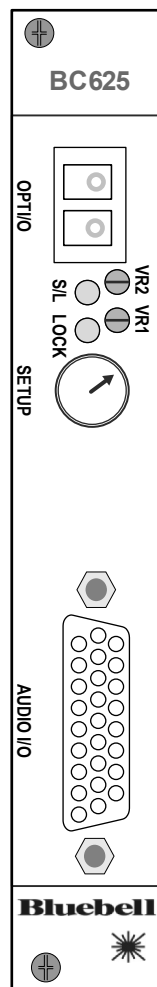


BC625 Fibre Audio Interface



Operation Guide

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Declaration of Conformities

The components of the Bluebell Opticom BC625 Fibre-optic Transmission System complies with the essential requirements of the following EU directives, where appropriate:

EMI/RFI: complies with:
89/336/EEC, EN55022B
EN61000-4-2, EN61000-4-4 (Level 2), EN61000-4-4FTB
EN61000-4-5, EN61000-4-11

Electrical: complies with:
EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4

Laser Safety: Dependent on SFP fitted.
Complies with Class 1 laser product

RoSH and WEEE declaration



Bluebell Opticom Ltd. complies with EU RoSH Directive 2002/95/EC, which restricts the use of substances hazardous to humans and their environment in the manufacture of electrical and electronic equipment.

The “crossed out wheellie bin” symbol on the enclosures and represented above is there to remind users of the obligation of selective collection of waste. This label is applied to various products to indicate that the product is not to be thrown away as unsorted municipal waste. At the end of life, dispose of this product by returning it to the point of sale or to your local municipal collection point for recycling of electric and electronic devices.

Customer participation is important to minimize the potential effects on the environment and human health that can result from hazardous substances that may be contained in this product.

Please dispose of this product and its packaging in accordance with local and national disposal regulations, including those governing the recovery and recycling of waste electrical and electronic equipment. Contact your local waste administration, waste collection company or dealer.

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Overview

Thank you for purchasing this Bluebell Opticom professional broadcast video product. If you are new to Bluebell products, or to the subject of transmitting audio or other types of signals over fibre links, please take the time to read through this document before putting the BC625 to use.

Introduction

The BC625 plug-in card belongs to the range of the Bluebell Opticom BC Series modular fibre interfaces, designed primarily for Outside Broadcast (OB) applications. It is a 4-channel transceiver, permitting transport of four analogue audio signals in each direction between two locations remote from each other over a dual-fibre optical link.

As they are transceivers, BC625 cards will normally be used in pairs.

Physical formats

BC625 cards fit the Bluebell BC100 or BC160 19" modular frames. The frames can house six (BC160) or fifteen (BC100) interface cards, and are fitted with dual internal AC power supplies. Alternatively, cards may be fitted into smaller aluminium chassis; the BC101 and BC102 hold one and two cards respectively and require an external DC power source, while the BC120 holds three cards and has an integral mains PSU.

All plug-in cards are fitted with cartridge-style SFP dual fibre transceiver modules; both single-mode and multi-mode versions are available. Single-mode operation will normally be at 1310 nm or 1550 nm; alternative CWDM grid wavelengths are also possible. The optical option must be specified at the time of order.

Power requirements

For all versions, power supply requirements are dictated by the enclosure type used.

BC-100 modular frames:

These may be fitted with either one or two AC mains PSU modules (number specified at time of order). Each module has sufficient capacity to power a fully-loaded frame. The AC connection is via standard IEC cables, DC power distribution inside the frame is via the motherboard. See the User Guide supplied with the frame units for more details.

BC-160 modular frames:

These are fitted as standard with dual internal AC mains power supplies each of sufficient capacity to power a fully-loaded frame. The AC connection is via standard IEC cables, DC power distribution inside the frame is via the motherboard. See the User Guide supplied with the frame units for more details.

