HDCC-OP47MULTI

(WST/OP-47 Closed Caption/Subtitle Card)

- **HDCC-OP47MULTI-OG2 (openGear Platform)**
- **HDCC-OP47MULTI-2CH (MC-1RU Platform)**

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

User Guide

Firmware Version: V3.19

Software Version: V0.08

Part Number 821151 Revision C

Wohler CONFIDENCE.

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CHAPTER 1
Getting Started

Introduction

Overview

This chapter describes the basic captioning functions that you can perform using your Wohler HDCC-OP47MULTI-OG2 (for the Ross DFR-8321 frame) and HDDC-OP47MULTI-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

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Product Description

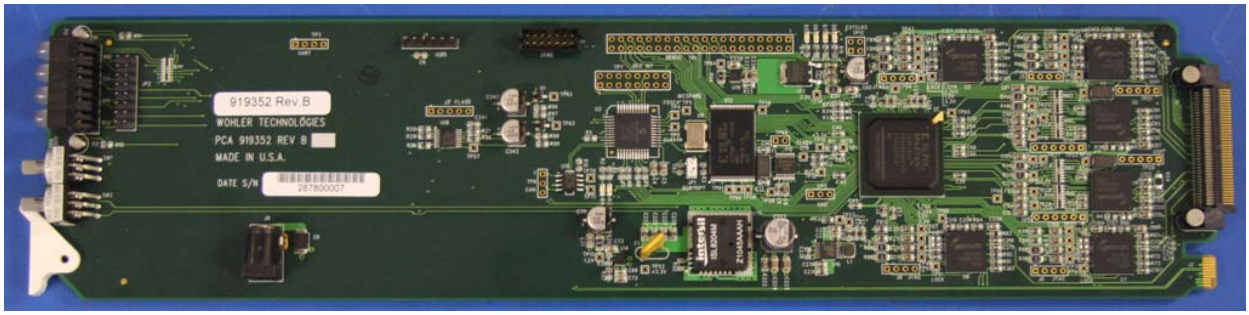
The HDCC is a versatile card for encoding, decoding, bridging, and transcoding captions on / from / between HD / SD-SDI video streams in real time.

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 13 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 39 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.

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

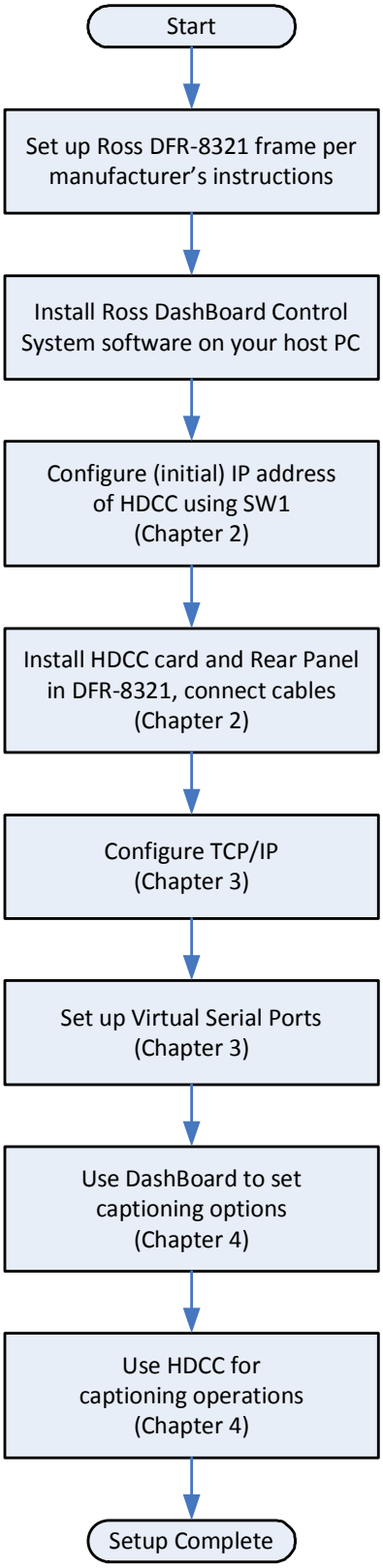

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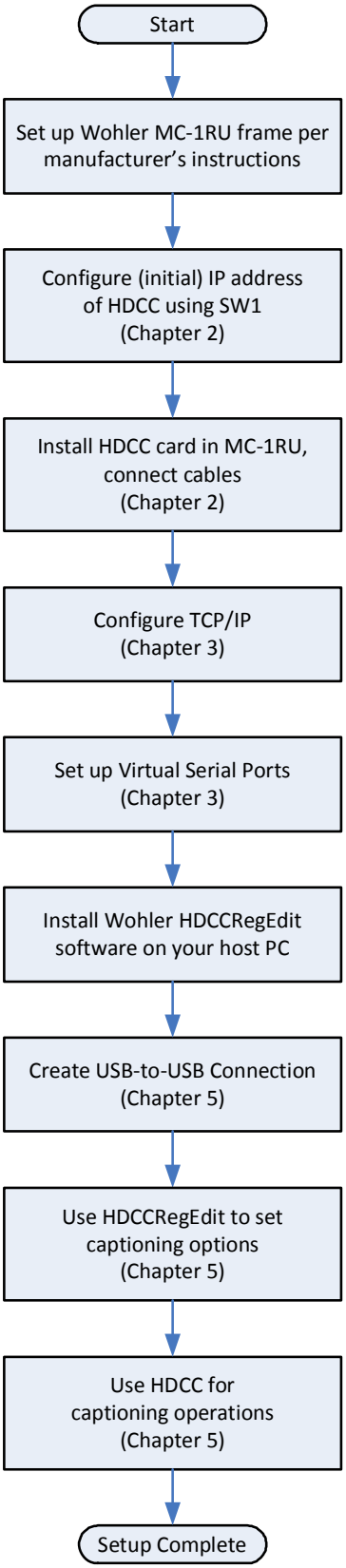
Figure 1–3 Quick Start Wohler MC-1RU Frame



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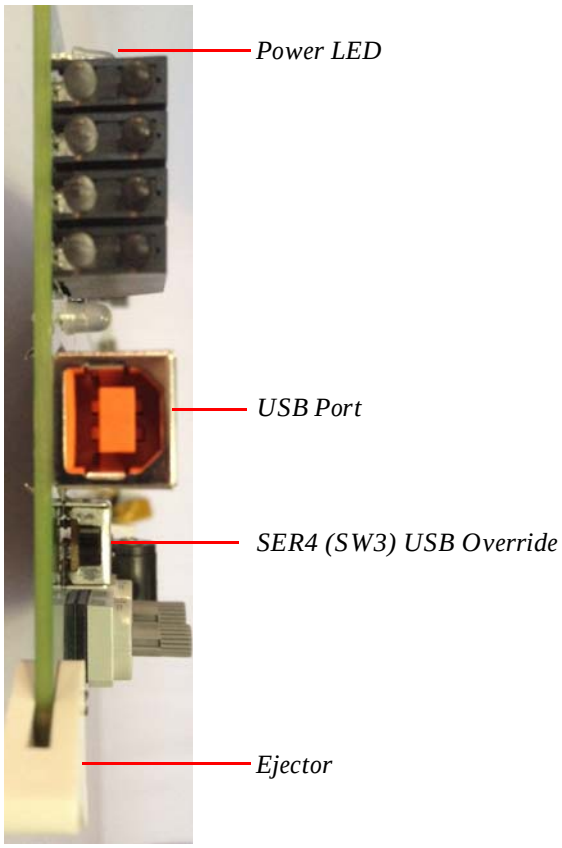
I/O Connections

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



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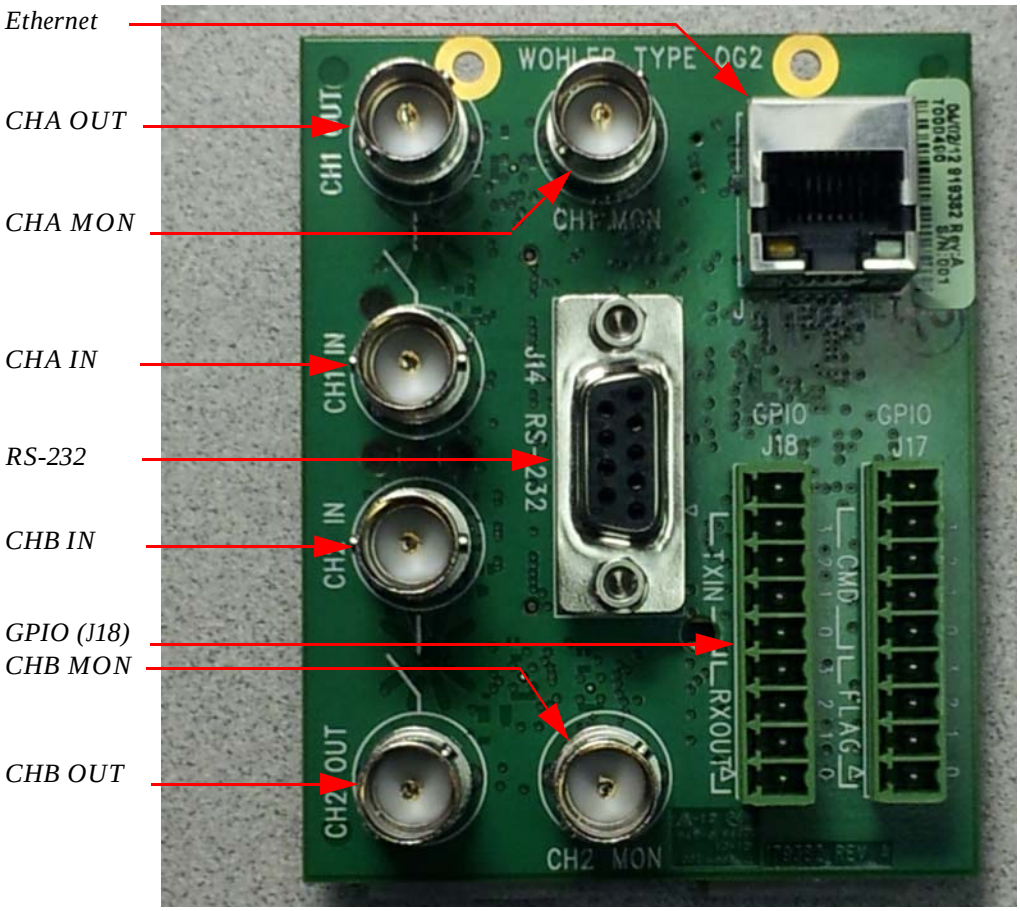
HDCC in Ross DFR-8321 Frame

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 **CH2 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



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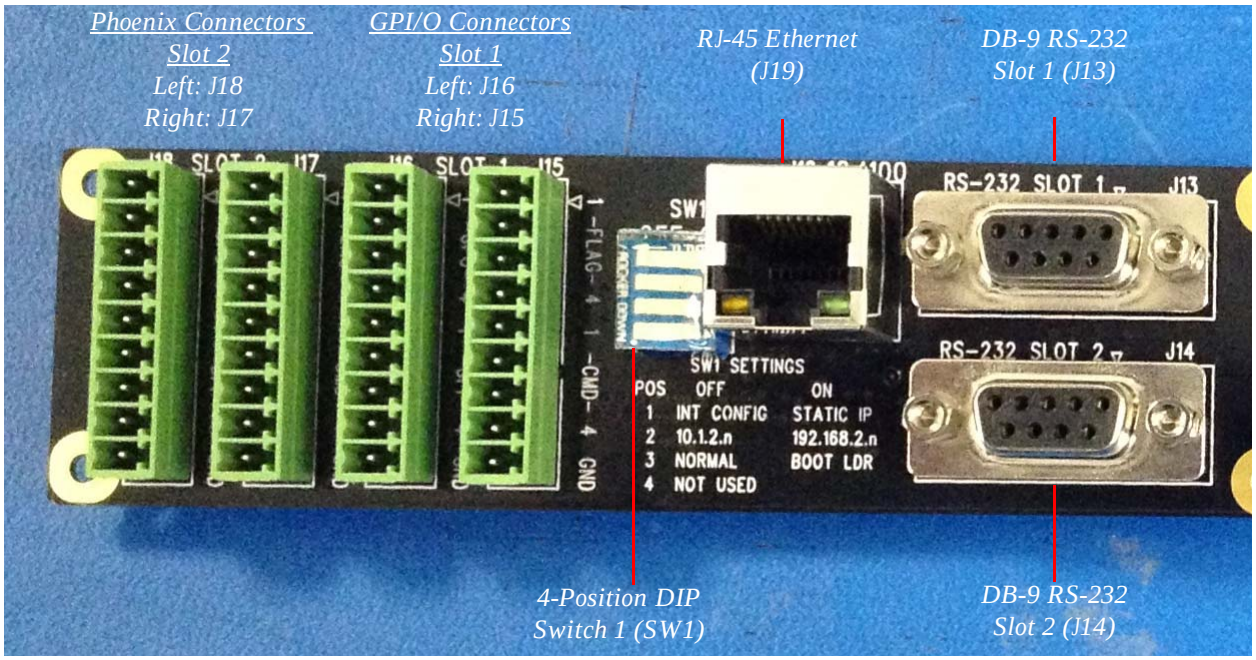
HDCC in Wohler MC-1RU Frame

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 127 for detailed pin-out descriptions for each connector.

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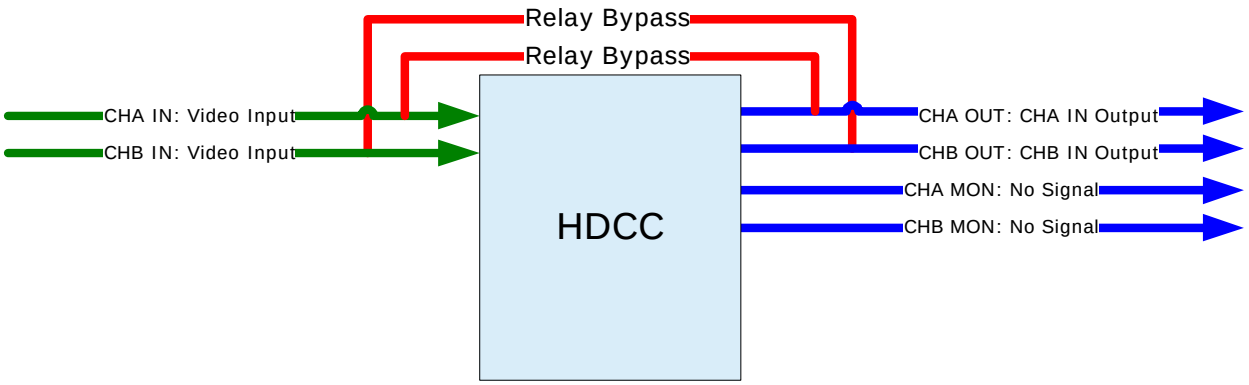
Figure 1–7 MC-1RU Rear Panel - Right Side

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 receive caption data from either the RS-232 port, the USB port, or one of two available Ethernet virtual serial ports, and

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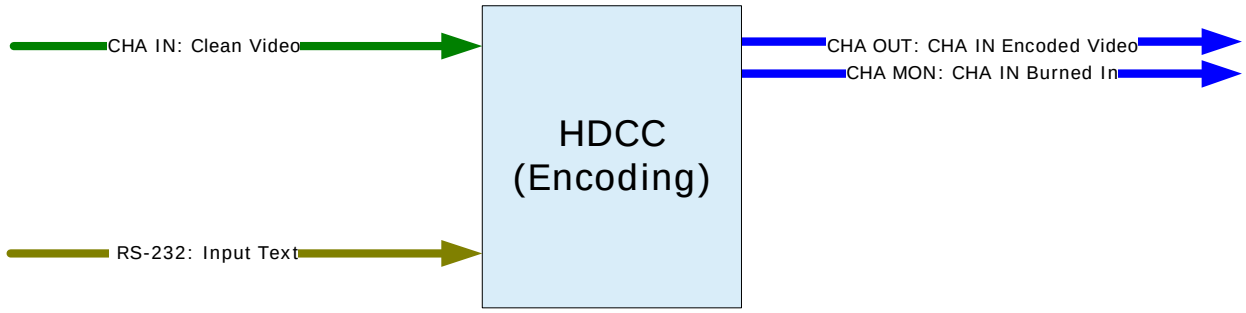
embed it into the input video stream. The monitoring output channel allows the encoding to be visually confirmed by displaying the video with captions overlaid. Moreover, you can simultaneously encode Channels A and B from either the same source or a different one.

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



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 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

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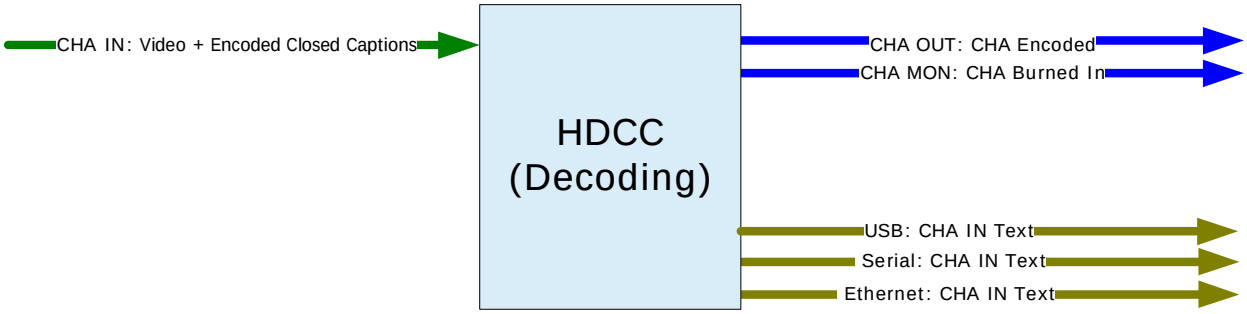
connection to a host PC for display. Note that the closed captioned text is not removed from the input video stream.

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



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 one channel and encode them onto the video stream of the second channel. If one channel is HD and the other SD, the card will

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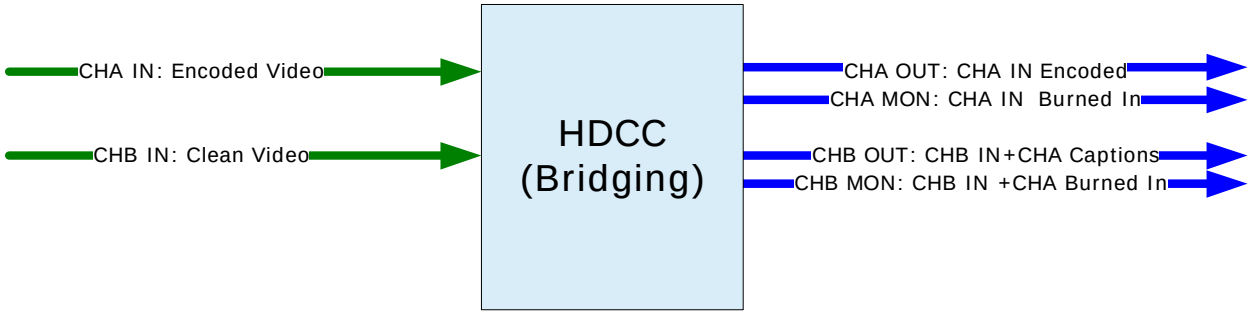
automatically reformat the caption data for the destination frame rate (transcode).

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 (CH A → CH B)



Example: This example demonstrates decoding. Captions from video provided at **CHA IN** are copied to video provided at **CHB IN**. **CHA OUT** is unmodified copy of **CHA IN**. **CHB OUT** is **CHB IN** encoded with captions from **CHA IN**.

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

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CHAPTER 2
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

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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 Installing the HDCC in the Wohler MC-1RU on page 18.

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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.

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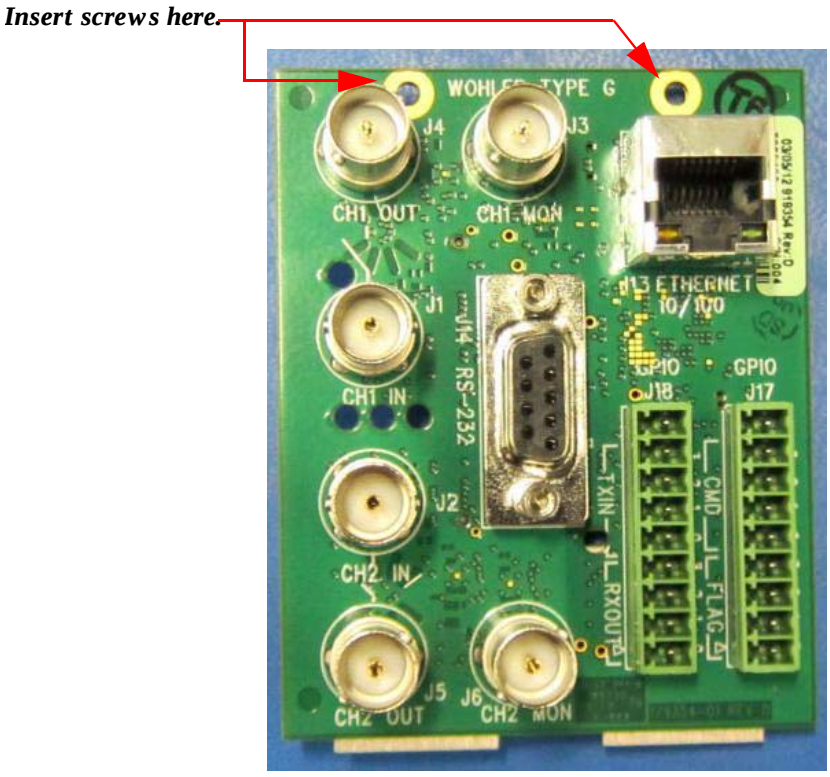
3. Insert the screws into the two corner holes of the rear panel. Refer to Figure 2–1 on page 16.

Figure 2–1 OG2 Rear Panel



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 inner 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.

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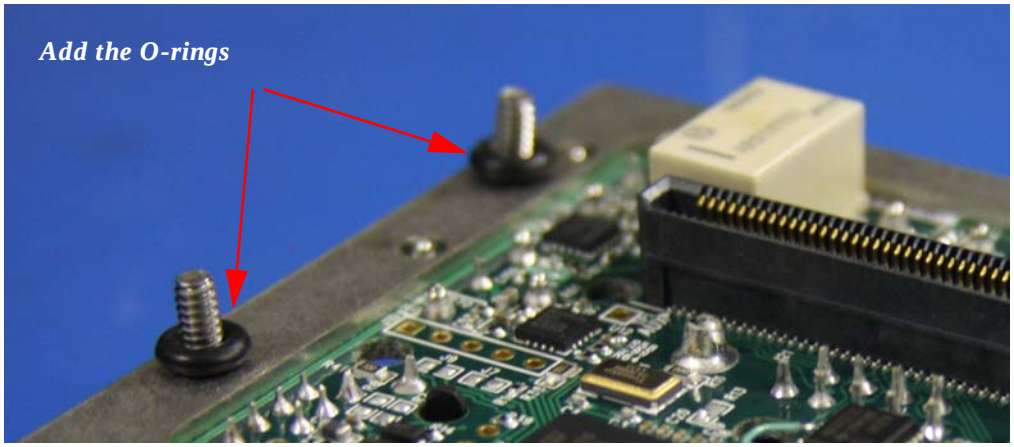
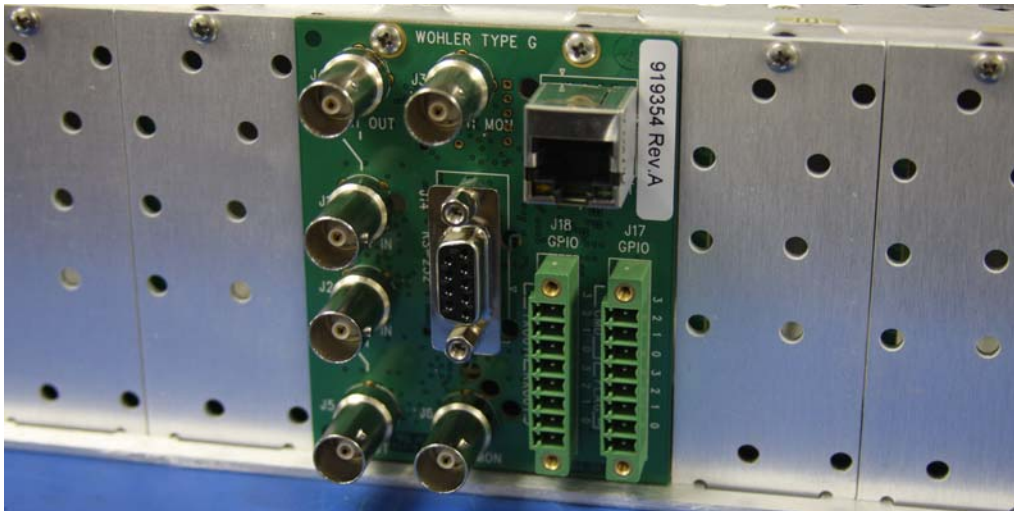
Figure 2–2 Adding the O-Rings



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, 7, 11, 15 or 19. Refer to Figure 2–3 below.

