



## **OPERATIONS & TECHNICAL MANUAL**

**For  
BM102**

**Network Monitoring Card  
With Ethernet connection**

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## Safety Warning – Important Precautions

**To reduce the risk of fire or electric shock, do not expose this equipment to rain, moisture, or wet conditions.**

### General Safety Guidelines

- Always **disconnect the entire system from the AC mains** before cleaning or servicing.
- The following product frames – **BC100, BC100i, BC101, BC102, BC120, BC160i** – must be connected using a **three-conductor AC mains power cord with an earth ground**. All three conductors must be used at all times to prevent electric shock.
- Do **not** bypass or disable any fuse.
- Only replace fuses with those of the **specified type and rating**.
- Do **not** use flammable or combustible chemicals for cleaning.
- Do **not** pour or spill liquids directly onto the unit.
- Do **not** allow any liquid to enter the unit or wet the internal components.
- Do **not** operate the unit with any cover or panel removed.
- Do **not** obstruct the ventilation slots—**adequate airflow must be maintained**.
- Do **not** operate the unit in environments with **extreme temperatures**.
- Do **not** use or store the unit in **explosive atmospheres**.
- Do **not** attempt to repair the unit yourself. If servicing is required, please contact your local **Bluebell Opticom** distributor.
-  **Product Warranty**
- **Bluebell Opticom Ltd** provides warranty coverage as detailed in our general terms and conditions.

Please note that warranty support is only valid **if product serial numbers remain intact and legible**. Tampering with or removing serial numbers may void your warranty.

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The BM102 monitoring card reads various status parameters from the cards in the 15 slots of a BC100 3RU frame or the 6 slots of a BC160 1RU frame plus the status of the dual power supplies and the cooling fans. It makes these statuses available via its RJ45 Ethernet 10-baseT port to an SNMP environment. The card also has built-in web pages that can show the same statuses.

The statuses read by the BM102 comprise the following:

Frame status

- PSU1 or PSU2 fault

- Fan failure

- Temperature

- Frame internal supply voltage

For each BC-series card the basic statuses are:

- Signal present or absent for channels A and B

For each 'new' BC-series card (see Note below) the additional statuses are:

- Card present or absent

- Card Model number, serial number and functional description

- Card hardware and firmware revision levels.

For each 'new' card (see Note below) with an SFP optical module, this will report:

- SFP Manufacturer and Model number

- SFP temperature and supply voltage and out-of-range statuses

- SFP transmitter wavelength and bias current

- SFP transmitter or receiver optical power.

Note: The range of BC-series cards are in the process of being updated to provide the additional status information listed. In this manual, cards without this update are referred to as 'old' cards, while updated cards are referred to as 'new'. Note that the BM102 cannot detect the presence or absence of 'old' cards.

In a BC100 3RU frame, the BM102 goes into Slot 16.

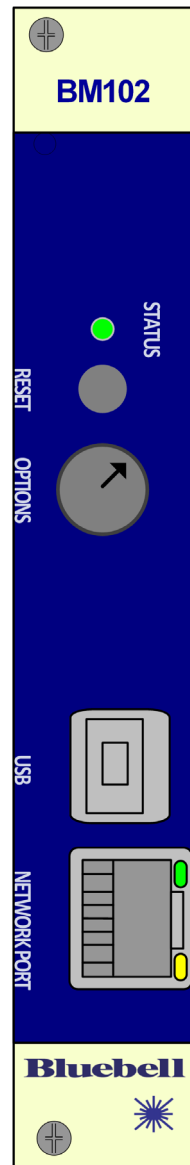
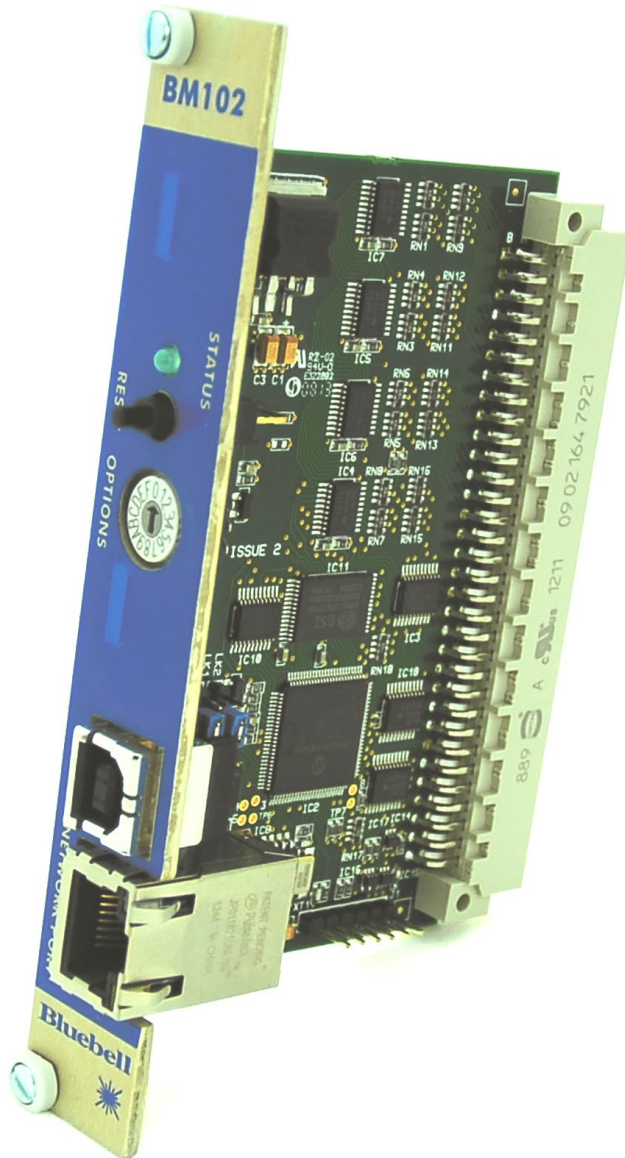
In a BC160 1RU frame, the BM102 goes into its dedicated slot in the front of the frame.

Card configuration can be achieved via the built-in web pages.

Ethernet signal status indication is provided on the RJ45 connector by LED indicators. The green left LED indicates a valid connection and the amber right LED shows data flow.

The green LED marked "STATUS" on the front panel flashes when the main program is running, collecting status information, and providing Ethernet access.

A 'MIB' file is available to allow integration into third party SNMP Management Software such as HP OpenView connector.



|                        |   |
|------------------------|---|
| Depth                  | 75mm  |
| Width                  | 20mm (4HP)  |
| Height                 | 129mm (3RU)   |
| Weight                 | 170g  |
| Power Supply           | 4.5 - 6V DC   |
| Power consumption      | 1.0W (160mA at +6V DC)  |
| Electrical connections | Ethernet 10Base-T<br>USB Standard B socket<br>Via the 64-way DIN41612 connector:<br>30 card status lines<br>2 power supply fail lines<br>1 fan fail line<br>16 slot select lines<br>3 'I2C' signals |
| Operating Temperature  | -30°C to +70°C  |

**Parameters reported by both BM101 and BM102**

|                          |  |
|--------------------------|--|
| From the Frame:          | PSU1, PSU2 faults<br>Frame temperature (sensor on the BM101/2)<br>Frame internal voltage |
| From cards in the frame: | Signal loss Channel A, B   |

