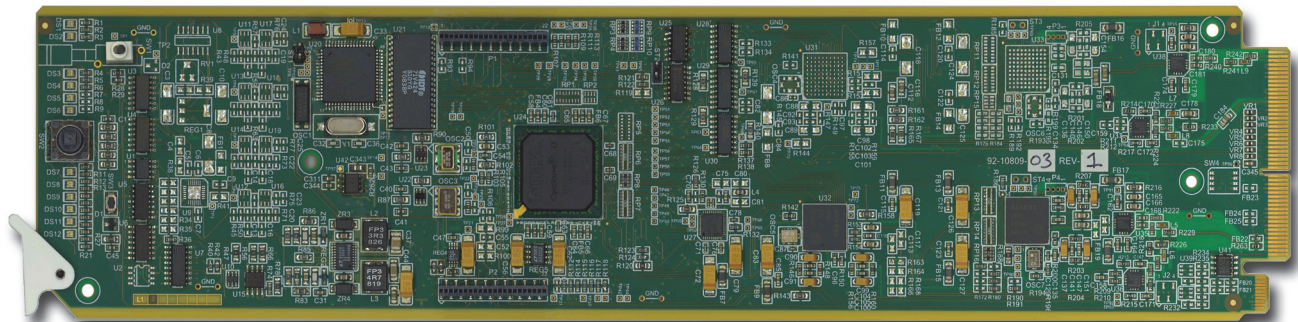


# CDP-100

## Caption Distribution Packet Analyzer User Manual



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You've made a great choice. We expect you will be very happy with your purchase of Ross Technology.

Our mission is to:

1. Provide a Superior Customer Experience
  - offer the best product quality and support
2. Make Cool Practical Technology
  - develop great products that customers love

Ross has become well known for the Ross Video Code of Ethics. It guides our interactions and empowers our employees. I hope you enjoy reading it below.

If anything at all with your Ross experience does not live up to your expectations be sure to reach out to us at [solutions@rossvideo.com](mailto:solutions@rossvideo.com).



David Ross  
CEO, Ross Video  
[dross@rossvideo.com](mailto:dross@rossvideo.com)

## Ross Video Code of Ethics

Any company is the sum total of the people that make things happen. At Ross, our employees are a special group. Our employees truly care about doing a great job and delivering a high quality customer experience every day. This code of ethics hangs on the wall of all Ross Video locations to guide our behavior:

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2. We will do our best to understand our customers' requirements.
3. We will not ship crap.
4. We will be great to work with.
5. We will do something extra for our customers, as an apology, when something big goes wrong and it's our fault.
6. We will keep our promises.
7. We will treat the competition with respect.
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9. We will go above and beyond in times of crisis. *If there's no one to authorize the required action in times of company or customer crisis - do what you know in your heart is right. (You may rent helicopters if necessary.)*

# CDP-100 · User Manual

- Ross Part Number: CDP100DR-004-04
- Release Date: February 22, 2018.

The information contained in this Guide is subject to change without notice or obligation.

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## Patents

Patent numbers US 7,034,886; US 7,508,455; US 7,602,446; US 7,802,802 B2; US 7,834,886; US 7,914,332; US 8,307,284; US 8,407,374 B2; US 8,499,019 B2; US 8,519,949 B2; US 8,743,292 B2; GB 2,419,119 B; GB 2,447,380 B; and other patents pending.

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The material in this manual is furnished for informational use only. It is subject to change without notice and should not be construed as commitment by Ross Video Limited. Ross Video Limited assumes no responsibility or liability for errors or inaccuracies that may appear in this manual.

## Safety Notices

Refer to the “**Important Regulatory and Safety Notices**” document that accompanied your product.

## Statement of Compliance

This product has been determined to be compliant with the applicable standards, regulations, and directives for the countries where the product is marketed.

Compliance documentation, such as certification or Declaration of Compliance for the product is available upon request by contacting [techsupport@rossvideo.com](mailto:techsupport@rossvideo.com). Please include the product; model number identifiers and serial number and country that compliance information is needed in request.

## EMC Notices

### US FCC Part 15

This equipment has been tested and found to comply with the limits for a class A Digital device, pursuant to part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a Commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio

communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

---

**Notice** — *Changes or modifications to this equipment not expressly approved by Ross Video Ltd. could void the user's authority to operate this equipment.*

---

#### Canada

This Class “A” digital apparatus complies with Canadian ICES-003 and part 15 of the FCC Rules.

Cet appareil numérique de la classe “A” est conforme à la norme NMB-003 du Canada.

#### European Union

This equipment is in compliance with the essential requirements and other relevant provisions established under regulation (EC) No 765/2008 and Decision No 768/2008/EC referred to as the “New Legislative Framework”.



---

**Warning** — *This equipment is compliant with Class A of CISPR 32. In a residential environment this equipment may cause radio interference.*

---

#### Australia/New Zealand

This equipment is in compliance with the provisions established under the Radiocommunications Act 1992 and Radiocommunications Labeling (Electromagnetic Compatibility) Notice 2008.

#### Korea

This equipment is in compliance with the provisions established under the Radio Waves Act.

Class A equipment (Broadcasting and communications service for business use)

This device is a business-use (Class A) EMC-compliant device. The seller and user are advised to be aware of this fact. This device is intended for use in areas outside home.

Type of Equipment	User's Guide
A급 기기 (업무용 방송통신기자재)	이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.
Class A Equipment (Industrial Broadcasting & Communication Equipment)	This equipment is <b>Industrial (Class A) electromagnetic wave suitability equipment</b> and seller or user should take notice of it, and this equipment is to be used in the places except for home.

#### International

This equipment has been tested under the requirements of CISPR 22:2008 or CISPR 32:2015 and found to comply with the limits for a Class A Digital device.

---

**Notice** — *This is a Class A product. In domestic environments, this product may cause radio interference, in which case the user may have to take adequate measures.*

---

## Maintenance/User Serviceable Parts

Routine maintenance to this openGear product is not required. This product contains no user serviceable parts. If the module does not appear to be working properly, please contact Technical Support using the numbers listed under the “**Contact Us**” section of this manual. All openGear products are covered by a generous 5-year warranty

and will be repaired without charge for materials or labor within this period. See the “**Warranty and Repair Policy**” section in this manual for details.

## Environmental Information

The equipment may contain hazardous substances that could impact health and the environment.

To avoid the potential release of those substances into the environment and to diminish the need for the extraction of natural resources, Ross Video encourages you to use the appropriate take-back systems. These systems will reuse or recycle most of the materials from your end-of-life equipment in an environmentally friendly and health conscious manner.

The crossed-out wheeled bin symbol invites you to use these systems.



If you need more information on the collection, reuse, and recycling systems, please contact your local or regional waste administration. You can also contact Ross Video for more information on the environmental performances of our products.

## Company Address



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# Introduction

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## In This Chapter

This chapter contains the following sections:

- Overview
- Functional Block Diagram
- User Interfaces
- Documentation Terms and Conventions

## A Word of Thanks

Congratulations on choosing an openGear CDP-100 Caption Distribution Packet Analyzer. Thank you for joining the group of worldwide satisfied Ross Video customers!

Should you have a question pertaining to the installation or operation of your CDP-100, please contact us at the numbers listed on the back cover of this manual. Our technical support staff is always available for consultation, training, or service.

