HDCC-708XWST

(CEA-608/708 to WST/OP-47 Translation Card)

- **HDCC-708XWST-OG2 (openGear Platform)**
- **HDCC-708XWST-2CH (MC1RU Platform)**

•HD/SD-SDI Closed Caption Translator, CEA-608/708 to WST/OP-47

User Guide

Firmware Version: V0.32

Software Version: V0.24

Part Number 821126 Revision B

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-708XWST-OG2 (for the Ross DFR 8321 frame) and HDCC-708XWST-2CH (for the Wohler MC-1RU frame) products (Collectively called HDCC).

Goals for This Chapter

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

Topics

Product Description

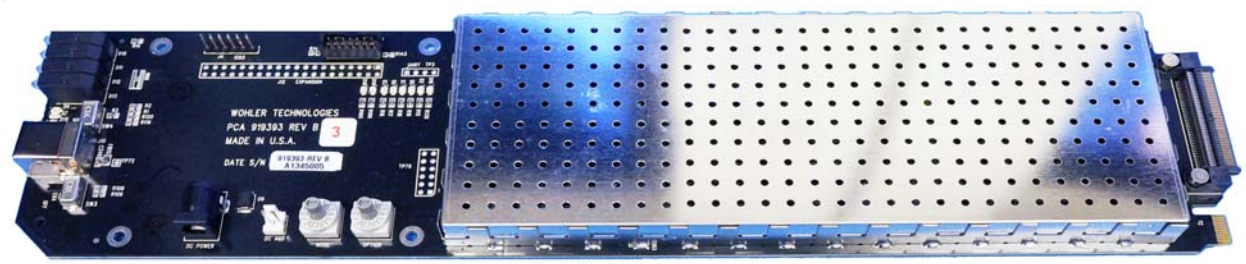
The HDCC translates CEA-608/708 captions from one HD/SD-SDI video stream to WST/OP-47 captions on another HD/SD-SDI video stream in real time.

You can operate the HDCC in a Ross® openGear® DFR-8321 frame or in Wohler's MC-1RU frame. (See Chapter 2: Hardware Installation on page 11 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 37 for instructions or Using HDCCRegEdit on page 59 for instructions.)

The HDCC is a two-channel card that allows two different HD/SD-SDI streams to pass through simultaneously.

Figure 1–1 HDCC Card



Quick Start Guides

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

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

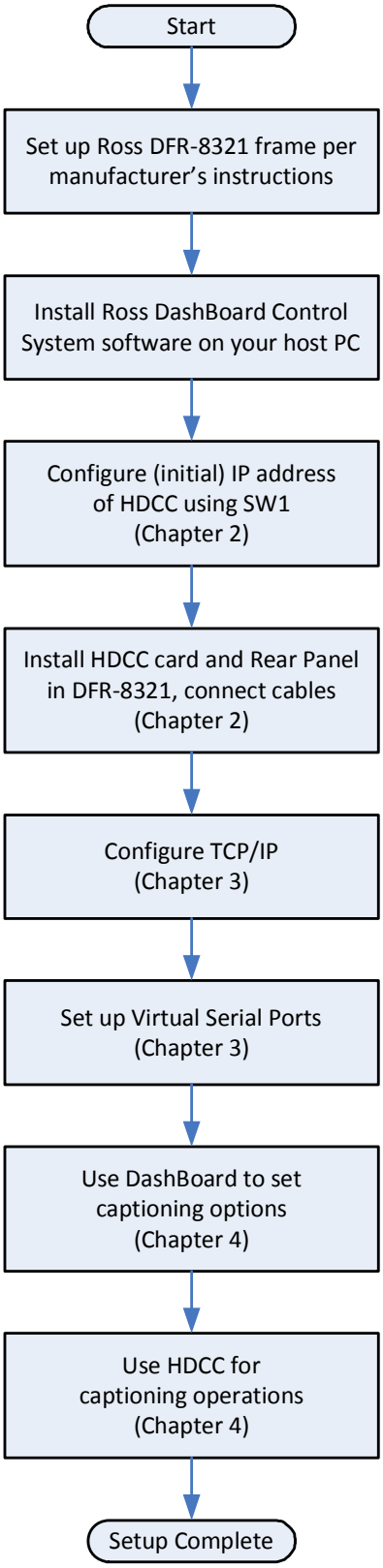
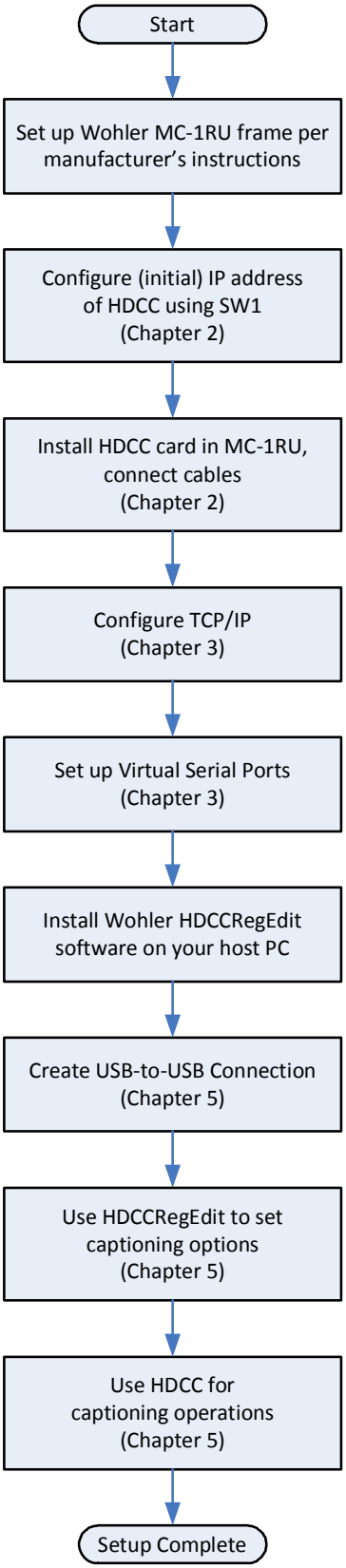


Figure 1–3 Quick Start Wohler MC-1RU Frame

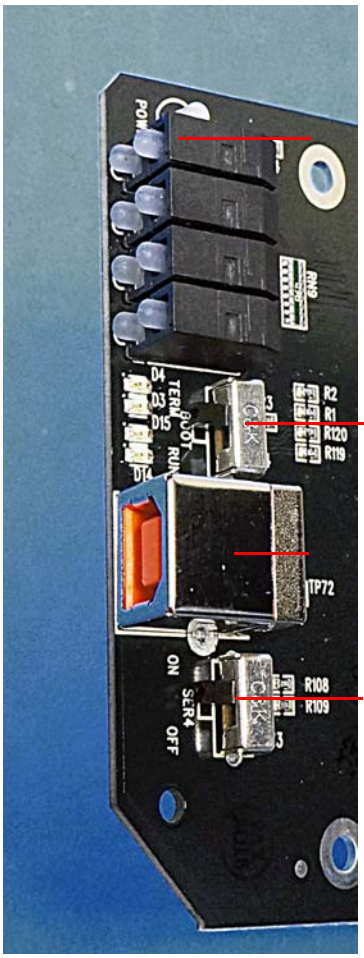


I/O Connections

Front Edge

The HDCC card's front edge has a power LED (lit when power is applied), a USB port, and a USB override switch. The USB port is useful during the initial setup.

Figure 1–4 HDCC Front Edge

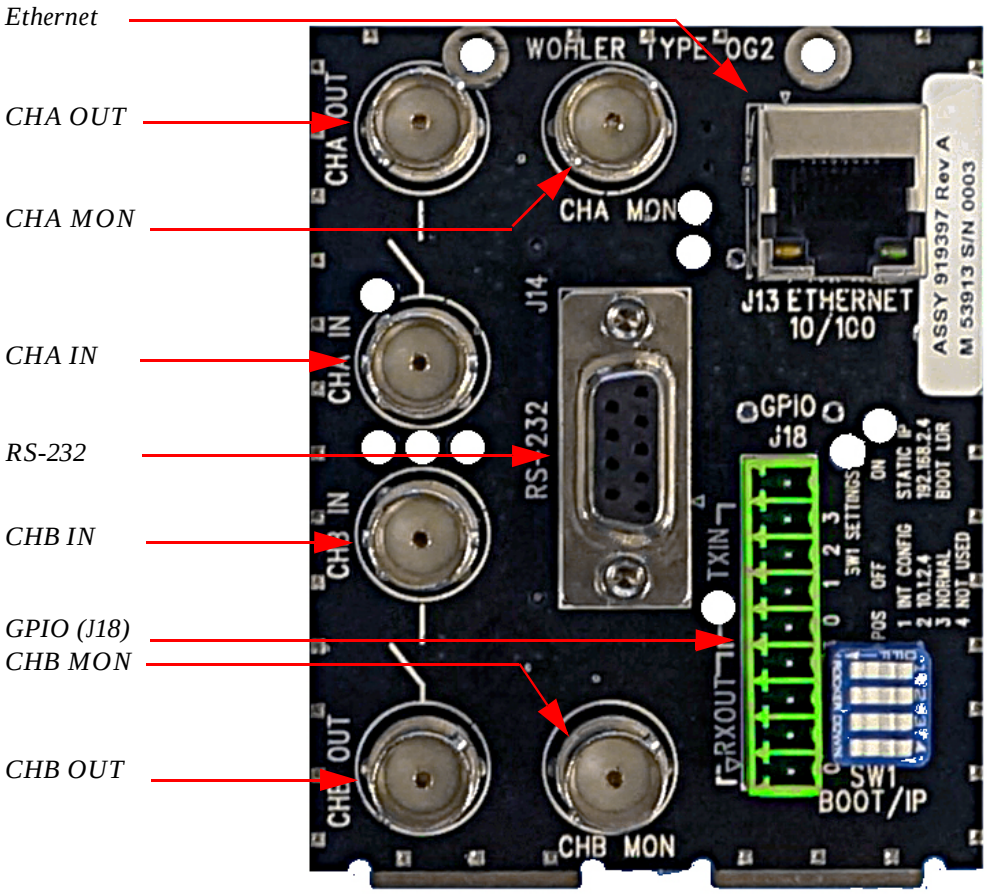


HDCC in Ross DFR-8321 Frame

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



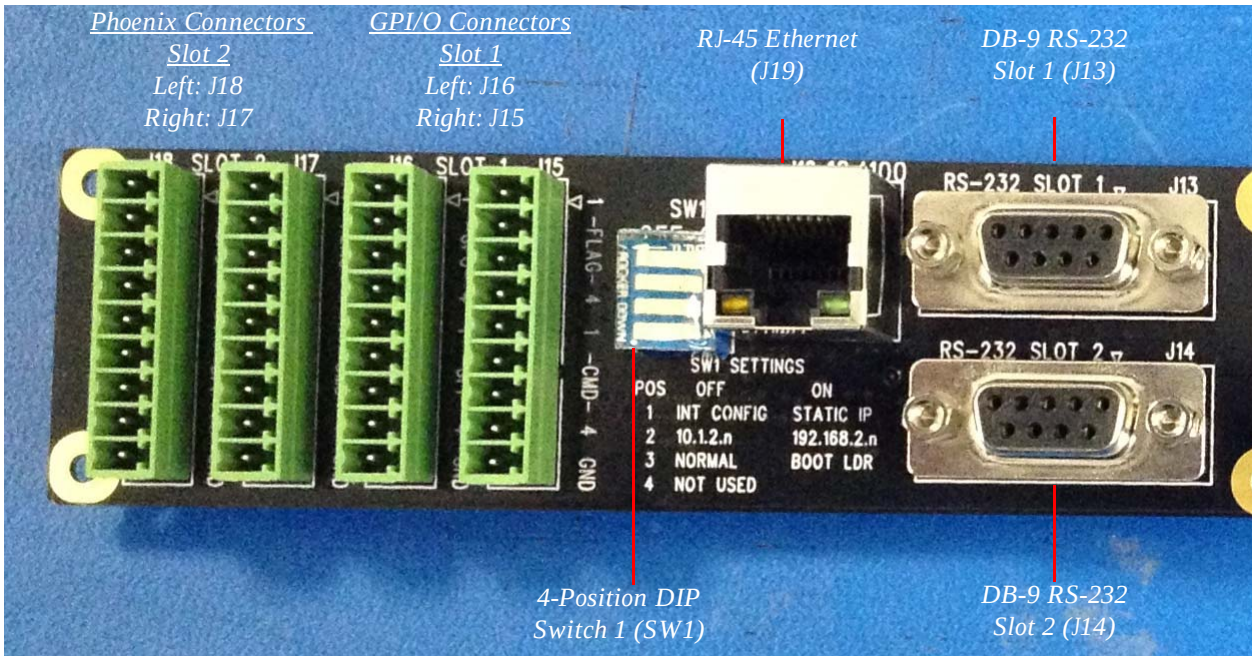
Note: Some OG2 Rear Panels may be marked “CH1” and “CH2” instead of “CHA” and “CHB”, respectively.

HDCC in Wohler MC-1RU Frame

The HDCC-2CH is designed to be used in a Wohler MC-1RU frame. The MC-1RU Rear Panel provides all of the I/O connections. Refer to Hardware Installation on page 11 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



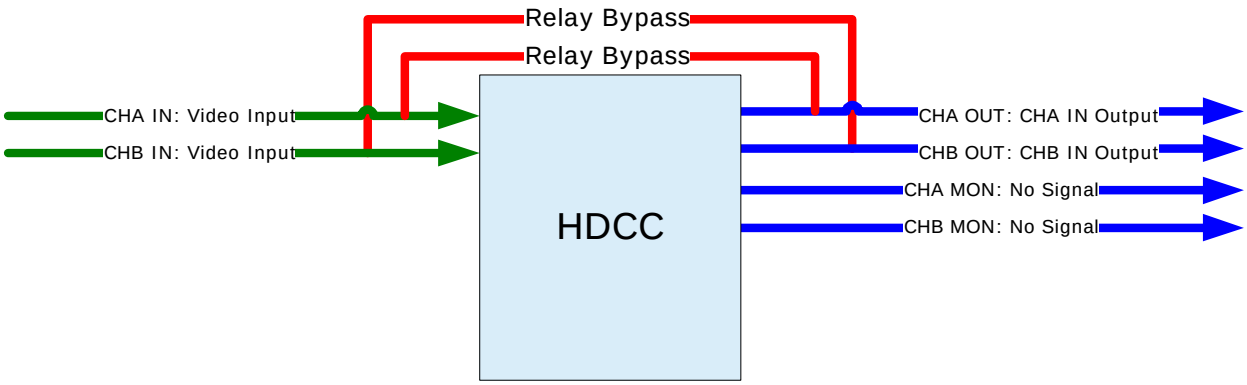
Note: Refer to Appendix B: Connector Pin Assignments on page 119 for detailed pin-out descriptions for each connector.

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

Relay Bypass

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

Figure 1–8 Relay Bypass - No Power Condition

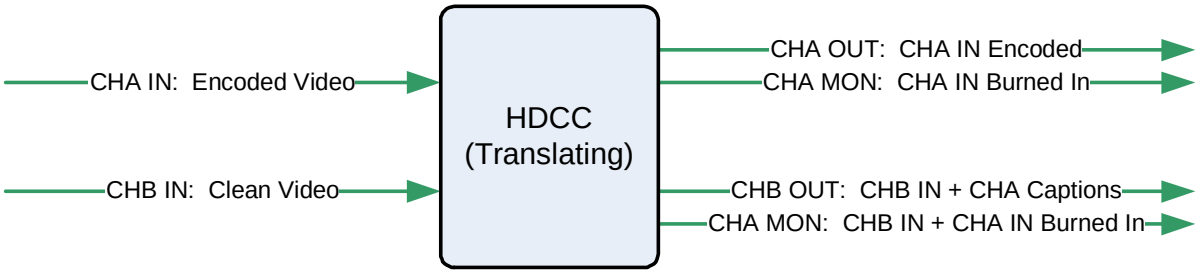


Functions

Translating

The HDCC will translate CEA-608/708 captions on the HD/SD-SDI video stream coming into Channel A to WST/OP-47 captions on the HD/SD-SDI video stream going out on Channel B.

Figure 1–9 Translating Setup (CH A → CH B)



Example: This example demonstrates translating. CEA-608/708 captions provided on the SDI signal to CHA IN are translated to WST/OP-47 captions and inserted on the SDI signal supplied to CHB.

Connections	
Port	**Data**
CHA IN	SMPTE HD/SD-SDI video stream with CEA 608/708 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** translated to WST/OP-47 format.
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.

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

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 card into a Wohler MC-1RU, skip down to Installing the HDCC in the Wohler MC-1RU on page 16.

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

Installing the HDCC in the Ross DFR-8321

Requirements

Tools

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

Chassis

Ross DFR-8321 openGear frame

Hardware

- HDCC card
- OG2 Rear Panel
- Screws (2)
- O-Rings (2)

Installation

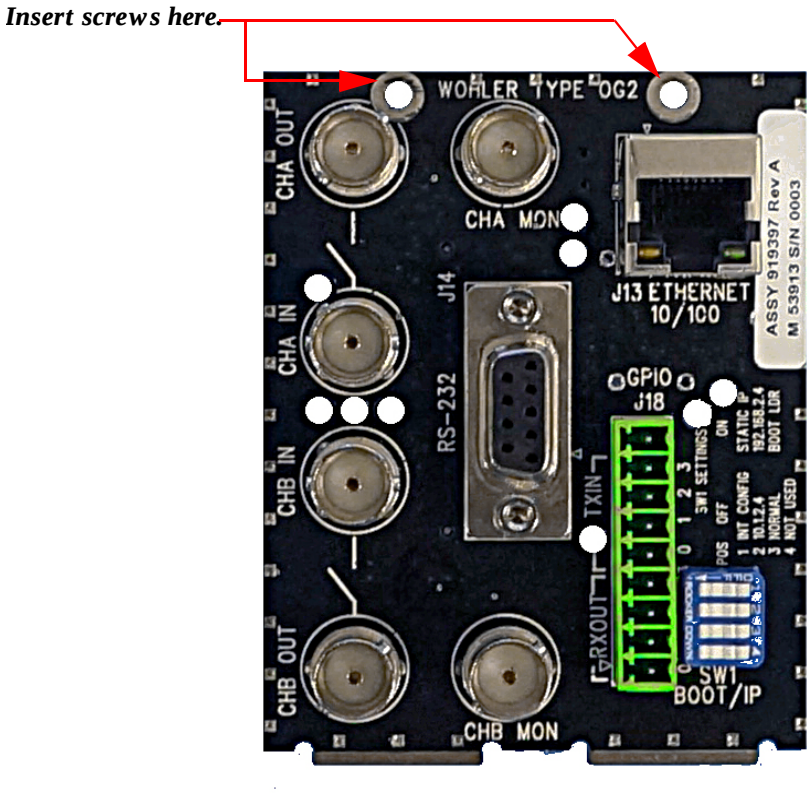
To install the HDCC board and OG2 Rear Panel in the frame, follow the steps below:

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

Important: The HDCC card occupies four slots of the Ross DFR-8321 chassis.

3. Insert the screws into the two corner holes of the rear panel. Refer to Figure 2–1 on page 14.

Figure 2–1 OG2 Rear Panel

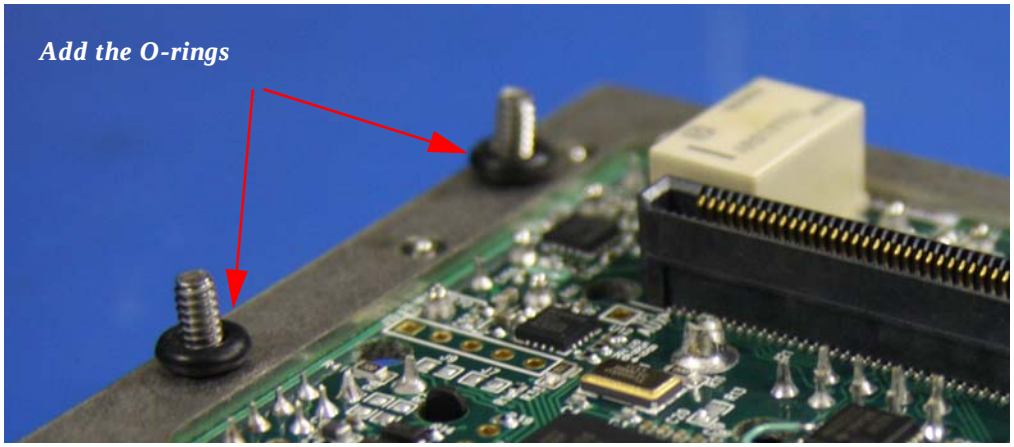


4. After you have inserted the screws into the OG2 Rear Panel, place the O-rings on the screws. Refer to Figure 2–2 below.

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.

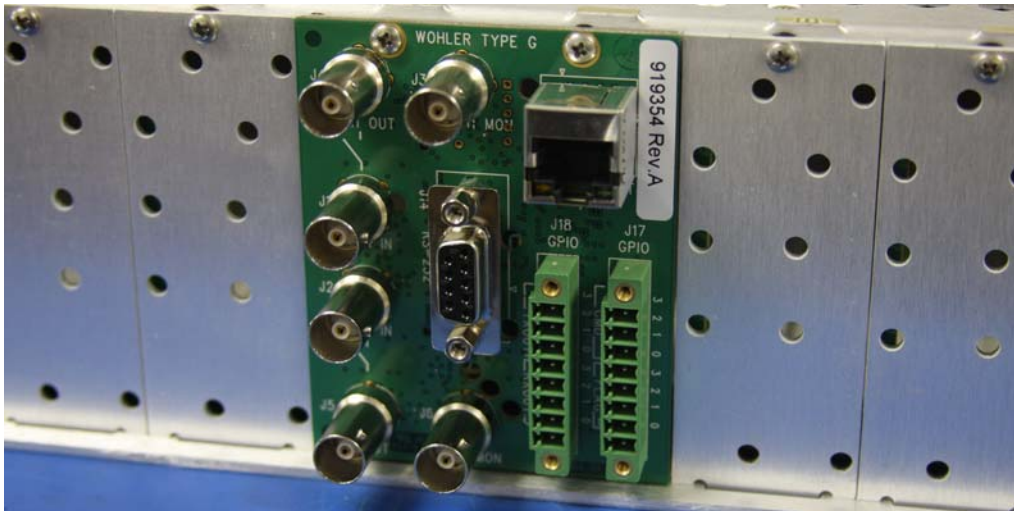
Note: Some OG2 Rear Panels will have **SW1** on the inner surface.

Figure 2–2 Adding the O-Rings



5. With the rear of the frame facing you, sit the rear panel into the base slot and tighten the top screws.

Figure 2–3 Rear Panel Installed

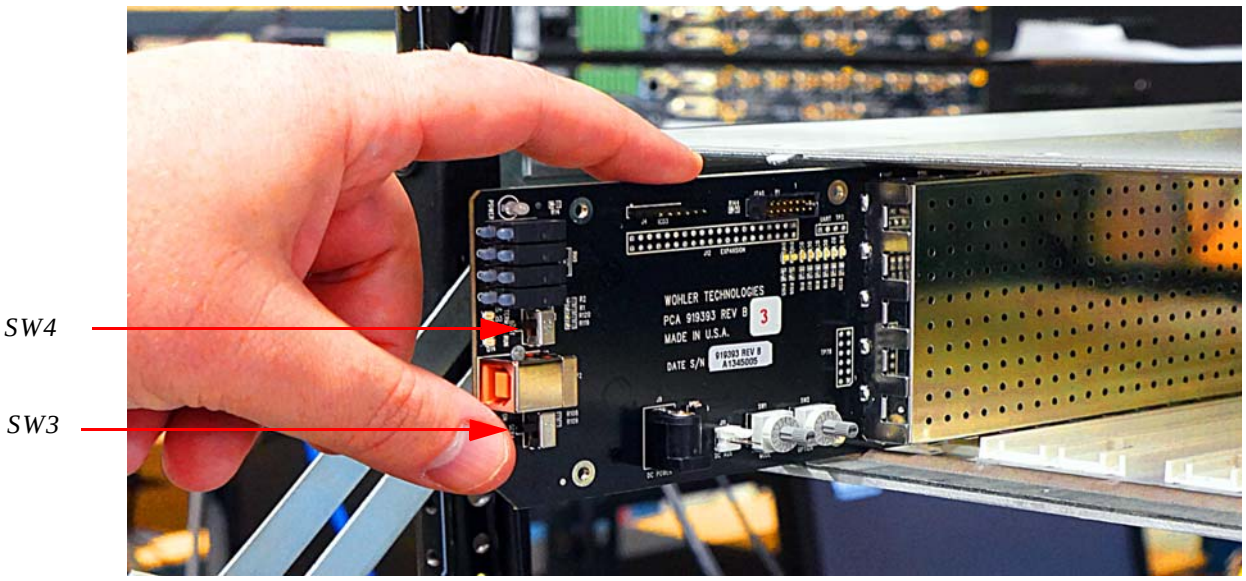


6. With the front of the frame facing you, press inward on both tabs to disengage the front panel from the chassis and pull the front panel towards you and then down.

7. Insert the card so that the ejector is at the bottom (Figure 2–4 below) and then close the front panel.

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

Figure 2–4 Open DFR-8321 Frame



Note: Ensure that **SW3** is in the **Off** position and that **SW4** is in the **RUN** position.

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

Installing the HDCC in the Wohler MC-1RU

Requirements

Wohler MC-1RU frame

Installation

To install the HDCC, follow the steps below

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

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

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

4. 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

network settings). If Position 1 is **Off**, the static IP address set by Position 2 will apply.

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

Important: If you're using the default static IP address, be aware that because the static IP addresses defined by the switch are *always* the same, no more than one HDCC card (or one MC-1RU frame) can be connected to the network **until** you change the card's (or frame's) TCP/IP settings (see next chapter).

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

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

```
arp -d *
```

Next Steps

1. Connect the SDI, serial, and Ethernet cables as needed.

2. Set up virtual serial ports (VSPs) if needed. Refer to next chapter.

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

If you want to configure your Ethernet port to support serial communications, continue on to Chapter 3: TCP/IP Configuration and Virtual Serial Ports (VSPs) on page 19.

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.

IMPORTANT NOTE If you will be operating your HDCC card in a Ross openGear frame, you should skip this chapter. If you will be operating your HDCC card in a Wohler MC-1RU frame, you do not need to perform the setup in this chapter UNLESS you intend to configure your HDCC card over Ethernet.

