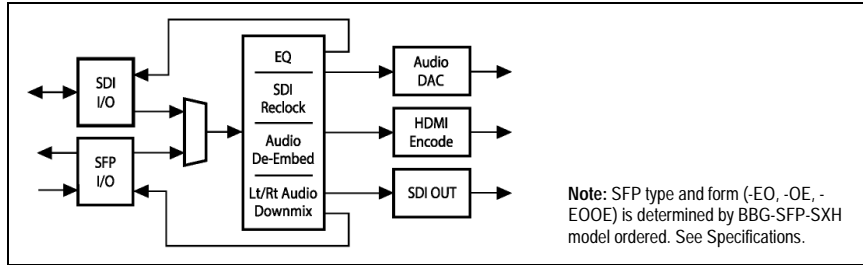


# BBG-SFP-SXH

3G/HD/SD-SDI / ASI Reconfigurable Video SFP Transceiver with Externally-Accessible SFP Module

The **BBG-SFP-SXH Coax/Fiber Transceiver** (hereinafter called “BlueBox™ SFP-SXH”) provides a small “throwdown” package that has an external SFP cage which supports numerous SFP choices that provide single or dual-channel IP-2022/2110 encapsulation or de-encapsulation conversions to and from SDI and uncompressed IP video. An SDI output, as well as convenience HDMI and analog audio downmix pair monitor audio outputs are also provided. IP interfaces are facilitated via an SFP optical module (see Specifications). Conversion schemes (encap, de-encap, etc.) are facilitated by the factory-installed software loaded on BlueBox™ SFP-SXH at time of order (see BlueBox™ SFP-SXH Configurations).

The unit receives its DC power from either connecting its USB port to associated equipment, or by the supplied AC adapter (dual-sourcing provides redundancy).



## Connecting BlueBox™ SFP-SXH

1. Connect BlueBox™ SFP-SXH to DC power using the supplied AC adapter or USB connection.
2. Remove any protective caps on fiber cables and/or input receptacles. Connect BNC Coax input/outputs and Fiber input/outputs to desired input/output connectors. This provides the basic conversion connections. Unused connections do not require termination.

**CLASS 1 LASER PRODUCT**  
IEC 60825-1:2007  
Caution - INVISIBLE LASER RADIATION. AVOID EXPOSURE TO THE BEAM.

## Status Indicator

BlueBox™ SFP-SXH has **Status** LEDs (one LED for the fiber input channel and one for the coax input channel) on the side of the unit which function as follows:

- **Solid Green** – Recognized SDI present.
- **Green Flash** – No SDI present, or not recognized as SDI.

## Configure Select Using DIP Switch Bank

BlueBox™ SFP-SXH can be used in a local control mode using DIP switches to configure settings, or via USB remote control. The USB remote also provides an optical Tx power meter for Tx confidence assessment. Refer to diagram on unit label for switch positions.

- **If using DIP switch control**, make certain switch SW1 is set to **ON**. USB remote control is locked out in this mode.
- **If using USB remote control**, make certain switch SW1 is set to **OFF**. DIP switch local control is locked out in this mode.

## Input Routing Select Switches

BlueBox™ SFP-SXH DIP switches SW2 and SW3 allow for selecting from either SDI coaxial input via **SDI I/O** or SFP input via **SFP I/O** as shown below and on rear label on unit. The Failover choices allow selecting from either SDI or SFP as the Primary input to be used (**Pri**), with failover to Secondary (**Sec**) as shown.

SW 2	SW 3	INPUT ROUTING
OFF	OFF	SFP In > SDI/HDMI/SFP Out
OFF	ON	SDI In > HDMI/SFP Out
ON	OFF	Failover In: SFP Pri/SDI Sec > HDMI/SFP Out
ON	ON	Failover In: SDI Pri/SFP Sec > HDMI/SFP Out

## Audio De-Embed Select Switches

BlueBox™ SFP-SXH DIP switches SW4 thru SW6 allow for selecting de-embed to be applied to the HDMI output as well as stereo downmix to the convenience analog audio

**AN-AUD L/R OUT** TRS 3.5mm stereo connector using DIP switch bank as shown below and on the unit label.

SW 4	SW 5	SW 6	AUDIO DE-EMBED
OFF	OFF	OFF	HDMI Passthrough ch 1-8 \ Analog Downmix ch 1-6
OFF	OFF	ON	HDMI Downmix ch 1-6 \ Analog Downmix ch 1-6
OFF	ON	OFF	HDMI Downmix ch 1-6 \ Analog Passthrough ch 1-2
OFF	ON	ON	HDMI Downmix ch 1-6 \ Analog Passthrough ch 3-4
ON	OFF	OFF	HDMI Downmix ch 1-6 \ Analog Passthrough ch 5-6
ON	OFF	ON	HDMI Downmix ch 1-6 \ Analog Passthrough ch 7-8
ON	ON	OFF	HDMI Passthrough ch 1-8 \ Analog Passthrough ch 1-2
ON	ON	ON	HDMI Passthrough ch 1-8 \ Analog Passthrough ch 3-4