---

# Overview

The CDP-100 extracts and analyses the Caption Distribution Packet (CDP) caption content of a HD-SDI (SMPTE 292M) signal. It is designed to find all the errors which might cause problems with captions passing through the broadcast chain to television receivers. The errors are clearly explained with the explanation overlaid on the video and logged to a file. Time stamps are used to determine when an error occurred and counters indicate how often the error occurred. Logged information may be viewed or uploaded to a PC for manipulation in a database or spreadsheet. For deeper analysis, errors may be captured in a binary file of CDPs, uploaded to the PC and viewed with the CDP File Analyzer program.

## Features

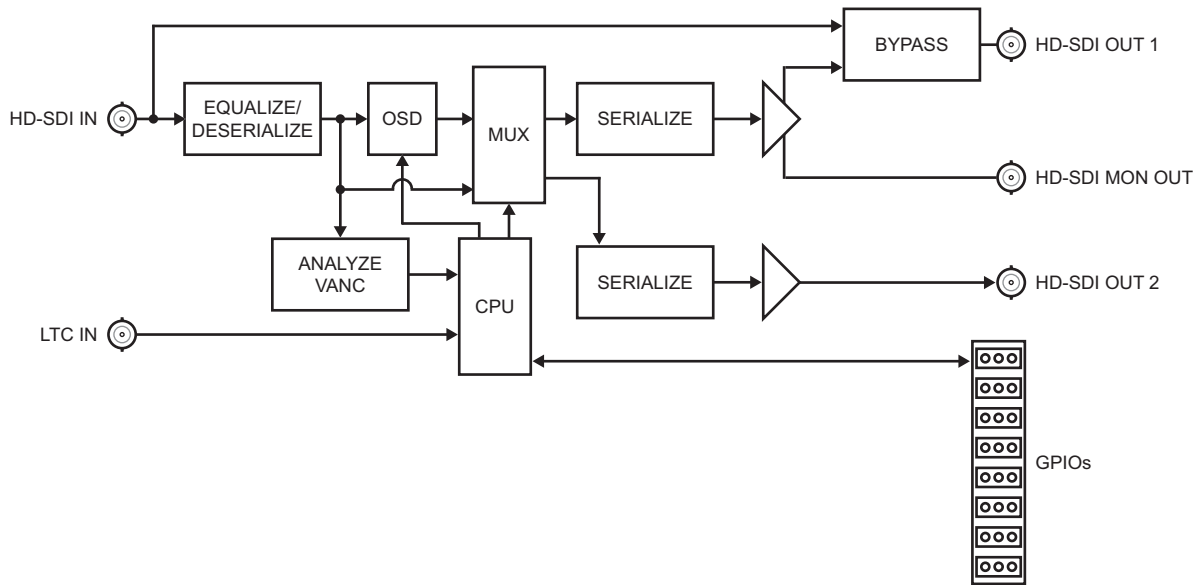
The following features make the CDP-100 the most ideal solution for detecting and identifying errors in the captioning of a video source:

- CDP Errors are overlaid on the source video with easy to read text descriptions
- Caption channel text may be overlaid for a visual inspection
- Raw data capture with packet by packet analysis available via CDP File Analyzer
- Down-loadable error log with easy to read, time stamped error descriptions
- Errors can drive GPIOs to trigger external devices, within one video frame time
- Individual errors can be set for severity and whether they should trigger errors or warnings
- Reports status and configuration remotely via the DashBoard Control System
- Fits openGear frames

---

# Functional Block Diagram

This section provides a functional block diagram that outlines the workflow of the CDP-100.



**Figure 1.1** CDP-100 — Simplified Block Diagram

---

# User Interfaces

The CDP-100 includes the following user interfaces.

## DashBoard Control System

DashBoard enables you to monitor and control openGear frames and cards from a computer. DashBoard communicates with other cards in the frame through the Network Controller Card. The DashBoard software and manual are available for download from our website.

***For More Information on...***

- using DashBoard, refer to the ***DashBoard User Manual***.

## SNMP Monitoring and Control

The Network Controller Card in the openGear frame provides optional support for remote monitoring of your frame and using Simple Network Management Protocol (SNMP), which is compatible with many third-party monitoring and control tools.

***For More Information on...***

- the SNMP controls on this card, refer to your CDP-100 Management Information Base (MIB) file.
- SNMP Monitoring and Control, refer to the ***MFC-8300 Series*** or ***MFC-OG3 Series User Manual***.

---

# Documentation Terms and Conventions

The following terms and conventions are used throughout this manual.

## Terms

The following terms are used:

- **“Board”**, and **“Card”** refer to openGear terminal devices within openGear frames, including all components and switches.
- **“DashBoard”** refers to the DashBoard Control System.
- **“openGear frame”** refers to all versions of the 10-slot (DFR-8310 series frame), 20-slot (DFR-8321 series frame), and any available options unless otherwise noted.
- **“openGear frame”** refers to openGear frame and OG3-FR series frame that houses the CDP-100 card.
- **“GPIO”** refers to General Purpose Input-Output DC signals used by one device to control another.
- **“Operator”** and **“User”** refer to the person who uses CDP-100.
- **“System”** and **“Video system”** refer to the mix of interconnected production and terminal equipment in your environment.

## Conventions

The following conventions are used:

- The **“Operating Tips”** and **“Note”** boxes are used throughout this manual to provide additional user information.



# Installation

---

## In This Chapter

This chapter provides instructions for installing the CDP-100, installing the card into the frame, cabling details, and updating the card software.

The following topics are discussed:

- Before You Begin
- Quick Start
- Installing the CDP-100
- Cabling for the CDP-100
- Software Upgrades

---

# Before You Begin

Before proceeding with the instructions in this chapter, ensure that your openGear frame is properly installed according to the instructions in its manual.

## Static Discharge

Throughout this chapter, please heed the following cautionary note:



---

**ESD Susceptibility** — *Static discharge can cause serious damage to sensitive semiconductor devices. Avoid handling circuit boards in high static environments such as carpeted areas and when synthetic fiber clothing is worn. Always exercise proper grounding precautions when working on circuit boards and related equipment.*

---

## Unpacking

Unpack each CDP-100 you received from the shipping container and ensure that all items are included. If any items are missing or damaged, contact your sales representative or Ross Video directly.



---

# Quick Start

Assuming you have an openGear frame, an CDP-100 card and a rear module, the following steps will allow you to start analyzing VANC captioning compliance with SMPTE 334-1 and 334-2:

1. Connect the frame to your LAN. Refer to the *DFR-8300 Series* and *OG3-FR Series Frames User Manual* and *MFC-8300 Series* or *MFC-OG3 Series User Manual* for details.
2. Install DashBoard on a computer connected to the LAN. The DashBoard software and user manual is available from the Ross Video website.
3. Install the rear module in the frame, as described in the section “**Installing a Rear Module**” on page 2-4.
4. Install a CDP-100 into the rear module as described in the section “**Installing a CDP-100**” on page 2-5.
5. Connect an HD-SDI signal to the **SDI IN** BNC on the rear module of the CDP-100 as described in the section “**Cabling for the CDP-100**” on page 2-6.
6. Launch the DashBoard client on your computer. It should automatically find your frame within a minute or two.
7. Click the “+” next to the frame name to display a list of the cards in the frame.
8. Double-click the CDP-100 to be used for monitoring. A tab in the Device view for the card is now displayed.