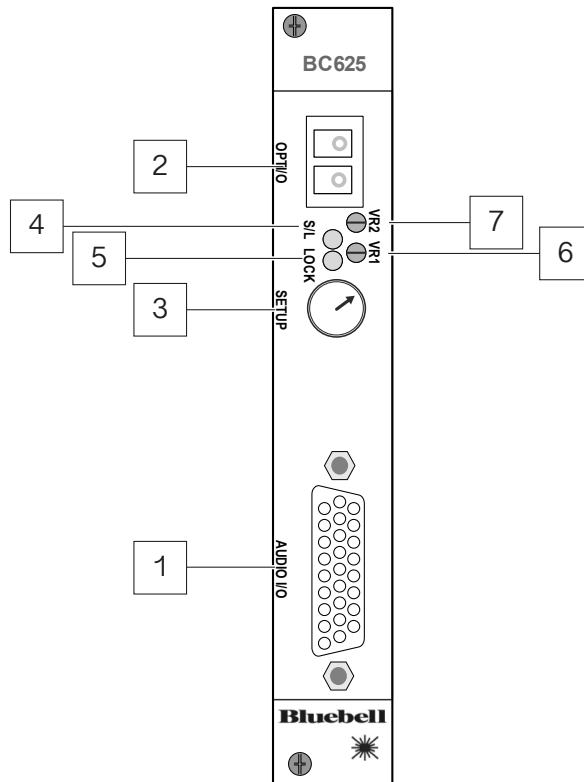
BC101 and BC102 single- and dual-slot chassis:

These are supplied with an external Universal AC adaptor which connects to the chassis via a flying lead terminated in a 4-pin locking XLR connector. Mains is via an IEC connector.

BC120 triple-slot chassis:

This housing for three plug-in cards is fitted with an internal AC mains supply; mains connection is via a rear IEC connector.

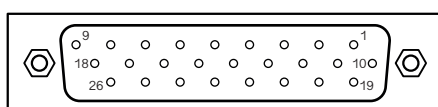
BC625 connections



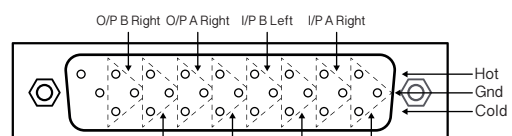
- AUDIO I/O** - all audio connections are made via the hi-density 26-pin female Dsub connector. All audio inputs and outputs are electronically balanced and at line level, nominally 0 dBu (0.775 V_{rms}).

Wire the mating Dsub connector according to the pinout listed below:

PIN	FUNCTION	PIN	FUNCTION	PIN	FUNCTION
1	I/P A Left +	10	I/P A Left Gnd	19	I/P A Left -
2	I/P A Right +	11	I/P A Right Gnd	20	I/P A Right -
3	I/P B Right +	12	I/P B Right Gnd	21	I/P B Right -
4	I/P B Left +	13	I/P B Left Gnd	22	I/P B Left -
5	O/P A Left +	14	O/P A Left Gnd	23	O/P A Left -
6	O/P A Right +	15	O/P A Right Gnd	24	O/P A Right -
7	O/P B Left +	16	O/P B Left Gnd	25	O/P B Left -
8	O/P B Right +	17	O/P B Right Gnd	26	O/P B Right -
9	No connection	18	No connection		