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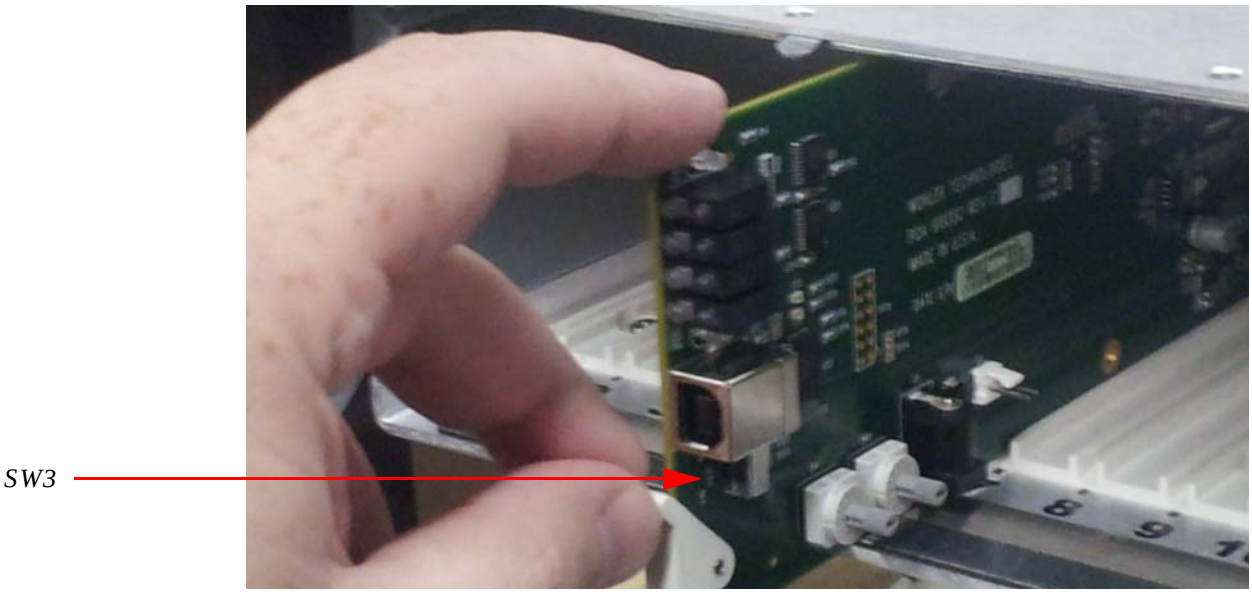
Figure 2–4 Open DFR-8321 Frame



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

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

4. 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.

5. Re-install the MC-1RU's 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 a slider-type DIP switch and is on the inside surface of the board.

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

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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. Othewise, 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 21.

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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

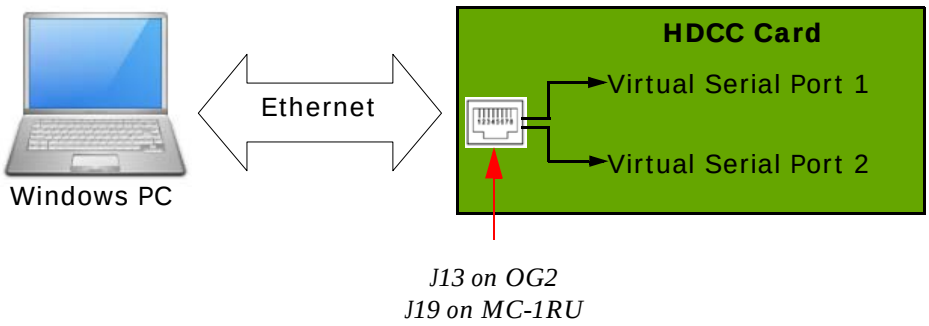

Figure 3–1 above provides a functional overview of the virtual serial port configuration. You can use third party software (link provided below) to create a virtual serial port which will transfer serial data to and from the HDCC over Ethernet. From the PC user's perspective, the virtual serial ports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

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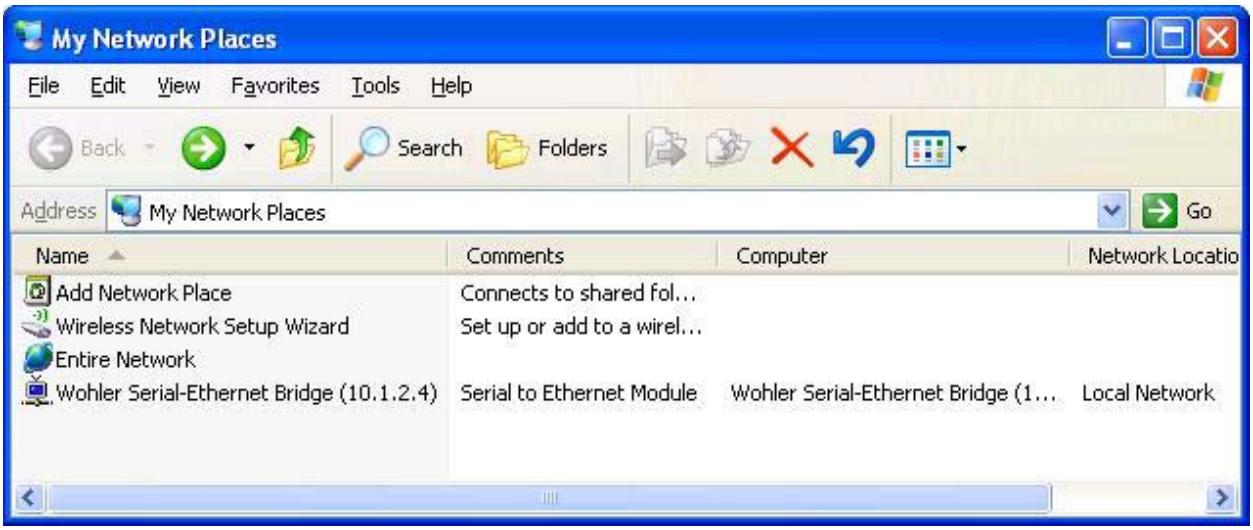
Finding the HDCC on the Network

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.

Note: If you cannot locate the HDCC in My Network Places, use the Stellaris® Board Finder application (finder.exe) included on the supplied CD/ROM to identify the card.

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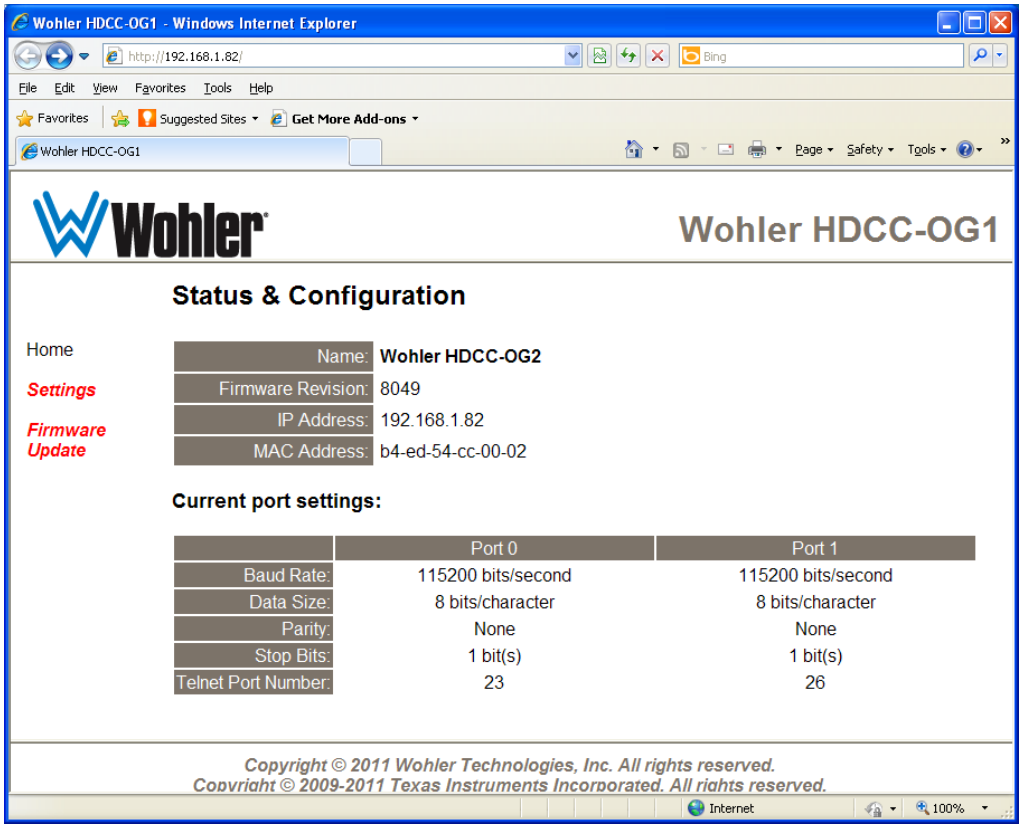
Assigning a Static IP Address/Enabling DHCP

Double-clicking on the Wohler Serial-Ethernet Bridge (see Figure 3–2 on page 23) 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).

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2. When the **Settings** screen appears (Figure 3–4 on page 25) 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. Othewise, 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 25).

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

Figure 3–4 Settings Menu

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

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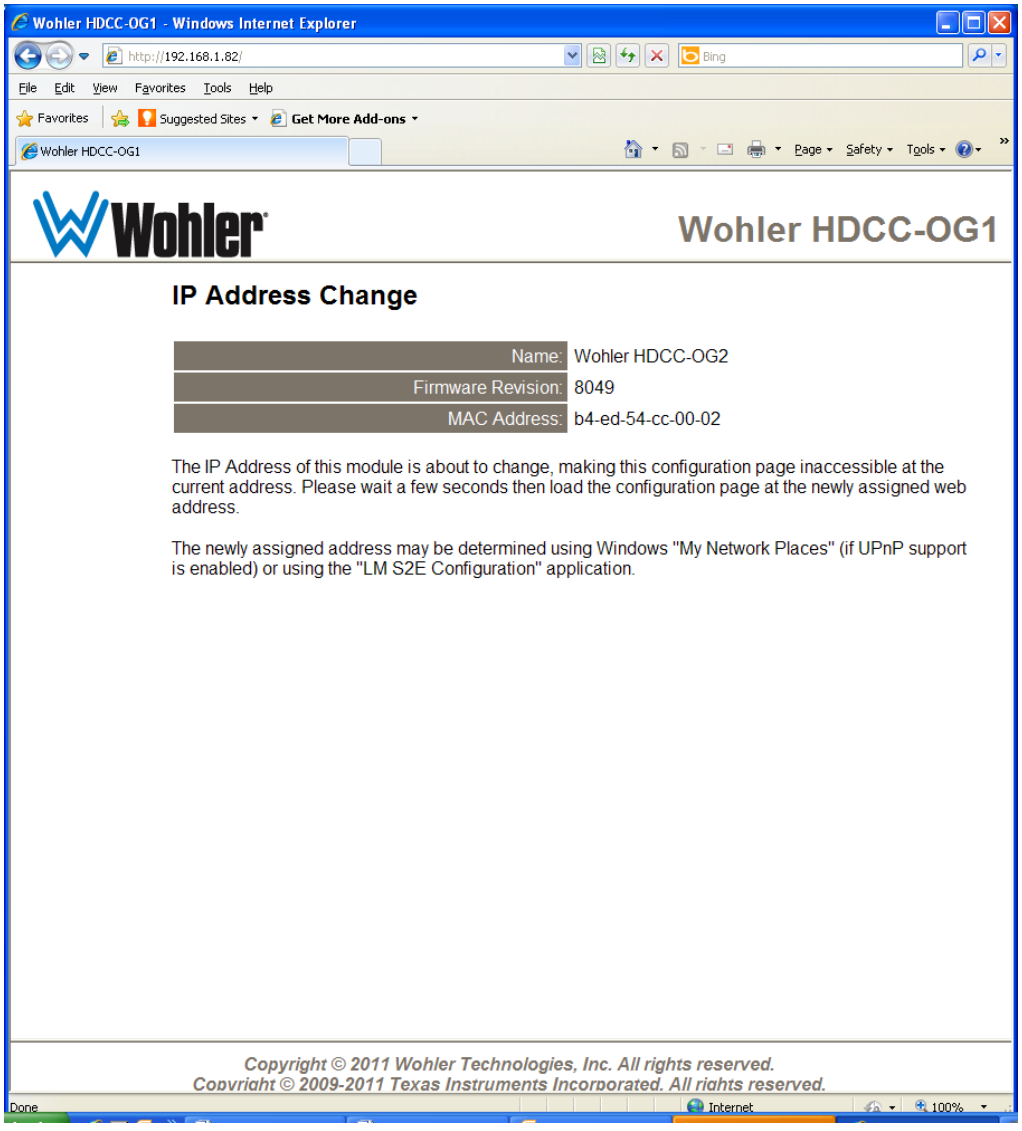
WARNING! Verify that all information is correct for your network. The HDCC card will become unreachable on your network if the wrong information is set.

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 19 for details.

Figure 3–5 IP Address Change



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

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

9. Power cycle the card.

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

Creating VSPs with the Lantronix Redirector

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

Important: If you are using Microsoft Windows 7 or 8, this software will not work for you. Instead, refer to Creating VSPs with Later Versions of Windows on page 36.

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**.

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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**.

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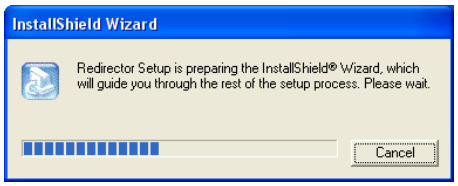
Figure 3–8 Lantronix Welcome Screen

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.

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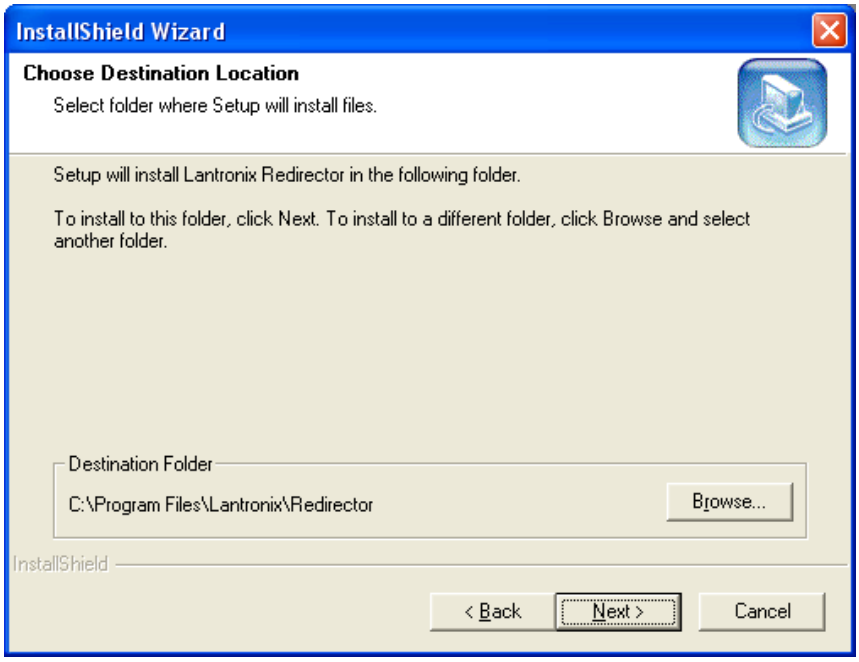
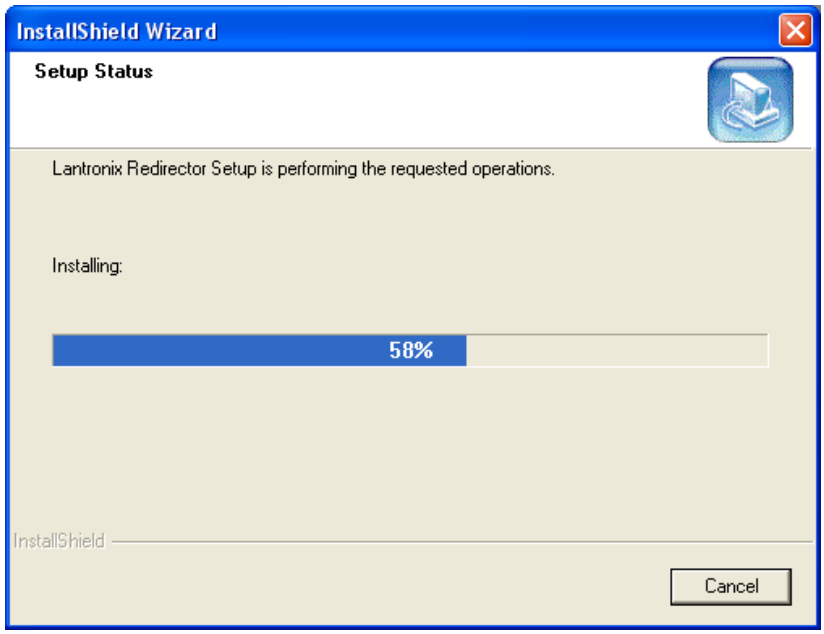
Figure 3–10 Choose Destination Location



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

   The **Setup Status** screen (Figure 3–11 on page 30) will display and quickly complete the file installation.

Figure 3–11 Setup Status



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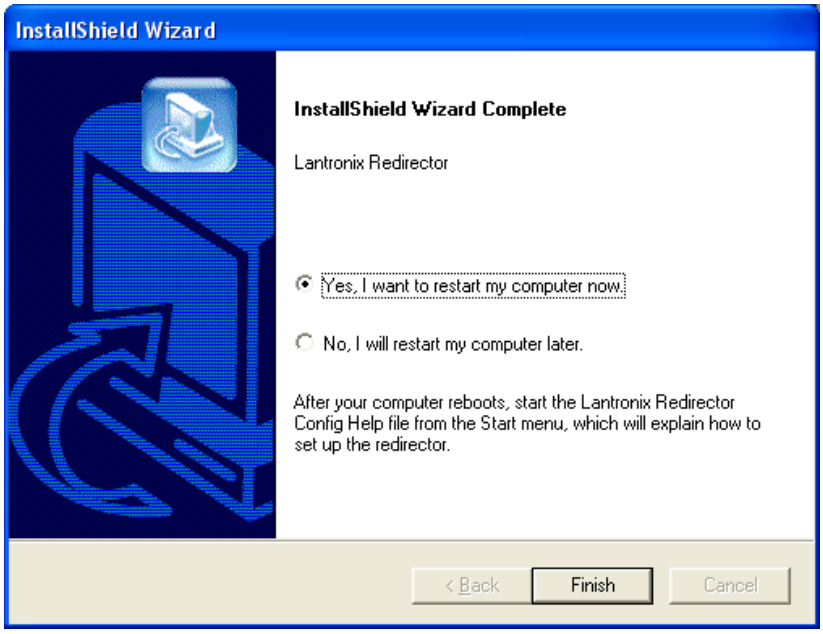
8. Before the wizard completes, take a moment to close all other applications on your PC before the system restarts your computer.

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**.

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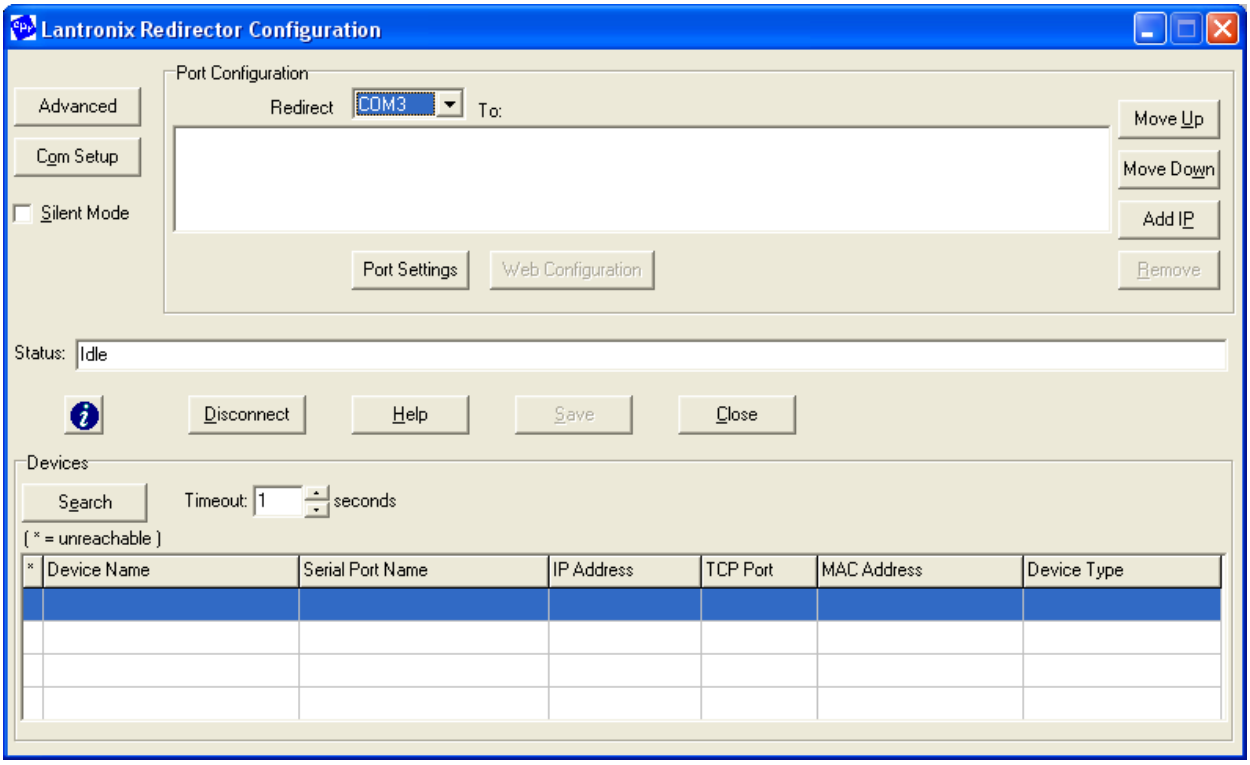
Figure 3–13 Lantronix Redirector Configuration



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.

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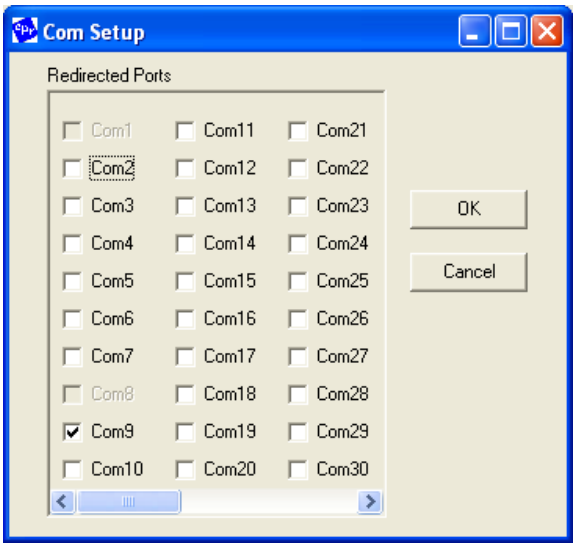
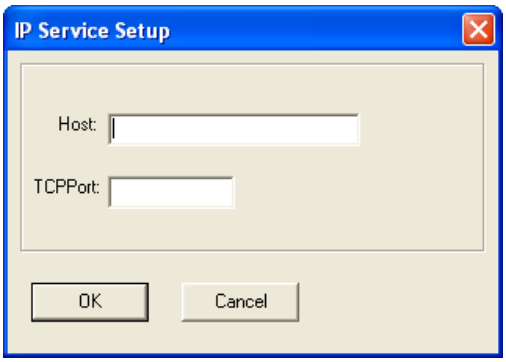
Figure 3–14 Com Setup



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**.