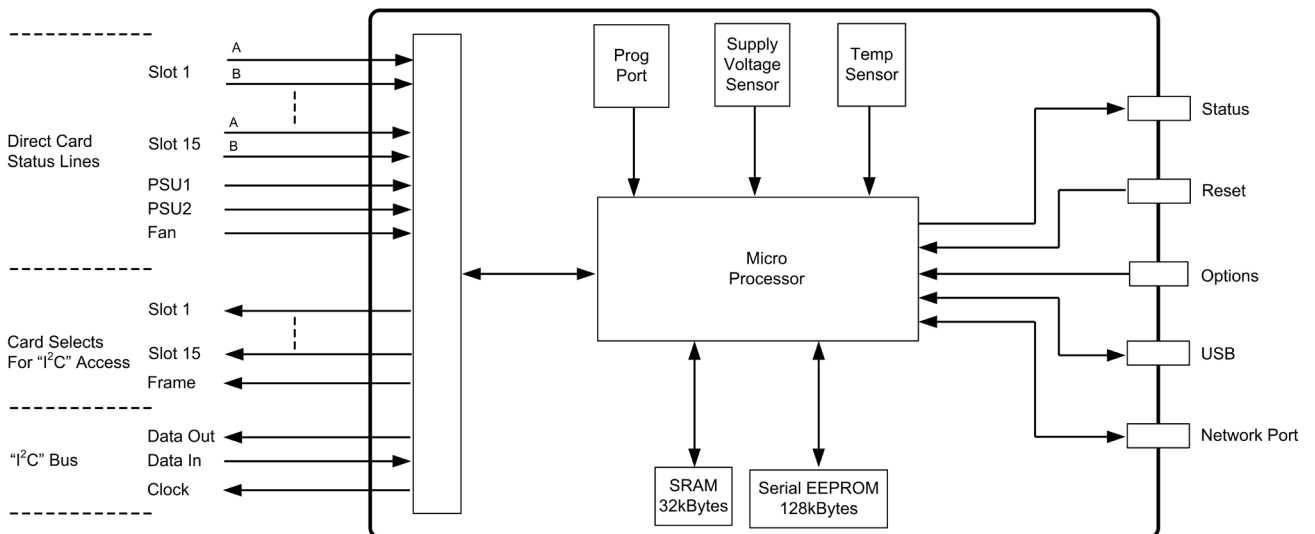
**Parameters added on the BM102**

|                                      |  |
|--------------------------------------|--|
| From the Frame:                      | Fan fault  |
| From 'new' cards in the frame:       | Card Present<br>Card Type (part number)<br>Card Serial Number<br>Card Hardware revision<br>Card Firmware revision<br>Card Function (brief summary)<br>Signal loss Channel A, B (see note 3)  |
| From 'new' cards fitted with an SFP: | SFP Manufacturer<br>SFP Type (part number)<br>SFP Temperature<br>SFP Temperature Warning<br>SFP Supply Voltage<br>SFP Supply Voltage warning<br>SFP Direction (tx/rx) Ch1, 2<br>SFP Transmit wavelength Ch1, 2<br>SFP Transmit Bias current Ch1, 2<br>SFP Transmit Bias current warning Ch1, 2<br>SFP Power Ch1, 2<br>SFP Power Warning Ch1, 2 |

Notes:

1. The above is a full list of potential information readable from some SFPs. Not all cards will report all these parameters.
2. In order to add the new functionality, all of the BC-series Signal Processing cards have to be updated to 'new' versions. 'Old' cards (without the new functionality) can still be fitted to a new frame, and they will still report the 'BM101' statuses of signal loss A and B, but they will not be seen as "Card Present".
3. The parameters added for the BM102 have been put into an SNMP table, and for completeness, the 'signal loss Channel A, B' statuses have been added to the table. These statuses are therefore available twice, with slightly different characteristics:
  1. On their own for easy compatibility with existing BM101 systems.  
Like the BM101, these have only 2 states: 'good' and 'fail'.  
An empty slot will report both states as 'good'.
  2. in the SNMP 'card' table for greater consistency in newer BM102 systems.  
These can have 3 states: 'unknown', 'good', and 'fail'.  
A 'new' card will report either 'good' or 'fail'.  
An 'old' card will report either 'unknown' or 'fail'.  
An empty slot will report both states as 'unknown'.
4. In some cases, the electrical channels A and B will correspond to the SFP optical channels 1 and 2. However, this is not always the case, which is why the optical channels are not labelled as A and B.

**Block Diagram**



Before its first use, a BM102 card should normally be configured, which can be done via an ethernet network and a web browser.

From the factory, the card's default settings are as follows:

```
Host name:                BM102
Static IP address:        192.168.16.200
Static gateway address:   192.168.16.2
Static subnet mask:       255.255.255.0
Static primary DNS server: 192.168.16.2
Static secondary DNS server: 0.0.0.0
DHCP is enabled
```

The BM102 can be connected to a network either by a straight ethernet cable connected to a router or switcher, or a crossover cable connected directly to a PC.

By default, DHCP is enabled on the card, and so if the network supports this, it will assign a different IP address to the card when it is first connected to the network. Your network administrator should be able to determine the new IP address.

The BM102's internal web page should be accessible via a standard web browser on your network. If the IP address is not known, you should still be able to access the card by its default name:

<http://bm102/>

Or by its re-assigned IP address or its default IP address (if not changed by DHCP):

<http://192.168.16.200/>

If these methods fail, it may be necessary to configure the card using a serial configuration cable (see "Configuration via USB port" chapter). The serial port will also display any new IP address assigned by DHCP.

From the home page you should then be able to select the "Network Configuration" page which is password protected. When the prompt comes up, enter the User name: as the 5-letter word:           admin

and the Password: as the 8-letter word:           settings  
or (on earlier software):                       bluebell

The Network Configuration page will allow you to change the IP addresses, the DHCP status, and the card's Host name to suit your network. If you access this page, please make a note of the MAC address in case it gets reset to default, and needs to be re-instated later.

## **SNMP**

The SNMP Configuration page (which uses the same User name and password as the Network Configuration page) allows setting of the SNMP Community names.

The card has a corresponding 'mib' file which would normally need to be loaded into your Network Management System (NMS) or mib browser.

If not supplied with the card, a mib file for SNMP use can be obtained by emailing [support@bluebell.tv](mailto:support@bluebell.tv)

Please note that BM102 mib files are incompatible with early versions of the BM101 mib file. If you are planning to mix both BM101 and BM102 cards in the same system, then please contact Bluebell for an update to your BM101s.

Configuring the SNMP traps is done using SET operations on the appropriate SNMP parameters.

## Panel Connections

### USB

This USB-B connector is for optional, engineering use (see "Configuration via USB port" section above).

### NETWORK PORT

This is an RJ45 connector for a standard ethernet network cable. It provides access to the card's internal web pages, and monitoring information via SNMP.

## Panel Settings

### "RESET" Push button

This button will perform a reset to the on-card micro-processor, similar to the powering-up of the card. This may be required during some configuration operations (see elsewhere in manual) but may also help in a fault lock-up situation (e.g. if the "STATUS" LED is not flashing, with the "OPTIONS" switch at 0). Normal operation of the "RESET" button (i.e. with LK2 in its normal position and "OPTIONS" switch at 0) may abort any monitoring operations in progress, but is otherwise safe, as all the non-volatile settings of the card (e.g. MAC address, IP address, SNMP 'sys' parameters etc.) will be preserved.

### "OPTIONS" Hex Switch (Pos 1 - D are temporary tests and may be altered or removed)

| Pos | Function                                      |
|-----|---|
| 0   | Normal operation                              |
| 1   | simulate slots 1 chs B fail                   |
| 2   | simulate slots 1-2 chs B fail                 |
| 3   | simulate slots 1-3                            |
| 4   | simulate slots 1-4                            |
| 5   | simulate slots 1-5                            |
| 6   | simulate slots 1-6 ch 6A fails Trap on sig 6A |
| 7   | simulate slots 1-7 ch 6B fails Trap on sig 6B |
| 8   | simulate even slots chs B fail                |
| 9   | simulate odd slots chs B fail                 |
| A   | simulate all slots chs A fail                 |
| B   | simulate all slots chs B fail                 |
| C   | simulate all slots                            |
| D   | simulate all slots All sigs fail              |
| E   | normal operation                              |
| F   | normal operation                              |

Positions 1 through D provide a 'Demo' mode, giving simulated responses for some card slots (overriding any real cards that are present). This may be helpful in analysing monitoring systems, particularly when no cards are available (or even no frame, with a loose BM102 powered by USB cable).

## Panel Indicators

### Indicator LEDs

| Indicator      | Function  |
|----------------|---|
| "STATUS" (LD1) | Flashes green when running normally<br>(does not flash when in serial configuration mode) |

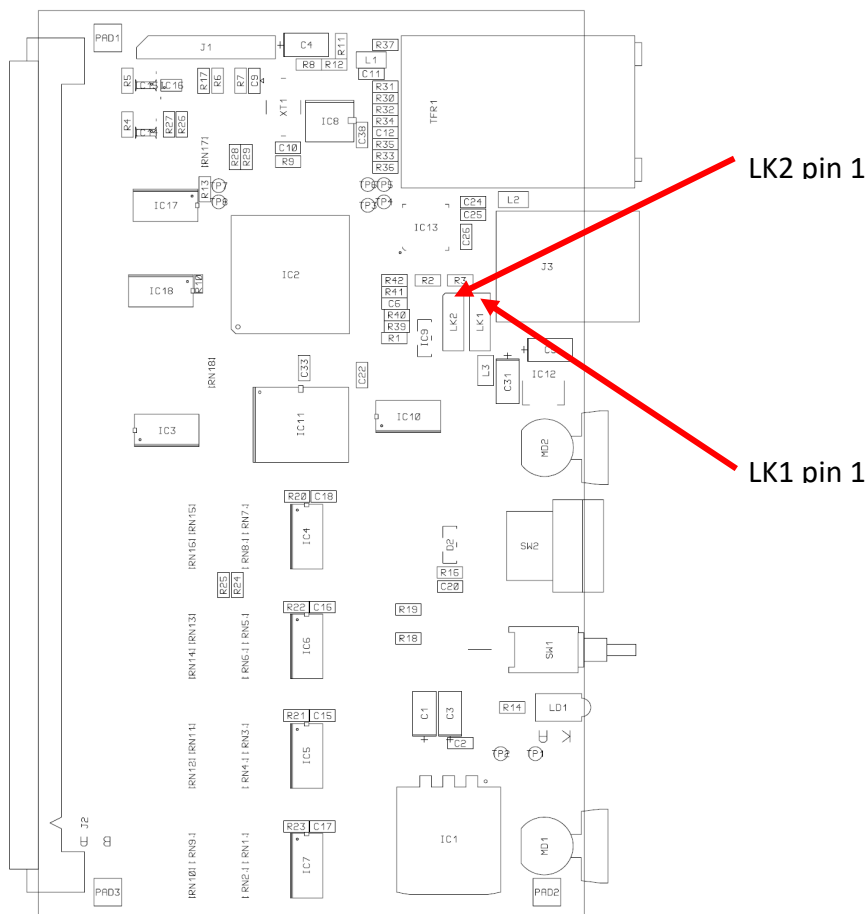
| "NETWORK PORT" Indicators | Function   |
|---------------------------|--|
| Green                     | Lit to show a valid ethernet connection detected |
| Amber                     | Flickers on data flow                            |

## Card Settings

### Link Settings (internal to card)

|     | Link: | To:   |   |
|-----|-------|-------|---|
| LK1 | Pin 1 | Pin 2 | Normal operation (default) (same as no link)      |
| "   | Pin 2 | Pin 3 | No function assigned as yet                       |
| LK2 | Pin 1 | Pin 2 | Normal operation (default) (same as no link)      |
| "   | Pin 2 | Pin 3 | Set Configuration to Default values on next Reset |

PCB1



BM102 ISS 2 RNS ASSEMBLY DRAWING TOP

The Quick Start Guide, above, should give enough information to get the card operational. This section gives more detailed information on the various configuration facilities.