Topics

Functional Overview

Virtual Serial Ports (VSPs) on the HDCC

Caption data is supplied to and received from the HDCC via serial ports. In addition to the RS-232 port (J14 on the 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

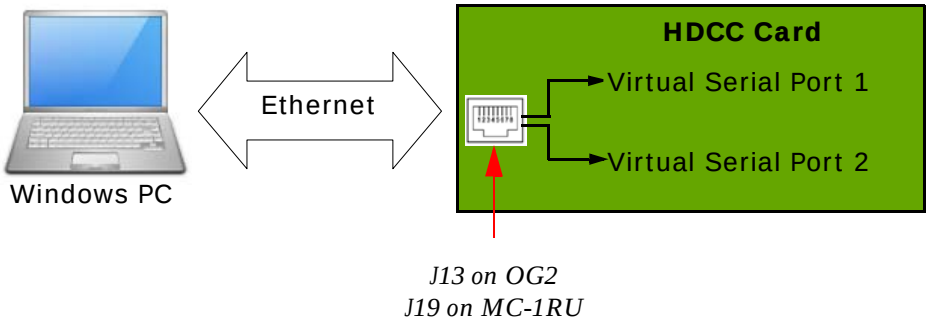


Figure 3–1 above provides a functional overview of the virtual serial port configuration. You can use third party software (link provided below) to create a virtual serial port which will transfer serial data to and from the HDCC over Ethernet. From the PC user's perspective, the virtual serial ports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

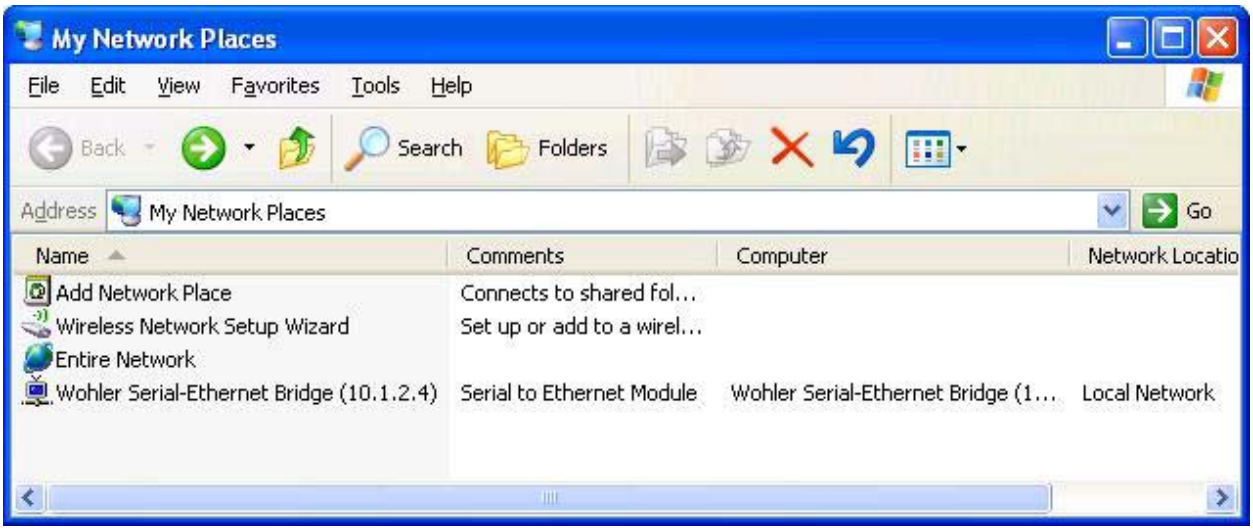
Required Information

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.

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.

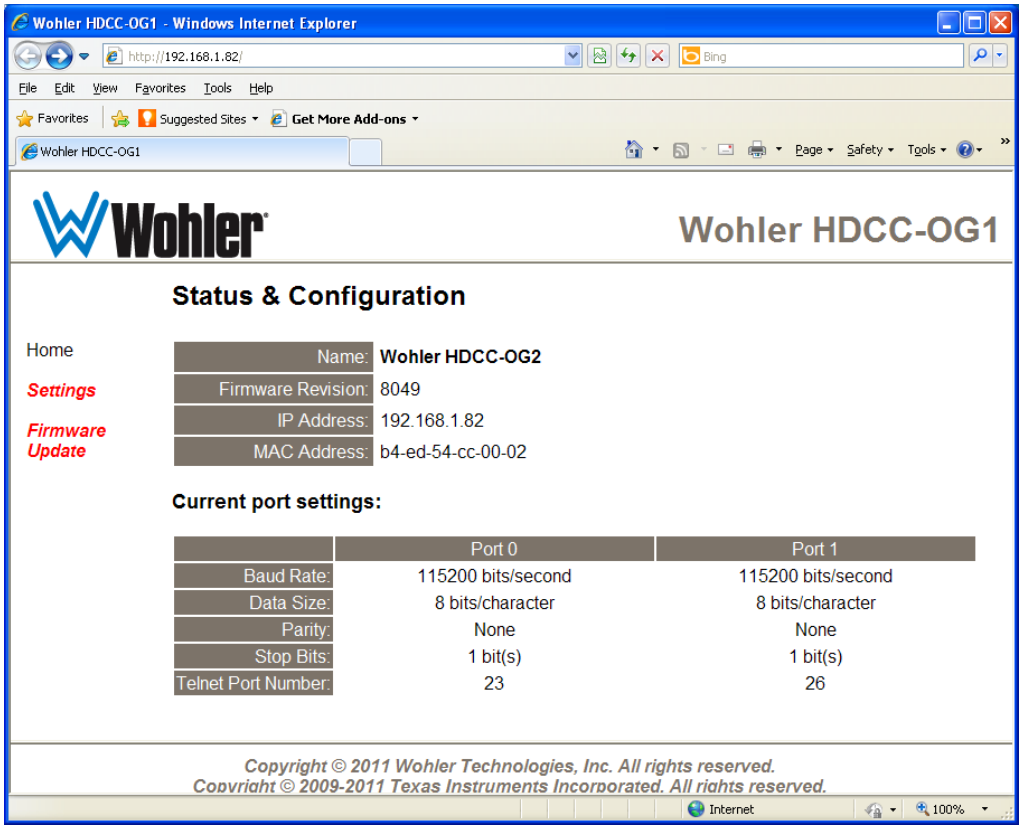
Assigning a Static IP Address/Enabling DHCP

Double-clicking on the Wohler Serial-Ethernet Bridge (see Figure 3–2 on page 21) will open a web browser and take you the card's configuration page where you can set a static IP address, if desired.

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

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

Figure 3–3 HDCC Configuration Page



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

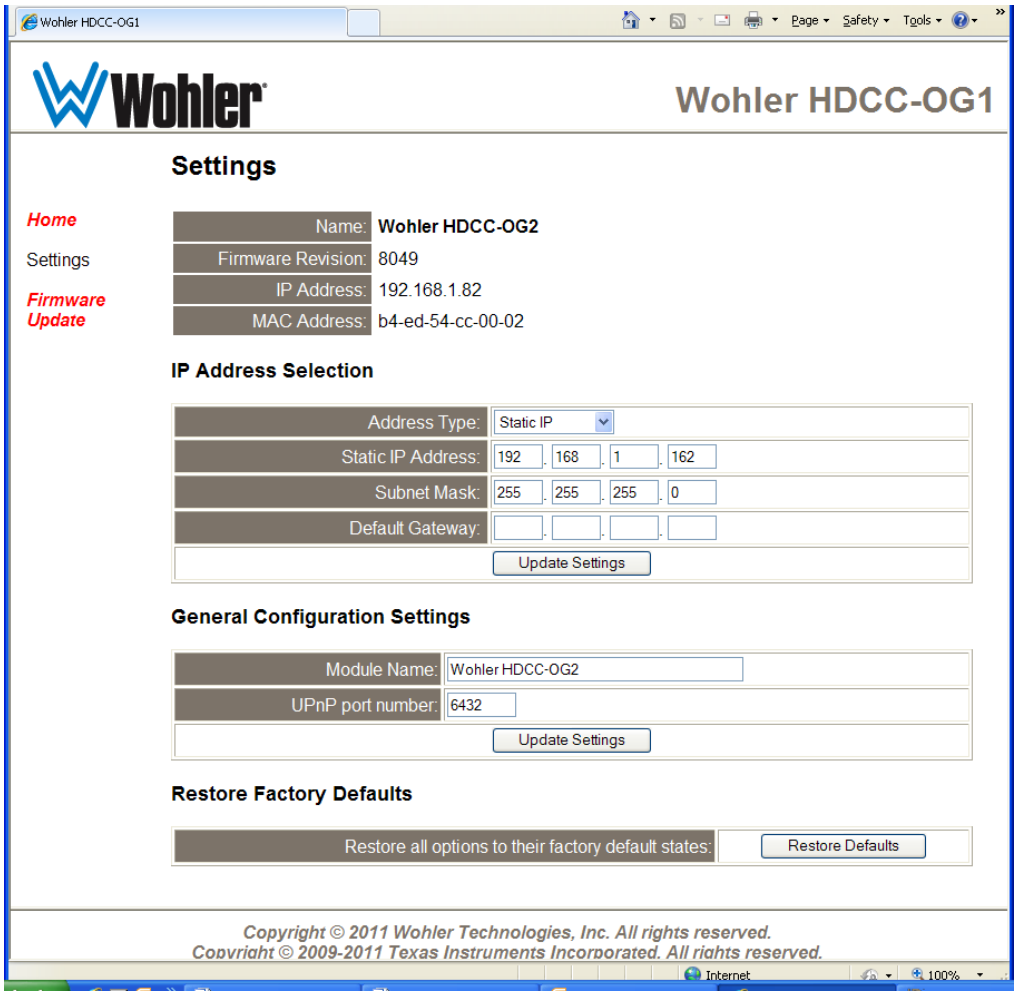
2. When the **Settings** screen appears (Figure 3–4) click the drop down in **Address Type** to change it to **Static IP** or **DHCP/AutoIP**. If you're using DHCP, skip to Set 6. Otherwise, continue to Step 3.

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

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

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

Figure 3–4 Settings Menu

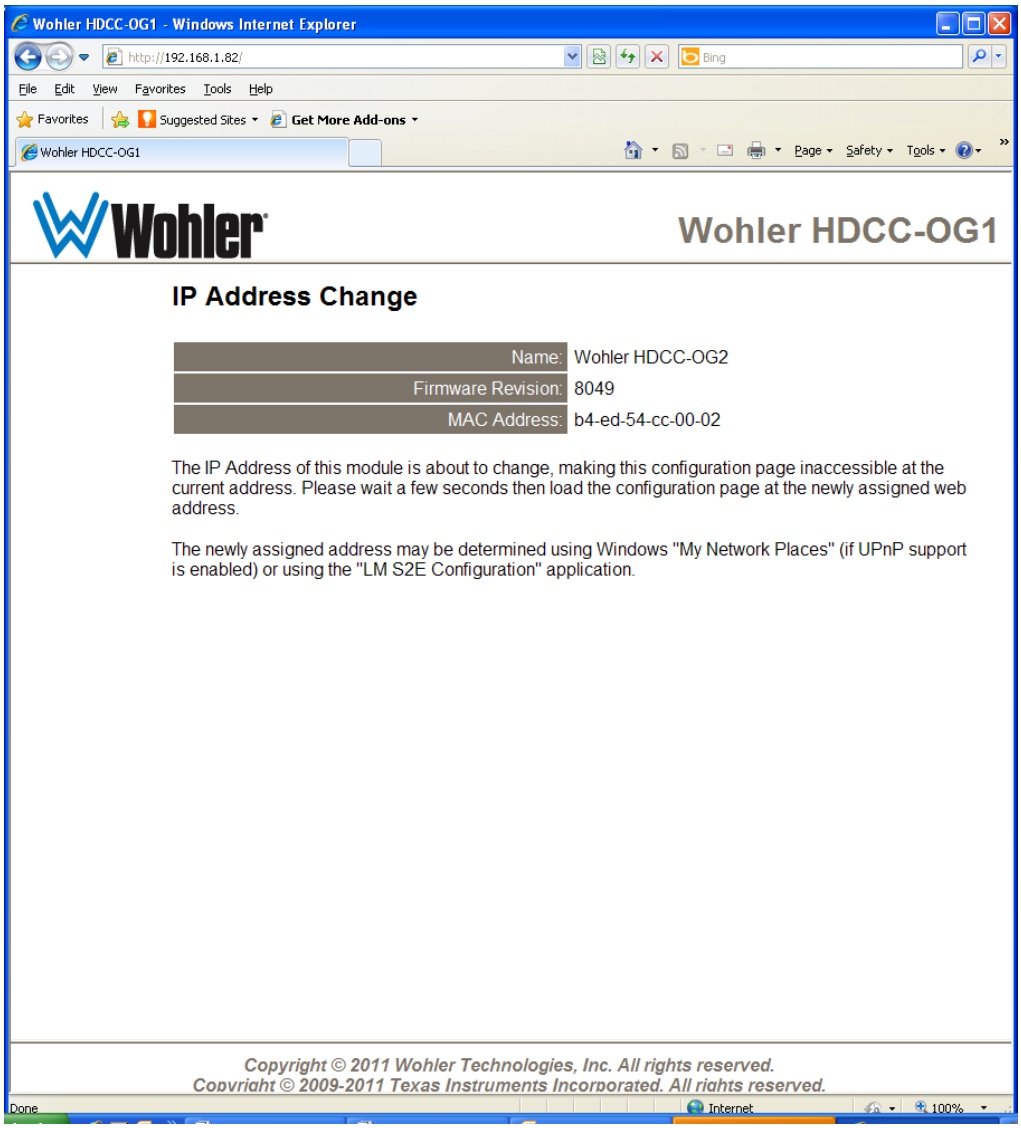


WARNING! Verify that all information is correct for your network. The HDCC card will become unreachable on your network if the wrong information is set.

If this occurs consult your IT department for assistance. You can set the card to a known static IP address using the DIP switch on the rear panel. See Rear Panel DIP Switch on page 17 for details.

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

Figure 3–5 IP Address Change



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

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

9. Power cycle the card.

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

Creating VSPs with the Lantronix Redirector

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

Important: If you are using Microsoft Windows 7 or 8, this software will not work for you. Instead, refer to Creating VSPs with Later Versions of Windows on page 34.

Software Installation

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

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

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

Figure 3–6 Redirector Download Location

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

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

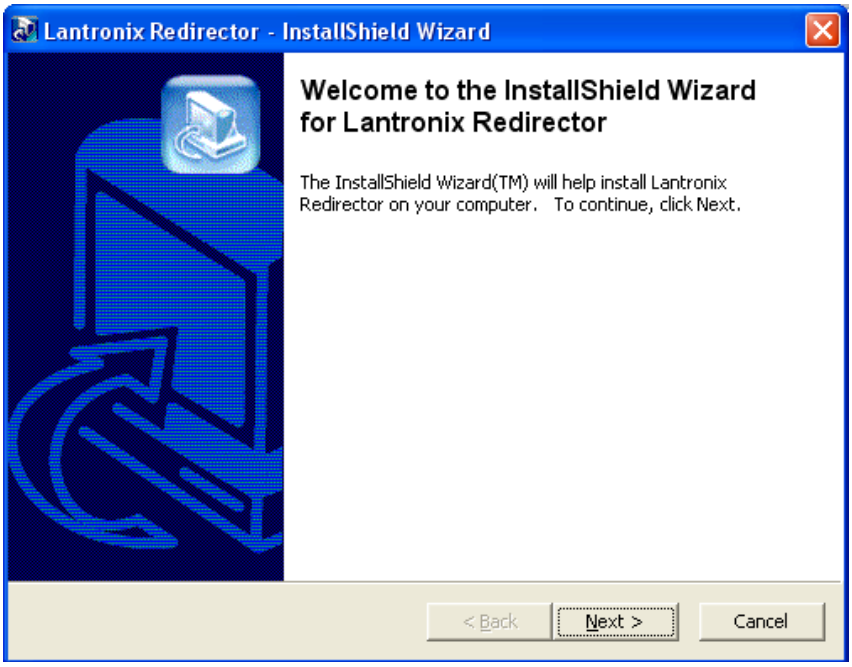
Download the Redirector.

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

Figure 3–7 Open File - Security Warning

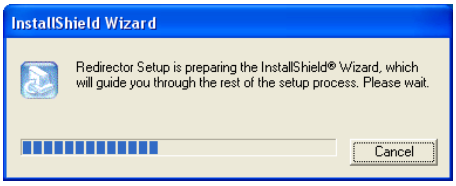
4. When the initial installation screen displays (Figure 3–7 above) click **Run**.

Figure 3–8 Lantronix Welcome Screen



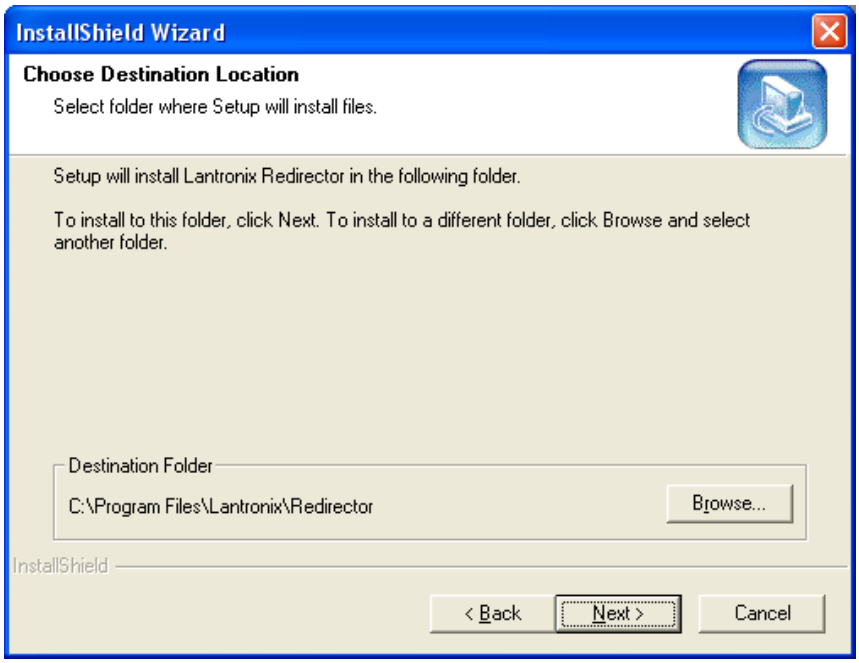
5. When the **Welcome** screen displays (Figure 3–8 above) click **Next**.

Figure 3–9 InstallShield



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

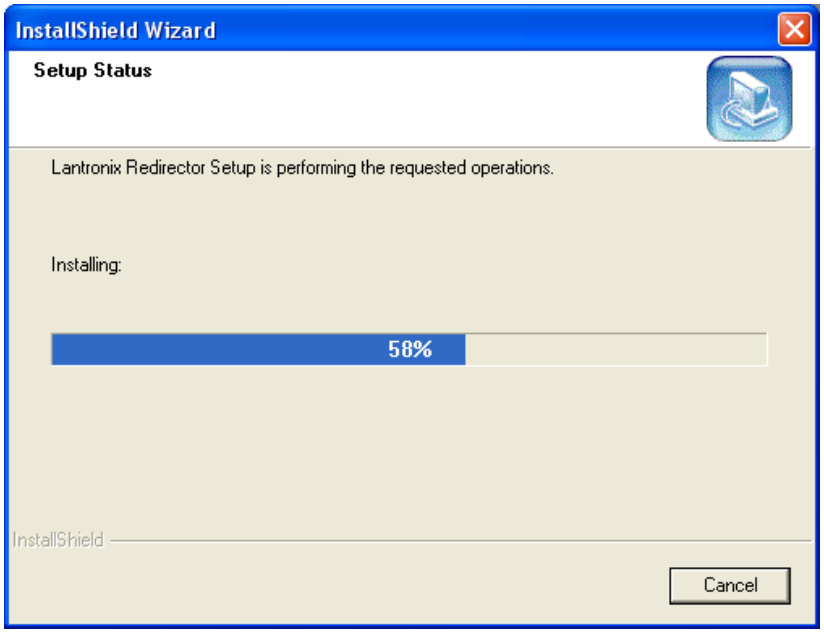
Figure 3–10 Choose Destination Location



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

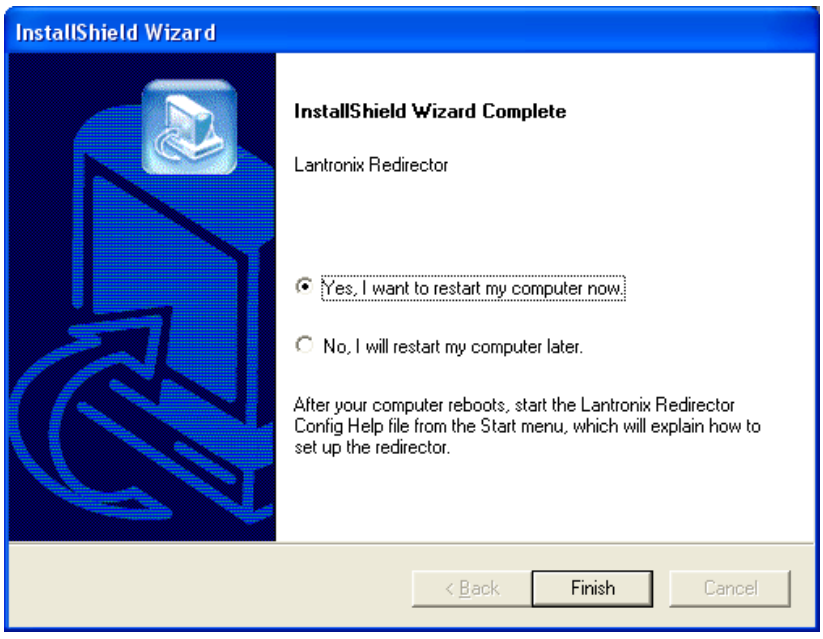
   The **Setup Status** screen (Figure 3–11) will display and quickly complete the file installation.

Figure 3–11 Setup Status



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

Figure 3–12 Wizard Complete



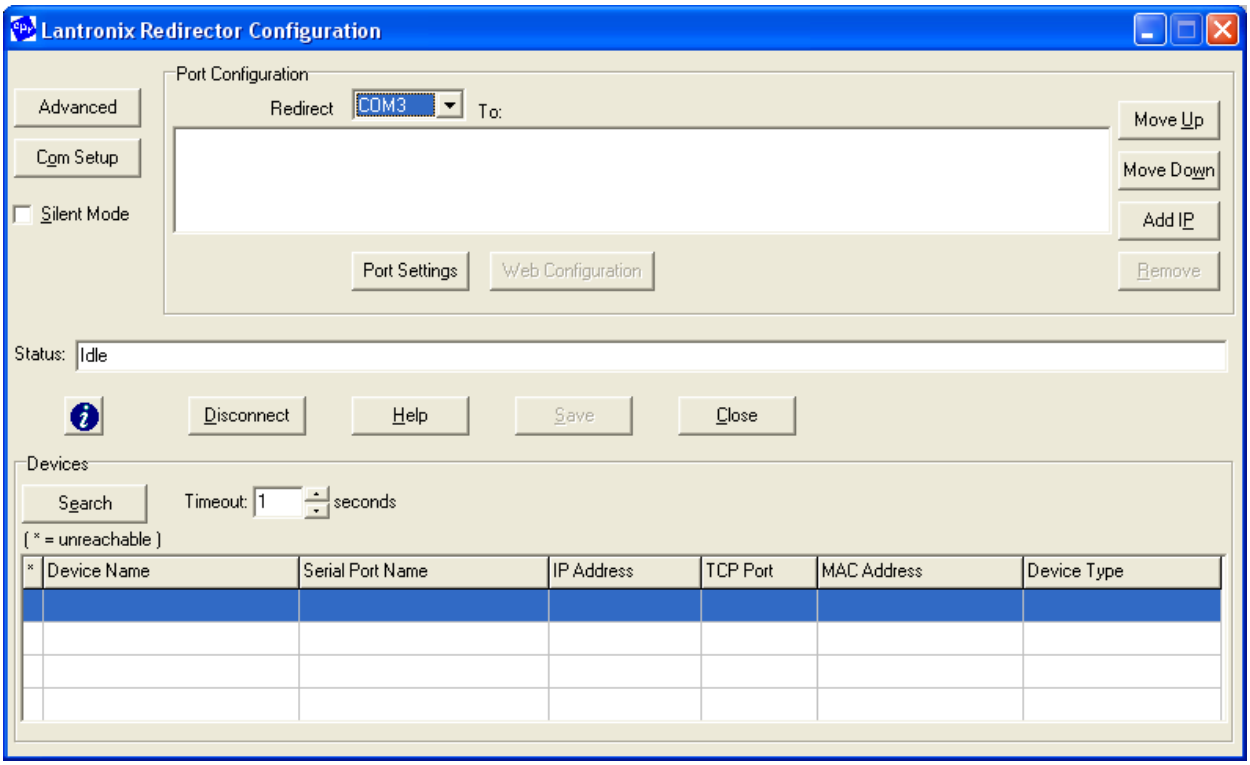
9. When the **InstallShield Wizard Complete** screen displays, verify that **Yes,...** is selected, and click **Finish**. The system will restart.

VSP Configuration

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

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

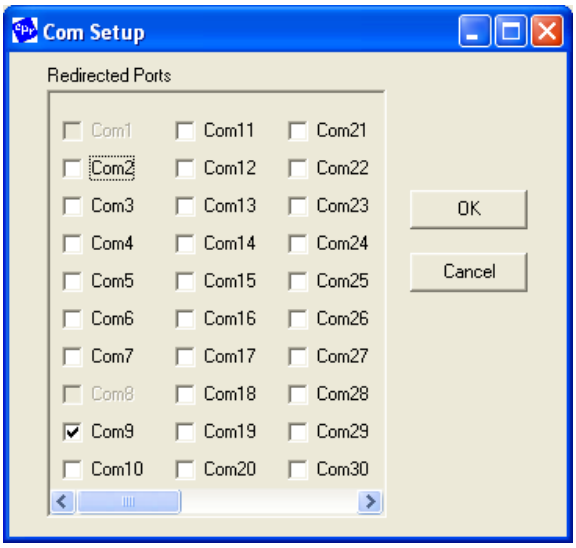
Figure 3–13 Lantronix Redirector Configuration



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

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

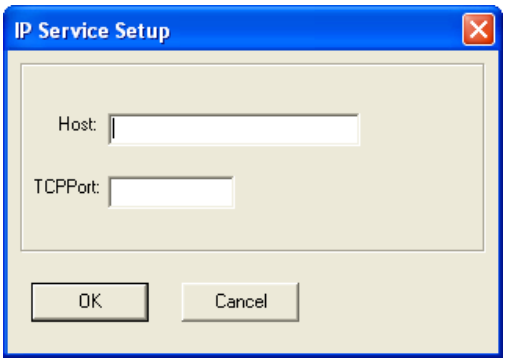
Figure 3–14 Com Setup



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

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

Figure 3–15 Wizard Complete



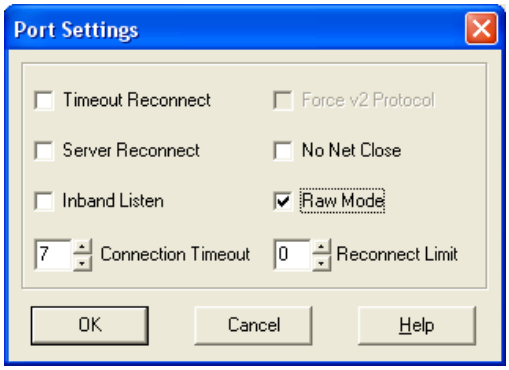
5. In the **Host** field (Figure 3–15 above) enter the IP address of your HDCC card. (Use **My Network Places** to rediscover it if necessary.)

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

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

8. Click **Port Settings**.

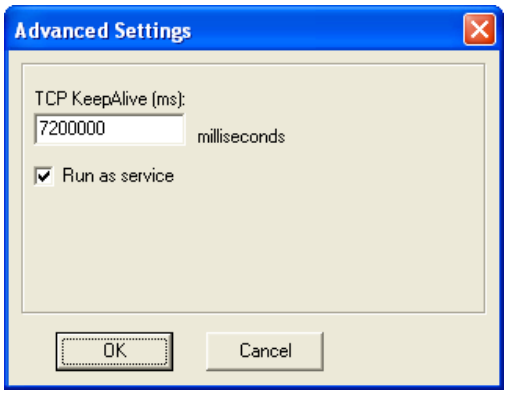
Figure 3–16 Port Settings



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

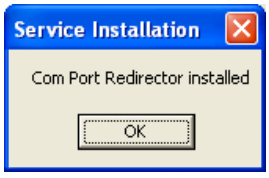
10. Click **Advanced** at the top left corner of the application window.

Figure 3–17 Advanced Settings



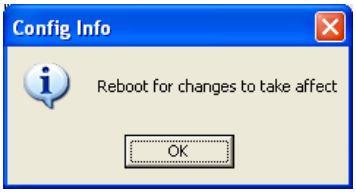
11. When the Advanced Settings dialog appears (Figure 3–17 above) check the **Run as service** box and click **OK**.