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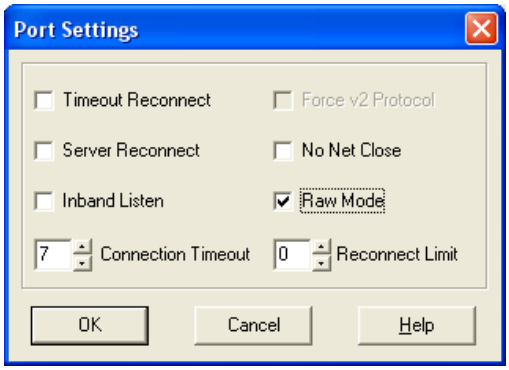
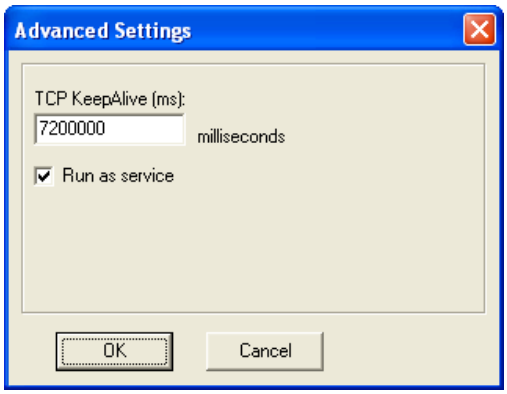
Figure 3–16 Port Settings



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

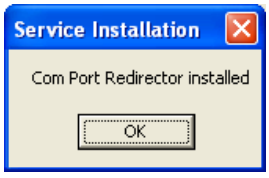
10. Click **Advanced** at the top left corner of the application window.

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**.

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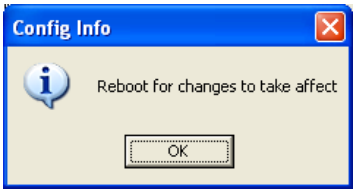
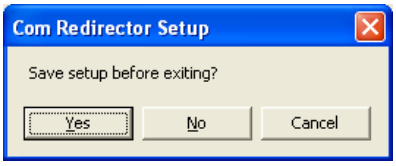
Figure 3–19 Config Info



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

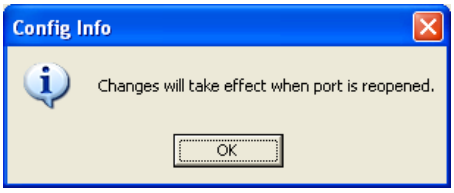
14. When the application window reappears, click **Close** near the center of the screen.

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 shoulld now have two available COM ports that will serve as serial connections to the HDCC card.

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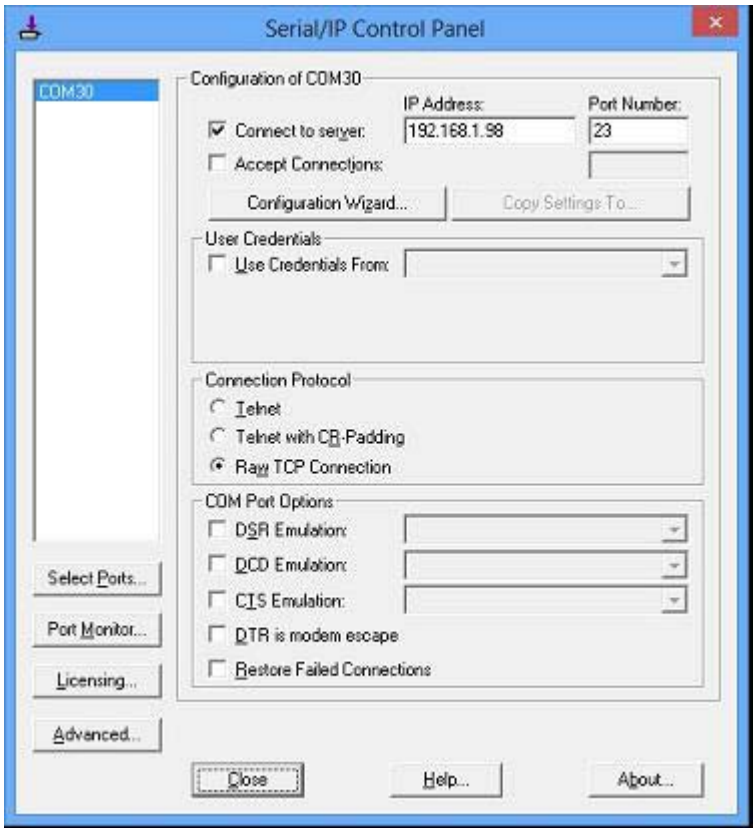
Creating VSPs with Later Versions of Windows

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

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

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

Figure 3–22 Tactical Serial/IP Control Panel



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

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

Next Steps

If you are using the Ross DFR-8321 frame, proceed to the next chapter, Using DashBoard on page 39.

If you are using the Wohler MC-1RU, proceed to Chapter 4: Using HDCCRegEdit on page 61.

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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

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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, 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

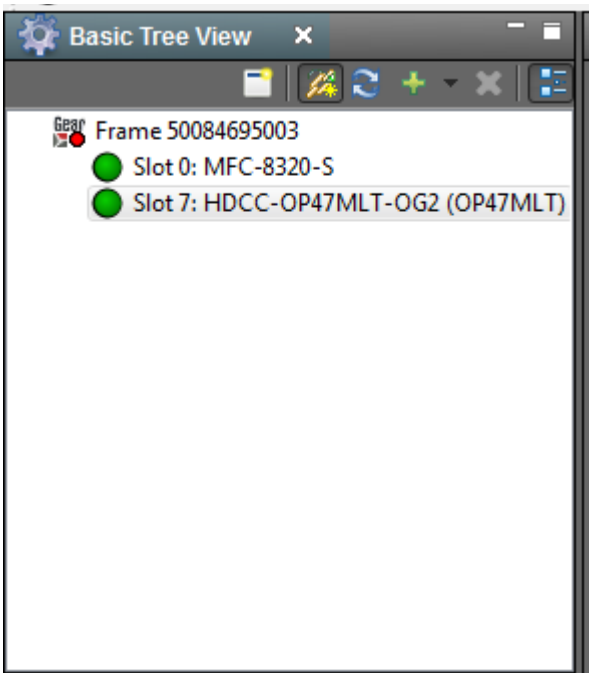

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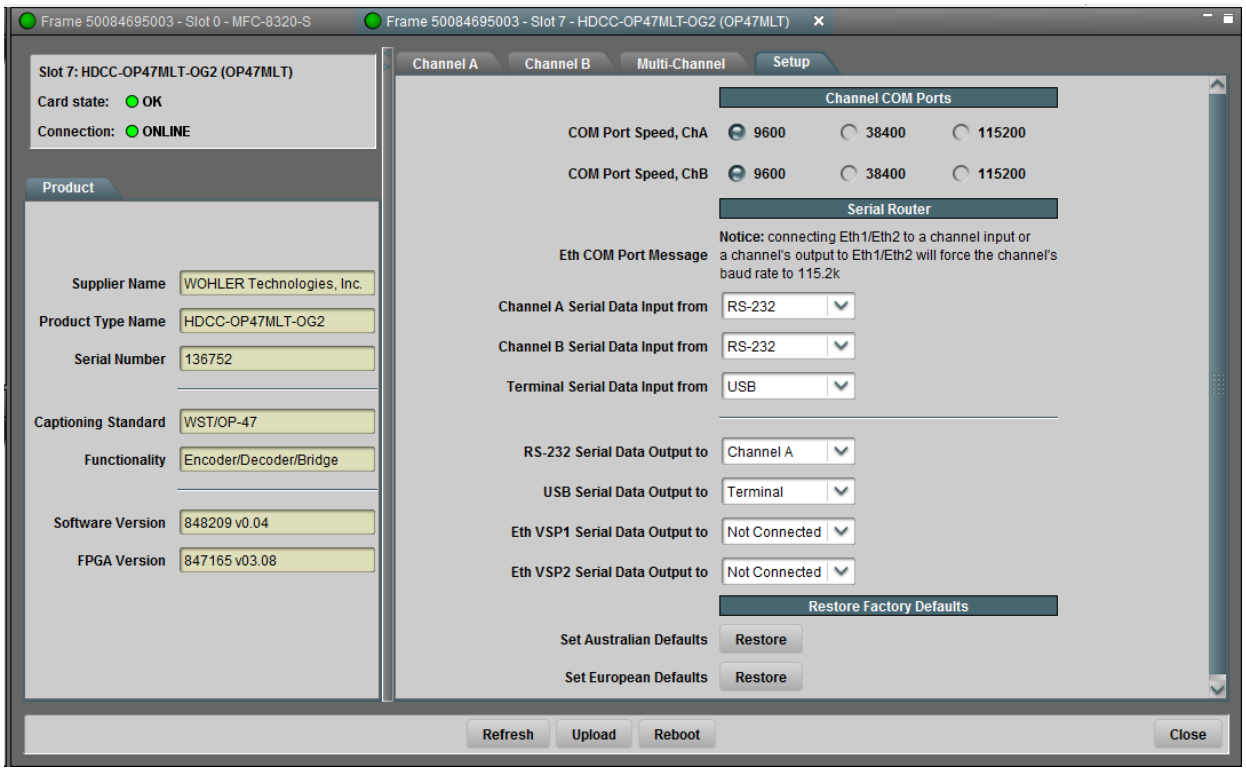
Figure 4–2 DashBoard Main Screen



Note: The Wohler HDCC-OP47MULTI-OG2 card will appear as **HDCC-OP47MLT-OG2 (OP47MLT)** 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 on page 42).

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Figure 4–3 Product Information Pane

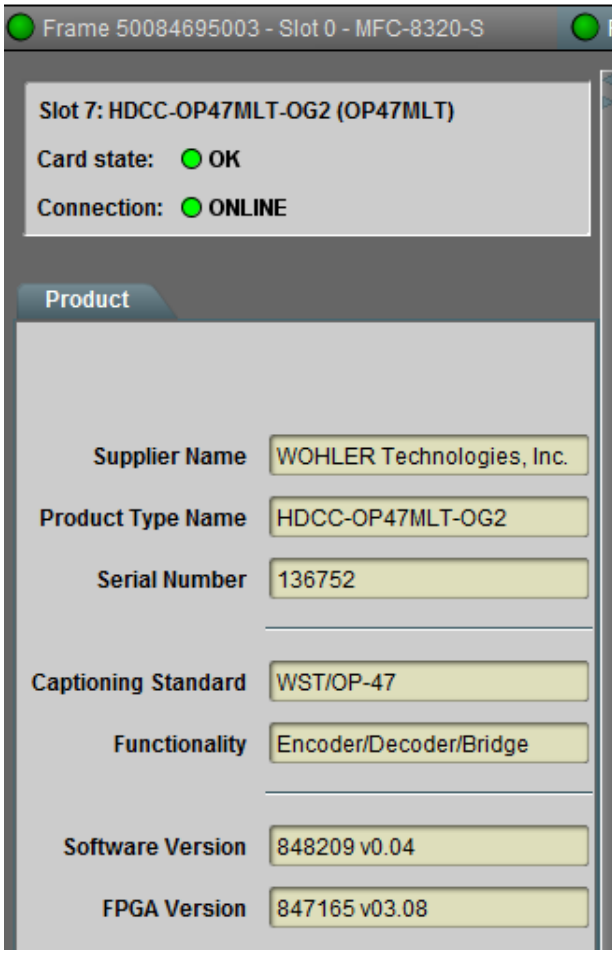

Figure 4–3 shows some product details about the HDCC that may be helpful at a future date, including the software and FPGA firmware part numbers and revisions.

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.

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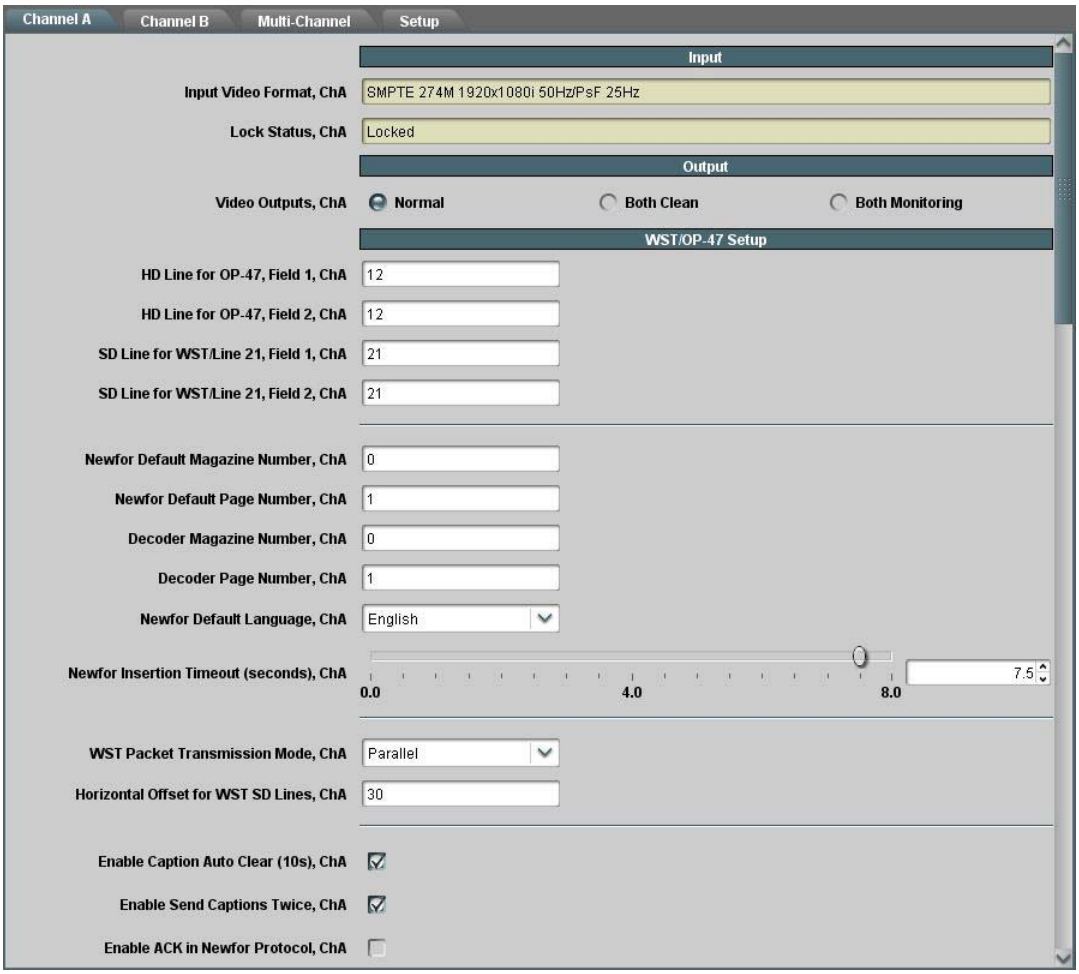
- **Reboot**: Clicking this button causes the HDCC card to reboot. A screen indicating that the card is busy will appear while the system is rebooting.

Channel A and B Tabs

Click the Channel A tab in DashBoard and change the settings (see Figure 4–4 below) to customize your configuration. Repeat the steps for Channel B.

Notice that the Channel A menu is divided into sections, each with a heading that describes the features below. We'll cover each of the options of each section below.

Figure 4–4 Channels A and B (Top)



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Channel A/B Status

Input

None of these fields are user-editable; they reflect the state of the input video channel as it is measured.

- **Input Video Format**: Indicates the video format (resolution, frame rate) of the incoming signal
- **Lock Status**: Indicates whether the hardware has locked onto an incoming video signal

Output

In the **Video Outputs** field, click to select whether you want both outputs for this channel to be:

- **Normal**: **OUT** has closed captions (when captions are present) and **MON** has open captions (when captions are present).
- **Both Clean**: Both outputs have neither closed nor open captions.
- **Both Monitoring**: Both outputs have open captions.

WST/OP47 Setup

- **HD Line for OP-47, Field 1**: The first video line for HD video formats on which OP-47 captions are present or will be placed.
- **HD Line for OP-47, Field 2**: The second video line for HD video formats on which OP-47captions are present or will be placed.
- **SD Line for OP-47, Field 1**: The first video line for SD video formats on which WST captions are present or will be placed.
- **SD Line for OP-47, Field 2**: The second video line for SD video formats on which WST captions are present or will be placed.
- **Newfor Default Magazine Number**: The magazine number the card will encode if input data doesn't specify one.
- **Newfor Default Page Number**: The page number the card will encode if input data doesn't specify one.

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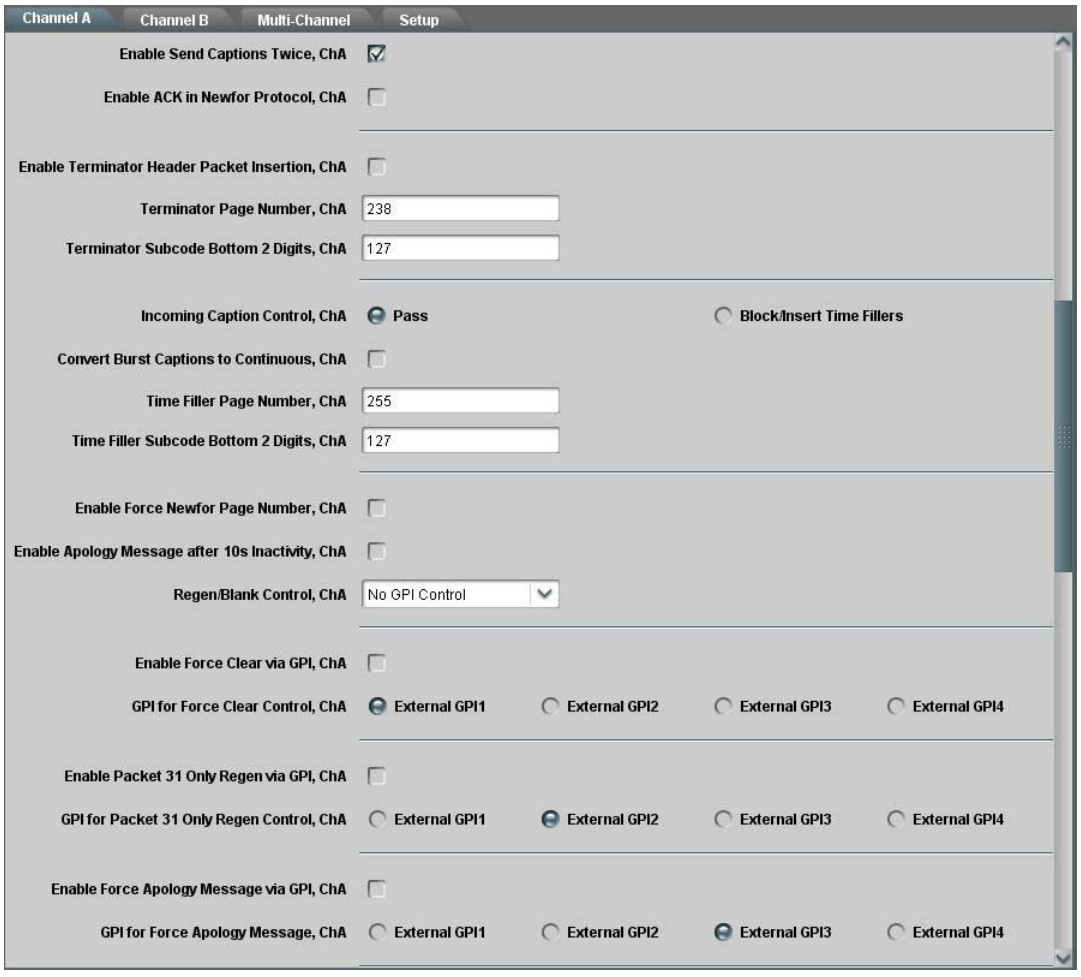
- **Decoder Magazine Number**: Specifies the magazine number of the packets the decoder will decode.
- **Decoder Page Number**: Specifies the page number of the packets the decoder will decode.
- **Newfor Default Language**: Specifies the language the encoder will use if not set by Newfor input.

Figure 4–5 Channels A and B (Part 2)



- **Newfor Insertion Timeout (seconds)**: Selects the interval from caption insertion to timeout, allowing the passthrough of existing captions.
- **WST Packet Transmission Mode**: Selects serial or parallel transmission.

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- **Enable Caption Auto clear (10s)**: Causes captions to be cleared after 10 seconds if no new captions are input.
- **Enable ACK in Newfor Protocol**: Enables message acknowledgement when encoding.
- **Enable Terminator Header Packet Insertion**: Enables terminator packet insertion.
- **Terminator Page Number**: Sets the terminator page number.
- **Terminator Subcode Bottom 2 Digits**: Sets the terminator subcode.
- **Incoming Caption Control**: Blocks incoming captions, inserts time fillers when Newfor data is not supplied.
- **Convert Burst Captions to Continuous**: Inserts time fillers into video stream if no caption data is present.
- **Time Filler Page Number**: The page number for the time filler packets.
- **Time Filler Subcode Bottom 2 Digits**: The subcode for the time filler packets.
- **Enable Force Newfor Page Number**: Allows the page number to be forced by Newfor input.
- **Enable Apology Message After 10s Inactivity**: Turns on the caption apology message after 10 seconds of no new caption data.
- **Regen/Blank Control**: Controls whether Regen/Blank can be controlled by external input.
- **Enable Force Clear via GPI**: Enables GP input to force clear.
- **GPI for Force Clear Control**: Selects input for forced clear.
- **Enable Packet 31 Only Regen via GPI**: Enables GPI to control passthrough of Packet 31 data.
- **Enable Force Apology Message via GPI**: Enables general purpose input to cause a caption apology message to display.

