HDCC-GPINHL-OG1

VANC/Audio GPI Cue Inserter/Receiver with CEA-608/708 Monitoring

Configuration Guide

Firmware Version: V1.10
Software Version: V0.17

Part Number 821065, Revision B

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CHAPTER 1
Getting Started

Introduction

Overview

This chapter describes the basic captioning functions that you can perform using your Wohler HDCC-GPINHL-OG1 (for the Ross DFR-8321 frame).

Goals for This Chapter

- ✓ Provide a Quick Start process that gives an overview of the installation.
- ✓ Identify the HDCC card's connectors.
- ✓ Understand the captioning functions the HDCC card performs.

Topics

Product Description

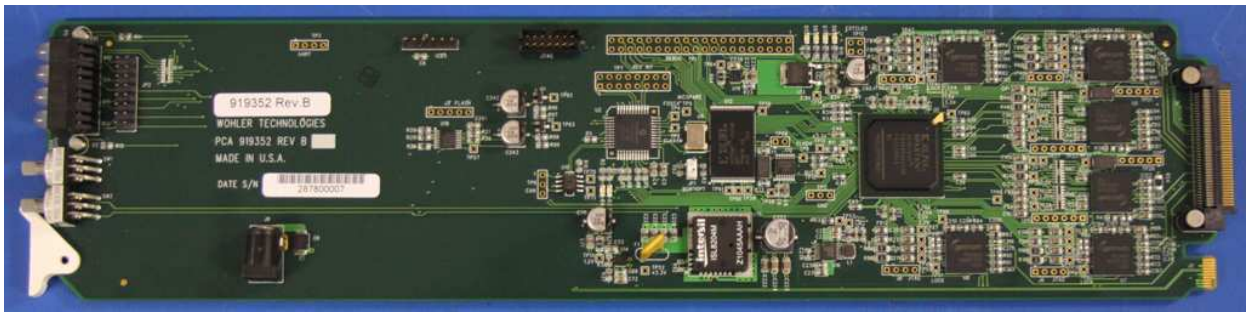
The HDCC-GPINHL is a versatile card for inserting/receiving GPI cues in the VANC or Audio area of an HD/SD-SDI video stream, as well as monitoring CEA-608/708 captions on the same signal.

You operate the HDCC-GPINHL-OG1 in a Ross® openGear® DFR-8321 frame. Refer to Chapter 2: Hardware Installation on page 9 for installation instructions.

When operated in the Ross frame, the card is configured and controlled through DashBoard® software. Refer to Using DashBoard on page 33 for instructions.

The HDCC-GPINHL-OG1 is a one-channel card; It allows a single HD/SD-SDI stream to pass through.

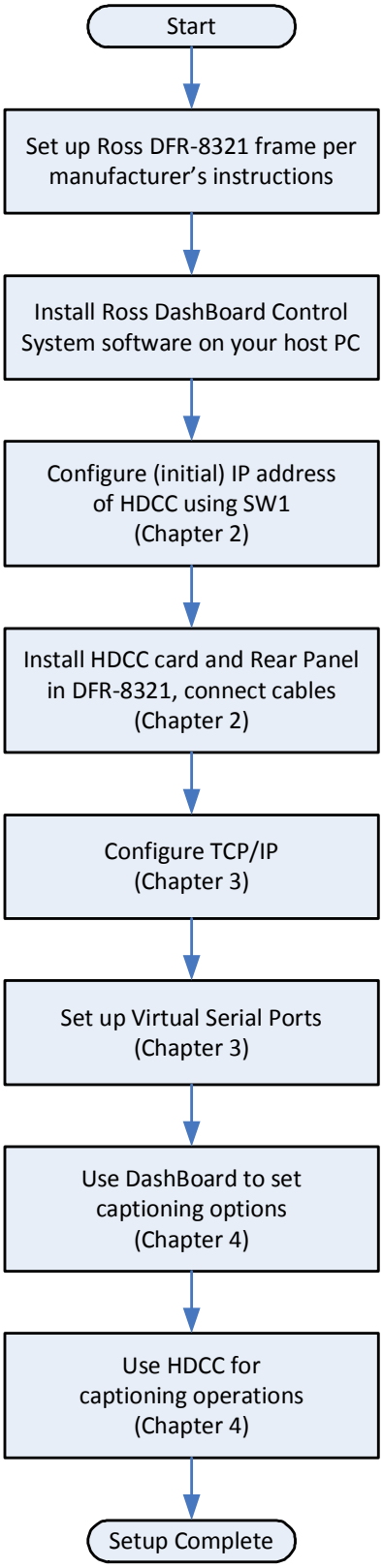
Figure 1–1 HDCC Card



Quick Start Guides

Figure 1–2 on page 3 illustrates the installation and configuration process for the Ross DFR-8321 frame.

Figure 1–2 Quick Start, Ross DFR-8321 Frame

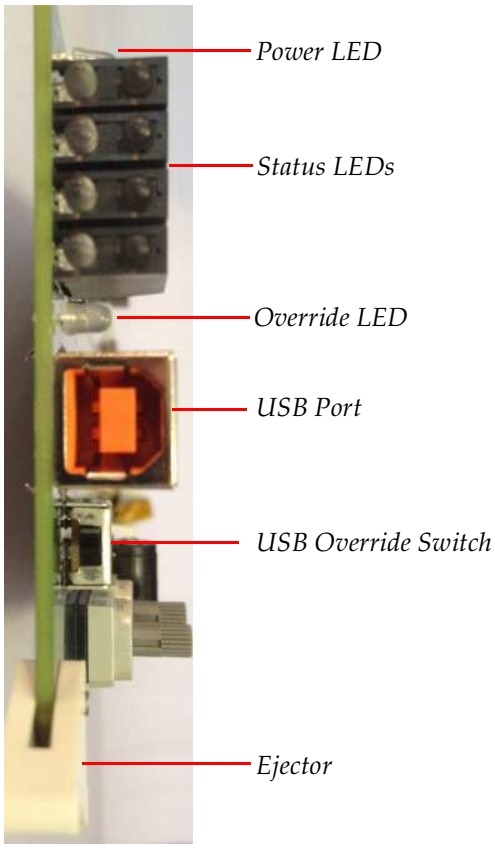


I/O Connections

Front Edge

The HDCC card's front edge has a power LED (lit when power is applied), a USB port, and a USB override switch. There are also status LEDs and an override LED.

Figure 1–3 HDCC Front Edge



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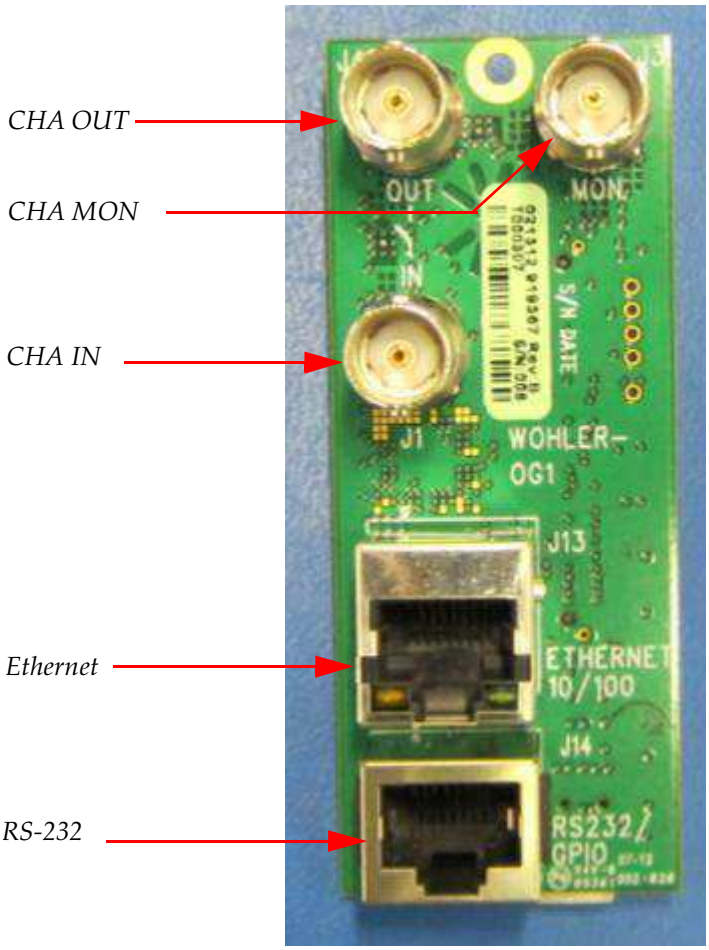
HDCC in Ross DFR-8321 Frame

The HDCC-OG1 consists of two main parts: the HDCC board which goes into a DFR-8321 slot, and the OG1 Rear Panel which is attached to the rear of the frame.

Figure 1–4 shows the input and output connectors of the Rear Panel supplied with the 1 HDCC card. The input is **CHA IN** and the output is **CHA OUT**. The monitoring output **CHA MON** provides a duplicate of the regular output to be sent to a monitor for display with burned-in captions.

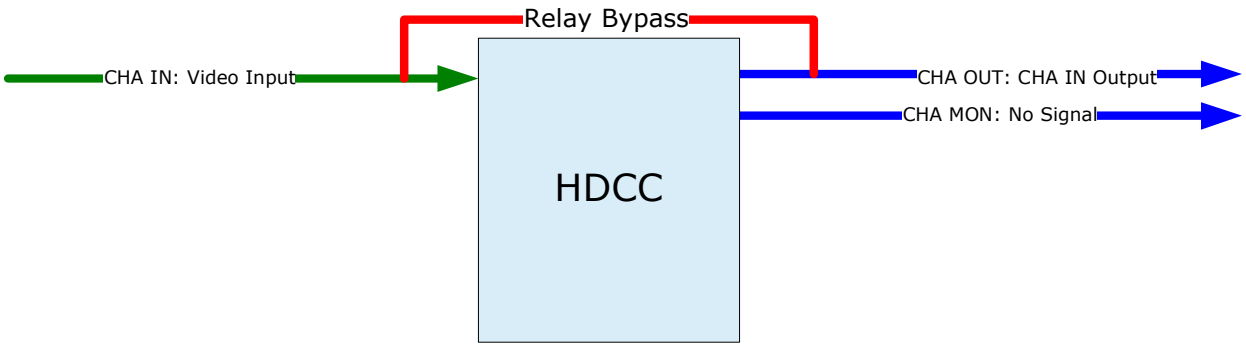
Figure 1–4 OG1 Rear Panel



Relay Bypass

To prevent the loss of the broadcast signal in the event of power failure, the input is bypassed via a relay to its output, ensuring the signal will always pass through the card.

Figure 1–5 Relay Bypass - No Power Condition



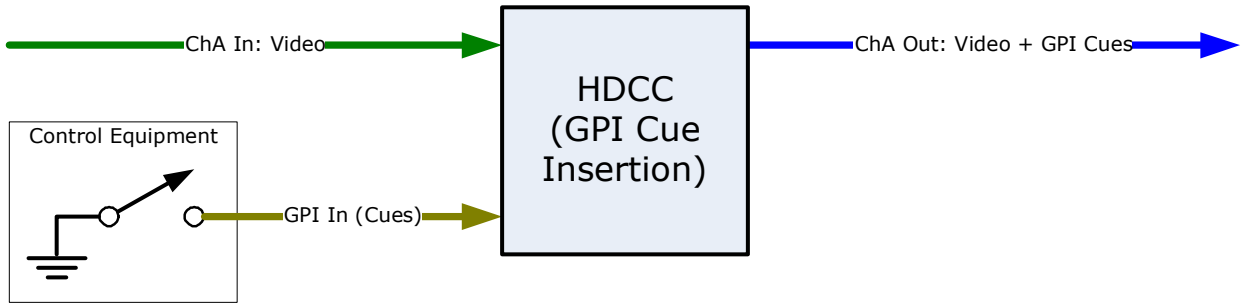
Functions

GPI Cue Insertion

GPI Cue Insertion is the process of encoding signaling cues in the VANC or Audio Channels area of a video signal based upon inputs provided either by the GPI/O connector J14 or by the Dashboard user interface. Refer to Figure 1–6 on page 7.

These cues can prompt downstream equipment to either take action or to signal operators.

Figure 1–6 Cue GPI Insertion

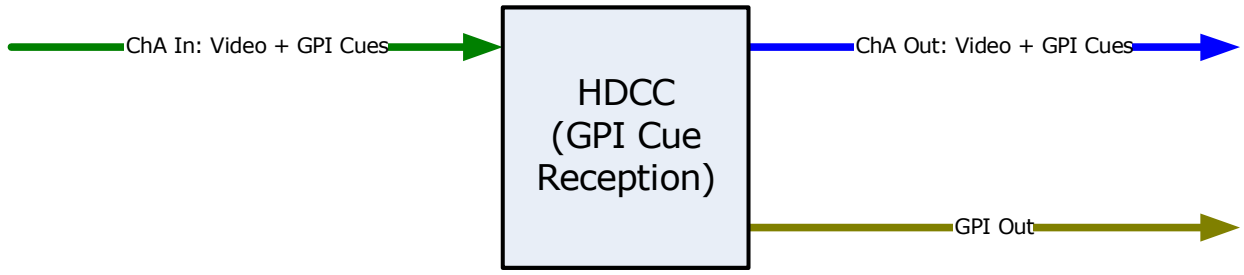


Connections	
Port	**Data**
CHA IN	SMPTE HD/SD-SDI video stream
CHA OUT	SMPTE HD/SD-SDI video stream with cues inserted
GPI IN	GPI cues provided via connector J14 or Dashboard user interface

GPI Cue Reception

GPI Cue Reception is the process of decoding signaling cues in the VANC or Audio Channels area of a video signal and outputting them to GPI/O connector J14. Refer to Figure 1–7.

Figure 1–7 GPI Cue Reception

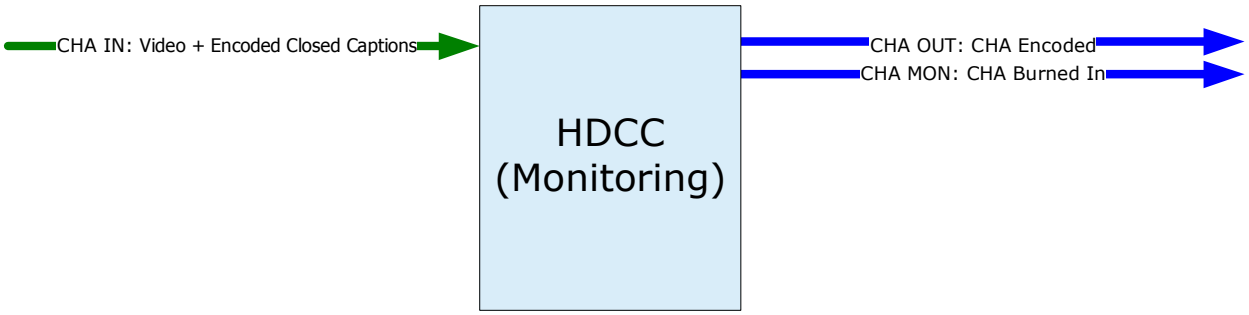


Connections	
Port	**Data**
CHA IN	SMPTE HD/SD-SDI video stream with GPI cues encoded
CHA OUT	SMPTE HD/SD-SDI video stream with GPI cues present (same as **CHA IN**)
GPI OUT	Voltages corresponding to the state of the cue are presented on connector J14

Monitoring

The monitoring function allows you to verify the presence of captions on the **SDI** output by showing the captions on the video signal. Connect the **CHA MON** output to an SDI monitor to view the video with captions displayed. Refer to Figure 1–8.