Figure 3–18 Service Installation



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

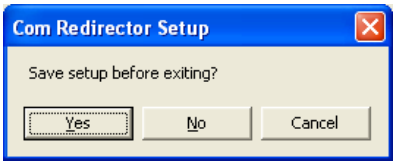
Figure 3–19 Config Info



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

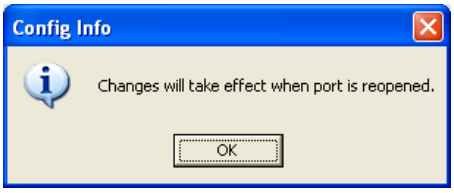
14. When the application window reappears, click **Close** near the center of the screen.

Figure 3–20 Com Redirector Setup



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

Figure 3–21 Config Info



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

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

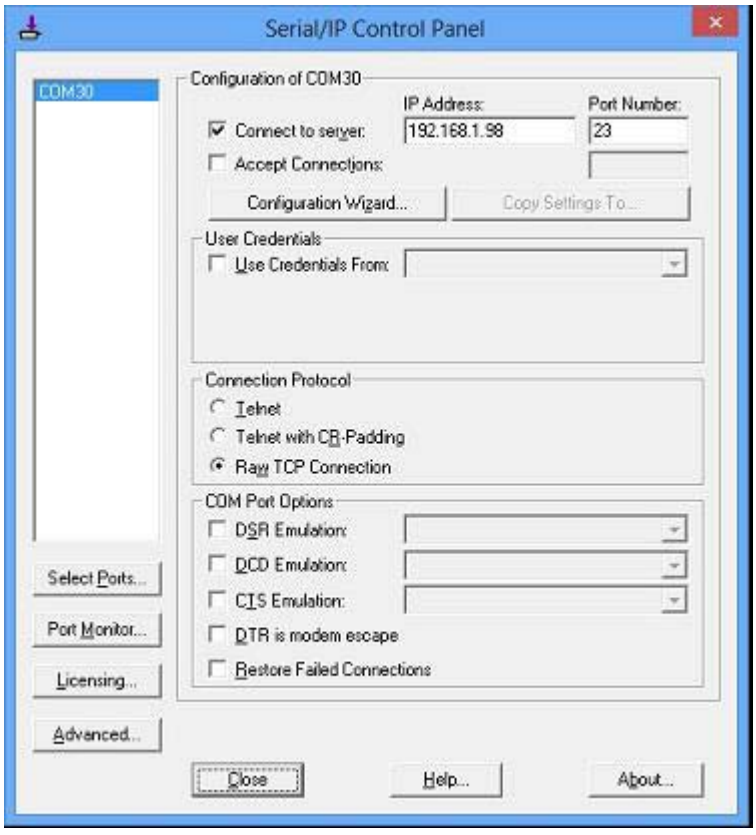
Creating VSPs with Later Versions of Windows

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 (32- and 64-bit versions).

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 37.

If you are using the Wohler MC-1RU, proceed to Chapter 4: Using HDCCRegEdit on page 59.

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 59.

Goals for This Chapter

- ✓ Use Ross's DashBoard Control System to operate your HDCC card.
- ✓ Learn the steps required for common captioning tasks.

Topics

Starting DashBoard

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

1. Make sure your openGear™ DFR-8321 frame is installed, the HDCC card is installed within it, and DashBoard has been installed on a PC that is networked to the frame.

2. Power up the frame.

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

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

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

Figure 4–1 DashBoard Tree

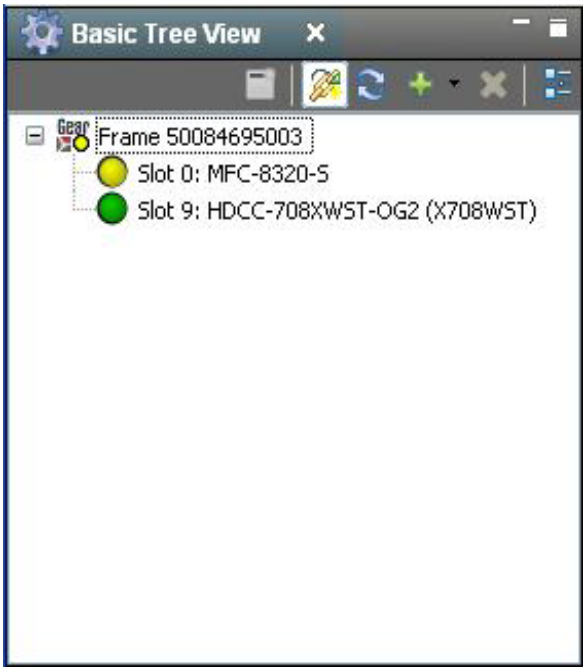
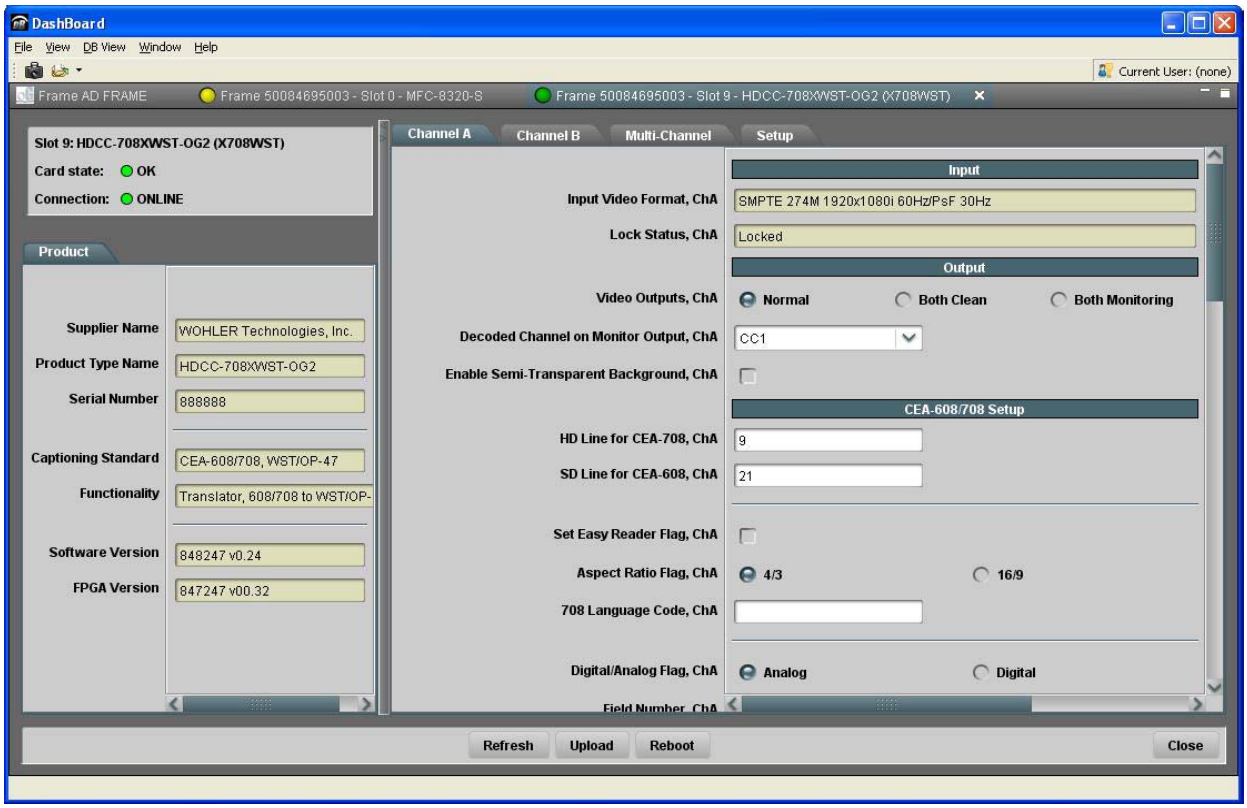


Figure 4–2 DashBoard Main Screen



Note: The Wohler HDCC-OP47MULTI-OG2 card will appear as **HDCC-708XWST-OG2 (X708WST)** 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 40).

Figure 4–3 Product Information Pane

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

Common Controls

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

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

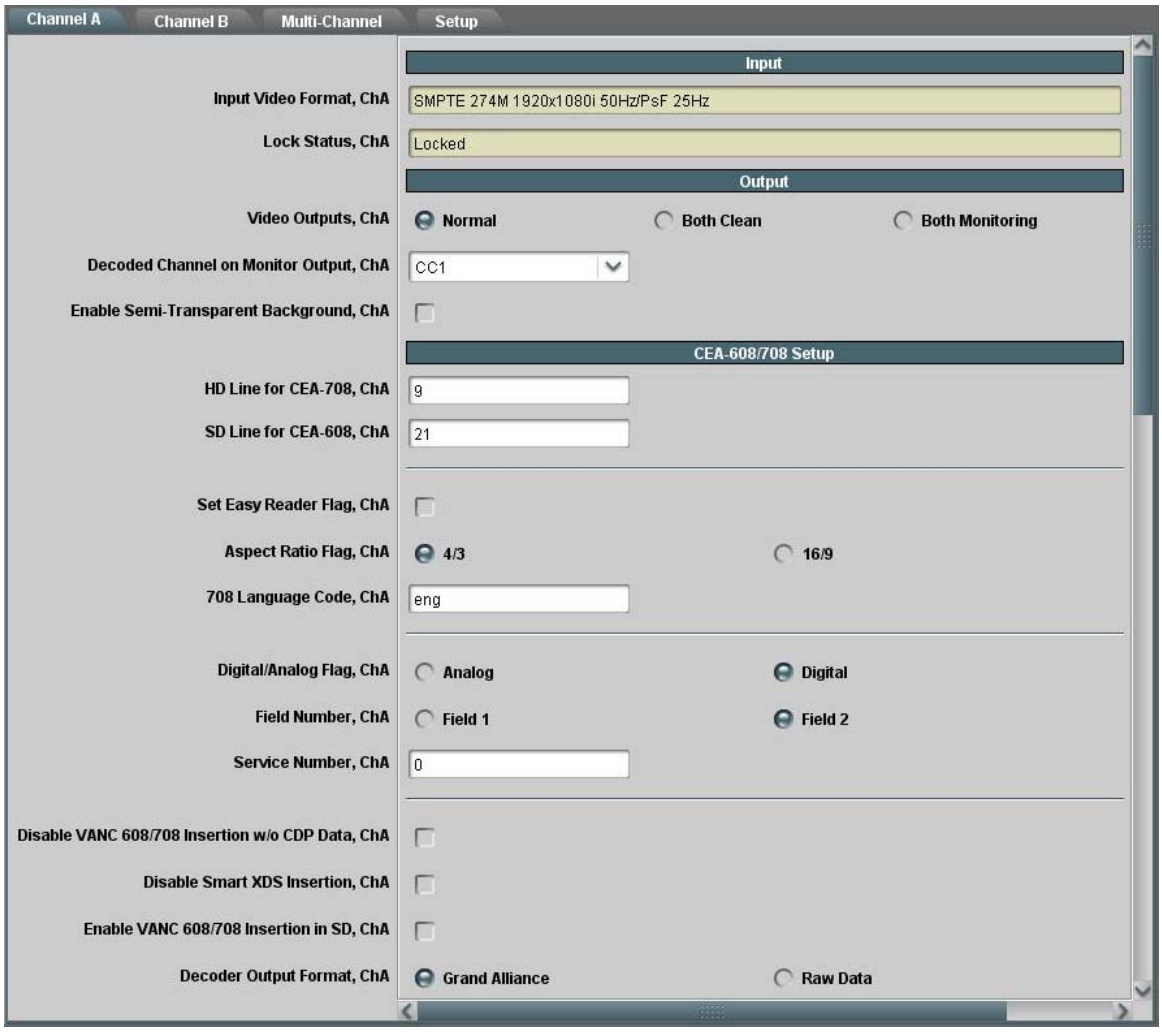
- **Reboot**: Clicking this button causes the HDCC card to reboot. A screen indicating that the card is busy will appear while the system is rebooting.

Channel A Tab

The **Channel A** tab contains the controls to customize the settings for Channel A.

For translation operations, **Channel A** is the **SOURCE** channel (**Channel B**—the WST/OP-47 channel—is the **DESTINATION**).

Figure 4–4 Channel A (Input, Output, CEA-608/708 Setup)



Channel A Settings

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

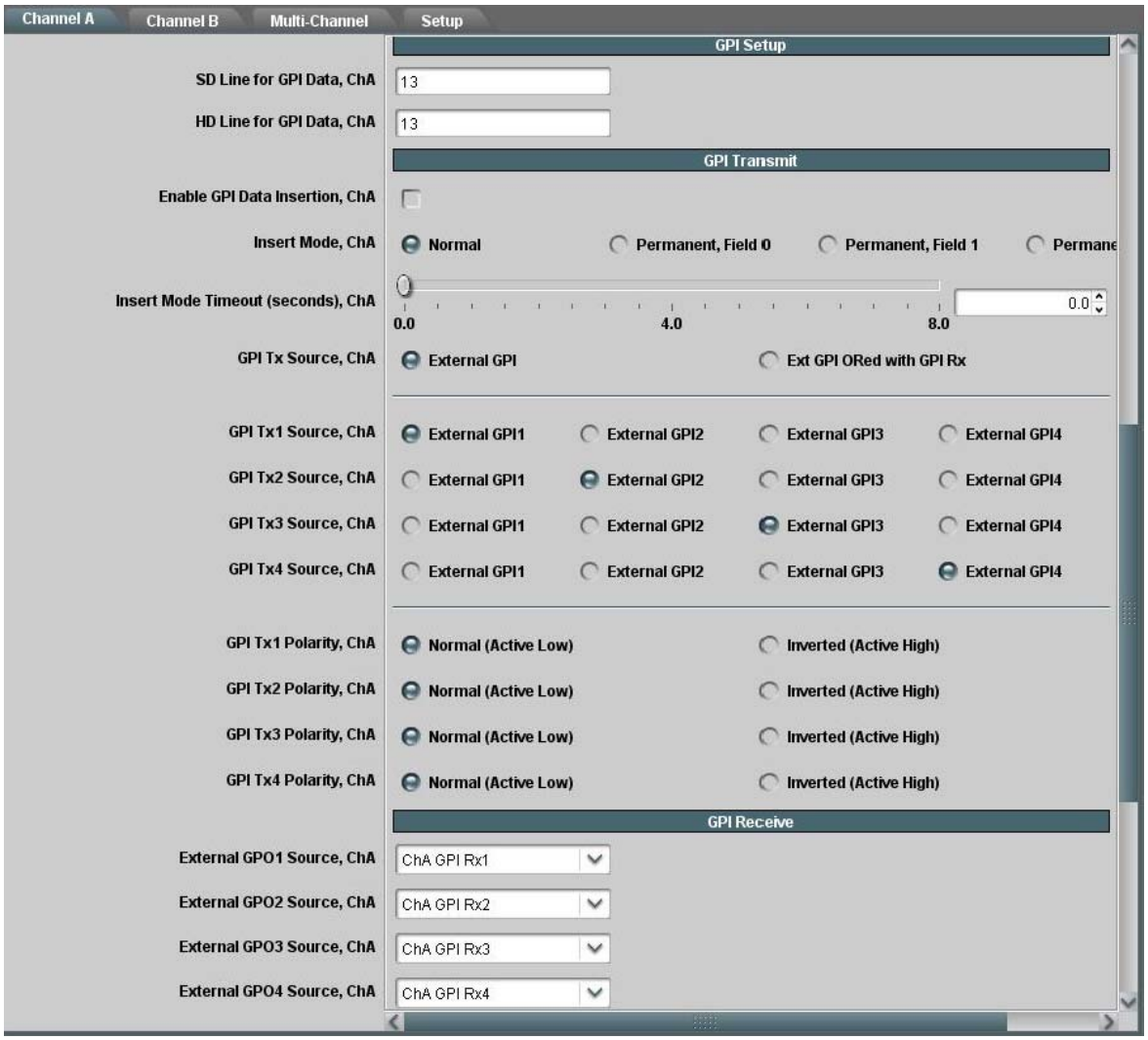
- **Video Outputs, ChA:** Select between Normal (CHA OUT has closed captions, CHA MON has “burned-in” captions), Both Clean (CHA OUT and CHA MON have closed captions), or Both Monitoring (CHA OUT and CHB MON have “burned-in” captions).
- **Decoded Channel on Monitor Output, ChA:** Selects which caption channel (CC1 or CC2) will be displayed on CHA MON.
- **Enable Semi-Transparent Background, ChA:** Selects whether the caption background on the monitoring output will be normal (unchecked) or semi-transparent.

CEA-608/708 Setup

- **HD Line for CEA-708, ChA:** Identifies the HD line from which captions will be read when translating.
- **HD Line for CEA-608, ChB:** Identifies the SD line from which captions will be read when translating.
- **Set Easy Reader Flag, ChA:** No function in this product.
- **Aspect Ratio Flag, ChA:** No function in this product.
- **708 Language Code, ChA:** No function in this product.
- **Digital/Analog Flag, ChA:** No function in this product.
- **Field Number, ChA:** No function in this product.

- **Service Number, ChA:** No function in this product.
- **Disable VANC 608/708 Insertion w/o CDP Data, ChA:** No function in this product.
- **Disable Smart XDS Insertion, ChA:** No function in this product.
- **Enable VANC 608/708 Insertion in SD, ChA:** No function in this product.
- **Decoder Output Format, ChA:** No function in this product.

Figure 4–5 Channel A (GPI Setup, GPI Transmit)



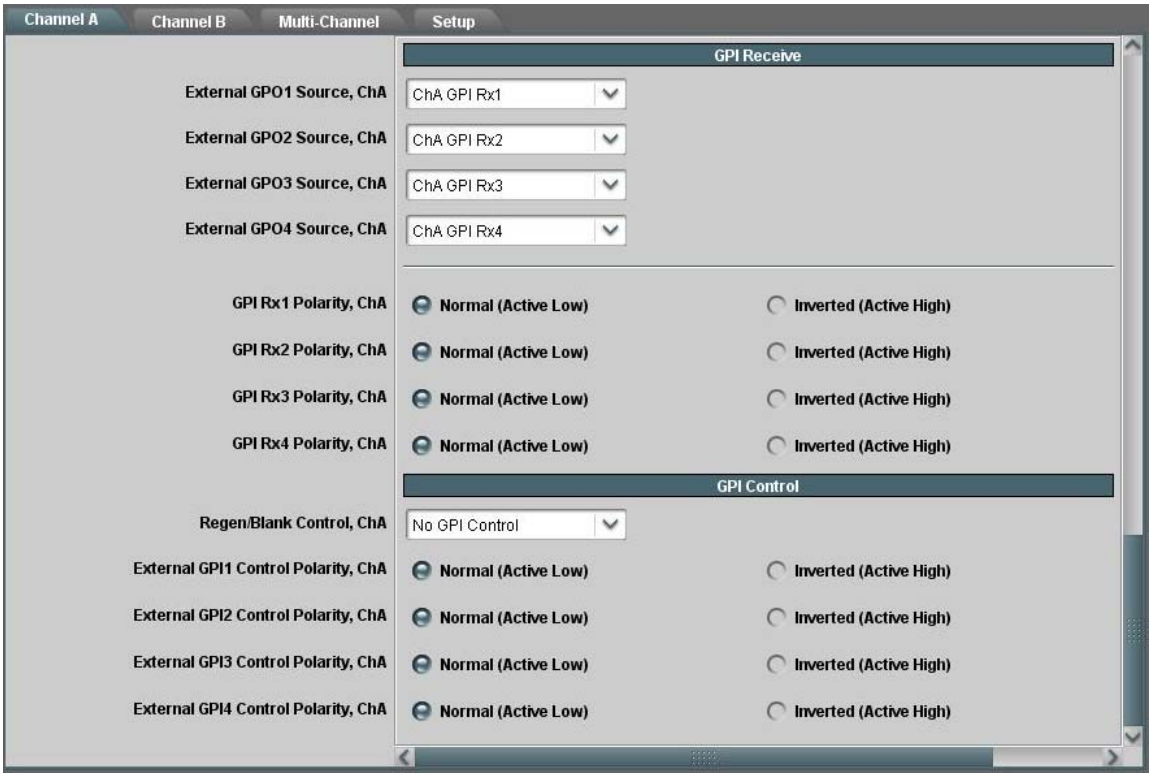
GPI Setup

- **SD Line for GPI Data, ChA:** Specifies which video line of SD video formats will be used for transmitting and receiving general purpose data (cues, etc.).
- **HD Line for GPI Data, ChA:** Specifies which video line of HD video formats will be used for transmitting and receiving general purpose data (cues, etc.)

GPI Transmit

- **Enable GPI Data Insertion, ChA:** Allows general purpose transmission bits to be encoded on the video signal.
- **Insert Mode, ChA:** Specifies whether the bits will be encoded Normal (bits encoded until timeout elapses) or Permanent (bits remain encoded until alternate input is provided) in either or both fields.
- **Insert Mode Timeout (seconds), ChA:** Set the timeout duration for Normal GPI data insertion.
- **GPI Tx Source, ChA:** Specifies whether transmission bits are just from the external GPI connector on the card, or if these bits are OR ed with received bits on the video stream. (This allows incoming bits to pass through when no GPI data is provided.)
- **GPI Tx [1-4] Source, ChA:** Control how the GPI pins on the board's connecter are mapped to the transmitted bits.
- **GPI Tx [1-4] Polarity, ChA:** Determines whether pulling the external connector's GPI pin low (Normal) or not (Inverted) sets a transmission bit.

Figure 4–6 Channel A (GPI Receive [cont.] and GPI Control)



GPI Receive

- **External GPO [1-4] Source, ChA:** Determines how external connector's GPO pins will be mapped to received bits from the video stream.
- **GPI Rx [1-4] Polarity, ChA:** Determines whether each GPO pin on the external connector is pulled low for a received SET bit (Normal) or pulled high (Inverted).

GPI Control

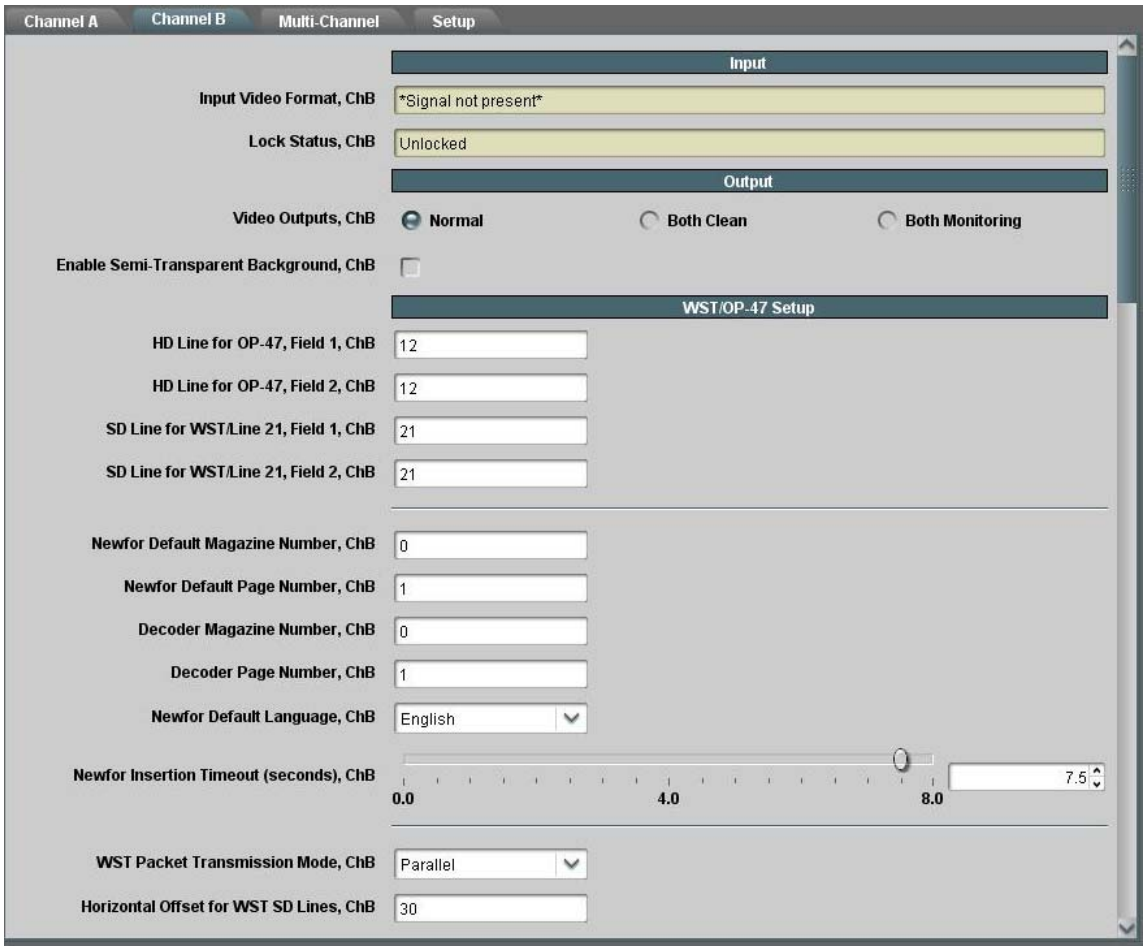
- **Regen/Blank Control, ChA:** Controls which (if any) GPI will cause caption blocking.
- **External GPI [1-4] Control Polarity, ChA:** Determines whether pulling the external GPI connector's pin low will assert a command (Normal) or whether not pulling it low (Inverted) does.

Channel B Tab

The **Channel B** tab contains the controls to customize the settings for Channel B.

The encoder and decoder in Channel B are for WST / OP-47 captions. For translation operations, **Channel B** is the **DESTINATION** channel. (**Channel A**—the CEA-608 / 708 channel—is the **SOURCE**).