### **Configuration Links**

There are two configuration links on the card, identified as LK1 and LK2. Their location is shown in the "Card settings" section and their function is summarised here:

LK1 normally has a link between pins 1 and 2, but the link has no function as yet. It may be assigned a function in the future. Having no link at all is equivalent to having a link between pins 1 and 2.

LK2 also normally has a link between its pins 1 and 2, but can be used to invoke a "Reset to Default" feature. Having no link at all is equivalent to having a link between pins 1 and 2. If a link is fitted to pins 2 and 3, then the next time the card is reset or powered up, the configuration settings will be returned to their default values. If the USB serial cable is in place and a terminal emulator running, then the following messages will be displayed:

```
Default settings restored.  
PLEASE de-select before next reset.
```

The 3 SNMP sys parameters: sysContact, sysName, sysLocation, are cleared to null strings.

Note that on older cards, this may also reset the card's MAC address and if this happens, the card's proper MAC address should be set to its correct value as soon as possible using either the "Network Configuration" web page (see "Network Configuration page" below) or the Serial Configuration menu (see "Configuration via USB port" below).

It may also clear the card's memory of its own serial number (readable over SNMP) and so this should be restored using the Serial Configuration menu (see below).

Once invoked, the link on LK2 should be returned to pins 1 and 2.

### **Ethernet**

From the factory, the card's default network settings are as follows:

```
Host name:                BM102  
Static IP address:       192.168.16.200  
Static gateway address:  192.168.16.2  
Static subnet mask:     255.255.255.0  
Static primary DNS server: 192.168.16.2  
Static secondary DNS server: 0.0.0.0  
DHCP is enabled
```

The BM102 can be connected to a network either by a straight ethernet cable connected to a router or switcher, or a crossover cable connected directly to a PC.

By default, DHCP is enabled on the card, and so if the network supports this, it will assign a different IP address to the card. If a serial configuration cable is connected (see "Configuration via USB port" chapter) the new IP address will be reported on the terminal. Otherwise, your network administrator may be able to determine the new IP address.

You can access the card's internal web page using its IP address, if known, by running a web browser and entering the address (for example, default shown):

`http://192.168.16.200/`

If the IP address is not known, you should still be able to access the card by its default host name:

`http://bm102/`

Either of these methods should display the card's home page which shows the basic status of the other cards in the frame. From here you can navigate to other web pages in the card.

### **Network Configuration page**

From the card's home page you should be able to select the "Network Configuration" page which is password protected:

When the prompt comes up,  
enter the User name: as the 5-letter word:                      admin

and the Password: as the 8-letter word:                      settings  
or (on earlier software):    bluebell

There is no facility for a user to change this password. Once the password is entered it remains valid for the rest of the browsing session, and you can navigate all the card's webpages without having to re-enter the password. Once you have configured the card, it is advisable to close the browser to cancel the access to the configuration pages, and then re-start it, if required, for monitoring with restored password protection to the configuration pages.

The Network Configuration page will allow you to change the card's MAC address, Host Name, and IP addresses to suit your network. If there is any difficulty accessing this page, these parameters can also be changed using a USB serial cable (see "Configuration via USB port" below). More information on the settings is given below.

### MAC Address

This value is set at the factory and should not be changed. It is worth making a note of this value so that it can be restored if it does get corrupted. After a "Reset to Default" operation using LK2 (see "Configuration Links" above) the MAC address may be reset to its default value of 00:50:C2:7C:90:00. If you see this value, you should re-instate the correct value (which will always be higher than the default value) as soon as possible.

If it gets corrupted and you don't know its correct value, please email [support@bluebell.tv](mailto:support@bluebell.tv) with the card's actual serial number (from a printed label on the card) and they should be able to tell you the MAC serial number to be entered.

If the value is changed, it will only be effective after the "Save Config" button is clicked (see below).

### Host Name

This name (maximum 15 characters) is included to be used by the NetBIOS Naming Service (NBNS) and so allows the card to be accessed in a web browser with this name (case insensitive). For example, with the default name, BM102, the card can be accessed by: <http://bm102/>

You should consult your network administrator to supply different names for multiple cards on a network. The name will be converted to all upper case and should not include 'space' characters if it is to be used in web browsers.

If the value is changed, it will only be effective after the "Save Config" button is clicked (see below).

Please note that this name will only be available on your local subnet, and will not be accessible from the Internet. Also, this service is not supported by all operating systems. If you have difficulty accessing your board by this means you will have to use the IP address instead.

### Enable DHCP

Click on the box to toggle the state of this option.

The Dynamic Host Configuration Protocol (DHCP) is a method of assigning IP and gateway addresses and subnet masks automatically from a DHCP server on a network. If enabled, and there is such a server on your network, then it will provide values that will override the values for IP Address, Gateway, Subnet Mask, Primary DNS, and Secondary DNS. These options will thus be greyed out if DHCP is enabled (ticked).

If the value is changed, it will only be effective after the "Save Config" button is clicked (see below).

### IP Address

This can only be changed when the "Enable DHCP" option is disabled (unticked).

This is the IP address to access this card, for example by typing this address into a web browser on your network. It will be overridden if DHCP is being used. To get the correct

value for this, ask the Network administrator or IT specialist where the card is to be installed.

If the value is changed, it will only be effective after the “Save Config” button is clicked (see below).

### Gateway

This can only be changed when the “Enable DHCP” option is disabled (unticked).

The correct value for the gateway should be provided by your Network administrator or IT specialist.

If the value is changed, it will only be effective after the “Save Config” button is clicked (see below).

### Subnet Mask

This can only be changed when the “Enable DHCP” option is disabled (unticked).

The value for the subnet mask should be provided by your Network administrator or IT specialist.

If the value is changed, it will only be effective after the “Save Config” button is clicked (see below).

### Primary DNS

### Secondary DNS

The Domain Name System (DNS) is not used on this card and so changing these addresses will not have any effect.

### Save Config

If you make changes to any of the values on this page, but then change your mind and wish to abandon the changes, simply click on the “Network Configuration” tab again, and the screen will be refreshed with the original values.

When all the required changes have been made to the values on this page, click on the “Save Config” button. This action will save the new values, re-boot the BM102, and show a “Reboot In Progress...” page on the web browser, which gives some advice on recovery in case there are any problems with the new settings.

At any other time, this page can be viewed by entering this address into your browser:  
<http://YourName/protect/reboot.htm?YourName>  
where YourName is the Host Name assigned to your card.

### **SNMP Configuration page**

The card uses SNMP v2c and the SNMP Configuration page allows the user to set the community names to be used for SNMP.

From the card's home page (or any page) The SNMP Configuration page can be accessed by clicking on its menu button, but it requires a password on its first access in any browsing session. The password access is the same as for the Network Configuration page (see above).

The page allows up to 3 community names each for Read and Write accesses. Each name can be up to 31 characters long.

### Save Config

If you make changes to any of the values on this page, but then change your mind and wish to abandon the changes, simply click on the "SNMP Configuration" menu option again, and the screen will be refreshed with the original values.

When all the required changes have been made to the values on this page, click on the "Save Config" button. This action will save the new values, and re-display the page. If any name is longer than 31 characters, it will be rejected, and the old name will be shown. When saved, the names are non-volatile and will survive any power-downs of the card.

Other SNMP parameters are configured using the SNMP 'Set' command. These include the 'System' values (Contact, Name, and Location) and the Trap parameters (Enabled/Disabled, Receiver IP address, and Trap Community name) for each of two trap generators. See the SNMP entry in the 'Operations' section below for more information.

### **Uploading 'Image' files**

Apart from the main software on the card, which cannot normally be changed by a customer, there is also an 'image' file which can be uploaded by a customer to a re-writable memory chip on the card.

An 'image' file incorporates the following components:

- 1 – A file defining the SNMP information, corresponding to the 'mib' file.
- 2 – One or more web pages (.htm and other support files) that the card will then provide to an internet browser.

