



The Copperlink 2353 Series converts broadcast quality 3G/HD/SD-SDI with or without embedded audio to HDMI®.

## Copperlink™ 2353 Series

3G/HD/SD-SDI to HDMI® Converter



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## Contents

Welcome .....	3
Features .....	3
Package Contents .....	3
Technical Specifications	
Model Part Number Specifications .....	4
General Specifications .....	4
Installation Instructions .....	6
Audio Pair Selection .....	7
Indicator LEDs .....	7
Maintenance and Repairs .....	8
Certifications .....	8
Warranty .....	9

## Welcome

Thank you for purchasing Artel Video Systems' Copperlink™ 2353 Series. The 2353 Series is used to convert 3G/HD/SD-SDI with or without embedded audio to HDMI®. The 2353 Series also provides immunity to video pathological signals over the entire operating temperature range.

## Features

- Convert 3G/HD/SD-SDI with embedded audio to HDMI® with audio pair selection
- Supports all SD and HD resolutions to 1080p/60
- HDMI® embedded and stereo line level outputs (if audio present in SDI stream)
- Re-clocked SDI BNC output allows for continuous 3G/HD/SD-SDI signal distribution
- User selection from up to 8 audio channel pairs for multilingual or multmessage support
- Automatic selection of output resolution - no scaling
- Small compact design

## Package Contents

- One Copperlink™ 2353
- This User's Manual

## Technical Specifications

### General Specifications

Indicators	Power, Alarm, Data Rate Lock (3G, HD, SD)
Box Version Dimensions	6.5 W x 1.15 H x 6 L (inches) 165 W x 29 H x 152 L (mm)
Weight	16 ounces, 453.5 grams
Power	9-24 volts, AC or DC, 5.5 watts, 18.8 BTU/Hr
Operating Temperature	-10° C to +50° C
MTBF:	37,000 Hours

### Serial Video BNC Input

Number of Inputs	1
Data Rate Range	270 Mbps to 2.97 Gbps
Supported Standards	SMPTE 259M, 292, 424M-2006
Re-clocked Data Rates	270 Mbps (SMPTE 259M, DVB-ASI-270), 1.485 Gbps (SMPTE 292) 2.97 Gbps (SMPTE 424M-2006)
Equalization	Automatic up to 100m of Belden 1694A at 2.97 Gbps, 200m at 1.485 Gbps and 350m at 270 Mbps
Return Loss	>10dB up to 2.97 Gbps

### Video Output

Number of Outputs	1
Connector Type	HDMI® Female
Signal Format	Single link HDMI® with embedded audio, RGB or YCrCb as negotiated with display
Resolutions Supported	All 3G/HD/SD-SDI formats from standard definition to 1080p/60
3G/HD/SD-SDI Output	Standard BNC, Follows SDI input
HDCP Compliant	Yes. SDI signals, by definition, are not encrypted

## Technical Specifications

### 3G/HD/SD-SDI Output

Signal Level	800mV ± 10%
DC Offset	0V ± 0.5V
Rise/Fall Time	< 135 ps at 2.97 Gbps per SMPTE 424M-2006; < 270 ps at 1.485 Gbps per SMPTE 292; 0.4 ns to 1.5 ns at 270 Mbps per SMPTE 259M
Overshoot	< 10% of amplitude
Timing Jitter	< 0.2 UI at 270 Mbps; < 1.0 UI at 1.485 Gbps; < 2.0 UI at 2.97 Gbps with color bar signal
Alignment Jitter	< 0.2 UI at 270 Mbps; < 0.2 UI at 1.485 Gbps; < 0.3 UI at 2.97 Gbps with color bar signal
Re-clocking	At 270 Mbps, 1.485 Gbps & 2.97 Gbps
Compliance	SMPTE 259M, 292, 424M-2006

### Audio Output

Number of Audio Channels	2 channels, unbalanced, line level 2 channels embedded in HDMI® signal
Audio Connector	RCA Jacks
Switches	Front panel selection of one of 8 audio channel pairs on SDI signal to output

**NOTE:** Audio on HDMI® and line level are available simultaneously and extracted from audio embedded within SDI signal in accordance with SMPTE standards.

## Installation Instructions

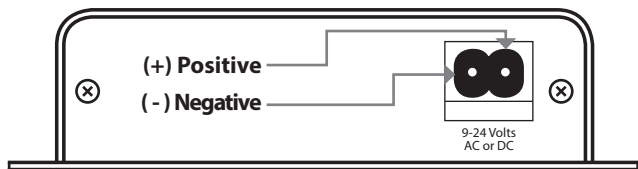
The Copperlink™ 2353 Series of 3G/HD/SD-SDI converters are ready for immediate use and do not require any special tools.

The following procedure presumes you have followed the instructions for installing your converter unit.

### The following instructions describe the typical installation procedure:

- 1) Connect the SDI coax cable to the SDI input BNC connector of the converter unit.
- 2) Connect the video output cable (HDMI®) to the video output HDMI® connector on the converter.
- 3) Optionally connect any audio cables and using the channel pair rotary selector, choose your desired audio output channel. Audio is also embedded on the HDMI® cable.
- 4) Terminate any unused BNC output connector at 75 Ohms.
- 5) Connect the Universal Power Supply to the converter.  
Please refer to figure 1.
- 6) When power is applied, the green POWER LED should illuminate, indicating the presence of operating power. The 3G/HD/SD RATE LED will give an indication as described in the Indicator LED's and Alarm Circuitry section of this manual.
- 7) The system should now be operational.

