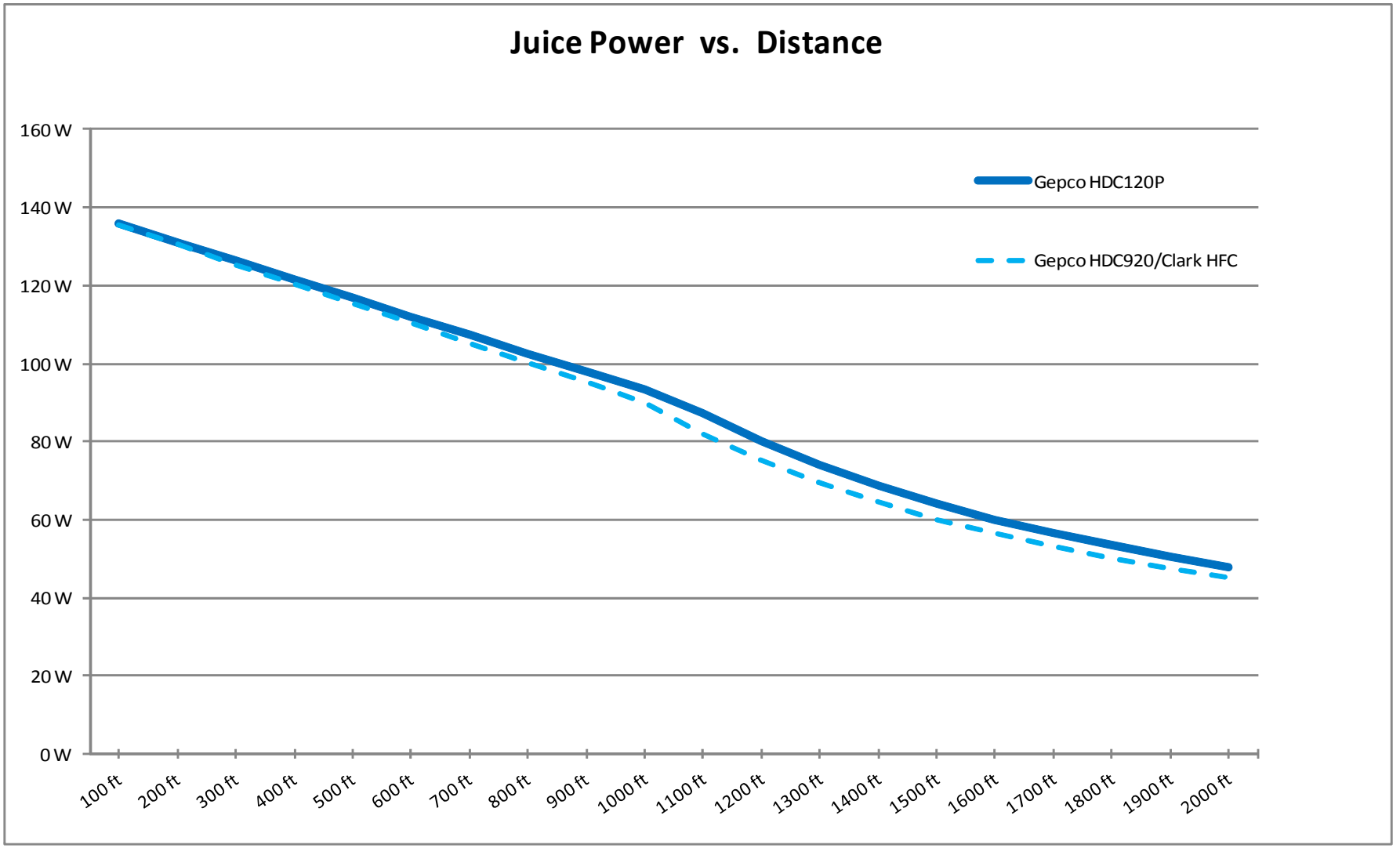
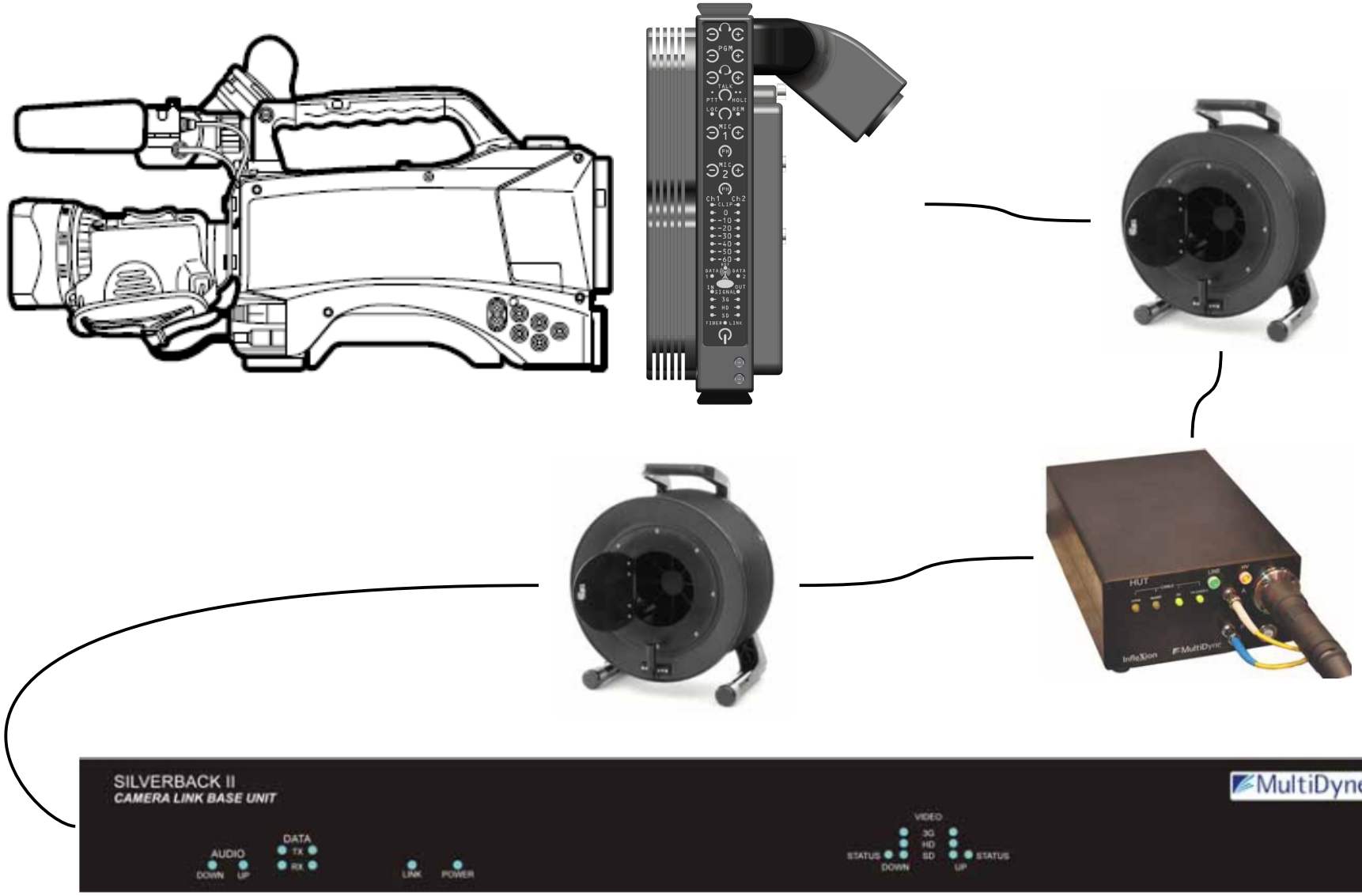
- Provides up to 140W (max) at the Camera
- Integrated Camera Unit Option
  - Replaces standard back plate
  - 0.85” thick
  - Battery can still be used
- Power supplied from Base Unit
  - Low Voltage DC - Safe
- Approx 100W @ 1000ft using Gepco HDC120P Hybrid Fiber Cable
  - Typical ENG-Type setups (Cam, Lens, VF, SB) are in the 50-60W range
- Longer distances can be achieved using HUT-48 “midspan”
- Future Higher Power/Longer Distance AC option?

