TES-8943 User Guide

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David Ross
CEO, Ross Video
dross@rossvideo.com

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TES-8943 · User Guide

- Ross Part Number: **8943DR-004-02**
- Revision: 3
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- Software Version: **1.4**

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Patents

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

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Ross Video Limited
8 John Street
P.O. Box 220
Iroquois, ON
Canada K0E 1K0
techsupport@rossvideo.com

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

These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a Commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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

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

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If you would like more information on how Ross Video security and privacy practices have been applied to the TES-8943, what you should know about maintaining security of this product, and how we can partner with you to ensure security throughout this product's life-cycle, contact techsupport@rossvideo.com.

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- Vulnerability and Patch Management
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- Vulnerability Scanning
- Access Controls appropriate to Customer Data
- Incident Response
- Clear paths for two-way communication between customers and Ross Video

If you would like to report a potential product related privacy or security issue (incident, breach, or vulnerability), contact techsupport@rossvideo.com.

Company Address

Ross Video Limited
8 John Street
Iroquois, Ontario
Canada, K0E 1K0

Ross Video Incorporated
P.O. Box 880
Ogdensburg, New York
USA 13669-0880

General Business Office: (+1) 613 • 652 • 4886
Fax: (+1) 613 • 652 • 4425

Technical Support: (+1) 613 • 652 • 4886
After Hours Emergency: (+1) 613 • 349 • 0006

E-mail (Technical Support): techsupport@rossvideo.com
E-mail (General Information): solutions@rossvideo.com
Website: http://www.rossvideo.com

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Introduction

This guide covers the installation, configuration, and use of the TES-8943. The following chapters are included:

- "**Introduction**" summarizes the guide and provides important terms, and conventions.
- "**Before You Begin**" provides general information to keep in mind before installing and configuring your TES-8943.
- "**Configuration Example**" provides a workflow example and related setup tasks.
- "**Hardware Overview**" provides a basic introduction to the TES-8943 hardware features including the cabling and monitoring features of the rear module.
- "**Physical Installation**" provides instructions for the physical installation of the TES-8943 and its rear module into an openGear frame.
- "**Cabling**" provides an overview of connecting input and output devices to each rear module of the TES-8943.
- "**Getting Started**" outlines how to display the TES-8943 interfaces in DashBoard.
- "**Licensed Features**" outlines the available software licensed features, and how to install a software key for a licensed feature.
- "**Reference and Timing Setup**" provides instructions for specifying the reference source for the TES-8943.
- "**Specifying the Video Format**" outlines how to specify the video format for the card output.
- "**Configuring a Remote Port for VANC Data**" outlines how to configure a TES Raw Data channel for an ethernet or serial connection.
- "**ANC Setup**" provides an overview of ANC processing for the TES-8943.
- "**VANC Encoding**" outlines how to configure the encoding and decoding features of the TES-8943 in a transparent stream.
- "**VANC Decoding**" outlines how to configure the decoding features of the TES-8943 in a transparent stream.
- "**Configuring the GPI/Tallies**" outlines how to configure the GPIO ports as a general input, a general output, or as part of an ANC workflow.
- "**SCTE-104 Messages**" outlines how to configure the TES-8943 to manage SCTE-104 messages.
- "**LTC and VITC Configuration**" explains how to configure the TES-8943 to manage LTC and VITC ancillary data.
- "**Using RossTalk**" outlines how to configure the TES-8943 for RossTalk communication over ethernet or serial, and configuring a GPIO port for RossTalk timecode messages.
- "**Monitoring**" summarizes the read-only status fields in DashBoard that report the encoding and decoding status of the TES-8943.
- "**Upgrading the Software**" outlines how to upgrade the TES-8943 via DashBoard.
- "**DashBoard Interface Overview**" summarizes the menus and parameters of the TES-8943 interfaces in DashBoard.
- "**Technical Specifications**" provides the specifications for the TES-8943.
- "**Service Information**" provides information on the warranty and repair policy for your TES-8943.
- "**Software Licenses**" provides third-party software license information for your TES-8943.
- "**Glossary**" provides a list of terms used throughout this guide.

Related Publications

It is recommended to consult the following Ross documentation before installing and configuring your TES-8943:

- ***DashBoard User Guide***, Ross Part Number: 8351DR-004
- ***MFC-OG3-N and MFC-8322-S User Guide***, Ross Part Number: 8322DR-004
- ***OGX-FR Series Quick Start Guide***, Ross Part Number: 8322DR-202
- ***OGX-FR Series User Guide***, Ross Part Number: 8322DR-204

Documentation Conventions

Special text formats are used in this guide to identify parts of the user interface, text that a user must enter, or a sequence of menus and sub-menus that must be followed to reach a particular command.

Interface Elements

Bold text is used to identify a user interface element such as a dialog box, menu item, or button. For example:

In the **Network** tab, click **Apply**.

User Entered Text

Courier text is used to identify text that a user must enter. For example:

In the **Language** box, enter **`English`**.

Referenced Guides

Text set in bold and italic represent the titles of referenced guides, manuals, or documents. For example:

For more information, refer to the ***DashBoard User Guide***.

Menu Sequences

Menu arrows are used in procedures to identify a sequence of menu items that you must follow. For example, if a step reads "**File** > **Save As**," you would select the **File** menu and then click **Save As**.

Important Instructions

Star icons are used to identify important instructions or features. For example:

✶ Contact your IT department before connecting to your facility network to ensure that there are no conflicts. They will provide you with an appropriate value for the IP Address, Subnet Mask, and Gateway for your device.

Contacting Technical Support

At Ross Video, we take pride in the quality of our products, but if problems occur, help is as close as the nearest telephone.

Our 24-hour Hot Line service ensures you have access to technical expertise around the clock. After-sales service and technical support is provided directly by Ross Video personnel. During business hours (Eastern Time), technical support personnel are available by telephone. After hours and on weekends, a direct emergency technical support phone line is available. If the technical

support person who is on call does not answer this line immediately, a voice message can be left and the call will be returned shortly. This team of highly trained staff is available to react to any problem and to do whatever is necessary to ensure customer satisfaction.

- **Toll Free Technical Support (North America)**: 1-844-652-0645
- **Toll Free Technical Support (International)**: +800 1005 0100
- **Technical Support**: (+1) 613-652-4886
- **After Hours Emergency**: (+1) 613-349-0006
- **E-mail**: techsupport@rossvideo.com
- **Website**: http://www.rossvideo.com

Before You Begin

If you have questions pertaining to the operation of TES-8943, contact us at the numbers listed in "**Contacting Technical Support**". Our technical staff is always available for consultation, training, or service.

Overview

The TES-8943 is a broadcast-quality ancillary data encoder/decoder for uncompressed digital video signals. It operates with signals that comply with SMPTE 2082, SMPTE 424M, SMPTE 292M, and SMPTE 259M. The TES-8943 can be used to add the data to the digital video stream, or extract it, or both.

The TES-8943 can be part of a system that allows data to be inserted into the VANC (Vertical Ancillary) area of an SDI video signal for distribution over a video network. This method of data embedding ensures that the data follows the video signal wherever it is routed. Eventually, the video signal reaches a location where the data is extracted and processed.

The TES-8943 inserts data having various formats and purposes into the vertical ancillary (VANC) space of its video input signal. These VANC data streams comply with SMPTE 291M and SMPTE 334M.

The TES-8943 is also capable of extracting VANC data from its video input signal. This allows it to forward the data to other systems, and combine locally generated data with that already carried in the input.

You can also use the TES-8943 to encode SMPTE 104 messages into VANC in accordance with SMPTE 2010-2008. The SMPTE messages can be source from either the serial port or a TCP/IP connection. In addition to sourcing from a port, the GPIs can be configured to trigger up to 8 pre-determined triggers.

The TES-8943 can perform a number of functions:

- Inserting data received from one or more of the data ports into the video. This is normally called "encoding", "inserting" or "embedding".
- Extracting data from the video and forwarding it to one or more data ports. This is normally called "decoding", "extracting" or "dis-embedding".
- Deleting selected data from the video.

✶ The TES-8943 must be installed in an OGX-FR frame with an MFC-OG3-N or MFC-OGX-N Network Controller card.

Features

Some features of the TES-8943 include:

- Accepts 2160p[1], 1080p, 1080i, 720p, 480i, and 576i
- Simultaneous use of data input and output over LAN, and Serial
- Ample status for easy signal troubleshooting
- Reports status and configuration remotely via DashBoard
- VANC insertion and extraction as per SMPTE 334M
- Supports four encode data services, plus four transparent decode data services, and one SCTE 104 encode/decode service

1. The TES-8943-12G-LICENSE is required for 12G formats.

- Ability to append a data service to others that are already present in a line, without delaying the existing services
- Multiple packet per line VANC encoding/insertion at megabit rates
- Ability to locate incoming VANC packets by DID-SDID, regardless of their line number
- Ability to mark existing packets for deletion
- Deletion of all VANC on selected lines
- SCTE 104 Messages Encoding and Decoding
- Identifies the occurrence of an SCTE 104 trigger, either by recognizing the splice-insert commands or simply by detecting the present of the trigger Program ID (PID)
- Monitor selected PIDs and associate them with GPIO outputs, allowing you to monitor multiple services with one TES-8943 card
- Each GPIO can indicate either the presence or absence of the a specified PID
- Each GPIO output can be specified to either close for the full duration of a trigger, or pulse briefly to indicate the start or end of a trigger
- An on-board log of the last 24 trigger events can be browsed from DashBoard
- Ability to repeat the last SCTE 104 splice message
- Support for SCTE 104 GPIO controls via SNMP
- Supports SMPTE 104 DTMF messages via a GPIO port
- Compatible with DataSafe
- Fully compliant with openGear specifications
- 5-year transferable warranty

Functional Block Diagram

Figure 1 shows the flow of video and data through the TES-8943.

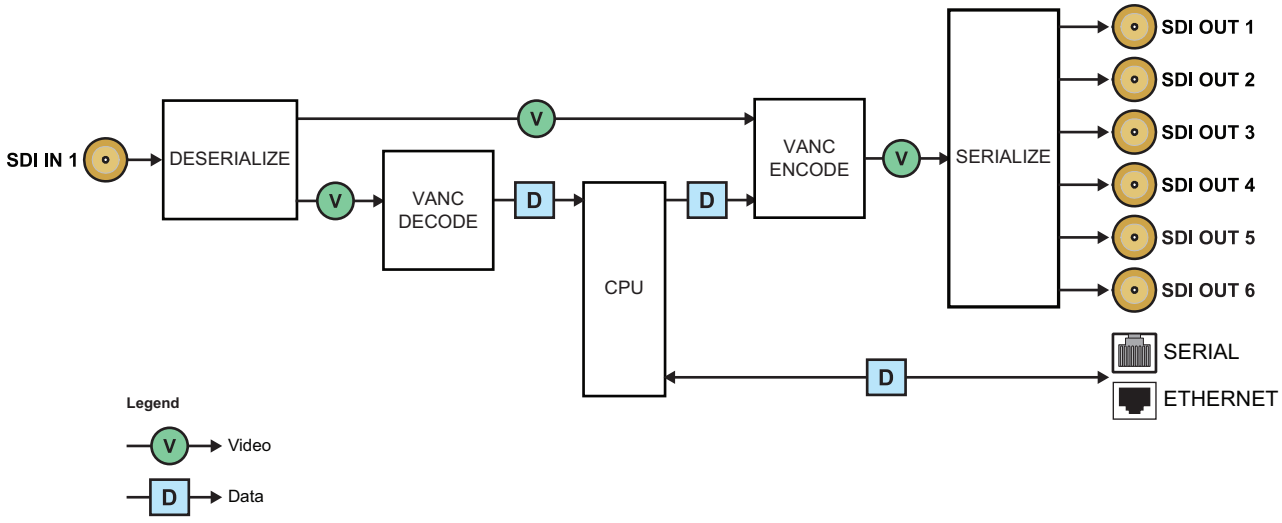


Figure 1 Functional Block Diagram

Figure 1 illustrates that a channel is equipped with a VANC decoder that provides extracted data to the CPU, and a VANC encoder that accepts data from the CPU for insertion into the video. The CPU also has access to a serial port and an ethernet port.

Workflow Overview

The VANC Processor is able to simultaneously insert and extract four data streams. Decode and encode operation and bandwidth usage are independent. Bandwidth for each is limited to just under 4kB/field including overhead (approximately 2Mbps of user data with maximum size packets at 60Hz). These eight data streams may be delivered via the network connection (Ethernet port) or one may be through the Serial port.

Transparent Encoding

The VANC Processor of the TES-8943 allows insertion in any line component of the VANC space that is defined for the video format (but not outside the VANC area). You can assign each data service to any valid line and component, including having any or all services share a single line and component. The VANC Processor allows you to specify whether to insert locally sourced data services after existing VANC data (append), or completely blank the line before inserting (overwrite).

Delay

Locally sourced data appears in the output stream with up to a one field delay. The upstream VANC data in the SDI input that are not processed, or that are simply marked for deletion, have a minimal delay equal to the SDI path length of the TES-8943.

Encode Overflow

If a line is not marked for deletion, then locally appended data may overflow the line. In this case the locally appended data will be appended in the next available VANC space. Additionally, a high capacity stream may exceed the space available in a single line, so again it is inserted in the next available VANC space. High capacity data should always be inserted on lines after other data services. We recommend >5lines after the switch-line.

VANC Deletion

The VANC Processor is able to 'mark for deletion' all incoming VANC packets having the same DID/SDID as services that are being inserted, regardless of their location in the VANC lines. This feature is automatically enabled for each DID/SDID used for insertion, to ensure that the output does not contain an unintended combination of upstream and locally inserted data bearing the same DID/SDID. The software has the ability to disable deletion for selected services, for example to allow an upstream data service to pass through when local insertion is paused.

- ✶ If an incoming service is carried in a line that is set for deletion, it will be deleted rather than just marked for deletion.

Transparent Decoding

You can specify services to be decoded and forwarded to a data port (serial or ethernet), by specifying the DID and SDID values. The TES-8943 finds and decodes these services, regardless of the line and luma/chroma component where they are carried in the SDI input.

DashBoard User Interface

The DashBoard client software enables you to monitor and control openGear frames and cards from a computer. DashBoard communicates with cards in the openGear frames through an MFC-OG3-N or MFC-OGX-N installed in the frame. This controller card is required in order to use DashBoard to control and monitor the TES-8943.

The TES-8943 includes DashBoard interfaces for configuration and operation. The interfaces are accessed by expanding the TES-8943 node in the DashBoard Tree View and selecting the appropriate sub-node.

For More Information on...

- displaying the TES-8943 in DashBoard, refer to "**Getting Started**".
- the TES-8943 menus and settings, refer to "**DashBoard Interface Overview**".

Configuration Example

This chapter describes the steps required to set up a working TES-8943 configuration. Many such configurations are possible, this is only one example.

✶ This chapter assumes that DashBoard is launched on your computer and the TES-8943 interface displays in the right-side of the DashBoard window. Refer to "**Getting Started**".

Overview

Figure 2 shows the devices involved in a simple data distribution system. In this configuration, there are two TES-8943 with one acting as an encoder, and the second as a decoder.

✶ In this chapter, the term *encoder* is used to refer to a TES-8943 which is being used to insert data into the video signal, and *decoder* is used to refer to a TES-8943 which is extracting data from the video signal.

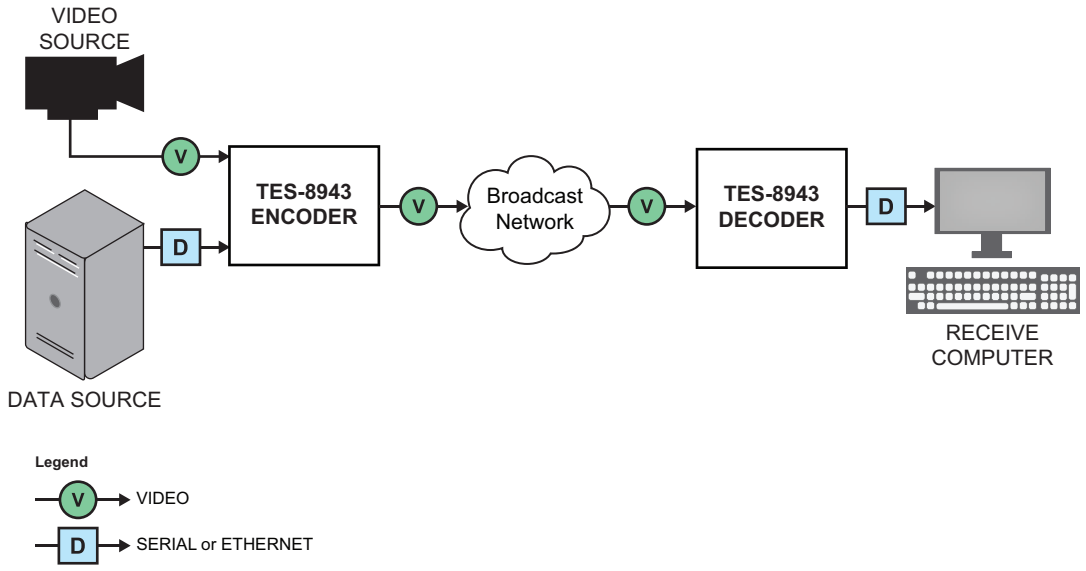


Figure 2 Work Flow Diagram — Simple Data Distribution System

Example: Raw Data Carriage in VANC

You want to use VANC through SDI as an end-to-end one-way data channel. The data output at the receive end must be identical to the input data at the transmit end, except for propagation delay. In this simple example, we will use Telnet to send text through VANC.

System Components

This section briefly describes the components seen in the use case presented in **Figure 2**.

DATA SOURCE

The Data Source executes application programs that supply data to the encoder.

In practical applications, data is sent to the TES-8943 encoder by application programs which may be written specifically for the data distribution system. Note that proper software timing may be critical to proper transmission of data.

In **Figure 2** a standard Telnet client, such as Tera Term, is used to send text that you type to the TES-8943.

TES-8943 ENCODER

The TES-8943 can encode up to four different input data streams into VANC lines of the SDI input. In this example, we will encode just one stream using transparent Byte mode.

DATA SOURCE to TES-8943 LINK

The link between the Data Source and the TES-8943 encoder, and between the TES-8943 decoder and receive computer, are a combination of ethernet (LAN) and serial connections. **Figure 2** uses an ethernet connection.

TES-8943 DECODER

The TES-8943 can decode up to four different data streams from VANC lines of the SDI input. **Figure 2** shows the decoding of one stream.

TES-8943 DECODER to RECEIVE COMPUTER LINK

The link between the TES-8943 decoder and the receive computer can be any combination of LAN and serial connections, as discussed above for the Data Source to TES-8943 Encoder link. In **Figure 2**, the Receive computer runs a Telnet client, just as the Data Source does.

RECEIVE COMPUTER

The receive computer processes the extracted VANC data. The program that processes the data can be either a Ross Video application program or a user-provided program. The term “computer” is used here to represent any type of device that can accept data from the TES-8943; for example, in the case of captioning data, this might be an MPEG video encoder.

Installing the TES-8943

This section provides a general overview of how to cable the two TES-8943 and external equipment.

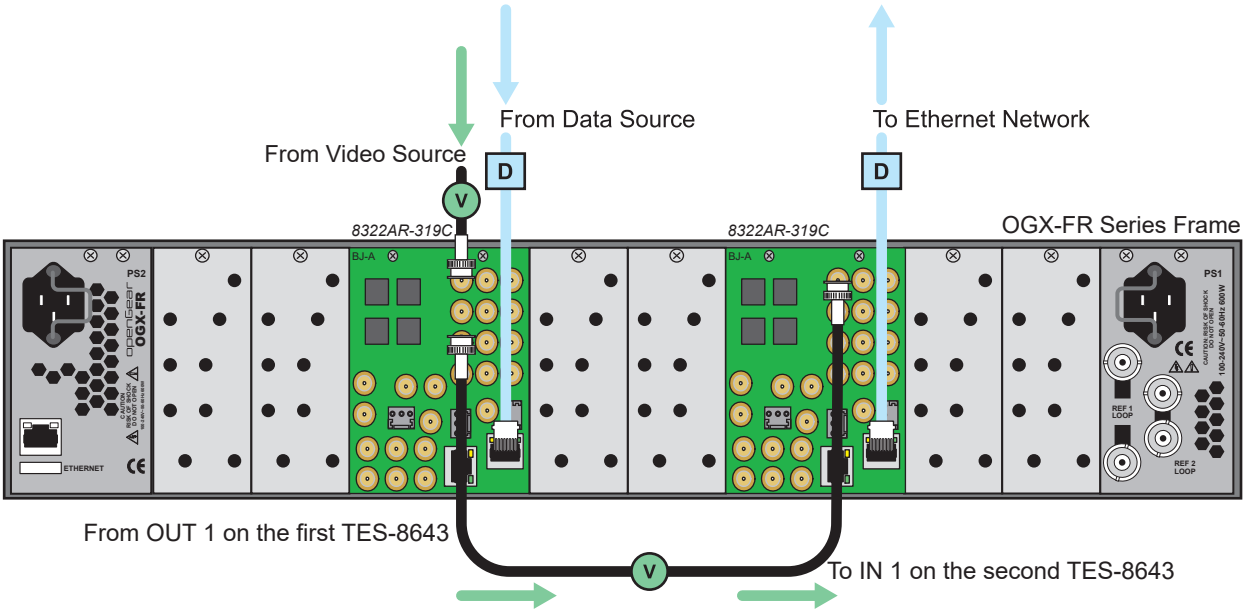


Figure 3 Cabling Overview

Installing the TES-8943 cards in an openGear frame

1. Install each rear module in the backplane of the openGear frame as outlined in "**Installing the Rear Module into the OGX-FR Frame**".
2. Install the first card in the appropriate slots as outlined in "**Installing the TES-8943 into an OGX-FR Frame**".
3. Connect the **OUT 1** BNC on the first TES-8943 to the **IN 1** BNC on the second TES-8943. See **Figure 3**.
4. Connect the **IN 1** BNC on the first TES-8943 to the video source. See **Figure 3**.
5. Connect the Data Source and the first TES-8943 to the network. See **Figure 3**.
6. Connect the receive computer and the second TES-8943 to the network. See **Figure 3**.

Configuration

This section outlines how to configure each TES-8943 as seen in **Figure 2**.

Set up Communications for each TES-8943

Perform the following procedure for each TES-8943 to set up basic communications for the card, select a reference source, and configure the video outputs.

To set up communications for a TES-8943

1. Configure the ethernet communications on the TES-8943 as outlined in "**Configuring the Ethernet Port on the Rear Module**".

   This allows the card to communicate with the Network Controller card in the openGear frame and DashBoard.
2. Configure the reference source for the TES-8943 as outlined in "**Specifying a Global Reference Source**".
3. Select the video format as outlined in "**Specifying the Video Format**".

   It is recommended to select **Input 1**.

Configure the First TES-8943 for Encoding

The first TES-8943 communicates with the Data Source over Telnet, and then sends the encoded service over VANC to the second TES-8943.

To configure the first TES-8943 for encoding

1. Select the **ANC Encode 1** tab.
2. Configure the first TES-8943 as outlined in "**To set up communications for a TES-8943**"
3. Set the **Encode Mode** to **Byte**.
4. Enable the **Flush Buffer at VANC** for **Field 1**.

To configure the data ports on the first TES-8943

1. Verify that the encoding streams configured in the previous section is now listed in the **Ports** sub-tabs.
2. To configure the **Ethernet** port, follow the instructions in "**Configuring the Ethernet Port on the Rear Module**".
3. Note the port number selected here, and the IP address displayed in the **Network Status** tab. You will need these settings to configure your transmit Telnet session.

Configure the Second TES-8943 for Decoding

The second TES-8943 receives the encoded service over VANC from the first TES-8943 and communicates with the receive computer over ethernet.

To configure the second TES-8943 for decoding

1. Select the **ANC Decode** tab.
2. Configure the second TES-8943 as outlined in "**To set up communications for a TES-8943**".
3. Set the DID and SDID to the same values you selected for encoding on the first TES-8943.

To configure the data ports on the second TES-8943

1. Verify that the decoding streams that you configured in the section are now listed in the **Ports** sub-tabs.
2. To configure the **Ethernet** port, follow the instructions in "**Configuring the Ethernet Port on the Rear Module**".
3. Note the port number selected here, and the IP address displayed in the **Network Status** tab. You will need these settings to configure your receive Telnet session

Using Telnet

This section briefly summarizes how to use Telnet to connect the two TES-8943 to the transmit and receive computers.

To use Telnet

1. Run the Telnet client programs on the Data Source and Receive computer.
2. In the Data Source's Telnet, connect to the TES-8943 Encoder at the IP address and port that you set.
3. In the Receive computer's Telnet, connect to the TES-8943 Decoder at the IP address and port that you set.
4. Any characters you type in the Data Source's Telnet session should appear in the Receive computer's telnet window. If you disconnect the SDI cable between the two TES-8943 cards, the text will no longer pass through to the Receive computer.

To illustrate some subtle buffer behavior

1. De-select both **Flush Buffer at VANC** boxes.
2. Set the data count to 8.
3. Type again on your transmit Telnet session and see how nothing is received until multiples of 8 characters are typed.

Hardware Overview

This chapter presents information on the TES-8943 card and rear modules.

Overview

The TES-8943 is an openGear modular system composed of two sub-systems.

- a main board which connects to a rear module and the openGear frame midplane
- a rear module that provides physical connectors

Table 1 outlines which rear module mates with specific TES-8943 PCB version and openGear frames.

Notice — *Installing the TES-8943 in a frame other than the OG3-FR or OGX-FR could damage the card, the rear module, or both.*

Table 1 Rear Modules — Supported openGear Frames

Code Displayed in DashBoard	Main PCB Marketing Code	PCB Part Number	Rear Module Marketing Code	Rear Module Part Number	Number of Frame Slots	Supported openGear Frame
TES-8943	GATOR-2	8929AR-251	R4-GATOR	8323AR-325	2	OGX-FR
TES-8943-B	GATOR-4B	8929AR-254	R3B-GATOR	8322AR-318D	4	OG3-FR, OGX-FR

Main PCB Overview

The main PCB is a typical openGear card. An ejector on one end secures the card to the slot inside the openGear frame, and the other end inserts into a connector on the back of the rear module.

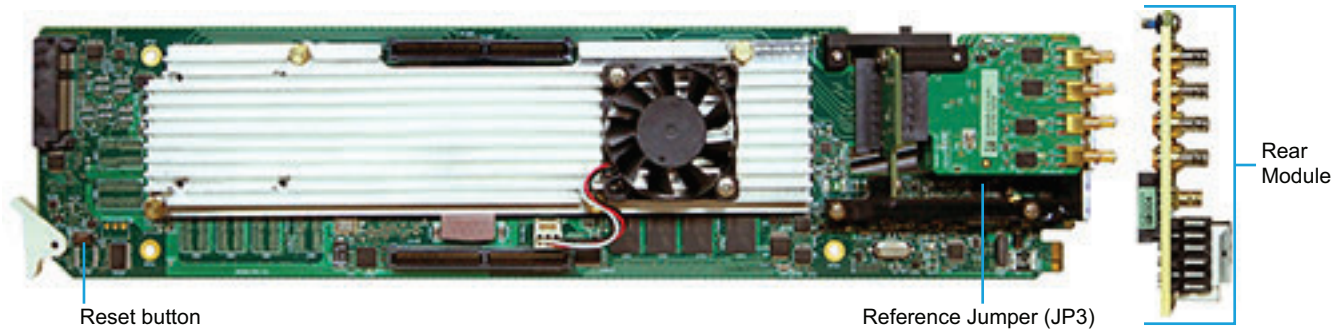


Figure 4 TES-8943 — Base Card Components

Reset Button

Pressing this button performs a hard reset of the microprocessor and re-initializes the card. This should only be performed if advised by Ross Video Technical Support.