Cards are supplied from the factory with a standard 'image' file pre-loaded and so this option is not normally needed. However, updates to the image file (with a filename of the form \*Img\*.bin) may be provided by Bluebell for uploading to the card by the customer.

For this procedure, the BM102 should be in its normal operating mode, with its STATUS LED flashing once per second, and an ethernet cable connected to a computer running a web browser. The Image file should be loaded onto that computer.

The card will normally be accessed from the web browser using its Host Name (see above). If the Host Name has been changed from its default of "BM102" then you'll need to replace "bm102" in the address below with the appropriate name.

Open a web browser and access the board at  
<http://bm102/imageupload>

This should produce a page headed "MPFS Image Upload" (MPFS is the File System used by the card).

If you mistype this URL, the board will provide a default HTTP 404 error page with a link to the "MPFS Upload" page. This default 404 page will not appear if you've configured your browser to override custom error pages (e.g. if the "Show friendly HTTP error messages" is ticked in Internet Explorer 7's internet options menu).

On the "MPFS Image Upload" page, click on the "Browse..." button to navigate to the required Image file. Then click on the "Upload" button. The image file is sent to the board and programmed into the EEPROM. As this happens, the activity LED on the Ethernet jack will blink. Once the browser reports that the upload has completed, click the link provided within the status message to access the board's web pages.

## Configuration via USB port

The USB serial port should not normally be needed either to set up or to operate the card, but it may be needed if there is any difficulty in accessing the card via ethernet, or for more fundamental configuration such as setting the card's serial number if it becomes corrupted.

### Serial Cable

The "USB" connector on the front panel is a standard USB-B socket and can be connected to a PC via a standard USB A-B cable. When first plugged in, a PC connected to the Internet will probably download and install a driver automatically. If not, it may be necessary to download a driver manually. The chip used on the BM102 is an FT232RQ made by FTDI (Future Technology Devices International Ltd) and drivers are available from their website:

<http://www.ftdichip.com/>

The driver creates a virtual com port for the BM102 connection and assigns it to the next available COM port number, which can then be set in your preferred terminal emulation program.

### Stand-alone Operation

A BM102 card that is outside of a BC-series frame can be powered by the USB cable alone, which may be useful for diagnostic purposes. In this case you can still connect an ethernet cable and access the card's internal webpages and SNMP features. A card can be configured in this way before being plugged into a frame.

With the OPTIONS switch at '0' or 'E', the card will attempt normal operation, which will provide blank results when reporting the values for the frame and other cards. However, with the OPTIONS switch between '1' and 'D', the card will provide simple simulated responses as listed in the table in the Settings/Indicators section below (providing a Demonstration mode). These features were added for initial testing and may be removed in later versions of the software.

## Running a Terminal Emulator on the PC

On the PC you need to run a simple terminal emulation program such as HyperTerminal. There are a number of public domain terminal programs available, such as Tera Term, PuTTY, Terminal, FoxTerm. These programs can be used for accessing most functions of the BM102 configuration menu, but one function (uploading 'image' file updates to the webpage) requires XMODEM file transfers. Many public domain terminal emulators either do not support XMODEM, or work unreliably with the BM102 (perhaps because the BM102 has to write each block to eeprom memory before receiving the next one and some terminal emulators can't cope with this reduced speed). The only programs we have found (so far) to upload these files reliably are HyperTerminal (bundled with older Microsoft operating systems) and ExtraPuTTY: a freeware available from: <http://www.extraputty.com/>

The appropriate comms port should be set to:-

- 19200 bps,
- 8 data bits, 1 STOP bit, and no parity
- No flow control
- XMODEM file transfer (to upload 'image' files)

### **Serial Configuration Menu**

With a serial cable connected and the PC running a terminal program, the configuration menu can be accessed as follows:

Set the OPTIONS switch on the front panel to "F" and press the RESET button. On coming out of reset the terminal program should display the Serial Configuration menu screen (see below).

For software dated 23 Jan 2018 or later, the config menu can be displayed by simply typing "98x" in anything OPTIONS switch without a need to reset. The terminal program should display the Serial Configuration menu screen (see below).

When using this 'configuration' mode, the following points should be noted:

1. While the configuration menu is active, the card is not servicing the ethernet port and the STATUS LED will not be flashing, to indicate that the card is not in normal operation. Exiting the menu with options 'S', 'Q', or 'Esc' will resume normal operation.
2. Menu options can be entered in either upper or lower case.
3. When all required changes have been made, they will only be saved to non-volatile memory if the menu is exited using option 'S'. There is the option to exit the menu with 'Q' or 'Esc' which means the changes will persist as long as the card is powered, but if the card is reset or powered down then the old values will be restored. (The one exception to this is the option: I: Upload Image File... which writes directly to non-volatile memory while staying in the Configuration menu and so cannot be undone.)

Here is the default configuration menu:

---

```
>98x
Card Monitor Configuration Screen
      Firmware   Version: Feb 05 2018 10:54:50
      Image file Version: Feb 05 2018 11:29:00

2: Change host name:                BM102
3: Change static IP address:        192.168.16.200
4: Change static gateway address:   192.168.16.2
5: Change static subnet mask:       255.255.255.0
6: Change static primary DNS server: 192.168.16.2
7: Change static secondary DNS server: 0.0.0.0
8: Disable DHCP:                    DHCP is enabled

I: Upload Image File...
C: Change Card serial number:       95373.00-001
M: Change MAC number:               37133

S: Save & Quit.
Q: Quit without saving.
Enter a menu choice:
```

---

The menu choices are described further here:

2: Change host name:

This name (maximum 15 characters) is included to be used by the NetBIOS Naming Service (NBNS) and so allows the card to be accessed in a web browser on your local network using this name (case insensitive). For example, with the default name, BM102, the card can be accessed by:

<http://bm102/>

You should consult your network administrator to supply different names for multiple cards on a network. The name will be converted to all upper case and it is advisable not to use 'space' characters in the name as this prevents using the name to access the card in a web browser. Note that any new value will only be saved to non-volatile memory if the menu is later exited by option **S**.

3: Change static IP address:

This is the IP address to access this card. It will be overridden if DHCP is being used. To get the correct value for this, ask the Network administrator or IT specialist where the card is to be installed.

To change the value, type **3** which will give the response:

**New setting:**

Enter the four decimal numbers, separated by full stops (period) then press **Return**. The card will refresh the menu showing the new value. Note that any new value will only be saved to non-volatile memory if the menu is later exited by option **S**.

4: Change static gateway address:

The correct value for the gateway should be provided by your Network administrator or IT specialist.

To change the value, type **4** which will give the response:

**New setting:**

Enter the four decimal numbers, separated by full stops (period) then press **Return**. The card will refresh the menu showing the new value. Note that any new value will only be saved to non-volatile memory if the menu is later exited by option **S**.

5: Change static subnet mask:

The value for the subnet mask should also be provided by your Network administrator or IT specialist.

To change the value, type **5** which will give the response:

**New setting:**

Enter the four decimal numbers, separated by full stops (period) then press **Return**. The card will refresh the menu showing the new value. Note that any new value will only be saved to non-volatile memory if the menu is later exited by option **S**.

6: Change static primary DNS server:

7: Change static secondary DNS server:

The Domain Name System (DNS) is not used on this card and so changing these addresses will not have any effect.

8: Disable DHCP:

The Dynamic Host Configuration Protocol (DHCP) is a method of assigning IP and gateway addresses and subnet masks automatically from a DHCP server on a network. If enabled, and there is such a server on your network, then it will provide values that will override the values shown against menu options 3, 4, and 5 above. If DHCP is disabled then the static values in menu options 3, 4, and 5 are the ones that will be used.

Typing **8** will toggle the state of DHCP with the new state being shown on the right hand side of the 8: option in the re-drawn menu. Note that the new state will only be saved to non-volatile memory if the menu is later exited by option **S**.

I: Upload Image File...

An 'image' file can be uploaded to the card which incorporates the following components:  
1 – A file defining the SNMP information, corresponding to the 'mib' file.

2 – One or more web pages (.htm files and assorted support files) that the card will then provide to an internet browser.

Cards are supplied from the factory with a standard 'image' file pre-loaded and so this option is not normally needed. However, updates to the image file (with a filename of the form \*Img\*.bin) may be provided by Bluebell for uploading to the card by the customer.

The easiest way to upload such a file is via the network cable from a web browser (see method in the "Configuration via Ethernet" section above). Uploading via the serial cable with this menu option is an alternative in case the first method provides any difficulty.

If a new image file is to be uploaded, it should first be copied to the computer which has the serial connection to the BM102 card. Then, at the "Enter a menu choice:" prompt on the serial configuration menu, type the letter: **I**. The card will respond by outputting the ascii NAK character (shows as **§** on HyperTerminal) every half-second.

If using HyperTerminal, select **Transfer -> Send File...** In the [Send File] window, click **Browse...** to select the correct image file from the computer's disk, then select **Xmodem** as the protocol, then click **[Send]**. A window should then show the progress of the file being uploaded, after which the card will refresh the menu to show the uploading was successful.