## Unbalanced Audio Levels and This Device

The unbalanced audio outputs on this device (available on the **AN-AUD L/R OUT** TRS 3.5mm stereo connector) correspond to 2.2 Vrms output when sourced from a unity-gain 0 dBFS digital sine-wave source. Consumer audio is specified in dBV with a nominal (or recording) level of -10 dBV. The 2 Vrms maximum output level corresponds to +6 dBV. The unbalanced analog outputs on this device allow for 16 dB of headroom above the nominal -10 dBV consumer level (“headroom” is the range between the maximum and nominal audio levels). Professional balanced analog audio levels in the US typically use a +4 dBu nominal level with 20 dB of headroom (-20 dBFS). The maximum level for balanced analog interfaces is +24 dBu.

The headroom difference between consumer and professional audio will result in a lower consumer level when converting from professional balanced analog audio. For example, if pro level analog audio is received and transmitted via AES or embedded SDI to a receiver converting to unbalanced analog audio, the output will be 4 dB lower, with a nominal level of -14 dBV.

## Channel Line-Up of HDMI vs. Standard SDI Conventions

To maintain conformance with CEA-861D HDMI audio channel line-up specifications and industry standard SDI convention, this device has DIP switch SW7 that selects audio line-up on the HDMI output as listed below (SDI line-up is always per SDI convention).

Signal Format/Channels	1	2	3	4	5	6
Standard SDI Convention	L	R	C	LFE	Ls	Rs
HDMI CEA-861D	L	R	LFE	C	Ls	Rs

## HDMI/DVI Mode Switches

BlueBox™ SFP-SXH can typically automatically detect connection to a downstream device as either an HDMI port or a DVI (monitor) port. However, switches **SW8** thru **SW10** allow setting BlueBox to force a DVI output suitable for direct connection to monitors using a DVI input in case the connection is not detected by the monitor. (Refer to illustration on rear panel label on unit for switch positions.)

- **SW8** – Set to **ON** to allow manual control of HDMI/DVI mode.
- **SW9** – Set to **ON** to force DVI output mode.
- **SW10** – Set to **ON** to force RGB color space (intended mode for monitor usage).

**Note:**

- Colorspace SW10 and DVI/HDMI Select SW9 only work when SW8 is set to Manual.
  - Connect monitor to BlueBox™ SFP-SXH and then set switches to ensure monitor gets handshake to “see” connection.

## BlueBox™ SFP-SXH Configurations

BlueBox™ SFP-SXH is factory-configured using SFP hardware options and software options as described below. These options will determine the available input/outputs on your device, and the formats/conversions supported.

SFP-SXH Hardware Options	Description
-SFP-EO: <sup>(1)</sup>	Single-Channel Video Optical Transmitter (EO); Embrionix™ GO2918
-SFP-OE: <sup>(1)</sup>	Single-Channel Video Optical Receiver (OE); Embrionix™ GO2917
-SFP-EOOE: <sup>(1)</sup>	Single-Channel Video Optical Transceiver (EOOE); Embrionix™ GO2929
-SFP-IP-SWD: <sup>(2)</sup>	<p>Software-Defined EmSFP 2011/2022-6 Encap/De-Encap Host. 10GigE Multi-Mode Optical Interface with Female LC Duplex Connectors. The following I/O purposing <b>software options</b> are supported and available for units using this SFP type:</p> <ul style="list-style-type: none"> <li>• <b>+ADD-SFP-2SDI-TO-IP-2022-6</b> SFP Software License; Dual-Channel Encapsulator 2SDI-to-IP-2022-6</li> <li>• <b>+ADD-SFP-2SDI-TO-IP-2110</b> SFP Software License; Dual-Channel Encapsulator 2SDI-to-IP-2110</li> <li>• <b>+ADD-SFP-IP-TO-2SDI-2022-6</b> SFP Software License; Dual-Channel De-Encapsulator IP-2022-6-to-2SDI</li> <li>• <b>+ADD-SFP-IP-TO-2SDI-2110</b> SFP Software License; Dual-Channel De-Encapsulator IP-2110-to-2SDI</li> <li>• <b>+ADD-SFP-IP-TO-SDI-2022-6</b> SFP Software License; Single-Channel De-Encapsulator IP-2022-6-to-SDI</li> <li>• <b>+ADD-SFP-IP-TO-SDI-2110</b> SFP Software License; Single-Channel De-Encapsulator IP-2110-to-SDI</li> <li>• <b>+ADD-SFP-SDI-TO-IP-2022-6</b> SFP Software License; Single-Channel Encapsulator SDI-to-IP-2022-6</li> <li>• <b>+ADD-SFP-SDI-TO-IP-2110</b> SFP Software License; Single-Channel Encapsulator SDI-to-IP-2110</li> </ul>
<p>(1) SFP types are factory-installed. These SFP modules are purchased separately from the base BlueBox™ SFP-SXH unit.</p> <p>(2) When <b>-SFP-IP-SWD</b> module is ordered with base BlueBox™ SFP-SXH unit, one of the factory-installed <b>+ADD</b> purposing software options is also ordered. The <b>+ADD</b> option correspondingly configures the device as described above</p>	