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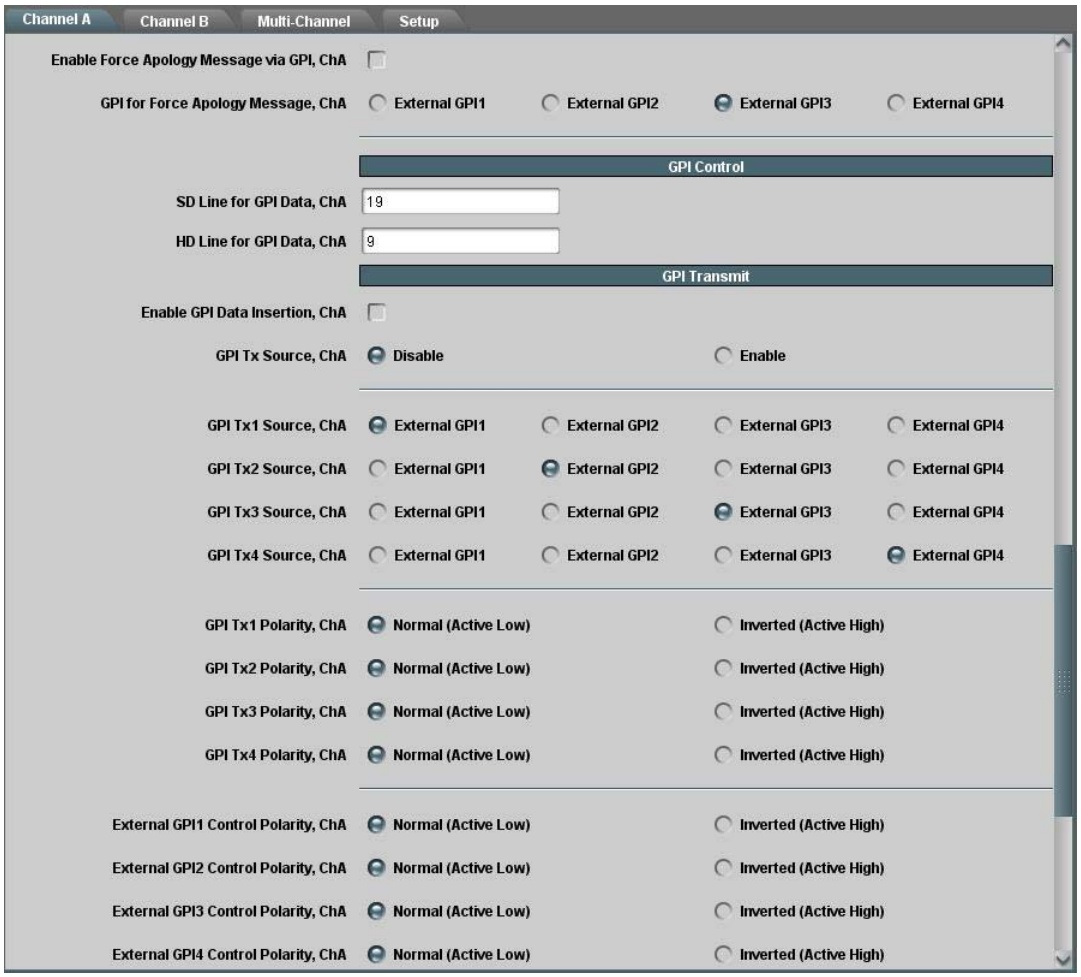
- **GPI for Force Apology Message**: Selects the general purpose input that causes the apology message to display.

Figure 4–6 Channels A and B (Part 3)



GPI Control

- **SD Line for GPI Data**: Controls whether data provided on the GPI inputs of the card will be encoded on a SD video signal.
- **HD Line for GPI Data**: Controls whether data provided on the GPI inputs of the card will be encoded on an HD video signal.

GPI Transmit

- **Enable GPI Data Insertion**: Enables the encoding of general purpose input bits into the VANC.

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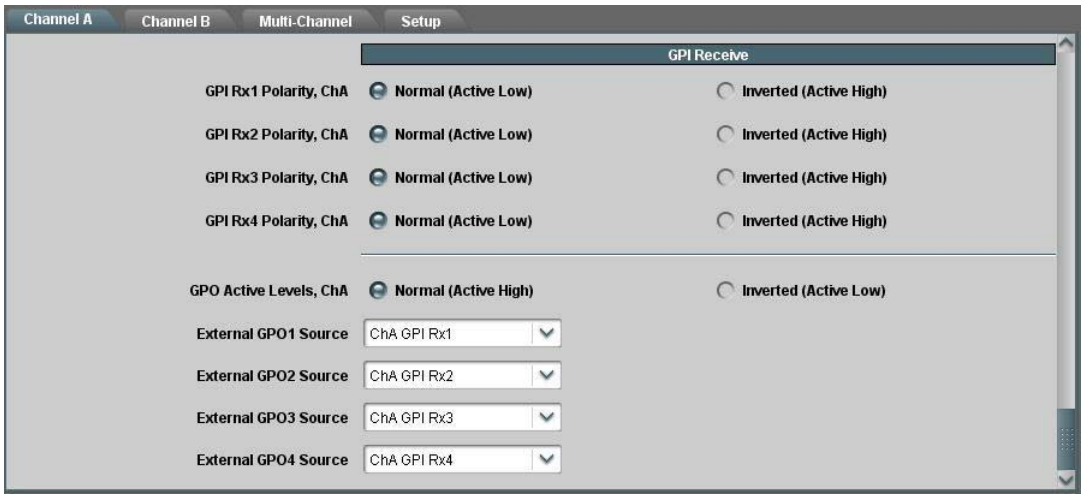
- **GPI Tx Source**: Enables external inputs to be used for bits transmitted to the VANC.
- **GPI Tx(1..4) Source**: Select from **External GPI 1..4**.

Figure 4–7 Channels A and B (Part 4)



- **GPI Tx(1..4) Polarity**: Select either **Normal (Active Low)** or **Inverted (Active High)**.
  - **Active High**: The output voltage is high if the bit is set.
  - **Active Low**: The output voltage is low if the bit is set
- **External GPI(1..4) Control Polarity**: Select either **Normal (Active Low)** or **Inverted (Active High)**.
  - **Active High**: The output voltage is high if the bit is set.
  - **Active Low**: The output voltage is low if the bit is set.

GPI Receive

- **GPI Tx(1..4) Polarity**: Select either **Normal (Active Low)** or **Inverted (Active High)**.
  - **Active High**: The output voltage is high if the bit is set.
  - **Active Low**: The output voltage is low if the bit is set.
- **GPO Active Levels**: Select either **Normal (Active Low)** or **Inverted (Active High)**.
  - **Active High**: The output voltage is high if the bit is set.

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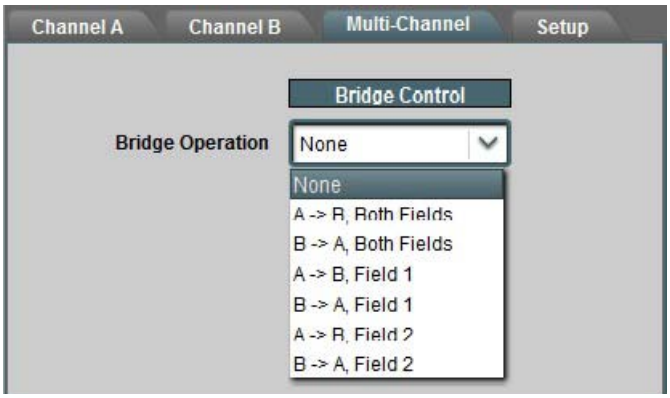
- **Active Low**: The output voltage is low if the bit is set.

- **External GPO(1..4) Source**: Select from **GPI Rx(1..4)** Controls how received bits are mapped to the external output.

Multi-Channel Tab

Figure 4–8 Bridge Configuration Selection



The **Bridge Control** selection shown in Figure 4–8 above 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.

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

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

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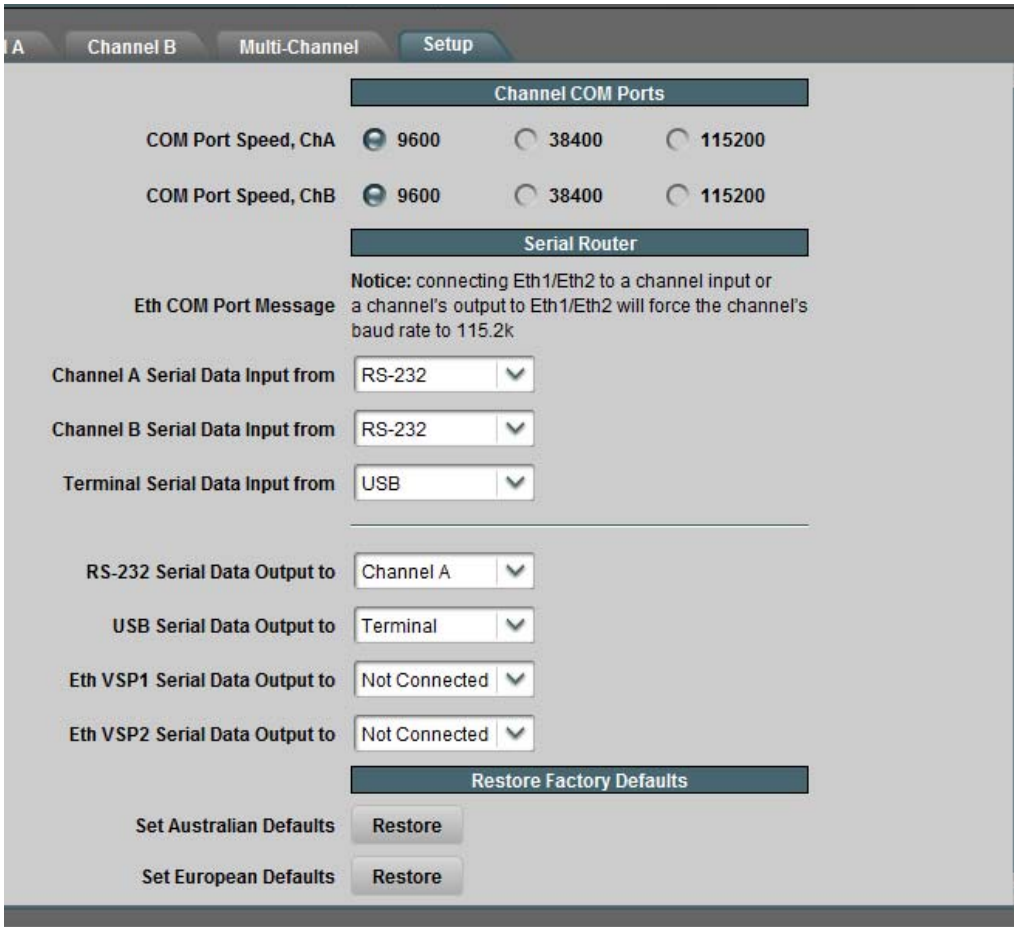
The Setup Tab

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. However, the serial connection at the PC can still be set for any baud rate.

- **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.

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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 Serial Data 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 **HD Line for OP47 Insertion line, Field 1, ChA** and **HD Line for OP47 Insertion line, Field 2, ChA** (if OP-47) or **SD Line for OP47 Insertion Line, Field 1, ChA** and **SD Line for OP47 Insertion Line, Field 2, ChA** (if WST).

Decoded caption data should be output from the **RS-232** port. Caption data output is raw, **WST** (if SD) or **OP-47** (if HD).

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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 previou chapter).

Process

1. In the **Setup** menu, set the **Eth1 VSP Output** to “Channel B” and the **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 **HD Line for OP47 Insertion line, Field 1, ChA** and **HD Line for OP47 Insertion line, Field 2, ChA** (if OP-47) or **SD Line for OP47 Insertion Line, Field 1, ChA** and **SD Line for OP47 Insertion Line, Field 2, ChA** (if WST).

Decoded caption data should be output from the **Eth1 VSP** port. Caption data output is **Raw**, **WST** (if SD) or **OP-47** (if HD).

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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 **HD Line for OP47 Insertion line, Field 1, ChA** and **HD Line for OP47 Insertion line, Field 2, ChA** (if OP-47) or **SD Line for OP47 Insertion Line, Field 1, ChA** and **SD Line for OP47 Insertion Line, Field 2, ChA** (if WST).

Decoded caption data should be output from your selected connectivity method. Decoded caption data should be output from the **Eth1 VSP** port. Caption data output is **Raw**, **WST** (if SD) or **OP-47** (if HD).

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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 **HD Line for OP47 Insertion line, Field 1, ChA** and **HD Line for OP47 Insertion line, Field 2, ChA** (if OP-47) or **SD Line for OP47 Insertion Line, Field 1, ChA** and **SD Line for OP47 Insertion Line, Field 2, ChA** (if WST) 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**.

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How do I encode captions on Channel A using a Virtual Serial port?

Situation: You have an incoming video stream on Channel A and you want to encode captions on it using data supplied by virtual serial port **Eth1 VSP**.

Preparations: Make sure a cable with a video stream is connected to **CHA IN** input, the card / frame is powered and operational, an Ethernet cable connects the HDCC card to your network, and that you have established an Ethernet virtual serial port (see the Installation Guide for instructions on doing this).

Process:

1. In the **Setup** menu, set the **Channel A** input to "Eth1 VSP" and the **COM Port Speed, ChA** 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 captioning system can still set the baud rate to any desired setting in the range 9,600 to 115.2k.

2. In the **Channel A** menu, in the **Caption Lines** section, set the **HD Line for OP47 Insertion line, Field 1, ChA** and **HD Line for OP47 Insertion line, Field 2, ChA** (if OP-47) or **SD Line for OP47 Insertion Line, Field 1, ChA** and **SD Line for OP47 Insertion Line, Field 2, ChA** (if WST) to the video line to which you want the captions encoded.

Caption data supplied on **Eth1 VSP** will be encoded on the video stream coming out of **CHA OUT**.

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How do I encode captions on EITHER channel using ANY port?

Situation: You want to generalize the process of encoding.

Preparation: Make sure a cable with a video stream is connected to your selected channel (or signals to both channels, if you'd like to encode two streams simultaneously), the card / frame is powered and operational, and you 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 board.

Any of these 3 connectivity methods can be used to output decoded data.

Process:

1. In the **Setup** menu, set your selected channel's input to your preferred connectivity method and set the **COM Port Speed** for that channel as required. Remember, the baud rate for a channel must always be set to 115.2k when an Ethernet virtual serial port is connected to it.
2. In the **Channel A** menu, in the **Caption Lines** section, set the **HD Line for OP47 Insertion line, Field 1, ChA** and **HD Line for OP47 Insertion line, Field 2, ChA** (if OP-47) or **SD Line for OP47 Insertion Line, Field 1, ChA** and **SD Line for OP47 Insertion Line, Field 2, ChA** (if WST) to the video line to which you want the captions encoded.

Caption data supplied by your chosen connectivity method will be encoded on the video stream coming out of the output for your selected channel.

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

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

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

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

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

2. You must configure Channel A so that the captions are read from the correct video line. In the **Channel A** menu, enter the video line containing the caption data in either the **HD Line for OP47 Insertion line, Field 1, ChA** and **HD Line for OP47 Insertion line, Field 2, ChA** (if OP-47) or **SD Line for OP47 Insertion Line, Field 1, ChA** and **SD Line for OP47 Insertion Line, Field 2, ChA** (if WST).

3. You must configure Channel B so that the captions are written to the correct video line. In the **Channel B** menu, enter the video line containing the caption data in either the **HD Line for OP47 Insertion line, Field 1, ChB** and **HD Line for OP47 Insertion line, Field 2, ChB** (if OP-47) or **SD Line for OP47 Insertion Line, Field 1, ChB** and **SD Line for OP47 Insertion Line, Field 2, ChB** (if WST).

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

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

Note: Bridging can go in either direction. Select one of the "B->A" options in the **Bridge Operation** menu to bridge captions from **CHB IN** to **CHA IN**.

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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. 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).

3. 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.

4. The mapping of the TXIN1-4 bits to the transmitted bits can be set with the controls in the **GPI TX1-4 Source, ChA** section.

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

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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 **External GPO1-4 Source**.

   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.

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CHAPTER 5
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

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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 the MC-1RU to power it down.

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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**.

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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 21).

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 21 for detailed instructions to install a VSP.

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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.

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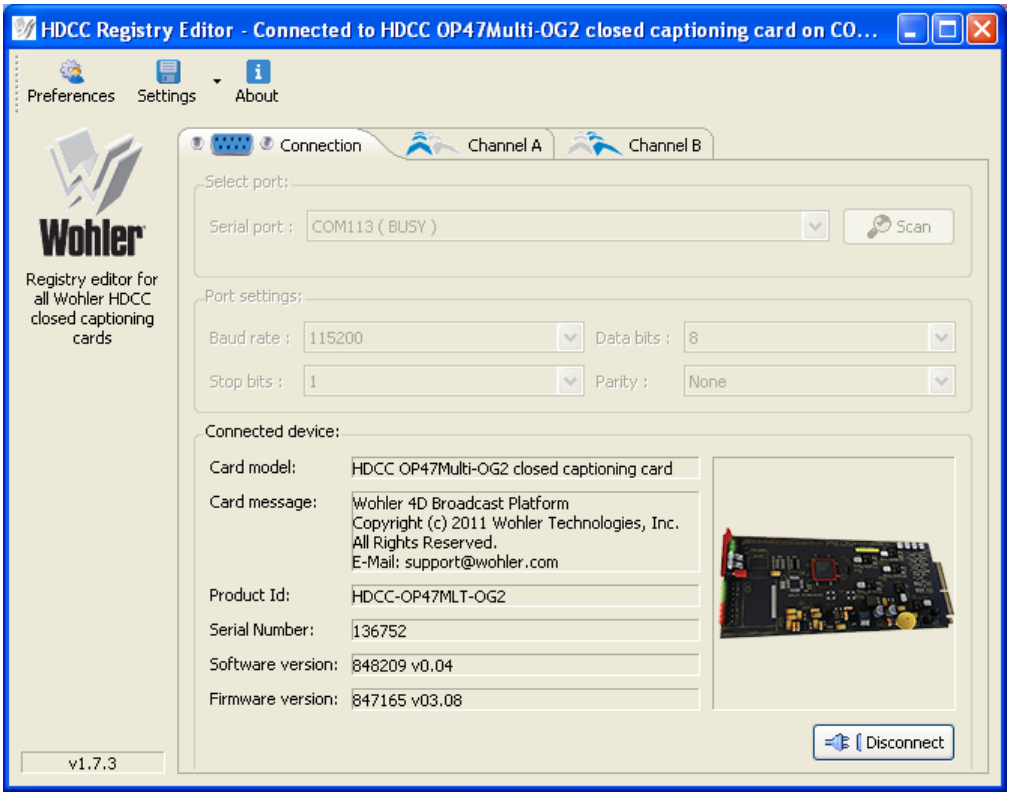
Figure 5–1 HDCC Registry Editor



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**.

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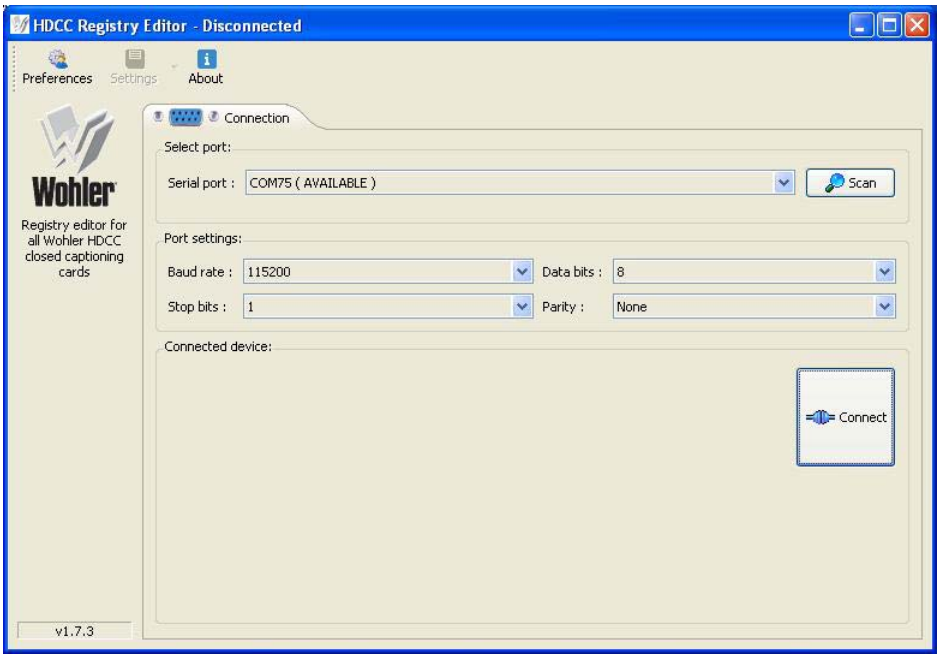
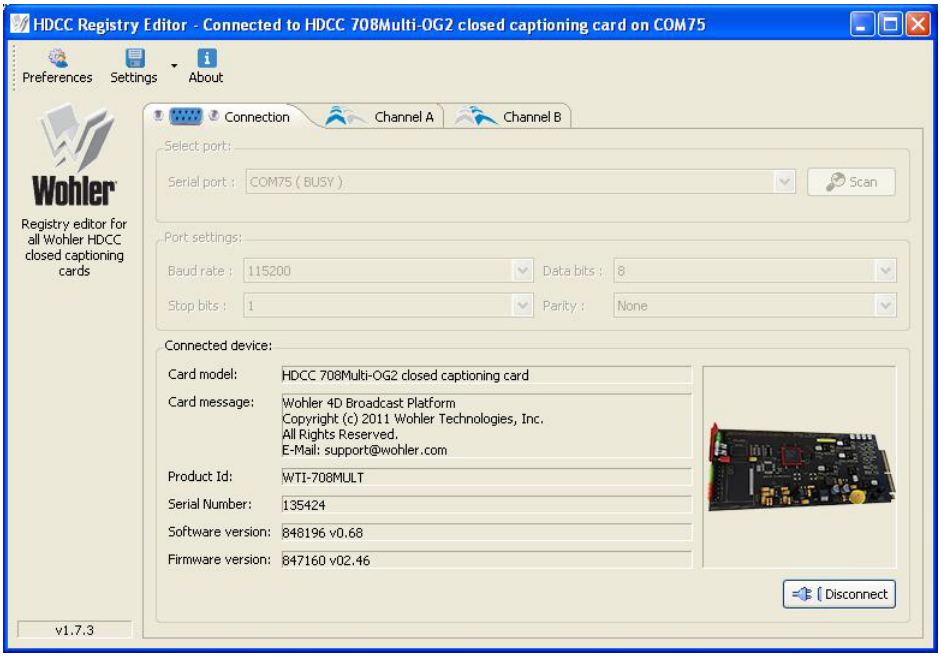
Figure 5–2 Setting the Port Settings



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



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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**: Thes 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 and B Tabs

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. Repeat the steps for Channel B.

Click the **Channel A** tab in HDCCRegEdit and change the settings to customize your configuration. Repeat the steps for **Channel B**.

The following are found in both menus.

Important: Changes to controls do NOT take effect unless the **Apply to Ch A/B** or **Apply to Both Channels** button is pressed.

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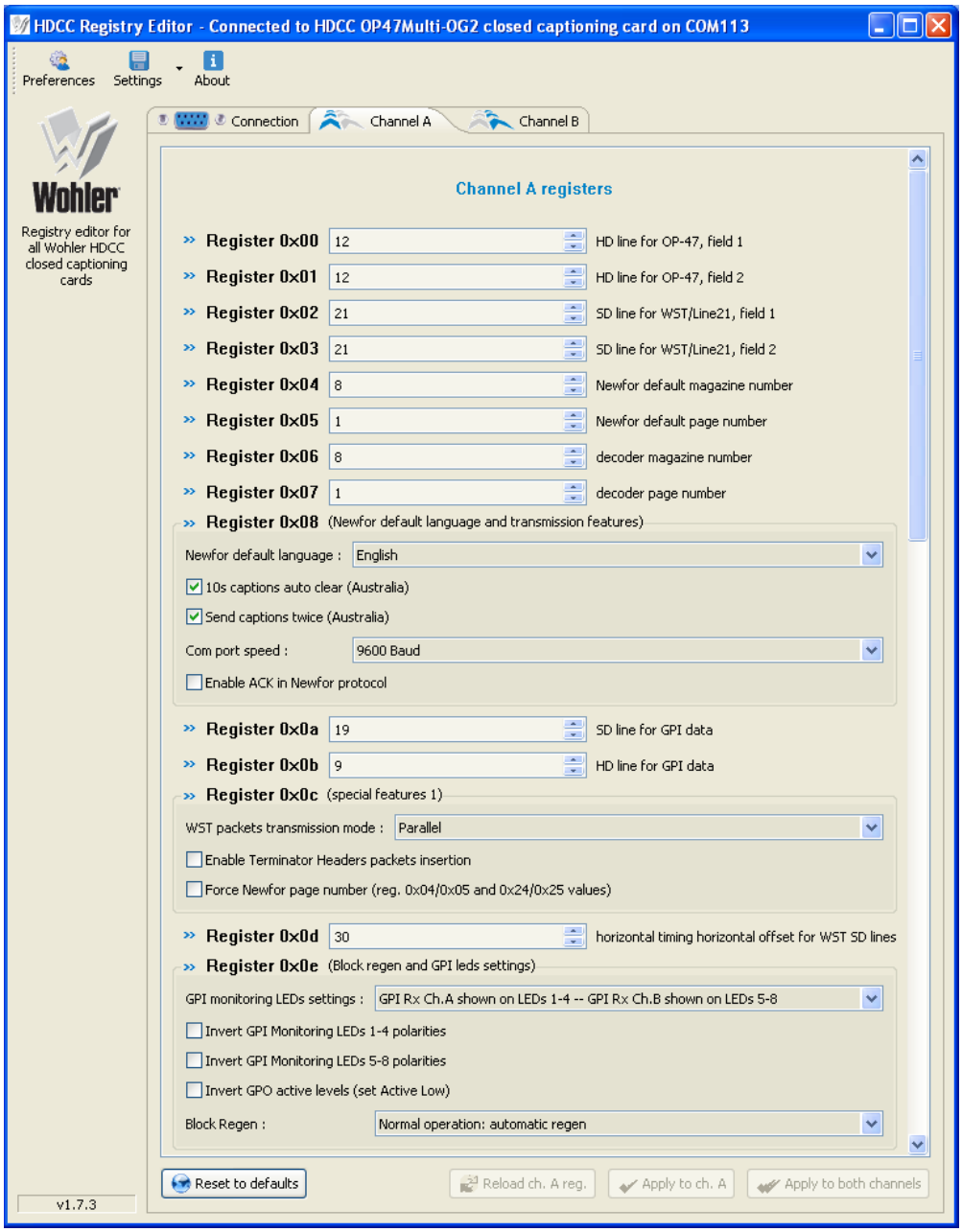
Figure 5–4 Channel A Settings (Top)



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Scroll down to see the rest of the register values (shown in Figure 5–5 below).