**Figure 1:**  
**Power Connector**  
**DC Input Polarity**



## Audio Pair Selection

The Copperlink™ 2353 Series has a rotary dial switch that allows you to select which audio pair to output. The chart below describes the operation of the rotary switch positions:

### Rotary Switch Positions

Position	Function
0	Will mute the audio output
1 through 8 cable	Will output the respective audio channel pair on the HDMI® and the audio output connectors
9	Not used

## Indicator LEDs

The Copperlink™ 2353 Series has six integral indicator LEDs that are used to monitor the state of the unit.

### Indicator LEDs

LED	Status	Definition
Power	On	Indicates that correct power has been applied.
3G Rate	Off On	Indicates no 3G-SDI data rate lock Indicates 3G-SDI data rate lock at 2.97 Gbps or 2.97/1.001 Gbps
HD Rate	Off On	Indicates no HD-SDI data rate lock Indicates HD-SDI data rate lock at 1.485 Gbps or 1.485/1.001 Gbps
ED Rate	Off On	Indicates no ED resolution data rate lock Indicates ED resolution data rate lock at 540 Mbps
SD Rate	Off On	Indicates no SD-SDI or DVB-ASI data rate lock Indicates SD-SDI or DVB-ASI data rate lock at 270 Mbps
Alarm	On	No input signal

*Note: The 3G, HD, ED and SD LEDs indicators are off when a non-standard signal is applied.*

## Maintenance and Repairs

The Copperlink™ 2353 Series has been manufactured using the latest semiconductor devices and techniques that electronic technology has to offer. They have been designed for long, reliable and trouble-free service and are not normally field repairable.

Should difficulty be encountered, Artel Video Systems maintains a complete service facility to render accurate, timely and reliable service of all products.

All other questions or comments should be directed to our Customer Service Department. It should be noted that many “problems” can easily be solved by a simple telephone call.

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## Certifications







Artel Video Systems (Artel) warrants that, for a period of three years after purchase by the Buyer, this product will be free from defects in material and workmanship under normal use and service. A Return Material Authorization (RMA) number must be obtained from Artel before any equipment is returned by the Buyer. All materials must be shipped to Artel at the expense and risk of the Buyer.

Artel's obligation under this warranty will be limited, at its option, to either the repair or replacement of defective units, including free materials and labor. In no event shall Artel be responsible for any incidental or consequential damages or loss of profits or goodwill.

Artel shall not be obligated to replace or repair equipment that has been damaged by fire, war, acts of God, or similar causes, or equipment that has been serviced by unauthorized personnel, altered, improperly installed, or abused.

RMA numbers and repairs can be obtained from:

**Artel Video Systems**

5B Lyberty Way

Westford, Massachusetts 01886 USA

Tel: (978) 263-5775

Fax: (978) 263-9577

RMA numbers can also be obtained from our web site: **artel.com**

**Please have your serial number available.**



### Fiberlink® 6656 Visible Light Source

The Fiberlink® Visible Light Source provides a visible 650 nm laser output that can be used for identifying fiber breaks and individual fibers within fiber bundles, allowing for convenient, on-site testing of fiber networks during construction and maintenance procedures.



### Fiberlink® 6650 Optical Power Meter

The Fiberlink® Optical Power Meter measures the power of optical signals at 850, 980, 1310 and 1550 nm wavelengths, allowing for convenient, on-site testing of fiber networks during construction and maintenance procedures. It can be used to measure the power of an optical signal reaching the receiving end of a fiber optic cable, as generated either by a transmitter unit or by a light source such as the 6620.



### Fiberlink® 6652 and 6654 Two Wavelength Light Source

The Fiberlink® Two Wavelength Light Source offers calibrated light outputs for MM or SM fiber, allowing for convenient, on-site testing of fiber networks during construction and maintenance procedures.

## Fiberlink® 3360 3G/HD/SD-SDI & 4 Pair AES Audio Series



The Fiberlink® 3360 Series allows you to transmit 3G, HD or SD-SDI as per SMPTE 424M-2006, 292 and 259 with the ability to embed up to 8 channels (4 pairs) of AES/EBU digital audio. Convenient switches on the 3360 Series transmitter allow the operator to embed each of the four pairs of audio independently, to strip previously serialized audio, or to pass it through without modification. At the receive end of the fiber optic link, the operator can decide which audio pairs they need de-embedded.

Audio signals are not required to operate the Fiberlink® 3360 link and it can be used as a stand-alone 3G/HD/SD-SDI optical link. Previously serialized data is left intact throughout the entire transmission process and the 3360 Series is immune to pathological signals over the entire budget link and operating temperature range.

Signals are equalized and re-clocked prior to fiber optic transmission and the 3361 receiver features a re-clocked SDI output.

The 3360 Series is compliant with SMPTE 297-2006 and has the ability to operate seamlessly with Fiberlink® Matrix and other SMPTE 297-2006 fiber optic compliant devices.

Available in card versions and a small footprint box version, it is ideal for broadcast or corporate studios, OB vans, rental and staging, auditoriums, stadiums and theaters, airport or transportation hubs, distance learning, surgical or medical imaging and more

**Learn more at [artel.com](http://artel.com)**



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