## Example

At the top of the overlay screen there is a status bar with the following information:

- The video type is the left-most item.
- **Caption Present** indicates if the caption DID and SDID (61/01) is present in the incoming signal and will be green for present or red for missing.
- **Caption Status** indicates the quality of the CDP packets.
- On the far right of the status bar is the CDP capture indicator. A green **Cont** indicates the CDP-100 is currently capturing packets. A red **Stop** indicates the CDP-100 is not currently capturing packets.

Directly underneath the status bar is a list of errors currently detected by CDP-100 in the incoming video. If the error is persistent (present in every CDP) then the error message will stay on the screen. Otherwise it will stay on the screen for five seconds and then be removed.

If caption display 1 and/or 2 have been selected, they will appear in the lower part of the screen beneath the error conditions.

---

# Installing the CDP-100

This section outlines how to install a rear module and a card in the openGear frame. Refer to the section “**Cabling for the CDP-100**” on page 2-6 for cabling details.

## Rear Modules for the CDP-100

When installing the CDP-100:

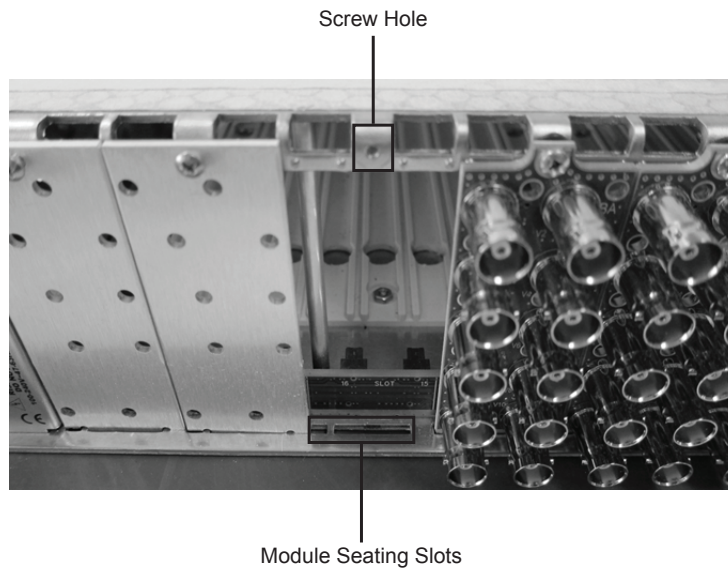
- **DFR-8310 series frames** — The **MDL-R10** Full Rear Module is required. The CDP-100 is not compatible with the DFR-8310-BNC frames.
- **DFR-8321 series and OG3-FR series frames** — The **MDL-R20** Full Rear Module is required.

## Installing a Rear Module

If the rear module is installed, proceed to the section “**Installing a CDP-100**” on page 2-5.

### To install a rear module in your openGear frame

1. Locate the card frame slots on the rear of the frame.
2. Remove the Blank Plate from the slot you have chosen for the CDP-100 installation.
3. Install the bottom of the Rear Module in the **Module Seating Slot** at the base of the frame’s back plane. (**Figure 2.1**)



**Figure 2.1** *Rear Module Installation in an openGear Frame (CDP-100 not shown)*

4. Align the top hole of the Rear Module with the screw on the top-edge of the frame back plane.
5. Using a Phillips screwdriver and the supplied screw, fasten the Rear Module to the back plane of the frame. Do not over tighten.
6. Ensure proper frame cooling and ventilation by having all rear frame slots covered with Rear Modules or Blank Plates.

## Installing a CDP-100

Use the following procedure to install the CDP-100 in an openGear frame:



---

**Caution** — *It is recommended to use a frame with the cooling fan option in all cases, in order to allow all slots to be used without exceeding heat dissipation limits.*

---

1. Locate the Rear Module you installed in the procedure “**Installing a Rear Module**” on page 2-4.
2. Hold the CDP-100 by the edges and carefully align the card-edges with the slots in the frame.
3. Fully insert the card into the frame until the rear connection plug is properly seated in the Rear Module.
4. Verify whether your label is self-adhesive by checking the back of the label for a thin wax sheet. You must remove this wax sheet before affixing the label.
5. Affix the supplied **Rear Module Label** to the BNC area of the Rear Module.

---

# Cabling for the CDP-100

This section provides information for connecting cables to the installed rear modules on the openGear frames. Connect the input and output cables according to the following sections. It is not necessary to terminate unused outputs.

## Rear Module Cabling

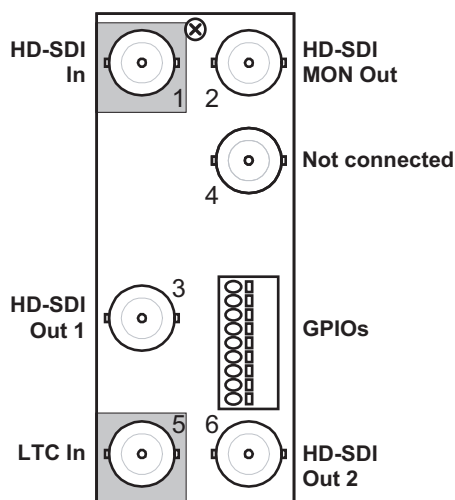
This section provides cabling diagrams for the rear modules. The type of rear module depends on the frame the card is installed in.

### DFR-8310 Series Frames

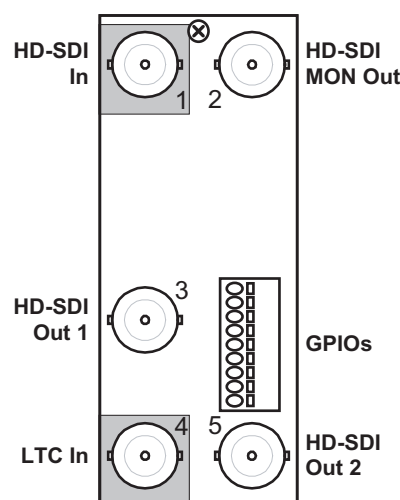
The CDP-100 is used with the **MDL-R10**. Each rear module occupies one slot and accommodates one card. This rear module provides one HD-SDI input, one LTC input, two HD-SDI outputs, one monitoring output, and bi-directional logic-level GPIOs. (**Figure 2.2**)

### DFR-8321 Series and OG3-FR Series Frames

The CDP-100 is used with the MDL-R20. Each rear module occupies two slots and accommodates one card. This rear module provides one HD-SDI input, one LTC input, two HD-SDI outputs, one monitoring output, and bi-directional logic-level GPIOs. (**Figure 2.3**)



**Figure 2.2** Cabling for the MDL-R10 Rear Module



**Figure 2.3** Cabling for the MDL-R20 Rear Module

## Connections Overview

This section briefly outlines the types of connections available on the rear modules.

### HD-SDI In — BNC 1

**BNC 1** accepts a SMPTE 292M serial digital video signal. The CDP-100 requires this input in all cases. The input signal is internally terminated in 75ohms when the CDP-100 is installed.

## HD-SDI Out 1 — BNC 3

**BNC 3** carries the output of the CDP-100, with caption status displayed on-screen. When the CDP-100 card is removed from its slot or the bypass switch is activated, the MDL-R20 rear module bypasses **BNC 1** to **BNC 3** directly.

