HDCC-B37MULTI
(ARIB B37/CEA-608/708 Multi-Function Closed Caption Card)

- **HDCC-B37MULTI-OG2   (openGear Platform)**

- **HDCC-B37MULTI-2CH   (MC-1RU Platform)**

Multi-Purpose, HD/SD-SDI Closed Caption Card: Inserter, Decoder, Bridge, Monitor, and Translator

Configuration Guide
Firmware Version: V0.08
Software Version: V0.06

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Reproduction

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Getting Started

Introduction

Overview

This chapter describes the basic captioning functions that you can perform using your Wohler HDCC-B37MULTI-OG2 (for the Ross DFR-8321 frame) and HDDC-B37MULTI-2CH (for the Wohler MC-1RU frame) products (collectively called HDCC).

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 is a versatile card for encoding, decoding, bridging, and transcoding captions on/from/between HD/SD-SDI video streams in real time.

You can operate the HDCC in either a Ross® openGear® DFR-8321 frame or in Wohler's MC-1RU frame. (See Chapter 2: Hardware Installation on page 15 for installation instructions.)

When operated in the Ross frame, the card is configured and controlled through DashBoard® software. In the Wohler MC-1RU frame the card is configured and controlled through HDCCRegEdit. (Refer to Using DashBoard on page 41 or Using HDCCRegEdit on page 61 for instructions.)

The HDCC is a two-channel card that allows two different HD/SD-SDI streams to pass through simultaneously. Caption data goes to and from the card through several available serial connections: RS-232, USB, and Ethernet (via a virtual serial port).

Figure 1–1   HDCC Card
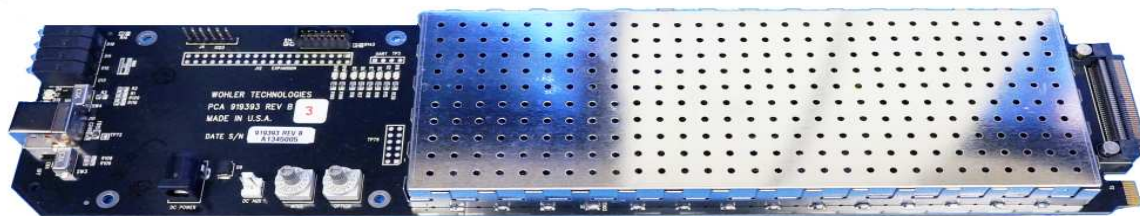
Quick Start Guides

Figure 1–2 on page 3 and Figure 1–3 on page 4 illustrate the installation and configuration processes for the Ross DFR-8321 frame and the Wohler MC-1RU frame respectively.

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

Start

↓

Set up Ross DFR-8321 frame per manufacturer's instructions

↓

Install Ross DashBoard Control System software on your host PC

↓

Configure (initial) IP address of HDCC using SW1 (Chapter 2)

↓

Install HDCC card and Rear Panel in DFR-8321, connect cables (Chapter 2)

↓

Configure TCP/IP (Chapter 3)

↓

Set up Virtual Serial Ports (Chapter 3)

↓

Use DashBoard to set captioning options (Chapter 4)

↓

Use HDCC for captioning operations (Chapter 4)

↓

Setup Complete

3

Figure 1–3   Quick Start Wohler MC-1RU Frame

```
                    ( Start )
                        │
                        ▼
        ┌───────────────────────────────┐
        │  Set up Wohler MC-1RU frame per │
        │     manufacturer's instructions │
        └───────────────────────────────┘
                        │
                        ▼
        ┌───────────────────────────────┐
        │   Configure (initial) IP address │
        │       of HDCC using SW1          │
        │          (Chapter 2)             │
        └───────────────────────────────┘
                        │
                        ▼
        ┌───────────────────────────────┐
        │   Install HDCC card in MC-1RU,   │
        │        connect cables            │
        │          (Chapter 2)             │
        └───────────────────────────────┘
                        │
                        ▼
        ┌───────────────────────────────┐
        │        Configure TCP/IP          │
        │          (Chapter 3)             │
        └───────────────────────────────┘
                        │
                        ▼
        ┌───────────────────────────────┐
        │    Set up Virtual Serial Ports   │
        │          (Chapter 3)             │
        └───────────────────────────────┘
                        │
                        ▼
        ┌───────────────────────────────┐
        │    Install Wohler HDCCRegEdit    │
        │    software on your host PC      │
        └───────────────────────────────┘
                        │
                        ▼
        ┌───────────────────────────────┐
        │   Create USB-to-USB Connection   │
        │          (Chapter 5)             │
        └───────────────────────────────┘
                        │
                        ▼
        ┌───────────────────────────────┐
        │    Use HDCCRegEdit to set        │
        │      captioning options          │
        │          (Chapter 5)             │
        └───────────────────────────────┘
                        │
                        ▼
        ┌───────────────────────────────┐
        │        Use HDCC for              │
        │     captioning operations        │
        │          (Chapter 5)             │
        └───────────────────────────────┘
                        │
                        ▼
                ( Setup Complete )
```

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. The USB port is useful during the initial setup.

Figure 1–4   HDCC Front Edge

Power LED

TERM/RUN Select (SW4)

USB Port

USB Override (SW3)

HDCC in Ross DFR-8321 Frame

The HDCC-OG2 consists of two main parts: the HDCC board which goes into a DFR-8321 slot, and the OG2 Rear Panel which is attached to the rear of the frame.

Figure 1–5 shows the input and output connectors of the Rear Panel supplied with the HDCC card. The inputs are **CHA IN** and **CHB IN** and the outputs are **CHA OUT** and **CHB OUT**. The monitoring outputs (**CHA MON** and **CHB MON**) allow duplicates of the regular outputs to be sent to a monitor for display with burned-in captions.

Figure 1–5   OG2 Rear Panel
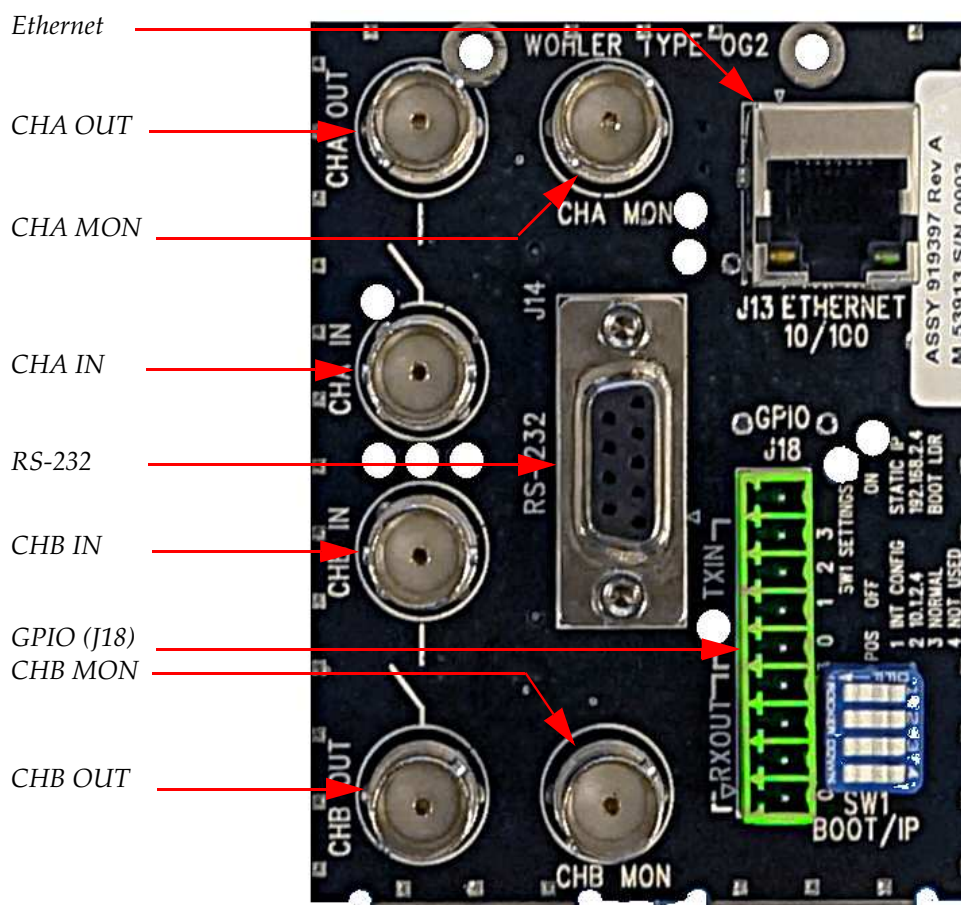
Note: Some OG2 Rear Panels may be marked "CH1" and "CH2" instead of "CHA" and "CHB", respectively.

HDCC in Wohler MC-1RU Frame

The HDCC-2CH is designed to be used in a Wohler MC-1RU frame. The MC-1RU Rear Panel provides all of the I/O connections. Refer to Figure 1–6 on page 7 for an overview of the installation and configuration.

Figure 1–6 and Figure 1–7 show the input and output connectors of the MC-1RU Rear Panel. Each of the two slots provides two channels (A and B) of SDI processing. The inputs are **CHA IN** and **CHB IN** and the outputs are **CHA OUT** and **CHB OUT**. The monitoring outputs (**CHA MON** and **CH2 MON**) allow duplicates of the regular outputs to be sent to a monitor for display with burned-in captions.

Figure 1–6   MC-1RU Rear Panel - Left Side
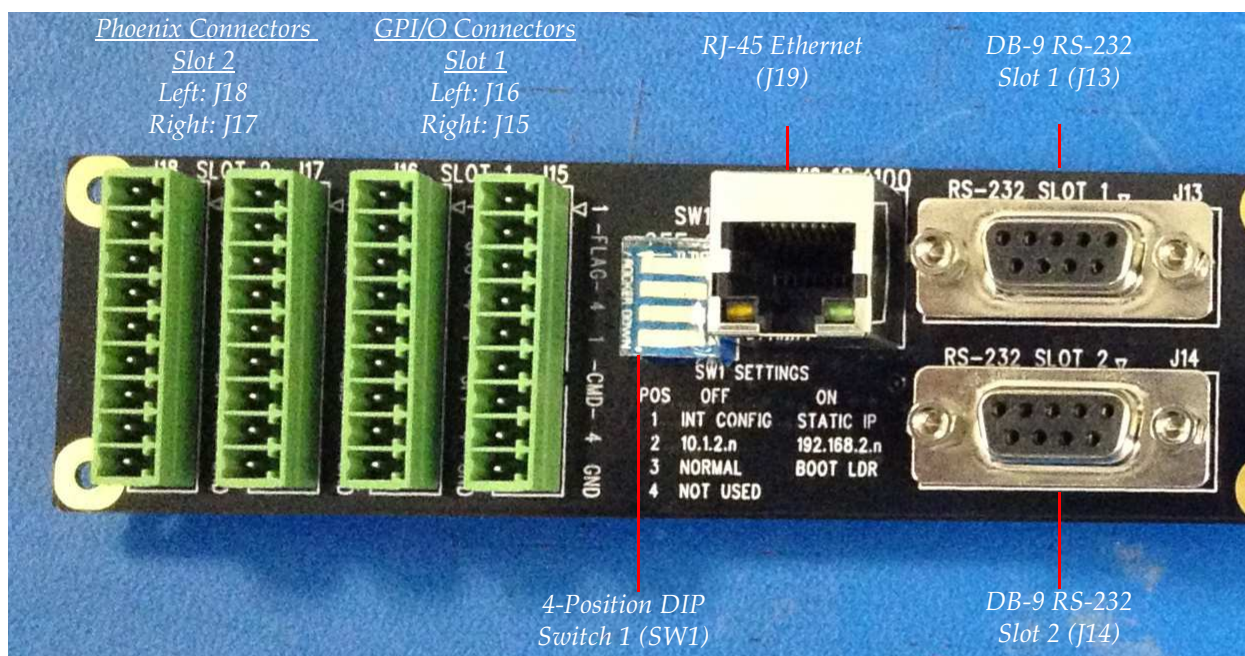
Note: Refer to Appendix B: Connector Pin Assignments on page 111 for detailed pin-out descriptions for each connector.

Figure 1–7   MC-1RU Rear Panel - Right Side
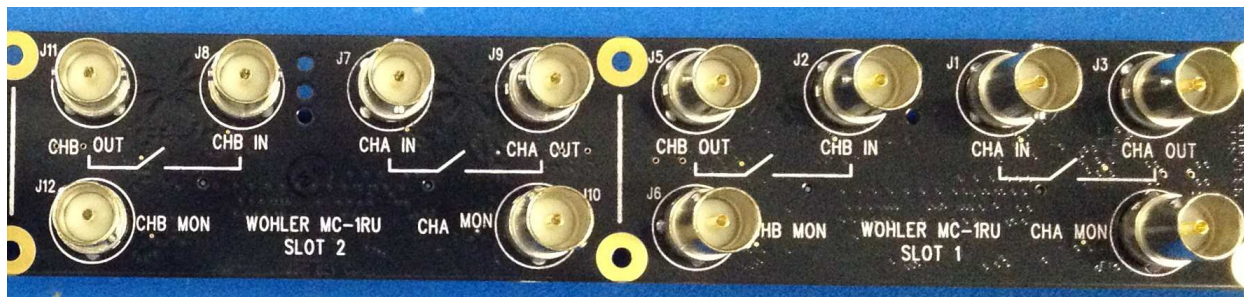
Relay Bypass

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

Figure 1–8   Relay Bypass - No Power Condition
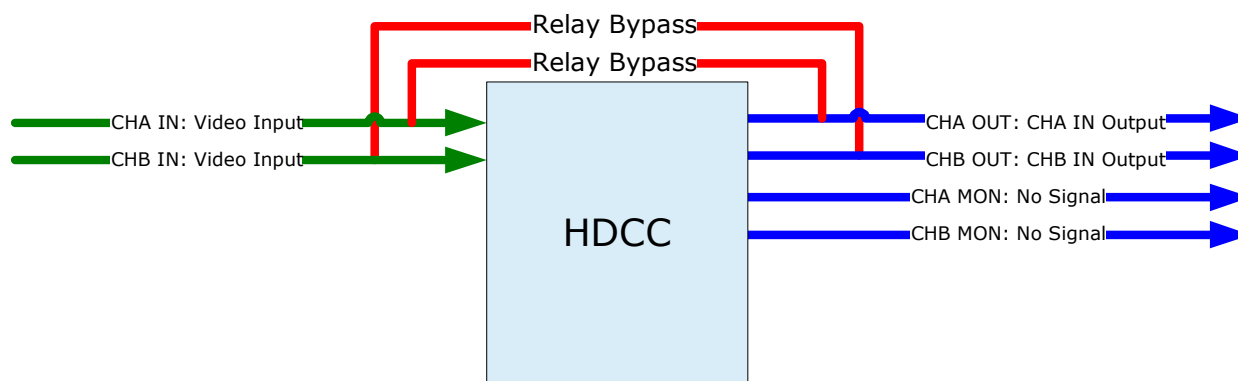
Functions

Encoding

The HDCC can insert closed caption information onto the video provided to CHA IN.

The HDCC can receive caption data from either the RS-232 port, the USB port, or one of two available Ethernet virtual serial ports, and embed it into the input video stream. The monitoring output channel allows the encoding to be visually confirmed by displaying the video with captions overlaid.

The following example shows the connections necessary to encode user-supplied caption data onto the video stream using the RS-232 port. See Figure 1–9 below.

Figure 1–9   Encoding Setup

CHA IN: Clean Video

HDCC
(Encoding)

RS-232: Input Text

CHA OUT: CHA IN Encoded Video
CHA MON: CHA IN Burned In
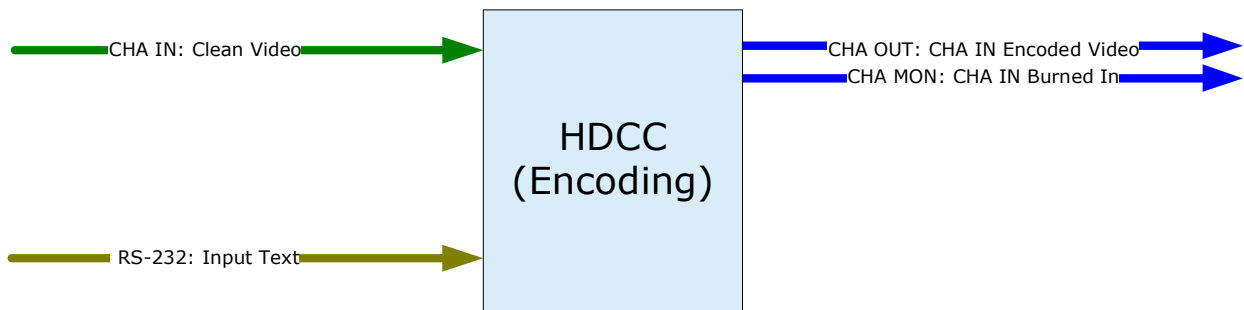
Example: The caption data supplied on RS-232 is encoded onto the video stream supplied at **CHA IN** and output to **CHA OUT** and **CHA MON**. Our example uses only one channel for simplicity; but you can easily duplicate the results on the second channel using similar inputs.

Connections	
Port	**Data**
CHA IN	SMPTE HD/SD-SDI video stream with no captions present.
CHA OUT	SMPTE HD/SD-SDI video stream with user-supplied captions encoded.
CHA MON	SMPTE HD/SD-SDID video stream with burned-in captions to monitor.
RS-232	**Input**: Closed caption input data, Grand Alliance/ SMPTE333/CDP format. **Output**: None.

Decoding

Decoding is the process of extracting closed caption text data from an SDI video stream, interpreting it, and making it available in human-readable form. For example, if a video/audio stream with embedded

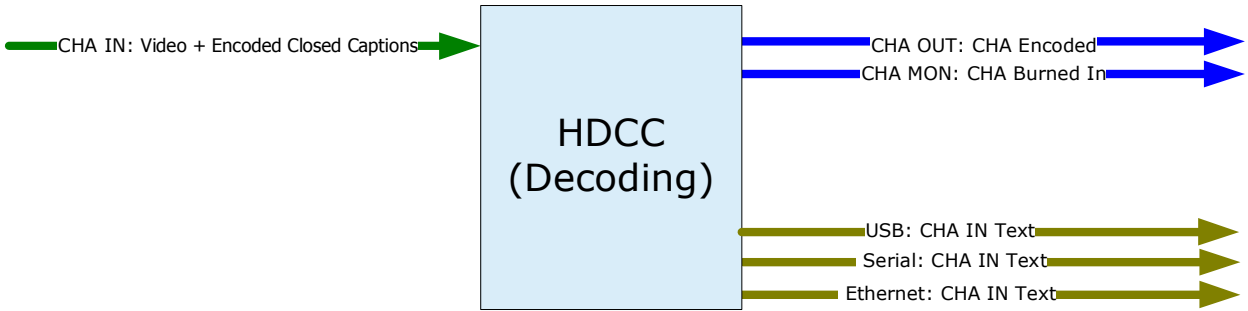caption data is supplied to **CHA IN** or **CHB IN**, the caption text is decoded and supplied through a serial and/or Ethernet and/or USB connection to a host PC for display. Note that the closed captioned text is not removed from the input video stream.

Like encoding, a signal comes in on **CHA IN** and goes out on **CHA OUT**. In decoding, however, the caption data is captured and output to the Ethernet port and/or the RS-232 port. See Figure 1–10 below.

Figure 1–10   Decoding Setup

CHA IN: Video + Encoded Closed Captions

HDCC
(Decoding)

CHA OUT: CHA Encoded
CHA MON: CHA Burned In

USB: CHA IN Text
Serial: CHA IN Text
Ethernet: CHA IN Text

Example: The caption data supplied on **CHA IN** is copied to both the **Ethernet** and **RS-232** output ports. Our example uses only one channel for simplicity; but you can easily duplicate the results on the second channel using similar inputs.

