HARRIS®

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6800+ PLUS™

HMX6800+BC8 Multiplexers

Installation and Operation Manual

HMX6800+BC8

Audio Multiplexers

Installation and Operation Manual

Copyright Information

Warranty Information

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HMX6800+BC8 Installation and Operation Manual

Preface

Manual Information

Purpose

This manual details the features, installation, operation, maintenance, and specifications for the HMX6800+BC8 Audio Multiplexers.

Audience

This manual is written for engineers, technicians, and operators responsible for installation, setup, maintenance, and/or operation of the HMX6800+BC8 Audio Multiplexers.

Revision History

Table P-1. Revision History of Manual

Edition	Date	Comments
A	February 2007	Initial release
B	November 2007	Update breakout cable information

Writing Conventions

To enhance your understanding, the authors of this manual have adhered to the following text conventions:

Table P-2. Writing Conventions

Term or Convention	Description
Bold	Indicates dialog boxes, property sheets, fields, buttons, check boxes, list boxes, combo boxes, menus, submenus, windows, lists, and selection names
Italics	Indicates E-mail addresses, the names of books or publications, and the first instances of new terms and specialized words that need emphasis
CAPS	Indicates a specific key on the keyboard, such as ENTER, TAB, CTRL, ALT, or DELETE
Code	Indicates variables or command-line entries, such as a DOS entry or something you type into a field
>	Indicates the direction of navigation through a hierarchy of menus and windows
hyperlink	Indicates a jump to another location within the electronic document or elsewhere
Internet address	Indicates a jump to a Web site or URL
Note	Indicates important information that helps to avoid and troubleshoot problems

Obtaining Documents

Product support documents can be viewed or downloaded from our website. Alternatively, contact your Customer Service representative to request a document.

Unpacking/Shipping Information

Unpacking a Product

This product was carefully inspected, tested, and calibrated before shipment to ensure years of stable and trouble-free service.

1. Check equipment for any visible damage that may have occurred during transit.

2. Confirm that you have received all items listed on the packing list.

3. Contact your dealer if any item on the packing list is missing.

4. Contact the carrier if any item is damaged.

5. Remove all packaging material from the product and its associated components before you install the unit.

Keep at least one set of original packaging, in the event that you need to return a product for servicing.

Product Servicing

Except for firmware upgrades, HMX6800✛BC8 modules are not designed for field servicing. All hardware upgrades, modifications, or repairs require you to return the modules to the Customer Service center.

Returning a Product

In the unlikely event that your product fails to operate properly, please contact Customer Service to obtain a Return Authorization (RA) number, then send the unit back for servicing.

Keep at least one set of original packaging in the event that a product needs to be returned for service. If the original package is not available, you can supply your own packaging as long as it meets the following criteria:

• The packaging must be able to withstand the product's weight.

• The product must be held rigid within the packaging.

• There must be at least 2 in. (5 cm) of space between the product and the container.

• The corners of the product must be protected.

Ship products back to us for servicing prepaid and, if possible, in the original packaging material. If the product is still within the warranty period, we will return the product prepaid after servicing.

Restriction on Hazardous Substances (RoHS) Compliance

Directive 2002/95/EC—commonly known as the European Union (EU) Restriction on Hazardous Substances (RoHS)—sets limits on the use of certain substances found in electrical and electronic equipment. The intent of this legislation is to reduce the amount of hazardous chemicals that may leach out of landfill sites or otherwise contaminate the environment during end-of-life recycling. The Directive, which took effect on July 1, 2006, refers to the following hazardous substances:

- Lead (Pb)
- Mercury (Hg)
- Cadmium (Cd)
- Hexavalent Chromium (Cr-V1)
- Polybrominated Biphenyls (PBB)
- Polybrominated Diphenyl Ethers (PBDE)

According to this EU Directive, all products sold in the European Union will be fully RoHS-compliant and "lead-free." (See our website for more information on dates and deadlines for compliance.) Spare parts supplied for the repair and upgrade of equipment sold before July 1, 2006 are exempt from the legislation. Equipment that complies with the EU directive will be marked with a RoHS-compliant emblem, as shown in Figure P-1.

RoHS Compliant

Figure P-1. RoHS Compliance Emblem

Waste from Electrical and Electronic Equipment (WEEE) Compliance

The European Union (EU) Directive 2002/96/EC on Waste from Electrical and Electronic Equipment (WEEE) deals with the collection, treatment, recovery, and recycling of electrical and electronic waste products. The objective of the WEEE Directive is to assign the responsibility for the disposal of associated hazardous waste to either the producers or users of these products. As of August 13, 2005, the producers or users of these products were required to recycle electrical and electronic equipment at end of its useful life, and may not dispose of the equipment in landfills or by using other unapproved methods. (Some EU member states may have different deadlines.)

In accordance with this EU Directive, companies selling electric or electronic devices in the EU will affix labels indicating that such products must be properly recycled. (See our website for more information on dates and deadlines for compliance.) Contact your local sales representative for information on returning these products for recycling. Equipment that complies with the EU directive will be marked with a WEEE-compliant emblem, as shown in Figure P-2.
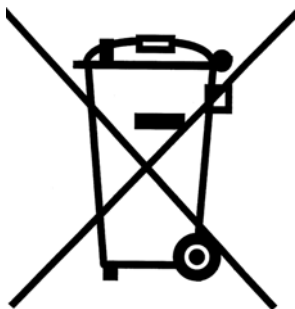
Figure P-2. WEEE Compliance Emblem

Safety

Carefully review all safety precautions to avoid injury and prevent damage to this product or any products connected to it. If this product is rack-mountable, it should be mounted in an appropriate rack using the rack-mounting positions and rear support guides provided. It is recommended that each frame be connected to a separate electrical circuit for protection against circuit overloading. If this product relies on forced air cooling, it is recommended that all obstructions to the air flow be removed prior to mounting the frame in the rack.

If this product has a provision for external earth grounding, it is recommended that the frame be grounded to earth via the protective earth ground on the rear panel.

IMPORTANT! Only qualified personnel should perform service procedures.

Safety Terms and Symbols in this Manual

WARNING

Statements identifying conditions or practices that may result in personal injury or loss of life. High voltage is present.

CAUTION

Statements identifying conditions or practices that can result in damage to the equipment or other property.

Chapter 1

Introduction

Overview

The HMX6800✛BC8 HD/SD Audio Multiplexers embed 8 AES audio signals, in both balanced and unbalanced formats, into a single 1.5 Gb/s HD or 270 Mb/s SD video stream. Following SMPTE specifications, this embedder can embed up to eight AES audio signals into four groups in the horizontal ancillary region of the HD-SDI or SD-SDI output signal. The sample rate conversion can be disabled for Dolby E®/compressed audio compliancy.

HMX6800✛BC8 modules auto-detect between HD-SDI and SD-SDI signals with full channel selection per HD or SD signal. Built-in video and audio processing amplifiers allow for full control over the picture and sound.

Each HMX6800✛BC8 includes a module-specific breakout cable that expands the number of available connections beyond what would fit on a standard two-slot back connector. The breakout cable includes an RS-422 serial connector to embed metadata.

HMX6800✛BC8 modules can be controlled at the card edge; or controlled and monitored through Pilot Lite, Pilot, Navigator, and CCS-compliant control panels.

The following topics are described in this chapter:

- "Product Description" on page 2
- "Module Descriptions" on page 3
- "Breakout Cables" on page 6
- "Signal Flow" on page 11

Product Description

HMX6800+BC8 modules have the following features:

- Automatic detection of all SMPTE 292M HDTV video standards and SMPTE 259M 525/625 component video standards

- 16-, 20-, or 24-bit audio processing (selectable word length in channel pairs)

- Audio test tone generator

- Programmable audio delays (up to 1.3 s)

- Inputs:

    - SMPTE 292M HD-SDI or SMPTE 259M SD-SDI input

    - Eight unbalanced AES digital audio or eight balanced AES digital audio inputs

- Four SMPTE 292M HD-SDI with SMPTE 299M embedded audio or SMPTE 259M SD-SDI with SMPTE 272M embedded audio outputs

- Video delay for 1 video stream (up to 5 frames for HD and 25 frames for SD)

- Sample rate conversion disable on AES inputs for Dolby / compressed audio embedding

- Optional ancillary data space cleaning mode before embedding

- 24-bit AES input audio embedding

- Data embedding (Dolby-E metadata)

- HD and SD video processing amplifier with controls for luminance gain, luminance offset, chrominance gain, chrominance offset, white clip, black clip, and hue (SD only)

- Audio processing amplifier with controls for delay, gain, invert, channel multiplexing, and averaging

- Thumbnail streaming of output video, when installed in an FR6802+QXF frame that also contains a 6800+Eth resource module

- Card-edge LEDs to indicate signal presence (both audio and video) and module failure

- Serial and Ethernet remote control and monitoring

Module Descriptions

Front Module

Figure 1-1 is a generic top-front view of a typical 6800+ module and shows the general location of standard LEDs, controls, and jumpers.
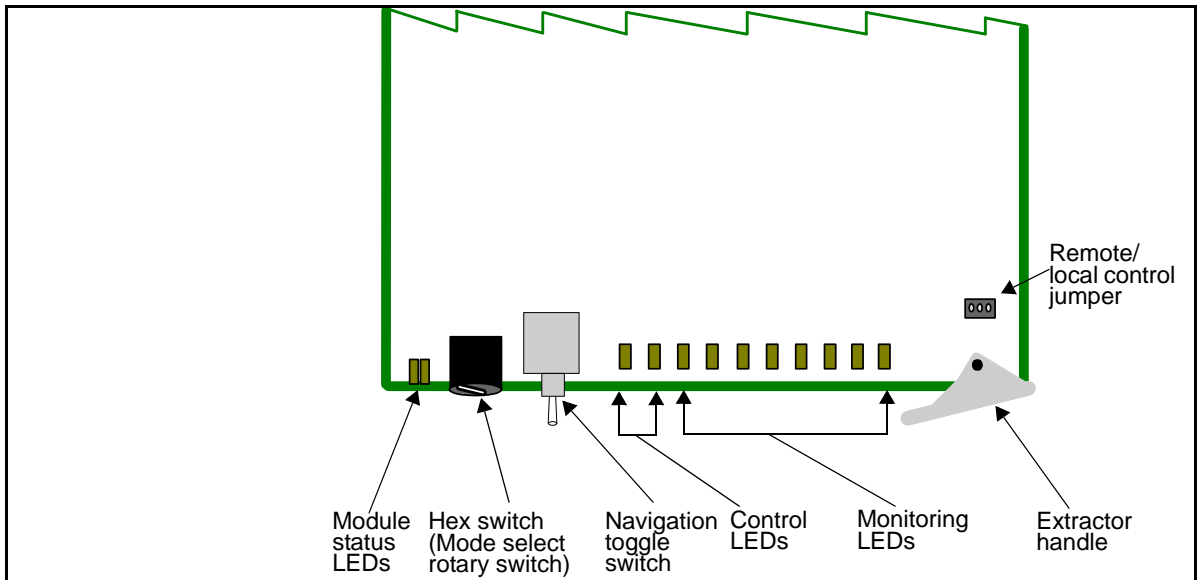
Figure 1-1. Typical 6800+ Module

Table 1-1 on page 4 briefly describes generic 6800+ LEDs, switches, and jumpers. See "Operation" on page 25 for more information on specific HMX6800+BC8 module controls, LEDs, and jumpers.

Table 1-1. Generic 6800**+** Module Features

Feature	Description
Module status LEDs	Various color and lighting combinations of these LEDs indicate the module state. See "Module Status LEDs" on page 61 for more information.
Mode select rotary switch	This switch selects between various control parameters.
Navigation toggle switch	This switch navigates up and down through the available control parameters: • **Up**: Decrease • **Down**: Increase
Control LEDs	Various lighting combinations of these control LEDs (sometimes referred to as "Bank Select LEDs") indicate the currently selected bank. See Table 3-7 on page 36 for more information.
Monitoring LEDs	Each 6800**+** module has a number of LEDs assigned to indicate varying states/functions. See "Monitoring LEDs" on page 60 for a description of these LEDs.
Local/Remote control jumper	• **Local**: Locks out external control panels and allows card-edge control only; limits the functionality of remote software applications to alarm monitoring • **Remote**: Allows remote or local (card-edge) configuration, operation, and monitoring of the HMX6800**+**BC8

Back Connectors

HMX6800+BC8 Back Connector for FR6802+ Frame

Figure 1-2 shows the double-slot back connector used by the HMX6800+BC8 when installed in an FR6802+QXF frame.
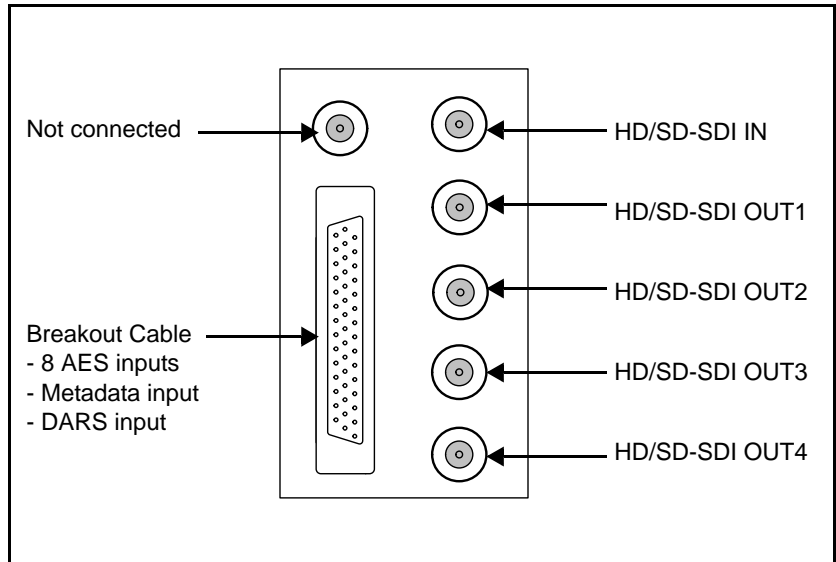
Figure 1-2. HMX6800+BC8 Back Connector