## HD-SDI MON Out — BNC 2

**BNC 2** carries an unswitched copy of the same signal that is output on **BNC 3**. When the CDP-100 card is removed from its slot or the card is in bypass, this output is not driven.

## LTC In — BNC 4 or BNC 5

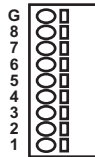
**BNC 4** (**BNC 5** on the **MDL-R10**) accepts an LTC source which the CDP-100 can use as a time source.

## HD-SDI Out 2 — BNC 5 or BNC 6

**BNC 5** (**BNC 6** on the **MDL-R10**) carries a second output from the CDP-100. The overlay ability is programmable under the **Settings** tab in DashBoard. Note that CDP-100 cards with serial numbers less than 107469 do not have this output.

## GPIOs

Eight bi-directional, logic-level GPIOs are available. Refer to **Figure 2.4** for pinouts on the **MDL-R10** and **Figure 2.5** for pinouts on the MDL-R20.



**Figure 2.4** GPIO Pinouts for the MDL-R10 Rear Module



**Figure 2.5** GPIO Pinouts for the MDL-R20 Rear Module

---

# Software Upgrades

This section provides instructions for upgrading the software for your CDP-100 using DashBoard.

## To upgrade the software on the CDP-100

1. Contact Ross Technical Support for the latest software version file.
2. Launch the DashBoard client on your computer.
3. Display a tab for the card you wish to upgrade by double-clicking its status indicator in the **Basic Tree View**.
4. From the **Device** tab, click **Upload** to display the **Select File for upload** dialog box.
5. Navigate to the **\*.bin** upload file you wish to upload.
6. Click **Open** and follow the on-screen instructions.
7. Click **Finish** to start the upgrade.
8. Monitor the upgrade.
  - A **Upload Status** dialog enables you to monitor the upgrade process.
  - The card reboots automatically once the file is uploaded. The card is temporarily taken off-line.
  - The reboot process is complete once the status indicators for the **Card State** and **Connection** return to their previous status.



---

**Operating Tip** — *If you are running DashBoard version 2.3.0 or lower, you must click **Reboot** in the **Device** tab to complete the upgrade process.*

---

## Troubleshooting

If you encounter problems when upgrading your card software, verify the following:

- Ethernet cable is properly connected if you are uploading the file via a network connection.
- The file you are attempting to load is a **\*.bin** file that is for the card you are upgrading.

# User Controls

---

## In This Chapter

This chapter provides a general overview of the user controls available on the CDP-100.

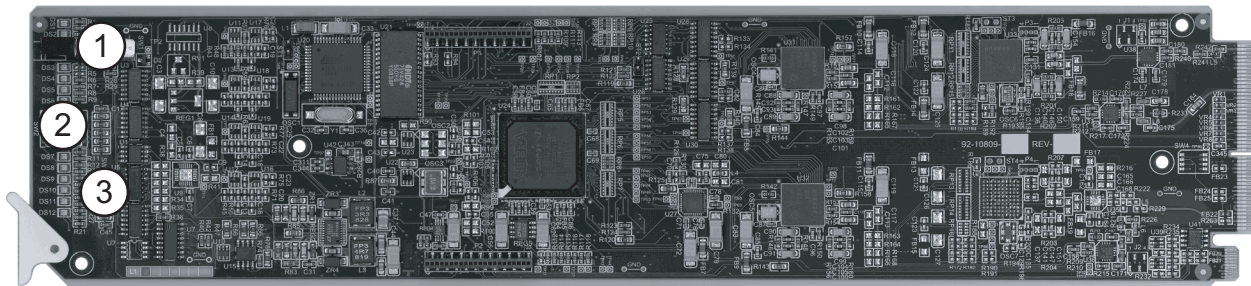
The following topics are discussed:

- Card Overview
- Control and Monitoring Features

---

# Card Overview

This section provides a summary of the CDP-100 components.



**Figure 3.1** CDP-100 — Components

1) Bypass Switch

2) Menu Switch

3) Reset Button

## 1. Bypass Switch

This two-position push-button can be used to control the bypass relay. This switch provides a quick way of disabling all CDP-100 operation, since it disconnects the video input and output from the card.

- When **SW1** is in the **IN** position, the CDP-100 is in the video signal path.
- Pressing **SW1** once moves the switch to the **OUT** position and bypasses the CDP-100.
- Pressing **SW1** again restores it to its active state.

If the CDP-100 is installed in a rear module that does not provide bypass, this switch has no function and should be left in the **IN** position.

## 2. Menu Switch

This switch is not implemented on the CDP-100.

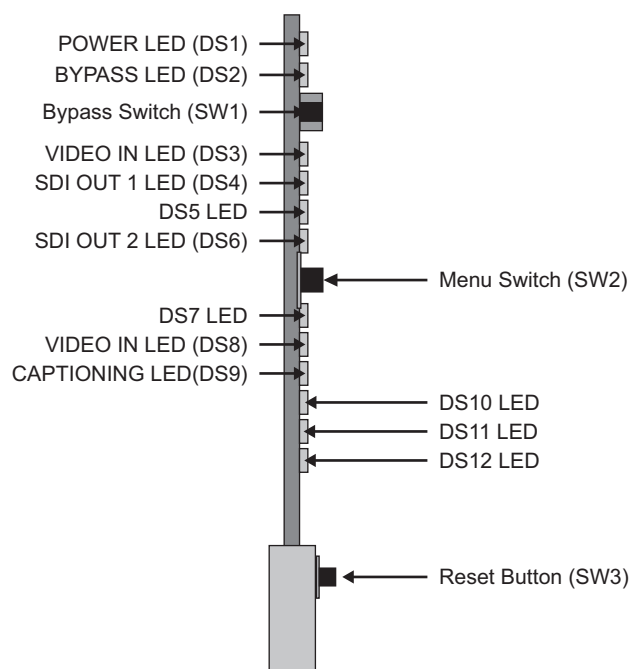
## 3. Reset Button

This button is used for rebooting the card.



# Control and Monitoring Features

This section provides information on the LEDs for the CDP-100. Refer to **Figure 3.2** for the location of the LEDs.



**Figure 3.2** CDP-100 Card-edge LEDs

## Status and Selection LEDs on the CDP-100

The front-edge of the CDP-100 has LED indicators for communication activity. Basic LED displays and descriptions are provided in **Table 3.1**.

**Table 3.1** LEDs on the CDP-100

LED	Color	Display and Description
<b>POWER (DS1)</b>	Green	When lit green, this LED indicates that the card is running with a valid input.
	Flashing Green	When flashing green, this LED indicates that the boot loader is waiting for software upload.
	Orange	When lit orange, this LED indicates that a signal or configuration error is occurring.
	Red	When lit red, this LED indicates the card is not operational. This will occur if, for example, there is no video input.
	Off	When unlit, this LED indicates there is no power to the card.
<b>BYPASS (DS2)</b>	Red	When lit red, this LED indicates the card video is bypassed.
	Off	When unlit, this LED indicates that the card is in the video path.