## Warranty and Service Information

### Cobalt Digital Inc. Limited Warranty

This product is warranted to be free from defects in material and workmanship for a period of five (5) years from the date of shipment to the original purchaser, except that 4000, 5000, 6000, 8000 and Blue Box series power supplies, and Dolby® modules (where applicable) are warranted to be free from defects in material and workmanship for a period of one (1) year.

Cobalt Digital Inc.'s (“Cobalt”) sole obligation under this warranty shall be limited to, at its option, (i) the repair or (ii) replacement of the product, and the determination of whether a defect is covered under this limited warranty shall be made at the sole discretion of Cobalt.

This limited warranty applies only to the original end-purchaser of the product, and is not assignable or transferrable therefrom. This warranty is limited to defects in material and workmanship, and shall not apply to acts of God, accidents, or negligence on behalf of the purchaser, and shall be voided upon the misuse, abuse, alteration, or modification of the product. Only Cobalt authorized factory representatives are authorized to make repairs to the product, and any unauthorized attempt to repair this product shall immediately void the warranty. Please contact Cobalt Technical Support for more information.

To facilitate the resolution of warranty related issues, Cobalt recommends registering the product by completing and returning a product registration form. In the event of a warrantable defect, the purchaser shall notify Cobalt with a description of the problem, and Cobalt shall provide the purchaser with a Return Material Authorization (“RMA”). For return, defective products should be double boxed, and sufficiently protected, in the original packaging, or equivalent, and shipped to the Cobalt Factory Service Center, postage prepaid and insured for the purchase price. The purchaser should include the RMA number, description of the problem encountered, date purchased, name of dealer purchased from, and serial number with the shipment.

Cobalt Digital Inc. Factory Service Center  
 2506 Galen Drive Office: (217) 344-1243  
 Champaign, IL 61821 USA Fax: (217) 344-1245  
 www.cobaltdigital.com Email: info@cobaltdigital.com

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## Specifications

Item	Description/Specification
Part Number/ Nomenclature:	- BBG-SFP-SXH 3G/HD/SD-SDI / ASI Reconfigurable Video SFP Transceiver with Externally-Accessible SFP Module. See "BlueBox™ SFP-SXH Configurations" for details of SFP hardware types available and software options in conjunction with software-defined SFP type -SFP-IP-SWD.
Power:	5-16 VDC, 2.4 W DC Power Connectors USB Mini and coaxial locking connector (for use with supplied Cobalt power adapter)
Standards Supported (SDI):	SMPTE 259M, 292M, 424M
Inputs/Outputs:	(1) Bidirectional SFP external cage connector (supports Embrionix Video SFPs; see Ordering Info) (1) Bidirectional SDI / ASI BNC connector (mode user selectable) (1) SDI reclocked output (1) HDMI output (HDMI 1.4a compliant). HDMI output can be set as DVI-D (limited to SMPTE HD formats). (1) Stereo analog audio out (L/R unbalanced pair via 3.5mm TRS jack)
Fiber Tx/Rx Specifications:	Tx Wavelength (SPF EO, EOOE): 1310 nm Tx Power (SFP EO, EOOE): -5.0 dBm (min) Rx Sensitivity (SFP OE, EOOE): -23 dBm Rx Wavelength Range (SFP OE, EOOE): 1260 to 1620 nm
Audio Conversion Format	48 kHz sampling, 24-bit 8-Ch HDMI to SDI groups 1 and 2
USB Port	Mini-USB (used for power source, USB remote control connection, and firmware upgrade upload to device)
Dimensions (WxHxD):	5.5" x 3" x 1" (including connector projections) (139 x 77 x 26 mm)
Operating Temperature Range	32°F to 122°F (0°C to 50°C)



### Cobalt Digital Inc.

2506 Galen Drive  
Champaign, IL 61821  
Voice 217.344.1243 • Fax 217.344.1245  
www.cobaltdigital.com