Figure 5–5 Channel A Settings (Center)

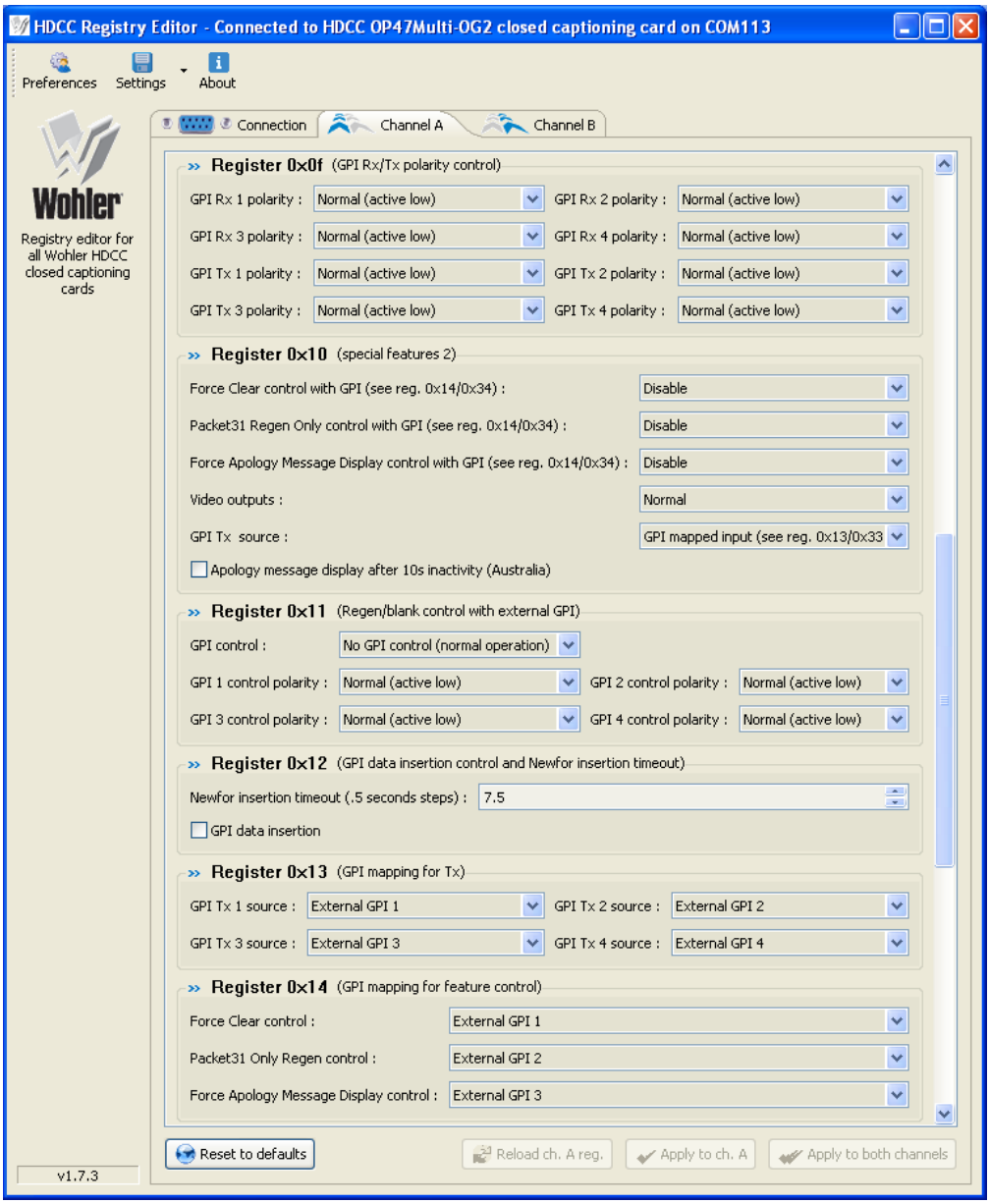

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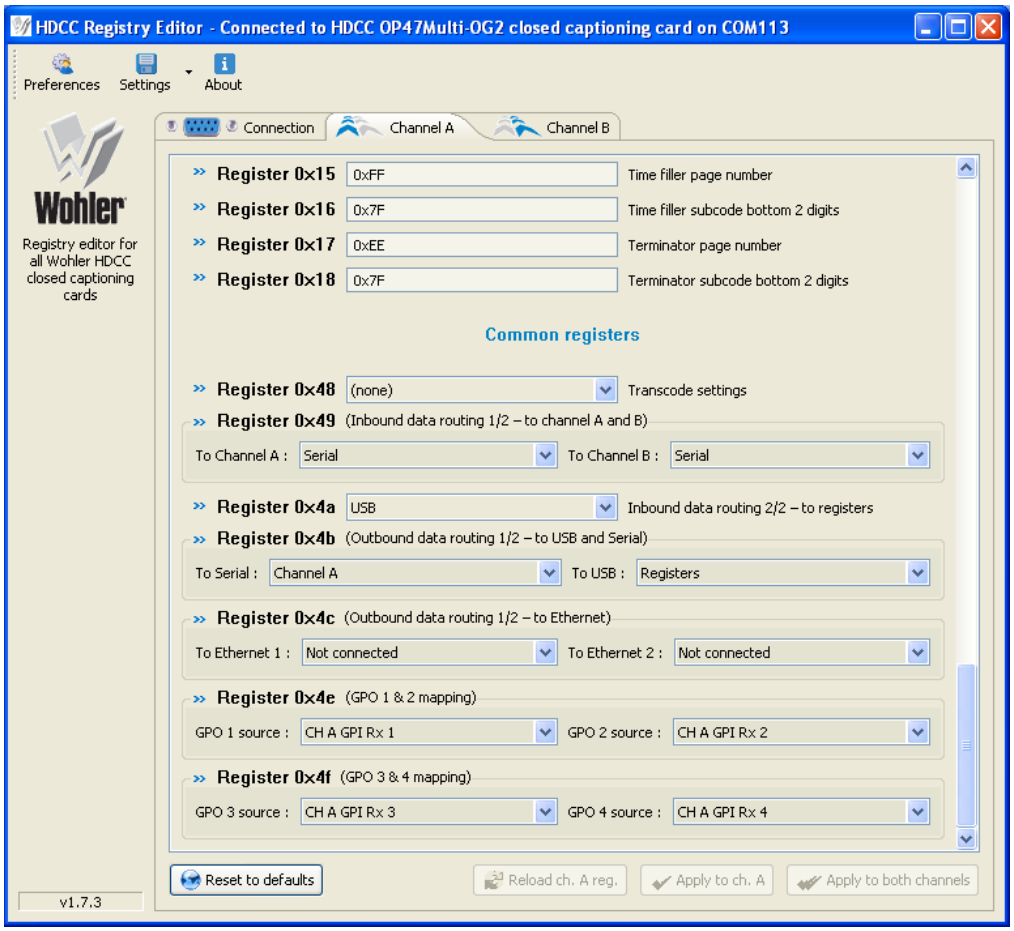
Figure 5–6 Channel A Settings (Bottom)



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.

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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 OP47 Insertion line, Field 1, ChA** and **HD Line for OP47 Insertion line, Field 2, ChA** (if OP-47) or **SD Line for OP47 Insertion Line, Field 1, ChA** and **SD Line for OP47 Insertion Line, Field 2, ChA** (if WST).

   Note: The HDCC's default line numbers have been chosen 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 output is raw, **WST** (if SD) or **OP-47** (if HD).

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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 21).

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 OP47 Insertion line, Field 1, ChA** and **HD Line for OP47 Insertion line, Field 2, ChA** (if OP-47) or **SD Line for OP47 Insertion Line, Field 1, ChA** and **SD Line for OP47 Insertion Line, Field 2, ChA** (if WST).

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

Decoded caption data should be output from the RS-232 port. Caption data output is raw, **WST** (if SD) or **OP-47** (if HD).

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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 OP47 Insertion line, Field 1, ChA / B** and **HD Line for OP47 Insertion line, Field 2, ChA / B** (if OP-47) or **SD Line for OP47 Insertion Line, Field 1, ChA** / B and **SD Line for OP47 Insertion Line, Field 2, ChA / B** (if WST).
3. Click **Apply to ch. A / B**.

Decoded caption data should be output from your selected connectivity method. Caption data output is raw, **WST** (if SD) or **OP-47** (if HD).

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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 OP47 Insertion line, Field 1, ChA** and **HD Line for OP47 Insertion line, Field 2, ChA** (if OP-47) or **SD Line for OP47 Insertion Line, Field 1, ChA** and **SD Line for OP47 Insertion Line, Field 2, ChA** (if WST).

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

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

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How do I encode captions on Channel B using the Ethernet 2 Virtual Serial Port?

Situations: You have an incoming video stream on Channel B and want to encode captions on it and using data supplied by the Ethernet 1 Virtual Serial Port.

Preparation: Make sure an SDI cable with a valid 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 that can be used by your caption generator.

Process:

1. On the **Channel B** page, set **To Channel B** to **Ethernet 2** and set **To Ethernet 2** to **Not connected**. Set **COM ports speed** to the 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 OP47 Insertion line, Field 1, ChB** and **HD Line for OP47 Insertion line, Field 2, ChB** (if OP-47) or **SD Line for OP47 Insertion Line, Field 1, ChB** and **SD Line for OP47 Insertion Line, Field 2, ChB** (if WST).

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

Caption data supplied on **Ethernet 2** will be encoded on the video stream coming out of **CHB OUT**.

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How do I encode captions on EITHER channel using ANY port?

Situations: You want to generalize the encoding process.

Preparation: A cable with a video stream must be connected to the channel you'll use for encoding (if you'd like, you can use both channels for simultaneous encoding 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 provide caption data for encoding.

Process:

1. On the **Channel A / B** page (depending on which channel you're using), set **To Channel A / B** to **RS-232**, **Ethernet 1**, **Ethernet 2**, or **USB**, and set **To Serial** / **To Ethernet 1** / **To Ethernet 2** / **To USB** to **Not connected**. 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 OP47 Insertion line, Field 1, ChA** and **HD Line for OP47 Insertion line, Field 2, ChA** (if OP-47) or **SD Line for OP47 Insertion Line, Field 1, ChA** and **SD Line for OP47 Insertion Line, Field 2, ChA** (if WST).

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

Caption data supplied by your selected connectivity method will be encoded on the video stream coming out of the output for your selected channel.

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

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

Preparation: Make sure an SDI cable with a valid captioned video stream is connected to input **CHA IN**, the destination video stream is connected to **CHB 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 A** page, set **Transcode settings** to **A->B (both fields)**, **A->B (field 1)**, or **A->B (field 2)** to bridge captains from both fields of A to B, odd fields of A to B, or even fields of A to B, respectively.

2. On the **Channel A** page, set the video line of the caption source in **HD Line for OP47 Insertion line, Field 1, ChA** and **HD Line for OP47 Insertion line, Field 2, ChA** (if OP-47) or **SD Line for OP47 Insertion Line, Field 1, ChA** and **SD Line for OP47 Insertion Line, Field 2, ChA** (if WST).

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

4. On the **Channel B** page, set the video line of the caption destination in **HD Line for OP47 Insertion line, Field 1, ChB** and **HD Line for OP47 Insertion line, Field 2, ChB** (if OP-47) or **SD Line for OP47 Insertion Line, Field 1, ChB** and **SD Line for OP47 Insertion Line, Field 2, ChB** (if WST)

5. Click **Apply to ch. B**.

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

Note: Set **Transcode settings** back to **None** in order to resume encoding or decoding.

Note: Bridging can go in either direction. Select one of the **B->A** options in **Transcode settings** to bridge captions from **CHB IN** to **CHA IN**.

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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. 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).

3. 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.

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

5. 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.

6. 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.

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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.

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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.

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

Figure 6–1 on page 83 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.

Notice: As of version 3.19 of the firmware, general purpose outputs driven by received bits will be de-asserted if the channel's video signal is interrupted. The bits must be re-transmitted in order to be asserted on the general purpose outputs after the video signal is restored.

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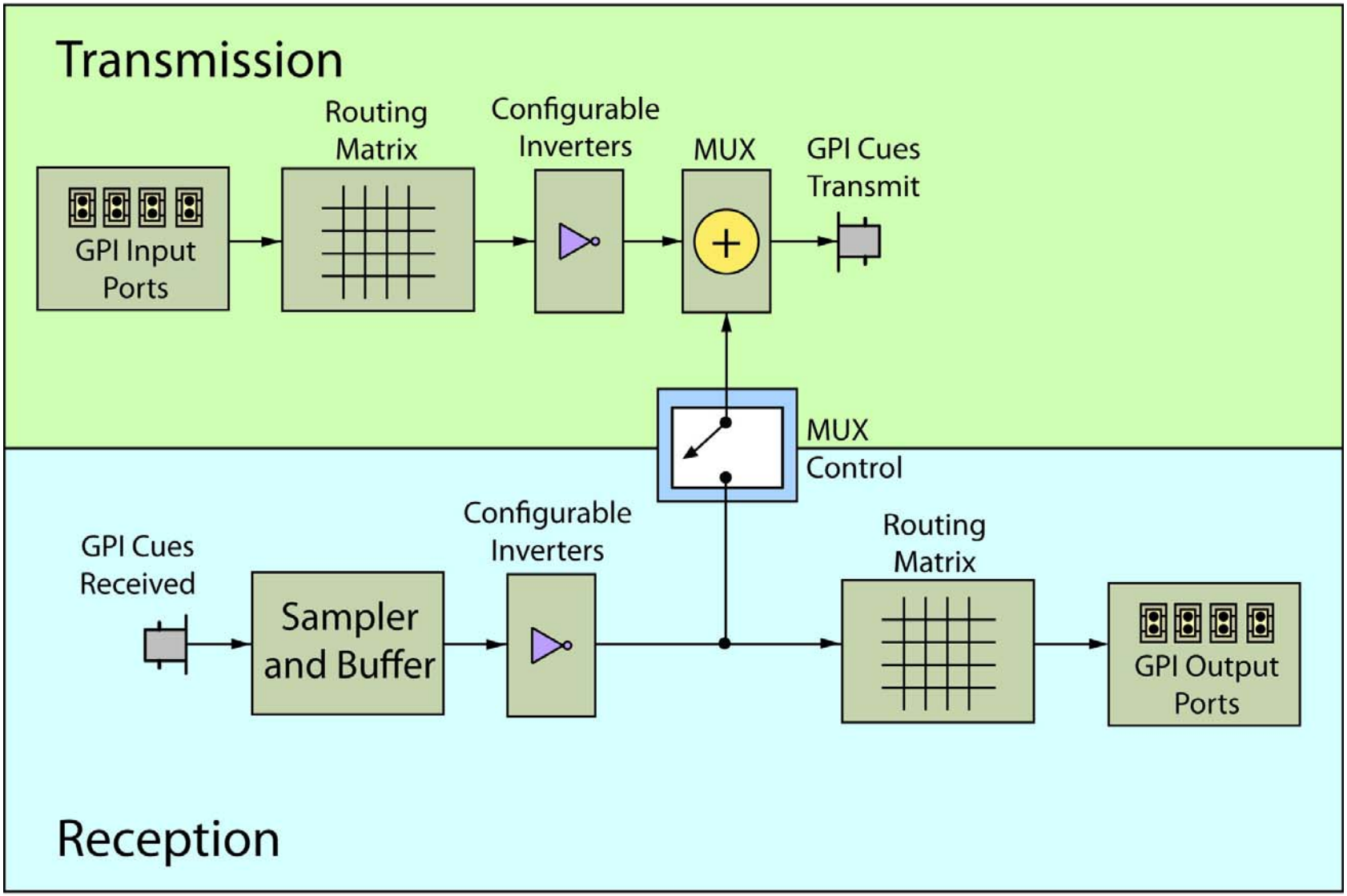
Figure 6–1 GPI/O Functional Diagram



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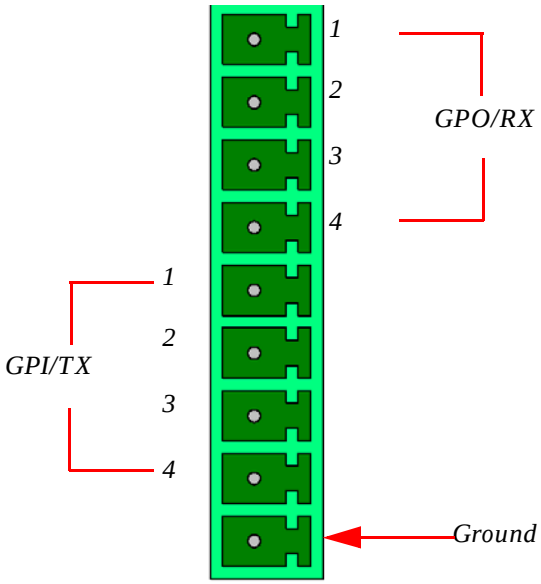
GPI/O Connector

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.

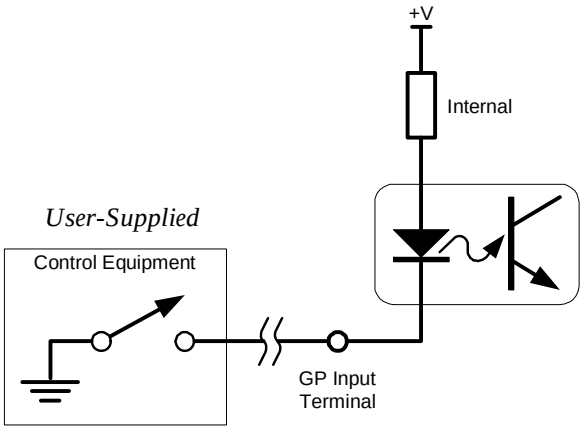
Figure 6–2 GPI/O Connector Diagram



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



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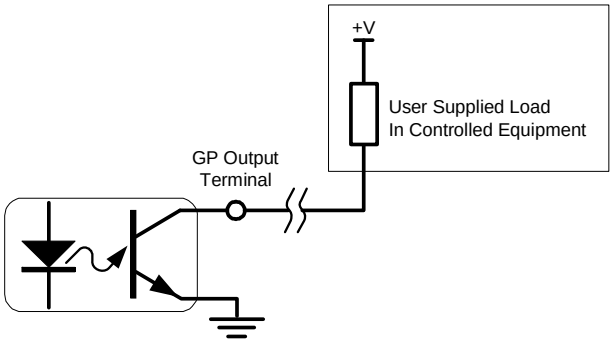
GPOs

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 127 in Chapter 4 for connectivity.)

Figure 6–4 Output Diagram



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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

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Background

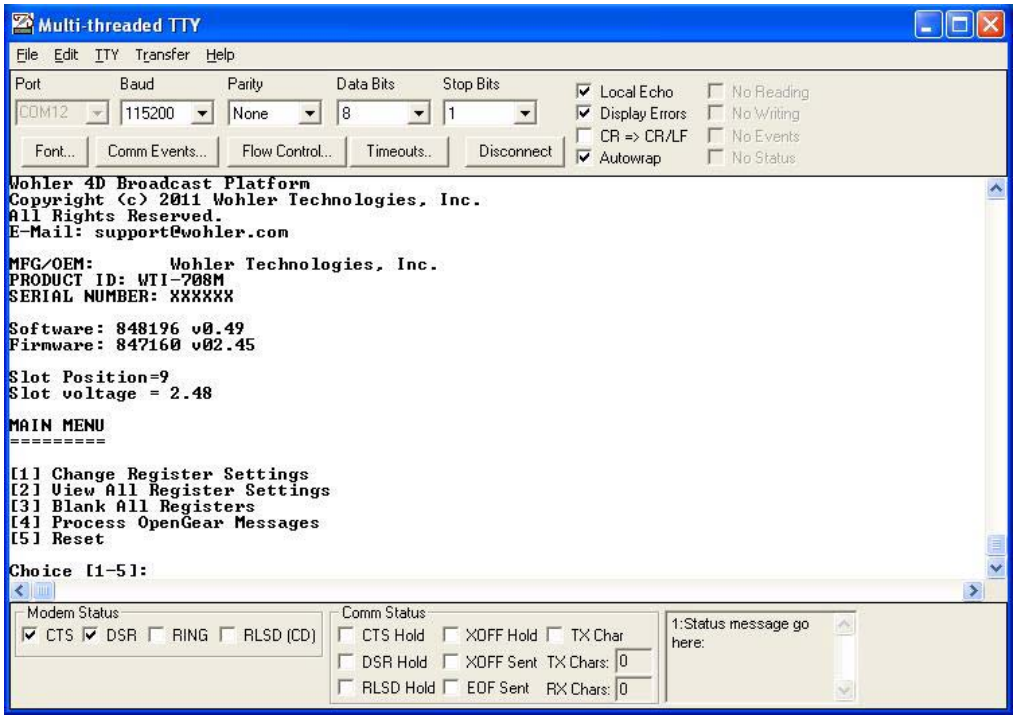
The HDCC card's operation is governed by several registers. These registers are modified automatically if you use either the DashBoard or HDCCRegEdit user interface.

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 Figure 7–2 below. The sections below describe how it is used.

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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, install the **BOOTOPT** jumper (see Figure 7–2 on page 90).

   Note: For MC-1RU users, the jumper should already be installed.

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 Figure 7–1 on page 88.