**Table 3.1 LEDs on the CDP-100**

LED	Color	Display and Description
<b>VIDEO IN (DS3)</b>	Green	When lit green, this LED indicates that a video input signal is present.
	Red	When lit red, this LED indicates no valid input signal is present. Verify that the input cable is connected correctly to the card rear module.
<b>SDI OUT 1 (DS4)</b>	Green	When lit green, this LED indicates the video output serializer is locked to a valid input.
	Red	When lit red, this LED indicates there is a hardware fault on the card.
<b>DS5</b>		This LED is not implemented.
<b>SDI OUT 2 (DS6)</b>	Green	When lit green, this LED indicates the HD/SD/SDI Out 2 serializer is locked to a valid input.
	Red	When lit red, this LED indicates there is a hardware fault on the card.
<b>DS7</b>		This LED is not implemented.
<b>VIDEO IN (DS8)</b>	Green	When lit green, this LED indicates that the input signal is valid.
	Red	When lit red, this LED indicates that an invalid input signal is present.
<b>CAPTIONING (DS9)</b>	Green	When lit green, this LED indicates the VANC captioning data is present.
	Red	When lit red, this LED indicates that the VANC captioning data is missing.
<b>DS10 - DS12</b>		These LEDs are not implemented.

# Configuration

---

## In This Chapter

This chapter explains how to use the user interface to set up the CDP-100. This discussion is based on the use of DashBoard through a network connection. The order of sections in this chapter follows the workflow required to setup the CDP-100 for operation. It is recommended that you proceed through the following sections in order to achieve the best possible understanding of the product.

The following topics are discussed:

- General Settings
- Capturing Data
- GPIO Assignments
- Selecting a Time Source
- Errors Levels
- Error Logs
- Monitoring

---

# General Settings

This section provides a summary of the initial tasks you may wish to perform before configuring your card for data collection.

## To configure the general settings

1. Select the **Settings** tab.
2. Type a unique name for your card in the **Card ID** field. This is especially useful if you have more than one CDP-100 in a frame. If this field is blank, the name is “CDP-100”.
3. Specify the overlay of the CDP errors on the two outputs of the card. **Program 1** and **Program 2** control the overlay of the CDP errors on the two outputs of the card. Program 1 refers to BNC 3 and Program 2 refers to BNC 6 (or BNC 5 on the MDL-R10). If overlay is selected, the CDP-100 overlays data onto the output video; overlay off lets the video pass unaltered.
4. Use the **First Capture Line** and the **Last Capture Line** fields to select the range of lines that the card processes when looking for VANC caption data. Normally, you can leave these set to include the complete range of VANC lines (1-20 for 1080i and 1-25 for 720p). However, you may wish to reduce the range to focus on the data in one specific line.
5. Use the **Error Hold Time** to set the approximate length of time an error will be displayed on the overlay before it times out.
6. Configure the background of the overlay using the **Black Background** box. Selecting Transparent enables you to view the image, while selecting Black makes the text easier to read.
7. You can save the **Configuration** of the card to a file on a PC by clicking **Save**.
8. The Factory Defaults **Reset** button clears all configuration settings and restores the settings to the values they had when shipped from the factory.

---

# Capturing Data

The **Capture Data** tab provides an easy method to know the exact bits and bytes of the CDPs when an error occurs. This data is suitable for detailed analysis by the CDP File Analyzer program which runs on a PC.

## To capture and save data to a file

1. Select the **Capture Data** tab.
2. Select a data collection method from the **Run Mode** area. The CDP-100 internally stores 1800 packets. Once the 1800 packet buffer fills, the CDP-100 deletes the oldest packet to make room for the newest.
  - **Stop on Error** — Selecting this option enables the card to stop capturing data if an error occurs.
  - **Stop Centered on Error** — Selecting this option enables the card to capture 900 more packets before stopping to center the error in the captured buffer.
  - **Continuous** — Selecting this option continues to capture regardless if errors occur.
3. Verify the **Running Status** field. This field is an indicator of the CDP-100 current capture state. It can either be “Running” indicating the card is currently capturing data, or “Stopped” indicating the card has stopped capturing data.
4. Click **Run** to start data capture if the running status is currently stopped.
5. Click **Save** to save the currently stored CDP data to a file. If the CDP-100 is currently running, saving the data will cause the CDP-100’s Running Status to stop so the data can be transferred.

## CDP File Analyzer

This program is supplied on an install CDROM. Once installed on your PC, it will prompt for a license key which applies to the PC on which it is installed. Contact Ross Technical Support and provide the information given by the program and Ross Video will provide you with this key.

The program interface will include the following components and fields:

### 1. Open Button

Use this button to open the file to be analyzed. It must be in the data folder of the CDP File Analyze program.

### 2. Controls

Use these controls to move through the CDPs.

### 3. Current CDP Content

This area shows the current CDP as hex bytes. It is color coded to show the different sections of the CDP.

### 4. Parameters

Some parameters are shown as short forms. The parameter’s full name displays when the cursor hovers over the short form.

### 5. Captioning Information

This field shows the last few lines of embedded 608 text as a reference to your position in the file.

## 6. Errors

Errors, like this 708 Packet Sequence error, are highlighted in red.

## 7. 708 Data Stream Information

These fields show the 708 data streams in both hex and as text.

## Caption Display

The **Caption Display** tab includes the **Caption Display 1** and **Caption Display 2** menu items that control which caption channel text is displayed on the overlay.

The display of captions will reduce the number of unique error types that can be displayed simultaneously on the overlay screen but has no other effect on error logging.

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# GPIO Assignments

The **GPIO Assignments** tab enables you to assign a GPIO to be triggered when an individual CDP error condition or when any CDP error occurs. When used in conjunction with the error levels to mask off unwanted errors, it is possible to build a subset of errors that will trigger a GPIO.

## To assign a GPIO to an individual CDP error condition

1. Select the **GPIO Assignments** tab.
2. From the **GPIO 1** menu, assign the type of error condition to trigger the GPIO.
3. Repeat step 2. for each GPIO you wish to configure.
4. If required, select the **Reverse Bits** box to set the GPIOs active low instead of the default, active high.
5. Click **Load** to apply the current settings.

---

# Selecting a Time Source

The CDP-100 requires a time source to time stamp errors in the log. The **Time** tab is used to select this time source.

## Selecting a Time Source

Time can be set accurately and automatically by using **LTC** time or **Network Time**. LTC requires connection of linear timecode source to the card and network time requires an NTP server accessible on the LAN that is connected to the openGear frame.

### To use an NTP Server as the time source

1. Select the **Time** tab.
2. From the **Time Source** area, select **Network Time**.
3. Specify your time offset from Universal Time (UTC), as a positive or negative number of hours and minutes. For example, the area of North America where Pacific time is observed is 8 hours west of longitude 0; the settings would be **UTC Offset: HH = -8, and MM = 0**. Note that UTC is also known as GMT (Greenwich Mean Time).
4. Enable or disable **DST** (Daylight Savings Time) as appropriate.
5. Click **Accept** to apply your changes.
6. Proceed to the section “**Using an NTP Server as the Time Source**” on page 4-6.

### To obtain a time reference from a linear timecode input (LTC)

1. From the **Time Source** area, select **LTC**.
2. Click **Accept** to apply your changes.

### To manually specify the date and time

1. From the **Time Source** area, select **Manual**. Use this option when neither Network Time or an LTC source are available.
2. Using the options in the **Manual** area, specify the date and time.
3. Click **Accept** to apply your changes.

## Using an NTP Server as the Time Source

In order to use network time, you also need to ensure that the Network Controller Card in the openGear frame has been configured to acquire time from an NTP server. Refer to the manual for your Network Controller Card for details.