Breakout Cables

Each HMX6800**+**BC8 comes with an unbalanced-audio breakout cable similar to the one pictured in Figure 1-3. An optional balanced-audio breakout cable, as seen in Figure 1-4 on page 7. For ordering information, see Figure 2-2 on page 15.
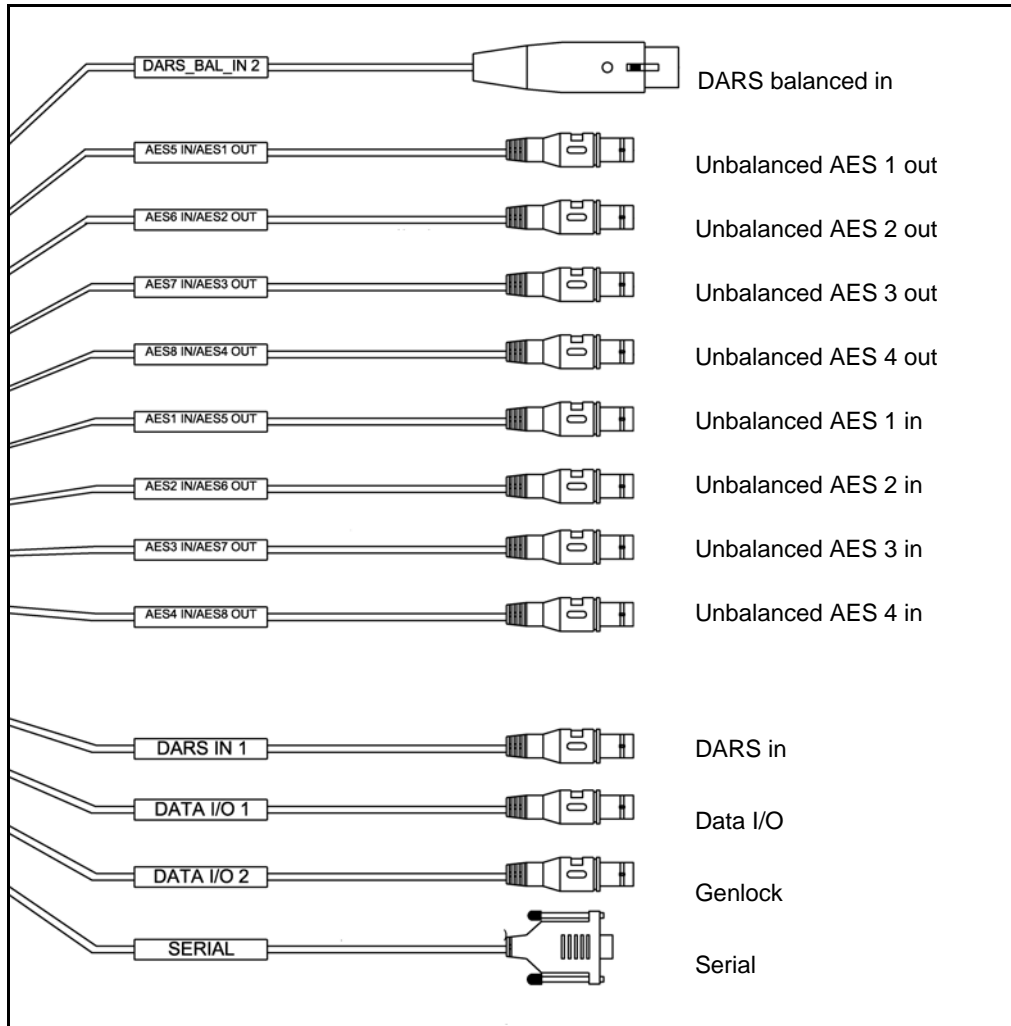
Figure 1-3. HMX6800**+**BC8 Unbalanced-Audio Breakout Cable
(Part Number 6800+OPT+16+C)
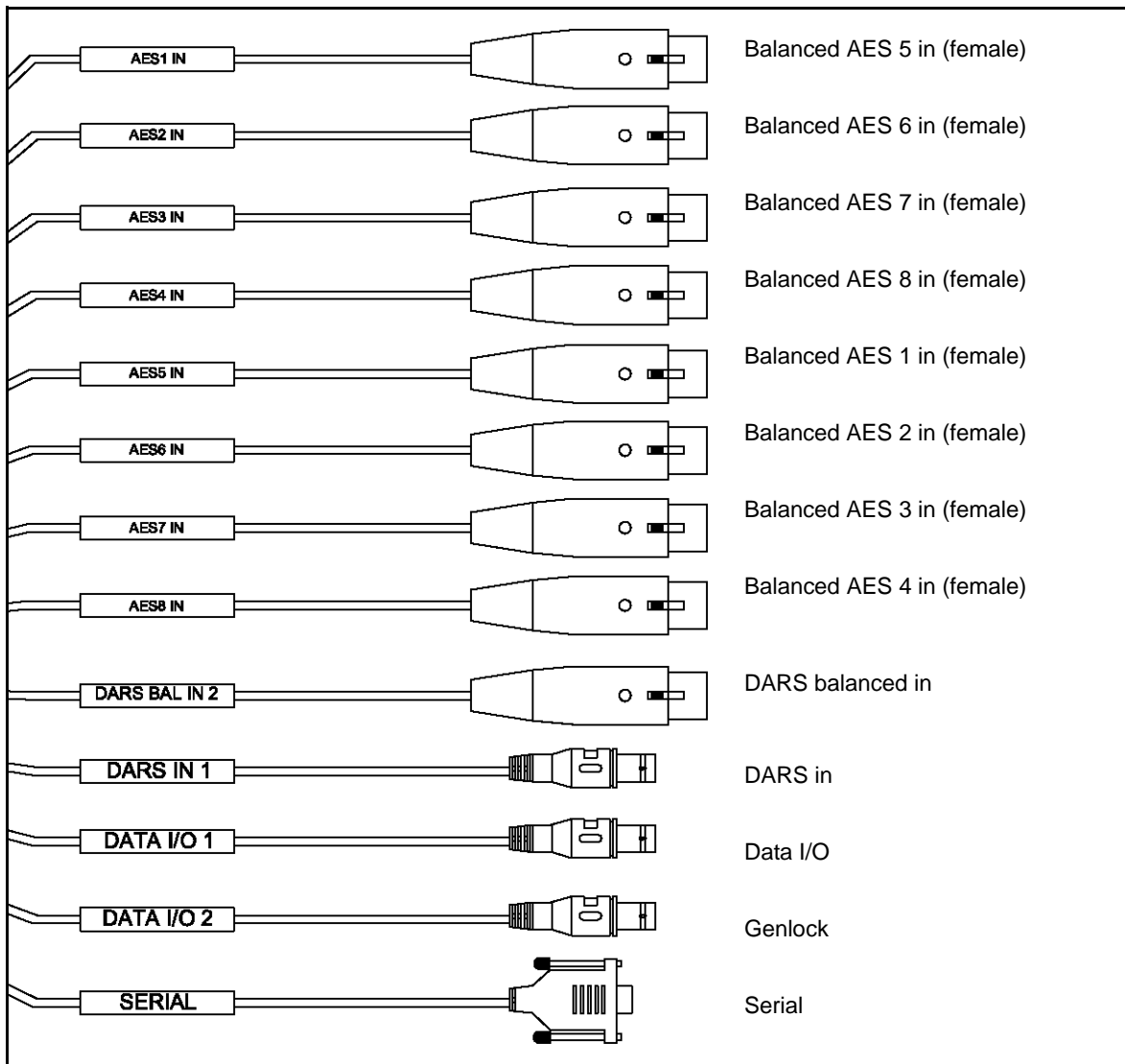
Figure 1-4. HMX6800**+**BC8 Balanced-Audio Breakout Cable
(Part Number 6800+OPT+16+XF)

If you need to make your own breakout cable, pinouts are listed in
Table 1-2, and pin numbers for the 44-pin connector are listed in
Figure 1-5.
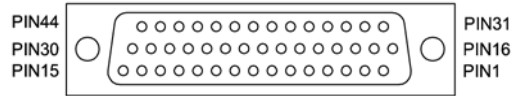
Figure 1-5. Pin Numbers for 44-pin Connector

Table 1-2. Pinouts for 44-pin Connector

Pin No. on DB-44M	Description	Connection Type on Unbalanced Cable	Connection Type on Balanced Cable	Cable Color
30	Balanced AES1B (-)		XLR5(XLR-3F)	Blue
44	Balanced AES1B (+)		XLR5(XLR-3F)	Blue
27	Balanced AES5B (-)		XLR1(XLR-3F)	Blue
41	Balanced AES5B (+)		XLR1(XLR-3F)	Blue
42	Balanced AES2B (-)		XLR6(XLR-3F)	Blue
43	Balanced AES2B (+)		XLR6(XLR-3F)	Blue
24	Balanced AES6B (-)		XLR2(XLR-3F)	Blue
38	Balanced AES6B (+)	Not connected	XLR2(XLR-3F)	Blue
14	Balanced AES3B (-)		XLR7(XLR-3F)	Blue
15	Balanced AES3B (+)		XLR7(XLR-3F)	Blue
3	Balanced AES73B (-)		XLR3(XLR-3F)	Blue
18	Balanced AES7B (+)		XLR3(XLR-3F)	Blue
29	Balanced AES4B (-)		XLR8(XLR-3F)	Blue
28	Balanced AES4B (+)		XLR8(XLR-3F)	Blue
33	Balanced AES8B (-)		XLR4(XLR-3F)	Blue
34	Balanced AES8B (+)		XLR4(XLR-3F)	Blue
17	Balanced DARS In 2 (-)	XLR9(XLR-3F)	XLR9(XLR-3F)	White
16	Balanced DARS In 2 (+)	XLR9(XLR-3F)	XLR9(XLR-3F)	White
31	Balanced Serial In (-)	162A10019X	162A10019X	Green
32	Balanced Serial In (+)	162A10019X	162A10019X	Green
39	Balanced Serial Out (-)	162A10019X	162A10019X	Green
40	Balanced Serial Out (+)	162A10019X	162A10019X	Green

Table 1-2. Pinouts for 44-pin Connector

Pin No. on DB-44M	Description	Connection Type on Unbalanced Cable	Connection Type on Balanced Cable	Cable Color
1	DATA I/O 2	BNC11	BNC11	Yellow
2	DATA I/O 2 GND	BNC11-GND	BNC11-GND	Yellow
36	Unbalanced AES1	BNC5		White
12	Unbalanced AES5	BNC1		White
13	Unbalanced AES5 GND	BNC1-GND		White
21	Unbalanced AES2	BNC6		White
10	Unbalanced AES6	BNC2		White
11	Unbalanced AES6 GND	BNC2-GND		White
6	Unbalanced AES3	BNC7	Not connected	White
7	Unbalanced AES3 GND	BNC7-GND		White
23	Unbalanced AES7	BNC3		White
22	Unbalanced AES7 GND	BNC3-GND		White
4	Unbalanced AES4	BNC8		White
5	Unbalanced AES4 GND	BNC8-GND		White
26	Unbalanced AES8	BNC4		White
25	Unbalanced AES8 GND	BNC4-GND		White
	RS232_GND	DB 9.5	DB 9.5	Black
35	Unbalanced AES2 GND	BNC6-GND	Not connected	White
	RS422_FR_GND	DB 9.1	DB 9.1	Black
37	Unbalanced AES1 GND/	BNC5-GND	Not connected	White
	RS422_FR_GND	DB 9.9	DB 9.9	Black
19	Unbalanced DARS In 1	BNC9	BNC9	White
20	Unbalanced DARS In 1 GND	BNC9-GND	BNC9-GND	White
8	DATA IO 1	BNC10	BNC10	Yellow
9	DATA IO 1 GND	BNC10-GND	BNC10-GND	Yellow

RS-422/RS-232 Cable

Table 1-3. Pin Assignment of DB-9 Connector (Female) in RS-422 Format

Pin No.	Signal	Comments
1	FG	Frame Ground
9	FG	Frame Ground
5	FG	Frame Ground
2	TA(Tx-)	Transmitted Data -
7	TB(Tx+)	Transmitted Data +
8	RA(Rx-)	Received Data -
3	RB(Rx+)	Received Data +
4	Not connected	
6		

Table 1-4. Pin Assignment of DB-9 Connector (Female) in RS-232 Format

Pin No.	Signal	Comments
1	FG	Frame Ground
9	FG	Frame Ground
5	FG	Frame Ground
2	Tx	Transmitted Data
7	Not connected	
8		
3	Rx	Received Data
4	Not connected	
6		

Signal Flow
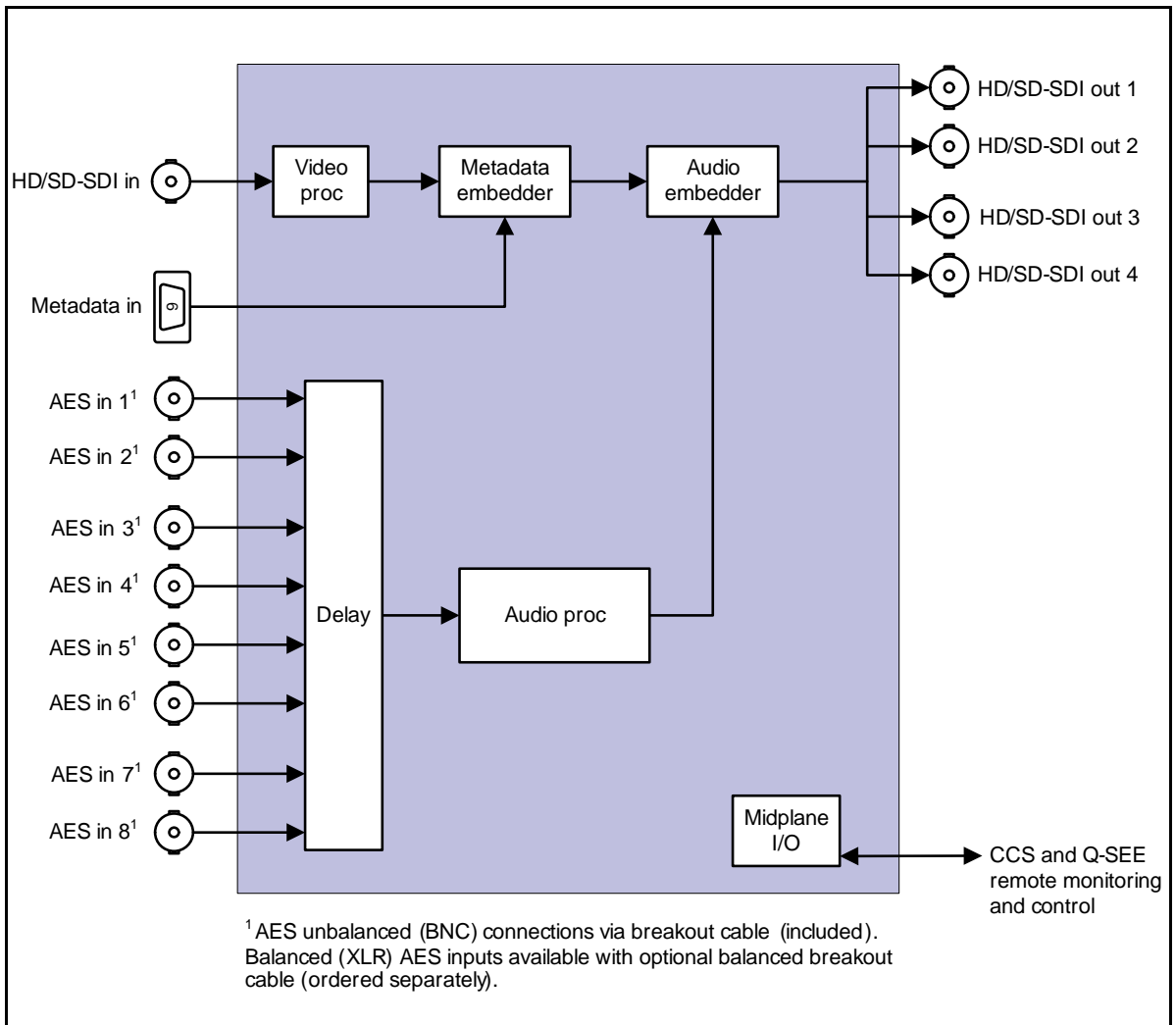
Figure 1-6. HMX6800**+**BC8 Signal Flow Diagram

<div align="right">

Chapter 2

Installation

</div>

Overview

This chapter describes the HMX6800**+**BC8 installation process, including the following topics:

See the *FR6802**+** Frame Installation and Operation Manual* for information about installing and operating an FR6802**+** frame and its components.

