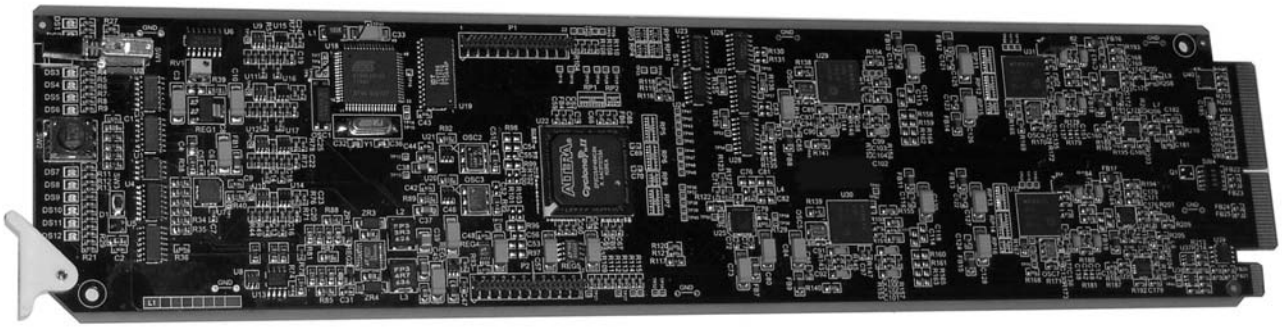
Ross Video Limited

VRC-100

VANC Receiver

User Manual



Live Production Technology

Product Name: VRC-100

VRC-100 • VANC Receiver User Manual

- Ross Part Number: **VRC100DR-004-02**
- Release Date: September 23, 2010. Printed in Canada.

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

Copyright

Notice

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

Trademarks

- ROSS is a registered trademark of Ross Video Limited.
- openGear is a registered trademark of Ross Video Limited.
- Ross, ROSS, Ross® are registered trademarks of Ross Video Limited.
- DashBoard Control System™ is a trademark of Ross Video Limited
- All other product names and any registered and unregistered trademarks mentioned in this manual are used for identification purposes only and remain the exclusive property of their respective owners.

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.

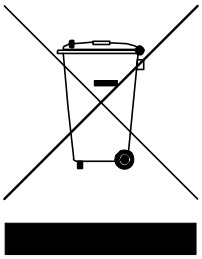
Environmental Information

The VRC-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 VRC-100 VANC Receiver. The VRC-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 VRC-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 VRC-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 VRC-100 is a SMPTE 292 VANC receiver card which decodes known VANC metadata and overlays the results on the video. It converts difficult to understand metadata to comprehendible English and presents it as an overlay on the video that carries it. The VRC-100 may be customized to best suit your application. Decode just the metadata of interest and display it how you want it and where you want it on the screen. It has a large library of known metadata types from which to choose. The card supports up to eight overlay screens controlled by GPIO or a PC over a LAN allowing for a fast switch from one set of metadata to another. You also get alarms on the loss of metadata which can be on-screen, via GPIO or over the LAN.

If you work with SMPTE 292 video, this is the product that will let you know what metadata it contains and whether or not it is correct. The VRC-100 provides a number of innovative tools to simplify your workflow. For example:

- A DID/SDID map of the VANC space showing what metadata is being carried and where.
- Decoding of many important metadata formats so that you will not only be able to tell what is present but also if it is correct.
- Control over the metadata that is displayed, so that you can quickly switch between views. This is important if you want to monitor more data than will fit on a single screen, or if you monitor for different data on different signals.
- Automatic timed sequencing of different screens of data or control by GPIO (switches).
- Alarms to alert you when critical metadata in not present in your signal.
- SNMP support for monitoring critical metadata alarms.
- GPIO Alarm output, which can be either a contact closure or logic level, depending on the choice or rear module.
- Matching of a set of stored configuration against the incoming audio metadata. Any differences are highlighted in red for easy identification.
- As a member of the openGear family, the VRC-100 shares a common control interface, known as DashBoard, with a broad array of other products.
- The configuration of the card can be saved to the PC and restored at any time. This includes switching from one configuration to another and loading different cards with the same configuration.
- The recommended ONG-MDL-R01or R21 rear connector module provides video bypass and eight GPIO inputs or outputs.
- Housed in the openGear DFR-8300 series frames
- Displays all the DID/SDID VANC packets in a map format and will decode and display the following data or metadata:
  - CEA-708 caption streams; DTVCC, 608 embedded and XDS embedded streams.
  - Active Format Descriptors (AFD).
  - Audio Metadata.
  - Broadcast Flag.
  - Time-code.
  - Logo Insertion triggers (CBS LIDIA V format).
  - Text Tags, packets carrying text identifiers.
  - Generic Data, detection of a packet by DID/SDID

Note that some of the VANC data that the VRC-100 monitors (such as closed captioning) is “data essence”, not metadata. For convenience, this manual uses the term “metadata” to refer to all VANC data types.

Features

The following features make the VRC-100 the solution of choice for monitoring the VANC:

- SMPTE 292 input on a 75-ohm BNC jack located on the rear module.
- SMPTE 292 output with metadata overlay for connection to a display.
- A LAN-based GUI for card setup.
- Non-volatile settings allow "set-and-forget" operation.
- Cards are hot-pluggable for ease of configuration and maintenance.
- GPIO inputs and outputs for compatibility with a broad range of control and monitoring equipment.
- SNMP alarm output available, if enabled on the frame.

Functional Block Diagram

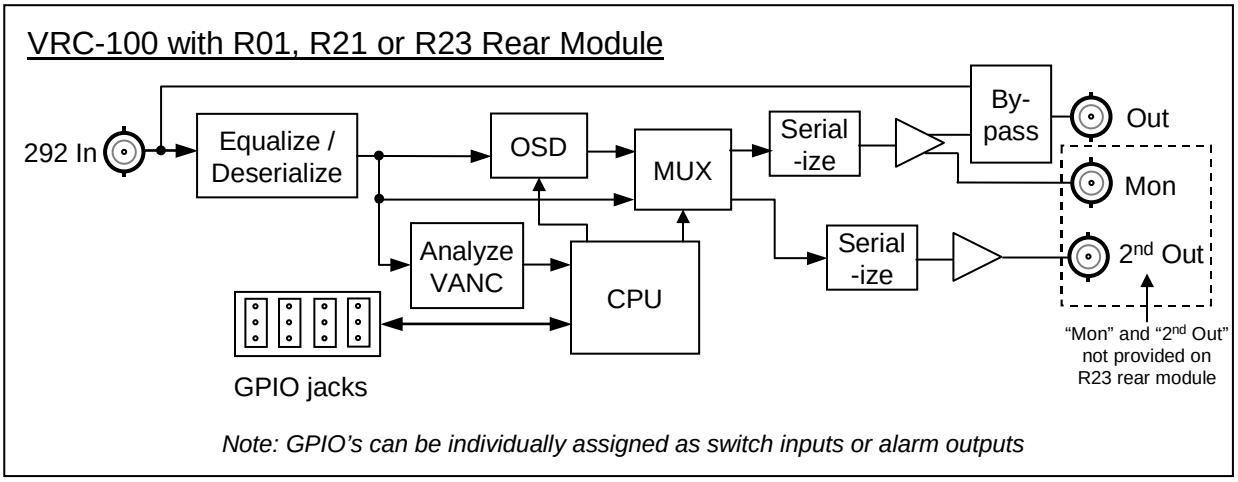


Figure 1. Simplified Block Diagrams of VRC-100 Functions

Documentation Terms

The following terms are used throughout this guide:

- "**Frame**" refers to the Open Gear frame that houses the **VRC-100** card.
- "**Operator**" and "**User**" refer to the person who uses the **VRC-100**.
- "**Board**" and "**Card**" refer to the **VRC-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 **VRC-100** operates.
- "**Rear Module**" refers to the connector module at the rear of the frame, into which the **VRC-100** is inserted.

Frame and Rear Module Compatibility

The VRC can operate with the following frame and rear modules combinations. It should be noted that rear module choice dictates the functionality of the VRC.

Table 1.Combinations of VRC, Frame and Rear Module models

Rear Module	Frame	Bi-Directional GPIOs	Isolated GPIO	Program 2 Out	Bypass Relay
ONG-MDL-R01	DFR-8310-N	Yes	No	Yes	Yes
ONG-MDL-R02	DFR-8310-N	No	Yes	No	No
ONG-MDL-R21	DFR-8321-C or –CN or -CNS	Yes	No	Yes	Yes
ONG-MDL-R22	DFR-8321-C or –CN or -CNS	No	Yes	No	No
ONG-MDL-R23	DFR-8321-C or –CN or -CNS	Yes	No	Yes	Yes

ONG-MDL-R21 (or R01) is preferred because it allows control of VRC-100 by external switches connected to GPIOs.

Quick Start

The purpose of the VRC-100 is to decode VANC data and overlay this information on the video. To do this you must:

1. Install the VRC-100 into the frame.
2. Install DashBoard on a computer and use it to set up the card.
3. Optionally, connect GPIOs to control what is overlaid on the screen.

Installing the Hardware

Assuming you have an openGear frame, an **ONG-VRC-100** card and a compatible rear module, the following steps will install the hardware:

1. Connect the frame to your LAN, using the instruction sheet "**Connecting the openGear Frame to a Network**", supplied with the frame.
2. Install the rear module in the frame, as described in the section "**Rear Module Installation**" of this manual.
3. Install the VRC-100 in the frame, aligned with the rear module you installed.
4. Connect a SMPTE 292 video signal to the video input jack on the rear module and connect a SMPTE 292 compatible display to the video output jack. This is described in the section "**Cable Connections"** of this manual.
5. Turn the frame power on.

Installing and Using DashBoard

The DashBoard application is used to setup, control and monitor the cards installed in the openGear frame.

