BBG-1080-CSC-3G

3G/HD/SD-SDI Standalone RGB Color Space Corrector / Frame Sync with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support

Product Manual

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BBG-1080-CSC3G-OM (V1.2)

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Congratulations on choosing the Cobalt® BBG-1080-CSC-3G 3G/HD/SD-SDI Standalone RGB Color Space Corrector / Frame Sync with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support. The BBG-1080-CSC-3G 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-1080-CSC-3G, please contact us at the contact information on the front cover.

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Table of Contents

Chapter 1 Introduction 1-1

Overview 1-1
Cobalt Reference Guides 1-2
Manual Conventions 1-2
Warnings, Cautions, and Notes 1-2
Labeling Symbol Definitions 1-3
Safety and Regulatory Summary 1-3
Warnings 1-3
Cautions 1-3
EMC Compliance Per Market 1-3
BBG-1080-CSC-3G Functional Description 1-4
BBG-1080-CSC-3G Input/Output Formats 1-4
Video Processor Description 1-6
Control and Data Input/Output Interfaces 1-7
User Control Interface 1-7
Technical Specifications 1-8
Warranty and Service Information 1-10
Cobalt Digital Inc. Limited Warranty 1-10
Contact Cobalt Digital Inc. 1-11

Chapter 2 Installation 2-1

Overview 2-1
Installing the BBG-1080-CSC-3G 2-1
Installing Using BBG-1000-TRAY Optional Mounting Tray 2-1
BBG-1080-CSC-3G Unit Dimensions 2-2
Rear Panel Connections 2-2
GPIO and Serial (COMM) Connections 2-4

Chapter 3 Setup/Operating Instructions 3-1

Overview 3-1
BBG-1080 Front Panel Display and Menu-Accessed Control 3-1
Connecting BBG-1080 To Your Network 3-3
Finding a BBG-1080 Device in DashBoard 3-4
Control and Display Descriptions 3-5
Function Submenu/Parameter Submenu Overview 3-5
Web User Interface 3-6
Display Theme 3-7
Checking BBG-1080-CSC-3G Device Information 3-8

BBG-1080-CSC-3G Function Menu List and Descriptions 3-9
Input Video Controls 3-10
Output Video Mode Controls 3-11
Framesync 3-12
Input Audio Status 3-15
Video Proc/Color Correction 3-15
Y/C Alignment Controls 3-18
Ancillary Data Proc Controls 3-19
GPO Setup Controls 3-19
Presets 3-20
Event Setup 3-23
Admin 3-26
User Log 3-28
Color and Video Correction Examples 3-29
On-Set Monitor Color Correction Example 3-29
Miscellaneous Color and Video Correction Examples 3-33
Uploading Firmware Using Web Interface and GUI 3-36
Front Panel User Menus 3-37
Troubleshooting 3-38
Error and Failure Indicator Overview 3-38
Basic Troubleshooting Checks 3-40
BBG-1080-CSC-3G Processing Error Troubleshooting 3-41
In Case of Problems 3-41

Chapter 1

Introduction

Overview

This manual provides installation and operating instructions for the BBG-1080-CSC-3G 3G/HD/SD-SDI Standalone RGB Color Space Corrector / Frame Sync with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support unit (also referred to herein as the BBG-1080-CSC-3G).

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-1080-CSC-3G.
- **Chapter 2, "Installation"** – Provides instructions for installing the BBG-1080-CSC-3G and setting up its network access.
- **Chapter 3, "Setup/Operating Instructions"** – Provides overviews of operating controls and instructions for using the BBG-1080-CSC-3G.

This chapter contains the following information:

- **Cobalt Reference Guides (p. 1-2)**
- **Manual Conventions (p. 1-2)**
- **Safety and Regulatory Summary (p. 1-3)**
- **BBG-1080-CSC-3G Functional Description (p. 1-4)**
- **Technical Specifications (p. 1-8)**
- **Warranty and Service Information (p. 1-10)**
- **Contact Cobalt Digital Inc. (p. 1-11)**

Cobalt Reference Guides

From the Cobalt® web home page, go to **Support>Reference Documents** for easy to use guides covering network remote control, device 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-1080-CSC-3G itself. Examples are provided below.

- Device display messages are shown like this:

  BBG-1080

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

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

- **BBG-1080-CSC-3G** refers to the BBG-1080-CSC-3G 3G/HD/SD-SDI Standalone RGB Color Space Corrector / Frame Sync with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support unit.
- **Frame** refers to the HPF-9000, oGx, 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-1080-CSC-3G and other devices 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

	Important note regarding product usage. Failure to observe may result in unexpected or incorrect operation.
	Electronic device or assembly is susceptible to damage from an ESD event. Handle only using appropriate ESD prevention practices.
	Symbol (WEEE 2002/96/EC) For product disposal, ensure the following: • 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-1080-CSC-3G 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-1080-CSC-3G Functional Description

Figure 1-1 shows a functional block diagram of the BBG-1080-CSC-3G. In addition to a YCbCr proc features with RGB processing controls color corrector, the BBG-1080-CSC-3G includes an advanced frame sync/pattern generator.

BBG-1080-CSC-3G Input/Output Formats

The BBG-1080-CSC-3G provides the following inputs and outputs:

- **Inputs:**
  - **3G/HD/SD SDI IN A** thru **SDI IN D** – four 3G/HD/SD-SDI inputs. **SDI IN A** or **SDI IN B** can be set to failover to **A** or **B** in absence of opposite channel of this pair.
- **Outputs:**
  - **3G/HD/SD-SDI OUT (1-4)** – four 3G/HD/SD-SDI buffered video outputs. Each output can be independently set as processed output video or selected input video reclocked.

Input Video Select Function

A GUI-based control allows the device to select from up to four 3G/HD/SD-SDI inputs.

The input can be selected using DashBoard manual control, set to failover to an alternate input upon loss of the target input, and can be externally selected via a GPIO interface. An input **Allowed Rasters** and **Allowed Frame Rates** filter allows inputs to be filtered (screened) for only user-allowed raster sizes and frame rates, with unallowed raster/rates being rejected as an input (input unlock). Reclocked copies of any SDI input can be outputted by the device when selected as a choice on the output crosspoint.

Video Output Crosspoint

A four-output video matrix crosspoint allows independently applying the device processed video output or reclocked input to any of the four discrete coaxial outputs (**SDI OUT 1** thru **SDI OUT 4**).

An additional output (**RLY BYP B**) provides a relay-protected output that outputs a copy of **SDI OUT 1** crosspoint selection in normal operation. In power loss failover **RLY BYP B** passive outputs the signal connected to **SDI IN B**.

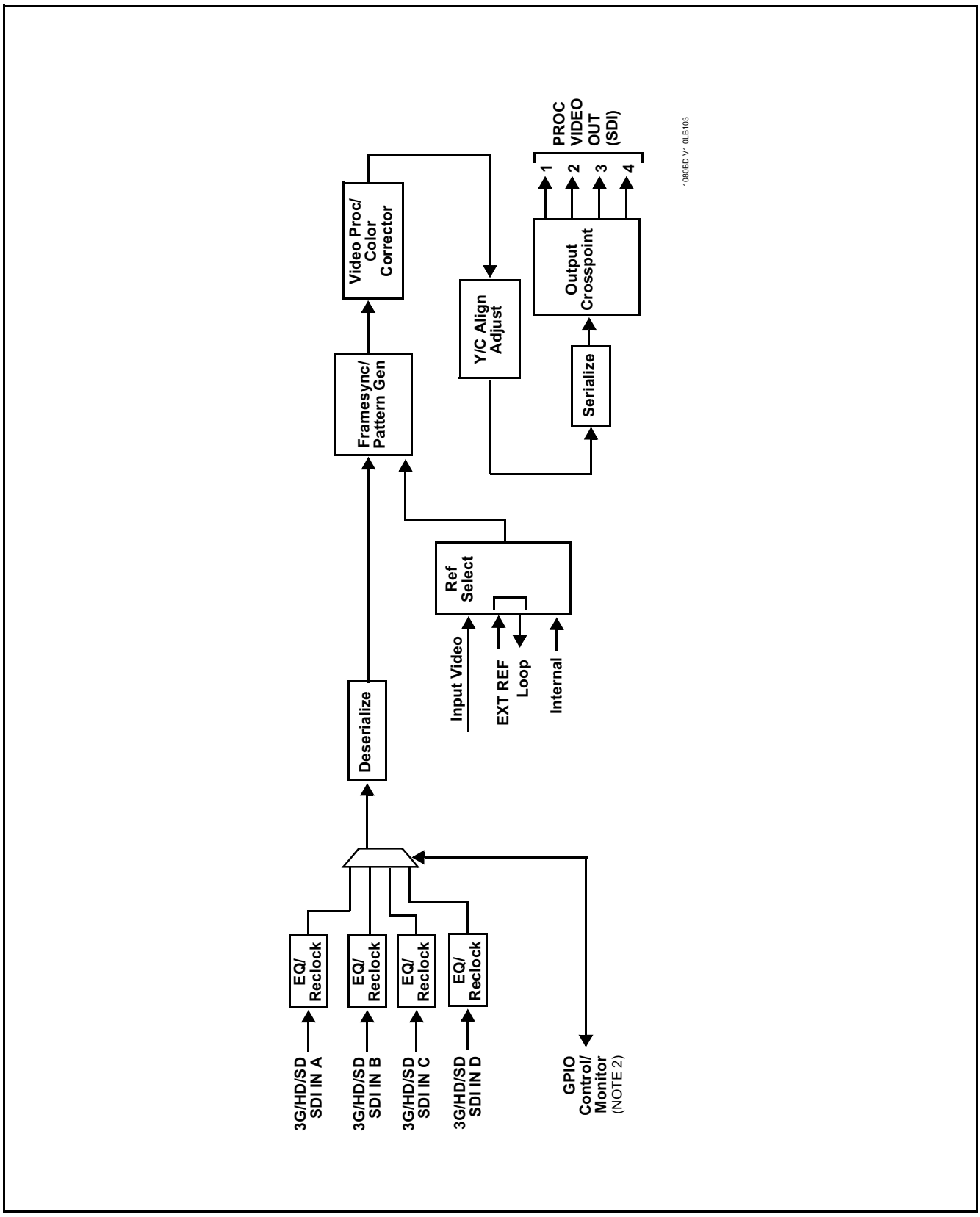

Figure 1-1 BBG-1080-CSC-3G Functional Block Diagram

Video Processor Description

Note: Although this model is not furnished with full audio controls (such as input audio routing/controls), it passes embedded audio fully intact with no modification to four-group audio.

Frame Sync Function

This function provides for frame sync control using a looping reference input that can use black burst or tri-level sync signals distributed with the plant, use the input video as a frame sync reference, or use internal timing. This function also allows horizontal and/or vertical offset to be added between the output video and the frame sync reference.

Frame sync can select from either of two device frame reference sources, or free-run input video sync. Selectable failover allows alternate reference selection should the initial reference source become unavailable or invalid. In the event of input video loss of signal, the output can be set to disable video, go to black, go to an internal test signal generator pattern, or freeze to the last intact frame (last frame having valid SAV and EAV codes).

An internal test signal generator provides a selection of various standard patterns such as color bars, sweep patterns, and other technical patterns. The test patterns can be applied to the output video upon loss of input or manually inserted at any time. Because the frame sync/pattern generator precedes the color corrector block, the BBG-1080-CSC-3G can readily provide custom offset calibrations for on-set monitor/camera colorimetry characteristics which can be saved to yield a calibrated setting.

Color Corrector

The color corrector converts the YCbCr SDI input video to the 4:4:4 RGB color space (where the color correction is applied), and then back to YCbCr SDI on the output. Controls are available to adjust each RGB level independently for both white levels (gain) and black levels (offset). Gamma can also be independently adjusted for each RGB channels. Various controls can be ganged to provide adjustment for all three color channels simultaneously.

Y/C Alignment Corrector

A Y/C alignment processor provides controls for correcting upstream misalignment of Y and C phase. Y/C misalignment is typically introduced by upstream analog-to-digital conversion, especially where the Y and chroma paths may experience differing characteristics.

Control and Data Input/Output Interfaces

GPI Interface

Two independent ground-closure sensing GPI inputs (**GPI 1** and **GPI 2**; each sharing common ground connection as chassis potential) are available. Associated with each GPI user control is a selection of one of 32 user-defined presets in which GPI activation invokes a device control preset. Because the GPI closure invokes a user-defined preset, the resulting setup is highly flexible and totally user-defined. Invoking a user preset to effect a change involves device setup communication limited **only** to the items being changed; the device remains on-line during the setup, and the called preset is rapidly applied.

GPI triggering can be user selected to consider the activity on discrete GPI ports, or combinations of logic states considering both GPI inputs, as well as be set for level or edge triggering. This flexibility allows multistage, progressive actions to be invoked if desired. Indication is provided showing whenever a GPI input has been invoked.

GPO Interface

Two independent phototransistor non-referenced (floating) contact pairs (**GPO 1/1** and **GPO 2/2**) are available. A GPO can be invoked by setting a GPO to be enabled when a preset is in turn applied (i.e., when a preset is invoked (either manually or via event-based loading), the GPO is correspondingly also activated.

User Control Interface

BBG-1080-CSC-3G 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-1080-CSC-3G 3G/HD/SD-SDI Standalone RGB Color Space Corrector / Frame Sync with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support unit.

Table 1-1 Technical Specifications

Item	Characteristic
Part number, nomenclature	BBG-1080-CSC-3G 3G/HD/SD-SDI Standalone RGB Color Space Corrector / Frame Sync with Integrated Test Signal Generator and OGCP-9000/CC Control Panel Support
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): Dimensions (WxHxD): Weight:	 32° – 104° F (0° – 40° C) < 95%, non-condensing 5.7 x 1.4 x 14.7 in (14.5 x 3.5 x 37.3 cm) Dimensions include connector projections. 6 lb (2.8 kg)
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.
Serial Digital Video Input	Number of inputs: Up to (4), with manual select or failover to alternate input. Input B uses relay bypass to output RLY BYP B. Data Rates Supported: SMPTE 424M, 292M, SMPTE 259M-C Impedance: 75 Ω terminating Return Loss: > 15 dB up to 1.485 GHz > 10 dB up to 2.970 GHz

Table 1-1 Technical Specifications — continued

Item	Characteristic
Post-Processor Serial Digital Video Outputs	Number of Outputs: Four 3G/HD/SD-SDI BNC Impedance: 75 Ω Return Loss: > 15 dB at 5 MHz – 270 MHz Signal Level: 800 mV ± 10% DC Offset: 0 V ± 50 mV Jitter (3G/HD/SD): < 0.3/0.2/0.2 UI Minimum Latency (frame sync 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
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
GPIO	(2) GPI; (2) GPO; opto-isolated GPO Specifications: Max I: 120 mA Max V: 30 V Max P: 120 mW GPI Specifications: GPI LO @ Vin < 1.5 V GPI HI @ Vin > 2.3 V Max Vin: 9 V
Redundant (or spare) AC power supply	BBG-1000-PS

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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Chapter 2

Installation

Overview

This chapter contains the following information:

- Installing the BBG-1080-CSC-3G (p. 2-1)
- Rear Panel Connections (p. 2-2)
- GPIO and Serial (COMM) Connections (p. 2-4)

Installing the BBG-1080-CSC-3G

Note:
- Where BBG-1080-CSC-3G 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-1080-CSC-3G in locations marked with stamped “x”. If feet are not affixed, chassis bottom cooling vents will be obscured.
- Where BBG-1080-CSC-3G 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-1080-CSC-3G to be mounted and securely attached to a 1 RU tray that fits into a standard EIA 19” rack mounting location. Install BBG-1080-CSC-3G unit into tray as described and shown here.

1. If installing BBG-1080-CSC-3G using optional frame Mounting Tray BBG-1000-TRAY, install BBG-1080-CSC-3G in tray as shown in Figure 2-1.