Rear (solder side) of mating male connector

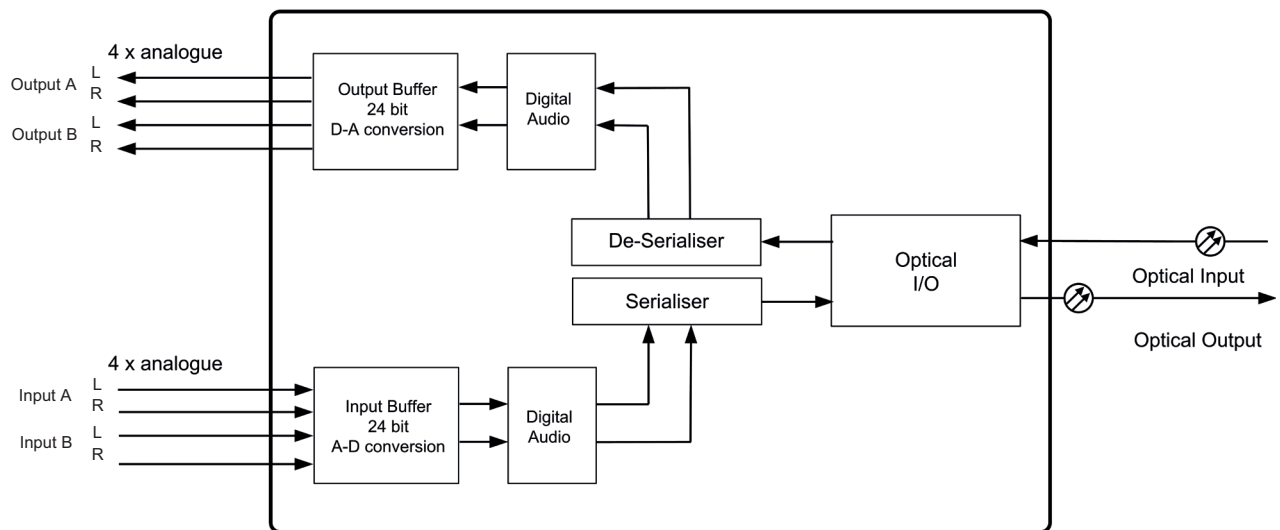


Rear (solder side) of mating male connector

2. **OPTICAL I/O** - SFP dual fibre connector. The connector is mounted on a removable cartridge. The BC625 uses single-mode fibre as standard, at a wavelength of 1310 nm; alternative CWDM wavelengths or multi-mode operation are available if specified at the time of order. A list of alternative SFP modules and wavelengths can be found in the table at the end of this User Guide. Modules may be retrofitted.
3. **SETUP** - this hexadecimal switch has no current function; it is reserved for future use.
4. **S/L** - this red LED illuminates when the received power at the optical input is below the minimum threshold for correct operation.
5. **LOCK** - this red LED illuminates when the unit is not locked to a signal received at the optical input.
6. **VR1** - this preset control is set at the factory to give the correct digital output for a given analogue audio input.
7. **VR2** - this preset control is set at the factory to give the correct analogue audio output level from a given digital audio input signal.

IMPORTANT: VR1 and VR2 should not require adjustment by the user.

System block diagram



The four analogue inputs are electronically balanced, and will accept a maximum level of +24 dBu (ref. 1 mW into 600 ohms). A-D conversion is 24-bit, 48 kHz sampling rate. Post-conversion, the four audio inputs are converted into two AES3 signals before modulation onto the optical carrier.

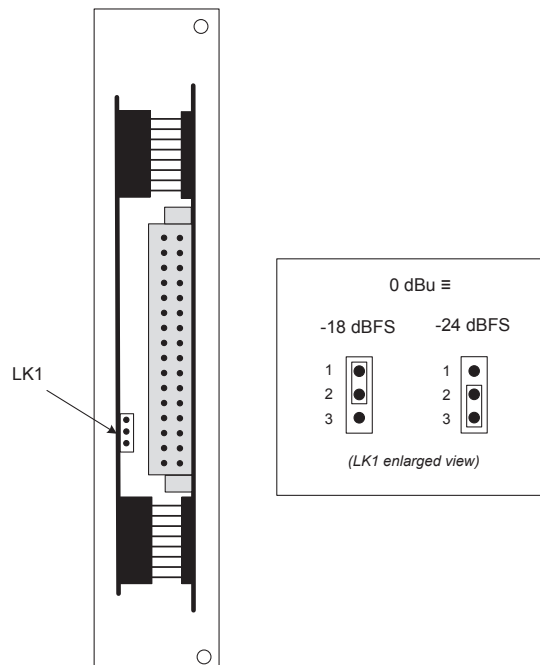
The received optical signal is demodulated and the AES3 signals passed for D-A conversion. The analogue audio outputs are electronically balanced, and can supply a maximum level of +18 dBu (ref 1 mW into 600 ohms).

Note that overall gain throughout the system – transmitter > optical fibre > receiver – is unity (0 dB).

Configuration and setup options

The BC625 has only one setup option which may need to be altered by the user. This controls the audio signal level relationship between analogue and digital domains.

The jumper, LK1, is located at the rear of the left-hand PCB, as the module is viewed from the rear.



The jumper position sets the digital output level relative to an analogue signal level of 0 dBu.

The table below summarises the options:

SETTING	ANALOGUE LEVEL	DIGITAL LEVEL
Pins 1 and 2 linked	0 dBu	-18 dBFS
Pins 2 and 3 linked		-24 dBFS

The setting of 0 dBu = -18 dBFS is widely used throughout Europe. The second setting of 0 dBu = -24 dBFS may be encountered in other territories, particularly in the USA, where it is normally written as +4 dBu = -20 dBFS.