Reference Termination Jumper (J3)

JP3 is a 3-position jumper block used to configure the 75ohm termination on the local reference input on the rear module.

- **Pin 1** (bottom) + **Pin 2** (center) — In this position, the reference is terminated with a 75ohm resistor. This configuration is to be used for point-to-point cabling, or on the last card of a daisy chain topology. This is the default position. Refer to **Figure 5** for pin positions.

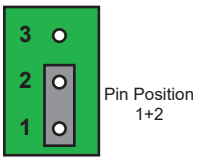


Figure 5 J3 — Default Position

- **Pin 2** (center) + **Pin 3** (top) — In this position, the 75ohm termination is removed and the reference is not terminated. This configuration is used in a daisy chain cabling topology where only the last card is terminated.

Back Components (Not Shown)

The Micro SD card slot is located on the backside of the main PCB and just above the ejector.

✶ Ensure the SD card is properly seated in its slot before installing the TES-8943.

TES-8943 Cabling Overview

The TES-8943 requires the 8323AR-325 rear module. (**Figure 6**) The following connections are available:

- 1 SDI input on HD-BNC
- 6 SDI outputs on HD-BNCs
- 1 local reference input signal
- 4 GPIO connections
- 1 Ethernet port

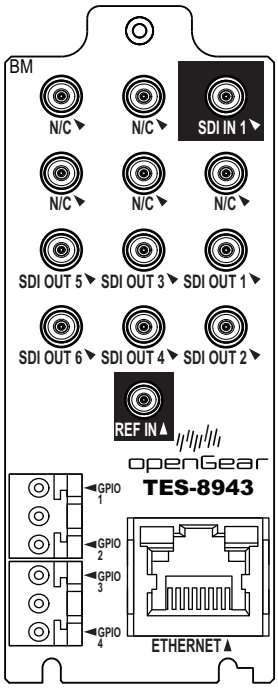


Figure 6 Cabling Designations — 8323AR-325 Rear Module

TES-8943-B Cabling Overview

The TES-8943-B requires the 8322AR-318D rear module. (**Figure 7**) The following connections are available:

- 1 SDI input on HD-BNC
- 6 SDI outputs on HD-BNCs
- 1 local reference input signal
- 1 Serial port
- 1 Ethernet port
- 8 GPIO connections

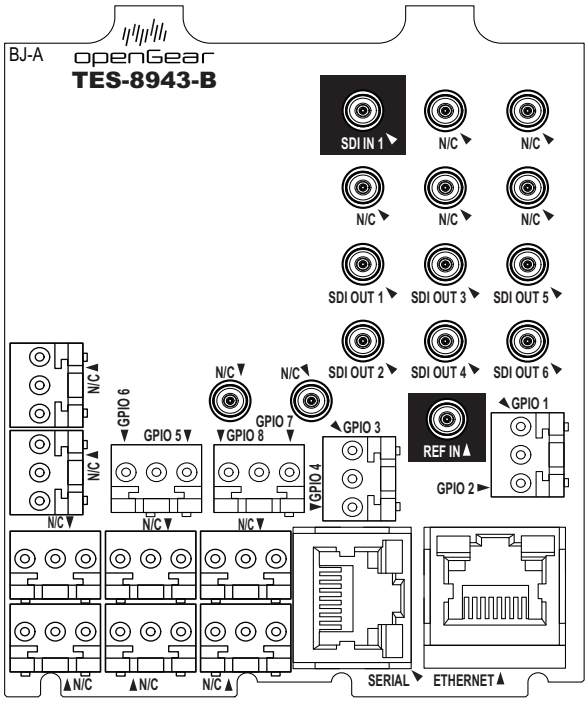


Figure 7 Cabling Designations — 8322AR-318D Rear Module

Physical Installation

Installing an TES-8943 card into the OGX-FR frame requires you to remove the blank plates in the designation frame slots, install the required rear module into the frame rear panel, and then install the TES-8943 card into the required frame slot.

If you have questions pertaining to the installation of TES-8943, contact us at the numbers listed in "**Contacting Technical Support**". Our technical staff is always available for consultation, training, or service.

For More Information on...

- the technical specifications for the TES-8943, refer to "**Technical Specifications**".

Before You Begin

These installation guidelines assume the following:

- Ensure the OGX-FR frame is properly installed. Refer to the ***User Guide*** for your frame.
- An MFC-OG3-N or MFC-OGX-N Network Controller Card installed in your OGX-FR frame.
- A valid IP address is available for the TES-8943.
- If the rear module is already installed in the OGX-FR frame, proceed to "**Installing the TES-8943 into an OGX-FR Frame**"

Static Discharge

Throughout this chapter, please heed the following cautionary note:

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

Removing the Blank Plates from the Rear Panel

When a frame slot is not populated with an openGear card, a blank plate must be installed to ensure proper frame cooling and ventilation.

Notice — *Installing the R4-GATOR (8323AR-325) rear module in a frame other than the OGX-FR could damage the card, the rear module, or both.*

To remove a blank plate from the OGX-FR frame

1. Locate the slots in the OGX-FR frame you wish to install the TES-8943 into.
2. If you are using an 8322AR-318D rear module, it is recommended to use the following slot combinations:
   - Slots 1, 2, 3, 4
   - Slots 5, 6, 7, 8
   - Slots 9, 10, 11, 12
   - Slots 13, 14, 15, 16
   - Slots 17, 18, 19, 20
3. Use a Phillips screwdriver to unfasten each blank plate from the OGX-FR frame backplane.
4. Remove each blank plate from the chassis and set aside.

✶ You must remove two Blank Plates (covering four slots) in the OGX-FR frame when installing an 8322AR-318D rear module.

Installing the Rear Module into the OGX-FR Frame

If the rear module is already installed in the OGX-FR frame, proceed to "**Installing the TES-8943 into an OGX-FR Frame**".

To install a rear module into the OGX-FR frame

1. For each retaining screw on the rear module, push the o-ring to the end of the screw (but not off the screw). This will help to align the rear module to the frame backplane in step 3.

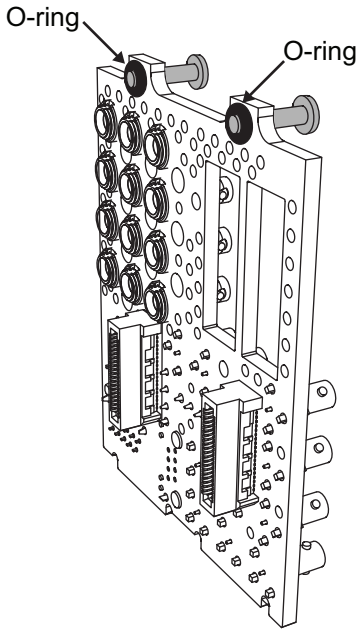


Figure 8 Location of the O-ring on the Rear Module

2. Seat the bottom of the rear module in the seating slots at the base of the frame's backplane.
3. Align the top holes of the rear module with the screw holes on the top-edge of the frame backplane.
4. Using a Phillips screwdriver and the provided screw, fasten the rear module to the backplane.

✶ Do not fully tighten the screws until after installing the card and you have verified that the main PCB aligns with the rear module.

Installing the TES-8943 into an OGX-FR Frame

The slot the TES-8943 installs into depends on the slot combination you installed the rear module in. This allows adequate spacing to avoid damaging the card, the cards installed in the neighboring slots, or both.

Refer to **Table 2** for valid slot combinations when using the 8323AR-325 rear module.

Table 2 Card Slot Combinations — 8323AR-325

Rear Module is Installed in	Main PCB Installs into Slot
Slots 1, 2	1
Slots 3, 4	3
Slots 5, 6	5
Slots 7, 8	7
Slots 9, 10	9
Slots 11, 12	11
Slots 13, 14	13
Slots 15, 16	15
Slots 17, 18	17
Slots 19, 20	19

Refer to **Table 3** for valid slot combinations when using an 8322AR-318D rear module.

Table 3 Card Slot Combinations — 8322AR-318D

Rear Module is Installed in	Main PCB Installs into Slot
Slots 1, 2, 3, 4	2
Slots 5, 6, 7, 8	6
Slots 9, 10, 11, 12	10
Slots 13, 14, 15, 16	14
Slots 17, 18, 19, 20	18

To install the card into the OGX-FR frame

1. Locate the frame slot the card will slide into.
2. Using a Phillips screwdriver fasten the rear module to the backplane using the provided screws.

✶ Do not over tighten the screws.

3. Hold the card by the edges and carefully align the card edges with the slot rails in the frame.
4. Fully insert the card into the frame until the card is properly seated in the rear module.

Cabling

If you have questions pertaining to the installation of TES-8943, contact us at the numbers listed in "**Contacting Technical Support**". Our technical staff is always available for consultation, training, or service.

- The examples in this chapter depict each rear module installed in a single OGX-FR frame. Your setup may differ than what is presented here.
- Ross Video does not supply the required cables.

Planning the Installation

This section briefly outlines the steps to cable the TES-8943 as an encoder or as a receiver. Your needs may differ than what is presented here.

- Ensure to connect your source device to the **SDI IN 1** BNC on the TES-8943 rear module.

To cable the TES-8943 as an encoder

If you plan to use the TES-8943 as an encoder, proceed as follows:

1. Connect the equipment providing the video signal source to the **SDI IN 1** BNC on the TES-8943 rear module. Refer to "**SDI Inputs**".
2. Connect the **SDI OUT 1** BNC on the TES-8943 rear module to the equipment that is to receive the video signal with the inserted VANC data. Refer to "**SDI Outputs**".
3. If you are using the 8322AR-318D rear module and require a serial data connection, connect the transmit computer to the **Serial** port on the rear module. Refer to "**Serial Cabling**".
4. If you are you are using a LAN connection, connect the transmit computer to the **Ethernet** port on the TES-8943 rear module via an ethernet LAN, using a standard RJ45 cable.

To cable the TES-8943 as a receiver

1. Connect the equipment providing the video signal containing the VANC data to be received to the TES-8943 **SDI IN 1** BNC on the encoder. Refer to "**SDI Inputs**".
2. Connect the TES-8943 **SDI OUT 1** BNC to other equipment that needs this video signal. It is recommended that the output be terminated in 75ohm. Refer to "**SDI Outputs**".
3. If you are using the 8322AR-318D rear module and require a serial data connection, connect the receive computer to the **Serial** port on the TES-8943 rear module. Refer to "**Serial Cabling**".
4. If you are using a LAN connection, connect the receive computer to the **Ethernet** port on the TES-8943 rear module via an ethernet LAN, using a standard RJ45 cable.

Cabling the Ethernet Port on the OGX-FR Frame

The TES-8943 is connected to your network via the MFC-OG3-N or MFC-OGX-N in the OGX-FR frame. This enables the TES-8943 to interface with other cards in the frame, and the computer running the DashBoard client. After a physical connection is established, DashBoard is used to configure the network settings for the TES-8943.

- You must provide an ethernet connection to the frame as outlined in the ***OGX-FR Series User Guide***.

Contact your IT department before connecting to your facility network to ensure that there are no conflicts. They will provide you with an appropriate value for the IP Address, Subnet Mask, and Gateway for your TES-8943.

✶ If difficulties or problems are experienced when connecting to a network hub, contact your network administrator.

Cabling for the TES-8943 Local Reference Input

The OGX-FR frame provides two reference input connections that the TES-8943 can use as a reference source. Refer to the ***OGX-FR Series User Guide*** to learn more about cabling these ports.

Each TES-8943 rear module also includes a **REF IN** HD-BNC that can assigned as a local reference input. This section outlines how to connect to this reference input port.

For More Information on...

- on specifying the reference source for your card, refer to "**Reference and Timing Setup**".

To connect a reference source to the TES-8943 rear module

- Connect the reference signal to the **REF IN** HD-BNC on the TES-8943 rear module. (**Figure 9**)

✶ By default, the reference input on th TES-8943 is terminated. You may disable the termination by moving **J3** on the rear module. Refer to "**Reference Termination Jumper (J3)**" for details.

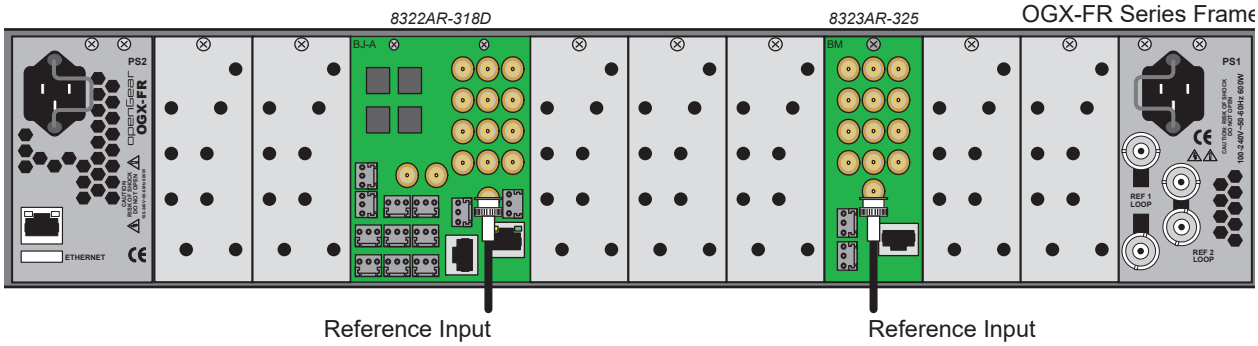


Figure 9 Rear Module Cabling — Reference Source (REF IN)

Video Signal Cabling

Each rear module provides connections for one SDI input and six SDI outputs.

SDI Inputs

Connect your input video signals to the SDI IN HD-BNC on the rear module as required. (**Figure 10**)

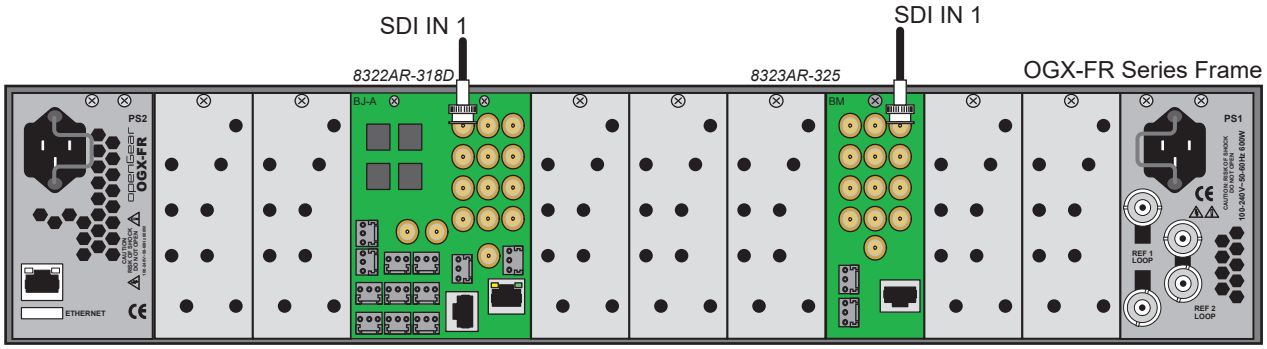


Figure 10 Rear Module Cabling — SDI IN

SDI Outputs

Connect your destination devices to the SDI OUT HD-BNCs on the rear module as required. There are six HD-BNC SDI outputs available on each rear module. (**Figure 11**)

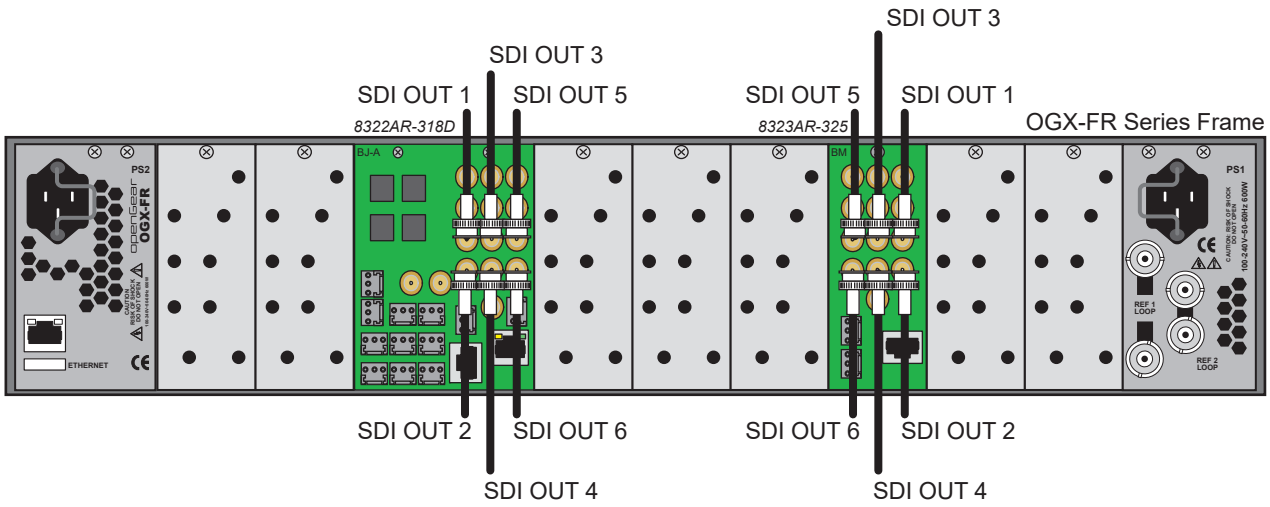


Figure 11 Rear Module Cabling — SDI OUT

Remote Control Cabling

The TES-8943 can stream VANC decode/encode data over an ethernet or serial connection. This section outlines the cabling for each remote port on the rear module.

Ethernet Cabling

✶ Contact your IT Department before connecting to your facility network to ensure that there are no conflicts.

If the TES-8943 will communicate with an external device via an ethernet communications protocol, you will also need to connect this device to the **Ethernet** port on the TES-8943 rear module. A standard network CAT-5 cable is required. (**Figure 12**)

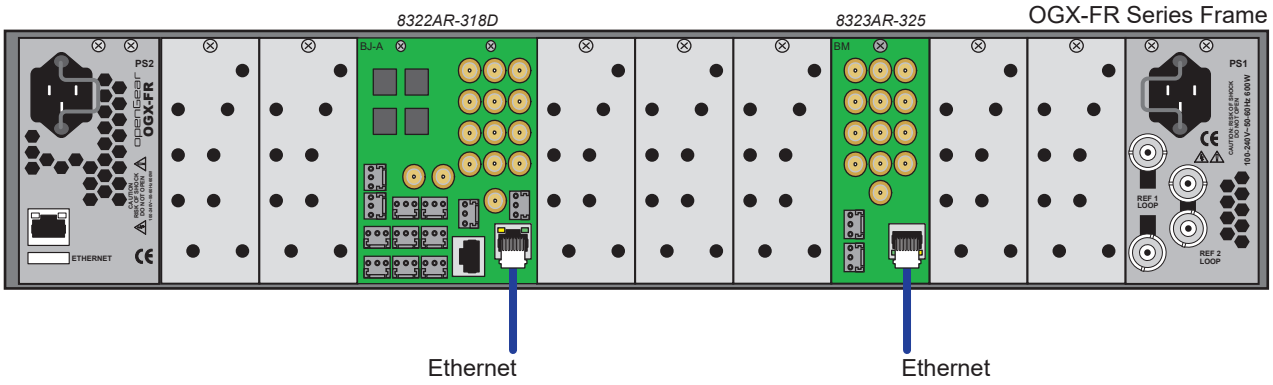


Figure 12 Rear Module Cabling — Ethernet Connection

Serial Cabling

If the TES-8943 will communicate with an external device via a serial communications protocol, you will also need to connect this device to the **Serial** port on the TES-8943 rear module. (**Figure 13**)

✶ This section applies only to the 8322AR-318D rear module. The 8323AR-325 rear module does not include a **Serial** port.

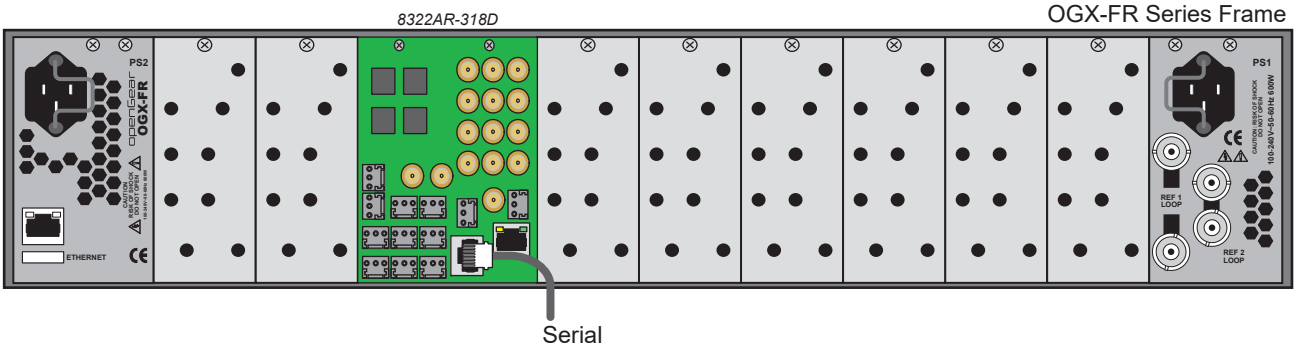


Figure 13 Rear Module Cabling — Serial Connection

Refer to **Table 4** for pin-outs for the **Serial** port on the rear module.

Table 4 Serial Pinouts on the TES-8943

RJ45 Pin	RS-232	RS-422
1	n/c	Tx+
2	Rx	Tx-
3	Tx	Rx+
4	n/c	n/c
5	n/c	n/c
6	n/c	Rx-
7	GND	GND
8	GND	GND

GPI/Tally Cabling

The GPIO ports are user programmable to be either an input (GPI) or an output (Tally) using the GPI/Tally Setup tab in DashBoard. Electrically, the ports are setup for contact closure to ground, with 4.75kohm pull-up resistor to +5V, so they default to a logical high state.

The ports are available on the 3-pin connectors located on each rear module. The 3-pin mating connectors are provided with the rear module. The default state for the GPIO contacts is active low signaling. This way, if the card is removed from the openGear frame, no external events will be inadvertently asserted by the card. This also means that if a cable is absent from the rear module, no GPI or Tally will be triggered and executed inadvertently by the card.

The number of available ports depends on the rear module (**Table 5**).

Table 5 Rear Modules — GPIO Ports

Product	Rear Module	Number of GPIO Ports
TES-8943	8323AR-325	4
TES-8943-B	8322AR-318D	8

TES-8943 Rear Module

Figure 14 shows the GPIO designations for the TES-8943 rear module (P/N 8323AR-325).

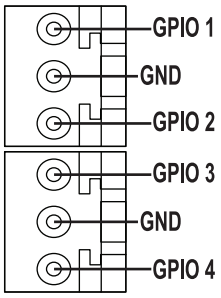


Figure 14 TES-8943 Designations — GPIOs

TES-8943-B Rear Module

Figure 15 shows the GPIO designations for the TES-8943-B rear module (P/N 8322AR-318D).

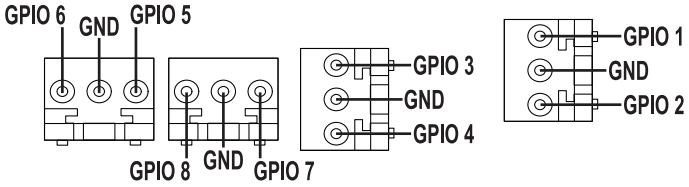


Figure 15 TES-8943-B Designations — GPIOs

For More Information on…

- the GPIO specifications, refer to **Table 45**.
- configuring a GPIO port via DashBoard, refer to "**Configuring the GPI/Tallies**".

Getting Started

This chapter provides instructions for launching DashBoard, assigning an initial IP address to the TES-8943, and accessing the TES-8943 interfaces in DashBoard.

If you have questions pertaining to the operation of TES-8943, contact us at the numbers listed in "**Contacting Technical Support**". Our technical staff is always available for consultation, training, or service.

Before You Begin

Ensure that:

- The openGear frame that houses the TES-8943 displays in the Basic Tree View of DashBoard.
- The TES-8943 displays as a sub-node in the openGear frame tree.
- Your facility IT Department provided the required network settings to be assigned to the TES-8943.

Launching DashBoard

DashBoard must run on a computer that has a physical wired Ethernet connection. Wireless connections do not allow device discovery.

For More Information on...

- downloading and installing the DashBoard client software, refer to our website.
- the TES-8943 interfaces in DashBoard, refer to "**DashBoard Interface Overview**".

To launch DashBoard

1. Ensure that you are running DashBoard software version 9.14 or higher.
2. Launch DashBoard by double-clicking its icon on your computer desktop.

Configuring the Initial Network Settings

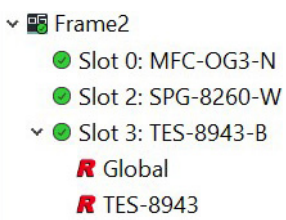
Once the TES-8943 is physically installed and cabled to your facility network, you will need to assign it an initial IP Address in order to gain full access to the card menus, options, and status fields in DashBoard. Establishing an initial IP Address enables DashBoard to communicate with the TES-8943 and update the Basic Tree View with the TES-8943 sub-node.

✶ This procedure requires a reboot of the card.

To assign the initial network settings for the TES-8943

1. Launch DashBoard.
2. Expand the openGear frame node to display a list of cards installed in that frame.

   In the example below, the TES-8943-B card is installed in Slot 3 of Frame2.



3. Double-click the **TES-8943** node under the frame node.

   The **Network** interface displays in DashBoard.

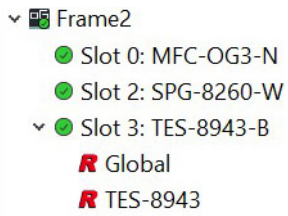
4. Select the **Network** tab.
5. Use the **Mode** menu to select **Static**.
6. Use the **Static IP Address** field to assign a unique IP Address to the TES-8943 card.

✶ This IP Address must be different that the subnet IP Address assigned to the Frame Controller Card.

7. Use the **Subnet Mask** field to assign the subnet mask for the card.
8. Use the **Gateway** field to specify the gateway for communications outside of the local area network (LAN) the card will use.
9. Click **Apply**.

   The card is temporarily taken off-line during the reboot of the card to apply the new settings.

10. Verify the new network settings as follows:
    a. Close the **Network** interface.
    b. Refresh the Basic Tree View.
    c. Expand the openGear frame node to display a list of sub-nodes.
    d. Verify that the TES-8943 sub-nodes display as seen in Slot 3 of the example below.



Accessing the TES-8943 Interfaces in DashBoard

Once you establish the initial network settings for the TES-8943, you can access the Global, and TES-8943 interfaces. These interfaces provide options for configuring, monitoring, and operating your card in DashBoard.

For More Information on...

- the Global interface, refer to "**Global Interface**".
- the TES-8943 interface, refer to "**TES-8943 Interface**".

To display the Global interface in DashBoard

1. Launch DashBoard.
2. In the Basic Tree View of DashBoard, locate the openGear frame the TES-8943 is installed in.
3. Expand the openGear frame node to display a list of sub-nodes.