Figure 1–8 Monitoring Setup



Example: The caption data supplied on **CHA IN** is burned into the video stream and displayed on **CHA MON**.

Connections	
Port	**Data**
CHA IN	SMPTE HD/SD-SDI video stream with captions present.
CHA OUT	SMPTE HD/SD-SDI video stream with closed captions present (same as **CHA IN**).
CHA MON	SMPTE HD/SD-SDID video stream with burned-in captions to monitor.

Note: By default, **CHA OUT** is “clean” (no burned-in captions displayed) and **CHA MON** shows the captions “burned” into the video. The HDCC-GPINHL-OG1 can be configured to have both outputs burned-in or both clean, as well.

CHAPTER 2
Hardware Installation

Introduction

Overview

This chapter explains how to install your HDCC card in the Ross DFR-8321 frame.

Goals for This Chapter

- ✓ Install your HDCC card in a Ross DFR-8321.
- ✓ Set **SW1** to configure a static IP address or DHCP for your HDCC card.

Topics

Safety Instructions

1. Read, keep, and follow all of these instructions; heed all warnings.
2. Do not use this equipment near water or expose the equipment to rain or moisture.
3. Use only the adaptors specified by the manufacturer.
4. Unplug the equipment during lightning storms or when unused for long periods of time.
5. Refer all servicing to qualified service personnel. Servicing will be required under all of the following conditions:
   - The equipment has been damaged in any way.
   - Liquid had been spilled or objects have fallen onto the equipment.
   - The equipment has been exposed to rain or moisture.
   - The equipment does not operate normally.
   - The equipment has been dropped.

Unpacking

CAUTION! Static discharge can cause serious damage to sensitive semiconductor devices. Avoid handling the circuit boards in high static environments such as carpeted areas, and when synthetic or wool fiber clothing is worn. Always exercise proper grounding precautions when handling circuit boards.

Unpack each HDCC that you have received from its shipping container and check the contents against the packing list to ensure that all items are included. If any items are missing or damaged, please contact your Wohler sales representative immediately.

Installing the HDCC in the Ross DFR-8321

Requirements

Tools

To install and use the HDCC, you will need a small Phillips screwdriver for attaching the rear panel adaptor to the frame.

Chassis

Ross DFR-8321 openGear frame

Hardware

- HDCC card
- OG1 Rear Panel (single channel)
- Screw
- O-Ring

Installation

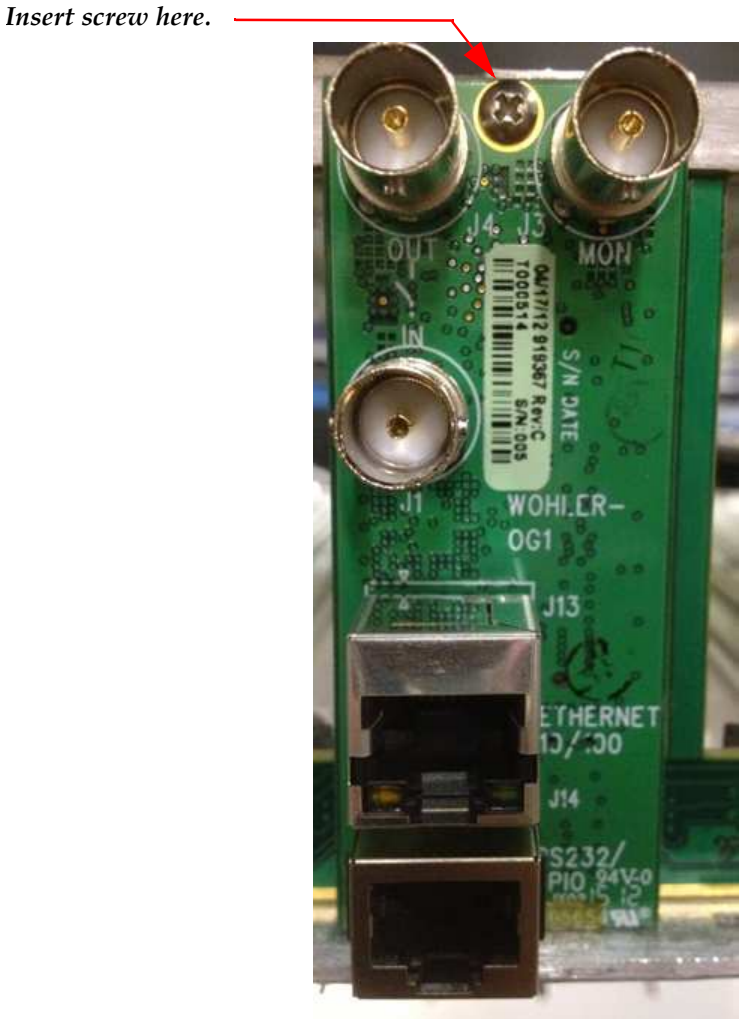
To install the HDCC board and OG1 Rear Panel in the frame, follow the steps below:

1. Ensure that the Ross DFR-8321 frame is properly installed.
2. Power down the frame.

Important: The OG1 requires two slots of the Ross DFR-8321 chassis.

3. Insert the screw into the two corner hole of the rear panel. Refer to Figure 2–1.

Figure 2–1 OG1 Rear Panel



4. After you have inserted the screw into the OG Rear Panel, place the O-ring on the screw. The O-ring will keep the screw from falling out during installation.

Important: The HDCC's IP address is determined by dip switch **SW1** on the inner surface of the rear panel. You may want to set the switch positions on **SW1** before installing the adapter in the frame. If so, skip ahead to Rear Panel DIP Switch on page 14, then come back here to finish the installation.

5. With the rear of the frame facing you, insert the rear panel into the base slot and tighten the top screw. Refer to Figure 2–2.

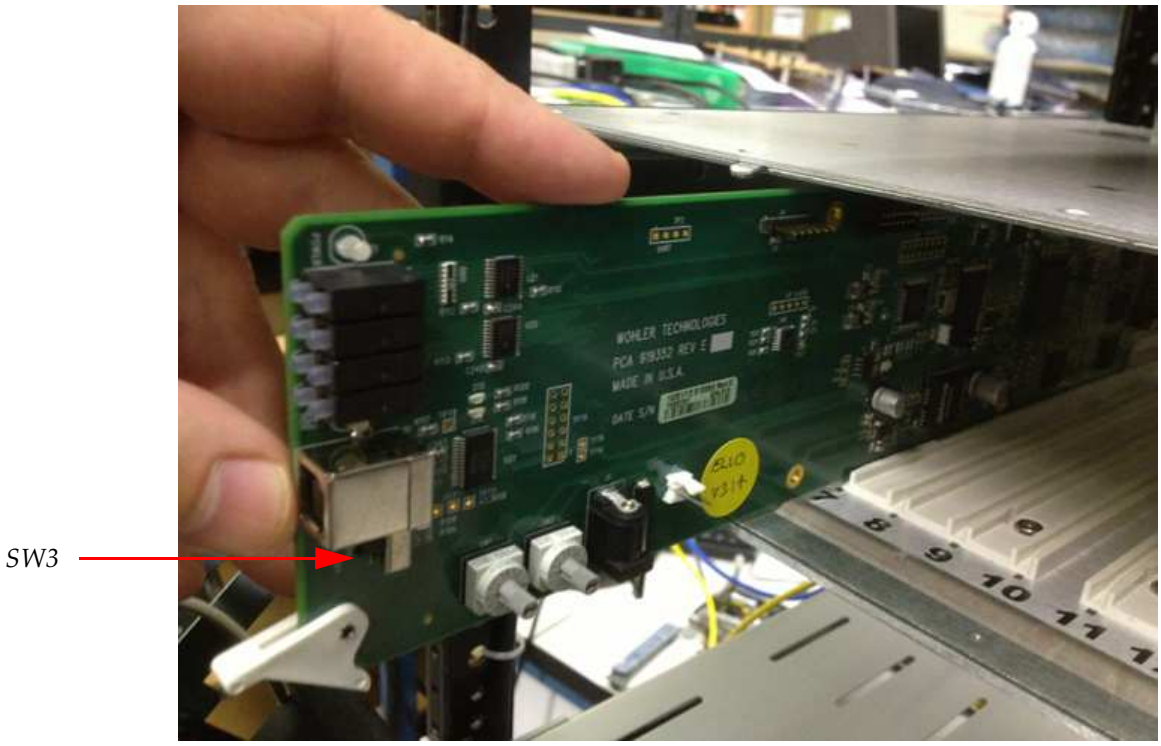
Figure 2–2 Rear Panel Installed

6. With the front of the frame facing you, press inward on both tabs to disengage the front panel from the chassis and pull the front panel towards you and then down.

7. Insert the card so that the ejector is at the bottom (Figure 2–3 on page 14) and then close the front panel.

Note: You can install the HDCC-OG1 card into any odd numbered slot. Again refer to Figure 2–3 on page 14.

Figure 2–3 Install in DFR-8321 Frame



Note: Ensure that **SW3** is in the **Off** position.

Rear Panel DIP Switch

The Rear Panel has a miniature DIP switch, SW1, that sets the IP address of the card. SW1 is a slider-type DIP switch and is on the inside surface of the board.

Position 1 is set to **Off** at the factory so that the card's IP address will be based on the previously stored configuration (by default, to use DHCP network settings). If Position 1 is **On**, the static IP address set by Position 2 will apply.

Table 2–1 Rear Panel DIP Switch Position Functionality

Position	Off	On	Default
1	Use internal settings for IP address.	Use static IP address determined by position 2.	**Off**
2	Static IP= 10.2.1.4	Static IP= 192.168.2.4	**Off**
3	Normal boot.	Execute boot loader.	**Off**
4	Not Used.		

Important: Position 3 should always be **Off**.

Important: If you're using the default static IP address, be aware that because the static IP addresses defined by the switch are *always* the same, no more than one HDCC card can be connected to the network **until** you change the card's (or frame's) TCP/IP settings (see next chapter).

Important: If you are setting up more than one HDCC card, you may need to clear your computer's ARP cache (that identifies which Ethernet MAC addresses are associated with which IP addresses) after you connect each HDCC card. Otherwise, you may be unable to connect because your cache contains outdated information.

To clear the cache, open a Windows command prompt and type:

```
arp -d *
```

Next Steps

1. Connect the SDI, serial, and Ethernet cables as needed.
2. Set up virtual serial ports (VSPs) if needed. Refer to next chapter.

Important: This concludes the procedure for installing the HDCC card and its rear panel.

If you want to configure your Ethernet port to support serial communications, continue on to Chapter 3: TCP/IP Configuration and Virtual Serial Ports (VSPs) on page 17.

CHAPTER 3
TCP/IP Configuration and Virtual Serial Ports (VSPs)

Introduction

Overview

This chapter describes how to configure your HDCC card for use on a TCP/IP network and how to install virtual serial ports (VSPs) to communicate with you HDCC card.

Note: Unless there is a need to access the terminal with a virtual serial port, this chapter may be skipped. Refer to Chapter 6: Terminal.

Goals for This Chapter

- ✓ Configure your HDCC card's TCP/IP settings.
- ✓ Create Virtual Serial Ports (VSPs) to provide serial port-like access to your HDCC card.

Topics

Functional Overview

Virtual Serial Ports (VSPs) on the HDCC

Caption data is supplied to and received from the HDCC via serial ports. In addition to the RS-232 port (J14 on the rear panel) serial data is also accessible over the Ethernet port using virtual serial ports. The HDCC provides two virtual serial ports as shown in Figure 3–1 below.

Figure 3–1 HDCC to PC Connectivity

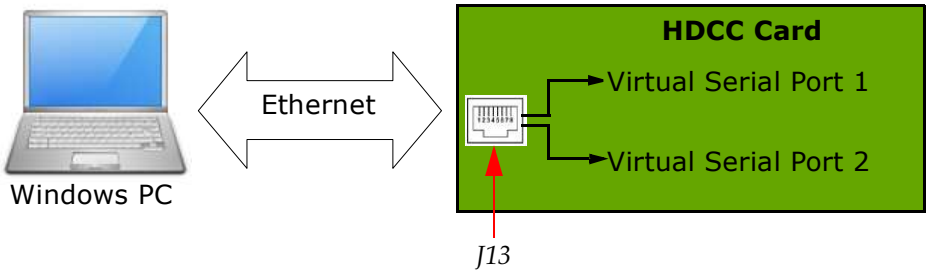


Figure 3–1 above provides a functional overview of the virtual serial port configuration. You can use third party software (link provided below) to create a virtual serial port which will transfer serial data to and from the HDCC over Ethernet. From the PC user's perspective, the virtual serial ports are indistinguishable from the hardware serial ports.

Once the virtual serial ports are operational, you can change the HDCC settings through DashBoard to control how these serial ports are routed to the captioning system.

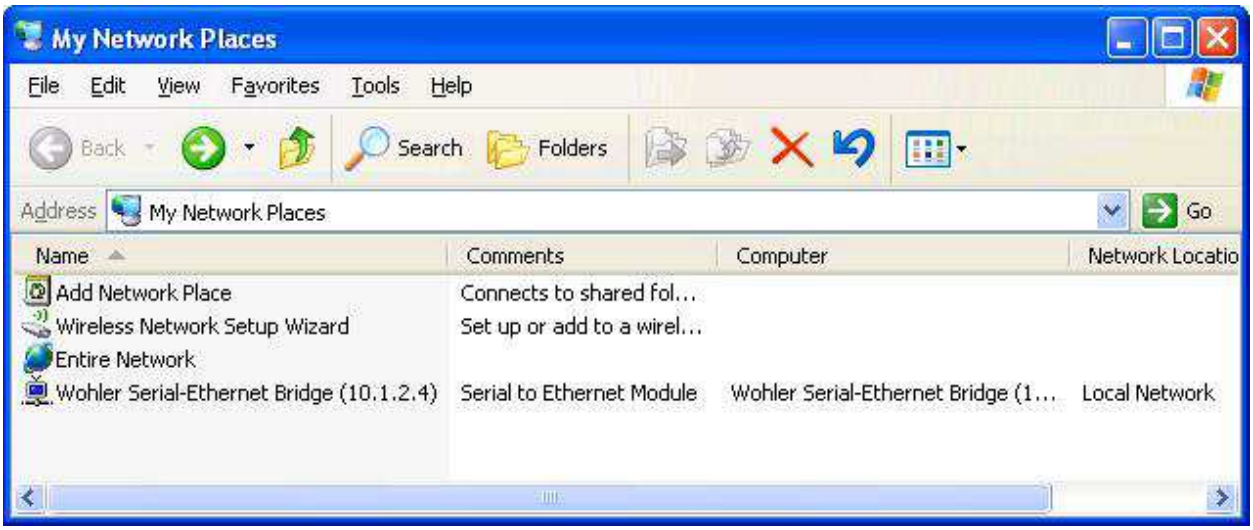
Required Information

To set up a virtual serial port (VSP) you must know the HDCC card's IP address and telnet port numbers. Once you have this information, the serial port redirector software can be configured.

Finding the HDCC on the Network

The HDCC card is factory set for **DHCP/AutoIP**. If you connect the HDCC card to a network with a DHCP server, the HDCC card's IP address will be assigned automatically. If you are using a Windows-based computer you will be able to see the card in **My Network Places** as shown in Figure 3–2 below.