If using ExtraPuTTY, select **Files Transfer -> Xmodem -> Send**. In the [Select files to upload...] window, navigate to the appropriate folder, select the correct image file from the computer's disk, then click on the **[ Open ]** button. A [Transferring File] window should then show the progress of the file being uploaded, after which the card will refresh the menu to show the uploading was successful.

If using a different terminal program, there should be equivalent means of sending a file using the Xmodem protocol.

If no other menu items are required, the '**Esc**' key can be pressed to exit the menu and resume normal card operation. Note that this image file is written directly to non-volatile memory and so will persist after later power-downs, irrespective of whether the menu is exited by option **S**, **Q** or **Esc**.

`C: Change Card serial number:`

The card's serial number is set in the factory and should not normally be changed. This option is included in case the value gets corrupted. The card's serial number should be printed on a white label stuck on the back of the card. If the label has two lines, it is normally the lower line that is used as the serial number.

The serial number shown in the menu is the value that will be reported back using SNMP. If the value looks corrupted, or disagrees with the value on the label, then this menu item can be used to correct it.

To change the value, type **C** which will give the response:

**New Setting:**

Enter the required value followed by **Return**. The card will refresh the menu showing the new value. Note that any new value will only be saved to non-volatile memory if the menu is later exited by option **S**.

M: Change MAC number:

This number determines the MAC address for this particular card. It is set at the factory and should not be changed. It is worth making a note of this number so that it can be restored if it does get corrupted. If it gets corrupted and you don't know its value, you will have to email [support@bluebell.tv](mailto:support@bluebell.tv) with the card's actual serial number (from a printed label on the card) and they should be able to tell you the MAC serial number to be entered.

To change the value, type **M** which will give the response:

**New setting:**

Enter the new decimal MAC serial number and press **Return**. The card will refresh the menu showing the new value. Note that any new value will only be saved to non-volatile memory if the menu is later exited by option **S**.

The "MAC number" is the decimal equivalent of the last two bytes of the MAC address, with the first four bytes being 00.50.C2.7C. For the example screen given above, the decimal number 37133 when converted to hexadecimal is 910D. So, the MAC address for this card would be 00.50.C2.7C.91.0D.

S: Save & Quit.

This option, **S**, will save the settings currently displayed on the menu to non-volatile memory so that these settings will be restored every time the card is powered up or reset. The card then starts normal operation, as though the card had powered with the hex switch at 0. It is probably best to return the hex switch to 0 to avoid invoking this menu (and suspending normal operation) after the next power cycle or reset.

Q: Quit without saving.

This option, or the **Esc** key (not shown on the menu), will quit the configuration menu and start normal card operation without saving any changes to non-volatile memory. If any settings were changed, the new values will remain active until the next power-down or reset, after which the old values will be restored. This allows any new values to be tested before committing them to non-volatile memory. Please note that this does not apply to Image files (web pages) uploaded via menu option **I**, as these are saved directly to non-volatile memory.

Other keys

If any key other than those listed above is pressed then the menu will simply refresh with the current values, giving another chance to select one of the listed options.

Normal operation

Please note, that if options **S**, **Q**, or **Esc** are selected, the card will start normal operation, with the status LED flashing. However, if the OPTIONS switch on the front panel is left on "F", at the next power up or reset, the card will re-enter the configuration menu and wait for an option to be selected. To return to normal operation fully, ensure the OPTIONS switch is set back to "0".

Also note that when options **S**, **Q**, or **Esc** are used to exit the menu, the card will show the current IP address. It will also show the IP address whenever it is changed, by a DHCP server, for example. Thus it may be useful to leave the Terminal emulator program running to monitor any IP address changes if you are having any network problems.

In normal operation, you can type **S** in the terminal emulator at any time to show some status information on the card, including the current IP address. This is part of an engineering debug facility that is beyond the scope of this manual, so you are advised not to type anything other than **S** as the results will be unpredictable.

### Change Card Name Menu

With a serial cable connected and the PC running a terminal program, the card type configuration menu can be accessed by typing "20x". The terminal program should display the cards detected by the BM102 in each slot. To change a card's name, ensure there are no write-protect pins connected. If this pin is connected, then writing to the eeprom of the card is disabled. See each card's operation manual to locate the write-protect pins.

Here is an example of the display when entering "20x":

---

```
>20x
Slot0: BC100
Slot1:
Slot2:
Slot3:
Slot4: BC362T
Slot5: BC362R
Slot6:
Slot7:
Slot8: BC369
Slot9:
Slot10: BC370T
Slot11: BC370R
Slot12:
Slot13: BC390T
Slot14: BC390R
Slot15:
nX to change a card name
```

---

To change a card name, simply type the slot number followed by 'x' and enter the desired name for the card. To leave the option of changing the card name, press "escape".

For example, changing Slot8 from "BC369" to "XX369" is as follows:

---

```
>8x      Enter new card name:
XX369

          New card name: XX369
          Please wait...
          Please wait...
          Please wait...
          Please wait...
          Card name has been set
>20x      [To confirm, type "20x"]
          Slot0: BC100
          Slot1:
          Slot2:
          Slot3:
          Slot4: BC362T
          Slot5: BC362R
          Slot6:
          Slot7:
          Slot8: XX369
          Slot9:
          Slot10: BC370T
          Slot11: BC370R
          Slot12:
          Slot13: BC390T
          Slot14: BC390R
          Slot15:
          nX to change a card name
```

---

**Note:**

- The Card Name has a limit of 32 characters and will not accept anything after this limit.
- This feature is only available in BM102 software after Feb 13 2018.

Once configured, a card's operation can be checked via its Ethernet port. The card's STATUS LED should be flashing once per second to indicate normal operation. If it isn't, ensure that the OPTIONS switch is not set to 'F' and press the RESET switch.

### Network Port

This RJ45 connector on the front panel is for an Ethernet cable. This would normally be a straight (non-crossover) cable connecting to an Ethernet hub, switch, or router. Please note that if connecting the BM102 directly to a PC's Ethernet port, a crossover type cable may be required.

Each card should have a unique MAC address that is set at the factory, and should not be changed. For more information on the MAC address, in the "Configuration via Ethernet" section above, look under the "Network Configuration page" => "MAC Address" heading.

The card's Host name and IP address should have been determined by the configuration process above and one of these needs to be known to access the card as described in this section.

### 'Pinging' the Card

If the IP address is known, a quick check of Ethernet connectivity between the card and a PC on the same network can be achieved by opening up a Command Prompt window on the PC and typing, for example (using default IP address):

```
C:\>ping 192.168.16.200
```

This utility sends 4 packets to the given address and checks for a response from each one. The key part of a successful response to look out for would be something like:-

```
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss)
```

If a failure is indicated, you may need to check with the local Network administrator or IT specialist to ensure that the card, router, and PC all have compatible network settings.

### The Internal Web Pages

Each BM102 has a built-in web server. Simply start up an internet browser on a PC and type the card's Host Name or its IP address as a web address, so for example, a card with default settings would be addressed as:

```
http://bm102/
```

Or:

```
http://192.168.16.200/
```

This should produce the card's home page, labelled "Overview".

The "Overview" page shows the status of each of two channels (A and B) on up to 15 cards, plus the status of the two power supplies and the fans. It also shows the

temperature sensed on the BM102. All these values are updated at regular intervals for a dynamic display of the card's status.

For any 'new' cards in the frame, the channel status values are shown as a green LED for good (signal present) and a red LED for a fault (e.g. signal missing). Any 'old' cards will show a red LED for a fault (e.g. signal missing). However, the BM102 cannot detect the presence of an 'old' card, and so an off LED (grey) can mean either no card in the slot, or an 'old' card with signals present.

In many cases, this good/fault status is the same as that reported by an LED on the panel of the card in the relevant slot. See the manuals for the individual cards for more information on this status.

The power supplies will show as green LEDs for good supply or a red LED for a faulty or absent supply. The Fan status LED will likewise show as either red or green.

Fans are standard on the 1U BC160 frames but optional on the 3U BC100 frames. Frames without fans will still show green for fans as it simply means there isn't a fan fault. The fans each have a detector chip that latches a fault condition to ensure that an intermittent fault is not missed. The latched fault condition can only be cleared by a power down, which would be required to investigate the fault. The fans are not hot-swappable on either frame size.

If the BM102 is in a 6-slot BC160 frame, its slots 1 through 6 correspond to slots 1 through 6 on the webpage and so slots 7 through 15 will show grey LEDs as missing cards.

All the web pages have tabs in a line just below the logo and title bar, to select the other internal web pages.

The 'Frame Information' page provides access to all the 'new' information additional to the basic signal information on the Overview page. It shows all the information for one 'slot' at a time. At the top, a "Select:" pull-down list allows slot 1 through slot 15, or the Frame (slot 0), or the BM102 itself (slot 16) to be selected, after which the "Select unit" button should be clicked to access the data for that slot. Those parameters that are considered changeable are updated at regular intervals for a dynamic display of the card's status. These parameters comprise:

- Ch A signal
- Ch B signal
- Temperature
- Temperature Status
- Supply voltage
- Supply voltage Status
- SFP Bias current Ch1
- SFP Bias current Ch2
- SFP Bias current Ch1 Status
- SFP Bias current Ch2 Status
- SFP Optic power Ch1

SFP Optic power Ch2  
SFP Optic power Ch1 Status  
SFP Optic power Ch2 Status

If a card is replaced in a slot, the 'Refresh page' option on the browser should be selected to update the other parameters for the new card, as well as the changeable parameters listed above.