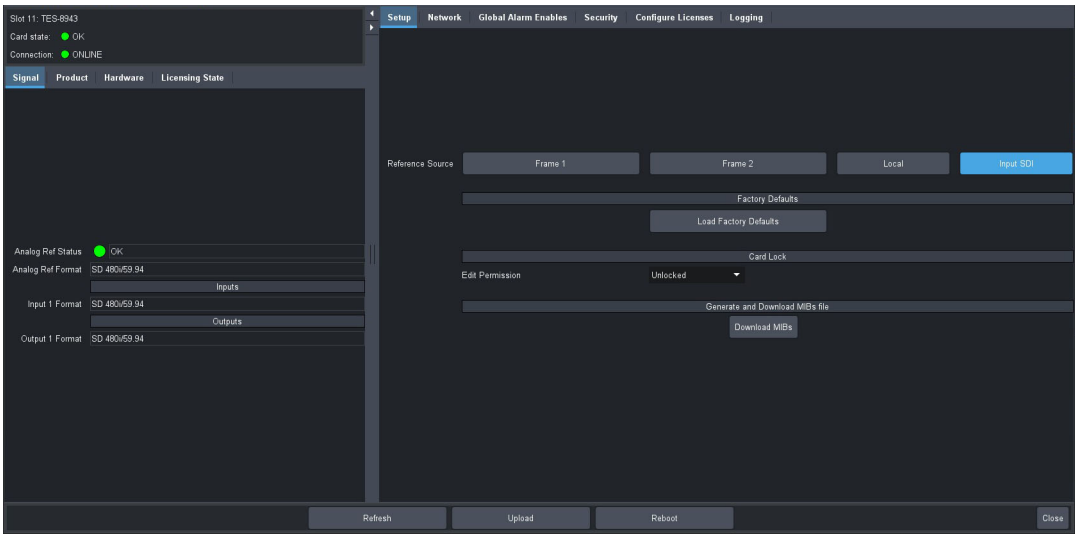
   Each sub-node represents a specific card installed in a frame slot.

4. Locate the TES-8943 sub-node.

✶ Look for the slot number that corresponds to the physical frame slot the TES-8943 is installed in.

5. Expand the TES-8943 node to display a list of sub-nodes for the card.
6. Double-click the **Global** sub-node.

The Global interface opens in the right pane of the DashBoard window. The left pane in the Global interface enable you to monitor the overall status of the TES-8943 software and hardware. The right pane provides configuration options such as specifying the network settings, and enabling licensed features.



To display the TES-8943 interface in DashBoard

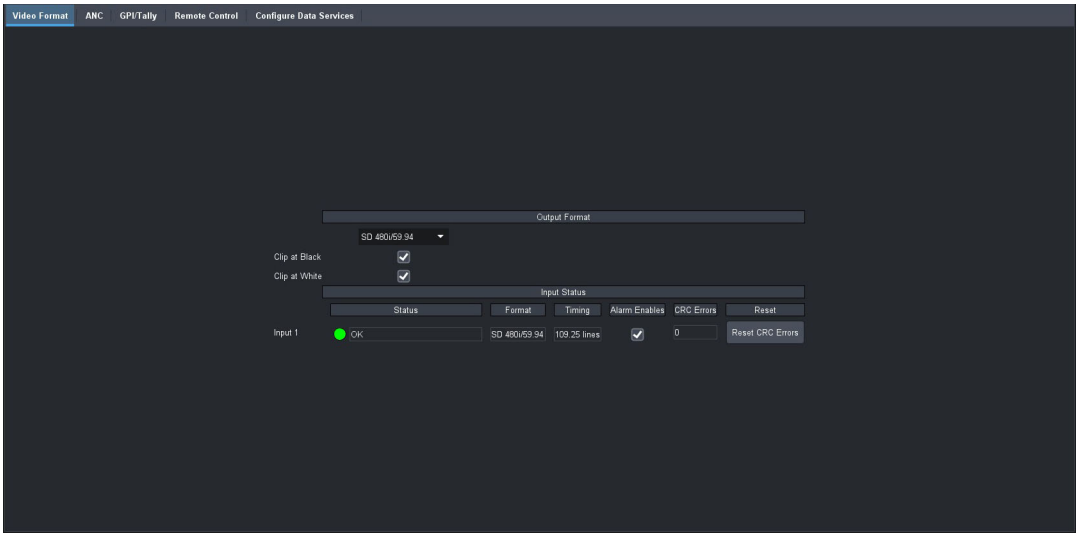
1. Launch DashBoard.
2. In the Basic Tree View of DashBoard, locate the openGear frame the TES-8943 is installed in.
3. Expand the openGear frame node to display a list of sub-nodes.

   Each sub-node represents a specific card installed in a frame slot.
4. Locate the TES-8943 node in the frame tree.

✶ Look for the slot number that corresponds to the physical frame slot the TES-8943 is installed in.

5. Expand the TES-8943 node to display a list of sub-nodes for the card.
6. Double-click the **TES-8943** sub-node.

   The TES-8943 interface opens in the right pane of the DashBoard window. The tabs in this interface enable you to configure the video format, monitor the ANC decode/encode status, and configure the communication settings to external devices.



Configuring the Ethernet Port on the Rear Module

If the TES-8943 will communicate with an external device via an ethernet communications protocol, you will also need to configure the **Ethernet** port on the TES-8943 rear module.

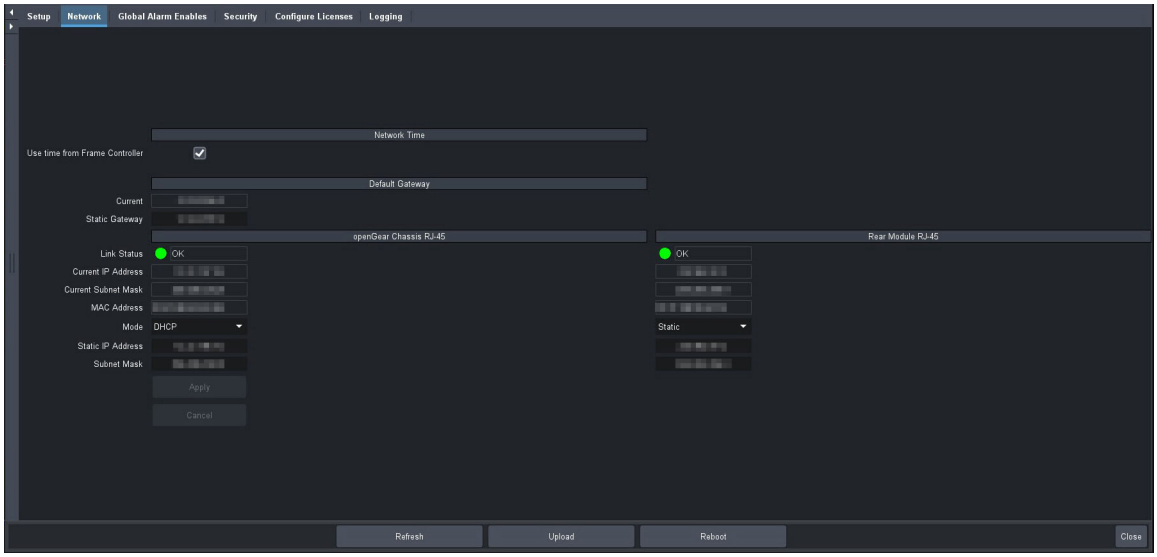
Notice — *The subnets for the rear module ethernet port and the Network Controller Card must be set to different values. This applies to all modes (Static and DHCP).*

For More Information on...

- cabling the **Ethernet** port, refer to "**Remote Control Cabling**".

To assign the network settings to the Ethernet port on the rear module

1. Display the **Global** interface as outlined in "**To display the Global interface in DashBoard**".
2. Select the **Network** tab.



3. Locate the **Rear Module RJ45** area on the tab.
4. Use the **Mode** menu to select **Static**.
5. Use the **Static IP Address** field to assign a unique IP Address to the Ethernet port on the rear module.
6. Use the **Subnet Mask** field to assign the subnet mask for the Ethernet port.
7. Use the **Gateway** field to specify the gateway for communications outside of the local area network (LAN) the card will use.
8. Click **Apply**.

   The card is temporarily taken off-line during the reboot of the card to apply the new settings.

Configuring the Remote Logging Feature

The TES-8943 enables you to implement a streaming log that captures status information of the system via Port 514. This feature is useful for troubleshooting.

✶ A centralized Syslog server must be installed in your system. Refer to the documentation that accompanied your server for installation and setup information.

To configure the remote logging feature

1. Display the **Global** interface as outlined in "**To display the Global interface in DashBoard**".
2. Select the **Logging** tab.
3. Use the **Remote Logging** field to specify the IP Address of the device that will capture and store the status information of the TES-8943.

✶ You must press **Enter** after typing the IP Address into the **Remote Logging** field.

4. Reboot the TES-8943 card as follows:
   a. Click **Reboot**. This button is located on the bottom of the tab.
   b. Monitor the reboot progress.

Security Configuration

Secure Shell (SSH) Login is a client-server protocol used by system administrators to securely log onto remote systems and execute commands over an unsecured network. SSH may also be used by Technical Support for advanced troubleshooting. This service is disabled by default on the TES-8943.

Licensed Features

The TES-8943 has software licenses for enabling functions and features of the card. This chapter outlines the available software licensed features, and how to install a software key for a licensed feature.

License Keys Overview

Table 6 provides a brief summary on the types of licensed features available for the TES-8943.

Table 6 List of TES-8943 Licensed Features

License	Description
TES-8943-12G-LICENSE	Enables the use of 12Gbps SDI signaling on the card

Installing a License Key

Ross Video uses license keys to control user access to specific TES-8943 features. You can obtain a key for a TES-8943 licensed feature from Ross Video Technical Support.

To install a license key

1. Display the **Global** interface as outlined in "**To display the Global interface in DashBoard**".
2. Select the **Configure Licenses** tab.
3. Make a note of the character string in the **Request Code** field for the feature you wish to enable.
4. Contact Ross Video using the information found in "**Contacting Technical Support**".
   a. When you speak to your Technical Support representative, tell them your name, your facility name, and the **Request Code** from the **Configure Licenses** tab.
   b. You will be given a License Key that must be entered in the applicable field in the **Licenses** table.
5. Enter the provided License Key in the applicable **Key** field in the **Configure Licenses** tab.
6. Click **Apply** in the row for the License Key you entered in step 5.

Removing a License Key

Disabling a License Key removes user access to the TES-8943 features associated with that License Key.

✶ To re-enable the features, you will need to contact Ross Technical Support and request a new License Key.

To remove a license key

1. Display the **Global** interface as outlined in "**To display the Global interface in DashBoard**".
2. Select the **Configure Licenses** tab.
3. Click in the **Key** field for the licensed feature you want to remove.
4. Type **`remove`**.
5. Click **Apply** to remove the license.

Reference and Timing Setup

The openGear frame supports a distributed frame reference, allowing incoming reference signals to feed timing information to all openGear cards in that frame. Thus, a single signal can be used for multiple cards.

Specifying a Global Reference Source

- When using a progressive format reference signal to lock an interlaced format video signal, the lock will be Frame Locked but Field indeterminate.

Frame Rate Compatibility

The card allows you to use any interlaced video format to operate the card in any format of the same frequency; however, the use of 480i or 576i (Composite Sync) reference signals for High Definition (720p, 1080i, 1080p) or UHD (2160p) video formats is not recommended for optimal performance. **Table 7** outlines the TES-8943 frame rate compatibility.

The use of composite sync reference formats is recommended for Standard Definition video modes only, and provides stable outputs with jitter performance in compliance with ***SMPTE-259M*** specifications.

Table 7 Reference/SDI Output Format Compatibility

Reference Format	SDI Video Output Format[a]
480i 59.94Hz	480i 59.94Hz
	720p 59.94Hz
	1080i 59.94Hz
	1080p 29.97Hz
	1080p 59.94Hz
	2160p 29.97Hz
	2160p 59.94Hz
576i 50Hz	576i 50Hz
	720p 50Hz
	1080i 50Hz
	1080p 25Hz
	1080p 50Hz
	2160p 25Hz
	2160p 50Hz
720p 50Hz	576i 50Hz
	720p 50Hz
	1080i 50Hz
	1080p 50Hz

Table 7 Reference/SDI Output Format Compatibility (Continued)

Reference Format	SDI Video Output Format[a]
720p 59.94Hz	720p 59.94Hz
	1080p 59.94Hz
	2160p 59.94Hz
1080i 50Hz	576i 50Hz
	720p 50Hz
	1080i 50Hz
	1080p 25Hz
	1080p 50Hz
	2160p 25Hz
	2160p 50Hz
1080i 59.94Hz	480i 59.94Hz
	720p 59.94Hz
	1080i 59.94Hz
	1080p 29.97Hz
	1080p 59.94Hz
	2160p 29.97Hz
	2160p 59.94Hz
1080p 23.98Hz	1080p 23.98Hz
	2160p 23.98Hz
1080p 24Hz	1080p 24Hz
	2160p 24Hz
1080p 50Hz	720p 50Hz
	1080p 50Hz
	2160p 50Hz
1080p 59.94Hz	720p 59.94Hz
	1080p 59.94Hz
	2160p 59.94Hz
1080pSF 23.98Hz	1080psF 23.98Hz
	1080psF 24Hz
1080pSF 24Hz	1080psF 23.98Hz
	1080psF 24Hz

a. The TES-8943-12G-LICENSE license is required for 12G support.

For More Information on...

- the options in the Analog Reference Status menu, refer to **Table 17**.

To specify a global analog reference source for the TES-8943

1. Display the **Global** interface as outlined in "**To display the Global interface in DashBoard**".
2. Select the **Setup** tab.
3. Use the **Analog Reference Source** options to specify the source for the reference input signal.

✶ Ensure the input video frame rate matches the reference frame rate.

Monitoring the Reference Signal via DashBoard

The status of the TES-8943 may be monitored via its fields in the DashBoard client software.

To configure the reference alarm for the TES-8943

1. Display the **Global** interface as outlined in "**To display the Global interface in DashBoard**".
2. Select the **Global Alarm Enables** tab.
3. Select the **Alarm Enable** box in the Reference Format row of the tab to enable the Card state status field, located in the top left corner of the Global interface, to report when the analog reference signal is not detected.

Configuring the Time Source

The Frame Network Controller card in the openGear frame can use an NTP server as a time source. The time data is then made available to any openGear card installed in the same frame. You must manually enable the TES-8943 to access this time data by selecting an option on its Global > Network tab.

For More Information on...

- setting up the Frame Network Controller to communicate with an NTP server, refer to the ***MFC-OG3-N and MFC-8322-S User Guide***.

To enable the TES-8943 to access the time data from the Frame Network Controller card

1. Display the **Global** interface as outlined in "**To display the Global interface in DashBoard**".
2. Select the **Network** tab.
3. Locate the **Network Time** area of the tab.
4. Select the **Use time from Frame Controller** box.
5. Click **Apply**.

To enable monitoring of the time data

1. From the Global interface, select the **Global Alarm Enables** tab.
2. Locate the **Network Alarm** area of the tab.
3. Select the **Alarm Enable** check box.

   The **Network time** field will report the status of the time data.

Specifying the Video Format

This chapter outlines how to specify the video format for the card output.

Before You Begin

Keep the following in mind when configuring your SDI signals:

- The SDI output timing is fixed on the TES-8943 and is set to approximately 0.5 lines after the reference.
- Each video input has a line sync that can support a full line of HD video including horizontal blanking.
- All video inputs must be timed with the reference. The input tolerance is approximately +/- 0.5 line. Exceeding this tolerance will result in the output shifting of 1 line. The status fields in the TES-8943 > Video Format tab displays a Yellow indicator when operating outside the range of the line sync. In such cases, a vertical shift of 1 line or more may occur.
- All of the video inputs must be the same video format as specified in the TES-8943 > Video Format tab in DashBoard. If the formats do not match, the card reports an error in the DashBoard Signal Status area and on the card-edge LEDs.

For More Information on…

- the options in the Output Format menu, refer to **Table 23**.
- setting the reference and timing features, refer to "**Reference and Timing Setup**".

Specifying the Output Video Format

✶ The video format must be compatible with the selected reference. Refer to **Table 7** for a list of available formats.

To specify the output video format

1. Display the **TES-8943** interface as outlined in "**To display the TES-8943 interface in DashBoard**".
2. Select the **Video Format** tab.
3. Locate the **Output Format** area.

4. Use the **Format** menu, located in the Output Format area of the tab, to specify the card output video format.

✶ Ensure that the specified output format matches the input video format.

5. Select the **Clip at Black** to enable the TES-8943 to clip at 0x40 on all outputs.
6. Select the **Clip at White** box to enable the TES-8943 to clip at 0x3AC on all outputs.

Configuring a Remote Port for VANC Data

The TES-8943 can stream VANC decode/encode data over an ethernet or serial connection by configuring a TES Raw Data channel. This chapter outlines how to configure both connection types.

✶ Once you configured the TES Raw Data channels, you can proceed to configure each channel for ANC encoding/decoding.

For More Information on...

- configuring a remote port for SCTE-104 messages, refer to "**SCTE-104 Messages**".

Overview

The TES-8943 can simultaneously insert up to four data streams or extract up to four data streams. The eight streams may all be delivered via the network connection (Ethernet port) or one may be through the Serial port on the rear module. For each stream, you can specify the source port, and the insertion/extraction parameters.

Calculating the Data Throughput

This section briefly summarizes how to calculate the data throughput based on the data port type.

Serial Port

When encoding a transparent stream using data supplied through a serial port, the throughput depends on the Data Count and also on the serial port baud rate. The maximum throughput is the lesser of the baud rate and the data rate value resulting from the following equation:

DR = FV x 10 x DC bits/second

Where:

- **FV** is the field rate for interlaced formats, or the frame rate for progressive formats.
- **DC** is the Data Count set for the TES-8943.

The factor 10 in the equation reflects the fact that each 8bit value is carried on the serial link with one start and one stop bit.

This is expressed in bits/second to allow comparison with the serial port baud rate.

For example, if FV = 59.94 and DC = 100, DR = 59,940 bits/second.

If the serial port speed is set to 57,600 bits/sec, the TES-8943 cannot fully use the capacity that has been reserved for this stream, and the throughput will be 57,600 bits/sec. If the port speed is 115,200 bits/sec, the TES-8943 will use flow control to maintain an average rate of 59,940 bits/sec However, if the transmit computer does not respect flow control, data will be lost.

This points out the importance of flow control. If you are not certain that the program you are using to send data to the TES-8943 responds properly to XON/XOFF flow control, it is advisable to select a Data Count value for the transparent stream which is large enough to ensure that flow control is never needed. For example, with FV= 59.94, a DC value of 193 or greater can transport a 115,200 bits/sec stream without flow control.

Similarly, when decoding a transparent stream, care must be taken to set the serial port baud rate high enough for the throughput of the stream. In the above example with DC=100, the serial port

for the decode stream would need to be set to 115,200 bits/sec, since 57,600 bits/sec is insufficient to sustain the throughput of 59,940 bits/sec.

Ethernet Port

When encoding a transparent stream using data supplied through the TCP/LAN port, the throughput is completely defined by the Data Count specified for the stream, assuming that the transmit computer and LAN can supply data as needed. This is defined by the following equation:

T = FV x DC bytes/second

Where:

- **FV** is the field rate for interlaced formats, or the frame rate for progressive formats.
- **DC** is the Data Count set for the TES-8943.

Using an Ethernet Connection

The Ethernet port on the rear module is used to stream VANC decode/encode data, connect to an ethernet network for communications, and software upgrades using DashBoard. To use the rear module ethernet port, the card must be configured with valid ethernet settings. The settings can be specified manually (Static) or may be obtained automatically from a server on your network (DHCP).

✶ Contact your IT Department before connecting to your facility network to ensure that there are no conflicts. They will provide you with an appropriate value for the IP address, subnet mask, and gateway for the external device and the TES-8943.

Cabling Requirements

You will require a standard network CAT-5 cable to connect the TES-8943 to your facility network. Refer to "**Ethernet Cabling**" for more information.

Configuring the TES-8943 for Ethernet Communications

This section outlines how to configure a TES Raw Data channel to stream VANC data over the Ethernet port.

To enable the TES-8943 for ethernet communications

1. Display the **TES-8943** interface as outlined in "**To display the TES-8943 interface in DashBoard**".
2. Select the **Remote Control** tab.
3. Select the box for a **TES Raw Data** channel.

✶ You can configure up to four TES Raw Data channels.

4. From the **Connection** menu, select one of the following:
   - **Network Client** — The TES-8943 functions as a service requester that initiates communications with a server on the network.
   - **Network Server** — The TES-8943 functions as a host, or socket listener, on the network. This is the default.

5. Click **Network Setup**.

The **Network Setup** dialog opens.

6. Use the **Ethernet Connector** menu to specify the network port the TES-8943 will use to communicate with the external device. Choose from the following:
   - **Chassis RJ-45** — The TES-8943 communicates with the external device via the open Gear Frame Network Controller card.
   - **Rear Module RJ-45** — The TES-8943 communicates with the external device via the Ethernet port on the rear module.
7. Use the **Packet Type** menu to specify the Ethernet protocol your external device will use to communicate with the TES-8943.
8. Ensure the **Port** field is set to **7788**.
9. If you selected **Network Client** in step 4, use the **Remote IP** field to specify the IP address of the TES-8943 on the network to be used for TES Raw Data communications.
10. Close the **Network Setup** dialog.

    The new settings are automatically applied.

Using a Serial Connection

RossTalk commands can be sent to the TES-8943 via the **Serial** port (RS-232/RS-422) on the 8322AR-318D rear module.

✶ Refer to the documentation for your external device for specific cabling requirements.

Cabling Requirements

Refer to "**Serial Cabling**" for details on connecting a serial device to the rear module.

Configuring the TES-8943 for Serial Communications

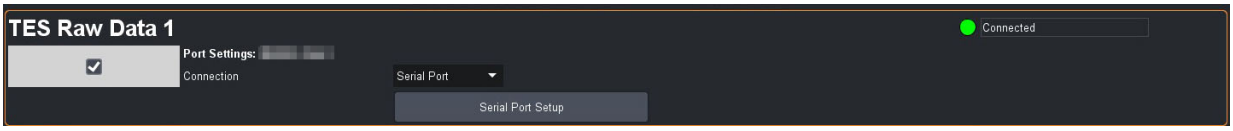
This section outlines how to configure a TES Raw Data channel to stream VANC data via the **Serial** port.

To enable the TES-8943 for serial communications

1. Display the **TES-8943** interface as outlined in "**To display the TES-8943 interface in DashBoard**".
2. Select the **Remote Control** tab.
3. Locate the **TES Raw Data** area in the tab.

✶ You can configure up to four TES Raw Data channels.

4. Select the box for one of the **TES Raw Data** channels.
5. From the **Connection** menu, select **Serial Port**.



6. Click **Serial Port Setup**.

   The **Configure the serial connection** dialog opens.
7. Use the **Port Type** menu to specify transmission standard the external device uses. The default is RS 422.

8. Use the **Bit rate** menu to select the bit rate for the external device connected to the Serial port of the TES-8943. The default is 115200.
9. Use the **Data Bits** menu to set the number of data bits transmission (character length). The default is 8.
10. Use the **Parity** menu to set the parity type for the external device. The default is None.
11. Use the **Stop Bits** menu to set the number of stop bits transmission. The default is 1.
12. Use the **Flow Control** menu to enable the TES-8943 notify the serial device when it is experiencing a data overflow and stop sending data (SW) or to allow continuous data flow between the TES-8943 and the device (None). The default is None.
13. Close the **Configure the serial connection** dialog.

    The new settings are automatically applied.
14. Repeat steps 4 to 13 for additional TES Raw Data channels.

ANC Setup

This chapter provides an overview of ANC processing for the TES-8943.

For More Information on…

- the ANC encoding features, refer to "**VANC Encoding**".
- the ANC decoding features, refer to "**VANC Decoding**".
- configuring the TES-8943 for SCTE-104 workflow, refer to "**SCTE-104 Messages**".
- monitoring the decoding status via DashBoard, refer to "**Monitoring**".

Before You Begin

Before proceeding, ensure that:

- you are running DashBoard software version 9.14 or higher. You can download the DashBoard software and manual from the Ross Video website.
- the required TES Raw Data channels are assigned to a remote port. Refer to "**Configuring a Remote Port for VANC Data**".

Overview

Ancillary Data (ANC) is the non-video data that can be embedded within the SDI signal, such as audio metadata, closed caption data, AFD, and OP-47. This section provide a summary of the data types the TES-8943 supports.

Compressed Audio Metadata

Compressed Audio Metadata can be passed or disabled as follows:

- If the input is not synchronous to the output, select **Pass** from the **Action** menu of the **ANC** tab.
- If converting between progressive and interlaced formats, select **Pass** from the **Action** menu of the **ANC** tab.
- If the input is not synchronous to the output, data will be dropped (but not duplicated[1]) as part of the frame sync behavior.

CEA-708/CEA-608 Closed Captioning

The TES-8943 card:

- ensures continuity of CEA-608 data and/or DTVCC data during frame drop or repeat.
- receives the packet, processes it, and inserts a new packet into the specific line.
- monitors the CDP sequence number of incoming CEA-708 data to detect discontinuities in the DTVCC transport stream, and propagates any sequence-number discontinuity to the outgoing DTVCC data, to alert downstream equipment of the change.

There are two supported types of closed captioning data: native CEA-708, and CEA-608 embedded in CEA-708. The order of preference for output CEA-708 data is as follows:

1. CEA-708
2. Up-converted CEA-608 embedded in CEA-708

The order of preference for output CEA-608 data is as follows:

1. CEA-608 embedded in CEA-708
2. Null content

✶ CEA-708 is not down-converted to CEA-608.

The card decodes any CEA-708 caption distribution packets (CDP) from the input video and embeds the same data in the output video. The CDP is re-formatted as required based on the frame rate, to maintain the correct CEA-708 transport channel data rate (9600bps) as specified by SMPTE 334-2. The TES-8943 ignores any timecode information in the CDP. If there is no native CEA-708, then CEA-608 is translated to native CEA-708 DTVCC format, and embedded along with the original CEA-608 data in the output CDPs.

- CC1 is translated and encoded as DTVCC Service #1.
- CC3 is translated and encoded as DTVCC Service #2.
- CC2 and CC4 are not translated.
- such translation follows ***CEA-708-C section 8.11*** and supports the standard character sets described in ***CEA-608-D section 6.4.1***.

Other Packets

When pass is enabled, the packets will be inserted in VANC on the specified line in the same order as they were received. If they do not fit on the specified line, they will continue on the next line. Approximately up to 250 packets, or 1500 bytes of data, can be passed this way. If the input is not synchronous to the output, data will be dropped (but not duplicated) as part of the frame sync behavior.