SilverBack II – Juice Power Features

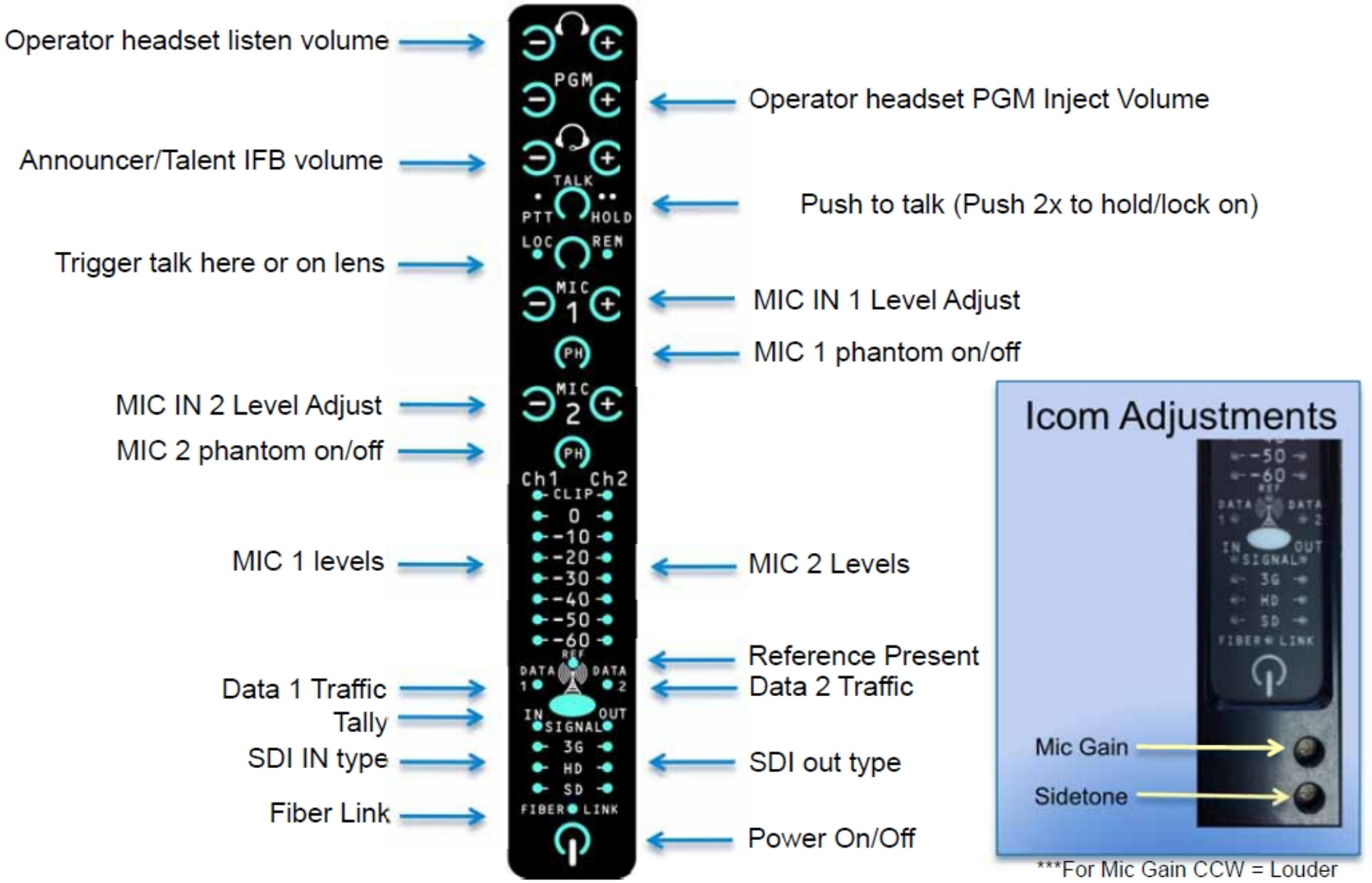


SilverBack II – Juice Power Options



HUT Powered Juice – For Long Distance Applications

SilverBack II – Camera Unit Operation



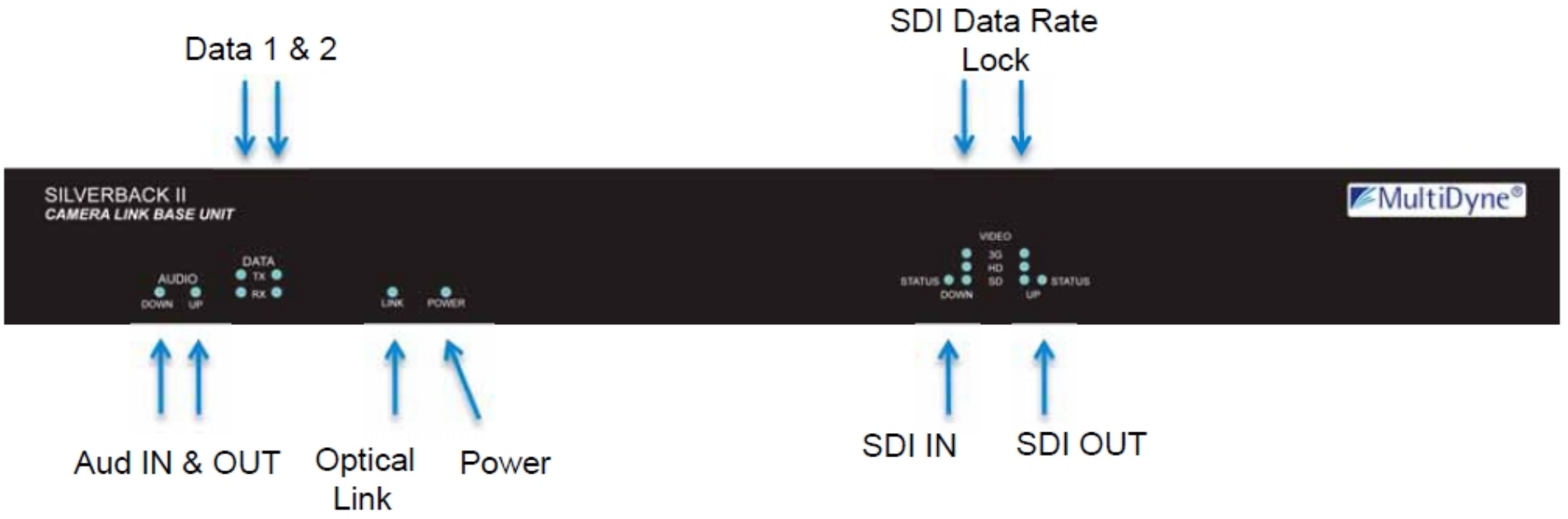
Camera Unit Control Panel

SilverBack II – Camera Unit AUX Port

Pin #	Function
1	GPI 1 In
2	GPI 2 In
3	GPO 1 Out
4	GPO 2 Out
5	Headset Mic PTT
6	Tally Out
7	Return Audio 1 Out + (future)
8	Return Audio 1 Out - (future)
9	Return Audio 2 Out + (future)
10	Return Audio 2 Out - (future)
11	LTC In
12	+12VDC Out, 1A
13	GND
14	GND
15	GND
16	LTC Out

AUX Connector Signals

SilverBack II – Base Unit Operation



Base Unit Front Panel LED Indicators

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At the base, connect the DATA1 Port DB-9 to the RCP via the SLB2-RCP-BASE cable. Power for The RCP is supplied by the SB Base unit

At the camera, connect the REMOTE port on the camera to the DATA 1 Lemo Port on the SIlverBack via The SLB2-RCP-CAM cable