Figure 4–7 Channel B (Input, Output, and WST / OP-47 Setup)



Channel B Settings

Input

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

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

Output

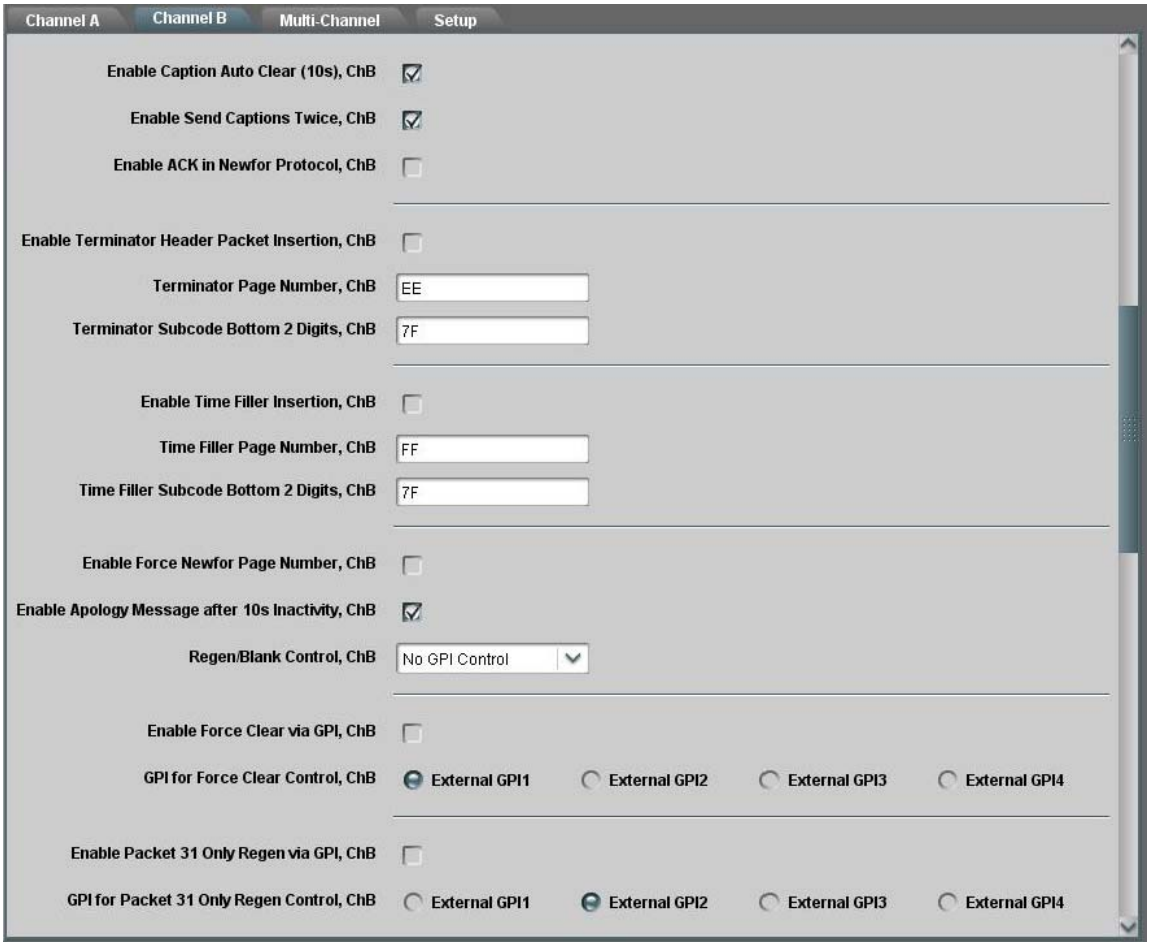
- **Video Outputs, ChB:** Select between Normal (CHA OUT has closed captions, CHA MON has “burned-in” captions), Both Clean (CHA OUT and CHA MON have closed captions), or Both Monitoring (CHA OUT and CHB MON have “burned-in” captions).
- **Enable Semi-Transparent Background, ChB:** Selects whether the caption background on the monitoring output will be normal (unchecked) or semi-transparent (checked).

WST/OP-47 Setup

- **HD Line for OP-47, Field 1, ChB:** Selects an HD stream’s video line of field 1 onto which OP-47 captions will be inserted.
- **HD Line for OP-47, Field 2, ChB:** Selects an HD stream’s video line of field 2 onto which OP-47 captions will be inserted.
- **SD Line for WST, Field 1, ChB:** Selects an SD stream’s video line of field 1 onto which WST captions will be inserted.
- **SD Line for WST, Field 2, ChB:** Selects and SD stream’s video line of field 2 onto which WST captions will be inserted.
- **Newfor Default Magazine Number, ChB:** No function in this product.
- **Newfor Default Page Number, ChB:** No function in this product.

- **Decoder Magazine Number, ChB:** Specifies the magazine number of caption data to be displayed on the monitor output.
- **Decoder Page Number, ChB:** Specifies the page number of caption data to be displayed on the monitor output.
- **Newfor Default Language, ChB:** No function in this product.
- **Newfor Insertion Timeout, ChB:** No function in this product.
- **WST Packet Transmission Mode, ChB:** Selects between Parallel (packets for different magazines can be transmitted in any order) and Serial (packets for each magazine are transmitted before packets for another magazine) transmission modes.

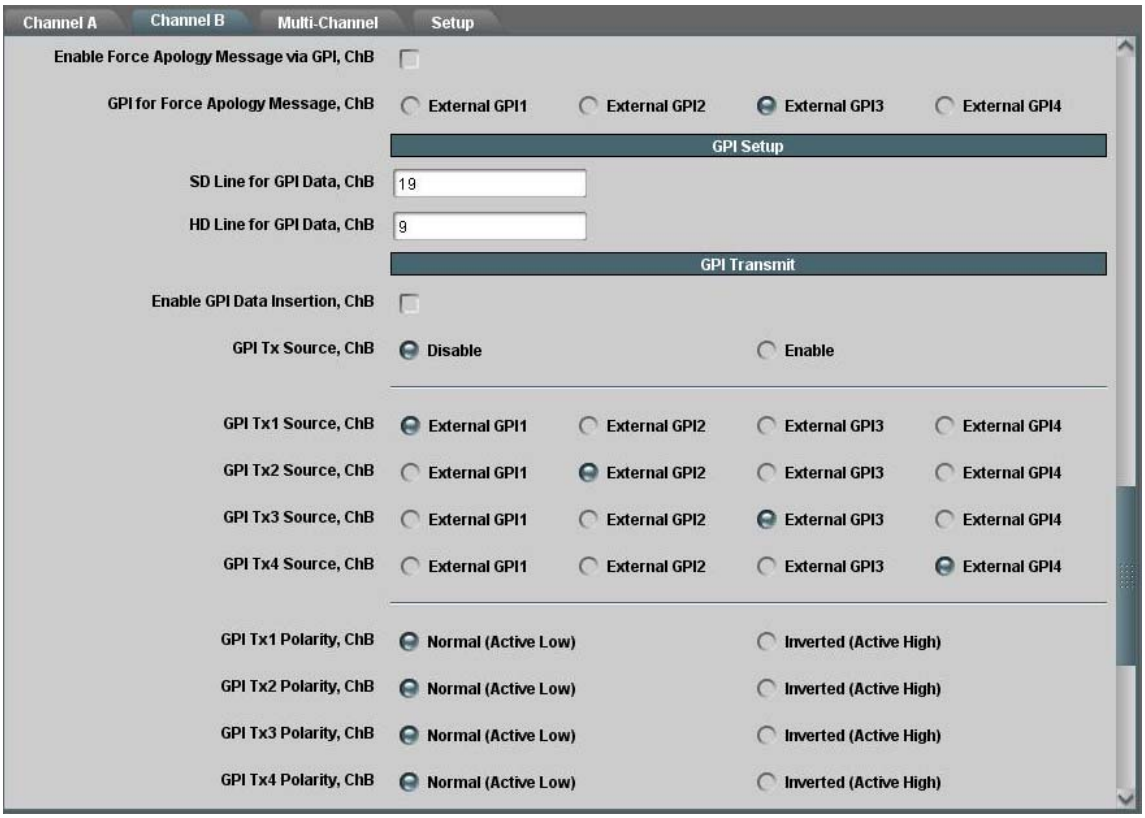
Figure 4–8 Channel B (WST/OP-47 Setup [cont.]



- **Enable Caption Auto Clear (10s), ChB:** Automatically clears the caption display after 10 seconds of no new caption data.

- **Enable Send Captions Twice, ChB:** No function in this product.
- **Enable ACK in Newfor Protocol, ChB:** No function in this product.
- **Terminator Page Number, ChB:** Sets the terminator page number.
- **Terminator Subcode Bottom 2 Digits, ChB:** Set the terminator subcode.
- **Enable Time Filler Insertion, ChB:** Enables the insertion of time fillers when no captions are present.
- **Time Filler Page Number, ChB:** Sets the page number of the time fillers.
- **Time Filler Subcode Bottom 2 Digits, ChB:** Sets the subcode for the time fillers.
- **Enable Force Newfor Page Number, ChB:** Enables page number provided via Newfor to override card settings.
- **Enable Apology Message after 10s Inactivity, ChB:** Displays a message—"This program is not captioned"—after 10s of no received caption data.
- **Regen/Blank Control, ChB:** Sets which (if any) GPI will cause the card to block incoming captions and insert time fillers.
- **Enable Force Clear via GPI, ChB:** Enables a GPI to clear the captions.
- **GPI for Force Clear, ChB:** Selects the GPI which will clear captions, if Force Clear via GPI is enabled.
- **GPI for Packet 31 Regen Only Control, ChB:** Selects which (if any) GPI will enable Packet 31 data to pass through the card.

Figure 4–9 Channel B (GPI Setup [cont.]



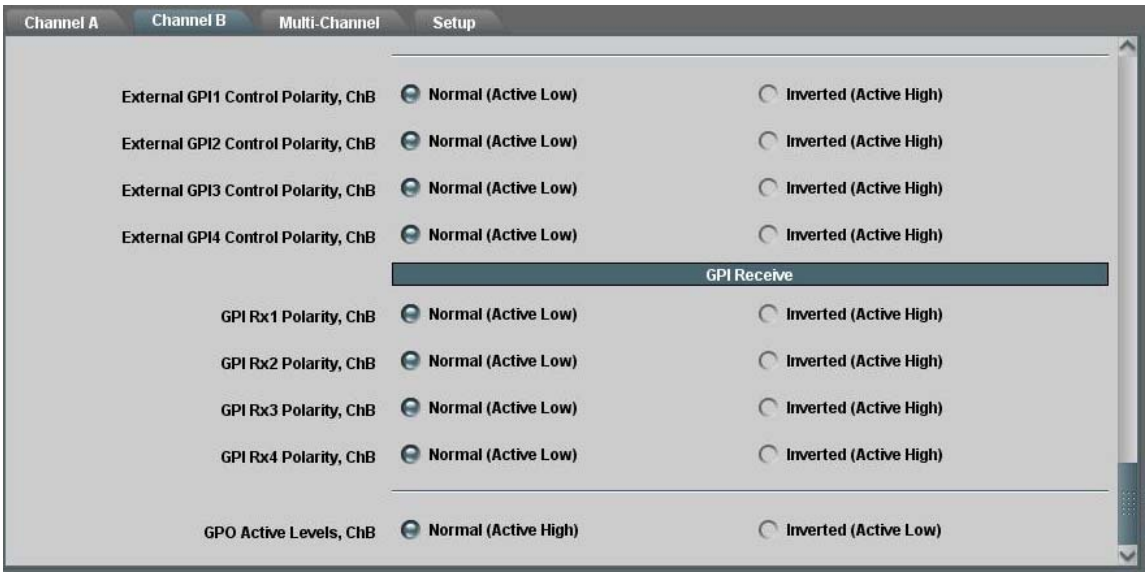
- **Enable Force Apology Message via GPI, ChB:** Enables a GPI to prompt an open-captioned display of a message indicating the program is not captioned.
- **GPI for Force Apology Message, ChB:** If Force Apology Message via GPI is enabled, selects which general purpose input will activate the message.

GPI Setup

- **SD Line for GPI Data, ChB:** Selects on which line of a standard definition video signal that transmitted bits / signaling cues will be placed.
- **HD Line for GPI Data, ChB:** Selects on which line of a high-definition video signal that transmitted bits / signaling cues will be placed.
- **Enable GPI Data Insertion, ChB:** Enables the encoding of bits / cues on the video signal.

- **GPI Tx Source, ChB:** Enables the general purpose I/O connector to be used as the source of bits/cues encoded on the video signal.
- **GPI Tx [1-4] Source, ChB:** Maps the connections of the general purpose I/O connector to bits/cues encoded on the video signal.
- **GPI Tx [1-4] Polarity, ChB:** Determines the polarity of a transmitted bit/cue: Normal, meaning a zero indicates the bit is asserted; or Inverted, meaning a one indicates the bit is asserted.

Figure 4–10 Channel B (GPI Setup [cont.], GPI Receive

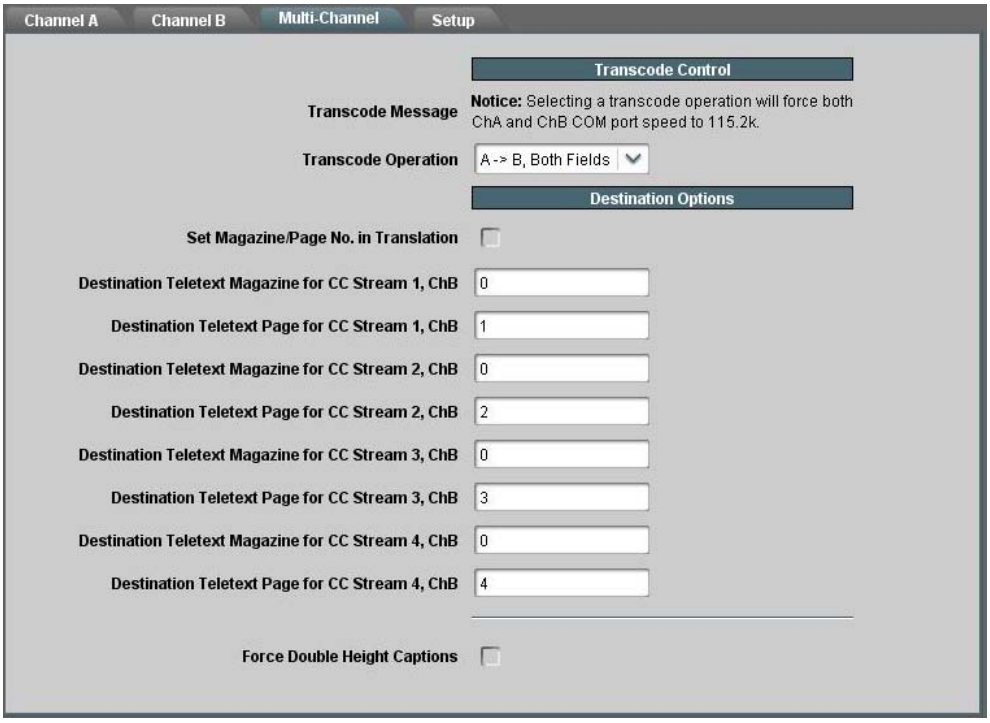


- **External GPI [1-4] Control Polarity, ChB:** Determines how an encoded bit/cue will be set based on the voltage applied to a general purpose I/O pin: Normal, meaning a low voltage signals an asserted bit; or Active High, meaning a high voltage (3.3V) signals an asserted bit.
- **GPI Rx [1-4] Polarity, ChB:** Determines how a received bit/cue will be interpreted: Normal, meaning a zero indicates an asserted bit; or Inverted, meaning a one indicates an asserted bit.
- **GPO Active Levels, ChB:** Determines how an asserted bit will be presented on the general purpose I/O connector: Normal, meaning with a high voltage; or Inverted, meaning with a low voltage.

Multi-Channel Tab

The Multi-Channel tab contains the settings for translation (CEA-608/708 on Channel A to WST/OP-47 on Channel B).

Figure 4–11 Channel B (WST/OP-47 Setup [cont.]



Transcode Control

- **Transcode Operation:** Selects which fields on Channel B will receive translated captions.

Important: When transcoding (translating captions from Channel A to Channel B), the serial ports for Channel A and Channel B are internally connected and locked to the 115.2kbps rate.

Destination Options

- **Set Magazine/Page No. in Translation:** Enables the WST/OP-47 magazine and page number to be set with the following controls.

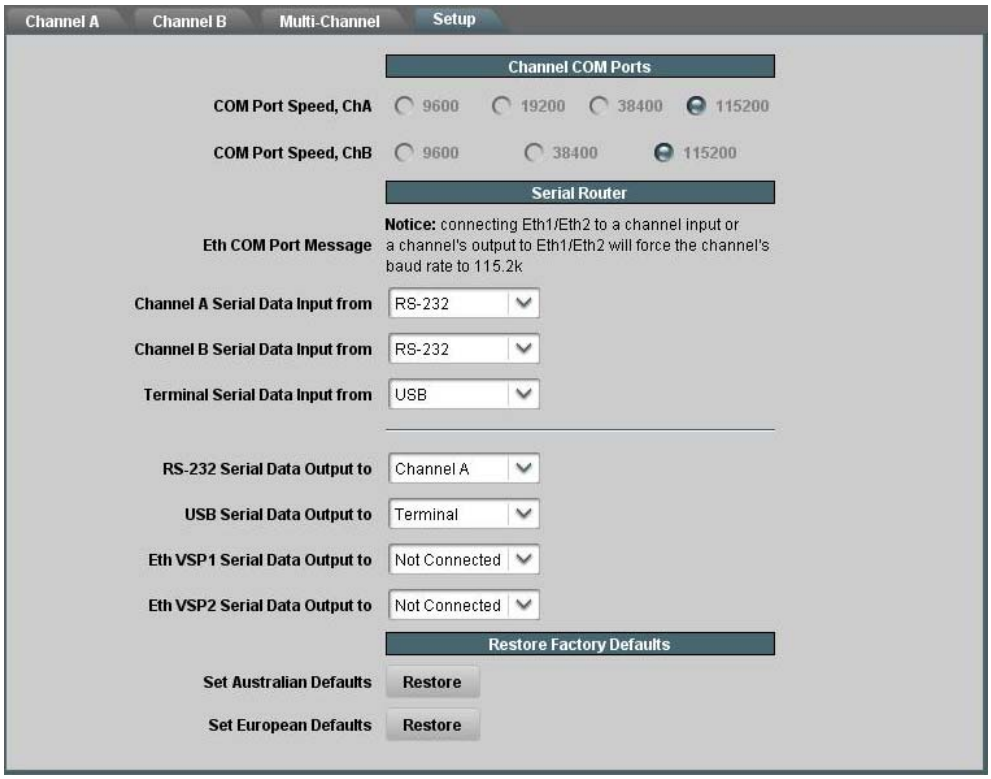
Important: Translation is only supported for CC Stream 1 in the current release. CC2-4 controls have no effect.

- **Destination Teletext Magazine for CC Stream [1-4], ChB:** Specifies the WST/OP-47 magazine number for the translated captions on Channel B based on the specific channel (CC1-CC4) of caption data on Channel A.
- **Destination Teletext Page for CC Stream [1-4], ChB:** Specifies the WST/OP-47 page number for the translated captions on Channel B based on the specific channel (CC1-CC4) of caption data on Channel A.
- **Force Double Height Captions:** Checking this box will enable caption characters that are two rows in height.

The Setup Tab

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

Figure 4–12 Setup Tab



Setup Tab

The Setup tab allows the routing of caption data into and out of the card to be changed, and the card's default settings to be restored.

Channel COM Ports

- **COM Port Speed, ChA/B:** Controls the baud rate of the serial input/output for a channel's encoder and decoder.

Serial Router

- **Channel A Serial Data Input from:** No function in this product. This control should be set to "Not Connected."
- **Channel B Serial Data Input from:** No function in this product. This control should be set to "Not Connected."
- **Terminal Serial Data Input from:** Specifies from which external port the terminal receives its input: the RS-232 port, either of the Ethernet virtual serial ports, or USB. If the terminal r is not used, this control should be set to "Not Connected."

Important: Channel A and B selections in the following controls have NO EFFECT in this product.

- **RS-232 Serial Data Output to:** Specifies the source of data for the RS-232 output: Channel A (the decoder in Channel A), Channel B (the decoder in Channel B), or the terminal.
- **USB Serial Data Output to:** Specifies the source of data for the USB output: Channel A (the decoder in Channel A), Channel B (the decoder in Channel B), or the terminal.
- **Eth1 VSP Serial Data Output to:** Specifies the source of data for the first Ethernet virtual serial port output: Channel A (the decoder in Channel A), Channel B (the decoder in Channel B), or the terminal.
- **Eth2 VSP Serial Data Output to:** Specifies the source of data for the second Ethernet virtual serial port output: Channel A (the

decoder in Channel A), Channel B (the decoder in Channel B), or the terminal.

Important: If a virtual serial port is connected for encoding or decoding, the baud rate will automatically be set to 115200. However, the serial connection at the PC can still be set for any baud rate.

Restore Factory Defaults

- **Set Australian Defaults:** Restores card to settings suitable for common Australian applications.
- **Set European Defaults:** Restores card to settings suitable for common European applications.

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 translate captions from Channel A to Channel B?

Situation: You have one video stream containing CEA-608/708 captions and want to translate them to WST/OP-47 captions on a second video stream.

Preparation: Connect a cable with the 608/708 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 video with the WST/OP-47 captions.

In the **Multi-Channel** menu select the transcode operation to perform (which field in the destination video to insert the captions).

Check the **Set Magazine/Page No. in Translation** box.

Set the **Destination Teletext Magazine Number** and **Destination Teletext Page Number** for each caption channel you wish to translate.

In the **Channel A** tab, set the **HD Line for CEA-708, ChA** control (for HD sources) or the **SD Line for CEA-608, ChA** control (for SD sources) to the number of the video line on which the captions are placed in the source video.

In the **Channel B** tab, set the **HD Line for OP-47 Field 1/2, ChB** (for HD destinations) or the **SD Line for WST Field 1/2, ChB** (for SD destinations) to the number of the video line on which captions will be inserted in the destination video.

CHB OUT will output **CHB IN** video with WST/OP-47 captions translated from the CEA-608/708 captions on the video stream input to **CHA IN**.

Note: To stop translation and resume normal encoding/decoding on a channel, select "None" on the **Transcode Operation** control in the Multi-Channel tab.

Note: This card translates in one direction only (CEA-608/708 to WST/OP-47) and the source channel must be Channel A and destination channel must be Channel B.

How do I transmit cues/general purpose data bits?

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/CHB IN** and a video output on **CHA OUT/CHB OUT**.

Process:

1. In the **Channel A/B** menu, check the **Enable GPI Data Insertion, ChA/ChB** check box. (Bits can be transmitted on both channels simultaneously by selecting both.)

2. In the **Channel A/B** menu, enter a video line for the data in **SD Line for GPI Data, ChA/ChB** text box (for SD video signals) and in **HD Line for GPI Data, ChA/B** 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/B according to the state of the switch closure circuit.

How do I receive cues/general purpose data bits?

Situation: You want to receive general purpose transmission bits on a video stream and set the card's general purpose outputs to reflect their state.

Preparation: Connect the **RXOUT1-4** pins on connector **J18** to the input of whatever device you wish to stimulate (remember that an external pull-up to a voltage is required). Provide a video stream with encode cues upon it to **CHA IN/CHB IN**.

Process:

1. In the **Channel A/B** menu, check the **Enable GPI Data Insertion, ChA/ChB** check box. (Bits can be transmitted on both channels simultaneously by selecting both.)

2. In the **Channel A/B** menu, enter a video line for the data in **SD Line for GPI Data, ChA/ChB** text box (for SD video signals) and in **HD Line for GPI Data, ChA/B** text box (for HD video signals).

3. The mapping of the **RXOUT1-4** bits to the received bits can be set with the controls in the **External GPO1-4 Source, ChA/B** section.

Received bits on Channel A/B will now be presented to the **RXOUT** pins on connector **J18**.

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

Setup

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

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

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

Connection Methods

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

- One port via an RS-232 connector on the rear panel,
- Two ports via the Ethernet connector on the rear panel, and
- One port via the USB connector on the card (accessible when the MC-1RU's front panel is removed).

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

USB-to-USB Connection

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

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

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

3. Identify which card you wish to configure.

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

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

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

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

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

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

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

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

RS-232 Serial Connection

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

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

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

2. Set up the USB-to-USB connection as described in the section entitled USB-to-USB Connection on page 60.

   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 19).

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 19 for detailed instructions to install a VSP.

3. Connecting with the USB-to-USB Connection on page 60,

   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 62.

Establishing Communications from the PC to the HDCC

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

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

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

Figure 5–1 HDCC Registry Editor

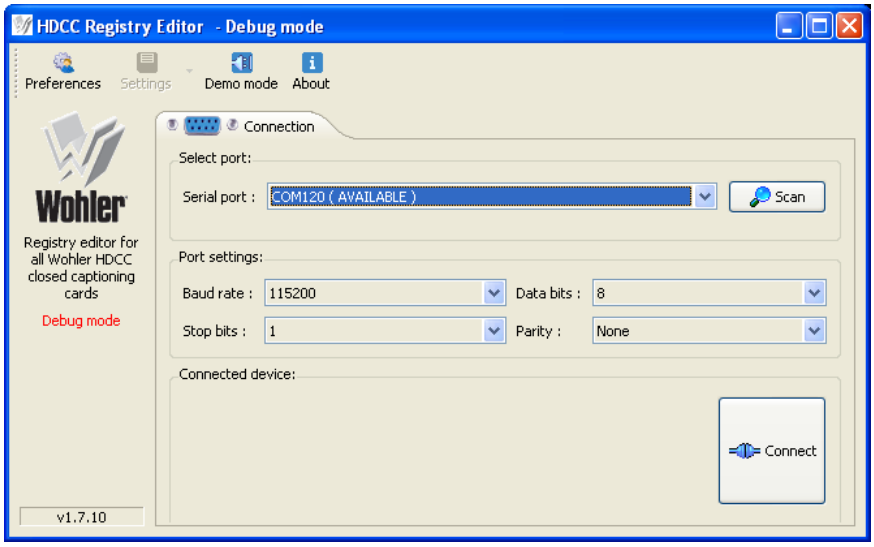
3. On the **Connection** tab, open the drop down list for the **Serial port** and select the serial port that corresponds to your USB port.

4. In the **Port settings** section, do not change the port settings. Use the settings shown in Figure 5–2 on page 65.

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

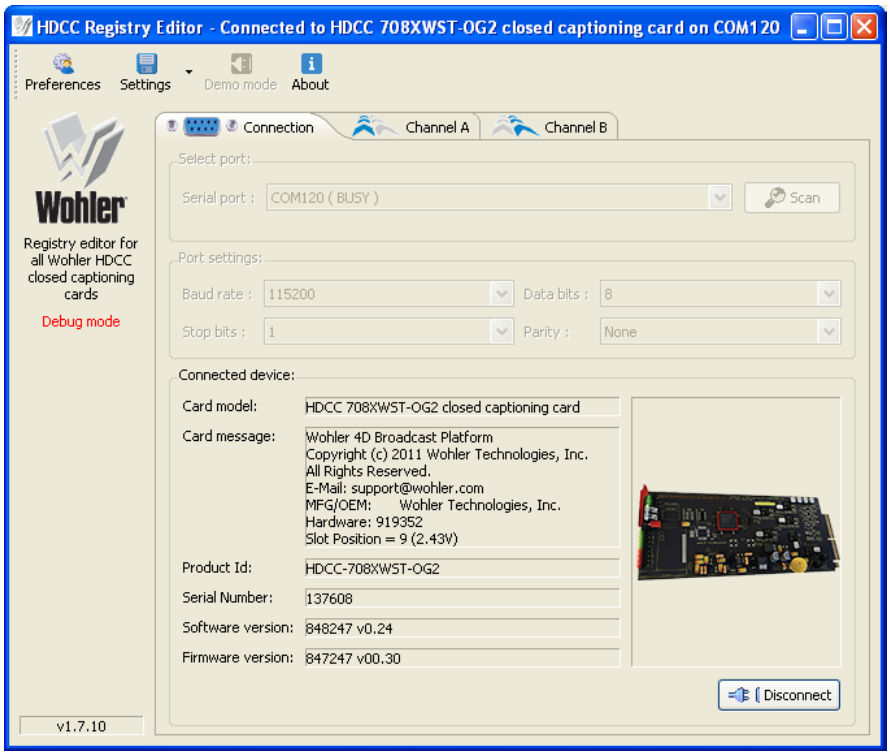
5. Click **Connect**.

Figure 5–2 Setting the Port Settings



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

Figure 5–3 Connected to the HDCC Card



Common Controls

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

- **Reset to Defaults**: Click this button if you want to start over and reload the factory defaults.
- **Reload ch. A/B reg.**: Click this button to restore the register values that the card had before your changes.
- **Apply to both channels**: Click this button after modifying values for registers that affect both channels.
- **Apply to ch A/B**: These buttons act like the **Save** function. After modifying the register values (by using either the drop-down lists, or by typing in the register values) clicking these buttons saves your new settings to the card.