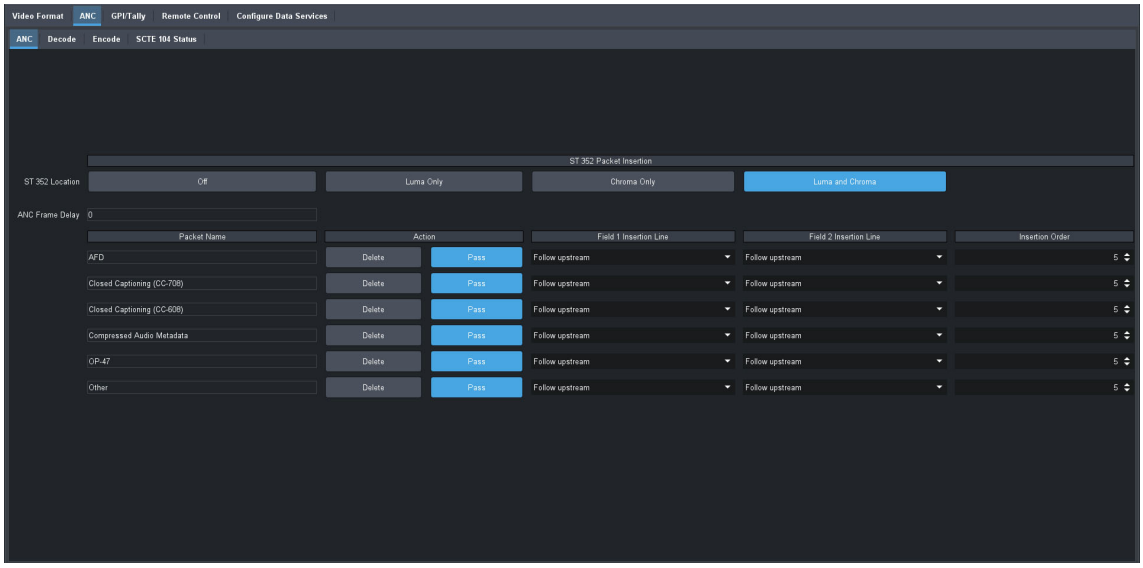
Specific ANC Processing

The **ANC** tab controls how ancillary data is inserted in the output when HANC and/or VANC pass through is not enabled. The user can control the insertion position for each packet type.

To configure the processing of specific ANC types

1. Display the **TES-8943** interface as outlined in "**To display the TES-8943 interface in DashBoard**".
2. Select the **ANC** tab.

   The **ANC** sub-tab is automatically selected.



3. For each packet, select how the card processes the ANC data by selecting an option from the **Action** field.
4. Specify the line to insert the ANC data packet as follows:
   - Use the **Insertion Line** menus to select a line to insert the specified ANC packet on. The default is 12 for each packet. Note that all packets are inserted in VANC, except for timecode in non-SD formats which are inserted in the HANC.
   - If more than one packet is to be inserted in the same line, the packet with the lowest insertion order number will be inserted first.
5. Use the **Insertion Order** menu to define the hierarchy of the packets insertion.

✶ Note that the lower the number, the higher priority the packet is given.

6. If the Video Format > Output Format is set to 576i/50, configure the **Subtitle Pass-through** option as follows:
   - Select the box to permit video to pass through on Lines 12 to the end of the Vertical Blanking Interval.
   - Clear the box to disable this feature. This is the default setting.

SMPTE ST 352 Packet Insertion

You can choose where to insert the SMPTE ST-352 packets.

To set the insert location of SMPTE ST-352 packets

1. Display the **TES-8943** interface as outlined in "**To display the TES-8943 interface in DashBoard**".
2. Select the **ANC** tab.
3. Locate the **ST 352 Packet Insertion** area of the tab.
4. Use the **ST 352 Location** options to determine where to insert the SMPTE ST-352 packets in the TES-8943 output.

✶ The packets are automatically inserted before the audio packets.

VANC Encoding

The TES-8943 can act as both an ANC encoder and a decoder simultaneously. This chapter outlines how to configure the encoding settings for a TES Raw Data channel.

For More Information on…

- the ANC decoding features, refer to "**VANC Decoding**".
- configuring the TES-8943 for SCTE-104 workflow, refer to "**SCTE-104 Messages**".
- monitoring the encoding status via DashBoard, refer to "**Monitoring**".

Before You Begin

Before proceeding, ensure that:

- you are running DashBoard software version 9.14 or higher. You can download the DashBoard software and manual from the Ross Video website.
- the required TES Raw Data channels are assigned a remote port. Refer to "**Configuring a Remote Port for VANC Data**".

Overview

The TES-8943 provides the ability to 'mark for deletion' all incoming VANC packets having the same DID and SDID as services that are being inserted, regardless of their location in the VANC lines. This feature is enabled by default for each DID/SDID used for insertion, to ensure that the output does not contain an unintended combination of upstream and locally inserted data bearing the same DID and SDID. However, you can disable deletion for selected services, for example to allow an upstream data service to pass through when local insertion is passed.

The TES-8943 enables you to customize the encoding settings. This mode will insert packets in both fields unless the source carefully times data transmission for one field using the Field Indicator.

The TES-8943 allows packets of data to be formatted by the transmit computer such that each packet will correspond to one VANC packet inserted into the HDTV signal. The packet of data sent to the TES-8943 by the transmit computer must be formatted as follows:

```
{Identifier} {Length} {data} {Footer ID} {Footer data}
```

Table 8 briefly describes the components of the packet.

Table 8 Packet Components

Parameter	Description
`{Identifier}`	A 2byte sequence indicating the start of the packet.
`{Length}`	A 1byte unsigned number indicating the number of bytes in the entire packet, from the first byte of the Identifier to the last byte of the Footer data, inclusive.
`{data}`	A sequence of any 8bit data, maximum number of data bytes is 248 (255-7).
`{Footer ID}`	One byte with a hexadecimal value of 0x74, indicating the start of the Footer data.
`{Footer data}`	A 3byte sequence of any 8bit data.

Configuring a TES Raw Data Channel for Encoding

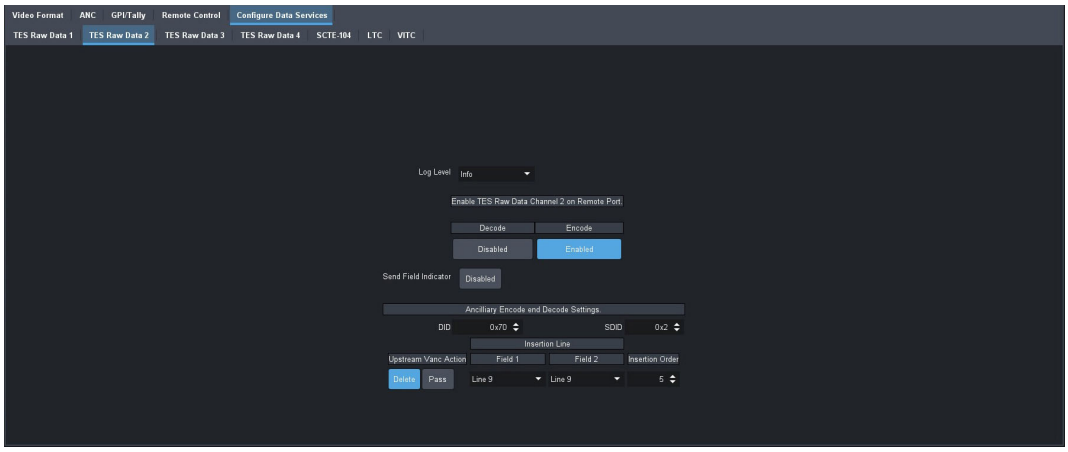
Control of overwriting upstream data is on a line by line basis and is separate for the chroma and luma channels. It is possible to have different settings for different lines.

The encoding feature can only “mark for deletion” packets in VANC. If a packet with matching DID/SDID arrives in HANC, it will pass through unaltered.

To configure a TES Raw Data Channel for encoding

1. Navigate to the **TES-8943** interface as outlined in “**To display the TES-8943 interface in DashBoard**”.
2. Select the **Configure Data Services** tab.
3. Select the sub-tab for the **TES Raw Data** channel you want to configure for encoding.
4. Locate the **Enable TES Raw Data** area.
5. Toggle the **Send Field Indicator** button to **`Enabled`** to send a single byte field indicator (either an ASCII ‘1’ or ‘2’), at the start of the next field to encode, out the data port to allow the downstream equipment to synchronize to the video signal.
6. Use the **DID** and **SDID** fields to specify the Data ID (DID) and Secondary Data ID (SDID) fields in the encoded Ancillary Data Packet, as defined by SMPTE 291M.
7. Use the **Upstream VANC Action** options to specify how the TES-8943 processes VANC data that is received. Choose from the following:
   - **Delete** — enables the TES-8943 to delete all VANC packets in user-selectable lines in the VANC space. All data on the line in the selected channel is completely deleted. If there is upstream data on the deleted line, it can not be detected by an encoder.
   - **Pass** — the TES-8943 passes all VANC packets without modification.
8. Locate the field in the **Insertion Line** column that represents the line that you wish to add VANC data to. Choose from the following:
   - **Follow Upstream** — enables the network to control the sharing between network and local data. The network can create an insertion opportunity for local data by pausing transmission of network data.
   - **Line #** — specifies the line component of the VANC space that is defined for the video format (but not outside the VANC area) that the TES-8943 will use for the insertion of the VANC data.
9. Use the **Insertion Order** field to define the hierarchy of the packets insertion. Note that the lower the number, the higher priority the packet is given.
10. Select the button in the **Encode** column.

    The button is now lit blue and displays the “**`Enabled`**” label.



VANC Decoding

The TES-8943 can act as both an ANC encoder and a decoder simultaneously. This chapter outlines how to configure the decoding settings for a TES Raw Data channel.

For More Information on...

- the ANC encoding features, refer to "**VANC Encoding**".
- configuring the TES-8943 for SCTE-104 workflow, refer to "**SCTE-104 Messages**".
- monitoring the decoding status via DashBoard, refer to "**Monitoring**".

Before You Begin

Before proceeding, ensure that:

- you are running DashBoard software version 9.14 or higher. You can download the DashBoard software and manual from the Ross Video website.
- the required TES Raw Data channels are assigned a remote port. Refer to "**Configuring a Remote Port for VANC Data**".

Decoder Settings Overview

The TES-8943 performs transparent decoding. You select the services to be decoded and forwarded to a data port (serial or ethernet) by specifying only their DID and SDID values. The TES-8943 finds and decodes these services, regardless of the line and luma/chroma channel where they are carried in the SDI input.

This section outlines the basic settings available on the ANC Decode tab.

DID and SDID

The Data ID and Secondary Data ID specify (in hexadecimal) the values to be used for the corresponding fields in the encoded Ancillary Data Packet, as defined by SMPTE 291M.

Send Field Indicator

When this check box is checked, the TES-8943 sends field indicator characters out the Serial or Ethernet port that it is using for decoded data, in order to allow the receive computer to synchronize to the video signal. The field indicator is sent just after each vertical interval. For an interlaced signal, the indicator is a '1' (ASCII code 0x31) to indicate field 1, and a '2' (ASCII code 0x32) to indicate field 2. For a non-interlaced (progressive) signal, each field indicator corresponds to the passing of one video frame, and the indicators still alternate between '1' and '2', even though a progressive signal consists of frames, rather than fields.

For most applications, the output data is expected to be the same as that which arrived at an upstream encoder; for this reason, the Send Field Indicator check box should be left clear (unselected) unless you know that the receiving device needs the field indicator for proper operation.

Configuring the TES-8943 to Decode

If the DID and SDID match a packet, then the contents are captured and made available at the data port selected. All data is sent to the data port. If the service is a packet type, then the header and footer data are sent along with the body. It is up to the receive computer to parse the stream to find the packet boundaries. The packet may be found in luma and/or chroma, HANC and/or VANC.

To configure a TES Raw Data Channel for decoding

1. Display the **TES-8943** interface as outlined in "**To display the TES-8943 interface in DashBoard**".
2. Select the **Configure Data Services** tab.
3. Select the sub-tab for the **TES Raw Data** channel you want to configure for encoding.
4. Use the **DID** and **SDID** fields to specify (in hexadecimal) the values to be used for the corresponding fields in the encoded Ancillary Data Packet, as defined by SMPTE 291M.
5. Toggle the **Send Field Indicator** button to Enabled to allow the TES-8943 to send the field indicator characters out the data port that it is sending decoded data to, to allow the receive computer to synchronize to the video signal. The field indicator is sent just after the VANC of each field (for an interlaced signal) or frame (for a progressive signal) in the video. Note that this button should be toggled to Disabled unless you are certain that the receive computer requires it.
   - For an interlaced signal, the indicator is a '1' (ASCII code 0x31) to indicate field 1, and '2' (ASCII code 0x32) to indicate field 2.
   - For a progressive signal, each field indicator corresponds to the passing of one video frame, and the indicators still alternate between '1' and '2', even though a progressive signal consists of frames, rather than fields.
6. Select the button in the **Decode** column.

   The button is now lit blue and displays the "**`Enabled`**" label.

Configuring the GPI/Tallies

You can choose to configure the GPIO ports as a general input, a general output, or as part of an ANC workflow. This chapter outlines how to configure the GPIO ports for each instance.

✶ The number of available GPIO ports depends on the rear module you are using. The 8322AR-318D provides 8 GPIO ports. The 8323AR-325 provides 4 GPIO ports.

For More Information on...

- configuring a GPIO port for RossTalk, refer to "**Using RossTalk to Send Timecode via a GPIO**".
- configuring a GPIO port for SCTE-104 messages, refer to "**Configuring a GPIO for SCTE-104 Messages**".

GPI Communication Setup

When configured as a GPI, a port behaves as an input, and can be used to trigger actions such as Cut/Dissolve the Key and/or Background. A push-button switch, or an ON-OFF switch, may be directly connected between the port and the adjacent ground pin. Alternatively, an external device may drive a low level. Minimum pulse duration is 1ms, anything shorter will be filtered out.

Typically, users will configure the GPI for Edge trigger. This means that the action is carried out either on the falling edge (button is pushed), or rising edge (button is released), depending on which Polarity is selected. Alternatively, users may configure the GPI for Level trigger. In this mode, the action is carried out on both the rising and falling edges, so there are effectively two states. The Polarity control can be used to invert the behavior. Regardless of the trigger type, GPI commands may be overridden by other command inputs such as serial protocols.

✶ RossTalk GPI commands will trigger functions assigned in the GPI setup.

The **Edge** option enables the GPI to act as a latching trigger. Edge triggers are used when you want to toggle between settings. This option enables the GPI to execute a specific function.

- If configured for Falling Edge, the selected function is executed when the GPI input signal transitions from High to Low.
- If configured for Rising Edge, the selected function is executed when the GPI input signal transitions from Low to High.
- Edge triggered GPI signals are sampled once per frame and the associated function is executed only once per frame. The minimum pulse width is 1 millisecond.
- Typically, the edge triggered GPI is driven by external equipment that generates one pulse per event.

Level triggers are used when you want to assert a particular state for a setting. You define the on-air state of the function as being either Level High or Level Low. Therefore, if the on-air state of the Key is defined as Level High for example, when the GPI is a Level High signal, the Key will stay on air. If a Level Low is received, the Key will be taken off air.

- If configured for Active Low, the selected function is executed when the GPI input signal is driven Low.
- If configured for Active High, the selected function is executed when the GPI input signal is driven High.

Configuring a Port as a GPI

Each GPI can be configured independently from the others, allowing you to customize the function of each connection.

To configure a port as a GPI

1. Display the **TES-8943** interface as outlined in "**To display the TES-8943 interface in DashBoard**".
2. Select the **GPI/Tally** tab.
3. Use the **Function** menu to assign a transition event to a specific GPI port. Choose from the following:
   - None — The specified GPIO port is not configured and the GPI has no effect. The Trigger/Tally Type setting is ignored.
   - General Input — The GPIO port functions as an input.
4. Use the **Trigger/Tally Type** menu to select a trigger and polarity for the GPI.
5. If the **Trigger/Tally Type** is set to **Falling** or **Rising**, use the **Output Pulse Width** menu to specify the number of frames the pulse will be for an edge trigger.
6. Use the **Manual Override** and **Level** options in conjunction to override a GPI. This allows a GPI to be manually triggered from the menu and is useful for testing GPI function.
   a. Select the **Manual Override** box for a GPI/Tally.
   b. Toggle the **Level** button.

Tally Communication Setup

When configured as a Tally, a port becomes an output, providing a status indicator. Typically this is used to indicate which input(s) are on-air at any given moment. Each tally output on the card can be configured to be active when any of the six inputs are on air. They can be configured as Active High or Active Low. Edge triggered tallies generate a pulse to the configure polarity (high or low) for a duration of 30 frames or the duration of the event (whichever is shorter). The tally outputs defaults to a logical high level when inactive. When the tally becomes active, for example on SCTE-104 match, then the output is driven low.

To configure a port as a general tally output

1. Display the **TES-8943** interface as outlined in "**To display the TES-8943 interface in DashBoard**".
2. Select the **GPI/Tally** tab.
3. Use the **Function** menu to specify what will drive the tally output when the input is on-air. Choose from the following:
   - None — The specified GPIO port is not configured and the tally has no effect. The Trigger/Tally Type setting is ignored.
   - General Output — The GPIO port functions as an output.
4. Use the **Trigger/Tally Type** menu to select the polarity of the tally.
5. If the **Trigger/Tally Type** is set to **Falling** or **Rising**, use the **Output Pulse Width** menu to specify the number of frames the pulse will be for an edge trigger.
6. Use the **Manual Override** and **Level** options in conjunction to override a tally. This allows a tally to be manually triggered from the menu and is useful for testing tally function.
   a. Select the **Manual Override** box for a GPI/Tally.
   b. Toggle the **Level** button.

Enabling GPI/Tally Logging

The TES-8943 can provide a log of commands received from downstream devices via the GPIO ports on the rear module. You can specify the type of events to monitor. Events are listed in a hierarchical order based on the selected severity including internal errors and unrecognized or invalid responses from the GPIO port, failed communications between the TES-8943 (such as time outs) and the device connected to the GPIO port. This is intended for troubleshooting incompatibilities between the TES-8943 and downstream devices.

To configure the GPI/Tally logging feature

1. Display the **TES-8943** interface as outlined in "**To display the TES-8943 interface in DashBoard**".
2. Select the **GPI/Tally** tab.
3. Use the **GPI/Tally Logging Level** menu to specify the type of events to log.

✶ By default, the logging level is set to **Info** which enables the TES-8943 to provide a summary of all commands sent to and responses via this GPI/Tally port.

SCTE-104 Messages

This chapter outlines how to configure the TES-8943 to manage SCTE-104 messages.

SCTE-104 Encode Mode Overview

In SCTE-104 Encode mode, the TES-8943 can be assigned as a **Proxy Device** and takes the place of the Injector Device accepting commands from the Automation System (AS). Since some automation systems do not recognize the proxy result code (128) for success, there is a DashBoard control directing the TES-8943 to respond with the standard injector response code (100) for success.

The AS sends single operation or multiple operation messages, exactly as outlined in the SCTE 104 document. The AS does not add the SMPTE 2010 encoding. The TES-8943 adds the SMPTE 2010 encoding, splitting long SCTE 104 messages into multiple VANC packets as required and marking duplicate packets where applicable. The TES-8943 also repeats the last splice message as directed by a DashBoard control, marking the repeated messages as duplicates. If you require the TES-8943 for an AS application, you can assign a data port (serial or ethernet).

SCTE-104 Decode Mode Overview

In SCTE-104 Decode mode, the TES-8943 passes Automation System messages received from the VANC to the actual Injector Device through the Ethernet or Serial port. The TES-8943 strips off the SMPTE 2010 encoding to rebuild the SCTE-104 messages before sending the message to the port. The duplicate SCTE-104 messages are discarded.

The TES-8943 monitors responses from the injector. The responses are not required, but they are logged upon arrival.

Selecting a Source

Since the packet format and DID/SDID values are fixed for SCTE-104 triggers, you need to specify a serial port or ethernet input, the direction (encode or decode), and the network port to be used for logging. This section outlines how to specify either the **Ethernet** port or the **Serial** port to monitor for SCTE-104 messages.

Specifying the Serial Port as the SCTE-104 Source

This section applies if you are using the 8322AR-318D rear module.

✶ The 8323AR-325 rear module does not include a Serial port.

To specify the Serial port as the SCTE-104 source for the TES-8943

1. Display the **TES-8943** interface as outlined in "**To display the TES-8943 interface in DashBoard**".
2. Select the **Remote Control** tab.
3. Locate the **SCTE-104** area.
4. Select the box in the **SCTE-104** area.
5. From the **Connection** menu, select **Serial Port**.
6. Click **Serial Port Setup**.

   The **Configure the serial connection** dialog opens.

7. Select the electrical standard from the **Port Type** menu. This value must match the serial cable type that connects the TES-8943 to the external serial device.
8. Set the **Bit Rate**, **Data Bits**, **Parity**, and **Stop Bits** values for the external serial device.
9. Use the **Service** menu to select **SCTE-104 Serial Basic Link Layer**.
10. Use the **Flow Control** menu to enable the TES-8943 notify the serial device when it is experiencing a data overflow and stop sending data (SW) or to allow continuous data flow between the TES-8943 and the device (None). The default is None.
11. Close the **Configure the serial connection** dialog.

    The new settings are automatically applied.

To specify the remote port protocol for serial

1. Display the **TES-8943** interface as outlined in "**To display the TES-8943 interface in DashBoard**".
2. Select the **Configure Data Services** tab.
3. Select the **SCTE-104** sub-tab.

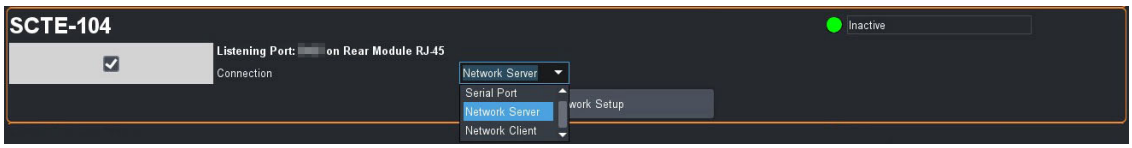
   The **Settings** sub-tab is automatically selected.
4. Select the **Serial Basic Link Layer** box to assign the VANC service to the Serial port on the rear module

Specifying the Ethernet Port as the SCTE-104 Source

This section applies to all models of the rear module.

To specify the Ethernet port as the SCTE-104 source

1. Display the **TES-8943** interface as outlined in "**To display the TES-8943 interface in DashBoard**".
2. Select the **Remote Control** tab.
3. Locate the **SCTE-104** area.
4. Select the box in the **SCTE-104** area.
5. From the **Connection** menu, select one of the following:
   - **Network Client** — The TES-8943 functions as a service requester that initiates communications with a server on the network.
   - **Network Server** — The TES-8943 functions as a host, or socket listener, on the network. This is the default.



6. Click **Network Setup**.

   The **Network Setup** dialog opens.
7. Use the **Ethernet Connector** menu to specify the network port the TES-8943 uses to communicate with the SCTE-104 device. Choose from the following:
   - **Chassis RJ-45** — The TES-8943 communicates with the SCTE-104 device via the open Gear Frame Network Controller card.
   - **Rear Module RJ-45** — The TES-8943 communicates with the SCTE-104 device via the Ethernet port on the rear module.

8. Use the **Packet Type** menu to specify the ethernet protocol your external device will use to communicate with the TES-8943. The default is TCP.
9. Use the **Port** field to specify the port that the TES-8943 will listen on. The default is 9001.
10. If you selected **Network Client** in step 5, use the **Remote IP** field to specify the IP Address of the TES-8943 on the network to be used for Presmaster communications.

✶ The **Remote IP** field value is ignored when the **Connection** is set to **Network Server**.

11. Close the **Network Setup** dialog.

    The new settings are automatically applied.

Setting the Protocol

You can choose to configure the remote port for Serial Basic Link Layer (BLL) or as a proxy device.

Serial Basic Link Layer (BLL)

There is also a **Basic Link Layer** (BLL) syntax that is mandatory when using the physical serial port on the rear module but is also made available on the Ethernet port for use with a serial hub. Refer to ***SCTE-104 - Appendix B*** for details.

- Encode Mode — In Encode mode, it is the responsibility of the AS to add the BLL start delimiter, CRC and end delimiter. It is also required to insert `<ESCAPE>` characters where required. The TES-8943 verifies the BLL before building the SMPTE 2010 encoded VANC packets for insertion.
- Decode Mode — In Decode mode, the TES-8943 removes the SMPTE 2010 encoding, reconstructing the raw SCTE-104 messages. The TES-8943 applies the BLL encoding to the raw SCTE 104 messages before sending to the target port.

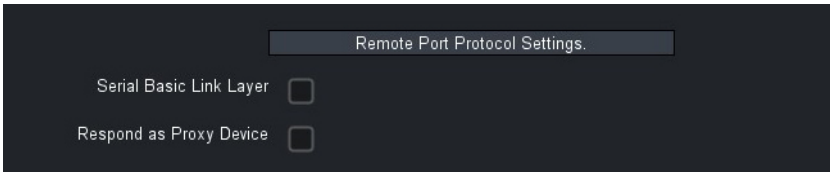
Proxy Device

The TES-8943 can operate as an SCTE-104 proxy device when you have an automation systems (AS) that sends SCTE-104 messages over a network or serial connection. The TES-8943 recognizes and accepts messages addressed to an "Injector", rejects others, responds appropriately to the AS, divides the message into VANC packets if needed, prepends the Payload Descriptor byte to each VANC packet per SMPTE 2010, inserts the packets into VANC, and maintains a log of transmissions.

To specify the remote port protocol for SCTE-104 messages

1. Display the **TES-8943** interface as outlined in "**To display the TES-8943 interface in DashBoard**".
2. Select the **Configure Data Services** tab.
3. Select the **SCTE-104** sub-tab.

   The **Settings** sub-tab is automatically selected.
4. Locate the **Remote Port Protocol Settings** area.



5. If required, select the **Serial Basic Link Layer** box if you assigned the serial Port as the SCTE-104 source. Refer to "**Specifying the Serial Port as the SCTE-104 Source**".
6. If required, select the **Respond as Proxy Device** box to identify the TES-8943 as a proxy device using the response code value of 128.

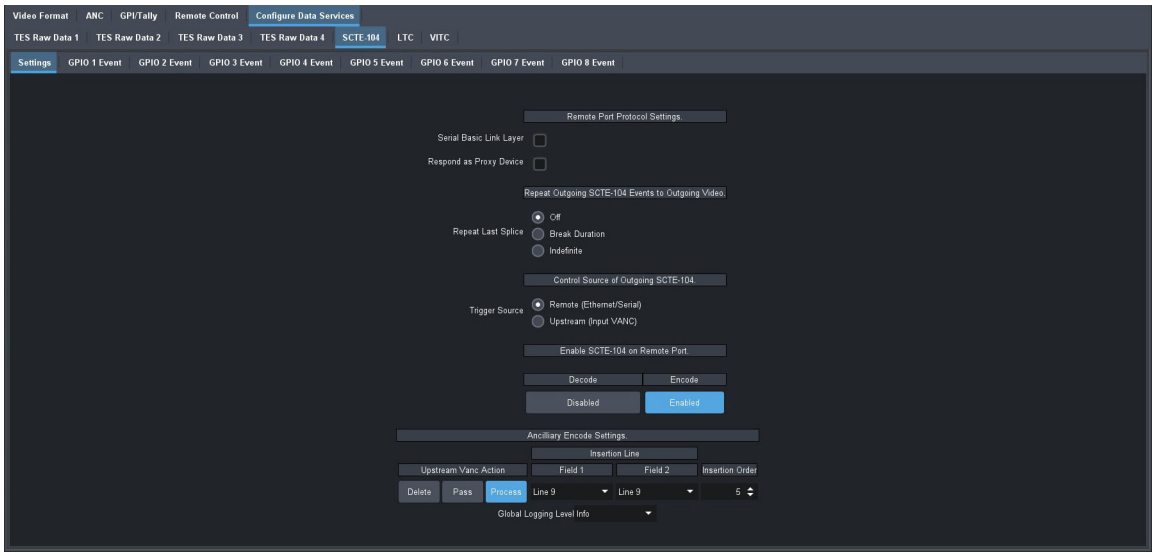
Selecting a Mode

The TES-8943 can either encode, or decode SCTE-104 triggers at any given time. You can also configure the TES-8943 to encode and decode on the same remote port.