⚠ Caution

Before installing this product, read the *6800+ Series Safety Instructions and Standards Manual* shipped with every *FR6802+ Frame Installation and Operation Manua*l or downloadable from our website. This safety manual contains important information about the safe installation and operation of 6800**+** series products.

Maximum 6800+ Frame Power Ratings

The power consumption for the HMX6800**+**BC8 module is 12 W.

Table 2-1 describes the maximum allowable power ratings for 6800**+** frames. Note the given maximums before installing any 6800**+** modules in your frame.

Table 2-1. Maximum Power Ratings for 6800**+** Frames

6800+ Frame Type	Max. Frame Power Dissipation	Number of Usable Slots	Max. Power Dissipation Per Slot
FR6802**+**XF (frame with AC power supply)	120 W	20	6 W
FR6802**+**XF48 (frame with DC power supply)	105 W	20	5.25 W
FR6802**+**QXF frame (with AC or DC power supply)	120W	20	6 W

Unpacking the Module

Preparing the Product for Installation

Before you install the HMX6800**+**BC8, perform the following:

- Check the equipment for any visible damage that may have occurred during transit.
- Confirm receipt of all items on the packing list. See "Checking the Packing List" for more information.
- Remove the anti-static shipping pouch, if present, and all other packaging material.
- Retain the original packaging materials for possible re-use.

See "Unpacking/Shipping Information" on page ix for information about returning a product for servicing.

Checking the Packing List

Table 2-2. Available Product Packages

Ordered Product	Content Description
HMX6800**+**BC8D	• One HMX6800**+**BC8 front module • One double-slot back connector • One 6800**+**OPT**+**16**+**C breakout cable with unbalanced audio connectors • One *HMX6800+BC8 Installation and Operation Manual*
6800**+**OPT**+**16**+**C	One breakout cable with unbalanced audio connectors
6800**+**OPT**+**16**+**XF	One breakout cable with balanced audio connectors

Setting Jumper CJ1 for Local or Remote Control

The HMX6800**+**BC8 module has one jumper, CJ1, which sets the module for local or remote control.
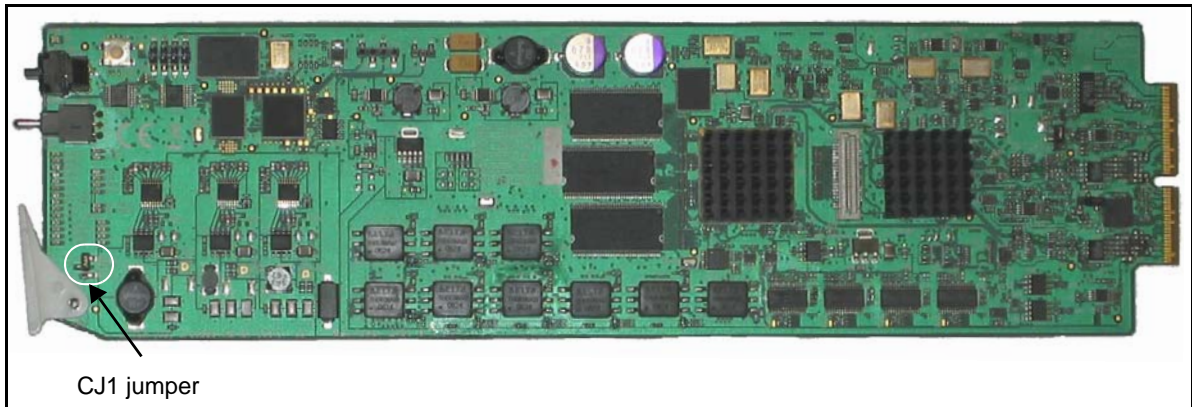
Figure 2-1. Jumper Locations

> ✎ **Note**
>
> You need to configure modules for local or remote operation *prior* to power-up. To change the configuration, first remove power from the module, reset the jumper, and then reapply power.
>
> The white triangle near the jumper pins on the module indicates pin 1.

Follow this procedure to set the **CJ1** jumper for either local or remote control:

1. Locate jumper **CJ1** on the module (behind the extractor handle).

   Figure 2-1 shows the location of the **CJ1** jumper.

2. Place a jumper on pins 1 and 2 to set the module for **Remote** control, or pins 2 and 3 to set the module for **Local** control. See Figure 2-2.
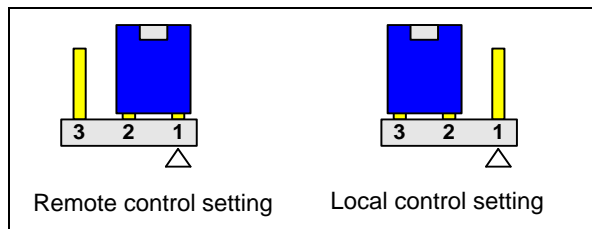
Figure 2-2. CJ1 Settings for Local and Remote Control

Installing 6800+ Modules

Required Frames and Back Connector Types

The HMX6800**+**BC8 modules have double-width back connectors that can be installed in anor FR6802**+**QXF frame. HMX6800**+**BC8 modules cannot be installed in a FR6802**+**DM frame, a FR6800/7000 frame, or a frame without fans.

See the *FR6802**+** Frame Installation and Operation Manual* for details on installing back connectors in an FR6802**+** frame.

A FR6802**+**RM (rear support extension rails for 6800**+** series frames) option is recommended for the HMX6800**+**BC8 modules. See your *FR6802**+** Frame Installation and Operation Manual* for installation instructions.

Installing and Removing Modules

These modules require no specialized installation or removal procedures. However, if installing both front and rear modules, ensure that the back module is installed first before plugging in the front module. When removing both the front and rear modules, ensure that the front module is unplugged from the frame first, before removing the rear module.

- See the *FR6802**+** Frame Installation and Operation Manual* for information about installing and operating an FR6802**+** frame and its components.
- See the *6800**+** Safety Instructions and Standards Manual* for important information about safely installing your module.

Once you have installed your HMX6800**+**BC8 modules, you can connect them to the appropriate input and outputs.

Upgrading Module Firmware

Firmware upgrading is a routine procedure that you must perform to install newer versions of software on 6800✚ modules. Pilot, Co-Pilot, or Navigator software version 3.1.1 or later is required for this procedure. The frame must contain or be connected to another frame that contains an ICE6800✚ module.

You can use either the discovery or the drag-and-drop method. When performing the upgrading procedure, check the appropriate readme file to confirm which files are needed. Use care to ensure that you upload the correct files to the intended module.

In the unlikely event that the upgrade fails, the module may not respond to controls and will appear to be non-functional. In that event, follow the procedures described in "Correcting a Failed Upgrading Procedure" on page 21.

Upgrading the Firmware

There are two methods for upgrading the firmware:

- "Upgrading the Firmware Using the Discovery Method" on page 18
- "Upgrading Firmware Using the Drag-and-Drop Method" on page 20

Upgrading the Firmware Using the Discovery Method

Follow these steps to upgrade the firmware using the discovery method:

1. Download the most recent appropriate upgrade package from our Web site or from your CD-ROM.

2. If the affected module has not been discovered, perform the Discovery operation, as described in your CCS software application manual or online help. (If you cannot discover the device, see "Upgrading Firmware Using the Drag-and-Drop Method" on page 20.)

3. From the **Tools** menu, select **Software Upgrade**.

    The **Software Upgrade** window opens or is brought to the foreground.

Device Options provide access to options for entering Telnet and FTP user name and password, and creating automatic backups.

Package Info includes a list of the components contained in the ZIP file.
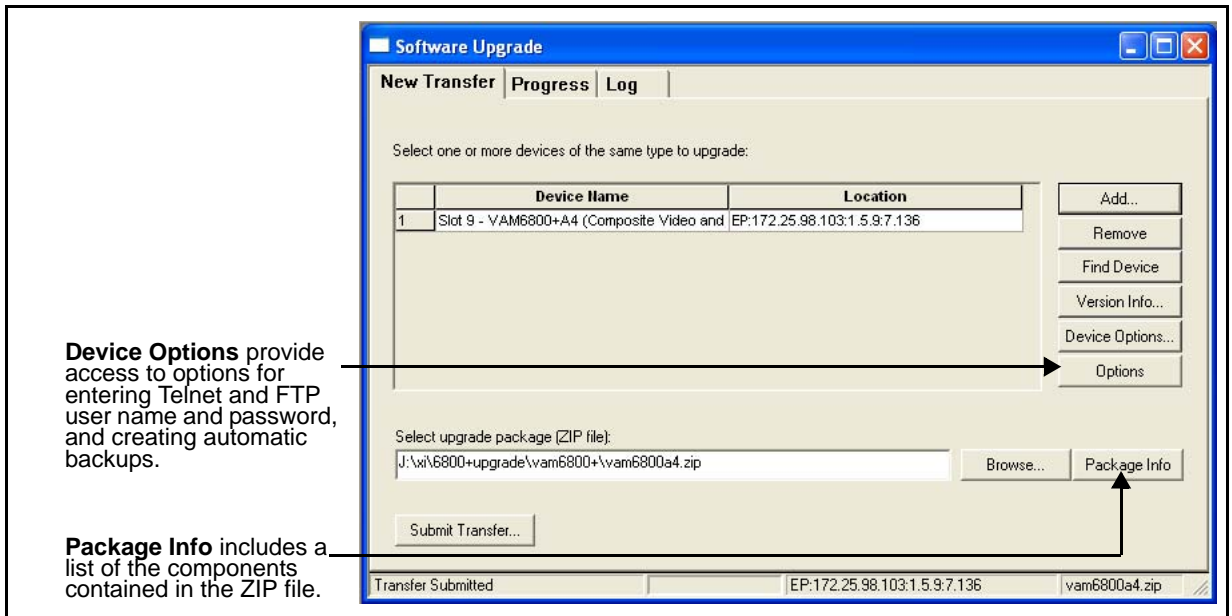
Figure 2-3. Software Upgrade Tool's New Transfer Tab

4. On the **New Transfer** tab, click **Add**.

    The **Device Selection** dialog opens.

5. Select one or more devices, and then click **OK** to close the **Add Device** dialog box.

    You can only add one unit from each IP address. All items in a frame have the same IP address.

    The selected devices appear in the table on the **New Transfer** tab of the **Software Upgrade** window. This table lists devices that are to receive the same upgrade package.

    For each device in this table, you can highlight its position in the **Tree View** by clicking **Find Device**. You can check the software revision numbers, etc., by clicking **Version Info**, and create an automatic backup by clicking the **Device Options...** button. (Place a check beside **Software Backup** and enter a file name or click **Browse** to choose a new file location.)

Note

Closing the **Software Upgrade** window does not affect any of the transfer processes that may be running in the background.

Note

If you try to log off or exit the CCS software while a transfer is underway, a notification window will alert you that processes are still active and will ask if you want to terminate these processes.

6. Press **Browse...** to select the software upgrade package (ZIP file).

   A standard **Windows File Selection** dialog opens.

7. Choose the upgrade ZIP file on a local or network drive.

   The selected file's path name is displayed in the edit box to the left of the **Browse…** button.

   The extraction process on the ZIP file is handled as part of the upgrade process. You do not need to extract the files yourself.

8. Press **Submit Transfer...**

   A dialog box opens, requesting confirmation that you want to proceed with the request. If you have multiple devices selected, multiple transfer tasks are submitted—one per device.

   The transfer now progresses. You may close the **Software Upgrade** window, continue with other tasks, or switch to the **Progress** tab to view the status of the transfers.

9. Click on the **Log** tab and look at the **Progress** column to ensure that all files have correctly updated.

   The module is automatically rebooted following an upgrade procedure.

Upgrading Firmware Using the Drag-and-Drop Method

Follow these steps to upgrade the firmware using the drag-and-drop method:

1. Download the appropriate most recent upgrade package fromour Web site or from your CD-ROM, and then unzip the upgrade package.

2. If the affected module has not been discovered by your CCS software application, enter the Build mode, and then drag or copy and paste the module's device icon from the catalog folder into the **Network** or **Discovery** folder.

3. Right-click the device icon, and then select **Properties**.

4. On the **Device** tab of the Navigation Properties box, enter the IP address of the frame that holds the module. (See Figure 2-4.)

Figure 2-4. Navigation Properties Box

⚠ Caution

If you make changes in the last field (located above and to the right of the **Set Default** button), you may lose your connection to the module. If this happens, you will need to rediscover the module.

5. In the third field, enter the slot number of the module, and then close the window.

You can now continue upgrading your device's firmware as in "Upgrading the Firmware Using the Discovery Method" on page 18, starting with step 3.

Correcting a Failed Upgrading Procedure

Firmware upgrades may fail in the event of network interruptions, power failures, or if files were sent to the wrong 6800**+** module.

These problems can be corrected by re-installing the firmware while in Boot Loader mode, as described in the following pages. Before you perform this procedure, check the appropriate readme file to confirm which files are needed. Use care to ensure that you upload the correct files to the intended module.

Follow these steps to upgrade a 6800✛ module in Boot Loader mode:

1. Remove the affected module from the 6800✛ frame.

Hex switch (mode select rotary switch)   **Navigation toggle switch**
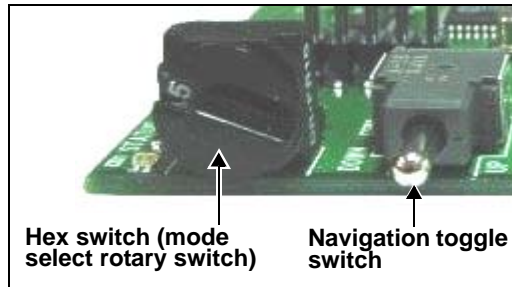
Figure 2-5. Buttons on a Typical Card Edge

2. Set the hex switch to F.

3. While pressing the Navigation toggle switch down, reinsert the module into the frame.

4. Download the most recent appropriate upgrade package from our Web site or from your CD-ROM, and then unzip the upgrade package.