Use the following steps to setup the VRC-100 and to overlay information about the data in the VANC over the video:

1. Install DashBoard on a computer connected to the LAN. The DashBoard Control System™ software and user manual are available from the Ross Video website.
2. Start DashBoard on your computer. It should automatically find your frame within a minute or two.
3. Click the "+" next to the frame name to show the cards in the frame, then double-click the VRC-100. The left side of the VRC-100 screen shows the status of the card. The right side of the screen shows the card setup.
4. Click the **Settings** tab. This is where you select the types of VANC data to capture. It also allows you to name the card and determine which lines of the VANC to monitor. It is recommended that you name the card. The name will appear in DashBoard making it easier to identify the card if you have more than one. Click on the **Captions and AFD** check boxes and leave all other boxes unchecked for now. A later section of the manual describes all the data types in more detail. These instructions will overlay the 708 captions and active format descriptor (AFD) on the video. Click on the **Load** button to make these settings.
5. Click the **Alarms** tab. This screen controls the reporting of the loss of VANC data and other problems. The alarms are reported in DashBoard by the circular colored icon beside the card name. If a card has a red circle beside it, one or more of the selected alarms is signaled. Only check the alarms for data types selected in the **Settings** tab. Also, if a signal is present intermittently or if its absence is

not a problem, leave it unchecked. On this screen, check **Loss of Video**, **Captions**, **AFD**, **Unknown Rear Module** and **Bypass**. Click on the **Load** button to make theses settings.

6. The next step is to set up the presentation of the VANC data. Click on the **Status Block** tab. The status block is a set of on-screen indicators to show if the VANC data types are present or not. Check the boxes for **Loss of Video**, **Captions** and **AFD**. Click on the **Load** button to make these settings.
7. Click on the **Caption** tab to select the caption data to decode. There are four caption decoders available. Set the first to 708 Primary Language. Set the second, third and fourth to 708 Secondary, 608 CC1 and 608 CC3 respectively. Click on the **Load** button to load these settings.
8. Click the **AFD Block** tab. Check **AFD Description and AFD Bars** and then click the **Load** button.
9. Click on the **Layouts** tab. This screen controls what will be overlaid on the screen at what time. This example will create two layouts. The first will contain the 708 primary language captions and the 608 CC1 captions. The second layout will contain the status indicators and the AFD information. At the top of the screen select **Layout 1** from the Layout Menu pull down list. For the first Layout Item select Caption Decode 1 which - in the previous step - you set to 708 Primary Language. Set the row to 1 and the column to 1 for this item. For the next Layout Item select Caption Decode 3 and row 12 column 1. Set the other Layout Items to None. Click the **Load** button to save this screen layout.
10. To create the second layout, select **Layout 2** in the **Layout Menu** selector box. For the first Layout Item chose Status Block and position it in row 1 column 1. For the second Layout Item chose AFD and position it in row 23 column 1. Click the **Load** button to save this layout.
11. Click on **Default Screen** tab. This tab selects the layout or layouts which are overlaid on the video when no GPIO switches are active. A check box on a layout causes that layout to be overlaid. Checking more than one layout causes the overlay to sequence between layouts with a delay in seconds set by the Display Time parameter. Select the **DID/SDID map** then press **Load**. The video will be overlaid with a map showing you the contents of the VANC. You can then repeat this procedure selecting either Layout 1 or Layout 2 for display. You will see the results on the monitor connected to the output of the VRC-100 card. If you select all three at once the overlay will sequence through each and repeat.

You have now successfully displayed VANC data. It is suggested that you try building and displaying different screens of data to become familiar with the controls. Once you have become familiar with creating layouts, you may wish to use GPIOs to control the layout that is displayed. GPIOs control which layout is overlaid removing the necessity of having DashBoard running.

Using GPIOs to Control the Screen Display

GPIOs serve two purposes: as inputs, they control what is overlaid on the video; as outputs, they indicate the state of alarms. By default, all eight are configured as inputs; you can change these assignments using one of the menus.

At this point connect a switch between GPIO 1 and GROUND, following the instructions in the section "**GPIO Outputs**".

The following instructions detail how to use GPIOs.

1. Click on the **GPIO Direction** tab. This screen controls whether the GPIO is used as an input to control layouts or as an output to signal alarm conditions. Set GPIO1 to GPIO4 to inputs and GPIO5 to GPIO8 to outputs. Click the **Load** button to save these settings.
2. Click on the **GPIO Output Mapping** tab. GPIO5 to GPIO8 will be present on this screen because they were set to outputs in the previous step. Select **Video Status** from the GPIO5 pull down list, Captions from the GPIO6 pull down list and AFD from the GPIO7 pull down list. Set GPIO8 to None. Click on the **Load** button to make the change. These GPIOs will follow the presence of their respective signals and can be used to trigger external alarms.

3. Click on the **GPIO Menu Mapping** tab. GPIO1 to GPIO4 will be present on this screen. Set GPIO1 to Layout 1 and the other GPIO fields to None. Click the **Load** button to save the settings. When the switch connected to GPIO1 is open the default layout (as set on the **Default Screen** tab) is displayed. When the switch is closed, layout 1 is displayed.

You have now successfully created layouts and controlled them with GPIOs. It is suggested that you experiment with layouts and GPIO control until you have the information that you want presented in the way that best suits your needs. DashBoard is no longer necessary for routine operation because the screen overlays are controlled by the GPIOs. The chapter on Setting up the VRC-100 gives greater detail on the tabs used to setup the card for operation. It may be used as a reference and a guide to understanding the information that can be displayed and its meaning.

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 VRC-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 VRC-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

Figure 2 below shows two rear modules mounted on an openGear frame. Ideally, you will have received an ONG-MDL-R01 module with your VRC-100. You will need to install it in your frame before you can install the VRC-100 or connect cables to the slot you have chosen for it.

Use the following procedure to install the rear module in an openGear DFR-8310 digital distribution 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 frame, locate the card frame slot.
3. Remove the Blocker Plate (if any) from the rear of the slot you have chosen for the VRC-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 frame back plane.
6. Using a Phillips screwdriver and the supplied screw, fasten the rear module to the frame's 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 digital distribution frame.

Board Installation

Use the following procedure to install the VRC-100 in an openGear distribution frame with LAN option:

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 VRC-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 VRC-100 in an openGear distribution frame.

BNC Labels

Affix the supplied connector label to the rear of the rack frame at the position occupied by the VRC-100, if it was not already attached to the rear module.

Cable Connections

This section provides information for connecting cables to the rear modules on the frame backplane. Connect the input and output cables according to the following diagram and the descriptions that follow. It is not necessary to terminate unused outputs. Figure 3 shows the rear modules that are most commonly used with the VRC-100. For information on using other modules, please contact our technical support group, using the contact information on the rear cover of this manual. In the following discussion, the five BNC jack positions in the left-hand column are numbered 1, 3, 5, 7 and 9, from top to bottom; the five in the right column are 2, 4, 6, 8 and 10.

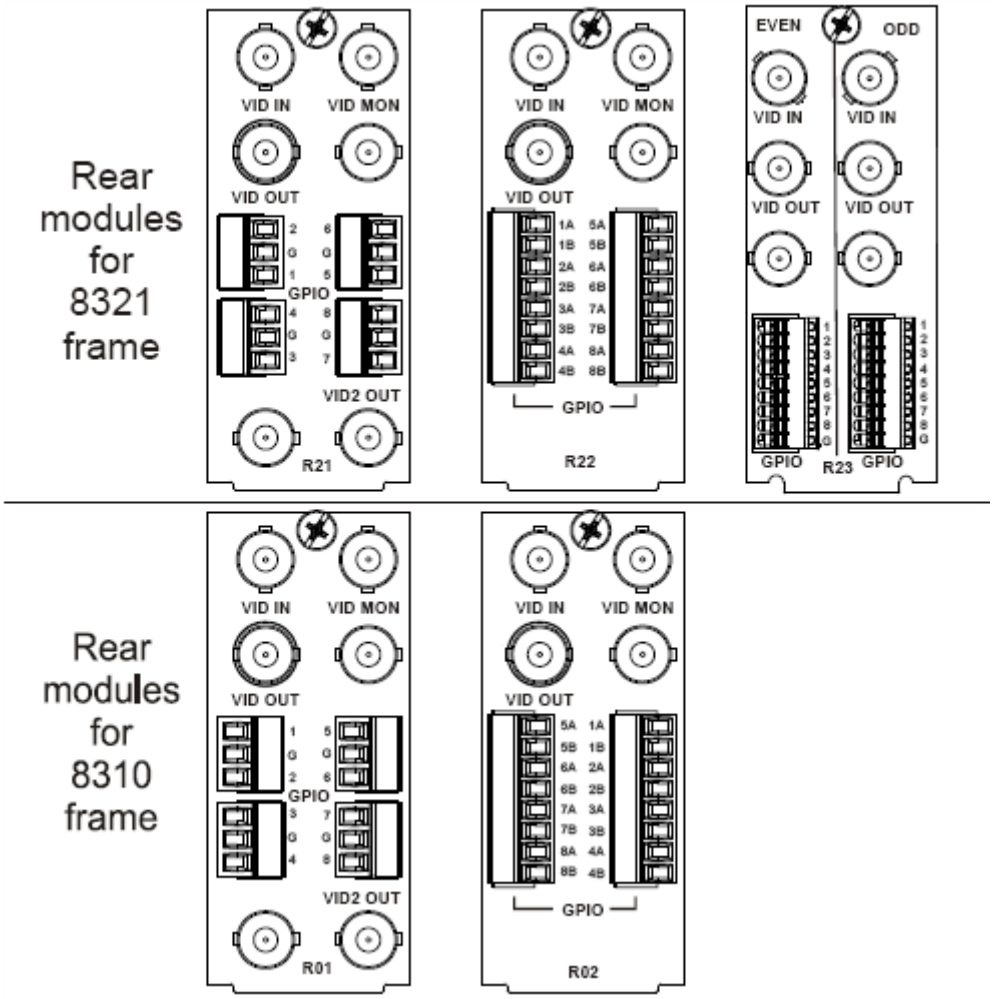


Figure 3. Jack Designations for the VRC-100 with Ross Video rear modules

BNC 1 VIDEO Input (May be labelled "VID IN" or "SDI IN")

This jack accepts a 292M serial digital video signal. The VRC-100 requires this input in all cases. The input signal is internally terminated in 75 ohms when the VRC-100 is installed.

BNC 3 VIDEO Output (May be labelled "VID OUT" or "SDI OUT")

This jack carries the output of the VRC-100, with metadata status displayed on-screen. When the VRC-100 card is removed from its slot or the bypass switch is activated, the **ONG-MDL-R01** rear module bypasses BNC1 to BNC3 directly.

BNC 2 VIDEO Monitor Output

This jack carries an unswitched copy of the same signal that is output on BNC3. When the VRC-100 card is removed from its slot or the card is in bypass, this output is not driven.

BNC 4 Not used

This jack is not used by the VRC-100.

BNC 9 Not used

This jack is not used by the VRC-100.

