

COBALT[®]

BBG-1002-DC-4K

NEW
4K SOLUTION



BLUE
BOX

**Standalone UHDTV Quadrant Combining
Downconverter**

Product Manual

COBALT[®]

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openGear[®] is a registered trademark of Ross Video Limited. **DashBoard**[™] is a trademark of Ross Video Limited.

Congratulations on choosing the Cobalt[®] BBG-1002-DC-4K UHD TV Standalone Combining Downconverter. The BBG-1002-DC-4K is part of a full line of modular processing and conversion gear for broadcast TV environments. The Cobalt Digital Inc. line includes video decoders and encoders, audio embedders and de-embedders, distribution amplifiers, format converters, remote control systems and much more. Should you have questions pertaining to the installation or operation of your BBG-1002-DC-4K, please contact us at the contact information on the front cover.

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Introduction

Overview

This manual provides installation and setup instructions for the BBG-1002-DC-4K UHD TV Quadrant Combining Downconverter (also referred to herein as the BBG-1002-DC-4K).

This manual consists of the following chapters:

- **Chapter 1, “Introduction”** – Provides information about this manual and what is covered. Also provides general information regarding the BBG-1002-DC-4K.
- **Chapter 2, “Installation”** – Provides instructions for installing the BBG-1002-DC-4K in a frame, and connecting signal and control cabling to the BBG-1002-DC-4K.
- **Chapter 3, “Setup Instructions”** – Provides overviews of setup operating controls and instructions for setting up the BBG-1002-DC-4K to integrate within its signal flow environment.

This chapter contains the following information:

- **BBG-1002-DC-4K Software Versions and this Manual (p. 1-2)**
- **Manual Conventions (p. 1-3)**
- **Safety and Regulatory Summary (p. 1-5)**
- **BBG-1002-DC-4K Functional Description (p. 1-6)**
- **Technical Specifications (p. 1-8)**
- **Warranty and Service Information (p. 1-10)**
- **Contact Cobalt Digital Inc. (p. 1-11)**

BBG-1002-DC-4K Software Versions and this Manual

When applicable, Cobalt Digital Inc. provides for continual product enhancements through software updates. As such, functions described in this manual may pertain specifically to devices loaded with a particular software build.

The Software Version can be checked by viewing the **Card Info** menu in DashBoard™. See Checking BBG-1002-DC-4K Device Information (p. 3-8) in Chapter 3, “Operating Instructions” for more information. You can then check our website for the latest software version currently released for the device as described below.

Note: Not all functionality described in this manual may appear on devices with initial software versions.

Check our website and proceed as follows if your device’s software does not match the latest version:

<p>Software earlier than latest version</p>	<p>Device is not loaded with the latest software. Not all functions and/or specified performance described in this manual may be available.</p> <p>You can update your device with new Update software by going to the Support>Firmware Downloads link at www.cobaltdigital.com. Download “Firmware Update Guide”, which provides simple instructions for downloading the latest firmware for your device onto your computer, and then uploading it to your device through DashBoard™.</p> <p>Software updates are field-installed without any need to remove the device from its installed state.</p>
<p>Software newer than version in manual</p>	<p>A new manual is expediently released whenever software is updated and specifications and/or functionality have changed as compared to an earlier version (a new manual is not necessarily released if specifications and/or functionality have not changed). A manual earlier than a device’s software version may not completely or accurately describe all functions available for your device.</p> <p>If your device shows features not described in this manual, you can check for the latest manual (if applicable) and download it by going to the device’s web page on www.cobaltdigital.com.</p>

Cobalt Reference Guides

From the Cobalt® web home page, go to **Support>Reference Documents** for easy to use guides covering network remote control, firmware updates, example processing UI setups and other topics.

Manual Conventions

In this manual, display messages and connectors are shown using the exact name shown on the BBG-1002-DC-4K itself. Examples are provided below.

- Device display messages are shown like this:



BBG-1002-DC-4K

- Connector names are shown like this: **SDI IN A**

In this manual, the terms below are applicable as follows:

- **BBG-1002-DC-4K** refers to the BBG-1002-DC-4K Standalone UHDTV Quadrant Combining Downconverter unit.
- **Frame** refers to the HPF-9000, OG3-FR, 8321, or similar 20-slot frame that houses Cobalt® or other cards.
- **Device** and/or **Card** refers to a Cobalt® or other card.
- **System** and/or **Video System** refers to the mix of interconnected production and terminal equipment in which the BBG-1002-DC-4K and other cards operate.
- Functions and/or features that are available only as an option are denoted in this manual like this:



Option ➔

Warnings, Cautions, and Notes

Certain items in this manual are highlighted by special messages. The definitions are provided below.

Warnings

Warning messages indicate a possible hazard which, if not avoided, could result in personal injury or death.




Cautions

Caution messages indicate a problem or incorrect practice which, if not avoided, could result in improper operation or damage to the product.

Notes

Notes provide supplemental information to the accompanying text. Notes typically precede the text to which they apply.

Labeling Symbol Definitions

	<p>Important note regarding product usage. Failure to observe may result in unexpected or incorrect operation.</p>
	<p>Electronic device or assembly is susceptible to damage from an ESD event. Handle only using appropriate ESD prevention practices.</p> <p>If ESD wrist strap is not available, handle only by edges and avoid contact with any connectors or components.</p>
	<p>Symbol (WEEE 2002/96/EC)</p> <p>For product disposal, ensure the following:</p> <ul style="list-style-type: none"> • Do not dispose of this product as unsorted municipal waste. • Collect this product separately. • Use collection and return systems available to you.

Safety and Regulatory Summary

Warnings

! WARNING !

To reduce risk of electric shock do not remove line voltage service barrier cover on frame equipment containing an AC power supply. **NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.**

Cautions

CAUTION

This device is intended for environmentally controlled use only in appropriate video terminal equipment operating environments.

CAUTION

This device contains no user-serviceable components. Refer servicing to authorized personnel.

CAUTION

This device is intended for use **ONLY** with specified power supplies. Power connection to unauthorized sources may cause product damage, unreliable operation, and invalidate warranty.

CAUTION

The BBG-1002-DC-4K FPGA is designed for a normal-range operating temperature around 85° C core temperature. Operation in severe conditions exceeding this limit for non-sustained usage are within device operating safe parameters, and can be allowed by setting this control to Disable. However, the disable (override) setting should be avoided under normal conditions to ensure maximum device protection.

EMC Compliance Per Market

Market	Regulatory Standard or Code
United States of America	FCC "Code of Federal Regulations" Title 47 Part15, Subpart B, Class A
Canada	ICES-003
International	CISPR 24:2010 IEC 61000-4-2:2008 IEC 61000-4-3:2006 with A1:2007 and A2:2010 IEC 61000-4-4:2004 IEC 61000-4-6:2008 IEC 61000-6-3:2006 with A1:2010 CISPR 22:2008

BBG-1002-DC-4K Functional Description

Figure 1-1 shows a functional block diagram of the BBG-1002-DC-4K. The BBG-1002-DC-4K includes input routing to accommodate four 3G/HD-SDI inputs and route these inputs to 4:1 (quadrant combining) video combining. Each path is equipped with independent frame sync. The output is available as a 2x DA 3G/HD-SDI output or HDMI/DVI. The output raster format is user-configurable.

BBG-1002-DC-4K Program Video Input/Output Formats

The BBG-1002-DC-4K provides the following inputs and outputs:

- **Inputs:**
 - **SDI IN A** thru **SDI IN D** – four 3G/HD-SDI quadrant-divided video inputs
- **Outputs:**
 - **3G/HD-SDI OUT** – 2x DA 3G/HD-SDI combined-image video outputs
 - **HDMI/DVI OUT** – Combined-image HDMI/DVI out with selectable audio embedding (suitable for direct connection to monitor panels)

Note: Although the inputs will receive SMPTE 424M, 292M, or 259M inputs, quadrant-combined 4K content is realized only using 3G (SMPTE 424M) inputs for all quadrant-divided inputs.

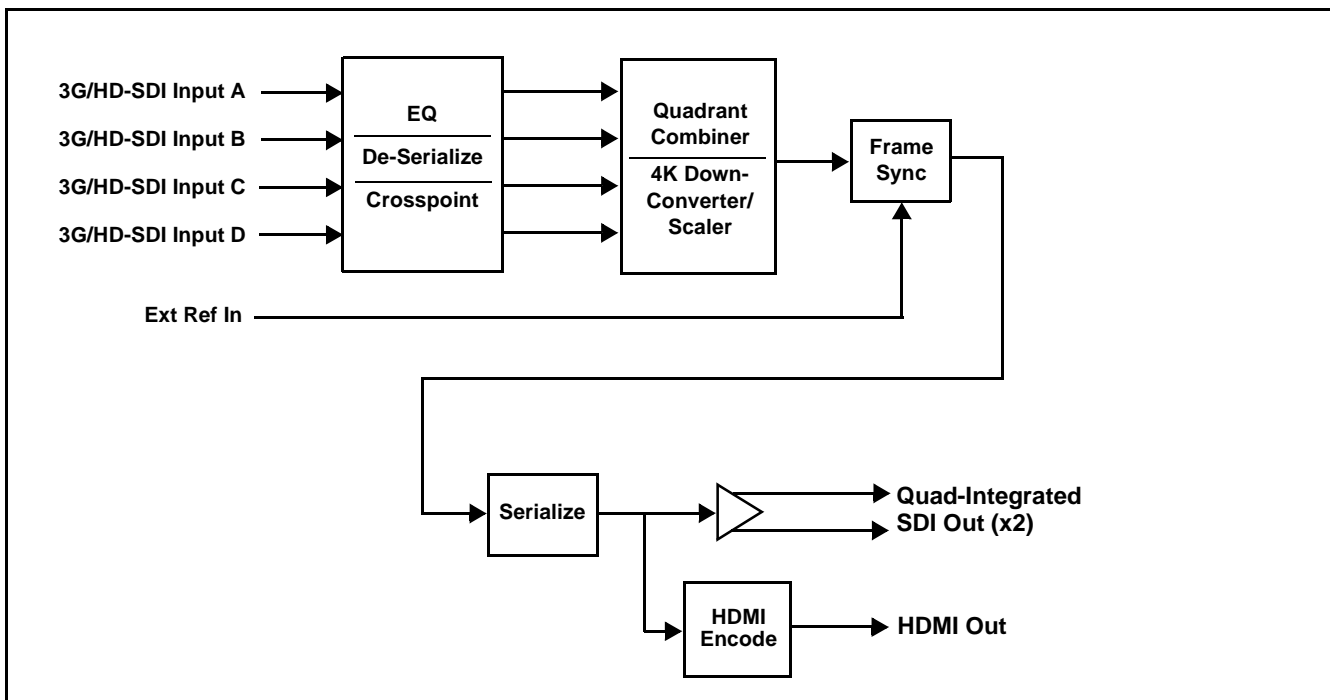


Figure 1-1 BBG-1002-DC-4K Functional Block Diagram

Video Processing Description

The BBG-1002-DC-4K precisely combines the four quadrant-divided individual SDI feeds into a combined SDI image directly suitable for broadcast production usage or monitoring purposes. The combined SDI output can be scaled to 3G/HD-SDI. An HDMI output is also furnished which is directly usable by a monitor. The BBG-1002-DC-4K features input select, timing alignment, and quadrant combining/scaling functions as described below.

Input Video Select Function

The input select function flexibly allows the four quadrant SDI inputs to be assigned to each of the four image quadrants comprising the overall combined-output raster. Using this function, the four inputs can be rearranged if necessary and as desired to correlate the quadrant inputs to the combined-image output.

Scaler/Combiner Function

This function provides conversion of each quadrant input to match a common user-selected format, resulting in images that are format-matched and suitable for combining into a single combined image. The combined output can be converted to numerous 3G/HD-SDI format choices.

Selectable underscanning allows the combined output raster size to be reduced as selected.

Quad Timing Alignment Function

This function provides for frame alignment control of the four quadrant inputs using the external frame reference input, or a selected input video as a frame reference. As such, asynchronous program video inputs can be accommodated.

This function also allows frame offset delay to be added between the output video and the frame sync reference.

Frame sync can select from the external frame reference source, input video (**Input A**), or free-run (internal) timing. Selectable failover allows alternate reference selection should the initial reference source become unavailable or invalid.