To select a mode

1. Display the **TES-8943** interface as outlined in "**To display the TES-8943 interface in DashBoard**".
2. Select the **Configure Data Services** tab.
3. Select the **SCTE-104** sub-tab.

   The **Settings** sub-tab is automatically selected.



4. Locate the **Enable SCTE-104 on Remote Port** area.
5. To enable the TES-8943 to encode SCTE-104 messages, click **Enable** in the **Encode** column.

   The **Enable** button is now lit blue and displays the "`Enabled`" label.
6. To enable the TES-8943 to decode SCTE-104 messages, click **Enable** in the **Decode** column.

   The **Enable** button is now lit blue and displays the "`Enabled`" label.

Repeating the Last Splice

The TES-8943 can continuously encode the last splice message (not other messages such as "Init" or "Keep Alive") that was received on a data port, or initiated via a GPI, on each frame. The message continues to be re-transmitted until the next message arrives from the data port, or is activated via a GPI. This "duplicated message" flag is 0 (zero) on the first packet and 1 (one) on all repeated packets as per ***ST2010-2008***. A new incoming SCTE-104 message from the data port, or activated via GPI, stops the re-transmissions of the old message and starts transmission of the new message.

For More Information on...

- using SCTE-104 splice insert (DPI) commands, refer to the ***SCTE-104*** standard available from the Society of Cable Telecommunications Engineers.

To repeat the last splice

1. Display the **TES-8943** interface as outlined in "**To display the TES-8943 interface in DashBoard**".
2. Select the **Configure Data Services** tab.

3. Select the **SCTE-104** sub-tab.

   The **Settings** sub-tab is automatically selected.

4. In the **Repeat Last Splice** area, choose one of the following:

   - **Off** — Disables this feature. There is no repetition of splice messages, including any on-going message.
   - **Break Duration** — Repeats the current message for its remaining duration and repeats future splices to the longest splice duration in the message. When the break duration is unknown, the message is repeated indefinitely.
   - **Indefinite** — Repeats the current and future messages indefinitely, regardless of the break duration encoded in the message.

Encoding in a Transparent Stream

This section outlines how to enable the TES-8943 to identify the occurrence of an SCTE-104 trigger.

To specify a trigger source for SCTE-104 messages

1. Display the **TES-8943** interface as outlined in "**To display the TES-8943 interface in DashBoard**".
2. Select the **Configure Data Services** tab.
3. Select the **SCTE-104** sub-tab.

   The **Settings** sub-tab is automatically selected.

4. Use the **Trigger Source** options to specify the source of the incoming SCTE-104 commands to encode into the outgoing VANC. Choose from the following:

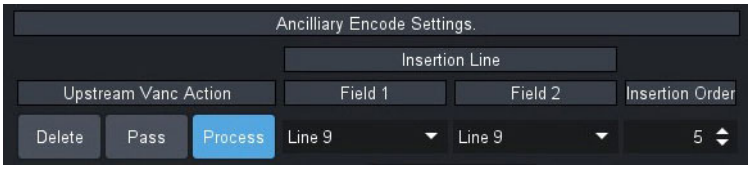
   - **Remote (Ethernet/Serial)** — The SCTE-104 messages are received via the Ethernet and/or the Serial ports on the TES-8943 rear module.
     - › If the source is via the Ethernet port, ensure that the **Enabled** box in the **Remote Control** > **SCTE-104** area is selected, and that **Network Server** is selected.
     - › If the source is via the Serial port, ensure that the **Enabled** box in the **Remote Control** > **SCTE-104** area, and that **Serial Port** is selected.
   - **Upstream (Input VANC)** — The SCTE-104 messages are received via the SDI IN 1 BNC on the TES-8943 rear module.

To specify the encode settings

1. Display the TES-8943 interface as outlined in "**To display the TES-8943 interface in DashBoard**".
2. Select the **Configure Data Services** tab.
3. Select the **SCTE-104** sub-tab.

   The **Settings** sub-tab is automatically selected.

4. Locate the **Ancillary Encode Settings** area.



5. Use the **Upstream VANC Action** options to determine how to manage the SCTE-104 data from the source device. Choose from the following:

   - **Delete** — the SCTE 104 data is automatically deleted from the input signal.

- **Pass** — the SCTE 104 data passes from the input signal to the output.
- **Process** — the TES-8943 modifies the SCTE 104 data from the input signal as defined by the Insertion Line and Insertion Order settings.

✶ No data will be inserted, and any upstream data will not be passed when Process mode is selected and data is not detected on the Ethernet port.

6. Use the **Insertion Line** options to specify the line to insert the SCTE 104 message on. For each Field, choose from the following:
   - **Follow upstream** — inserts the SCTE 104 message on the same line as the upstream device.
   - **Line #** — specifies the line to insert the SCTE 104 message on. Note that if more than one SCTE 104 message is to be inserted in the same line, the packet with the lowest insertion order number will be inserted first.
7. Use the **Insertion Order** field to define the hierarchy of the SCTE message insertion.

✶ The lower the number, the higher priority the packet is given.

Configuring a GPIO for SCTE-104 Messages

The TES-8943 allows you to match against a Splice Insert or a Program ID message for each of its GPIO ports. But first you must configure each port you wish to use for SCTE-104 encoding.

Before You Begin

Keep the following in mind:

- **GPI Based Encoding** — when the SCTE-104 direction is set to encode, the TES-8943 GPIO functions as an input. If a GPI message arrives at the same time as a data port message, it is inserted on the following field. In the case where two or more GPIs are asserted simultaneously, the TES-8943 parses the message and holds the GPI in Trigger state until the event has expired.
- **GPI Based Decoding** — when the SCTE-104 direction is set to decoding, the TES-8943 GPIO functions as an output, with the GPO assigned to a specified decoded SCTE-104 message. The GPO is triggered by the arrival of a transport stream packet with the specified PID, and is then negated after a user-specified time-out. This lets you control the duration of the output pulse to meet your system requirements.

To configure a GPIO port for SCTE-104 messages

1. Display the **TES-8943** interface as outlined in "**To display the TES-8943 interface in DashBoard**".
2. Select the **GPI/Tally** tab.
3. Use the **Function** menu to specify what will drive the tally output when the input is on-air. Choose from the following:
   - **None** — The specified GPIO port is not configured and the tally has no effect. The Trigger/Tally Type setting is ignored.
   - **GPI Trigger SCTE 104** — Specifies that the GPI will be used for SCTE 104 trigger encoding.
   - **GPI Override SCTE104 Source** — Specifies that the GPI will override the SCTE-104 > Settings > Trigger Source setting.
   - **GPI Reset SCTE104 Source** — Specifies that the GPI will switch the Trigger Source setting to the original selection in the SCTE-104 > Settings tab (if the Trigger is set to Edge).
   - **Tally Match SCTE104** — Configures the GPIO port as an output; the Tally is active when SCTE104 data is decoded.
4. Use the **Trigger/Tally Type** menu to select the polarity of the tally.

5. If the **Trigger/Tally Type** is set to **Falling** or **Rising**, use the **Output Pulse Width** menu to specify the number of frames the pulse will be for an edge trigger.
6. Use the **Manual Override** and **Level** options in conjunction to override a tally. This allows a tally to be manually triggered from the menu and is useful for testing tally function.
   a. Select the **Manual Override** box for a GPI/Tally.
   b. Toggle the **Level** button.

Configuring a GPIO for Encoding SCTE-104 Messages

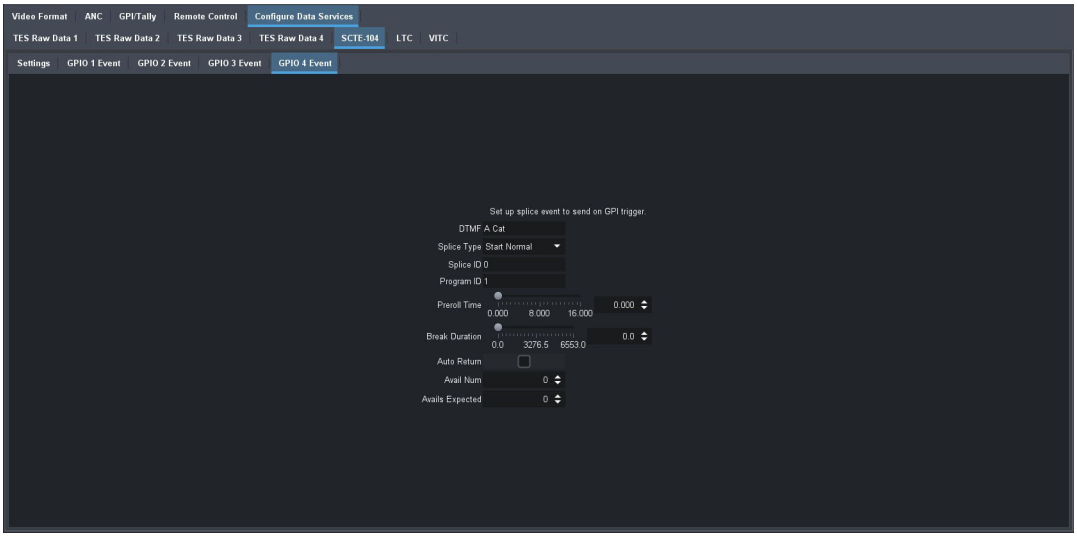
Configure the TES-8943 to encode via GPIs when you want to use contact closures to cause insertion of one of a group of predefined SCTE-104 messages. You can use the options in DashBoard to define the set of messages and this information is stored in the non-volatile memory in the VANC Processor. In this case, the TES-8943 becomes a GPI-driven SCTE-104 *inserter*.

To configure the GPIO port to encode

1. Ensure the **TES-8943** > **GPI/Tally** > **Function** is set to **GPI Trigger SCTE 104** for each GPIO port you wish to use for encoding.
2. Display the **TES-8943** > **Configure Data Services** > **SCTE-104** tab.

✶ Each GPIO port that has the Function set to GPI Trigger SCTE 104 will have a sub-tab displayed in the Configure Data Services > SCTE-104 tab.

3. Select the **GPIO Event** sub-tab for the port to encode SCTE-104 messages.



4. If required, use the **DTMF** field to specify a specific DMTF message on GPIO activation.
5. Use the **Splice Type** menu to specify the class of splice insertion. Refer to **Table 33** for a list of options.

✶ You may wish to set the Splice Type to N/A if you want a GPIO to only trigger a DTMF message without an accompanying splice message.

6. Use the **Splice ID Value** field to specifies the splice insert command in the encoded message.
7. Use the **Program ID Value** field to specify the PID in the encoded message.
8. Use the **Pre Roll Time** slider to specify, in the encoded message, the number of seconds to wait before initiating the trigger.
9. Use the **Break Duration** slider to specify the number of seconds for the insertion length in the encoded message.

10. Select the **Auto Return** box to have the encoded message specify that an acknowledgment to the device connected to the specified GPIO must be sent.
11. Use the **Avail Num** field to specify the amount of Avails within the associated PID of the encoded message.
12. Use the **Avails Expected** field to specify the total number of the expected Avails of the encoded message.

Configuring the GPIO for Decoding SCTE-104 Messages

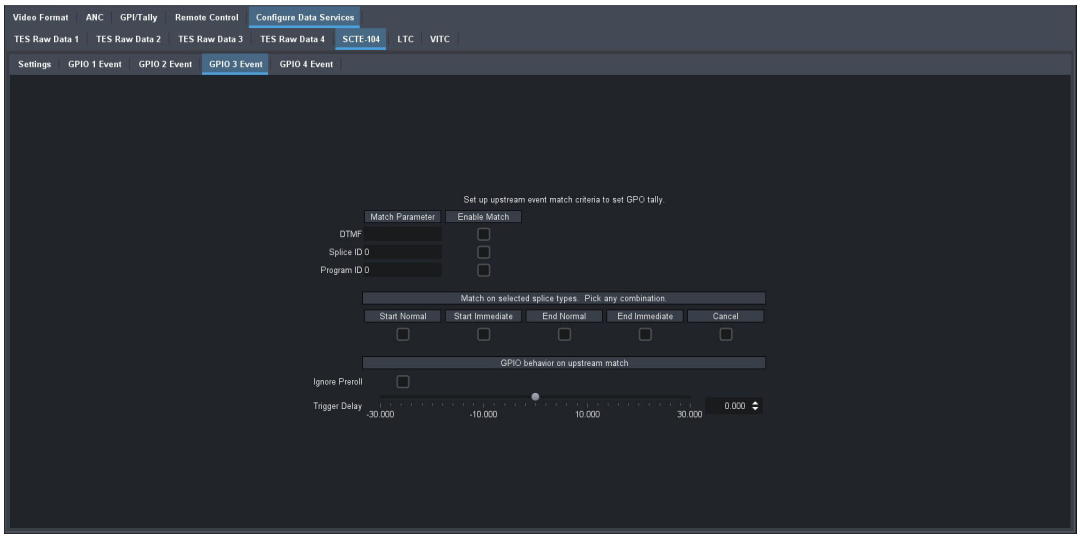
Configure the TES-8943 for GPI-based decoding if you want to create contact closure outputs in response to predefined SCTE-104 messages. You can use the options in DashBoard to define the set of messages and this information is stored in non-volatile memory in the VANC Processor. In this case, the TES-8943 becomes a SCTE-104 *receiver* with contact closure outputs.

To configure the GPIO port to decode

1. Ensure the **TES-8943** > **GPI/Tally** > **Function** is set to **Tally Match SCTE104** for each GPIO port you wish to use for decoding.
2. Display the **TES-8943** > **Configure Data Services** > **SCTE-104** tab.

✶ Each GPIO port that has the Function set to Tally Match SCTE104 will have a sub-tab displayed in the Configure Data Services > SCTE-104 tab.

3. Select the **GPIO Event** sub-tab for the port to decode SCTE-104 messages.



4. Locate the **Match Parameters** area on the tab.
5. To allow any incoming DTMF message with an exact match to trigger the 1sec GPIO pulse:
   a. Use the **DTMF** field specify a specific DMTF message on GPIO activation.
   b. Select the **Enable Match** box for DTMF.
6. To match the Splice ID in the trigger:
   a. Use the **Splice ID** field to specify the Splice ID value that the TES-8943 searches for in the trigger. The TES-8943 activates the GPO when the specified value matches what is set in the trigger. If the values do not match, the trigger is ignored.
   b. Select the **Enable Match** box for Splice ID.
7. To match the Program ID to the trigger:

a. Use the **Program ID** field to specify the Program ID value that the TES-8943 searches for in the trigger. The TES-8943 activates the tally when the specified value matches what is set in the trigger. If the values do not match, the trigger is ignored.

b. Select the **Program ID** box for Program ID.

8. Use the **Match Splice Types** to specify the splice type(s) the TES-8943 searches for in the trigger.

✶ Zero-duration events normally require an End Normal or End Immediate event to terminate. Clearing the **End Normal** and **End Immediate** boxes disables recognition of these End messages, resulting in a 1/4 second pulse.

9. Use the **Trigger Delay** slider to augment when the pre-roll begins (in milliseconds). This field allows the GPIO pulse signal to be delayed if required for compatibility with connected equipment. This should normally be set to 0 unless you know that a delay is needed.

10. Select the **Ignore Preroll** box to enable the TES-8943 to ignore any pre-roll values and initiate the trigger immediately.

Overriding the SCTE-104 Messages

The TES-8943 provides a means of overriding the source of messages to be encoded into the outgoing VANC. When using SCTE-104, local messages are received from an Ethernet or Serial port and upstream messages are present in the input video VANC. From DashBoard, you can select the trigger source of incoming SCTE-104 commands to encode into the outgoing VANC and have the ability to change this setting at any time without the need of a GPI. Once this setting is enabled, GPI events can be used to temporarily override the setting.

When a GPI is configured and used as an override of the main setting described above, the GPI will behave differently depending on the trigger function assigned to the GPI.

- **Level** trigger — If the GPI is set to **Override SCTE-104 Source**, and the GPI is configured as a Level trigger, then the feature is enabled while the GPI is active. In this mode the feature will not automatically disable when the commands are received from the other source. The feature would only be disabled when the GPI level changes back to an inactive state.
- **Edge** trigger — If the GPI is set to **Override SCTE-104 Source**, and the GPI is configured as a Edge trigger, then the feature is enabled when the edge event occurs. In this scenario the override would automatically disable at the next receipt of an event command from the other data source. Alternatively, you can remove the override by asserting a 'Reset' GPI event if they wish.

Keep the following in mind when using this feature:

- Receiving any Multiple Operation Message from the other source will disable the feature.
- Receiving a Single Operation Message will not disable the override feature.
- GPI triggered SCTE-104 splice events will not reset the override feature.

To configure an override of the SCTE-104 messages on a GPIO

1. Configure the GPIO port as outlined in "**Configuring the GPI/Tallies**".
2. To use the GPI to override the Trigger Source setting in the Configure Data Services > SCTE-104 tab, set the **Function** to **GPI Override SCTE104 Source**.
3. To use the GPI to reset the Trigger Source setting in the ANC Encode > SCTE-104 tab, set the **Function** to **Reset SCTE-104 Source**.
4. Select a trigger for the GPIO from the **Trigger** column.

To manually override the SCTE-104 messages on a GPIO via DashBoard

1. Configure the GPIO port as outlined in "**Configuring the GPI/Tallies**".
2. Locate the row for the GPIO you want to use as an override.

3. Select the **Override** box to assign the GPIO as an override.
4. Toggle the **Level** button to set the level for the override.

Setting up Event Logging

When installed in openGear frames with an MFC-8322-N or MFC-OG3-N card, the TES-8943 uses NTP to properly timestamp messages and SCTE-104 event log entries. Note that this timestamp is expressed as UTC time only. Logging is limited to messages containing splice requests only.

Types of Events

Each entry includes the GPIO number, date and time, Splice Event ID, and type of event.

- When encoding, this includes logging of all upstream VANC messages including those originating from the remote port or GPI-triggered event.
- When decoding, all upstream VANC splice messages, including when an error occurs, is recorded.

Viewing the Log Entries

The TES-8943 maintains a list of trigger events and presents them in reverse chronological order in DashBoard.

To view the SCTE-104 status via DashBoard

1. Display the **TES-8943** interface as outlined in "**To display the TES-8943 interface in DashBoard**".
2. Select the **ANC** tab.
3. Select the **SCTE-104 Status** tab.

   The tab displays the first 24 of a possible 4000 log entries. At a typical rate of 2 trigger events per hour, it will hold over 20 days of triggers for one GPIO. When it fills, the oldest entries are removed to make room for new ones. Click **Refresh** to view the next available 24 logs.
4. Select the **Last Event** tab to display the last log entry for each GPIO and the data port configured for SCTE-104 triggers.

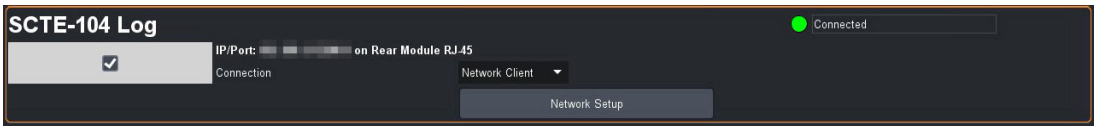
✶ Click **Clear Log** to delete all the log entries.

Outputting the SCTE-104 Log via the Ethernet Port

You can configure the **Ethernet** port on the TES-8943 rear module to output the log entries. Note that the TES-8943 discards all existing log entries on initial connection, then continues reporting events as they occur.

To configure the TES-8943 for SCTE-104 logging

1. Display the **TES-8943** interface as outlined in "**To display the TES-8943 interface in DashBoard**".
2. Select the **Remote Control** tab.
3. Select the box in the **SCTE-104 Log** area.
4. From the **Connection** menu, select one of the following:
   - **Network Client** — The TES-8943 functions as a service requester that initiates communications with a server on the network.
   - **Network Server** — The TES-8943 functions as a host, or socket listener, on the network. This is the default.



5. Click **Network Setup**.

   The **Network Setup** dialog opens.

6. Use the **Packet Type** menu to specify the ethernet protocol your external device will use to communicate with the TES-8943.
7. Ensure the **Port** field is set to **7788**.
8. If you selected **Network Client** in step 4, use the **Remote IP** field to specify the IP Address of the TES-8943 on the network to be used for TES Raw Data communications.
9. Close the **Network Setup** dialog.

   The new settings are automatically applied.

LTC and VITC Configuration

This chapter explains how to configure the TES-8943 to accept timecode data and output it as LTC or VITC using the menus and options available in DashBoard.

Overview

The TES-8943 provides the ability to transmit ***SMPTE ST 12-2*** timecode into the outgoing ancillary data space. Before proceeding, ensure that the port is connected to the timecode source. Refer to "**Supported Rear Module**" for details on the available ports.

✶ Before proceeding, ensure that Network Controller Card for your openGear frame is connected to an NTP server and its Network > Use time from Frame Controller box is selected. Refer to the ***MFC-OG3-N and MFC-8322-S User Guide*** for details.

Timecode Encode Lines and Locations

The timecode and binary fields are copied directly to the ANC output timecode with no interpretation except the field mark flag as follows:

Table 9 Field Mark Flags

Video Format	Flags
Interlaced	0 on Field 1, 1 on Field 2
Progressive	≤ 30Hz: always 0
	>30Hz:0 on the first frame of a pair, 1 on duplicated second frame of a pair

The location of the field mark bit depends on the video as follows:

Table 10 Location of Field Mark Bit

Frames/Second	VITC Bit Number[a]	ATC UDW, Bit Number[b]
24, 30	35	UDW 7, Bit 7
25	75	UDW 15, Bit 7

a. ST 12-1-2014, section 10.2.2
b. ST 12-2-2014, section 6.3

For SD video formats, the default is to encode in the VANC area on the second line following the switch line.

Table 11 Default Lines

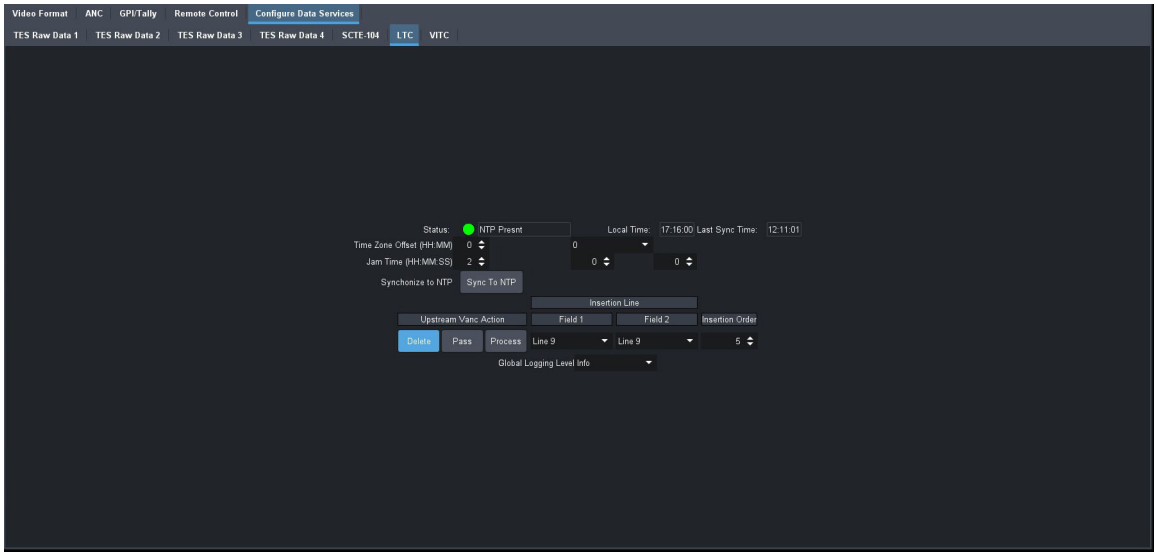
Video Format	Lines
480i	Line 12F1/275F2
576i	Line 8F1/321F2
HD interlaced	LTC on Line 10, VITC2 on Line 571
HD progressive	LTC on Line 10, VITC2 on Line 9

Configuring the LTC Settings

The TES-8943 supports SMPTE 12M Linear Timecode (LTC). The outgoing video signal is rendered with a known and constant delay.

To configure the LTC settings for the TES-8943

1. Display the **TES-8943** interface as outlined in "**To display the TES-8943 interface in DashBoard**".
2. Select the **Configure Data Services** tab.
3. Select the **LTC** sub-tab.



✶ Use the **Jam Time** read-only field to verify the last instance when the TES-8943 was synchronized to the NTP server.

4. Select the **Sync to NTP** button to use the time data transmitted by the Network Controller Card in the same openGear frame.
5. Use the **Time Zone Offset** fields to adjust the NTP values relative to the output to align with your time zone (HH:MM). Keep in mind that:
   - A negative offset value indicates that the input signal is earlier than the output signal.
   - A positive value indicates that the input signal is later than the output signal
6. Use the **Upstream VANC Action** options to manage the LTC data. Choose from the following:
   - **Delete** — removes the LTC data from the remote port on the rear module.
   - **Pass** — encodes Linear Timecode from the remote port on the rear module without modifications.
   - **Process** — encodes Linear Timecode from the remote port on the rear module and applies the settings on the LTC sub-tab.
7. Use the **Insertion Line** > **Field #** options to specify the line to insert the LTC packet on.

✶ If more than one packet is to be inserted in the same line, the packet with the lowest insertion order number will be inserted first.

8. Use the **Insertion Order** field to define the hierarchy of the LTC packets insertion.

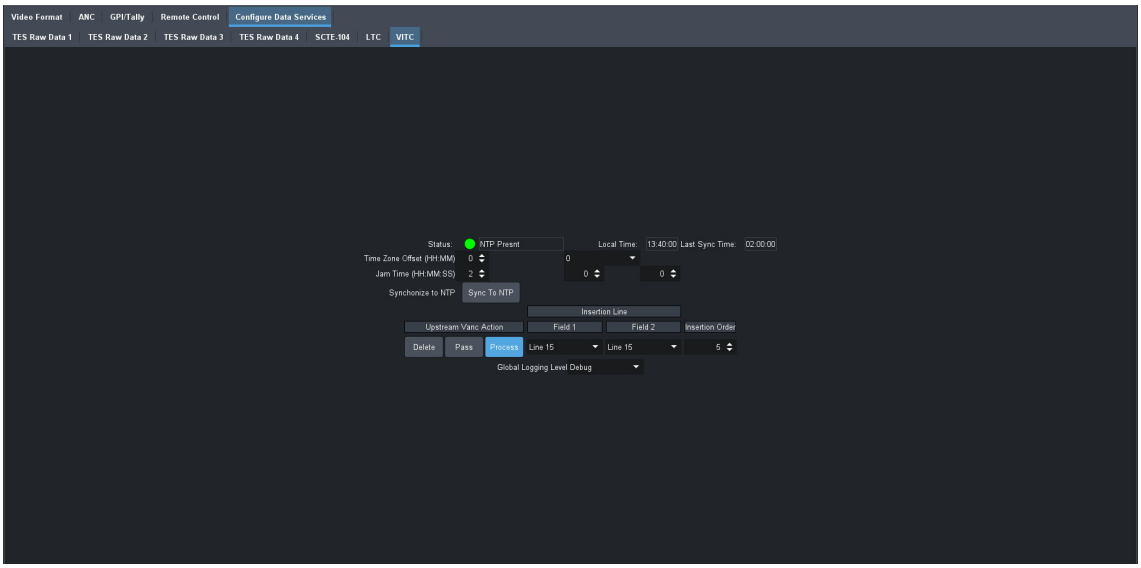
✶ The lower the **Insertion Order** value, the higher priority the packet is given.