BNC 10 Program Output 2

This jack carries a second output from the VRC-100. The overlay ability on BNC 3 and 10 is programmable under the Settings tab. VRC-100 cards with serial numbers less than 107469 do not have this output.

Rear Module Styles

In the 8310 frame, each rear module is connected to one circuit card and occupies one-tenth of the space on the rear of the frame.

The 8321 frame has twenty slots in the same space as the ten slots of the 8310 frame. Each rear module corresponds to two slots of the frame. Rear modules that can accommodate one card are called "full"; an 8321 frame with ten "full" rear modules can hold ten cards.

There are also "split" rear modules that can accommodate two cards. Each card is connected to half of the connectors on the rear module. An 8321 frame with ten "split" rear modules can hold twenty cards.

The ONG-MDL-R01 and R02 are full rear modules for the 8310 frame; each can accommodate one VRC-100 card.

The ONG-MDL-R21 and R22 are full rear modules for the 8321 frame with the same functionality as the R01 and R02; each can accommodate one VRC-100 card which must be in an even-numbered slot (2, 4, 6 etc).

The ONG-MDL-R23 is a split rear module for the 8321 frame that can accommodate two VRC-100 cards. Its two columns of jacks are labelled ODD and EVEN to indicate which slot they are connected to. For example, assume that an R23 rear module is installed in the position corresponding to slots 1 and 2 of the frame. The jacks labelled ODD will be connected to the card in slot 1, and those labelled EVEN will be connected to the card in slot 2. If it were installed at slots 7 and 8, ODD would connect to 7 and EVEN would connect to 8.

User Controls and Indicators

In This Chapter

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

- Switches
- LEDs

User Controls

Figure 4 shows the front edge of the VRC-100. Following the illustration are descriptions of the controls and indicators identified here.

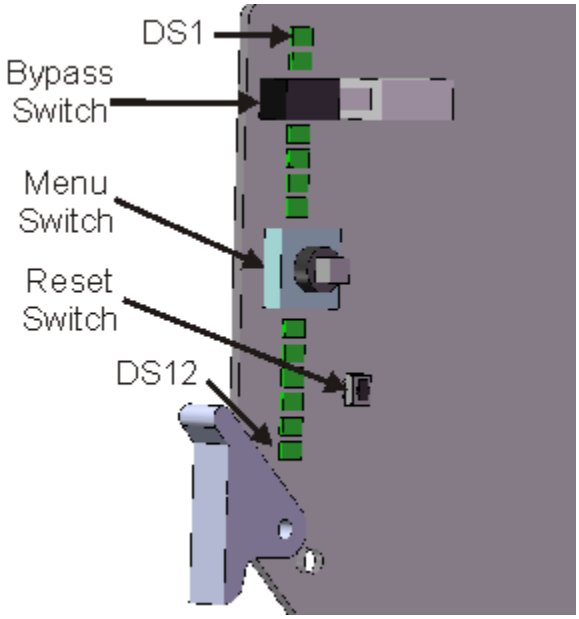


Figure 4. Card-edge User Controls

Bypass Switch

If the VRC-100 is installed in an ONG-MDL-R01 rear module 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 VRC-100 is in the video signal path. Pressing it once moves the switch to the "OUT" position and bypasses the VRC-100. Pressing it again restores it to its active state. This switch provides a quick way of disabling all VRC-100 operation, since it disconnects the video input and output from the card.

If the VRC-100 is installed in any rear module other than the ONG-MDL-R01, this switch has no function and should be left in the "IN" position.

Menu Switch

This switch is not used by the VRC-100.

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.

Table 3. 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, VRC-100 is in the video path. When lit red, the VRC-100's video is bypassed.
Video In	Red/ Green	DS3	When lit green, the video input is present and valid. When lit red, no valid input is present. This typically means that the input cable is disconnected.
Video Out	Red/ Green	DS4	When lit green, the video output serializer is locked to a valid input. When lit red, there is a hardware fault on the card.
Not used		DS5	
Video 2 SDI Out	Red/ Green	DS6	When lit green, the video 2 output serializer is locked to a valid input. When lit red, there is a hardware fault on the card.
Video In	Red/ Green	DS7	Normally lit green. When lit red, this indicates that the video input is missing.
Captioning	Red/ Green	DS8	Normally lit green. When lit red, this indicates that the VANC captioning data is missing.
AFD	Red/ Green	DS9	Normally lit green. When lit red, this indicates that the VANC AFD metadata is missing.
Audio metadata	Red/ Green	DS10	Normally lit green. When lit red, this indicates that the VANC audio metadata is missing.
Broadcast Flag	Red/ Green	DS11	Normally lit green. When lit red, this indicates that the VANC Broadcast Flag is missing.
Timecode	Red/ Green	DS12	Normally lit green. When lit red, this indicates that the VANC timecode is missing.

Note — *The DS7-DS12 are conditioned by the Alarm Enable settings. Each of these LEDs will only turn red if its corresponding Alarm Enable bit is set.*

DashBoard and VRC-100 Status

In This Chapter

This chapter provides an introduction to the DashBoard user interface and a description of the VRC-100's Status screens. The DashBoard program is available for download from the Ross Video website.

The following topics are discussed in this chapter:

- Layout and Navigation
- Selecting a VRC-100 Module
- Screen layout
- Status screens

The use of the Setup menus is covered in the chapter, "**Setting up a VRC-100**".

Layout and Navigation

This section focuses on the use of the DashBoard program to control and monitor a VRC-100. For a more complete description of DashBoard and its capabilities, please refer to the ***DashBoard Control System User Manual***.

Selecting a VRC-100 Module

Figure 5 shows a typical DashBoard screen. After it has established its connection to the frame containing the VRC-100, a list of modules is displayed at the left side. Clicking on a frame and then double-clicking on a VRC-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 VRC-100, open. DashBoard provides the ability to view multiple devices in this window. For details, see the ***DashBoard Control System User Manual***.

The module name is displayed in the device list and on the tab for the module.

Screen layout

The VRC-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 three tabs to select more detailed status.
- The right side, the Settings area, provides controls 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 Figure 5 shows product information that is useful in discussing the operation of the module with Ross Video's Technical Support staff.

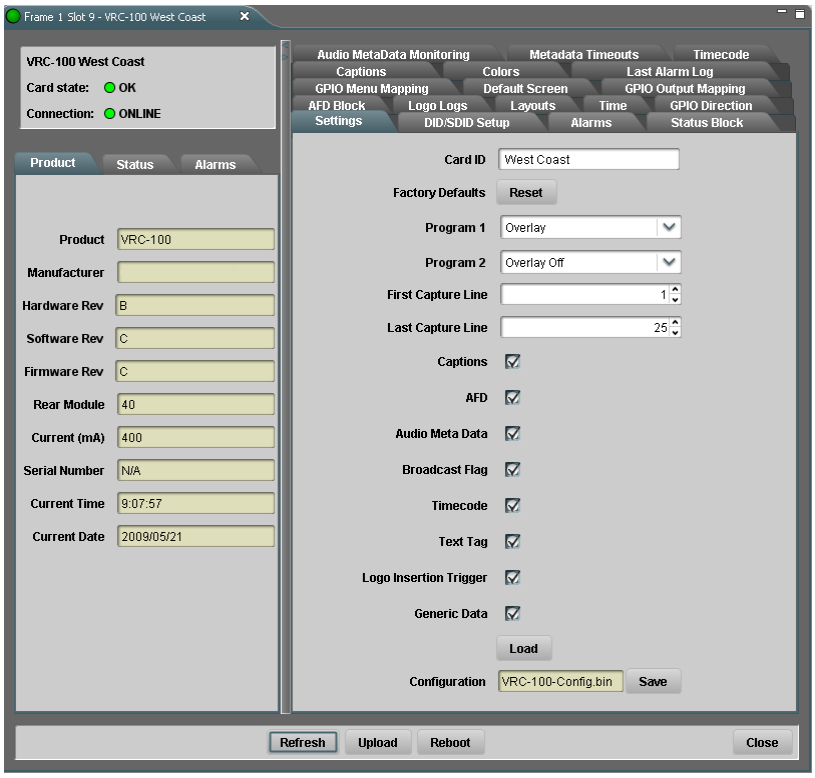


Figure 5. The Dashboard Screen

The Status Tabs

Figure 6 shows the three tabs available in the status window. The **Product** tab has information about the VRC-100 which will be helpful to a Ross Video technician when there are questions about the operation of the unit. The status tab contains information about the operation of the unit. The Active/Bypass indicator is either Active or Bypass. When active the card can overlay the metadata information over the video. In bypass the card input is connected directly to the card output. The Current Video will be either the current video at the input connector or "No Video Present". The GPIO status shows what each of the GPIOs is currently being used for. The term "Not Assigned" means that the GPIO is not assigned to any function. This operation is described later in the manual. The Alarms tab shows the current state of all the signals that can cause alarms. Green indicates no alarm and red indicates an alarm state. A red alarm status for any of the monitored VANC data will cause a red alarm for the card and the frame. When a frame alarm occurs, you should first check which card and then which event caused the alarm.

