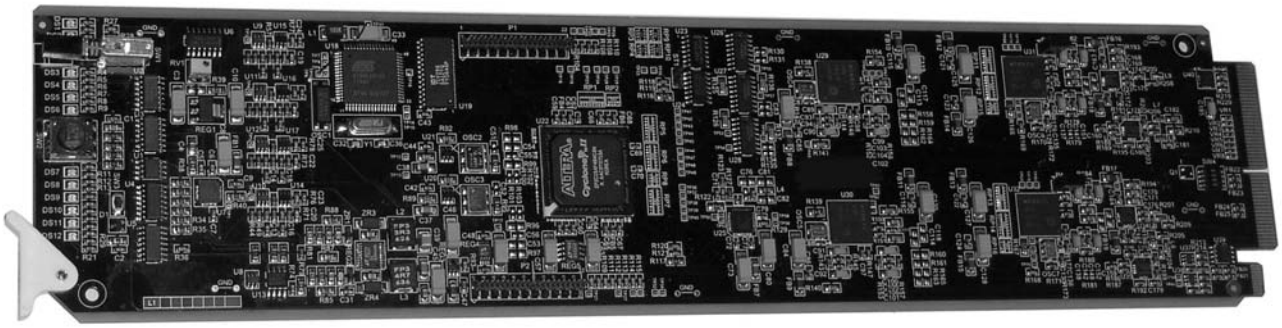
Ross Video Limited

CMI-100

Constant Metadata Inserter

User Manual



Live Production Technology

openGear

Product Name: CMI-100

CMI-100 • Constant Metadata Inserter User Manual

- Ross Part Number: **CMI100DR-004-02**
- Release Date: September 23, 2010. Printed in Canada.

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Trademarks

Important Regulatory and Safety Notices

Before using this product and any associated equipment, refer to the “Important Safety Instructions” listed below so as to avoid personnel injury and to prevent product damage.

Products may require specific equipment, and/or that installation procedures be carried out to satisfy certain regulatory compliance requirements. Notices have been included in this publication to call attention to these Specific requirements.

Symbol Meanings

This symbol on the equipment refers you to important operating and maintenance (servicing) instructions within the Product Manual Documentation. Failure to heed this information may present a major risk of damage or injury to persons or equipment.

Warning

The symbol with the word **“Warning”** within the equipment manual indicates a potentially hazardous situation, which if not avoided, could result in death or serious injury.

Caution

The symbol with the word “**Caution**” within the equipment manual indicates a potentially hazardous situation, which if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

Notice

The symbol with the word “**Notice**” within the equipment manual indicates a situation, which if not avoided, may result in major or minor equipment damage or a situation which could place the equipment in a non-compliant operating state.

ESD Susceptibility

This symbol is used to alert the user that an electrical or electronic device or assembly is susceptible to damage from electrostatic discharge.

Important Safety Instructions

Caution

This product is intended to be a component product of the openGear 8000 series frame. Refer to the openGear 8000 series frame User Manual for important safety instructions regarding the proper installation and safe operation of the frame as well as its component products.

Warning

Certain parts of this equipment namely the power supply area still present a safety hazard, with the power switch in the OFF position. To avoid electrical shock, disconnect all A/C power cords from the chassis' rear appliance connectors before servicing this area.

Warning

Service barriers within this product are intended to protect the operator and service personnel from hazardous voltages. For continued safety, replace all barriers after any servicing.

This product contains safety critical parts, which if incorrectly replaced may present a risk of fire or electrical shock. Components contained within the product’s power supplies and power supply area, are not intended to be customer serviced and should be returned to the factory for repair.

To reduce the risk of fire, replacement fuses must be the same type and rating.

Only use attachments/accessories specified by the manufacturer.

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 users will be required to correct the interference at their own expense.

Notice

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

CANADA

This Class "A" digital apparatus complies with Canadian ICES-003.

Cet appareil numerique de classe "A" est conforme à la norme NMB-003 du Canada.

EUROPE

This equipment is in compliance with the essential requirements and other relevant provisions of **CE Directive 93/68/EEC**.

INTERNATIONAL

This equipment has been tested to **CISPR 22:1997** along with amendments **A1:2000** and **A2:2002** 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 on the last page of this manual.

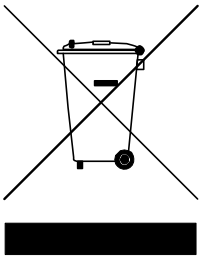
Environmental Information

The CMI-100 complies with the European Union's RoHS Directive. This stands for "the restriction of the use of certain hazardous substances in electrical and electronic equipment". This Directive bans the placing on the EU market of new electrical and electronic equipment containing more than agreed levels of lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE) flame retardants.

The equipment that you purchased required the extraction and use of natural resources for its production. Despite compliance with the RoHS directive, it may nevertheless 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, we encourage 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.

Contents

Introduction

In This Chapter

This chapter contains the following sections:

- Overview
- Functional Block Diagram
- Features
- Documentation Terms

A Word of Thanks

Congratulations on choosing the openGear CMI-100 Constant Metadata Inserter. The CMI-100 is part of a full line of Digital Products within the openGear Terminal Equipment family of products.

You will be pleased at how easily your new CMI-100 fits into your overall working environment. Equally pleasing is the product quality, reliability and functionality. 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 CMI-100, please contact us at the numbers listed on the back cover of this manual. Our technical support staff is available for consultation or service.

Overview

The CMI-100 adds Vertical Ancillary (VANC) data services to an SDI (SMPTE 259) or HD-SDI (SMPTE 292) video signal, in accordance with SMPTE 291 and other related standards. Its function is to add one or more VANC packets containing data that is constant over some known period of time. Some examples are audio metadata (SMPTE 2020) and active format descriptor (AFD) metadata (SMPTE 2016), which are typically constant for any specific piece of program material.

Users who need to add a variety of dynamically changing VANC services (such as closed captioning) should consider the Ross Video TES9 encoder.

The CMI-100 provides a number of innovative tools for defining and selecting metadata services, in order to simplify your workflow. For example:

- It is possible to specify a set of VANC services to be inserted for each expected video type. In this way, a post-production house might define a standard metadata configuration for one or more specific clients, that are triggered automatically by the presence of the specified video formats.
- The VANC services can also be triggered by contact closures on rear-panel GPIO connectors.
- Constant metadata packets can be authored using the Ross Video VANC MetaGenerator software application, then uploaded into the CMI-100 using the DashBoard ™ control program.
- Packets can also be captured from the video input. The user interface provides controls that allow the user to select packets from a list of those that are present in the input, and save them to non-volatile memory for later use.
- As a member of the openGear family, the CMI-100 shares a common control interface, known as DashBoard, with a broad array of other products.

To make configuration truly easy, the CMI-100 offers a complete user interface through the DashBoard control program. It also provides a Heads-Up Display on separate monitoring outputs; both analog video and SDI are available. When activated, card status and parameters can be viewed and adjusted using the card-mounted finger joystick and an easy to use menu system.

The CMI-100 is housed in the openGear DFR-8300 series frames. It is compatible with both 10-slot and future 20-slot frames.

Features

The following features make the CMI-100 the best solution for insertion of constant data or metadata VANC services:

- Operates automatically with major SD and HD video formats.
- Powerful metadata authoring and capture features.
- Flexible selection of packets and assignment to scan lines.
- GPIO and video-triggered VANC packet selection.
- Video bypass capability with ONG-MDL-R01 rear module.
- Fits openGear DFR-8300 series frames.
- Compatible with the openGear frame's SNMP option, allowing monitoring with third-party SNMP software systems. For more information, contact Ross Technical Support.
- Intelligent VANC replacement enables automatic selection of local or network metadata, by inserting only when VANC data of the same type is not present in the input. Alternatively, the CMI-100 can overwrite specific incoming metadata services, enabling selective metadata re-authoring.

Functional Block Diagram

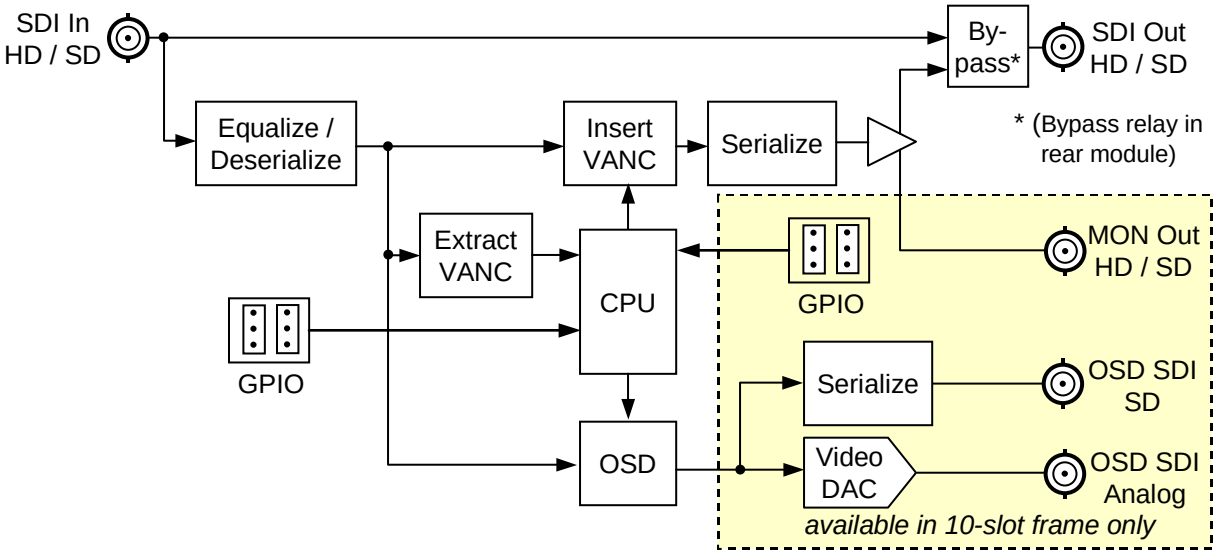


Figure 1. Simplified Block Diagram of CMI-100 Functions

Documentation Terms

The following terms are used throughout this guide:

- "**Frame**" refers to the **DFR-8310** frame that houses the **CMI-100** card.
- All references to the **DFR-8310** also include the **DFR-8310-C** versions with the cooling fan option. See the respective User Manuals for details.
- "**Operator**" and "**User**" refer to the person who uses the **CMI-100**.
- "**Board**" and "**Card**" refer to the **CMI-100** card itself, including all components and switches.
- "**System**" and "**Video system**" refer to the mix of interconnected production and terminal equipment in which the **CMI-100** operates.
- "**Rear Module**" refers to the connector module at the rear of the frame, into which the **CMI-100** is inserted.