2. Connect the input and output cables as shown in Figure 2-3.

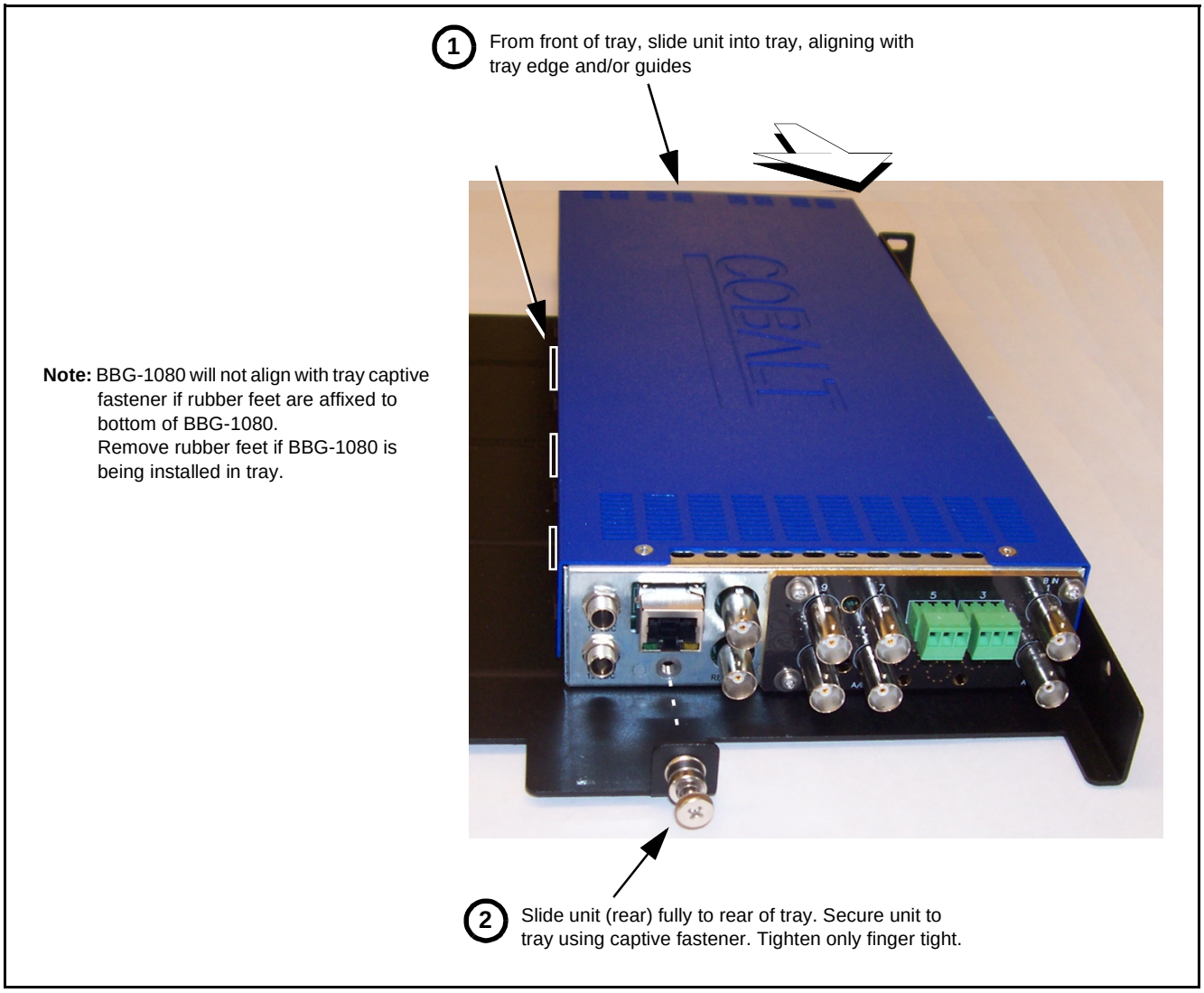


Figure 2-1 Mounting BBG-1080-CSC-3G Using Frame Mounting Tray

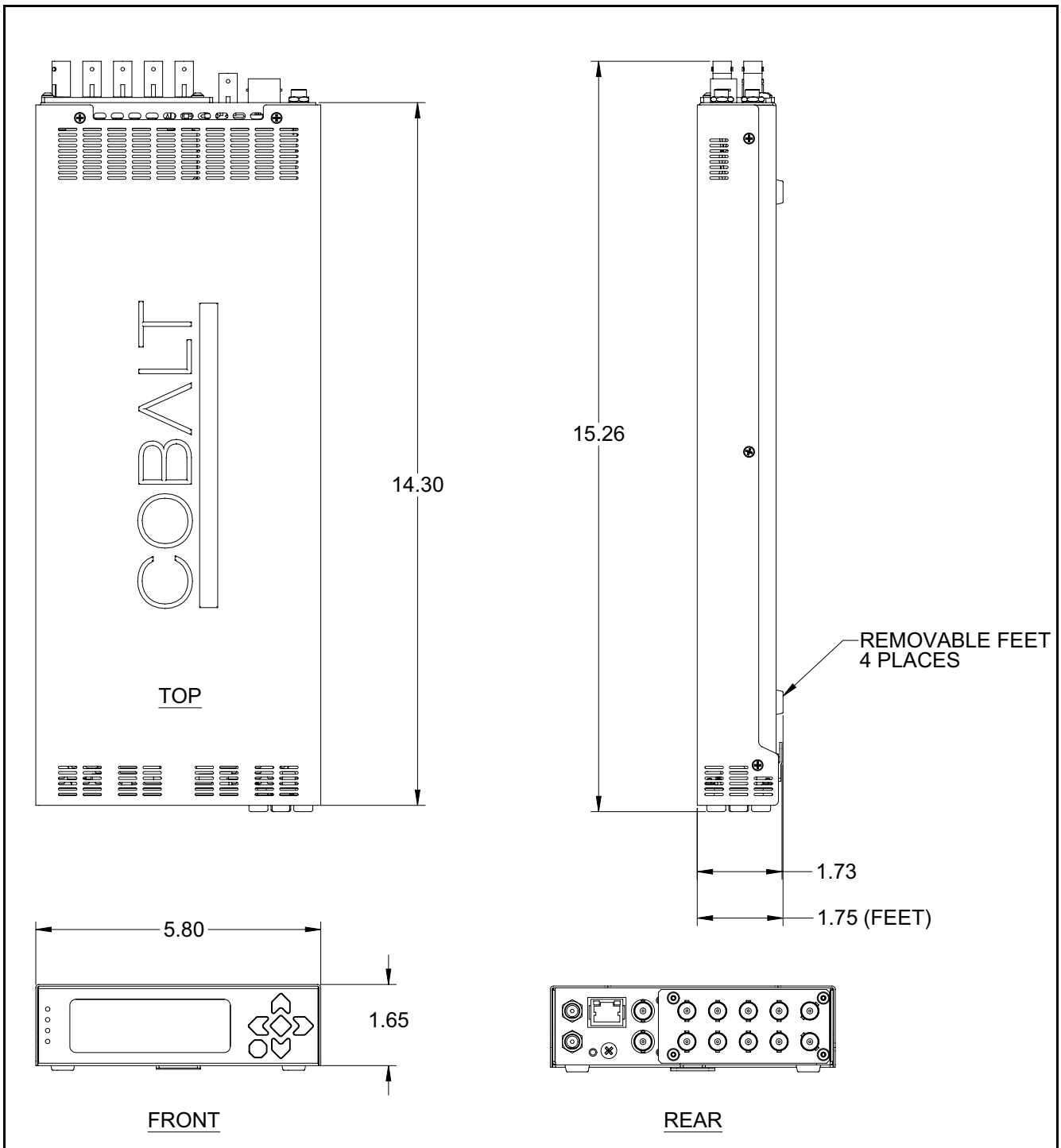
BBG-1080-CSC-3G Unit Dimensions

Figure 2-2 shows the BBG-1080-CSC-3G physical dimensions and mounting details for cases where BBG-1080-CSC-3G 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.

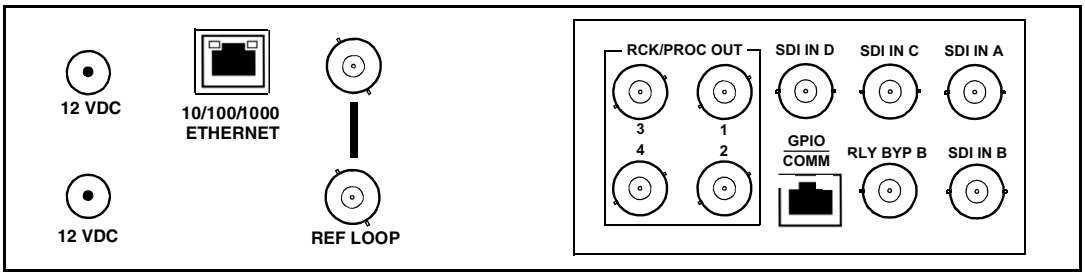
Note:
- The BBG-1080-CSC-3G BNC inputs are internally 75-ohm terminated. It is not necessary to terminate unused BNC video inputs or outputs.
- External frame sync reference signal (if used) must be terminated if a looping (daisy-chain) connection is not used. Unterminated reference connection may result in unstable reference operation.



Notes: 1. All dimensions in inches.
2. If BBG-1080 is mounted on flat surface, either rubber feet must be installed, or mounting surface must be open to mate with cooling vents on bottom of BBG-1080 chassis.

Figure 2-2 BBG-1080-CSC-3G Dimensional Details

BBG-1080-CSC-3G Rear Panel



Connector	Function
12 VDC – ⊂ +	Dual DC power IN connectors (diode-isolated). Single AC adapter (supplied) can be connected to either connector. Dual adapters can be connected to provide power redundancy.
10/100/1000 ETHERNET	Gigabit Ethernet control/monitoring connection. Communication activity status is shown by integral status LEDs.
REF LOOP	Looping 75Ω reference connection for connection to house black burst or tri-level reference connections
Signal Connectors	
SDI IN A thru **SDI IN D**	(4) 3G/HD/SD-SDI video input BNCs
RCK/PROC OUT 1 thru **RCK/PROC OUT 4**	(4) 3G/HD/SD-SDI video output BNC; each GUI selectable as selected-input reclocked or processed out
RLY BYP B	(1) relay-protected SDI processed output BNC. Outputs a copy of SDI OUT 1 under normal conditions, or passive outputs the SDI input on SDI IN B as a relay failover if device power is lost.
COMM/GPIO	RJ-45 connector that provides the following: - Multi-format serial interface - Two opto-isolated GPI inputs - Two opto-isolated GPO outputs Note: See Figure 2-4 for connector pinouts.

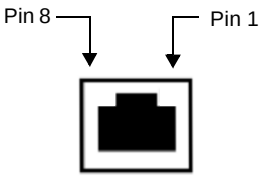
Figure 2-3 BBG-1080-CSC-3G Rear Panel Connectors

GPIO and Serial (COMM) Connections

Figure 2-4 shows connections to the **GPIO/COMM** RJ-45 connector, which is used for serial comm and GPIO connections.

Pin	Function
1	GPI IN 1
2	GPI IN 2
3	**GPO RTN**
4	GPO OUT 1
5	GPO OUT 2
6	UART_TX
7	UART_RX
8	**COMM GND**

GPI GND connections should be connected to pin 8 – COMM GND, which is chassis GND.



Note: View is "looking into" connector from unterminated (user-facing) side.

GPIO uses equivalent opto-isolated circuits shown below.

GPO Specifications:
Max I: 120 mA
Max V: 30 V
Max P: 120 mW
Pullup R >500Ω resistor is recommended when using 5V control.

GPI Specifications:
GPI LO @ Vin < 1.5 V
GPI HI @ Vin > 2.3 V
Max Vin: 9 V

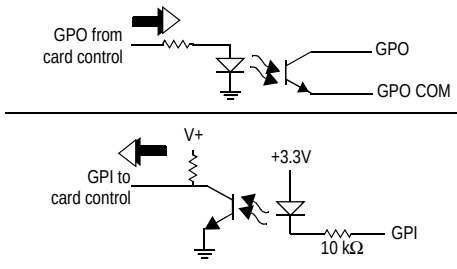


Figure 2-4 COMM and GPIO Connector Pinouts

Chapter 3

Setup/Operating Instructions

Overview

This chapter contains the following information:

- BBG-1080 Front Panel Display and Menu-Accessed Control (p. 3-1)
- Connecting BBG-1080 To Your Network (p. 3-3)
- Control and Display Descriptions (p. 3-5)
- Checking BBG-1080-CSC-3G Device Information (p. 3-8)
- BBG-1080-CSC-3G Function Menu List and Descriptions (p. 3-9)
- Color and Video Correction Examples (p. 3-29)
- Uploading Firmware Using Web Interface and GUI (p. 3-36)
- Front Panel User Menus (p. 3-37)
- Troubleshooting (p. 3-38)

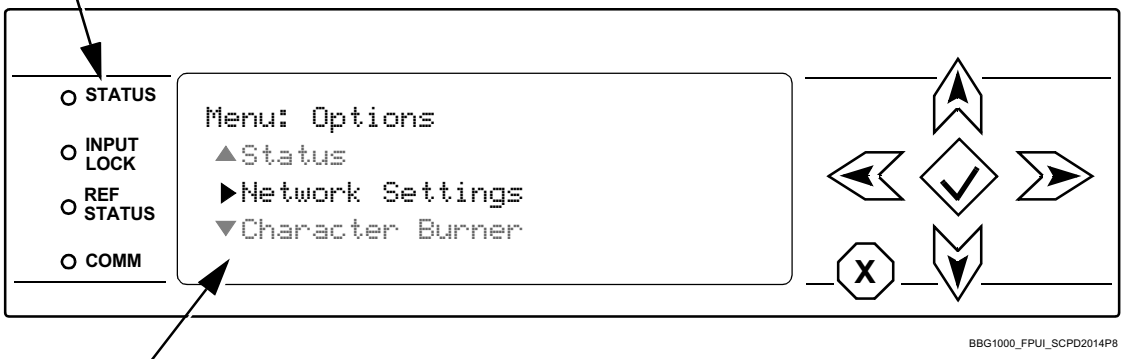
Perform the setup procedures here in the sequence specified. All procedures equally apply to all models unless otherwise noted.

Note: • All instructions here assume BBG-1080 is physically connected to the control physical network as described in Chapter 2. Installation.

BBG-1080 Front Panel Display and Menu-Accessed Control

Figure 3-1 shows and describes the BBG-1080 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:

```
Menu: Network Settings
▶ IP: 10.99.11.162
▼ Netmask: 255.255.255.0
▼ Gateway: 10.99.11.1
```

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

```
IP
 ▲
010.099.011.162
 ▼
```

The carets above and below a character indicate this character is ready for editing. Use the ▼ and ▲ buttons to decrement or increment the value.

Use the ≪ and ≫ buttons to navigate to other characters.

To exit a sub-menu or a menu, press the X 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-1080 Front Panel Display and Menu Controls

Connecting BBG-1080 To Your Network

BBG-1080 ships with network protocol set to DHCP and populates its address with an addressed allocated by your DHCP server. If your network does not have a DHCP server, the BBG-1080 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-1080 To Network

1. Power-up BBG-1080 and connect Ethernet cable connection to media. Wait for BBG-1080 to complete booting. When **`Product: BBG-1080`** ... 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 (X) to commit changes and exit the setup menu.
Note: Current IP address of BBG-1080 can now be checked from the front panel by accessing this at any point.

6. At this point, BBG-1080 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-1080

Finding a BBG-1080 Device in DashBoard

(See Figure 3-2) If BBG-1080 is configured with an address within a network also available via DashBoard, a BBG-1080 device appears as a frame entity in the DashBoard Basic Tree View.

Note: BBG-1080 DashBoard remote control is also available by opening the device in DashBoard similar to opening an openGear® card.

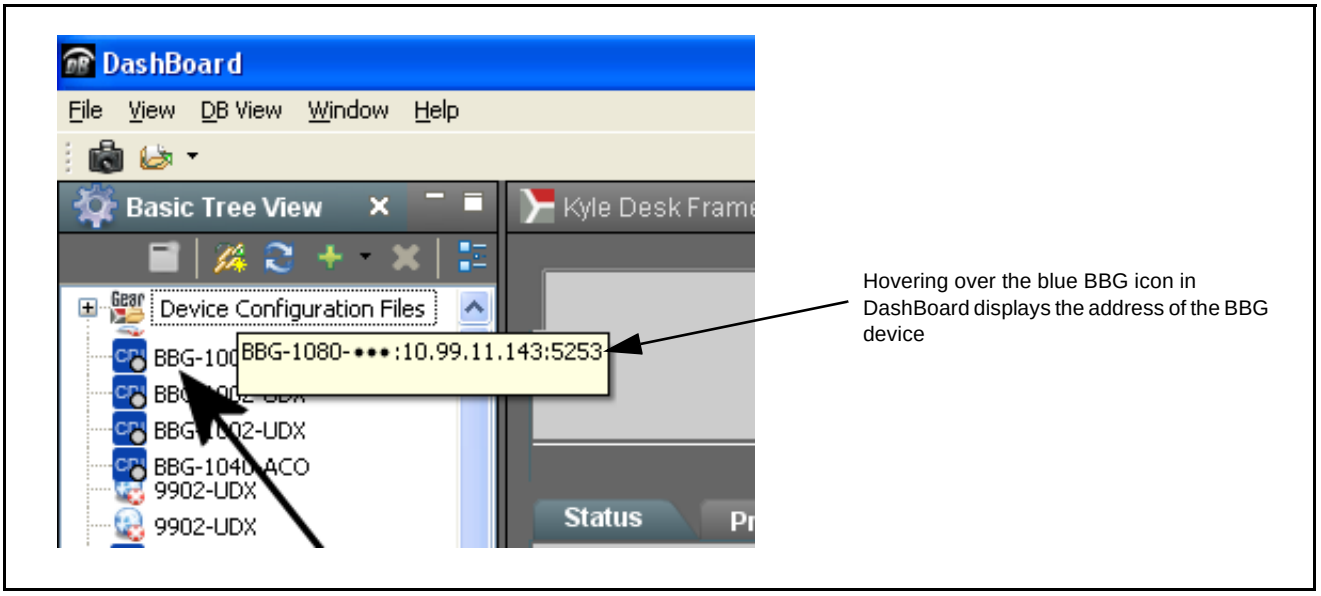


Figure 3-2 Finding BBG-1080 Using DashBoard

Control and Display Descriptions

This section describes the web user interface controls for using the BBG-1080-CSC-3G.

The format in which the BBG-1080-CSC-3G 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-1080-CSC-3G device are organized into function **menus**, which consist of parameter groups as shown below.

Figure 3-3 shows how the BBG-1080-CSC-3G device and its menus are organized, and also provides an overview of how navigation is performed between devices, function menus, and parameters.

