OPERATIONS MANUAL

For

BC160

1U Card Frame

Unit 2, The Quadrant, Howarth Road, Maidenhead, Berkshire, SL6 1AP United Kingdom
Tel: +44 (0)1628 510055 Fax: +44 (0)1628 510057 Email: sales@bluebell.tv Website: www.bluebell.tv

IMPORTANT SAFETY INSTRUCTIONS

1. Read these instructions
2. Keep these instructions
3. Heed all warnings
4. Follow all instructions
5. Do not use this apparatus near water
6. Clean only with a dry cloth
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12.  Only use with the cart, stand, tripod, bracket or table specified by the manufacturer, or sold with the apparatus.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally or has been dropped.

WARNING: To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

It is important that the apparatus shall not be exposed to dripping or splashing and that no objects filled with liquids, such as vases shall be placed on the apparatus.

- To avoid overheating, do not install this apparatus in direct sunlight.
- Do not expose this apparatus to drips or splashes.
- Do not place any objects filled with liquids on the apparatus.
- Do not install this apparatus in a confined space such as a bookcase or similar unit.
- Please ensure adequate space around the apparatus for sufficient ventilation. Ventilation should not be impeded by covering the ventilation openings with any items.
- The apparatus should be located close enough to an AC outlet so that you can easily grasp the power cord plug at any time.
- An apparatus with Class 1 construction shall be connected to an AC outlet with a protective grounding connection.
- No naked flames, such as lighted candles, should be placed on the apparatus.

IMPORTANT SAFETY PRECAUTIONS

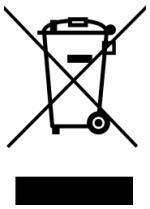
CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER. NO USER- SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

The lightning flash with arrowhead symbol, within equilateral triangle, is intended to alert the user to the presence of an uninsulated “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating instructions and maintenance (servicing) instructions in the literature accompanying the appliance.

ENVIRONMENTAL RATING: IP50
WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

Contents	BC160



WEEE Directive & Product Disposal
At the end of its serviceable life, this product should not be treated as household or general waste. It should be handed over to the applicable collection point for the recycling of electrical and electronic equipment, or returned to the supplier for disposal.

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United Kingdom

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Website: www.bluebell.tv

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Description	BC160

The BC160 is a 19" 1RU frame for Bluebell BC Series cards that can hold up to 6 single-slot cards. Any of the standard cards can be fitted and mixed within a frame. Some BC Series cards have dual channels allowing up to 12 video signals to be transmitted or received from a single 1RU frame.

Frame Versions
Note that this guide is for the later frames with the internal 2-row, 64-pin SKT7 that can take the BM102 monitoring card.

For information on the earlier frame, with the internal 3-row, 48-pin SKT7 that can take the BM100 or BM101 monitoring cards, please see the manual: BC160-OpsTechMan-Issue2.pdf

Monitor Panel
The front panel's "STATUS" area displays information derived from each card position. There are two LEDs for each slot (one each for channels A and B) and a LED for each PSU.

Signal Status information:		Power supply leds (PS1, PS2):	
LED OFF	No card / channel present	LED OFF	Power supply no output
LED GREEN	Signal O.K.	LED GREEN	Power supply working
LED RED	Signal missing or error		

Remote Monitoring
Signal and card monitoring is achieved via an optional monitoring card fitted to the front of the BC160 frame. In this case, a different front panel is fitted with a cut-out for the monitoring card. The BM102 network card monitors the status of the power supplies and the channel A and B status and other diagnostic data from each card. It can then report this data over Ethernet via its internal webpages and to a third party SNMP management system. Note that if a BM102 card is fitted, the PSU relay signals on the ALARM connector on the front panel should not be used.

Power Supplies
The frame has built-in dual redundant power supplies as standard (each PSU has its own IEC power inlet).