Quick Start

Assuming you have a **DFR-8310-N** openGear frame, an **ONG-CMI-100** card and an **ONG-MDL-R01** rear module, the following steps will get you started with VANC metadata insertion:

1. Connect the frame to your LAN, using the instruction sheet "Connecting the openGear Frame to a Network", supplied with the frame.
2. Install DashBoard on a computer connected to the LAN. The DashBoard Control System™ software and user manual are available from the Ross Video website.
3. Install the rear module in the frame, as described in the section "**Rear Module Installation**" of this manual.
4. Install the CMI-100 into the rear module, as described in the section "**Board Installation**" of this manual.
5. Connect a 292 or 259 signal to the SDI input jack on the rear module as described in the section "**Cable Connections**" of this manual.
6. Connect the SDI output jack to an SDI analyzer or VANC monitoring test set, and turn the frame power on. For information on our VANC monitoring tools, visit the Ross Video website.
7. Start DashBoard on your computer. It should automatically find your frame within a minute or two. Click the "+" next to the frame name to show the cards in the frame, then double-click the CMI-100.
8. Click the **Setup Encoding** tab then the **Default** box, select a VANC packet (for example the AFD packet for your video format), and click **Start**.
9. Click the **Outgoing Services** tab. The VANC packet that you selected in the previous step should be present in the list.
10. Check the SDI analyzer or VANC Monitor connected to the SDI output for presence of your VANC packet.
11. Proceed to the chapter "**Setting Up the CMI-100**" for further explanation of the controls that are available to you.
12. If you want to use contact closures to control VANC encoding, connect wires from the GPIO jacks on the rear panel to your controlling equipment, as described in the section "**Cable Connections**" of this manual. You should also consult the section "**Assigning VANC services to GPIO contacts and video formats**".
13. If needed, you can use Ross Video's VANC Metadata Generator program to create custom VANC packets and package them together for upload to the CMI-100. If you don't have this program, please contact Ross Video sales, using the contact information on the rear cover of this manual.

Installation and Setup

In This Chapter

This chapter contains the following sections:

- Static Discharge
- Unpacking
- Rear Module Installation (Optional)
- Board Installation
- BNC Labels
- Cable Connections

Static Discharge

Whenever handling the CMI-100 and other related equipment, please observe all static discharge precautions as described in the following 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 wearing synthetic fiber clothing. Always exercise proper grounding precautions when working on circuit boards and related equipment.*

Unpacking

Unpack each CMI-100 you received from the shipping container, and check the contents against the packing list to ensure that all items are included. If any items are missing or damaged, contact your sales representative or Ross Video Limited directly.

Rear Module Installation (if applicable)

If you are installing the CMI-100 in an openGear DFR-8310-BNC (or -C-BNC or -N-BNC) frame, skip this section.

If you received an ONG-MDL-R01 or RM-8300-B Rear I/O Module with your CMI-100, you will need to install the I/O module in your DFR-8310 frame before you can install the CMI-100 in the frame, or connect cables to the slot you have chosen for the CMI-100.

Use the following procedure to install the rear module in an openGear DFR-8310 frame:

1. Refer to the ***DFR-8300 Series Frames User Manual*** to ensure that the frame is properly installed according to instructions.
2. On the rear of the DFR-8310, locate the card frame slot.
3. Remove the Blocker Plate (if any) from the rear of the slot you have chosen for the CMI-100 installation. Retain the plate for possible future use.
4. Seat the bottom of the rear module in the seating slot at the base of the frame's back plane.

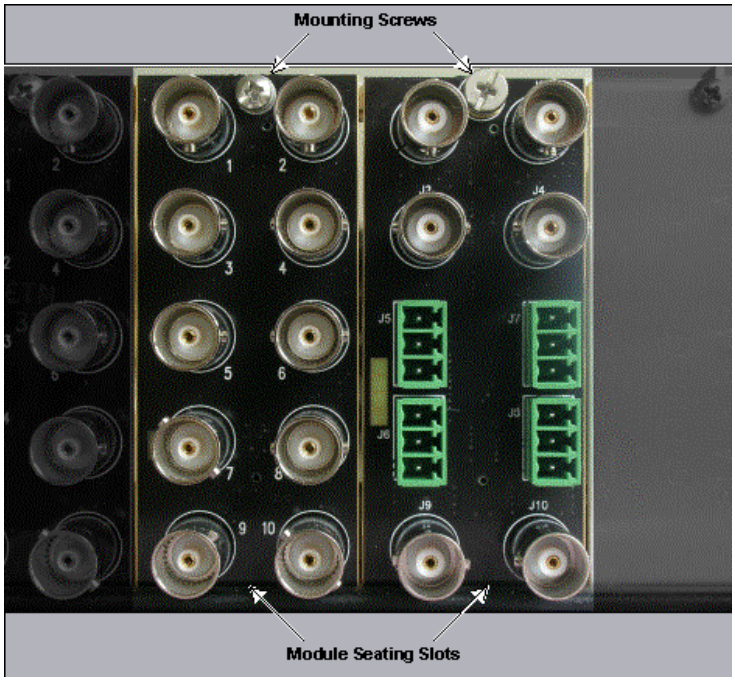


Figure 2. Rear Module Installation, showing RM-8300-B (left) and ONG-MDL-R01 (right) modules

5. Align the top hole of the rear module with the screw hole on the top edge of the DFR-8310 back plane.
6. Using a Phillips screwdriver and the supplied screw, fasten the rear module to the DFR-8310 back plane. Do not over tighten.
7. Ensure proper frame cooling and ventilation by having all rear frame slots covered with rear I/O modules or blank metal plates. If you need blanks, contact your openGear sales representative.

This completes the procedure for installing the Rear I/O Module in an openGear DFR-8310 frame.

Board Installation

Use the following procedure to install the CMI-100 in an openGear DFR-8310 distribution frame (DFR-8310-C, or DFR-8310-C-BNC):

Notice — *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. Refer to the ***DFR-8300 Series Frames User Manual*** to ensure that the frame is properly installed according to instructions.
2. After selecting the desired frame installation slot, hold the CMI-100 card 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 plugs are properly seated on the midplane and rear modules.

This completes the procedure for installing the CMI-100 in an openGear DFR-8310 distribution frame.

BNC Labels

Affix the supplied BNC label, as per the included instructions, to the BNC area on the rear of the rack frame at the position occupied by the CMI-100.

Cable Connections

This section provides information for connecting cables to the installed rear modules on the DFR-8310 series frame backplane. Connect the input and output cables according to the following diagram. It is not necessary to terminate unused outputs. Note that the BNCs are numbered 1-10 by convention, even though some may not be installed. The upper left BNC is #1, with the other odd-numbered jacks 3-9 below it. The even-numbered BNC jacks 2-10 are in the right column. As shown in the following illustration, the ONG-MDL-R01 rear module has 1-4 and 9-10, whereas the RM-8300-B has 1-10.

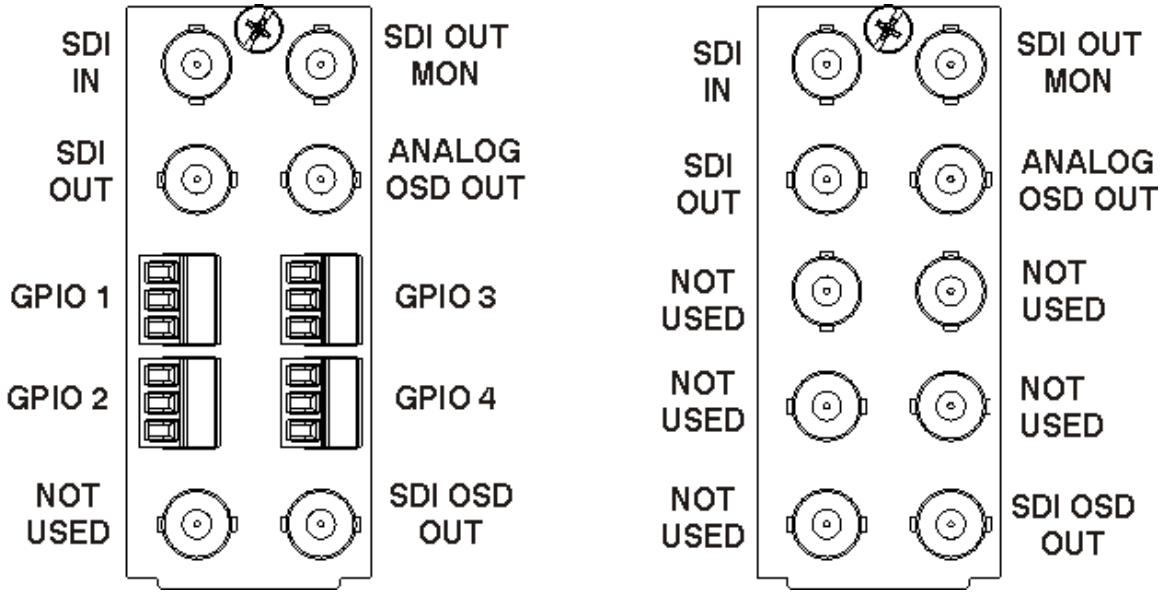


Figure 3. BNC Designations for the CMI-100 with ONG-MDL-R01 (left) and RM-8300-B Rear Modules

BNC 1 SDI Input

This jack accepts an SDI (SMPTE 259) or HD-SDI (SMPTE 292) video signal. The CMI-100 requires this input in all cases. It inserts VANC packets into this signal and routes the resulting output to BNC3. The input signal is internally terminated in 75 ohms when the CMI-100 is active; when the CMI-100 is in bypass, the termination is provided by the downstream equipment connected to BNC3.