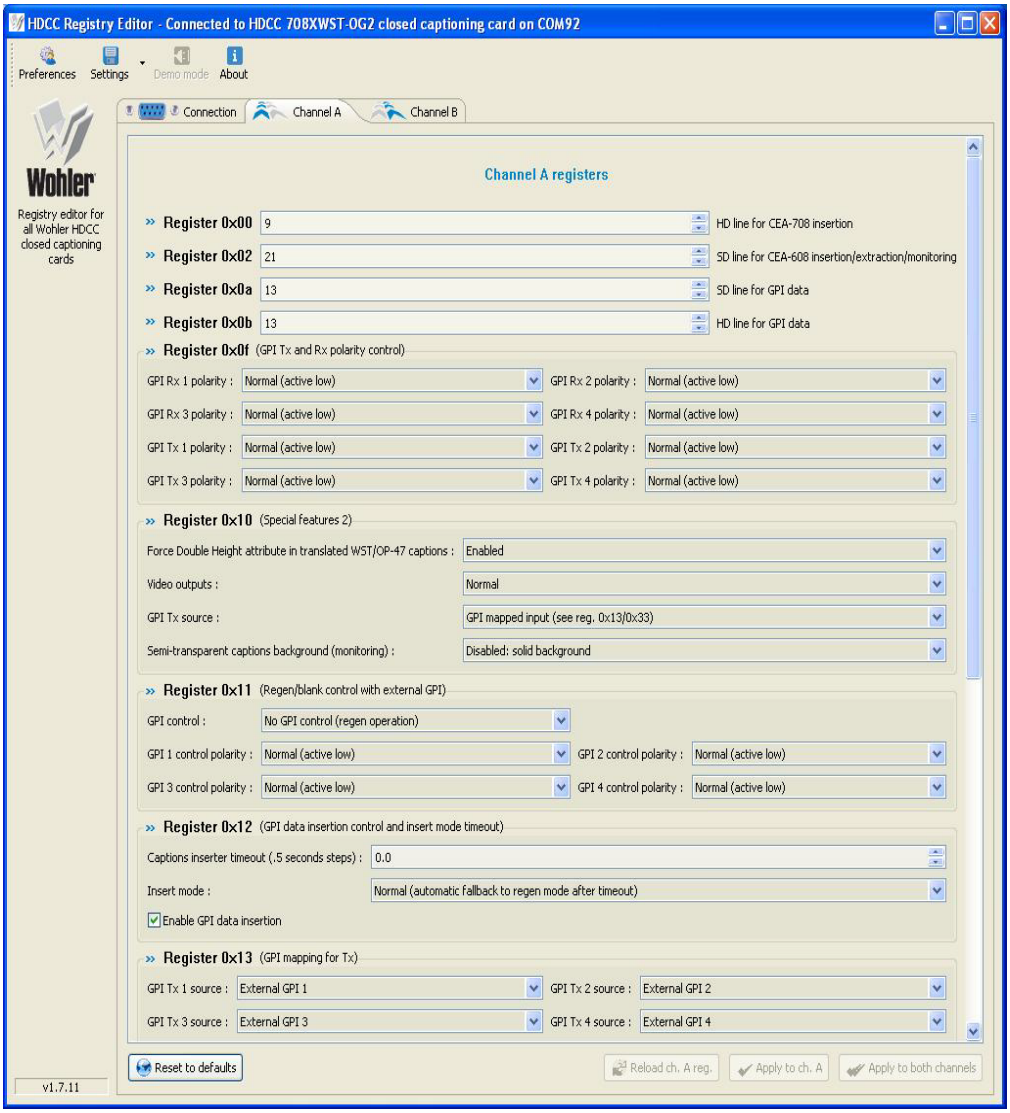
Channel A Tab

The **Channel A** tab contains the controls to customize the settings for Channel A.

For translation operations, **Channel A** is the **SOURCE** channel (**Channel B**—the WST/OP-47 channel—is the **DESTINATION**).

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

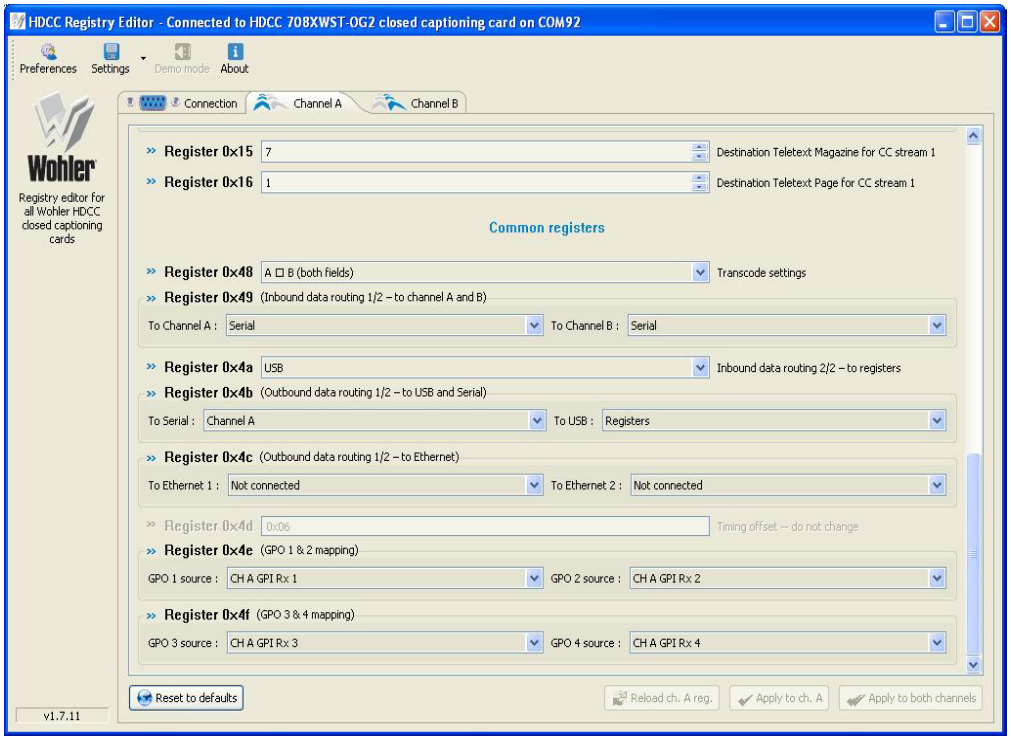
Figure 5–4 Channel A Settings (Top)



- **HD line for CEA-708 insertion:** The video line for HD video formats on which CEA-708 captions are present.
- **SD line for CEA-608 insertion / extraction / monitoring:** The video line for SD video formats on which CEA-608 captions are present.
- **Easy Reader:** No function in this product.
- **Aspect Ratio:** No function in this product.
- **Digital / Analog:** No function in this product.

- **Service number:** No function in this product.
- **708 language code:** No function in this product.
- **Disable VANC 608/708insertion unless receiving CDP data:** No function in this product.
- **Disable "Smart XDS insertion" feature:** No function in this product.
- **Enable VANC 608/708 insertion in SD:** No function in this product.
- **Select decoded data output format:** No function in this product.
- **Com ports speed:** No function in this product.
- **SD line for GPI data:** Specifies on which SD video line general purpose transmission bits will be received/transmitted.
- **HD line for GPI data:** Specifies on which HD video line general purpose transmission bits will be received/transmitted.
- **GPI LED settings:** No function in this product
- **GPI Rx 1-4 polarity:** Controls the polarity of the output that represents the value of a received general purpose transmission bit.
- **GPI Tx 1-4 polarity:** Controls the polarity of the input used to provide the value for a transmitted general purpose transmission bit.

Figure 5–5 Channel A Settings (Bottom)



- **Force Double Height attribute in translated WST/OP-47 captions:** Sets a flag in translated WST/OP-47 captions to indicate the captions are double-height.

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

- **GPI Tx source:** Controls whether the general purpose transmission bits are taken solely from the mapped input from the connector or whether the mapped input is logically OR ed with a received transmission bit (the latter enables transmission bit pass through when the connector input is not asserted).

- **Semi-transparent captions background (monitoring):** Controls semi-transparent background on monitored captions.

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

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

- **Caption inserter timeout:** Sets the duration for insertion timeout to occur.
- **Insert mode:** Controls whether captions are permanently inserted in the absence of new encoding data, or whether the card falls back to regen mode according to the timeout specified in Caption insert timeout.
- **GPI data insertion:** Enables general purpose transmission bit encoding.
- **GPI Tx 1-4 source:** Maps bits transmitted on the video stream to inputs on the GPIO connector.
- **Destination Teletext Magazine for CC stream 1..4:** Specifies which WST / OP-47 magazine number will be used for a particular 608 / 708 CC stream.
- **Destination Teletext Page for CC stream 1..4:** Specifies which WST / OP-47 page number will be used for a particular 608 / 708 CC stream.
- **Decoded Channel on mon. output:** Specifies which CC channel is decoded on the monitor output.
- **Transcode Settings:** Controls how captions are translated from Channel A to Channel B.
- **To Channel A:** No function in this product.
- **To Channel B:** No function in this product.
- **Inbound Data Routing 2 / 2 - Registers:** Controls which serial port will be used for inputting data to HDCCRegEdit / terminal.
- **To Serial:** Controls which output is routed to the RS-232 port. Only valid for Registers in this product.
- **To USB:** Controls which output is routed to the USB port. Only valid for Registers in this product.
- **To Ethernet1, To Ethernet2:** Controls which output is routed to the available virtual serial ports. Only valid for Registers in this product.

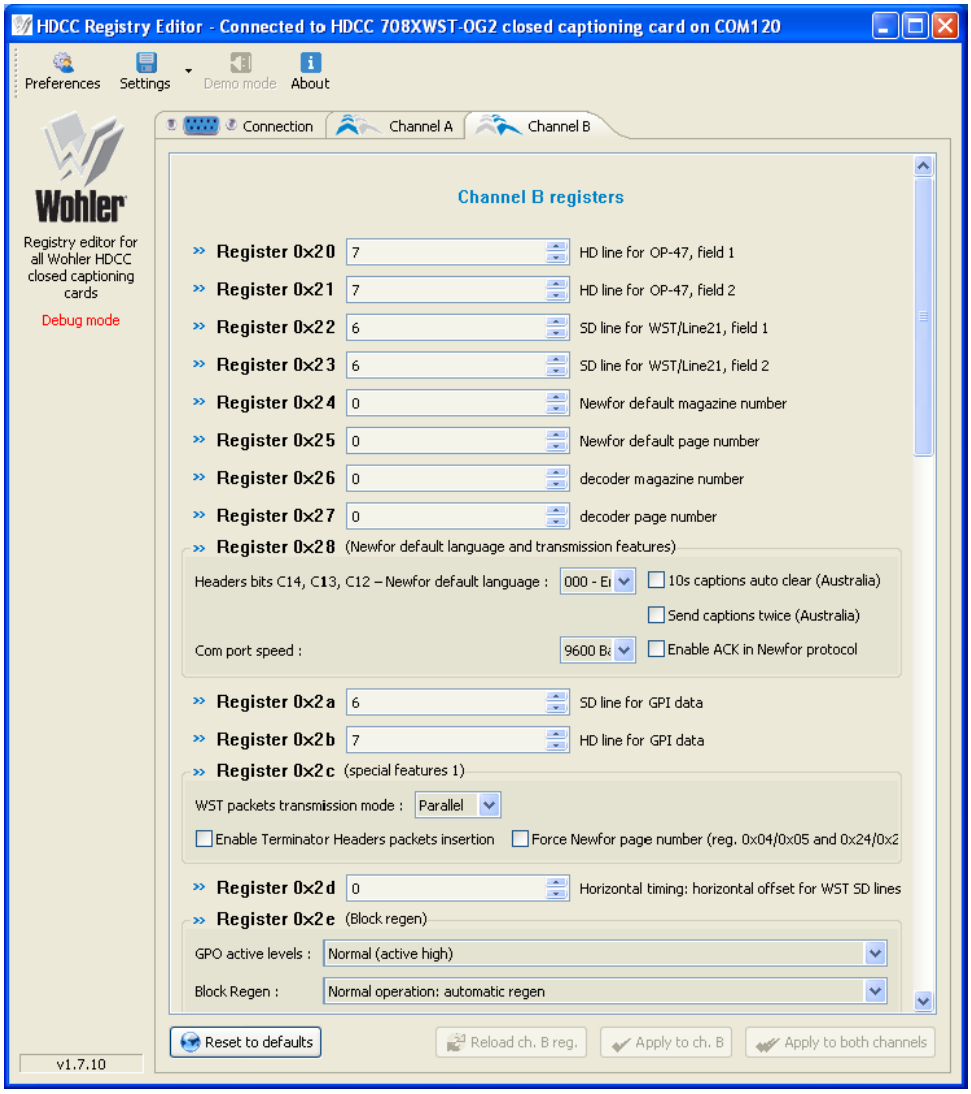
- **GPO1-4 source:** controls how received transmission bits are mapped to the outputs on the GPIO connector.

Channel B Tab

The Channel B tab contains the controls to customize the settings for Channel B.

For translation operations, **Channel A** is the **SOURCE** channel (**Channel B**—the WST/OP-47 channel—is the **DESTINATION**).

Figure 5–6 Channel B Settings (Top)

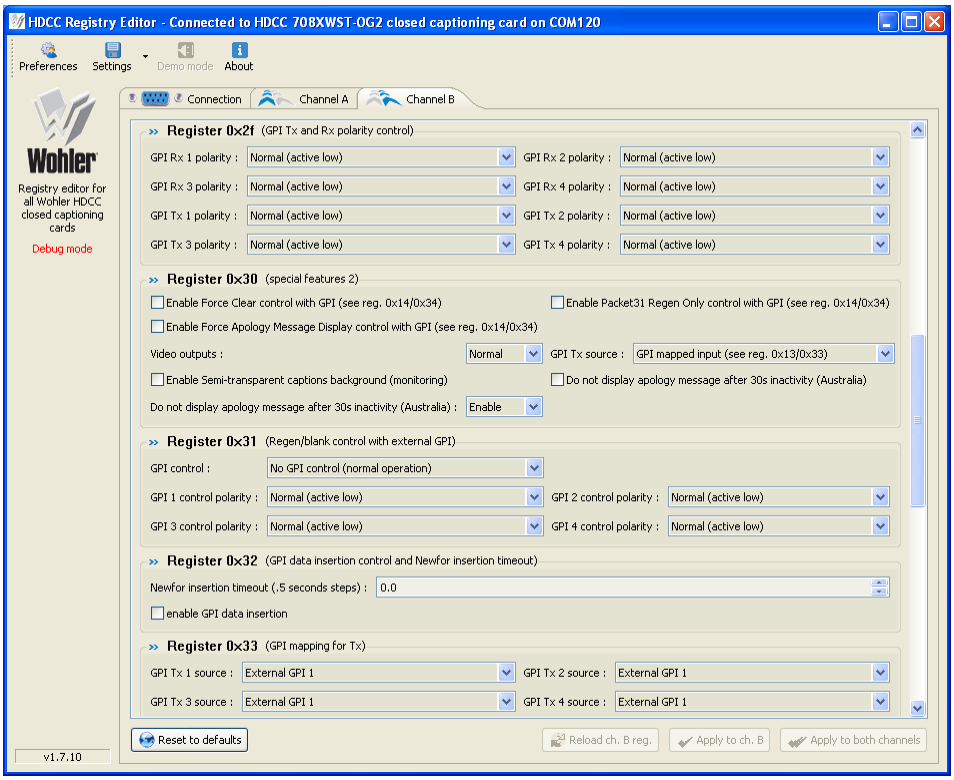


- **HD line for OP-47, field 1:** Specifies the HD video line in field 1 on which OP-47 captions will be placed.
- **HD line for OP-47, field 2:** Specifies the HD video line in field 2 on which OP-47 captions will be placed.
- **SD line for WST/Line 21, field 1:** Specifies the SD video line in field 1 on which WST captions will be placed.
- **SD line for WST/Line 21, field 2:** Specifies the SD video line in field 2 on which WST captions will be placed.

- **Newfor default magazine number:** No function in this product.
- **Newfor default page number:** No function in this product.
- **Decoder magazine page number:** No function in this product.
- **Decoder page number:** No function in this product.
- **Header bits C14,C13,C12 – Newfor default language:** No function in this product.
- **10s captions auto clear (Australia):** No function in this product.
- **Send captions twice (Australia):** No function in this product.
- **Enable ACK in Newfor protocol:** No function in this product.
- **Com port speed:** No function in this product.
- **SD line for GPI data:** Specifies on which line of an SD video signal transmission bits will be placed.
- **HD line for GPI data:** Specifies on which line of an HD video signal transmission bits will be placed.
- **WST packet transmission mode:** No function in this product.
- **Enable Terminator Headers packets insertion:** No function in this product.
- **Force Newfor page number:** No function in this product.
- **Horizontal timing:** Factory selected value, **DO NOT CHANGE**.
- **GPO active levels:** Controls how asserted bits are presented at the GPIO connector: Normal (high indicates asserted) or Inverted (low indicates asserted).
- **Block Regen:** No function in this product.
- **GPI Rx1-4 polarity:** Controls how received transmission bits will be interpreted.

- **GPI Tx1-4 polarity:** Controls how bits to be transmitted will be interpreted.

Figure 5–7 Channel B Settings (Middle)



Enable Force Clear control with GPI: No function in this product.

Enable Packet 31 Regen: No function in this product.

Enable Force Apology Message Display control with GPI: No function in this product.

Video outputs: Controls Whether the captions on Channel B's outputs are closed / open, both open, or both closed.

GPI Tx source: Controls the source of transmitted bits: Either the bits from the GPIO connector, or the bits from the GPIO connector OR ed with received transmission bits.

Enable Semi-transparent captions background (monitoring): Controls whether the monitoring display uses a semi-transparent background.

Do not display apology message: No function in this product.

Do not display apology message after 30s inactivity (Australia): No function in this product.

GPI Control: No function in this product.

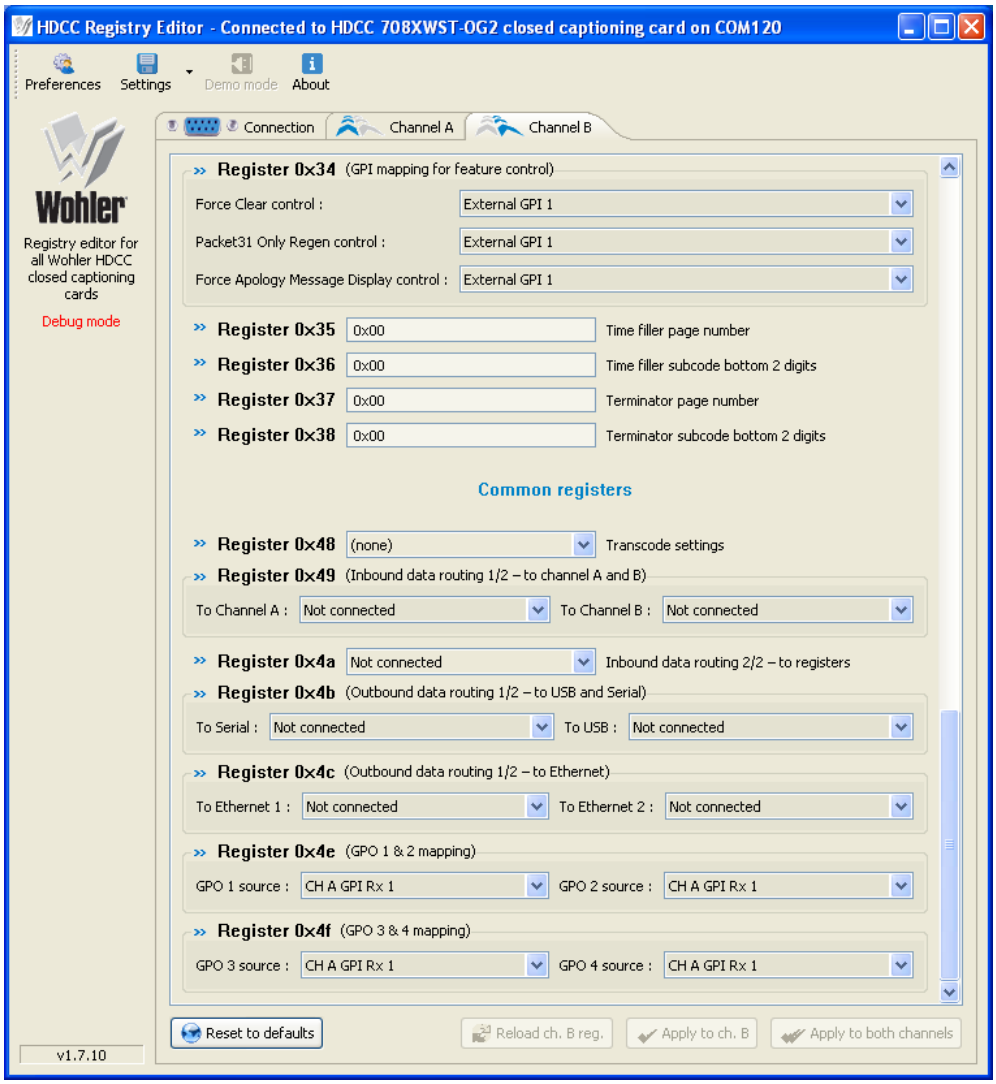
GPI1-4 control polarity: No function in this product.

Newfor insertion timeout: No function in this product.

Enable GPI data insertion: Enables insertion of transmission bits into the video signal.

GPI Tx1-4 source: specifies to which transmission bit pins on the external GPIO connector map.

Figure 5–8 Channel B Settings (Bottom)



Force Clear control: No function in this product.

Packet31 Only Regen control: No function in this product.

Force Apology Message Display control: No function in this product.

Time filler page number: No function in this product.

Time filler subcode bottom 2 digits: No function in this product.

Terminator page number: No function in this product.

Terminator subcode bottom 2 digits: No function in this product.

Common registers: These controls have the same functions as listed in the Channel A section.

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 translate CEA-608/708 captions to WST/OP-47 captions?

Situation: you have one video stream containing CEA-608/708 captions and want to translate them to WST/OP-47 captions on a second video stream.

Preparation: Connect a cable with the 608/708 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 video with the WST/OP-47 captions.

Process:

1. In the **Channel A** tab select the **Transcode Operation** to perform (which field in the destination video to insert the captions).

2. Set the **Destination Teletext Magazine Number** and **Destination Teletext Page Number** for each caption channel you wish to translate (Registers 0x15-0x1C).

3. In the **Channel A** tab, set the **HD Line for CEA-708, ChA** control (for HD sources) or the **SD Line for CEA-608, ChA** control (for SD sources) to the number of the video line on which the captions are placed in the source video.

4. In the **Channel B** tab, set the **HD Line for OP-47 Field 1/2, ChB** (for HD destinations) or the **SD Line for WST Field 1/2, ChB** (for SD destinations) to the number of the video line on which captions will be inserted in the destination video.

CHB OUT will output **CHB IN** video with WST/OP-47 captions translated from the CEA-608/708 captions on the video stream input to **CHA IN**.

Note: To stop translation and resume normal encoding/decoding on a channel, select "None" on the **Transcode Operation** control in the **Channel A** tab.

Note: This card translates in one direction only (CEA-608/708 to WST/OP-47) and the source channel must be **Channel A** and destination channel must be **Channel B**.

How do I transmit cues/general purpose data bits?

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/CHB IN** and a video output on **CHA OUT/CHB OUT**.

Process:

1. In the **Channel A/B** menu, check the **Enable GPI Data Insertion** check box. (Bits can be transmitted on both channels simultaneously by selecting both.)

2. In the **Channel A/B** menu, enter a video line for the data in **SD Line for GPI Data** text box (for SD video signals) and in **HD Line for GPI Data** 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** section.

Transmitted bits will now be encoded on Channel A/B according to the state of the switch closure circuit.

How do I receive cues/general purpose data bits?

Situation: You want to receive general purpose transmission bits on a video stream and set the card’s general purpose outputs to reflect their state.

Preparation: Connect the **RXOUT1-4** pins on connector **J18** to the input of whatever device you wish to stimulate (remember that an external pull-up to a voltage is required). Provide a video stream with encode cues upon it to **CHA IN/CHB IN**.

Process:

1. In the **Channel A/B** tab, check the **Enable GPI Data Insertion, ChA/ChB** check box. (Bits can be transmitted on both channels simultaneously by selecting both.)

2. In the **Channel A/B** tab, enter a video line for the data in **SD Line for GPI Data** text box (for SD video signals) and in **HD Line for GPI Data** text box (for HD video signals).

3. The mapping of the **RXOUT1-4** bits to the received bits can be set with the controls in the **GPO 1-4 Source, ChA/B** section.

Received bits on Channel A/B will now be presented to the **RXOUT** pins on connector **J18**.

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

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

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

Process:

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

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

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

   - **Normal**
   - **Permanent insert mode in field 0**
   - **Permanent insert mode in field 1**
   - **Permanent insert mode in both fields**

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

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

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

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

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

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

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

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

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

Process:

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

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

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

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

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

CHAPTER 6
Using the General Purpose Inputs/Outputs

Introduction

Overview

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

Goals for This Chapter

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

Topics

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:

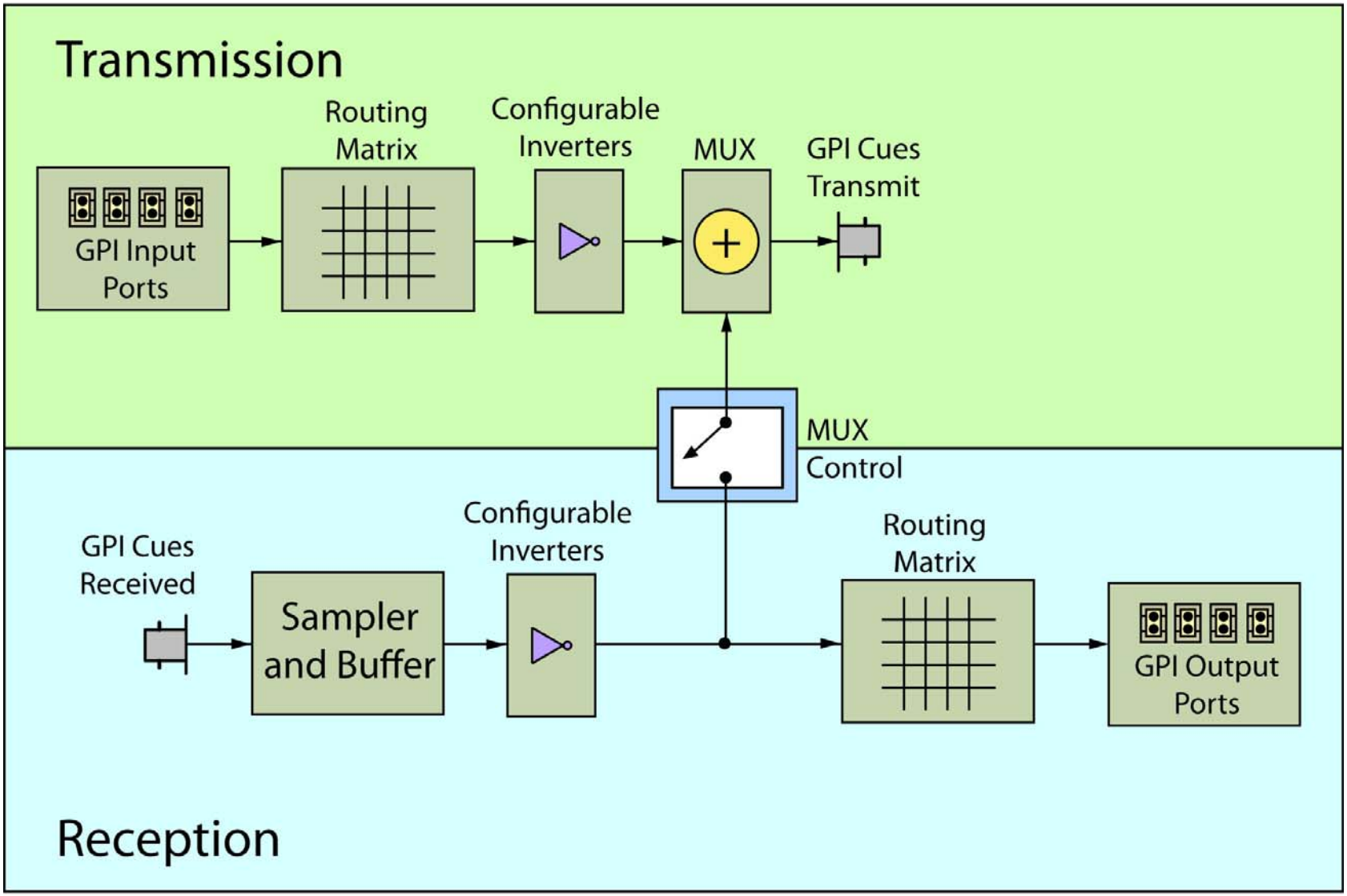
- ARC switching
- Commercial cue triggers (more accurate than the antiquated cue tone system)
- Machine control
- Regional commercial insertion cards

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.