5. If the affected module has not been discovered by your CCS software application, enter Build mode, and then drag or copy and paste the module's device icon from the catalog folder into the **Network** or **Discovery** folder.

6. Right-click the device icon, and then select **Properties**.

Note

To successfully upgrade the firmware, you must follow these steps in the exact sequence described.

7. On the **Device** tab of the **Navigation Properties** box, enter the IP address of the frame that holds the module. (See Figure 2-6.)
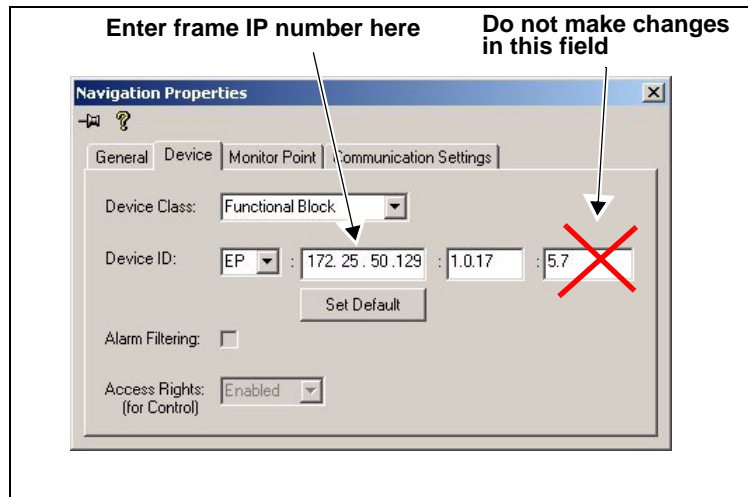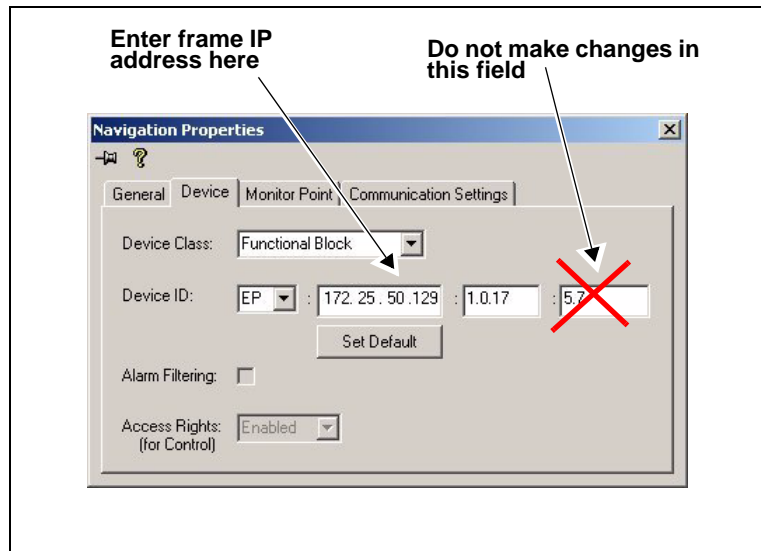

Figure 2-6. Navigation Properties Box

⚠ Caution

If you make changes in the last field (located above and to the right of the **Set Default** button), you may lose your connection to the module. If this happens, you will need to rediscover the module.

8. In the third field, enter

   `1.0.[slotnumber]`

   (In this example, 1.0.5 refers to the module in slot 5 of the frame.)

9. Close the window.

10. Double-click the device icon.

    The **Configuration...** box opens. On the **File Transfer** tab, the /frame/slot (where x is the slot number) directory appears in the **Select the device directory to transfer to:** field.

11. Click **Add**.

12. In the **Add Upgrade Files** box, browse to the module's upgrade package, and then click **OK**.

13. Choose the file you wish to upgrade, and then click **OK**.

14. Click **Perform Transfer**, and then click **Yes**.

    This may take several minutes.

15. Wait for the message **File transfer to device succeeded** in the status bar.

16. Click **Reboot Device**, and then click **Yes**.

    After the module has rebooted, a message box advises you to wait until the device has rebooted.

17. Wait 30 seconds.

    Your upgrade procedure is complete.

Operation

Overview

This chapter describes how to operate HMX6800**+**BC8 modules using card-edge controls only. The following topics are discussed in this chapter:

- "Operating Notes" on page 26
- "Activating Multiplexer Functions" on page 27
- "Cross-Functional Parameter Changes" on page 33
- "Changing Parameter Settings" on page 36
- "LEDs and Alarms" on page 60

See the following documents for information on how to operate this product remotely:

- **+***Pilot Lite User Manual* for serial interface
- CCS Pilot, CoPilot, Navigator, or RCP-CCS-1U Remote Control Panel manual for Ethernet interface

Operating Notes

When setting the control parameters on the HMX6800✚BC8, observe the following:

*   If you make changes to certain parameters, other related parameters may also be affected. See "Cross-Functional Parameter Changes" on page 33 for more information.

*   When you change a parameter, the effect is immediate. However, the module requires up to 30 seconds to save the latest change. After 30 seconds, the new settings are saved and will be restored if the module loses power and must be restarted.

Q-SEE Compliant Thumbnails

When installed in an FR6802✚QXF frame that also contains a 6800✚Eth resource module, HMX6800✚BC8 module control windows have an extra **Streaming** tab in CCS Pilot and Navigator (version 3.2.1 or later). Here you can view output video from the module.

In addition, video from the HMX6800✚BC8, displayed at up to three frames per second, can be displayed on the 6800+Eth's control page, and (for CCS Navigator only) on **Graphical Navigation** pages.

Activating Multiplexer Functions

The following sections provide information about the HMX6800**+**BC8 special functions:

- "Audio Test Tones" on page 27
- "Audio Embedding Modes" on page 27
- "Audio Embedding Errors" on page 32
- "Input Audio Rate" on page 32

Audio Test Tones

Table 3-1 describes the frequency and levels of each audio output test tone, available as a selection from each of the **Output Ch** (**1 - 16**) **Source Select** parameters (see page 44 and page 58):

Table 3-1. Audio Test Tones

Test Tone	Frequency	Level
Test Tone 1	400 Hz	-20 dBFS
Test Tone 2	1 kHz	-20 dBFS
Test Tone 3	2 kHz	-20 dBFS
Test Tone 4	4 kHz	-20 dBFS

Audio Embedding Modes

The audio embedder component in the HMX6800**+**BC8 is composed of several smaller subcomponent blocks:

- One ancillary data stripper (ADS)
- Four audio embedding subcomponents

The first subcomponent is an ancillary data stripper (ADS). This block removes all ancillary data packets in the input SDI stream, prior to embedding.

Following the ADS block are four separate audio-embedding subcomponents. Each subcomponent has the ability to operate on only one audio group, either appending or overwriting a predetermined group onto the SDI stream.

The audio embedding modes are **Audio Group** (**1 - 4**) **Mode** parameters (see page 44 and page 58). Table 3-2 briefly describes the **Off**, **Append**, **OverWrt**, and **Auto** options available from each of the embedding modes.

Table 3-2. Embedding Mode Options

Options	Description
Off	Disables embedding of the selected audio group
Append	Attempts to insert the audio data and control packets immediately following the last existing audio data/control packet in the horizontal ancillary region (This setting is valid only if the audio group to be embedded does not already exist.) See Figure 3-1 on page 29 and Figure 3-2 on page 30 for more information on **Append** embedding mode.
OverWrt	Attempts to overwrite existing audio data and control packets of the same group number with the new audio data (This setting is valid only if the audio group to be embedded already exists.) In this setting, if the new sample distribution does not exactly match the existing audio data packet sample distribution, the embedder will mark some audio data packets for deletion (DID word will be set to 180h). To avoid sample distribution issues, enable the **ADS Clean** feature. See Figure 3-3 on page 31 for more information on **OverWrt** embedding mode.
Auto	Attempts first to overwrite existing audio data and control packets of the same audio group number; failing that, appends the new audio data and control packets immediately following the last existing audio data/control packet Refer to the **Audio Group** (**1 - 4**) **Exists** parameters to determine what audio groups are already present in the incoming SDI signal.

Append Embedding

ADS before embedding

EAV	

ADS after embedding group

EAV	Group 1

ADS before embedding

EAV	Other auxilliary data **A**	Other auxilliary data **B**

ADS after embedding group

EAV	Other auxilliary data **A**	Other auxilliary data **B**	Group 1

ADS before embedding

EAV	Pre-existing Group 1

EAV	Pre-existing Group 1

Result: Error is returned
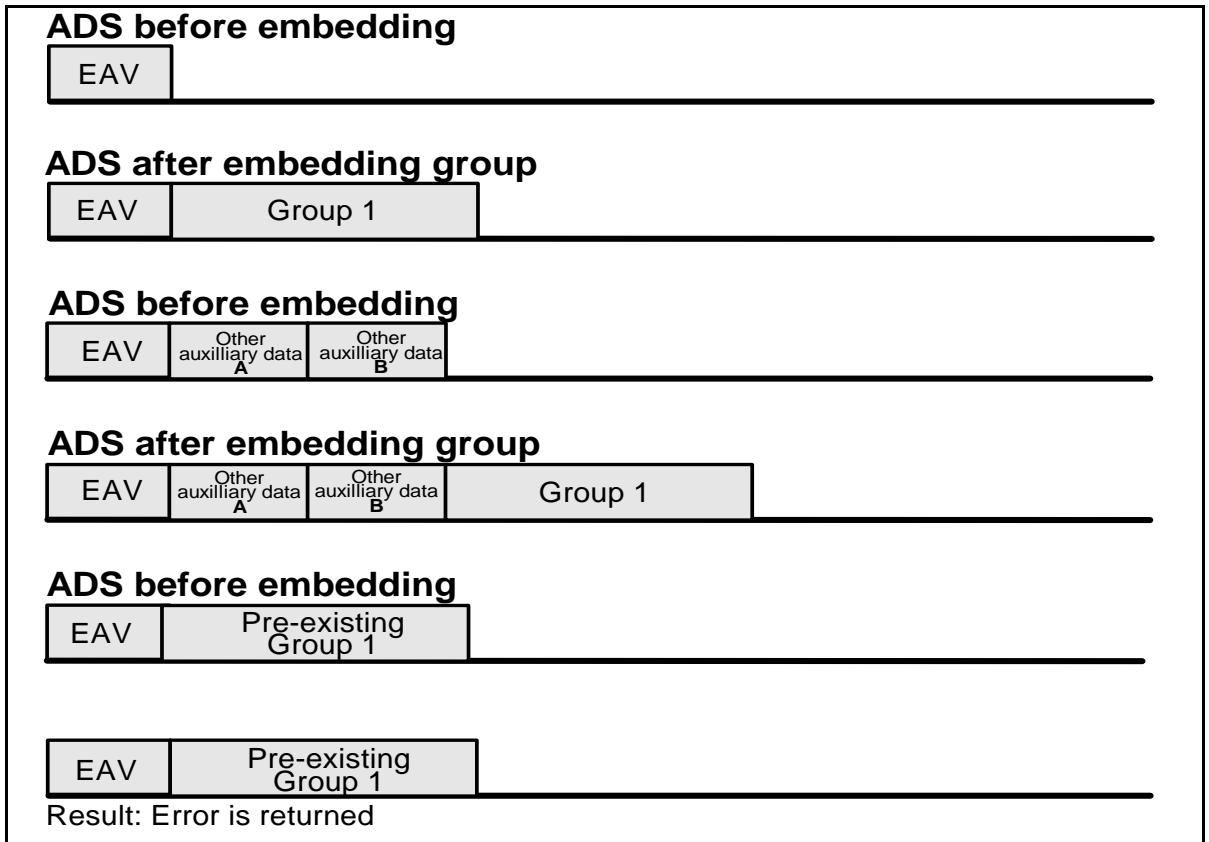
Figure 3-1. Append Embedding Mode, Part 1

ADS before embedding

EAV	Group 1

ADS after embedding group 2

EAV	Group 1	Group 2

ADS before embedding

EAV	Group 2

ADS after embedding group 1

EAV	Group 2	Group 1

ADS before embedding

EAV	Other auxillary data	Other auxillary data	Other auxillary data

ADS after attempting to embed group 1

EAV	Other auxillary data	Other auxillary data	Other auxillary data

Result: Error is returned

Figure 3-2. Append Embedding Mode, Part 2

Overwrite Embedding

ADS before embedding

EAV	

ADS after attempting to embed group 1

EAV	

Result: Error is returned

ADS before embedding

EAV	other auxilliary data A	other auxilliary data B	

ADS after attempting to embed group 1

EAV	other auxilliary data A	other auxilliary data B	

Result: Error is returned

ADS before embedding

EAV	Pre-existing Group 1	

ADS after embedding group 1 (with overwrite group specified as Group 1)

EAV	Group 1	

Figure 3-3. OverWrt Embedding Mode

Audio Embedding Errors

Table 3-3 describes **Group** (**1 - 4**) **Append Embedding Error** and **Group** (**1 - 4**) **Overwrite Embed Error** audio embedding errors (also see).