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.
RS-232	**Input**: None. **Output**: Captions from **CHA IN**.
Ethernet	**Input**: None. **Output**: Captions from **CHA IN**.

Bridging

As a bridge, the HDCC can decode the captions from the input video stream on Channel B and encode them onto the video stream of

Channel A. If one channel is HD and the other SD, the card will automatically reformat the caption data for the destination frame rate (transcode).

The following example shows the connections necessary to bridge captions; that is, to copy the captions from one video stream onto another.

Note: It is not necessary to match the resolutions and/or refresh rates when using multiple inputs, with one exception: the target video frame rate must match or be faster than the source video frame rate.

For example, you can bridge and transcode from a SD-50Hz to a HD-60Hz signal but not the other way around.

Figure 1–11   Bridging Setup (CHB → CHA)
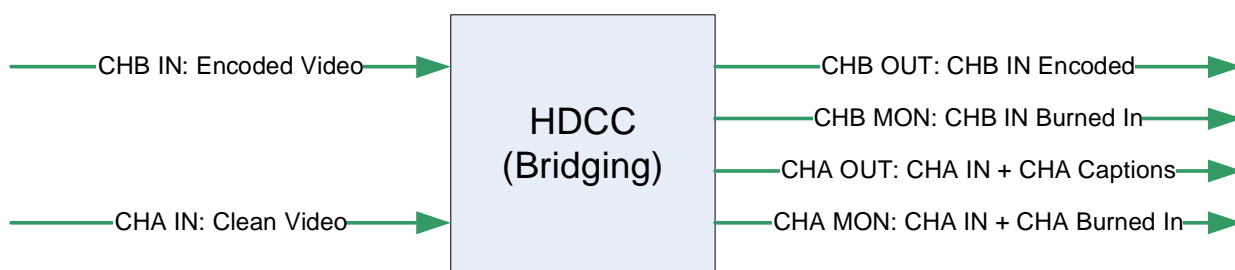
Example: This example demonstrates decoding. Captions from video provided at **CHB IN** are copied to video provided at **CHA IN**. **CHB OUT** is unmodified copy of **CHB IN**. **CHA OUT** is **CHA IN** encoded with captions from **CHB IN**.

Connections	
Port	**Data**
CHB IN	SMPTE HD/SD-SDI video stream with captions present.
CHA IN	SMPTE HD/SD-SDI video stream.
CHB OUT	SMPTE HD/SD-SDI video stream, unmodified from **CHB IN**.
CHA OUT	SMPTE HD/SD-SDI video stream from **CHA IN**, but with captions from **CHB IN** encoded.
CHB MON	SMPTE HD/SD-SDI video stream with burned-in captions to monitor.
CHA MON	SMPTE HD/SD-SDI video stream with burned-in captions to monitor.

> **Note:** Burned-in captions are available for CEA-608/708 captions only.

Caption Standards

The HDCC-B37MULTI card can perform various caption functions involving CEA-608/708 or ARIB B37 captions.

The caption standard used by the card is set by the **SW1** and **SW2** rotary switches, marked **MODE** and **OPTION**, respectively (refer to Figure 1–12 below.)

Figure 1–12   Mode and Option Switches
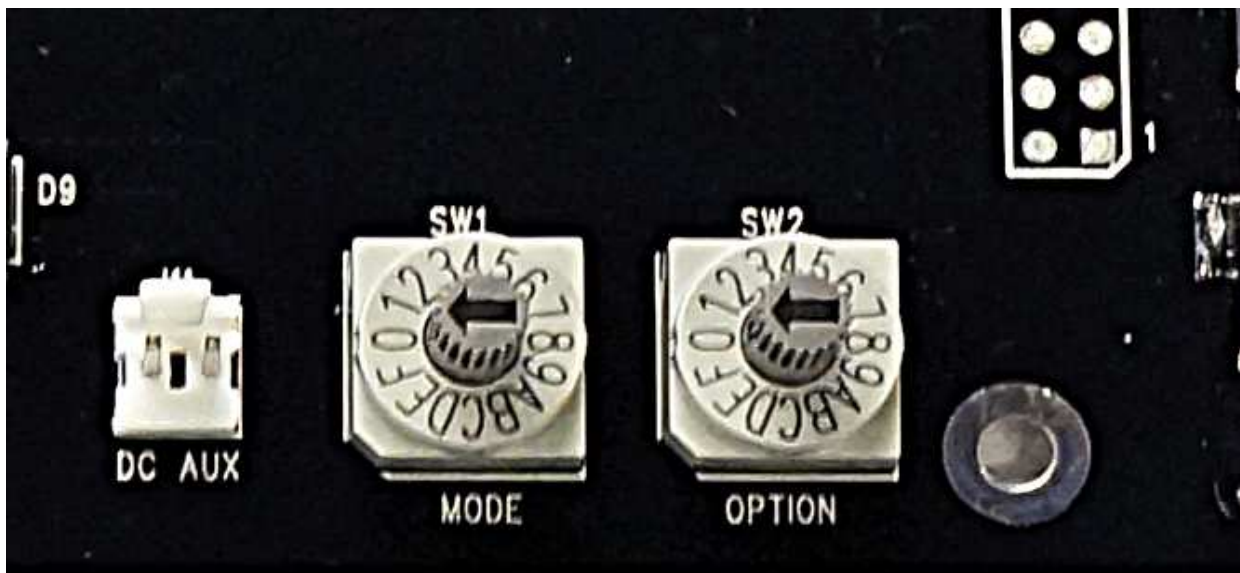
For CEA-608/708, these switches should both be set to **0**. For ARIB B37, they both should be set to **F**.

Operational Setup

The following chart provides a brief overview of the hardware/software setup required for each caption function. Refer to the chapters Using DashBoard on page 41 and Using HDCCRegEdit on page 61, for a more detailed explanation of the software setup.

Operation	Hardware	Connections		Notes
		Dashboard (for openGear Users)	HDCCRegEdit (for MC-1RU Users)	
Insert CEA-608/708 captions on Channel A	Provide HD/SD-SDI video to CHA IN, provide caption data to serial port, **SW1/2** set to **00**	Set HD/SD line number in Channel A tab, select Channel A serial input and baud rate in Setup tab	Set HD/SD line number, Channel A serial input, and baud rate in Channel A tab	
Insert ARIB B37 captions on Channel A	Provide HD-SDI to CHA IN, provide caption data to serial port, **SW1/2** set to **FF**	Select Channel A serial input and baud rate in Setup tab	Select Channel A serial input and baud rate in Channel A tab	B37 captions are locked to line 19 and are HD only
Decode CEA-608/708 captions on Channel A or B	Provide HD/SD-SDI video with encoded captions to CHA IN or CHB IN, receive data from selected serial port, **SW1/2** set to **00**	Select Channel A/B serial output and baud rate in Setup tab	Select Channel A/B serial output and baud rate in Channel A/B tab	
Decoder ARIB B37 captions on Channel A	Provide HD-SDI video with encoded captions to CHA IN, receive data from selected serial port, **SW1/2** set to **FF**	Select Channel A serial output and baud rate in Setup tab	Select Channel A serial output and baud rate in Channel A tab	

Connections

Operation	Hardware	Dashboard (for openGear Users)	HDCCRegEdit (for MC-1RU Users)	Notes
Monitor CEA-608/708 captions on Channel A or B	Provide HD/SD-SDI video with encoded captions to CHA IN or CHB IN, **SW1/2** set to **00**	Select decoded channel (CC1, CC2) in Channel A/B tab	Select decoded channel (CC1, CC2) in Channel A/B tab	Monitoring is for CEA-608/708 only
Bridge CEA-608/708 captions from Channel B to Channel A	Provide HD/SD-SDI video with encoded captions to CHB IN, provide HD/SD-SDI video to CHA IN, **SW1/2** set to **00**	On Multi-Channel tab, select **B->A** bridging operation, set HD/SD insertion line in Channel A tab	On Channel A tab, select **B->A** transcode operation, set HD/SD insertion line	Channel B is the source, Channel A is the destination
Translate CEA-608/708 captions on Channel B to ARIB B37 captions on Channel A	Provide HD-SDI video with encoded captions to CHB IN, provide HD/SD-SDI video to CHA IN, **SW1/2** set to **FF**	On Multi-Channel tab, select **B->A** bridging operation	On Channel A tab, select **B->A** transcode operation, set HD/SD insertion line	Channel B is the source, Channel A is the destination; B37 captions are HD/line 19 only

Hardware Installation

Introduction

Overview

This chapter explains how to install your HDCC card in the Ross DFR-8321 frame or in the Wohler MC-1RU frame.

Goals for This Chapter

✓ Install your HDCC card in a Ross DFR-8321 or Wohler MC-1RU chassis.

✓ 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.

Decision Point:

If you will be installing your HDCC-OG2 card into a Wohler MC-1RU, skip down to .

Otherwise, if you will be installing your HDCC-2CH card into a Ross DFR-8321 frame, continue on to Installing the HDCC in the Ross DFR-8321 immediately below.

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

- OG2 Rear Panel

- Screws (2)

- O-Rings (2)

Installation

To install the HDCC board and OG2 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 HDCC card occupies four slots of the Ross DFR-8321 chassis.
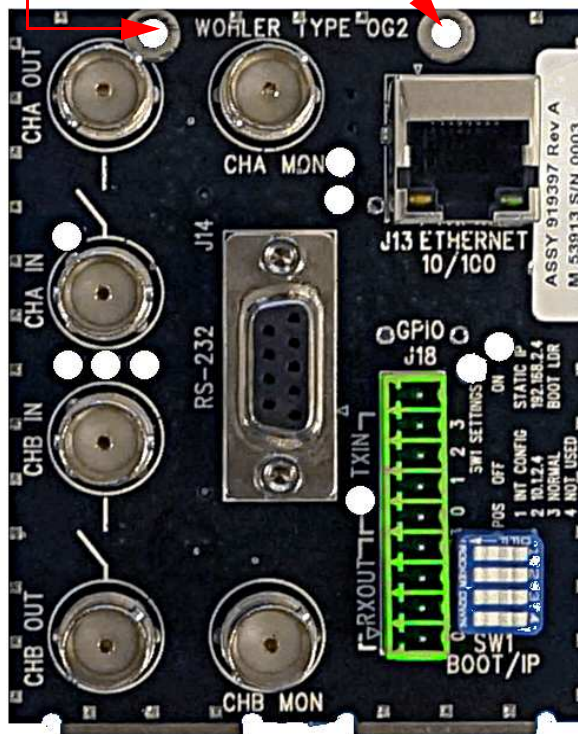
3. Insert the screws into the two corner holes of the rear panel. Refer to Figure 2–1 on page 18.

**Figure 2–1   OG2 Rear Panel**

Insert screws here.

4. After you have inserted the screws into the OG2 Rear Panel, place the O-rings on the screws. Refer to Figure 2–2 below.

Important: The HDCC's IP address is determined by dip switch **SW1** on the outer surface of the OG2 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" section, then come back here to finish the installation.
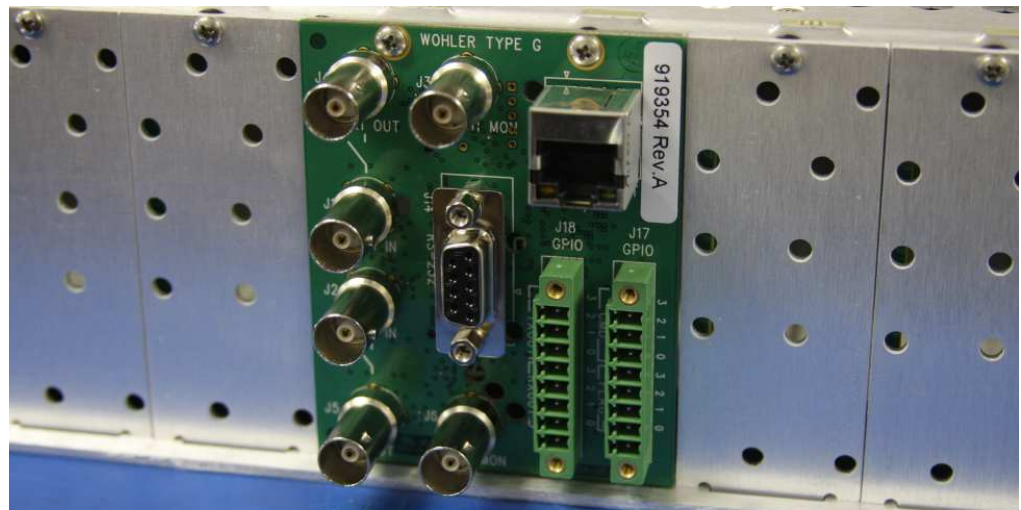
Note: Some OG2 Rear Panels will have **SW1** on the inner surface.

Figure 2–2   Adding the O-Rings
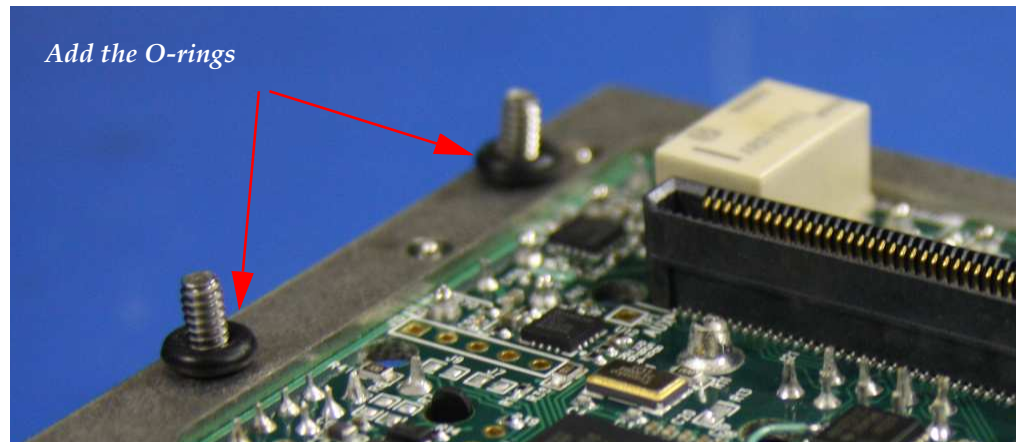
5.   With the rear of the frame facing you, sit the rear panel into the base slot and tighten the top screws.

Figure 2–3   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 2–4 below) and then close the front panel.

Note: You can install the HDCC-OG2 card into any of the following slots: 3, 5, 7, 9, 11, 13, 15, 17, or 19. Refer to Figure 2–3 below.

Figure 2–4   Open DFR-8321 Frame
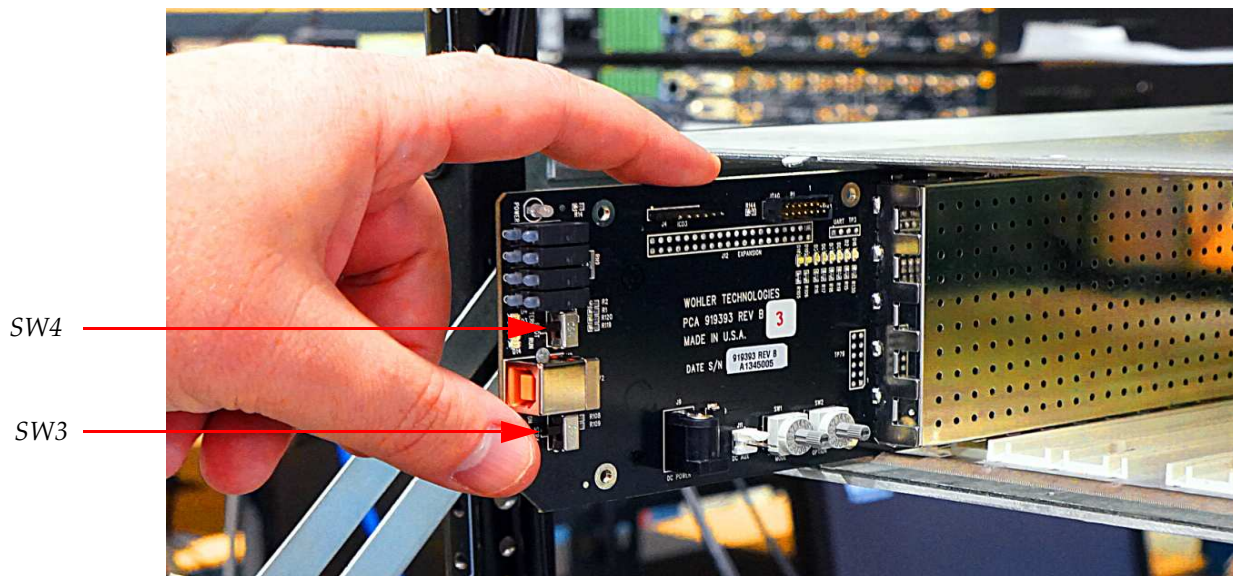
Note: Ensure that **SW3** is in the **Off** position and that **SW4** is in the **RUN** position.

8.   When complete, skip ahead to Rear Panel DIP Switch below.

Installing the HDCC in the Wohler MC-1RU

Requirements

Wohler MC-1RU frame

Installation

To install the HDCC, follow the steps below

1.   Ensure that the Wohler MC-1RU frame is properly installed. Refer to the *MC-1RU Installation Guide* (part number 821084).

2.   Remove the power cord from the MC-1RU to power it down.

3. Remove the MC-1RU's front panel by loosening the two captive screws.

4. Ensure that switch **SW4** on the front edge of the card is in the **TERM** position.

5. With the components facing up and the ejector to the right, slide the HDCC-2CH board into either Slot 1 or 2. The connectors will positively engage and the ejector will bottom out when the board is fully seated.

6. Re-install the MC-1RU front panel.

Rear Panel DIP Switch

Both the MC-1RU and OG2 Rear Panel have a miniature DIP switch, SW1, that sets the IP address of the card. On the MC-1RU, SW1 contains four rocker type switches next to the Ethernet port on the rear panel. On the MC-1RU, SW1 is a rocker-type DIP switch next to the Ethernet port on the rear panel. On the OG2, SW1 is next to the green GPIO connector.

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 (DFR-8321 and MC-1RU Slot 1)	Static IP= 10.2.1.4	Static IP= 192.168.2.4	**Off**
2 (MC-1RU Slot 2)	Static IP= 10.2.1.5	Static IP= 192.168.2.5	
3	Normal boot.	Execute boot loader.	**Off**
4	Not Used.		

Position 1 is set to **On** 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 **Off**, the static IP address set by Position 2 will apply.

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 (or one MC-1RU frame) 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 25.

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.

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

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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 OG2 rear panel, or J13 and J14 on the rear panel of the MC-1RU) 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

J13 on OG2
J19 on MC-1RU
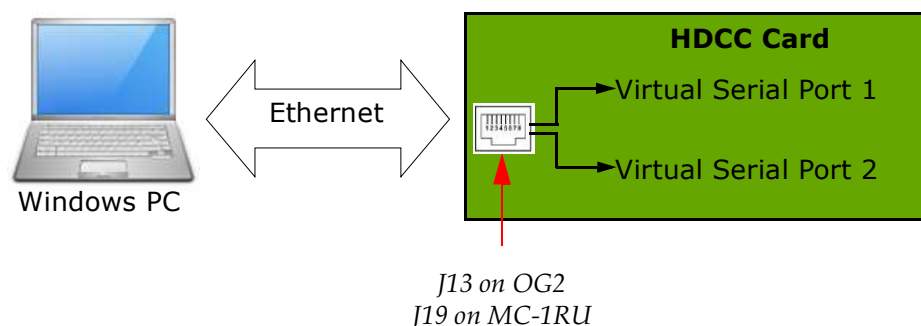
Figure 3–1 above provides a functional overview of the virtual serial port configuration. You can use third party software (link provided below) to create a virtual serial port which will transfer serial data to and from the HDCC over Ethernet. From the PC user's perspective, the virtual serial ports are indistinguishable from the hardware serial ports.