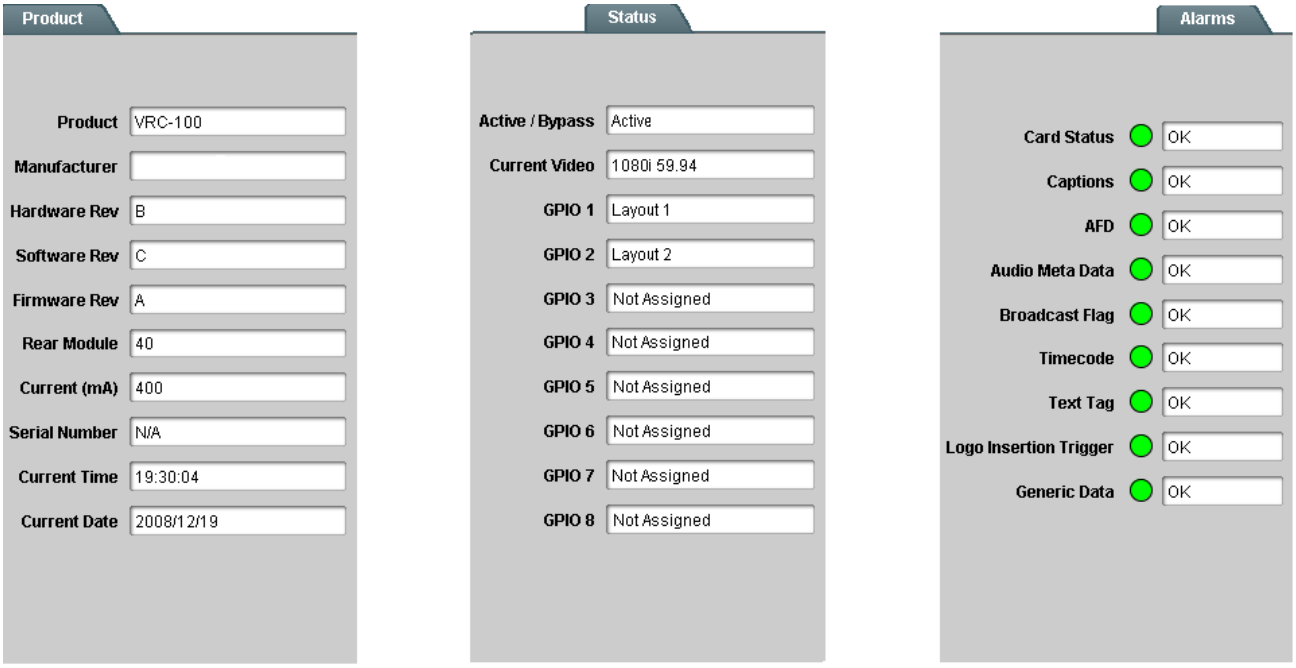


Figure 6. Status Tabs

Setting Up the VRC-100

In This Chapter

This chapter explains how to use the user interface to set up the VRC-100. This discussion is based on the use of DashBoard through a network connection.

The following topics are discussed:

- Selecting the metadata to monitor
- Setting the address of the metadata
- Setting timeouts for detecting loss of metadata
- Enabling alarms for loss of metadata
- Setting how to display the different metadata
- Selecting the background color
- Setting GPIO inputs and outputs
- Defining screen layouts
- Defining the default screen layouts and sequencing
- Controlling the screen layouts using GPIOs
- Connecting alarms to GPIOs

The order of sections in this chapter follows the workflow required to setup the VRC-100 for operation. It is recommended that you proceed through the following sections in order to achieve the best possible understanding of the product.

Selecting the metadata to monitor

Figure 7 shows the screen displayed by clicking the **Settings** tab. On this screen you select the types of metadata that you wish to monitor. Metadata monitoring is selected by placing a checkmark in the box beside the metadata type.

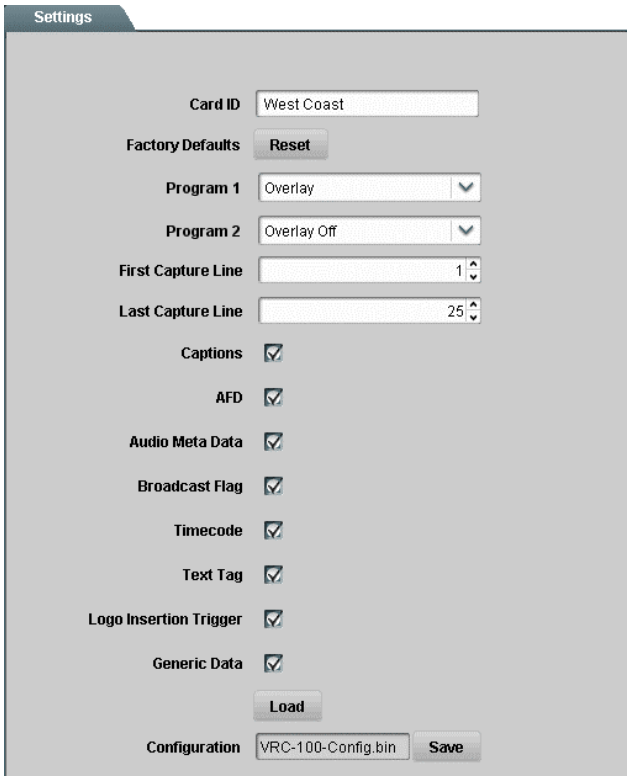


Figure 7. Settings Menu

The following data or metadata types are available:

- Captions: CEA-708 caption data.
- AFD: Active Format Descriptors.
- Audio Metadata.
- Broadcast Flag.
- Timecode.
- Text Tags, packets carrying textual information.
- Logo Insertion Triggers, packets used to trigger the insertion of network branding information.
- Generic Data, detection of packets with a user-defined address.

Note — *It is important that you enable each of the metadata services that you wish to monitor in this menu before selecting them in other menus that make use of their data. Otherwise, the services will be shown as missing even when they are present.*

The **Card ID** assigns a name to the card which appears as part of the card description in Dashboard. This name is included wherever slot 9: VRC-100 is displayed.

The **First Capture Line** and the **Last Capture Line** select the range of lines that the card processes when looking for VANC metadata. 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, for example.

Program 1 and **Program 2** controls the overlay ability of the 2 outputs on the card. Program 1 refers to BNC 3 and program 2 refers to BNC 10. If overlay is selected the VRC-100 overlays data onto the output video, overlay off lets the video pass unaltered. Note: some rear modules will not have a BNC 10. In this case the program 2 control will not be present. Also, VRC-100 cards with serial numbers less than 107469 do not have a program 2.

The **Factory Defaults Reset** button removes any settings that you have made. This is not a recommended action under normal circumstances; it will require that you repeat the setup process of the card from the beginning.

The **Load** button makes the changes shown on the screen. The **Save** button allows you to save a copy of the cards configuration to a file on the PC. This file can then be loaded back onto the card at any time thus restoring the settings. The configuration can also be loaded onto other cards. This allows for the quick cloning of cards. The file is restored using the **Upload** button.

Setting the address of the metadata

Figure 8 shows the screen used to set up the addresses of the metadata. By default these will be set to the addresses normally used for the data types. The addresses should only be changed if required and may be restored by pressing the **Defaults** button. The **Load** button is pressed to make the change.

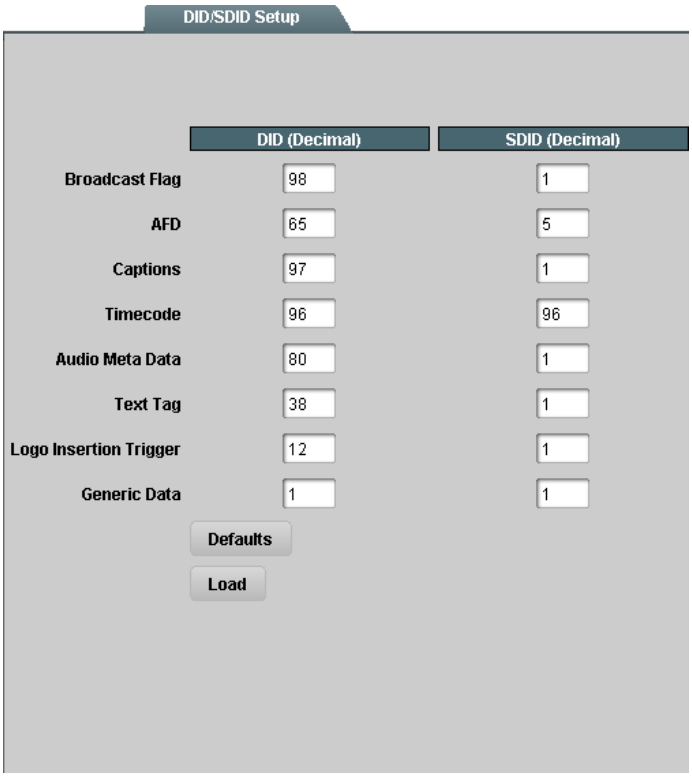


Figure 8. Setting metadata address

Setting timeouts for loss of metadata

Figure 9 shows the screen used to setup the timeout used to debounce the loss of metadata. The default values are normally appropriate but may be changed by selecting a new value from the pull down list and then clicking on the Load button.

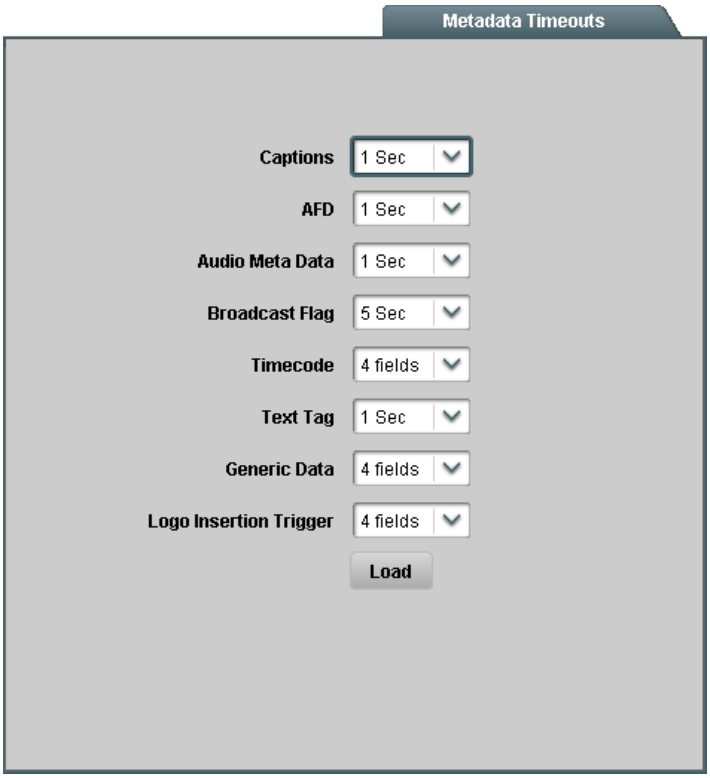


Figure 9. Setting metadata timeouts

Note — *The caption alarm is triggered by a one-second loss of caption data. However, the displayed caption text is cleared after ten seconds pass without any new caption text being presented, whether or not caption data is present*

Enabling alarms for the loss of the metadata

Figure 10 shows the screen used to select the conditions that will generate an alarm if they occur. The status of the alarm is shown on the **Alarm** tab. Any alarm in the red state causes the card state to be red. Or, viewed another way, on seeing that the card state is red, you should check which VANC data is missing on the **Alarms** tab.