The 'Network Configuration' and 'SNMP Configuration' pages are password protected. They are described in the "Configuration via Ethernet" section above.

## **SNMP**

In SNMP terminology, the BM102 acts as an Agent, to be monitored by a Network Management System (NMS). The NMS is likely to be a PC running an SNMP browser or other SNMP control system, connected by a network to the ethernet port of one or more BM102 cards. The BM102 uses SNMP version v2c and will accept either v1 or v2c commands. It is also capable of issuing v1 traps.

The NMS needs to know what values it can read from and write to the card, and this information is provided in a "Management Information Base" or MIB file. Such a file might have a filename like:-

Bluebell-BM102-02.mib

Where the '02' is the revision of the MIB file.

For the appropriate mib file for your card, please email: [support@bluebell.tv](mailto:support@bluebell.tv) quoting the serial number of your card, and the Firmware and Image Dates shown at the bottom of the Overview page.

The NMS can issue 'Get', 'GetNext', and 'Set' commands to access the parameters of the card. The various parameters that the BM102 can deal with are each assigned an Object Identifier number (OID) and these are listed in the tables below. In these tables, 'E' represents the 'enterprise' OID: 1.3.6.1.4.1.29054

The parameters can be divided into 2 groups.

### Group 1 - 'Basic' parameters

The first group are the 'basic' parameters, which are almost the same group as were monitored by the BM101. They are listed in the first table.

The read-write values in the table are non-volatile and will survive card power-downs.

| <u>NAME</u>           | <u>OID</u>      | <u>ACCESS</u> | <u>DESCRIPTION / TYPICAL VALUE</u>                           |
|-----------------------|-----------------|---------------|--|
| sysDescr              | 1.3.6.1.2.1.1.1 | read-only     | BM102  |
| sysObjectID           | 1.3.6.1.2.1.1.2 | read-only     | E.1.1.2  |
| sysUpTime             | 1.3.6.1.2.1.1.3 | read-only     | Time since reset (units = 10ms)                              |
| sysContact            | 1.3.6.1.2.1.1.4 | read-write    | <a href="mailto:support@company.com">support@company.com</a> |
| sysName               | 1.3.6.1.2.1.1.5 | read-write    | BC-Series Frame  |
| sysLocation           | 1.3.6.1.2.1.1.6 | read-write    | Frame number   |
| sysServices           | 1.3.6.1.2.1.1.7 | read-only     | 7  |
| name                  | E.1.1.2.1.1     | read-only     | Bluebell BM102   |
| version               | E.1.1.2.1.2     | read-only     | v4.0   |
| date                  | E.1.1.2.1.3     | read-only     | Feb 05 2018 11:29:00   |
| trapReceiverNumber    | E.1.1.2.2.1.1.1 | N/A           | Index of trap receiver                                       |
| trapEnabled           | E.1.1.2.2.1.1.2 | read-write    | Is this trap entry enabled or not.                           |
| trapReceiverIPAddress | E.1.1.2.2.1.1.3 | read-write    | Trap receiver IP address                                     |
| trapCommunity         | E.1.1.2.2.1.1.4 | read-write    | community name for trap messages                             |
| sig1A                 | E.1.1.2.3.1.1   | read-only     | good (0) / fail (1)  |
| sig1B                 | E.1.1.2.3.1.2   | read-only     | good (0) / fail (1)  |
| sig2A                 | E.1.1.2.3.1.3   | read-only     | good (0) / fail (1)  |
| sig2B                 | E.1.1.2.3.1.4   | read-only     | good (0) / fail (1)  |
| sig3A                 | E.1.1.2.3.1.5   | read-only     | good (0) / fail (1)  |
| sig3B                 | E.1.1.2.3.1.6   | read-only     | good (0) / fail (1)  |
| sig4A                 | E.1.1.2.3.1.7   | read-only     | good (0) / fail (1)  |
| sig4B                 | E.1.1.2.3.1.8   | read-only     | good (0) / fail (1)  |
| sig5A                 | E.1.1.2.3.1.9   | read-only     | good (0) / fail (1)  |
| sig5B                 | E.1.1.2.3.1.10  | read-only     | good (0) / fail (1)  |
| sig6A                 | E.1.1.2.3.1.11  | read-only     | good (0) / fail (1)  |
| sig6B                 | E.1.1.2.3.1.12  | read-only     | good (0) / fail (1)  |
| sig7A                 | E.1.1.2.3.1.13  | read-only     | good (0) / fail (1)  |
| sig7B                 | E.1.1.2.3.1.14  | read-only     | good (0) / fail (1)  |
| sig8A                 | E.1.1.2.3.1.15  | read-only     | good (0) / fail (1)  |
| sig8B                 | E.1.1.2.3.1.16  | read-only     | good (0) / fail (1)  |
| sig9A                 | E.1.1.2.3.1.17  | read-only     | good (0) / fail (1)  |
| sig9B                 | E.1.1.2.3.1.18  | read-only     | good (0) / fail (1)  |
| sig10A                | E.1.1.2.3.1.19  | read-only     | good (0) / fail (1)  |
| sig10B                | E.1.1.2.3.1.20  | read-only     | good (0) / fail (1)  |
| sig11A                | E.1.1.2.3.1.21  | read-only     | good (0) / fail (1)  |
| sig11B                | E.1.1.2.3.1.22  | read-only     | good (0) / fail (1)  |
| sig12A                | E.1.1.2.3.1.23  | read-only     | good (0) / fail (1)  |
| sig12B                | E.1.1.2.3.1.24  | read-only     | good (0) / fail (1)  |
| sig13A                | E.1.1.2.3.1.25  | read-only     | good (0) / fail (1)  |
| sig13B                | E.1.1.2.3.1.26  | read-only     | good (0) / fail (1)  |
| sig14A                | E.1.1.2.3.1.27  | read-only     | good (0) / fail (1)  |
| sig14B                | E.1.1.2.3.1.28  | read-only     | good (0) / fail (1)  |
| sig15A                | E.1.1.2.3.1.29  | read-only     | good (0) / fail (1)  |
| sig15B                | E.1.1.2.3.1.30  | read-only     | good (0) / fail (1)  |
| psu1                  | E.1.1.2.3.1.31  | read-only     | good (0) / fail (1)  |
| psu2                  | E.1.1.2.3.1.32  | read-only     | good (0) / fail (1)  |
| fanStatus             | E.1.1.2.3.1.33  | read-only     | good (0) / fail (1)  |

In the table above "version" refers to the internal structure of the mib parameters, and "date" refers to the revision of the Image file installed (web pages and mib structure). (For the firmware version, see the group 2 parameter cardFwRev for the BM102 slot 16.)

The "trap..." parameters are part of a table with two entries, so each parameter can have two values.

The signal name "sig5B", for example, means channel B of the card in slot 5 (either 15-slot BC100 or 6-slot BC160 frame). In many cases, this status is the same as that reported by an LED on the front panel of the card in the relevant slot. The channel status values are reported as "0" or "good" for signal present and "1" or "fail" for a fault (e.g. signal missing). See the manuals for the individual cards for more information on this status. The power supplies and fans also report as "0" for good and "1" for a fault.

If a slot in the frame has no card fitted, its channels will be reported as "0", and so a missing card cannot be distinguished from a good card with signals present. If a power supply is missing, however, it will report as "1" or "fail".

#### Group 2 - 'CardTable' parameters

The second group consist largely of lower priority parameters that were not available on the BM101 and will still not be available on 'old' cards. It includes fixed information from each card, such as its part number and serial number, etc. Also, from any SFP module fitted to the card it provides both fixed information such as its manufacturer and part number and variable information such as its temperature, signal power etc.

Because of the large number of parameters, they are presented as an SNMP table, with the slot number as the index to the table, so that slot numbers 1 through 15 correspond to the 15 cards in a BC100 frame. A BC160 frame has only slots 1 through 6 and so slots 7 through 15 should be ignored.

For completeness the 'basic' statuses of channel A and B signal loss are also duplicated in the table. Since the table is only applicable to 'new' cards, whose presence can be detected, the basic statuses here have 3 states: good, bad, or unknown, where 'unknown' means either no card present, or an 'old' card with a good signal. A user thus has the choice of accessing these basic statuses from the new table, or individually in the basic, BM101-compatible, form above.

The frame itself can provide the same fixed information as the cards, such as its part number and serial number, etc. and so this has been included in the table as slot 0. In this case, the signal loss parameters of channel A and B are used to provide the PSU1 and PSU2 fault signals respectively.