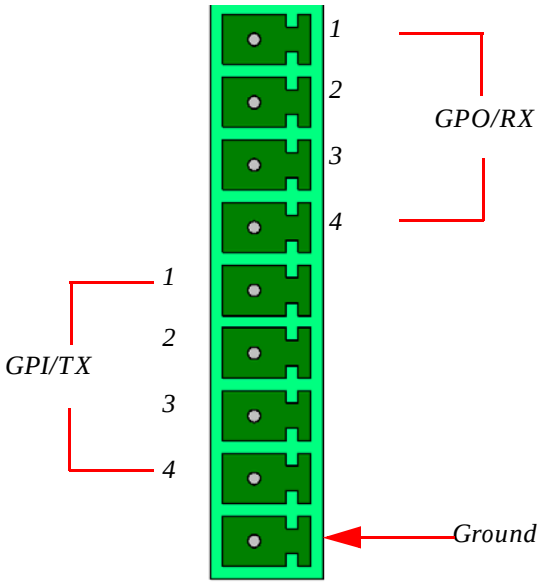
Figure 6–1 GPI/O Functional Diagram



GPI/O Connector

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

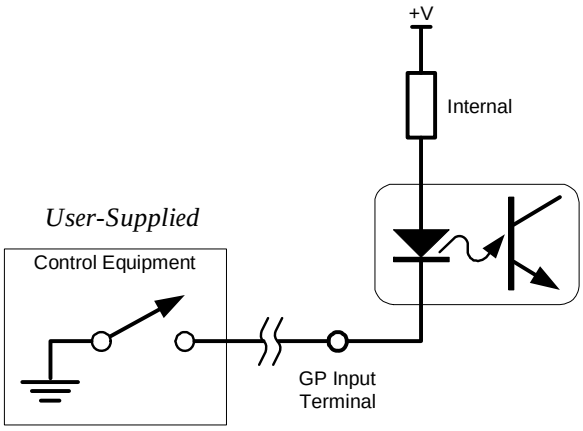
Figure 6–2 GPI/O Connector Diagram



GPIs

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

Figure 6–3 Input Diagram



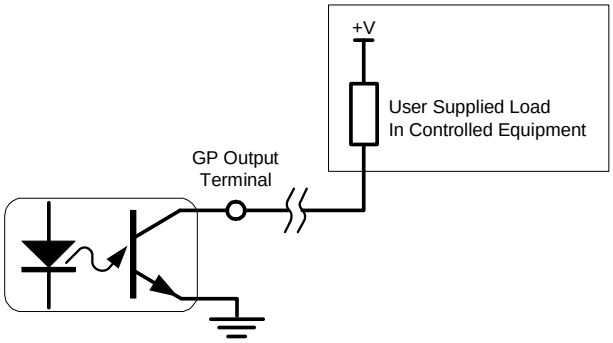
GPOs

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

Important: The GP outputs are optically isolated and "open collector" so the user must provide the appropriate pull-up resistor for each GP output. See Figure 6–4 below.

The HDCC provides four GPOs. (See Connector Pin Assignments on page 119 in Chapter 4 for connectivity.)

Figure 6–4 Output Diagram



Important: The internal transistor can switch only POSITIVE voltages. The output should be connected to a voltage that is positive with respect to the card's ground (pin 9 on J18 [-OG products:], pin 9 on J16 / J18 [-2CH products]).

CHAPTER 7
Terminal

Introduction

Overview

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

Goals for This Chapter

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

Topics

Background

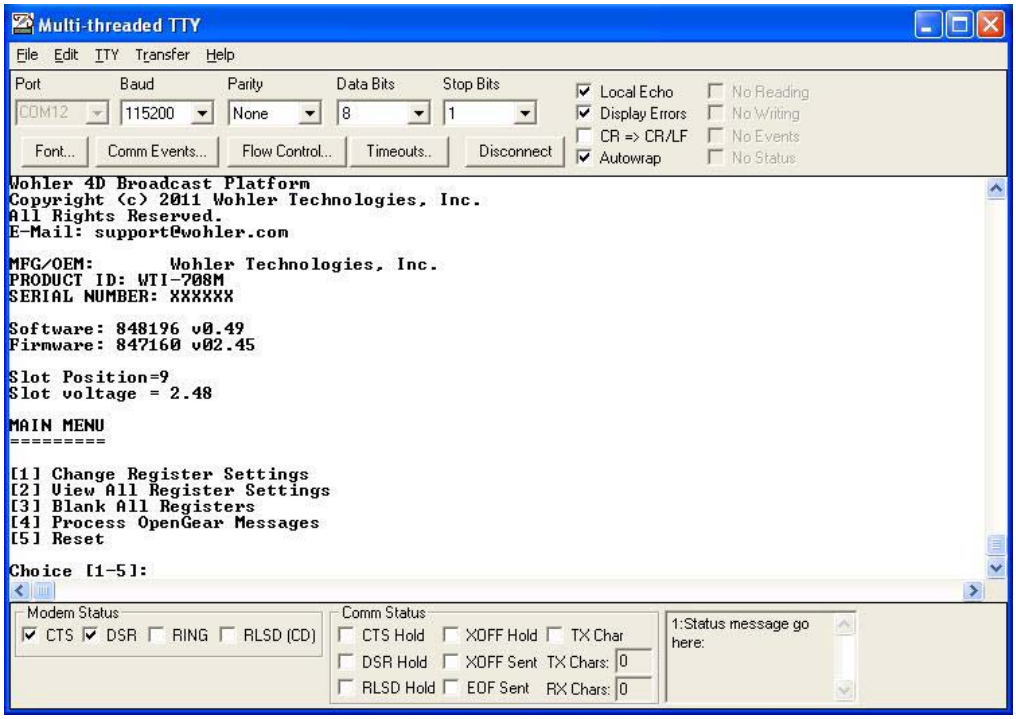
The HDCC card's operation is governed by several registers. These registers are modified automatically if you use either the DashBoard or HDCCRegEdit user interface.

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

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

Configuring the HDCC Card for Terminal Access

Figure 7–1 Terminal Main Menu



Access to the Terminal is controlled by the **BOOTOPT** jumper on the card as shown in 10. below. The sections below describe how it is used.

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

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

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

Accessing the Terminal via the RS-232 Port

1. In DashBoard's **Setup Menu**, set the Terminal input to **RS-232** and the RS-232 output to **Terminal**.
2. In HDCCRegEdit's **Channel A** page, set **To RS-232** to **Registers** and set the **To Registers** to **RS-232**. Click **Apply**.
3. Power down the card, set **SW4** to **TERM**.

   Note: For MC-1RU users, **SW4** should already be set to **TERM**.
4. Verify the SW3 is set to **OFF**.
5. Connect a serial cable from your PC to the RS-232 connector on the rear panel.
6. Re-power the card.
7. Open a terminal emulator (e.g., HyperTerminal, PuTTY, etc.) with the serial COM port set to 115.2k, 8 data bits, 1 stop bit, no parity, and no handshaking.
8. Press the Enter key to display the Engineering Menu as shown in Figure 7–1 on page 88.

9. Power off the card, set **SW4** to **RUN**, and re-power the card to restore normal operation. (See 10. on page 90 for details.)

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

10. Go to the Engineering Menu functions below.

Accessing the Terminal via the Virtual Serial Ports

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

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

2. Power down the card, set **SW4** to **TERM** and re-power the card.

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

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

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

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

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

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

8. Power off the card, set **SW4** to **RUN**, and re-power the card to restore normal operation. (See 10. on page 90 for details.)

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

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

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

The following instructions are configuration via DashBoard.

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

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

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

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

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

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

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

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

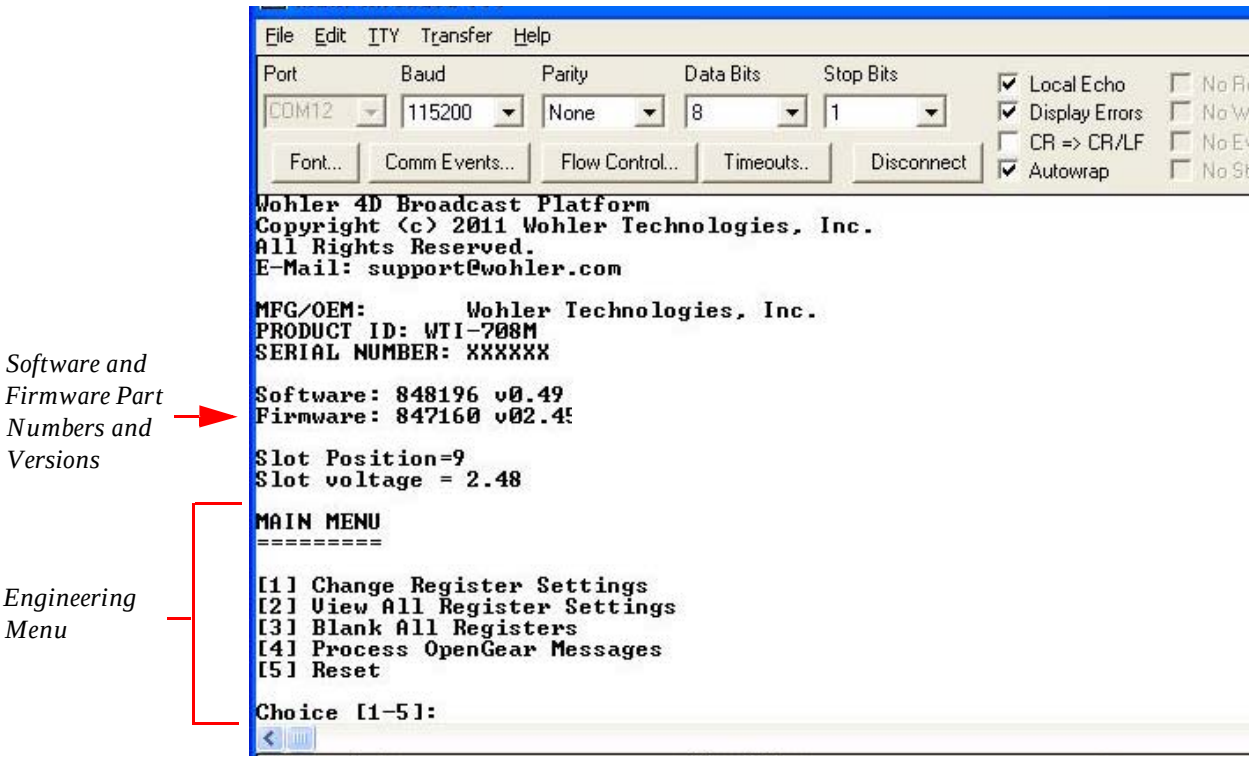
8. Power off the card, set **SW4** to **RUN**, and re-power the card to restore normal operation. (see 10. on page 90)

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

Main Menu

The Main Menu provides several functions for quick and easy modifications. You can also find software and firmware version listed above the menu. Refer to Figure 7–2 on page 92 and the following descriptions of each menu option for details.

Figure 7–2 Main Menu



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

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

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

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

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

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

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

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

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

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

APPENDIX A
Registers

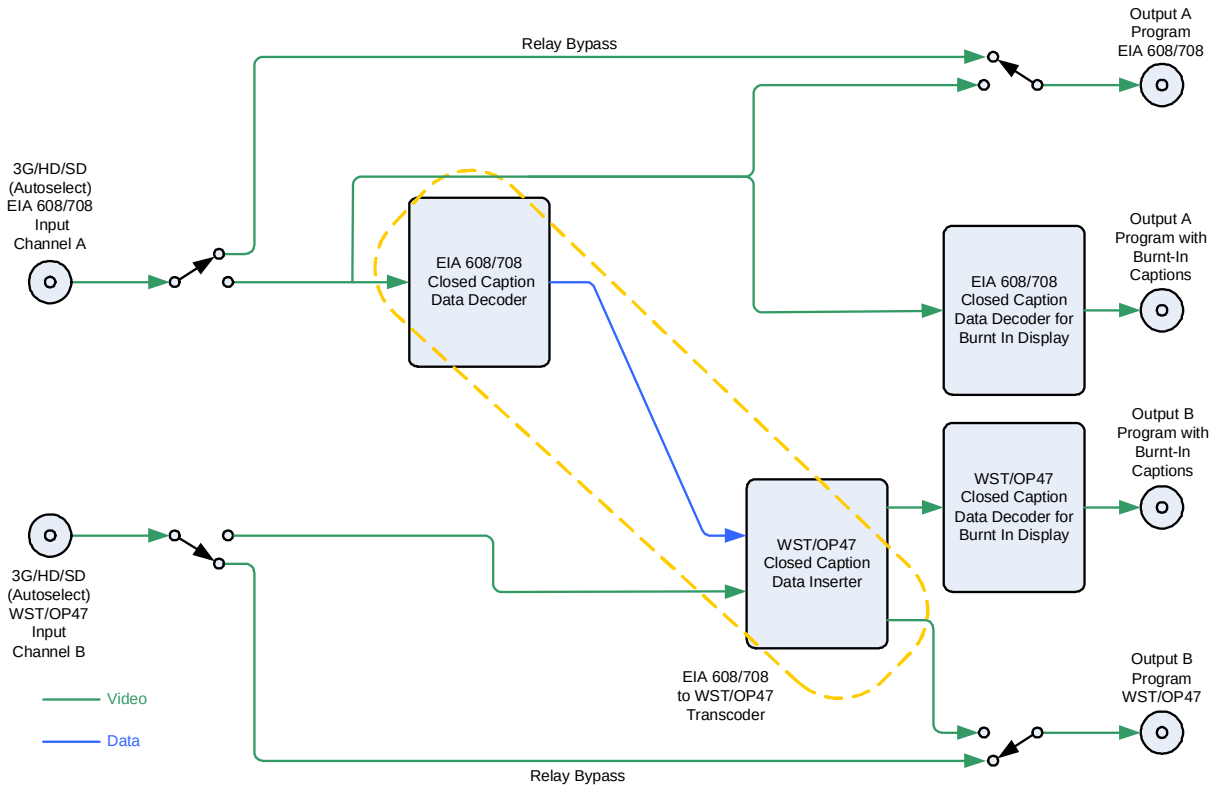
Introduction

Overview

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

Topics

HDCC-708XWST Block Diagram



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

Ch A	Edit ?	Description	Encoding	EU Def	AU Def	Min Val	Max Val	Disp GUI
00	Yes	HD line for CEA-708 insertion	Hex	09	09	07	19	dec
01	No							
02	Yes	SD line for CES-608 insertion / extraction / monitoring	Hex	15	15	06	16	dec
03	No							
04	No							
05	No							
06	No							
07	No							
08	Yes	Transmission Features	Figure A–1	00	18			
09	No	Horizontal timing offset for GPI SD insertion line	Reserved					
0A	Yes	SD line for GPI data	Hex	0D	oD	06	16	dec
0B	Yes	HD line for GPI data	Hex	0D	0D	07	19	dec
0C	No							
0D	No							
0E	No							
0F	Yes	GPI Rx/Tx Polarity Control	Figure A–2	00	00	-	-	mixed
10	Yes	Special Features 2	Figure A–3	80	00	-	-	mixed
11	No							
12	Yes	GPI data insertion control and encoder timeout	Figure A–4	00	00	-	-	mixed
13	Yes	GPI mapping for Tx	Figure A–5	E4	E4	-	-	mixed
14	No							
15	Yes	Destination teletext magazine for CC stream 1	Hamming	00	00	00	07	dec
16	Yes	Destination teletext page for CC stream 1	BCD	88	01	00	99	dec
17	No							
18	No							
19	No							
1A	No							
1B	No							
1C	No							
1D	Yes	Decoded channel on monitor output (0=CC1, 1=CC2, ...)	Hex	00	00	00	03	combo
1E	No							
1F	No							
48	Yes	Transcode settings	Figure A–6	00	00	-	-	mixed
49	No							
4A	Yes	Inbound data routing 2/2 - to Registers		08	08	-	-	mixed
4B	Yes	Outbound data routing 1/2 - to USB and Serial		41	41	-	-	mixed

Table A–1 Register Table Summary - Channel A

Ch A	Edit ?	Description	Encoding	EU Def	AU Def	Min Val	Max Val	Disp GUI
4C	Yes	Outbound data routing 1/2 - to Ethernet		00	00	-	-	mixed
4D	No	Timing offset - Do not change	Hex	06	06	-	-	dec
4E	Yes	GPO 1 and 2 Mapping	Figure A–7	10	10	-	-	mixed
4F	Yes	GPO 3 and 4 Mapping	Figure A–8	32	32	-	-	mixed

Table A–2 Register Table Summary - Channel B

Ch B	Edit ?	Description	Encoding	EU Def	AU Def	Min Val	Max Val	Disp GUI
20	Yes	HD line for OP47, field 1	Hex	0A	0C	07	19	dec
21	Yes	HD line for OP47, field 2	Hex	0A	0C	07	19	dec
22	Yes	SD line for WST/line 21, field 1	Hex	0A	15	06	16	dec
23	Yes	SD line for WST/line 21, field 2	Hex	0A	15	06	16	dec
24	Yes	Newfor default magazine number	Hamming	15(00)	15(00)	15(00)	2F(07)	dec
25	Yes	Newfor default page number	BCD	88	01	00	99	dec
26	Yes	Decoder magazine number	Hamming	15(00)	15(00)	15(00)	2F(07)	dec
27	Yes	Decoder page number	BCD	88	01	00	99	dec
28	Yes	Newfor default language and transmission features	Figure A–9	00	18	-	-	mixed
29	No	Horizontal timing offset for GPI SD insertion line	Reserved					
2A	Yes	SD line for GPI data	Hex	0D	oD	06	16	dec
2B	Yes	HD line for GPI data	Hex	0D	0D	07	19	dec
2C	Yes	Special features 1	Figure A–10	00	00	-	-	mixed
2D	Yes	Horizontal timing: horizontal offset for WST SD lines	Hex	1E	1E	00	FF	dec
2E	Yes	Block regen	Figure A–11	00	00	-	-	combo
2F	Yes	GPI Rx/Tx Polarity Control	Figure A–12	00	00	-	-	mixed
30	Yes	Special Features 2	Figure A–13	80	00	-	-	mixed
31	Yes	Regen/blank control with external GPI	Figure A–14	00	00	-	-	mixed
32	Yes	GPI data insertion control Newfor insertion timeout	Figure A–15	0F	0F	-	-	mixed
33	Yes	GPI mapping for Tx	Figure A–16	E4	E4	-	-	mixed
34	Yes	GPI mapping for feature control (reserved)	Figure A–17	24	24	-	-	mixed
35	Yes	Time filler page number	Hex	FF	FF	00	FF	hex
36	Yes	Time filler subcode bottom 2 digits	Hex	7E	7F	00	7F	hex
37	Yes	Terminator page number	Hex	FF	EE	00	FF	hex
38	Yes	Terminator subcode bottom 2 digits	Hex	7E	7F	00	7F	hex

Register Details

Figure A–1 Register 08h: Channel A Transmission Features

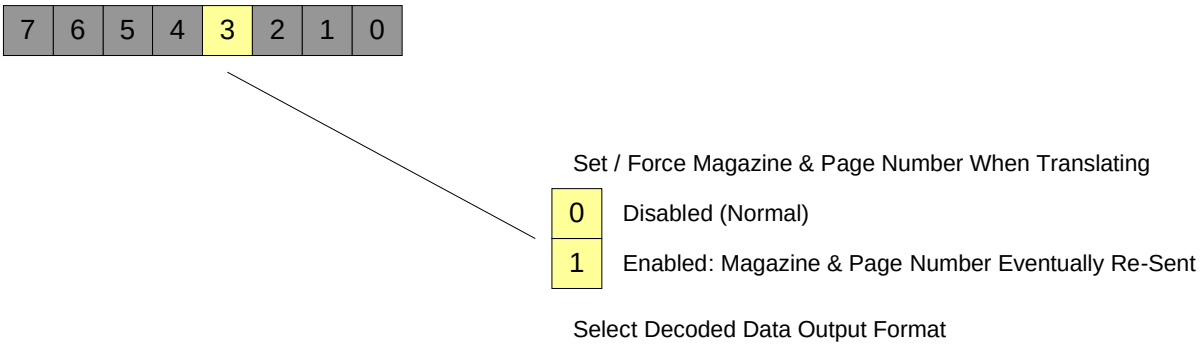


Figure A–2 Register 0Fh: Channel A GPI Tx/Rx Polarity

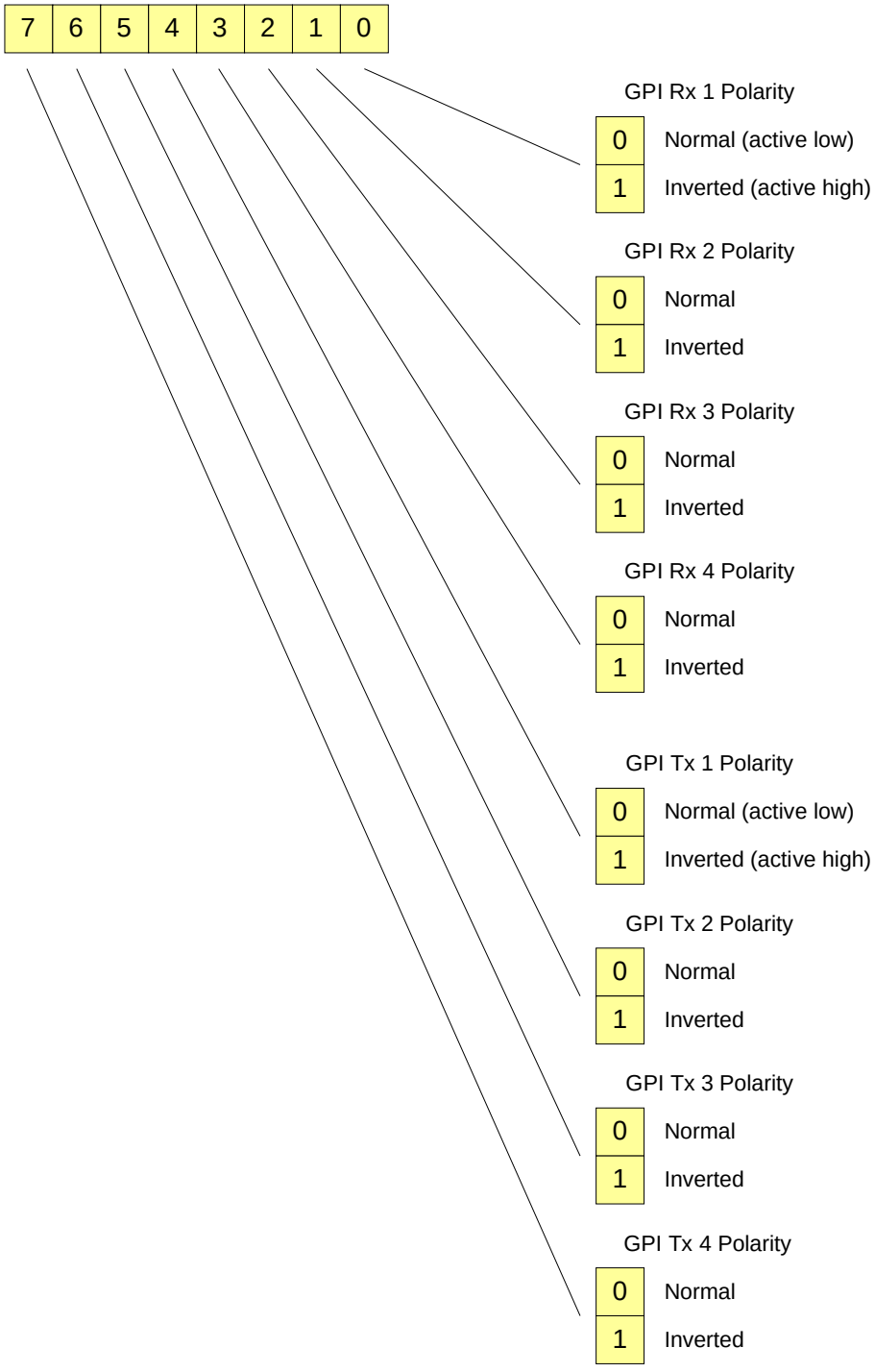


Figure A–3 Register 10h: Channel A Special Features 2

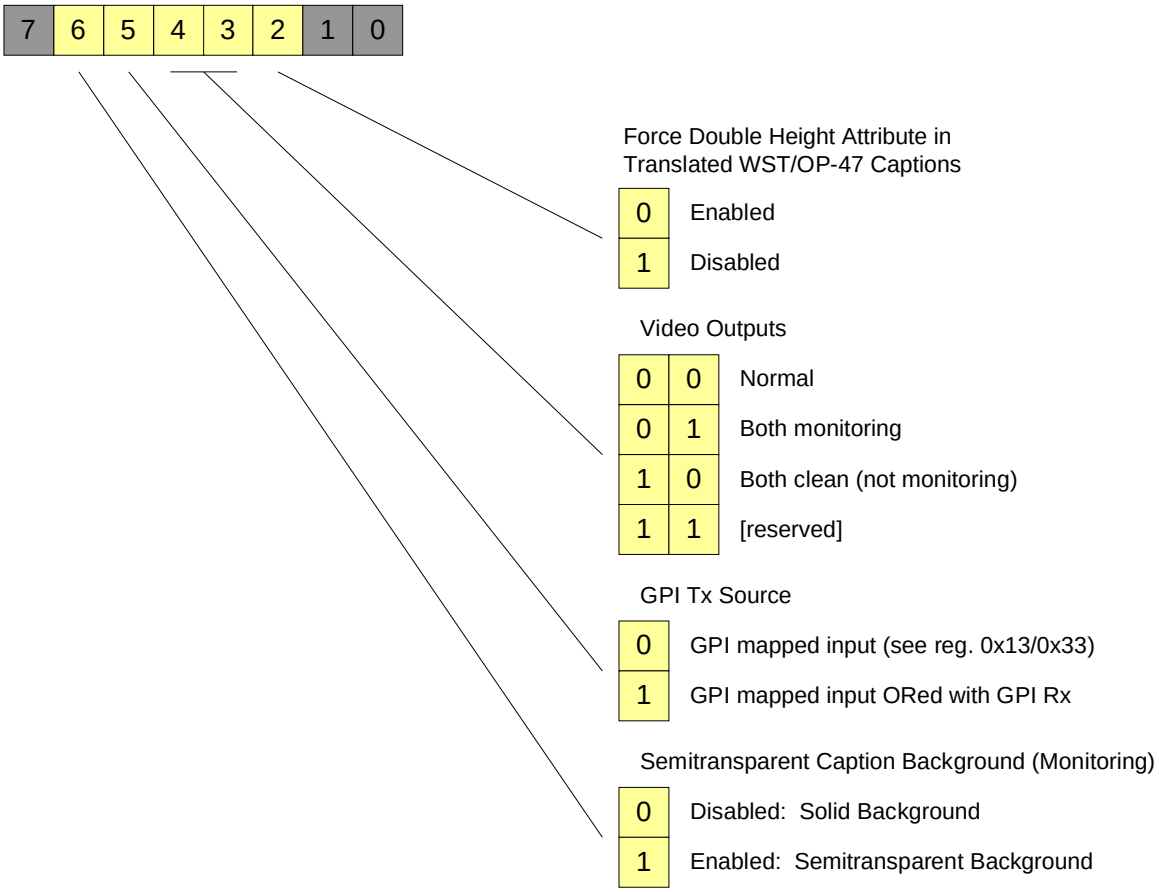


Figure A–4 Register 12h: Channel A GPI Data Insertion Control and Insert Mode Timeout