Figure 3–2 HDCC Shown in My Network Places



Note: The default IP address can be set by SW1. See the previous chapter

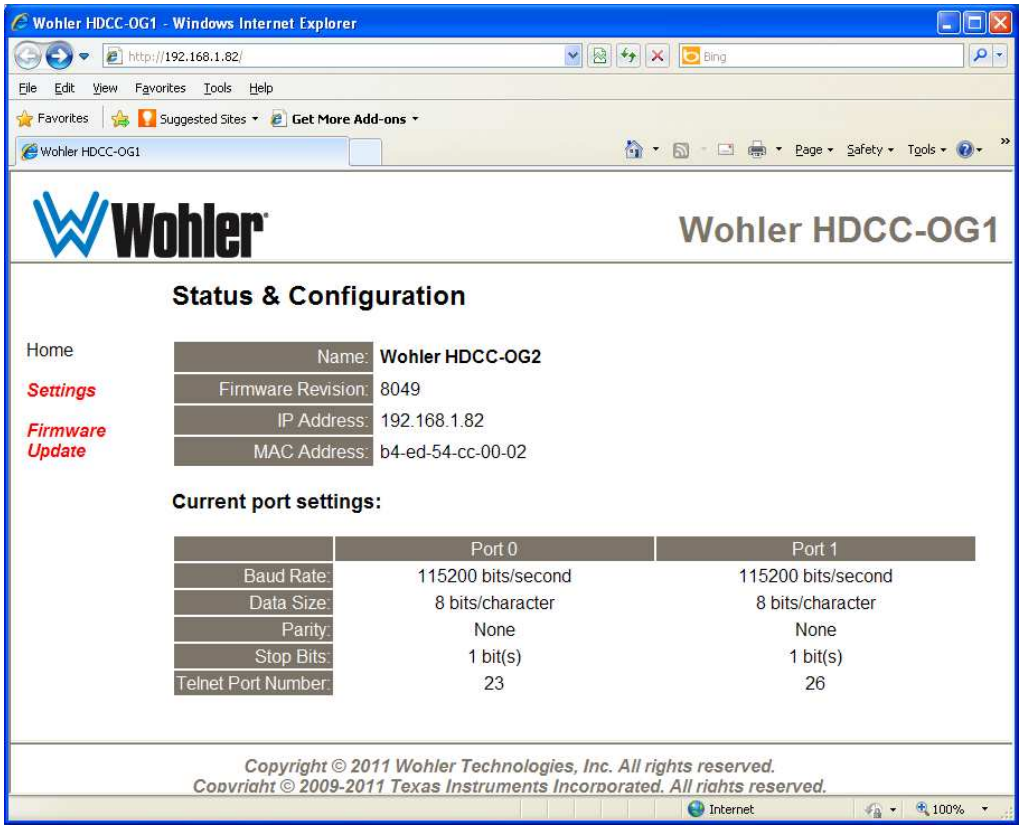
Assigning a Static IP Address/Enabling DHCP

Double-clicking on the Wohler Serial-Ethernet Bridge (see Figure 3–2 above) will open a web browser and take you the card's configuration page where you can set a static IP address, if desired.

You can also reach the HDCC card configuration screen through a web browser by entering the IP address in the address bar. Refer to Figure 3–3 on page 20.

Important: The HDCC uses telnet ports 23 and 26 for Eth VSP1 and VSP2 respectively. We **highly** recommend that you do not change these port numbers. All subsequent instructions depend on these port values.

Figure 3–3 HDCC Configuration Page



1. Click **Settings** on the left hand side of the screen (Figure 3–3 above).

2. When the **Settings** screen appears (Figure 3–4 on page 21) click the drop down in **Address Type** to change it to **Static IP** or **DHCP/AutoIP**. If you're using DHCP, skip to Set 6. Otherwise, continue to Step 3.

3. Enter the new **Static IP Address** for your network provided by your network administrator.

4. If needed, enter a different **Subnet Mask** (Figure 3–4 on page 21).

5. If your network administrator provides you with a **Default Gateway**, enter that, too.

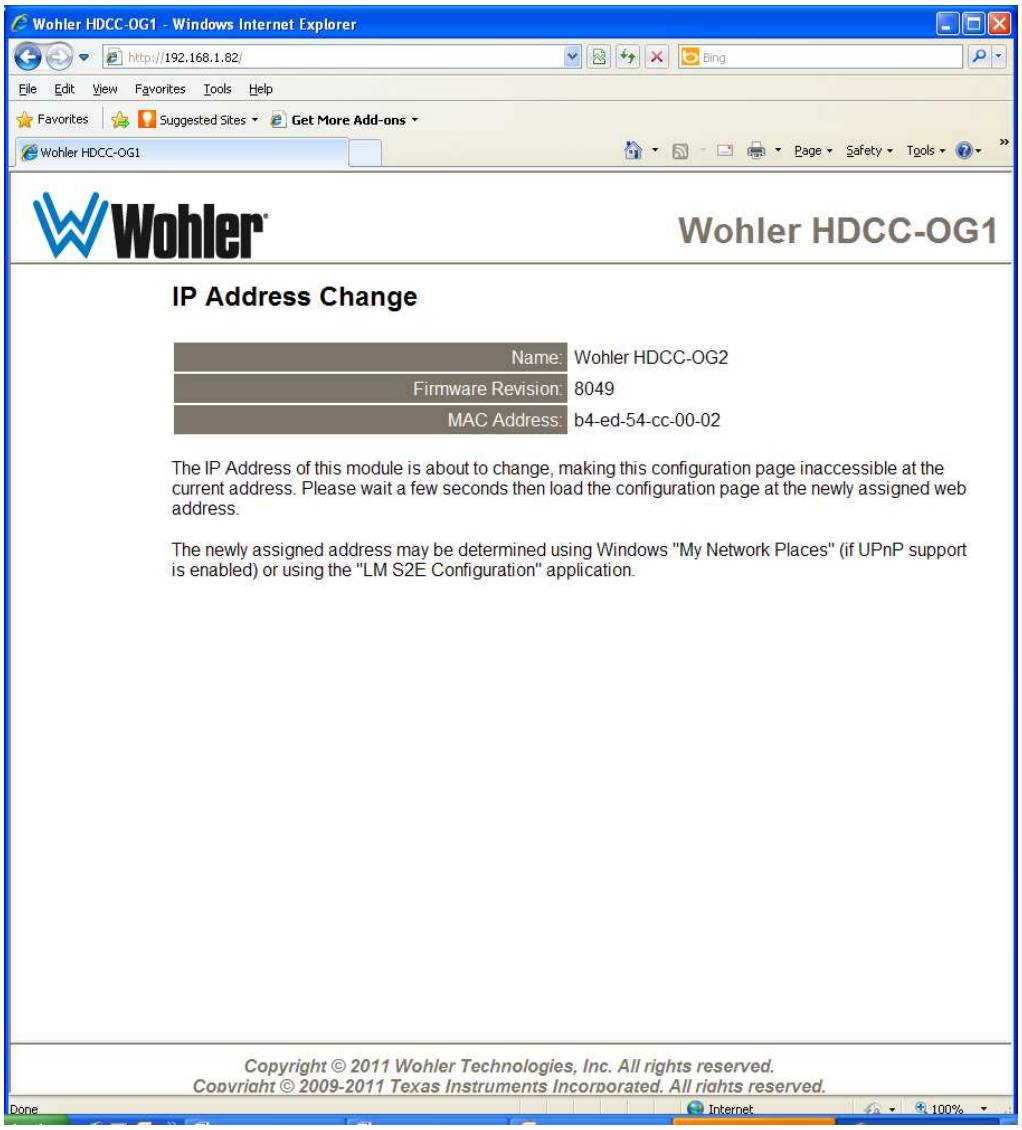
Figure 3–4 Settings Menu

WARNING! Verify that all information is correct for your network. The HDCC card will become unreachable on your network if the wrong information is set.

If this occurs consult your IT department for assistance. You can set the card to a known static IP address using the DIP switch on the rear panel. See Rear Panel DIP Switch on page 14 for details.

6. Once the information is accurate, click on the **Update Settings** button in the **IP Address Selection** section.

Figure 3–5 IP Address Change



7. Close this window (Figure 3–5 above).

8. Set **SW1** Position 1 so that the card will use the TCP/IP configuration you just set.

9. Power cycle the card.

Important: If SW1 Position 1 is set to **On**, the card will continue to use its default static IP address.

Creating VSPs with the Lantronix Redirector

The Lantronix Redirector software allows you to create VSPs quickly and easily.

Important: If you are using Microsoft Windows 7 or 8, this software will not work for you. Instead, refer to Creating VSPs with later versions of Windows.

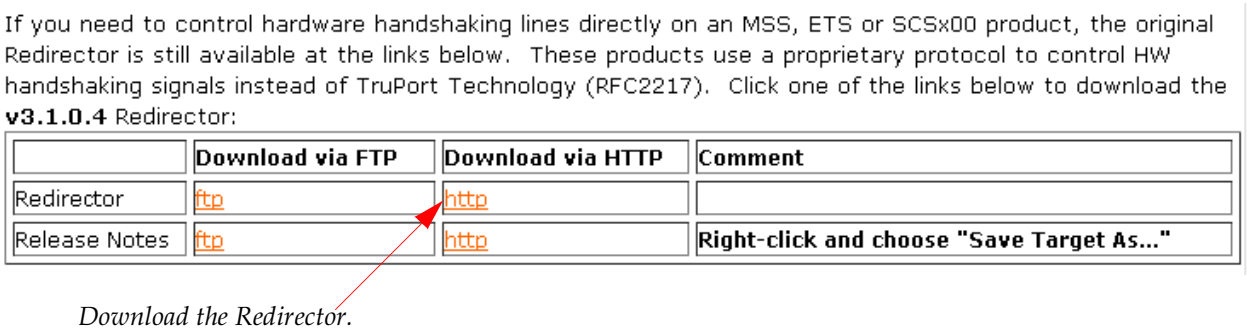
Software Installation

1. Launch your web browser and navigate to http://ltxfaq.custhelp.com/app/answers/detail/a_id/928.

Important: Download only the legacy version 3.1.0.4. Do not use a more recent version. None of them will connect to the card's Ethernet interface.

2. Scroll to the bottom of the page and click on the **http** link for the **Redirector**.

Figure 3–6 Redirector Download Location



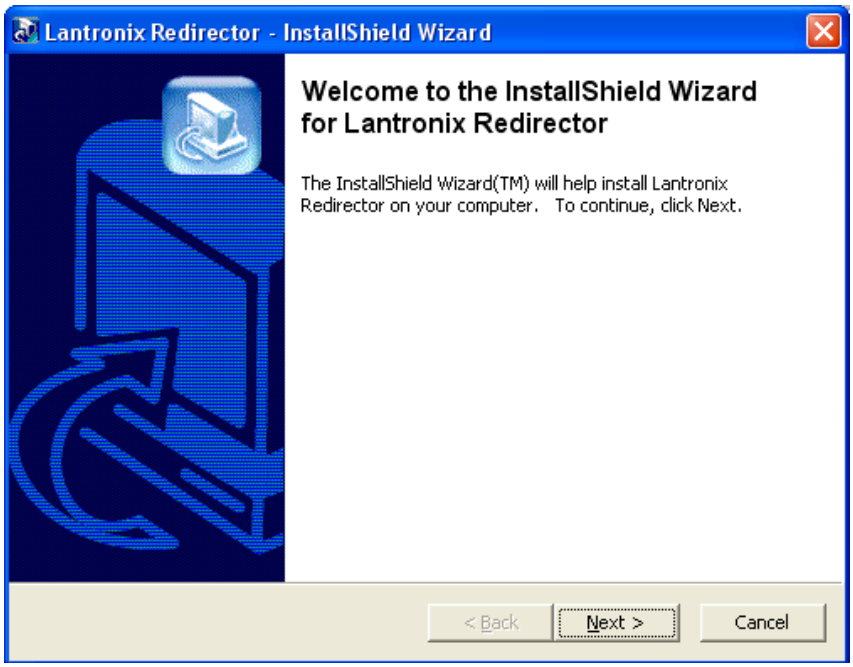
Download the Redirector.

3. Once the file is downloaded, double-click **red32.bit.exe** to install.

Figure 3–7 Open File - Security Warning

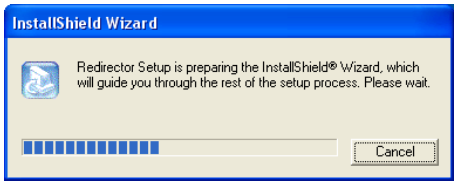
4. When the initial installation screen displays (Figure 3–7 above) click **Run**.

Figure 3–8 Lantronix Welcome Screen



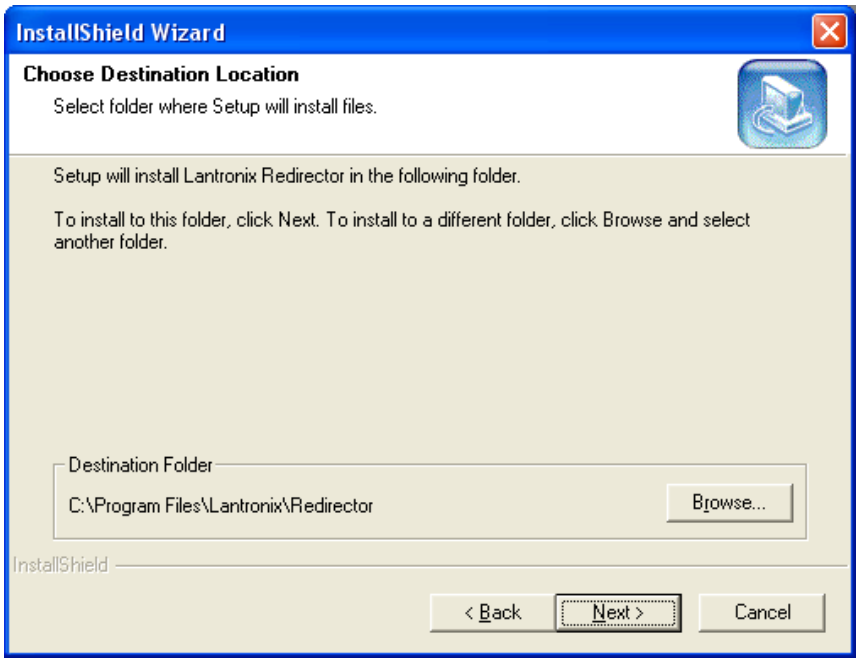
5. When the **Welcome** screen displays (Figure 3–8 above) click **Next**.