Audio Processor Description

Audio Select/Embed

The audio processor operates as an internal audio router for selecting quadrant-input embedded channels 1-16 as channels (as a four-group package) to be embedded into the combined SDI and HDMI video outputs. The audio processor function operates with the timing alignment function to align audio with the selected reference.

- Note:**
- Output audio always corresponds to a single particular selectable quadrant input. Various output embedded channels cannot be sourced from a mix of various quadrant input embedded channels.
 - To maintain conformance with CEA-861D HDMI audio channel line-up specifications and industry standard SDI convention, the HDMI output swaps between the C and LFE channels for the HDMI output.

User Control Interface

BBG-1002-DC-4K uses an HTML5 internal web server for control/monitoring communication, which allows control via a web interface with no special or unique application on the client device. Connection to the device to the network media connection is via a standard 10/100/1000 RJ-45 Ethernet connection. The device can also be controlled using DashBoard™ remote control, where it appears as a frame connection.

Technical Specifications

Table 1-1 lists the technical specifications for the BBG-1002-DC-4K Up/Down/Cross Format Converter, Video/Audio In with Frame Sync card.

Table 1-1 Technical Specifications

Item	Characteristic
Part number, nomenclature	BBG-1002-DC-4K UHD TV Quadrant Combining Downconverter
Installation/usage environment	Intended for installation and usage in frame meeting openGear™ modular system definition
Power consumption	< 18 Watts maximum. Power provided by included AC adapter; 100-240 VAC, 50/60 Hz. Second DC power connection allows power redundancy using second (optional) AC adapter.
Installation Density	Up to 3 units per 1RU space
Environmental: Operating temperature: Relative humidity (operating or storage):	32° – 104° F (0° – 40° C) < 95%, non-condensing
Dimensions (WxHxD):	5.7 x 1.4 x 14.7 in (14.5 x 3.5 x 37.3 cm) Dimensions include connector projections.
Weight:	6 lb (2.8 kg)

Table 1-1 Technical Specifications — continued

Item	Characteristic
Ethernet communication	10/100/1000 Mbps Ethernet with Auto-MDIX via HTML5 web interface.
Front-Panel Controls and Indicators	Backlit LCD display and menu navigation keys. Display and controls provide unit status display and full control as an alternate to web GUI control.
Program (Quadrant) Video Inputs	Four 3G/HD-SDI video inputs Data Rates Supported: SMPTE 424M, 292M Impedance: 75 Ω terminating Receive Cable Length: 3G/HD-SDI: 120/180 m (Belden 1694A) Return Loss (SDI): > 15 dB up to 1.485 GHz > 10 dB up to 2.970 GHz
Serial Digital Combined Video Output	Number of Outputs: Two 3G/HD/SD-SDI BNC Impedance: 75 Ω Return Loss: > 15 dB at 5 MHz – 270 MHz Signal Level: 800 mV \pm 10% DC Offset: 0 V \pm 50 mV Jitter (3G/HD/SD): < 0.3/0.2/0.2 UI Minimum Latency (framesync disabled): SD: 127 pixels; 9.4 us 720p: 330 pixels; 4.45 us 1080i: 271 pixels; 3.65 us 1080p: 361 pixels; 2.43 us
HDMI Combined Video Output	HDMI CEA-861D
Frame Reference Input	Looping 2-BNC connection. SMPTE 170M/318M “Black Burst”, SMPTE 274M/296M “Tri-Level” Return Loss: >35 dB up to 5.75 MHz

Warranty and Service Information

Cobalt Digital Inc. Limited Warranty

This product is warranted to be free from defects in material and workmanship for a period of five (5) years from the date of shipment to the original purchaser, except that 4000, 5000, 6000, 8000 series power supplies, and Dolby® modules (where applicable) are warranted to be free from defects in material and workmanship for a period of one (1) year.

Cobalt Digital Inc.'s ("Cobalt") sole obligation under this warranty shall be limited to, at its option, (i) the repair or (ii) replacement of the product, and the determination of whether a defect is covered under this limited warranty shall be made at the sole discretion of Cobalt.

This limited warranty applies only to the original end-purchaser of the product, and is not assignable or transferrable therefrom. This warranty is limited to defects in material and workmanship, and shall not apply to acts of God, accidents, or negligence on behalf of the purchaser, and shall be voided upon the misuse, abuse, alteration, or modification of the product. Only Cobalt authorized factory representatives are authorized to make repairs to the product, and any unauthorized attempt to repair this product shall immediately void the warranty. Please contact Cobalt Technical Support for more information.

To facilitate the resolution of warranty related issues, Cobalt recommends registering the product by completing and returning a product registration form. In the event of a warrantable defect, the purchaser shall notify Cobalt with a description of the problem, and Cobalt shall provide the purchaser with a Return Material Authorization ("RMA"). For return, defective products should be double boxed, and sufficiently protected, in the original packaging, or equivalent, and shipped to the Cobalt Factory Service Center, postage prepaid and insured for the purchase price. The purchaser should include the RMA number, description of the problem encountered, date purchased, name of dealer purchased from, and serial number with the shipment.

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Contact Cobalt Digital Inc.

Feel free to contact our thorough and professional support representatives for any of the following:

- Name and address of your local dealer
- Product information and pricing
- Technical support
- Upcoming trade show information

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Installation

Overview

This chapter contains the following information:

- Installing the BBG-1002-DC-4K (p. 2-1)
- Rear Panel Connections (p. 2-2)
- BBG-1002-DC-4K Rear Panel Connectors (p. 2-4)

Installing the BBG-1002-DC-4K

- Note:**
- Where BBG-1002-DC-4K is to be installed on a mounting plate (or regular table or desk surface) **without** optional frame Mounting Tray BBG-1000-TRAY, affix four adhesive-backed rubber feet (supplied) to the bottom of BBG-1002-DC-4K in locations marked with stamped “x”. If feet are not affixed, chassis bottom cooling vents will be obscured.
 - Where BBG-1002-DC-4K is to be installed **with** optional frame Mounting Tray BBG-1000-TRAY, **do not** affix adhesive-backed feet.

Installing Using BBG-1000-TRAY Optional Mounting Tray

BBG-1000-TRAY allows up to three BBG-1002-DC-4K to be mounted and securely attached to a 1 RU tray that fits into a standard EIA 19” rack mounting location. Install BBG-1002-DC-4K unit into tray as described and shown here.

1. If installing BBG-1002-DC-4K using optional frame Mounting Tray BBG-1000-TRAY, install BBG-1002-DC-4K in tray as shown in Figure 2-1.
2. Connect the input and output cables as shown in Figure 2-3.

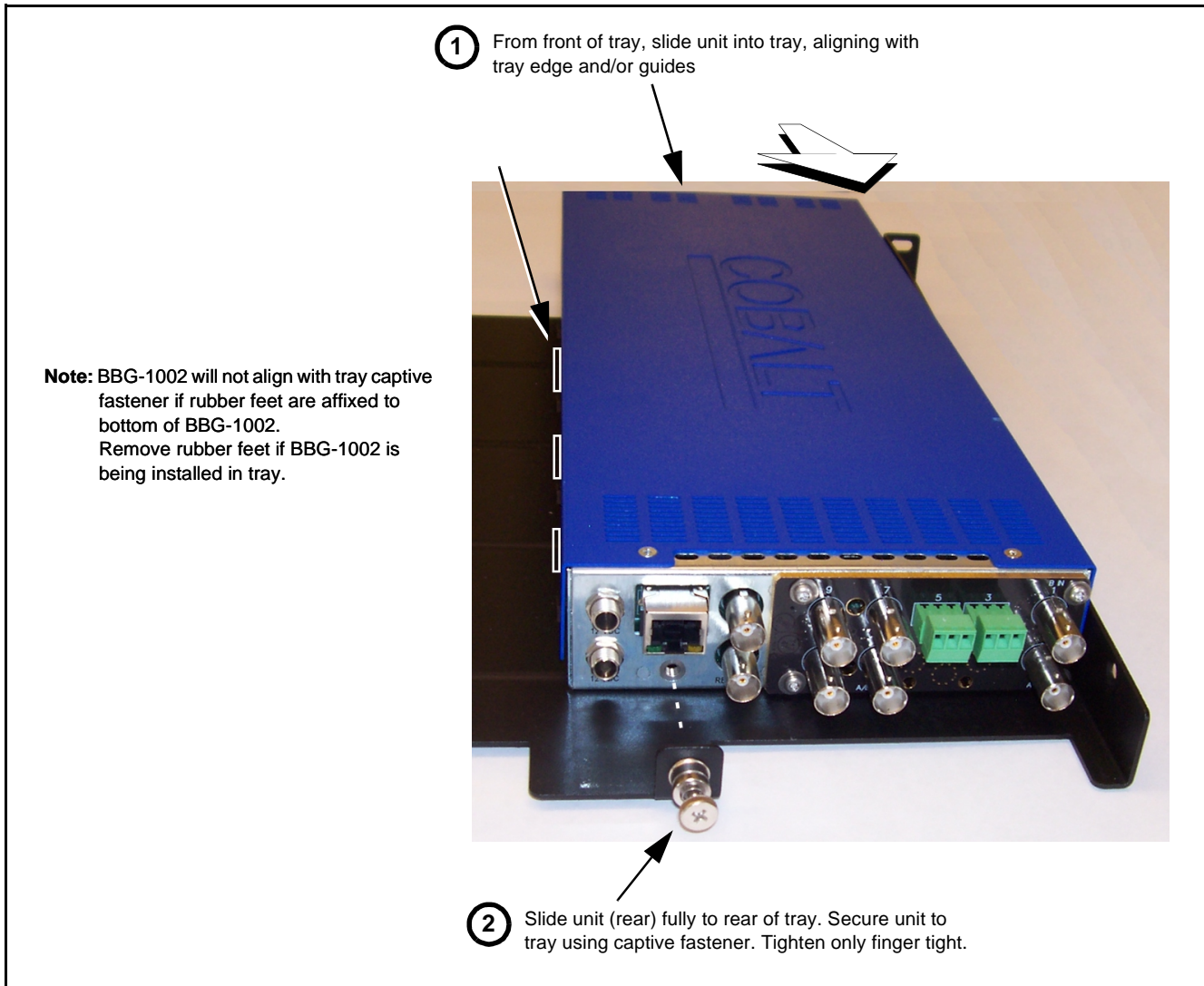


Figure 2-1 Mounting BBG-1002-DC-4K Using Frame Mounting Tray

BBG-1002-DC-4K Unit Dimensions

Figure 2-2 shows the BBG-1002-DC-4K physical dimensions and mounting details for cases where BBG-1002-DC-4K will be installed in a location not using the optional **BBG-1000-TRAY** mounting tray.

Rear Panel Connections

Perform rear panel cable connections as shown in Figure 2-3.

- Note:**
- The BBG-1002-DC-4K BNC inputs are internally 75-ohm terminated. It is not necessary to terminate unused BNC video inputs or outputs.
 - External frame sync reference signal (if used) must be terminated if a looping (daisy-chain) connection is not used. Unterminated reference connection may result in unstable reference operation.