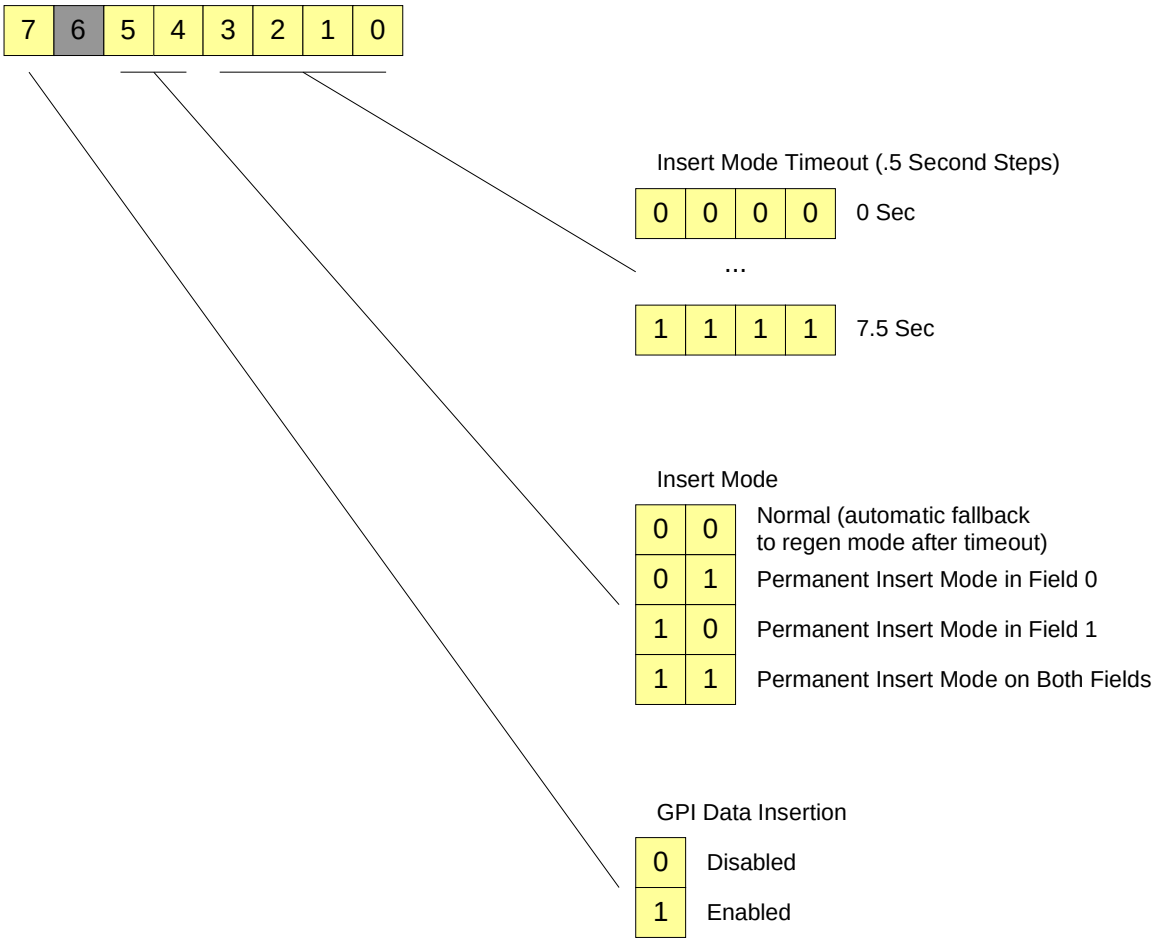


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Figure A–5 Register 13h: Channel A GPI Mapping for Tx

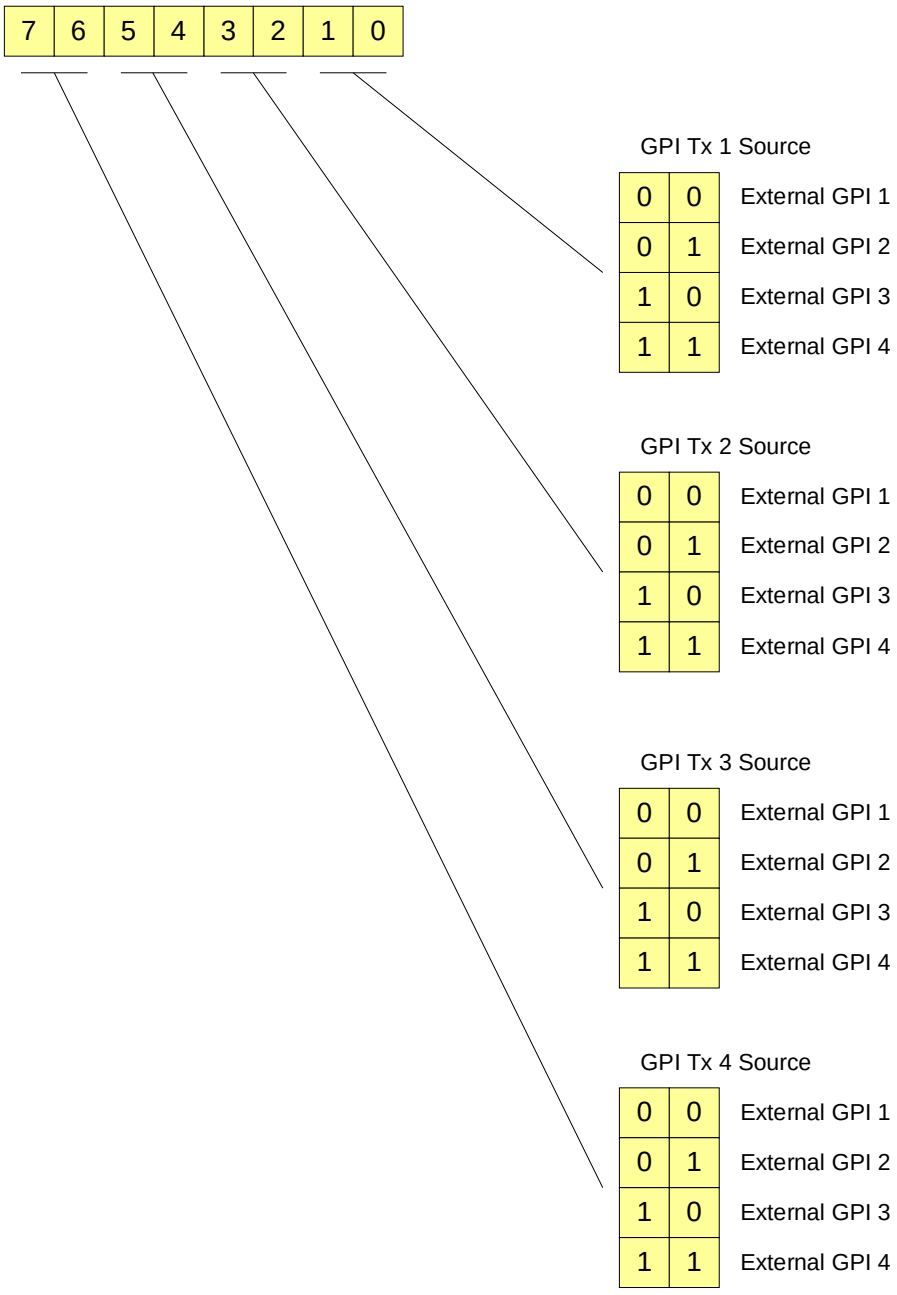


Figure A–6 Register 48h: Transcode Settings

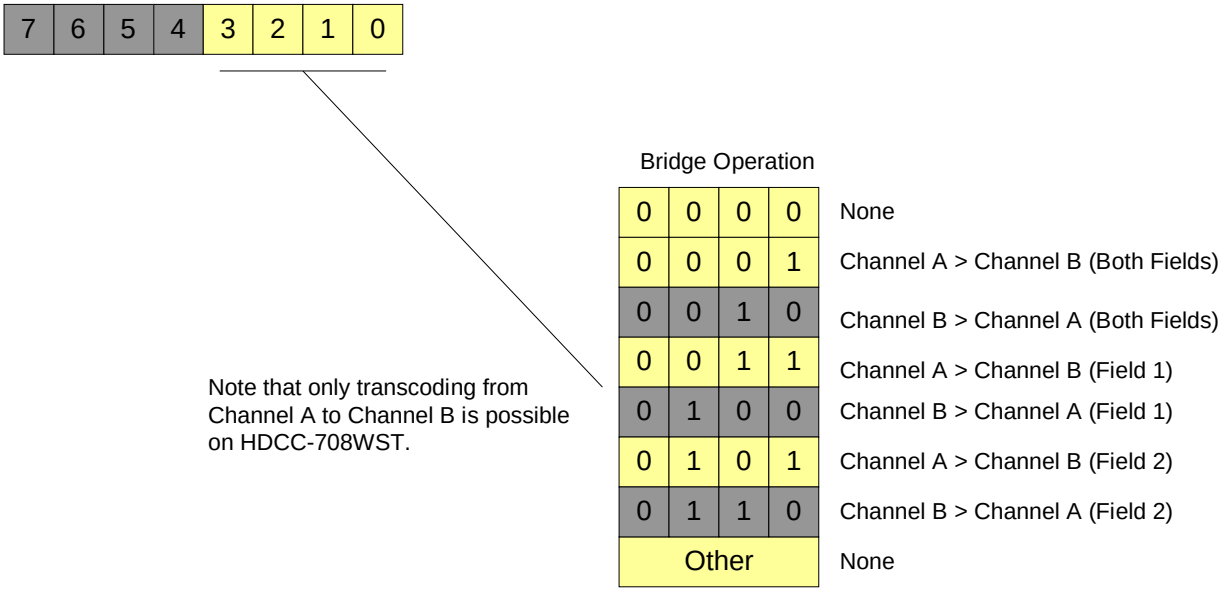


Figure A–7 Register 4Eh: Channel A GPO 1 & 2 Mapping

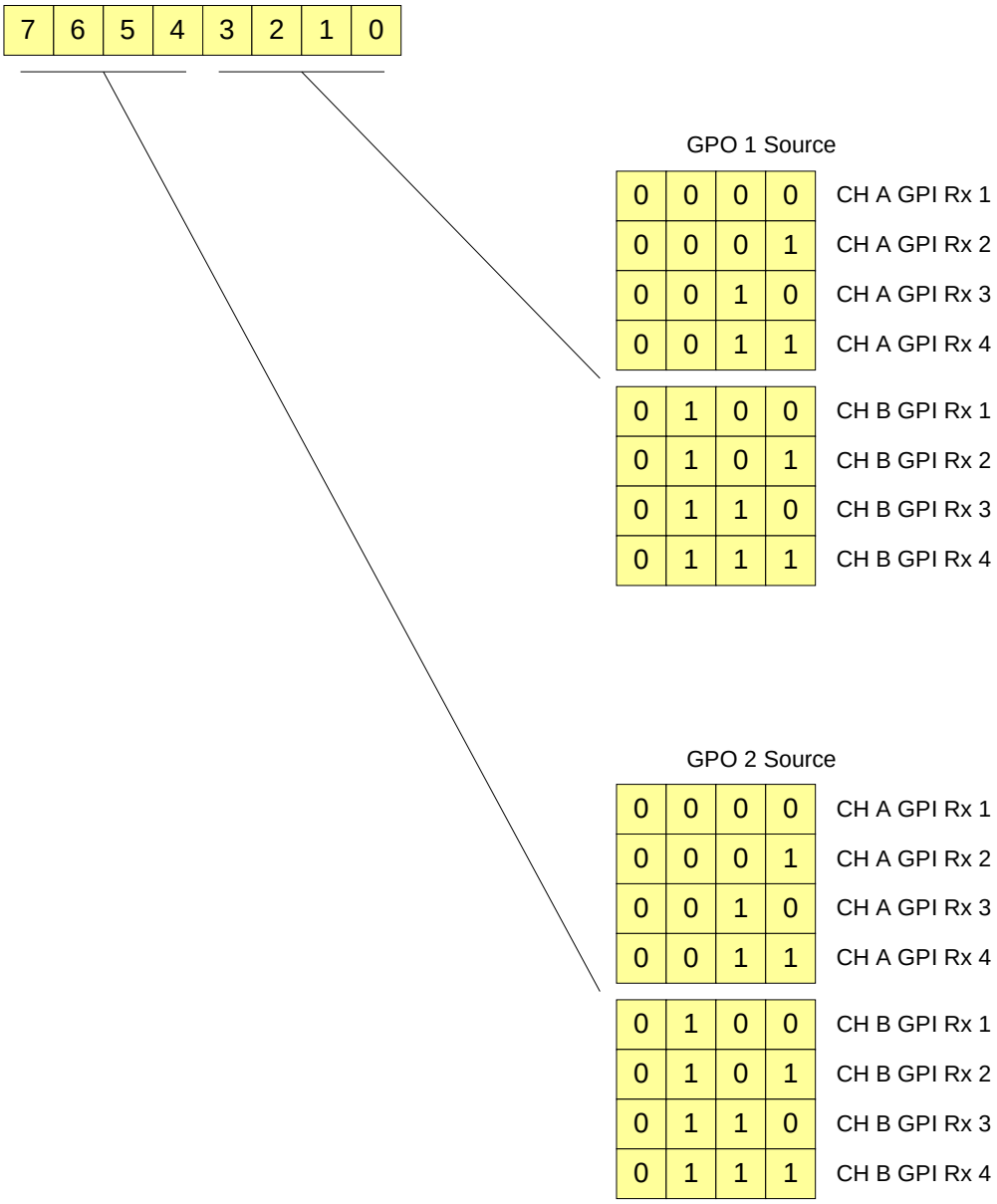


Figure A–8 Register 4Fh: Channel A GPO 3 & 4 Mapping

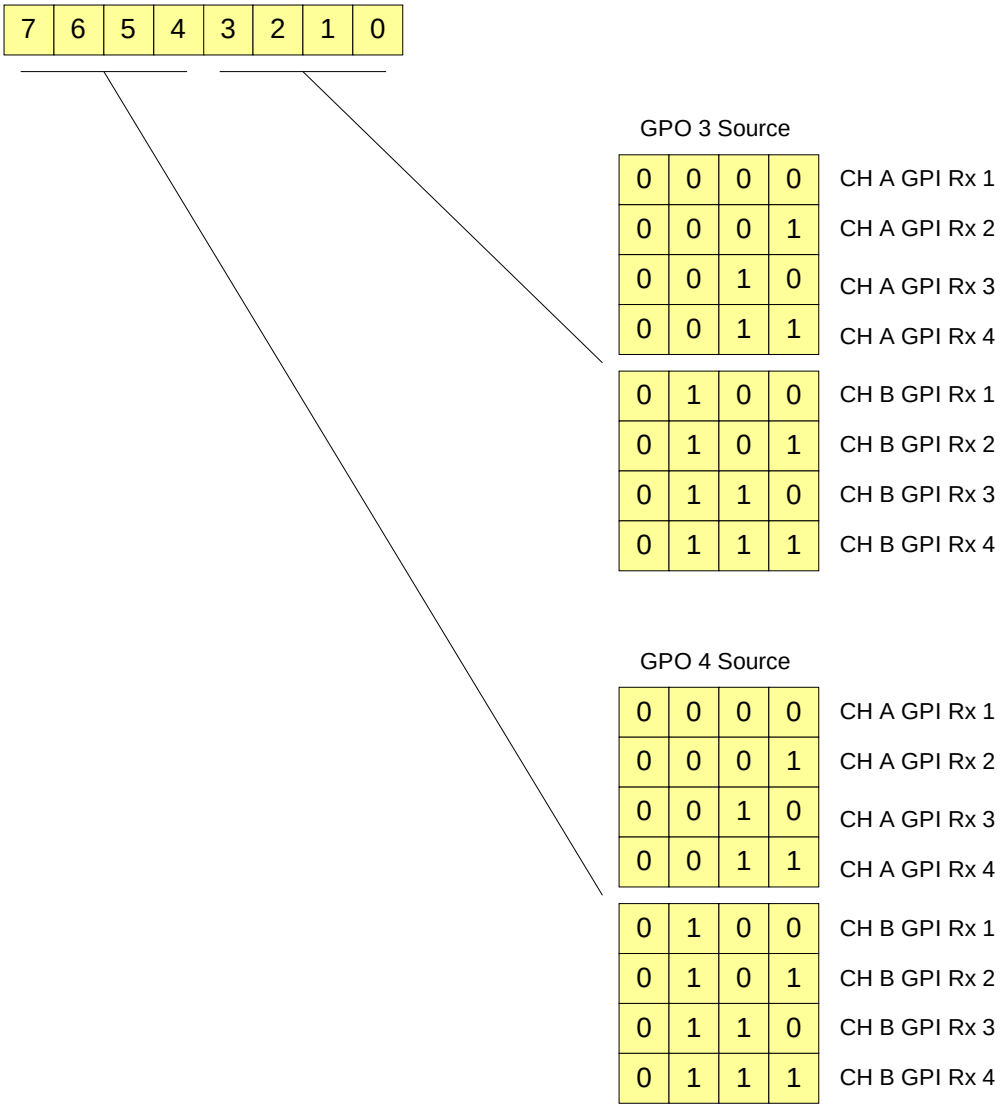


Figure A–9 Register 28h: Channel B Newfor Default Language and Transmission Features