Similarly, the BM102 card itself will report its fixed information (serial number etc.) as slot 16 in either a 15-slot BC100 or a 6-slot BC160. In this case, the card's signal loss parameter for channel A is used to report the fan status for the frame.

| NAME             | OID              | ACCESS    | DESCRIPTION / TYPICAL VALUE                                   | Notes   |
|------------------|------------------|-----------|---|---------|
| cardSlot         | E.1.1.2.3.2.1.1  | N/A       | Index of card table   |         |
| cardPresent      | E.1.1.2.3.2.1.2  | read-only | notPresent (0) / present (1)                                  |         |
| cardType         | E.1.1.2.3.2.1.3  | read-only | Card Model e.g. "BC300R"                                      |         |
| cardSerNo        | E.1.1.2.3.2.1.4  | read-only | Serial number, from bottom line of card label                 |         |
| cardHwRev        | E.1.1.2.3.2.1.5  | read-only | Normally PCB issue number. Sub-boards added after semi-colon. |         |
| cardFwRev        | E.1.1.2.3.2.1.6  | read-only | Revision of any firmware on card                              |         |
| cardFunc         | E.1.1.2.3.2.1.7  | read-only | Brief description of card function                            |         |
| cardSigChA       | E.1.1.2.3.2.1.8  | read-only | unknown (0) / fail (1) / good (2)                             | 1, 2, 3 |
| cardSigChB       | E.1.1.2.3.2.1.9  | read-only | unknown (0) / fail (1) / good (2)                             | 1, 2    |
|                  |                  |           |   |         |
| sfpMfr           | E.1.1.2.3.2.1.10 | read-only | Name of manufacturer of SFP fitted                            |         |
| sfpType          | E.1.1.2.3.2.1.11 | read-only | SFP model name  |         |
| sfpTemp          | E.1.1.2.3.2.1.12 | read-only | temperature read from SFP in degrees C.                       | 4       |
| sfpTempStat      | E.1.1.2.3.2.1.13 | read-only | 0-5 = n/a, tooLow, low, ok, high, tooHigh                     | 4       |
| sfpVolt          | E.1.1.2.3.2.1.14 | read-only | SFP supply voltage in mV, typically 3300                      | 5       |
| sfpVoltStat      | E.1.1.2.3.2.1.15 | read-only | 0-5 = n/a, tooLow, low, ok, high, tooHigh                     | 5       |
|                  |                  |           |   |         |
| sfpDirCh1        | E.1.1.2.3.2.1.16 | read-only | Ch1 sig dir: unknown(0), tx (1), rx (2)                       |         |
| sfpDirCh2        | E.1.1.2.3.2.1.17 | read-only | Ch2 "   |         |
| sfpWlCh1         | E.1.1.2.3.2.1.18 | read-only | Ch1 wavelength (if transmitter) in nm                         |         |
| sfpWlCh2         | E.1.1.2.3.2.1.19 | read-only | Ch2 "   |         |
| sfpBiasCh1       | E.1.1.2.3.2.1.20 | read-only | Ch1 bias current (if transmitter) in mA                       |         |
| sfpBiasCh2       | E.1.1.2.3.2.1.21 | read-only | Ch2 "   |         |
| sfpBiasStatCh1   | E.1.1.2.3.2.1.22 | read-only | 0-5 = n/a, tooLow, low, ok, high, tooHigh                     | 6       |
| sfpBiasStatCh2   | E.1.1.2.3.2.1.23 | read-only | Ch2 "   | 6       |
| sfpPowerCh1      | E.1.1.2.3.2.1.24 | read-only | Ch1 optical power in uW                                       |         |
| sfpPowerCh2      | E.1.1.2.3.2.1.25 | read-only | Ch2 "   |         |
| sfpPowerStatCh1  | E.1.1.2.3.2.1.26 | read-only | 0-5 = n/a, tooLow, low, ok, high, tooHigh                     | 6       |
| sfpPowerStatCh2  | E.1.1.2.3.2.1.27 | read-only | Ch2 "   | 6       |
|                  |                  |           |   |         |
| sfp2Mfr          | E.1.1.2.3.2.1.28 | read-only | Name of manufacturer of SFP fitted                            | 7       |
| sfp2Type         | E.1.1.2.3.2.1.29 | read-only | SFP model name  |         |
| sfp2Temp         | E.1.1.2.3.2.1.30 | read-only | temperature read from SFP in degrees C.                       | 4       |
| sfp2TempStat     | E.1.1.2.3.2.1.31 | read-only | 0-5 = n/a, tooLow, low, ok, high, tooHigh                     | 4       |
| sfp2Volt         | E.1.1.2.3.2.1.32 | read-only | SFP supply voltage in mV, typically 3300                      | 5       |
| sfp2VoltStat     | E.1.1.2.3.2.1.32 | read-only | 0-5 = n/a, tooLow, low, ok, high, tooHigh                     | 5       |
| sfp2DirCh1       | E.1.1.2.3.2.1.34 | read-only | Ch1 sig dir: unknown(0), tx (1), rx (2)                       |         |
| sfp2DirCh2       | E.1.1.2.3.2.1.35 | read-only | Ch2 "   |         |
| sfp2WlCh1        | E.1.1.2.3.2.1.36 | read-only | Ch1 wavelength (if transmitter) in nm                         |         |
| sfp2WlCh2        | E.1.1.2.3.2.1.37 | read-only | Ch2 "   |         |
| sfp2BiasCh1      | E.1.1.2.3.2.1.38 | read-only | Ch1 bias current (if transmitter) in mA                       |         |
| sfp2BiasCh2      | E.1.1.2.3.2.1.39 | read-only | Ch2 "   |         |
| sfp2BiasStatCh1  | E.1.1.2.3.2.1.40 | read-only | 0-5 = n/a, tooLow, low, ok, high, tooHigh                     | 6       |
| sfp2BiasStatCh2  | E.1.1.2.3.2.1.41 | read-only | Ch2 "   | 6       |
| sfp2PowerCh1     | E.1.1.2.3.2.1.42 | read-only | Ch1 optical power in uW                                       |         |
| sfp2PowerCh2     | E.1.1.2.3.2.1.43 | read-only | Ch2 "   |         |
| sfp2PowerStatCh1 | E.1.1.2.3.2.1.44 | read-only | 0-5 = n/a, tooLow, low, ok, high, tooHigh                     | 6       |
| sfp2PowerStatCh2 | E.1.1.2.3.2.1.45 | read-only | Ch2 "   | 6       |
|                  |                  |           |   |         |