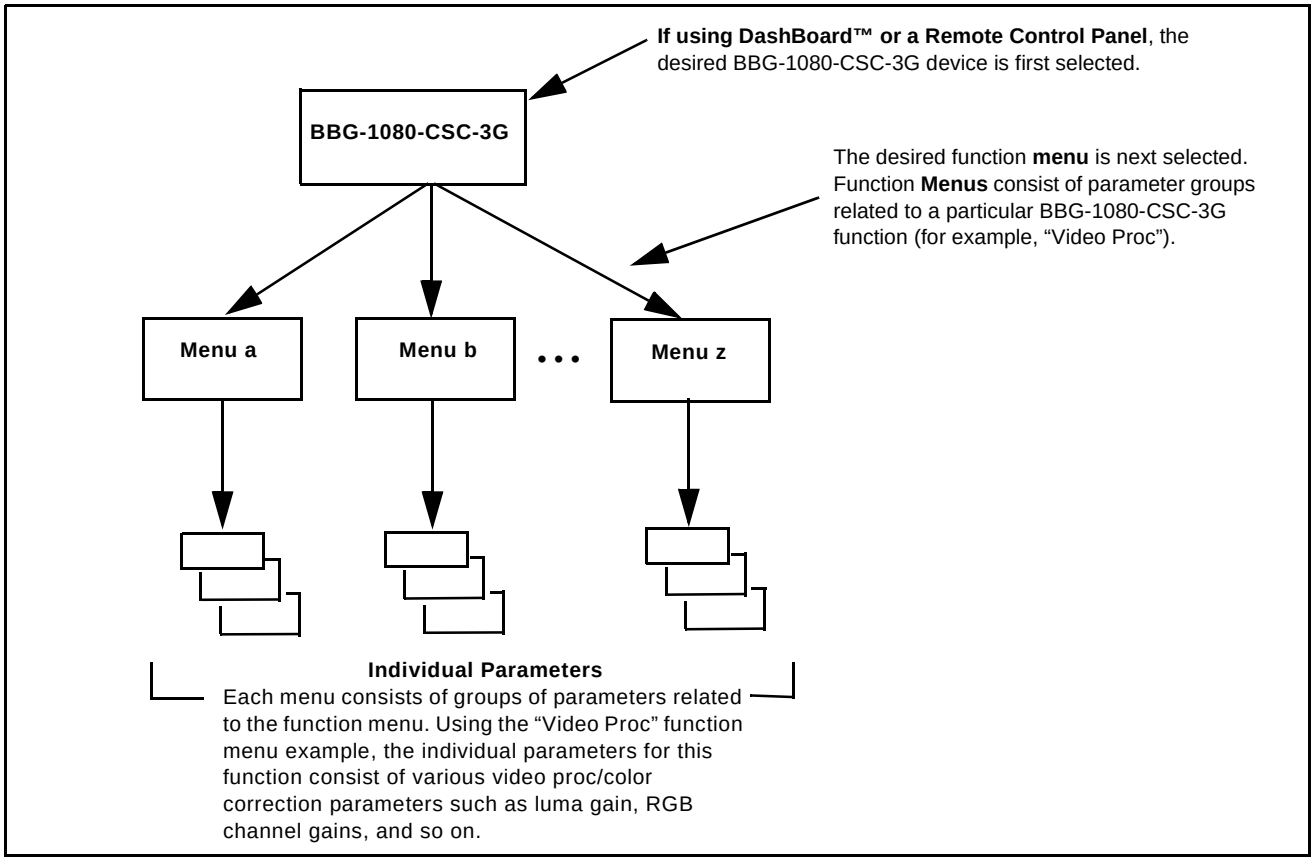
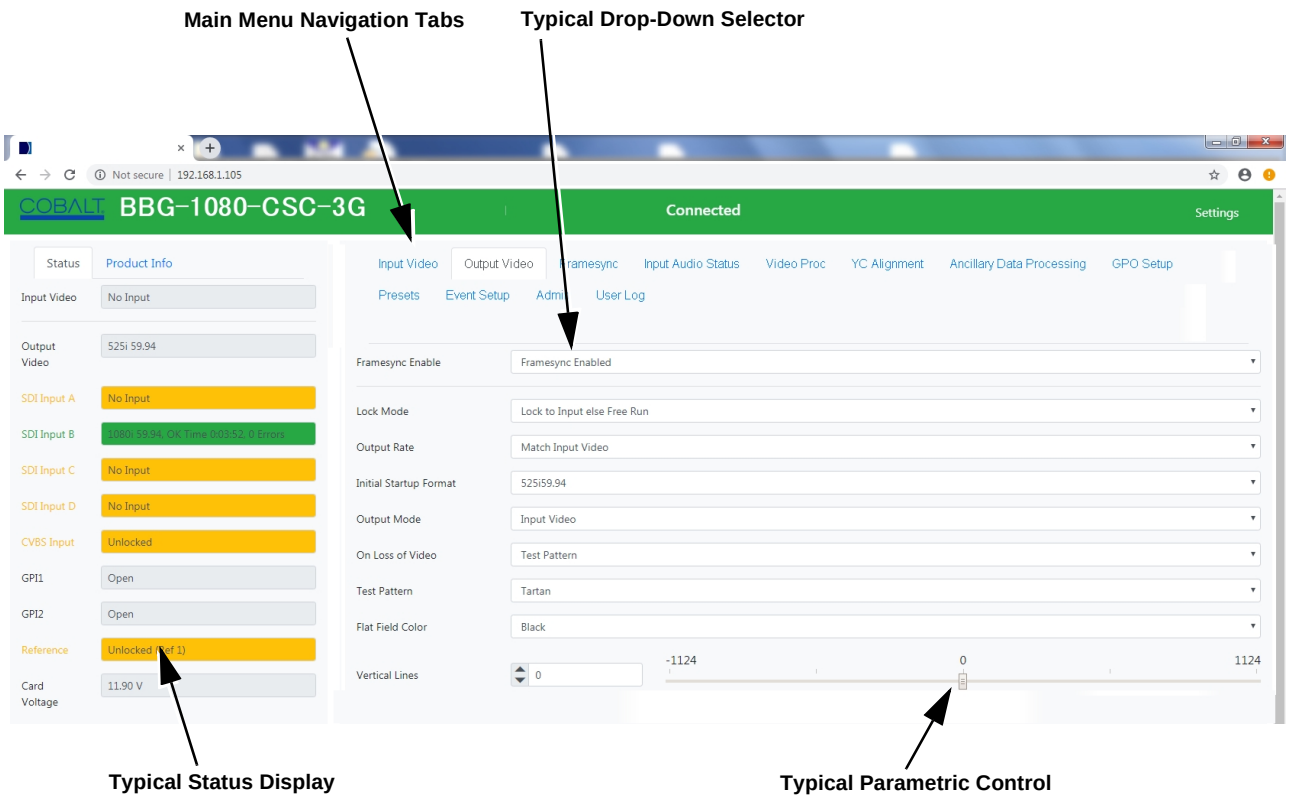


Figure 3-3 Function Submenu/Parameter Submenu Overview

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.



In this example, the **Framesync** 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-1080 user interface theme selection offers light and dark themes suited for various users and environments.

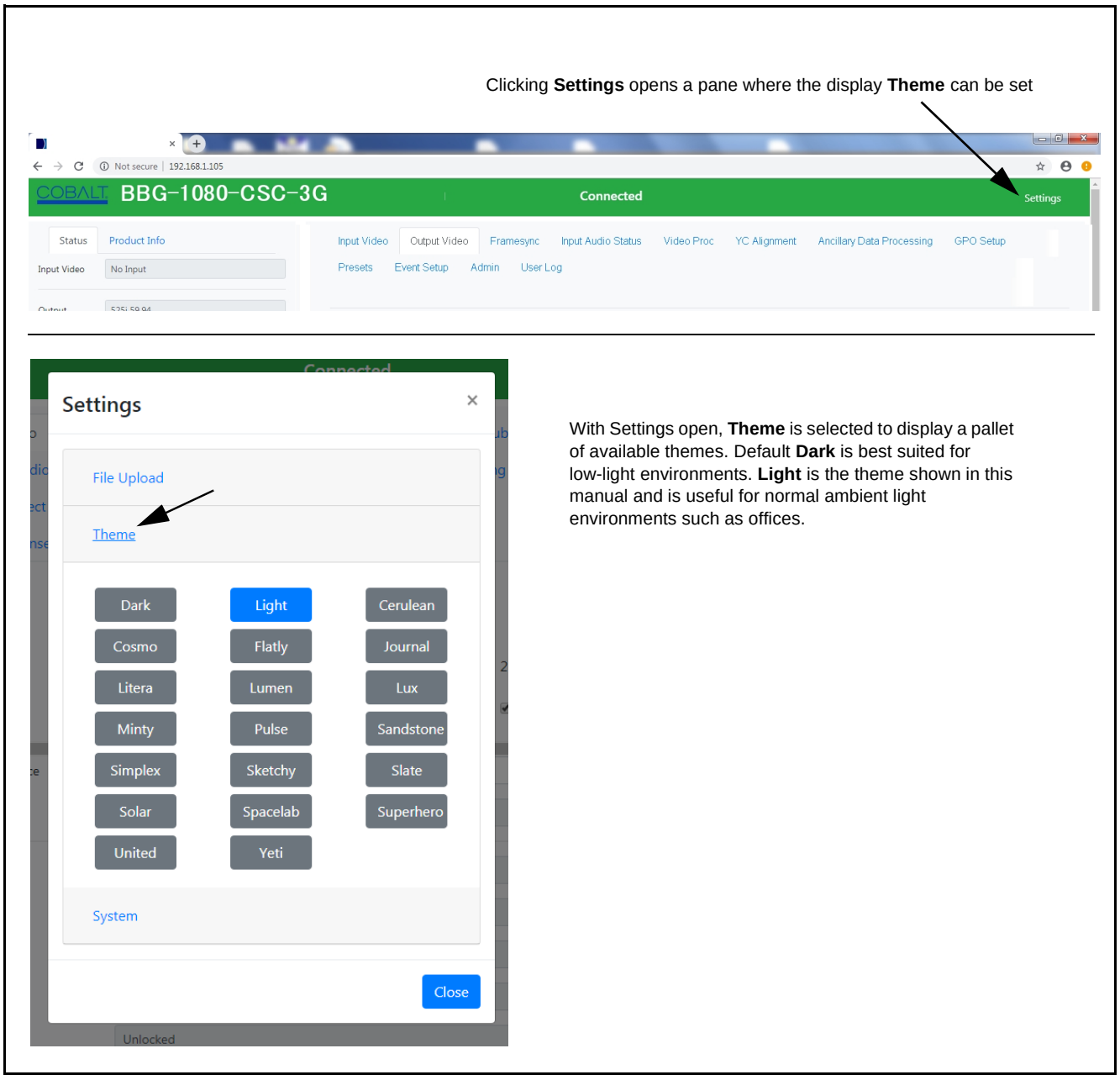


Figure 3-5 Web UI Display Themes

Checking BBG-1080-CSC-3G Device Information

The operating status and software version the BBG-1080-CSC-3G device can be checked by clicking the **Status** main menu tab. Figure 3-6 shows and describes the BBG-1080-CSC-3G 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. 3-38) for corrective action.

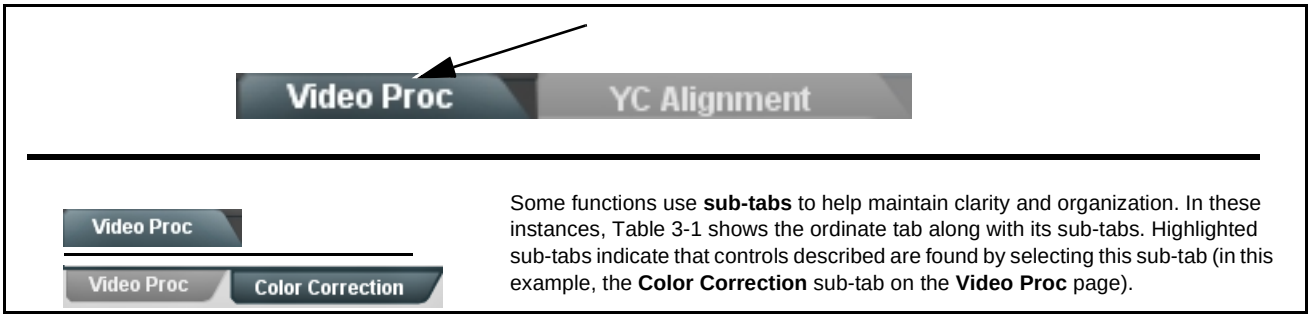
Figure 3-6 Typical Device Info/Status Utility

BBG-1080-CSC-3G Function Menu List and Descriptions

Table 3-1 individually lists and describes each BBG-1080-CSC-3G function menu item and its related list selections, controls, and parameters. Where helpful, examples showing usage of a function are also provided.

Note:
- All numeric (scalar) parameters displayed 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 may show DashBoard UI. Web UI is similar.

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



Some functions use **sub-tabs** to help maintain clarity and organization. In these instances, Table 3-1 shows the ordinate tab along with its sub-tabs. Highlighted sub-tabs indicate that controls described are found by selecting this sub-tab (in this example, the **Color Correction** sub-tab on the **Video Proc** page).

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

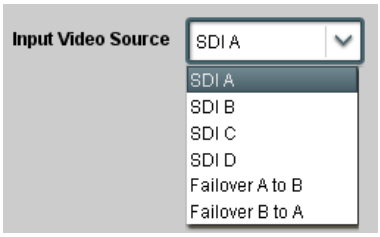
Function Main Menu Item	Page	Function Main Menu Item	Page
Input Video Controls	3-10	Ancillary Data Proc Controls	3-19
Output Video Mode Controls	3-11	GPO Setup Controls	3-19
Framesync	3-12	Presets	3-20
Input Audio Status	3-15	Event Setup	3-23
Video Proc/Color Correction	3-15	Admin	3-26
Y/C Alignment Controls	3-18	User Log	3-28

Table 3-1 BBG-1080-CSC-3G Function Menu List

Input Video

Allows manual or failover selection of SDI program video inputs and displays status and raster format of received SDI video.

- **Input Video Source**



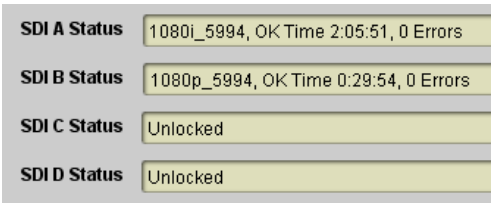
Selects the input video source to be applied to the program video input.

- **SDI A** and **SDI B** choices allow forced manual selection of correspondingly **SDI IN A** or **SDI IN B**.
- **Failover A to B** sets main path preference of **SDI IN A.**
  - If **SDI IN A** goes invalid, then **SDI IN B** is selected.
  - If **SDI IN A** goes valid again, failover automatically reverts to **SDI IN A**.
- **Failover B to A** sets main path preference of **SDI IN B.**
  - If **SDI IN B** goes invalid, then **SDI IN A** is selected.
  - If **SDI IN B** goes valid again, failover automatically reverts to **SDI IN B**.
- **SDI C** and **SDI D** choices allow forced manual selection of correspondingly **SDI IN C** or **SDI IN D** without failover choices.

Note: Failover criteria via this control is simple signal presence.

- **Input Video Status**

Displays input status of each video input, along with elapsed time of signal acquire.

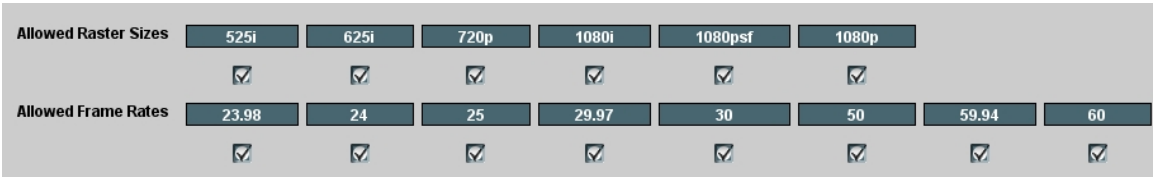


SDI A thru **SDI D Status** show raster/format for all inputs. If signal is not present or is invalid, **Unlocked** is displayed. (These status indications are also propagated to the Card Info pane.)

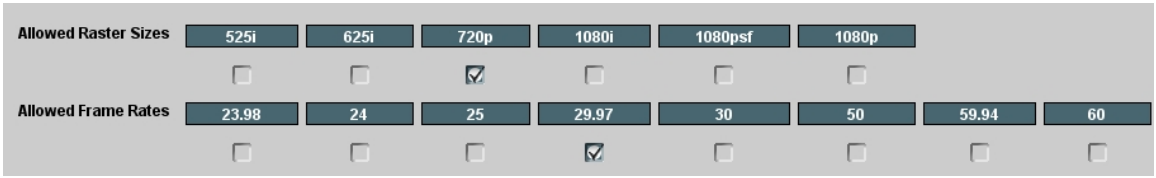
Input SDI Raster Size / Frame Rate Filtering

The controls shown below allow user filtering to only include selected raster or rate formats to be used as a program video input.

Default settings have all raster sizes and frame rates “checked”, thereby providing no filtering (exclusion.)



In the example below, only 720p and 29.97 are checked, filtering allowed input to only be 720p 29.97 (“720p half-rate”).



Note: Rates shown in selector are frame rates and not field rates.

Table 3-1 BBG-1080-CSC-3G Function Menu List — continued

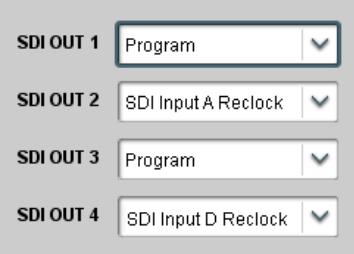
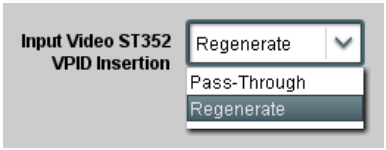
Output Video	Allows selection of each of the four video output coaxial connectors as processed SDI out or reclocked SDI out.
• **Output Video Crosspoint** 	For each SDI output port, provides a crosspoint for routing program processed video or selected-input reclocked to an SDI output. In this example, **SDI OUT 1** and **SDI OUT 3** are receiving Program (procesed) video out, with **SDI OUT 2** and **SDI OUT 4** providing various reclocked input video. **Note:** Outputs set to Input Reclocked will pass input SDI regardless of Input SDI Raster Size / Frame Rate Filtering. Input filtering applies only to the program video path.
• **ST352 VPID Insertion/Pass-Thru Select** 	Selects from default Regenerate mode and special Pass-Through mode (see below for important usage notes). • **Regenerate** makes certain ST352 is marked for whatever the device is passing, or if the payload is being modified by the device. (An example of where ST352 would have to be modified would be if the device Framesync is user-set to change the frame rate from 59.94 to 60.) • **Pass-Through** will extract and preserve the ST352 information from input SDI, and re-insert it on the output regardless of any changes the device has locally done to identifying characteristics carried in the ST352 metadata. In all normal usages, it is recommended to leave this control set to default **Regenerate** setting. This ensures that downstream devices will “see” ST352 that represents the payload being provided by the device. Pass-Through is only used in highly specialized cases where special ST352 data must be preserved (even if the data may not match the payload).

