

DEPLOYABLE ULTRA HD OPTICAL INTERFACE SYSTEM

BN390T UHD 4K SDI Multiplexer/Transmitter

BN390R UHD 4K SDI Demultiplexer/Receiver

The BN390T and BN390R provide a convenient method of transporting 4K UHD signals over a fibre optic link. They are compact, free-standing units, and have been designed specifically for rapid field deployment when HD SDI signals from multiple cameras need to be transported over one (or two) optical fibres. The modules will operate on a DC supply of between 4.5 and 17 V via a 4-pin Neutrik XLR connector: the optional Bluebell PS12 is a suitable PSU. They are small enough to be attached directly to the side of a camera.

The modules will normally be used in pairs, the BN390T performing electrical-to-optical conversion and the BN390R optical-to-electrical conversion at the receiving end. In addition, they are able to perform a wide range of inter-format conversions, with multiple SDI signals being multiplexed onto a single optical wavelength (BN390T), and correspondingly demultiplexed by the BN390R.

Primary electrical inputs and outputs on both cards are via four BNC connectors, the optical interface being a Neutrik OpticalCON DUO connector. CWDM wavelengths in the range 1270 to 1610 nm may be specified for the BN390T; the BN390R's optical receiver is wideband. The BN390T also has an additional SDI output on a fifth BNC which carries an electrical version of the multiplexed signal at optical Output A. Similarly, the BN390R has an SDI BNC input which may be used instead of Optical Input A. The flexibility of the BN390T/ BN390R is greatly enhanced by the ability to handle SDI signals of multiple standards: SD, HD, 3G, 6G and 12G SDI are all catered for. The BN390T has eight operating modes, each providing a different option for format conversion, as follows:

- Bypass mode
- Dual HD → Single 3G
- 2 x Dual 3G \rightarrow 2 x Single 6G
- 2 x Dual 6G \rightarrow 2 x Single 12G
- Quad 3G \rightarrow Dual 6G
- Quad $6G \rightarrow Dual 12G$
- Quad HD → Single 6G
- Quad $3G \rightarrow$ Single 12G

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Selection of format conversion mode is via a simple set of web server control pages, which may be accessed through the unit's Ethernet port from any compatible device. Alternatively, the unit may be set to automatic mode: this transfers mode selection to an internal algorithm which intelligently determines the necessary conversion mode by evaluating the SDI standards present at the various inputs.

The BN390R is able to perform a "mirror-image" set of downscaling conversions. The conversion mode is selected either via the web server pages, or automatically by determining the SDI formats present at the optical inputs.

Both the BN390T and BN390R have bi-colour LEDs adjacent to each BNC connector which indicate the presence of a locked or unlocked signal at that connector.

BN390R ULTRA HD 4K SDI Demux Receiver



BN390T transmitter



BN390R receiver



BN390R

In addition to the web server control pages, the modules support a high level of SNMP implementation (v2c compliant). Full unit control and monitoring is available, including trap configuration (v1 compliant).



Application examples

1. Simplifying 4K camera outputs

Most 4K cameras used in UHD TV have four separate BNC outputs, which can create an inconvenient mess of cables in a dynamic OB

available as four independent

3G signals.

situation. By using a BC390T (which may be easily Velcroed to the camera itself), these may be reduced to a single optical fibre

or co-axial cable. A BN390R unit can be used to reconstitute the original camera outputs at a remote location.

video signals

OUT



Specifications

| • | BN390T | BN390R |
|---|--|---|
| Electrical Inputs and Outputs | | |
| SDI standards – conformities | Compliant with: SMPTE ST 2082 SMPTE ST 2081 SMPTE ST 424M SMPTE 292M SMPTE 259M SMPTE 259M | |
| Signal standards: | SD-SDI, HD-SDI, 3G-SDI, 6G-SDI, 12G-SDI, MADI | |
| Equalisation (T only) | Automatic to: SD-SDI: 300 m @ 270 Mb/s HD-SDI: 240 m @ 1.485 Gb/s 3G-SDI: 140 m @ 2.97 Gb/s 6G-SDI: 95 m @ 5.94 Gb/s 12G-SDI: 70 m @ 11.88 Gb/s | |
| Return Loss | <15 dB, 5 Mb/s - 1.485 Gb/s <10 dB, 1.485 Gb/s - 2.97 Gb/s <7 dB, 2.974 Gb/s - 5.94 Gb/s <4 dB, 5.94 Gb/s - 11.88 Gb/s | <17 dB, 5 Mb/s - 1.485 Gb/s <12 dB, 1.485 Gb/s - 2.97 Gb/s <8 dB, 2.974 Gb/s - 5.94 Gb/s <5 dB, 5.94 Gb/s - 11.88 Gb/s |
| Connectors | 5 x 75 ohm BNC per IEC 60169-8, Amendment 2 | |
| Format | Re-clocked | |
| Polarity (R only) | | Non-inverting |
| Signal Level (R only) | | 800 mV +/-10% |
| Alignment Jitter (R only) | <0.2 UI line equalised <0.3 UI line equalised | i @ 270 Mb/s, 1.485 Gb/s i @ 2.97 Gb/s, 5.94 Gb/s, 11.88 Gb/s |
| Timing Jitter (R only) | <0.2 Ul line equalised @ 270 Mb/s <1 Ul line equalised @ 1.485 Gb/s <2 Ul line equalised @ 2.97 Gb/s <4 Ul line equalised @ 5.94 Gb/s <8 Ul line equalised @ 11.88 Gb/s | |
| Optical Inputs and Outputs | | |
| Connector | Neutrik OpticalCON DUO | |
| Wavelength | 1270 – 1610 nm | |
| Optical power (T only) | -15 dBm @ 1310 nm multimode -6 dBm @ 1310 nm singlemode -6 dBm @ 1310 nm (4K emSF) | |
| Sensitivity (R only) | BN390T | >-22 dBm @ 3 Gb/s BN390R |

| Monitoring | | |
|---------------------------------|---|--|
| On unit | Bi-colour LED per electrical input or output indicating a valid and locked signal | |
| External via web pages | "Overview" web page indicating lock status of all inputs and outputs | |
| SNMP monitoring via Ethernet | Full monitoring and control of all unit functions including selection of up- and down-conversion modes | |
| Conformities | | |
| EMI/RFI | Comply with 89/336/EEC, EN55022B, EN61000-4-2, EN61000-4-4 (Level 2), EN61000-4-5TB, EN61000-4-5, EN61000-4-11 | |
| Electrical | Comply with EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4 | |
| Laser Safety | Complies with Class 1 laser product | |
| RoHS & WEEE | Complies with Directive 2002/95/EC | |
| General | | |
| Input Voltage | 4.5 – 17 V | |
| Power consumption | 9 W | |
| Depth | 167 mm (excluding connectors) | |
| Width | 109 mm | |
| Height | 30 mm | |
| Weight | 200 g | |
| Operating Temperature | -30 to +70 °C | |



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