Once the virtual serial ports are operational, you can change the HDCC settings through DashBoard or HDCCRegEdit 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.

821159: HDCC-B37MULTI Configuration Guide

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
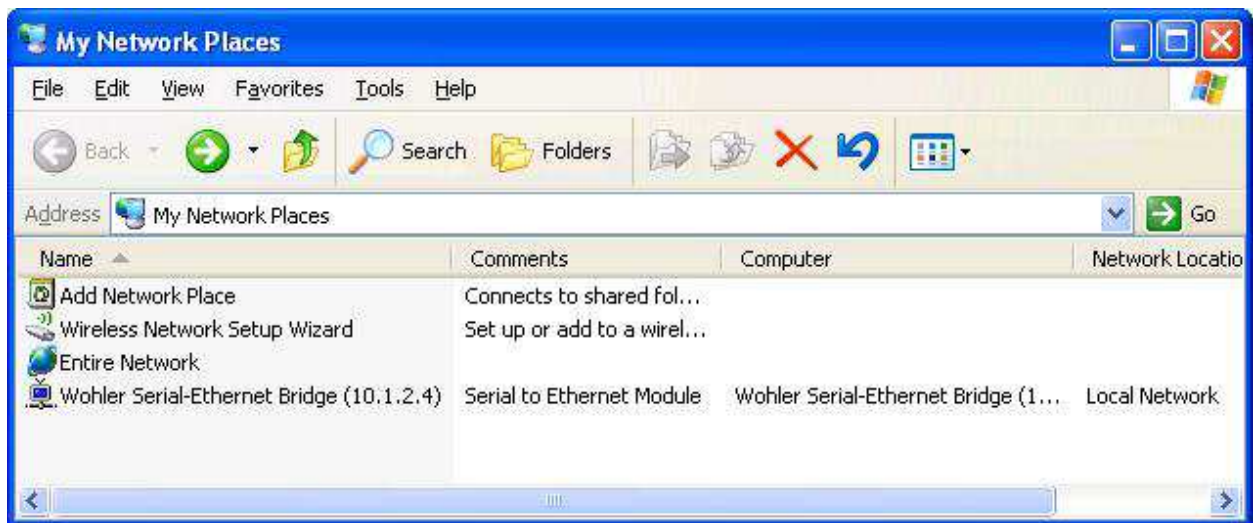
Note: If you are using a Wohler MC-1RU chassis, two Wohler serial-Ethernet bridges will appear: each slot has its own IP address.

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 below.

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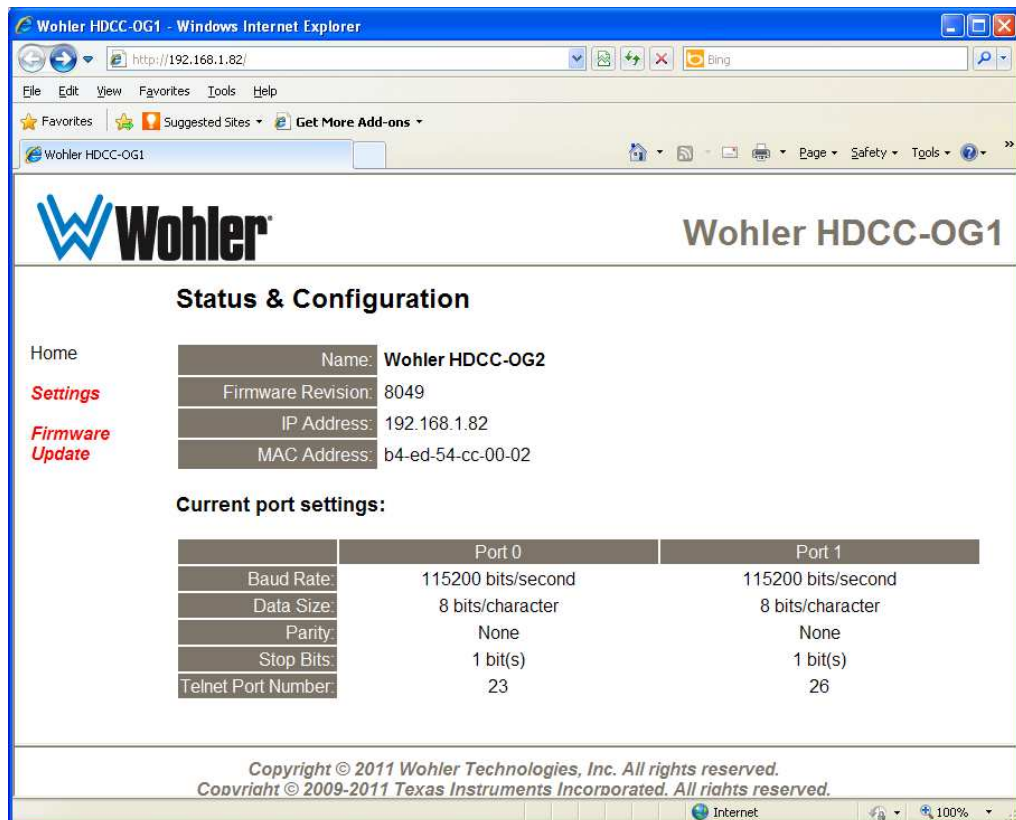
1. Click **Settings** on the left hand side of the screen (Figure 3–3 above).

2. When the **Settings** screen appears (Figure 3–4 on page 29) 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 29).

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 21 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
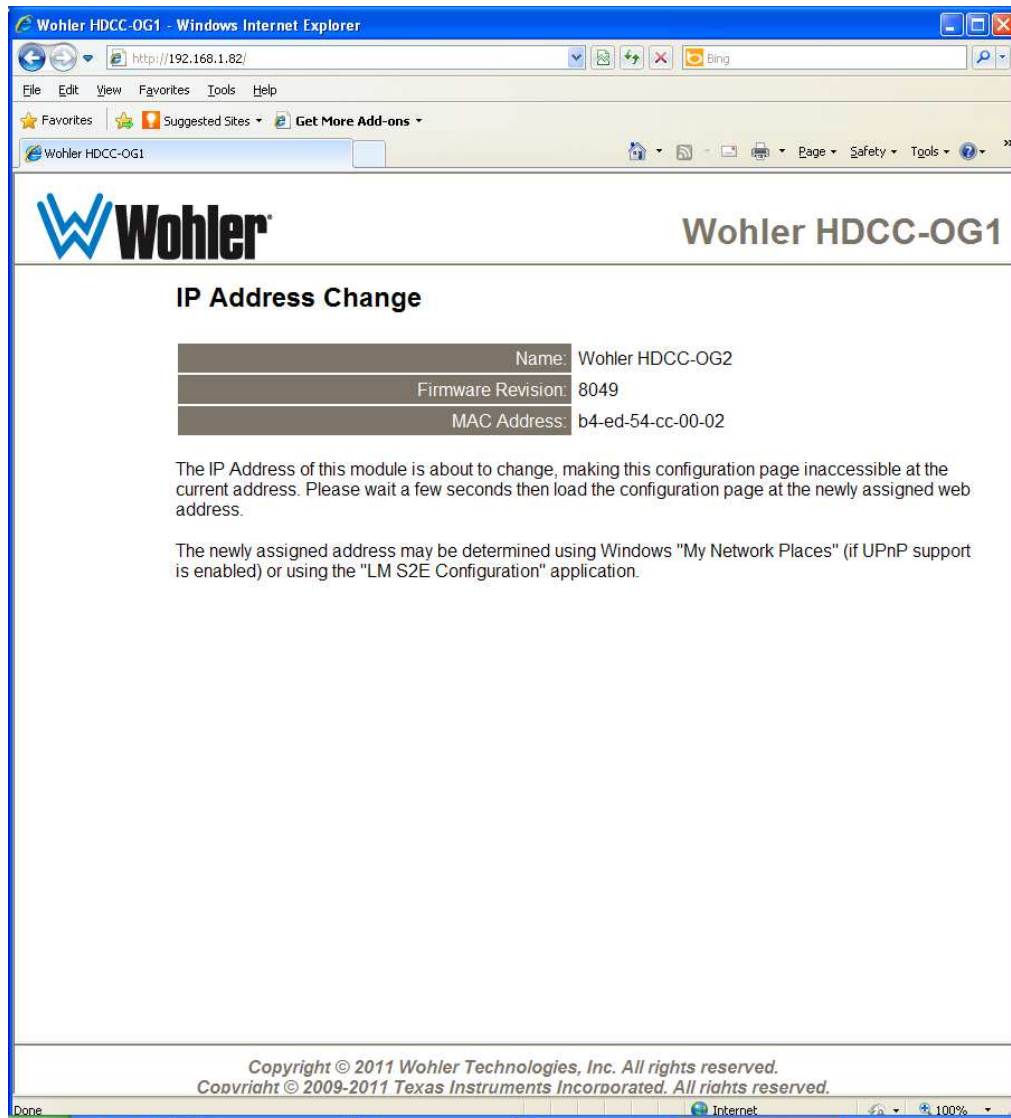
7. Close this window (Figure 3–5 above).

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.

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

If you need to control hardware handshaking lines directly on an MSS, ETS or SCSx00 product, the original Redirector is still available at the links below. These products use a proprietary protocol to control HW handshaking signals instead of TruPort Technology (RFC2217). Click one of the links below to download the **v3.1.0.4** Redirector:

	Download via FTP	Download via HTTP	Comment
Redirector	ftp	http	
Release Notes	ftp	http	Right-click and choose "Save Target As..."

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**.
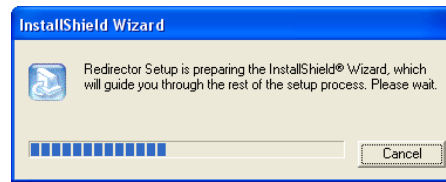
Figure 3–8   Lantronix Welcome Screen

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

Figure 3–9   InstallShield
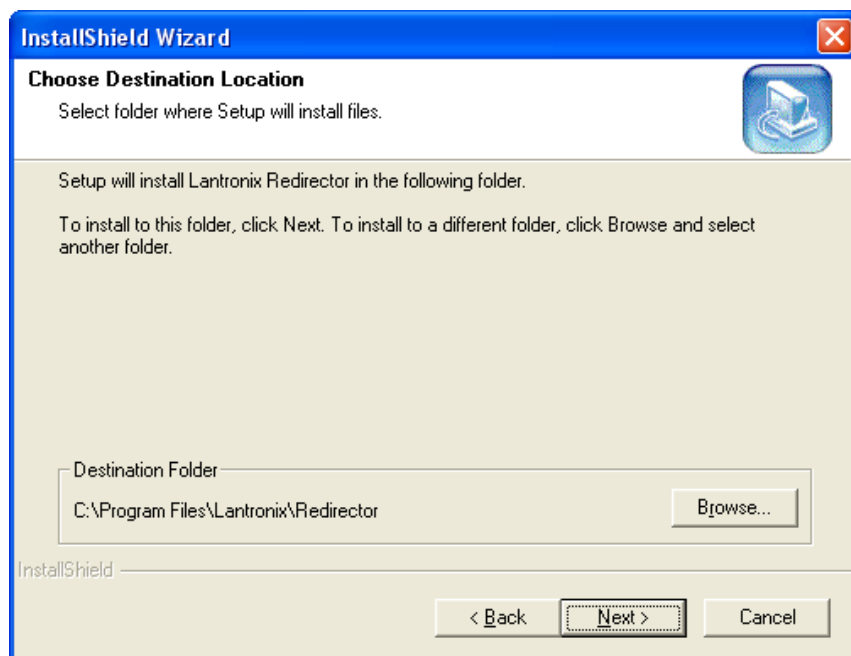

6. The **InstallShield** screen will quickly display and then return you to the Welcome screen. Click **Next** again.
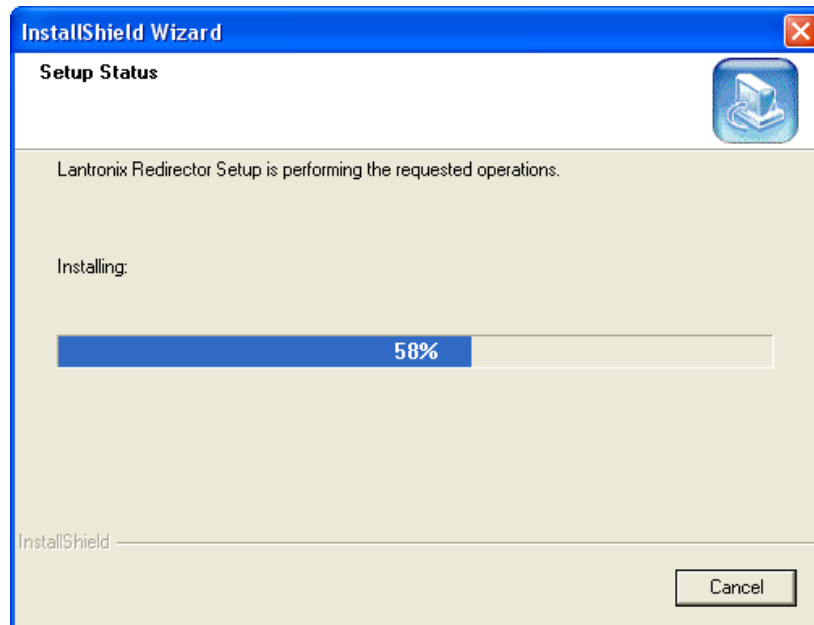
Figure 3–10   Choose Destination Location

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

    The **Setup Status** screen (Figure 3–11 on page 34) 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
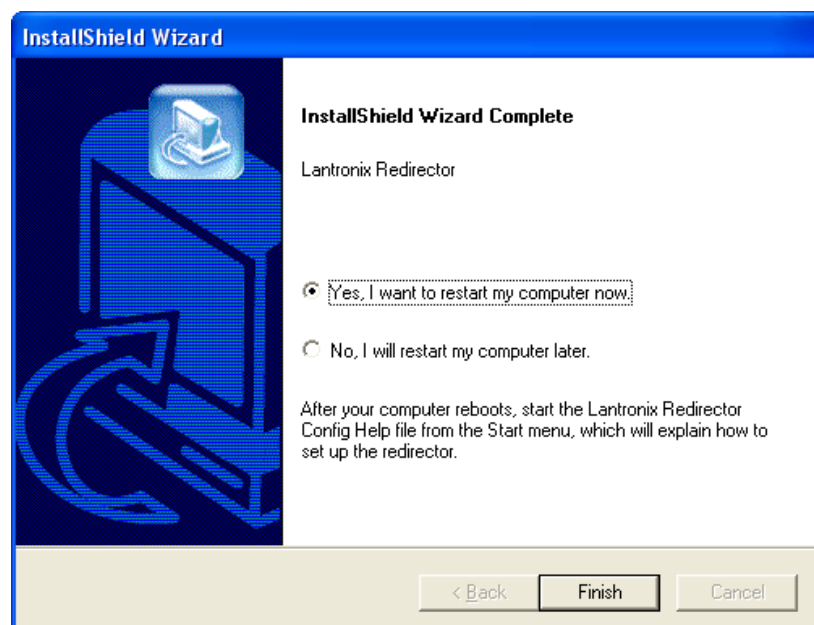
9. When the **InstallShield Wizard Complete** screen displays, verify that **Yes,...** is selected, and click **Finish**. The system will restart.

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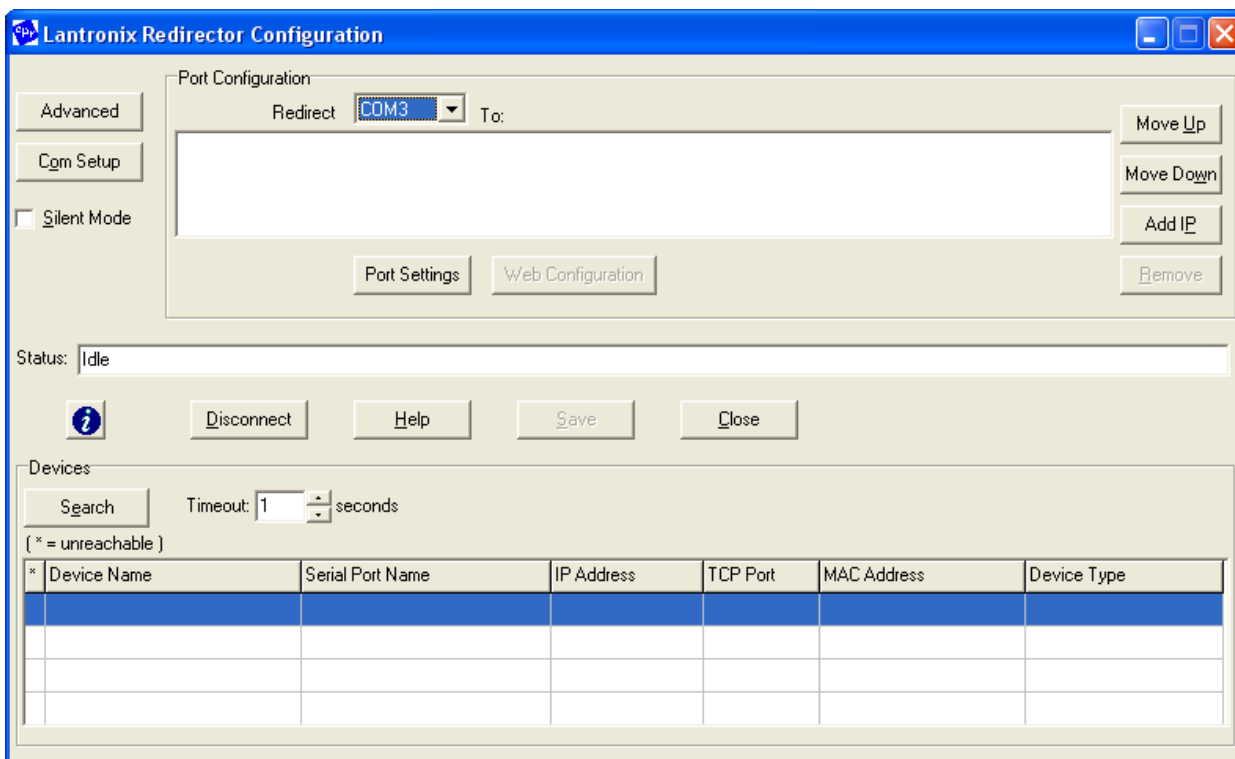
Important: Each HDCC has provision for two virtual serial ports; each MC-1RU frame therefore has provision for four virtual serial ports (two HDCC cards times two VSPs per card). For each HDCC card, you will perform Steps 2 through 12 twice: once for VSP#1 and again for VSP#2.

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

Figure 3–14   Com Setup
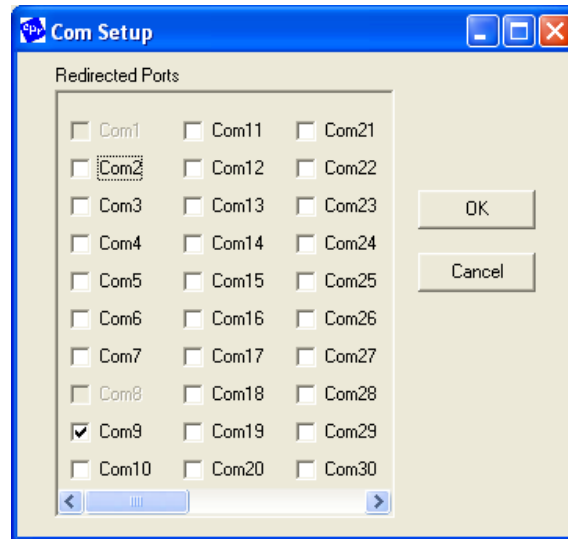
3.   Assign an available **Com** port (in our example Com9 is selected) and click **OK**.