If you do not have access to an NTP server, you can use LTC or enter the time and date directly on the **Time** tab as described in the section “**To manually specify the date and time**” on page 4-6.



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# Errors Levels

The **Error Levels** tab enables you to select which type of CDP-100 error to mask.

## To select which errors to mask

1. Select the **Error Logs** tab.
2. For each type of error there are the following options:
  - **Error** — Error is displayed, registered in the error logs and causes the CDP-100 to stop capturing in “Stop on Error” and “Stop Centered on Error” modes.
  - **Warning** — Error is displayed, registered in the error logs but doesn't cause the CDP-100 to stop capturing in “Stop on Error” and “Stop Centered on Error” modes.
  - **Ignore** — Error is ignored and is not displayed or registered in the error logs.

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# Error Logs

The **Error Logs** tab lists each error type and indicates the time the error last occurred. Possible log messages are “None”, a start time only indicating the error is currently taking place, or a start time and an end time indicating the error occurred sometime in the past. The complete log history can be downloaded to the DashBoard client computer.

## To download the error log

1. Select the **Error Logs** tab.
2. Click **Save**. Note that clicking **Reset** clears the log history.

---

# Monitoring

This section provides an explanation of the status tabs available when using DashBoard to monitor the CDP-100. For a more complete description of DashBoard and its capabilities, refer to the *DashBoard User Manual*.

## Product Tab

The **Product** tab displays read-only information that is useful in discussing the operation of the module with Ross Video's Technical Support staff.

## Status Tab

The **Status** tab reports the current status of the GPIOs. The CDP-100 can control up to eight GPIO outputs. These GPIO outputs can be assigned to CDP error conditions. Errors are assigned on the GPIO Assignments tab described in the section “**GPIO Assignments**” on page 4-5. Once a CDP error is assigned to a GPIO, its short form name will be used on the Status tab rather than the default GPIO#.

## Alarms Tab

The **Alarms** tab includes the following fields:

- The **Card Status** field represents the sum of all the possible error states the card is experiencing. This includes all the CDP errors.
- The **Caption Present** field indicates whether or not the DID/SDID that carries captioning CDPs is present.
- The **LTC** field indicates whether or not an LTC time source is connected to the rear module. This indicator only applies when LTC has been selected as the time source. When not specified as the time source, this indicator remains green and reports “OK”.



# Understanding CDP Errors

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## In This Chapter

The CDP-100 detects most coding errors in the CDP. This chapter attempts to describe each error, what problems it might cause and how severe it may be.

The following topics are discussed:

- CDP Error Overview

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# CDP Error Overview

It should be noted that each device acts differently when presented with each error type. It is therefore impossible to say with certainty whether an error will cause a loss of captioning. It is best practice to ensure that no errors are present in the CDP to give the best chance that all captioning will pass through to the TV sets correctly.

The user should also be aware that not all monitoring equipment will show all problems with the captioning stream. For example, decoding the captions and viewing them on a monitor does not guarantee that all required information is present. Many decoders will decode either the CEA-608 or CEA-708 captions and not warn you that one of the two is missing. Any equipment which manipulates CDPs may also make a small CDP error worse so captions which look fine at one point of the broadcast chain may not be usable later in the chain.

## **CDP Missing, A field 1 was found without a CDP**

### *Explanation*

SMPTE 334-1 states that a single CDP should appear in each field 1 of an interlaced video frame and each progressive frame. This error is generated any time the CDP-100 detects an interlaced field 1 or a progressive frame which does not contain a CDP (no 61/01 VANC packet)

### *Severity*

This error does not usually cause problems. Sometimes it indicates that there are no captions present. In this case the error is constant. If it happens on a single frame over a long time period (typically hours) it indicates a loss of single packet which may cause the loss of some on-screen data. Most equipment is not affected by this error.

## **Extra, A field 1 was found with more than one CDP**

### *Explanation*

There should be one and only one CDP in field 1 of every interlaced video frame and every progressive frame. This error is generated any time two or more 61/01 VANC packets are found in field 1. There are several possible causes including two devices both providing captions. The error may also occur if equipment falls behind and tries to catch up by inserting two packets.

### *Severity*

This error normally has severe consequences. Some equipment will only process one of the two CDPs. If there are two complete caption streams, only one will be passed and it may not be the correct one. If equipment does pass both CDPs then you may end up with a mix of two caption streams which will produce no captioning at output. If it is just a single frame with two CDPs in field 1, it will cause a loss of captions at the error point but normal captioning will resume after the error.

## **Field 2, A CDP was found in field 2**

### *Explanation*

SMPTE 334-1 states that CDPs shall only be carried in field 1 of interlaced video. This error occurs when a CDP is detected in field 2. On occasion there may be data constantly in field 2 caused by equipment that either mistakenly inserts it there or by equipment that has inadvertently moved it there from field 1. There may also be cases where a single frame has the CDP in field 2 rather than in field 1.

### *Severity*

It is a severe problem if a signal constantly has CDPs in field 2. Most equipment will ignore this data causing a complete loss of captioning. If the occasional frame has the CDP in field 2 then

there may be a loss of caption text when the error occurs but normal captioning will return after the error.

## **CDP Header, Frame rate does not match current video**

### *Explanation*

The CDP header contains a frame rate for which the CDP was constructed. This is important because the amount of data carried in the caption portion of the CDP varies with frame rate. This error is signaled when the frame rate of the actual video does not match the frame rate specified in the CDP header.

### *Severity*

This error may cause severe captioning issues. If an incorrect amount of caption stream data is carried in the CDP for the actual video frame rate it may cause data to be lost.

## **CDP Header, Sequence counter did not count by one**

### *Explanation*

Each CDP in the 61/01 VANC packet has an identifier, indication of CDP size and content, plus a sequence counter. The sequence counter is designed to count by one for each new CDP. Devices use the sequence counter to determine if the stream of CDPs has been interrupted. When an interruption is detected the device may try to resync to the captioning stream. It is normal to see this error when there is a switch from one captioned video source to another.

### *Severity*

If the header sequence counter error is caused by an appropriate switch between two video sources then it will cause no problems in the captioning. The new source will have all the appropriate information to allow any device to sync to the new caption stream. It is a low severity error if there are occasionally CDPs with the incorrect sequence count because this will cause some equipment to lose parts of captions. It is a severe error if the sequence counter is not counting at all or count continuously does not increment correctly. Some devices will remove the captions under these circumstances.

## **CDP Footer, Sequence counter does not match header sequence**

### *Explanation*

Each CDP ends with a footer which contains an identifier, a checksum for the CDP, and a repeat of the sequence number contained in the header. This error occurs if the sequence number from the footer does not match the one in the header. This may be caused by the CDP not being constructed correctly.

### *Severity*

This is a severe problem. Many devices will throw away CDPs where the footer sequence does not match the header. If this is a non-continuous error then it will only cause a disruption in captioning when the error occurs.

## **CDP Footer Calculated checksum does not match footer checksum**

### *Explanation*

Each CDP is protected by a checksum which is carried in the footer of the CDP. This error occurs when the checksum carried in the footer does not match the checksum calculated for the CDP.

### *Severity*

This is normally a severe problem. Many devices will throw away any CDP where the checksum is incorrect, causing a total loss of captioning.