BNC 3 SDI Output

This jack carries the main program output from the CMI-100, consisting of the signal applied to BNC1, with VANC data packets inserted. When the **ONG-MDL-R01** rear module is used, BNC1 is routed directly to BNC3 (without passing through the CMI-100), under the following circumstances: power off, CMI-100 card removed, CMI-100 Bypass pushbutton out, software selection or certain major error conditions.

BNC 2 SDI Output Monitor

When the CMI-100 is active, this jack carries a copy of the SDI output present on BNC3. This can be useful for test purposes. This jack does not have any bypass capability: with power off or the CMI-100 removed, there is no output signal on this jack.

BNC 4 Analog OSD Output

This jack carries an analog video signal (NTSC/525 or PAL/625) that can be connected to an analog composite video monitor for setup of operating parameters, in conjunction with the CMI-100's Menu Switch.

BNC 10 SDI OSD Output

This jack carries an SDI (SMPTE 259) video signal that can be connected to an SDI video monitor for setup of operating parameters, in conjunction with the CMI-100's Menu Switch. Note that this output may be an option on some models of the CMI-100.

GPIO1-4 Inputs

These jacks can be used to remotely control the operation of the CMI-100 by means of contact closures. These are only available on the **ONG-MDL-R01** rear module. VANC services can be enabled or disabled in several ways, one of which uses contact closures on one or more of these inputs. Figure 4 illustrates these connections. Note that the plugs are supplied with the module.

Other jacks

As shown in Figure 3, the other rear-module jacks are unused with the CMI-100.

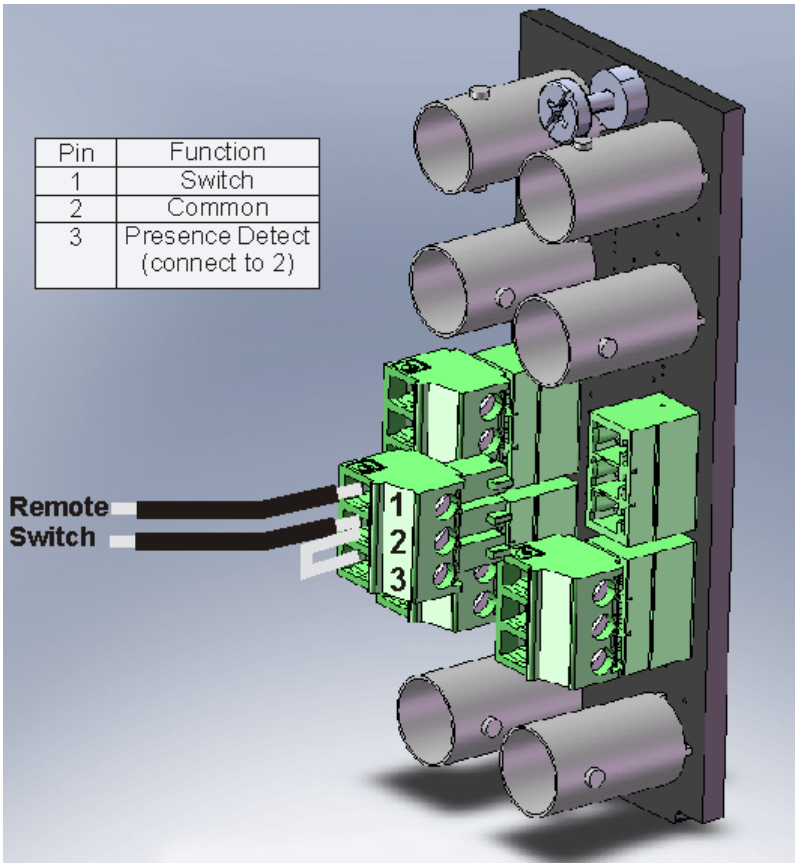


Figure 4. GPIO connections

User Controls

In This Chapter

This chapter contains a description of the CMI-100 user controls:

- Switches
- LEDs

User Controls

Figure 5 shows the front edge of the CMI-100. Following the illustration are descriptions of the controls and indicators identified here.

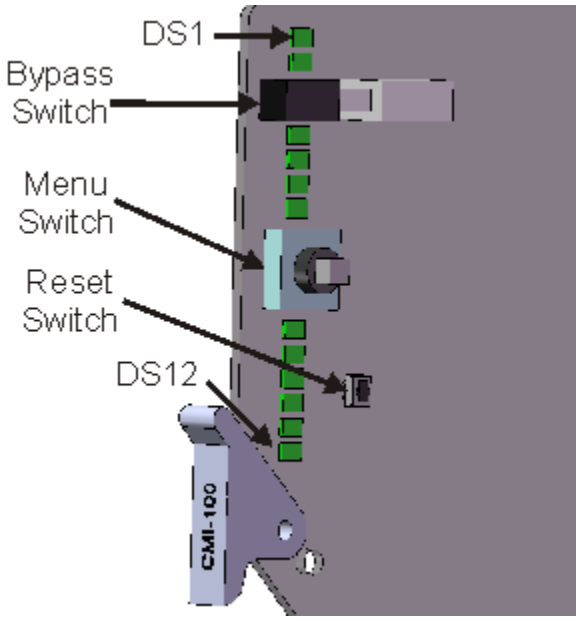


Figure 5. Card-edge User Controls

Bypass Switch

If the CMI-100 is installed in a rear module such as the ONG-MDL-R01 that has a bypass relay, this two-position pushbutton can be used to control the relay. When the pushbutton is in the "IN" position, the CMI-100 is in the video signal path. Pressing it once moves the switch to the "OUT" position and bypasses the CMI-100. Pressing it again restores the CMI-100 to its active state.

When the CMI-100 is installed in a rear module that does not provide bypass capability, this switch enables and disables VANC encoding.

Menu Switch

The recommended user interface for the CMI-100 is the DashBoard program, running on a computer connected to the openGear frame through an Ethernet connection. If your frame does not have the LAN option, or you do not have access to a computer with DashBoard, you can use the on-screen display (OSD) in conjunction with the **Menu Switch**. This requires either an SDI or analog monitor (NSTC or PAL) to be connected to the CMI card. The **Menu Switch** is a five-direction square finger joystick located near the front edge of the CMI-100 card.

For details on the use of the **Menu Switch** and **OSD**, please see the chapter entitled *Using the On-Screen Menus*.

Reset Switch

This button is used for rebooting the card.

LEDs

The front-edge of the card features LEDs that display the status of the input signals. Descriptions are provided in the following table:

Table 1. Selection and Status LED Descriptions

LED	Color	Location	Display and Description
Power	Red/ Green/ Orange	DS1	When off, there is no power. When lit and green the card is running with valid input. When flashing green, the boot loader is waiting for software upload. When lit orange, this is a warning about a signal or configuration error. When lit red, the card is not operational. This will occur if, for example, there is no video input.
Bypass	Red	DS2	When off, CMI-100 is in the video path and is capable of inserting data. When lit red, the CMI-100's video is bypassed.
Program Video In	Red/ Green	DS3	When lit green, the Program Video input is present and valid. When lit red, no valid input is present. This typically means that the input cable is disconnected.
Program Video Out	Red/ Green	DS4	When lit green, the Program Video output serializer is locked to a valid input. When lit red, there is a hardware fault on the card.
Not used		DS5	
OSD SDI Out		DS6	When lit green, the OSD output serializer is locked to a valid input. When lit red, there is a hardware fault on the card.
VANC Encode	Green/ Orange	DS7	When lit green, the CMI-100 is inserting VANC data into the video. When lit orange or blinking orange-green, there is too much VANC data to fit in the specified line(s), and some data is being lost When off, there is no insertion.
Capture Failed	Green/ Orange	DS8	Normally lit green. When lit orange, this indicates that the most recent Load command on the Capture menu failed.
Video Error	Green/ Orange	DS9	Normally lit green. When lit orange, this indicates that there has been an error (e.g. EDH) in the video input stream.
Unknown Rear Module	Green/ Orange	DS10	Normally lit green. When lit orange, this indicates that the rear module connected to the CMI-100 is not one of the types recognized by the software. Operation may not be correct.
Invalid Insertion Line	Red/ Green	DS11	Normally lit green. When lit red, this indicates that the CMI-100 has been set to insert VANC data into an invalid line, that is a line that is not in the vertical interval for the current video format.
Incompatible Video Type	Red/ Green	DS12	Normally lit green. When lit red, this indicates that you have selected a VANC service intended for interlaced video and that the current video input is progressive, or vice versa.

DashBoard and CMI-100 Status

In This Chapter

This chapter provides a detailed explanation of the functions available when using DashBoard to monitor and control the CMI-100. The program is available for download from the Ross Video website.

The following topics are discussed in this chapter:

- Layout and Navigation
- Selecting a CMI-100 Module
- Screen layout
- Status and Setup menus

Layout and Navigation

This section focuses on the use of the DashBoard program to control and monitor a CMI-100. For a more complete description of DashBoard and its capabilities, please refer to the documentation supplied with the program.

Selecting a CMI-100 Module

Figure 6 shows a typical DashBoard screen. After it has established its connection to the frame containing the CMI-100, a list of modules is displayed at the left side. Clicking on a frame and then on a CMI-100 causes a window for that module to be opened, resulting in the display shown here. In this simple example, there is only one device, the CMI-100 open. DashBoard provides the ability to view multiple devices in this window. For details, see the ***DashBoard Control System User Manual***.

Screen layout

The CMI-100 window is divided into four sections as shown:

- The upper left side is the Product Status area, and displays a summary of the present module status.
- The lower left side is the Status area and provides tabs to select more detailed status.
- The right side, the Settings area, provides tabs to allow control of the various functions of the module.
- The bottom band contains buttons for functions that are used relatively infrequently.