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

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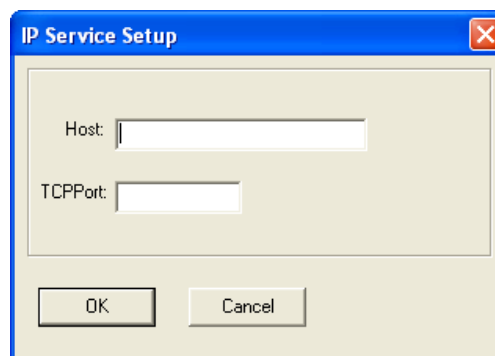
5.   In the **Host** field (Figure 3–15 above) enter the IP address of your HDCC card. (Use **My Network Places** to rediscover it if necessary.)

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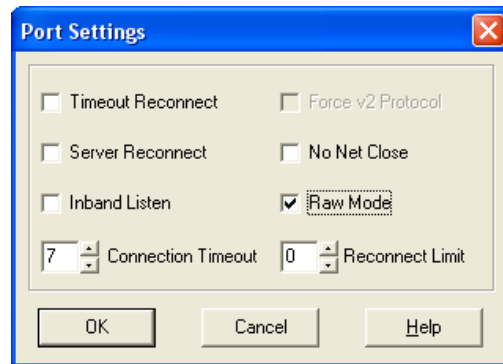
9.   Check **Raw Mode** (Figure 3–16 above) and click **OK**.

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

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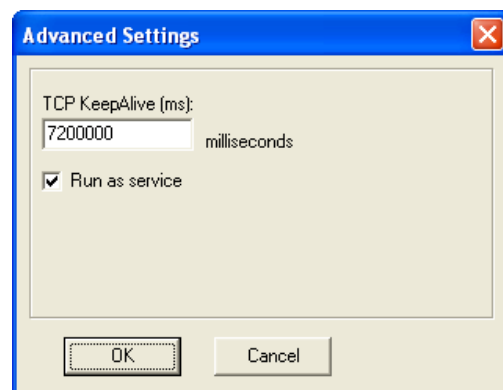
11. When the Advanced Settings dialog appears (Figure 3–17 above) check the **Run as service** box and click **OK**.

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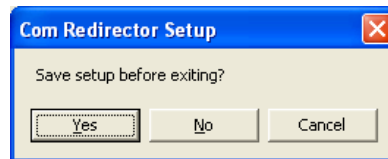
15. When the **Com Redirector Setup** dialog appears (Figure 3–20) click **Yes**.

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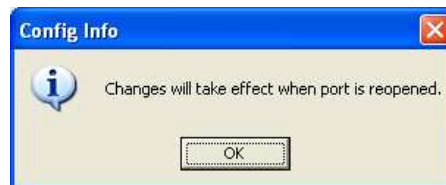
16. When the **Config Info** dialog displays (Figure 3–21 above) click **OK**.

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.

Next Steps

If you are using the Ross DFR-8321 frame, proceed to the next chapter, .

If you are using the Wohler MC-1RU, proceed to Chapter 4: .

CHAPTER 4
Using DashBoard

Introduction

Overview

This chapter explains how to use the HDCC card in a Ross DFR-8321 frame with the DashBoard Control System™ (the PC graphic user interface, from here on referred to as *DashBoard*) to configure your HDCC card.

Important: If you are using the HDCC card in a MC-1RU frame, skip this chapter and continue on to Using HDCCRegEdit on page 61.

Goals for This Chapter

✓ Use Ross's DashBoard Control System to operate your HDCC card.

✓ Learn the steps required for common captioning tasks.

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™ DFR-8321 frame is installed, switch **SW4** is in the **RUN** position, the HDCC card is installed within it, and DashBoard has been installed on a PC that is networked to the frame.

2. Power up the frame.

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.

   Note: Depending on the frame contents, the card may take several minutes to appear in the list.

Figure 4–1   DashBoard Tree
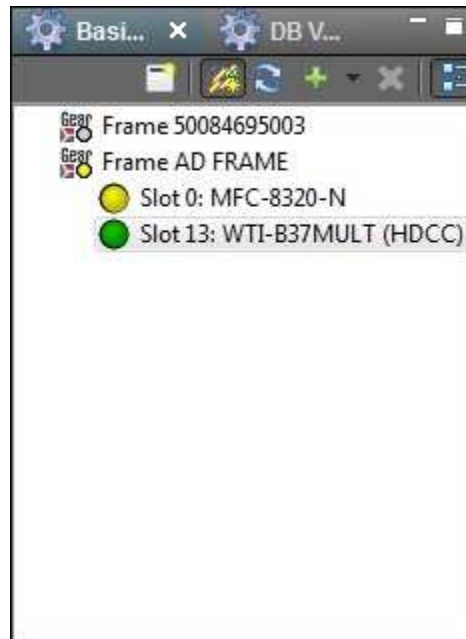
Figure 4–2   DashBoard Main Screen (Top)
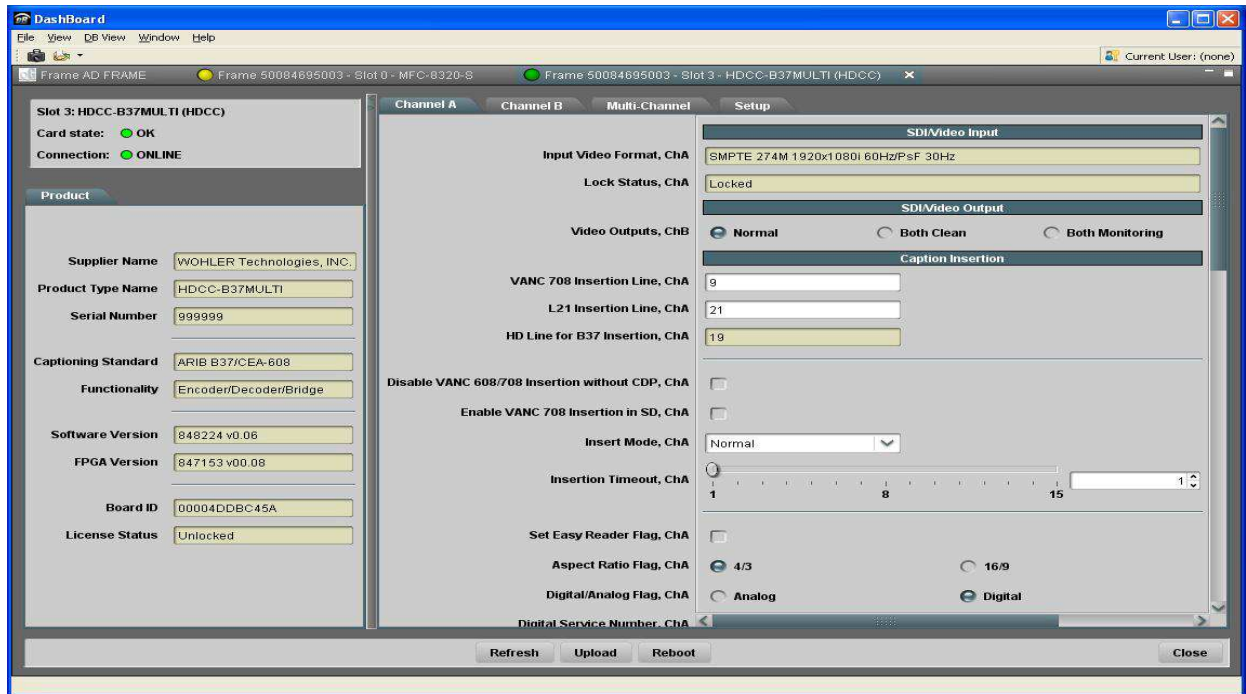
Note: The Wohler HDCC-B37MULTI card will appear as **B37MULTI** in the list of cards installed in the frame.

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

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   Product Information Pane

Figure 4–3 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.

Common Controls

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

- **Upload**: Not currently used.

- **Refresh**: Clicking this button causes the HDCC 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 HDCC card to reboot. A screen indicating that the card is busy will appear while the system is rebooting.

Channel A Tab

Click the Channel A tab in Dashboard and change the settings (see Figure 4–4 below) to customize the configuration for Channel A.

Notice that the Channel A menu is divided into sections, each with a heading that describes the features below.

Figure 4–4   Channel A (Top)
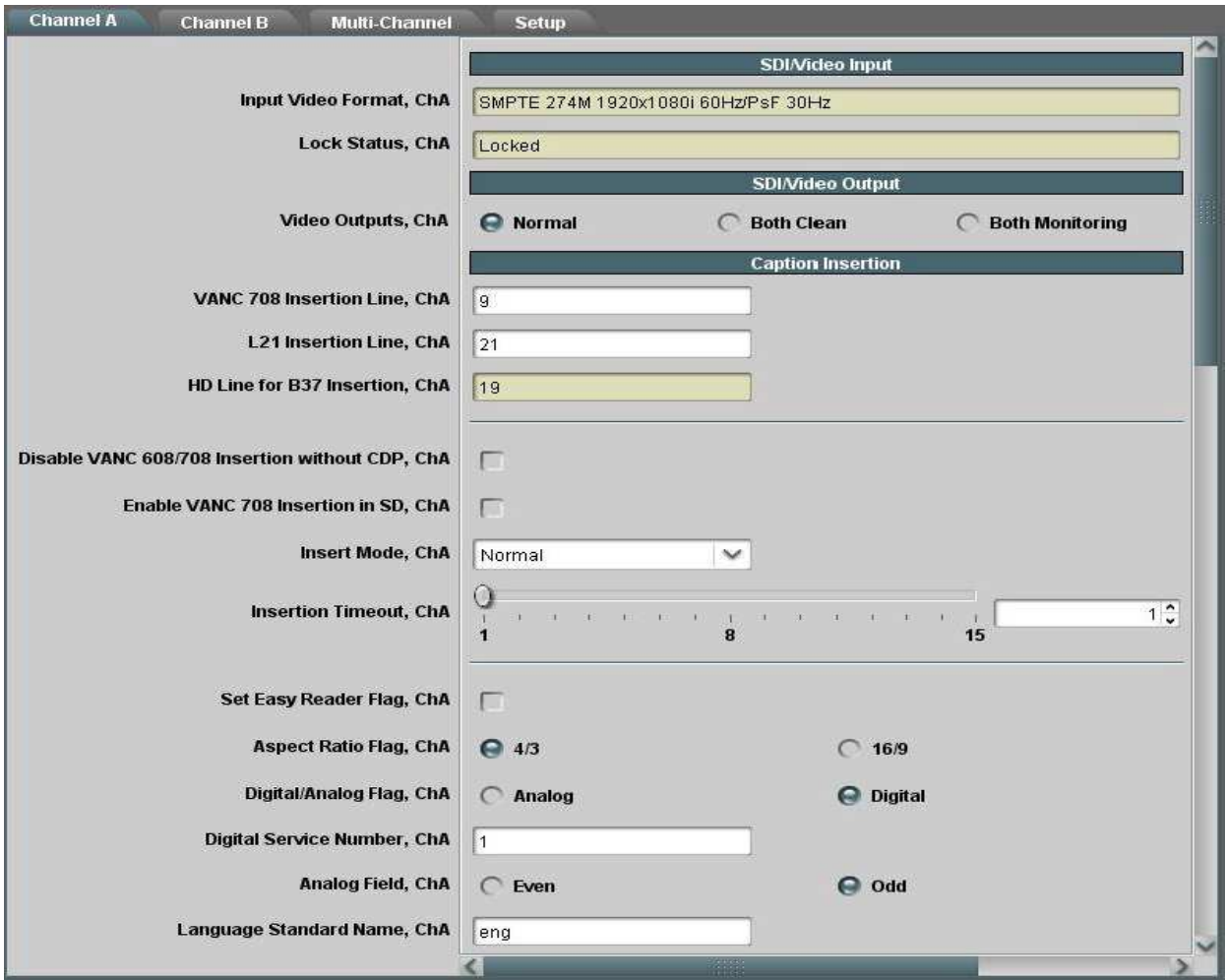
SDI Video Input

Neither of these fields is user-editable; they reflect the state of the input video channel as it is measured.

- **Input Video Format, CHA**: The video format (resolution, frame rate) of the incoming signal

- **Lock Status, CHA**: Indicates whether the hardware has locked onto an incoming video signal

SDI Video Output

- **Video Outputs, CHA**: Controls whether the outputs for Channel A will be normal (**OUT** is "clean," **MON** is "burned-in"), both monitoring, or both clean.

Caption Insertion

- **VANC 708 Insertion Line, CHA**: Specifies the video line on which CEA-708 caption data will be inserted.

- **L21 Insertion Line, CHA**: Specifies the video line on which CEA-608 caption data will be inserted.

- **HD Line for B37 Insertion, CHA**: Specifies the video line on which ARIB B37 caption data will be inserted. The standard requires this to be line 19, so this control is read only. This product does not support SD B37 insertion.

- **Disable VANC 608/708 Insertion without CDP**: Prevents any insertion of caption data in the VANC unless this data is provided in CDP format.

- **Enable VANC 708 Insertion in SD, CHA**: Controls whether CEA-708 data may be inserted into SD video streams.

- **Insert Mode, CHA**: Controls whether the card will block captions on the incoming video stream and only insert captions sent to it (permanent mode) or will revert to re-inserting captions from the incoming video stream (regen mode) when new caption data is not received for an interval set by the insert mode timeout.

- **Insert Mode Timeout, CHA**: When the card's insert mode is set to fall back to regen, this control specifies how long following the last caption data received that the card will revert to regenerating incoming captions.

- **Set Easy Reader Flag, CHA**: Sets a flag that indicates that the captioning content is written at a level appropriate for language learners.

- **Aspect Ratio, CHA**: Sets a flag that indicates the screen aspect ratio which the caption authoring assumes.

- **Digital/Analog Flag, CHA**: Sets a flag that specifies whether captioning data is older analog format or newer digital format.

- **Digital Service Number, CHA**: Sets a number which links captioning to other metadata in the video stream.

- **Analog Field, CHA**: For analog format, selects which field receives the data.

- **Language Standard Name, CHA**: Specifies the language in which the captions are written (e.g., "eng" for English).

Caption Decoding

This section contains the controls which determine how captions on Channel A are decoded.

- **Decoded Channel on Monitor Output, CHA**: Specifies which captioning stream is decoded to generate the burned-in captioning.

- **Decoded Data Output Format, CHA**: Controls in which format—Grand Alliance or raw—decoded caption data is output.

- **Omit 708 Packets from Decoder Output, CHA**: Filters out 708-specific packets from the decoder output.

Figure 4–5   Channel A (Middle)

GPI Controls

This section controls how asserting a GPI can change the operation of the card.

- **GPI Blank Control, CHA**: Specifies which GPI (if any) causes incoming captions to be blocked.

- **GPI1-4 Control Polarity, CHA**: Determines whether a high-voltage or a low-voltage (switch closure) will assert the GPI.

GPI Data Insert

This section controls how general purpose data (for cues, etc.) are encoded onto the Channel A video stream.

- **Enable GPI Data Insertion, CHA**: Controls whether inputs to the card's general purpose I/O connector on the rear panel will be encoded on the video stream.

- **SD Line for GPI Data, CHA**: Specifies on which video line of an SD video stream the data bits will be inserted.

- **HD Line for GPI Data, CHA**: Specifies on which video line of an HD video stream the data bits will be inserted.

- **GPI Tx Source**: Specifies whether the data bits to be encoded are taken directly from the rear panel connector or whether they are ORed with bits on the incoming stream. (OR i ng the bits allows for pass-through of data bits already on the signal.)

Figure 4–6   Channel A (Bottom)
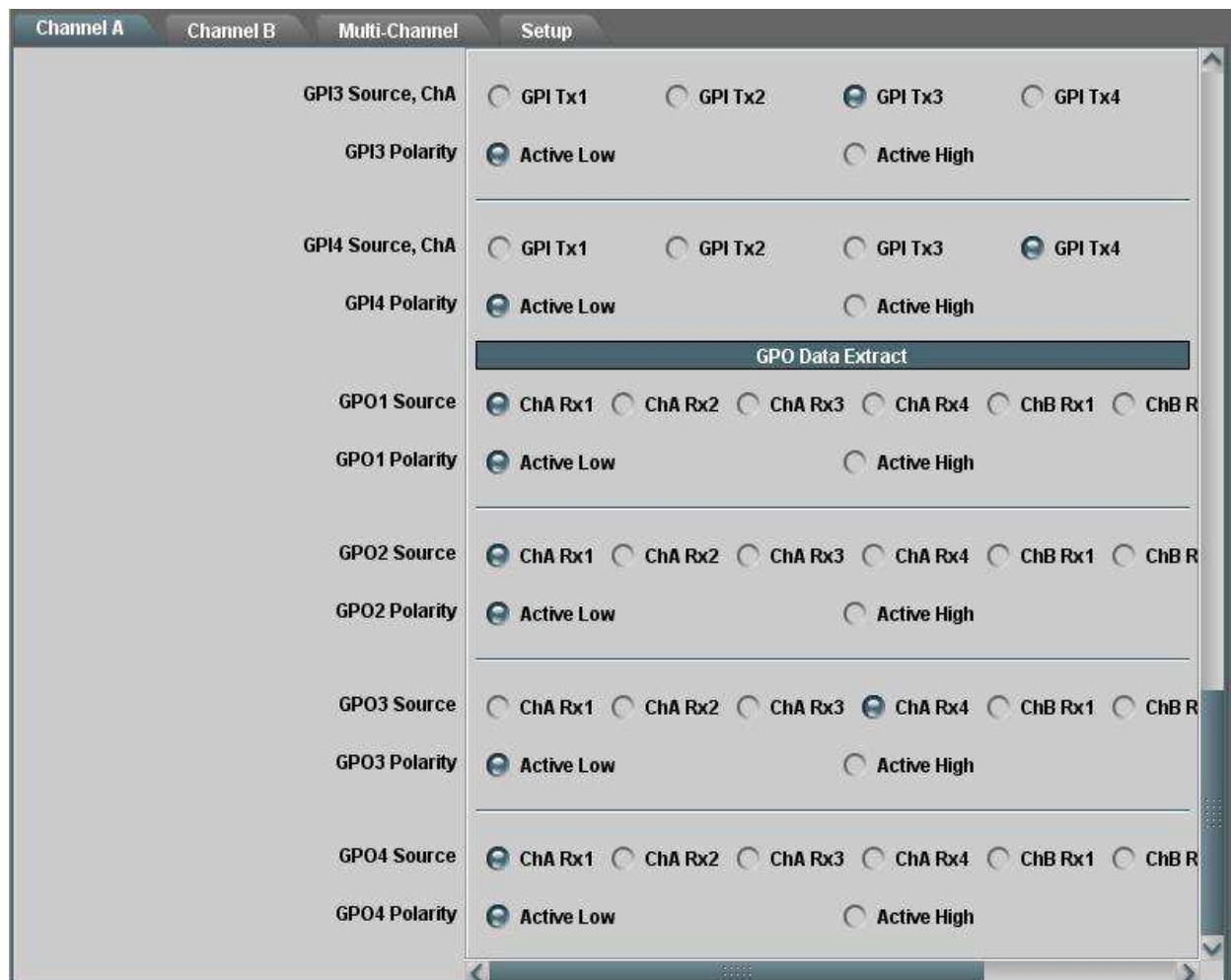
- **GPI1-4 Source, CHA**: Controls which inputs on the rear panel connector are mapped to encoded bits on the video stream.

- **GPI1-4 Polarity, CHA**: Determines how the voltage on the connector will be interpreted in setting the encoded bit's state.