Table 3-1 BBG-1080-CSC-3G Function Menu List — continued

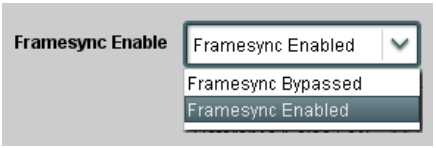
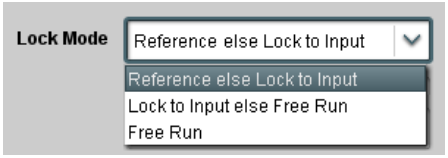
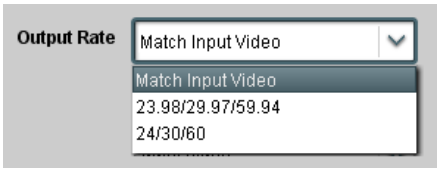
Framesync	Provides video frame sync/delay offset control and output control/loss of program video failover selection controls.
• **Framesync Enable/Disable Control** 	Provides master enable/disable of all device framesync functions/ controls.
• **Lock Mode Select** 	Selects Frame Sync functions from the choices shown to the left and described below. • **Lock to Reference:** Output video is locked to external reference received on the device **REF LOOP** input. **Note:** If valid reference is not received, the Card state: Reference Invalid indication appears in the Card Info status portion of DashBoard™, indicating invalid frame sync reference error. • **Lock to Input:** Uses the program video input video signal as the reference standard. **Note:** If **Lock to Input** is used for framesync, any timing instability on the input video will result in corresponding instability on the output video. • **Free Run:** Output video is locked to the device's internal clock. Output video is **not** locked to external reference.
• **Output Rate Select** 	Allows frame rate to be outputted same as input video, or converted to from the choices shown to the left and described below. • **Auto** – output video frame rate tracks with input video. • **23.98/29.97/59.94** – forces standard North American frame rates. Can be used to convert 24/30/60 Hz camera frame rates to corresponding 23.98/29.97/59.94 standard North American frame rates. • **24/30/60** – forces 24/30/60 frame rates. Can be used to convert 23.98/29.97/59.94 Hz frame rates to corresponding 24/30/60 Hz frame rates.

Table 3-1 BBG-1080-CSC-3G Function Menu List — continued

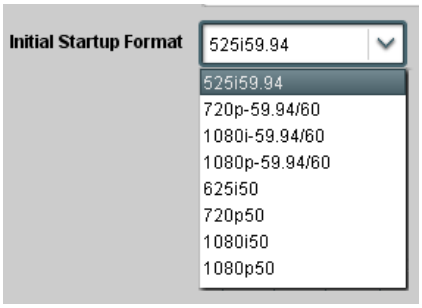
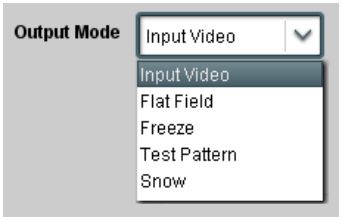
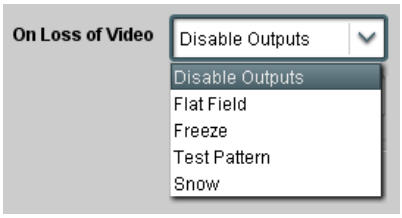
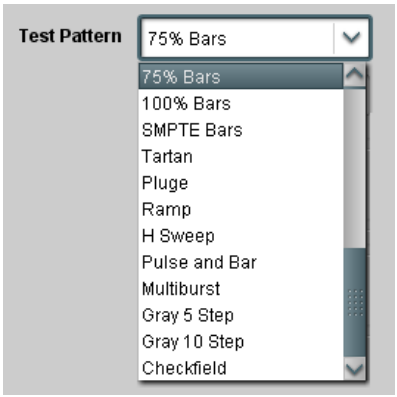
Framesync	**(continued)**
• Initial Startup Format Select 	Selects a frame sync format/rate to be invoked (from the choices shown to the left) in the time preceding stable lock to external reference. Set this control to that of the intended external reference to help ensure smoothest frame sync locking. This control also sets the device test pattern format where the device's initial output at power-up is the internal pattern instead of program video.
• Program Video Output Mode Select 	Provides a convenient location to select between program video output and other technical outputs from the choices shown to the left and described below. • **Input Video** – device outputs input program video (or loss of signal choices described below). • **Flat Field** – device outputs flat field. • **Freeze** – device outputs last frame having valid SAV and EAV codes. • **Test Pattern** – device outputs standard technical test pattern (pattern is selected using the Pattern drop-down described below). • **Snow** – device outputs snow multi-color pattern.
• Loss of Input Signal Selection 	In the event of program input video Loss of Signal (LOS), determines action to be taken as follows: • **Disable Outputs:** Disable program video SDI outputs. • **Flat Field** – go to flat field on program video output. • **Freeze** – go to last frame having valid SAV and EAV codes on program video output. • **Test Pattern** – go to standard technical test pattern on program video output (pattern is selected using the Pattern drop-down described below). • **Snow** – output snow multi-color pattern.
• Test Pattern Select 	Provides a choice of standard technical patterns (shown to the left) when **Test Pattern** is invoked (either by LOS failover or directly by selecting Test Pattern on the Program Video Output Mode Select control). **Note:** Because the Framesync pattern generator precedes the color correction block, test pattern color parameters can be post-offset from the calibrated standard levels as desired. This is highly useful for developing offsets for use in on-set monitor offset calibration. See Color and Video Correction Examples (p. 3-29) for examples and details of using these offsets.

Table 3-1 BBG-1080-CSC-3G Function Menu List — continued

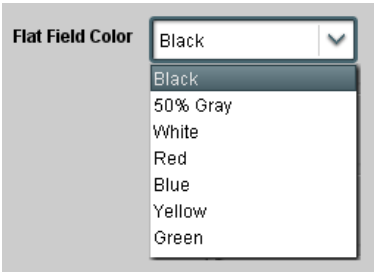
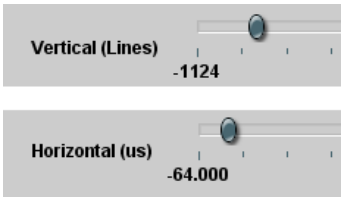
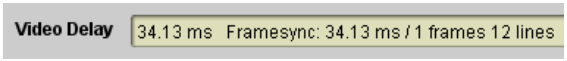
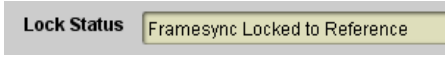
Framesync	**(continued)**
• **Flat Field Color Select** 	Provides a choice of flat field colors when **Flat Field** is invoked (either by LOS failover or directly by selecting Flat Field on the Program Video Output Mode Select control).
• **Output Video Reference Offset Controls** 	With framesync enabled, provides the following controls for offsetting the output video from the reference: • **Vertical (Lines)** – sets vertical delay (in number of lines of **output video**) between the output video and the frame sync reference. (Positive values provide delay; negative values provide advance) (Range is -1124 thru 1124 lines; null = 0 lines.) • **Horizontal (µs)** – sets horizontal delay (in µs of **output video**) between the output video and the frame sync reference. (Positive values provide delay; negative values provide advance) (Range is -64 thru 64 µsec; null = 0.000 µsec.) **Note:** Offset **advance** is accomplished by hold-off of the reference-directed release of the frame, thereby effectively advancing the program video relative to the reference.
• **Frame Delay Control** 	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. **The operational latency of the frame sync is always between the specified minimum latency and minimum latency plus one frame (not one field).** **Note:** Due to device memory limits, the maximum available Minimum Latency Frames is related to the output video format selected. When using this control, be sure to check the **Report Delay** display to make certain desired amount of frames are delayed.
• **Video Delay Display** 	Displays the current input-to-output video delay (in msec units) as well as in terms of Frames/fractional frame (in number of lines). Status display shows total input-to-output video delay, along with any framesync delay.
• **Framesync Lock Status Display** 	Displays the current framesync status and reference source.

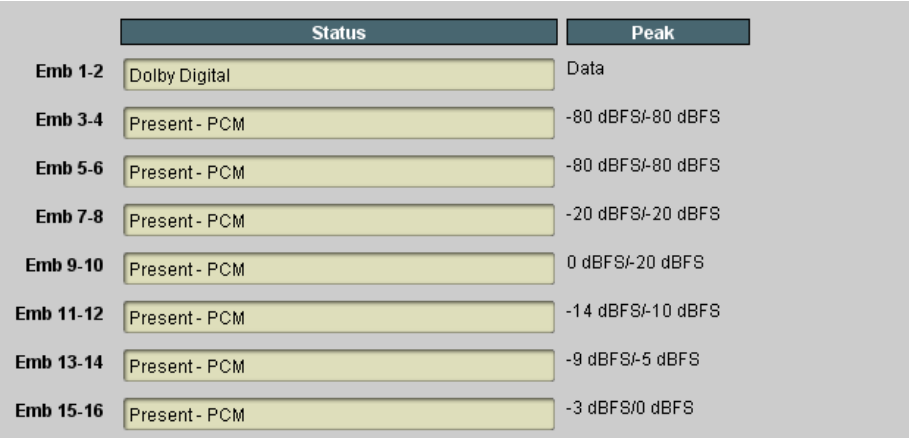
Table 3-1 BBG-1080-CSC-3G Function Menu List — continued

Input Audio Status	Displays signal status and payload for embedded and discrete audio received by the device.

Individual signal status and peak level displays for embedded audio input pairs as described below.

- **Absent:** Indicates embedded channel pair does not contain recognized audio PCM data.
- **Present - PCM:** Indicates embedded channel pair contains recognized audio PCM data.
- **Dolby E:** Indicates embedded channel pair contains Dolby® E encoded data.
- **Dolby Digital:** Indicates embedded channel pair contains Dolby® Digital encoded data.

Note: Dolby status displays occur only for valid Dolby® signals meeting SMPTE 337M standard.



Video Proc Video Proc / Color Correction	Provides the following Video Proc and Color Correction parametric controls.
• **Video Proc** Video Proc: Enabled	**Video Proc (Enable/Disable)** provides master on/off control of all Video Proc functions. • When set to **Disable**, Video Proc is bypassed. • When set to **Enable**, currently displayed parameter settings take effect.
• **Reset to Unity** Reset to Unity: Confirm	**Reset to Unity** provides unity reset control of all Video Proc functions. When Confirm is clicked, a **Confirm?** pop-up appears, requesting confirmation. • Click **Yes** to proceed with the unity reset. • Click **No** to reject unity reset.
• **Luma Gain** Luma Gain 0.0	Adjusts gain percentage applied to Luma (Y channel). (0% to 200% range in 0.1% steps; unity = 100%)

Table 3-1 BBG-1080-CSC-3G Function Menu List — continued

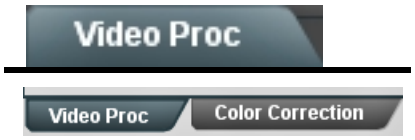
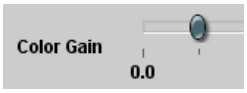
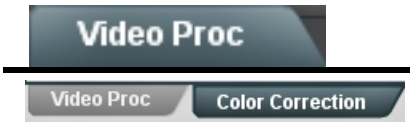
	**(continued)**
• **Luma Lift** 	Adjusts lift applied to Luma (Y-channel). (-100% to 100% range in 0.1% steps; null = 0.0%)
• **Color Gain** 	Adjusts gain percentage (saturation) applied to Chroma (C-channel). (0% to 200% range in 0.1% steps; unity = 100%)
• **Color Phase** 	Adjusts phase angle applied to Chroma. (-360° to 360° range in 0.1° steps; null = 0°)
• **Gang Luma/Color Gain** 	When set to **On**, changing either the **Luma Gain** or **Color Gain** controls increases or decreases both the Luma and Color gain levels by equal amounts.
	Provides color corrector functions for the individual RGB channels for the program video path.
• **Color Corrector** 	**Color Corrector (On/Off)** provides master on/off control of all Color Corrector functions. • When set to **Off**, all processing is bypassed. • When set to **On**, currently displayed parameters settings take effect.
• **Reset to Unity** 	**Reset to Unity** provides unity reset control of all Color Corrector functions. When Confirm is clicked, a **Confirm?** pop-up appears, requesting confirmation. • Click **Yes** to proceed with the unity reset. • Click **No** to reject unity reset.

Table 3-1 BBG-1080-CSC-3G Function Menu List — continued

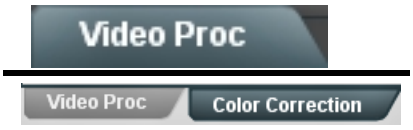
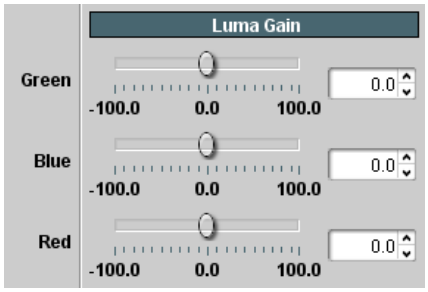
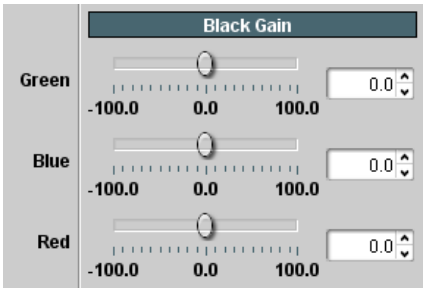
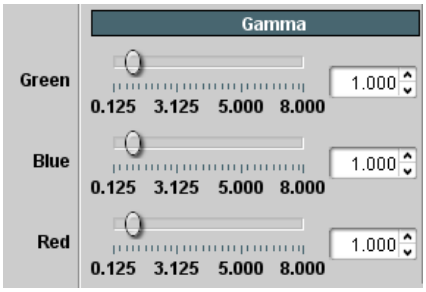
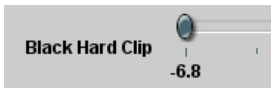
	**(continued)**
• Luma Gain R-G-B controls  **• Black Gain R-G-B controls**  **• Gamma Factor R-G-B controls** 	Separate red, green, and blue channels controls for Luma Gain, Black Gain, and Gamma curve adjustment. Gain controls provide gain adjustment from 0.0 to 200.0% range in 0.1% steps (unity = 100.0) Gamma controls apply gamma curve adjustment in 0.125 to 8.000 range in thousandths steps (unity = 1.000) Each of the three control groups (Luma, Black, and Gamma have a **Gang Column** button which allows settings to be proportionally changed across a control group by changing any of the group's controls.
• Black Hard Clip 	Applies black hard clip (limiting) at specified percentage. (-6.8% to 50.0%; null = -6.8%)
• White Hard Clip 	Applies white hard clip (limiting) at specified percentage. (50.0% to 109.1%; null = 109.1%)

Table 3-1 BBG-1080-CSC-3G Function Menu List — continued

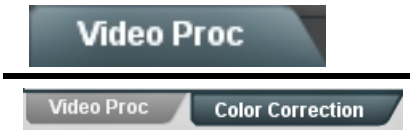
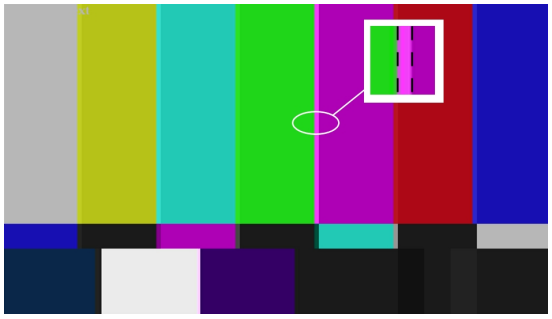
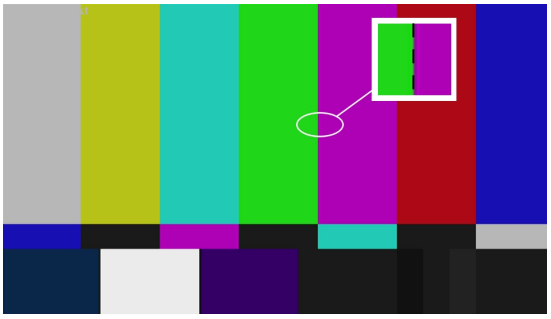
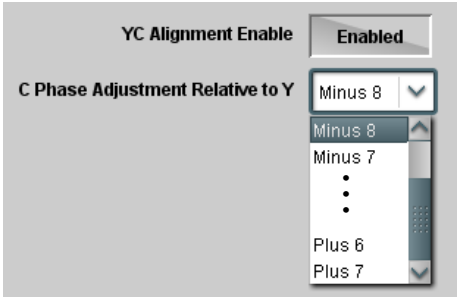
	**(continued)**
• **White Soft Clip** 	Applies white soft clip (limiting) at specified percentage. (50.0% to 109.1%; null = 109.1%)
• **Chroma Saturation Clip** 	Applies chroma saturation clip (limiting) chroma saturation at specified percentage. (50.0% to 160.0%; null = 160.0%)
	Provides controls for correcting upstream misalignment of Y and C phase.
SMPTE color bars showing Y/C misalignment (as evidenced by poor transitions at the color borders)  SMPTE color bars showing proper Y/C alignment (as evidenced by crisp transitions at the color borders)  Y/C misalignment is typically introduced by upstream analog-to-digital conversion, especially where the Y and chroma paths may experience differing characteristics.	
• **Y/C Alignment Controls** 	Provides the following Y/C alignment controls: • **Enable** control turns on alignment. • **C Phase Adjustment Relative to Y** provides a -8° to +7°phase offset of C phase from Y phase.