The jumper may be moved and repositioned with a small pair of long-nosed pliers.

Other settings:

The BC625 has further jumpers located on the other PCB; these are for factory use only and should not be disturbed.

Appendix

Specifications - BC625

Analogue audio Inputs (4)	
Input impedance	24 kohm (balanced)
Max. input level	+24 dBu (ref 1mW into 600 ohms)
Noise	< -90 dB pk-pk weighted full scale
Frequency response	20 Hz – 20 kHz \pm 0.5 dB
Analogue audio Outputs (4)	
Output impedance	44 ohms (balanced)
Max. output level	+18 dBu (ref 1mW into 600 ohms)
Noise	< -90 dB pk-pk weighted full scale
Frequency response	20 Hz – 20 kHz \pm 0.25 dB
Optical Input/Output	
Physical	SFP Module
Connector	Dual LC
Wavelength	1310 nm single-mode or 850 nm multi-mode. User-specified CWDM wavelengths (see following table) are also available
Optical Power	-2 dBm @ 1310/1510 nm (typical)
Conformities	
EMI/RFI	Complies with: 89/336/EEC, EN55022B, EN61000-4-2, EN61000-4-4 (Level 2), EN61000-4-4FTB, EN61000-4-5 & EN61000-4-11
Electrical	Complies with: EN61000-6-1, EN61000-6-2, EN61000-6-3 & EN61000-6-4
Laser Safety	SFP-dependent; complies with Class 1 laser product
RoHS	Complies with Directive 2002/95/EC
Physical	
Depth	80 mm (inc. connector)
Width	20 mm (4TE)
Height	129 mm (3RU)
Weight	100 g
Operating Temp	-30 to +70 °C
Power	4.8 W

Optical wavelengths

Part Ref.	Transmitter	Receiver
Standard wavelengths:		
DTR/M/SFP	Multimode dual fibre SFP transceiver, 850nm	Wideband
DTR/S/SFP	Single mode dual fibre 40 km SFP transceiver, 1310 nm	
DTR/S/WDM/13/SFP	Single mode single fibre 10 km SFP transceiver, 1310 nm	
DTR/S/WDM/15/SFP	Single mode single fibre 10 km SFP transceiver, 1550 nm	
CWDM wavelengths:		
DTR/S/SFP/CWDM/27	Single mode, single channel CWDM SFP transmitter, 1270nm	Wideband
DTR/S/SFP/CWDM/29	Single mode, single channel CWDM SFP transmitter, 1290nm	
DTR/S/SFP/CWDM/31	Single mode, single channel CWDM SFP transmitter, 1310nm	
DTR/S/SFP/CWDM/33	Single mode, single channel CWDM SFP transmitter, 1330nm	
DTR/S/SFP/CWDM/35	Single mode, single channel CWDM SFP transmitter, 1350nm	
DTR/S/SFP/CWDM/37	Single mode, single channel CWDM SFP transmitter, 1370nm	
DTR/S/SFP/CWDM/39	Single mode, single channel CWDM SFP transmitter, 1390nm	
DTR/S/SFP/CWDM/41	Single mode, single channel CWDM SFP transmitter, 1410nm	
DTR/S/SFP/CWDM/47	Single mode, single channel CWDM SFP transmitter, 1470nm	
DTR/S/SFP/CWDM/49	Single mode, single channel CWDM SFP transmitter, 1490nm	
DTR/S/SFP/CWDM/51	Single mode, single channel CWDM SFP transmitter, 1510nm	
DTR/S/SFP/CWDM/53	Single mode, single channel CWDM SFP transmitter, 1530nm	
DTR/S/SFP/CWDM/55	Single mode, single channel CWDM SFP transmitter, 1550nm	
DTR/S/SFP/CWDM/57	Single mode, single channel CWDM SFP transmitter, 1570nm	
DTR/S/SFP/CWDM/59	Single mode, single channel CWDM SFP transmitter, 1590nm	
DTR/S/SFP/CWDM/61	Single mode, single channel CWDM SFP transmitter, 1610nm	