Product Status

The left side of this figure shows product information that is useful in discussing the operation of the module with Ross Video's Technical Support staff.

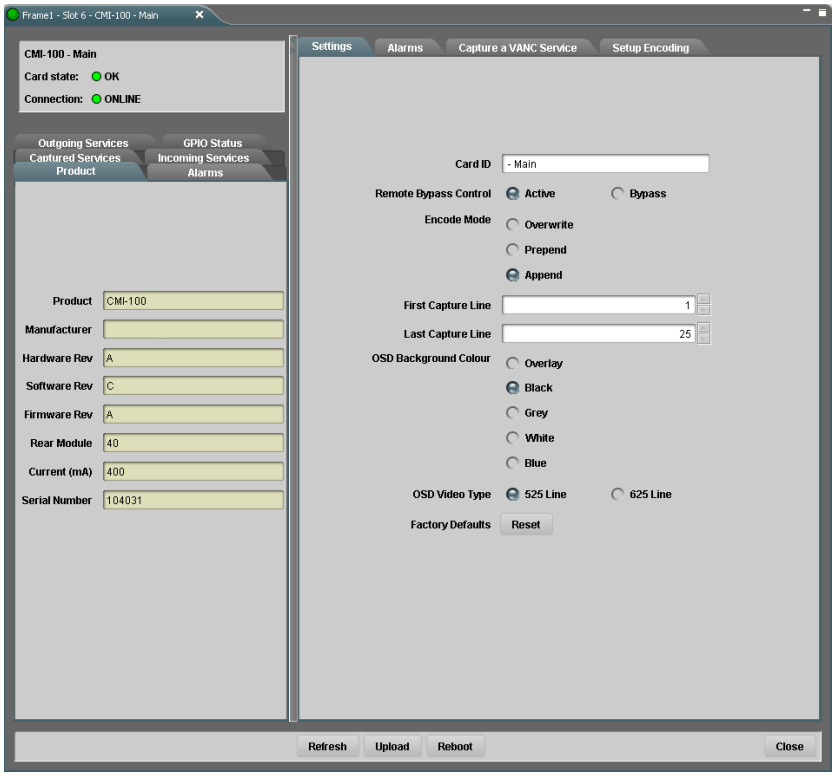


Figure 6. Main CMI-100 DashBoard Screen, showing Product Status and Settings

Incoming Services Status

The left side of Figure 7 shows a list of VANC services that are present in the video input signal. This includes the input video type and indicates whether the rear module is in active or bypass state.

The Capture Lines are specified by the *Settings* menu.

Lastly, it shows up to 8 VANC services found in the selected lines (1 through 20 in this example). These are labeled **Decode 1** through **Decode 8**. For each one, the following information is displayed:

- Line number (e.g. 9)
- Component (L for luma or C for chroma)
- DID:SDID (e.g. 50:01) These addresses are assigned by SMPTE to identify data services.
- Packet size in bytes. If there are two packets (typically one per field), both are shown (e.g. 64,30).

The chapter, "**Setting Up the CMI-100**", describes how to cause the CMI-100 to capture selected Incoming Services for later use.

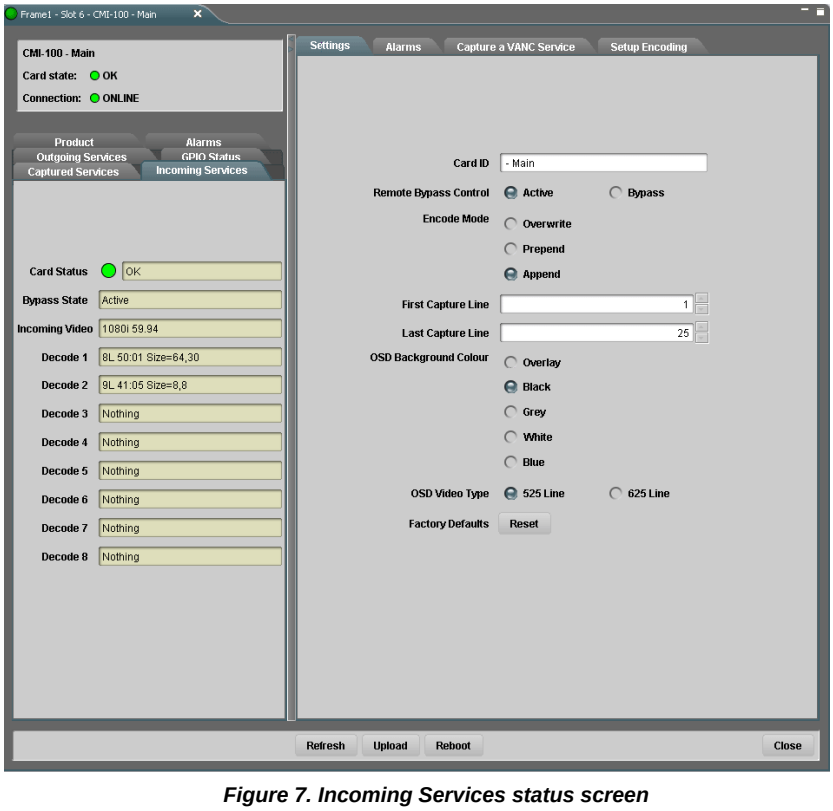


Figure 7. Incoming Services status screen

Captured Services Status

The left side of Figure 8 shows a list of VANC services that have been captured from the video input signal and stored in non-volatile memory in the CMI-100. This display includes the input video type and indicates whether the rear module is in active or bypass state.

It also lists the contents of the 8 capture buffers that may have been filled with incoming VANC packets, using the **Capture a VANC Service** menu. For each one, the following information is displayed:

- Line number (e.g. 9)
- Component (L for luma or C for chroma)
- DID:SDID (e.g. 50:01) These addresses are assigned by SMPTE to identify data services.
- Packet size in bytes. If there are two packets (typically one per field), both are shown (e.g. 64,30).
- Video format from which the packet was captured (e.g. 1080i 59.94)

The chapter, "**Setting Up the CMI-100**", describes how to cause the CMI-100 to capture selected Incoming Services and store them in Capture Buffers for later use.

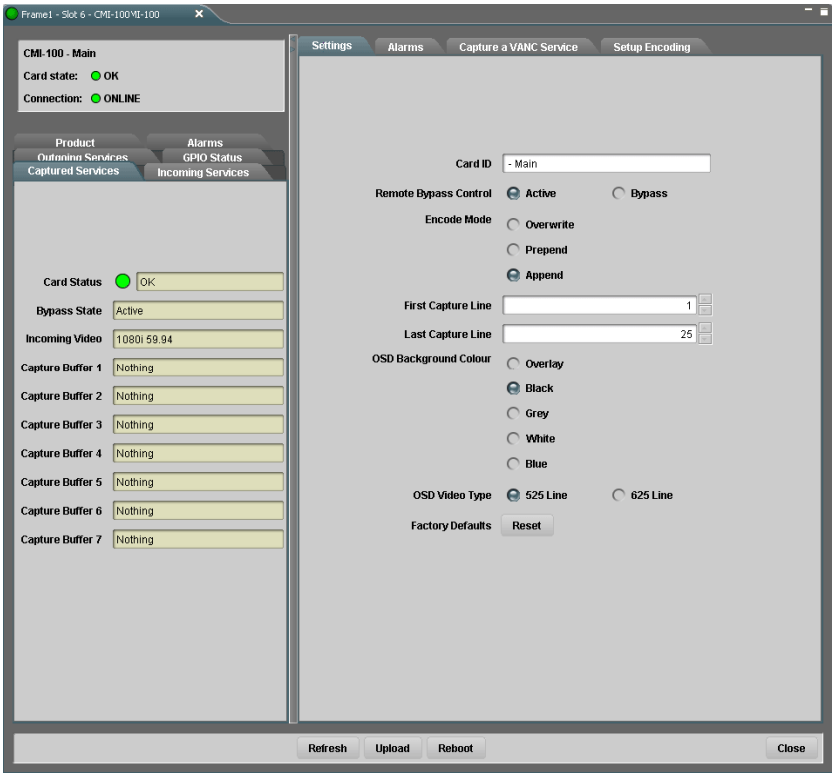


Figure 8. Captured Services status screen

Outgoing Services Status

The left side of Figure 9 shows a list of VANC services that are currently being inserted into the program video by the CMI-100. This shows the input video type and indicates whether the rear module is in the active or bypass state.

The four Encode lines show the VANC services that have been enabled using the **Setup encoding** menu. For each one, the following information is displayed:

- Line number (e.g. 12)
- Component (L for luma or C for chroma)
- DID:SDID (e.g. 41:05) These addresses are assigned by SMPTE to identify data services.
- Service name (e.g. "AFD1080i")

The chapter, "**Setting Up the CMI-100**", describes how to cause the CMI-100 to select Services and specify where to insert them in the video signal.

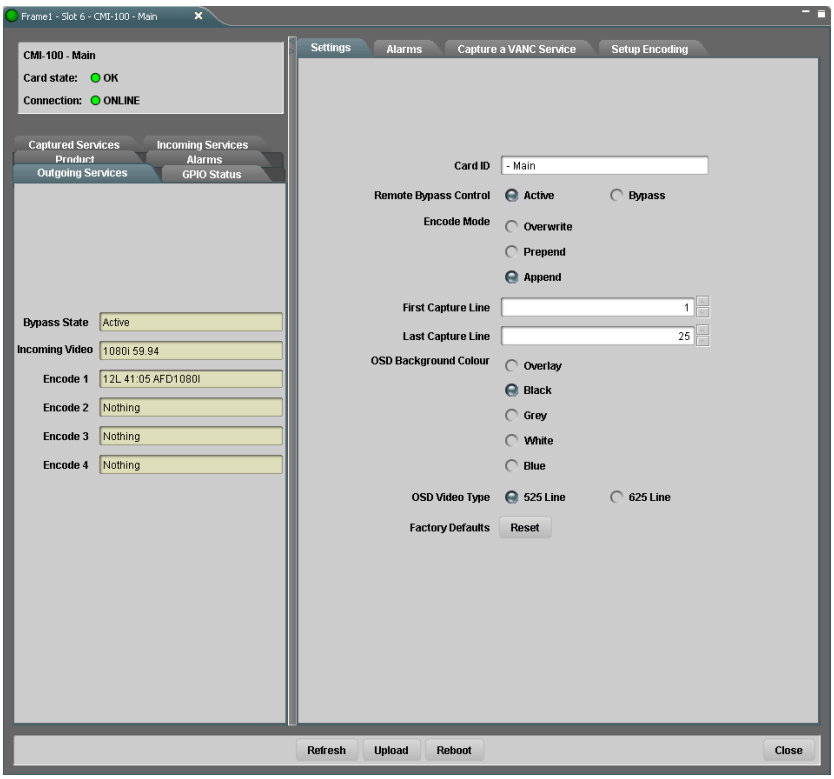


Figure 9. Outgoing Services status screen

GPIO Status

The left side of Figure 10 shows the status of the four general purpose (GPIO) inputs. Each of these ports has three pins, one of which indicates the presence of a connection. The status of each of the inputs is consequently one of the three possible values: Not Connected, Open or Closed.