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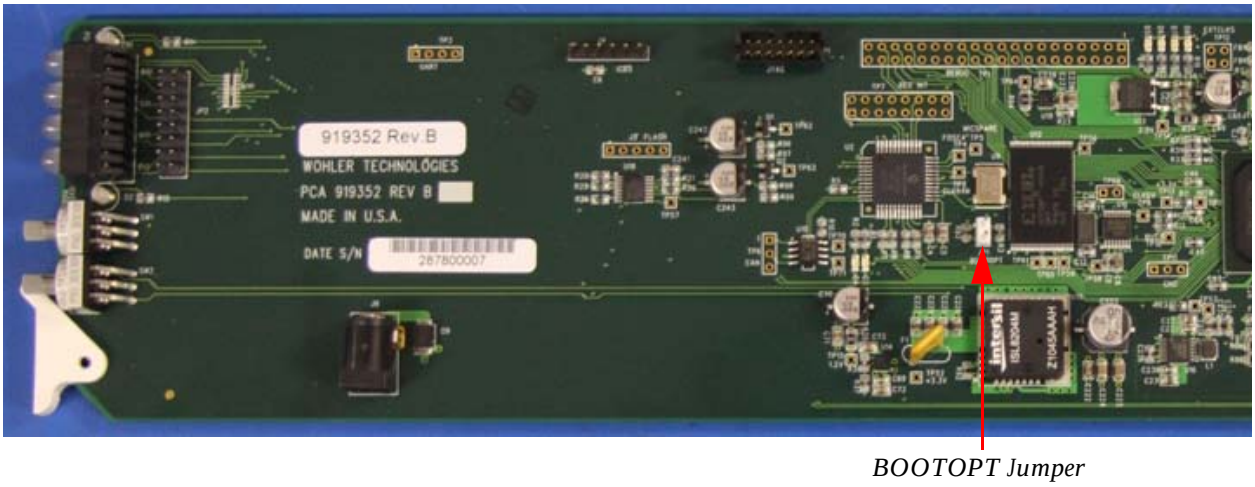
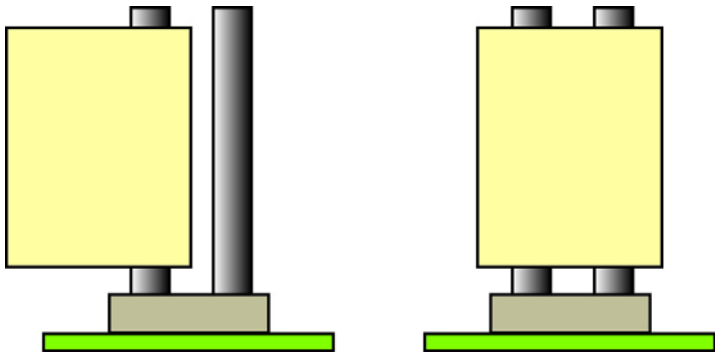
9. Power off the card, remove the **BOOTOPT** jumper, and re-power the card to restore normal operation. (See Figure 7–2 on page 90 for details.)

   Note: MC-1RU users should not remove the **BOOTOPT** jumper.

Figure 7–2 BOOTOPT Jumper Location





BOOTOPT Jumper Removed = Normal Operation

BOOTOPT Jumper Installed = Access Engineering Menu

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.

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

2. Power down the card, install the **BOOTOPT** jumper (see Figure 7–2 above) and re-power the card.

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

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

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

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

7. Press the Enter key to display the Main Menu. (See Figure 7–1 on page 88).

8. Power off the card, remove the **BOOTOPT** jumper, and re-power the card to restore normal operation. (See Figure 7–2 on page 90 for details.)

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

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

The following instructions are configuration via DashBoard.

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

2. Power down the card, install the **BOOTOPT** jumper (see Figure 7–2 on page 90), connect a USB cable between the host computer and the HDCC's USB connector, and re-power the card.

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

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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 88).

8. Power off the card, remove the **BOOTOPT** jumper, and re-power the card to restore normal operation. (see Figure 7–2 on page 90)

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

1. Power down the card, set **SW3** to **On**, install **BOOTOPT** jumper, connect a USB cable from your host computer to the USB connector on the front edge of the HDCC card, and re-power the card. (See Figure 7–2 on page 90 for details.)

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

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

4. Press the Enter key to display the Main Menu. (See Figure 7–1 on page 88).

5. Power off the card, remove the **BOOTOPT** jumper, and re-power the card to restore normal operation. (See Figure 7–2 on page 90 for details.)

Main Menu

The Main Menu provides several functions for quick and easy modifications. You can also find software and firmware version listed above the menu. Refer to Figure 7–3 on page 93 and the following descriptions of each menu option for details.

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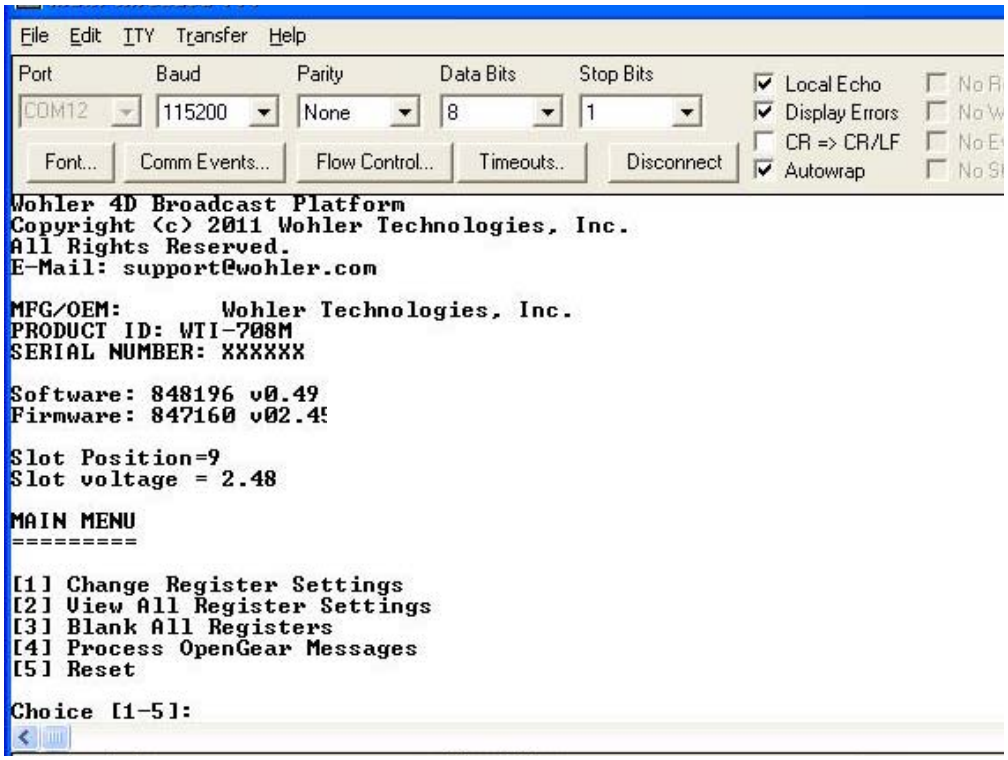
Figure 7–3 Main Menu



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.

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

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

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

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APPENDIX A
Registers

Introduction

Overview

This appendix explains how to access the engineering registers to configure the HDCC card for your particular system.

Topics

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Changing the Registers

You can modify the registers directly using the Terminal. Refer to Chapter 7: Terminal on page 87.

Important: However, 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.

Register Settings

Table A–1 Register Table Summary

Channel A	Channel B	Description	Encoding	EU Default	AUST Default
00	20	HD-Field 1 OP-47 Insertion Line	Hex	0A	0C
01	21	HD-Field 2 OP-47 Insertion Line	Hex	0A	0C
02	22	SD-Field 1 WST Insertion Line	Hex	0A	15
03	23	SD-Field 2 WST Insertion Line	Hex	0A	15
04	24	Default Newfor Magazine Number	Hamming	15 (00)	15 (00)
05	25	Default Newfor Page Number	BCD	88	01
06	26	Decoder Magazine Number	Hamming	15 (00)	15 (00)
07	27	Decoder Page Number	BCD	88	01
08	28	Default Newfor Languages and Transmission	Figure A–1	00	18
09	29	Horizontal Timing Offset for GPI SD Line	Hex	Reserved	
0A	2A	SD Line Number for GPI Data	Hex	0D	13
0B	2B	HD Line Number for GPI Data	Hex	0D	09
0C	2C	Special Features 1	Figure A–2	00	00
0D	2D	Horizontal Timing Offset for WST SD Line	Hex	1E	1E
0E	2E	Block Regeneration and GPI LED Settings	Figure A–3	00	00
0F	2F	GPI Rx/Tx Polarity Control	Figure A–4	00	00
10	30	Special Features 2	Figure A–5	80	00
11	31	Regen/Blank Control with GPI	Figure A–6	00	00
12	32	GPI Data Insertion Control and Newfor Insertion Timeout	Figure A–7	0F	0F
13	33	GPI Mapping for Tx	Figure A–8	E4	E4
14	34	GPI Mapping for Feature Control	Figure A–9	E4	E4
15	35	Time Filler Page Number	Hex	FF	FF
16	36	Time Filler Subcode Bottom 2 Digits	Hex	7E	7F
17	37	Terminator Page Number	Hex	FF	EE
18	38	Terminator Subcode Bottom 2 Digits	Hex	7E	7F
19	39 to FD	Reserved for future use			
FE		GPO 1 and 2 Mapping	Figure A–10	10	10
FF		GPO 3 and 4 Mapping	Figure A–11	32	32

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Table A–2 Register Settings 00h to 07h and 20h to 27h

Ch A	Ch B	Description	EU Default	AUST Default
00	20	**HD OP-47 Insertion Line, Field 1** *Min: 07—Max: 19* Sets the actual Field-1 line number that the OP47 data will be inserted. The OP47 data is inserted into the HD-VANC. The HD-HANC is not manipulated. Note: Since the OP47 data overwrites any existing data in the VANC, verify that no other data is already present on this line.	0A	0C
01	21	**HD OP-47 Insertion Line, Field 2** *Min: 07—Max: 19* Sets the actual Field-2 line number that the OP47 data will be inserted. The OP47 data is inserted into the HD-VANC. The HD-HANC is not manipulated. Note: Since the OP47 data overwrites any existing data in the VANC, verify that no other data is already present on this line.	0A	0C
02	22	**SD WST Insertion Line, Field 1** *Min: 06—Max: 16* Sets the actual Field-1 line number that the WST data will be inserted. The WST Subtitle Line complies with EBU ETS-300-706 Level 1 specifications. Note: Since the WST data overwrites any existing data in the VBI, verify that no other data is already present on this line.	0A	15
03	23	**SD WST Insertion Line, Field 2** *Min: 06—Max: 16* Sets the actual Field-2 line number that the WST data will be inserted. The WST Subtitle Line complies with EBU ETS-300-706 Level 1 specifications. Note: Since the WST data overwrites any existing data in the VBI, verify that no other data is already present on this line.	0A	15

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Table A–2 Register Settings 00h to 07h and 20h to 27h

Ch A	Ch B	Description	EU Default	AUST Default
04	24	**Default Newfor Magazine Number** *Min: 15 (00)—Max: 2F (07)* (*Hamming Encoded* Refer to Table A–14 on page 122.) Used by the caption inserter only, this register value sets the default magazine number that will be used when inserting subtitles on either a HD or SD video stream in the event that the system fails to receive the appropriate command to change the magazine number. *Note: Interacts with Register 0C*	15 (00)	15 (00)
05	25	**Default Newfor Page Number** *Min: 00—Max: 99* *(BCD Encoded)* Sets the default page number that will be used when inserting subtitles on either a HD or SD video stream in the event that the system fails to receive the appropriate command to change the page number. *Note: Interacts with Register 0C*	88	01
06	26	**Decoder Magazine Number** *Min: 15 (00)—Max: 2F (07)* (*Hamming Encoded* Refer to Table A–14 on page 122.) Sets the magazine number that will be used by the monitoring subtitle decoder when decoding subtitles from either a HD or SD video stream.	15 (00)	15 (00)
07	27	**Decoder Page Number** *Min: 00—Max: 99* *(BCD Encoded)* Sets the page number that will be used by the monitoring subtitle decoder when decoding subtitles from either a HD or SD video stream.	88	01

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Figure A–1 Registers 08h to 28h

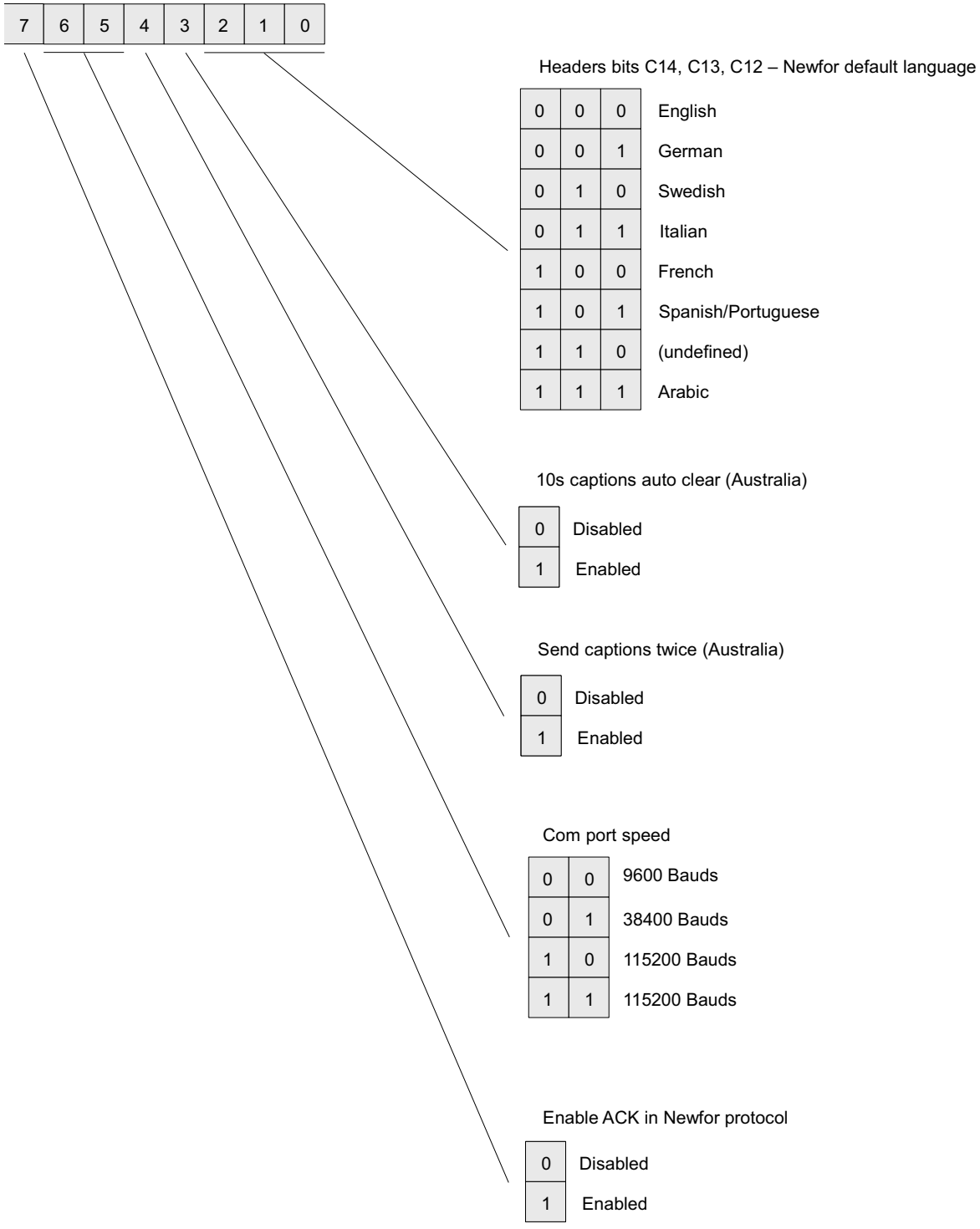

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Table A–3 Register Settings 08h to 0Bh and 28h to 2Bh

<table>
<tr><th>Ch A</th><th>Ch B</th><th>Description</th><th>EU Default</th><th>AUST Default</th></tr>
<tr><td>08</td><td>28</td><td>Default Newfor Languages and Transmission Features
Min: N/A—Max: N/A
Set Newfor protocol options, as well as some subtitle transmission options. Also sets the default language that will be specified when inserting subtitles on either a HD or SD video stream in the event that the system fails to receive the appropriate command to set the required language.
<table><tr><th>Bit(s)</th><th>Function</th></tr><tr><td>7</td><td>ACK / NAK support for Newfor standard:
0 = Disabled
1 = Enabled</td></tr><tr><td>6:5</td><td>Baud Rate for Newfor Protocol:
00 = 9600
01 = 38400
1x = 115200</td></tr><tr><td>4</td><td>Send Caption Twice: (Australia)
0 = Disabled
1 = Enabled</td></tr><tr><td>3</td><td>10-Second Caption Clear: (Australia)
0 = Disabled
1 = Enabled</td></tr><tr><td>2:0</td><td>Newfor Default Language:
000 = English
001 = German
010 = Swedish
011 = Italian
100 = French
101 = Spanish / Portuguese
110 = Undefined
111 = Arabic</td></tr></table></td><td>00</td><td>18</td></tr>
</table>

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Table A–3 Register Settings 08h to 0Bh and 28h to 2Bh

Ch A	Ch B	Description	EU Default	AUST Default
09	29	**Horizontal Timing Offset for GPI SD Line** *Min: N/A—Max: N/A*	Reserved	
0A	2A	**SD Line Number for GPI Data** *Min: 06—Max: 16* Sets the line number that will be used when inserting and decoding GPIs from an SD video stream. Note: Since the GPI data overwrites any existing data in the VBI, verify that no other data is already present on this line. **WARNING**: Do not use the same line number that is used for caption insertion as this data will overwite.	0D	13
0B	2B	**HD Line Number for GPI Data** *Min: 07—Max: 19* (Value in hex: Default 09h = Line 9) Sets the line number that will be used when inserting and decoding GPI from an HD video stream. Note: Since the GPI data overwrites any existing data in the VANC, verify that no other data is already present on this line. **WARNING**: Do not use the same line number that is used for caption insertion as this data will overwite.	0D	09

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Figure A–2 Registers 0Ch to 2Ch

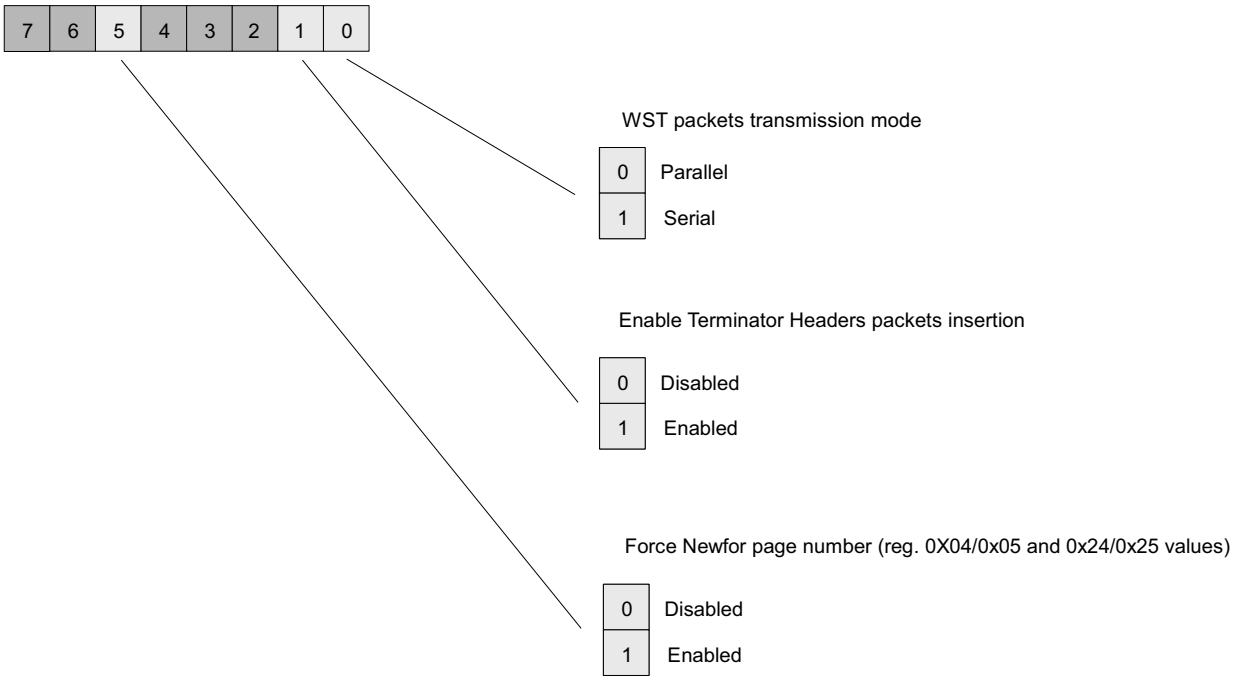

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Table A–4 Register Settings 0Ch to 0Dh and 2Ch to 2Dh

<table>
<tr><th>Ch A</th><th>Ch B</th><th>Description</th><th>EU Default</th><th>AUST Default</th></tr>
<tr><td>0C</td><td>2C</td><td>Special Features 1
Min: N/A—Max: N/A
This register is used to set some subtitles transmission options. And also to force the default page number that will be specified when inserting subtitles on either a HD or SD video stream even though the system receives the appropriate command to set the subtitles page number.
<table><tr><th>Bit(s)</th><th>Function</th></tr><tr><td>7:6</td><td>Unused</td></tr><tr><td>5</td><td>Force Newfor Page Number (Register values: 04h / 24h and 05h / 25h):
0 = Disabled
1 = Enabled</td></tr><tr><td>4:2</td><td>Unused</td></tr><tr><td>1</td><td>Enable Terminaor Headers Packets Insertion:
0 = Disabled
1 = Enabled</td></tr><tr><td>0</td><td>WST Packets Transmission Mode:
0 = Parallel
1 = Serial</td></tr></table></td><td>00</td><td>00</td></tr>
<tr><td>0D</td><td>2D</td><td>Horizontal Timing Offset for WST SD Lines
Min: 00—Max: FF</td><td>1E</td><td>1E</td></tr>
</table>

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Figure A–3 Registers 0Eh and 2Eh

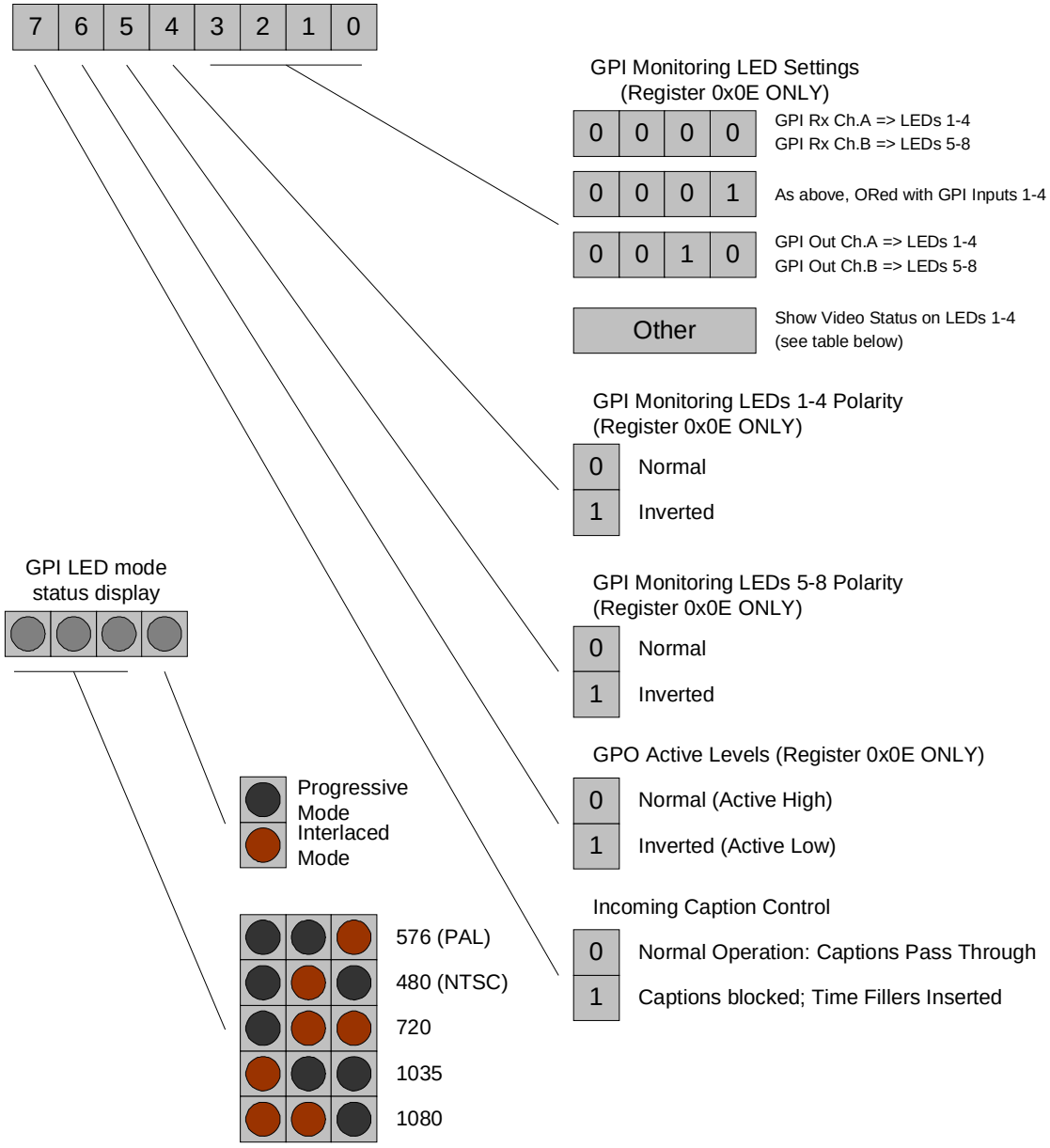

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Table A–5 Register Settings 0Eh and 2Eh

<table>
<tr><th>Ch A</th><th>Ch B</th><th>Description</th><th>EU Default</th><th>AUST Default</th></tr>
<tr><td>0E</td><td>2E</td><td>
Block Regeneration and GPI LED Settings
Min: N/A—Max: N/A

This register is used to control miscellaneous functions on the card including the front status LED's.