GPO Data Extract

This section controls how received data bits will be presented to the output pins on the rear panel connector.

- **GPO1-4 Source, CHA**: Specifies how received bits are mapped to connector outputs.

- **GPO1-4 Polarity, CHA**: Determines how the state of received bits will be reflected in voltage levels on the connector outputs.

Channel B Tab

Click the Channel B tab in Dashboard and change the settings (see Figure 4–7 below) to customize the configuration for Channel B.

Channel B is used as a source for bridging or translating, but it also has a decoder.

Figure 4–7   Channel B

SDI/Video Input

Neither of these fields is user-editable; they reflect the state of the input video channel as it is measured.

- **Input Video Format, CHB**: The video format (resolution, frame rate) of the incoming signal.

- **Lock Status, CHB**: Indicates whether the hardware has locked onto an incoming video signal.

Caption Decoding

These controls determine how the Channel B decoder operates.

- **Decoded Channel on Monitor Output, CHB**: specifies which captioning stream is decoded to generate the burned-in captioning.

- **Decoded Data Output Format, CHB**: controls in which format—Grand Alliance or raw—decoded caption data is output.

- **Omit 708 Packets from Decoder Output, CHB**: Filters out 708-specific packets from the decoder output.

Multi-Channel Tab

Figure 4–8   Bridge Configuration Selection

The **Bridge Control** selection shown in • on page 52 provides the following options:

- **A→B Both Fields**:   This option copies all the closed caption data from both fields of Channel A to both respective fields of Channel B.

- **B→A Both Fields**:   This option copies all the closed caption data from both fields of Channel B to both respective fields of Channel A.

- **A→B Field 1**:   This option copies all the closed caption data from Field 1 of Channel A to Field 1 of Channel B.

- **B→A Field 1**:   This option copies all the closed caption data from Field 1 of Channel B to Field 1 of Channel A.

- **B→A Field 2**:   This option copies all the closed caption data from Field 2 of Channel B to Field 2 of Channel A.

The Setup Tab

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

Figure 4–9   System Setup

- **Com Port Speed, Ch A/B**: Click either 9600, 19200, 38400, or 115200.

Important: If a virtual serial port is connected (for encoding or decoding) the baud rate **must** be 115200.

- **Edit License Key**: Enables the license key to be changed.

    Note: This product comes from the factory with the license key set. The user is **strongly advised** not to modify it. An invalid license key will disable the ability of the card to function.

- **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.

How Do I…?

In this section we provide a list of questions and answers to help you set up and use your new HDCC product as efficiently as possible.

How do I decode captions on Channel A and output the data on the RS-232 port?

Situation

You have an incoming video stream on Channel A and want to decode the captions on it and output the data through the RS-232 port.

Preparation

Make sure an SDI cable with a valid captioned video stream is connected to input **CHA IN**, the card/frame is powered and operational, and a serial cable is connected to the **RS-232** port, hooked to a PC with a terminal/decoding program.

Process

1. In the **Setup** menu, set the **RS-232 Port Output** to "Channel A" and the **COM Port Speed, ChA** to the baud rate used by your terminal program. No other output should be set to "RS-232."

2. Enter the video line for the captions on the **VANC 708 Insertion line, ChA** (if 708), **L21 Insertion Line, ChA** (if 608), or **HD Line for B37 Insertion, ChA** (if B37).

Decoded caption data should be output from the **RS-232** port. Caption data output can either be **Normal**/**Grand Alliance**/**CTRL-A**, or **Raw**, depending upon the setting of **Decoded Data Output Format, ChA** in the **Channel A** menu.

How do I decode captions on Channel B and output the data on the Ethernet virtual serial port Eth1 VSP (port 23)?

Situation

You have an incoming video stream on Channel B and want to decode the captions on it and output the data through virtual serial port **Eth1 VSP**.

Preparation

Make sure an SDI cable with a valid captioned video stream is connected to input **CHB IN**, the card/frame is powered and operational, an Ethernet cable connects the HDCC card to your computer network, and that you have established an Ethernet virtual serial port (refer to the previous chapter).

Process

1. In the **Setup** menu, set the **Eth1 VSP Output** to "Channel B" and the **Channel B COM Port Speed, ChB** to 115.2k. The baud rate for a channel must always be set to 115.2k when an Ethernet virtual serial port is connected to it; however, your PC's terminal emulator can still set the baud rate to any desired setting in the range 9,600 to 115.2k. No other output should be set to "Eth1 VSP."

2. Enter the video line for the captions on the **VANC 708 Insertion line, ChB** (if 708), **L21 Insertion Line, ChB** (if 608), or **HD Line for B37 Insertion, ChB** (if B37).

Decoded caption data should be output from the **Eth1 VSP** port. Caption data output can either be **Normal**/**Grand Alliance**/**CTRL-A**, or **Raw**, depending upon the setting of **Decoded Data Output Format, ChB** in the **Channel B** menu.

How do I decode captions on either channel using ANY port?

Situation: You want to generalize decoding process.

Preparation: A cable with a valid captioned video stream must be connected to the channel you'll use for decoding (if you'd like, you can use both channels for simultaneous decoding of two different video streams), the card/frame must be powered and operational, and you must have at least one of the following:

- A serial cable connected to the **RS-232** port;

- An Ethernet cable connecting to your network and one or two virtual serial ports configured; or

- A USB cable connected to the **USB** connector on the front edge of the HDCC card.

Any of these three connectivity methods can be used to output decoded data.

Process:

1. In the **Setup** menu, set the output of your chosen connectivity method to the channel you wish to decode (e.g., **Eth2 VSP Output** set to "Channel 1") and make sure no other outputs are set to that same connectivity method.

2. Enter the video line for the captions on the **VANC 708 Insertion line, CHx** (if 708), **L21 Insertion Line, CHx** (if 608), or **HD Line for B37 Insertion, CHx** (if B37).

Decoded caption data should be output from your selected connectivity method. Caption data output can either be **Normal**/**Grand Alliance**/**CTRL-A**, or **Raw**, depending upon the setting of **Decoded Data Output Format** for the channel you are using.

How do I encode captions on Channel A using the RS-232 port?

Situation: You have an incoming video stream on Channel A and you want to encode captions on it using data supplied by **RS-232**.

Preparation: Make sure a cable with a video stream is connected to **CHA IN** input, the card/frame is powered and operational, and a serial cable is connected from your caption generator to the card's **RS-232** port.

Process:

1. In the **Setup** menu, set the **Channel A** input to "RS-232" and the **COM Port Speed, ChA** to the baud rate used by your captioning system.

2. In the **Channel A** menu, in the **Caption Lines** section, set the **VANC 708 Insertion Line, ChA** (if signal is HD), **L21 Insertion Line, ChA** (if SD), or **HD Line for B37 Insertion, ChA** (if B37) to the video line to which you want the captions encoded.

Caption data supplied on **RS-232** will be encoded on the video stream coming out of **CHA OUT**.

How do I bridge/translate captions from Channel B to Channel A?

Situation: You have captions on one video stream and want to bridge/translate them to another video stream.

Preparation: Connect a cable with the captioned video stream to **CHB IN**, a cable with the destination video stream to **CHA IN**, and a cable to **CHA OUT** for the destination stream with captions bridged.

1. In the **Multi-Channel** menu, select either **B->A, Both Fields** (captions on both odd and even fields), **B->A Field 1** (captions on odd fields), or **B->A Field 2** (captions on even fields) from the **Bridge Operation** pull-down menu.

2. You must configure Channel A so that the captions are written to the correct video line. In the **Channel A** menu, enter the video line containing the caption data in either the **VANC 708 Insertion Line, ChB** (if CEA-708), the **L21 Insertion Line, ChB** (if CEA-608), or the **HD Insertion Line for B37, ChB** (if ARIB B37).

CHA OUT will output **CHA IN** video with captions from **CHB IN**.

Note: Set **Bridge Operation** back to "None" when complete to resume encoding/decoding.

Note: Bridging/translating can **only** go from Channel A to Channel B.

How do I set general purpose transmission bits on Channel A?

Situation: You want to set general purpose transmission bits on a video stream to cue downstream equipment, etc.

Preparation: Connect a switch-closing circuit for the **TXIN1-4** pins on connector **J18**. Provide a video input on **CHA IN** and a video output on **CHA OUT**.

Process:

1. Check the **Enable GPI Data Insertion, ChA** check box on the **Channel A** menu.

2. If you want encoding to time out (and revert to passing received data), select an interval using the **Insertion Timeout ChA** slider in the **Channel A** menu.

3. Select the insertion mode using the **Insert Mode, ChA** drop-down list:

   • "Normal" means encoding will time out after the interval selected in step 2.

   • "Permanent, Field 0" will keep the input data present on the odd.

   • "Permanent, Field 1" will keep the input data present on the even field.

   • "Permanent, Both" will keep the input data present on both fields.

4. Enter a video line for the data in **SD Line for GPI Data, ChA** text box (for SD video signals) and in **HD Line for GPI Data, ChA** text box (for HD video signals).

5. The polarity of the input-active high—(a high input means "1") or active low (a low input means "1")—can be set for each of the TXIN1-4 inputs with the controls in the GPI/Tx Polarity section. For example, if GPI Tx1 Polarity is set to "Active Low," then a low input (switch closed) on the TXIN1 pin will correspond to a set ("1") bit in the transmission stream.

6.	The mapping of the TXIN1-4 bits to the transmitted bits can be set with the controls in the **GPI Mapping** section.

7.	If **GPI Tx Source, ChA** is set to "GPI Mapped Input," the transmitted bits will be as assigned by the **TXIN1-4** inputs. If pass-through of existing data bits is desired, select "GPI Input OR GPI Rx."

Transmitted bits will now be encoded on Channel A according to the inputs you provide and the settings you've chosen.

How do I receive general purpose transmission bits on Channel A?

Situation: You are receiving a video stream with transmission bits encoded upon it and you want to drive the outputs on the GPIO connector based on their values.

Preparation: Connect your video input to **CHA IN**. Sense (or provide output circuit for) RXOUT1-4 outputs on **J18** connector.

Process:

1.	Enter a video line for the data in **SD Line for GPI Data, ChA** text box (for SD video signals) and in **HD Line for GPI Data, ChA** text box (for HD video signals).

2.	The polarity of the output-active high—(a high output means a "1" in the transmission stream) or active low (a low output means "1")—can be set for each of the RXOUT1-4 outputs with the controls in the GPO/Rx Polarity section. For example, if GPO Rx1 Polarity is set to "Active Low," then a high transmission bit will correspond to a low output on the RXOUT1 pin.

3.	The mapping of the RXOUT1-4 pins to the received bits can be set with the controls in the GPO Mapping section.

	Note:	Received bits from either/both video channels can be used to drive the RXOUT1-4 outputs.

Received bits will now be represented on the RXOUT1-4 pins of **J18** according to the received data bits and the settings you've chosen.

Using HDCCRegEdit

Introduction

Overview

HDCCRegEdit is a Windows application that enables a user to configure and operate cards installed in the MC-1RU. This chapter describes how to install the HDCCRegEdit application.

Goals for This Chapter

✓ Perform the initial setup with a USB-to-USB connection.

✓ Control your HDCC card with any available serial connection.

✓ Use HDCCRegEdit to operate your HDCC card.

✓ Learn the steps required for common captioning tasks.

Topics

Setup

To install HDCCRegEdit, copy the executable file from the CD-ROM included with your card to the desktop (or a convenient folder) on your Windows-based PC. It can be executed from there by double-clicking its icon.

Note: HDCCRegEdit is written in Java and requires a Java VM in order to run. If you do not already have the Java VM installed, you will be prompted to do so when you execute HDCCRegEdit.

Each running instance of HDCCRegEdit communicates with one of the cards installed in the MC-1RU. To communicate with both cards simultaneously, simply open another instance of HDCCRegEdit.

Connection Methods

HDCCRegEdit communicates with each card via a serial connection. Each card installed in the MC-1RU can connect to the outside world through four serial ports:

- One port via an RS-232 connector on the rear panel,

- Two ports via the Ethernet connector on the rear panel, and

- One port via the USB connector on the card (accessible when the MC-1RU's front panel is removed).

However, for the *initial* setup (the first time you configure the card) you can only use USB-to-USB Connection.

USB-to-USB Connection

This method entails connecting the host computer to the card with a USB cable. USB-to-USB is **always** available no matter how the card is configured. Follow the instructions below.

1.   Remove the power cord from the MC-1RU to power it down.

2. Open the front panel of the MC-1RU by loosening the captive screws.

3. Identify which card you wish to configure.

4. Move the **SW3** switch (between the card's USB connector and the ejector) to **On**.

5. Connect a USB cable (Type A male to Type B male) from a USB port on the machine running HDCCRegEdit to the USB port on the card you are configuring.

Important: The HDCC's USB interface is not hot-pluggable. Either connect it with the power off, or power cycle after connecting the cable.

6. Replace the MC-1RU's power cord to power up the chassis.

7. Install FTDI USB-serial virtual COM port drivers if necessary (visit FTDI's web site at `http://www.ftdichip.com/Drivers/VCP.htm` to download).

8. Run HDCCRegEdit by following the instructions below using the COM port created in Step 7.

Important: If you subsequently choose to control the card through a different means (RS-232, Ethernet as below), remember to set the **SW3** switch on the card back to **Off**.

Important: Although the card can be controlled by any of the serial connection methods, you MUST connect with the USB-to-USB connection method described above if you want to change the serial method that controls the card.

RS-232 Serial Connection

This method is very easy but will only work after your card is configured to be controlled this way. Follow the instructions below.

Important: You cannot use this method for the initial setup.

1. Connect a serial cable from the host computer's serial port (or from a USB serial dongle installed in your computer's USB port) to the 9-pin **RS-232** port on the back of the MC-1RU. Make sure to connect to the connector for the particular slot your board is in. The RS-232 connectors are identified **Slot 1** and **Slot 2**.

2. Set up the USB-to-USB connection as described in the section entitled USB-to-USB Connection on page 62.

   A. Launch HDCCRegEdit.

   B. Change the **Inbound data routing** to **Serial** and **To Serial** to **Registers**.

   C. Save the changes by clicking on **Apply to both channels**.

   D. Click on the **Connection** tab then click on the **Disconnect** button.

   E. Power off the HDCC card.

   F. Set the **SW3** switch to **Off**.

   G. Power on the HDCC card.

3. Run HDCCRegEdit using the COM port that corresponds to your RS-232 connection.

A third connection method is available, but it can only be selected when HDCCRegEdit is up and running with the USB-to-USB connection.

Ethernet Virtual Serial Port Connection

This method is more complicated and will only work if your card is configured to be controlled this way; that is, you can only set this method once you have HDCCRegEdit connected via USB-to-USB or RS-232. Follow the instructions below.

Important: You cannot use this method for the initial setup.

1. Make sure your MC-1RU has network connectivity and is accessible to the computer running HDCCRegEdit (see Chapter 3: TCP/IP Configuration and Virtual Serial Ports (VSPs) on page 25).

2. Make sure the Virtual Serial Port (VSP) software is installed. This will give you two serial ports that can be used to connect with HDCCRegEdit. See Chapter 3: TCP/IP Configuration and Virtual Serial Ports (VSPs) on page 25 for detailed instructions to install a VSP.

3. Connecting with the USB-to-USB Connection on page 62,

    A. Launch HDCCRegEdit.

    B. Change the **Inbound data routing** to **Ethernet 1 or Ethernet 2** and change **To Ethernet 1** or **To Ethernet 2** to **Registers**.

    C. Save the changes by clicking on **Apply to both channels**.

    D. Click on the **Connection** tab then click on the **Disconnect** button.

    E. Power off the HDCC card.

    F. Set the **SW3** switch to **Off**.

    G. Power on the HDCC card.

4. Run HDCCRegEdit per below using either of the COM ports created in Step 2 on page 64.

Establishing Communications from the PC to the HDCC

1. On the PC, launch **HDCCRegEdit**.

    Note: The HDCCRegEdit application runs on Microsoft© Windows XP, Windows Vista, and Windows 7.

2. When the application window displays (Figure 5–1 below) click **Scan** to display the available COM ports.

Figure 5–1   HDCC Registry Editor
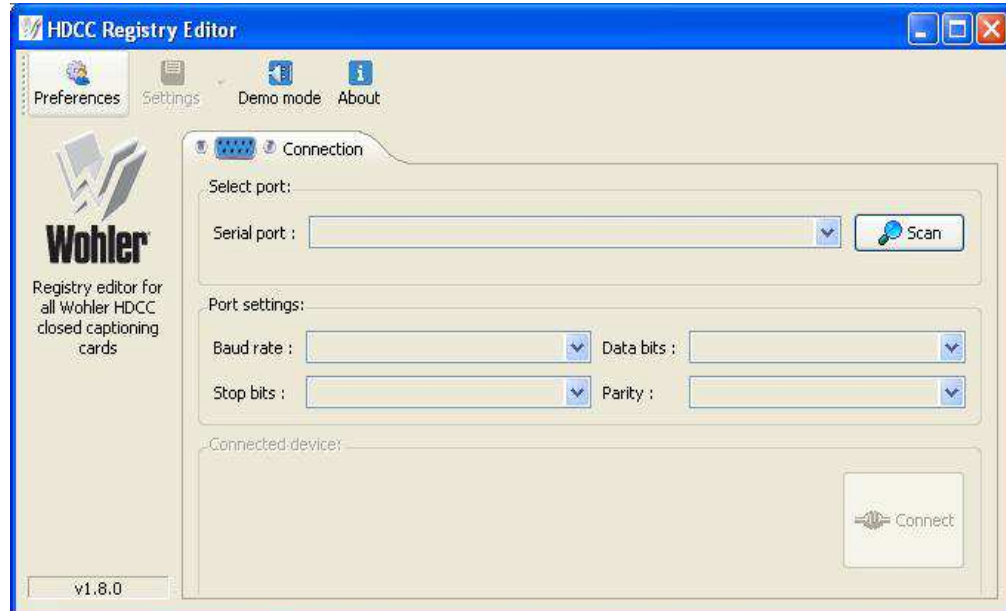
3. On the **Connection** tab, open the drop down list for the **Serial port** and select the serial port that corresponds to your USB port.

4. In the **Port settings** section, do not change the port settings. Use the settings shown in Figure 5–2 below.

Important: Port settings should remain at 115.2k, 8 data bits, no parity, 1 stop bit in the **Connection** tab for the current HDCC hardware platform. Only these settings will permit connection to the card.

5. Click **Connect**.

Figure 5–2   Setting the Port Settings
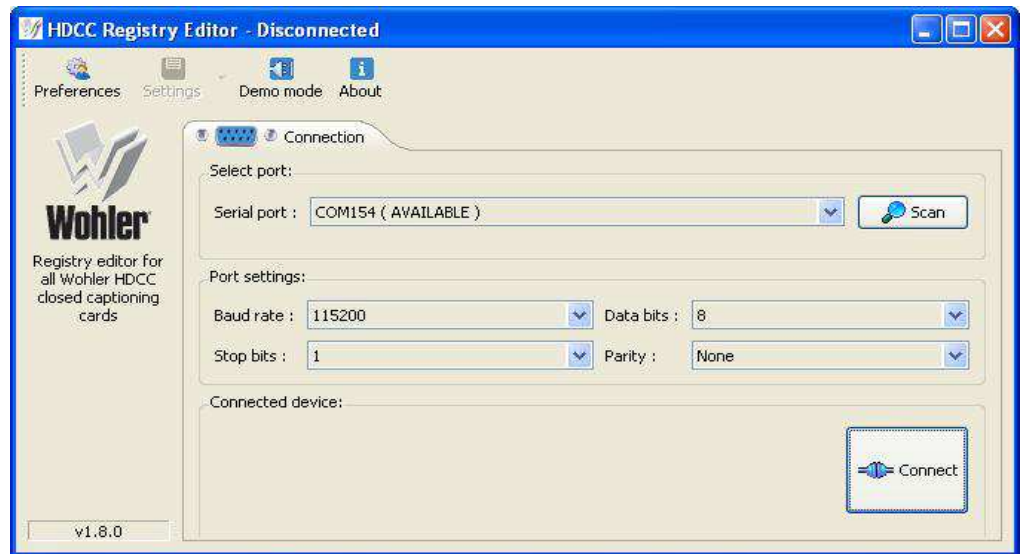
When the PC has established communications with the HDCC card, the **HDCCRegEdit** application window will display the Wohler copyright and the software part number and version (Figure 5–3 below).