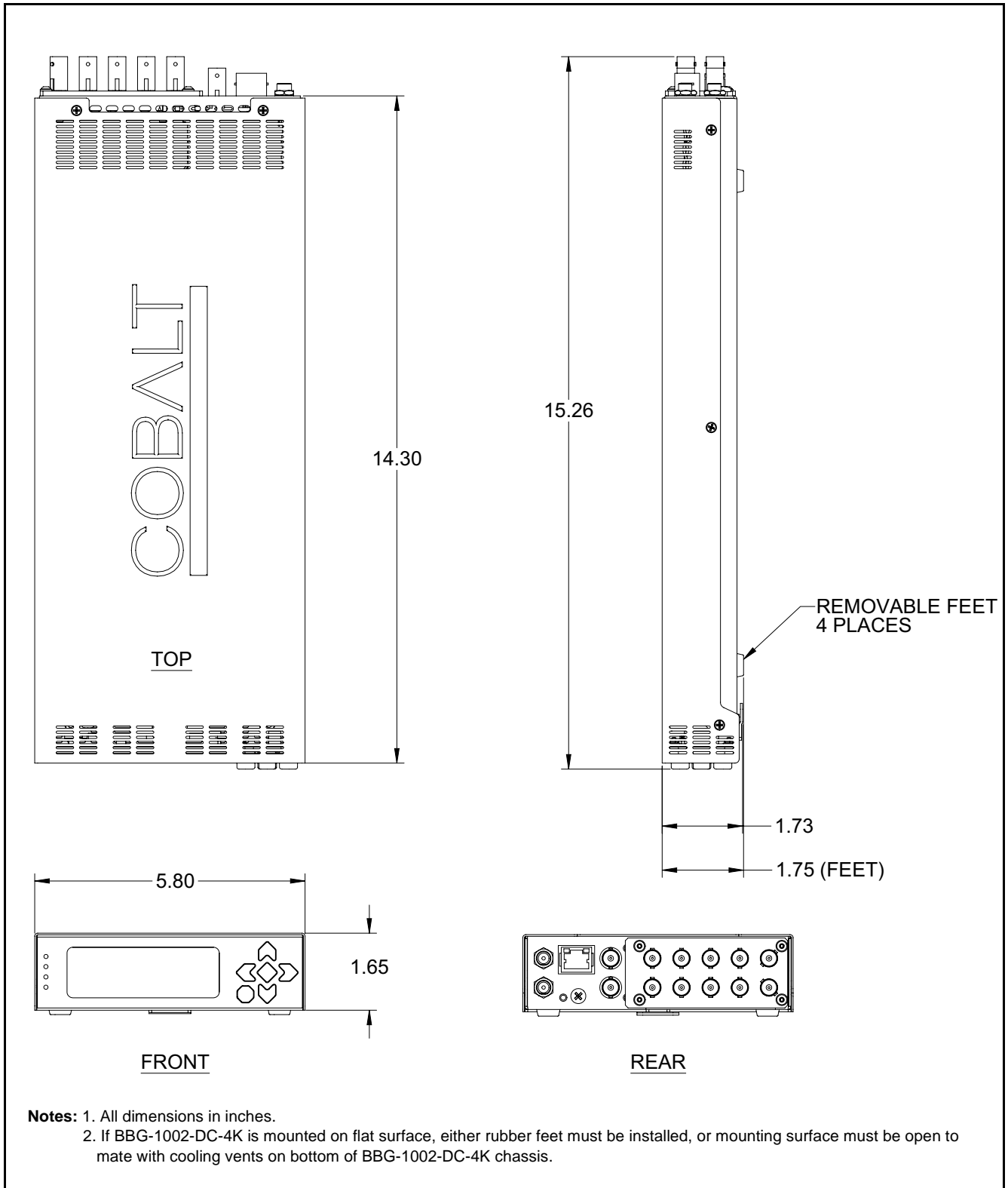


Figure 2-2 BBG-1002-DC-4K Dimensional Details

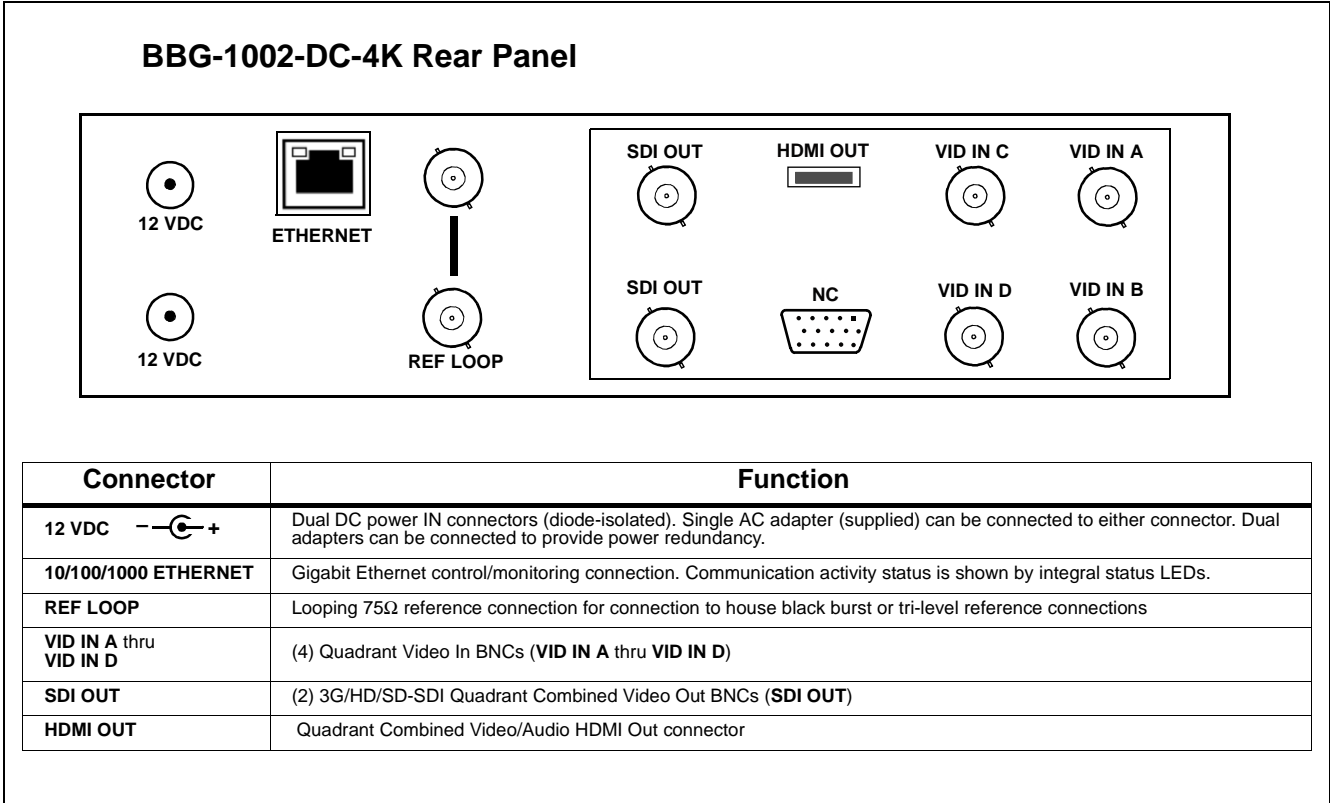


Figure 2-3 BBG-1002-DC-4K Rear Panel Connectors

Setup Instructions

Overview

If you are already familiar with using DashBoard, please skip to BBG-1002-DC-4K Function Menu List and Descriptions (p. 3-9).

This chapter contains the following information:

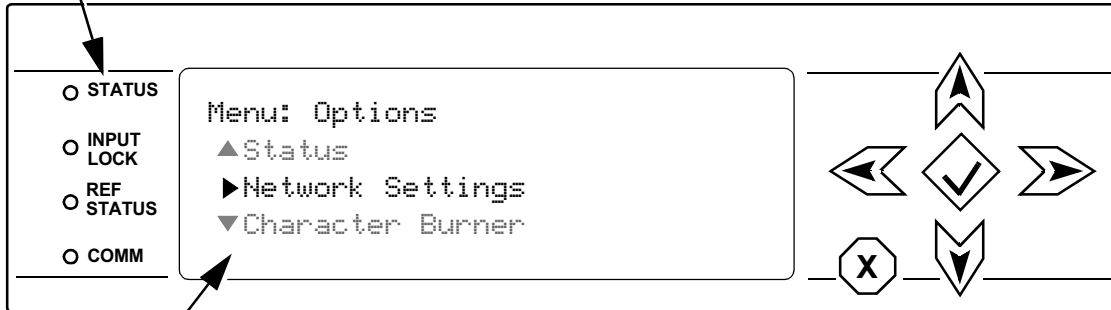
- BBG-1002 Front Panel Display and Menu-Accessed Control (p. 3-1)
- Connecting BBG-1002 To Your Network (p. 3-3)
- Control and Display Descriptions (p. 3-5)
- Checking BBG-1002-DC-4K Device Information (p. 3-8)
- BBG-1002-DC-4K Function Menu List and Descriptions (p. 3-9)
- Uploading Firmware Using Web Interface and GUI (p. 3-18)
- Troubleshooting (p. 3-19)

Note: All instructions here assume BBG-1002 is physically connected to the control physical network as described in Chapter 2. Installation.

BBG-1002 Front Panel Display and Menu-Accessed Control

Figure 3-1 shows and describes the BBG-1002 front panel displays and menu-accessed user interface controls. Initial network setup is performed using these controls.

- **STATUS** LED illuminated green shows unit power is OK and unit is functional.
- **INPUT LOCK** LED illuminated green shows at least one video input is locked to video.
- **REF STATUS** LED illuminated green shows valid reference is being received.
- **COMM** LED illuminated green shows Ethernet connection is OK.



BBG1000_FPUI_SCPD2014P8

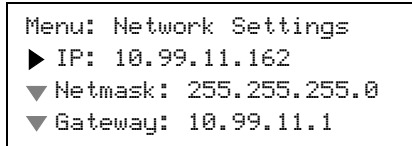
Alphanumeric display shows configuration items, and shows and allows changes of settings when a menu item is accessed.

▲ and ▼ arrows denote scroll up or down to access the menu item.

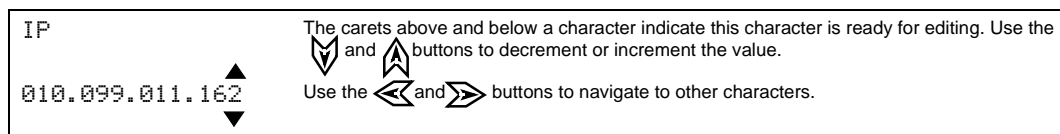
▶ arrows denotes a menu item is accessed to be selected (in the example above, **Network Settings**).

Press the button to now access and enter the menu item. When this button is pressed, the selected menu item is displayed, along with its sub-menus.

In this example showing the Network Settings menu, Menu: Network Settings as menu item is displayed (indicating this is the actively selected menu item) and its sub-menus are now displayed:



In this example, with ▶ pre-selecting the IP: sub-menu, pressing the button again opens the IP: sub-menu.



To exit a sub-menu or a menu, press the button. This locks in any changes and proceeds to the last-selected sub-menu or menu item. Repeatedly press the button to step up through sub-menus and then to other menus. Access other menu items using the and buttons.

The display backlight automatically brightens with any navigation arrow activity, and then goes dim after a few moments.



Figure 3-1 BBG-1002 Front Panel Display and Menu Controls

Connecting BBG-1002 To Your Network

BBG-1002 ships with network protocol set to DHCP and populates its address with an address allocated by your DHCP server. If your network does not have a DHCP server, the BBG-1002 address field will be blank, and a static address must then be assigned. All initial network settings are performed using the Front Panel Display menu-accessed control (as described on the previous page). Refer to this page for instructions of using the front-panel menu navigation.

Access the Network Settings menu and configure network settings as follows:

Connecting BBG-1002 To Network

1. Power-up BBG-1002 and connect Ethernet cable connection to media. Wait for BBG-1002 to complete booting. When **Product: BBG-1002 ...** is displayed, device is ready for configuration.
 2. Press  and access the **Network Settings** menu. Current network settings are displayed (as configured by host DHCP server).
Note: It is recommended to now change the settings to use a static IP address of your choice. The following steps describe using a static IP address.
 3. In **Network Settings > Mode**, change setting to **Mode: Static**.
 4. Configure the following fields as desired and appropriate for your network connection (examples shown below).
- ```
Menu: Network Settings
IP: 10.99.16.105
Netmask: 255.255.255.0
Gateway: 10.99.16.1
Mode: Static
```
5. Press  to commit changes and exit the setup menu.  
**Note:** Current IP address of BBG-1002 can now be checked from the front panel by accessing this at any point.
  6. At this point, BBG-1002 can now be accessed with a web browser pointing to the configured address. Browse to the configured address and check connectivity.

Web browser pointing to configured address displays BBG-1002



### Finding a BBG-1002 Device in DashBoard

(See Figure 3-2) If BBG-1002 is configured with an address within a network also available via DashBoard, a BBG-1002 device appears as a frame entity in the DashBoard Basic Tree View.

**Note:** BBG-1002 DashBoard remote control is also available by opening the device in DashBoard similar to opening an openGear® card.