The chapter, "**Setting Up the CMI-100**" describes how to cause the CMI-100 to respond to GPIO Open and Closed conditions by inserting specified VANC packets into the video.

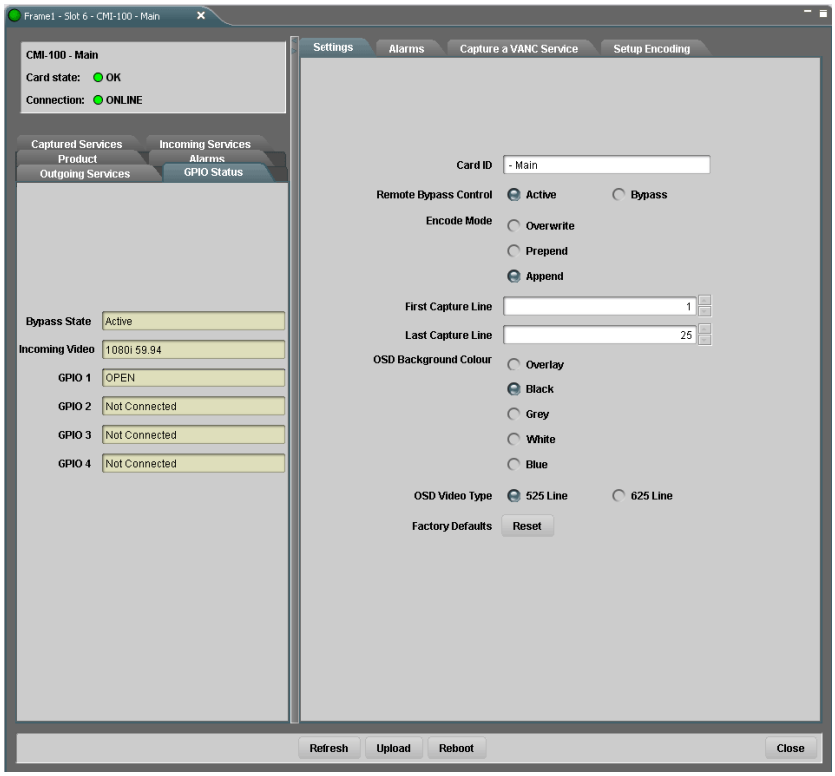


Figure 10. GPIO Input status screen

Alarm Status

The left side of Figure 11 shows the status of the various conditions that are monitored. Each of these conditions can be enabled or disabled on the **Alarms settings** tab. The **Card Status** is a summary of these indicators. It reports the most severe alarm condition that is present:

- If all the indicators are green, the **Card Status** is green and OK.
- If any of the indicators are red, the **Card Status** is also red and its description is the underlying error condition.

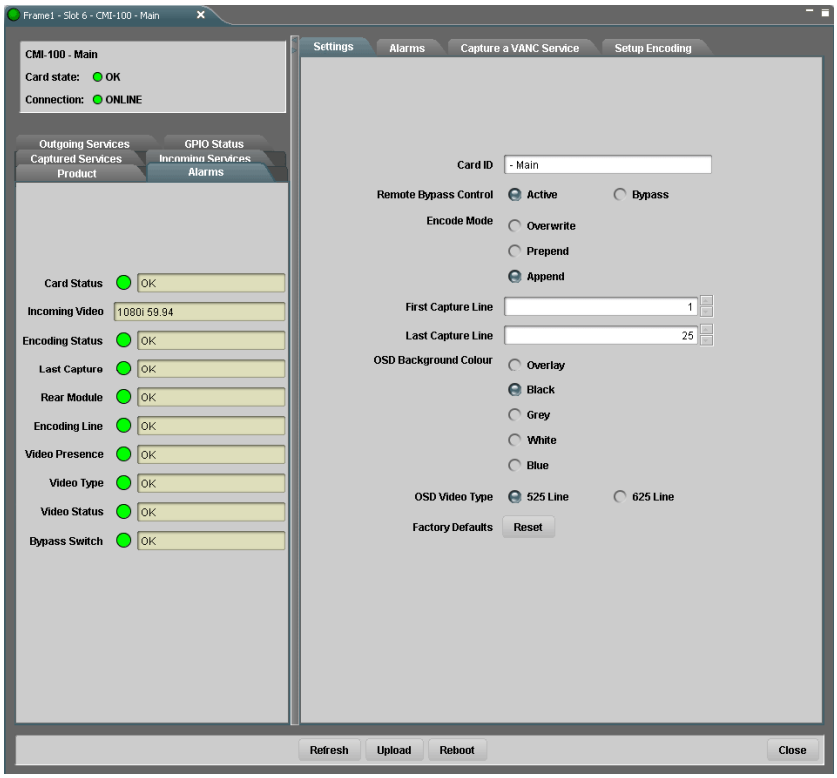


Figure 11: Alarms status screen

Setting Up the CMI-100

In This Chapter

This chapter explains how to use the user interface to set up the CMI-100. This discussion is based on the use of DashBoard through a network connection, however most of these functions are also available through the local Heads-up Display.

The following topics are discussed:

- General Settings
- Assigning VANC services to GPIO contact closures and video formats
- Uploading VANC packets to the CMI-100
- Capturing VANC packets from the video input
- Setting Alarm sensitivity

General Settings

Figure 12 shows the screen that is displayed by clicking the **Settings** tab. Before proceeding to any of the other sections, please ensure that these settings are correct, as they will have an effect on the operation of the other functions.

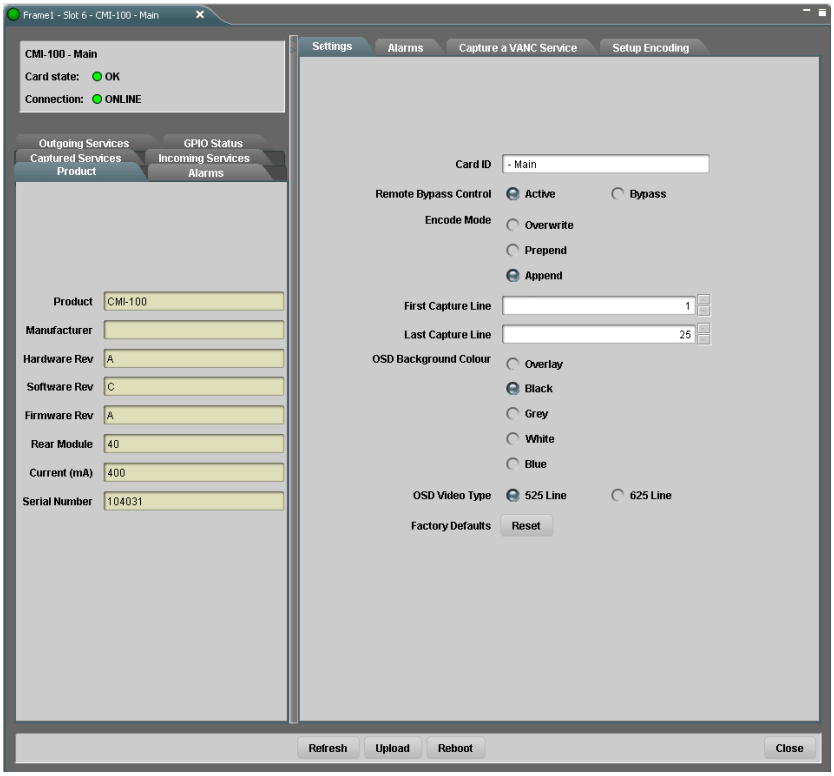


Figure 12. Settings Menu

The **Card ID** field allows you to assign a unique name to a CMI-100 card. This is especially useful if you have more than one CMI-100 in a frame. In this example, the **Card ID** has been set to " – Main", and the name appearing in DashBoard's device list is consequently "CMI-100 – Main". If this field were blank, the name would just be "CMI-100".

The **Remote Bypass Control** should normally be set to **Active**, which allows the CMI-100 to insert VANC data into the video. You might choose to set this to **Bypass** during maintenance operations such as software updates, for example – provided, of course, that the rear module has bypass capability.

The **Encode Mode** should normally be set to **Append**. This allows the CMI-100 to add your VANC data services after any that are present on the same line(s) of the input signal. This is the preferred mode of operation, since it adds your VANC data services with no effect on any others.

If, for some reason, you want to eliminate incoming VANC services from the output, set **Encode Mode** to **Overwrite** instead.

If you want to place your VANC services before any incoming services in the lines, set **Encode Mode** to **Prepend**; you might choose this if you want to give priority to your locally-added services in the case where there may be insufficient space in the line(s) for both incoming and local services.