Table 3-3. Audio Embedding Error Descriptions

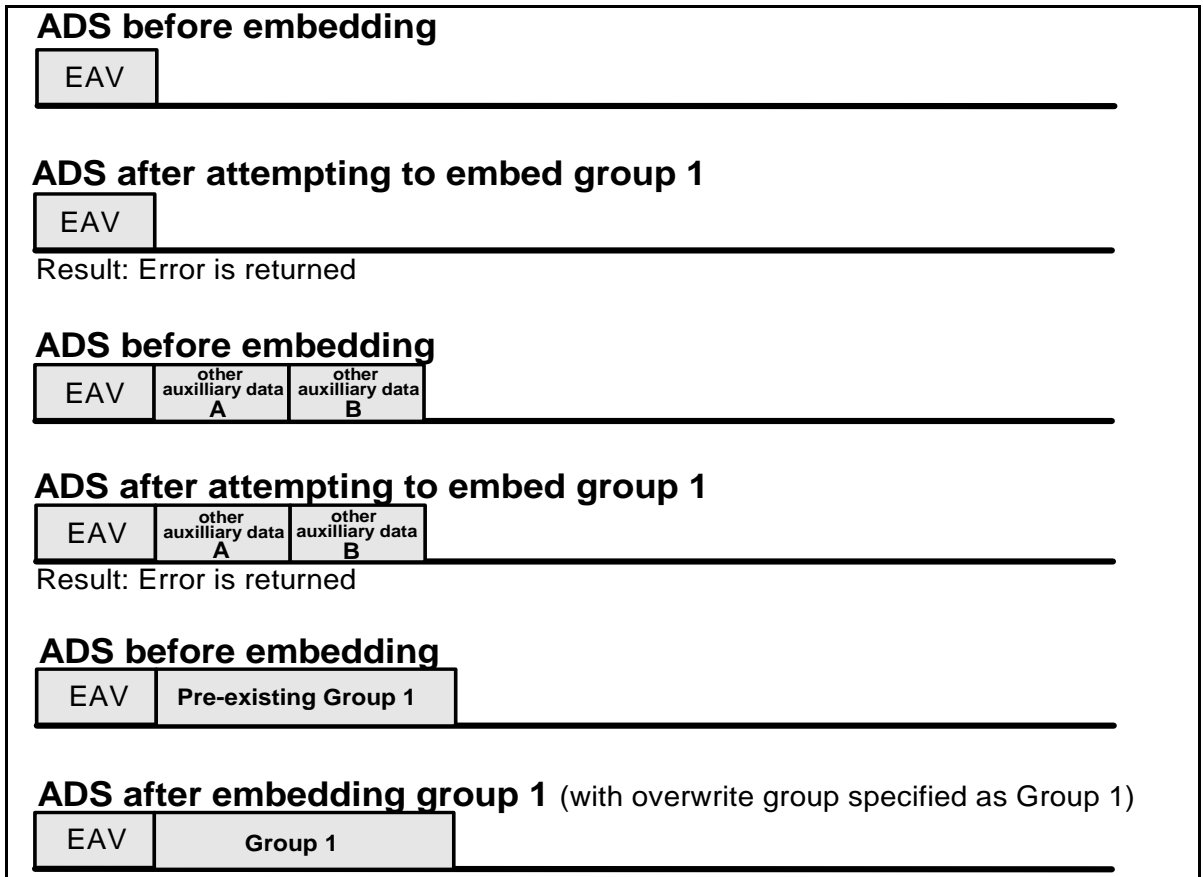| Error	Description
Group (1 - 4) Append Embedding Error	Occurs if the embedder is set to **Append** mode for a particular audio group, but that audio group already exists in the incoming SDI signal In this case, the embedder will not embed another audio data and control packet of the same audio group, as this will result in incorrect audio sample distribution.
Group (1 - 4) Overwrite Embed Error	Occurs if the embedder is set to **Overwrite** mode for a particular audio group, but that audio group does not exist in the incoming SDI signal

To avoid embedding errors, follow these guidelines:

- Set the embedding mode to **Auto**. If the group is present, it will be overwritten; if it is not present, it will be appended. The overwrite and append errors are actually warnings that the desired operation is not being performed.

- In SD-SDI mode do not overwrite embedded groups of 20-bit audio samples with groups of 24-bit audio samples. The required extended data packet information appended to that group may overwrite a pre-existing audio group. For 24-bit audio embedding, use the **ADS Clean** feature provided.

Input Audio Rate

When embedding audio in PCM mode (**Audio Ch** [**1 - 16**] **Format** = **PCM** or **Audio Ch** [**1 - 16**] **Format** = **Auto** and **Audio Ch** [**1 - 16**] **Format Feedback** = **PCM**), the input audio sample rate may be from 32 kHz to 96 kHz. This input audio will be sample rate converted to 48 kHz prior to embedding in the HD video signal; as well, the embedder will indicate 48 kHz in the "Rate" word of the audio control packet for each embedded audio group.

When embedding audio in Non-PCM mode (**Audio Ch** [**1 - 16**] **Format** = **Non-PCM** or **Audio Ch** [**1 - 16**] **Format** = **Auto** and **Audio Ch** [**1 - 16**] **Format Feedback** = **Non-PCM**), the input audio sample rate must be 48 kHz, and it must be frequency locked to the source video. In this scenario, the sample rate conversion function is bypassed and the embedder will indicate 48 kHz in the "Rate" word of the audio control packet for each embedded audio group.

Cross-Functional Parameter Changes

When you configure certain parameters, you force a change in other associated parameters. The various conditions that affect parameter availability or settings are described in the following sections:

ADS Clean Parameter

Depending on the setting of the **ADS Clean** parameter, the **Audio Group** (**1 - 4**) **Embedding Mode** parameters will have different options.

Table 3-4. ADS Clean Parameter

ADS Clean State	Audio Group (1 - 4) Embedding Mode Options
Yes	• Off • Append
No	• Off • Append • OverWrt • Auto

PCM/Non-PCM Settings

Depending on whether or not a channel's format is PCM, that channel's **Gain** and **Invert** parameters will be enabled or disabled.

Table 3-5 describes how the PCM format setting for Channel 1 affects the Gain and Invert options for Channel 01. Similar conditions apply to channels 2 - 16 when their audio formats are changed.

Note that the forced setting (center column) takes effect before the identified parameter (right column) becomes enabled/disabled.

Table 3-5. Cross-Functional Parameters

Condition	Forced Setting	Enabled/Disabled Parameters
Audio Ch 1 Format = Non-PCM or Audio Ch 1 Format = Auto and Audio Ch 1 Format Feedback = Non-PCM	• Audio Ch 1 Gain = 0 dB • Audio Ch 1 Invert = No	• Audio Ch 1 Gain = Disabled • Audio Ch 1 Invert = Disabled
Audio Ch 1 Format = PCM or Audio Ch 1 Format = Auto and Audio Ch 1 Format Feedback= PCM		• Audio Ch 1 Gain = Enabled • Audio Ch 1 Invert = Enabled

Channel Word Length

If in HD mode, the default value for all **Audio Ch XX-XX Word Length** parameters is 24 bits. In SD mode, it is 20 bits.

In SD mode if at least one channel is set to 24 bits, the corresponding embedder will enable 24-bits embedding.

Parameter Availability based on Operating Mode

Depending on whether the operating mode is HD or SD, some parameters will be enabled and some disabled.

- The HD parameters will apply when **SDI Input Video Standard Set** is set to one of the HD operating modes, or when the **SDI Input Video Standard Set** is set to Auto and **SDI IP Video Standard Feedback** is one of the HD operating modes.

- The SD parameters will apply when **SDI Input Video Standard Set** is set to either SD 525 or SD 625, or the **SDI Input Video Standard Set** is set to Auto and **SDI IP Video Standard Feedback** is SD 525 or SD 625.

Table 3-6. Parameter Availability Based on Operating Mode

Condition	Enabled Parameters	Disabled Parameters
HD Operating Mode • 1080i/25 (295M) • 1080i/30 • 1080i/29.97 • 1080i/25 • 1080p/30 • 1080p/29.97 • 1080p/25 • 1080p/24 • 1080p/23.98 • 1080PsF/24 • 1080PsF/23.98 • 720p/60 • 720p/59.94 • 720p/50	• Y CRC Error Counter • Y CRC Error Counter Clear • C CRC Error Counter • C CRC Error Counter Clear	• EDH Present • EDH Error Counter • EDH Error Counter Clear
SDI Operating Mode • SD 525 • SD 625	• EDH Present • EDH Error Counter • EDH Error Counter Clear	• Y CRC Error Counter • Y CRC Error Counter Clear • C CRC Error Counter • C CRC Error Counter Clear

Changing Parameter Settings

You can change parameter settings at the card edge for HMX6800**+**BC8 modules; or you can change the parameter settings, and view read-only parameters, and view alarms and adjust alarm settings using CCS software. See the following topics for more information:

- "Changing Parameter Settings using Card-Edge Controls" on page 36
- "Changing Parameter Settings using CCS Software" on page 49

Changing Parameter Settings using Card-Edge Controls

Follow these steps to change the HMX6800**+**BC8 parameter settings:

1. Rotate the hex switch (mode select rotary switch) to "0."

2. Once the hex switch is set to "0," toggle the navigation switch up or down to select a bank.

   View the two control LEDs next to the navigation toggle switch to see which bank is currently selected. (See Table 3-7.)

   See "Setting HMX6800**+**BC8 Control Parameters" on page 38 to view the various banks, hex switch positions, and corresponding parameter options and values.

Table 3-7. Selected Bank as Indicated by Control LEDs

LED 3	LED 2	LED 1	LED 0	Bank Number
Off	Off	Off	Off	0
Off	Off	Off	On	1
Off	Off	On	Off	2
Off	Off	On	On	3
Off	On	Off	Off	4
Off	On	Off	On	5
Off	On	On	Off	6
Off	On	On	On	7
On	Off	Off	Off	8
On	Off	Off	On	9

3. Rotate the hex switch to the parameter number (1 to 9) or letter (A to F) of the option you want to set.

4. Toggle the navigation switch to select and set the value of the chosen parameter.

5. Rotate the hex switch to another parameter number/letter in the current bank, and then repeat step 4.

    or

    Rotate the hex switch to "0" again to select a different bank, and then repeat steps 3 and 4.

Note

For best results, use the available 6800✚ software control options (serial/local or Ethernet/remote) to aid in viewing, setting, and confirming parameter values.

Recalling Factory Default Parameter Settings

"Setting HMX6800✚BC8 Control Parameters" on page 38 describes all of the parameter settings for the HMX6800✚BC8, including the original factory defaults. To return this module to its factory default settings, you can either reset each parameter individually or do a global recall following this procedure:

1. Rotate the hex switch to "0."

2. Toggle the navigation switch to the bank number "0."

    Use the control LEDs to verify which bank you have selected, or use an available 6800✚ software control option (serial/local or Ethernet/remote) to aid in confirming your bank selection.

3. Rotate the hex switch to the global recall parameter "F."

4. Toggle the navigation switch to "On."

    Use an available 6800✚ software control option to aid in viewing, setting, and confirming the parameter value.

Reading Software and Hardware Versions

The current software version of your HMX6800✚BC8 module can only be viewed using a CCS-enabled control panel or a CCS software application, such as Pilot or ✚Pilot Lite. See your *RCP-CCS-1U Installation and Operation Manual,* CCS software application user manual, or CCS software application online help for information on viewing software and hardware version numbers.

Setting HMX6800+BC8 Control Parameters

Table 3-8 lists all of the card-edge parameters and options for the HMX6800+BC8. *All parameters clip unless otherwise indicated.*

The On/Off combinations of the control LEDs on the card-edge indicate the active bank number. See "Changing Parameter Settings" on page 36 for more information.

Legend

Bold option=Indicates that this is the default setting for the parameter.

Table 3-8. Card-Edge Parameter Options—HMX6800+BC8 Modules

Bank, Rotary Switch	Parameter Name	Function	Options
0, 1	SDI Input Video Standard Set	Selects the SDI input video signal standard	• **Auto** • SD 525 • SD 625 • 1080I 25 (295M) • 1080I 30 • 1080I 29.97 • 1080I 25 • 1080P 30 • 1080P 29.97 • 1080P 25 • 1080P 24 • 1080P 23.98 • 1080PsF 24 • 1080PsF 23.98 • 720P 60 • 720P 59.94 • 720P 50
0, 2	Y CRC Error Counter Clear	Clears the luminance CRC error counter	• **No** • Yes
0, 3	C CRC Error Counter Clear	Clears the chrominance CRC error counter	• **No** • Yes
0, 4	EDH Error Counter Clear	Clears the EDH error counter	• **No** • Yes

Table 3-8. Card-Edge Parameter Options—HMX6800**+**BC8 Modules *(Continued)*

Bank, Rotary Switch	Parameter Name	Function	Options
0, 5	Audio Input Type Select	Selects the type of AES input	• Balanced • **Unbalanced**
0, 6 to 0, B	Reserved		
0, C	Fade Rate	Controls the rate of fading when channels are swapped or muted	0.0 s to 10.0 s (**1.0 s**)
0, D	V-Bit Mute Enable	Enables audio channel muting upon detection of an incoming set V-bit	• **No** • Yes
0, E	Metadata Interface Type	Selects the metadata interface type	• **RS-232** • RS-422
0, F	Factory Recall	Recalls the factory default settings	• **No** • Yes

Table 3-8. Card-Edge Parameter Options—HMX6800**+**BC8 Modules *(Continued)*

Bank, Rotary Switch	Parameter Name	Function	Options
1, 1	Input Audio Ch 1 Delay	Adjusts delay for the selected input audio channel	**0.0** ms to 1320.0 ms
1, 2	Input Audio Ch 2 Delay		
1, 3	Input Audio Ch 3 Delay		
1, 4	Input Audio Ch 4 Delay		
1, 5	Input Audio Ch 5 Delay		
1, 6	Input Audio Ch 6 Delay		
1, 7	Input Audio Ch 7 Delay		
1, 8	Input Audio Ch 8 Delay		
1, 9	Input Audio Ch 9 Delay		
1, A	Input Audio Ch 10 Delay		
1, B	Input Audio Ch 11 Delay		
1, C	Input Audio Ch 12 Delay		
1, D	Input Audio Ch 13 Delay		
1, E	Input Audio Ch 14 Delay		
1, F	Input Audio Ch 15 Delay		
2, 1	Input Audio Ch 16 Delay		

Table 3-8. Card-Edge Parameter Options—HMX6800**+**BC8 Modules *(Continued)*

Bank, Rotary Switch	Parameter Name	Function	Options
2, 2	Audio Ch 1 Gain	Adjusts gain for the specified output channel	± 18.0 dB (**0.0 dB**)
2, 3	Audio Ch 2 Gain		
2, 4	Audio Ch 3 Gain		
2, 5	Audio Ch 4 Gain		
2, 6	Audio Ch 5 Gain		
2, 7	Audio Ch 6 Gain		
2, 8	Audio Ch 7 Gain		
2, 9	Audio Ch 8 Gain		
2, A	Audio Ch 9 Gain		
2, B	Audio Ch 10 Gain		
2, C	Audio Ch 11 Gain		
2, D	Audio Ch 12 Gain		
2, E	Audio Ch 13 Gain		
2, F	Audio Ch 14 Gain		
3, 1	Audio Ch 15 Gain		
3, 2	Audio Ch 16 Gain		

Table 3-8. Card-Edge Parameter Options—HMX6800**+**BC8 Modules *(Continued)*

Bank, Rotary Switch	Parameter Name	Function	Options
3, 3	Audio Ch 1 Invert	Invert control for the specified output channel	• **No**
3, 4	Audio Ch 2 Invert		• Yes
3, 5	Audio Ch 3 Invert		
3, 6	Audio Ch 4 Invert		
3, 7	Audio Ch 5 Invert		
3, 8	Audio Ch 6 Invert		
3, 9	Audio Ch 7 Invert		
3, A	Audio Ch 8 Invert		
3, B	Audio Ch 9 Invert		
3, C	Audio Ch 10 Invert		
3, D	Audio Ch 11 Invert		
3, E	Audio Ch 12 Invert		
3, F	Audio Ch 13 Invert		
4, 1	Audio Ch 14 Invert		
4, 2	Audio Ch 15 Invert		
4, 3	Audio Ch 16 Invert		