**Figure 5–3   Connected to the HDCC Card**

Common Controls

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

- **Reset to Defaults**:   Click this button if you want to start over and reload the factory defaults.

- **Reload ch. A/B reg**.:   Click this button to restore the register values that the card had before your changes.

- **Apply to both channels**:   Click this button after modifying values for registers that affect both channels.

- **Apply to ch A/B**:   These buttons act like the **Save** function. After modifying the register values (by using either the drop-down lists, or by typing in the register values) clicking these buttons saves your new settings to the card.
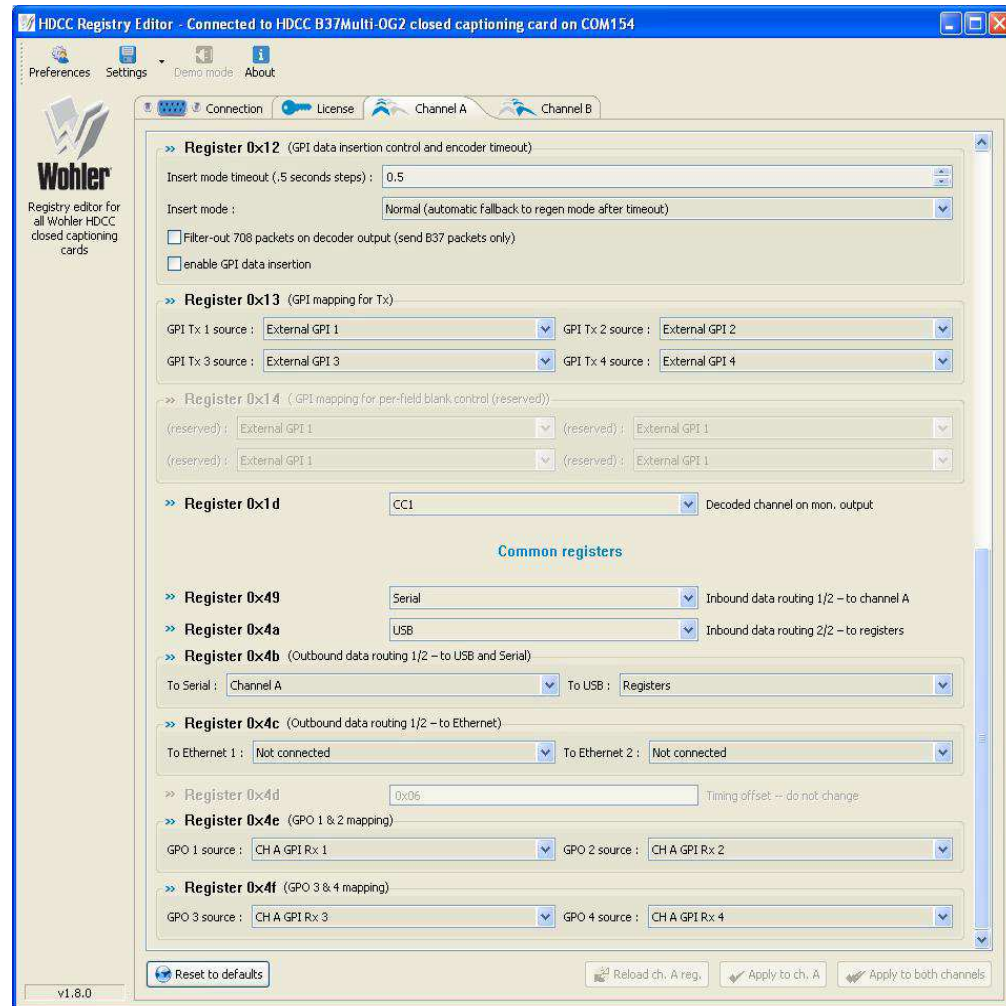
Channel A Tab

Click the Channel A tab in HDCCRegEdit and change the settings (see Figure 5–4 on page 69 and Figure 5–5 on page 70) to customize your configuration.

Figure 5–4   Channel A Settings (Top)
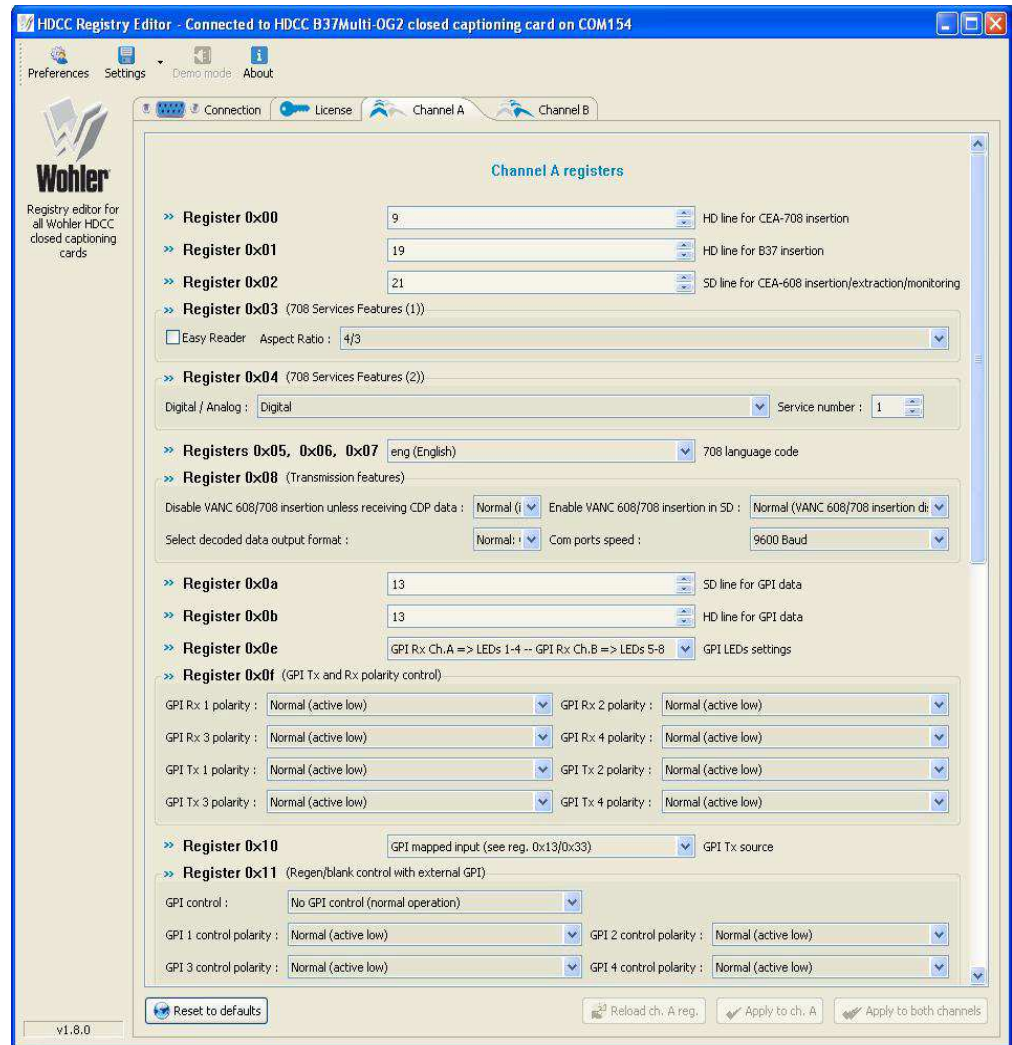
Scroll down to see the rest of the register values (shown in Figure 5–5 below).

Figure 5–5   Channel A Settings (Bottom)

- **HD line for CEA-708 insertion**: The video line for HD video formats on which CEA-708 captions are present or will be placed.

- **SD line for CEA-608 insertion/extraction/monitoring**: The video line for SD video formats on which CEA-608 captions are present or will be placed

- **HD line for B37 insertion**: The video line for HD video formats on which ARIB B37 captions are present or will be placed.

- **Easy Reader**: Sets flag indicating if caption data is at language appropriate for language learners.

- **Aspect Ratio**: Sets flag denoting either 4:3 or 16:9 content.

- **Digital/Analog**: Sets a flag indicating whether captions are older analog type or newer digital type.

- **Service number**: Sets the service number of the captioning service. Enter a number from 1 to 63 inclusive.

- **708 language code**: Sets the language code for the captions.

- **Disable VANC 608/708 insertion unless receiving CDP data**: Disables the insertion of captions when no caption data packets are being received.

- **Disable "Smart XDS insertion" feature**: Disables Smart XDS insertion.

- **Enable VANC 608/708 insertion in SD**: Enables VANC 608/708 insertion in video streams.

- **Select decoded data output format**: Controls the format of decoder caption data packets. Select either **Normal/Grand Alliance** or **Raw Data**.

- **Com ports speed**: Sets the speed of the serial communications with either channel's caption encoder/decoder.

- **SD line for GPI data**: Specifies on which SD video line general purpose transmission bits will be received/transmitted.

- **HD line for GPI data**: Specifies on which HD video line general purpose transmission bits will be received/transmitted.

- **GPI Rx 1-4 polarity**: Controls the polarity of the output that represents the value of a received general purpose transmission bit.

- **GPI Tx 1-4 polarity**: Controls the polarity of the input used to provide the value for a transmitted general purpose transmission bit.

- **Video outputs**: Controls whether captions are burned-in on the channel's output and monitor output.

- **GPI Tx source**: Controls whether the general purpose transmission bits are taken solely from the mapped input from the connector or whether the mapped input is logically OR'd with a

received transmission bit (the latter enables transmission bit pass through when the connector input is not asserted).

- **GPI control**: Controls whether an external GPI can cause caption blanking.

- **GPI 1-4 control polarity**: Controls how high or low voltages at the GPIO connector input will be interpreted for GPI control.

- **Caption inserter timeout**: Sets the duration for insertion timeout to occur.

- **Insert mode**: Controls whether captions are permanently inserted in the absence of new encoding data, or whether the card falls back to regen mode according to the timeout specified in Caption insert timeout.

- **GPI data insertion**: Enables general purpose transmission bit encoding.

- **GPI Tx 1-4 source**: Maps bits transmitted on the video stream to inputs on the GPIO connector.

- **Decoded channel on mon. output**: Specifies which CC channel is decoded on the monitor output.

- **GPI LED settings**: Not currently used.

- **Transcode settings**: Controls how captions are bridged/transcoded between video controls.

- **To Channel A**: Controls which serial port is connected as INPUT (e.g., for encoding) to Channel A.

- **To Channel B**: Controls which serial port is connected as INPUT (e.g., for encoding) to Channel B.

- **Inbound data touring 2/2 - to registers**: Controls which serial port is connected as INPUT for the terminal.

- **To Serial**: Controls which OUTPUT is connected to the RS-232 port.

- **To USB**: Controls which OUTPUT is connected to the USB port.

- **To Ethernet 1**: Controls which OUTPUT is connected to Ethernet VSP 1.

- **To Ethernet 2**: Controls which OUTPUT is connected to Ethernet VSP 2.

- **GPO 1-4 source**: Controls how the outputs on the connector are mapped to received general purpose transmission bits.

Channel B Tab

Click the Channel B tab in and change the settings (see Figure 5-6 below) to customize the configuration for Channel B.

Channel B is used as a source for bridging or translating, but it also has a decoder.

Figure 5–6   Channel B
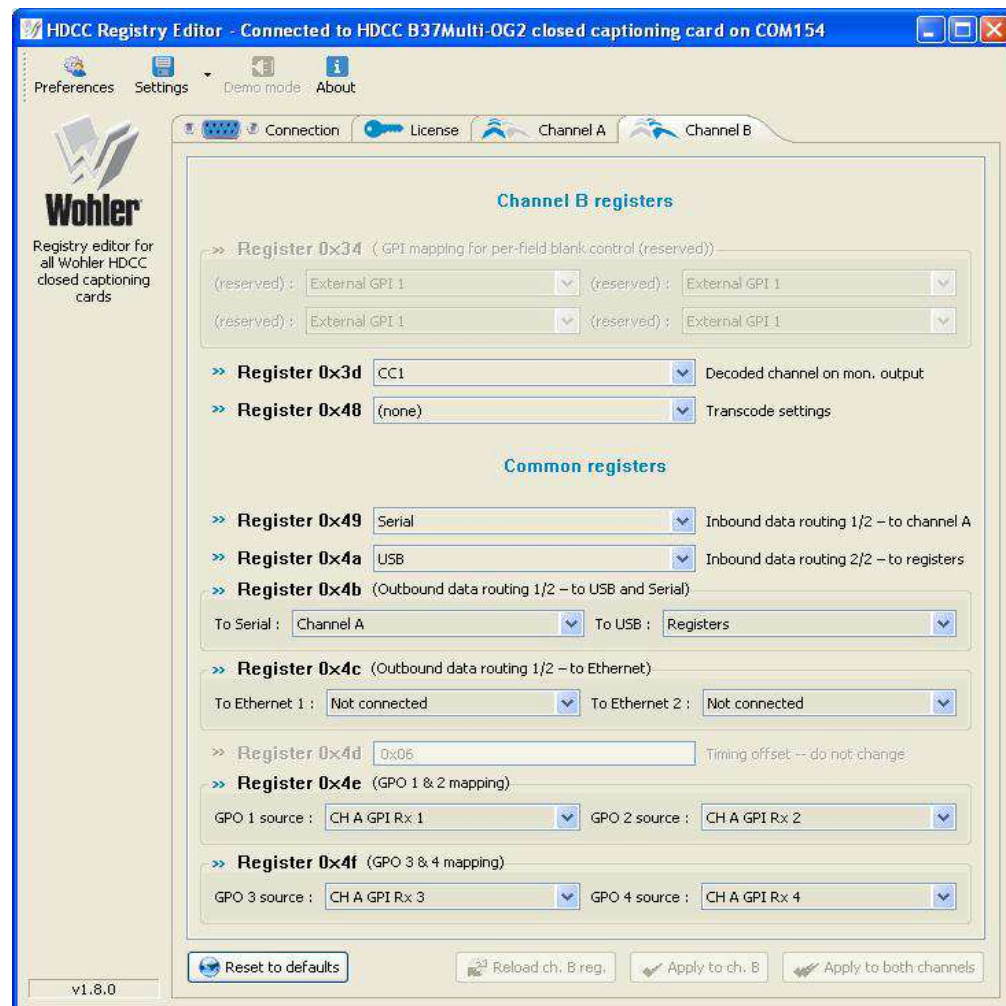
- **Decoded channel on mon. output**: Specifies which captioning stream is decoded to generate the burned-in captioning.

- **Transcode settings**: Controls how captions supplied on Channel B will be bridged/translated to Channel A.

The settings shown in the "Common registers" section are identical to the controls in the "Common registers" section of the Channel A tab.

License Tab

The License tab shows the board's unique ID number and allows for a license key code to be entered.

Note: This product comes from the factory with the license key set. The user is **strongly advised** not to modify it. An invalid license key will disable the ability of the card to function.

How Do I…?

In this section we provide a list of questions and answers to help you set up and use your new HDCC product as efficiently as possible.

How do I decode captions on Channel A and output the data on the RS-232 port?

Situations: You have an incoming video stream on Channel A and want to decode the captions on it and output the data through the **RS-232** port.

Preparation: Make sure an SDI cable with a valid captioned video stream is connected to input **CHA IN**, the card/frame is powered and operational, and a serial cable is connected to the RS-232 port, hooked to a PC with a terminal/decoding program.

Process:

1. On the **Channel A** page, set **To Channel A** to **Not Connected** and set **To Serial** to **Channel A**. Set **COM ports speed** to the desired baud rate.

2. On the **Channel A** page, enter the video line for the captions on the **HD line for CEA-708 insertion** if the signal is HD, or **SD line for CEA-608 insertion** if the signal is SD.

> **Note:** The HDCC's default line numbers have been chose to work with the most common caption standards in the market.

3. Click **Apply to ch. A**.

Decoded caption data should be output from the **RS-232** port. Caption data can be either **Normal**/**Grand Alliance**/**CTRL-A or Raw**, depending on the setting of **Decoded data output format** on the **Channel A** page.

How do I decode captions on Channel B and output the data on the Ethernet 1 Virtual Serial Port?

Situations: You have an incoming video stream on Channel B and want to decode the captions on it and output the data through the Ethernet 1 Virtual Serial Port.

Preparation: Make sure an SDI cable with a valid captioned video stream is connected to input **CHB IN**, the card/frame is powered and operational, an Ethernet cable connects the HDCC card to your computer network, and that you have established an Ethernet Virtual Serial Port (see Chapter 3: TCP/IP Configuration and Virtual Serial Ports (VSPs) on page 25).

Process:

1. On the **Channel B** page, set **To Channel B** to **Not connected** and set **To Ethernet 1** to **Channel B**. Set **COM ports speed** to 115.2k.

> **Important:** Ethernet 1 and Ethernet 2 can be operated ONLY at 115.2k. If **COM ports speed** is not set to 115.2k, communication with the HDCC card will fail. If a different baud rate is needed, the RS-322 and USB ports can be run at other speeds.

2. On the **Channel B** page, enter the video line for the captions on the **HD line for CEA-708 insertion** if the signal is HD, or **SD line for CEA-608 insertion** if the signal is SD.

3. Click **Apply to ch. B**.

Decoded caption data should be output from the RS-232 port. Caption data can be either **Normal**/**Grand Alliance**/**CTRL-A or Raw**, depending on the setting of **Decoded data output format** on the **Channel A** page.

How do I decode captions on either channel and output the data on ANY port?

Situation: You want to generalize the decoding process.

Preparation: A cable with a valid captioned video stream must be connected to the channel you'll use for decoding (if you'd like, you can use both channels for simultaneous decoding of two different video streams), the card/frame must be powered and operational, and you must have at least one of the following:

• A serial cable connecting your computer to the RS-232 port;

• An Ethernet cable connecting the card/frame to your network AND one or two virtual serial ports configured; or

• A USB cable connected to the USB connector on the front edge of the board.

Any of these three connectivity methods can be used to output decoded data.

Process:

1. On the **Channel A/B** page (depending on which channel you're using), set **To Channel A/B** to **Not connected** and set **To Serial/To Ethernet 1/To Ethernet 2/To USB** to **Channel A** or **Channel B**. Set **COM ports speed** to 115.2k if you're using Ethernet 1 or Ethernet 2, otherwise set as desired.

Important: Ethernet 1 and Ethernet 2 can be operated ONLY at 115.2k. If **COM ports speed** is not set to 115.2k, communication with the HDCC card will fail. If a different baud rate is needed, the RS-322 and USB ports can be run at other speeds.

2. On the **Channel A/B** page, enter the video line for the captions on the **HD line for CEA-708 insertion** if the signal is HD, or **SD line for CEA-608 insertion** if the signal is SD.

3. Click **Apply to ch. A/B**.

Decoded caption data should be output from your selected connectivity method. Caption data can be either **Normal**/**Grand Alliance**/**CTRL-A or Raw**, depending on the setting of **Decoded data output format** on the **Channel A** page.

How do I encode captions on Channel A using the RS-232 port?

Situations: You have an incoming video stream on Channel A and want to encode captions on it and using data supplied by the **RS-232** port.