## **CDP Header Reserved bits are not set correctly**

### *Explanation*

The CDP header has bits which convey no information at this time but are reserved for future standardization. The SMPTE 334-2 standard defines how these bits should be set. This error is generated any time a reserved header bit is not set according to the standard.

### *Severity*

The severity of this error varies greatly depending on equipment. Some equipment completely ignores reserved bits and does not care how they are set. Other equipment will completely reject the CDP causing a complete loss of caption data.

## **CDP Header, CDP Length not a legal value**

### *Explanation*

The header of the CDP contains the length of the CDP. This error occurs if the length in the header is less than the minimum possible length or greater than the maximum possible length.

### *Severity*

This is a severe error because it likely makes the CDP not decodable.

## **CDP Header, CDP Length does not match footer position**

### *Explanation*

The CDP header has a count of the number of bytes in the CDP. The footer is of a fixed size so its identifier should be found through calculations based on length. An error is generated if the footer identifier is not found where expected. This indicates an improperly constructed CDP.

### *Severity*

This is normally a severe error and usually causes a total loss of the captioning stream. Some devices do not use the length and may still be able to process the CDP.

## **CDP Caption, Caption triplet count incorrect for frame rate**

### *Explanation*

The CEA 708 specification specifies a constant bit rate for caption data. This creates an absolute relationship between the video frame rate and the bytes of caption data which are carried in triplets. This error occurs when the frame rate from the header does not indicate the same number of triplets as carried in the caption portion of the CDP.

### *Severity*

This can be a severe problem. Some gear will see this error and ignore all the caption data. Other gear may attempt to fix the problem and possibly lose some caption data.



## **CDP Caption, Reserve bits are not set correctly**

### *Explanation*

The CDP caption information area has bits which convey no information at this time but are reserved for future standardization. The SMPTE 334-2 standard defines how these bits should be set. This error is generated any time a reserved caption information bit is not set according to the standard.

### *Severity*

Most devices do not check reserved bits, so normally this error does not cause a problem. Caution should be taken because it is unknown what a device that does check these bits might do if an error is detected.

## **CDP Caption, No 608 data present**

### *Explanation*

This is one of the least understood errors. SMPTE 334-2 makes the carriage of captioning optional through a CC data present bit in the header. If this bit is not set then the caption portion of the CDP will not be present. However, if this bit is set it must carry all the captioning information required by CEA 708 as determined by the current video frame rate. This means that the caption information section must carry CEA 608 embedded data. An error is generated if no CEA 608 embedded data is present.

### *Severity*

This error may lead to subtle but severe captioning problems which can be hard to detect by monitoring equipment. It may indicate that the embedded CEA 608 data is not being carried at all and this will lead to a non-compliant broadcast signal (embedded 608 is a “must carry”). It may cause downstream equipment problems because they expect this data and may not be able to create a correct output without it. The problem is difficult to detect because some monitoring systems do not assume this to be an error. Equipment which displays the text of the captioning may only show the CEA 708 captions or may automatically show CEA 708 if CEA 608 is not present.

## **CDP Service, Start flag does not match header**

### *Explanation*

The CDP service information may be too large to place in a single CDP so may be broken into pieces and spread over more than one CDP. To allow for decoding of the service information there are flags to indicate the start and end of the service information and when the service information has changed. These flags reside in both the header of the CDP and in the service information section. An error is generated when the start of service information flag in the header does not match the same flag in the service information section.

### *Severity*

This is not normally a severe error because much equipment ignores the service information. It may cause service information to be removed as it passes through a device but this data is not typically used and will not cause any loss of data in the caption streams. However, as with any error, there may be some gear where this error will cause the loss of the CDP which includes the captioning stream.

## **CDP Service, Change flag does not match header**

### *Explanation*

The CDP service information may be too large to place in a single CDP so may be broken into pieces and spread over more than one CDP. To allow for decoding of the service information there are flags to indicate the start and end of the service information and when the service information has changed. These flags reside in both the header of the CDP and in the service information section. An error is generated when the change of service information flag in the header does not match the same flag in the service information section.

### *Severity*

This is not normally a severe error because much equipment ignores the service information. It may cause service information to be removed as it passes through a device but this data is not typically used and will not cause any loss of data in the caption streams. However, as with any error, there may be some gear where this error will cause the loss of the CDP which includes the captioning stream.

## **CDP Service, Complete flag does not match header**

### *Explanation*

The CDP service information may be too large to place in a single CDP so may be broken into pieces and spread over more than one CDP. To allow for decoding of the service information there are flags to indicate the start and end of the service information and when the service information has changed. These flags reside in both the header of the CDP and in the service information section. An error is generated when the completion of service information flag in the header does not match the same flag in the service information section.

### *Severity*

This is not normally a severe error because much equipment ignores the service information. It may cause service information to be removed as it passes through a device but this data is not typically used and will not cause any loss of data in the caption streams. However, as with any error, there may be some gear where this error will cause the loss of the CDP which includes the captioning stream.

## **CDP Service, Reserve Bits set incorrectly**

### *Explanation*

The CDP service information area has bits at the beginning of the area that are always present which convey no information at this time but are reserved for future standardization. The SMPTE 334-2 standard defines how these bits should be set. This error is generated any time a reserved service information bit is not set according to the standard.

### *Severity*

Most devices do not check reserved bits so normally this error does not cause a problem. It may cause service information to be removed as it passes through a device but this data is not typically used and will not cause any loss of data in the caption streams. However, as with any error, there may be some gear where this error will cause the loss of the CDP which includes the captioning stream.

## **CDP Caption, 708 caption block sequencing error**

### *Explanation*

The CEA 708 native captioning stream(s) are carried in triplets in the same fashion as the embedded CEA 608 captions streams. The first byte of the triplet identifies the type of data carried in the triplet and the other two bytes are the data. For 708 data, the first byte will define it as 708 data and whether this triplet starts a set of captioning service blocks. A start of the captioning service blocks start with a packet header which includes a size of the packet and a sequence counter. The sequence counter should count by one each time a new packet is received. An error is generated any time the count is not properly incremented.

### *Severity*

This is a very subtle error. The sequence number is used to keep the underlying caption streams synchronized and may cause some equipment to resync with the stream. In doing so, portions of CEA 708 captioning text may be lost. The effect on captioning is that CEA 608 data will be correct but characters or words will be missing from the CEA 708 captions.

## **CDP Caption, 708 Triplet count does not match caption count**

### *Explanation*

The triplet count at the start of the caption section of the CDP indicates how many caption triplets there are in the caption section. This should match the number of triplets that must be carried for a given video frame rate. An error is generated if these two values do not match.

### *Severity*

The effect on downstream devices is unpredictable when this error is present. It means that there is either too much or too little caption data being delivered to the ATSC encoder for the given frame rate. Some gear may correct this problem without affecting the caption stream. Others may cause some caption data to be lost and still others may pass no captions at all.

## **CDP Caption, 708 Extra triplets in caption block**

### *Explanation*

The size of the CEA 708 captioning packet is part of the header. This starts the processing of caption stream blocks until the last block is processed as indicated by a caption stream block with a null header. An error is generated if the size of the packet does not match the number of bytes processed to reach the end of the packet.

### *Severity*

This is a severe error and in most cases will cause a loss or corruption of caption streams.