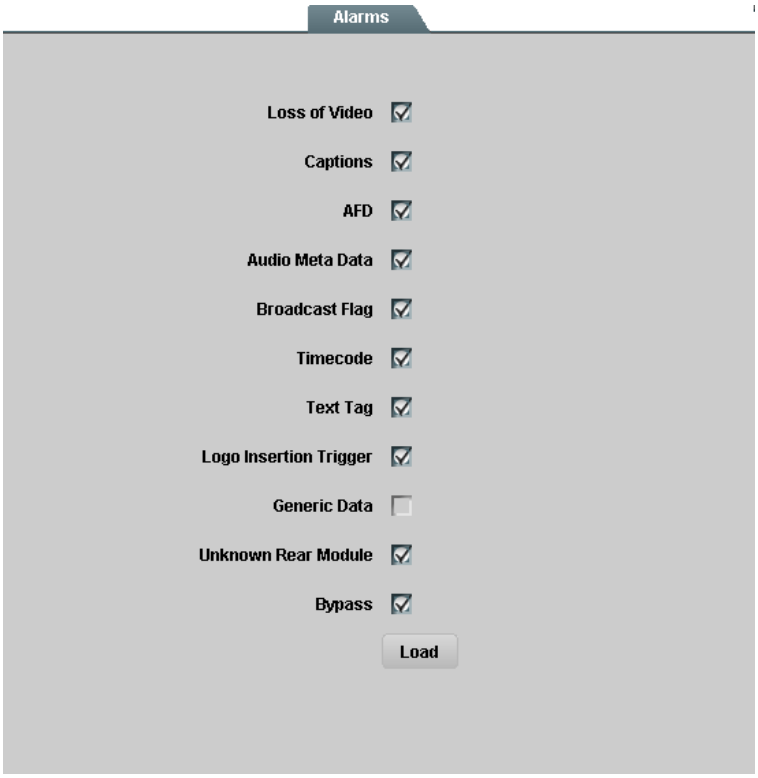


Figure 10: Enabling Alarms e.g. for loss of metadata

Note — *It is important that you enable each of the metadata services that you wish to monitor in the Settings menu before enabling alarms for them in this menu. Otherwise, the services will be shown as missing even when they are present.*

Specifying how to display the different metadata

The user interface has settings that allow you to control the display of the metadata on the screen. Each type of metadata has a tab that allows you to select how much detail is displayed. The following tabs are available:

- Status Block, a summary screen of the presence of metadata.
- AFD Block, controls Active Format Descriptor display.
- Logo Logs, controls what is displayed for logo insertion triggers.
- Time, controls the source of time and date and how it is used.
- Captions, controls the captioning information that is displayed.
- Audio Metadata monitoring, shows differences between captured and expected audio metadata.
- Timecode, control which timecode source is monitored.

Figure 11 shows the screen used to control the appearance of the status block metadata summary screen. Each checkbox controls whether the status block will contain a presence indicator for the corresponding metadata type. On the video screen this will be a round indicator colored green if the metadata is present or red if it is not.

Note — *It is important that you enable each of the metadata services that you wish to monitor in the Settings menu before enabling their status display in this menu. Otherwise, the service will be shown as missing and its name will be flashing in the Status Block, even when it is present.*

Each of the indicators is available separately but this screen is a convenient way to group the indicators together.

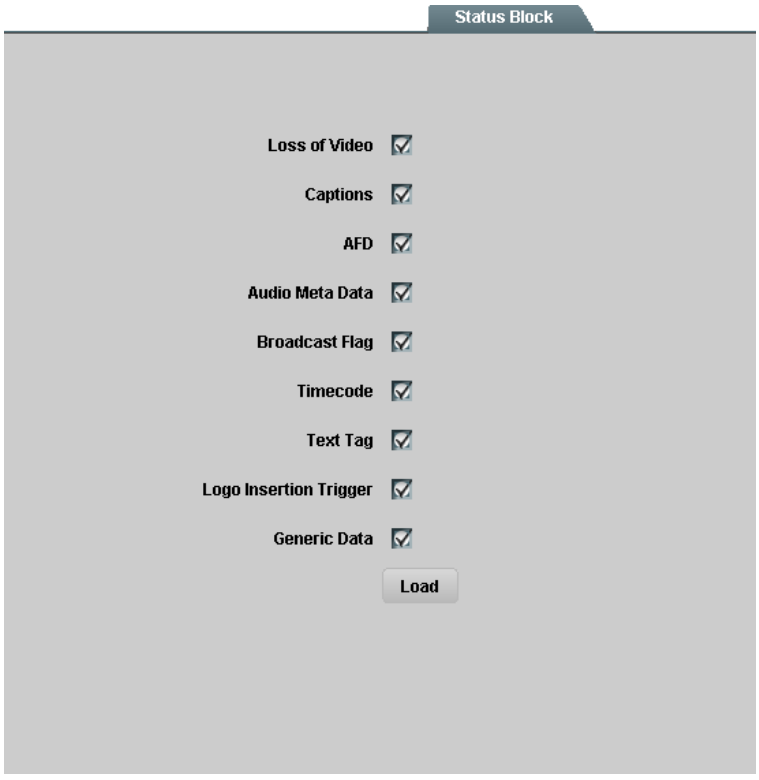


Figure 11. Status Block summary screen

Figure 12 shows the screen used to control the appearance of the Active Format Descriptor when overlaid on video. The display will be one or two lines of text depending on the boxes that are checked.

AFD Description causes the display of a line of text describing the AFD information. When not set, only a short form is displayed. When set, the short form is followed by a long description. A typical AFD description would look like:

```
AFD 16:9_8 Full frame 16:9 image preferred coding
```

"AFD 16:9_8" is the short form, where 16:9 is the aspect ratio and 8 is the AFD code. The rest of the line is the long description of what code 8 means.

AFD Bars controls whether a second line displays the bar information. This will be in the form:

```
Top Bar 25     Bottom Bar 746
```

It will display the top and bottom line numbers for letterbox images and the left and right pixel numbers for pillar bar images.

Use SMPTE descriptions allows the user select SMPTE or common text descriptions.

The GPIO trigger controls allow the user to set output GPIOs to trigger on specific AFD codes.

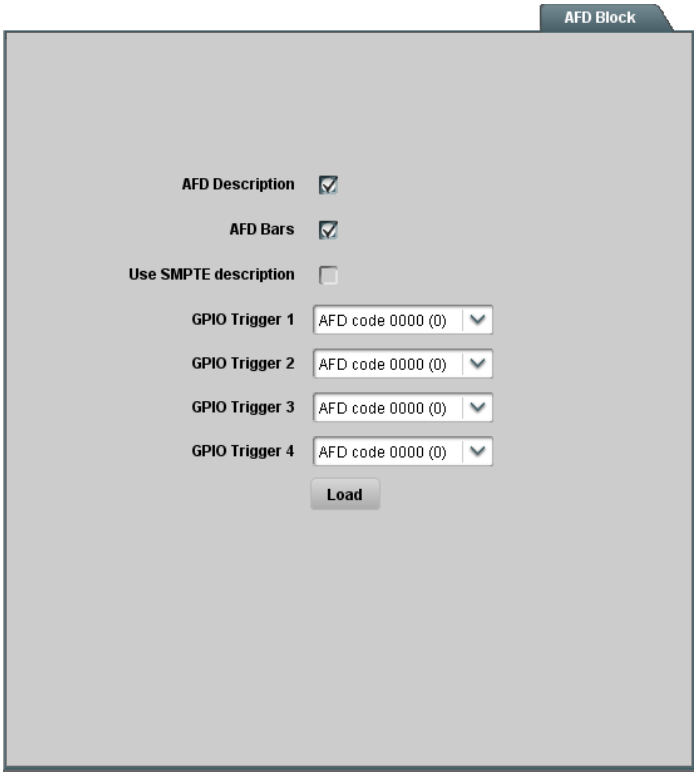


Figure 12. AFD Block

Figure 13 shows the screen used to control the appearance of the log of the logo insertion triggers when overlaid on video. There are two options; a summary of all the trigger metadata using abbreviations or a full text description of just the trigger type.

The logo trigger log is an on-screen list of the last five logo insertion triggers. Currently the CBS LIDIA V trigger format is supported.

Figure 13. Logo Logs

The logo triggers overlay is a full width overlay of variable length. The first two lines are the last or currently active trigger. The next one to five lines are the history of the previous triggers. The Full Text Description check box affects the way the history lines are displayed. A typical logo trigger overlay looks like:

```
14:23:10-Active Fade= 5 Fade=5 0,0 s=0
Solid Logo
13:29:00-13:29:10 SL F=5 F=5 0,0 s=0
13:10:30-13:10:45 SL,ST+T F=5 F=5 0,0 s=0
```

There are three possible logos called “Logo”, “Time and Temp” and “Text”; in short form, these are L, T+T and T. Each of these can be displayed on a solid black or a transparent background which are displayed as Solid or Trans in their long form or S and T in their short form. The bottom history line therefore shows that between 13:10:30 and 13:10:45 there were both a solid logo and a solid time and temp which faded in for 5 seconds and faded out for 5 seconds. The logos were positioned at the default location (0,0) and were for service 0.

The VRC-100 allows you to include a display of the local time and date in the video overlay. Figure 14 shows the screen used to set the time and date. Automatic time setting is convenient, provided you have network access to an NTP (Network Time Protocol) server.

To enable this feature, you need to:

1. Select **Network Time** on this menu.
2. 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).
3. Enable or disable **DST** (Daylight Savings Time) as appropriate, and click **Accept**.
4. In order to use network time, you also need to ensure that the network card in the openGear frame has been configured to acquire time from an NTP server. To do this, double-click the network card in slot 0 of the frame and then click the **Network** settings tab. In the menu shown below, enter the IP address of the NTP server and then click **Apply**.

Figure 14. Network Tab

5. If you do not have access to an NTP server, you can enter the time and date directly on the **Time** menu, select **Manual** and click **Accept**.

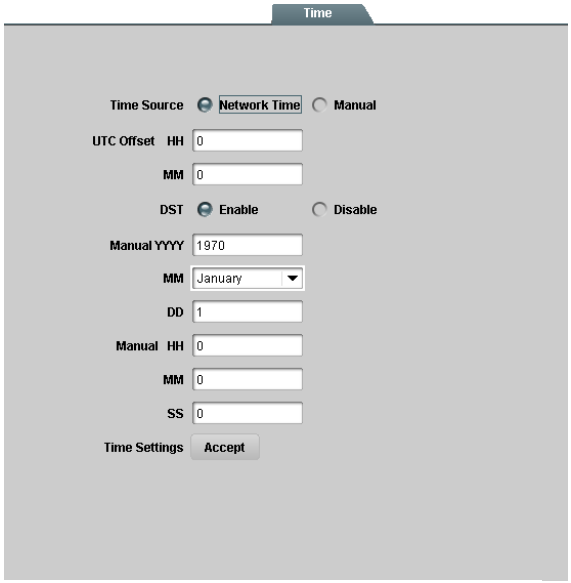


Figure 15. Time Tab

Figure 15 shows the screen used to control the appearance of the Captions when overlaid on video. There are four caption windows which can be placed on the screen. Each window may contain one of the captioning text streams as defined in CEA 708.