Preparation: Make sure an SDI cable with a valid video stream is connected to input **CHA IN**, the card/frame is powered and operational, and a serial cable is connected from your caption generator to the card's **RS-232** port.

Process:

1. On the **Channel A** page, set **To Channel A** to **Serial** and set **To Serial** to **Not connected**. Set **COM ports speed** to the desired baud rate.

2. On the **Channel A** page, enter the video line for the captions on the **HD line for CEA-708 insertion i**f the signal is HD, or **SD line for CEA-608 insertion** if the signal is SD.

3. Click **Apply to ch. A**.

Caption data supplied on **RS-232** will be encoded on the video stream coming out of **CHA OUT**.

How do I bridge/translate captions from Channel B to Channel A?

Situation: You have an incoming captioned video stream on Channel B and want to bridge (and transcode, if necessary) the captions to a video stream on Channel A.

Preparation: Make sure an SDI cable with a valid captioned video stream is connected to input **CHB IN**, the destination video stream is connected to **CHA IN**, and the card/frame is powered and operational.

Important:	The destination video frame rate must be greater or equal to the source video frame rate. For examples, captions from a 50Hz source signal can be bridged to a 60Hz destination signal, but not vice versa.

Process:

1. On the **Channel B** page, set **Transcode settings** to **B->A (both fields)**, **B->A (field 1)**, or **B->A (field 2)** to bridge captains from both fields of B to A, odd fields of B to A, or even fields of B to A, respectively.

2. On the **Channel B** page, set the video line of the caption source in **HD line for CEA-708 insertion** if the signal on Channel B is HD, or **SD line for CEA-608 insertion** if the signal is SD.

3. Click **Apply to ch. B**.

4. On the **Channel A** page, set the video line of the caption destination in **HD line for CEA-708 insertion** if the signal on Channel A is HD, or **SD line for CEA-608 insertion** if the signal is SD.

5. Click **Apply to ch. A**.

CHB OUT will output **CHA IN** video with captions from **CHB IN**.

Note:	Set **Transcode settings** back to **None** in order to resume encoding or decoding.
Note:	Bridging/translating can go **only** from Channel B to Channel A.

How do I set general purpose transmission bits on Channel A?

Situation: You want to set general purpose transmission bits on Channel A's video stream (e.g., to cue downstream equipment).

Preparation: Connect a switch-closing circuit to the **TXIN1-4** pins on connector **J18**. (If using an MC-1RU chassis, **J16** is for **Slot 1**, **J18** is for **Slot 2**.)

Process:

1. On the **Channel A** page, check the **GPI data insertion** check box.

2. If you want the card to let GPI encoding time out (and revert to passing data in the received video stream), select an interval using the **Captions Inserter Timeout** control.

3. Using the **Insert** mode drop down control, select how you want the data to persist on the output video stream:

    -   **Normal**

    -   **Permanent insert mode in field 0**

    -   **Permanent insert mode in field 1**

    -   **Permanent insert mode in both fields**

4. Enter a video line for the data in SD line for GPI data (if the input video signal is SD) or in **HD line for GPI data** (if the signal is HD).

5. Set the preferred signaling polarity of the switch-closure with the **GPI Tx 1-4 polarity** controls: **active low** means switching the connector's input low will result in a transmitted 1; **active high** means switching the connector's input low will result in a transmitted 0.

6. The pins on the connector can be individually mapped to bits in the video stream with the **GPI mapping for Tx** controls.

7. If **GPI Tx source** is set to **GPI Mapped Input**, the transmitted bits will be as provided at the connector (with polarity taken into account). If pass-through of existing data on the input video stream is desired, select **GPI input OR GPI Rx**, which will logically OR the incoming bits with the input bits.

8. Click **Apply to ch. A**.

Transmitted bits will now be encoded on Channel A according to the inputs you provide and the settings you've chosen.

How do I receive general purpose transmission bits on Channel A?

Situation: You are receiving a video stream on Channel A that has transmission bits encoded upon it and want to drive the GPIO connector based on their values.

Preparation: Sense (or connect an output circuit to) the **RXOUT1-4** pins on connector **J18**. (If using an MC-1RU chassis, **J16** is for **Slot 1**, **J18** is for **Slot 2**.)

Process:

1. Enter a video line for the data in the **SD line for GPI data** text box (for SD signals) and/or a video line in the **HD line for GPI data** text box (for HD signals).

2. For a received bit, the output signal can be either polarity: **active high** or **active low**. If the received bit's polarity is set to **active low**, it will output a low voltage when a 1 is received; if the polarity is set to **active high**, it will output a high voltage when a 1 is received. The polarity can be set with the **GPI Rx 1-4 polarity** controls.

3. The received bits can be mapped in any order to the output pins. Use the **GPO Mapping** controls to switch the received bits to the desired connector pins.

    Note: Received bits from either/both video channels can be used to drive the **RXOUT1-4** outputs on the connector.

The **RXOUT1-4** pins of the connector will now show the show the received bits in the polarity and ordering that you've selected.

CHAPTER 6
Using the General Purpose Inputs/Outputs

Introduction

Overview

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

Goals for This Chapter

- ✓ Understand what General Purpose I/Os are.
- ✓ Identify GPI/O connector pin-outs.
- ✓ Understand how to assert a GP input.
- ✓ Understand how to connect a GP output.

Topics

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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 Register Reference on page 98 for details.

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

Figure 6–1 on page 85 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 6–1   GPI/O Functional Diagram
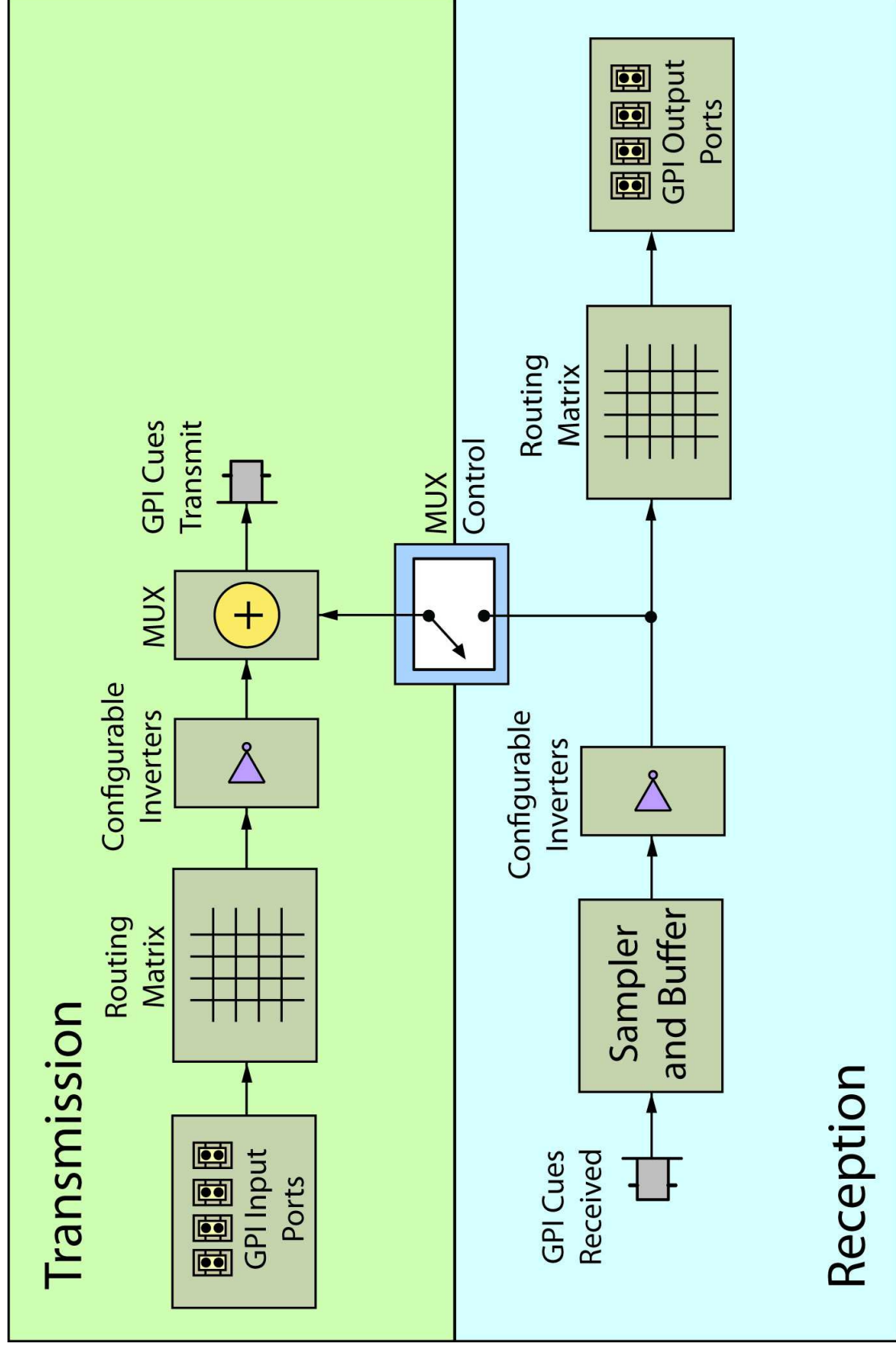
GPI/O Connector

Connector **J18** (-OG products) /Connectors **J16** and **J18** (-2CH products, Slot 1 and 2, respectively) on the Rear Panel provides general purpose input and output.

Figure 6–2   GPI/O Connector Diagram
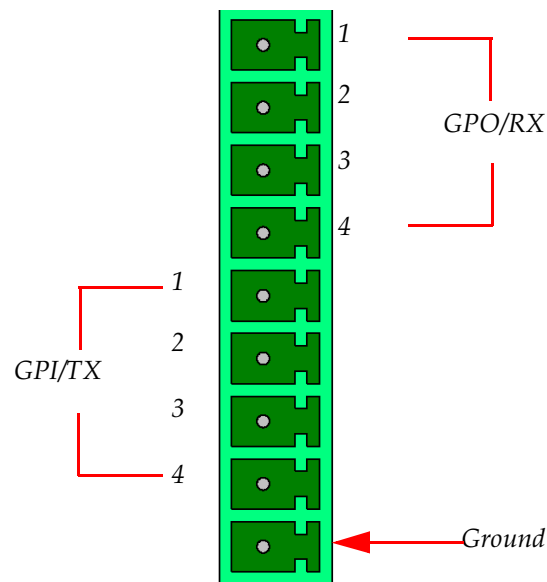
GPIs

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 6–3   Input Diagram
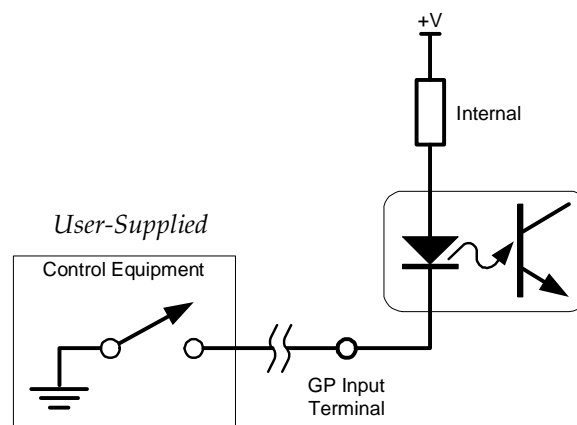
GPOs

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 6–4 below.

The HDCC provides four GPOs. (See Connector Pin Assignments on page 111 in Chapter 4 for connectivity.)

Figure 6–4   Output Diagram

+V

User Supplied Load
In Controlled Equipment

GP Output
Terminal
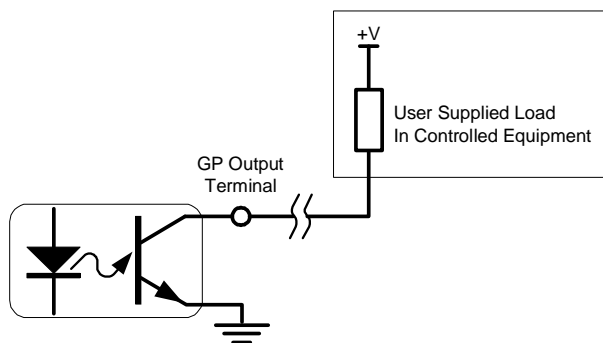
Important: The GPOs can only be used to switch **positive** voltages.

CHAPTER 7
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 if you use either the DashBoard or HDCCRegEdit user interface.

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 7–1   Terminal Main Menu
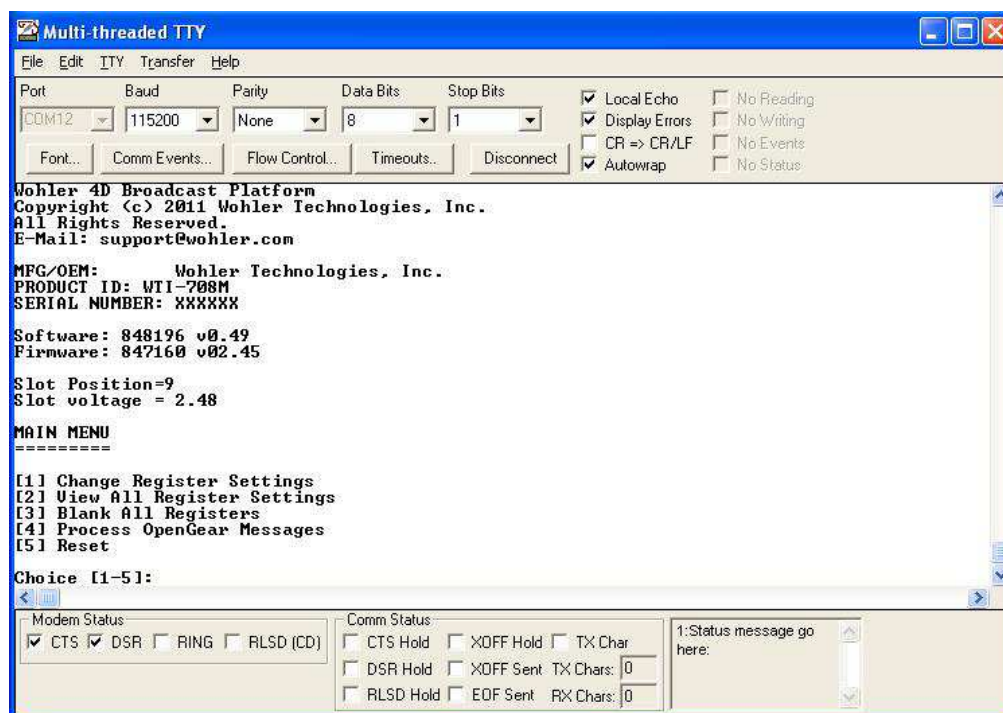
Access to the Terminal is controlled by the **BOOTOPT** jumper on the card as shown in below. The sections below describe how it is used.

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. In HDCCRegEdit's **Channel A** page, set **To RS-232** to **Registers** and set the **To Registers** to **RS-232**. Click **Apply**.

3. Power down the card, set **SW4** to **TERM**.

    Note: For MC-1RU users, **SW4** should already be set to **TERM**.

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

5. Connect a serial cable from your PC to the RS-232 connector on the rear panel.

6. Re-power the card.

7. 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.

8. Press the Enter key to display the Engineering Menu as shown in

9. Power off the card, set **SW4** to **RUN**, and re-power the card to restore normal operation. (See 10. on page 92 for details.)

    Note: MC-1RU users should leave **SW4** set to **TERM**.

10. 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, set **SW4** to **TERM** and re-power the card.

    Note: For MC-1RU users, **SW4** should already be set to **TERM**.

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 7–1 on page 90).

8. Power off the card, set **SW4** to **RUN**, and re-power the card to restore normal operation. (See 10. on page 92 for details.)

    Note: MC-1RU users should leave **SW4** set to **TERM**.

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, set **SW4** to **TERM**, connect a USB cable between the host computer and the HDCC's USB connector, and re-power the card.

    Note: For MC-1RU users, **SW4** should already be set to **TERM**.

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 7–1 on page 90).

8. Power off the card, set **SW4** to **RUN**, and re-power the card to restore normal operation. (see 10. on page 92)

    Note: MC-1RU users should leave **SW4** set to **TERM**.

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 7–2 on page 94 and the following descriptions of each menu option for details.

Figure 7–2   Main Menu

Software and Firmware Part Numbers and Versions

Engineering Menu
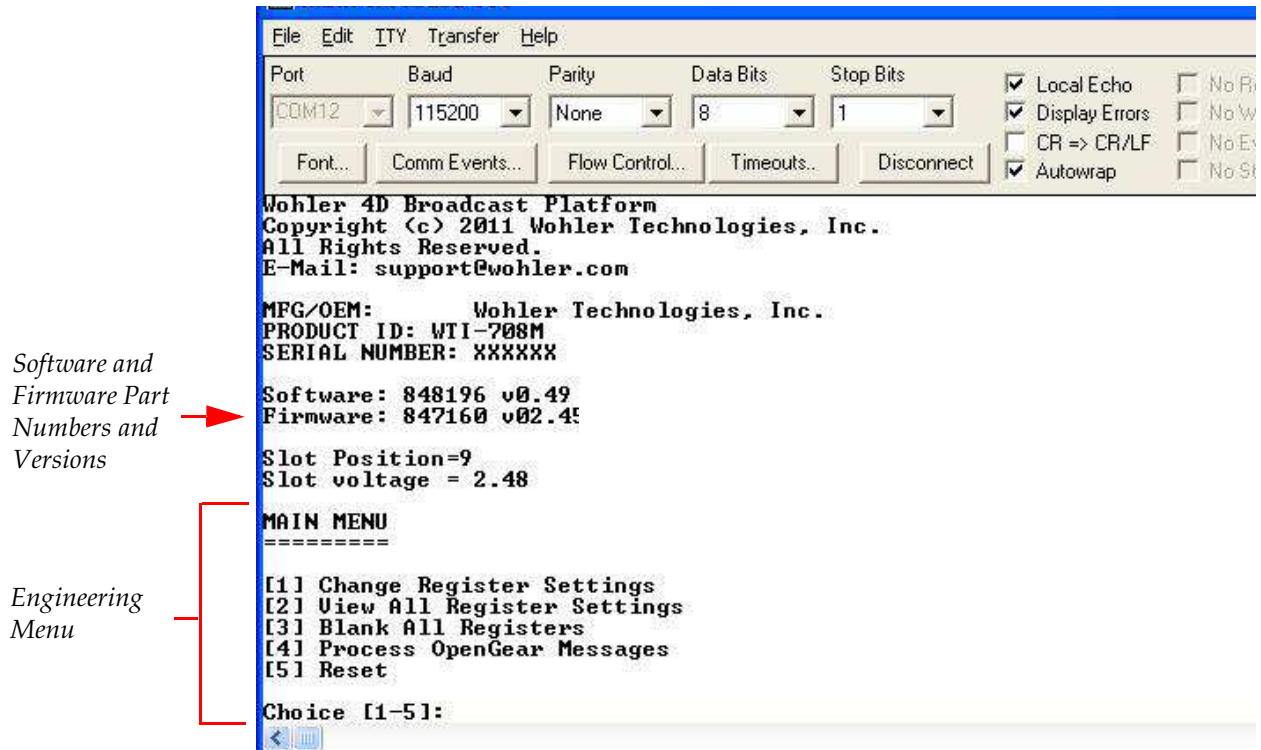
Important: Refer to the configuration guide for your product for a detailed list of registers.

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.

Note: If you're using a Wohler MC-1RU frame, you should never use this function.

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

Note: If **SW4** is not switched to **RUN**, the card will not be accessible in Dashboard.

Register Set

Introduction

Overview

This appendix summarizes the registers that control the operation of your HDCC card.

Topics

Changing the Registers

You can modify the registers directly using the Terminal. Refer to Chapter 7: Terminal on page 89.