Each PSU has an alarm output, in the form of a relay contact which is normally closed and opens on failure, available on a 9-pin 'ALARM' connector at the front of the frame. However, these contact signals are also sent to the monitoring slot and so if a BM102 monitoring card is in place, the 'ALARM' connector should not be used.
If a BM102 is not being used, the outputs from each PSU relay can be wired in series and then 'daisy-chained' with outputs from other frames.

Ventilation
The frame has two internal fans that draw in air from the left end (when looking at the front panel) and expels it at the right end.

Description BC160P

The BC160P frame has the same physical footprint as the BC160 but without any power supplies or signal monitoring. It is specifically intended to house passive optical cards including splitters, WDM, and CWDM devices.

Ordering Information BC160

Main parts and options:

Part Num	Description
BC160	19" 1RU Frame for up to 6 BCxxx Cards. Includes Dual Redundant Power Supplies. Monitoring card is optional and accessible via dedicated front slot.
BC160P	19" 1RU Frame for up to 6 Passive BCxxx Cards. No power supplies or monitoring capability.
Optical 2U Flightcase	Ruggedized aluminium flight case which houses a BC160 frame. Any combination of cards, including WDM and CWDM, can be fitted to give complete flexibility in the field. Dual mains inputs and a rugged rear panel is fitted with BNC, XLR and optical connectors as necessary. Contact the UK Sales Office for a written quotation.
BM102	Network Monitoring Card with Ethernet connection. Optional: 1 per frame.

Related products:

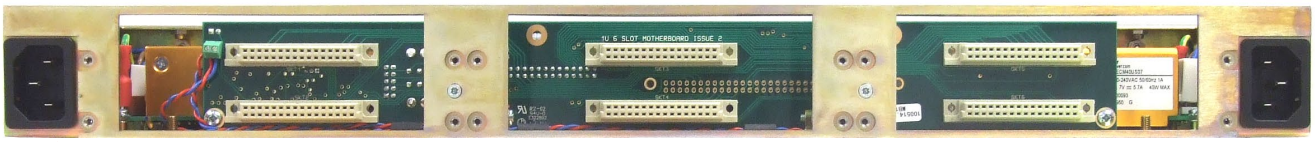
Part Num	Description
BC100	19" 3RU Frame for up to 15 BCxxx Cards, with optional Network Monitoring and facility for Dual Redundant Power Supplies. (Order PSUs separately)
BC101	Single Slot Frame for a BCxxx card. Needs external DC Power Supply.
BC102	Double Slot Frame for BCxxx cards. Needs external DC Power Supply.
PS12	10W Plugtop PSU for the BC101/102 Enclosures. Fitted with 4 pin XLR. IEC Mains Leads not supplied
BC120	Triple Slot Frame for BCxxx cards with Universal Mains Power Supply.

Product photos	BC160

Front view - with monitoring card option fitted

Rear view showing slots for 6 cards

Card position 1 Card position 3 Card position 5



Card position 2 Card position 4 Card position 6

PSU2

PSU1

Specification	BC160

General frame specifications

Depth:	150 mm (excluding connectors)
Width:	445 mm
Height:	44.5 mm (1RU)
Weight:	approx 4.5kg when fully loaded
Operating Temperature:	-30°C to +70°C
Number of slots:	6, plus 1 for monitoring card option
Input Voltage Range:	90 to 260 V ac, 50/60 Hz
Power:	18W when fully loaded
Fuses:	There are no user-serviceable fuses in the frame. In a fused mains cable, a 5A fuse is recommended.