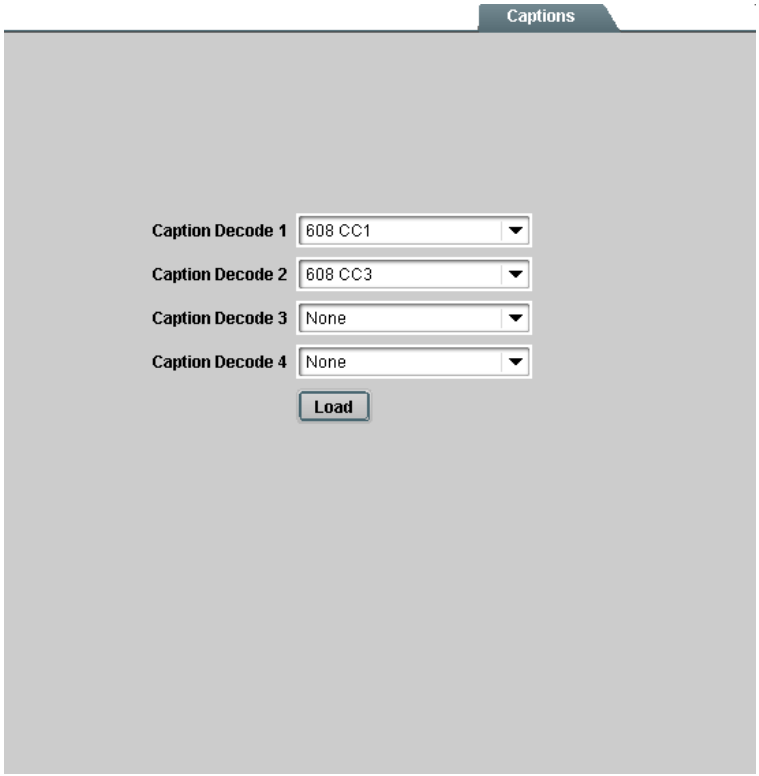


Figure 16. Captions

First language captions are normally in the 708 Primary Language and in 608 CC1. The second language captions are normally in the 708 Secondary Language and 608 CC3.

Note — *To be compliant with FCC caption rules a signal must contain both 708 and 608 captions. The VRC-100 allows you to check that both are present.*

Audio metadata monitoring is controlled by the Audio Metadata tab which has four sub-tabs as shown in Figures 16 to 19. The card will store up to five program configurations which it matches captured audio metadata against. Figure 16 shows the first sub-tab of Audio Metadata Monitoring.

The **Current Program Config** pull-down menu selects which of the five configurations to modify.
The **Program Config** selects which of the program configurations this set of data will be used to match against.
The **Encode Method** and **Frame Rate** are parameters and can be set to explicit, must match, values or left as Don't Care so that they will not be used in the match. Data which does not match will be displayed in red on the overlay screen and will cause the audio metadata indicator to be red.
The **Load Defaults**, **Copy** and **Paste** buttons can be used to lessen the burden of setting the many audio metadata parameters. Copy allows you to copy the settings from one program and Paste allows you to set them into a different program. You then only have to change the parameters which are different between the two programs.
The **Apply Current Program Matches** button is how you save your work. It is wise to save your work often.

Each program configuration has a number of programs and all parameters on the Program, XBS and Flags sub-tabs must be set to their match values or to Don't Care if no match is desired. The program number pull-down menu selects which program parameters are set. So, start with program 1 and set the parameters and then do program 2 and so on until all the required programs are set. Use **Copy** and **Paste** whenever possible to limit the number of parameters to set.

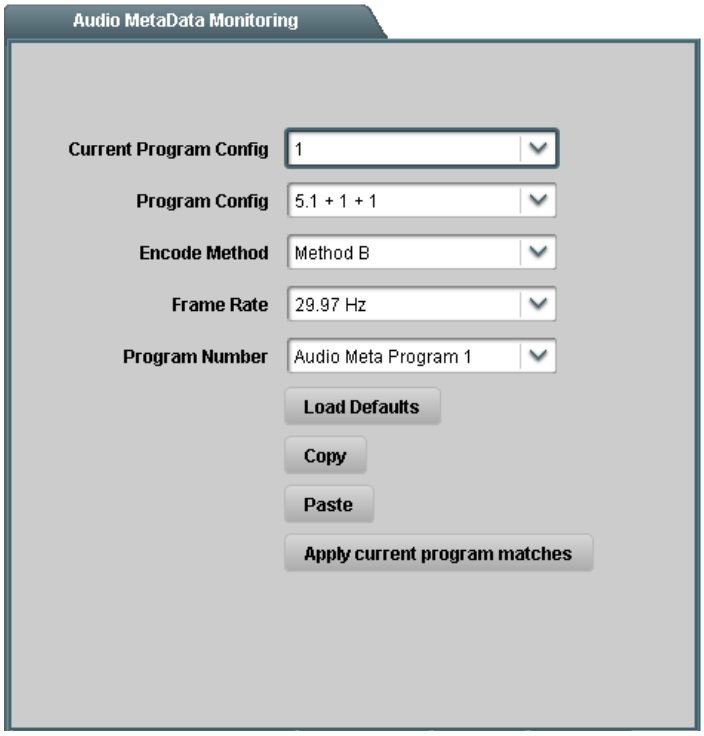


Figure 17. Audio Metadata Monitoring – main sub-tab

Figures 17, 18 and 19 show the Program, XBS and Flags sub-tabs. Each parameter for the program must be set to a match value or to Don't Care if no match is desired.

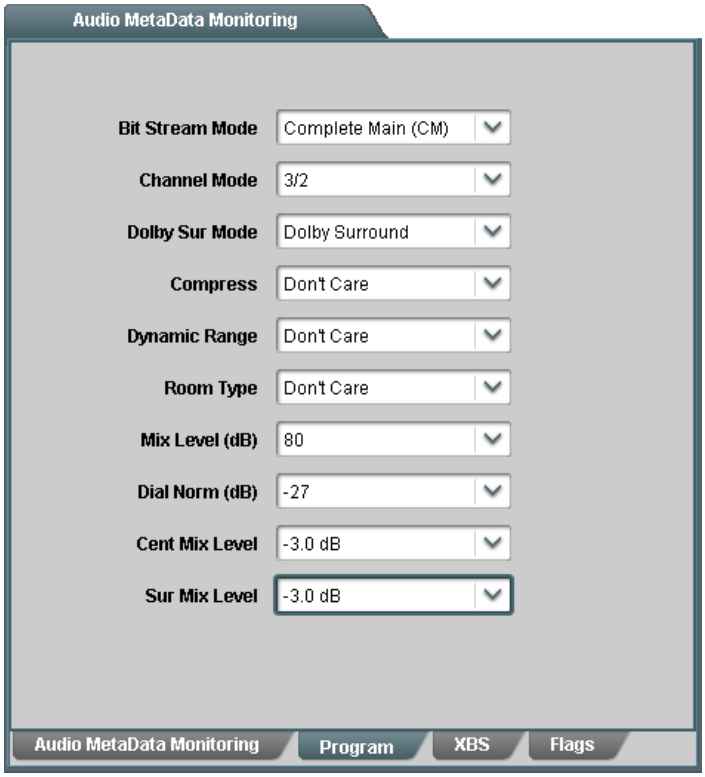


Figure 18. Audio Metadata Monitoring – Program sub-tab

Figure 19. Audio Metadata Monitoring – XBS sub-tab

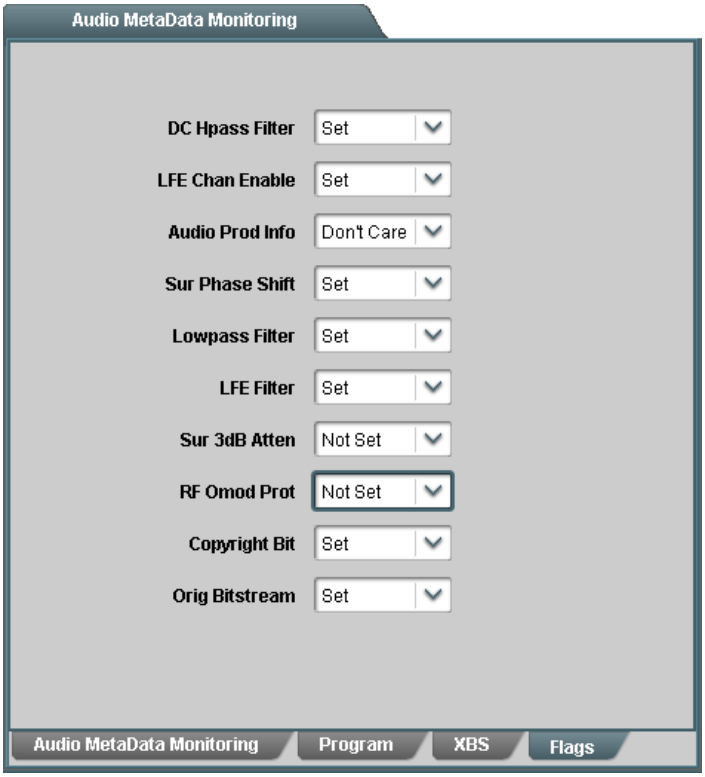


Figure 20. Audio Metadata Monitoring – Flags sub-tab

Figure 20 shows the **Timecode** tab. The VANC may include two types of timecode on three possible lines. Normally the first timecode found anywhere in the VANC is the one displayed. If the **Enable Timecode Filter** box is checked then timecode will only be decoded from the line and field selected.