Configuring the VITC Settings

The TES-8943 uses NTP time and encodes the data as VITC into the outgoing ancillary data.

To configure the VITC settings for the TES-8943

1. Display the **TES-8943** interface as outlined in "**To display the TES-8943 interface in DashBoard**".
2. Select the **Configure Data Services** tab.
3. Select the **VITC** sub-tab.



✶ Use the **Jam Time** read-only field to verify the last instance when the TES-8943 was synchronized to the NTP server.

4. Select the **Sync to NTP** button to use the time data transmitted by the Network Controller Card in the same openGear frame.
5. Use the **Time Zone Offset** fields to adjust the NTP values relative to the output to align with your time zone (HH:MM). Keep in mind that:
   - A negative offset value indicates that the input signal is earlier than the output signal.
   - A positive value indicates that the input signal is later than the output signal
6. Use the **Upstream VANC Action** options to manage the VITC data. Choose from the following:
   - **Delete** — removes the VITC data from the remote port on the rear module.
   - **Pass** — encodes VITC from the remote port on the rear module without modifications.
   - **Process** — encodes VITC from the remote port on the rear module and applies the settings on the VITC sub-tab.
7. Use the **Insertion Line** > **Field #** options to specify the line to insert the VITC packet on.

✶ If more than one packet is to be inserted in the same line, the packet with the lowest insertion order number will be inserted first.

8. Use the **Insertion Order** field to define the hierarchy of the VITC packets insertion.

✶ The lower the **Insertion Order** value, the higher priority the packet is given.

Using RossTalk

The TES-8943 can be controlled from a remote editor or computer via RossTalk commands. These commands can be sent to the TES-8943 over an ethernet connection or serial connection. Both methods are described below.

✶ Contact your IT Department before connecting to your facility network to ensure that there are no conflicts. They will provide you with an appropriate value for the IP address, subnet mask, and gateway for the external device communicating with the TES-8943.

RossTalk over a Network Connection

This section outlines how to configure the TES-8943 to communicate with a RossTalk device via a network connection.

Cabling Requirements

There are two options for connecting the TES-8943 to your facility network: via the Ethernet port on the rear module, or via the openGear frame network connection.

- If you are connecting via the rear module You will require a standard network CAT-5 cable to connect the TES-8943 to your facility network. Refer to "**Remote Control Cabling**" for more information.
- If you are connecting via the openGear frame, refer to the ***OGX-FR Series User Guide*** for details.

Configuring the TES-8943 for RossTalk Communications via a Network

This section outlines how to configure the TES-8943 to communicate via the RossTalk protocol.

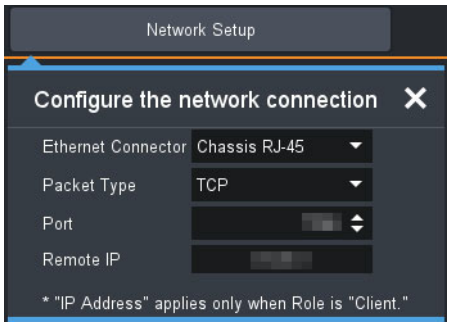
For More Information on…

- the RossTalk settings on the Remote Control tab, refer to **Table 30**.

To enable the RossTalk protocol for a network connection

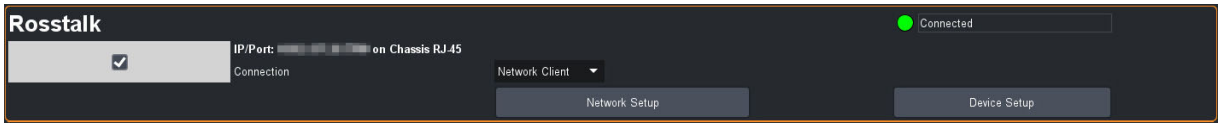
1. Display the **TES-8943** interface as outlined in "**To display the TES-8943 interface in DashBoard**".
2. Select the **Remote Control** tab.
3. Locate the **RossTalk** area in the tab.
4. Select the box in the **RossTalk** area.
5. From the **Connection** menu, select one of the following:
   - Network Client — The TES-8943 functions as a service requester that initiates communications with a server on the network.
   - Network Server — The TES-8943 functions as a host, or socket listener, on the network. This is the default.
6. Click **Network Setup**.

   The **Configure the network connection** dialog opens.



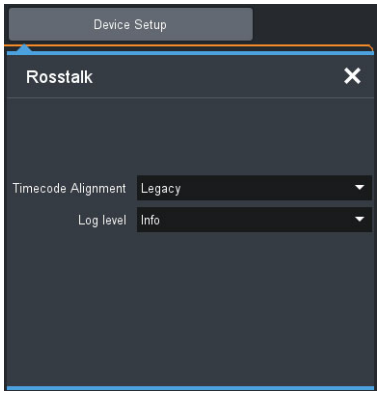
7. Use the **Ethernet Connection** menu to specify the network connection you chose in "**Cabling Requirements**".
8. Use the **Packet Type** menu to specify the ethernet protocol your external device will use to communicate with the TES-8943.
9. Ensure the **Port** field is set to **7788**.
10. If you selected **Network Client** in step 5, use the **Remote IP** field to specify the IP address of the TES-8943 on the network to be used for RossTalk communications.
11. Close the **Network Setup** dialog.

    The new settings are automatically applied.



12. Click **Device Setup**.

    The **Rosstalk** dialog opens.



13. Use the **Timecode Alignment** menu to specify the timecode source. Choose from the following:
    - **Legacy** — uses the timecode as read directly from the input (with no delay).
    - **Last incoming field** — Note the timecode will not be aligned with the output field when using interlaced video.
    - **Aligned to output field** — select this when using interlaced video. This option delays the timecode by one field to line up with output.
    - **Encoded timecode** — sends the last generated timecode.
14. Use the **Logging Level** menu to specify the type of timecode message to monitor.

15. Close the **Rosstalk** dialog.

    The new settings are automatically applied.

16. If the **Timecode Alignment** menu is set to **Encoded timecode**:
    a. Select the **Configure Data Services** tab.
    b. Locate the **Upstream VANC Action** area.
    c. Click **Process**.

Using a Serial Connection

RossTalk commands can be sent to the TES-8943-B via the **Serial** port (RS-232/RS-422) on the 8322AR-318D rear module).

✶ Refer to the documentation for your external device for specific cabling requirements.

Cabling Requirements

Refer to "**Serial Cabling**" for details on connecting a serial device to the TES-8943 rear module.

Configuring the TES-8943 for Serial RossTalk Communications

This section outlines how to configure the TES-8943 to communicate with a device via RossTalk.

To enable the RossTalk protocol for serial communications

1. Display the **Configuration** interface as outlined in "**To display the Configuration interface in DashBoard**".
2. Select the **Remote Control** tab.
3. Locate the **RossTalk** row in the tab.
4. Select the box in the **RossTalk** area.
5. From the **Connection** menu, select **Serial Port**.
6. Click **Serial Port Setup**.

   The **Configure the serial connection** dialog opens.

7. Use the **Port Type** menu to specify transmission standard the external device uses. The default is RS 422.
8. Use the **Bit rate** menu to select the bit rate for the external device connected to the Serial port of the TES-8943. The default is 115200.
9. Use the **Data Bits** menu to set the number of data bits transmission (character length). The default is 8.
10. Use the **Parity** menu to set the parity type for the external device. The default is None.
11. Use the **Stop Bits** menu to set the number of stop bits transmission. The default is 1.
12. Use the **Flow Control** menu to enable the TES-8943 notify the serial device when it is experiencing a data overflow and stop sending data (SW) or to allow continuous data flow between the TES-8943 and the device (None). The default is None.
13. Close the **Configure the serial connection** dialog.

    The new settings are automatically applied.

Using the RossTalk Protocol

RossTalk is a plain text based protocol that allows control of Ross Video equipment.

Sending RossTalk Commands

RossTalk commands are generally case-sensitive, and must be terminated with carriage return and linefeed (CR+LF). When using with the TES-8943, the command can be uppercase or lowercase, and the terminator can by simply linefeed.

To send RossTalk Commands

1. Verify that you have created a network connection to the TES-8943.
2. Enter the commands you want to send to the TES-8943.

Supported RossTalk Commands

Table 12 lists the RossTalk commands that the TES-8943 supports.

Table 12 Supported RossTalk Commands

Command	Description
GPI <n>	Triggers action associated with the specified GPI number <n>

Using RossTalk to Send Timecode via a GPIO

You can configure a triggered GPIO port to send a specified string as an output to the RossTalk port.

On the incoming GPI event, sends the last timecode inside a RossTalk Timecode String to the RossTalk port. This substitutes the last incoming timecode as follows:

- Replaces {VITC} with last incoming VITC timecode in format:
  HH:MM:SS.ff or --:--:--.-- if VITC not present.
- Replaces {LTC} with last incoming LTC timecode in format:
  HH:MM:SS.ff or --:--:--.-- if LTC not present.
- Replaces {TC} with last incoming VITC (preferred) or LTC timecode in format:
  HH:MM:SS.ff or --:--:--.-- if neither timecode is present.

For example,

```
TC: {VITC} 01:01
TC: [{LTC}] 12:34
LTC: {LTC} GPI6
VITC: {VITC} GPI8
```

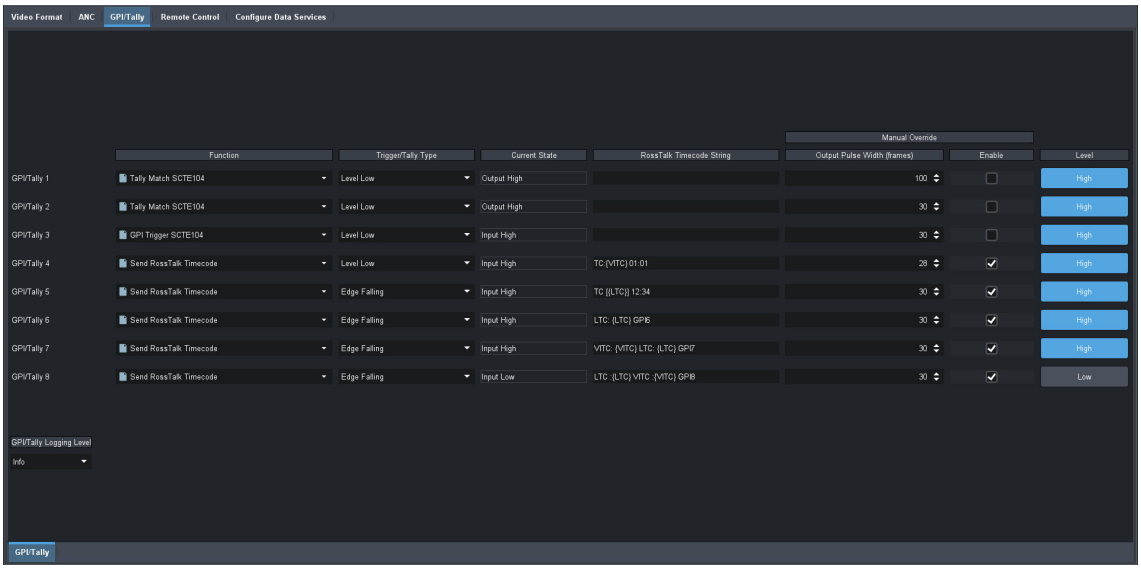
To configure a GPIO to send a RossTalk Timecode string

1. Display the **TES-8943** interface as outlined in "**To display the TES-8943 interface in DashBoard**".
2. Select the **GPI/Tally** tab.
3. Locate the row for the GPIO port you wish to configure for RossTalk.
4. Set the **Function** to **Send RossTalk Timecode**.
5. Set the **Trigger/Tally Type** to **Edge Falling**.

6. Use the **RossTalk Timecode String** field to specify the string to output to the RossTalk port when this GPIO is triggered.

✶ In progressive video formats, this doubles the frame number: counting from 0 through 59. VITC1 will always be even values 0 through 58. VITC2 will be odd frame numbers 1 through 59.

- The string is not case sensitive.
- The string should contain the timecode type to send:
  - `{VITC}` to use the last VITC timecode
  - `{LTC}` to use the last LTC timecode
  - `{TC}` to use the last VITC timecode or LTC timecode if no VITC timecode is available.



Monitoring

This chapter summarizes the read-only status fields in DashBoard that report the encoding and decoding status of the TES-8943.

For More Information on...

- additional read-only fields, refer to "**DashBoard Interface Overview**".

Monitoring the Encoding Status via DashBoard

Use the **TES-8943** > **ANC** > **Encode** tab to monitor the ANC services available to the TES-8943.

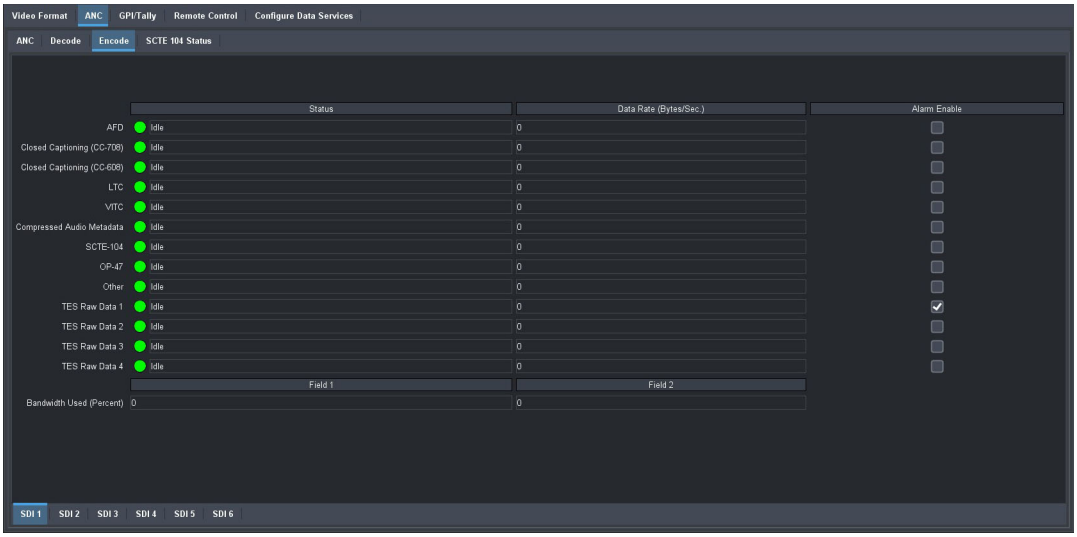


Figure 16 Example of the ANC > Encode Tab

This tab provides read-only information on each stream currently configured on the TES-8943. (**Figure 16**) You can also enable the alarm for each stream using the provided Alarm Enable check box.

- If the check box is selected for a stream, the corresponding Status field reports when error conditions are occurring for that stream.
- If the check box is cleared, the Status field will not report any error conditions even if they are occurring on the TES-8943.

Overview

For each encode stream, the following read-only information is reported on the Encode Status tab:

- Encode Mode assigned to the stream or disabled. (e.g. Encode Custom Packet or Encode Disabled).
- Specified DID:SDID for the stream. (e.g. DID:61 SDID:01, DID:10 SDID:01)
- Indicator and current status. For example, a green indicator that displays OK in the Status field indicates the encoding stream is not experiencing errors. Most warning and error messages will be hidden if the Alarm Enable check box is not selected.
- Data rate reported in Bytes/second.

Monitoring the Decoding Status via DashBoard

Use the Decode Status tab to monitor the ANC services you have configured on the TES-8943. This list updates whenever you configure a new stream using the **ANC** > **Decode** tab. (**Figure 17**)

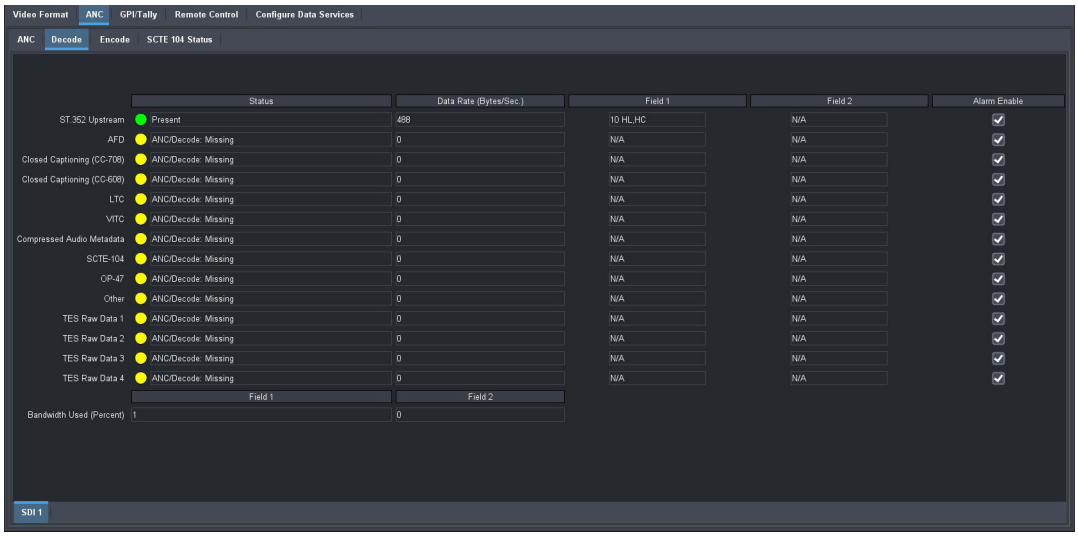


Figure 17 Example of the ANC > Decode Tab

Overview

The Decode Status tab provides read-only information on each stream currently configured on the TES-8943. You can also enable the alarm for each stream using the provided Alarm Enable check box.

- If the check box is selected for a stream, the corresponding Status field reports when error conditions are occurring for that stream.
- If the check box is cleared, the Status field will not report any error conditions even if they are occurring on the TES-8943.

Decoding Status

For each decode stream, the following read-only information is reported on the Decode Status tab:

- Specified DID:SDID for the stream. (e.g. DID:12 SDID:34, DID:10 SDID:06)
- Indicator and current status. For example, a red indicator that displays Decode stream not assigned to output port in the Status field could indicate that the stream has not been assigned to a data port. Most warning and error messages will be hidden if the Alarm Enable check box is not selected.
- Data rate reported in Bytes/second.
- Line number(s), channel (LUMA or CHROMA), and/or field (F1, or F2).

Upgrading the Software

The TES-8943 can be upgraded in the field via DashBoard.

✶ During a software upgrade, the TES-8943 may be unresponsive and there will be interruptions to signal flow. Ensure the TES-8943 is bypassed in your signal path prior to performing a software upgrade.

To upgrade the software on a card

1. Contact Ross Technical Support for the latest software version file.
2. Ensure the ethernet cable is connected to the **Ethernet** port on the openGear frame.
3. Ensure the network settings on the TES-8943 are valid.
4. From the **Tree View**, expand the node for the TES-8943 you want to access.
5. Double-click the **Global** sub-node to display the interface in the right-half of DashBoard.
6. Click **Upload**, located near the bottom of the interface, to display the **Select file Upload** dialog.
7. Navigate to the ***.bin** file you want to upload.
8. Click **Open**.
9. If you are upgrading a single card:
    a. Click **Finish** to start the upgrade.
    b. Proceed to step 11.
10. If you are upgrading multiple cards:
    a. Click **Next >** to display the **Select Destination** menu. This menu provides a list of the compatible cards.
    b. Specify the card(s) to upload the file to by selecting the check box(es) for the cards you want to upload the file to.
    c. Verify the card(s) you want to upload the file to. The **Error/Warning** fields indicate any errors, such as incompatible software or card type mismatch.
    d. Click **Finish**.
11. Monitor the upgrade.
    - An **Upload Status** dialog enables you to monitor the upgrade process.
    - Notice that each card is listed in the dialog with a  button. This button is replaced with a **Reboot** button once the software file is loaded to that card.

✶ Avoid clicking the individual Reboot buttons until all cards have successfully completed the file upload process and the **OK** button, located in the bottom right corner of the dialog, is enabled.

- Click **OK** to reboot all the cards listed in the **Uploading to Selected Devices** dialog.
- The **Reboot Confirm** dialog displays, indicating the number of cards that will reboot. Click **Yes** to continue the upgrade process. Note that clicking **Cancel** or **No** returns you to the **Uploading to Selected Devices** dialog without rebooting the card(s).
- The card(s) are temporarily taken off-line during the reboot process. The process is complete once the status indicators for the **Card State** and **Connection** return to their previous status.

DashBoard Interface Overview

This chapter summarizes the interfaces, and tabs available from DashBoard for the TES-8943.

✶ An asterisk beside a parameter indicates that it is the default value.

Global Interface

The Global interface is displayed by double-clicking the **Global** sub-node in the TES-8943 tree.

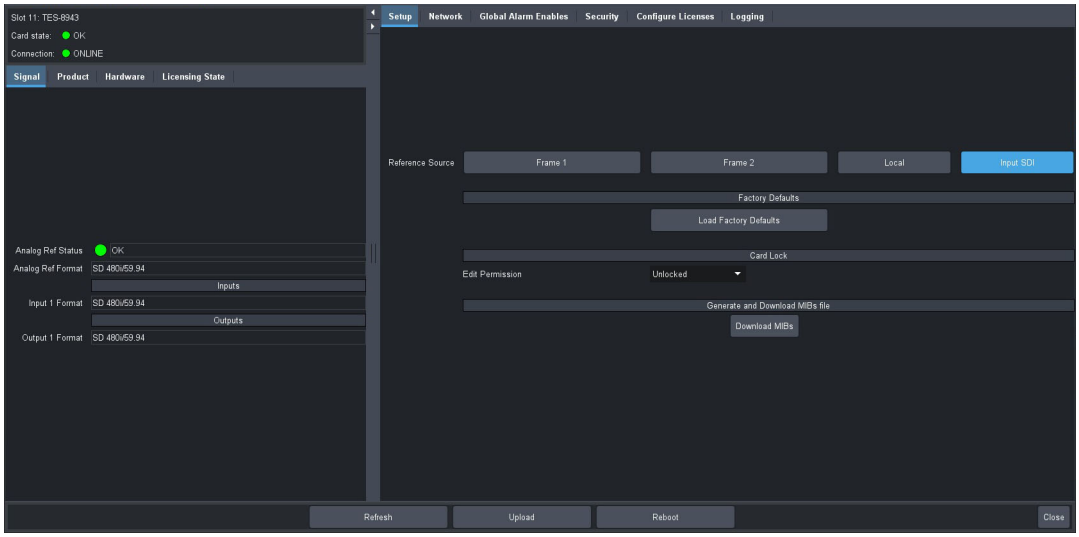


Figure 18 Example of the Global Interface in DashBoard

✶ If the Global Interface does not display as shown in **Figure 18**, the network settings of the TES-8943 may be incorrectly set or invalid. Refer to "**Getting Started**" for details.

Signal Tab

Table 13 summarizes the read-only information displayed in the Signal tab.

Table 13 Signal Tab

Item	Parameters	Description
Analog Ref Status	OK (Green)	The detected reference format is supported
	Alarm Suppressed (Green)	An unsupported reference format is detected but the Global Alarm Enables > Reference Format option is disabled (box is not selected)
	Unlocked (Red)	A reference signal is detected but the TES-8943 is not locked to it
	Unsupported (Red)	A reference signal is detected but the format is not supported by the TES-8943
	Incompatible (Red)	A reference signal is detected but the format is incompatible with the current output mode
Analog Ref Format	###	Indicates the detected reference format

Table 13 Signal Tab (Continued)

Item	Parameters	Description
Inputs		
Input # Format	###	Signal present and the format matches the video output format configuration of the card
Outputs		
Output # Format	###	Reports the format of the specified video output

Product Tab

Table 14 summarizes the read-only information displayed in the Product tab.

Table 14 Product Tab

Item	Parameters	Description
Product	TES-8943	
Supplier	Ross Video Ltd.	
Board Rev	#	Indicates the hardware version
Serial Number	#	Indicates the serial number of the card
Rear Module	#	Indicates the rear module the card is installed in
Rear Module Status	OK (Green)	A supported rear module is installed with the card
	Alarm suppressed (Green)	An unsupported rear module is installed but the Global Alarm Enables > Rear Module option is disabled (box is not selected)
	Incomp I/O Module (Red)	Card is connected to an unsupported rear module
Software Rev	v#.#-#	Indicates the software version running on the card
Firmware Rev	#.#	Indicates the firmware version running on the card
CPLD Rev	#.#	Indicates the complex programmable logic device version of the TES-8943
Daughter Card		
Type	#	Indicates the daughter card model installed on the main card
Variant	#	
Issue	#	Indicates the hardware version of the daughter card

Hardware Tab

Table 15 summarizes the read-only information displayed in the Hardware tab.

Table 15 Hardware Tab

Item	Parameters	Description
Hardware Status	OK (Green)	The fans are operating correctly and no errors are detected
	Alarm suppressed (Green)	There are fan errors detected but the Global Alarm Enables > Fan Speed option is disabled (box is not selected)
	Critical Temperature (Red)	An error with the fans is occurring. Verify that the fans and airflow for the card is valid.
	Fan Off/Stalled (Red)	
Voltage (mV)	#	Measured input voltage
Current (mA)	#	Current consumption in milliamperes
Power (W)	#	Power consumption in watts
FPGA Temp (C)	#C	Indicates the FPGA Core temperature where: • A green indicator displays when the temperature is less than 95°C. • A yellow indicator displays when the temperature is greater than or equal to 95°C. • A red indicator displays when the temperature is greater than or equal to 100°C.
	If the temperature is greater than 100°C (212°F), the user must manually power down the card.	
AXI Bridge	#	The Advanced extensible interface bridge is running correctly on the card. This information is used by Ross Technical Support for diagnostics.
Fan Speed	#	Reports the speed (rpm) of the fan on the board
CPU Usage	x.xx / y.yy / z.zz	Displays the CPU Load average where: • x.xx represents in the last minute • y.yy represents the last five minutes • z.zz represents the last fifteen minutes
RAM Available	# / #.## MB	CPU Memory Used / Total CPU Memory
Daughter Card		
Voltage (mV)	#	Measured input voltage
Current (mA)	#	Current consumption in milliamperes
Power (W)	#	Power consumption in watts

Licensing State Tab

Table 16 summarizes the information displayed in the Licensing State tab.

Table 16 Licensing State Tab

Item	Parameters	Description
Base Product Type	TES-8943	
TES-8943-#-LICENSE		
License State	Unlicensed	The license key for the feature is not installed. Navigate to the Configure License tab to enable this feature
	Licensed	The license key for this feature was correctly enabled in the Configure License tab

Setup Tab

Table 17 summarizes the options in the Setup tab.

Table 17 Setup Tab

Item	Parameters	Description
Reference Source	Frame 1	Uses the source connected to the **REF 1** port on the openGear frame
	Frame 2	Uses the source connected to the **REF 2** port on the openGear frame
	Local	Uses the external reference source connected to **REF IN** on the rear module
	Input SDI	Uses the source connected to the **SDI IN 1** port on the rear module
Factory Defaults		
Load Factory Defaults	All editable parameters in DashBoard, except those in the Network tab and any installed licenses, are reset to the factory default values. A reboot of the card may be required to update the parameters.	
Card Lock		
Unlocked*	All editable parameters in DashBoard can be modified by a user	
Locked	The DashBoard interface is locked. The editable parameters in DashBoard can no longer be modified by the user. To unlock the interface, select the box again.	
Generate and Download MIBs File		
Download MIBs	Downloads the Management Information Base (MIB) file that provides the SNMP controls for your card	

Network Tab

Table 18 summarizes the menus and read-only fields displayed in the Network tab.