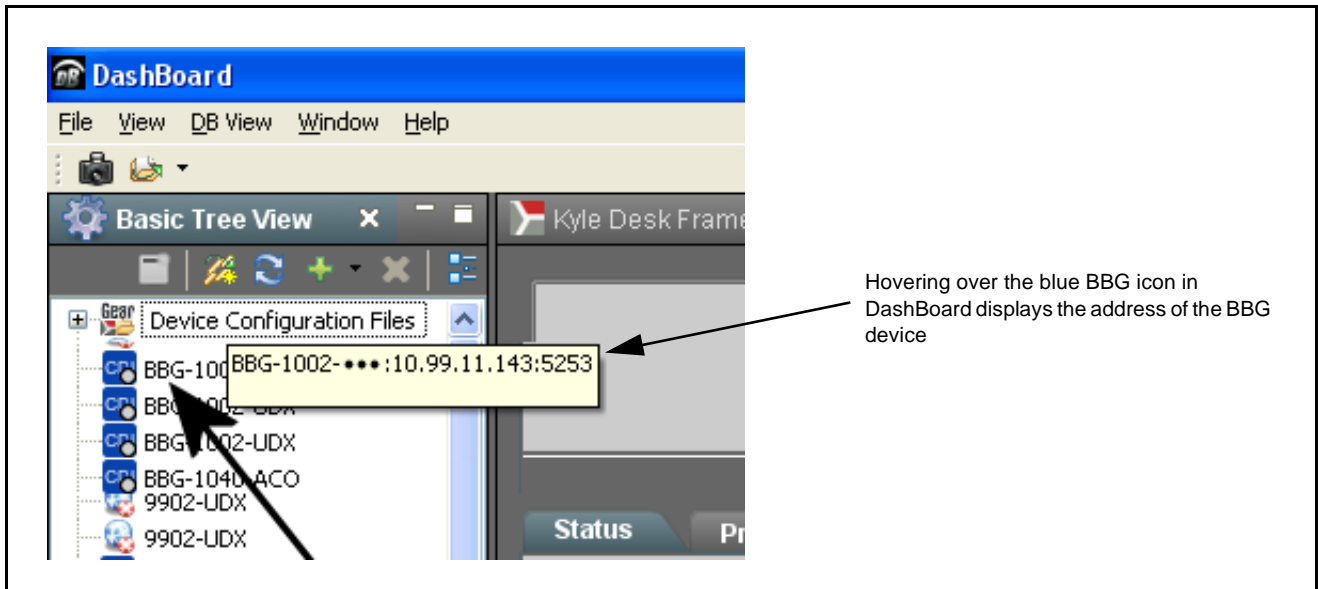


Figure 3-2 Finding BBG-1002 Using DashBoard



## Control and Display Descriptions

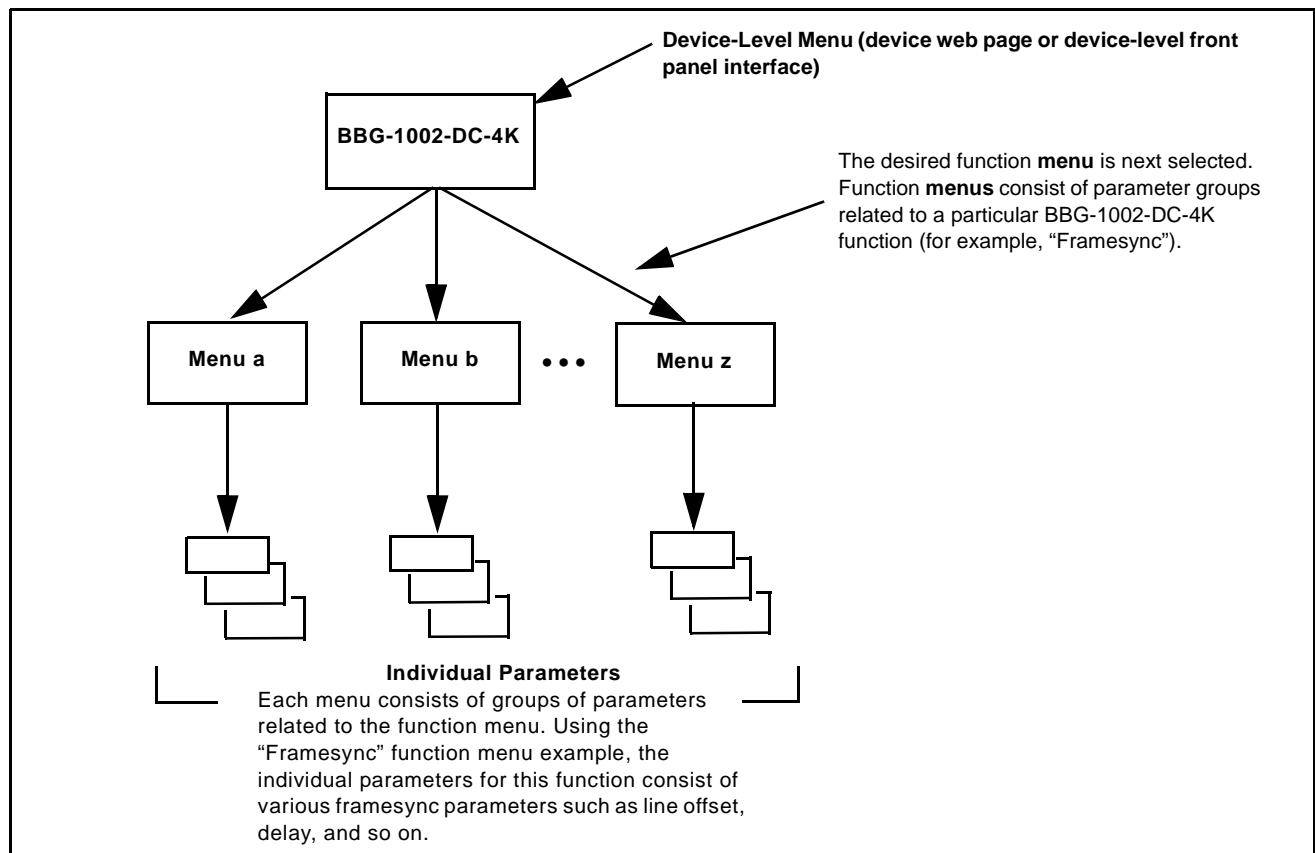
This section describes the web user interface controls for using the BBG-1002-DC-4K.

The format in which the BBG-1002-DC-4K functional controls appear follows a general arrangement of Function Submenus under which related controls can be accessed (as described in Function Submenu/Parameter Submenu Overview below).

### Function Submenu/Parameter Submenu Overview

The functions and related parameters available on the BBG-1002-DC-4K device are organized into function **menus**, which consist of parameter groups as shown below.

Figure 3-3 shows how the BBG-1002-DC-4K device and its menus are organized, and also provides an overview of how navigation is performed between devices, function menus, and parameters.



**Figure 3-3 Function Submenu/Parameter Submenu Overview**

Web User Interface

(See Figure 3-4.) The device function menu is organized using main menu navigation tabs which appear on the left side of any pane regardless of the currently displayed pane. When a menu tab is selected, each parametric control or selection list item associated with the function is displayed. Scalar (numeric) parametric values can then be adjusted as desired using the GUI slider controls. Items in a list can then be selected using GUI drop-down lists.

The screenshot shows a web browser window with the URL 10.99.16.105. The page title is BBG-1002 and the logo for COBALT is visible. On the left, there is a 'Main Menu Navigation Tabs' sidebar with options: Status, Frame Sync (selected), Input Video, Output Audio Routing, Timecode, Character Burner, Moving Box, GPIO, Scaler, AFD/WSS/VI, Closed Captioning, YC Alignment, Log Status, Input Audio Status, Presets, Video Quality Events, and Input Audio Routing/Controls. The main content area is titled 'Typical Drop-Down Selector' and contains several controls: Lock Mode (Free Run), Output Rate (Auto), Initial Startup Format (525i59.94), Output Mode (Input Video), On Loss of Video (Freeze), and Test Pattern (Tartan). A 'Drop-Down Expansion' shows the 'Free Run' options: Reference 1 else Free Run, Lock to Input else Free Run, and Free Run. Below these are sliders for Vertical Lines (0), Horizontal (us) (-64.000 to 64.000), and Frame Delay (0 to 20). A 'Typical Status Display' shows Report Delay (29.35 ms / 1 frames 854 lines) and Lock Status (Framesync Free Running). A 'Typical Parametric Control' is shown as a slider for the Frame Delay.

In this example, the **Frame Sync** main menu tab is selected, with the overall pane now showing all sub-menu items related to the framesync function. Clicking another main menu tab immediately displays the pane related to the selected main menu tab.

Figure 3-4 Typical Web UI Display and Controls

Display Theme

(See Figure 3-5.) The BBG-1002 user interface theme selection offers light and dark themes suited for various users and environments.

Clicking **Settings** opens a pane where the display **Theme** can be set



The screenshot shows the BBG-1002 web interface. At the top, there are tabs for 'Alarm Table', 'Settings', and 'About and Licensing'. The 'Settings' tab is active. On the left, there is a sidebar with various settings categories: Status, Frame Sync, Input Video, Output Audio Routing, Timecode, Character Burner, Moving Box, GPIO, and Scaler. The main content area shows the 'Settings' pane with a 'Theme' section expanded. Under 'Theme', there are two options: 'Dark' and 'Light'. The 'Dark' option is selected, and its description reads: 'Use the dark theme for a dimly lit control room or studio. This theme will try to make use of darker shades of gray, so when monitoring, the user interface will not overwhelm the room with light.' The 'Light' option is described as: 'Use the light theme for a normally lit office or laboratory.'




**Light** – this is the theme shown in this manual and is useful for normal ambient light environments such as offices.

**Dark** – the dark theme is suited for low-light environments.

Figure 3-5 Web UI Display Themes

## Checking BBG-1002-DC-4K Device Information

The operating status and software version the BBG-1002-DC-4K device can be checked by clicking the **Status** main menu tab. Figure 3-6 shows and describes the BBG-1002-DC-4K device information status display.

**Note:** Proper operating status is denoted by green icons for the status indicators shown in Figure 3-6. Yellow or red icons respectively indicate an alert or failure condition. Refer to Troubleshooting (p. 3-19) for corrective action.

**Device Info Display**  
This display shows the the device hardware and software version info.

**Status Display**  
This displays shows the status and format of the signals being received by the BBG-1002-DC-4K, as well as device status.


| Card Information |                     |
|------------------|---------------------|
| Product          | BBG-1002-UDX        |
| Product Options  | +LTC                |
| Supplier         | Cobalt Digital Inc. |
| Revision         | 0.9.0011            |
| FPGA Revision    | 1.00.0000           |
| FPGA Build Date  | Apr 5 2014 10:35:33 |
| Build Date       | Apr 6 2014 20:40:30 |
| Serial Number    | 361145              |
| Rear Module      |                     |

| Status          |                                                                           |
|-----------------|---------------------------------------------------------------------------|
| SDI Input A     | <span style="color: green;">●</span> 720p_5994, OK Time 2:37:06, 0 Errors |
| SDI Input B     | <span style="color: yellow;">●</span> Unlocked                            |
| SDI Input C     | <span style="color: yellow;">●</span> Unlocked                            |
| SDI Input D     | <span style="color: yellow;">●</span> Unlocked                            |
| CPI1            | <span style="color: green;">●</span> Open                                 |
| CPI2            | <span style="color: green;">●</span> Open                                 |
| Reference 1     | <span style="color: yellow;">●</span> Unlocked                            |
| Card Voltage    | 11.53 V                                                                   |
| Card Power      | 20.63 W                                                                   |
| Card Temp Front | 29.4 C                                                                    |
| Card Temp Rear  | 61.3 C                                                                    |
| Card Temp FPGA  | 61.0 C amb 70.0 C core                                                    |
| Card Up Time    | 02:37:12                                                                  |

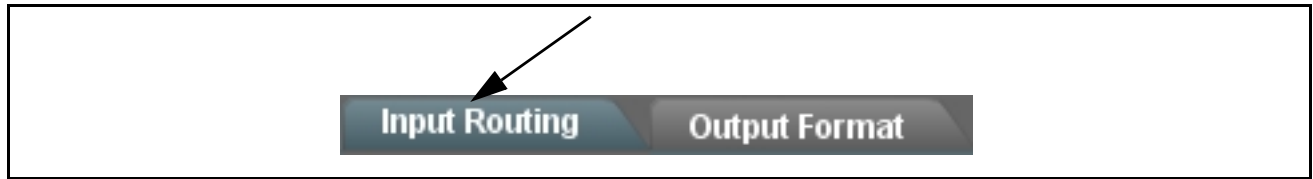
Figure 3-6 BBG-1002-DC-4K Device Info/Status Utility

## BBG-1002-DC-4K Function Menu List and Descriptions

Table 3-1 individually lists and describes each BBG-1002-DC-4K function menu and its related list selections, controls, and parameters. Where helpful, examples showing usage of a function are also provided. Table 3-1 is primarily based upon using DashBoard™ to access each function and its corresponding menus and parameters.