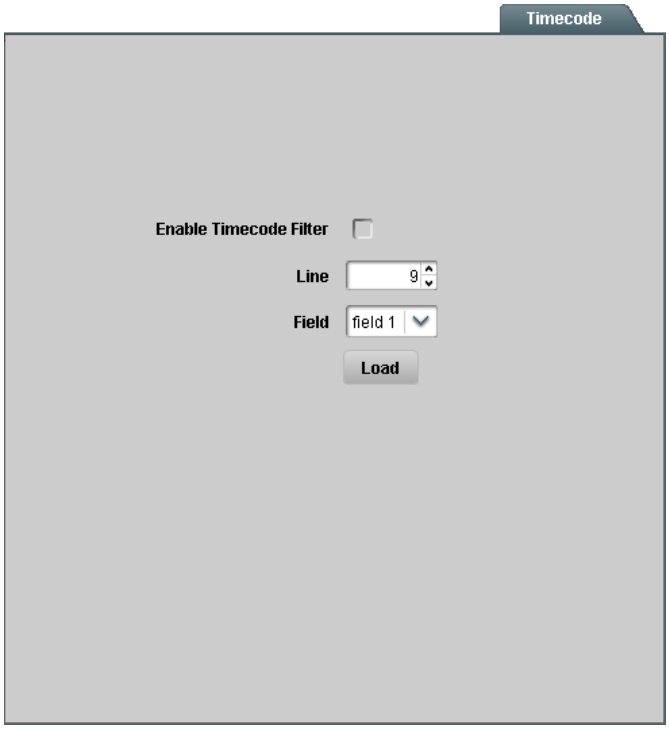


Figure 21. Timecode tab

Selecting the background color

Figure 21 shows the screen used to control whether text is overlaid on a black background or a semi-transparent background. Each of the metadata components has a checkbox on this screen.

- If the box is checked then the background will be black. Left unchecked, the background will be semi-transparent.
- Choose the black background to achieve the most legible display of the metadata information.
- Choose the transparent background to cover as little of the underlying picture as possible.

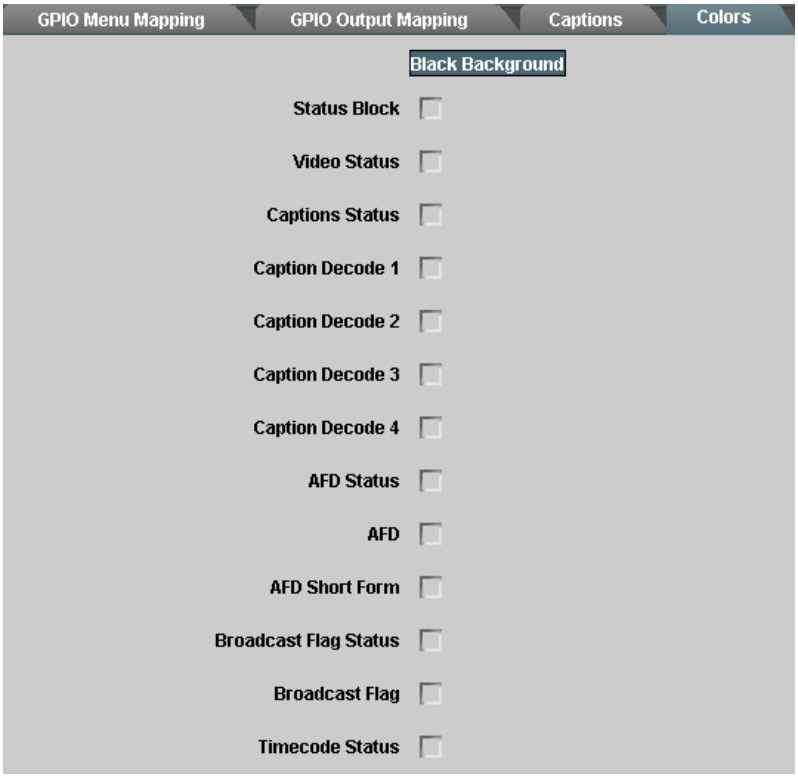


Figure 22. Setting the Background Color

Setting GPIO inputs and outputs

GPIOs serve two purposes; as inputs, GPIOs select what is overlaid over the video. As outputs, GPIOs act as alarms when a metadata is not present. Figure 22 shows the screen used to control the direction of the eight GPIOs. Each GPIO input controls the display of one screen layout of metadata. The contents of the layout are controlled by the layout tab which is described later. An active GPIO causes the layout associated with it to be displayed.

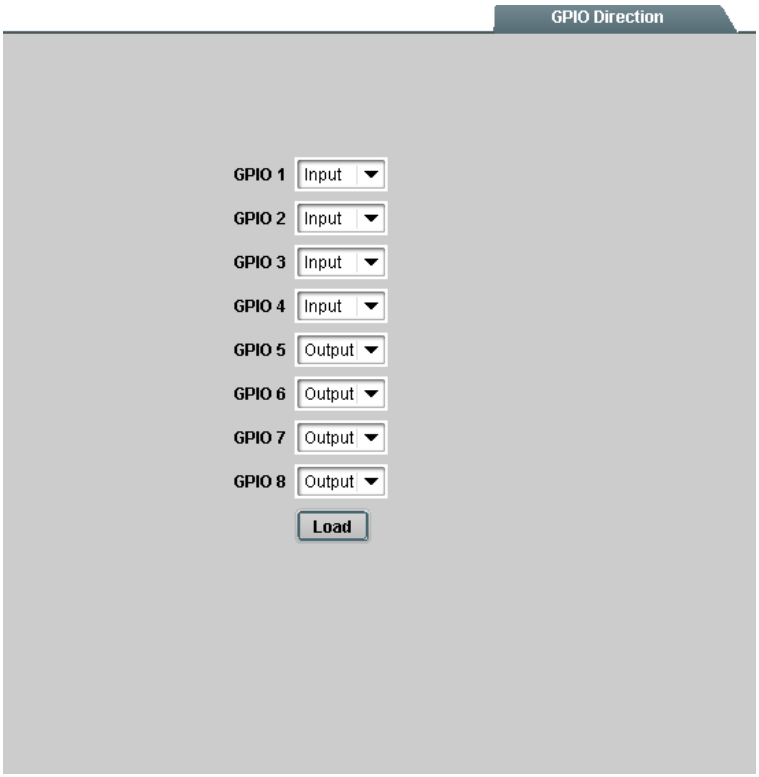


Figure 23. GPIO direction

GPIO outputs can be associated with alarms and their state will then change with the state of the alarm. The mapping of alarms to GPIOs is discussed later.

Defining screen layouts

The goal of the VRC-100 layout tab is to take metadata and combine then into screens. Figure 23 shows the layouts tab. There are eight possible layouts as selected by the Layout Menu pull-down. Each layout can contain zero to four Layout Items. These items are the metadata objects that you have configured as described earlier in this manual.

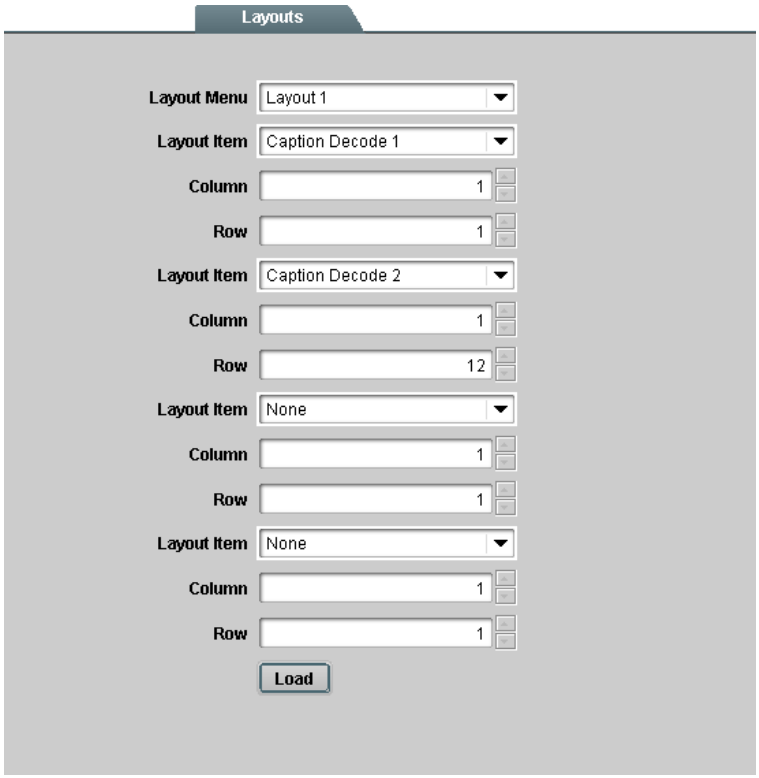


Figure 24. Layouts

Each layout item must be placed on the overlay screen. This is done by selecting a row and column position for the information. There are three columns across the screen and 24 rows. Each layout item has a size so not all possible screen position are allowed for all items.

When working with layouts it is recommended that you watch the overlay screen to make sure the screen is as desired.

Layout Item List

The Layout Item list contains the following:

1. None, no overlay on video.
2. Status Block, the summary of alarm status as described earlier. This overlay has a width of one third of the screen; its height is one text row, plus one row per enabled alarm. Controlled by the Status Block tab.
3. Video Status, a red/green indication of whether video is present at the input. This overlay is one third of a row.
4. Caption Status, a red/green indicator of caption data presence in the VANC. This overlay is one third of a row.
5. Caption Decode 1 to 4, a scrolling window displaying one of the 708 caption streams as controlled by the Captions tab. This overlay is nine full rows.
6. XDS, a 5 line full width overlay showing the most common 608 XDS records. This includes the records contents and two timers. One timer counts the time since the last capture of the record and the other shows the number of seconds between the last two records.
7. XDS Rating, a single line full width overlay containing the Vchip rating.
8. XDS CGMS, a single line full width overlay containing the CGMS record information.
9. AFD Status, a red/green indication of AFD data presence in the VANC. This overlay is one third of a row.
10. AFD, a one or two row full width overlay describing the AFD data as controlled by the AFD tab.
11. AFD Short Form, a short form display of the current AFD code. This overlay is one third of a row.
12. Broadcast Flag Status, a red/green indication of broadcast flag presence in the VANC. This overlay is one third of a row.
13. Broadcast Flag, a display of the number of seconds between occurrences of the broadcast flag. This overlay is one third of a row.
14. Timecode Status, a red/green indication of timecode data presence in the VANC. This overlay is one third of a row.
15. Timecode, an overlay containing the timecode in the format HH:MM:SS:FF. This overlay is one third of a row.
16. Text Tag Status, a red/green indication of the presence of the DID/SDID containing the text packet. This overlay is one third of a row.
17. Text Tag, a one-row display of the first 16 printable characters contained in the packet defined as the text tag. This overlay is one third of a row.
18. Logo Insertion Trigger Status, a red/green indication of logo insertion trigger presence in the VANC. This overlay is one third of a row.
19. Logo Insertion Trigger, an on-screen log of the last five logo insertion triggers. It includes a time stamp and the trigger information as controlled by the Logo Logs tab. This overlay has a variable size but requires a window of seven full rows.
20. Audio Metadata Status, a red/green indication of audio metadata presence in the VANC. This overlay is one third of a row.
21. Audio Metadata, a two-row full width overlay showing the top level information about SMPTE 2020 audio metadata.
22. Audio Programs Short, a summary of all active programs of the audio metadata. Each program requires two full width rows; all eight would take 16 rows.
23. Audio Meta Program 1 to 8, a detailed overlay of all the audio metadata for a program; it uses eleven full rows.
24. Time and Date, a convenient way to overlay the current time and date on the screen. This information is not decoded from the VANC but from the card's clock as set in the Time tab. This overlay is one third of a row.
25. Generic Data, a red/green indication of the presence of a specified DID/SDID. This overlay is one third of a row.