Table 18 Network Tab

Item	Parameters	Description
Network Time		
Use time from Frame Network Controller	Selected	Enables the TES-8943 to use the time data reported by the MFC-OG3-N or MFC-OGX-N that is installed in the same frame
	Cleared	
Default Gateway		
Current (read-only)	#.#.#.#	Indicates the gateway for communications outside of the local area network (LAN)
Static Gateway	#.#.#.#	The Gateway for the TES-8943 that the user manually assigned
openGear Chassis RJ-45		
Link Status (read-only)	OK (Green)	The TES-8943 is communicating on the network via the MFC-OG3-N or MFC-OGX-N
	Invalid Subnet Mask (Yellow)	The Current Subnet Mask value is set incorrectly or is invalid within your network
	Apply/Cancel Changes (Yellow)	One or more setting on this tab was changed but the **Apply** button was not selected
	Not Present (Red)	A link could not be established using the present network setting values
	Link Down (Red)	The link for the MFC-OG3-N or MFC-OGX-N is invalid
Current IP Address (read-only)	#.#.#.#	Indicates the IP Address currently assigned to the TES-8943 via the MFC-OG3-N or MFC-OGX-N
Current Subnet Mask (read-only)	#.#.#.#	Indicates the subnet mask for the TES-8943
MAC Address (read-only)	#	Indicates the MAC Address currently assigned to the TES-8943
Mode	Static	The user manually supplies the network settings for the TES-8943
	DHCP*	Automates the assignment of network settings for the TES-8943
Static IP Address[a]	#	The IP Address for the TES-8943 that the user manually assigned
Subnet Mask	#	The Subnet Mask for the TES-8943 that the user manually assigned
Rear Module RJ-45		
Link Status (read-only)	OK (Green)	The TES-8943 is communicating on the network via the Ethernet port on the rear module

Table 18 Network Tab (Continued)

Item	Parameters	Description
Link Status (read-only)	Invalid Subnet Mask (Yellow)	The Current Subnet Mask value is set incorrectly or is invalid within your network
	Apply/Cancel Changes (Yellow)	One or more setting on this tab was changed but the **Apply** button was not selected
	Not Present (Red)	A link could not be established using the present network setting values
	Link Down (Red)	The link for the Ethernet port on the rear module is invalid
Current IP Address (read-only)	#.#.#.#	Indicates the IP Address currently assigned to the Ethernet port on the rear module
Current Subnet Mask (read-only)	#.#.#.#	Indicates the subnet mask for the Ethernet port on the rear module
MAC Address (read-only)	#	Indicates the MAC Address currently assigned to the Ethernet port on the rear module
Mode	Static	The user manually supplies the network settings for the Ethernet port on the rear module
	DHCP*	Automates the assignment of network settings for the Ethernet port on the rear module
Static IP Address[b]	#	The IP Address for the Ethernet port on the rear module that the user manually assigned
Subnet Mask	#	The Subnet Mask for the Ethernet port on the rear module that the user manually assigned
Apply	Applies and saves any changes made to the editable menus on the **Network** tab	
Cancel	Cancels any changes and resets the editable menus on the **Network** tab to the previous values	

a. When configuring both the openGear Frame RJ45 port and the Ethernet port on the rear module, ensure that each IP Address is unique to the subnet.
b. When configuring both the openGear Frame RJ45 port and the Ethernet port on the rear module, ensure that each IP Address is unique to the subnet.

Global Alarm Enables Tab

Table 19 summarizes the options displayed in the Global Alarm Enables tab.

Table 19 Global Alarm Enables Tab

Item	Parameters	Description
Network Time		
Network time (read-only)	#	Displays the time data transmitted by the Frame Controller card in the same frame. Requires that the Global > Network > Use time from Frame Controller box is selected.
Alarm Enable	Selected	The TES-8943 reports the NTP time as provided by the Frame Controller card
	Cleared*	Disables this alarm
Rear Module Alarm		
Rear Module (read-only)	This field replicates the information displayed in the Product > Rear Module Status field	
Alarm Enable	Selected*	The Global > Product > Rear Module Status field reports when a rear module is not compatible with the card
	Cleared	Disables this alarm
Fan Alarm		
Fan Speed (read-only)	#	Reports the fan speed (rpm) of the fan on the board
Alarm Enable	Selected*	The TES-8943 reports when the fan is not working correctly
	Cleared	Disables this alarm
Analog Reference Alarm		
Reference Format (read-only)	OK (Green)	Indicates the detected reference format is supported
	Alarm Suppressed (Green)	The Alarm Enable box is cleared. The status of the reference signal will not be reported.
	Unlocked (Red)	A reference signal is detected, but the card is not locked to it
	Unsupported (Red)	A reference signal is detected, but the format is not supported by the TES-8943
	Incompatible (Red)	A reference signal is detected but the format is incompatible with the current output mode of the card
Alarm Enable	Selected*	The Global > Signal > Analog Reference Status field reports when there is a loss of reference signal
	Cleared	Disables this alarm
SDI Input Alarms		
Input # Status (read-only)	Each field duplicates the information reported in the TES-8943 > Video Format > Input Status fields	

Table 19 Global Alarm Enables Tab (Continued)

Item	Parameters	Description
Alarm Enable	Selected*	TES-8943 reports a loss of the specified input or if the format is incompatible for the specified input
	Cleared	Disables this alarm

Security Tab

Table 20 summarizes the options displayed in the Security tab.

Table 20 Security Tab

Item	Parameters	Description
Security Configuration		
SSH Login	Disable*	Disables the ability to log onto the TES-8943 via an SSH server
	Enable	The TES-8943 can be accessed via a secure channel by an SSH server
Apply	Applies and saves any changes made to the editable menus on the **Security** tab	
Cancel	Cancels any changes and resets the editable menus on the **Security** tab to the previous values	

Configure Licenses Tab

Table 21 summarizes the read-only information displayed in the Configure Licenses tab.

Table 21 Configure Licenses Tab

Item	Parameters	Description
Base Product Type	TES-8943	
Feature	<license name>	Specifies the available license(s)
Request Code	#	Use to obtain a license key
Key	#	Specifies the license key that was provided to enable the licensed feature
	Licensed	The license key is valid and the licensed feature is enabled

Logging Tab

Table 22 summarizes the read-only information displayed in the Logging tab.

Table 22 Logging Tab

Item	Parameters	Description
Logging Level	Filters the events the System Log captures	
Remote Logging	#.#.#.#	Specifies the IP Address for the external device that is logging the communication activity for the TES-8943
System Log	Displays the events logged for the TES-8943 since the last time the log was cleared	

TES-8943 Interface

The TES-8943 interface is displayed by double-clicking the TES-8943 sub-node. (**Figure 19**)

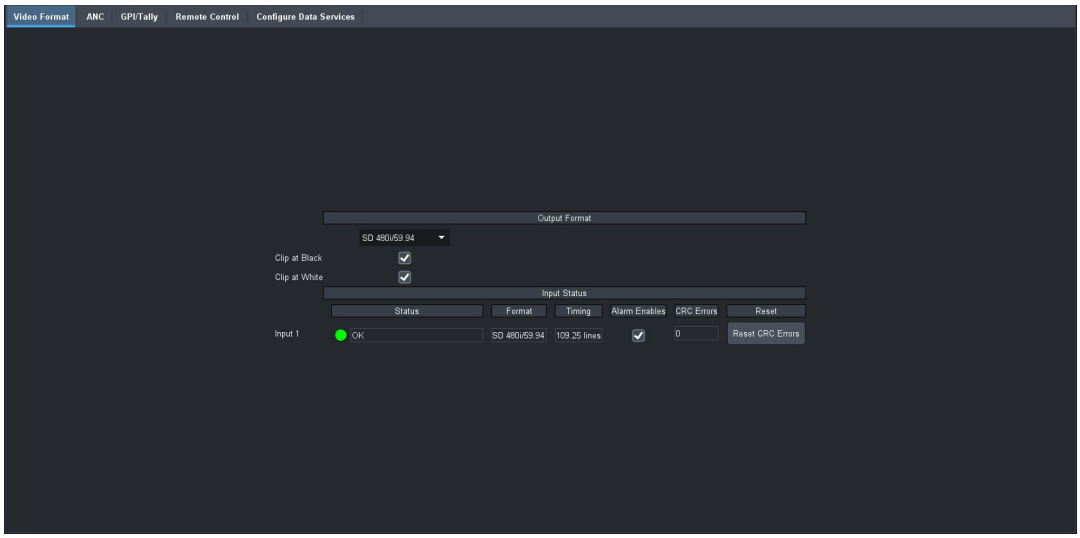


Figure 19 Example of the TES-8943 Interface in DashBoard

Video Format Tab

Table 23 summarizes the read-only information displayed in the Video Format tab.

Table 23 Video Format Tab

Item	Parameters	Description
Output Format		
Output Format	#	Selects the video format for the output signal. Note that a change in video format takes effect immediately. The default is 1080p/59.94.
Clip at Black	Selected*	Enables the card to clip to SMPTE black on all outputs
	Cleared	Super-black is not clipped (allows super-black)

Table 23 Video Format Tab (Continued)

Item	Parameters	Description
Clip at White	Selected*	Enables the card to slip to SMPTE white on all outputs
	Cleared	Super-white is not clipped (allows super-white)
Input Status - Input #		
Status (read-only)	OK (Green)	The input signal is valid and no errors are detected
	Incompatible Video (Yellow)	The input video format is not supported by the reference format
	Invalid Video (Red)	The input signal is detected but it is in an unsupported format or an error is occurring
	No signal (Red)	No signal present on the specified input
Format (read-only)	#	Indicates the detected video format of the specified input signal
Timing (read-only)	# lines (to analog ref)	Indicates the timing of the specified input signal relative to the reference signal
Alarm Enables	Selected*	The TES-8943 monitors the signal on the specified IN BNC and reports when an error is detected on the input signal
	Cleared	The TES-8943 does not report when an error is detected on the specified input signal
CRC Errors	#	Displays the count of the CRC errors on the video input. This counter is reset on loss of video, or by user request. The counter is non-latching, and the count can roll over the counter.
Reset	Reset CRC Errors	Resets the CRC Errors field

ANC Tab

The ANC menus, status fields, and options are organized into four sub-tabs: ANC, Decode, Encode, and SCTE 104 Status. This section summarizes the options available in each sub-tab.

ANC

Table 24 summarizes the options available in the **ANC** sub-tab DashBoard.

Table 24 ANC — ANC Tab

Item	Parameters	Description
ST 352 Location	Off	Determines where to insert the SMPTE ST-352 packet in the output
	Luma Only	
	Chroma Only	
	Luma and Chroma	

Table 24 ANC — ANC Tab (Continued)

Item	Parameters	Description
ANC Frame Delay (read-only)	#	The frame delay is always relative to the next output frame. The output is at a fixed rate as defined by the Output Video mode.
Packet Name		
Action	Delete	Card deletes the packet from the output
	Pass*	The card receives and re-inserts the specified packet type into the specified line without modifying the packet contents
Field # Insertion Line	Line #	Selects a line to insert the specified ANC packet on. Note that if more than one packet is to be inserted in the same line, the packet with the lowest insertion order number will be inserted first.
	Follow upstream	Inserts the ANC packet on the same line as the upstream device
Insertion Order	#	Defines the hierarchy of the packets insertion. Note that the lower the number, the higher priority the packet is given.
Allow Subtitles to Pass Through Vertical Blanking [a]		
Subtitle Pass-through	Selected	Permits video to pass through on Lines 12 to the end of the Vertical Blanking Interval (VBI)
	Cleared	Disables this feature

a. This option only available when the Setup > Reference Source is set to Input SDI, and the Video Format > Output Format is set to 576i/50.

Decode

Table 25 summarizes the **Decode** sub-tab fields available in DashBoard for each type of ANC data for each SDI signal.

Table 25 ANC — Decode > SDI # Tab

Item	Parameters	Description
Status (read-only)	OK	Expected decoded ANC data is present
	Exceeded Bandwidth	Captured VANC services exceeded bandwidth
	Missing	Expected decoded ANC data is not present
	Present in Luma and Chroma	Decoded data was found on both LUMA and CHROMA channels
	Unexpected: Field #	Receiving ANC data from wrong field
	Unexpected: LUMA	Receiving ANC data from wrong channel

Table 25 ANC — Decode > SDI # Tab (Continued)

Item	Parameters	Description
Status (read-only)	Unexpected: CHROMA	Receiving ANC data from wrong channel
	Line Out of Range	Receiving data from wrong line
	Too Many Packets in Frame	There is a data overflow
	Overflow	Exceeded decoded bandwidth. Lost data.
	CRC Error	CRC error found in decoded ANC data: some protocols only
	Parse Error	Decoded data does not match expected protocol
	Invalid Length	The length of decoded ANC packet is incorrect for service
Data Rate (Bytes/Sec) (read-only)	#	Reports the decoding data transfer rate; the number of bytes received in the last field
Field #	#, <text>	Reports the data insertion location where **#** represents the specific line and **<text>:** • HC represents HVANC CHROMA • HL represents HVANC LUMA • VC represents VANC CHROMA • VL represents VANC LUMA
Alarm Enable	Selected	The TES-8943 monitors the decoded ANC status and updates the Status field accordingly
	Cleared*	Disables this alarm
Field #		
Bandwidth Used (Percent) (read-only)	#	The overall bandwidth percentile including buffer overflow state, of all decoding ANC services

Encode

Table 26 summarizes the **Encode** sub-tab fields available in DashBoard for the ANC data for each SDI signal.

Table 26 ANC — Encode SDI # Tab

Item	Parameters	Description
Status (read-only)	OK	Expected encoded ANC data is present
	Exceeded Bandwidth	Captured VANC services exceeded bandwidth
	Missing	Expected encoded ANC data is not present
	Present in Luma and Chroma	Encoded data was found on both LUMA and CHROMA channels
	Unexpected: Field #	Receiving ANC data from wrong field

Table 26 ANC — Encode SDI # Tab (Continued)

Item	Parameters	Description
Status (read-only)	Unexpected: LUMA	Receiving ANC data from wrong channel
	Unexpected: CHROMA	Receiving ANC data from wrong channel
	Line Out of Range	Receiving data from wrong line
	Too Many Packets in Frame	There is a data overflow
	Overflow	Exceeded encoded bandwidth. Lost data.
	CRC Error	CRC error found in encoded ANC data: some protocols only
	Parse Error	Encoded data does not match expected protocol
	Invalid Length	The length of encoded ANC packet is incorrect for service
Data Rate (Bytes/Sec) (read-only)	#	Reports the encoding data transfer rate; the number of bytes received in the last field
Alarm Enable	Selected	The TES-8943 monitors the encoded ANC status and updates the Status field accordingly
	Cleared*	Disables this alarm
Field #		
Bandwidth Used (Percent)	#	The overall bandwidth percentile including buffer overflow state, of all decoding ANC services

SCTE 104 Status

The SCTE 104 Status interface displays the following sub-tabs: Log and Last Event. **Table 27** summarizes the **SCTE 104 Status** read-only fields displayed in each sub-tab.

Table 27 ANC — SCTE 104 Status Tab

Item	Parameters	Description
Log		
yyyy-mm-dd Tt Ty SI PID PT BD AR AN AE		Each row displays an event where: • **yyy-mm-dd** represents the date • **Tt** represents the timestamp (UTC) • **Ty** represents the trigger type • **SI** represents the Splice ID • **PID** represents the Program ID • **PT** represents the Pre-roll Time • **BD** represents the Break Duration • **AR** represents the Auto Return • **AN** represents the Avail Numbers • **AE** represents the Avail Numbers Expected

Table 27 ANC — SCTE 104 Status Tab (Continued)

Item	Parameters	Description
Refresh	Updates the fields on the Event Log tab	
Clear Log	Removes the entries from the fields on the Event Log tab	
Last Event - Port, GPIO #		
Timestamp	Specific time that the event was processed (UTC value) for the specified port/GPIO	
Type	Specifies when the splice occurred	
Splice ID	Specifies the Splice ID value in the SCTE 104 message	
Program ID	Specifies the Program ID value in the SCTE 104 message	
Pre-roll Time	Indicates the Pre Roll Time that was applied	
Break Duration	Indicates the insertion length	
Auto Return	Indicates whether an auto ACK was sent	
Avail Num	Specifies the found Avail value	
Avails Expected	Indicates the total number of Avails	
DTMF	Indicates the DMTF message sent on GPIO activation	

Table 28 briefly summarizes the prefixes that log entries can include.

Table 28 Extended Logging Prefixes

Prefix	Notes
BLOCKED	The upstream VANC message was not re-encoded into the VANC output stream due to the GPI non-override state.
COMM FAILURE	Received message from the incoming VANC stream could not be sent to the remote port. Verify your Ethernet connection.
EXTRA PACKET	Only one SCTE 104 VANC packet is expected per frame. This message is contained in an extra VANC packet.
SUPPRESSED	Remote or GPI-triggered message was not encoded into the VANC output stream while in the GPI Override state.
UPSTREAM	This upstream VANC message was re-encoded into the VANC output stream due to the GPI Override state.

GPI/Tally Tab

Table 29 summarizes the options displayed in the GPI/Tally tab.

Table 29 GPI/Tally > GPI/Tally Tab

Item	Parameters	Description
GPI/Tally #[a]		
Function	None*	The specified GPIO port is not configured and the GPI has no effect. The Trigger/Tally Type setting is ignored.

Table 29 GPI/Tally > GPI/Tally Tab (Continued)

Item	Parameters	Description
Function	Tally Match SCTE104	Configures the GPIO port as an output for decoding the SCTE-104 message; the Tally is active
	General Output	The GPIO port functions as an output
	Send RossTalk Timecode	On an incoming event, sends the last timecode via the RossTalk timecode command to the RossTalk port. Refer to "**Using RossTalk to Send Timecode via a GPIO**".
	GPI Trigger SCTE104	Specifies that the GPI will be used for SCTE 104 trigger encoding
	GPI Override SCTE104 Source	Specifies that the GPI will override the SCTE-104 > Settings > Trigger Source setting
	GPI Reset SCTE104 Source	Specifies that the GPI will switch the Trigger Source setting to the original selection in the SCTE-104 > Settings tab (if the Trigger is set to Edge).
	General Input	The GPIO port functions as an input
Trigger/Tally Type	Falling*	If configured for Falling Edge, the selected function is executed when the GPI input signal transitions from High to Low
	Rising	If configured for Rising Edge, the selected function is executed when the GPI input signal transitions from Low to High
	High	If configured for Active High, the selected function is executed when the GPI input signal is driven High
	Low	If configured for Active Low, the selected function is executed when the GPI input signal is driven Low
Current State (read-only)	High	Reports the tally status
	Low	
RossTalk Timecode String	• Replaces {VITC} with last incoming VITC timecode in the format of: HH:MM:SS.ff or --:--:--.-- if VITC not present. • Replaces {LTC} with last incoming LTC timecode in the format of: HH:MM:SS.ff or --:--:--.-- if LTC not present. • Replaces {TC} with last incoming VITC (preferred) or LTC timecode in format: HH:MM:SS.ff or --:--:--.-- if neither timecode is present.	
Manual Override		
Output Pulse Width (frames)	#	Specifies the number of frames between the rising and falling edges of the output
Enable	Selected	The user will trigger a switch in states
	Cleared	The port will trigger a switch in states

Table 29 GPI/Tally > GPI/Tally Tab (Continued)

Item	Parameters	Description
Level	High	The output toggles from the base low level to the high level. The output signal remains at this level until reset.
	Low	The output level toggles from the base high level to the low level. The output signal remains at this level until reset.
GPI/Tally Logging Level		
Emergency	Events are listed in a hierarchical order based on the selected severity including: • internal errors and unrecognized or invalid responses from the GPI/Tally port • failed communications between the TES-8943 (such as time outs) and the device connected to the GPI/Tally port. This is intended for troubleshooting incompatibilities between the TES-8943 and downstream devices.	
Alert		
Critical		
Error		
Warning		
Notice		
Info*	The TES-8943 provides a summary of commands sent to and responses via this GPI/Tally port	

a. The number of GPI/Tally ports depends on the rear module you are using.

Remote Control Tab

This section summarizes the options displayed in the Remote Control tab.

✶ The Remote Control IP Address field, located at the top of the tab, reports the IP address assigned to the TES-8943.

RossTalk

Table 30 summarizes the RossTalk options displayed in the Remote Control tab.

Table 30 Remote Control — RossTalk

Item	Parameters	Description
RossTalk	Selected	Enables RossTalk communication as defined in the provided options
	Cleared	RossTalk communication is disabled. When the box is cleared, any incoming RossTalk data from the external device is discarded by the TES-8943
Listening Port	#	Reports the network socket for RossTalk communications on the network
Connection	Serial Port	If the 8322AR-318D rear module is installed, you can configure its Serial port for RossTalk.
	Network Server*	The TES-8943 functions as a host, or socket listener, on the network

Table 30 Remote Control — RossTalk (Continued)

Item	Parameters	Description
Connection	Network Client	The TES-8943 functions as a service requester that initiates communications with a server
Network Setup		
Ethernet Connection	Chassis RJ-45	The TES-8943 uses the Ethernet port on the openGear frame to connect to the network for RossTalk communication
Ethernet Connection	Rear Module RJ-45	The TES-8943 uses the Ethernet port on its rear module to connect to the network for RossTalk communication
Packet Type	TCP*	Select this option if your RossTalk device is connected to the TES-8943 through a network and uses the Transmission Control Protocol (TCP/IP)
	UDP	Select this option if your RossTalk device is connected to the TES-8943 through a network and uses the User Datagram Protocol (UDP/IP).
Port	#	When **Connection** is set to **Network Server**: • specifies the TCP or UDP port numbers where the TES-8943 will listen on. • TCP ports 0, 21, 80, 5253, and 6667 are unavailable for Ethernet communications
		When **Connection** is set to **Network Client**, this menu specifies the remote port number to which the TES-8943 will try to connect
Remote IP	#.#.#.#	• Only applicable when **Connection** is set to **Network Client** • Specifies the IP address of the external device. The default is 0.0.0.0 and this must be changed to the actual IP address of the external device.
Serial Port Setup		
Port Type	Specifies the transmission standard the external device uses for RossTalk. The default is RS 422.	
Bit Rate	#	Selects the bit rate for the external device connected to the Serial port of the TES-8943. The default is 115200
Data Bits	#	Sets the number of data bits transmission (character length). The default is 8
Parity	Sets the parity type for the external device. The default is None.	
Stop Bits	#	Sets the number of stop bits transmission. The default is 1.

Table 30 Remote Control — RossTalk (Continued)

Item	Parameters	Description
Flow Control	SW	Enables the TES-8943 notify the serial device when it is experiencing a data overflow and stop sending data.
	None*	Enables continuous data flow between the TES-8943 and the device
Device Setup		
Timecode Alignment	Legacy	Sends the timecode as read directly from the input (with no delay)
	Last incoming field	Sends the last received timecode but the timecode will not be aligned with the output field when using interlaced video
	Aligned to output field	Select when using interlaced video. This option delays the timecode by one field to line up with output.
	Encoded timecode	Sends the last generated timecode
Log Level	Specifies the type of timecode message to monitor	
Status (read-only)		
Connected (Green)	• **Enabled** box is selected for RossTalk • **Connection** is set to **Network Client** • Specified IP address and Port number are valid • TES-8943 has successfully established connection to the given IP address and port	
Inactive (Green)	**Enabled** box is not selected for RossTalk	
Listening (Green)	• **Enabled** box is selected for RossTalk • **Connection** is set to **Network Server** • Specified Port number is valid • TES-8943 is ready to accept connections on the specified port	
Reconnecting (Yellow)	• **Enabled** box is selected for RossTalk • **Connection** is set to **Network Client** • TES-8943 attempts to connect periodically to the specified IP address and Port number. The interval between connection attempts start at 10 seconds, increases by 10 seconds, to a maximum of 60 seconds.	
Connecting (Yellow)	• **Enabled** box is selected for RossTalk • **Connection** is set to **Network Client** • TES-8943 is attempting to connect to the specified IP address and Port Number	
Port in use (Red)	• **Enabled** box is selected for RossTalk • **Connection** is set to **Network Server** • Port Number specified in the Port field is invalid or in use by another service	

Table 30 Remote Control — RossTalk (Continued)

Item	Parameters	Description
Cannot connect (Red)	• **Enabled** box is selected for RossTalk • **Connection** is set to **Network Client** • Specified IP address and Port Number are invalid or in use by another device	

TES Raw Data

Table 31 summarizes the options displayed for each TES Raw Data channel. There are four channels that can be configured.

Table 31 Remote Control — TES Raw Data #

Item	Parameters	Description
TES Raw Data	Selected	Enables this TES Raw Data channel for ANC encoding/decoding
	Cleared	Disables this channel
Listening Port	#	Reports the network socket this TES Raw Data channel will use on the network
Serial Port	If the 8322AR-318D rear module is installed, you can assign its Serial port to the specified TES Raw Data channel.	
Network Server	TES-8943 functions as a host, or socket listener, on the network	
Network Client	TES-8943 functions as a service requester that initiates communications with a server	
Network Setup		
Ethernet Connector	Chassis RJ-45	The TES-8943 communicates with the external device via the open Gear Frame Network Controller card
	Rear Module RJ-45	The TES-8943 communicates with the external device via the Ethernet port on the rear module
Packet Type	TCP	Select this option if your external device is connected to the TES-8943 through a network and uses the Transmission Control Protocol (TCP)
	UDP	Select this option if your device is connected to the TES-8943 through a network and uses the User Datagram Protocol (UDP/IP)

Table 31 Remote Control — TES Raw Data # (Continued)

Item	Parameters	Description
Port	#	When **Role** is set to **Network Server**: • specifies the TCP port number where the TES-8943 will listen. • TCP ports 0, 21, 80, 5253, and 6667 are unavailable for ethernet communications When **Role** is set to **Network Client**: • specifies the remote port number to which the TES-8943 will try to connect • specifies the port number of the external device
Remote IP	#.#.#.#	• Only applicable when **Role** is set to **Network Client** • Specifies the IP address of the external device. The default is 0.0.0.0 and this must be changed to the actual IP address of the external device.
Status (read-only)		
Connected (Green)	• **Enabled** box is selected for this channel • **Connection** is set to **Network Client** • Specified IP address and Port number are valid • TES-8943 has successfully established connection to the given IP address and port	
Inactive (Green)	**Enabled** box is not selected for this channel	
Listening (Green)	• **Enabled** box is selected for this channel • **Connection** is set to **Network Server** • Specified Port number is valid • TES-8943 is ready to accept connections on the specified port	
Reconnecting (Yellow)	• **Enabled** box is selected for this channel • **Connection** is set to **Network Client** • TES-8943 attempts to connect periodically to the specified IP address and Port number. The interval between connection attempts start at 10 seconds, increases by 10 seconds, to a maximum of 60 seconds.	
Connecting (Yellow)	• **Enabled** box is selected for this channel • **Connection** is set to **Network Client** • TES-8943 is attempting to connect to the specified IP address and Port Number	
Port in use (Red)	• **Enabled** box is selected for this channel • **Connection** is set to **Network Server** • Port Number specified in the Port field is invalid or in use by another service	
Cannot connect (Red)	• **Enabled** box is selected for this channel • **Connection** is set to **Network Client** • Specified IP address and Port Number are invalid or in use by another device	

Table 31 Remote Control — TES Raw Data # (Continued)

Item	Parameters	Description
Serial Port Setup		
Port Type	None	No transmission standard is specified
	RS-232	Select this option if the TES-8943 is connected to an external device that uses the RS-232 (TIA/EIA-232) transmission standard
	RS-422*	Select this option if the TES-8943 is connected to an external device that uses the RS-422 (TIA/EIA-422) transmission standard. In this mode, the Rx receive end is terminated with a 120ohm resistor on the TES-8943.
	RS-422 unterm	Select this option if the TES-8943 is connected to an external device that uses an unterminated RS-422 transmission standard. In this mode, the Rx receive end is not terminated on the TES-8943.
	RS-422 NULL	Select this option if the TES-8943 is connected to an external device that uses the standard RS-422 transmission standard with a null pinout. In this mode, the Rx and Tx are swapped on the TES-8943 port and the Rx receive end is terminated with a 120ohm resistor on the TES-8943.
	RS-422 NULL unterm	Select this option if the TES-8943 is connected to an external device that uses the standard RS-422 unterminated transmission standard with a null pinout. In this mode, the Rx and Tx are swapped on the TES-8943 port and the Rx receive end is not terminated on the TES-8943.
Bit Rate	#	Selects the bit rate for the external device connected to 19200 the Serial port. The default is 38400.
Data Bits	#	Sets the number of data bits transmission (character length). The default is 8.
Parity		Sets the Parity type. The default is None.
Stop Bits	#	Sets the number of stop bits transmission. The default is 1.
Flow Control	SW	Enables the TES-8943 to notify the serial device when it is experiencing a data overflow and stop sending data (SW) or to allow continuous data flow between the TES-8943 and the device (None)
	None*	

SCTE-104

Table 32 summarizes the SCTE-104 options displayed in the Remote Control tab.