Figure 3–9 InstallShield



6. The **InstallShield** screen will quickly display and then return you to the Welcome screen. Click **Next** again.

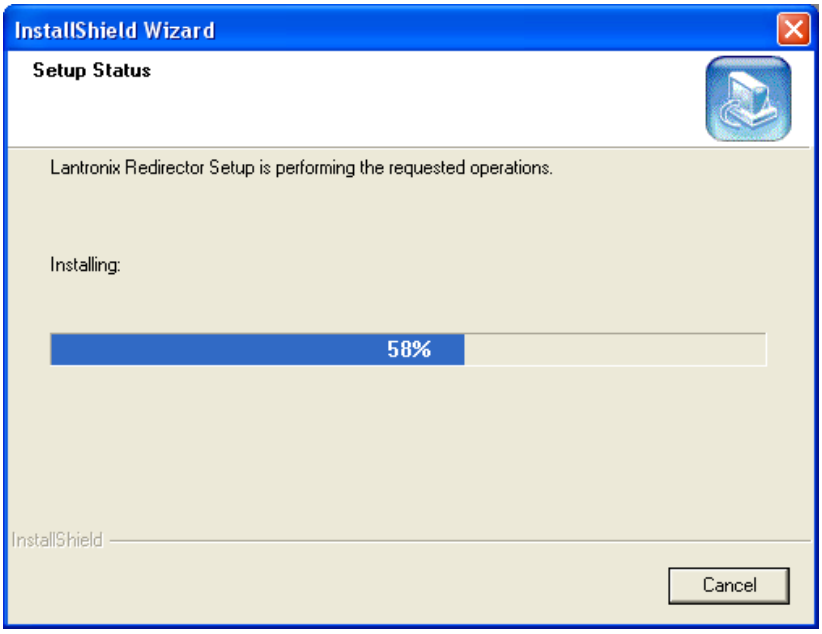
Figure 3–10 Choose Destination Location



7. When the **Choose Destination Location** screen displays, accept the default and click **Next**.

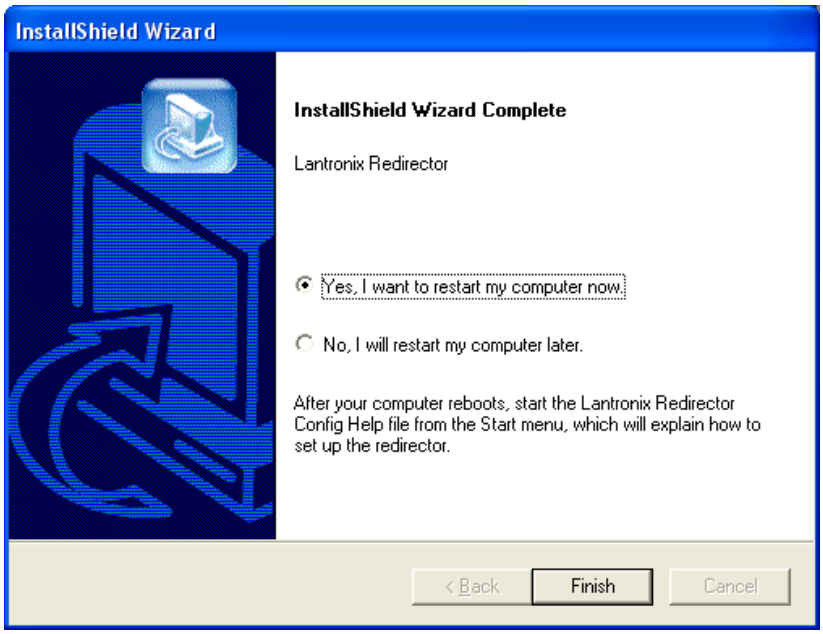
   The **Setup Status** screen (Figure 3–11 on page 26) will display and quickly complete the file installation.

Figure 3–11 Setup Status



8. Before the wizard completes, take a moment to close all other applications on your PC before the system restarts your computer.

Figure 3–12 Wizard Complete



9. When the **InstallShield Wizard Complete** screen displays, verify that **Yes,...** is selected, and click **Finish**. The system will restart.

VSP Configuration

Now that the software is installed, you can set up VSPs.

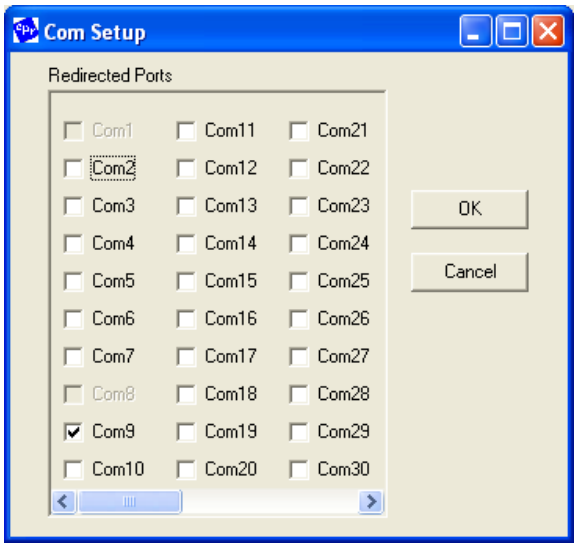
1. After your computer reboots, launch the Lantronix Redirector by clicking the **Start** menu ⇨ **Programs** ⇨ **Lantronix** ⇨ **Redirector** ⇨ **Configuration**.

Figure 3–13 Lantronix Redirector Configuration

Important: Each HDCC has provision for two virtual serial ports; each MC-1RU frame therefore has provision for four virtual serial ports (two HDCC cards times two VSPs per card). For each HDCC card, you will perform Steps 2 through 12 twice: once for VSP#1 and again for VSP#2.

2. Click **Com Setup** on the left side of the screen.

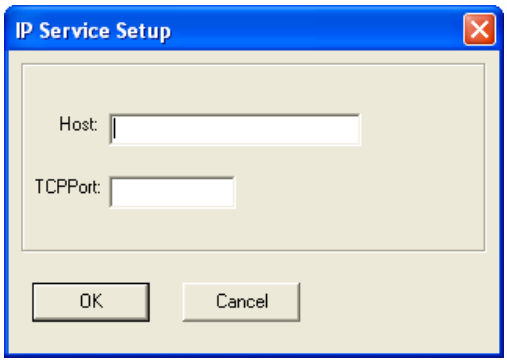
Figure 3–14 Com Setup



3. Assign an available **Com** port (in our example Com9 is selected) and click **OK**.

4. Click **Add IP** on the right side of the screen.

Figure 3–15 Wizard Complete



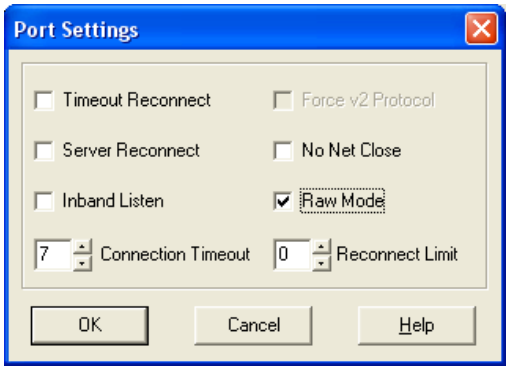
5. In the **Host** field (Figure 3–15 above) enter the IP address of your HDCC card. (Use **My Network Places** to rediscover it if necessary.)

6. In the **TCPPort** field (Figure 3–15 above) enter the telnet port number and click **OK**.

7. For VSP#1, this will be 23. For VSP#2 this will be 26.

8. Click **Port Settings**.

Figure 3–16 Port Settings

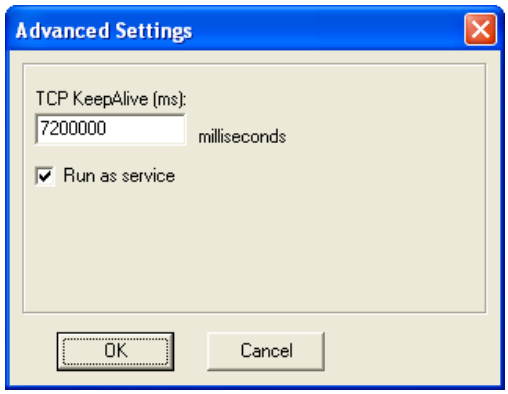


9. Check **Raw Mode** (Figure 3–16 above) and click **OK**.

Important: The virtual serial port will not function unless Raw Mode is enabled

10. Click **Advanced** at the top left corner of the application window.

Figure 3–17 Advanced Settings



11. When the Advanced Settings dialog appears (Figure 3–17 above) check the **Run as service** box and click **OK**.

Figure 3–18 Service Installation

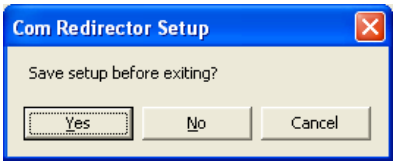
12. When the **Service Installation** (Figure 3–18 above) dialog appears, click **OK**.

Figure 3–19 Config Info

13. When the **Config Info** dialog displays (Figure 3–19 above) click **OK**.

14. When the application window reappears, click **Close** near the center of the screen.

Figure 3–20 Com Redirector Setup



15. When the **Com Redirector Setup** dialog appears (Figure 3–20) click **Yes**.

Figure 3–21 Config Info

16. When the **Config Info** dialog displays (Figure 3–21 above) click **OK**.

17. Reboot the computer to enable the VSPs. You should now have two available COM ports that will serve as serial connections to the HDCC card.

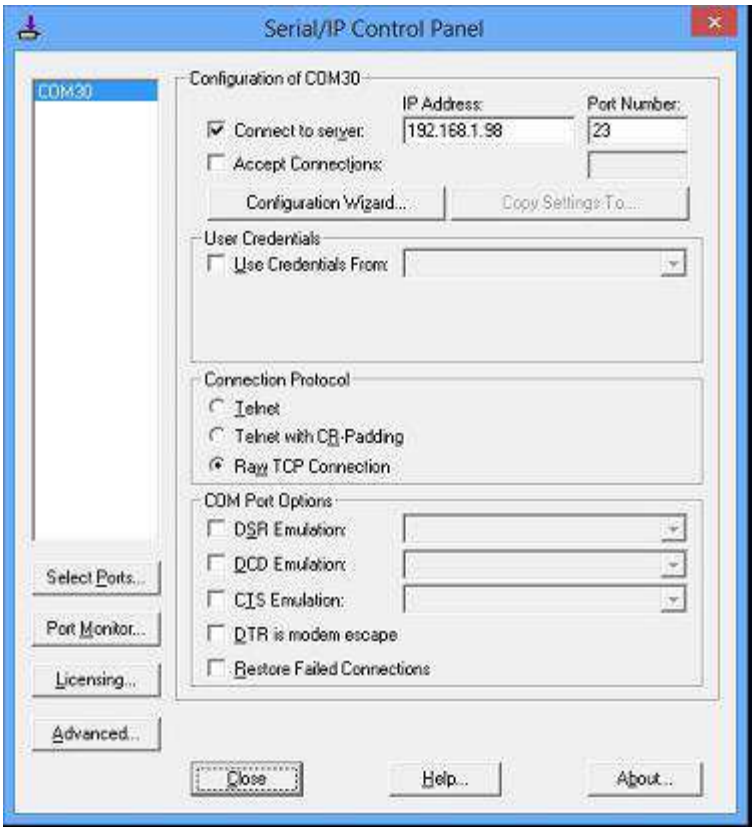
Creating VSPs with the Later Versions of Windows

Windows 7 or 8 users need to install an alternative COM port redirector. There are many freeware/shareware possibilities, but Tactical Software's Serial/IP COM Port Redirector has been used successfully with both Windows 7 and 8.

The product description can be found at: http://www.tacticalsoftware.com/products/serialip/index.html.

The software is not free (a two port license costs $150.00), but Tactical Software offers a free downloadable 30-day trial

Figure 3–22 Tactical Serial/IP Control Panel



With the software, you can configure two virtual COM ports. Both muse use the IP address of the card, port 23 should be used for Eth1, and port 26 for Eth2.

Important: Raw TCP connection must be selected or the VSP will not operate.

CHAPTER 4
Using DashBoard

Introduction

Overview

This chapter explains how to use the DashBoard Control System™ (the PC graphic user interface, from here on referred to as *DashBoard*) to configure your HDCC card.

Topics

Starting DashBoard

The operations of the HDCC card are controlled by the settings of internal registers, which are easily and intuitively configured with DashBoard.

1. Make sure your openGear™ frame is installed, the HDCC card is installed within it, and DashBoard has been installed on a PC that is networked to the frame (see the Installation Guide).

2. Power up the frame to initialize the HDCC card's interface.

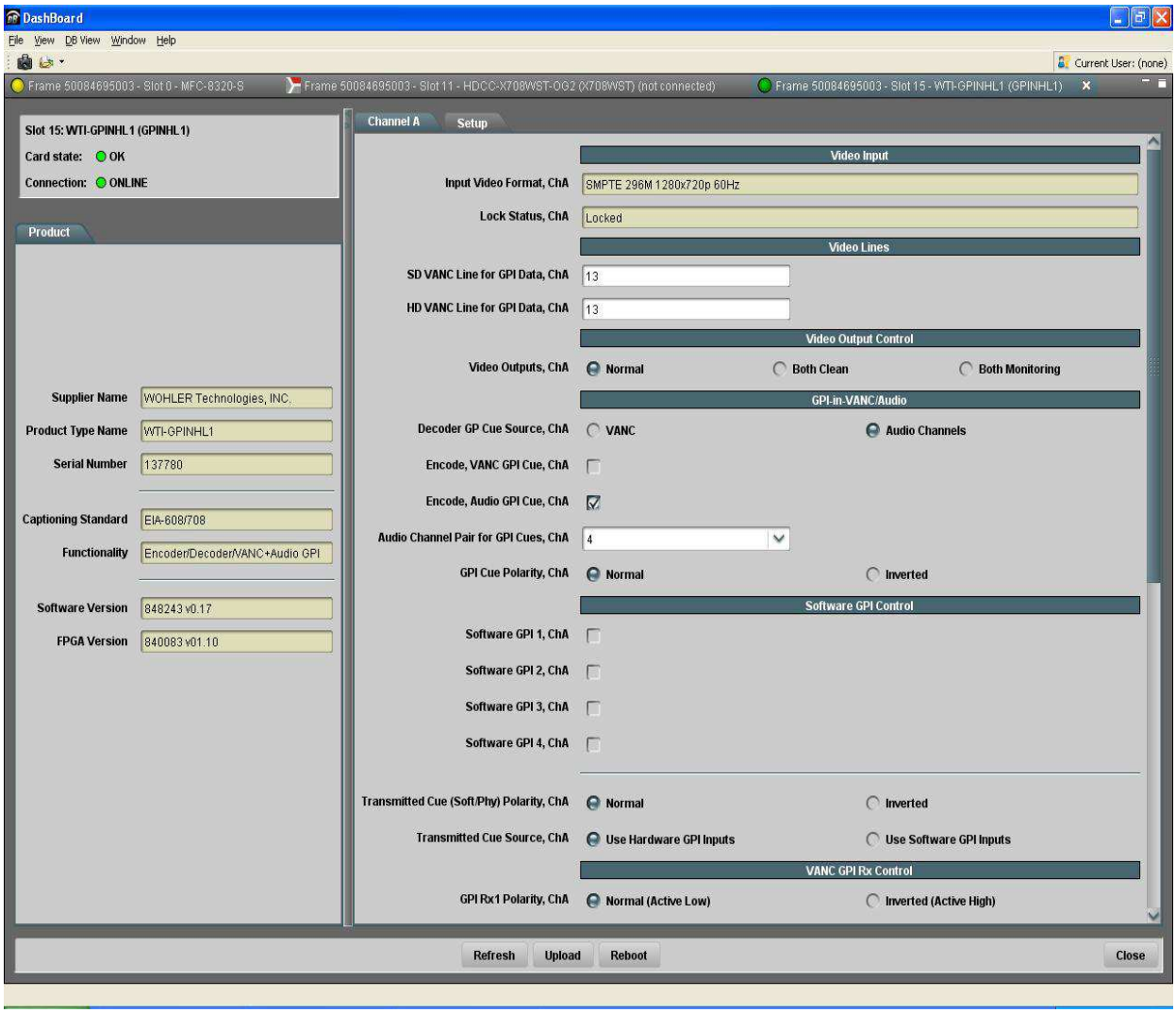
Important: Depending on the frame contents, the card may take several minutes to be ready.