## **CDP Service, Reserved bits incorrect, service index 0 to 15**

### *Explanation*

This is actually a collection of 16 possible errors where the index will be 0 to 15. The service information has two parts. The first part is fixed and contains the service information flags and a count of the service information to follow. Count blocks of service information follows and the index will indicate which one contains the error. Each block has the service number, the language code, an aspect ratio flag and an easy reading flag. Each block has bits which convey no information at this time but are reserved for future standardization. The SMPTE 334-2 standard defines how these bits should be set. This error is generated any time a reserved bit is not set according to the standard.

## **CDP Caption, 608 Field 2 Data Missing**

### *Explanation*

Field 2 608 data carries second language captioning and extended data services (XDS) such as VChip. When these services are not present, some equipment does not code the 608 field 2 triplet into the captioning data section of the CDP. Most equipment encodes a field 2 null triplet.

### *Severity*

This is not a severe problem and will not usually cause a loss of captioning.

## **CDP Caption, 708 Triplet Precedes 608 Triplet**

### *Explanation*

CEA-708 specifies that 608 captioning triplets precede any 708 triplets in the captioning data structure.

### *Severity*

Devices processing CDPs where 708 data precedes 608 data may not be able to construct the 608 and / or 708 data streams correctly. This may lead to a partial or complete loss of captions.

## **CDP Caption, 608 Cadence Does Not Match Frame Rate**

### *Explanation*

CDPs contain embedded 608 data so that a set top box can easily down convert the ATSC signal to NTSC and encode the 608 captions. The frame rate for NTSC is always 29.97 but the ATSC signal can have different frame rates. The CDPs must therefore carry a different pattern or cadence of 608 field 1 and field 2 data depending on the frame rate.

### *Severity*

In most cases this is not a severe problem. It occurs any time video sources are switched. However this is a severe problem if the cadence is incorrect across many frames.

# Specifications

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## In This Chapter

This chapter provides the technical specification information for the CDP-100. Note that technical specifications are subject to change without notice.

The following topics are discussed:

- Technical Specifications

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# Technical Specifications

This section provides technical specifications for the CDP-100.

**Table 6.1 CDP-100 Technical Specifications**

Category	Parameter	Specifications
<b>Serial Digital Video Inputs</b>	Number of Inputs	1
	Standard Accommodated	SMPTE 292M
	Impedance	Active mode: 75ohm terminating Bypass mode: Loop-through to Video Output
	Equalization	> 100m of Belden 1694A cable
	Return Loss	>10dB to 1485MHz
<b>Serial Digital Video Outputs</b>	Number of Outputs	3 (same format as the input)
	Standard Accommodated	SMPTE 292M
	Impedance	75ohm
	Return Loss	>10dB to 1485MHz
	Signal Level	800mV $\pm$ 10%
	DC Offset	0 Volts $\pm$ 50mV
	Overshoot	<8%
<b>GPIO Outputs</b>	Number and type of outputs	8 logic outputs (3.3v) and 1 ground connection
<b>Power</b>	Max. Power Consumption	5W

# Service Information

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## In This Chapter

This chapter contains the following sections:

- Troubleshooting Checklist
- Warranty and Repair Policy

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# Troubleshooting Checklist

Routine maintenance to this openGear product is not required. In the event of problems with your CDP-100, the following basic troubleshooting checklist may help identify the source of the problem. If the frame still does not appear to be working properly after checking all possible causes, please contact your openGear products distributor, or the Technical Support department at the numbers listed under the “**Contact Us**” section.

1. **Visual Review** — Performing a quick visual check may reveal many problems, such as connectors not properly seated or loose cables. Check the card, the frame, and any associated peripheral equipment for signs of trouble.
2. **Power Check** — Check the power indicator LED on the distribution frame front panel for the presence of power. If the power LED is not illuminated, verify that the power cable is connected to a power source and that power is available at the power main. Confirm that the power supplies are fully seated in their slots. If the power LED is still not illuminated, replace the power supply with one that is verified to work.
3. **Re-seat the Card in the Frame** — Eject the card and re-insert it into the frame.
4. **Check Control Settings** — Refer to the Installation and User Controls sections of this manual to verify all user-adjustable component settings
5. **Input Signal Status** — Verify that source equipment is operating correctly and that a valid signal is being supplied.
6. **Output Signal Path** — Verify that destination equipment is operating correctly and receiving a valid signal.
7. **Unit Exchange** — Exchanging a suspect unit with a unit that is known to be working correctly is an efficient method for localizing problems to individual units.

## Reset Button

In the unlikely event of a complete card failure, you may be instructed by a Ross Technical Support specialist to perform a complete software reload on the CDP-100.

### To reload the software on a CDP-100

1. Press and hold the **Menu** switch.
2. While holding the **Menu** switch, press the **Reset** button in.
3. Release the **Reset** button and then the **Menu** switch.
  - The **POWER** LED will flash green while the card is waiting for a new software load.
  - If a new software load is not sent to the card within 60 seconds, the card will attempt to restart with its last operational software load.
  - Software loads can be sent to the CDP-100 via the connection on the rear of the frame.



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# Warranty and Repair Policy

The CDP-100 is warranted to be free of any defect with respect to performance, quality, reliability, and workmanship for a period of FIVE (5) years from the date of shipment from our factory. In the event that your CDP-100 proves to be defective in any way during this warranty period, Ross Video Limited reserves the right to repair or replace this piece of equipment with a unit of equal or superior performance characteristics.

Should you find that this CDP-100 has failed after your warranty period has expired, we will repair your defective product should suitable replacement components be available. You, the owner, will bear any labor and/or part costs incurred in the repair or refurbishment of said equipment beyond the FIVE (5) year warranty period.

In no event shall Ross Video Limited be liable for direct, indirect, special, incidental, or consequential damages (including loss of profits) incurred by the use of this product. Implied warranties are expressly limited to the duration of this warranty.

This CDP-100 User Manual provides all pertinent information for the safe installation and operation of your openGear Product. Ross Video policy dictates that all repairs to the CDP-100 are to be conducted only by an authorized Ross Video Limited factory representative. Therefore, any unauthorized attempt to repair this product, by anyone other than an authorized Ross Video Limited factory representative, will automatically void the warranty. Please contact Ross Video Technical Support for more information.

## In Case of Problems

Should any problem arise with your CDP-100, please contact the Ross Video Technical Support Department. (Contact information is supplied at the end of this publication.)

A Return Material Authorization number (RMA) will be issued to you, as well as specific shipping instructions, should you wish our factory to repair your CDP-100. If required, a temporary replacement frame will be made available at a nominal charge. Any shipping costs incurred will be the responsibility of you, the customer. All products shipped to you from Ross Video Limited will be shipped collect.

The Ross Video Technical Support Department will continue to provide advice on any product manufactured by Ross Video Limited, beyond the warranty period without charge, for the life of the equipment.

# Contact Us

Contact our friendly and professional support representatives for the following:

- Name and address of your local dealer
- Product information and pricing
- Technical support
- Upcoming trade show information

## Technical Support

Telephone: +1 613 • 652 • 4886  
After Hours Emergency: +1 613 • 349 • 0006  
Email: [techsupport@rossvideo.com](mailto:techsupport@rossvideo.com)

## General Information

Telephone: +1 613 • 652 • 4886  
Fax: +1 613 • 652 • 4425  
Email: [solutions@rossvideo.com](mailto:solutions@rossvideo.com)  
Website: <http://www.rossvideo.com>

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