<table>
<tr><th>Bit(s)</th><th>Function</th></tr>
<tr><td>7</td><td>Incoming Caption Control:
0 = Normal operation: Captions pass through.
1 = Incoming captions blocked; time fillers inserted when no Newfor input.</td></tr>
<tr><td>6:4</td><td>Bits 6 through 4 apply to Register 0Eh only

<table>
<tr><th>Bit</th><th>Description</th><th>Values</th></tr>
<tr><td>6</td><td>Physical GPO Active Levels (Register 0Eh only)</td><td rowspan="3">0=Normal (active high
1=Inverted (active low</td></tr>
<tr><td>5</td><td>GPI Monitoring LEDs 5 to 8 Polarity</td></tr>
<tr><td>4</td><td>GPI Monitoring LEDs 1 to 4 Polarity</td></tr>
</table>
</td></tr>
<tr><td>3:0</td><td>LED Mode Selection:
0000 = GPI Rx Ch. A shown on LEDs 1 thru 4 (Register 03h) and GPI Rx Ch. B shown on LEDs 5 to 8 (Register 2Eh)
0001 = As above, ORed with GPIs 1 to 4
0010 = GPI Tx Ch. A shown on LEDs 1 to 4 (Register 0Eh) and GPI Tx Ch. B shown on LEDs 5 to 8 (Register 2Eh).
0011 = Engineering status display
All other values = Show status on LEDs 1 to 4 as shown below

<table>
<tr><th colspan="2">GPI 4</th></tr>
<tr><th>LED</th><th>Description</th></tr>
<tr><td>On</td><td>Interleaved Mode</td></tr>
<tr><td>Off</td><td>Progressive Mode</td></tr>
</table>

<table>
<tr><th rowspan="2">Description</th><th colspan="3">GPI LED</th></tr>
<tr><th>1</th><th>2</th><th>3</th></tr>
<tr><td>576 (PAL)</td><td>Off</td><td>Off</td><td>On</td></tr>
<tr><td>480 (NTSC)</td><td>Off</td><td>On</td><td>Off</td></tr>
<tr><td>720</td><td>Off</td><td>On</td><td>On</td></tr>
<tr><td>1035</td><td>On</td><td>Off</td><td>Off</td></tr>
<tr><td>1080</td><td>On</td><td>Off</td><td>On</td></tr>
</table>
</td></tr>
</table>
</td><td>00</td><td>00</td></tr>
</table>

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Figure A–4 Registers 0Fh and 2Fh

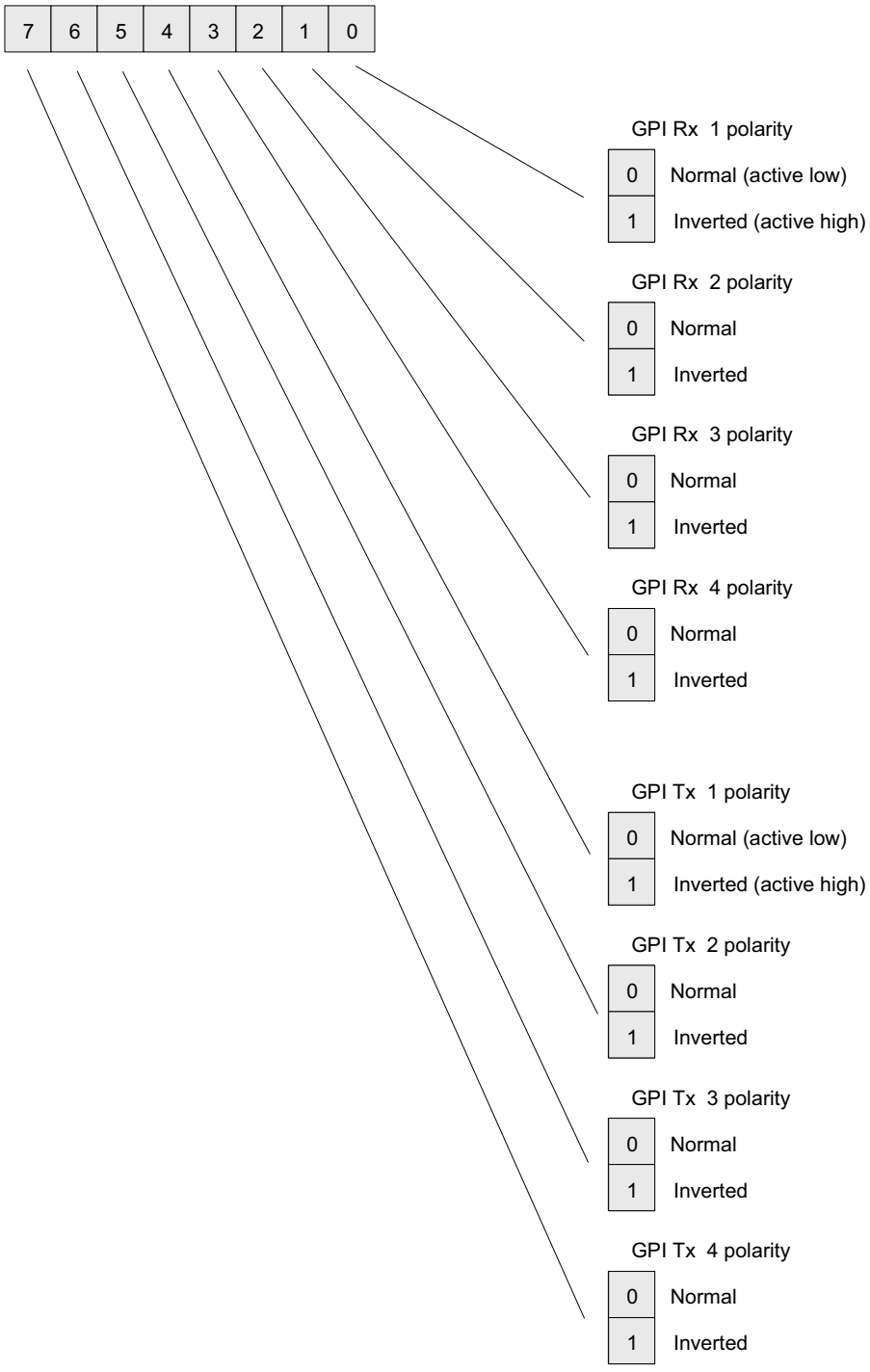

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Table A–6 Register Settings 0Fh and 2Fh

<table>
<tr><th>Ch A</th><th>Ch B</th><th>Description</th><th>EU Default</th><th>AUST Default</th></tr>
<tr><td>0F</td><td>2F</td><td>GPI Rx nd Tx Polarity Control
Min: N/A—Max: N/A
Controls the polarity of the Rx and Tx GPIs for the card.
<table>
<tr><th>Bit(s)</th><th>Type</th><th>Function</th></tr>
<tr><td>7
6
5
4</td><td>Tx Input</td><td>0 = Normal (Active Low)
1 = Inverted (Active High)</td></tr>
<tr><td>3
2
1
0</td><td>Rx Output</td><td>0 = Normal (Active Low)
1 = Inverted (Active High)</td></tr>
</table></td><td>00</td><td>00</td></tr>
</table>

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Figure A–5 Registers 10h and 30h

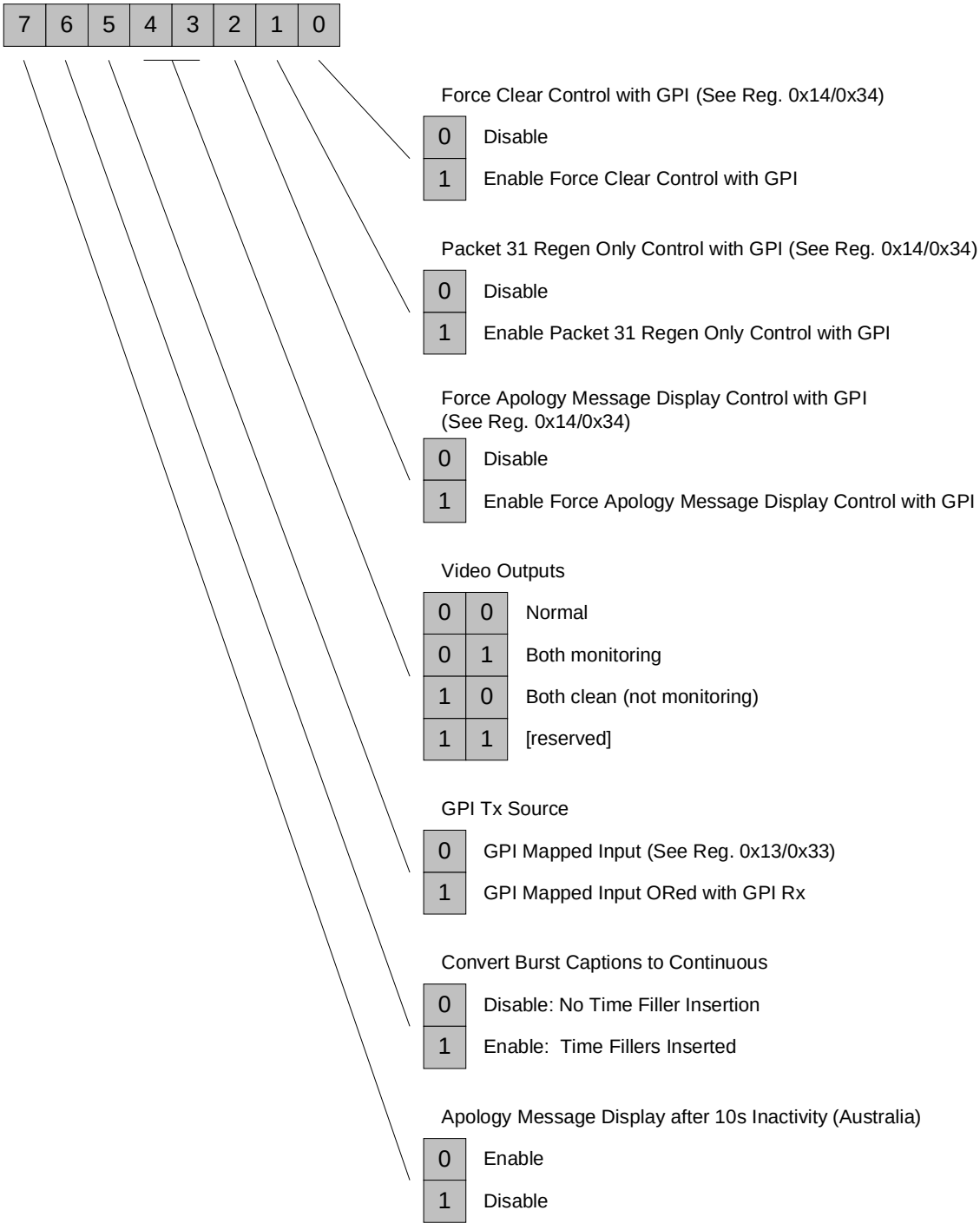

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Table A–7 Register Settings 10h and 30h

<table>
<tr><th>Ch A</th><th>Ch B</th><th>Description</th><th>EU Default</th><th>AUST Default</th></tr>
<tr><td>10</td><td>30</td><td>
Special Function Register—2
Min: N/A—Max: N/A

This register controls miscellaneous functions on the card including the video outputs.

<table>
<tr><th>Bit(s)</th><th>Function</th></tr>
<tr><td>7</td><td>Apology Message Display After 10 sec Inactivity:
0 = Enable 1 = Disable</td></tr>
<tr><td>6</td><td>Convert Burst Options to Continuous
0 = Disable: No time filler insertion
1= Enable: Time fillers inserted</td></tr>
<tr><td>5</td><td>GPI Tx Source
0 = GPI mapped input (see Registers 13h / 33h)
1= GPI mapped input ORed with GPI Rx</td></tr>
<tr><td>4[a]:3</td><td>Video Output s:
00 = Normal
01 = Both outputs set to monitoring
10 = Both outputs are clean
11 = Not Used</td></tr>
<tr><td>2</td><td>Force Apology Message Display Control with GPI (See 14h / 34h).
0 = Enable 1 = Disable</td></tr>
<tr><td>1</td><td>Packet 31 Regen Only control with GPI (See 14h / 34h).
0 = Enable 1 = Disable</td></tr>
<tr><td>0</td><td>Force clear control with GPI (See 14h / 34h):
0 = Enable 1 = Disable</td></tr>
</table>
a Normal (default) = Monitoring O / Ps are 3 and 4; Clean O / Ps are 1 and 2
Monitoring = Burnt-in captions on all O / Ps
Clean = No burnt-in captions on any O / Ps
</td><td>80</td><td>00</td></tr>
</table>

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Figure A–6 Registers 11h and 31h

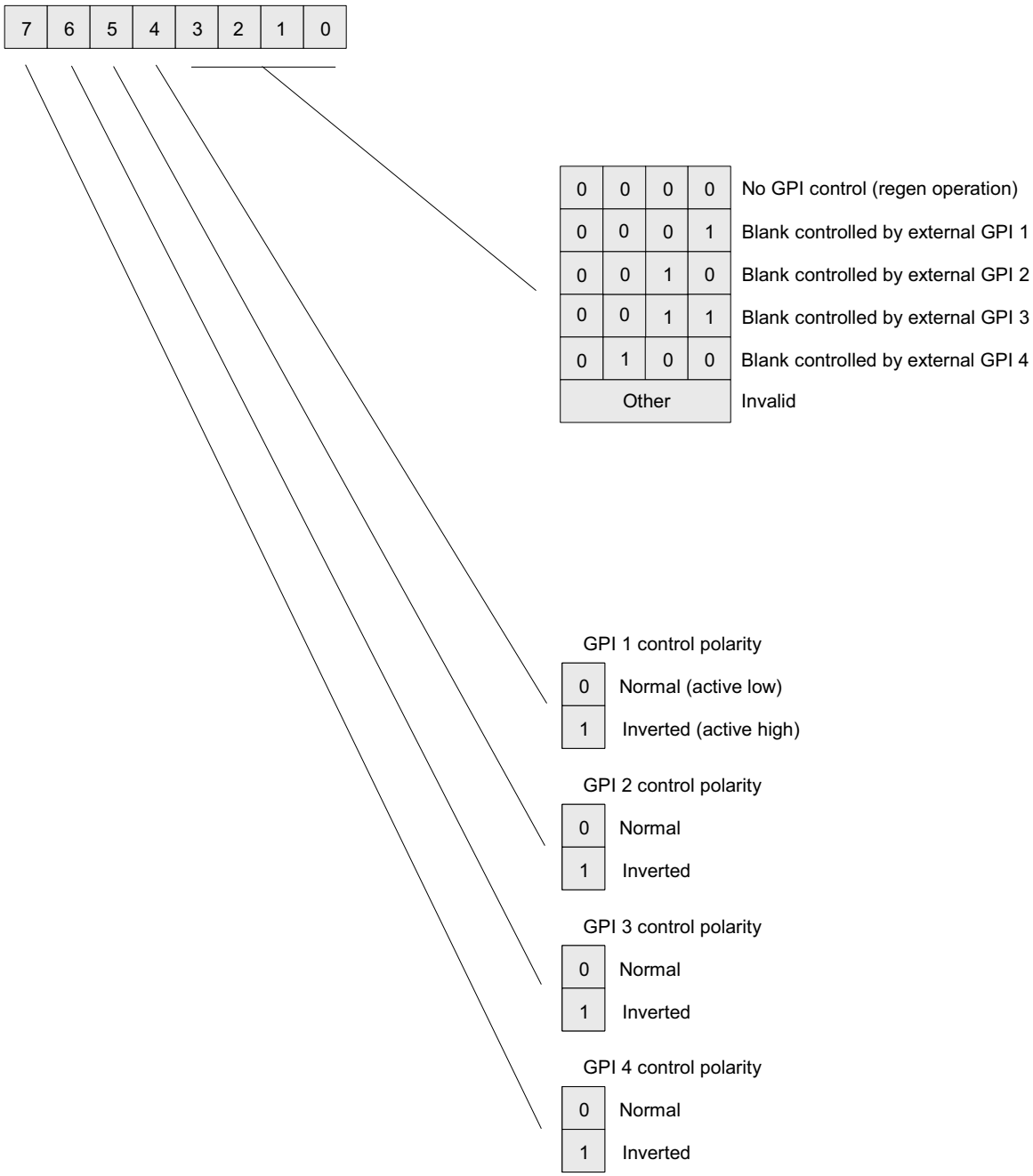

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Table A–8 Register Settings 11h and 31h

<table>
<tr><th>Ch A</th><th>Ch B</th><th>Description</th><th>EU Default</th><th>AUST Default</th></tr>
<tr><td>11</td><td>31</td><td>Bypass Control with External GPI
Min: N/A—Max: N/A
This register assigns a GPI to inhibit the 'regen' operation of subtitle streams already encoded in I/P1 (or I/P2 respectively). When on, the GPI controls whether the incoming subtitles are regenerated or blanked. Special care needs to be taken to assure the GPI selected has not been already assigned to another task.
<table>
<tr><th>Bit(s)</th><th>Function</th></tr>
<tr><td>4
5
6
7</td><td>GPI:
0 = Active Low
1 = Active High</td></tr>
<tr><td>3:0</td><td>GPI Polarity:
0000 = No GPI control: normal regen operation
0001 = GPI 1
0010 = GPI 2
0011 = GPI 3
0100 = GPI 4
All other values = invalid</td></tr>
</table>
</td><td>00</td><td>00</td></tr>
</table>

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Figure A–7 Registers 12h and 32h

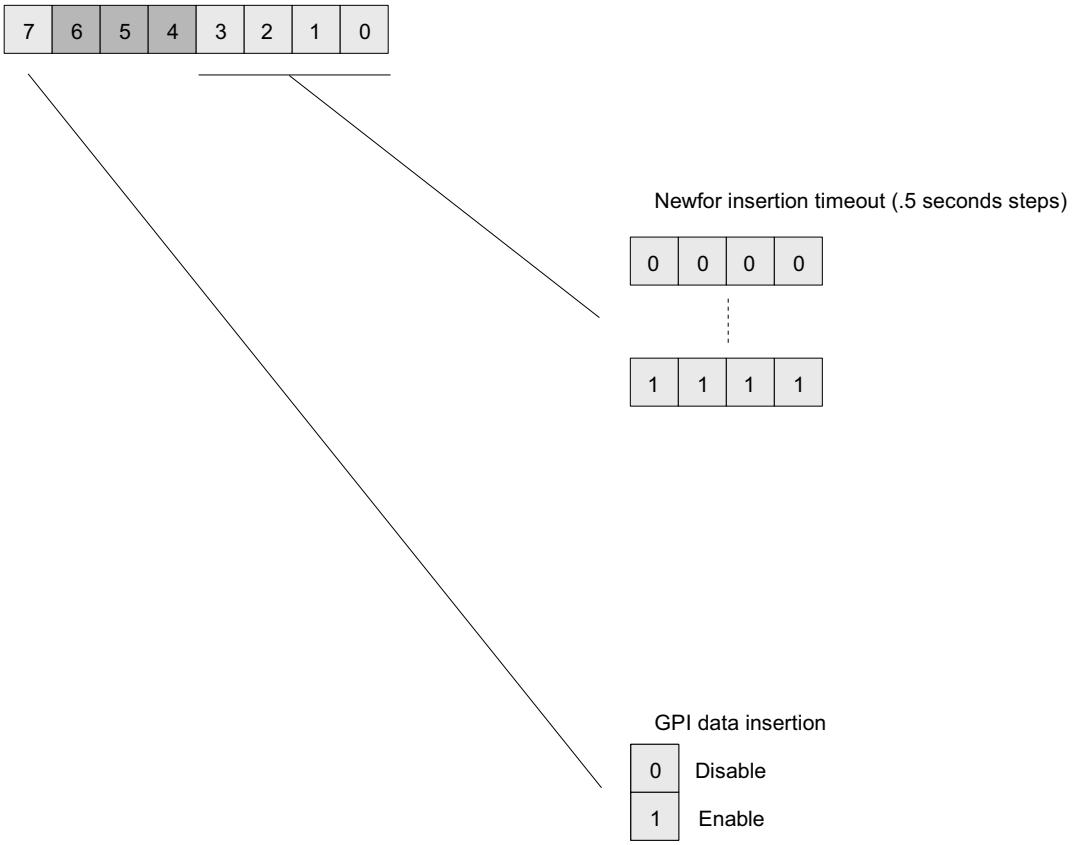

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Table A–9 Register Settings 12h and 32h

<table>
<tr><th>Ch A</th><th>Ch B</th><th>Description</th><th>EU Default</th><th>AUST Default</th></tr>
<tr><td>12</td><td>32</td><td>GPI Data Insertion Control and Newfor Insertion Timeout
Min: N/A—Max: N/A
Bit 7 enables the insertion of GPI data into the video stream.
Bits 0 thru 3 control the timeout settings for subtitle insertion. These bits set the changeover time between loss of Newfor data and the pass-through of input captions when present. If a valid teletext header is present on the input and the timeout has been reached then the card will select this data to be passed through after the timeout has expired. The timeout is reset on the detection of Newfor data.
<table>
<tr><th>Bit(s)</th><th>Function</th></tr>
<tr><td>7</td><td>GPI Insertion:
0 = Off
1 = On</td></tr>
<tr><td>6:4</td><td>Reserved: Set to 0</td></tr>
<tr><td>3:0</td><td>Time Out:
0000 = No timeout (immediate changeover)
0001 = 0.5 second
0010 = 1.0 second
...
1110 = 7.0 seconds
1111 = 7.5seconds</td></tr>
</table></td><td>0F</td><td>0F</td></tr>
</table>

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Figure A–8 Registers 13h and 33h