|                  |                  |           |   |   |
|------------------|------------------|-----------|---|---|
| sfp3Mfr          | E.1.1.2.3.2.1.46 | read-only | Name of manufacturer of SFP fitted        | 9 |
| sfp3Type         | E.1.1.2.3.2.1.47 | read-only | SFP model name                            |   |
| sfp3Temp         | E.1.1.2.3.2.1.48 | read-only | temperature read from SFP in degrees C.   | 4 |
| sfp3TempStat     | E.1.1.2.3.2.1.49 | read-only | 0-5 = n/a, tooLow, low, ok, high, tooHigh | 4 |
| sfp3Volt         | E.1.1.2.3.2.1.50 | read-only | SFP supply voltage in mV, typically 3300  | 5 |
| sfp3VoltStat     | E.1.1.2.3.2.1.51 | read-only | 0-5 = n/a, tooLow, low, ok, high, tooHigh | 5 |
| sfp3DirCh1       | E.1.1.2.3.2.1.52 | read-only | Ch1 sig dir: unknown(0), tx (1), rx (2)   |   |
| sfp3DirCh2       | E.1.1.2.3.2.1.53 | read-only | Ch2 “                                     |   |
| sfp3WlCh1        | E.1.1.2.3.2.1.54 | read-only | Ch1 wavelength (if transmitter) in nm     |   |
| sfp3WlCh2        | E.1.1.2.3.2.1.55 | read-only | Ch2 “                                     |   |
| sfp3BiasCh1      | E.1.1.2.3.2.1.56 | read-only | Ch1 bias current (if transmitter) in mA   |   |
| sfp3BiasCh2      | E.1.1.2.3.2.1.57 | read-only | Ch2 “                                     |   |
| sfp3BiasStatCh1  | E.1.1.2.3.2.1.58 | read-only | 0-5 = n/a, tooLow, low, ok, high, tooHigh | 6 |
| sfp3BiasStatCh2  | E.1.1.2.3.2.1.59 | read-only | Ch2 “                                     | 6 |
| sfp3PowerCh1     | E.1.1.2.3.2.1.60 | read-only | Ch1 optical power in uW                   |   |
| sfp3PowerCh2     | E.1.1.2.3.2.1.61 | read-only | Ch2 “                                     |   |
| sfp3PowerStatCh1 | E.1.1.2.3.2.1.62 | read-only | 0-5 = n/a, tooLow, low, ok, high, tooHigh | 6 |
| sfp3PowerStatCh2 | E.1.1.2.3.2.1.63 | read-only | Ch2 “                                     | 6 |
|                  |                  |           |   |   |
| sfp4Mfr          | E.1.1.2.3.2.1.64 | read-only | Name of manufacturer of SFP fitted        | 9 |
| sfp4Type         | E.1.1.2.3.2.1.65 | read-only | SFP model name                            |   |
| sfp4Temp         | E.1.1.2.3.2.1.66 | read-only | temperature read from SFP in degrees C.   | 4 |
| sfp4TempStat     | E.1.1.2.3.2.1.67 | read-only | 0-5 = n/a, tooLow, low, ok, high, tooHigh | 4 |
| sfp4Volt         | E.1.1.2.3.2.1.68 | read-only | SFP supply voltage in mV, typically 3300  | 5 |
| sfp4VoltStat     | E.1.1.2.3.2.1.69 | read-only | 0-5 = n/a, tooLow, low, ok, high, tooHigh | 5 |
| sfp4DirCh1       | E.1.1.2.3.2.1.70 | read-only | Ch1 sig dir: unknown(0), tx (1), rx (2)   |   |
| sfp4DirCh2       | E.1.1.2.3.2.1.71 | read-only | Ch2 “                                     |   |
| sfp4WlCh1        | E.1.1.2.3.2.1.72 | read-only | Ch1 wavelength (if transmitter) in nm     |   |
| sfp4WlCh2        | E.1.1.2.3.2.1.73 | read-only | Ch2 “                                     |   |
| sfp4BiasCh1      | E.1.1.2.3.2.1.74 | read-only | Ch1 bias current (if transmitter) in mA   |   |
| sfp4BiasCh2      | E.1.1.2.3.2.1.75 | read-only | Ch2 “                                     |   |
| sfp4BiasStatCh1  | E.1.1.2.3.2.1.76 | read-only | 0-5 = n/a, tooLow, low, ok, high, tooHigh | 6 |
| sfp4BiasStatCh2  | E.1.1.2.3.2.1.77 | read-only | Ch2 “                                     | 6 |
| sfp4PowerCh1     | E.1.1.2.3.2.1.78 | read-only | Ch1 optical power in uW                   |   |
| sfp4PowerCh2     | E.1.1.2.3.2.1.79 | read-only | Ch2 “                                     |   |
| sfp4PowerStatCh1 | E.1.1.2.3.2.1.80 | read-only | 0-5 = n/a, tooLow, low, ok, high, tooHigh | 6 |
| sfp4PowerStatCh2 | E.1.1.2.3.2.1.81 | read-only | Ch2 “                                     | 6 |
|                  |                  |           |   |   |
| cspCount         | E.1.1.2.3.2.1.82 | read-only |   | 8 |
| cspDesc1         | E.1.1.2.3.2.1.83 | read-only | Card Specific Parameter Description 1     | 8 |
| cspDesc2         | E.1.1.2.3.2.1.84 | read-only | “ 2                                       |   |
| cspDesc3         | E.1.1.2.3.2.1.85 | read-only | “ 3                                       |   |
| cspDesc4         | E.1.1.2.3.2.1.86 | read-only | “ 4                                       |   |
| cspDesc5         | E.1.1.2.3.2.1.87 | read-only | “ 5                                       |   |
| cspDesc6         | E.1.1.2.3.2.1.88 | read-only | “ 6                                       |   |
| cspDesc7         | E.1.1.2.3.2.1.89 | read-only | “ 7                                       |   |
| cspDesc8         | E.1.1.2.3.2.1.90 | read-only | “ 8                                       |   |
| cspDesc9         | E.1.1.2.3.2.1.91 | read-only | “ 9                                       |   |
| cspDesc10        | E.1.1.2.3.2.1.92 | read-only | “ 10                                      |   |
| cspDesc11        | E.1.1.2.3.2.1.93 | read-only | “ 11                                      |   |
| cspDesc12        | E.1.1.2.3.2.1.94 | read-only | “ 12                                      |   |

|            |                   |           |                                 |   |
|------------|-------------------|-----------|---------------------------------|---|
| cspDesc13  | E.1.1.2.3.2.1.95  | read-only | " 13                            |   |
| cspDesc14  | E.1.1.2.3.2.1.96  | read-only | " 14                            |   |
| cspDesc15  | E.1.1.2.3.2.1.97  | read-only | " 15                            |   |
| cspDesc16  | E.1.1.2.3.2.1.98  | read-only | " 16                            |   |
|            |                   |           |                                 |   |
| cspValue1  | E.1.1.2.3.2.1.99  | read-only | Card Specific Parameter Value 1 | 8 |
| cspValue2  | E.1.1.2.3.2.1.100 | read-only | " 2                             |   |
| cspValue3  | E.1.1.2.3.2.1.101 | read-only | " 3                             |   |
| cspValue4  | E.1.1.2.3.2.1.102 | read-only | " 4                             |   |
| cspValue5  | E.1.1.2.3.2.1.103 | read-only | " 5                             |   |
| cspValue6  | E.1.1.2.3.2.1.104 | read-only | " 6                             |   |
| cspValue7  | E.1.1.2.3.2.1.105 | read-only | " 7                             |   |
| cspValue8  | E.1.1.2.3.2.1.106 | read-only | " 8                             |   |
| cspValue9  | E.1.1.2.3.2.1.107 | read-only | " 9                             |   |
| cspValue10 | E.1.1.2.3.2.1.108 | read-only | " 10                            |   |
| cspValue11 | E.1.1.2.3.2.1.109 | read-only | " 11                            |   |
| cspValue12 | E.1.1.2.3.2.1.110 | read-only | " 12                            |   |
| cspValue13 | E.1.1.2.3.2.1.111 | read-only | " 13                            |   |
| cspValue14 | E.1.1.2.3.2.1.112 | read-only | " 14                            |   |
| cspValue15 | E.1.1.2.3.2.1.113 | read-only | " 15                            |   |
| cspValue16 | E.1.1.2.3.2.1.114 | read-only | " 16                            |   |

### Notes

1. These statuses are the same as that in the 'basic' table above, except they are qualified by cardPresent (i.e. 'new' card detected)  
'unknown' means no 'new' card detected: could be 'old' card with good signal.  
'fail' means card reporting signal loss ('old' or 'new' card)  
'good' means 'new' card detected, with good signal
2. For slot 0 (the frame itself), cardSigChA reports the status of PSU 1.  
For slot 0 (the frame itself), cardSigChB reports the status of PSU 2.
3. For slot 16 (the BM102 card), cardSigChA reports the status of the frame fans.
4. For slot 0 (frame) or 16 (BM102), sfpTemp, sfp2Temp, sfpTempStat, and sfp2TempStat are derived from a temperature sensor on the BM102.
5. For slot 0 (frame) or 16 (BM102), sfpVolt, sfp2Volt, sfpVoltStat, and sfp2VoltStat are derived from the motherboard supply voltage, sensed on the BM102, typically 6000mV.
6. "n/a" means not applicable (for all the ...Stat.. parameters)
7. The handling of cards with dual SFPs was added in software dated 5 Sep 2014 or later. Parameters beginning with sfp2 don't exist for earlier software.
8. The handling of Card Specific Parameters was added in software dated 11 Dec 2015 or later.
9. The handling of cards with 4-SFPs was added in software dated 23 Jan 2018 or later. Parameters beginning with sfp3 and sfp4 don't exist for earlier software.

### **Traps**

Normally, the Network Management System (NMS) issues requests for information and the BM102 provides the appropriate responses. However, to get quicker notification of a fault condition, the BM102 can be set up to initiate a message, called a Trap, to one or two NMS computers.

When traps are enabled, they are generated for a change of state (on or off) for any of the 32 'basic' frame signals: 2 channels on 15 cards plus 2 power supplies.

### Configuring Traps

The settings for configuring traps are controlled via SNMP, and they are non-volatile. Traps are set up by issuing SNMP 'Set' commands to the relevant 'trap...' parameters in the 'Basic' table above. The two trap generators can be individually enabled or disabled, and for each trap generator, a destination IP address and an SNMP 'community' name can be specified. The parameters are listed here:

trapReceiverNumber (1.3.6.1.4.1.29054.1.1.2.2.1.1.1)

This parameter is not accessed directly but is the index (0 or 1) to select the required trap generator when accessing the remaining 3 parameters.

For example, for the next parameter, trapEnabled,

1.3.6.1.4.1.29054.1.1.2.2.1.1.2.0 controls trap generator 0, and

1.3.6.1.4.1.29054.1.1.2.2.1.1.2.1 controls trap generator 1.

trapEnabled (1.3.6.1.4.1.29054.1.1.2.2.1.1.2)

This parameter can be set to '0' to disable that trap generator or '1' to enable it.

The other parameters are still remembered when the generator is disabled.

trapReceiverIPAddress (1.3.6.1.4.1.29054.1.1.2.2.1.1.3)

This parameter is the destination address for the trap and should be set to the IP address of the computer running the Network Management System that will display and log the traps.

trapCommunity (1.3.6.1.4.1.29054.1.1.2.2.1.1.4)

This parameter should be set with a text string that will be used as the community name in any traps that are sent. The text can be no more than 31 characters.

### Generating Traps

When traps are enabled, they are generated by a change of state (on or off) for any of the 32 'basic' frame signals, that is:

sig1A, sig1B, sig2A, sig2B

etc. up to..

sig15A, sig15B, psu1, psu2

### Note

Whilst the SNMP version is v2c, traps are currently v1.