Important: We highly recommend that you only modify the registers using either DashBoard or HDCCRegEdit. Please do not modify the register table directly unless absolutely necessary.

Note: All table cells highlighted in green apply only to the ARIB B37 versions of the HDCC.

Register Reference

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

Channel		Description
A	**B**	
00h		HD Line for CEA-708 Insertion, Extraction, and Monitoring
01h		HD Line for ARIB B37 Insertion, Extraction, and Monitoring
02h		SD Line for CEA-608 Insertion, Extraction, and Monitoring
03f		708 Features (1)
04h		708 Features (2)
05h		708 Language Code (1st Letter)
06h		708 Language Code (2nd Letter)
07h		708 Language Code (3rd Letter)
08h	28h	Transmission Features
09h	29h	Horizontal Timing Offset for GPI SD Insertion Line (Reserved)
0Ah		SD Line for GPI Data Insertion and Decoding
0Bh		HD Line for GPI Data Insertion and Decoding
0Ch	2Ch	Not Used
0Dh	2Dh	Not Used
0Eh	2Eh	Not Used
0Fh		GPI Rx/Tx Polarity Control
10h		Special Features 2
11h		Regen/Blank Control With External GPI
12h		GPI Data Insertion Control and Encoder Timeout

Table A–1   Register Table Summary

Channel		Description
A	B	
13h		GPI Mapping for Tx
14h	34h	GPI Mapping for Per-Field Blank Control (Reserved)
15h	35h	Not Used
16h	36h	Not Used
17h	37h	Not Used
18h	38h	Not Used
19h	39h	Not Used
1Ah	3Ah	Not Used
1Bh	3Bh	Not Used
1Ch	3Ch	Not Used
1Dh	3Dh	Decoded Channel on Monitor Output (CC1, CC2, etc.)
1Eh	3Eh	Not Used
1Fh	3Fh	Not Used
4Dh		Timing Offset—Do Not Change
4Eh		GPO 1 and 2 Mapping
4Fh		GPO 3 and 4 Mapping

Table A–2   Register Settings with Descriptions, Domains, and Defaults

CHA Reg #	CHB Reg #	Description	Default
00h		**HD Line for CEA-708 Insertion, Extraction, and Monitoring** *Min: 07—Max: 19*	09h
01h		**HD Line for ARIB B37 Insertion, Extraction, and Monitoring** *Min: 07—Max: 19*	13h
02h		**SD Line for CEA-608 Insertion, Extraction, and Monitoring** *Min: 06—Max: 16*	15h

Table A–2   Register Settings with Descriptions, Domains, and Defaults (Continued)

CHA Reg #	CHB Reg #	Description	Default
03h		**708 Services Features (1)** *Min: N/A—Max: N/A* | Bit(s)	Function
---	---
7	**Aspect Ratio Flag** 0 = 4:3 1 = 16:9
6	**Easy Reader Flag** 0 = Easy reader flag not set 1 = Easy reader flag set
5:0	Not Used		00h
04h		**708 Service Features (2)** *Min: N/A—Max: N/A* | Bit(s)	Function
---	---
7	**Digital/Analog Flag** 0 = Analog 1 = Digital
6:1	**Service Number** (if Bit 7=1): 000 0001 . . . 111 1111
0	**Field Number** (if Bit 7=0): 0 = Field 1 1 = Field 2		81h
05h		**708 Language Code (1st Letter)** *Min: "a" 61h—Max: "z" 7Ah*	"e" 65h
06h		**708 Language Code (2nd Letter)** *Min: "a" 61h—Max: "z" 7Ah*	"n" 6Eh
07h		**708 Language Code (3rd Letter)** *Min: "a" 61h—Max: "z" 7Ah*	"g" 67h

Table A–2   Register Settings with Descriptions, Domains, and Defaults (Continued)

CHA Reg #	CHB Reg #	Description		Default
08h	28h	**Transmission Features** *Min: N/A—Max: N/A*		00h
		Bit(s)	**Function**	
		7	**Enable SMPTE 333 Protocol** (Not Yet Used) 0 = Disabled 1 = Enabled	
		6:5	**Com Port Speed** 00 = 9600 baud 01 = 19200 baud 10 = 38400 baud 11 = 115200 baud	
		4	**Decoded Data Output Format** 0 = Normal; Grand Alliance (^A) 1 = Raw	
		3	Not Used	
		2	**Enable VANC 608/708 Insertion in SD** 0 = Normal 1 = Insert	
		0	**Disable VANC 608/708 Insertion in HD** 0 = Normal: Insertion Enabled 1 = Insertion Disabled	
09h	29h	Reserved—Do Not Change		—
0Ah		**SD Line for GPI Data** *Min: 06h—Max: 16h*		0Dh

Table A–2 **Register Settings with Descriptions, Domains, and Defaults (Continued)**

CHA Reg #	CHB Reg #	Description	Default
0Bh		**HD Line for GPI Data** *Min: 07h—Max: 19h*	0Dh
0Ch	2Ch	Not Used	—
0Dh	2Dh	Not Used	—
0Eh	2Eh	Not Used	—
0Fh		**GPI Tx/Rx Polarity** *Min: N/A—Max: N/A*	00h

Bit(s)	Type	Function
0	GPI Rx 1	
1	GPI Rx 2	
2	GPI Rx 3	
3	GPI Rx 4	0 = Normal (Active Low)
4	GPI Tx 1	1 = Inverted (Active High)
5	GPI Tx 2	
6	GPI Tx 3	
7	GPI Tx 4	

Table A–2   Register Settings with Descriptions, Domains, and Defaults (Continued)

CHA Reg #	CHB Reg #	Description	Default
10h		**Special Features—2** *Min: N/A—Max: N/A* This register controls miscellaneous functions on the card including the video outputs. 	00h

Description cell table:

Bit(s)	Function
7:6	Not Used
5	GPI Tx Source: 0 = GPI mapped input (See Registers 13h and 33h.) 1 = GPI mapped input ORed with GPI Rx
4[a]:3	Video Output Mode: 00 = Normal 01 = Both outputs set to monitoring 10 = Both outputs are clean 11 = Not Used
2:0	Not Used

a   Normal (default) = Monitoring O/Ps are 3 and 4; Clean O/Ps are 1 and 2
Monitoring = Burned-in captions on all O/Ps
Clean = No burned-in captions on any O/Ps

Table A–2   Register Settings with Descriptions, Domains, and Defaults (Continued)

CHA Reg #	CHB Reg #	Description	Default
11h		**Regen/Blank Control with External GPI** *Min: N/A—Max: N/A*	00h

Bit(s)	Polarity Control	Function
7	GPI 4	
6	GPI 3	0 = Normal (Active Low)
5	GPI 2	1 = Inverted (Active High)
4	GPI 1	

Bit(s)	Value	Blank Controlled by...
3:0	0000	GPI Control (Regen Operation)
	0001	External GPI 1
	0010	External GPI 2
	0011	External GPI 3
	0100	External GPI 4

Table A–2   Register Settings with Descriptions, Domains, and Defaults (Continued)

CHA Reg #	CHB Reg #	Description	Default
12h		**GPI Insertion Control and Insert Mode Timeout** *Min: N/A—Max: N/A* **See table below**	12h

Bit(s)	Function
7	**GPI Data Insertion** 0 = Off 1 = On
6	**Omit 708 Packets on Decoder Output** (Send B37 Packets Only) 0 = Disabled 1 = Enabled
5:4	**Insert Mode** 00 = Normal (Automatic Fall Back to Regen Mode After Timeout) 01 = Permanent Insert Mode in Field 0 10 = Permanent Insert Mode in Field 1 11 = Permanent Insert Mode in Both Fields
3:0	**Insert Mode Time Out** (0.5 second intervals): 0000 = 0 seconds 0001 = 0.5 seconds 0010 = 1.0 seconds . . . 1111 = 7.5 seconds

Table A–2   Register Settings with Descriptions, Domains, and Defaults (Continued)

CHA Reg #	CHB Reg #	Description	Default
13h		**GPI Mapping for Tx** *Min: N/A—Max: N/A* | Bit(s)	GPI Tx Source	Function
---	---	---
7:6	4	External GPIs:
5:4	3	00 = GPI 1
3:2	2	01 = GPI 2
1:0	1	10 = GPI 3 11 = GPI 4		E4h
14h	34h	Not Used	—
15h	35h	Not Used	—
16h	36h	Not Used	—
17h	37h	Not Used	—
18h	38h	Not Used	—
19h	39h	Not Used	—
1Ah	3Ah	Not Used	—
1Bh	3Bh	Not Used	—
1Ch	3Ch	Not Used	—
1Dh	3Dh	**Decoded Channel on Monitor Output** *Min: 00h—Max: 03h* 0 = CC1 1 = CC2	00h
1Eh	3Eh	Not Used	—
1Fh	3Fh	Not Used	—
4Dh		**Timing Offset**—Do Not Change *Min: N/A—Max: N/A*	06h

**Table A–2   Register Settings with Descriptions, Domains, and
Defaults (Continued)**

CHA Reg #	CHB Reg #	Description	Default
4Eh		**GPO 0 and 1 Source** *Min: N/A—Max: N/A* | Bit(s)	Function | |---|---|
7:4	**GPO 2 Source** 0000 = Ch 1 GPI Rx 1 0001 = Ch 1 GPI Rx 2 0010 = Ch 1 GPI Rx 3 0011 = Ch 1 GPI Rx 4 0100 = Ch 2 GPI Rx 1 0101 = Ch 2 GPI Rx 2 0110 = Ch 2 GPI Rx 3 0111 = Ch 2 GPI Rx 4
3:0	**GPO 1 Source** 0000 = Ch 1 GPI Rx 1 0001 = Ch 1 GPI Rx 2 0010 = Ch 1 GPI Rx 3 0011 = Ch 1 GPI Rx 4 0100 = Ch 2 GPI Rx 1 0101 = Ch 2 GPI Rx 2 0110 = Ch 2 GPI Rx 3 0111 = Ch 2 GPI Rx 4		10h

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Table A–2   Register Settings with Descriptions, Domains, and Defaults (Continued)

CHA Reg #	CHB Reg #	Description	Default
4Fh		**GPO 2 and 3 Source** *Min: N/A—Max: N/A* | **Bit(s)**	**Function**
7:4	**GPO 4 Source** 0000 = Ch 1 GPI Rx 1 0001 = Ch 1 GPI Rx 2 0010 = Ch 1 GPI Rx 3 0011 = Ch 1 GPI Rx 4 0100 = Ch 2 GPI Rx 1 0101 = Ch 2 GPI Rx 2 0110 = Ch 2 GPI Rx 3 0111 = Ch 2 GPI Rx 4
3:0	**GPO 3 Source** 0000 = Ch 1 GPI Rx 1 0001 = Ch 1 GPI Rx 2 0010 = Ch 1 GPI Rx 3 0011 = Ch 1 GPI Rx 4 0100 = Ch 2 GPI Rx 1 0101 = Ch 2 GPI Rx 2 0110 = Ch 2 GPI Rx 3 0111 = Ch 2 GPI Rx 4		00h

Specifications and Pin-Outs

Introduction

Overview

This chapter lists the specifications of the HDCC-B37MULTI and provides the pin-outs for its connectors.

Topics

Specifications

Table B–1   Physical Specifications

Specification	Value
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 (-OG2 only)
Power Requirements	Receives power from frame
Power Consumption	Approximately 10 W

Table B–2   Technical Specifications

Specification	Value
Inputs	2 SD/HD-SDI autosensing on BNC
	4 GPI (Phoenix connector J18)
Outputs	2 HD/SD-SDI Closed Captioned (BNC)
	2 HD/SD-SDI Open Captioned (BNC)
	4 GPO (Phoenix connector J18)
Inputs/Outputs	1 Ethernet (RJ-45) 10/100 BaseTX
	1 RS-232 (DB-9)
Frame compatibility	• Ross DFR-8321 • Wohler MC-1RU
Available functions	• Closed Caption OSD Monitoring • HD/SD Closed Caption Encoding/Inserting • HD/SD Closed Caption Decoding/Analyzing • HD/SD Closed Caption Bridging and Transcoding • GPI Encoding and Decoding
Available communication protocols	• GrandAlliance • SMPTE333 • CDP
Supported closed caption specifications	CEA-608, CEA-708 both encapsulated 608 and native 708

Connector Pin Assignments

Table B–3 GPI/O Pin-Out Assignments [a]

Pin	Label	Interface
1	Ground	
2	TX4 (GPI-4)	Open Collector (Emitter to Ground)
3	TX3 (GPI-3)	
4	TX2 (GPI-2)	
5	TX1 (GPI-1)	
6	RX4 (GPO-4)	Active Low
7	RX3 (GPO-3)	
8	RX2 (GPO-2)	
9	RX1 (GPO-1)	

a   J18 on OG2. J18 (SLOT2) J16(SLOT1) on MC-1RU.

Table B–4 RS-232 DE-9 Pin-Out Assignments

Pin	Label	Function
2	TXD	RS-232 Tx Data
3	RXD	RS-232 Rx Data
5	Common GND	GND

Figure B–1 RS-232 DE-9 Pin-Out
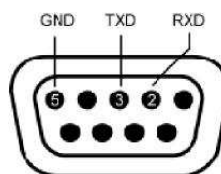
Technical Functional Overview

illustrates the design of the HDCC.

Figure B–2   HDCC Block Diagram

APPENDIX C
Troubleshooting

Introduction

Overview

This appendix provides instructions for correcting the most common problems.
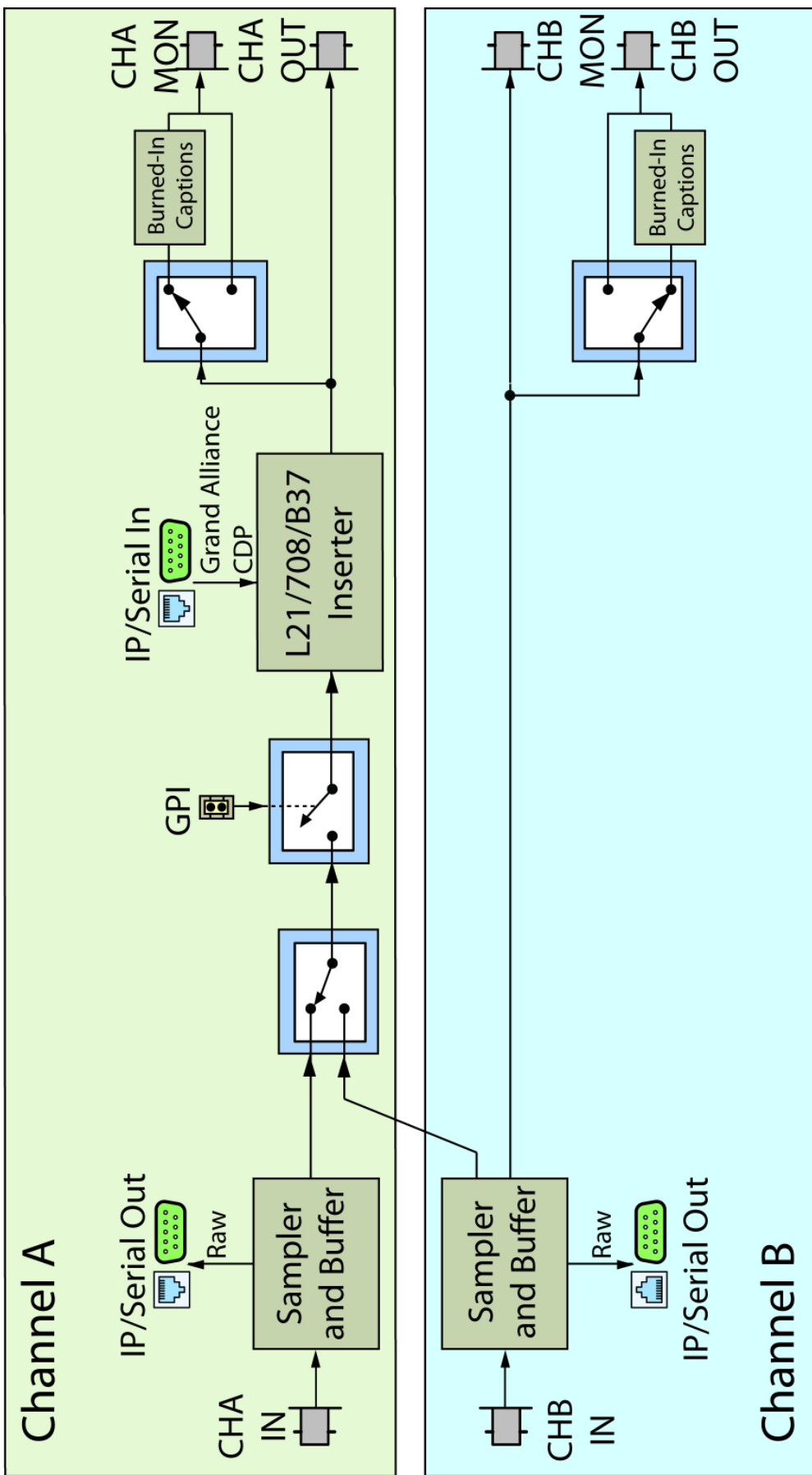
Topics

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.

HDCCRegEdit

Table C–2   Common HDCCRegEdit Problems and Solutions

Symptom	Possible Cause	Solution
HDCCRegEdit cannot connect to the HDCC card.	**BOOTOPT** jumper is not installed.	Install BOOTOPT jumper, then power cycle the frame.

Network

Table C–3   Common Network Problems and Solutions

Symptom	Possible Cause	Solution
Cannot locate HDCC card in **My Network Places**.	No network connectivity to card.	Check network connectivity.

Decoding

Table C–4   Common Decoding Problems and Solutions

Symptom	Possible Cause	Solution
Incoming video stream with captions is not decoding.	Channel set up incorrect.	Check HD/SD video line for captions.
	Serial output connection not valid.	Verify output serial connection is valid. If video output is set to **Normal**, burned in captions will be visible on the channel's **MON** output.
	If using VSP, settings are wrong.	VSP settings must be 115.2k, 8, 1, n for decoded output.
	Channel connection incorrect.	Verify the signal is provided to the input for decoding.

Encoding

Table C–5   Common Encoding Problems and Solutions

Symptom	Possible Cause	Solution
Encoding not working.	Channel setup is incorrect.	Check HD/SD video line for captions set correctly.
	Serial input connection not valid.	Verify the input line for captions is set correctly.
	caption source inoperative.	Verify caption system source is providing data.
	If using VSP, settings are wrong.	User settings must be 115.2k, 8, 1, n for encoding.

Bridging

Table C–6   Common Bridging Problems and Solutions

Symptom	Possible Cause	Solution
Bridging/transcoding not working	Channel setup is incorrect.	Check video lines for captions on both channels.
	No bridging operation selected.	Verify bridge operation / transcode settings set for correct direction, **B->A**.
	No captions on source channel.	Verify the source video stream has captions.

GPI/O

Table C–7   Common GPI/O Problems and Solutions

Symptom	Possible Cause	Solution
Asserted input on GPI/O connector not encoded on video stream.	Wrong pin stimulated.	Verify that the correct GPI pin is being stimulated.
	Data insertion not enabled.	Enable GPI data insertion.
	Input polarity is wrong.	Set GPI Tx polarity.
	Input mapping is wrong.	Set GPI Tx source.
Output on GPI/O connector not reflecting received bit in input video stream.	Output circuit incorrect.	GPO requires external pull-up resistor.
	Output is wrong polarity.	Set GPI Rx polarity.

VSPs

Table C–8   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.
VSP encoder input not working.	VSP settings are incorrect.	VSP must be operated at 115.2k, 8, 1, n for encoding.
VSP decoder output not working.	VSP settings are incorrect.	VSP must be operated at 115.2k, 8, 1, n for decoding.