3. Open the DashBoard application by double-clicking the desktop icon or selecting it from the Start menu.

4. When the application opens, it will discover any openGear frames on the network and display them in the left side window of the main screen (Figure 4–1 below) the DashBoard tree. Clicking on the frame's entry in this window will show cards that are installed within it.

Figure 4–1 DashBoard Tree

Figure 4–2 DashBoard Main Screen (Top)



Note: The Wohler HDCC-GPINHL-OG1 card will appear as **WTI-GPINHL1 (GPINHL1)** in the list of cards installed in the frame.

5. Double-click on the HDCC card in the list of cards and the user interface will appear in the main screen.

Important: If the user interface does not immediately appear after double-clicking on the card's icon, the card may still be initializing. When controls respond to user input, the user interface is ready.

6. If everything is in order, the **Card state** and **Connection** indicators in the left frame of the window will be green and product information will appear in the Product submenu (see Figure 4–3 below).

Figure 4–3 Center Pane

Figure 4–3 above shows some product details about the HDCC that may be helpful at a future date, including the software and FPGA firmware part numbers and revisions.

Since you have a single channel card, you'll only see **Channel 1**. The next section discusses how to configure the channel. The **Setup** menu allows you to configure the routing of the HDCC's serial ports and is discussed in a later section.

Common Controls

At the bottom of the screen (no matter which tab is selected) you can perform three systemic functions.

- **Upload**: Not currently used.
- **Refresh**: Clicking this button causes the card to re-query all the settings. A screen indicating that the card is busy will appear while the system is refreshing.
- **Reboot**: Clicking this button causes the card to reboot. A screen indicating that the card is busy will appear while the system is rebooting.

Configuring the Channel

Click the channel tab in DashBoard and change the settings in the Channel A submenu (see Figure 4–4 below) to customize your configuration.

Figure 4–4 Channel A (Top)

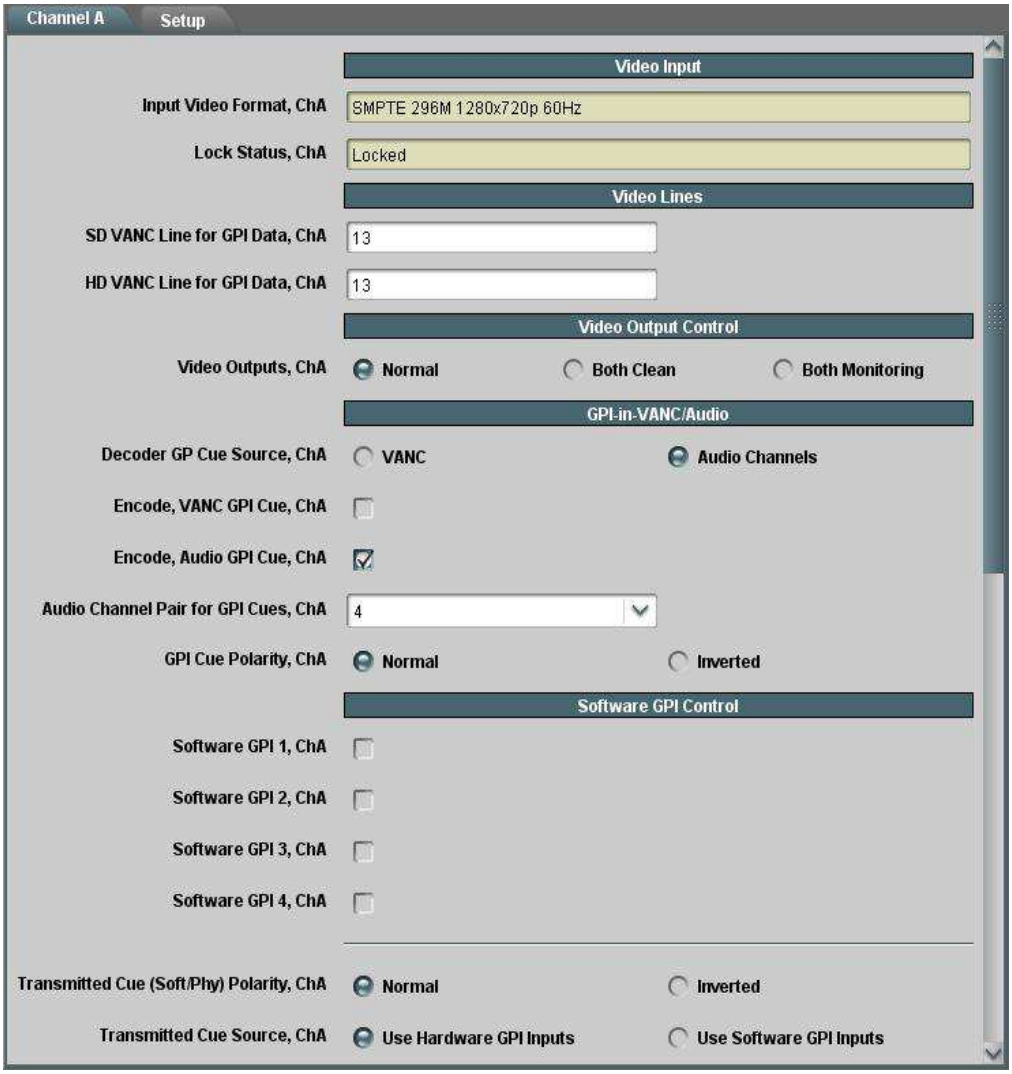
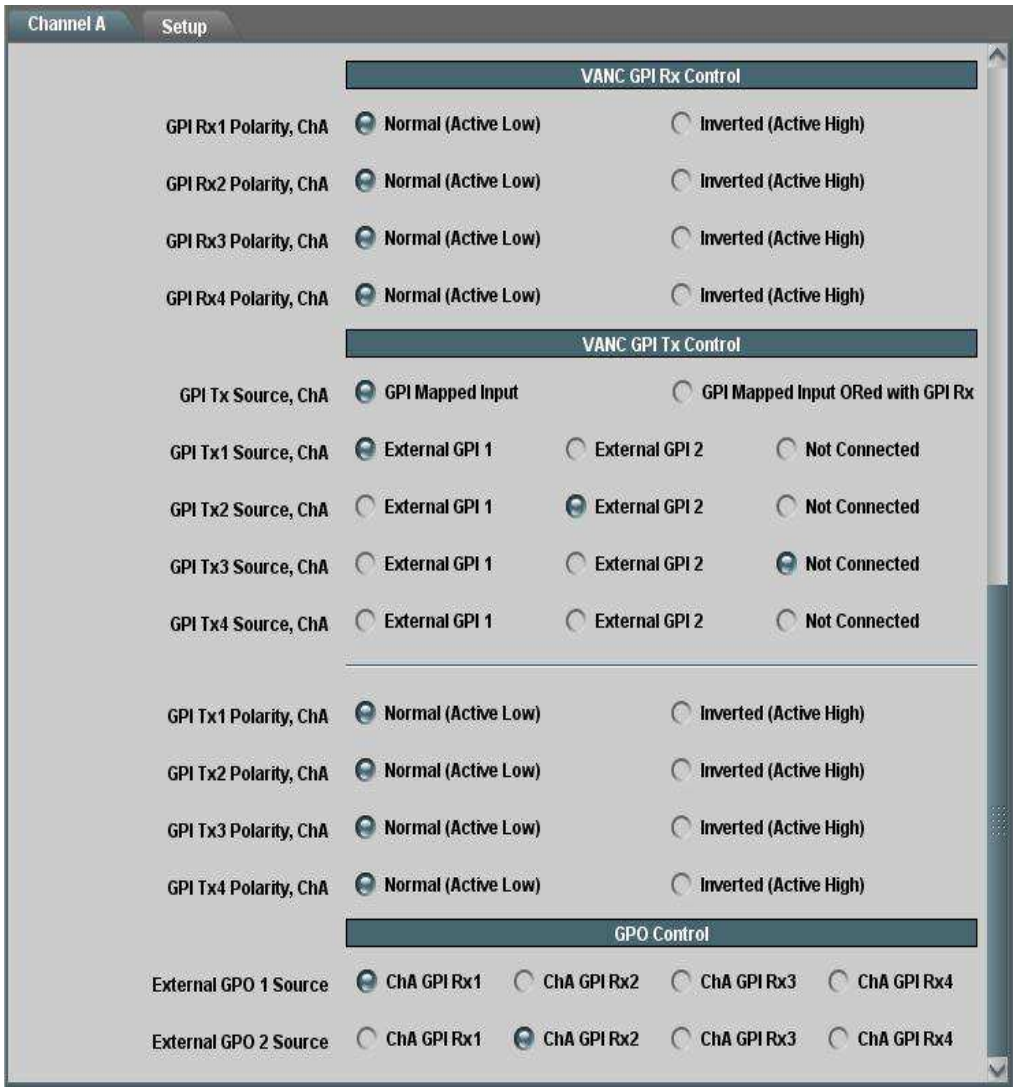


Figure 4–5 Channel A (Bottom)



You'll notice that the submenu is divided into sections, each with a heading that describes the features below. Let's review each section.

Video Lines

- **SD VANC Line for GPI Data, CHA**: The line in the video ancillary area of SD video formats where GPI cues/data will be encoded/detected.
- **HD VANC Line for GPI Data, CHA**: The line in the video ancillary area of HD video formats where GPI cues/data will be encoded/detected.

Table 4–1 Caption Lines

Specification	Register	Default
SD VANC Line for GPI Data	0Ah	0Dh
HD VANC Line for GPI Data	0Bh	0Dh

Video Output Control

Video Outputs, CHA: Selects how captions are displayed on outputs.

Table 4–2 Caption Lines

Specification	Register	Default
Video Output	10h	00h

- **Normal:** The output is clean [no burned-in captions], monitor output has burned-in captions.
- **Both Clean** Neither output nor monitor output show burned-in captions.
- **Both Monitoring** Both output and monitor output show burned-in captions.

GPI-In-VANC/Audio

- **Decoder GP Cue Source, CHA**: Selects where received cues are to be found, either in the VANC or in the Audio Channels.
- **Encode, VANC GPI Cue, CHA**: Enables encoding of GPI cues in the VANC.
- **Encode, Audio GPI Cue, CHA**: Enables encoding of GPI cues in an Audio channel.
- **Audio Channel Pair for GPI Cues, CHA:** When encoding/ decoding GPI-in-Audio cues, which Audio channel is used.
- **GPI Cue Polarity, CHA**: Selects whether the GPI cue is active high (Normal) or active low (Inverted).

Table 4–3 Caption Lines

Specification	Register	Default
Audio GPI Settings	0Ch	96h

Software GPI Control

Software GPI [0-3] Polarity, CHA: These check boxes can set/reset a signalling cue if Use Software GPI Inputs (below) is checked.

Table 4–4 Software GPI

Specification	Register	Default
Software GPI 1, CHA	0Dh[0]	00h
Software GPI 2, CHA	0Dh[1]	
Software GPI 3, CHA	0Dh[2]	
Software GPI 4, CHA	0Dh[3]	

Transmitted Cue (Soft/Phy) Polarity, CHA: This controls how an asserted software or physical GPI input will be interpreted (Note: This control applies IN ADDITION TO the separate GPI Tx [0-3] Polarity control below.)

Table 4–5 GPI Tx [0-3] Polarity

Specification	Register	Default
Transmitted GPI Cue Polarity (Soft/Phy), CHA	0Dh[5]	00h

Transmitted Cue Source, CHA: Selects whether the GPI/O connector or the Dashboard user interface (refer to Table 4–4 above) will provide the input for transmitted GPI cues.

Table 4–6 Transmitted Cue Source

Specification	Register	Default
Transmitted Cue Source, CHA	0Dh[7]	00h

VANC GPI Rx Control

GPI Rx[0-3] Polarity, CHA: Selects how the polarity of received VANC cues will be interpreted, either Active High or Active Low.

Table 4–7 Caption Lines

Specification	Register	Default
VANC GPI Tx and Rx Polarity Control	0Fh	00h

VANC GPI Tx Control

- **GPI Tx Source, CHA**: Selects whether the transmitted bit will be either the bit provided from an External GPI (GPI Mapped Input) or will be the External GPI logically ORed with a received bit (GPI Mapped INPUT ORed with GPI Rx). The latter mode allows received bits to pass through when there are no active inputs on the External GPI.

- **GPI Tx[0-3] Source, CHA**: These controls map the transmitted bits to the External GPI that drives them (External GPI 0 or External GPI 1) or to none (None).

- **GPI Tx[0-3] Polarity, CHA**: These controls determine how External GPI inputs will be interpreted, either Active High or Active Low.

Table 4–8 Caption Lines

Specification	Register	Default
VANC GPI Tx and Rx Polarity Control	0Fh	00h

GPO Control

GPO[0-1] Source: These controls determine with which signals the board's external GP outputs will be driven (if any). The two outputs on the board may be driven from any of the four received (encoded) bits.

Table 4–9 Caption Lines

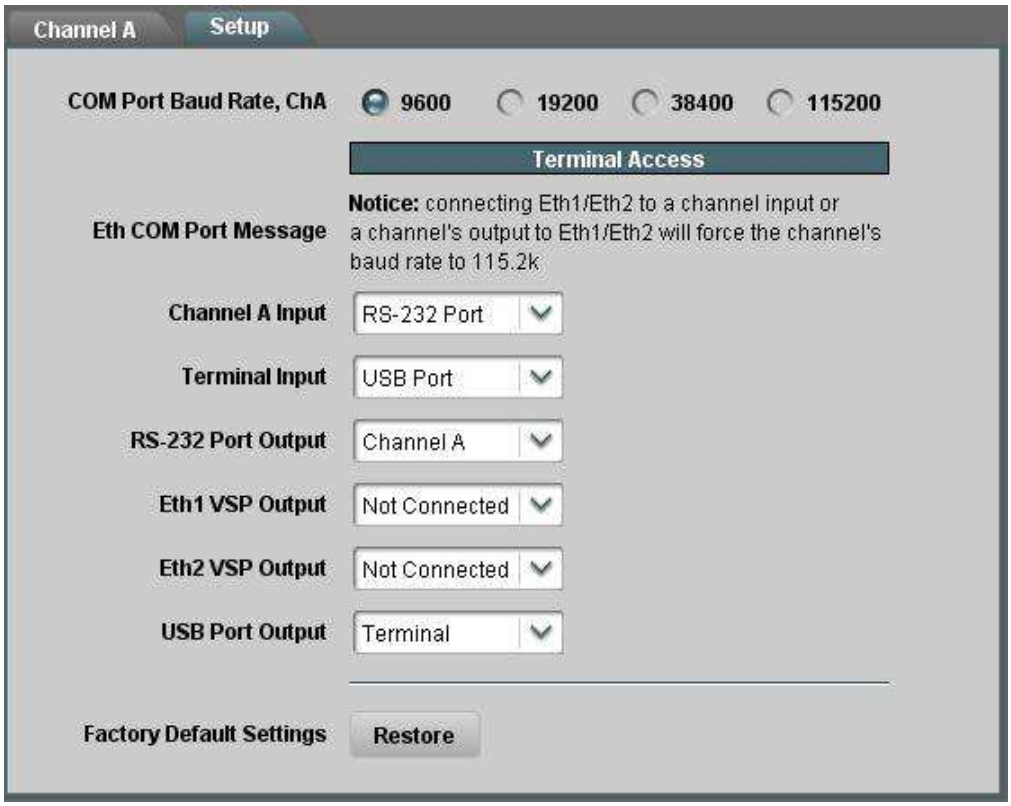
Specification	Register	Default
GPO-0 Mapping	4Eh	10h
GPO-1 Mapping	4Eh	

The Setup Tab

The **Setup** tab allows you to set the Com port speed for both channels and reload the factory default settings.