Defining the default screen layouts and sequencing

Figure 24 shows the **Default Screen** tab. This tab controls which layouts will be overlaid on the video when none of the GPIO switches are in use. Any checked layout will be part of a sequence of overlays. The Display Time is the length of time in seconds that each overlay will remain on the screen. If no boxes are checked then no overlays will be present unless requested by a GPIO switch. GPIO switches have priority over the default sequence and will immediately bring up the overlay associated with the switch. The **Load** button makes the selections active.

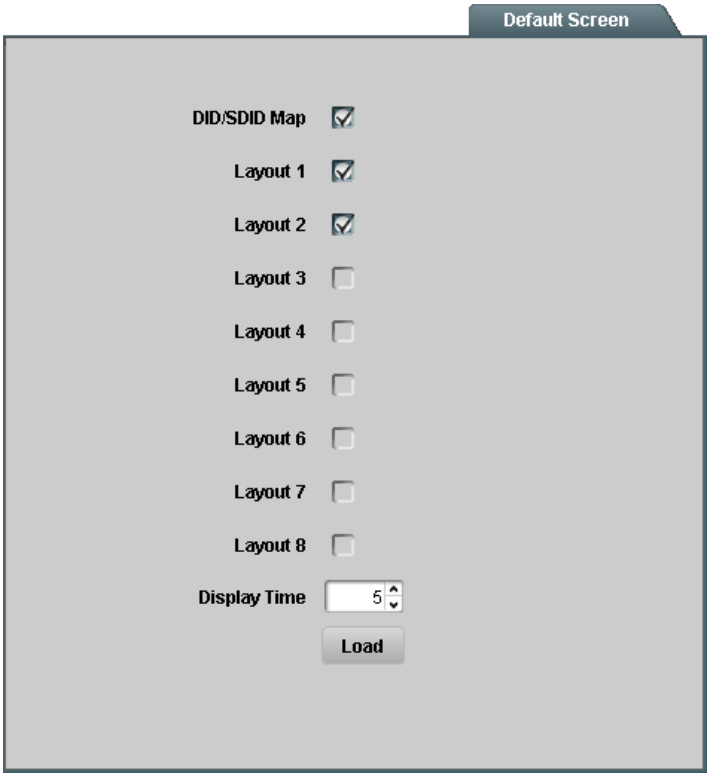


Figure 25. Default Screen

Controlling Screen Layouts with GPIOs

The next step is to define which GPIO, if any, will control when a screen layout is overlaid on the screen. Figure 25 shows the screen which allows GPIOs to control the display of screen layouts. On this screen there is one GPIO layout pull-down for each GPIO set up for input (zero to eight). The default layout is the one which is used when no GPIOs are active. This may be any layout, a DID/SDID Map or no overlay.

The lower the number of the GPIO the higher its priority as an input. So, if both GPIO1 and GPIO2 are active, then the screen associated with GPIO1 is displayed.

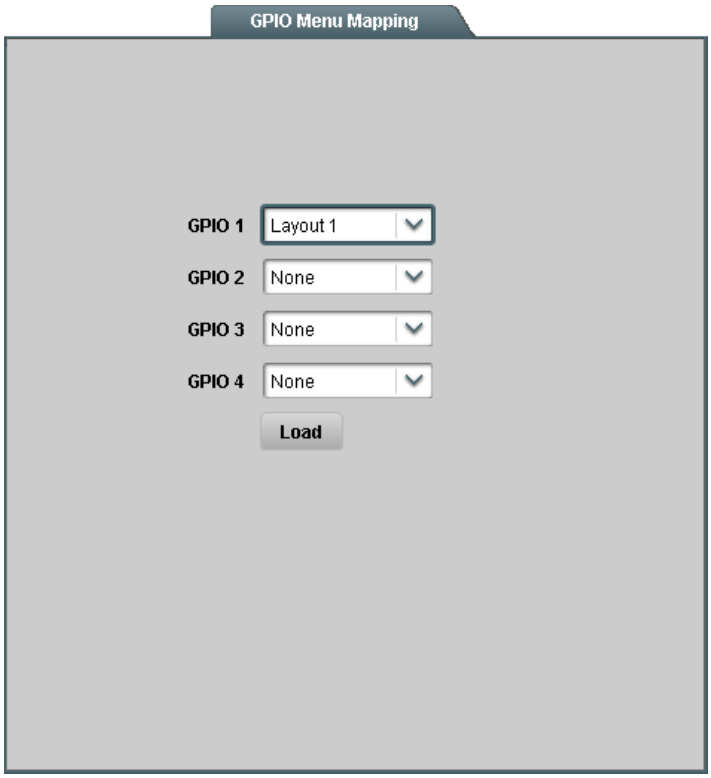


Figure 26. GPIO Menu Mapping

Note — *If the VRC-100 is using rear module a rear module that has no GPIOs or only has relays this menu will not appear and all GPIOs will be set to output.*

Connecting Alarms to GPIOs

An alarm is generated when metadata or video is not present. The metadata service must be one that is being monitored and the alarm for the metadata must be enabled as described earlier in this document. Figure 26 shows the screen that controls the mapping of alarms to GPIOs. There will be one GPIO alarm pull-down for each GPIO configured for output, as described earlier in this manual. Once a GPIO is attached to a type of metadata, its output will track the presence of that metadata. The polarity can be changed by checking the **Active Low** box. With the box checked, a high level on the GPIO indicates the absence of the assigned signal; with the box unchecked, a high level on the GPIO indicates its presence.

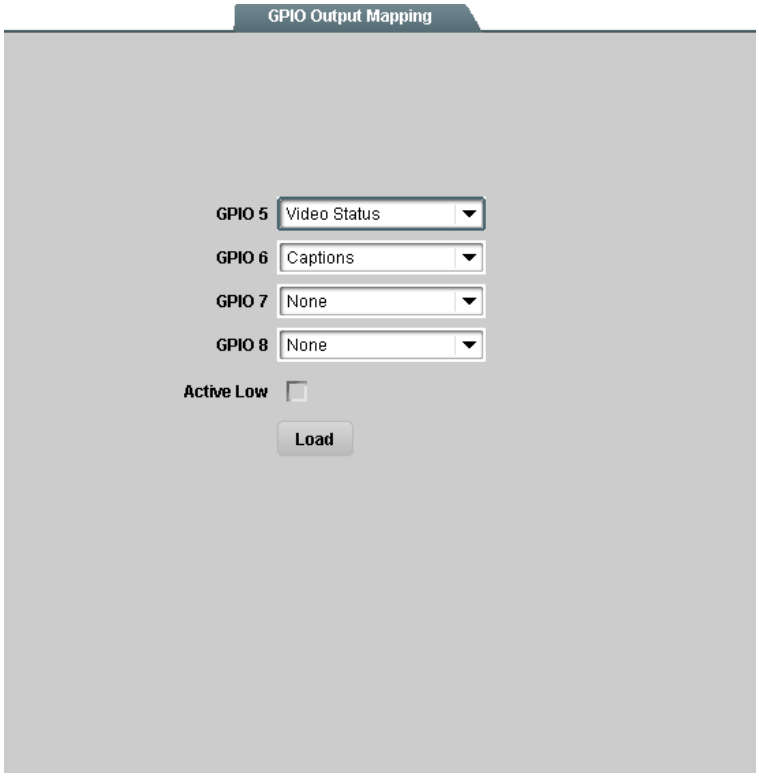


Figure 27. GPIO Output Mapping

There is a delay built in to the detection of loss of metadata. This debounces the loss of metadata alarms. Different types of metadata have different debounce times, as discussed in a previous section.

Note — *If the VRC-100 is using rear module with no GPIOs or relays this menu will not appear.*

Specifications

In This Chapter

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

Table 1. VRC-100 Technical Specifications

Category	Parameter	Specification
Serial Digital Video Inputs	Number Of Inputs	1 input
	Input Signal Standard Accommodated	SMPTE 292 HD-SDI, 1080i or 720p.
	Impedance	75Ω terminating in Active mode. If using an ONG-MDL-R01/R21/R23 rear module, loop-through to Video Output in Bypass mode
	Equalization	Over 100 m of Belden 1694A cable
	Return Loss	>13dB to 1.485GHz
Serial Digital Video Outputs	Number of Outputs	Three SMPTE 292 outputs with optionally overlaid on-screen display. If using an ONG-MDL-R01/R21/R23 rear module, one output is bypass-protected.
	Impedance	75Ω
	Return Loss	>10dB to 1.485GHz
	Signal Level	800mV ±10%
	DC Offset	0 Volts ±50 mV
	Rise & Fall Time (20-80%)	120ps. typical
	Overshoot	<8%
GPIO connections	Number and type of inputs or outputs	With recommended ONG-MDL-R01/R21/R23 rear module: 8 logic inputs or outputs (3.3v) plus ground.
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 VRC-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 VRC-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 received within 60 seconds, the card will attempt to restart with the last operational software load.

Software loads can be sent to the VRC-100 from DashBoard, using a MFDC-8300 Series Network Controller card.

Warranty and Repair Policy

The VRC-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 VRC-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 VRC-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 VRC-100. Ross Video policy dictates that all repairs to the VRC-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 VRC-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 VRC-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.

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
	After –hours emergency	613 • 349 • 0006
	Fax	613 • 652 • 4425
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: VRC100DR-004-02