Table 3-1 BBG-1080-CSC-3G Function Menu List — continued

Ancillary Data Processing

Provides controls for VANC/HANC ancillary data de-embedding and embedding to and from program video stream. Data can be extracted and inserted within the device (Bridge mode). This can be used to move ancillary data to another line, or to remove ancillary data.

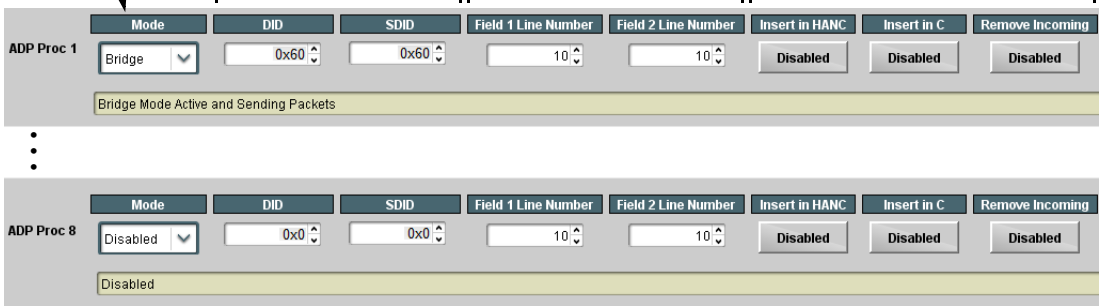
Eight individual Ancillary Data Processors (ADPs) provide for bridging ancillary data to and from the program video SDI stream.

Bridge extracts ANC from the deserialized input video and re-inserts in the output video, thereby allowing specialized ANC packets to be retained and moved to another VANC/HANC location

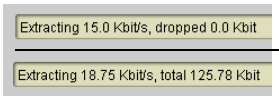
DID and **SDID** controls select the desired packet to be handled by the corresponding ANC Data Processor

Line Number controls select the VANC location of packet insertion/ extraction.
Setting the line numbers to 0 (zero) lets externally-sourced payload assert and set the line number.

Insertion controls allow special insertions in HANC or the C-channel, as well as removal of incoming packets



In the example above, **ADP Proc 1** is set to extract ATC timecode at DID60_h / SDID 60_h. Depending on the interface used to carry the extraction (COM or IP), status is displayed as shown below.



When set to extract to **COM** interface, displays rate and dropped data (if any)

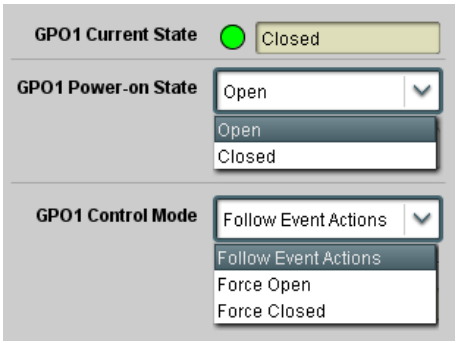
When set to extract to **IP** interface, displays rate and total amount transferred

Note: DashBoard versions 4.1 and earlier display DID and SDID numbers in decimal; newer DashBoard versions display DID and SDID numbers in hexadecimal. Hexadecimal notation is denoted by the "0x" preceding the value.

GPO Setup

Provides controls for setting up the two GPO's power-up states as well as forced manual or event action triggered.

Note: This tab has identical independent controls for **GPO 1** and **2**. Therefore, only the **GPO 1** controls are described here.



- **Current State** indicates GPO status regardless of any pre-setup.
- **Power-on State** allows the power-up GPO state to be set (initialized) upon power-up
- **Control Mode** allows GPO manual asserted open or closed states, or hands over control to Event Action triggering.

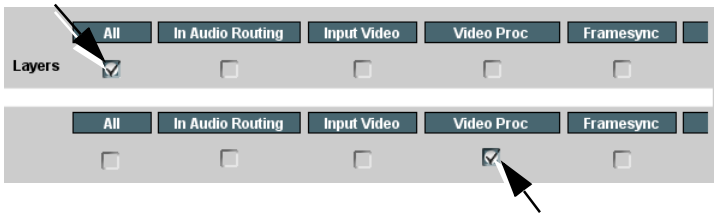
Table 3-1 BBG-1080-CSC-3G Function Menu List — continued

Presets	Allows user control settings to be saved in a Preset and then loaded (recalled) as desired, and provides a one-button restore of factory default settings.

• Preset Layer Select

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 device settings in areas outside of the layer or area of concern.

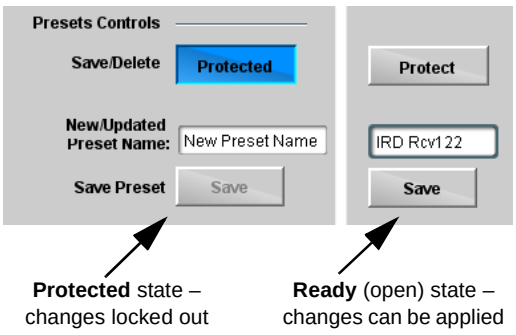
Default **All** setting will “look” at all device settings and save all settings to the defined preset with no masking.



Selecting a layer (in the example, “Video Proc”) will set the preset to **only** “look at” and “touch” video proc/color correction settings and save these settings under the preset. When the preset is loaded (recalled), the device will only “touch” the video proc layer.

Example: Since other setups can be considered independent of custom video proc settings, if normal input routing was set up with a particular video proc setting in effect, and at a later time input routing or other settings need to be changed, selecting **Video Proc** here tells the preset save and load to not concern itself with other custom settings and apply only the video proc settings preset. In this manner, the saved video proc settings can be applied without disturbing any other settings.

• Preset Enter/Save/Delete



Protected state – changes locked out

Ready (open) state – changes can be applied

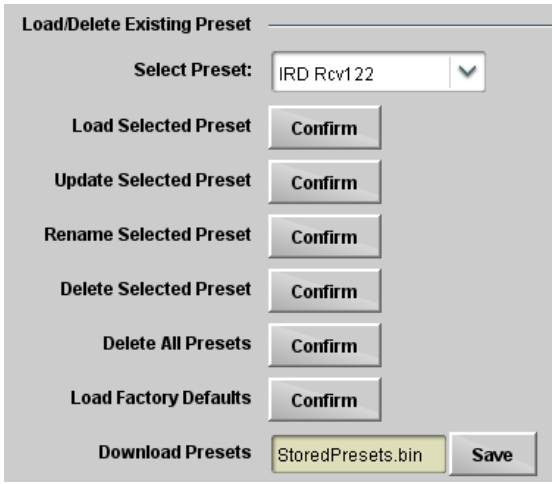
Locks and unlocks editing of presets to prevent accidental overwrite as follows:

- **Protect (ready):** This state awaits Protected and allows preset Save/Delete button to save or delete current device settings to the selected preset. **Use this setting when writing or editing a preset.**
- **Protected:** Toggle to this setting to lock down all presets from being inadvertently re-saved or deleted. **Use this setting when all presets are as intended.**
- **Create New Preset:** Field for entering user-defined name for the preset being saved (in this example, “IRD Rcv122”).
- **Save:** Saves the current device settings under the preset name defined above.

Table 3-1 BBG-1080-CSC-3G Function Menu List — continued

Presets	(continued)

• Preset Save/Load Controls



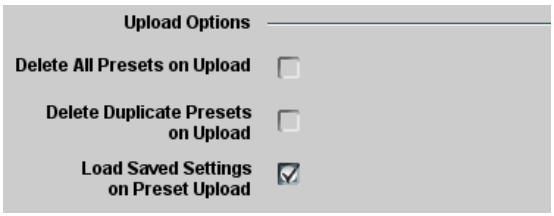
- **Select Preset:** drop-down allows a preset saved above to be selected to be loaded or deleted (in this example, custom preset "IRD Rcv122").
- **Load Selected Preset** button allows loading (engaging) the selected preset. When this button is pressed, the changes called out in the preset are immediately applied.

Note: Controls below that modify or delete presets are grayed-out (inactive) when Save/Delete button is in **Protected** mode. To use these controls, make certain Protected is not enabled.

- **Update - Rename - Delete Selected Preset** buttons allow selected preset to be updated (take in current custom settings), be renamed, or be deleted. A Confirm prompt appears in all cases.
- **Delete All Presets** button allows a delete of **all** stored presets. (This is useful if all presets are to be replaced by a new Presets .bin file.)
- **Load Factory Defaults** button allows loading (recalling) the factory default preset. When this button is pressed, the changes called out in the preset are immediately applied.

Note: Load Factory Defaults functions with no masking. The Preset Layer Select controls have no effect on this control and will reset **all** layers to factory default.

- **Download Presets** saving the preset files to a folder on the connected computer.



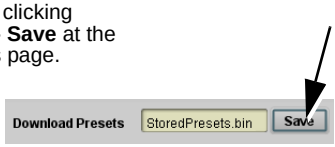
- **Upload Options** checkboxes function as follows:
  - **Delete All Presets on Upload** clears all stored presets, and then replaces or adds any presets as defined in the uploaded Presets .bin file. (This is useful to establish a "clean slate" and remove any presets that may no longer be desired.)
  - **Delete Duplicate Presets on Upload** clears stored presets bearing the same name as currently stored presets. (This avoids dual iterations of same preset name (plain and duplicate using "*" marking), and avoids possibility of "stale" presets no longer desired from appearing as a choice.)
  - **Load Saved Settings on Preset Upload** makes certain any local settings card state is retained following a preset upload. When checked, a preset within the upload is invoked only when specifically selected and invoked.

Note: Any combination of checkboxes can be checked or unchecked (enabled or disabled) as desired.

Table 3-1 BBG-1080-CSC-3G Function Menu List — continued

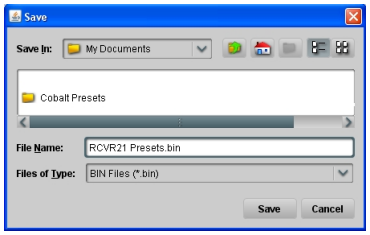
Presets	(continued)

Download (save) presets to a network computer by clicking **Download Presets – Save** at the bottom of the Presets page.



Browse to a desired save location (in this example, *My Documents\Cobalt Presets*).

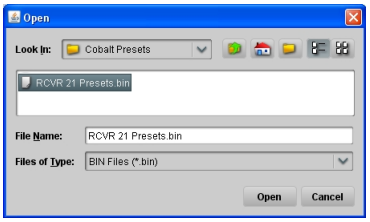
The file can then be renamed if desired (*RCVR21 Presets* in this example) before committing the save.



Upload (open) presets from a network computer by clicking **Upload** at the bottom of DashBoard.

Browse to the location where the file was saved on the computer or drive (in this example, *My Documents\Cobalt Presets*).

Select the desired file and click **Open** to load the file to the device.



Note: • Preset transfer between device download and file upload is on a **group** basis (i.e., individual presets cannot be downloaded or uploaded separately).

• 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.

Table 3-1 BBG-1080-CSC-3G Function Menu List — continued

Provides event-based loading allowing a defined preset to be automatically engaged upon various received signal status or other conditions/actions. Actions can be “canned” control commands or user-defined by going to a user preset.

Event-based loading is particularly useful for automated setup when transitioning from normal processing to processing supporting an alternate format. Up to 32 separate event can be set up.

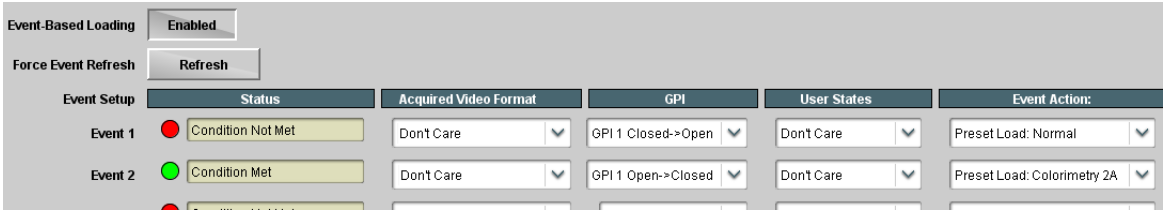
- Event based preset loading is not passive and can result in very significant and unexpected control and signal processing changes if not properly used. If event based presets are not to be used, make certain the **Event Based Loading** button is set to **Disabled**.
- Because event based preset loading applies control changes by invoking presets, loading conditions cannot be nested within a called preset (event-based loading settings performed here cannot be saved to presets).

Event triggers allow a variety of event screening criteria, and in turn provide an Event Action “go to” in response to the detected event(s). For each screened criteria, categories can be set as “don’t care” or set to specific criteria to broaden or concentrate on various areas of concern.

The **Event based loading** button serves as a master enable/disable for the function.

Go-to Event Actions can be user-defined presets, “canned” (hard-coded) selections (such as GPO triggers or routing changes), or automated E-mail alert to a respondent (see Email Alerts (p. 3-25) for setting up e-mail alerts).

In the example here for Event 1 and Event 2, the device is set to invoke a preset that applies custom color correction settings nested in preset “Colorimetry 2A” whenever GPI 1 goes LO. When this GPI goes HI, corresponding action in preset “Normal” invokes another preset to revert the device to default settings.



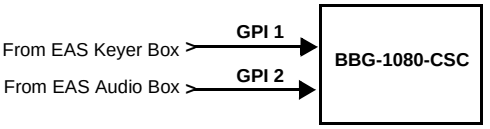
Note:
- Screened conditions are triggered upon start of event. Any event-based setup must be done in advance of the triggering event in order for event to be detected.
- Loss of true conditions does not disengage an event-based triggering. A new set of true conditions must be defined and then occur to transition from one event-based trigger to another.
- Time required to engage an event-based trigger depends upon complexity of the called preset. (For example, a preset that invokes large-scale changes may take longer to engage than a preset involving only a small change.)
- Make certain all definable event conditions that the device might be expected to “see” are defined in any of the Event 1 thru Event 32 rows. This makes certain that the device will always have a defined “go-to” action if a particular event occurs. For example, if the device is expected to “see” a 720p5994 stream or as an alternate, a 525i5994 stream, make certain both of these conditions are defined (with your desired go-to presets) in any two of the Event 1 thru Event 32 condition definition rows.

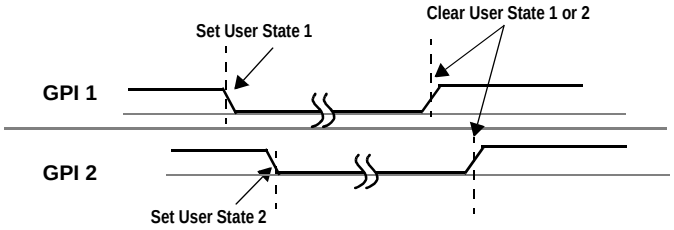
Table 3-1 BBG-1080-CSC-3G Function Menu List — continued

(continued)

User States is a special column which allows a logic state to be set (similar to a register or latch) whenever a defined condition is first triggered. A user state (which is latched until cleared by some other definable action) can be sucessively used with other user states, thereby allowing a final action to be invoked only when subordinate user states have been sequentially satisfied as true.

In the example here, two independent units are used for an EAS alert input (one box supplies alert key video, and the other supplies automated alert audio). Both communicate their ready signal each using edge-trigger GPO's which are fed to the respective GPI 1 and GPI 2 on the device. Because these two boxes are independent and cannot be relied upon to provide coinciding triggers, a chain of user state definers are used here to engage a preset routing key video and EAS audio routing when both states from both boxes are true in the order of GPI 1 first and then GPI 2 second for this example.





Event Setup	Status	GPI	User States	Event Action:
Event 1	Condition Met	GPI 1 Open->Closed	Don't Care	Set User State 1
Event 2	Condition Met	GPI 2 Open->Closed	User State 1 Set	Set User State 2
Event 3	Condition Met	Don't Care	User State 2 Set	Set User State 3
Event 4	Last Active Event	Don't Care	User State 3 Set	Preset Load: EAS Key+Audio
Event 5	Condition Not Met	Don't Care	User State 1 Cleared	Preset Load: Revert to Normal
Event 6	Condition Not Met	Don't Care	User State 2 Cleared	Preset Load: Revert to Normal
Event 7	Condition Not Met	GPI 1 Closed->Open	Don't Care	Clear User State 1
Event 8	Condition Not Met	GPI 2 Closed->Open	Don't Care	Clear User State 2

GPI 1 (key) cue falling-edge sets user state 1

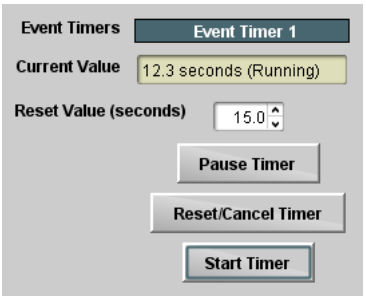
GPI 2 (audio) cue falling-edge sets user state 2

User state 2 (which requires user state 1 being true first) sets state 3, which then invokes a preset to load settings to route EAS key and audio

When either GPI 1 or GPI 2 has a rising-edge trigger (cease EAS), user states 1 or 2 are cleared, thereby clearing user state 3. Either state change calls a preset to revert to normal operation.