Alarm connector

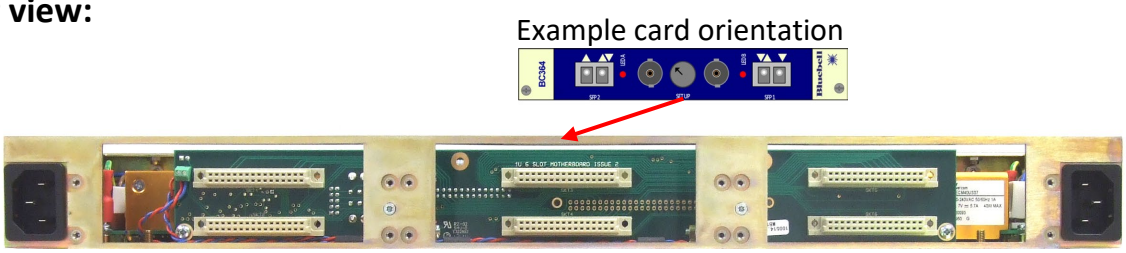
Type of connector:	9-pin 'D' connector (male pins) at the front of frame
PSU 1 pins:	Pins 1 & 2
PSU 2 pins:	Pins 3 & 4
Error indication:	Closed relay contacts open on PSU failure (Not to be used if a BM102 option card is fitted)
Contact resistance:	0.2ohm max.
Current rating:	0.5A @ 100V

Conformance

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
RoHS:	Complies with Directive 2002/95/EC
Warranty:	5 years

Connections BC160

Rear view:



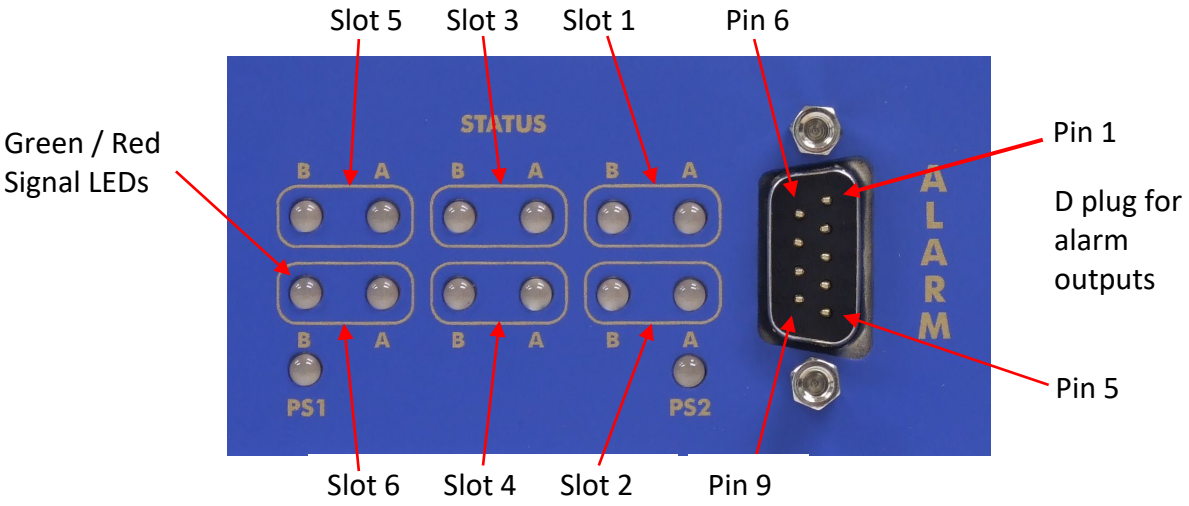
PSU2	Card position 1	Card position 3	Card position 5	PSU1
	Card position 2	Card position 4	Card position 6	

”ALARM” 9-pin D-plug (male pins) on front of frame

Pin 1	PSU1 Relay Contacts:	closed = power good
Pin 2		open = power fail
Pin 3	PSU2 Relay Contacts:	closed = power good
Pin 4		open = power fail
Pin 5	No connection	
Pin 6	No connection	
Pin 7	No connection	
Pin 8	No connection	
Pin 9	No connection	

Note:
These contact signals are also sent to the monitoring slot and so if a BM102 card is fitted, the "ALARM" connector should not be used.

If no BM102 card is fitted, these outputs can be wired in series and 'daisy-chained' with outputs from other frames.



Indicators BC160

Refer to photograph of "STATUS" panel just above.

The arrangement of Signal LEDs is the same as the arrangement of the cards when viewed from the front (i.e. as though the frame were transparent).

Signal LEDs: **Off = No card/signal**
Green = Good
Red = Fault

PS1, PS2 LEDs: **Off = No voltage**
Green = Good