Table 3-8. Card-Edge Parameter Options—HMX6800**+**BC8 Modules *(Continued)*

Bank, Rotary Switch	Parameter Name	Function	Options
4, 4	Audio Ch 1 Mute	Enables muting for the specified output channel	• **Off** • On
4, 5	Audio Ch 2 Mute		
4, 6	Audio Ch 3 Mute		
4, 7	Audio Ch 4 Mute		
4, 8	Audio Ch 5 Mute		
4, 9	Audio Ch 6 Mute		
4, A	Audio Ch 7 Mute		
4, B	Audio Ch 8 Mute		
4, C	Audio Ch 9 Mute		
4, D	Audio Ch 10 Mute		
4, E	Audio Ch 11 Mute		
4, F	Audio Ch 12 Mute		
5, 1	Audio Ch 13 Mute		
5, 2	Audio Ch 14 Mute		
5, 3	Audio Ch 15 Mute		
5, 4	Audio Ch 16 Mute		
5, 5	Audio Ch 1/2 Word Length	Adjusts the sample resolution for the selected audio output channel pair	• **24 bits** (Default for HD mode) • **20 bits** (Default for SD mode) • 16 bits
5, 6	Audio Ch 3/4 Word Length		
5, 7	Audio Ch 5/6 Word Length		
5, 8	Audio Ch 7/8 Word Length		
5, 9	Audio Ch 9/10 Word Length		
5, A	Audio Ch 11/12 Word Length		
5, B	Audio Ch 13/14Word Length		
5, C	Audio Ch 15/16 Word Length		

Table 3-8. Card-Edge Parameter Options—HMX6800**+**BC8 Modules *(Continued)*

Bank, Rotary Switch	Parameter Name	Function	Options
5, D	Output Ch 1 Source Select	Selects the source for the specified output channel	• Input Ch 1 (default for Out01Src)
5, E	Output Ch 2 Source Select		• Input Ch 2 (default for Out02Src)
5, F	Output Ch 3 Source Select		• Input Ch 3 (default for Out03Src)
6, 1	Output Ch 4 Source Select		• Input Ch 4 (default for Out04Src)
6, 2	Output Ch 5 Source Select		• Input Ch 5 (default for Out05Src)
6, 3	Output Ch 6 Source Select		• Input Ch 6 (default for Out06Src)
6, 4	Output Ch 7 Source Select		• Input Ch 7 (default for Out07Src)
6, 5	Output Ch 8 Source Select		• Input Ch 8 (default for Out08Src)
6, 6	Output Ch 9 Source Select		• Input Ch 9 (default for Out09Src)
6, 7	Output Ch 10 Source Select		• Input Ch 10 (default for Out10Src)
6, 8	Output Ch 11 Source Select		• Input Ch 11 (default for Out11Src)
6, 9	Output Ch 12 Source Select		• Input Ch 12 (default for Out12Src)
6, A	Output Ch 13 Source Select		• Input Ch 13 (default for Out13Src)
6, B	Output Ch 14 Source Select		• Input Ch 14 (default for Out14Src)
6, C	Output Ch 15 Source Select		• Input Ch 15 (default for Out15Src)
6, D	Output Ch 16 Source Select		• Input Ch 16 (default for Out16Src)
			• In Pair 1 Sum
			• In Pair 2 Sum
			• In Pair 3 Sum
			• In Pair 4 Sum
			• In Pair 5 Sum
			• In Pair 6 Sum
			• In Pair 7 Sum
			• In Pair 8 Sum
			• TstTone 400 Hz
			• TstTone 1 kHz
			• TstTone 2 kHz
			• TstTone 4 kHz

Table 3-8. Card-Edge Parameter Options—HMX6800**+**BC8 Modules *(Continued)*

Bank, Rotary Switch	Parameter Name	Function	Options
6, E	Audio Ch 1 Format	Selects the format for the specified output audio channel	• PCM • Non-PCM • **Auto**
6, F	Audio Ch 2 Format		
7, 1	Audio Ch 3 Format		
7, 2	Audio Ch 4 Format		
7, 3	Audio Ch 5 Format		
7, 4	Audio Ch 6 Format		
7, 5	Audio Ch 7 Format		
7, 6	Audio Ch 8 Format		
7, 7	Audio Ch 9 Format		
7, 8	Audio Ch 10 Format		
7, 9	Audio Ch 11 Format		
7, A	Audio Ch 12 Format		
7, B	Audio Ch 13 Format		
7, C	Audio Ch 14 Format		
7, D	Audio Ch 15 Format		
7, E	Audio Ch 16 Format		
7, F	Metadata Embedding Enable	Enables embedding of metadata	• **Enable** • Disable
8, 1	ADS Clean	Cleans the Ancillary Data Space prior to audio embedding	• **No** • Yes
8, 2	Audio Group 1 Embedding Mode	Selects the embedding mode for the specified audio group	• Off • Append • OverWrt • **Auto**
8, 3	Audio Group 2 Embedding Mode		
8, 4	Audio Group 3 Embedding Mode		
8, 5	Audio Group 4 Embedding Mode		

Table 3-8. Card-Edge Parameter Options—HMX6800**+**BC8 Modules *(Continued)*

Bank, Rotary Switch	Parameter Name	Function	Options
8, 6	Video ProcAmp Enable	Enables the video processing amplifier	• No • **Yes**
8, 7	Y Gain	Adjusts gain for the Y channel	-3.0 to +3.0 dB (**0 dB**)
8, 8	Cb Gain	Adjusts gain to the Cb color difference component	-3.0 to +3.0 dB (**0 dB**)
8, 9	Cr Gain	Adjusts gain to the Cr color difference component	-3.0 to +3.0 dB (**0 dB**)
8, A	Y Offset	Adjusts offset for the Y channel	±100.6 mV (**0 mV**)
8, B	Cb Offset	Adjusts offset for the Cb channel	±100.6 mV (**0 mV**)
8, C	Cr Offset	Adjusts offset for the Cr channel	±100.6 mV (**0 mV**)
8, D	White Clip Enable	Controls level clipping according to the White Clip Level control	• **Disable** • Enable
8, E	White Clip Level	Sets the white clip level	636.9 to 763.1 mV (**700 mV**)
8, F	Black Clip Enable	Controls level clipping according to the Black Clip Level control	• **Disable** • Enable
9, 1	Black Clip Level	Sets the black clip level	-47.9 to +47.9 mV (**0.0 mV**)
9, 2	Hue	Adjusts the hue of the incoming digital video signal	-180° to +180° (**0°**) (SD 525 and SD 625 only)

Table 3-8. Card-Edge Parameter Options—HMX6800**+**BC8 Modules *(Continued)*

Bank, Rotary Switch	Parameter Name	Function	Options
9, 3	Video Delay Bypass	Controls insertion of the video delay circuit in the signal processing path	• **No** • Yes
9, 4	Horizontal Phase	Adjusts the horizontal timing	• **0** to 29.616 µsec (1080I30, 1080P30) • **0** to 29.646 µsec (1080I29.97, 1080P29.97) • **0** to 35.542 µsec (1080I25, 1080P25) • **0** to 37.024 µsec (1080P24, 1080PsF24) • **0** to 37.061 µsec (1080P23.98, 1080PsF23.98) • **0** to 31.987 µsec (1080I25 SMPTE 295M) • **0** to 22.209 µsec (720P60) • **0** to 22.231 µsec (720P59.94) • **0** to 26.653 µsec (720P50) • **0** to 63.518 µsec (SD 525) • **0** to 63.963 µsec (SD 625)
9, 5	Vertical Phase	Adjusts the vertical timing	• **0** to 1124 lines (1080P/I/PsF) • **0** to 1249 lines (1080I25 SMPTE 295M) • **0** to 749 lines (720P) • **0** to 524 lines (SD 525) • **0** to 624 lines (SD 625)
9, 6	Video Delay	Controls the amount of video delay in frames	• **0**-5 frames (HD) • **0**-25 frames (SD)
9, 7 to 9, A	Reserved		

Table 3-8. Card-Edge Parameter Options—HMX6800**+**BC8 Modules *(Continued)*

Bank, Rotary Switch	Parameter Name	Function	Options
9, B	Metadata Embedding Line Number	Controls the line to which metadata packets will be embedded	• 9 to 41 (1080P) **(13)** • 9 to 25 (720P) **(13)** • 9 to 20 (1080I) **(13)** • 12 to 20 (SD-525) **(13)** • 8 to 22 (SD-625) **(13)**

Changing Parameter Settings using CCS Software

Using CCS software such as Pilot or Navigator, you can access read-only parameters and adjust controllable parameters in a convenient tree-view navigation window. If you haven't discovered your module, follow these steps to start using the HMX6800✚BC8 with your CCS software.

1. With Pilot or Navigator in Build mode, click **Tools** > **Discovery** in the main menu. The **Discovery** window opens.

2. Click **Options**, and then click **Add**.

3. Enter the IP address for the frame that contains the ICE6800✚ or 6800✚Eth module through which your module will communicate.

   Up to eight frames can be connected through an ICE6800✚ module, or up to three frames can be connected through a 6800✚Eth module, to communicate with CCS software. See your *FR6802 ✚QXF Mounting Frames Installation and Operation Manual* for more information.

4. Click **OK** to close the Add IP address window, and then **OK** again to close the **Discovery Options** window.

5. Click **Start**.

   When your discovery is complete, the Discovery window will show a list of frames and modules found, and will end with a **Discovery Completed** statement.

6. Click **Save**.

   The contents of your discovery are saved to the Discovery folder of the Navigation pane.

7. Right click in the bottom right corner of the CCS software screen and choose **Control** to switch to Control mode.

8. Double click on the HMX6800✚BC8 in the **Navigation** pane to open its **Control** window.

9. Double click on the HMX6800✚BC8 in the Navigation pane to open its **Control** window.

Setting HMX6800+BC8 Remote Control Parameters

Table 3-9 lists all of the remote control parameters and options for the HMX6800**+**BC8. To access these parameters, you must use **+** Pilot Lite or CCS control software such as Pilot or Navigator. See your software user manual for more information.

Note that rows in the table that contain a range of numbers in parentheses indicate that a series of numbered parameters contain that same function and range.

Legend

Bold option=Indicates that this is the default setting for the parameter.

Rows of the table that are in grey are read-only parameters.

All parameters clip unless otherwise indicated.

Table 3-9. HMX6800**+**BC8 Parameters—Remote Control Only

Path	Parameter Name	Function	Options or User Range
General	Serial Number	Displays the module's unique identifier	(string)
	Factory Recall	Recalls the factory default settings	• **No** • Yes
AES	Audio Input Type Select	Selects the type of AES input	• Balanced • **Unbalanced**
	AES (1 to 8) Input Present	Reports the presence of the specified AES input signal	• No • Yes
Metadata	External Metadata Present	Reports the presence of external serial metadata	• No • Yes
	Metadata Interface Type	Selects the metadata interface type	• **RS-232** • RS-422

Table 3-9. HMX6800**+**BC8 Parameters—Remote Control Only *(Continued)*

Path			Parameter Name	Function	Options or User Range
Stream 1			V-Bit Mute Enable	Enables audio channel muting upon detection of an incoming set V-bit	• **No** • Yes
	Input				
		General			
			Input Ch (1 to 16) V-Bit Feedback	Reports the validity bit status of the specified input audio channel	• Off • On
		Metadata	Embedded Metadata Present	Reports the presence of embedded metadata	• No • Yes
		SDI	SDI Input Video Standard Set	Selects the SDI input video signal standard	• **Auto** • SD 525 • SD 625 • 1080I 25 (295M) • 1080I 30 • 1080I 29.97 • 1080I 25 • 1080P 30 • 1080P 29.97 • 1080P 25 • 1080P 24 • 1080P 23.98 • 1080PsF 24 • 1080PsF 23.98 • 720P 60 • 720P 59.94 • 720P 50

Table 3-9. HMX6800**+**BC8 Parameters—Remote Control Only *(Continued)*

Path	Parameter Name	Function	Options or User Range

Stream 1
  Input
    SDI (continued)
	SDI IP Video Standard Feedback	Reports the detected SDI input video signal standard	• Unknown
			• 1080P 25
			• 720P 59.94
			• 720P 60
			• 1080P 23.98
			• 1080P 24
			• 1080P 29.97
			• 1080P 30
			• 1080I 25
			• 1080I 25 (295M)
			• 1080I 29.97
			• 1080I 30
			• SD 525
			• SD 625
			• 720P 50
			• 1080PsF 23.98
			• 1080PsF 24

	SDI Input Video Present	Reports the presence of the SDI input video signal	• No • Yes
	Y CRC Error Counter	Reports the number of occurred luminance CRC errors	0 to 16777215
	Y CRC Error Counter Clear	Clears the luminance CRC error counter	• **No** • Yes
	C CRC Error Counter	Reports the number of occurred chrominance CRC errors	0 to 16777215
	C CRC Error Counter Clear	Clears the chrominance CRC error counter	• **No** • Yes

Table 3-9. HMX6800**+**BC8 Parameters—Remote Control Only *(Continued)*

Path	Parameter Name	Function	Options or User Range
	EDH Error Counter	Reports the number of occurred EDH errors	0 to 32767
	EDH Error Counter Clear	Clears the EDH error counter	• **No** • Yes
	EDH Present	Reports the presence of EDH in the input SDI signal	• No • Yes
Stream 1 Input Embedded Audio Status	Audio Group (1 to 4) Exists	Reports the presence of the specified audio group in the SDI stream	• No • Yes
Stream 1 Processing Video ProcAmp	Video ProcAmp Enable	Enables the video processing amplifier	• No • **Yes**
	Y Gain	Adjusts gain for the Y channel	-3.0 to +3.0 dB (**0 dB**)
	Cb Gain	Adjusts gain to the Cb color difference component	-3.0 to +3.0 dB (**0 dB**)
	Cr Gain	Adjusts gain to the Cr color difference component	-3.0 to +3.0 dB (**0 dB**)
	Y Offset	Adjusts offset for the Y channel	±100.6 mV (**0 mV**)
	Cb Offset	Adjusts offset for the Cb channel	±100.6 mV (**0 mV**)

Table 3-9. HMX6800**+**BC8 Parameters—Remote Control Only *(Continued)*

Path			Parameter Name	Function	Options or User Range
Stream 1			Cr Offset	Adjusts offset for the Cr channel	±100.6 mV (**0 mV**)
	Processing				
		Video			
		ProcAmp (Cont)			
			White Clip Enable	Controls level clipping according to the White Clip Level control	• **Disable** • Enable
			White Clip Level	Sets the white clip level	636.9 to 763.1 mV (**700 mV**)
			Black Clip Enable	Controls level clipping according to the Black Clip Level control	• **Disable** • Enable
			Black Clip Level	Sets the black clip level	-47.9 to +47.9 mV (**0.0 mV**)
			Hue	Adjusts the hue of the incoming digital video signal	-180° to +180° (**0°**) (SD 525 and SD 625 only)