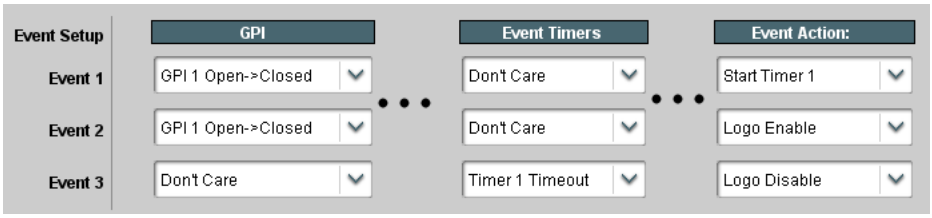
Table 3-1 BBG-1080-CSC-3G Function Menu List — continued

Provides three general-purpose timers that can be triggered to start, pause, reset, or stop upon event actions. The state of each timer, in turn, can also be used to invoke other actions.



Event Timers 1 thru **3** (Timer 1 shown) can be set with count-down values. The Pause/Reset/Start control here are manual controls. The timers are typically used with automated cues to start and stop the timer(s), as shown below.

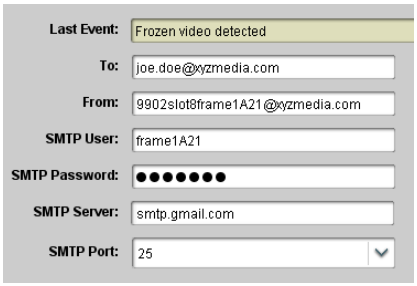
in the example here, **Event Timer 1** is used to set a logo insertion disable after a specific amount of elapsed time. A GPI inserts the logo, along with a time started at that time. Upon the timer timeout, a separate action sets logo insertion to Disabled.



Provides setup for automated Email alerts when an event has occurred.

As an Event Action choice on the Events Triggers sub-tab, an Email alert can be sent as a response. Set up email fields as shown in the example below.

Note: Frame hosting the device must be accessible to email recipient's network. It is recommended to set up and generate a test event to test the email send.



When fields are filled-in to specify recipient and sender, and email alert is selected for Event Action on Event Triggers sub-tab page, recipeient receives an email alert upon event, with the triggering event shown (in this example, "frozen video detected").

Table 3-1 BBG-1080-CSC-3G Function Menu List — continued

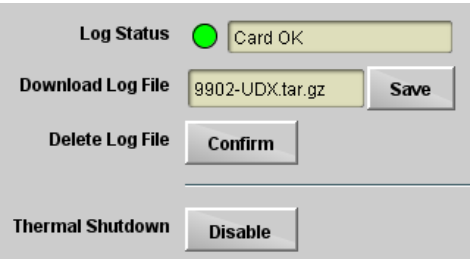
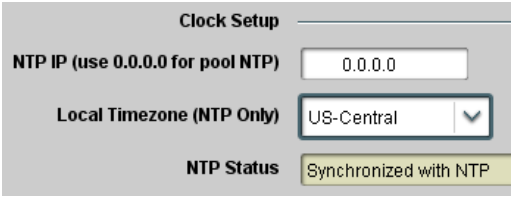
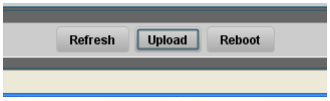
Admin	Provides a global operating status and allows a log download for factory engineering support. Also provides controls for selecting and loading firmware upgrade files.
• **Log Status and Download Controls** 	• **Log Status** indicates overall device internal operating status. • **Download Log File** allows a device 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. • **Delete Log File** deletes the currently displayed log file. A second confirmation dialog is displayed to back out of the delete if desired. • **Thermal Shutdown** enable/disable allows the built-in thermal failover to be defeated. (Thermal shutdown is enabled by default). **CAUTION** **The 9922-FS 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.**
• **NTP Clock Setup** 	Allows device NTP clock IP source and localization. This is the clock/time device will use for logs and other recorded actions. • **NTP IP** sets the IP address where NTP is to be obtained. • **Local Timezone** sets the recorded time to the localized time. • **NTP Status** shows if time is synced with NTP or if an error exists.
• **Parameter Blast** 	When enabled, Parameter Blast can reduce the time it takes for the device to appear and populate in DashBoard (this is especially relevant where high-latency connections are present). This is facilitated by reducing some handshakes on initial DashBoard setup where control settings are static (not being manipulated) while the device is first appearing. **Note:** The frame network card is the arbiter of all frame/card communications and in some cases may not accept full extent of parameter blast under some conditions.

Table 3-1 BBG-1080-CSC-3G Function Menu List — continued

Admin	**(continued)**
• Firmware Upgrade Controls	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 device reboot (thereby allowing upgrade downtime to be controlled at a scheduled point in time).

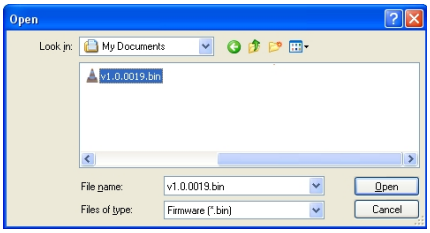
Note: The page/tab here allows managing multiple firmware versions saved on the device. New upgrade firmware from our web site can always be directly uploaded without using this page. Instructions for firmware downloading to your computer and uploading can be found at the **Support>Firmware Downloads** link at www.cobaltdigital.com.

1. Access a firmware upgrade file from a network computer by clicking **Upload** at the bottom of DashBoard.



2. Browse to the location of the firmware upgrade file (in this example, *My Documents\v1.0.0019.bin*).

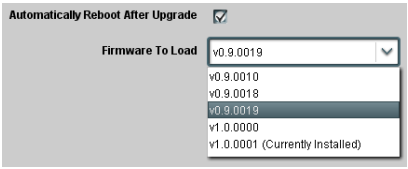
3. Select the desired file and click **Open** to upload the file to the device.



• **Immediate firmware upload.** The device default setting of **Automatically Reboot After Upgrade** checked allow a selected firmware version to be immediately uploaded as follows:

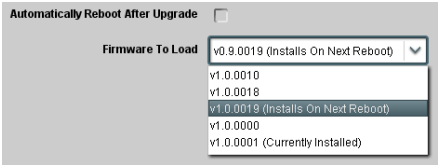
1. Click **Firmware To Load** and select the desired upgrade file to be loaded (in this example, "v1.0.0019").

2. Click **Load Selected Firmware**. The device now reboots and the selected firmware is loaded.



• **Deferred firmware upload.** With **Automatically Reboot After Upgrade** 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).

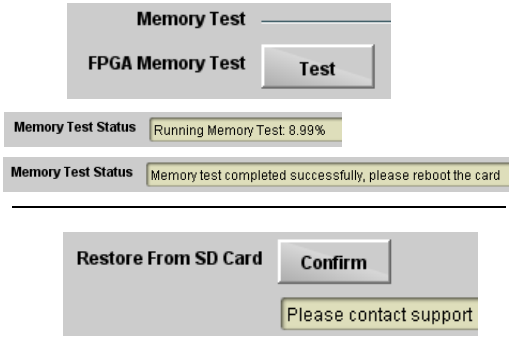
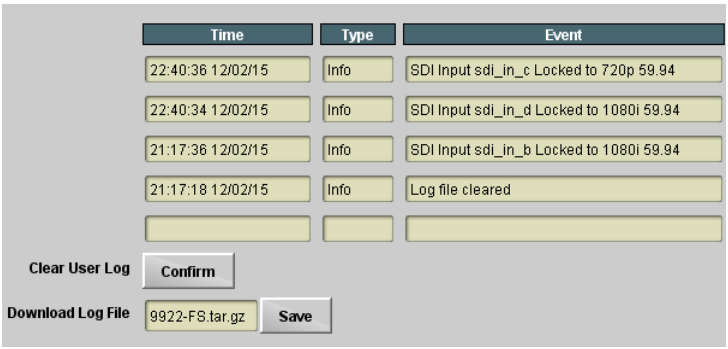
1. Click **Firmware To Load** and select the desired upgrade file to be loaded (in this example, "v1.0.0019"). Note now how the display shows "Installs on Next Reboot".



2. Click **Load Selected Firmware**. The device holds directions to proceed with the upload, and performs the upload only when the device is manually rebooted (by pressing the **Reboot** button).

3. To cancel a deferred upload, press **Cancel Pending Upgrade**. The device reverts to the default settings that allow an immediate upload/upgrade.

Table 3-1 BBG-1080-CSC-3G Function Menu List — continued

Admin	**(continued)**
• **Card Check and Restore Utilities** 	**Memory Test** allows all cells of the device FPGA memory to be tested. This control should **only** be activated under direction of product support. Exercising the memory test is **not** part of normal device maintenance. **Restore from SD Card** allows device rendered inoperable to be restored using an SD memory card fitted to the device internal SD slot. Product support must be contacted prior to performing this operation. Use of any SD card not supplied by support can corrupt the device.
User Log	Automatically maintains a log of user actions and input lock status. Log file can be downloaded using download utility.
User Log shows input lock and other user conditions (with most recent event at top of list). **Clear User Log** clears all entries. **Download Log File** opens a browser allowing the log file to be saved on the host machine.	

Color and Video Correction Examples

Shown below are examples of using the BBG-1080-CSC-3G to provide parametric color and video correction.

On-Set Monitor Color Correction Example

A typical use for the BBG-1080-CSC-3G Color Corrector function is to provide color correction for a monitor when an anchor desk set includes a monitor, as shown in Figure 3-7.

In the example setup shown in Figure 3-7, a monitor is located behind the anchor desk. When the camera includes the monitor in its shot, typically the color balance of the monitor will appear to be incorrect due to the colorimetry characteristics of the camera responding differently to the spectral light emissions from the monitor as compared to the natural light spectra emissions that exist across the set overall. This monitor color balance problem is a function of the camera(s), and can vary with different camera models.

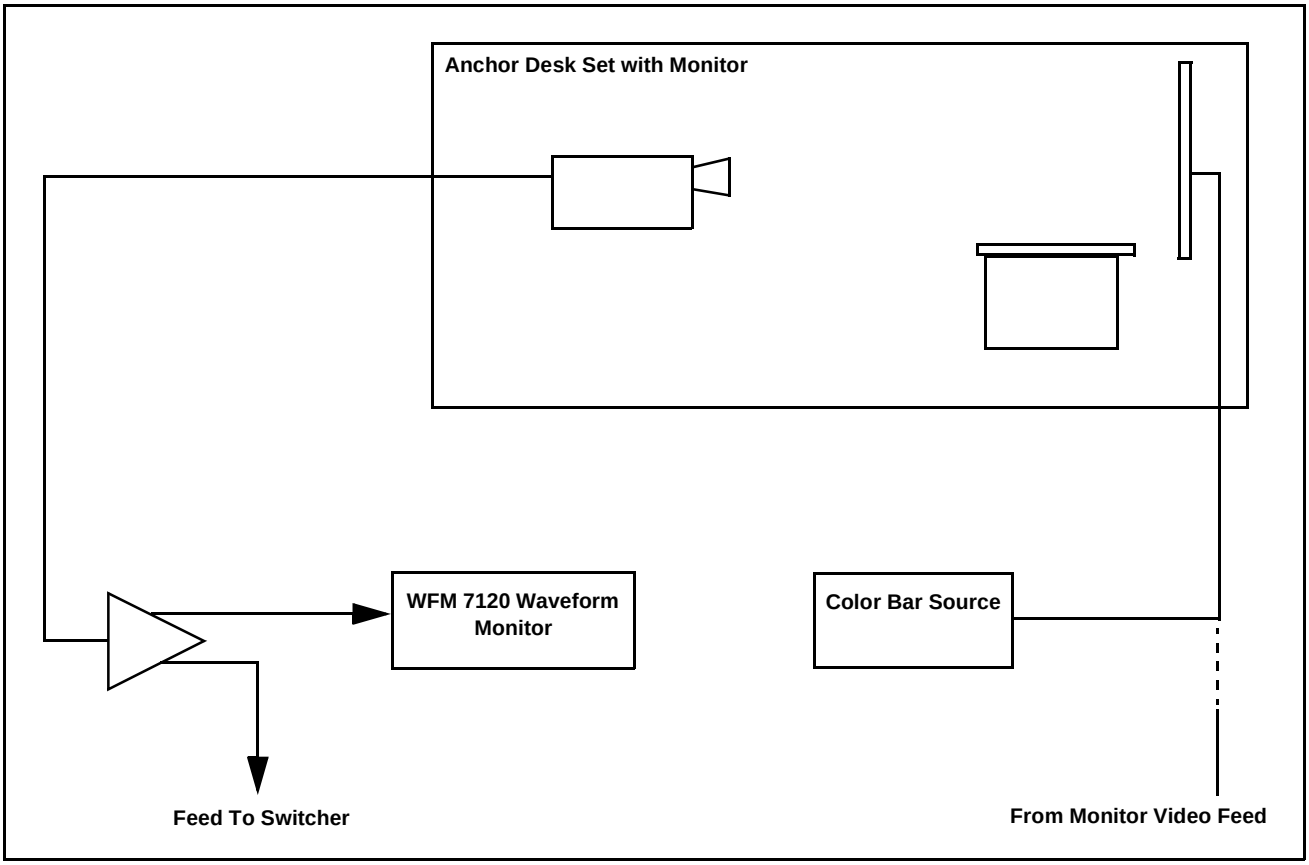


Figure 3-7 Example Uncompensated Setup

Ideally, this display would essentially result in a waveform showing identical RGB components corresponding to the grayscale monochrome bar spectrum being fed to the set monitor. However, as shown in Figure 3-8 with no correction applied, the waveform monitor shows imbalance between the RGB channels due to the reasons discussed above. Note the excessive offset, level, and deviation from an ideal gamma curve for the blue channel.

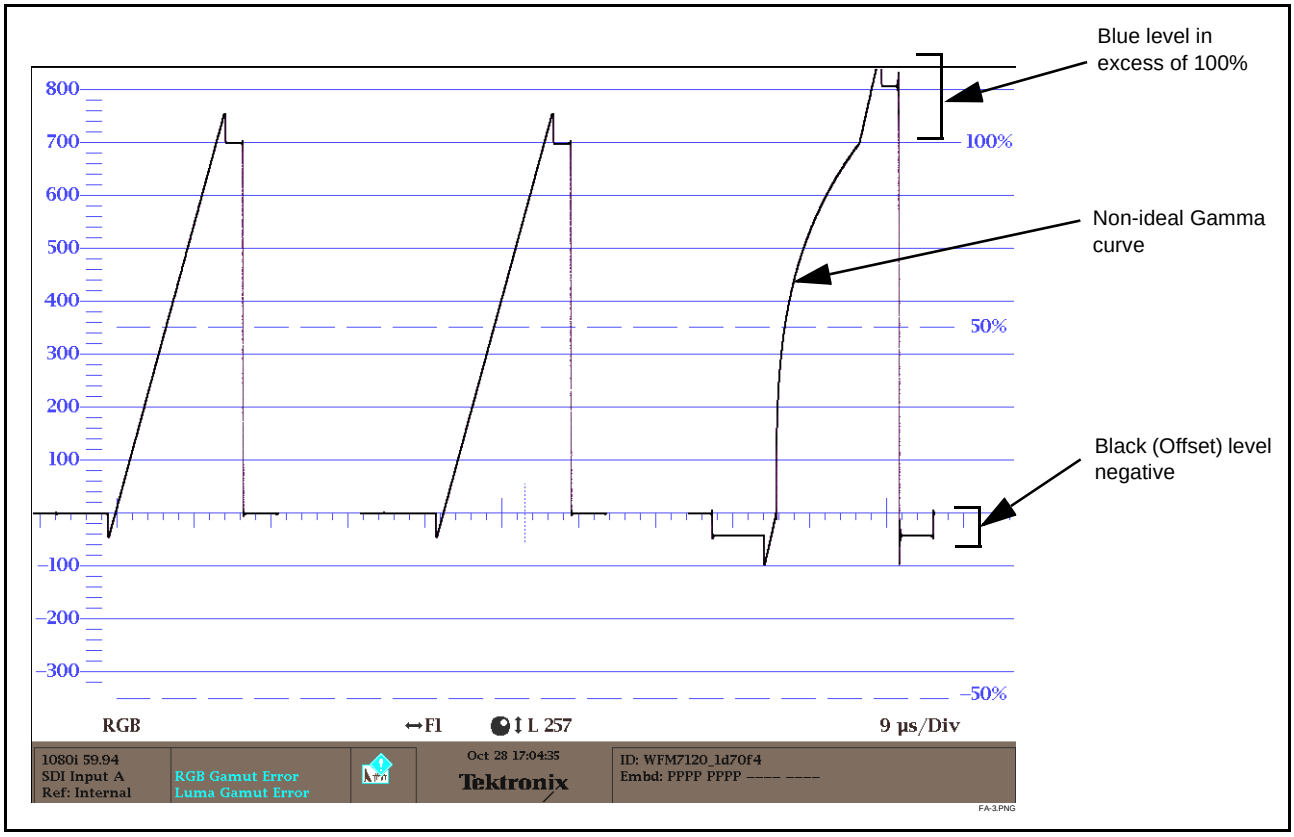


Figure 3-8 Uncorrected (Uncompensated) Monitor Waveform

Figure 3-9 shows the same setup using the BBG-1080-CSC-3G Color Corrector function, along with the device test pattern signal source standard and a video waveform monitor to assess and determine the color correction required. In the calibration setup shown in Figure 3-9 the feed to the switcher is monitored by a WFM 7120 Waveform Monitor, with the set monitor being fed a linear limit ramp by the BBG-1080-CSC-3G test pattern generator.