- Note:**
- All numeric (scalar) parameters displayed on DashBoard™ can be changed using the slider controls,  arrows, or by numeric keypad entry in the corresponding numeric field. (When using numeric keypad entry, add a return after the entry to commit the entry.)
  - User interface depictions here show DashBoard user interface. Web user interface controls are similar.


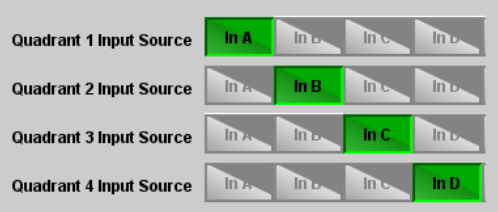
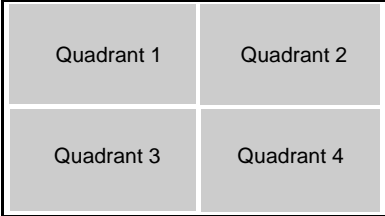

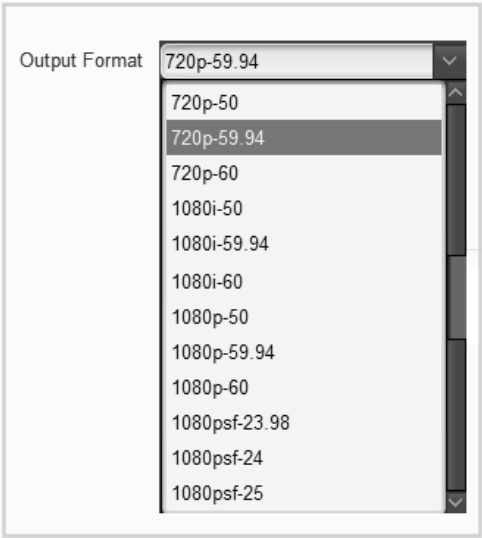
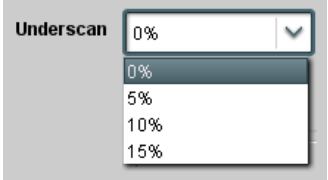
On DashBoard™ itself and in Table 3-1, the function menu items are organized using tabs as shown below.



The table below provides a quick-reference to the page numbers where each function menu item can be found.

| Function Menu Item     | Page | Function Menu Item                 | Page |
|------------------------|------|------------------------------------|------|
| Input Routing Controls | 3-10 | Output Audio Routing/Controls      | 3-13 |
| Output Format Controls | 3-10 | Presets                            | 3-14 |
| HDMI/DVI Mode Controls | 3-12 | Admin (Log Status/Firmware Update) | 3-15 |

Table 3-1 BBG-1002-DC-4K Function Menu List

|                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                               | <p>Provides controls to select input routing of device SDI inputs to the four quadrants comprising the combined image raster.</p>                                                                                                                                                                                                                                                                                                                                |
| <p>• <b>Quadrant Input Source Select</b></p>  | <p>Routes the SDI inputs (VID IN A thru VID IN D as <b>In A</b> thru <b>In D</b>, respectively) to the four quadrant inputs.<br/>(In this example, VID IN A thru VID IN D are respectively routed as Quadrant 1 thru Quadrant 4 input sources.)</p> <p>Default correlation of <b>In A</b> thru <b>In D</b> and quadrant identification is as shown to the left and below:</p>  |
|                                               | <p>Provides controls to set combined output format/conditioning and device global ref lock mode.</p>                                                                                                                                                                                                                                                                                                                                                             |
| <p>• <b>Output Format Selector</b></p>      | <p>Provides conversions to formats as shown.</p> <p><b>Note:</b> Although drop-down and device will allow output video raster/rate choices unrelated to the input rates (for example, PAL 50Hz rate for NTSC 59.94Hz input rates), cross-rate conversion choices should not be used for critical applications (frames will be dropped when performing such conversions).</p>                                                                                     |
| <p>• <b>Underscan Select</b></p>            | <p>Provides underscanning to reduce the merged output raster size by choices shown.</p>                                                                                                                                                                                                                                                                                                                                                                          |

**Table 3-1 BBG-1002-DC-4K Function Menu List — continued**

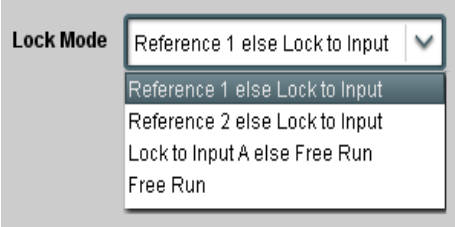


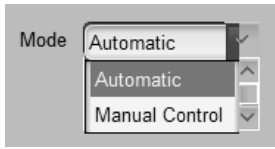
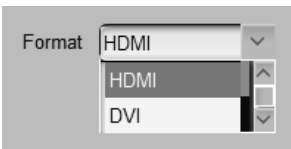
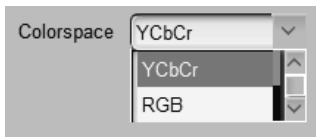
| <div style="background-color: #333; color: white; padding: 5px; text-align: center; font-weight: bold;">Output Format</div> | (continued)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>• <b>Video Lock Mode Select</b></p>     | <p>Selects lock to reference functions from the choices shown and described below.</p> <ul style="list-style-type: none"> <li>• <b>Free Run:</b> Quadrant inputs and output video is locked to the device's internal clock. Output video is <b>not</b> locked to external reference.</li> <li>• <b>Lock to Reference:</b> Quadrant inputs and output video is locked to external reference, else input.</li> <li>• <b>Lock to Input A:</b> Uses Input A program video input video signal as the reference standard, else free-run.</li> </ul> <p><b>Note:</b> Lock to reference provides the most stable operation, and is preferred where available. In this case, source video should also be locked to the same reference.</p> |
| <p>• <b>Frame Delay Control</b></p>        | <p>When Framesync is enabled, specifies the smallest amount of latency delay (frames held in buffer) allowed by the frame sync. The frame sync will not output a frame unless the specified number of frames are captured in the buffer.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

Table 3-1 BBG-1002-DC-4K Function Menu List — continued

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <p>Provides settings to force an HDMI or DVI output suitable for direct connection to monitors using a DVI input in case the connection is not detected by the monitor. Also provides color mode controls to match HDMI/DVI output to the color space of the monitor.</p>                                                              |                                            |                           |                                            |   |       |   |   |       |   |   |       |     |     |       |   |    |       |    |    |       |    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|---------------------------|--------------------------------------------|---|-------|---|---|-------|---|---|-------|-----|-----|-------|---|----|-------|----|----|-------|----|
| <p>• <b>Mode Control</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p>Sets HDMI/DVI output to use the connected monitor to inform BBG-1002-DC-4K to automatically detect the monitor format, or to use manual (forced) control.</p> <p>Where the monitor may not be able to provide this handshake signal, it is recommended to use <b>Manual</b> mode and force the desired mode as described below.</p> |                                            |                           |                                            |   |       |   |   |       |   |   |       |     |     |       |   |    |       |    |    |       |    |
| <p>• <b>Format Manual (Forced) Mode Control</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <p>Sets HDMI output as forced HDMI or DVI mode.</p>                                                                                                                                                                                                                                                                                    |                                            |                           |                                            |   |       |   |   |       |   |   |       |     |     |       |   |    |       |    |    |       |    |
| <p>• <b>Colorspace Control</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <p>Forces output colorspace as either YCbCr or RGB.</p>                                                                                                                                                                                                                                                                                |                                            |                           |                                            |   |       |   |   |       |   |   |       |     |     |       |   |    |       |    |    |       |    |
| <p><b>Note:</b> The HDMI output on this device conforms with CEA-861D HDMI audio channel line-up specifications. As such, a swap between the C and LFE channels for the HDMI output is automatically performed.</p> <p>If connecting to a device that does not meet CEA-861D HDMI, a Ch3 / Ch4 swap using the Output Audio Routing/Controls may be required to effect desired C - LFE line-up.</p> <table border="0" style="width: 100%; text-align: center;"> <thead> <tr> <th style="text-align: left;">SDI SMPTE Convention</th> <th style="text-align: center;">BBG-1002-DC-4K Conversion</th> <th style="text-align: right;">Automatic Re-Line-up to CEA-861 Convention</th> </tr> </thead> <tbody> <tr> <td>L</td> <td>_____</td> <td>L</td> </tr> <tr> <td>R</td> <td>_____</td> <td>R</td> </tr> <tr> <td>C</td> <td>_____</td> <td>LFE</td> </tr> <tr> <td>LFE</td> <td>_____</td> <td>C</td> </tr> <tr> <td>Ls</td> <td>_____</td> <td>Ls</td> </tr> <tr> <td>Rs</td> <td>_____</td> <td>Rs</td> </tr> </tbody> </table> |                                                                                                                                                                                                                                                                                                                                        | SDI SMPTE Convention                       | BBG-1002-DC-4K Conversion | Automatic Re-Line-up to CEA-861 Convention | L | _____ | L | R | _____ | R | C | _____ | LFE | LFE | _____ | C | Ls | _____ | Ls | Rs | _____ | Rs |
| SDI SMPTE Convention                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | BBG-1002-DC-4K Conversion                                                                                                                                                                                                                                                                                                              | Automatic Re-Line-up to CEA-861 Convention |                           |                                            |   |       |   |   |       |   |   |       |     |     |       |   |    |       |    |    |       |    |
| L                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | _____                                                                                                                                                                                                                                                                                                                                  | L                                          |                           |                                            |   |       |   |   |       |   |   |       |     |     |       |   |    |       |    |    |       |    |
| R                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | _____                                                                                                                                                                                                                                                                                                                                  | R                                          |                           |                                            |   |       |   |   |       |   |   |       |     |     |       |   |    |       |    |    |       |    |
| C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | _____                                                                                                                                                                                                                                                                                                                                  | LFE                                        |                           |                                            |   |       |   |   |       |   |   |       |     |     |       |   |    |       |    |    |       |    |
| LFE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | _____                                                                                                                                                                                                                                                                                                                                  | C                                          |                           |                                            |   |       |   |   |       |   |   |       |     |     |       |   |    |       |    |    |       |    |
| Ls                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | _____                                                                                                                                                                                                                                                                                                                                  | Ls                                         |                           |                                            |   |       |   |   |       |   |   |       |     |     |       |   |    |       |    |    |       |    |
| Rs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | _____                                                                                                                                                                                                                                                                                                                                  | Rs                                         |                           |                                            |   |       |   |   |       |   |   |       |     |     |       |   |    |       |    |    |       |    |



**Table 3-1 BBG-1002-DC-4K Function Menu List — continued**




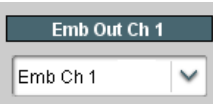
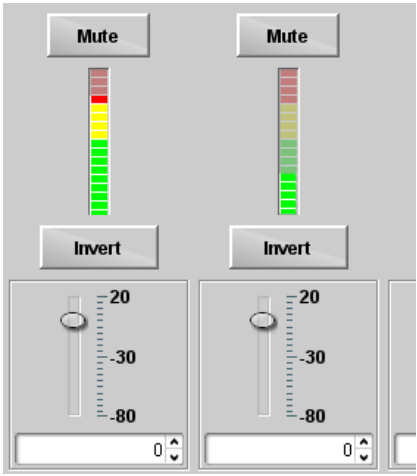