- **Com Port Speed, CHA**: Click either 9600, 19200, 38400, or 115200.
- **Factory Default Settings**: Clicking the **Restore** button displays a confirmation dialog and then allows you to reload all the factory default settings of the card.

Figure 4–6 Setup Tab



CHAPTER 5
Using the General Purpose Inputs/Outputs

Introduction

Overview

This chapter describes the functionality of the GPI/O connectors on the adaptors.

Topics

Functionality

The GPI interface allows the user to encode contact closure triggers into a HD or SD video stream frame accurately. The encoded data uses a proprietary algorithm designed to withstand severe degradation and prevent false triggering or releasing of GPIs. Error checking information is embedded within the GPI data stream which accomplishes this task and is far more advanced than simple CRC.

Typical triggers that users can encode from automation include (but are not limited to:

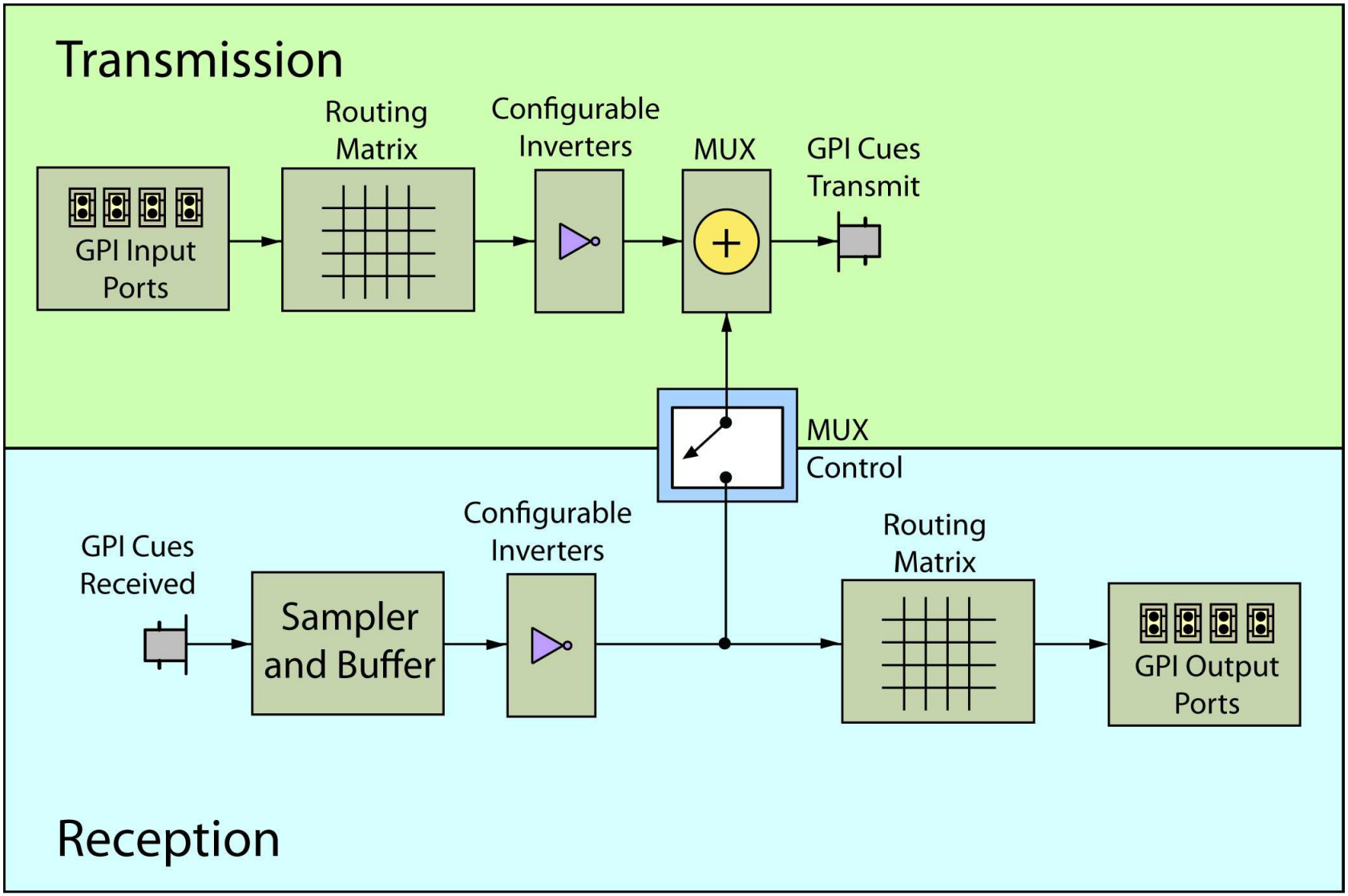
- ARC switching
- Commercial cue triggers (more accurate than the antiquated cue tone system)
- Machine control
- Regional commercial insertion cards

Typically the GPI data is encoded on Line 13 for both the HD-SDI signals and the SD-SDI signals. However, the HDCC is flexible enough to allow you to assign the lines on which you want the GPI data. See Video Lines on page 38 for details.

You can also use the GPI interface to control other operational aspects of the card.

Figure 5–1 on page 45 illustrates the GPI/O signal flow through the HDCC. For our purposes, a GPI is an input signal to the HDCC card supplied by the user through the physical GPI/O port that can activate certain modes in the HDCC card, and/or can be encoded onto the outgoing SDI video stream to notify downstream equipment of some condition, event, or command. A GPO is a signal the HDCC card receives on the incoming SDI video stream that is output to the physical GPI/O port to signify some condition, event, or command generated by upstream equipment.

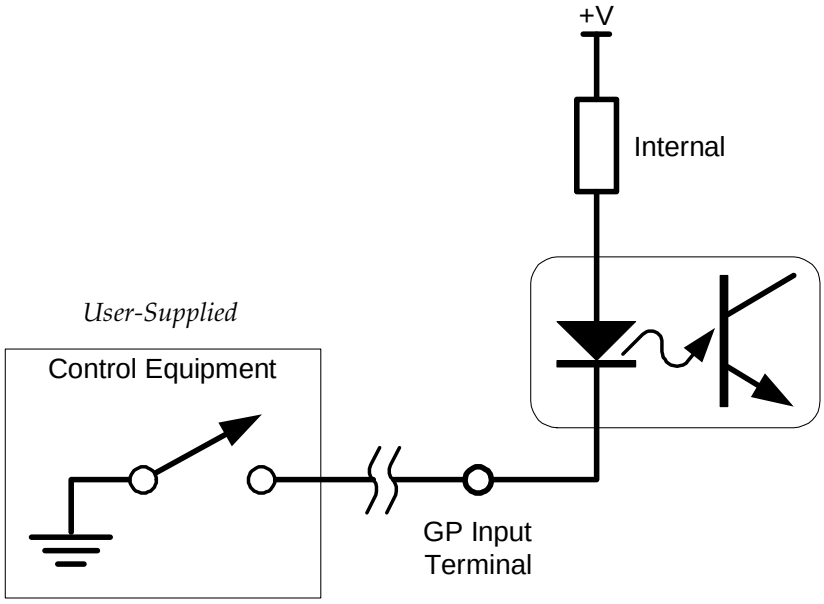
Figure 5–1 GPI/O Functional Diagram



GPIs

The GP inputs are designed to be asserted by switching the closures to ground. Asserting a GP input will result in that input state being encoded on the appropriate line of the video signal or the required function being activated.

Figure 5–2 Input Diagram



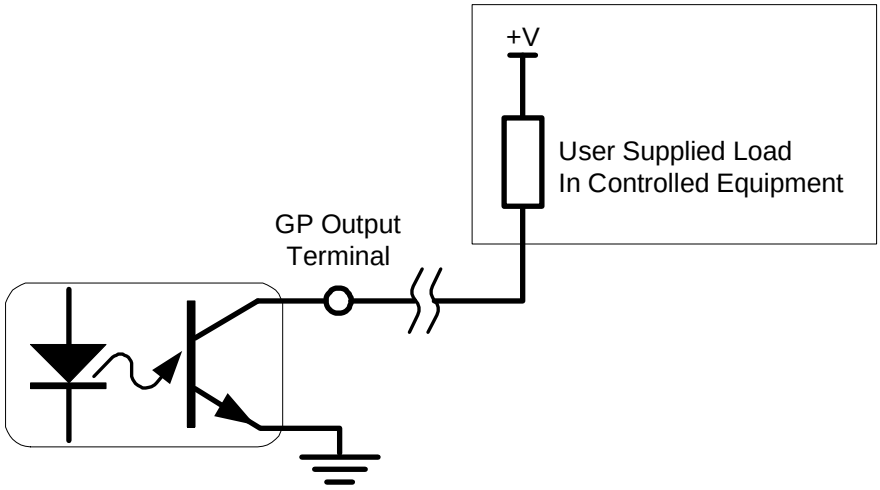
GPOs

If the incoming SDI data stream contains GP data on the appropriate line of the video signal, the corresponding GP output on the card can be activated. The GP output is asserted when its voltage is high.

Important: The GP outputs are optically isolated and "open collector" so the user must provide the appropriate pull-up resistor for each GP output. See Figure 5–3 below.

The HDCC-GPINHL-OG1 provides two GPOs. (See Connector Pin Assignments on page 47 for connectivity.)

Figure 5–3 Output Diagram

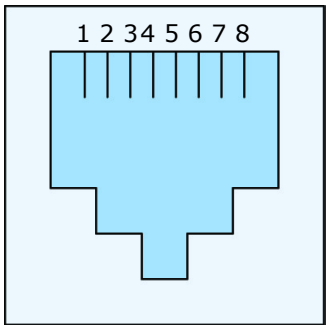


Connector Pin Assignments

Table 5–1 RS-232/GPI/O Pin-Out Assignments

Pin	Label	Interface
1	Rx0	Open Collector GPO
2	Not Connected	
3	Tx0+	Active Low GPI
4	GND	
5	TX (Out)	RS-232
6	RX (In)	RS-232
7	Rx1	Open Collector GPO
8	Tx1	Active Low GPI

Figure 5–4 RS-232/GPI/O RJ-45 Pin-Out



WARNING! RS-232 voltage levels are present on pins 5 and 6. These voltages can damage digital components. Make certain the connectivity is RS-232-compatible before connecting.

GPI/O Polarities

You can control the polarities of the encoded GPIs, both at the receiving stage (Rx) and at the encoding stage (Tx).

GPI Encoded Polarity (Rx)

Channel	Register	Bit(s)	Values
1	0Fh	0 thru 1	See Table 5–2 below.

The polarity settings are listed in Table 5–2 below.

Table 5–2 Register 0Fh: GPI Rx Polarity

Bits	GPI	Active Low (default)	Active High
0	GPI-Rx 0	0	1
1	GPI-Rx 1	0	1

GPI Encoded Polarity (Tx)

Channel	Register	Bit(s)	Values
1	0Fh	4 thru 5	See Table 5–3 below.

You can set the polarity of the GPI as encoded on the data stream as shown in Table 5–3 below.

Table 5–3 Register 0Fh: GPI Tx Assertion Polarity

Bits	GPI	Active Low (default)	Active High
4	GPI-Tx 0	0	1
5	GPI-Tx 1	0	1

Enabling/Disabling GPI Transmission

Channel	Register	Bit(s)	Values
1	12h	7	0=Disable 1=Enable

The HDCC-GPINHL-OG1 can be configured to enable or disable transmission of GPI data by setting bit 7 of register 12h.

CHAPTER 6
Terminal

Introduction

Overview

This chapter describes how to access the Terminal to change the HDCC card's registers directly.

Goals for This Chapter

- ✓ Explain the purpose and operation of the Terminal.
- ✓ Explain how to access the Terminal with any serial connection.

Topics

Background

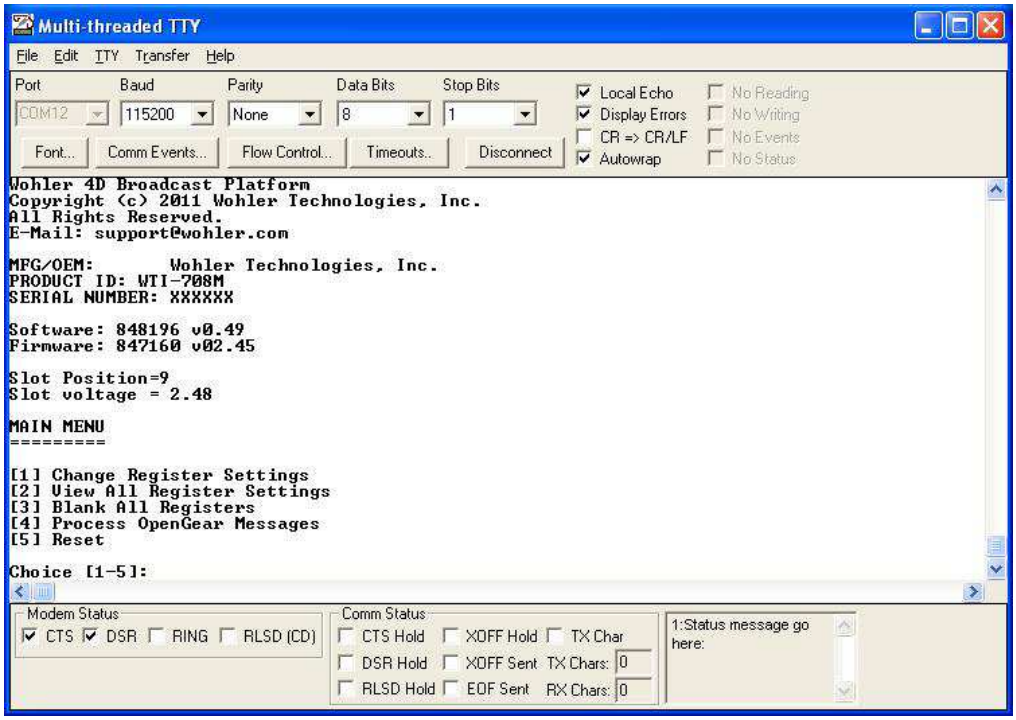
The HDCC card's operation is governed by several registers. These registers are modified automatically when you use the DashBoard.

However, more advanced users may prefer to configure these registers manually. You can do so by accessing the Terminal via a number of ports: RS-232, Ethernet Virtual Serial Ports, and the USB port.

The sections below describe how to connect to the Terminal with each method.

Configuring the HDCC Card for Terminal Access

Figure 6–1 Terminal Main Menu



Access to the Terminal is controlled by the **BOOTOPT** jumper on the card as shown in Figure 6–2 on page 54. The sections below describe how it is used.

Note: If you're using the DFR-8321 frame, be aware that while the card is configured for Engineering Menu access, it will not be controllable from DashBoard. To restore DashBoard operation, power down the card, remove the jumper, and re-power the card.