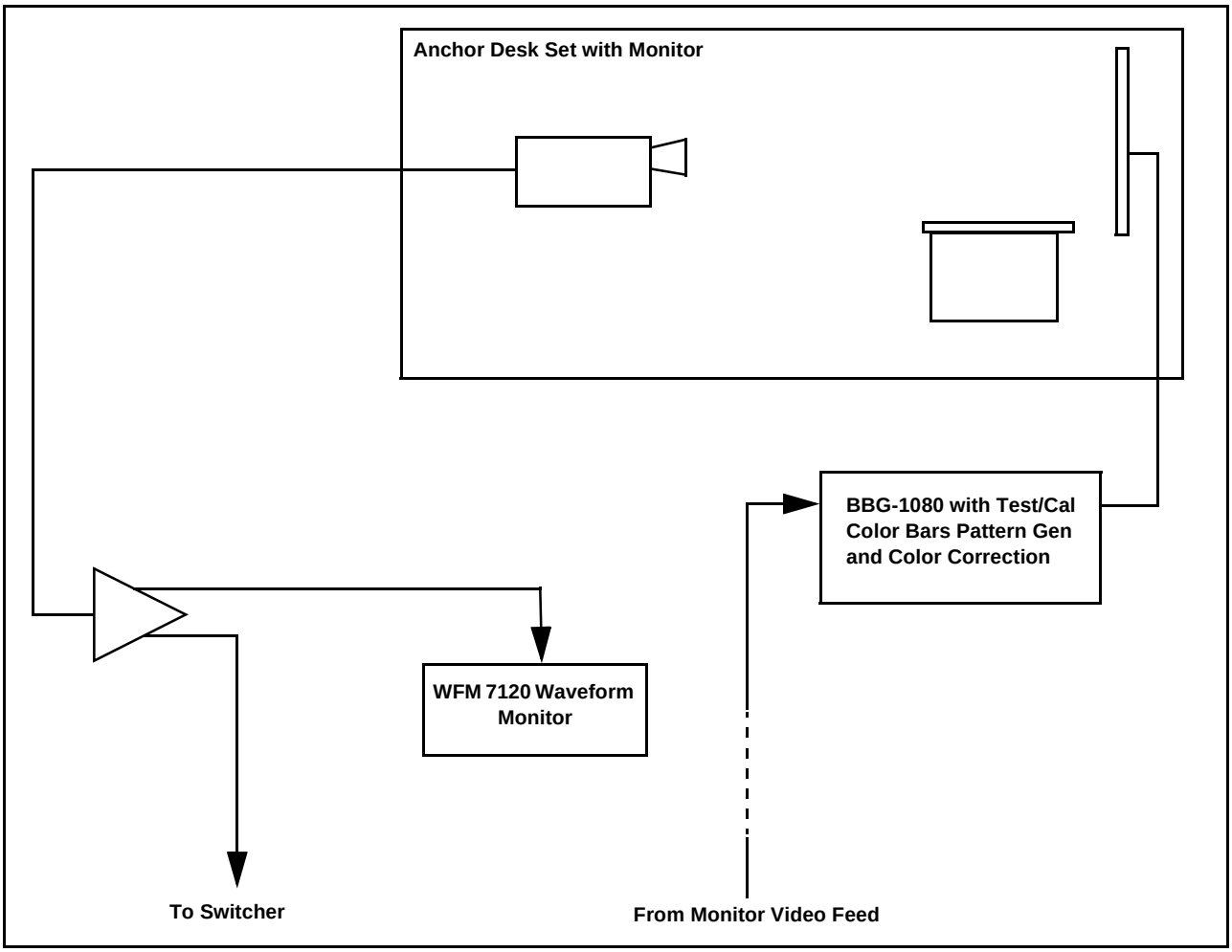
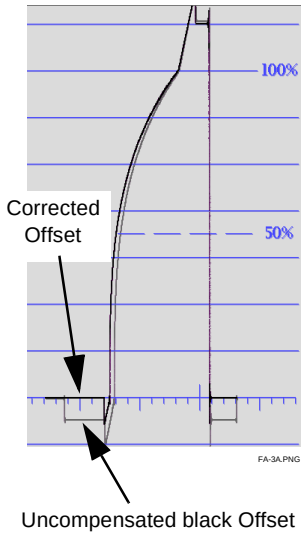


Figure 3-9 Example Setup Using Control Panel Color Corrector Function

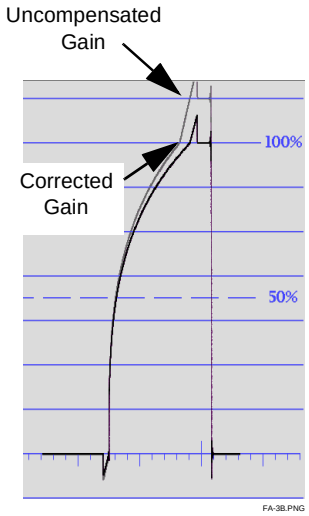
Using the BBG-1080-CSC-3G Color Corrector function and setup shown in Figure 3-9, this condition can be corrected through compensation using the BBG-1080-CSC-3G Color Corrector function as shown in Figure 3-10.

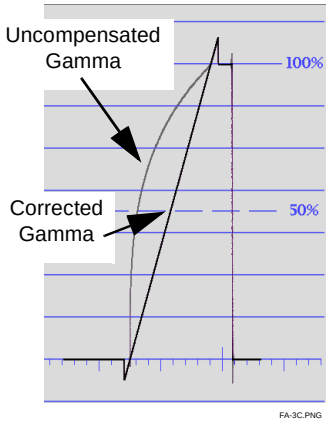
Note: As shown in Figure 3-10, a recommended approach to performing color corrections is to first apply offset correction, then gain correction, and finally gamma correction. When the various offsets that provide proper on-set monitor/camera characteristics are determined, these control offsets can be saved to a device preset, allowing these settings to be engaged as a one-button set-up using device or OGCP-9000/CC presets.



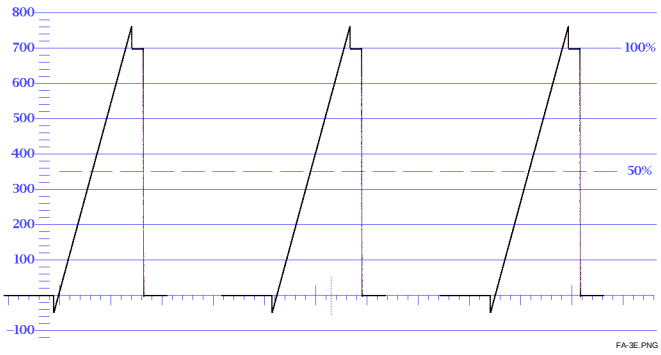
(Left) Noting that the uncompensated black offset for the blue channel is negative, a correspondingly equivalent positive setting is applied using the blue channel **Black** offset control (in this example, adjusting the Black offset from unity to 5.0 provides compensation).

(Right) Noting that the uncompensated blue Gain exceeds ideal 100% level, a correspondingly smaller gain percentage setting is applied using the blue channel **Gain** control until the gain is observed as 100% (in this example, adjusting blue **Gain** from unity to 87.5% provides compensation).





(Left) Noting that the uncompensated blue Gamma curve indicates gamma factor is less than ideal 1.000, a correspondingly greater numeric gamma factor is applied using the blue channel **Gamma** control until the blue gamma function is observed as linear (in this example, adjusting blue **Gamma** from unity to 3.333 provides compensation).



(Left) Compensated Offset, Gain, and Gamma are now symmetrical across all three color channels, resulting in proper monitor appearance in the OTA feed.

Figure 3-10 Applying Correction to Example Monitor Waveform Signal

Miscellaneous Color and Video Correction Examples

Table 3-2 provides examples showing and describing various color and video condition corrections using the BBG-1080-CSC-3G.

Table 3-2 Color and Video Corrections Using the BBG-1080-CSC-3G

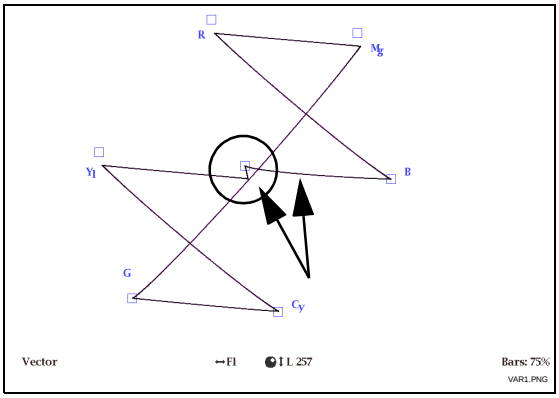
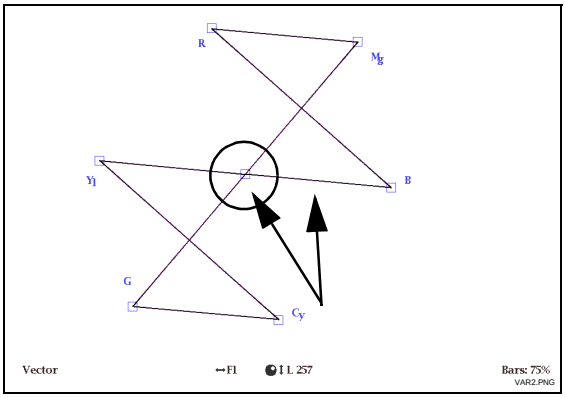
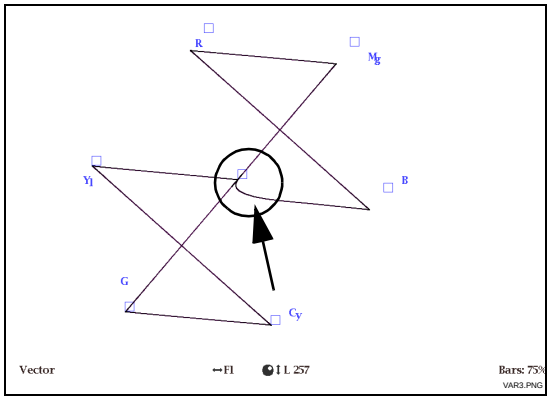
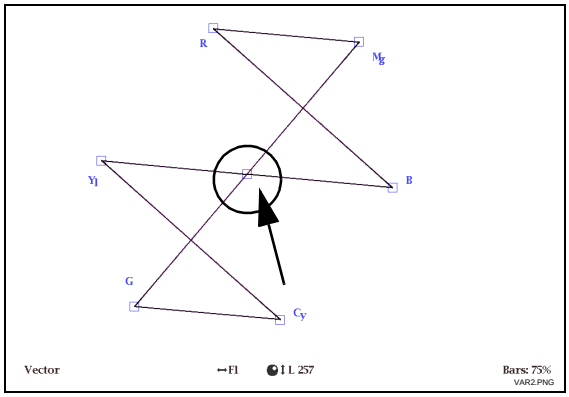
Condition Observed On Waveform Monitor	Correction Using BBG-1080-CSC-3G
Excessive red channel Gamma (as shown below for SMPTE color bars on vectorscope display) 	Using the red channel **Gamma** control to reduce Gamma factor, vectorscope display now shows correction with no knee or curvature at intersection of axes. 
Excessive green channel lift/offset (as shown below for SMPTE color bars on vectorscope display) 	Using the green channel **Black** control to reduce green channel lift/offset, vectorscope display now shows no droop along axis. 

Table 3-2 Color and Video Corrections Using the BBG-1080-CSC-3G — continued

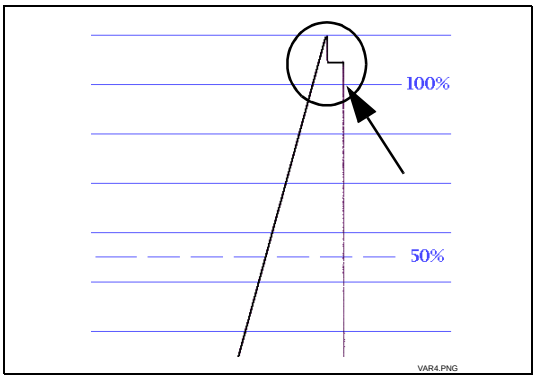
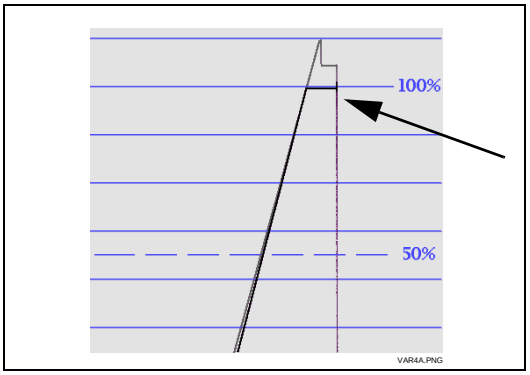
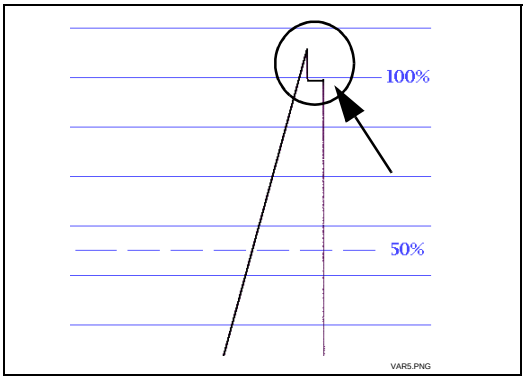
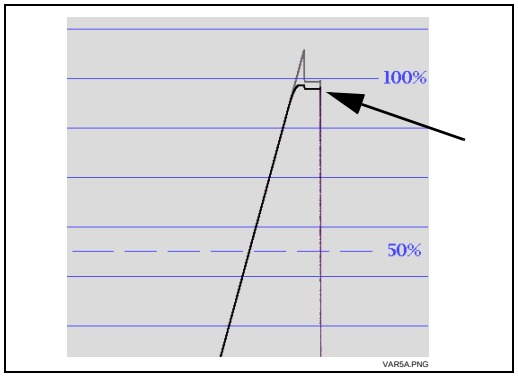
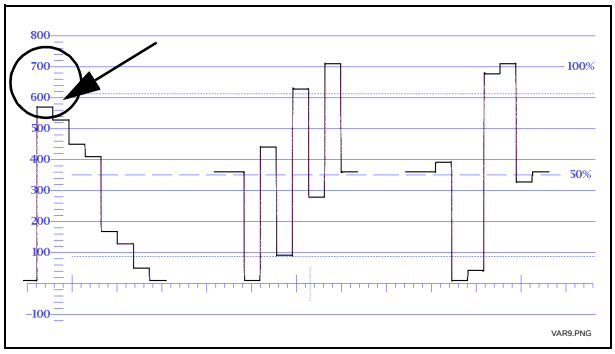
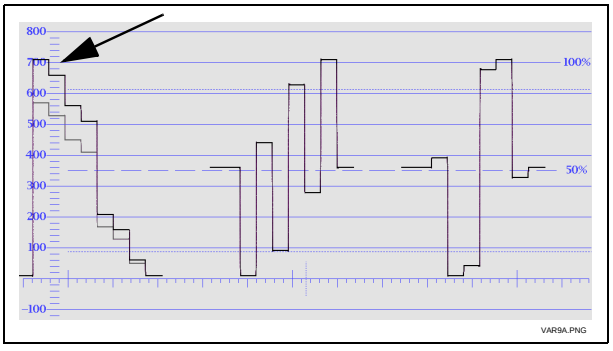
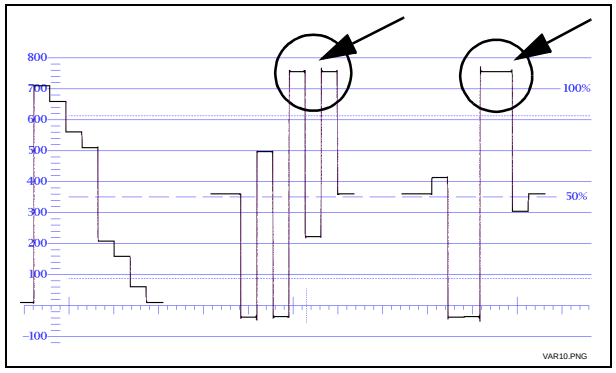
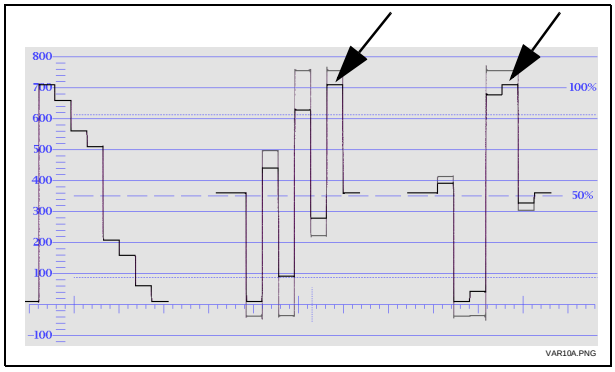
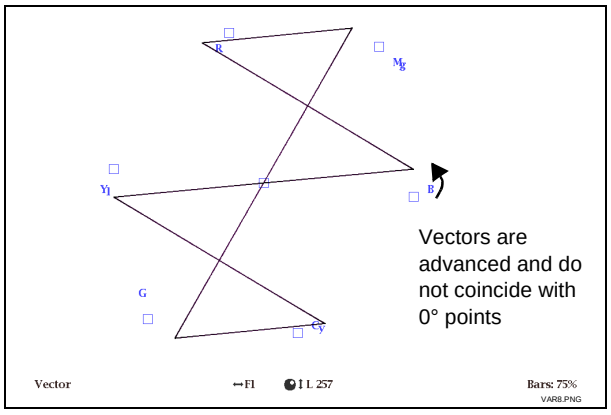
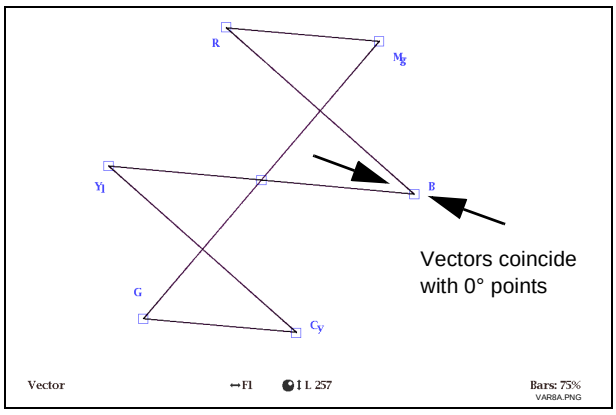
Condition Observed On Waveform Monitor	Correction Using BBG-1080-CSC-3G
White (luma) level exceeding 100% level (as shown below for limit ramp monochrome bars on waveform monitor display) 	Using the **White Hard Clip** control, a lowered white hard clipping threshold is applied to now limit the level to 100%. 
White (luma) level exceeding 100% level (as shown below for limit ramp monochrome bars on waveform monitor display) 	Using the **White Soft Clip** control, a lowered white soft clipping threshold is applied to now limit the level to 100%. 
Luma gain less than 100% level (as shown below for 100% color bars on YPbPr waveform monitor display) 	Using the **Luma Gain** control to increase luma gain, luma gain is now restored to 100%. 