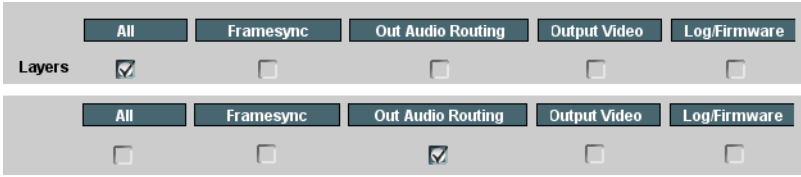

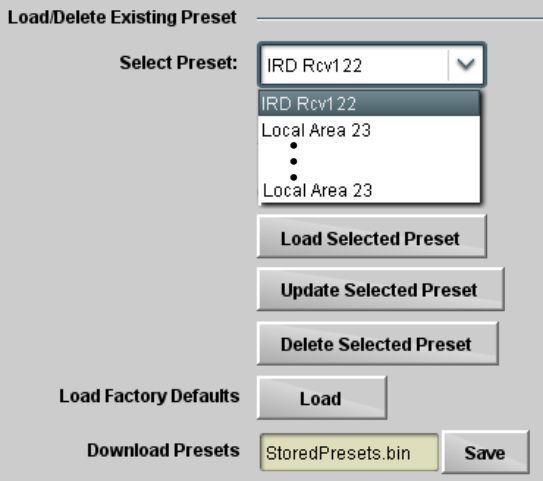
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                     | <p>Provides an audio crosspoint allowing the audio source selection for each embedded audio output channel. Also provides Gain, Phase Invert, and Muting controls and peak level meters for each output channel.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• <b>Embedded Ch 2</b> thru <b>Embedded Ch 16</b> have controls identical to the <b>Source</b>, <b>Gain</b>, <b>Mute</b>, and <b>Invert</b> controls described here for <b>Embedded Ch 1</b>. Therefore, only the <b>Embedded Ch 1</b> controls are shown here.</li> <li>• For each channel, its source and destination should be considered and appropriately set. Unused destination channels should be set to the <b>Silence</b> selection.</li> </ul> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <p>• <b>Embedded Audio Output Input Source</b></p>                                                                                                                                                                                                                                                                                                                                                                                  | <p>Selects the four-group embedded audio to be embedded in the output embedded SDI audio (and HDMI Ch1 - Ch8 embedded audio).<br/>(In this example, <b>In A</b> quadrant input audio is selected as the output four-group audio.)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <p>• <b>Group Enable/Disable Controls</b></p>                                                                                                                                                                                                                                                                                                                                                                                       | <p>Allows enable/disable of embedded audio groups 1 thru 4 on program video output to accommodate some legacy downstream systems that may not support all four embedded audio groups.</p> <p><b>Note:</b> Changing the setting of this control will result in a noise burst in all groups. This control should not be manipulated when carrying on-air content.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <p>• <b>Embedded Output Channel Source</b></p>                                                                                                                                                                                                                                                                                                                                                                                     | <p>Using the drop-down list, selects the audio input source to be embedded in the corresponding embedded output channel from the following choices:</p> <ul style="list-style-type: none"> <li>• <b>Audio Bus (Emb) Ch 1</b> thru <b>Ch 16</b></li> <li>• Built-in Tone generators <b>Tone 1</b> thru <b>Tone 16</b><br/>(all are -20 dBFS level; freq (Hz) in ascending order are 100, 200, 300, 400, 500, 600, 700, 800, 900, 1k, 2k, 4k, 6k, 8k, 12k, and 16k)</li> </ul> <p><b>Note:</b> Multiple tone generators, even if set to the same frequency, may not exhibit phase coherence. If identical tones with frequency and phase coherence are required, use a single tone generator (e.g., "Tone 1") across multiple channels instead of multiple generators set to the same frequency.</p> |
| <p>• <b>Channel Mute/Phase Invert/Gain Controls and Peak Level Display</b></p>                                                                                                                                                                                                                                                                                                                                                    | <p>Provides <b>Mute</b> and phase <b>Invert</b> channel controls, as well as peak level meter for each output channel. (Meter shows level as affected by Level control.)</p> <p><b>Gain</b> controls allow relative gain (in dB) control for the corresponding destination Embedded Audio Group channel.</p> <p>(-80 to +20 dB range in 1.0 dB steps; unity = 0 dB)</p> <p><b>Note:</b> Although this device can pass non-PCM data such as Dolby® E or AC-3, setting the gain control to any setting other than default 0 will corrupt Dolby data.</p>                                                                                                                                                                                                                                             |

Table 3-1 BBG-1002-DC-4K Function Menu List — continued

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <p>Allows user control settings to be saved in a one-button Preset and then loaded (recalled) as desired, and provides a one-button restore of factory default settings.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p><b>• Preset Layer Select</b></p> <p>Allows selecting a functional layer (or “area of concern”) that the preset is concerned with. Limiting presets to a layer or area of concern allows for highly specific presets, and masks changing settings in areas outside of the layer or area of concern. Default <b>All</b> setting will “look” at all device settings, and save and invoke <b>all</b> settings when the preset is invoked (loaded).</p> <div data-bbox="204 520 1000 695">  </div> <p>Selecting a layer (in this example, “Out Audio Routing”) will set the preset to <b>only</b> “look at” and “touch” output audio routing settings and save these settings under the preset. When the preset is invoked (loaded), <b>only</b> the output audio routing layer is “touched”.</p> <p><b>Example:</b> Since audio routing can be considered independent of other settings, if normal audio routing was set up with a particular input routing setting in effect, and at a later time audio routing is desired to be saved as a preset, selecting <b>Out Audio Routing</b> here limits preset-invoked changes to <b>only</b> the audio routing layer, “telling” the preset save/load to not concern itself with other aspects such as input routing settings. In this manner, when the preset is invoked any unrelated settings in effect will remain untouched, with only the audio routing changes invoked.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <p><b>• Preset Enter/Save/Delete</b></p> <div data-bbox="188 919 695 1146">  </div> <p><b>Protected</b> state – changes locked out</p> <p><b>Ready</b> (open) state – changes can be applied</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <p>Locks and unlocks editing of presets to prevent accidental overwrite as follows:</p> <ul style="list-style-type: none"> <li>• <b>Protect (ready):</b> This state awaits Protected and allows preset Save/Delete button to save or delete current settings to the selected preset. <b>Use this setting when writing or editing a preset.</b></li> <li>• <b>Protected:</b> Toggle to this setting to lock down all presets from being inadvertently re-saved or deleted. <b>Use this setting when all presets are as intended.</b></li> <li>• <b>Create New Preset:</b> Field for entering user-defined name for the preset being saved (in this example, “IRD Rcv122”).</li> <li>• <b>Save:</b> Saves the current device settings under the preset name defined above.</li> </ul> |
| <p><b>• Preset Save/Load Controls</b></p> <div data-bbox="204 1335 743 1812">  </div> <ul style="list-style-type: none"> <li>• <b>Select Preset:</b> drop-down allows a preset saved above to be selected to be loaded or deleted (in this example, custom preset “IRD Rcv122”).</li> <li>• <b>Load Selected Preset</b> button allows loading (recalling) the selected preset. When this button is pressed, the changes called out in the preset are immediately applied.</li> <li>• <b>Update Selected Preset</b> button allows saving any settings changes to the selected preset. When this button is pressed, the changes in effect are rolled into the selected preset.</li> <li>• <b>Delete Selected Preset</b> button deletes the currently selected preset.</li> <li>• <b>Load Factory Defaults</b> button allows loading (recalling) the factory default preset. When this button is pressed, the changes called out in the preset are immediately applied.</li> </ul> <p><b>Note:</b> Load Factory Defaults functions with no masking. The Preset Layer Select controls have no effect on this control and will reset <b>all</b> layers to factory default.</p> <ul style="list-style-type: none"> <li>• <b>Download Presets</b> saving the preset files to a folder on the connected computer.</li> </ul>                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

**Table 3-1 BBG-1002-DC-4K Function Menu List — continued**

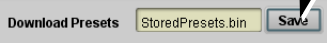
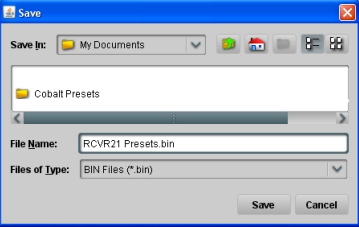

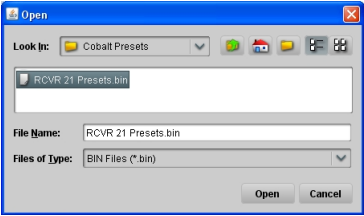


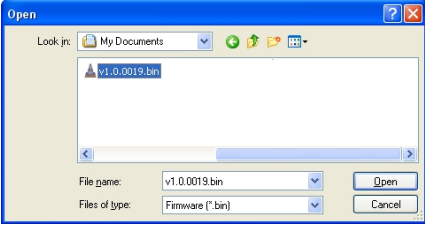
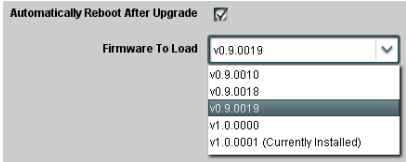
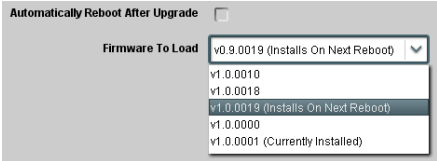


|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div style="background-color: #333; color: white; padding: 5px; text-align: center; font-weight: bold; font-size: 1.2em;">Presets</div>                                                                                                                                                                                                                                                                                                                                                                                          | <p>(continued)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p><b>Download (save)</b> presets to a network computer by clicking <b>Download Presets – Save</b> at the bottom of the Presets page.</p>  <p>Browse to a desired save location (in this example, <i>My Documents\Cobalt Presets</i>).</p> <p>The file can then be renamed if desired (<i>RCVR21 Presets</i> in this example) before committing the save.</p>  | <p><b>Upload (open)</b> presets from a network computer by clicking <b>Upload</b> at the bottom of Dashboard.</p>  <p>Browse to the location where the file was saved on the computer or drive (in this example, <i>My Documents\Cobalt Presets</i>).</p> <p>Select the desired file and click <b>Open</b> to load the file to the device.</p>  <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• Preset transfer between download and file upload is on a <b>group</b> basis (i.e., individual presets cannot be downloaded or uploaded separately).</li> <li>• After uploading a presets file, engagement of a desired preset is only assured by selecting and loading a desired preset as described on the previous page.</li> </ul>                                                                                                                                                                                                |
| <div style="background-color: #333; color: white; padding: 5px; text-align: center; font-weight: bold; font-size: 1.2em;">Admin</div>                                                                                                                                                                                                                                                                                                                                                                                            | <p>Provides a global operating status and allows a log download for factory engineering support.</p> <p>Also provides controls for selecting and loading firmware upgrade files.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <p>• <b>Log Status and Download Controls</b></p>                                                                                                                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>• <b>Log Status</b> indicates overall internal operating status.</li> <li>• <b>Download Log File</b> allows a operational log file to be saved to a host computer. This log file can be useful in case of a device error or in the case of an operational error or condition. The file can be submitted to Cobalt engineering for further analysis.</li> <li>• <b>Thermal Shutdown</b> enable/disable allows the built-in thermal failover to be defeated. (Thermal shutdown is enabled by default).</li> </ul> <div style="background-color: black; color: white; padding: 5px; font-weight: bold; font-size: 1.1em; margin-top: 10px;">CAUTION</div> <p>The BBG-1002-DC-4K FPGA is designed for a normal-range operating temperature around 85° C core temperature. Operation in severe conditions exceeding this limit for non-sustained usage are within device operating safe parameters, and can be allowed by setting this control to Disable. However, the disable (override) setting should be avoided under normal conditions to ensure maximum device protection.</p> |