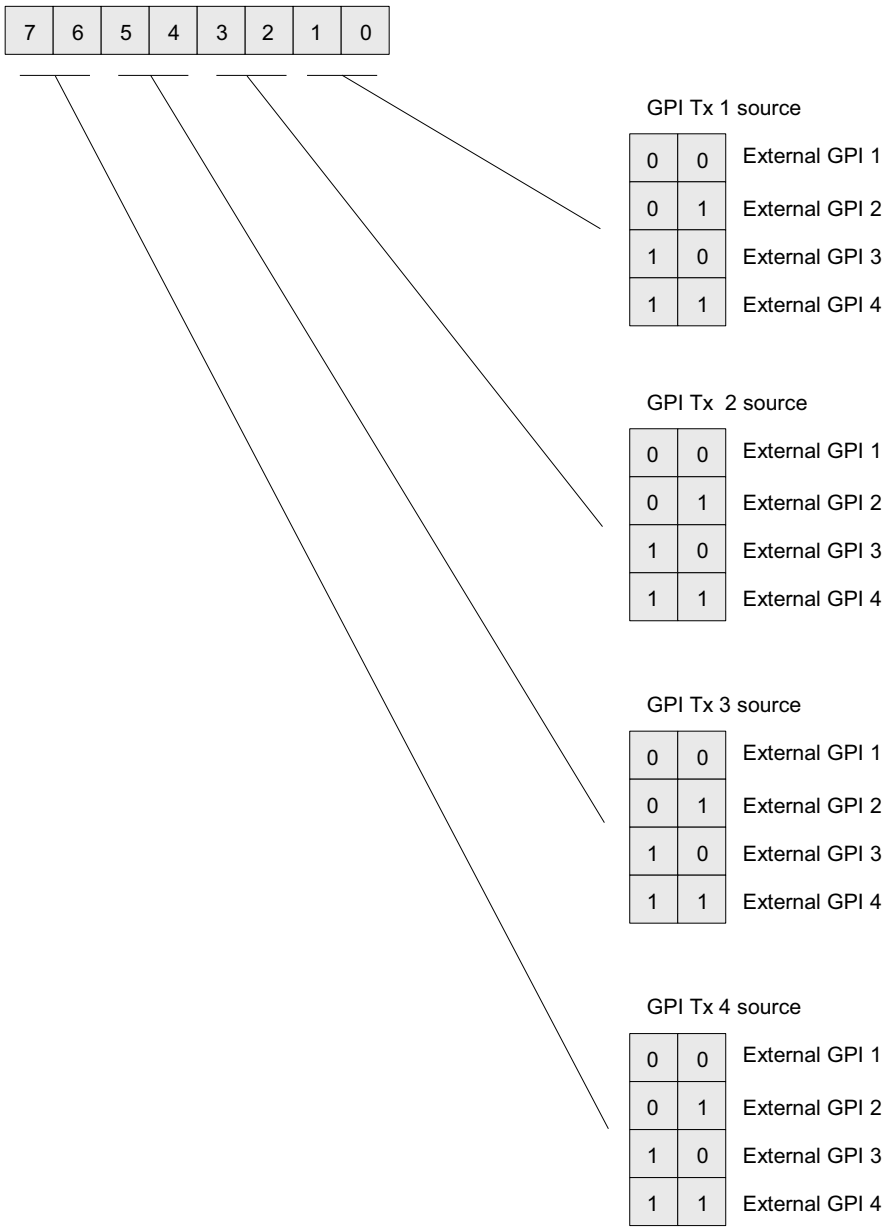

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Table A–10 Register Settings 11h to 1Fh and 31h to 3Fh

<table>
<tr><th>Ch A</th><th>Ch B</th><th>Description</th><th>EU Default</th><th>AUST Default</th></tr>
<tr><td>13</td><td>33</td><td>GPI Mapping for Tx
Min: N/A—Max: N/A
This register allows you assign physical GPIs to any of the four virtual GPIs transmitted by the card. The card transmits four GPIs but in some instances, users may need to re-map the actual GPIs sent in any of these four placeholders.
<table>
<tr><th>Bit(s)</th><th>Internal GPI</th><th>Function</th></tr>
<tr><td>7:6</td><td>4</td><td rowspan="4">External GPIs:
00 = GPI 1
01 = GPI-2
10 = GPI 3
11 = GPI 4</td></tr>
<tr><td>5:4</td><td>3</td></tr>
<tr><td>3:2</td><td>2</td></tr>
<tr><td>1:0</td><td>1</td></tr>
</table></td><td>E4</td><td>E4</td></tr>
</table>

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Figure A–9 Registers 14h and 34h

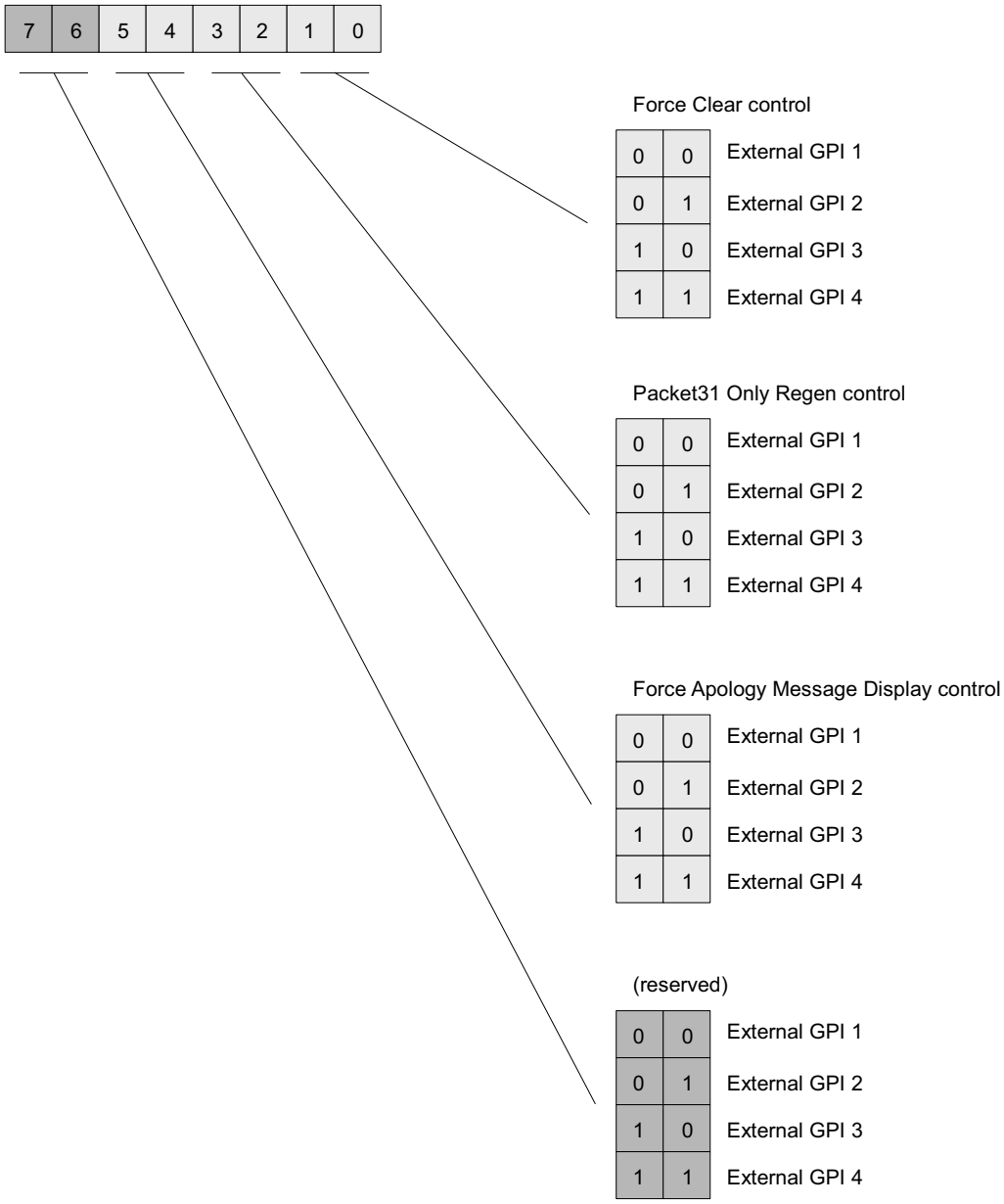

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Table A–11 Register Settings 14h to 19h and 34h to FDh

<table>
<tr><th>Ch A</th><th>Ch B</th><th>Description</th><th>EU Default</th><th>AUST Default</th></tr>
<tr><td>14</td><td>34</td><td>GPI Mappting for Feature Control
Min: N/A—Max: N/A
This register determines how the GPI are routed to perform special functions.
<table><tr><th>Bit(s)</th><th>Function</th></tr><tr><td>7:6</td><td>Reserved</td></tr><tr><td>5:4</td><td>Force Apology Message Display Control:
00 = GPI 1 01 = GPI 2
10 = GPI 3 11 = GPI 4</td></tr><tr><td>3:2</td><td>Controls the GPI used to activate the "Packet31 only regen" operation.:
00 = GPI 1 01 = GPI 2
10 = GPI 3 11 = GPI 4</td></tr><tr><td>1:0</td><td>Controls the GPI used to force the card to immediately send an on-air "Clear Subtitle" command.
00 = GPI 1 01 = GPI 2
10 = GPI 3 11 = GPI 4</td></tr></table></td><td>E4</td><td>E4</td></tr>
<tr><td>15</td><td>35</td><td>Time Filler Page Number
Min: 00—Max: FF</td><td>FF</td><td>FF</td></tr>
<tr><td>16</td><td>36</td><td>Time Filler Subcode Bottom 2 Digits
Min: 00—Max: 7E</td><td>7E</td><td>7F</td></tr>
<tr><td>17</td><td>37</td><td>Terminator Page Number
Min: 00—Max: FF</td><td>FF</td><td>EE</td></tr>
<tr><td>18</td><td>38</td><td>Terminator Subcode Bottom 2 Digits
Min: 00—Max: 7F</td><td>7E</td><td>7F</td></tr>
<tr><td>19</td><td>39 thru FD</td><td colspan="3">Reserved: Do Not Change</td></tr>
</table>

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Figure A–10 Register FEh

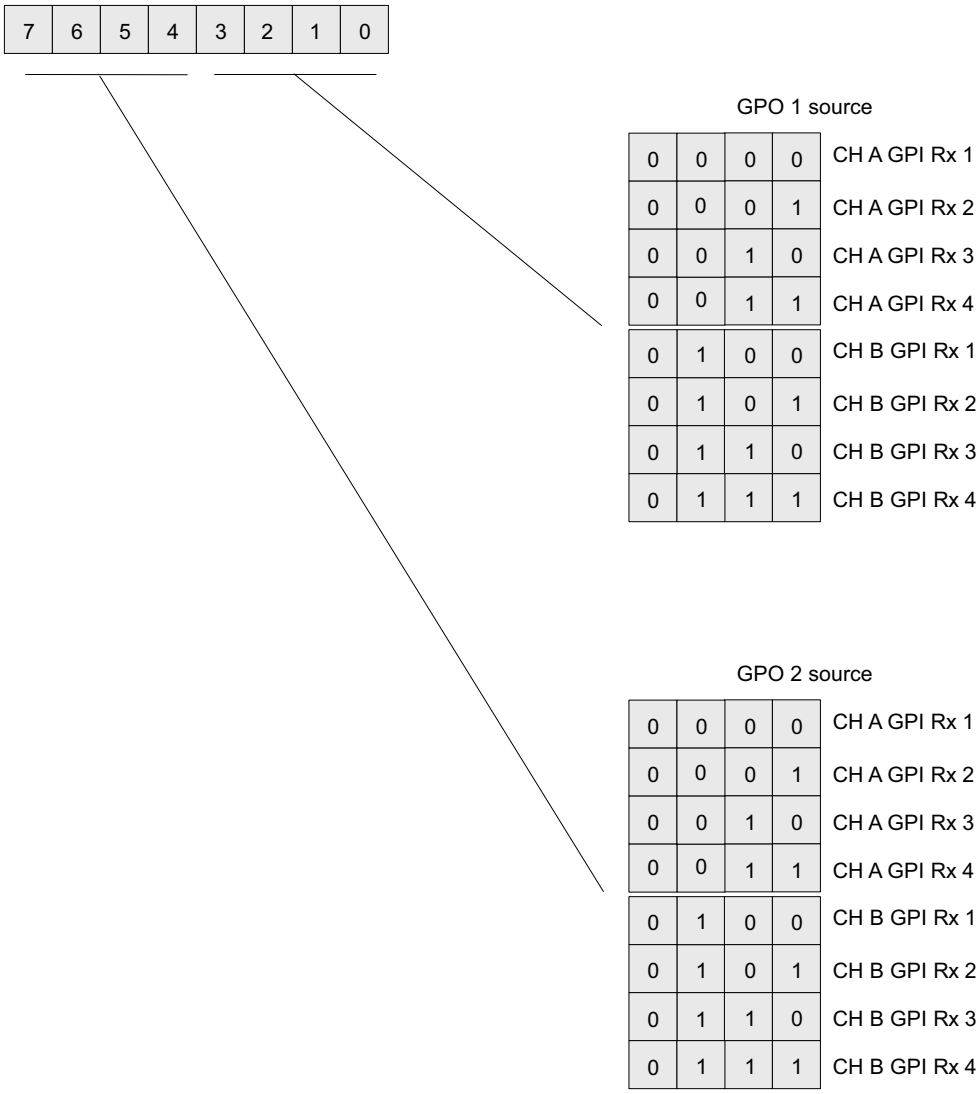

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Table A–12 Register Setting FEh - Both Channels

<table>
<tr><th>Description</th><th>Default</th></tr>
<tr><td>GPO 1 and 2 Source
Min: N/A—Max: N/A
<table>
<tr><th>Bit(s)</th><th>Function</th></tr>
<tr><td>0:3</td><td>GPO 1 Source
0000 = Ch A GPI Rx 1
0001 = Ch A GPI Rx 2
0010 = Ch A GPI Rx 3
0011 = Ch A GPI Rx 4
0100 = Ch B GPI Rx 1
0101 = Ch B GPI Rx 2
0110 = Ch B GPI Rx 3
0111 = Ch B GPI Rx 4</td></tr>
<tr><td>4:7</td><td>GPO2 Source
0000 = Ch A GPI Rx 1
0001 = Ch A GPI Rx 2
0010 = Ch A GPI Rx 3
0011 = Ch A GPI Rx 4
0100 = Ch B GPI Rx 1
0101 = Ch B GPI Rx 2
0110 = Ch B GPI Rx 3
0111 = Ch B GPI Rx 4</td></tr>
</table></td><td>10h</td></tr>
</table>

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Figure A–11 Register FFh

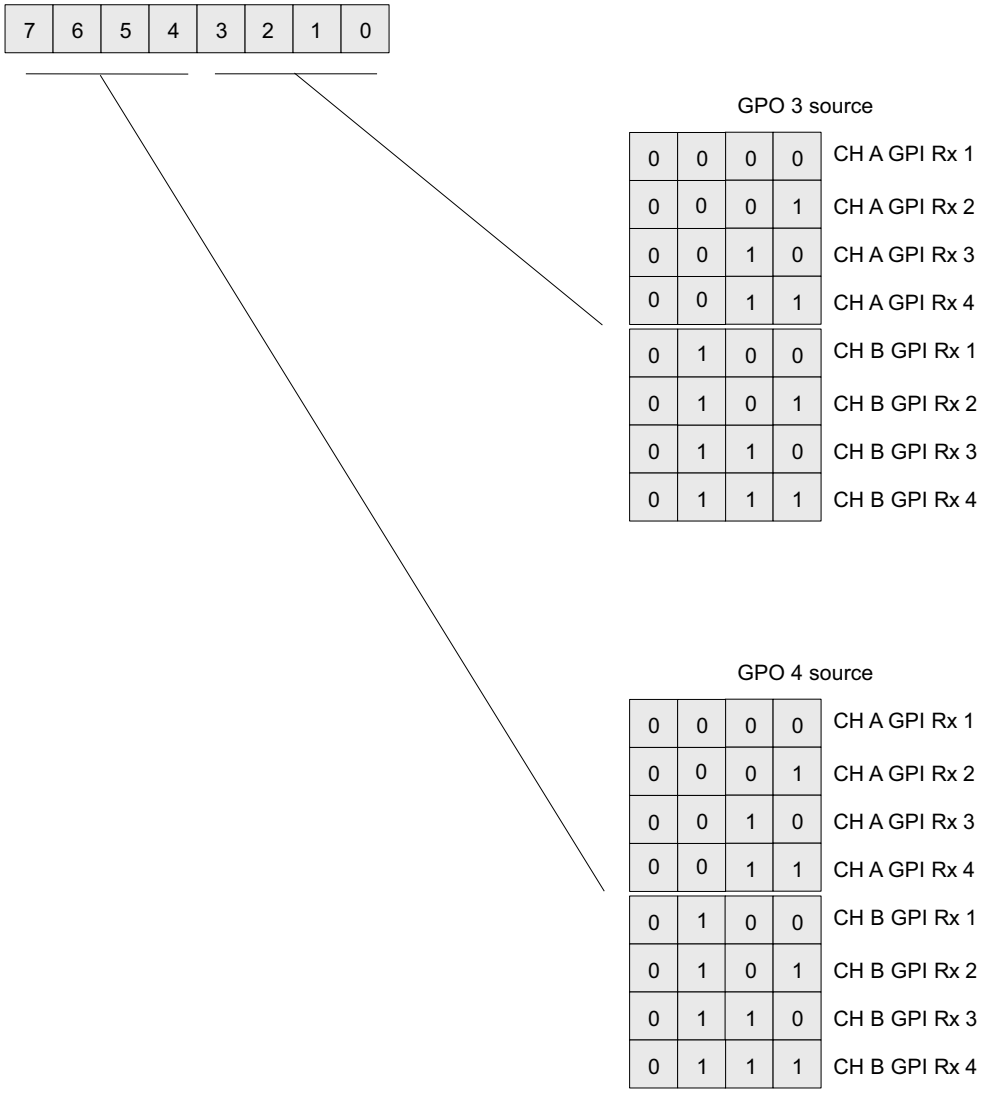

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Table A–13 Register Setting Descriptions - Both Channels

<table>
<tr><th>Description</th><th>Default</th></tr>
<tr><td>GPO 3 and 4 Source
Min: N/A—Max: N/A
<table>
<tr><th>Bit(s)</th><th>Function</th></tr>
<tr><td>0:3</td><td>GPO 3 Source
0000 = Ch A GPI Rx 1
0001 = Ch A GPI Rx 2
0010 = Ch A GPI Rx 3
0011 = Ch A GPI Rx 4
0100 = Ch B GPI Rx 1
0101 = Ch B GPI Rx 2
0110 = Ch B GPI Rx 3
0111 = Ch B GPI Rx 4</td></tr>
<tr><td>4:7</td><td>GPO 4 Source
0000 = Ch A GPI Rx 1
0001 = Ch A GPI Rx 2
0010 = Ch A GPI Rx 3
0011 = Ch A GPI Rx 4
0100 = Ch B GPI Rx 1
0101 = Ch B GPI Rx 2
0110 = Ch B GPI Rx 3
0111 = Ch B GPI Rx 4</td></tr>
</table></td><td>32h</td></tr>
</table>

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For all registers with hamming encoding, the following table defines those codes.

Table A–14 Hamming Codes

Byte	Encoding
0	15
1	02
2	49
3	5E
4	64
5	73
6	38
7	2F
8	D0
9	C7
A	8C
B	9B
C	A1
D	B6
E	FD
F	EA

Magazine and Page Number Settings

The magazine has a range of 1 through 8. Since only a 3-bit value is allowed to represent the magazine, Magazine 8 is represented by 0 and values 1 through 7 represent Magazines 1 through 7 respectively.

The page number is a BCD number between 00h and 99h.

Example: So to insert captions on Magazine 8, Page 88 by default, set the following registers (See Table A–3 on page 100 for details.):

- Register 06h = 15h (Magazine 8 Hamming Encoded)
- Register 07h = 88h

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You should also set Registers 08h and 09h for the decoder.

Note: Do not try to convert 88 into a hexadecimal number—it's already in BCD format.

Note Sending a PAGE 999 command via the Newfor protocol will restore the inserter to the default magazine and page.

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APPENDIX B
Specifications and Pin-Outs

Introduction

Overview

This chapter lists the specifications of the HDCC-OP47MULTI and provides the pin-outs for its connectors.

Topics

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Specifications

Table B–1 Physical Specifications

Specification	Value
Dimensions (H x W x D)	Card: 3.1” x 12.6” x 0.75” (79 mm x 320 mm x 19 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	Newfor Line 21
Supported closed caption specifications	WST and OP-47

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Connector Pin Assignments

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

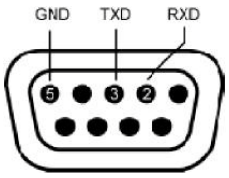
Pin	Label	Interface
1	Ground	
2	TX4 (GPI-4)	Open Collector (Emitter to Ground)
3	TX3 (GPI-3)	
4	TX2 (GPI-2)	
5	TX1 (GPI-1)	
6	RX4 (GPO-4)	Active Low
7	RX3 (GPO-3)	
8	RX2 (GPO-2)	
9	RX1 (GPO-1)	

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

Figure B–2 on page 128 illustrates the design of the HDCC.

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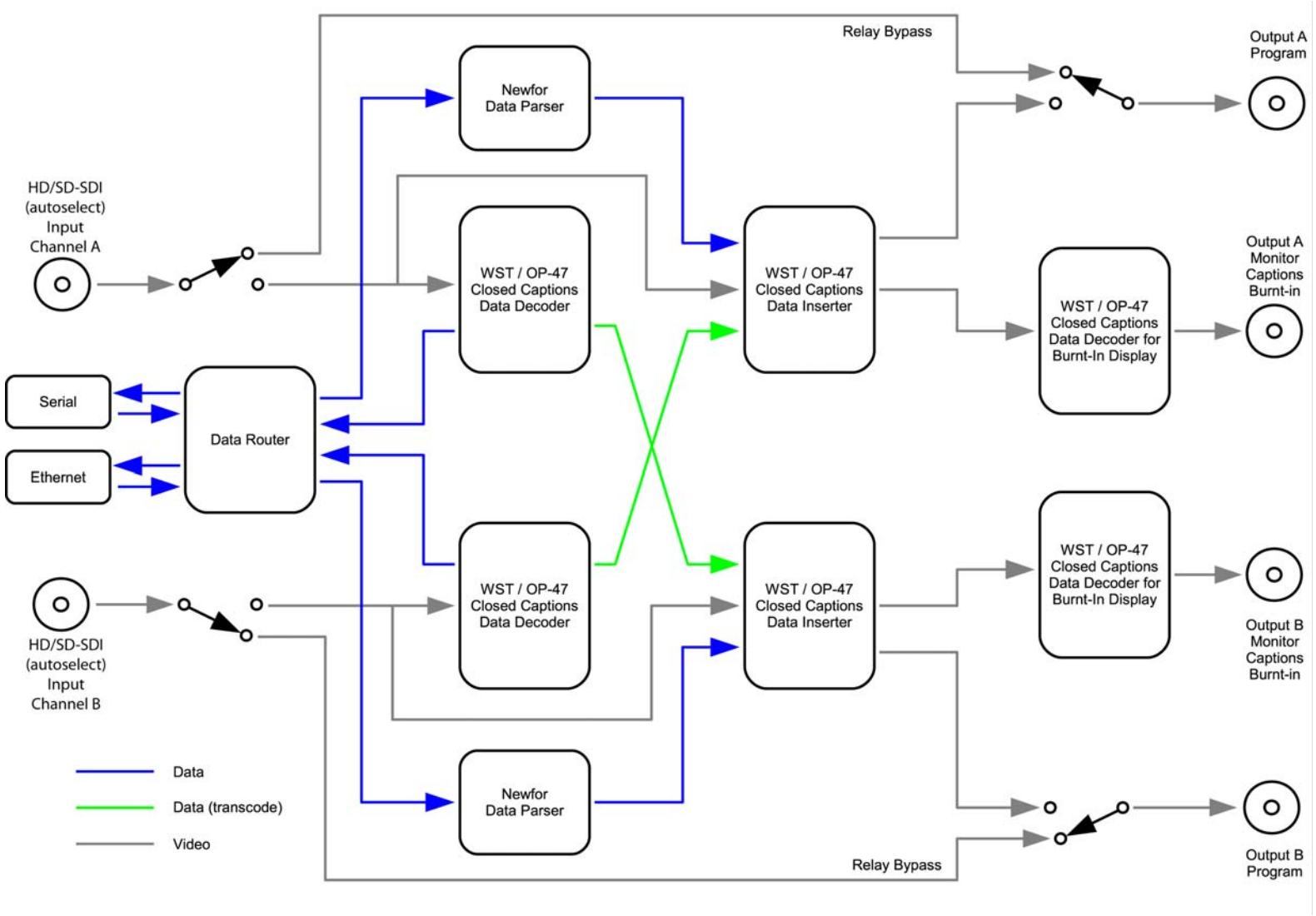
Figure B–2 HDCC Block Diagram



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APPENDIX C
Troubleshooting

Introduction

Overview

This appendix provides instructions for correcting the most common problems.

Topics

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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** jumpter, 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.

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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.

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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.
	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 recieved bit in input video stream.	Output circuit incorrect.	GPO requires external pull-up resistor.
	Output is wrong polarity.	Set GPI Rx polarity.

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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.

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