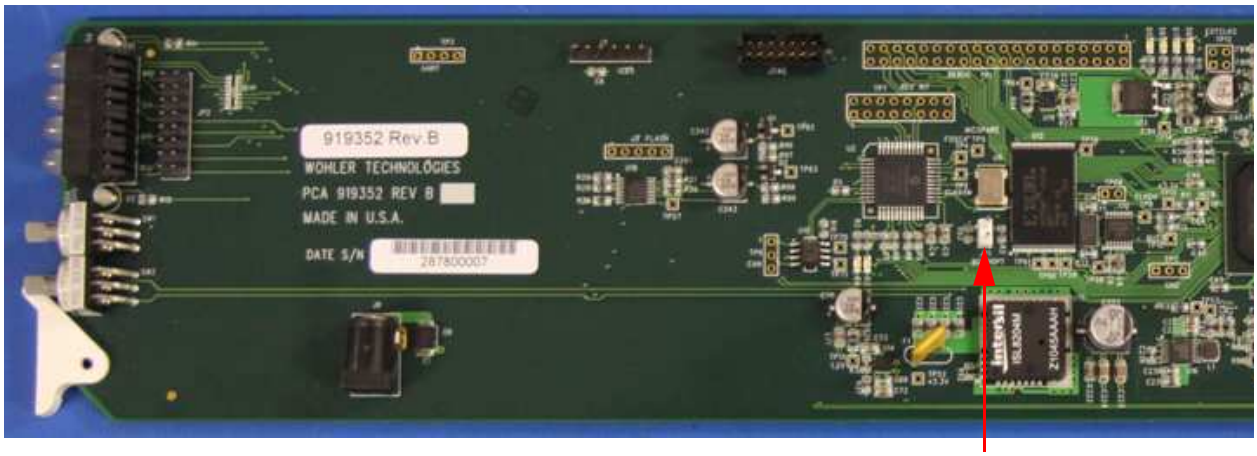
Note: If you're using the Wohler MC-1RU frame, you can access the Terminal with the same serial port you use to connect to the HDCCRegEdit. (HDCCRegEdit is really a user interface that uses the Terminal.)

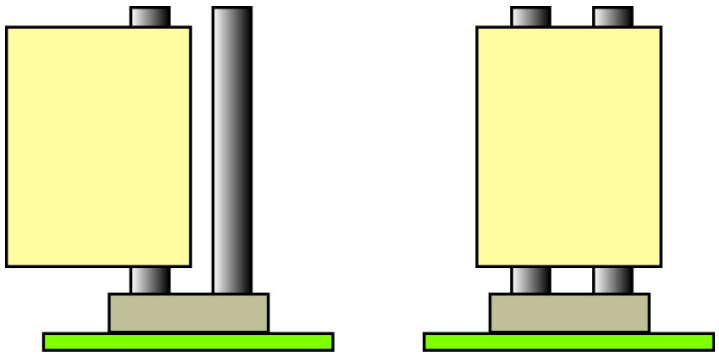
WARNING! Use caution when modifying the HDCC card's register values. Incorrect values may cause the card to behave unpredictably.

Accessing the Terminal via the RS-232 Port

1. In DashBoard's **Setup Menu**, set the Terminal input to **RS-232** and the RS-232 output to **Terminal**.
2. Power down the card, install the **BOOTOPT** jumper (see Figure 6–2 on page 54).
3. Verify the SW3 is set to **OFF**.
4. Connect a serial cable from your PC to the RS-232 connector on the rear panel.
5. Re-power the card.
6. Open a terminal emulator (e.g., HyperTerminal, PuTTY, etc.) with the serial COM port set to 115.2k, 8 data bits, 1 stop bit, no parity, and no handshaking.
7. Press the Enter key to display the Engineering Menu as shown in Figure 6–1 on page 52.
8. Power off the card, remove the **BOOTOPT** jumper, and re-power the card to restore normal operation. (See Figure 6–2 on page 54 for details.)

Figure 6–2 BOOTOPT Jumper Location





BOOTOPT Jumper Removed = Normal Operation

BOOTOPT Jumper Installed = Access Engineering Menu

9. Go to the Engineering Menu functions below.

Accessing the Terminal via the Virtual Serial Ports

There are two virtual serial ports, Eth1 and Eth2. The instructions below are for Eth1 but are easily applied to Eth2.

1. In DashBoard's **Setup Menu**, set the Terminal input to **Eth1** and the Eth1 output to **Terminal**.

2. Power down the card, install the **BOOTOPT** jumper (see Figure 6–2 above) and re-power the card.

3. Verify the SW3 is set to **OFF**.

4. Verify that Eth1 is installed per Chapter 2 of this document.

5. Connect an Ethernet cable from your network to the Ethernet connector on the rear panel.

6. Open a terminal emulator (e.g., HyperTerminal, PuTTY, etc.) with Eth1's COM port set to 115.2k, 8 data bits, 1 stop bit, no parity, and no handshaking.

7. Press the Enter key to display the Main Menu. (See Figure 6–1 on page 52).

8. Power off the card, remove the **BOOTOPT** jumper, and re-power the card to restore normal operation. (See Figure 6–2 on page 54 for details.)

Accessing the Terminal via the USB Port (Front of Card)

There are two methods of accessing the Terminal via USB: the first requires configuration via DashBoard; the second uses SW3 on the card's front edge to override any software settings.

The following instructions are configuration via DashBoard.

1. In DashBoard's **Setup Menu**, set the Terminal input to **USB** and the USB output to **Terminal**.

2. Power down the card, install the **BOOTOPT** jumper (see Figure 6–2 on page 54), connect a USB cable between the host computer and the HDCC's USB connector, and re-power the card.

3. Verify the SW3 is set to **off**.

4. Connect a USB cable from your network to the USB connector on the front edge of the HDCC card.

5. Install the USB-Serial interface software as prompted.

6. Open a terminal emulator (e.g., HyperTerminal, PuTTY, etc.) with USB serial port set to 115.2k, 8 data bits, 1 stop bit, no parity, and no handshaking.

7. Press the Enter key to display the Main Menu. (See Figure 6–1 on page 52).

8. Power off the card, remove the **BOOTOPT** jumper, and re-power the card to restore normal operation. (see Figure 6–2 on page 54)

The following instructions show how to access the terminal without DashBoard configuration.

1. Power down the card, set **SW3** to **On**, install **BOOTOPT** jumper, connect a USB cable from your host computer to the USB connector on the front edge of the HDCC card, and re-power the card. (See Figure 6–2 on page 54 for details.)

2. Install the USB-Serial interface software as prompted.

3. Open a terminal emulator (e.g., HyperTerminal, PuTTY, etc.) with USB serial port set to 115.2k, 8 data bits, 1 stop bit, no parity, and no handshaking.

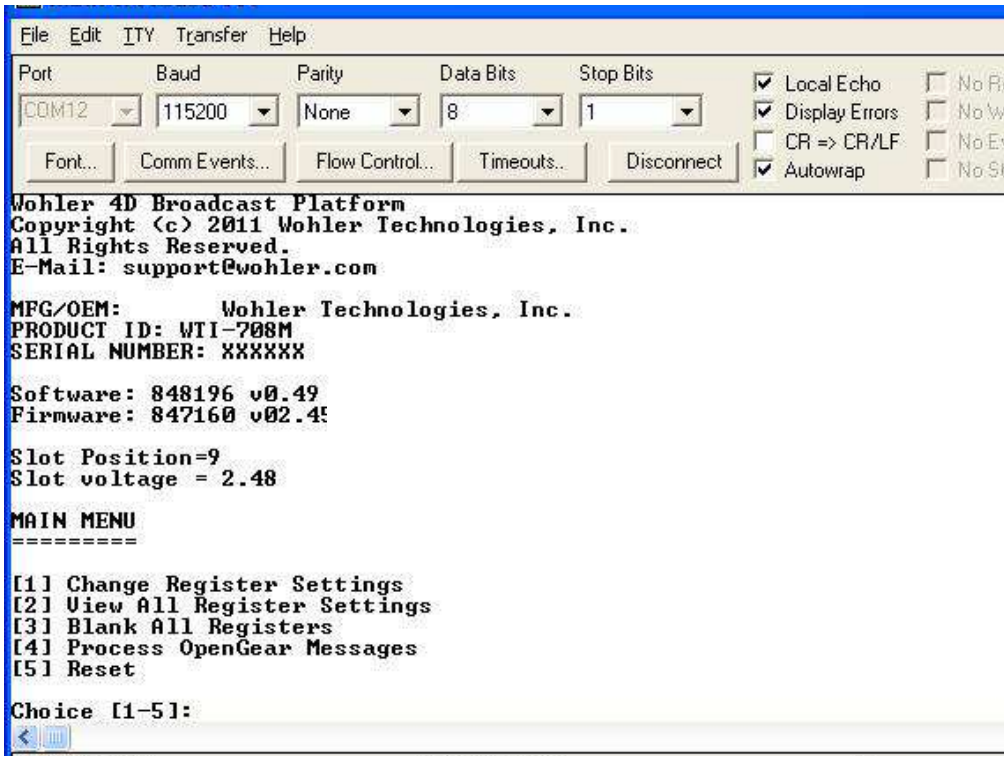
4. Press the Enter key to display the Main Menu. (See Figure 6–1 on page 52).

5. Power off the card, remove the **BOOTOPT** jumper, set SW3 to OFF (Refer to Figure 2–3 on page 14.), and re-power the card to restore normal operation. (See Figure 6–2 on page 54 for details.)

Main Menu

The Main Menu provides several functions for quick and easy modifications. You can also find software and firmware version listed above the menu. Refer to Figure 6–3 on page 57 and the following descriptions of each menu option for details.

Figure 6–3 Main Menu



Software and Firmware Part Numbers and Versions

Engineering Menu

Important: Refer to Appendix A for a detailed list of registers.

1. **Change Register Settings**: Allows you to modify any available register value.

2. **View All Register Settings**: Shows you the register list and all of the current values for each.

3. **Blank All Registers**: Sets all registers to zero.

WARNING! Without further register modifications, the card will be unusable after the registers are erased. Use only with extreme caution/discretion.

Note: Some registers are READ ONLY and will display a value even after you select option **[3] Blank All Registers**.

4. **Process OpenGear Messages**: Disables the Main Menu and returns control of the HDCC card to DashBoard to start processing openGear messages.

5. **Reset**: Reboots the hardware.

Note: If the **BOOTOPT** jumper is not removed, the card will boot back to the Main Menu.

APPENDIX A
Register Set

Introduction

Overview

The registers can be modified directly using the terminal. Refer to Chapter 6: Terminal on page 51.

IMPORTANT We highly recommend that Dashboard be used for configuration changes. The registers should be modified directly only when absolutely necessary.

Topics

Accessing the Engineering Menu

To access the Engineering Menu, refer to the *Hardware Installation Guide* (part number 821150).

Modifying the Register Settings

WARNING! If a register is not listed in Table A–1 below, do not modify it. Doing so will cause unpredictable results.

Table A–1 Register Table Summary

CH1	Description
00h	Not Used
01h	Not Used
02h	Not Used
03f	Not Used
04h	Not Used
05h	Not Used
06h	Not Used
07h	Not Used
08h	Transmission Features
09h	Horizontal Timing Offset for GPI SD Insertion Line (Reserved)
0Ah	SD Line for VANC GPI Data Insertion
0Bh	HD Line for VANC GPI Data Insertion
0Ch	Audio GPI Settings
0Dh	Software GPI Settings
0Eh	Not Used
0Fh	VANC GPI Rx/Tx Polarity Control
10h	Special Features 2
11h	Not Used
12h	VANC GPI Data Insertion Control and Encoder Time-out
13h	VANC GPI Mapping for Tx
14h	Not Used
15h	Not Used
16h	Not Used
17h	Not Used
18h	Not Used

Table A–1 Register Table Summary

CH1	Description
19h	Display Attributes—Reserved
1Ah	Not Used
1Bh	Not Used
1Ch	Not Used
1Dh	Not Used
1Eh	Not Used
1Fh	Not Used
48h	Transcode Settings
49h	Inbound Data Routing 1/2 —to Channels A and B
4Ah	Inbound Data Routing 2/2—to Registers
4Bh	Outbound Data Routing 1/2—to USB and Serial
4Ch	Outbound Data Routing 2/2—to Ethernet
4Dh	Not Used
4Eh	GPO 1 and 2 Mapping
4Fh	GPO 3 and 4 Mappings

Table A–2 Register Settings, Descriptions, and Default Values

CH1	Description	Default
00h	Not Used	
01h	Not Used	
02h	Not Used	
03h	Not Used	
04h	Not Used	
05h	Not Used	
06h	Not Used	
07h	Not Used	

Table A–2 Register Settings, Descriptions, and Default Values

<table>
<tr><th>CH1</th><th>Description</th><th>Default</th></tr>
<tr><td>08h</td><td>Transmission Features
Min: N/A—Max: N/A
<table><tr><th>Bit(s)</th><th>Function</th></tr><tr><td>7</td><td>Not Used</td></tr><tr><td>6:5</td><td>Com Port Speed
00 = 9600 baud
01 = 19200 baud
10 = 38400 baud
11 = 115200 baud</td></tr><tr><td>4:0</td><td>Not Used</td></tr></table></td><td>00h</td></tr>
<tr><td>09h</td><td>Horizontal Timing Offset for GPI Insertion Line:
Reserved—Do Not Change</td><td>—</td></tr>
<tr><td>0Ah</td><td>SD Line for VANC GPI Data
Min: 06h—Max: 16h</td><td>0Dh</td></tr>
<tr><td>0Bh</td><td>HD Line for VANC GPI Data
Min: 07h—Max: 19h</td><td>0Dh</td></tr>
</table>

Table A–2 Register Settings, Descriptions, and Default Values

<table>
<tr><th>CH1</th><th>Description</th><th>Default</th></tr>
<tr><td>0Ch</td><td>
Audio GPI Settings
Min: N/A—Max: N/A
<table>
<tr><th>Bit(s)</th><th>Function</th></tr>
<tr><td>7</td><td>Audio GPI Cues Encode
0 = Disabled
1 = Enabled</td></tr>
<tr><td>6</td><td>Not Used</td></tr>
<tr><td>5</td><td>Received GPI Cues Polarity
0 = Normal
1 = Inverted</td></tr>
<tr><td>4</td><td>GPI Cues Decoder Source
0 = GPI Cues in VANC
1 = GPI Cues in Audio Channels</td></tr>
<tr><td>3:1</td><td>Audio Channel Pair Number for GPI Cures Data Encode/Decode
000 = Audio Channel Pair 1
001 = Audio Channel Pair 2
010 = Audio Channel Pair 3
011 = Audio Channel Pair 4
100 = Audio Channel Pair 5
101 = Audio Channel Pair 6
110 = Audio Channel Pair 7
111 = Audio Channel Pair 8</td></tr>
<tr><td>0</td><td>Not Used</td></tr>
</table>
</td><td>96h</td></tr>
</table>