Note — *A note about Append and Prepend modes: when you insert a VANC service into a line that already contains packets with the same DID and SDID as the service that you are adding, the CMI-100 either deletes the incoming packets before inserting its own, or refrains from inserting to allow the incoming data to flow through; this depends on the Priority setting in the Setup Encoding menu. This eliminates any possible confusion caused by two or more versions of the same service.*

The **First Capture Line** and **Last Capture Line** should normally be set to **1** and **20** for most video formats, although 720p and 1080sf allow Last Capture Line numbers up to 25. One reason to reduce the range would be if there are so many VANC services displayed on the **Incoming Services** screen that you find it difficult to locate one that you wish to capture. Note that the CMI-100 will not capture from lines that are not considered part of the vertical interval (for example, lines above 20 for 1080i/59.94), even if you include them in the capture range.

The last two settings pertain if you plan to use the Heads-up Display. The **OSD Video Type** can be set to **525 lines** or **625 lines**, to suit your picture monitor. The **OSD Background Color** is normally black, but other selections are available for your convenience. If the video input is a standard definition SMPTE 259 signal (480i 59.94 or 576i 50), you can select **Overlay** as the background color. This causes the menus to be keyed over the video background. If you select **Overlay** when the video input is HD or absent, the background is black.

Assigning VANC services to GPIO contacts and video formats

Figure 13 shows the screen that is displayed by clicking the **Setup Encoding** tab.

This menu allows you to define one of four VANC services, labeled **Encode1** through **Encode4**, selected in the **Encoding Service** box. For each of these four services, you can assign different VANC packets to each of the recognized video formats, and also optionally control transmission with a GPIO contact closure.

Note — *As used here, the term "packet" refers to a group of one or more VANC packets that are inserted in one or both fields of an interlaced video signal, or one or two frames of a progressive signal. Some services such as AFD contain a single packet, whereas others such as audio metadata may contain two or more VANC packets. The term "packet" is used to designate any of these combinations of VANC packets that is assigned to a video format for one of the CMI-100's four services.*

Figure 13. Setup Encoding menu

The **GPIO Condition** selector allows you to specify which GPIO condition, if any, will trigger transmission of the VANC packets that are part of this service. The selector only allows you to select GPIO contacts that are present; figure 4 shows how to wire these ports so that their presence is detected. For example, if only GPIO 1 is installed, the selections available for **GPIO Condition** are **Don't Care, GPIO 1 Open** and **GPIO 1 Closed.** If you select **GPIO 1 Closed**, the packets defined for this service will only be inserted when the GPIO 1 contacts are closed. If you select **Don't Care** as shown here, the packets will be inserted regardless of the state of the GPIOs.

The **Priority** buttons are used to specify what to do when the input contains VANC data that has the same DID and SDID values in the same line as the service you are inserting. Select **Local Has Priority** if you want to replace the incoming data by the service you define here (for example, because the incoming data is incorrect). Select **Upstream Has Priority** if you want your data to be inserted only when there is none present in the

input. An example of the latter is a network-affiliated station that inserts metadata (say, AFD) into its program signal; if the network provides AFD in its distribution feed, this setting can be used to automatically pass network AFD during network programming and insert local AFD otherwise. The **Priority** buttons apply when the **Encode Mode** on the **Settings** menu is **Append** or **Prepend**. If the **Encode Mode** is **Overwrite**, any data in the lines selected for insertion is overwritten unconditionally. Data in lines that are not used for insertion is unaffected in all cases.

If desired, you can have the insertion of the service automatically depend on the current input video type, by specifying a VANC packet for each video format. Alternatively, you can specify the default packet and then assign the default to any or all of the video formats. In this example, different AFD packets have been assigned to three 59.94 Hz formats: 1080i, 720p and 480i. The presence at the video input of one of these video formats causes the corresponding AFD packet to be inserted. With any other video input, nothing is inserted.

Note — *The packets that you can assign to services contain the video type that they are intended to be inserted into. The CMI-100 will not insert packets authored for interlaced video into progressive signals, or vice versa. It does not prevent you from selecting them on the menu. However, if they are not the correct type, they are not inserted and an alarm condition is generated.*

For each VANC service, you can specify the DID and SDID values to be used when inserting them. These are addresses assigned by SMPTE for services that have been standardized. Fixed values have been assigned for audio metadata and Active Format Descriptor (AFD), for example.

When authoring metadata packets using the VANC MetaGenerator tool, the intended DID and SDID values are included in the file, along with the payload. Similarly, when you capture VANC packets from the video input using the CMI-100, the received DID and SDID values are stored along with the packet payload. You can choose to use these default DID and SDID values by selecting **DID and SDID Selection** = **Default**. If you prefer, you can override these defaults by picking **Custom** and entering the desired values. You should be aware that using non-standard values of DID and SDID may prevent downstream receiving equipment from recognizing your VANC data.

You can also specify the video line where the VANC packet will be inserted. Again, you can specify either **Default** or **Custom**. The line number is in the range 1-20 or 1-25 for most video formats, but some standards recommend using lines that are located two or more lines after the switching line defined in SMPTE RP168. When you select a line number for interlaced video formats, the equivalent line in the second field is also enabled for VANC insertion.

For HD (SMPTE 292) video formats, the VANC data can be inserted into either the luminance or chrominance component; you need to specify which one to use. For SD (SMPTE 259) video, this selection is not available.

In this example, you could enable a second VANC service for each video format that is of interest by selecting **Encode 2** as the **Encoding Service** and following the procedure described above. For example, you might assign **Encode 1** to AFD and Bar Metadata, and **Encode 2** to Audio Metadata, leaving VANC services 3 and 4 available for other purposes.

Uploading VANC packets to the CMI-100

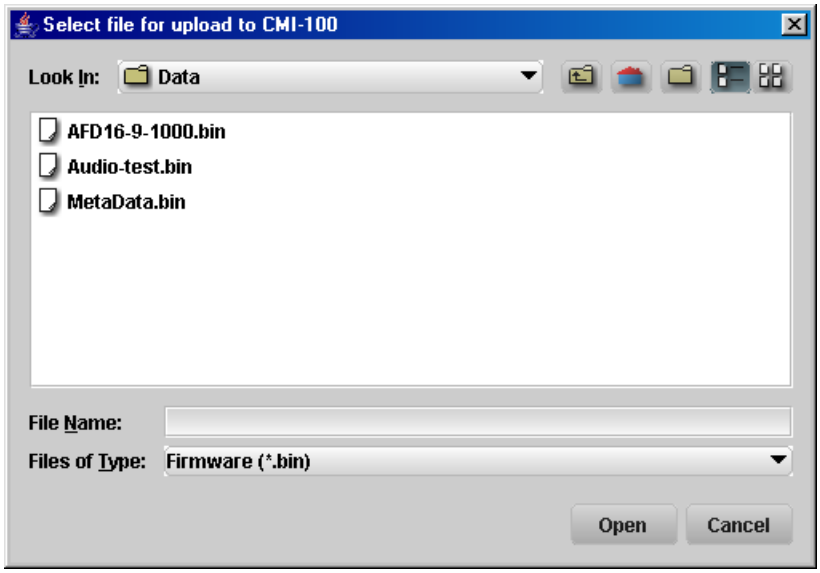
The **VANC MetaGenerator** program is used for authoring several types of constant VANC data or metadata. It can generate AFD and Bar Metadata, Audio Metadata and arbitrary user-defined data patterns. A description of the facilities offered by this program is well beyond the scope of this manual. Refer to the ***VANC MetaGenerator User's Guide*** for details.

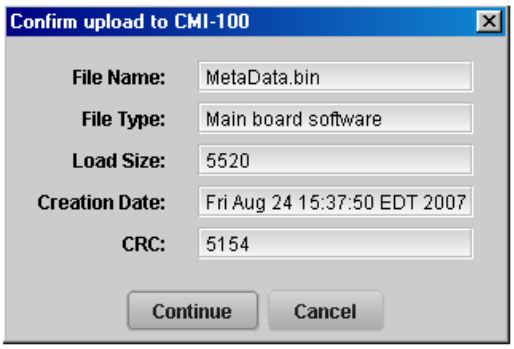
Notice — *Before uploading a file of VANC packets to the CMI-100, you should be aware that this will overwrite all other VANC packets in the CMI-100. For this reason, it is essential that you include all desired packets in the file when using the Combine function in VANC MetaGenerator.*

Also, the CMI-100 will reboot after the upload, causing it to go into bypass and then return to active operation; since each of these switches interrupts one frame of the video, care is required to avoid disruption of on-air programming.

VANC MetaGenerator produces a file containing VANC packets with a name that you specify, normally MetaData.bin. Let us assume that you have stored this file in the default folder (C:\Program Files\ VANC MetaGenerator\Data) on the computer where you use DashBoard to control the CMI-100.

To load your data file into the CMI-100, click the **Upload** button near the bottom of the screen. You will see the dialog box shown below. Browse to your folder, select your file and click **Open**. Typically, you would select MetaData.bin, as this is the default name of the file generated by the VANC MetaGenerator program. A box will appear, asking you to confirm the decision to upload; click **Continue**.





Once the file has been uploaded to the CMI-100, the VANC packets in the file will become available for insertion. If you click one of the selectors (say, Default) on the **Setup Encoding** tab, the available selections should be displayed, including those that you have just uploaded, plus any that have been captured from the video input.

Capturing VANC packets from the Video Input

This is an alternative method of acquiring constant VANC packets for subsequent insertion. It requires that you have access to a video signal that contains a VANC service that you want to be able to insert into other video signals at a later time.

To make use of this capability, first click the **Incoming Services** tab to view a list of the VANC packets that are presently available in the input. Then click the **Capture a VANC Service** tab. Figure 15 is an example of the resulting display.