Table 3-2 Color and Video Corrections Using the BBG-1080-CSC-3G — continued

Condition Observed On Waveform Monitor	Correction Using BBG-1080-CSC-3G
Chroma gain exceeds 100% level (as shown below for 100% color bars on YPbPr waveform monitor display) 	Using the **Color Gain** (Chroma) control to reduce chroma gain, chroma gain is now restored to 100% level. 
Leading color phase condition (as shown below for SMPTE color bars on vector display) 	Using the **Color Phase** control to provide phase lag, color phase condition is now corrected. 

Uploading Firmware Using Web Interface and GUI

Firmware (such as upgrades, option keys, and presets .bin files) can be uploaded to BBG-1080-CSC-3G directly via the web html5 interface without going through DashBoard (see Figure 3-11). In addition to allowing uploads without needing a DashBoard connection, this method transfers files typically much faster than using DashBoard.

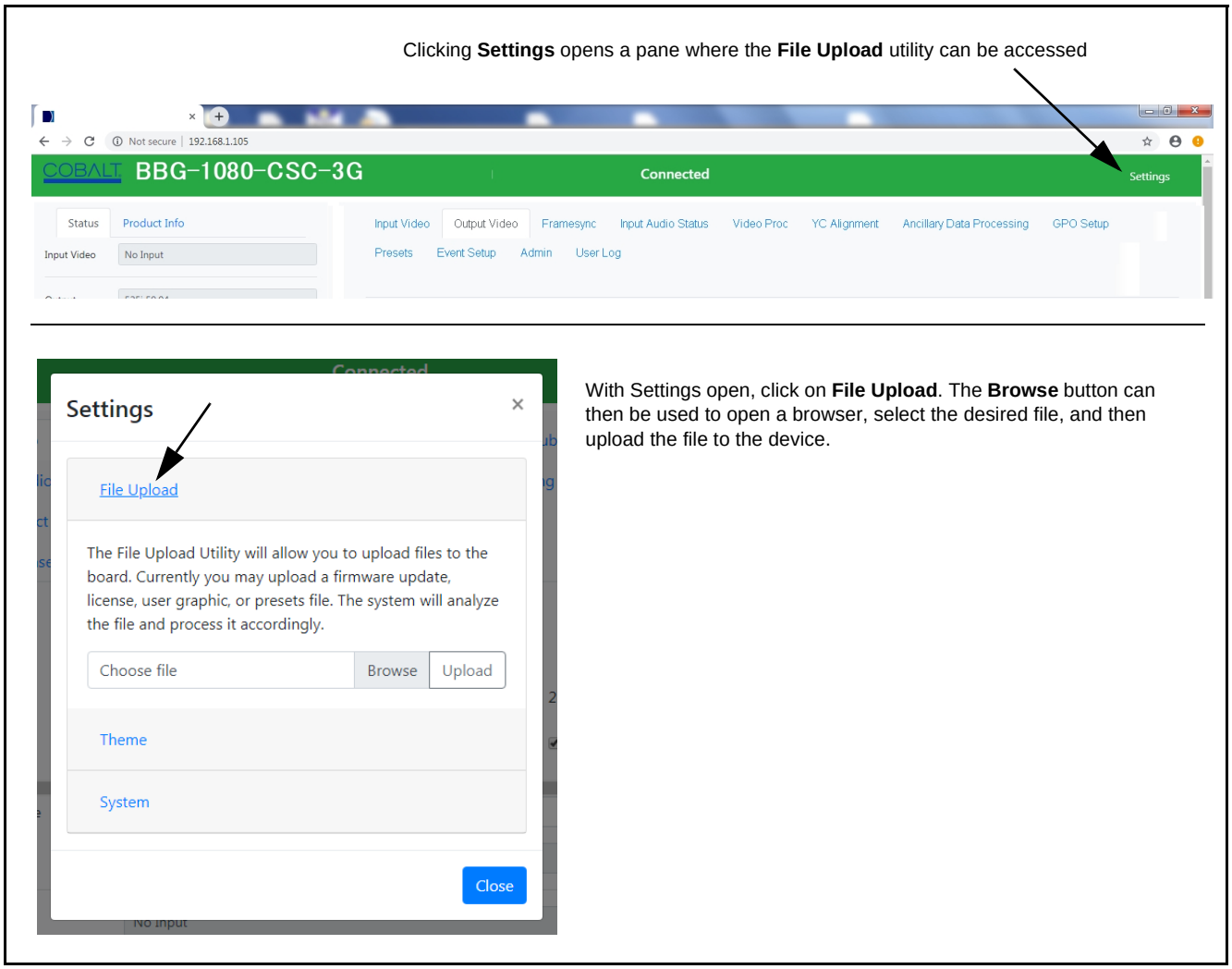


Figure 3-11 Uploads Using Web Interface/GUI

Front Panel User Menus

All of the mode and parametric controls available using the web UI (as described in BBG-1080-CSC-3G Function Menu List and Descriptions) are available using the front panel display and arrow navigating buttons. Table 3-3 lists the menu structure and identifiers for these functions, along with page references for detailed information about the functions and its controls.

The front panel menus offers a true standalone means to configure the BBG-1080 with no connection to a network required, and is useful where changes need to be done immediately (or in emergency situations) without the benefit of network access. However, the web GUI provides greatly simplified user interfaces as compared to using this menu and the arrow controls. For this reason, it is **strongly recommended** that the web GUI remote control or DashBoard be used for all applications other than the most basic cases.

Note:
- When a setting is changed using either the menu described here or the web GUI remote control, settings displayed are the settings as effected by the device itself and reported back to the remote control; the value displayed at any time is the actual value as set on the device.
- Items other than status displays have an additional submenu where a selection for the item can be made. Some submenu items listed in Table 3-3 have additional nested submenus (denoted by ∗). These multiple-level submenus are not listed here; refer to the referenced page number for more information.

Table 3-3 Front Panel User Menus

Menu>Submenu Items	Menu>Submenu Items	
Status (pg 3-8) Output Video SDI Input A SDI Input B SDI Input C SDI Input D GPI 1 GPI 2 Reference Card Voltage Card Power Card Temp(front) Card Temp (rear) Card Temp (FPGA) Card Up Time Preset Engaged	Framesync (pg 3-12) Lock Mode Output Rate Initial Startup Format Output Mode On LOS-- Test Pattern Vert Lines Offset Horiz Offset Frame Delay Report Delay Lock Status	Product Info (pg 3-8) Product Product Options Supplier Revision Build Date FPGA Rev FPGA Build Date S/N
GPIO (pg 3-19) GPI1 GPI2 GPI Coding	Input Video (pg 3-10) Source SDI IN A Status SDI IN B Status SDI IN C Status SDI IN D Status	Network Settings (pg 3-3) IP Addr Netmask Gateway Mode (DHCP/Stat)
Presets (pg 3-20) Save/Delete Mode Select Preset Load Selected Preset Delete Selected Preset Load Factory Defaults		

Troubleshooting

This section provides general troubleshooting information and specific symptom/corrective action for the BBG-1080-CSC-3G and its remote control interface. The BBG-1080-CSC-3G 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-1080-CSC-3G itself and its remote control provide error and failure indications. Depending on how the BBG-1080-CSC-3G 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.

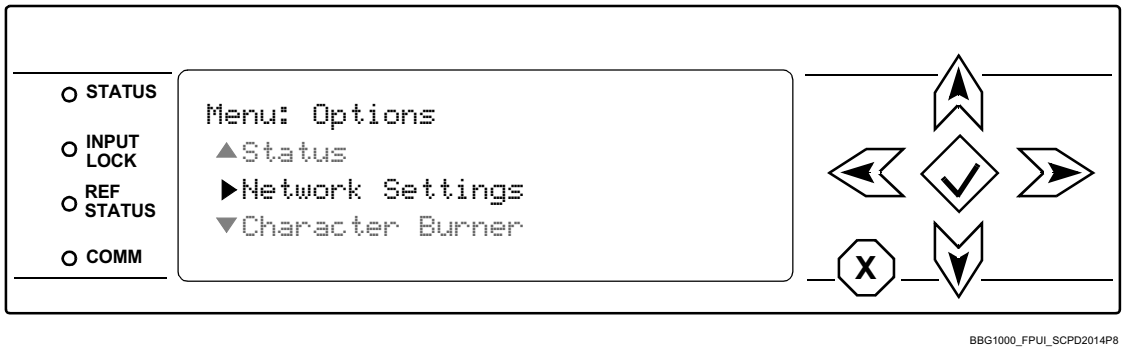
The various BBG-1080-CSC-3G device and remote control error and failure indicators are individually described below.

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. 3-40)
- BBG-1080-CSC-3G Processing Error Troubleshooting (p. 3-41)

BBG-1080-CSC-3G Front Panel Status/Error Indicators and Display

Figure 3-12 shows and describes the BBG-1080-CSC-3G 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.



Item	Function
Alphanumeric Display	Shows device statuses
STATUS LED	Illuminates GREEN indicating BBG-1080-CSC-3G has successfully powered-up and passed self-tests.
INPUT LOCK LED	Illuminates GREEN indicating signal presence for currently-selected input video path. Illuminates ORANGE if input video is lost.
REF STATUS LED	Illuminates GREEN indicating BBG-1080-CSC-3G is receiving valid reference when set up for framesync operation. Illuminates ORANGE if reference is lost or incompatible with input video.
COMM LED	Illuminates GREEN when device is communicating with network connection. Illuminates ORANGE if connection is lost.
Note: The LEDs listed above are always illuminated under normal conditions. An LED that is not lit indicates an error with the device.	

Figure 3-12 BBG-1080-CSC-3G 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 3-4 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 3-4 Basic Troubleshooting Checks

Item	Checks

Verify power presence and characteristics	• On the BBG-1080-CSC-3G, 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.
	• Check the Power Consumed indication for the BBG-1080-CSC-3G. This can be observed using the Status front-panel or web UI pane.
	  • If display shows **no** power being consumed, either the frame power supply, connections, or the BBG-1080-CSC-3G itself is defective.
	  • If display shows **excessive** power being consumed (see Technical Specifications (p. 1-15) in Chapter 1, “Introduction”), the BBG-1080-CSC-3G may be defective.

Check Cable connection secureness and connecting points	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.
Check status indicators and displays	On BBG-1080-CSC-3G 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.
Troubleshoot by substitution	All devices can be hot-swapped, replacing a suspect device with a known-good item.

BBG-1080-CSC-3G Processing Error Troubleshooting

Table 3-5 provides BBG-1080-CSC-3G processing troubleshooting information. If the BBG-1080-CSC-3G exhibits any of the symptoms listed in Table 3-5, follow the troubleshooting instructions provided.

In the majority of cases, most errors are caused by simple errors where the BBG-1080-CSC-3G is not appropriately set for the type of signal being received by the device.

Table 3-5 Troubleshooting Processing Errors by Symptom

Symptom	Error/Condition	Corrective Action
BBG-1080 shows **Unlocked** message in BBG-1080-CSC-3G Info pane.	No video input present	Make certain intended video source is connected to appropriate BBG-1080-CSC-3G video input. Make certain BNC cable connections are OK.
Selected upgrade firmware will not upload	Automatic reboot after upgrade turned off	Device **Presets** > **Automatically Reboot After Upgrade** 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 (**Event Setup** tab) should be set to **Disabled** 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 Event Setup (p. 3-23) for more information.
Device will not retain user settings, or setting changes or presets spontaneously invoke.	**Event Based Loading** sub-tab inadvertently set to trigger on event	If event based loading is not to be used, make certain event-based preset loading on **Event Setup** tab is disabled (either using master **Enable/Disable** control or through events settings. See Event Setup (p. 3-23) for more information.

In Case of Problems

Recovering Device From SD Memory Card

New production devices/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 3-13.) 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:
- (Option +TTS only) Cards shipped with option +TTS use an SD card for the TTS library in addition to recovery files. If your +TTS-equipped device was received **earlier than December 2015**, your SD may not contain the recovery files. Contact Product Support to obtain the updated SD card containing both TTS library and SD recovery files.
- If unit is a BBG-1000 Series device, remove the top cover before proceeding.

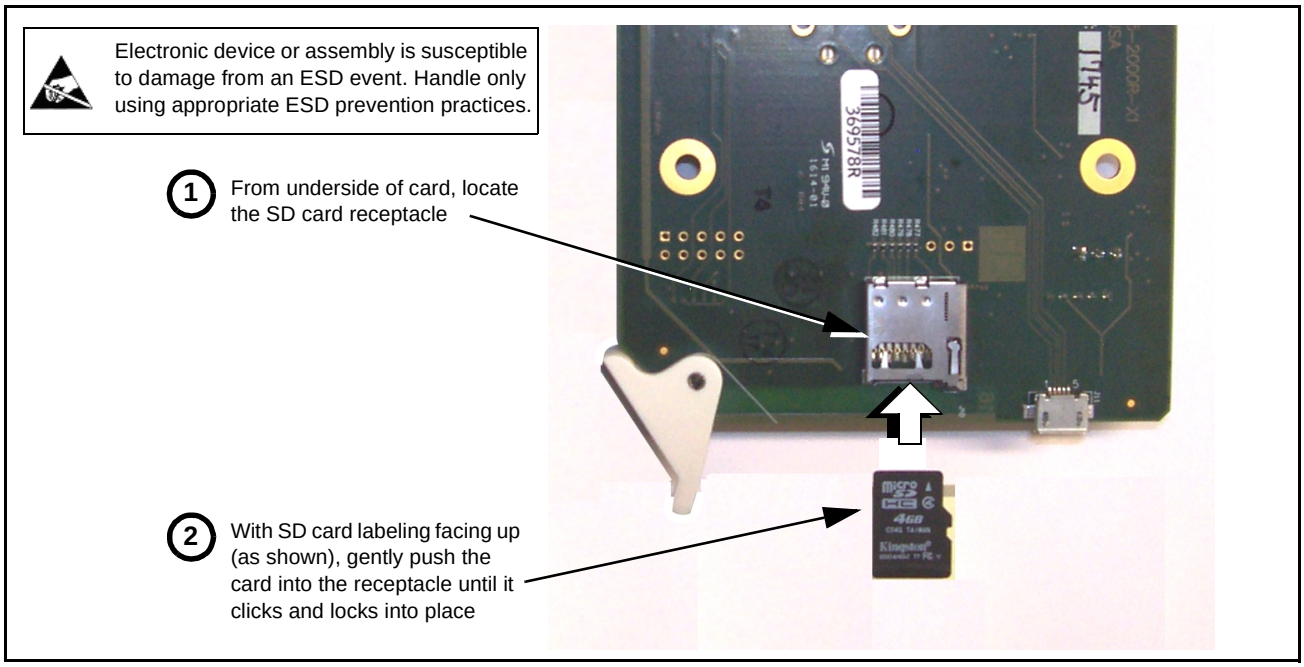


Figure 3-13 SD Card Installation

2. (See Figure 3-14.) With card powered-down, locate the **MMC BOOT** button on the card. Proceed as shown in picture.

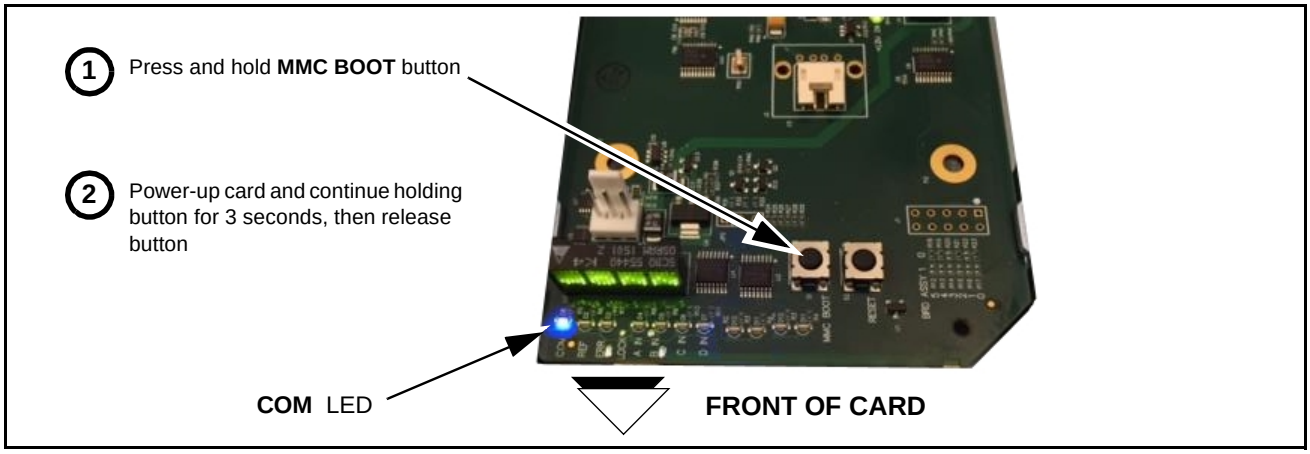


Figure 3-14 MMC Boot Button

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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