Table 3-9. HMX6800**+**BC8 Parameters—Remote Control Only *(Continued)*

Path			Parameter Name	Function	Options or User Range
Stream 1			Video Delay Bypass	Controls insertion of the video delay circuit in the signal processing path	• **No** • Yes
	Processing				
		Video	Horizontal Phase	Adjusts the horizontal timing	• **0** to 29.616 μsec (1080I30, 1080P30) • **0** to 29.646 μsec (1080I29.97, 1080P29.97) • **0** to 35.542 μsec (1080I25, 1080P25) • **0** to 37.024 μsec (1080P24, 1080PsF24) • **0** to 37.061 μsec (1080P23.98, 1080PsF23.98) • **0** to 31.987 μsec (1080I25 SMPTE 295M) • **0** to 22.209 μsec (720P60) • **0** to 22.231 μsec (720P59.94) • **0** to 26.653 μsec (720P50) • **0** to 63.518 μsec (SD 525) • **0** to 63.963 μsec(SD 625)
			Vertical Phase	Adjusts the vertical timing	• **0** to 1124 lines (1080P/I/PsF) • **0** to 1249 lines (1080I25 SMPTE 295M) • **0** to 749 lines (720P) • **0** to 524 lines (SD 525) • **0** to 624 lines (SD 625)
			Video Delay	Controls the amount of video delay in frames	• **0**-5 frames (HD) • **0**-25 frames (SD)
Stream 1			Fade Rate	Controls the rate of fading when channels are swapped or muted	0.0 s to 10.0 s (**1.0 s**)
	Processing				
		Audio			

Table 3-9. HMX6800**+**BC8 Parameters—Remote Control Only *(Continued)*

Path		Parameter Name	Function	Options or User Range
	Delay	Input Audio Ch (1 to 16) Delay	Adjusts delay for the selected input audio channel	**0.0** ms to 1320.0 ms
	Gain	Audio Ch (1 to 16) Gain	Adjusts gain for the specified output channel	± 18.0 dB (**0.0 dB**)
	Invert	Audio Ch (1 to 16) Invert	Invert control for the specified output channel	• **No** • Yes
	Mute	Audio Ch (1 to 16) Mute	Enables muting for the specified output channel	• **Off** • On
Embedding	Metadata	Metadata Embedding Enable	Enables embedding of metadata	• **Enable** • Disable
		Metadata Embedding Line Number	Controls the line to which metadata packets will be embedded	• 9 to 41 (1080P) **(13)** • 9 to 25 (720P) **(13)** • 9 to 20 (1080I) **(13)** • 12 to 20 (SD-525) **(13)** • 8 to 22 (SD-625) **(13)**
	Audio	ADS Clean	Cleans the Ancillary Data Space prior to audio embedding	• **No** • Yes
		Audio Group (1 to 4) Embedding Mode	Selects the embedding mode for the specified audio group	• Off • Append • OverWrt • **Auto**
		Group 1 Append Embedding Error	Reports if an append embedding error has occurred in the group 1 embedder	• No • Yes
		Group 1 Overwrite Embed Error	Reports if an overwrite embedding error has occurred in the Group 1 embedder	• No • Yes

Table 3-9. HMX6800**+**BC8 Parameters—Remote Control Only *(Continued)*

Path	Parameter Name	Function	Options or User Range

Stream 1
   Processing
     Embedding
       Audio (cont)
	Group 2 Append Embedding Error	Reports if an append embedding error has occurred in the group 2 embedder	• No
			 • Yes

	Group 2 Overwrite Embed Error	Reports if an overwrite embedding error has occurred in the group 2 embedder	• No • Yes
	Group 3 Append Embedding Error	Reports if an append embedding error has occurred in the group 3 embedder	• No • Yes
	Group 3 Overwrite Embed Error	Reports if an overwrite embedding error has occurred in the group 3 embedder	• No • Yes
	Group 4 Append Embedding Error	Reports if an append embedding error has occurred in the group 4 embedder	• No • Yes
	Group 4 Overwrite Embed Error	Reports if an overwrite embedding error has occurred in the group 4 embedder	• No • Yes

Table 3-9. HMX6800**+**BC8 Parameters—Remote Control Only *(Continued)*

Path			Parameter Name	Function	Options or User Range
Stream 1			Output Ch (1 to 16) Source Select	Selects the source for the specified output channel	• Input Ch 1 (default for Out01Src)
	Output				• Input Ch 2 (default for Out02Src)
		Audio Source Selection			• Input Ch 3 (default for Out03Src)
					• Input Ch 4 (default for Out04Src)
					• Input Ch 5 (default for Out05Src)
					• Input Ch 6 (default for Out06Src)
					• Input Ch 7(default for Out07Src)
					• Input Ch 8 (default for Out08Src)
					• Input Ch 9 (default for Out09Src)
					• Input Ch 10 (default for Out10Src)
					• Input Ch 11 (default for Out11Src)
					• Input Ch 12 (default for Out12Src)
					• Input Ch 13 (default for Out13Src)
					• Input Ch 14 (default for Out14Src)
					• Input Ch 15 (default for Out15Src)
					• Input Ch 16 (default for Out16Src)
					• In Pair 1 Sum
					• In Pair 2 Sum
					• In Pair 3 Sum
					• In Pair 4 Sum
					• In Pair 5 Sum
					• In Pair 6 Sum
					• In Pair 7 Sum
					• In Pair 8 Sum
					• TstTone 400 Hz
					• TstTone 1 kHz
					• TstTone 2 kHz
					• TstTone 4 kHz

Table 3-9. HMX6800**+**BC8 Parameters—Remote Control Only *(Continued)*

Path			Parameter Name	Function	Options or User Range
Stream 1			Audio Ch (1 to 16) Format	Selects the format for the specified output audio channel	• PCM • Non-PCM • **Auto**
	Output				
		Audio Format			
			Audio Ch (1 to 16) Format Feedback	Reports the AES format of the specified output audio channel	• PCM • Non-PCM
Stream 1			Audio Ch 3/4 Word Length	Adjusts the sample resolution for the selected output audio channel pair	• **24 bits** (Default for HD mode) • **20 bits** (Default for SD mode) • 16 bits
	Output				
		Audio Word Length	Audio Ch 3/4 Word Length		
			Audio Ch 5/6 Word Length		
			Audio Ch 7/8 Word Length		
			Audio Ch 9/10 Word Length		
			Audio Ch 11/12 Word Length		
			Audio Ch 13/14 Word Length		
			Audio Ch 15/16 Word Length		

LEDs and Alarms

Monitoring LEDs

The HMX6800**+**BC8 has 11 monitoring LEDs that serve as a quick monitoring reference. Figure 3-4 shows the location of the monitoring LEDs on an HMX6800**+**BC8 module. Table 3-10 describes each LED in more detail.
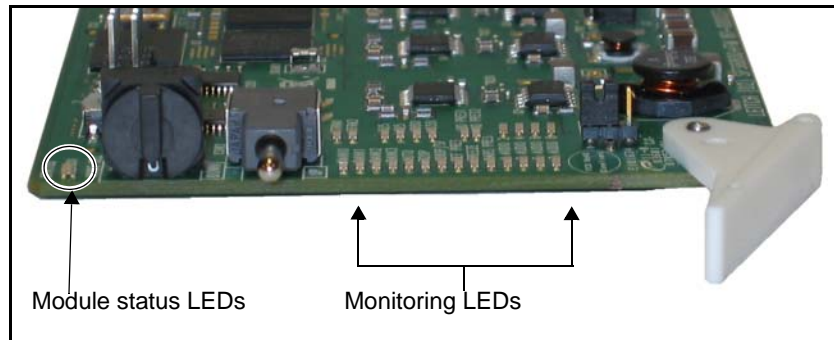
Figure 3-4. Location of HMX6800**+**BC8 LEDs

Table 3-10. Monitoring LEDs

LED	Color Indications	Meaning
Auto	Green	Auto detection of the SD-SDI input standard is active
720P	Green	Selected video standard is 720p
1035I	Green	Unused
1080PsF	Green	Selected video standard is 1080p/sF
1080I	Green	Selected video standard is 1080i
525	Green	Selected video standard is 525
625	Green	Selected video standard is 625
Vid Pres	Green	Input video is present
DARS Pres	N/A	Does not apply to HMX6800**+**BC8
AUDIO 1	Green	Presence of AES audio on AES input 1

Table 3-10. Monitoring LEDs *(Continued)*

LED	Color Indications	Meaning
AUDIO 2	Green	Presence of AES audio on AES input 2
AUDIO 3	Green	Presence of AES audio on AES input 3
AUDIO 4	Green	Presence of AES audio on AES input 4
AUDIO 5	Green	Presence of AES audio on AES input 5
AUDIO 6	Green	Presence of AES audio on AES input 6
AUDIO 7	Green	Presence of AES audio on AES input 7
AUDIO 8	Green	Presence of AES audio on AES input 8

Module Status LEDs

HMX6800**+**BC8 modules do not have any card-edge alarms. Instead, module status LEDs on the corner of the module light up if an error is detected. See Figure 3-4 on page 60 for the location of these LEDs, and Table 3-11 for a definition of the LED colors.

Note

If the LED is flashing red, please contact your Customer Service representative.

Table 3-11. Module Status LED Descriptions

LED Color Sequence	Meaning
Off	There is no power to the module; the module is not operational.
Green	There is power to the module; the module is operating properly.
Red	There is an alarm condition.
Flashing red	The module has detected a hardware/firmware fault.
Amber	The module is undergoing configuration.

Alarms

If a major or minor alarm is triggered within your HMX6800**+**BC8 module, the Status LED will light red.

Alarms are usually logged and monitored within available software control applications (for example, **+** Pilot Lite or Pilot). You can only differentiate between major and minor alarms within a software control application. See the appropriate software control user manual or online help for more information.

The following settings can be made for each alarm within Pilot or Navigator software:

Table 3-12. Alarm Options

Alarm Option	Effect
Enable/Disable	This option toggles between Enabled and Disabled. If the alarm is **Enabled**, an alarm condition will generate an alarm; but if it is **Disabled**, the alarm condition will be ignored.
Alarm priority	This setting determines whether a triggered alarm will be reported as major or minor. The range is 1 - 10. A priority of 6 or higher is a major alarm, and a priority of 5 or lower is a minor alarm.
Trigger (s)	This option determines how long an alarm condition must exist (in seconds) before the alarm is triggered. If the alarm level is reached for less time than the **Trigger** duration, then the alarm will not trigger. Choose any duration from 0 to 7200 (or two hours). If this option is set to 0 and the alarm condition exists for any period of time, then the alarm will trigger.
Clear (s)	Determines the amount of time the alarm condition must be in abate in order for the alarm to be turned off. Choose any duration from 0 to 7200 seconds (or two hours). If this option is set to 0 and the alarm condition ceases for any period of time, then the alarm will clear.
Ack	When an alarm is active, click here to allow other users on the network to see that you have acknowledged the alarm.

Table 3-13 describes the specific alarms for the HMX6800**+**BC8. You can only identify specific alarms using a software control application.

Table 3-13. Alarm Definitions—HMX6800**+**BC8

Alarm Name	Alarm Description	Alarm Option Default Settings			
		Enable/ Disable	Priority	Trigger	Clear
Loss of SDI	Reports that active SD/ HD-SDI is absent	Enabled	9	1 sec	2 sec
Video Standard Mismatch	Reports that a mismatch has occurred between the set and detected input video standards	Enabled	8	1 sec	2 sec
Unsupported Video Standard	Reports that the detected input video standard is unsupported	Enabled	8	1 sec	2 sec
Group (1 - 4) Append Embedding Error	Reports that the embedder is unable to append the specified audio group due to the pre-existence of that audio group	Enabled	6	2 sec	2 sec
Group (1 - 4) Overwrite Embedding Error	Reports that the embedder is unable to overwrite the specified audio group due to a lack of that audio group existing in the input SDI	Enabled	6	2 sec	2 sec
AES (1 - 8) In Missing	Reports that the specified AES input is missing	Enabled	1	2 sec	2 sec

Specifications

Overview

The following specifications appear in this chapter:

Specifications and designs are subject to change without notice.

Inputs

SDI Video Input

Table 4-1. SDI Video Input

Item	HD-SDI Specification	SD-SDI Specification
Number	1	1
Standard	SMPTE 292M	SMPTE 259M
Connector	BNC (IEC169-8)	BNC (IEC169-8)
Impedance	75Ω	75Ω
Return loss	18 dB (typical) from 5 MHz to 1485 MHz	18 dB (typical) to 270 MHz
Equalization	Adaptive cable equalization for up to 393 ft (120 m) (typical) of Belden 1694A co-axial cable	Adaptive cable equalization for up to 700 ft (230 m) (typical) of Belden 8281 co-axial cable

AES Input

The input can be either balanced or unbalanced (see Table 4-2). This is designated by the **Audio Input Type Select** parameter. See "Setting HMX6800**+**BC8 Control Parameters" on page 38.

Table 4-2. AES Input

Item	Balanced Specification	Unbalanced Specification
Standard	AES 3	AES 3, SMPTE 276M
Type	Balanced, transformer coupled	Unbalanced, AC coupled
Connector	XLR	BNC (IEC169-8)
Sensitivity	<200 mV	<100 mV
Impedance	110Ω ± 20% (0.1 to 6 MHz)	75Ω
Return loss	N/A	> 25 dB, 0.1 to 6 MHz
Common mode rejection	0 V to 7 V (0 kHz to 20 kHz)	N/A
Input audio rate	• PCM input: 32 to 96 kHz • Non-PCM input: 48 kHz	• PCM input: 32 to 96 kHz • Non-PCM input: 48 kHz
Bits	16, 20 or 24	16, 20 or 24
Channel status and user bit	Maintained, but professional mode, 48 kHz. See Appendix A for full details.	

Outputs

SDI Video Output

Table 4-3. SDI Video Output

Item	HD-SDI Specification	SD-SDI Specification
Number	4	4
Standard	SMPTE 292M with SMPTE 299M embedded audio	SMPTE 259M with SMPTE 272 embedded audio
Connector	BNC (IEC 169-8)	BNC (IEC 169-8)
Impedance	75Ω	75Ω
Return loss	> 18 dB (typical) from 5 MHz to 1485 MHz	> 18 dB (typical) to 270 MHz
Signal level	800 mV ± 10%	800 mV ± 10%
D.C. offset	0.0 V ± 0.5 V	0.0 V ± 0.5 V
Rise and fall time	< 270 ps, within 100 ps of each other	400 ps to 1500 ps, within 500 ps of each other
Overshoot	< 10% of amplitude	< 10% of amplitude
Jitter	• >100kHz: < 135 ps • 10 Hz-100 kHz: < 675 ps	< 0.2 UI (740 ps) pk-to-pk

RS-232/RS-422

Table 4-4. RS-232/RS-422

Item	Specification
Standard	Electrical specification EIA-232C
Connector	• DB-9 • 232/422 switchable

Propagation Delay

Table 4-5. HMX6800**+**BC8 Propagation Delay

Item	Specification
Video	1080: 6.5 µsec 720: 6.2 µsec 525/625: 16 µsec
Audio (typical with minimum delay setting; combined embedding and de-embedding)	1080 PCM mode: 5.5 msec 1080 Non-PCM mode: 2.6 msec 720 PCM mode: 5.8 msec 720 Non-PCM mode: 2.9 msec 525 PCM mode: 5.3 msec 525 Non-PCM mode: 2.4 msec 625 PCM mode: 5.1 msec 625 Non-PCM mode: 2.3 msec

Power Consumption

The power consumption for HMX6800**+**BC8 modules is 12 W.