Table A–2 Register Settings, Descriptions, and Default Values

<table>
<tr><th>CH1</th><th>Description</th><th>Default</th></tr>
<tr><td>0Dh</td><td>Software GPI Settings
Min: N/A—Max: N/A
<table><tr><th>Bit(s)</th><th>Function</th></tr><tr><td>7</td><td>Transmitted GPI Cues Source
0 = Use Hardware GPI Inputs
1 = Use Software GPI Bits (Register 0Dh bits 3:0)</td></tr><tr><td>6:5</td><td>Not Used</td></tr><tr><td>4</td><td>Transmitted GPI Cues Polarity (Either from Software or Physical GPI-IN)
0 = Normal
1 = Inverted</td></tr><tr><td>3:0</td><td>Software GPI-IN Status Bits</td></tr></table></td><td>00h</td></tr>
<tr><td>0Eh</td><td>Not Used</td><td>—</td></tr>
<tr><td>0Fh</td><td>VANC GPI Tx and Rx Polarity Control
Min: N/A—Max: N/A
<table><tr><th>Bit(s)</th><th>Type</th><th>Function</th></tr><tr><td>7</td><td>GPI Tx 3</td><td rowspan="8">0 = Normal (Active Low)
1 = Inverted (Active High)</td></tr><tr><td>6</td><td>GPI Tx 2</td></tr><tr><td>5</td><td>GPI Tx 1</td></tr><tr><td>4</td><td>GPI Tx 0</td></tr><tr><td>3</td><td>GPI Rx 3</td></tr><tr><td>2</td><td>GPI Rx 2</td></tr><tr><td>1</td><td>GPI Rx 1</td></tr><tr><td>0</td><td>GPI Rx 0</td></tr></table></td><td>00h</td></tr>
</table>

Table A–2 Register Settings, Descriptions, and Default Values

<table>
<tr><th>CH1</th><th>Description</th><th>Default</th></tr>
<tr><td>10h</td><td>Special Features—2
Min: N/A—Max: N/A
This register controls miscellaneous functions on the card including the video outputs.
<table><tr><th>Bit(s)</th><th>Function</th></tr><tr><td>3:4[a]</td><td>Video Outputs:
00 = Normal
01 = Both outputs set to monitoring
10 = Both outputs are clean
11 = Not Used</td></tr><tr><td>5</td><td>VANC GPI Tx Source:
0 = GPI Mapped Input (See Registers 13h)
1 = GPI Mapped Input ORed with VANC GPI Rx</td></tr></table>a Normal (default) = Monitoring O/P is 2. Clean O/P is 1. Monitoring = Burned-in captions on all O/Ps. Clean = No burned-in captions on any O/Ps.</td><td>00h</td></tr>
<tr><td>11h</td><td>Not Used</td><td>—</td></tr>
<tr><td>12h</td><td>VANC GPI Insertion Control and Insert Mode Time-out
Min: N/A—Max: N/A
<table><tr><th>Bit(s)</th><th>Function</th></tr><tr><td>7</td><td>VANC GPI Data Insertion
0 = Disable
1 = Enable</td></tr><tr><td>6:0</td><td>Not Used</td></tr></table></td><td>00h</td></tr>
</table>

Table A–2 Register Settings, Descriptions, and Default Values

<table>
<tr><th>CH1</th><th>Description</th><th>Default</th></tr>
<tr><td>13h</td><td>VANC GPI Mapping for Tx
Min: N/A—Max: N/A
<table><tr><th>Bit(s)</th><th>GPI Tx Source</th><th>Function</th></tr><tr><td>0:1</td><td>1</td><td rowspan="4">00 = External GPI 1/GP Tx0
01 = External GPI 2/GP Tx1
02 = External GPI 3/GP Tx2
04 = External GPI 4/GP Tx3</td></tr><tr><td>2:3</td><td>2</td></tr><tr><td>4:5</td><td>3</td></tr><tr><td>6:7</td><td>4</td></tr></table></td><td>E4h</td></tr>
<tr><td>14h</td><td>GPI Mapping for Per-Field Blank Control
(Reserved)</td><td>—</td></tr>
<tr><td>15h</td><td>Not Used</td><td>—</td></tr>
<tr><td>16h</td><td>Not Used</td><td>—</td></tr>
<tr><td>17h</td><td>Not Used</td><td>—</td></tr>
<tr><td>18h</td><td>Not Used</td><td>—</td></tr>
<tr><td>19h</td><td>Display Attributes—Reserved</td><td>—</td></tr>
<tr><td>1Ah</td><td>Not Used</td><td>—</td></tr>
<tr><td>1Bh</td><td>Not Used</td><td>—</td></tr>
<tr><td>1Ch</td><td>Not Used</td><td>—</td></tr>
<tr><td>1Dh</td><td>Not Used</td><td>—</td></tr>
<tr><td>1Eh</td><td>Not Used</td><td>—</td></tr>
<tr><td>1Fh</td><td>Not Used</td><td>—</td></tr>
<tr><td colspan="3">.
.
.</td></tr>
<tr><td>48h</td><td>Transcode Settings—Reserved</td><td>00h</td></tr>
<tr><td>49h</td><td>Inbound Data Routing 1/2—to Channels A and B
Min: N/A — Max: N/A
<table><tr><th>Bit(s)</th><th>To Channel A</th></tr><tr><td>7:4</td><td>Not Used</td></tr><tr><td>3</td><td>USB</td></tr><tr><td>2</td><td>Ethernet 2</td></tr><tr><td>1</td><td>Ethernet 1</td></tr><tr><td>0</td><td>Serial</td></tr></table></td><td>11h</td></tr>
</table>

Table A–2 Register Settings, Descriptions, and Default Values

<table>
<tr><th>CH1</th><th>Description</th><th>Default</th></tr>
<tr><td>4Ah</td><td>Inbound Data Routing 2/2—to Registers
Min: N/A — Max: N/A
<table><tr><th>Bit(s)</th><th>To Channel B</th></tr><tr><td>7:4</td><td>Not Used</td></tr><tr><td>3</td><td>USB</td></tr><tr><td>2</td><td>Ethernet 2</td></tr><tr><td>1</td><td>Ethernet 1</td></tr><tr><td>0</td><td>Serial</td></tr></table></td><td>08h</td></tr>
<tr><td>4Bh</td><td>Outbound Data Routing 1/2—to USB and Serial
Min: N/A — Max: N/A
<table><tr><th>Bit(s)</th><th>To USB</th></tr><tr><td>7</td><td>Not Used</td></tr><tr><td>6</td><td>Registers</td></tr><tr><td>5</td><td>Not Used</td></tr><tr><td>4</td><td>Channel A</td></tr><tr><th>Bit(s)</th><th>To Ethernet 1</th></tr><tr><td>3</td><td>Not Used</td></tr><tr><td>2</td><td>Registers</td></tr><tr><td>1</td><td>Not Used</td></tr><tr><td>0</td><td>Channel A</td></tr></table></td><td>41h</td></tr>
<tr><td>4Ch</td><td>Outbound Data Routing 2/2—to Ethernet
Min: N/A — Max: N/A
<table><tr><th>Bit(s)</th><th>To Ethernet 2</th></tr><tr><td>7</td><td>Not Used</td></tr><tr><td>6</td><td>Registers</td></tr><tr><td>5</td><td>Not Used</td></tr><tr><td>4</td><td>Channel A</td></tr><tr><th>Bit(s)</th><th>To Ethernet 1</th></tr><tr><td>3</td><td>Not Used</td></tr><tr><td>2</td><td>Registers</td></tr><tr><td>1</td><td>Not Used</td></tr><tr><td>0</td><td>Channel A</td></tr></table></td><td>00h</td></tr>
<tr><td>4Dh</td><td>Timing Offset—Reserved</td><td>06h</td></tr>
</table>

Table A–2 Register Settings, Descriptions, and Default Values

<table>
<tr><th>CH1</th><th>Description</th><th>Default</th></tr>
<tr><td>4Eh</td><td>GPO 1 and 2 Source
Min: N/A—Max: N/A
<table><tr><th>Bit(s)</th><th>Function</th></tr><tr><td>0:3</td><td>GPO 1 Source:
0000 = Ch 1 GPI Rx 0
0001 = Ch 1 GPI Rx 1
0010 = Ch 1 GPI Rx 2
0011 = Ch 1 GPI Rx 3</td></tr><tr><td>4:7</td><td>GPO 2 Source:
0000 = Ch 1 GPI Rx 0
0001 = Ch 1 GPI Rx 1
0010 = Ch 1 GPI Rx 2
0011 = Ch 1 GPI Rx 3</td></tr></table></td><td>10h</td></tr>
<tr><td>4Fh</td><td>GPO 3 and 4 Source
Min: N/A—Max: N/A
<table><tr><th>Bit(s)</th><th>Function</th></tr><tr><td>0:3</td><td>GPO 3 Source:
0000 = Ch 1 GPI Rx 0
0001 = Ch 1 GPI Rx 1
0010 = Ch 1 GPI Rx 2
0011 = Ch 1 GPI Rx 3</td></tr><tr><td>4:7</td><td>GPO 4 Source:
0000 = Ch 1 GPI Rx 0
0001 = Ch 1 GPI Rx 1
0010 = Ch 1 GPI Rx 2
0011 = Ch 1 GPI Rx 3</td></tr></table></td><td>32h</td></tr>
</table>

APPENDIX B
Specifications

Introduction

Overview

This chapter lists the specifications of the HDCC and provides the pin-outs for its connectors.

Topics

Specifications

Table B–1 Physical Specifications

Specification	OG
Dimensions (H x W x D)	Card: 3″ x 12.75″x 0.5″ (76.2 mm x 323.85 mm x 12.7 mm)
	Rear Panel: 2.5″ (W) x 3.5″ (H) x 1.5″ (D) (63.5 mm x 88.9 mm x 38.1 mm)
Shipping Weight (combined)	1 lbs (.45 kg)
Supplied Accessories	Rear panel adaptor (OG only)
Power Requirements	Receives power from frame
Power Consumption	Approximately 10 W

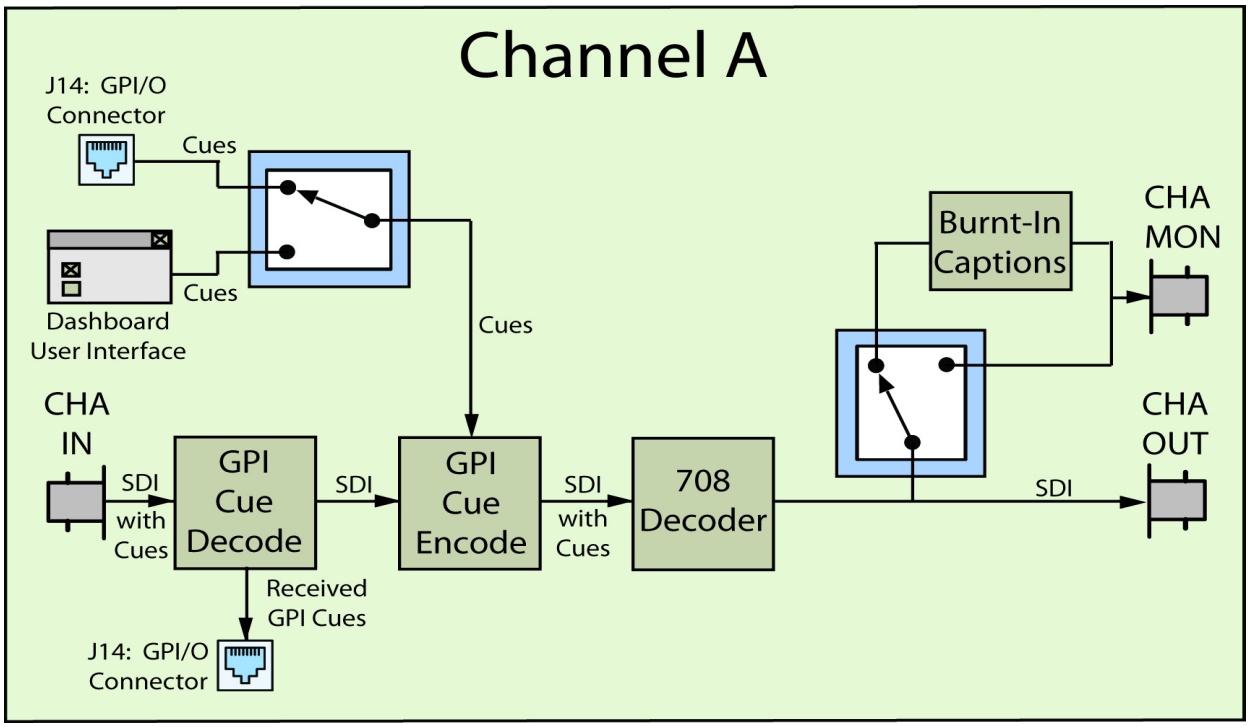
Table B–2 Technical Specifications

Specification	1 Channel
Video Inputs	1 SD/HD-SDI autosensing on BNC
Video Outputs	1 HD/SD-SDI Closed Captioned (BNC) 1 HD/SD-SDI Open Captioned (BNC)
Caption Inputs/Outputs	1 Ethernet (RJ-45) 10/100 BaseTX 1 RS-232 (DB-9) 1 USB
Frame compatibility	• Ross DFR-8321
Available functions	• Closed Caption OSD Monitoring • GPI Cue Insertion and Reception
Supported closed caption specifications	CEA-608, CEA-708 both encapsulated 608 and native 708

Technical Functional Overview

Figure B–1 on page 71 illustrates the design of the HDCC.

Figure B–1 HDCC Block Diagram



APPENDIX C
Troubleshooting

Introduction

Overview

This appendix provides instructions for correcting the most common problems.

Topics

DashBoard

Table C–1 Common DashBoard Problems and Solutions

Symptom	Possible Cause	Solution
Frame does not appear in DashBoard.	Frame not power up.	Apply power to frame.
	No network connectivity.	Verify Ethernet/IP connectivity between host PC and frame is established.
HDCC card does not appear in DashBoard.	**BOOTOPT** jumper is in place.	Remove **BOOTOPT** jumper, then power cycle the frame.

Network

Table C–2 Common Network Problems and Solutions

Symptom	Possible Cause	Solution
Cannot locate HDCC card in the Network folder of Windows Explorer.	No network connectivity to card.	Check settings of SW1 DIP switch on Rear Panel.

VSPs

Table C–3 Common VSPs Problems and Solutions

Symptom	Possible Cause	Solution
VSP input/output is not working.	VSP software settings are incorrect.	Set each VSP's IP address and port number correctly. Verify that **Raw** mode is selected.

GPI Cue Insertion

Table C–4 Common Cue Insertion Problems and Solutions

Symptom	Possible Cause	Solution
GPI Cues not being inserted.	HD/SD Video Line for cues not set (if VANC).	Set **SD/HD VANC Line for GPI Data, CHA** to correct line.
	Insertion not enabled.	Check **Encode, VANC GPI Cue, CHA** (for VANC insertion) or **Encode, Audio GPI Cue, CHA** (for Audio insertion.
	Hardware/Software selection wrong.	Set **Transmitted Cue Source, CHA** correctly.
	GPI/O connector not correctly connected.	Verify input connections of J14.
GPI Cue is inverted	Input is opposite polarity.	Set **Transmitted Cue (Soft/Phy) Polarity** correctly.

GPI Cue Reception

Table C–5 Common Cue Reception Problems and Solutions

Symptom	Possible Cause	Solution
GPI Cues not being received.	Decoder source not set correctly.	Set **Decoder GP Cue Source, CHA** to **VANC** or **Audio Channels**, as appropriate.
	Wrong Audio Pair Selected.	Set **Audio Channel Pair** to correct pair.
	GPI/O connector not correctly connected.	Verify output connections of J14.

Table C–5 Common Cue Reception Problems and Solutions

Symptom	Possible Cause	Solution
GPI Cue is inverted	Output is opposite polarity.	Set **GPI Tx1-4 Polarity** correctly.
	Output is not correctly mapped to received cue.	Make sure **External GPO 1/ 2 Source** is set to correct cue.