Table 3-1 BBG-1002-DC-4K Function Menu List — continued

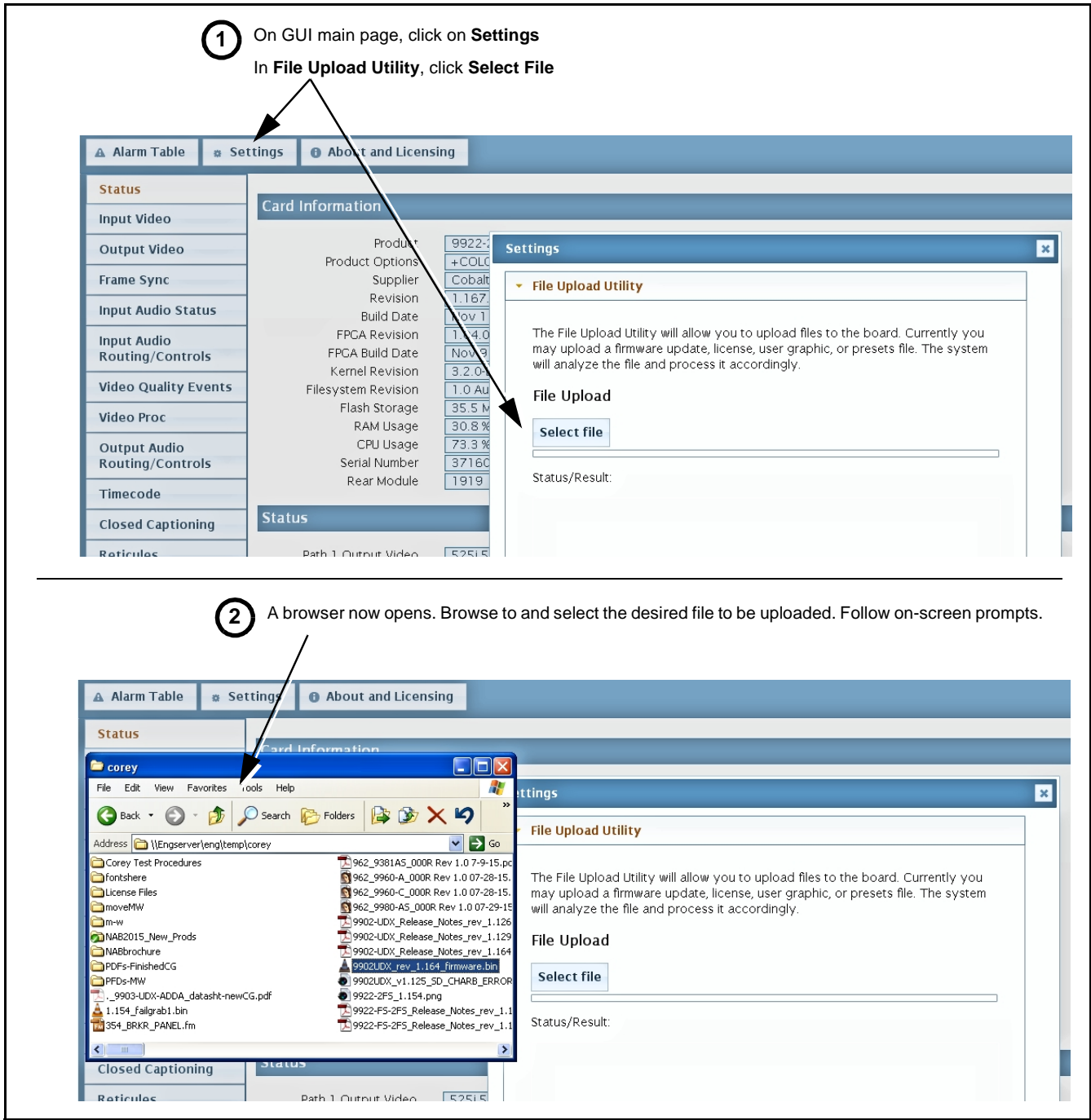
| <div style="background-color: #333; color: white; padding: 5px; text-align: center; font-weight: bold;">Admin</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | (continued)                                                                                                                                                                                                                                                                                                                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li><b>Firmware Upgrade Controls</b></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <p>Firmware upgrade controls allow a selected firmware version (where multiple versions can be uploaded to the device's internal memory) to invoke an upgrade to a selected version either instantly, or set to install on the next reboot (thereby allowing upgrade downtime to be controlled at a scheduled point in time).</p> |
| <p><b>Note:</b> The page/tab here allows managing multiple firmware versions saved on the device. New upgrade firmware from our web site can always be directly uploaded to the device without using this page. Instructions for firmware downloading to your computer and uploading to the device can be found at the <b>Support&gt;Firmware Downloads</b> link at <a href="http://www.cobaltdigital.com">www.cobaltdigital.com</a>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                   |
| <ol style="list-style-type: none"> <li>1. Access a firmware upgrade file from a network computer by clicking <b>Upload</b> at the bottom of DashBoard.</li> <li>2. Browse to the location of the firmware upgrade file (in this example, <i>My Documents\lv1.0.0019.bin</i>).</li> <li>3. Select the desired file and click <b>Open</b> to upload the file to the device.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <br>                                                                                                                                                         |
| <ul style="list-style-type: none"> <li><b>Immediate firmware upload.</b> The device default setting of <b>Automatically Reboot After Upgrade</b> checked allow a selected firmware version to be immediately uploaded as follows:</li> </ul> <ol style="list-style-type: none"> <li>1. Click <b>Firmware To Load</b> and select the desired upgrade file to be loaded (in this example, "v1.0.0019").</li> <li>2. Click <b>Load Selected Firmware</b>. The device now reboots and the selected firmware is loaded.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                               |
| <ul style="list-style-type: none"> <li><b>Deferred firmware upload.</b> With <b>Automatically Reboot After Upgrade</b> unchecked, firmware upgrade loading is held off until the device is manually rebooted. This allows scheduling a firmware upgrade downtime event until when it is convenient to experience to downtime (uploads typically take about 60 seconds).</li> </ul> <ol style="list-style-type: none"> <li>1. Click <b>Firmware To Load</b> and select the desired upgrade file to be loaded (in this example, "v1.0.0019"). Note now how the display shows "Installs on Next Reboot".</li> <li>2. Click <b>Load Selected Firmware</b>. The device holds directions to proceed with the upload, and performs the upload only when the device is manually rebooted (by pressing the <b>Reboot</b> button).</li> <li>3. To cancel a deferred upload, press <b>Cancel Pending Upgrade</b>. The device reverts to the default settings that allow an immediate upload/upgrade.</li> </ol> |                                                                                                                                                                                                                                               |

**Table 3-1 BBG-1002-DC-4K Function Menu List — continued**

| <div style="background-color: #333; color: white; padding: 5px; text-align: center; font-weight: bold;">Admin</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | (continued)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>• <b>Card IP Physical Port Select Control</b></p> <div style="border: 1px solid #ccc; padding: 5px; background-color: #f9f9f9;"> <p><b>Network PHY Interface</b> <span style="float: right;">Frame ▼</span></p> <div style="border: 1px solid #ccc; padding: 2px; margin-top: 2px;"> <span style="background-color: #333; color: white; padding: 2px;">Frame</span><br/> <span style="padding: 2px;">Rear I/O</span> </div> </div>                                                                                                                                                                                                                                                                                                                                                                                                                       | <p>Allows card dedicated IP interface (as set below) to use frame communications or dedicated rear I/O module Ethernet RJ-45 port.</p> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• Frame net connection allows cards with per-card Ethernet connection to connect with network via a shared frame Ethernet port instead of per-card dedicated Ethernet connectors on the card's rear module. Frame net connection is available only on certain frame models.</li> <li>• Card slot must be fitted with a rear I/O module equipped with an Ethernet connector (such as RM20-9902-L) in order to use <b>Rear I/O</b> selection.</li> </ul>                                                            |
| <p>• <b>Card Check and Restore Utilities</b></p> <div style="border: 1px solid #ccc; padding: 5px; background-color: #f9f9f9;"> <p style="text-align: center;"><b>Memory Test</b></p> <p><b>FPGA Memory Test</b> <span style="float: right;"><input type="button" value="Test"/></span></p> <hr/> <p><b>Memory Test Status</b> <span style="float: right; border: 1px solid #ccc; padding: 2px;">Running Memory Test: 8.99%</span></p> <hr/> <p><b>Memory Test Status</b> <span style="float: right; border: 1px solid #ccc; padding: 2px;">Memory test completed successfully, please reboot the card</span></p> <hr/> <p><b>Restore From SD Card</b> <span style="float: right;"><input type="button" value="Confirm"/></span></p> <p style="text-align: right; border: 1px solid #ccc; padding: 2px; margin-top: 2px;">Please contact support</p> </div> | <p><b>Memory Test</b> allows all cells of the card FPGA memory to be tested.</p> <p> This control should <b>only</b> be activated under direction of product support. Exercising the memory test is <b>not</b> part of normal card maintenance.</p> <p><b>Restore from SD Card</b> allows card rendered inoperable to be restored using an SD memory card fitted to the card internal SD slot.</p> <p> Product support must be contacted prior to performing this operation. Use of any SD card not supplied by support can corrupt the card.</p> |

## Uploading Firmware Using Web Interface and GUI

Firmware (such as upgrades, option keys, and presets .bin files) can be uploaded to BBG-1002-DC-4K directly via the web html5 interface without going through DashBoard (see Figure 3-7). In addition to allowing uploads without needing a DashBoard connection, this method transfers files typically much faster than using DashBoard.



**Figure 3-7 Uploads Using Web Interface/GUI**

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## Troubleshooting

This section provides general troubleshooting information and specific symptom/corrective action for the BBG-1002-DC-4K and its remote control interface. The BBG-1002-DC-4K requires no periodic maintenance in its normal operation; if any error indication (as described in this section) occurs, use this section to correct the condition.

### Error and Failure Indicator Overview

The BBG-1002-DC-4K itself and its remote control provide error and failure indications. Depending on how the BBG-1002-DC-4K is being used (i.e, standalone or network controlled through DashBoard™ or a Remote Control Panel), check all available indications in the event of an error or failure condition.

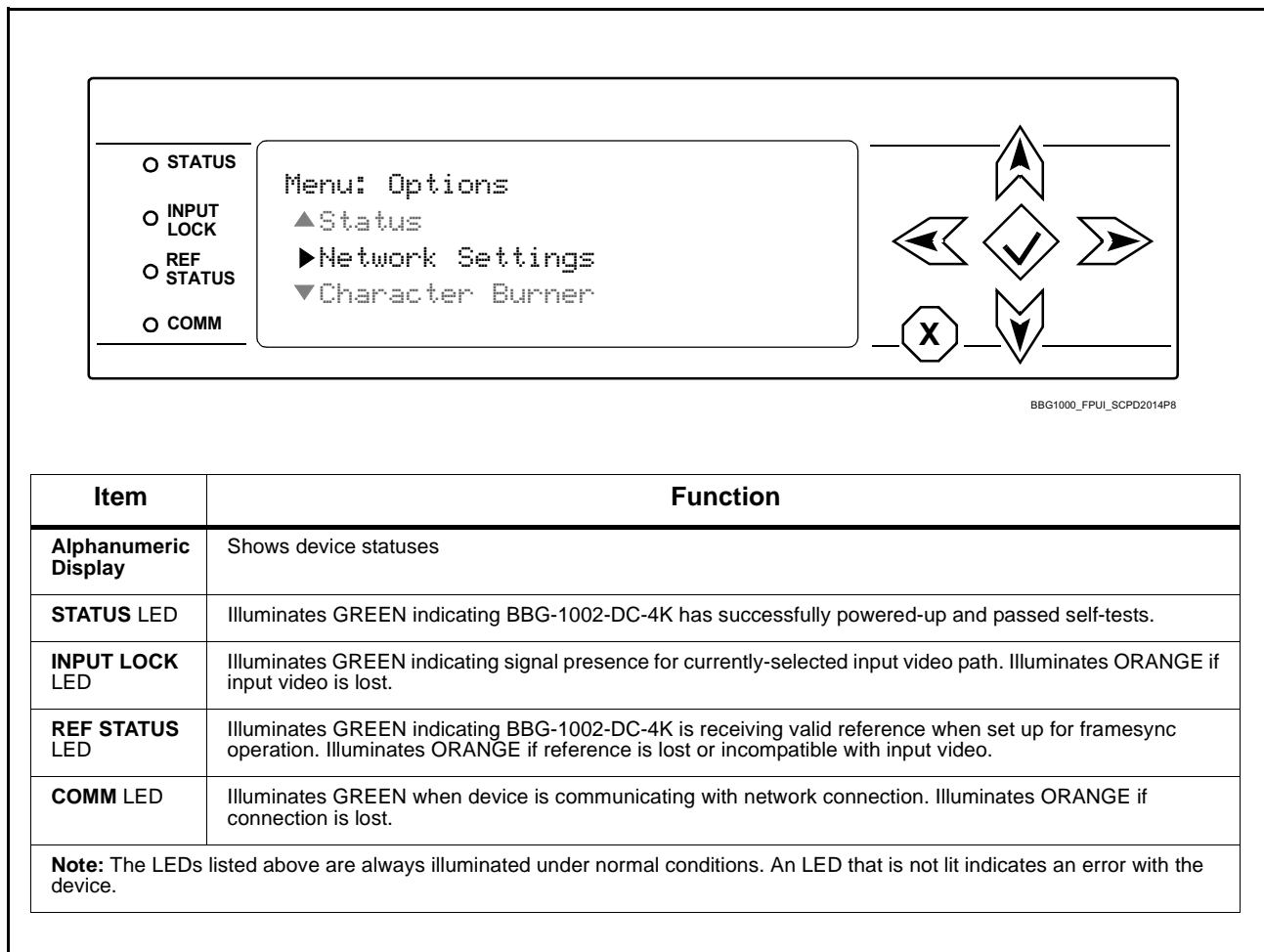
The various BBG-1002-DC-4K device and remote control error and failure indicators are individually described below.