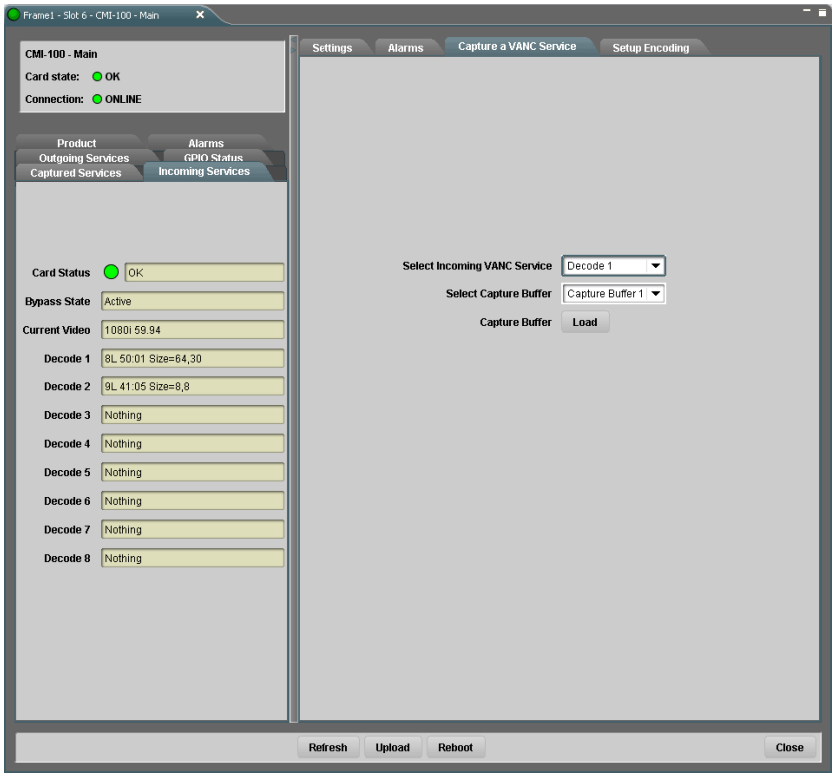


Figure 15.Capture a VANC Service menu

In the example, the desired VANC service is labeled Decode 1, because it is the first VANC service present in the input signal. Next to **Select Incoming VANC Service**, select **Decode 1**. A glance at the **Captured**

Services screen reveals that **Capture Buffer 1** is empty and thus available for use. Next to **Select Capture Buffer**, select **Capture Buffer 1**. Click **Load**.

Once the operation has been completed, which should be instantaneous if the desired service is continuously available, the captured VANC packet is stored in non-volatile memory and is available for insertion. If you click one of the selectors (say, Default) on the **Setup Encoding** tab, **Capture Buffer 1** should be displayed as an available selection.

Note — *This function captures a single VANC packet per field from the input signal. If there are two or more packets in the same field having the same DID and SDID values, only one packet is captured and stored.*

Setting Alarm Sensitivity

The screen shown in Figure 16 is obtained by clicking the Alarms tab. This allows you to specify which conditions in the CMI-100 will cause an alarm indication on your DashBoard screen and the on-screen display output. Whenever any of the enabled alarm conditions becomes true, the color of the indicator for the CMI-100 on the DashBoard screen switches from green to red.

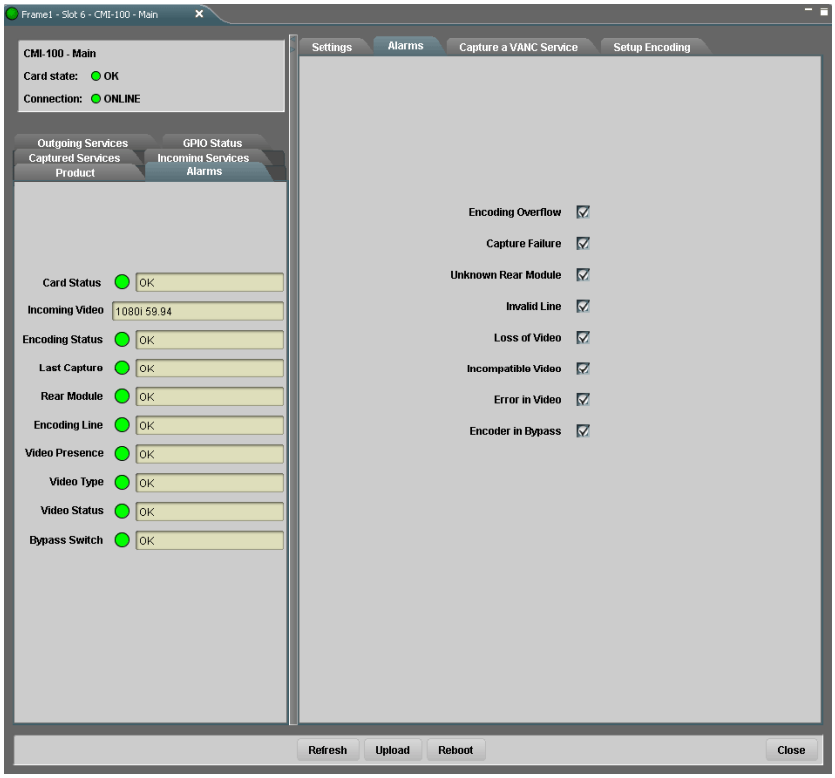


Figure 16. Alarms menu

Encoding Overflow means that there was an attempt to insert more data than could fit in the specified line(s), usually because you are adding VANC services to ones which are already present. If this alarm is enabled and this condition occurs, the **Encoding Status** on the Alarms status screen will show Overflow.

Capture Failure means that the **Load** operation on the **Capture a VANC Service** screen was not successful. If this alarm is enabled and this condition occurs, the **Last Capture** field on the Alarms status screen will show Failed.

Unknown Rear Module means that the CMI-100 is plugged into a rear module that it does not recognize. This could have an effect on the video output, since the types and locations of jacks are unknown. If this alarm is enabled and this condition occurs, the **Rear Module** field on the Alarms status screen will show Unknown.

Invalid Line means that there has been an attempt to insert VANC data in a line that is not part of the vertical interval (or example, line > 20 for 1080i/59.94). If this alarm is enabled and this condition occurs, the **Encoding Line** field on the Alarms status screen will show Invalid.

Loss of Video is normally an emergency and should therefore always be enabled. If it is and this condition occurs, the **Video Presence** field on the Alarms status screen will show Missing.

Incompatible Video means that you have selected a VANC service intended for interlaced video and that the current video input is progressive, or vice versa. If this alarm is enabled and this condition occurs, the **Video Type** field on the Alarms status screen will show Incompatible.

Error in Video means that a detectable video error, such as an EDH or CRC error, has occurred in the input video. If enabled, this alarm causes the status to blink briefly from green to red when an error occurs, and stay red if errors are occurring constantly. If this alarm is enabled and this condition occurs, the **Video Status** field on the Alarms status screen will show Error.

Encoder in Bypass means that the CMI-100's video is bypassed for some reason. This could be because it has been set to **Bypass** on the **Settings** menu, or the card-edge **Bypass** pushbutton is in the **Out** position, or because of a fault condition such as missing video input. If this alarm is enabled and this condition occurs, the **Bypass Switch** field on the Alarms status screen will show Bypass.

Note — *These alarm settings also apply to the generation of SNMP traps, if SNMP is enabled on the openGear frame that houses the CMI-100.*

Using the On-screen Menus

In This Chapter

This chapter explains how to use the Menu functions available on the Heads-Up Display of the CMI-100. It does not describe each available menu; for information on these, see the chapters that describe the menus available through DashBoard. The purpose is to explain how to navigate the menus and access the available functions and settings. The following topics are discussed:

- Layout and Navigation
- Using the Menus

Layout and Navigation

The **Menu Switch** is a five-direction square finger joystick located near the front edge of the CMI-100 card.

With the card edge facing you, use the following menu switch actions to navigate the menu and configure parameters:

- **In** —Press once to enter a value or select a menu or item.
- **Up** — Press once to move to the menu, item, or value above the current selection.
- **Down** — Press once to move to the menu, item, or value below the current selection.
- **Forward** — Press once to move across columns from left to right.
- **Back** — Press once to move across columns from right to left.

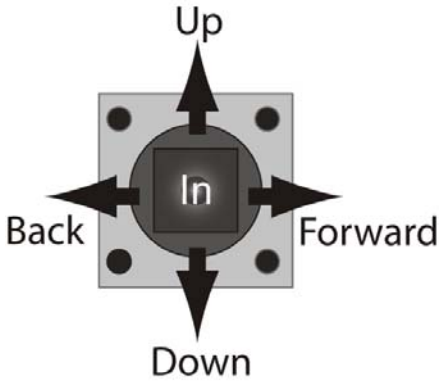


Figure 17. Menu Switch

When the CMI-100 is first powered on, the menu shown below is displayed on the OSD output. The top line of the screen has three items:

- The leftmost item, **Product**, is the first in a list of Status screens. To view these screens, press the Menu Switch ***In*** to highlight the word **Product**, then press the Menu Switch ***Down*** once to view the **Alarms** status screen, ***Down*** a second time for **Captured**, and so on. These are the same Status screens described in the DashBoard Status chapter.
- The second item, **Settings**, is the first in a list of Setup menus. To view these, press the Menu Switch ***Forward*** to advance the selection bar to the word **Settings**, then press the Menu Switch ***In*** to highlight it. Now press the Menu Switch ***Down*** once to view the **Alarms** menu, a second time for **Capture**, and so on. These are the same Setup menus described in the DashBoard Setup chapter.
- The third item is **Exit**. To turn off the OSD, press the Menu Switch ***Forward*** to advance the selection bar to the word **Exit**, then press the Menu Switch ***In***. To turn the OSD back on, press the Menu Switch ***In*** again.