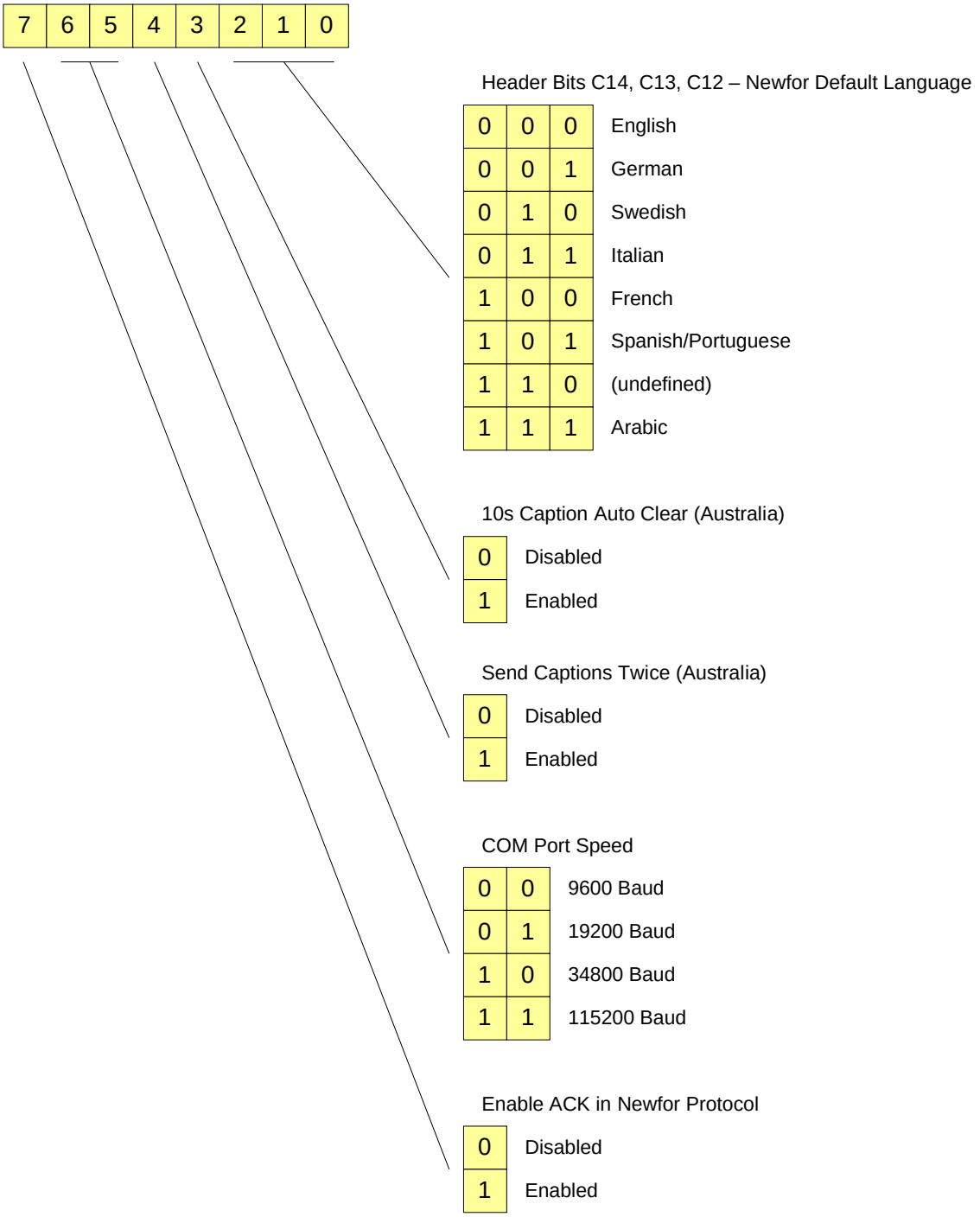


Figure A–10 Register 2Ch: Channel B Special Features

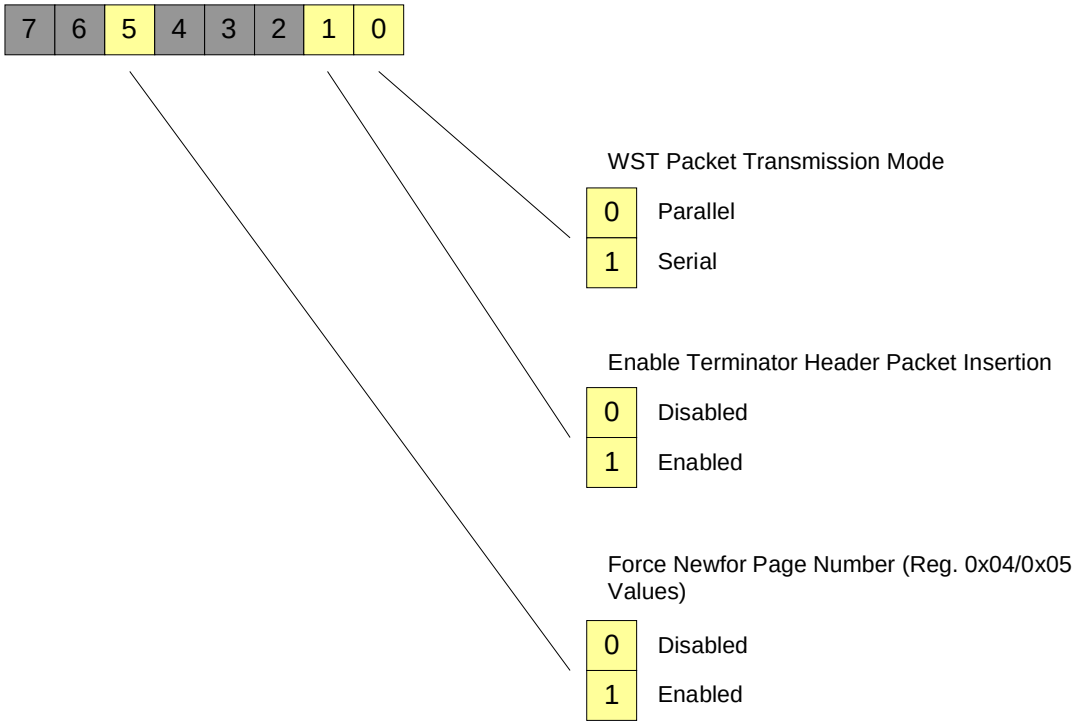


Figure A–11 Register 2Eh: Channel B Block Regen and GPO Level Settings

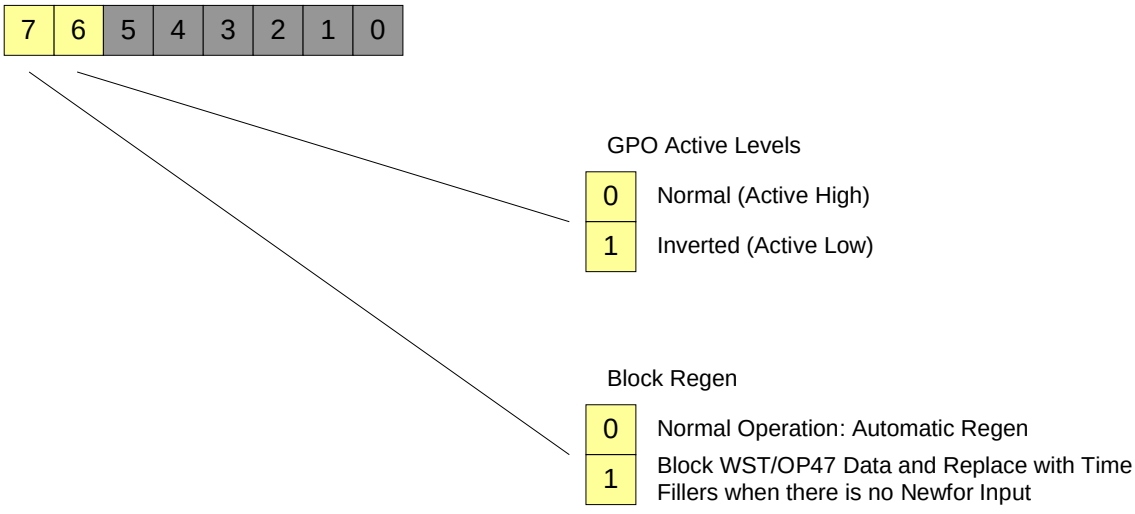


Figure A–12 Register 2Fh: Channel B GPI Tx/Rx Polarity

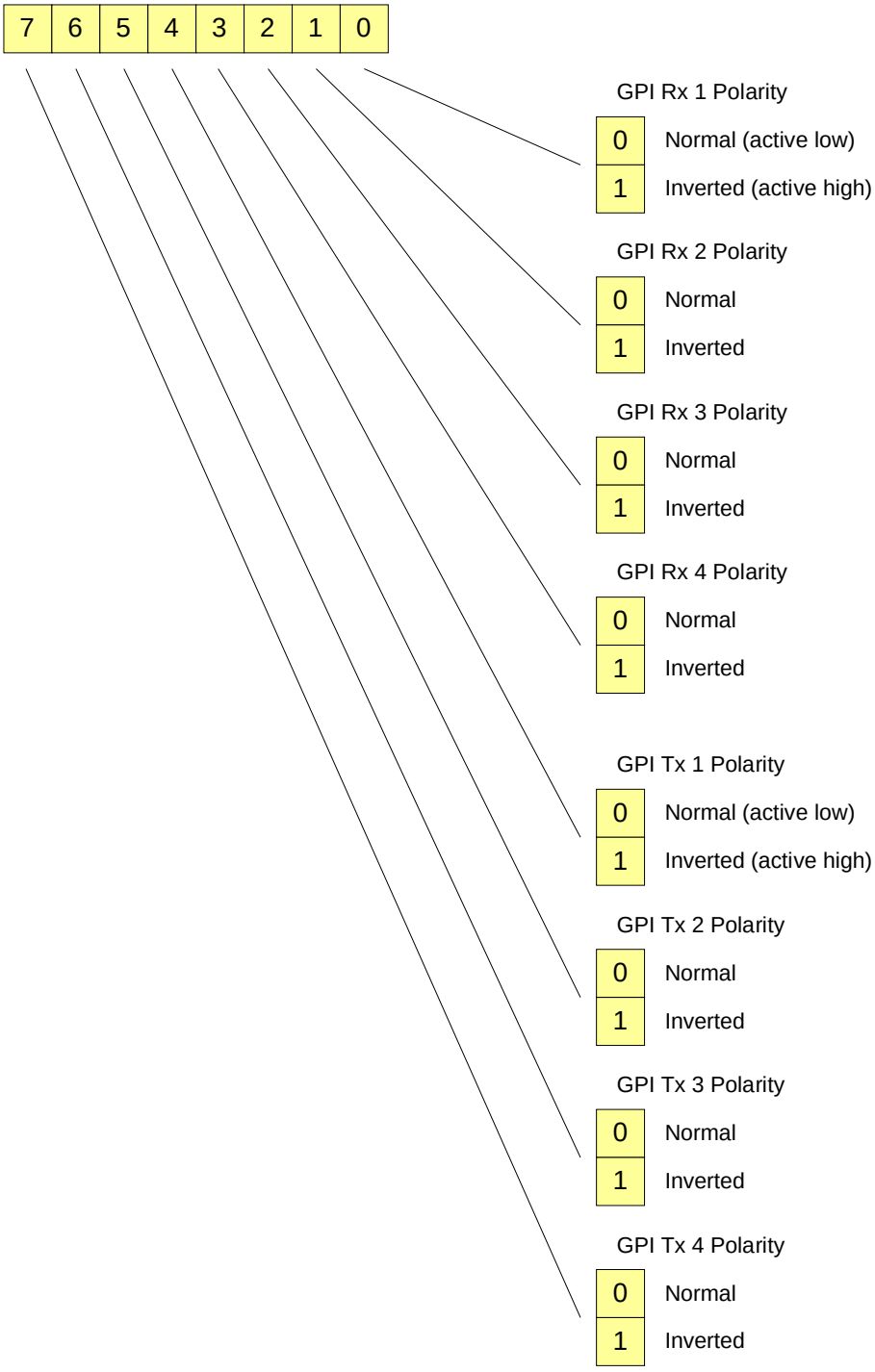


Figure A–13 Register 30h: Channel B Special Features 2

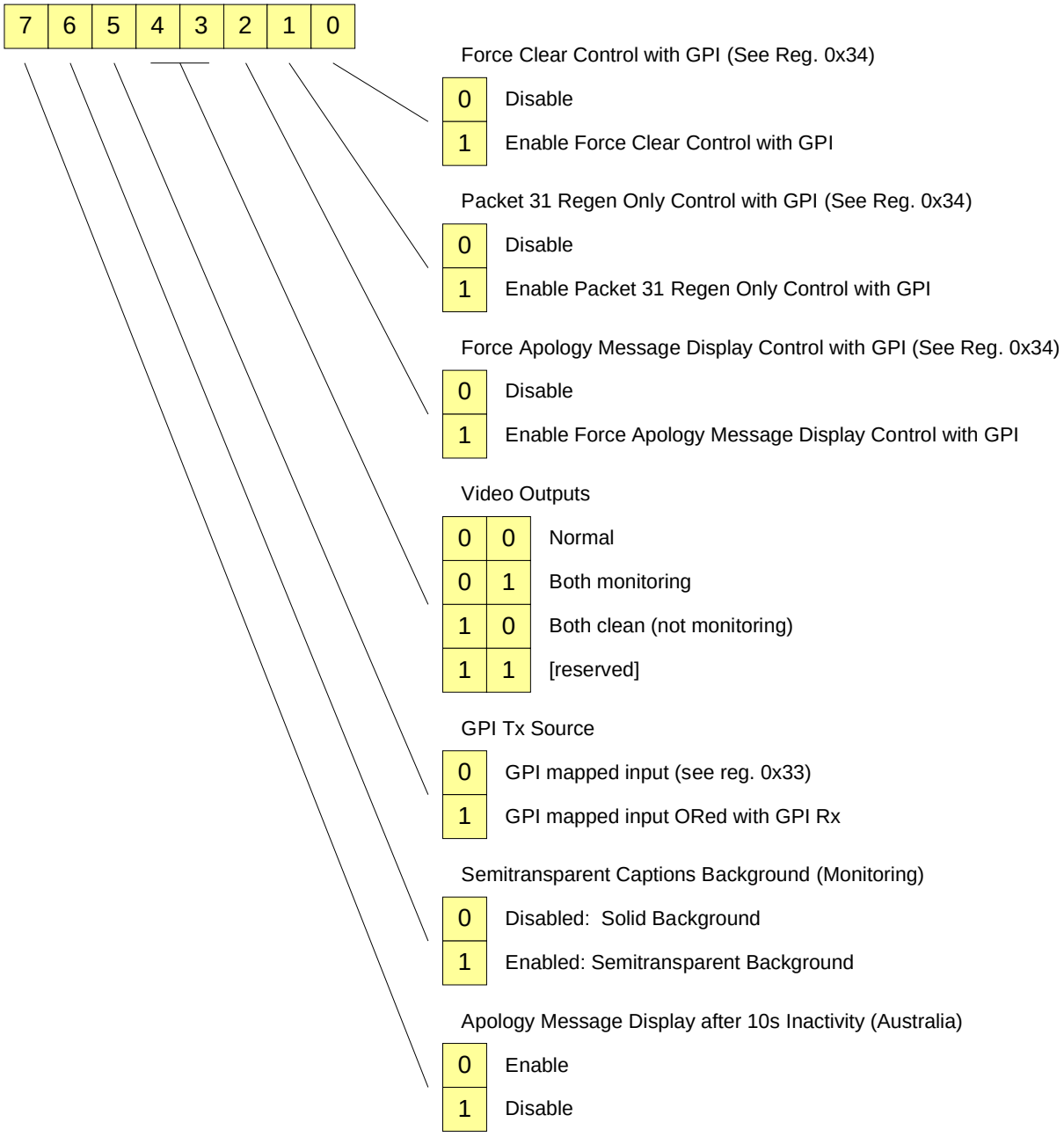


Figure A–14 Register 31h: Channel B Regen / Blank Control with External GPI

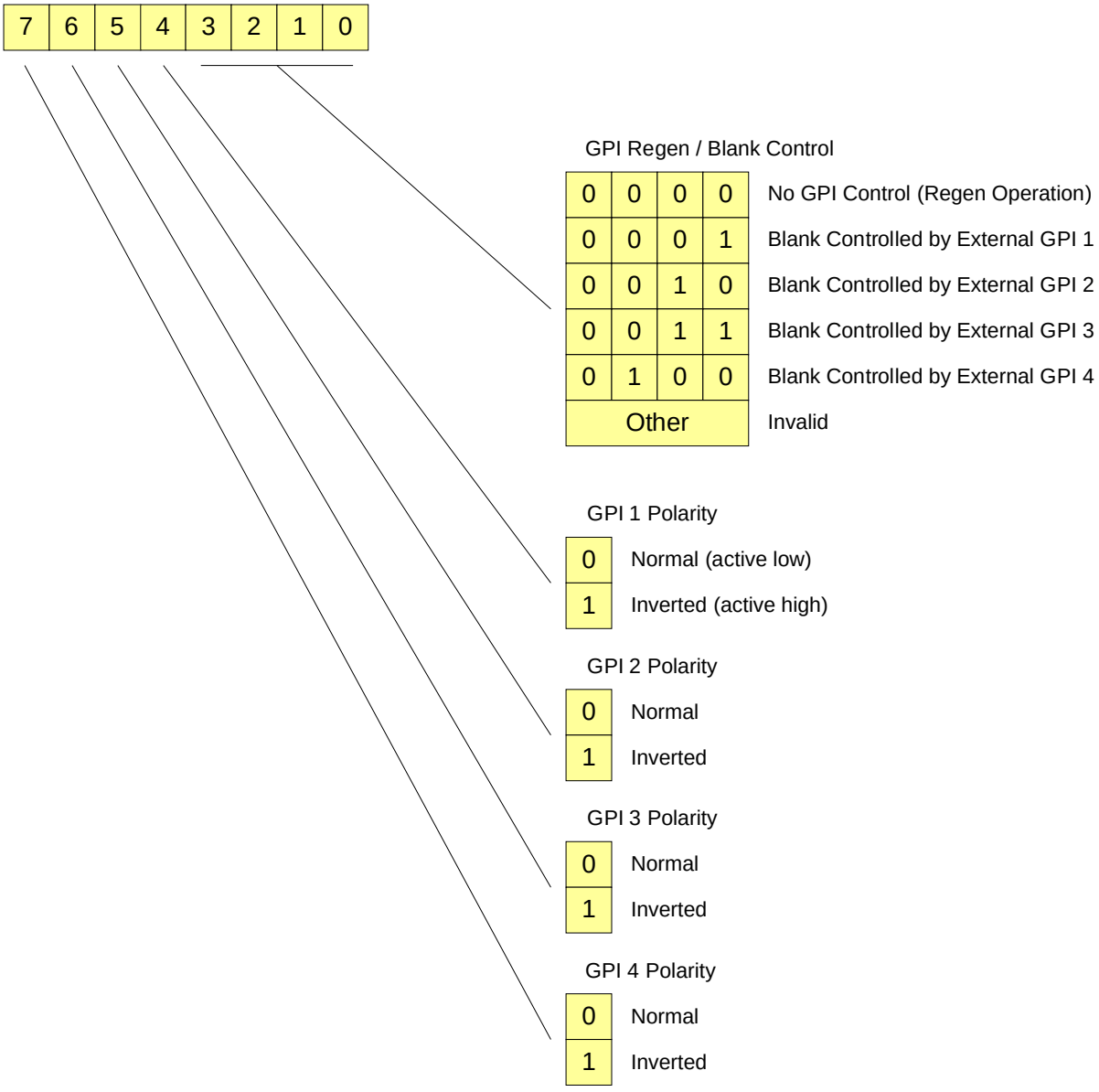


Figure A–15 Register 32h: Channel B GPI Data Insertion Control and Newfor Insertion Timeout

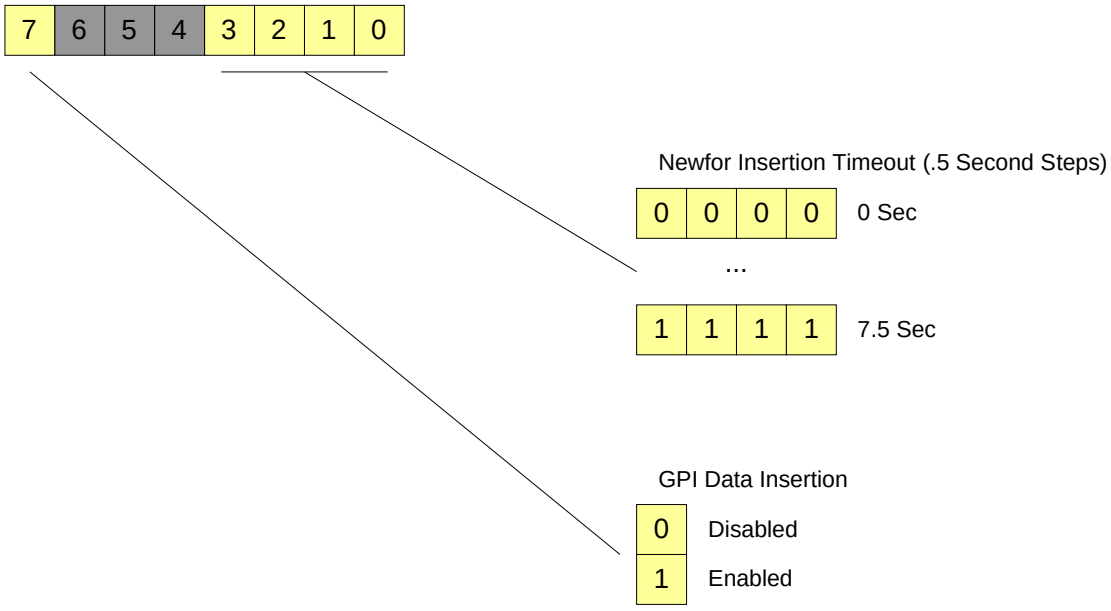


Figure A–16 Register 33h: Channel B GPI Mapping for Tx

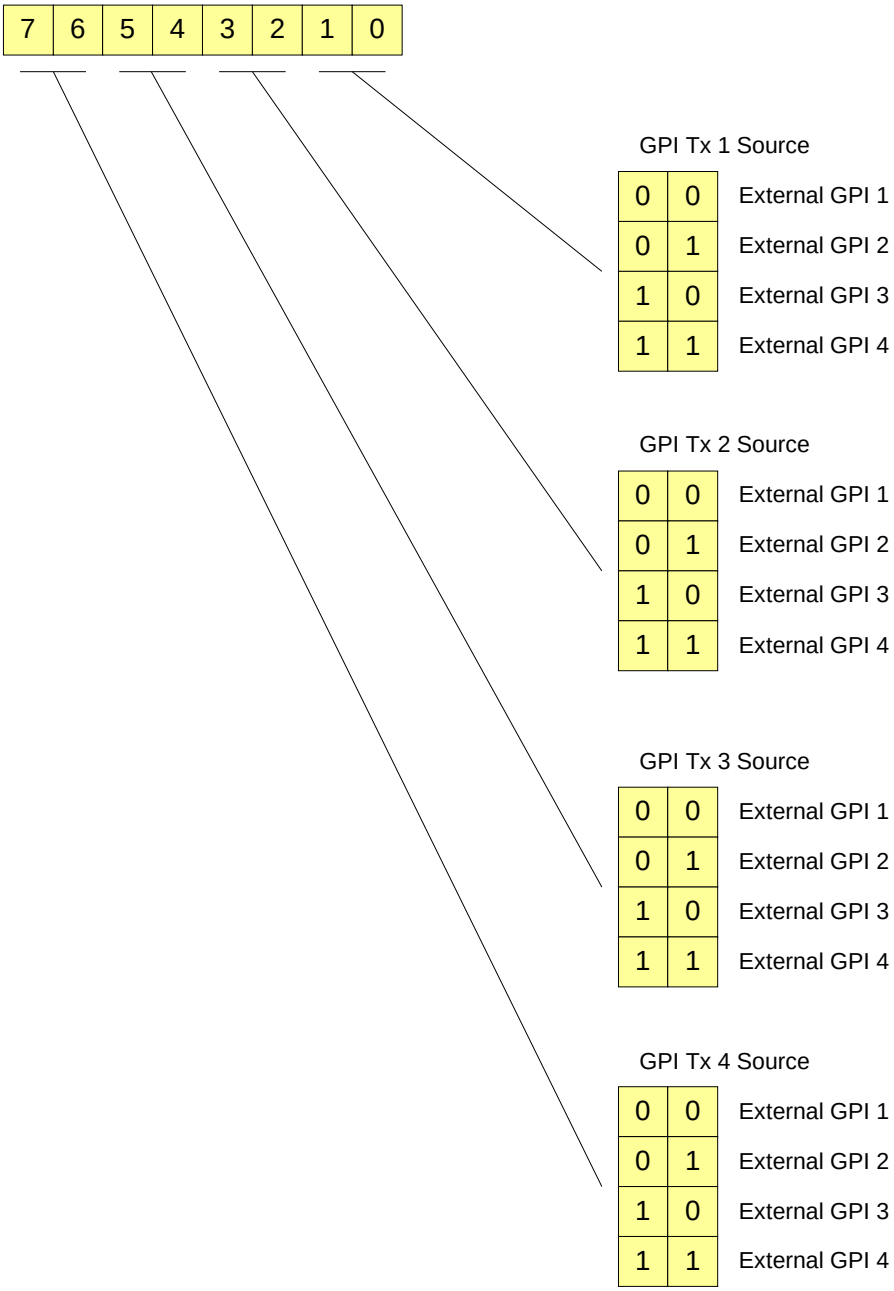
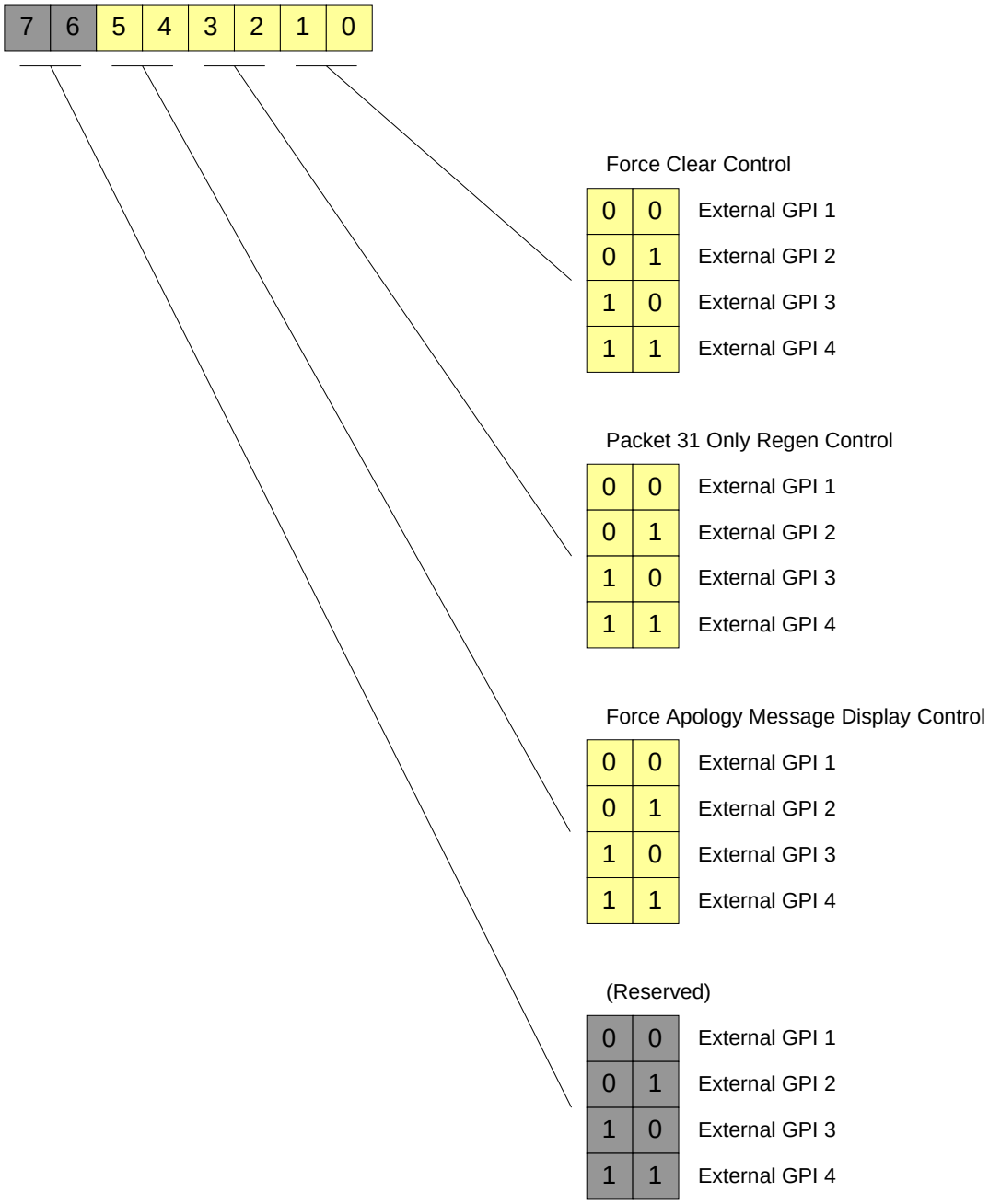


Figure A–17 Register 34h: Channel B GPI Mapping for Feature Control



HDCC-708XWST-OG2 Serial Port Router Configuration Registers

This section describes the bit-by-bit register settings for each possible configuration:

Figure A–18 Registers for Inbound Routing

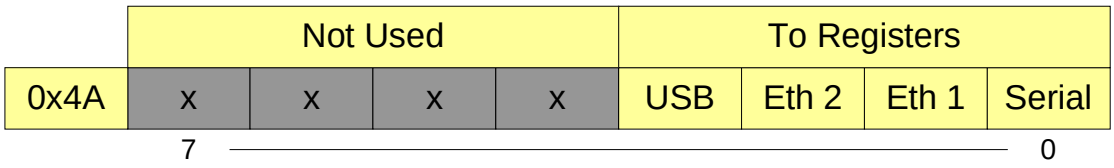
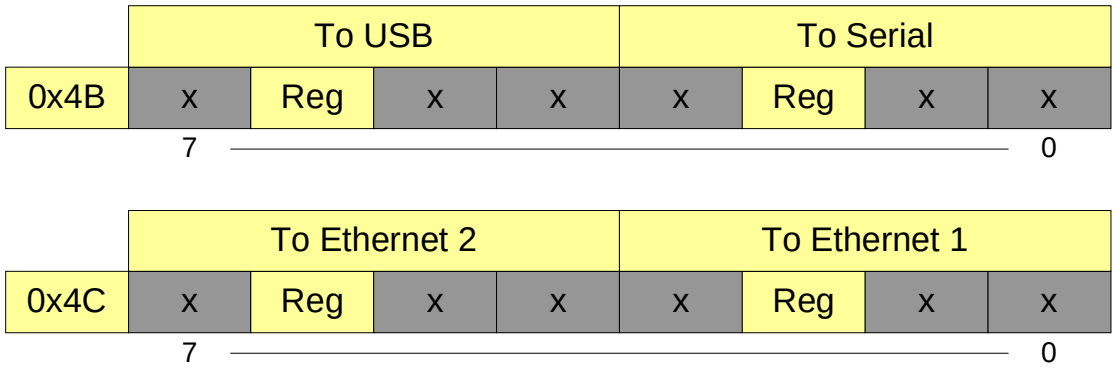


Figure A–19 Registers for Outbound Routing



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

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 Transcoding • GPI Encoding and Decoding
Supported closed caption specifications	CEA-608 / 708 (Channel A) WST / OP-47 (Channel B)

Connector Pin Assignments

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

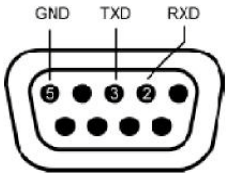
Pin	Label	Interface
1	Ground	
2	TX4 (GPI-4)	Open Collector (Emitter to Ground)
3	TX3 (GPI-3)	
4	TX2 (GPI-2)	
5	TX1 (GPI-1)	
6	RX4 (GPO-4)	Active Low
7	RX3 (GPO-3)	
8	RX2 (GPO-2)	
9	RX1 (GPO-1)	

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

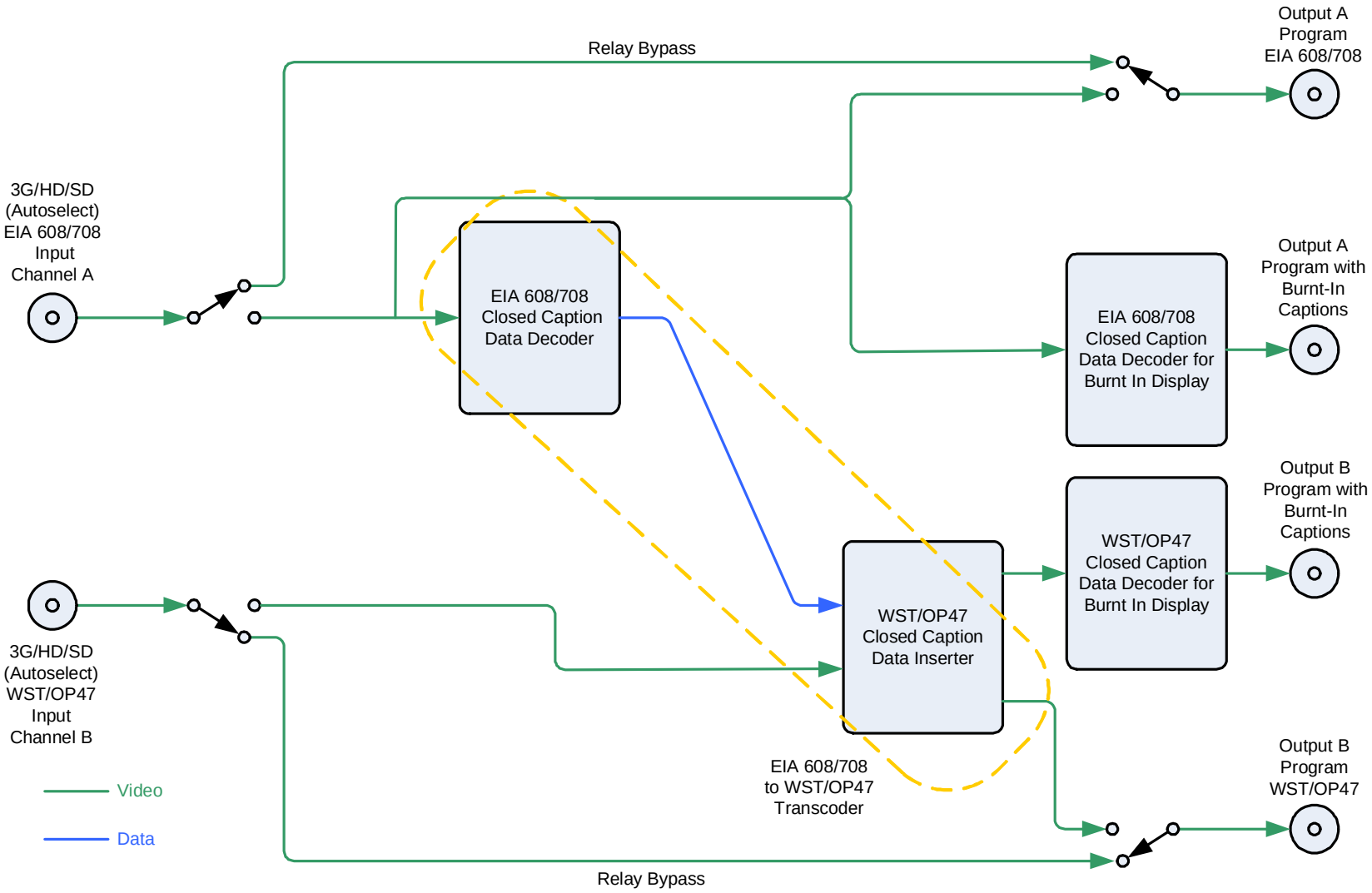
Figure B–1 RS-232 DE-9 Pin-Out



Technical Functional Overview

Figure B–2 on page 120 illustrates the design of the HDCC.

Figure B–2 HDCC Block Diagram



APPENDIX C
Troubleshooting

Introduction

Overview

This appendix provides instructions for correcting the most common problems.

Topics

DashBoard

Table C–1 Common DashBoard Problems and Solutions

Symptom	Possible Cause	Solution
Frame does not appear in DashBoard.	Frame not power up.	Apply power to frame.
	No network connectivity.	Verify Ethernet / IP connectivity between host PC and frame is established.
HDCC card does not appear in DashBoard.	**SW4** in **TERM** position.	Set **SW4** to **RUN** position.

HDCCRegEdit

Table C–2 Common HDCCRegEdit Problems and Solutions

Symptom	Possible Cause	Solution
HDCCRegEdit cannot connect to the HDCC card.	**SW4** in **RUN** position.	Set **SW4** to **TERM** position.

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.

Translation

Table C–4 Common Translation Problems and Solutions

Symptom	Possible Cause	Solution
Translation not working	Channel setup is incorrect.	Check video lines for captions on both channels.
	No translation operation selected.	Verify translation settings set for correct direction.
	No captions on source channel.	Verify the source video stream has captions.

GPI/O

Table C–5 Common GPI/O Problems and Solutions

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

Virtual Serial Ports (VSPs)

Table C–6 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.