**Note:** The descriptions below provide general information for the various status and error indicators. For specific failures, also use the appropriate subsection listed below.

- Basic Troubleshooting Checks (p. 3-21)
- BBG-1002-DC-4K Processing Error Troubleshooting (p. 3-21)

## BBG-1002-DC-4K Front Panel Status/Error Indicators and Display

Figure 3-8 shows and describes the BBG-1002-DC-4K front panel indicators and display. These indicators and the display show status and error conditions relating to the device itself and remote (network) communications (where applicable). Because these indicators are part of the device itself and require no external interface, the indicators are particularly useful in the event of communications problems with external devices such as network remote control devices.



**Figure 3-8 BBG-1002-DC-4K Device Edge Status Indicators and Display**



## Basic Troubleshooting Checks

Failures of a general nature (affecting many devices and/or functions simultaneously), or gross inoperability errors are best addressed first by performing basic checks before proceeding further. Table 3-2 provides basic system checks that typically locate the source of most general problems. If required and applicable, perform further troubleshooting in accordance with the other troubleshooting tables in this section.

**Table 3-2 Basic Troubleshooting Checks**

| Item                                                           | Checks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Verify power presence and characteristics</b>               | <ul style="list-style-type: none"> <li>• On the BBG-1002-DC-4K, in all cases when power is being properly supplied all indicators should be illuminated. Any device showing no illuminated indicators should be cause for concern.</li> <li>• Check the Power Consumed indication for the BBG-1002-DC-4K. This can be observed using the Status front-panel or web UI pane.               <ul style="list-style-type: none"> <li>• If display shows <b>no</b> power being consumed, either the frame power supply, connections, or the BBG-1002-DC-4K itself is defective.</li> <li>• If display shows <b>excessive</b> power being consumed (see Technical Specifications (p. 1-8) in Chapter 1, “Introduction”), the BBG-1002-DC-4K may be defective.</li> </ul> </li> </ul> |
| <b>Check Cable connection secureness and connecting points</b> | Make certain all cable connections are fully secure (including coaxial cable attachment to cable ferrules on BNC connectors). Also, make certain all connecting points are as intended. Make certain the selected connecting points correlate to the intended device inputs and/or outputs. Cabling mistakes are especially easy to make when working with large I/O modules.                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Check status indicators and displays</b>                    | On BBG-1002-DC-4K front panel and web interface indicators, red indications signify an error condition. If a status indicator signifies an error, proceed to the following tables in this section for further action.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Troubleshoot by substitution</b>                            | All devices can be hot-swapped, replacing a suspect device with a known-good item.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

## BBG-1002-DC-4K Processing Error Troubleshooting

Table 3-3 provides BBG-1002-DC-4K processing troubleshooting information. If the BBG-1002-DC-4K exhibits any of the symptoms listed in Table 3-3, follow the troubleshooting instructions provided.

In the majority of cases, most errors are caused by simple errors where the BBG-1002-DC-4K is not appropriately set for the type of signal being received by the device.

**Note:** Where errors are displayed on both the BBG-1002-DC-4K and network remote controls, the respective indicators and displays are individually described in this section.

**Table 3-3 Troubleshooting Processing Errors by Symptom**

| Symptom                                                                                                         | Error/Condition                                                          | Corrective Action                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BBG-1002 shows <b>Unlocked</b> message in BBG-1002-DC-4K Info pane.                                             | No video input present                                                   | Make certain intended video source is connected to appropriate BBG-1002-DC-4K video input. Make certain BNC cable connections are OK.                                                                                                                                                                                                         |
| Audio not processed or passed through device                                                                    | Enable control not turned on                                             | On <b>Output Audio Routing/Controls</b> tab, <b>Audio Group Enable</b> control for group 1 thru 4 must be turned on for sources to be embedded into respective embedded channel groups.                                                                                                                                                       |
| Selected upgrade firmware will not upload                                                                       | Automatic reboot after upgrade turned off                                | Device <b>Presets &gt; Automatically Reboot After Upgrade</b> box unchecked. Either reboot the device manually, or leave this box checked to allow automatic reboot to engage an upgrade upon selecting the upgrade.                                                                                                                          |
| Device does not pass video or audio as expected. Control settings spontaneously changed from expected settings. | Event-based preset inadvertently invoked                                 | Event-based preset loading ( <b>Presets</b> tab > <b>Event Triggers</b> sub-tab) should be set to <b>Disabled</b> if this function is not to be used. Read and understand this control description before using these controls to make sure engagement for all expected conditions is considered. See Presets (p. 3-14) for more information. |
| Device will not retain user settings, or setting changes or presets spontaneously invoke.                       | <b>Event Based Loading</b> sub-tab inadvertently set to trigger on event | If event based loading is not to be used, make certain <b>Event Based Presets</b> is disabled (either using master <b>Enable/Disable</b> control or through events settings. See Presets (p. 3-14) for more information.                                                                                                                      |

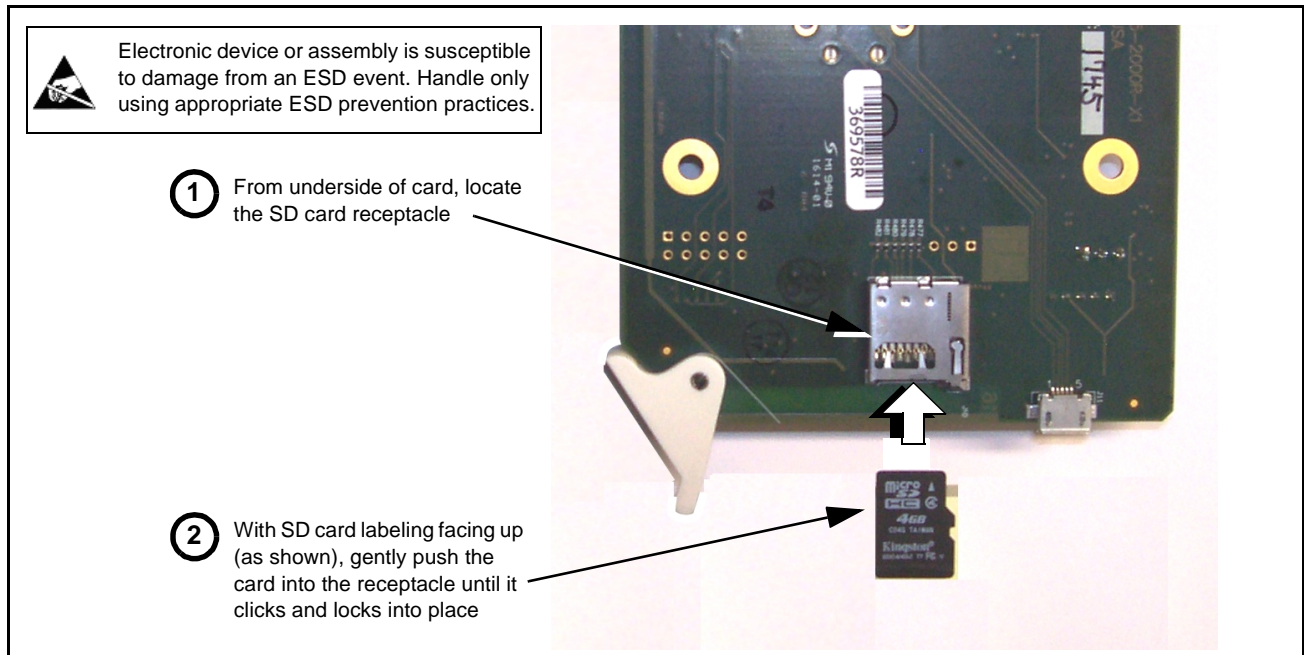
## In Case of Problems

### Recovering Card From SD Memory Card

New production cards come equipped with an SD card installed in a slot receptacle on the underside of the card. The data on this SD card can be used to restore a card should the card become unresponsive (can't communicate with DashBoard or other remote control). Recovering a card using the procedure here will restore the card to any installed option licenses and the most recent firmware installed.

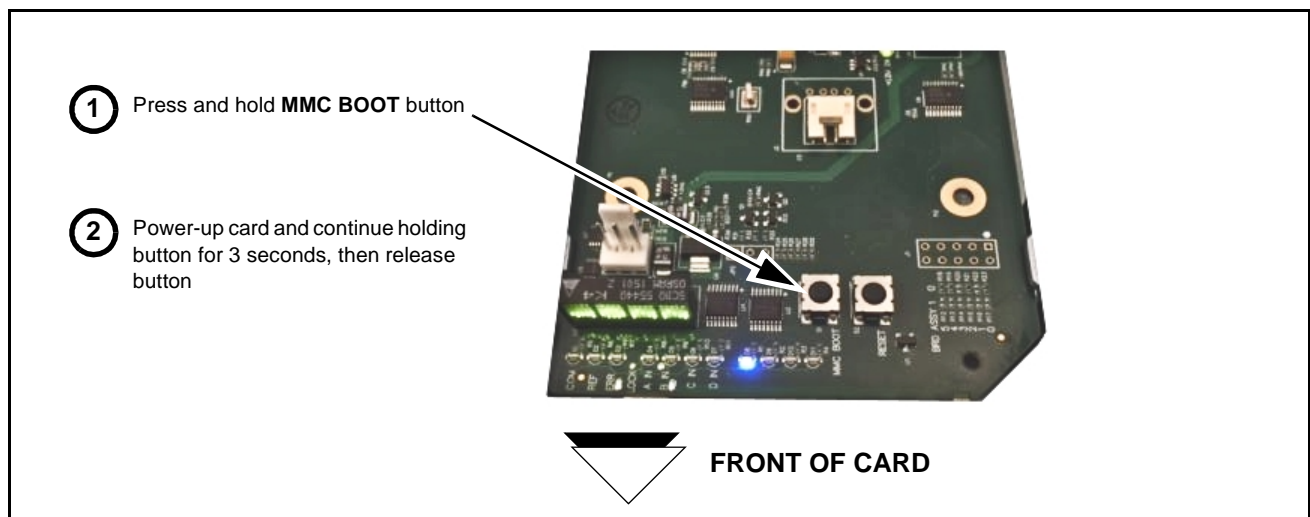
1. (See Figure 3-9.) Make certain the card has the proper SD card installed in the under-card slot. If SD card is **not** installed, contact Product Support to obtain an SD card.

**Note:** If unit is a BBG-1000 Series device, remove the top cover before proceeding.



**Figure 3-9 SD Card Installation**

2. (See Figure 3-10.) With card powered-down, locate the **MMC BOOT** button on the card. Proceed as shown in picture.



**Figure 3-10 MMC Boot Button**

3. With button now released, the card will begin reprogramming:
  - **COM** LED illuminates and remains illuminated.
  - When reprogram is complete, **COM** LED turns off, on, and then off again (entire process takes about 1-1/2 minute).

4. Remove power from the card (remove card from slot or power-down BBG-1000 Series unit).
5. Re-apply power to the card. The card/device will display as “*UNLICENSED*” in DashBoard/remote control.
6. In Dashboard or web remote control, go to **Admin** tab and click **Restore from SD Card**. After about 1/2-minute, the card license(s) will be restored and card will be using its most recently installed firmware.
7. Card/device can now be used as normal. On BBG-1000 Series unit, re-install top cover.

### **Contact and Return Authorization**

Should any problem arise with this product that was not solved by the information in this section, please contact the Cobalt Digital Inc. Technical Support Department.

If required, a Return Material Authorization number (RMA) will be issued to you, as well as specific shipping instructions. If required, a temporary replacement item will be made available at a nominal charge. Any shipping costs incurred are the customer’s responsibility. All products shipped to you from Cobalt Digital Inc. will be shipped collect.

The Cobalt Digital Inc. Technical Support Department will continue to provide advice on any product manufactured by Cobalt Digital Inc., beyond the warranty period without charge, for the life of the product.

See Contact Cobalt Digital Inc. (p. 1-11) in Chapter 1, “Introduction“ for contact information.





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