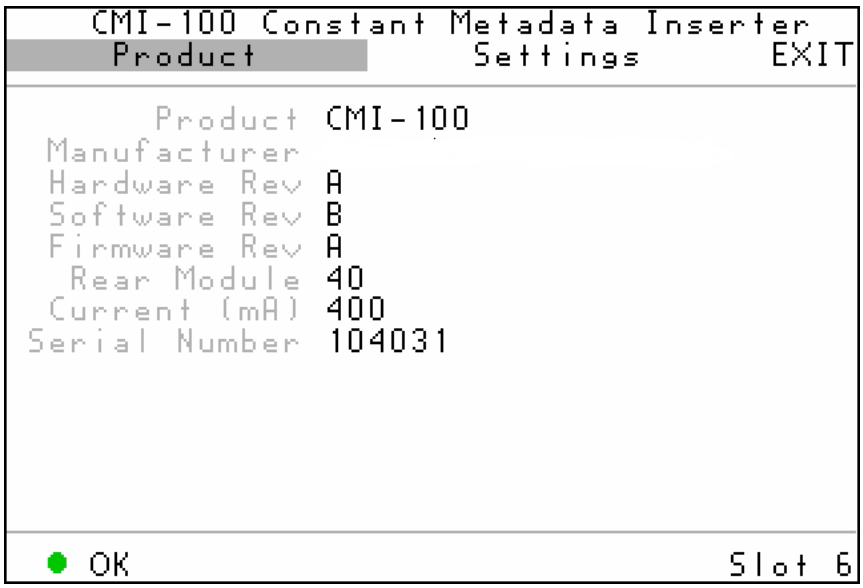


Figure 18. Main OSD screen, showing Product Status

Using the Menus

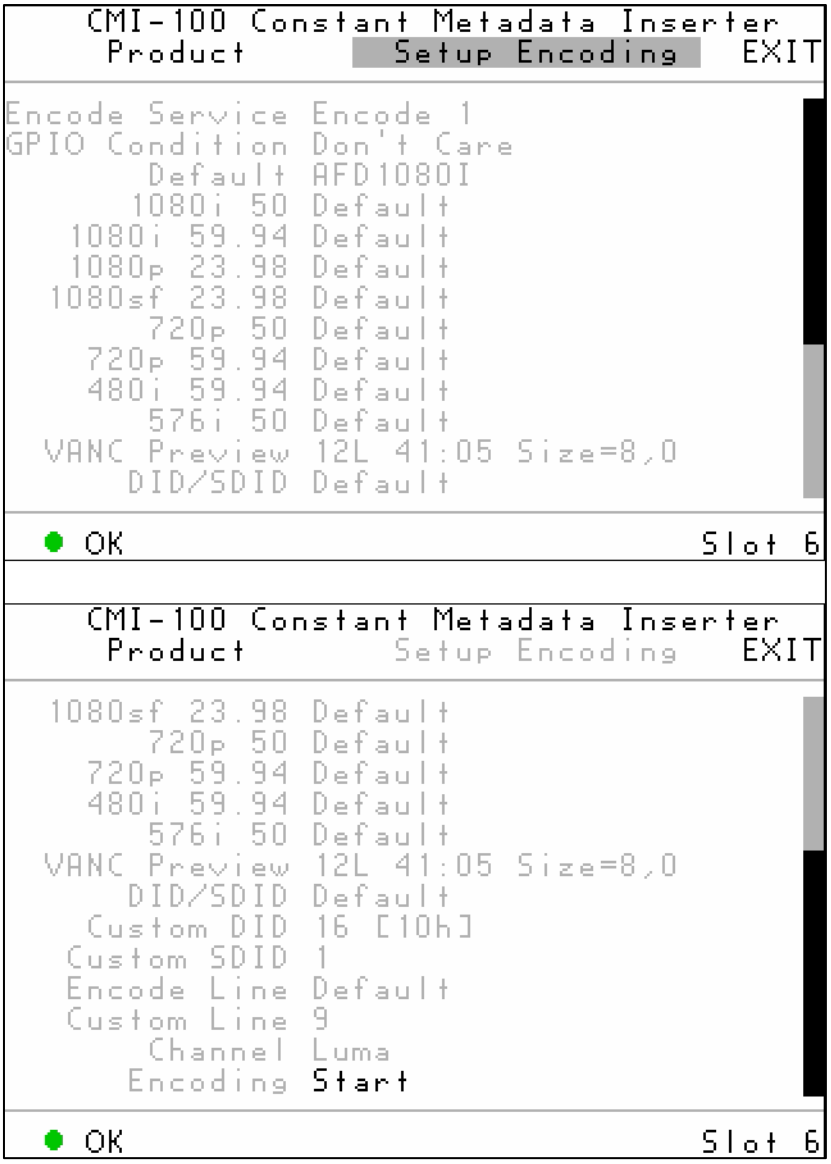
The available screens that can be selected are:

Status (left column)	Setup menus (center column)	Exit (right column)
Product	Settings	Exit
Alarms	Alarms	
Captured	Capture	
Incoming	Setup Encoding	
Outgoing		
GPIO		

The use of the menus to change settings will be illustrated by the following example:

1. Navigate to the **Setup** Menus entry on the top row, as discussed previously, by using the ***Forward*** and ***Back*** positions of the Menu Switch.
2. If the Menu name (for example, **Settings**) is highlighted (brighter than other text), skip to step 3. If it is not highlighted, press the Menu Switch ***In*** to highlight it.
3. Press the Menu Switch ***Down*** or ***Up*** to step through the available menus.
4. When you reach **Setup Encoding**, select it by pressing the Menu Switch ***In***. The display should be similar to the one shown in the top half of Fig. 19.
5. Now press the Menu Switch ***Down*** or ***Up*** to step through the available items that you can set on this menu.

6. When you reach the **Default** item, select it by pressing the Menu Switch ***In***.
7. Now press the Menu Switch ***Down*** or ***Up*** to step through the available values for this item.
8. When you reach the desired value, select it by pressing the Menu Switch ***In***.
9. You can repeat steps 5-8 to select values for other items in this menu.
10. This menu has more items than can fit on one screen. When you repeatedly press the Menu Switch ***Down***, the menu items will eventually scroll up, until you reach the display shown in the lower half of Fig 19, with the highlight on the word **Start**. The scroll bar at the right side of the display shows where you are in the available selections. In this case, with the highlight on the word **Start**, press the Menu Switch ***In*** to put into effect the changes you've made to Encode Service 1.
11. To switch to a different menu, press the **Menu Switch *Up*** or ***Down*** repeatedly until the selection bar moves to the title (**Setup Encoding**). Press the **Menu Switch *In*** and return to step 3.



Specifications

In This Chapter

This chapter contains the Technical Specifications table. Note that specifications are subject to change without notice.

Table 2. CMI-100 - Technical Specifications

Category	Parameter	Specification
Serial Digital Video Inputs	Number Of Inputs	1 Program input (bypass-protected if available in the rear module)
	Data Rates and SMPTE Standards Accommodated	480i/59.94 (SMPTE 259M) 576i/50 (SMPTE 259M) 1080i/50, 59.94, 60 (SMPTE 292M) 720p/50, 59.94, 60 (SMPTE 292M) 1080p/23.98, 24 (SMPTE 292M) 1080sf/23.98, 24 (SMPTE 292M)
	Impedance	75Ω terminating in Active mode Loop-through to SDI Output in Bypass mode, if available in the rear module
	Equalization	Over 100m of Belden 1694A cable @ 1.485Gb/s, or 400m @ 270Mb/s
	Return Loss	>13dB to 1.485GHz
Serial Digital Video Outputs	Number of Outputs	1 Program output 1 output monitor (only available in 10-slot frame) 1 on-screen display (OSD) output (only available in 10-slot frame)
	Impedance	75Ω
	Return Loss	10dB to 1.485GHz
	Signal Level	800mV ±10%
	DC Offset	0 Volts ±50 mV
	Rise & Fall Time (20-80%)	700ps. Typical (270Mb/s) 120ps. Typical (1.485Gb/s)
	Overshoot	<8%
Analog video Output	Number of outputs	1 on-screen display (OSD) output (only available in 10-slot frame)
	Impedance	75Ω
	Signal level	1.0 v
	Formats	NTSC-M or PAL-B/G
GPIO Inputs	Number of Inputs	4 three-pin connectors (available with ONG-MDL-R01 rear module)
Other	Maximum Power Consumption	5W
	Warranty	1 year return to factory

Service Information

In This Chapter

This chapter contains the following sections:

- Troubleshooting Checklist
- Power LED Conditions
- Bootload Sequence
- Warranty and Repair Policy

Troubleshooting Checklist

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

1. **Visual Review –** Performing a quick visual check may reveal many problems, such as connectors not properly seated or loose cables. Check the module, 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. **Reseat the Card in the Frame** – Eject the card and reinsert it in the frame.
4. **Check Control Settings –** Refer to the Installation and Operation sections of the manual and 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. **Module Exchange** – Exchanging a suspect module with a module that is known to be working correctly is an efficient method for localizing problems to individual modules.

Power LED Conditions

The top front edge of the module has a Power LED which indicates card status. The Power LED displays the following conditions:

- **Off** - there is no power.
- **Green** - the card is running with valid input.
- **Flashing green** - the boot loader is waiting for, or receiving, a software upload.
- **Orang**e – there is a signal or configuration error. Check the inputs and menus.
- **Red** - the card is not operational. This will occur if, for example, there is no video input. Check the inputs, reseat the card, press the Reset button, or call Technical Support.

Bootload Sequence

In the unlikely event of a complete card failure, you may be instructed by a Ross Video Technical Support specialist to perform a complete software reload on the CMI-100. To perform this task, follow these steps:

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 the last operational software load.

Software loads can be sent to the CMI-100 from DashBoard, using the MFC-8310-N Frame Controller with Networking.

Warranty and Repair Policy

The CMI-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 CMI-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 CMI-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 User Manual provides all pertinent information for the safe installation and operation of your CMI-100. Ross Video policy dictates that all repairs to the CMI-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 CMI-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 CMI-100. If required, a temporary replacement module 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.

Notes:

Notes:

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

PHONE	**General Business Office and Technical Support**	613 • 652 • 4886
	Fax	613 • 652 • 4425
	After-hours Emergency	613 • 349 • 0006
E-MAIL	**General Information**	solutions@rossvideo.com
	Technical Support	techsupport@rossvideo.com
POSTAL SERVICE	**Ross Video Limited**	8 John Street, Iroquois, Ontario, Canada K0E 1K0
	Ross Video Incorporated	P.O. Box 880, Ogdensburg, New York, USA 13669-0880

Visit Us

Please visit us at our website for:

- Company information
- Related products and full product lines
- Trade show information
- News

Ross Part Number: CMI100DR-004-02