Operating Temperature

The operating temperature for HMX6800**+**BC8 modules is 41° to 113°F (5° to 45°C).

Appendix A

Audio Bit Manipulation

Overview

The tables in this appendix contain information on the manipulation of bits that occur when using HMX6800✛BC8 modules.

The following items are documented:

- "Manipulating Channel Status Bits (C-Bit)" on page 70
- "Manipulating Validity and User Bits (V-Bit and U-Bit)" on page 73
- "Identifying Audio Characteristics (Audio Sampling Frequency and Word Length)" on page 74

Table A-1. Description of Short Forms in the Appendix

RX Key	TX Key	Sample Rate Indication	Audio Word Length
N=Not recognized	N=Not transmitted	Byte 0 Bits [6,7], Byte 4 Bits [3,4,5,6]	Byte 2 Bits [0,1,2]
Y=Recognized	Y=Transmitted	• [00,0100] = 96 kHz	• [000] = Maximum word length 20 bits (auxiliary bit use not indicated)
S=Recognized and stored, passed-through, or both		• [01,0000] = 48 kHz	• [001] = Maximum word length 24 bits (auxiliary bits used for audio)
		• [11,0000] = 32 kHz	Byte 2 Bits [3,4,5]
		• [00,1000] = 24 kHz	• [100] = Encoded word length =Maximum word length - 4 bits
		• [00,0101] = 88.2 kHz	• [101] = Encoded word length =Maximum word length - 0 bits
		• [10,0000] = 44.1 kHz	
		• [00,1001] = 22.05 kHz	

Manipulating Channel Status Bits (C-Bit)

Table A-2. Channel Status (C-Bits) Data Description

Byte	Bit	Function	RX	TX	Remarks
0	0	[0] Consumer Use [1] Professional Use	N Y	N Y	• RX ignores bit • TX sets bit to 1
0	1	[0] Audio [1] Non-Audio	S S	Y Y	• RX sets up audio channel to pass data (Gain=0 dB, Invert=off) • TX bit passed unmodified or forced, according to **Output Chxx Format** and **Out Chxx Format Fb** parameters
0	2 to 4	[000] Not Indicated [100] No Emphasis [110] 50/15 µs [111] CCITTJ17	S S S S	Y Y Y Y	• RX ignores bits • TX passed bits unmodified
0	5	[0] Locked [1] Unlocked	N N	Y N	• RX ignores bits • TX sets bit to [0]
0	6 to 7	[00] Not indicated [01] 48 kHz [10] 44.1 kHz [11] 32 kHz	Y Y Y Y	N Y N N	• RX ignores bits • TX sets bits to [01]
1	0 to 3	[0000] Not indicated [0001] Two channel [0010] Mono [0011] Prim/sec [0100] Stereo [0101] to [1111] Undefined	N N N N N N	Y N N N N N	• RX ignores bits • TX sets bits to [0000]
1	4 to 7	[0000] Not indicated [0001] 192 bit block [0010] AES18 (HDLC) [0011] User defined [0100] to [1111] Undefined	S S S S S	Y Y Y Y Y	• RX ignores bits • TX passes bits unmodified

Table A-2. Channel Status (C-Bits) Data Description *(Continued)*

Byte	Bit	Function	RX	TX	Remarks
2	0 to 2	[000] Aux. bit use is not indicated [001] Aux. bit use is audio data [010] Aux. bit use is co-ordination signal [011] to [111] Undefined	N N N N	Y Y N N	• RX ignores bits • TX sets bits according to transmitted word length
2	3 to 5	[000] Not indicated [001] Max Length - 1 [010] Max Length - 2 [011] Max Length - 3 [100] Max Length - 4 [101] Max Length [110] to [111] Undefined	N N N N N N N	N N N N Y Y N	• RX ignores bits • TX sets bits according to transmitted word length
2	6 to 7	[00] Alignment level not indicated [01] Alignment to SMPTE RP155 [10] Alignment to EBU R68 [11] Reserved	N	Y	• RX ignores bits • TX sets bits to [00]
3	0 to 6	bit 7 = 0: Channel number bit 7 = 1: [0,1,2,3] Channel number 　　　　　 [4,5,6] Multi-channel mode	N	Y	• RX ignores bits • TX sets bits to [0000000]
3	7	[0] Undefined multi-channel mode [1] Defined multi-channel mode	N	Y	• RX ignores bits • TX sets bits to [0]
4	0 to 1	[00] Not a reference [01] Grade 1 reference [10] Grade 2 reference [11] Undefined	N N N N	Y N N N	• RX ignores bits • TX sets bits to [00]
4	2	Reserved	N	Y	• RX ignores bits • TX sets bits to [0]

Table A-2. Channel Status (C-Bits) Data Description *(Continued)*

Byte	Bit	Function	RX	TX	Remarks
4	3 to 6	[0000] Not indicated [1000] 24 kHz [0100] 96 kHz [1100] 192 kHz [1001] 22.05 kHz [0101] 88.2 kHz [1101] 176.4 Hz [1111] User defined	N	Y	• RX ignores bits • TX sets bits to [0000]
4	7	[0] Sample frequency not scaled [1] Sample frequency scaled by 1/1.001	N	Y	• RX ignores bits • TX sets bits to [0]
5	0 to 7	Reserved	N	Y	• RX ignores bits • TX sets bits to [00000000]
6 to 9	0 to 7	Alphanumeric channel origin data	S	Y	• RX ignores bits • TX passed bits unmodified
10 to 13	0 to 7	Alphanumeric channel destination data	S	Y	• RX ignores bits • TX passed bits unmodified
14 to 17	0 to 7	Local sample address code	S	Y	• RX ignores bits • TX passed bits unmodified
18 to 21	0 to 7	Time-of-day sample address code	S	Y	• RX ignores bits • TX passed bits unmodified
22	0 to 3	Reserved	N	Y	• RX ignores bits • TX passed bits unmodified
22	4	Bytes 0 to 5 reliability flag	N	Y	• RX ignores bits • TX passed bits unmodified

Table A-2. Channel Status (C-Bits) Data Description *(Continued)*

Byte	Bit	Function	RX	TX	Remarks
22	5	Bytes 6 to 13 reliability flag	S	Y	• RX ignores bits • TX passed bits unmodified
22	6	Bytes 14 to 17 reliability flag	S	Y	• RX ignores bits • TX passed bits unmodified
22	7	Bytes 17 to 21 reliability flag	S	Y	• RX ignores bits • TX passed bits unmodified
23	0 to 7	CRC	Y	Y	• RX ignores bits • TX calculates CRC on output

Manipulating Validity and User Bits (V-Bit and U-Bit)

Table A-3. V-Bit and U-Bit Data Descriptions

Item	RX	TX	Remarks
Validity (V) bit	S	Y	• RX optionally mutes data if enabled • TX passes bit unmodified
User (U) bit	S	Y	• RX ignores bits • TX passed bits unmodified

Identifying Audio Characteristics (Audio Sampling Frequency and Word Length)

Table A-4. Audio Sampling Frequency and Word Length

Item	Remarks
Audio sampling frequency	• RX: 32 to 108 kHz • TX: 48 kHz
Audio word length	• RX: 16 to 24 bits • TX: 16 to 24 bits

Communication and Control Troubleshooting Tips

Overview

Find the following troubleshooting information in this appendix:

- "General Troubleshooting Steps" on page 76
- "Software Communication and Control Issues" on page 77
- "Hardware Communication and Control Issues" on page 81
- "Contacting Customer Service" on page 81

General Troubleshooting Steps

Follow these steps in troubleshooting 6800✚ product problems:

1. Review the "Software Communication and Control Issues" on page 77 outlined in this chapter.

2. Search this product manual and other associated documentation for answers to your question.

   Product documentation (including manuals, online help, application notes, erratas, product release notes, and more) can be found on our website along with technical support information, training information, product downloads, and a product knowledge base.

3. Contact your Customer Service representative if, after following these initial steps, you cannot resolve the issue.

   To contact Customer Service, see "Contacting Customer Service" on page 81.

✎ Note

Associated documentation for 6800✚ series products can generally be found in the product-specific manual that accompanies every module, in the *FR6802✚ Frame Installation and Operation Manual*, and in the 6800✚ *Safety Instructions and Standards Manual*.

Software Communication and Control Issues

- "**+** Pilot Lite Fails to Communicate with Installed Modules" on page 77
- "**+** Pilot Lite Does Not Find All Modules in Frame" on page 78
- "**+** Pilot Lite or CCS Software Application Not Responding" on page 79
- "**+** Pilot Lite Cannot Control a Module Showing in the Control Window" on page 79
- "**+** Pilot Lite Reports "Not Ready" Status" on page 79
- "CCS Software Application or Remote Control Panel Does Not Communicate with Module" on page 80
- "Alarm Query Fails When a Device Reboots" on page 80

+ Pilot Lite Fails to Communicate with Installed Modules

Confirm that the following items are not the reason for the communication failure:

- Proper module slot has not been specified (**+** Pilot Lite is not communicating with the appropriate slot). See your *FR6802***+** *Frame Installation and Operation Manual* for more information on slot identification.

- COM port is used elsewhere (Check that the correct COM port is configured in **+** Pilot Lite and that another application is not using that COM port).

- Actual frame ID does not match with the two DIP switch settings in the back of the frame (**+** Pilot Lite is not communicating with the proper frame). See your *FR6802***+** *Frame Installation and Operation Manual* for more information on frame ID switch settings.

- Null modem cable is not being used. Between the PC running **+** Pilot Lite and the FR6802**+** frame, there should be a null RS-232 modem cable. At minimum, this requires that pins 2 and 3 are crossed and 5 to 5 for ground.

- ICE6800**+** module is installed in the frame (**+** Pilot Lite control is disabled if an ICE6800**+** module is installed in the frame; ICE6800**+** modules are used for CCS control).

- A legacy 6800 series product is in the frame. **✚** Pilot Lite cannot communicate with legacy 6800 series products. They will not be discovered or controlled by **✚** Pilot Lite, although they can be installed in the FR6802**✚** frame and work using card edge controls. The module must be from the 6800**✚** product family.

- Check that the back module does not have any bent pins, following this procedure:

    a. Unplug the front module.

    b. Unscrew and remove the back module.

    c. View the 20-pin spring connector at the bottom of the back module. (See Figure A-1.)

20-pin connector
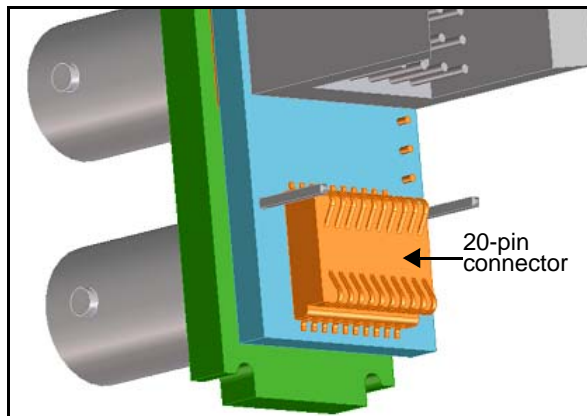
Figure A-1. Back Module to Front Module Connector

This connector should not have any bent or pressed pins. Even a slightly depressed or bent pin may cause genlock issues.

    d. If there are bent pins, carefully reposition them to their correct positions.

    If this is not possible, you can exchange the back module for a new one (order part number HMX6800**✚**BC8DR).

✚ Pilot Lite Does Not Find All Modules in Frame

If a discovery is started too soon after frame power-up, **✚** Pilot Lite will not find all the installed modules. Refresh **✚** Pilot Lite (**File** > **Refresh**), and ensure that installed modules are fully powered-up first before discovery.

If a module is plugged into the frame after a discovery, **+** Pilot Lite does not automatically detect the module. Refresh **+** Pilot Lite (**File** > **Refresh**) to discover the newly installed module.

If a Legacy 6800 series product is in the frame, **+** Pilot Lite will not detect it. **+** Pilot Lite cannot communicate with legacy 6800 series products. They will not be discovered or controlled by **+** Pilot Lite although they can be installed in the FR6802**+** frame and work using card edge controls. For **+** Pilot Lite to find a module, it must be from the 6800**+** product family.

+ Pilot Lite or CCS Software Application Not Responding

+ Pilot Lite and CCS applications such as Navigator or Pilot cannot run on the same PC at the same time. Both applications can be installed, but only one can be opened at a time.

+ Pilot Lite Cannot Control a Module Showing in the Control Window

Consider these questions:

- Did you physically set the jumper for local control? If so, set this jumper to the REM position for remote control.

- Does the card name in the control window physically match the card type in the frame?

- Is the module properly seated in the frame? Check the positioning of the module in its slot in the frame.

- Does the Control window indicate the device is "ready"? The device may be powered off or disconnected from the network.

+ Pilot Lite Reports "Not Ready" Status

+ Pilot Lite reports each device's connection status in the status bar. If the connection status message reads "Not Ready," check the following:

- Is the module properly seated in the frame? Check the position of the module in the frame.

- Is the frame connected to the network? Check the device's network connection.

If the status bar still reports no status or "Not Ready" for the frame or device, try restarting **+** Pilot Lite.

CCS Software Application or Remote Control Panel Does Not Communicate with Module

CCS software applications (such as Pilot, CoPilot, and Navigator) and remote control panels require the purchase and installation of an ICE6800**+** module in an FR6802**+** frame in order to communicate remotely via Ethernet.

Alarm Query Fails When a Device Reboots

When you reboot a device connected to your PC, the alarm traffic hitting the network may cause an alarm query request to time out and fail. While the query does not automatically retry, it will post an "Alarm query failed" message to the **Diagnostics** window.

To clear an "Alarm query failed" message, right-click inside the **Diagnostics** window, and then select **Refresh** from the resulting context menu.

Hardware Communication and Control Issues

Frames Fail to Communicate with the PC after a Power Failure

You must exit the software and restart after the frame recovers from its power failure. To restore communications between the PC and the frames, ensure that the frames have three or more minutes to recover from the power failure before you exit the application and restart the PC.

Module Does Not Seem to Work

Although the following troubleshooting tips may seem obvious, please take the time to ensure the following:

- All appropriate rear connections are securely made
- The board is securely installed (with no bent pins)
- The frame is turned on

Contacting Customer Service

We are committed to providing round-the-clock, 24-hour service to our customers around the world. Visit our website for information on how to contact the Customer Service team in your geographical region.

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