Table 32 Remote Control — SCTE-104

Item	Parameters	Description
SCTE-104	Selected	Enables the remote port for SCTE-104 data encoding/decoding
	Cleared	Disables this channel
Listening Port (read-only)	#	Reports the network socket for SCTE-104 data that the TES-8943 will use on the network
Serial Port	If the 8322AR-318D rear module is installed, you can assign its Serial port for SCTE-104 data encoding/decoding	
Network Server	TES-8943 functions as a host, or socket listener, on the network	
Network Client	TES-8943 functions as a service requester that initiates communications with a server	
Network Setup		
Ethernet Connector	Chassis RJ-45	The TES-8943 communicates with the SCTE-104 device via the open Gear Frame Network Controller card
	Rear Module RJ-45	The TES-8943 communicates with the SCTE-104 device via the Ethernet port on the rear module
Packet Type	TCP	Select this option if your SCTE-104 device is connected to the TES-8943 through a network and uses the Transmission Control Protocol (TCP)
	UDP	Select this option if your SCTE-104 device is connected to the TES-8943 through a network and uses the User Datagram Protocol (UDP/IP)
Port	#	When **Role** is set to **Network Server**: • specifies the TCP port number where the TES-8943 will listen. • TCP ports 0, 21, 80, 5253, and 6667 are unavailable for ethernet communications When **Role** is set to **Network Client**: • specifies the remote port number to which the TES-8943 will try to connect • specifies the port number of the SCTE-104 device
Remote IP	#.#.#.#	• Only applicable when **Role** is set to **Network Client** • Specifies the IP address of the external device. The default is 0.0.0.0 and this must be changed to the actual IP address of the SCTE-104 device

Table 32 Remote Control — SCTE-104 (Continued)

Item	Parameters	Description
Status (read-only)		
Connected (Green)	• **Enabled** box is selected for SCTE-104 • **Connection** is set to **Network Client** • Specified IP address and Port number are valid • TES-8943 has successfully established connection to the specified IP address and Port Number	
Inactive (Green)	**Enabled** box is not selected for SCTE-104	
Listening (Green)	• **Enabled** box is selected for SCTE-104 • **Connection** is set to **Network Server** • Specified Port Number is valid • TES-8943 is ready to accept connections on the specified port	
Reconnecting (Yellow)	• **Enabled** box is selected for SCTE-104 • **Connection** is set to **Network Client** • TES-8943 attempts to connect periodically to the specified IP address and Port Number. • The interval between connection attempts start at 10 seconds, increases by 10 seconds, to a maximum of 60 seconds.	
Connecting (Yellow)	• **Enabled** box is selected for SCTE-104 • **Connection** is set to **Network Client** • TES-8943 is attempting to connect to the specified IP address and Port Number	
Port in use (Red)	• **Enabled** box is selected for SCTE-104 • **Connection** is set to **Network Server** • Specified Port Number is invalid or in use by another service	
Cannot connect (Red)	• **Enabled** box is selected for SCTE-104 • **Connection** is set to **Network Client** • Specified IP address and Port Number are invalid or in use by another device	
Serial Port Setup		
Port Type	None	No transmission standard is specified
	RS-232	Select this option if the TES-8943 is connected to an external device that uses the RS-232 (TIA/EIA-232) transmission standard
	RS-422*	Select this option if the TES-8943 is connected to an external device that uses the RS-422 (TIA/EIA-422) transmission standard. In this mode, the Rx receive end is terminated with a 120ohm resistor on the TES-8943.

Table 32 Remote Control — SCTE-104 (Continued)

Item	Parameters	Description
Port Type	RS-422 unterm	Select this option if the TES-8943 is connected to an external device that uses an unterminated RS-422 transmission standard. In this mode, the Rx receive end is not terminated on the TES-8943.
	RS-422 NULL	Select this option if the TES-8943 is connected to an external device that uses the standard RS-422 transmission standard with a null pinout. In this mode, the Rx and Tx are swapped on the TES-8943 port and the Rx receive end is terminated with a 120ohm resistor on the TES-8943.
	RS-422 NULL unterm	Select this option if the TES-8943 is connected to an external device that uses the standard RS-422 unterminated transmission standard with a null pinout. In this mode, the Rx and Tx are swapped on the TES-8943 port and the Rx receive end is not terminated on the TES-8943.
Bit Rate	#	Selects the bit rate for the external device connected to 19200 the Serial port. The default is 38400.
Data Bits	#	Sets the number of data bits transmission (character length). The default is 8.
Parity		Sets the Parity type. The default is None.
Stop Bits	#	Sets the number of stop bits transmission. The default is 1.
Flow Control	SW	Enables the TES-8943 to notify the serial device when it is experiencing a data overflow and stop sending data (SW) or to allow continuous data flow between the TES-8943 and the device (None)
	None*	

SCTE-104 Log

Table 33 summarizes the SCTE-104 Log options displayed in the Remote Control tab.

Table 33 Remote Control — SCTE-104 Log

Item	Parameters	Description
SCTE-104	Selected	Enables the TES-8943 to maintain a log of the last 24 trigger events
	Cleared	Disables this feature
Listening Port (read-only)	#	Reports the network socket for SCTE-104 that the TES-8943 will use to receive trigger log entries
Serial Port	If the 8322AR-318D rear module is installed, you can assign its Serial port to the SCTE-104 log	

Table 33 Remote Control — SCTE-104 Log (Continued)

Item	Parameters	Description
Network Server	TES-8943 functions as a host, or socket listener, on the network for SCTE-104 log data	
Network Client	TES-8943 functions as a service requester that initiates communications with a server for SCTE-104 log data	
Network Setup		
Ethernet Connector	Chassis RJ-45	The TES-8943 communicates with the SCTE-104 device via the open Gear Frame Network Controller card
	Rear Module RJ-45	The TES-8943 communicates with the SCTE-104 device via the Ethernet port on the rear module
Packet Type	TCP	Select this option if your SCTE-104 device is connected to the TES-8943 through a network and uses the Transmission Control Protocol (TCP)
	UDP	Select this option if your SCTE-104 device is connected to the TES-8943 through a network and uses the User Datagram Protocol (UDP/IP)
Port	#	When **Role** is set to **Network Server**: • specifies the TCP port number where the TES-8943 will listen. • TCP ports 0, 21, 80, 5253, and 6667 are unavailable for ethernet communications When **Role** is set to **Network Client**: • specifies the remote port number to which the TES-8943 will try to connect • specifies the port number of the SCTE-104 device
Remote IP	#.#.#.#	• Only applicable when **Role** is set to **Network Client** • Specifies the IP address of the external device. The default is 0.0.0.0 and this must be changed to the actual IP address of the SCTE-104 device.
Status (read-only)		
Connected (Green)	• **Enabled** box is selected for SCTE-104 logging • **Connection** is set to **Network Client** • Specified IP address and Port Number are valid • TES-8943 has successfully established connection to the given IP address and Port Number	
Inactive (Green)	**Enabled** box is not selected for SCTE-104 logging	

Table 33 Remote Control — SCTE-104 Log (Continued)

Item	Parameters	Description
Listening (Green)	• **Enabled** box is selected for SCTE-104 logging • **Connection** is set to **Network Server** • Specified Port Number is valid • TES-8943 is ready to accept connections on the specified port	
Reconnecting (Yellow)	• **Enabled** box is selected for SCTE-104 logging • **Connection** is set to **Network Client** • TES-8943 attempts to connect periodically to the specified IP address and Port Number. The interval between connection attempts start at 10 seconds, increases by 10 seconds, to a maximum of 60 seconds.	
Connecting (Yellow)	• **Enabled** box is selected for SCTE-104 logging • **Connection** is set to **Network Client** • TES-8943 is attempting to connect to the specified IP address and Port Number	
Port in use (Red)	• **Enabled** box is selected for SCTE-104 logging • **Connection** is set to **Network Server** • The specified Port Number is invalid or in use by another service	
Cannot connect (Red)	• **Enabled** box is selected for SCTE-104 logging • **Connection** is set to **Network Client** • The specified IP address and Port Number are invalid or in use by another device	
Serial Port Setup		
Port Type	None	No transmission standard is specified
	RS-232	Select this option if the TES-8943 is connected to an external device that uses the RS-232 (TIA/EIA-232) transmission standard
	RS-422*	Select this option if the TES-8943 is connected to an external device that uses the RS-422 (TIA/EIA-422) transmission standard. In this mode, the Rx receive end is terminated with a 120ohm resistor on the TES-8943.
	RS-422 unterm	Select this option if the TES-8943 is connected to an external device that uses an unterminated RS-422 transmission standard. In this mode, the Rx receive end is not terminated on the TES-8943.

Table 33 Remote Control — SCTE-104 Log (Continued)

Item	Parameters	Description
Port Type	RS-422 NULL	Select this option if the TES-8943 is connected to an external device that uses the standard RS-422 transmission standard with a null pinout. In this mode, the Rx and Tx are swapped on the TES-8943 port and the Rx receive end is terminated with a 120ohm resistor on the TES-8943.
	RS-422 NULL unterm	Select this option if the TES-8943 is connected to an external device that uses the standard RS-422 unterminated transmission standard with a null pinout. In this mode, the Rx and Tx are swapped on the TES-8943 port and the Rx receive end is not terminated on the TES-8943.
Bit Rate	#	Selects the bit rate for the external device connected to 19200 the Serial port. The default is 38400.
Data Bits	#	Sets the number of data bits transmission (character length). The default is 8.
Parity		Sets the Parity type. The default is None.
Stop Bits	#	Sets the number of stop bits transmission. The default is 1.
Flow Control	SW	Enables the TES-8943 to notify the serial device when it is experiencing a data overflow and stop sending data (SW) or to allow continuous data flow between the TES-8943 and the device (None)
	None*	

Configure Data Services Tab

The Configure Data Services options are organized into 6 sub-tabs: one for each TES Raw Data channel, one for SCTE-104 messages, one for LTC data, and one for VITC data.

TES Raw Data Sub-tabs

Table 34 summarizes the options displayed in each of the TES Raw Data sub-tabs.

Table 34 TES-8943 > TES Raw Data Sub-tabs

Item	Parameters	Description
Enable TES Raw Data Channel # on Remote Port		
Decode	Enable	This channel is assigned as a decoder
	Disable	Data passes through without modification
Encode	Enable	This channel is assigned as an encoder
	Disable	Data passes through without modification

Table 34 TES-8943 > TES Raw Data Sub-tabs (Continued)

Item	Parameters	Description
Send Field Indicator	Enable	• If Encoding is enabled, sends a single byte field indicator (either an ASCII '1' or '2'), at the start of the next field to encode, out the data port to allow the downstream equipment to synchronize to the video signal. • If Decoding is enabled, the TES-8943 sends a single byte field indicator (either an ASCII '1' or '2') at the start of a field before sending any received data packets. This allows the downstream equipment to synchronize to the video signal.
	Disable	Disables this feature
Ancillary Encode and Decode Settings		
DID	#	Specifies the Data ID (DID) and Secondary Data ID (SDID) values to be used for the corresponding fields in the encoded/decoded Ancillary Data Packet as defined by SMPTE 291M
SDID	#	
Upstream Action VANC Action	Delete	Card deletes the VANC packet from the output
	Pass	The card receives and re-inserts the VANC packet into the specified line, as defined by the Field # and Insertion Order settings, without modifying the packet contents.
Field #	Follow upstream	Inserts the VANC packet on the same line as the upstream device
	Line #	Selects a line to insert the specified VANC packet on. Note that if more than one packet is to be inserted in the same line, the packet with the lowest insertion order number will be inserted first.
Insertion Order	#	Defines the hierarchy of the VANC packets insertion. Note that the lower the number, the higher priority the packet is given.
Global Logging Level		
Emergency	VANC data events are listed in a hierarchical order based on the selected severity including: • internal errors and unrecognized or invalid responses from the remote port • failed communications between the TES-8943 (such as time outs) and the device connected to the remote port. This is intended for troubleshooting incompatibilities between the TES-8943 and downstream devices.	
Alert		
Critical		
Error		
Warning		
Notice		

Table 34 TES-8943 > TES Raw Data Sub-tabs (Continued)

Item	Parameters	Description
Info*	The TES-8943 provides a summary of commands sent to and responses via this remote port	

SCTE-104 Settings Sub-tab

Table 35 summarizes the options displayed in the SCTE-104 > Settings sub-tab.

Table 35 TES-8943 > SCTE-104 > Settings Sub-tab

Item	Parameters	Description
Remote Port Protocol Settings		
Serial Basic Link Layer	Selected	Specifies the VANC service is assigned to the Serial port on the rear module
	Cleared	The Serial port is not assigned to the VANC service
Respond as Proxy Device	Selected	TES-8943 communicates as a proxy device using response code value 128
	Cleared	Disables this feature. Select this option if you are using an automation system that does not recognize the proxy response code.
Repeat Outgoing SCTE-104 Events to Outgoing Video		
Repeat Last Splice	Off*	Disables this feature
	Break Duration	TES-8943 encodes the last SCTE 104 trigger (or other message). If there are “start” events with a non-zero duration, then re-transmission stops after the duration in the message.
Repeat Last Splice	Indefinite	• TES-8943 continuously encodes the last SCTE 104 trigger (or other message) that was received on each frame. • The TES-8943 continues to re-transmit the message until the next message arrives. • Note there is only one SCTE 104 message transmitted per frame.
Control Source of Outgoing SCTE-104		
Trigger Source	Remote (Ethernet/Serial)	Specifies that the source of the incoming SCTE 104 commands to encode into the outgoing VANC will be via the Ethernet or Serial port on the TES-8943 rear module
	Upstream (Input VANC)	Specifies that the source of the incoming SCTE 104 commands to encode into the outgoing VANC will be via the SDI IN port on the TES-8943 rear module
Enable SCTE-104 on Remote Port		

Table 35 TES-8943 > SCTE-104 > Settings Sub-tab (Continued)

Item	Parameters	Description
Decode	Enable	Configures the TES-8943 as a decoder of SCTE 104 triggers. All remote ports are automatically configured as outputs.
	Disable	TES-8943 does not decode SCTE 104 triggers
Encode	Enable	Configures the TES-8943 as an encoder of SCTE 104 triggers. All GPIO ports are automatically configured as inputs.
	Disable	TES-8943 does not encode SCTE 104 triggers
Ancillary Encode Settings		
Upstream VANC Action	Delete	The TES-8943 automatically deletes the SCTE 104 data from the input signal
	Pass	The TES-8943 automatically passes the SCTE 104 data from the input signal
	Process	The TES-8943 modifies the SCTE 104 data from the input signal as defined by the Insertion Line settings. No data will be inserted, and any upstream data will not be passed when Process mode is select-ed and data is not detected on the Ethernet port.
Insertion Line		
Field #	Follow upstream	Inserts the SCTE 104 message on the same line as the upstream device
	Line #	Specifies the line to insert the SCTE 104 message on. Note that if more than one SCTE 104 message is to be inserted in the same line, the packet with the lowest insertion order number will be inserted first.
Insertion Order	#	Defines the hierarchy of the SCTE message insertion. Note that the lower the number, the higher priority the packet is given.
Global Logging Level		
Emergency	SCTE-104 events are listed in a hierarchical order based on the selected severity including: • internal errors and unrecognized or invalid responses from the remote port • failed communications between the TES-8943 (such as time outs) and the device connected to the remote port. This is intended for troubleshooting incompatibilities between the TES-8943 and downstream devices.	
Alert		
Critical		
Error		
Warning		
Notice		
Info*	The TES-8943 provides a summary of commands sent to and responses via this remote port	

SCTE-104 GPIO Event Sub-tabs

Table 36 summarizes the options displayed in each of the SCTE-104 > GPIO # Event sub-tab when a GPIO port is configured for encoding (the GPIO port Function is set to GPI Trigger SCTE104).

Table 36 TES-8943 > SCTE-104 > GPIO # Event Sub-tabs

Item	Parameters	Description
DTMF	<text>	Any incoming DTMF message with an exact match will trigger the 1sec GPIO pulse. The message must match the Splice ID and DTMF messages.
Splice Type	N/A	Specifies that a splice event must match the selected Splice type(s) in order to trigger a GPIO event. The Start Normal and Start Immediate types are enabled by default. The other types are disabled by default.
	Start Normal	
	Start Immediate	
	End Normal	
	End Immediate	
	Cancel	
Splice ID	#	Specifies the Splice ID value that the TES-8943 searches for in the message. The TES-8943 activates the GPIO when the specified value matches what is set in the message. If the value does not match, the message is ignored.
Program ID	#	Specifies the Program ID value that the TES-8943 searches for in the message. The TES-8943 activates the GPIO when the specified value matches what is set in the message. If the value does not match, the message is ignored.
Preroll Time	0.000 - 16.000	The TES-8943 adjusts and applies the pre-roll value (number of seconds) before initiating the trigger. The default is 8. This value is ignored when Type is set to Start Immediate or End Immediate.
Break Duration	0.0* - 6553.00	Specifies the length (tenths of seconds) for the insertion. This value is ignored when Type is set to End Normal or End Immediate.
Auto Return	Selected	The TES-8943 automatically returns an ACK message to the automation system connected to the specified GPIO port. This is ignored when Type is set to End Normal or End Immediate.
	Cleared	Disables this feature

Table 36 TES-8943 > SCTE-104 > GPIO # Event Sub-tabs (Continued)

Item	Parameters	Description
Avail Number	#	Specifies the Avail within the specified Program ID. The default is 0.
Avails Expected	#	Specifies the total number of the expected Avails during the trigger. When set to 0, the Avail Number value is ignored. The default is 0.

Table 37 summarizes the options displayed in each of the SCTE-104 > GPIO # Event sub-tab when a GPIO port is configured for decoding (the GPIO port Function is set to Tally Match SCTE 104).

Table 37 TES-8943 > SCTE-104 > GPIO # Event Sub-tabs

Item	Parameters	Description
DTMF		
Match Parameter	Specifies the DMTF data to monitor for activating this GPIO	
Enable Match	Selected	Sends the appropriate DMTF message on GPIO activation. The Pre Roll Time is applied.
	Cleared	Ignores DMTF matches
Splice ID		
Match Parameter	Specifies the Splice ID value that the TES-8943 searches for in the SCTE 104 message	
Enable Match	Selected	The TES-8943 activates the GPIO when the specified Splice ID in the SCTE 104 message, matches what is set in the trigger. If the value does not match, the trigger is ignored.
	Cleared	Ignores Splice ID matches
Program ID		
Match Parameter	Specifies the Program ID value in the SCTE 104 message that the TES-8943 searches for in the trigger. If the value does not match, the trigger is ignored.	
Enable Match	Selected	The TES-8943 activates the GPIO when the specified value matches what is set in the trigger.
	Cleared	Ignores Program ID matches
Splice Types		
Start Normal	Selected*	Trigger occurs before the splice point
	Cleared	The TES-8943 ignores this splice type
Start Immediate	Selected*	Trigger occurs at the exact moment of the splice point
	Cleared	The TES-8943 ignores this splice type
End Normal	Selected	Trigger occurs once the splice point ends
	Cleared*	The TES-8943 ignores this splice type

Table 37 TES-8943 > SCTE-104 > GPIO # Event Sub-tabs (Continued)

Item	Parameters	Description
End Immediate	Selected	Trigger occurs before the splice point ends
	Cleared*	The TES-8943 ignores this splice type
Cancel	Selected	Cancels the last sent trigger
	Cleared	Disables this feature
GPIO Behavior		
Ignore Preroll	Selected	Enables the TES-8943 to ignore any pre-roll values and initiate the message immediately
	Cleared	The TES-8943 applies the pre-roll value before initiating the trigger
Trigger Delay	#	Augments when the pre-roll begins (in milliseconds). A negative value decreases the pre-roll start time while a positive value adds to the pre-roll start time. The default is 0.

LTC Tab

Table 38 summarizes the options displayed in the Configure Data Services > LTC sub-tab.

Table 38 Configure Data Services > LTC Sub-tab

Item	Parameters	Description
Status (read-only)	NTP Present (Green)	A valid NTP connection is detected and the Network Time option is enabled on the Global > Network tab
Status (read-only)	NTP Absent (Red)	Verify that the NTP connection is available on your network and the Network Time option is selected on the Global > Network tab
Local Time (read-only)	#	Displays the time data reported by the Frame Controller card in the same openGear frame
Last Sync Time (read-only)	#	Reports the last instance where the LTC value was matched to the time data reported by the Frame Controller card
Time Zone Offset (HH:MM)	#	Adjusts the NTP values relative to the output to align with your time zone • A negative offset value indicates that the input signal is earlier than the output signal. • A positive value indicates that the input signal is later than the output signal
Jam Time (HH:MM:SS)	#	Reports the last instance where the TES-8943 was synchronized to the NTP server

Table 38 Configure Data Services > LTC Sub-tab (Continued)

Item	Parameters	Description
Synchronize to NTP	Sync to NTP	LTC is set to the time data transmitted by the Frame Controller card in the same openGear frame
Upstream VANC Action	Delete	Deletes the LTC data from the remote port on the rear module
	Pass	Encodes Linear Timecode from the remote port on the rear module without modifications
	Process	Encodes Linear Timecode from the remote port on the rear module and applies the settings on the LTC sub-tab
Insertion Line		
Field #	Line #	Selects a line to insert the LTC packet on. Note that if more than one packet is to be inserted in the same line, the packet with the lowest insertion order number will be inserted first.
Insertion Order	#	Defines the hierarchy of the LTC packets insertion. Note that the lower the number, the higher priority the packet is given.
Global Logging Level		
Emergency	LTC events are listed in a hierarchical order based on the selected severity including: • internal errors and unrecognized or invalid responses from the remote port • failed communications between the TES-8943 (such as time outs) and the device connected to the remote port. This is intended for troubleshooting incompatibilities between the TES-8943 and downstream devices.	
Alert		
Critical		
Error		
Warning		
Notice		
Info*	The TES-8943 provides a summary of commands sent to and responses via the remote port	

VITC Tab

Table 39 summarizes the options displayed in the Configure Data Services > VITC sub-tab.

Table 39 Configure Data Services > VITC Sub-tab

Item	Parameters	Description
Status (read-only)	NTP Present (Green)	A valid NTP connection is detected and the Network Time option is enabled on the Global > Network tab
	NTP Absent (Red)	Verify that the NTP connection is available on your network and the Network Time option is selected on the Global > Network tab

Table 39 Configure Data Services > VITC Sub-tab (Continued)

Item	Parameters	Description
Local Time (read-only)	#	Displays the time data reported by the Frame Controller card in the same openGear frame
Last Sync Time (read-only)	#	Reports the last instance where the VITC value was matched to the time data reported by the Frame Controller card
Time Zone Offset (HH:MM)	#	Adjusts the NTP values relative to the output to align with your time zone • A negative offset value indicates that the input signal is earlier than the output signal. • A positive value indicates that the input signal is later than the output signal
Jam Time (HH:MM:SS)	#	Reports the last instance where the TES-8943 was synchronized to the NTP server
Synchronize to NTP	Sync to NTP	VITC is set to the time data transmitted by the Frame Controller card in the same openGear frame
Upstream VANC Action	Delete	The TES-8943 automatically deletes the VITC data from the input signal
	Pass	The TES-8943 automatically passes the VITC data from the input signal
	Process	The TES-8943 modifies the VITC data from the input signal as defined by the Insertion Line settings
Insertion Line		
Field #	Line #	Selects a line to insert the VITC packet on. Note that if more than one packet is to be inserted in the same line, the packet with the lowest insertion order number will be inserted first.
Insertion Order	#	Defines the hierarchy of the VITC packets insertion. Note that the lower the number, the higher priority the packet is given
Global Logging Level		
Emergency	VITC events are listed in a hierarchical order based on the selected severity including: • internal errors and unrecognized or invalid responses from the remote port • failed communications between the TES-8943 (such as time outs) and the device connected to the remote port. This is intended for troubleshooting incompatibilities between the TES-8943 and downstream devices.	
Alert		
Critical		
Error		
Warning		
Notice		
Info*	The TES-8943 provides a summary of commands sent to and responses via the remote port	

Technical Specifications

This chapter provides technical information for TES-8943.

✶ Specifications are subject to change without notice.

Supported Video Formats

Table 40 Technical Specifications — Supported Video Formats

Resolution (lines)	Frame Rate (Hz)
480i	59.94
576i	50
720p	50
	59.94
1080i	50
	59.94
1080p	50
	59.94
1080pSF	23.98
	24
2160p	23.98
	24
	25
	29.97
	30
	50[a]
	59.94[a]

a. Requires the TES-8943-12G-LICENSE.

SDI Inputs Specifications

Table 41 Technical Specifications — SDI Inputs

Item	Specifications
Number of Inputs	1
Standards Accommodated	270Mbps, 525/625 Component, SMPTE 259M
	1.485Gbps Component, SMPTE 292M
	2.97Gbps Component, SMPTE 424M
	5.94Gbps Component, SMPTE ST-2081
	11.88Gbps Component, SMPTE 2082
Impedance	75ohm

Table 41 Technical Specifications — SDI Inputs (Continued)

Item	Specifications
Return Loss	>15dB to 1.485Gbps
	>10dB to 2.97Gbps
	>4dB to 11.88Gbps
Equalization (Belden 1694A cable)	>220m (722ft) @ 1.485Gbps
	>140m (459ft) @ 2.97Gbps
	>50m (190ft) @ 11.88Gbps
Connection	HD-BNC

SDI Outputs Specifications

Table 42 Technical Specifications — SDI Outputs

Item	Specifications
Number of Outputs	6
Impedance	75ohm
Return Loss	>15dB to 1.485Gbps
	>10dB to 2.97Gbps
	>4dB to 11.88Gbps
Signal Level	800mV ±10%
DC Offset	0V ±50mV
Rise and Fall Time (20-80%)	1.485Gbps: <270ps, <100ps difference
	2.97Gbps: <135ps, <50ps difference
	11.88Gbps: <45ps, <18ps difference
Jitter	1.485Gbps: <1.0UI jitter measured 10Hz-100kHz, <0.2UI above 100kHz
	2.97Gbps: <1.0UI jitter measured 10Hz-100kHz, <0.3UI above 100kHz
	11.88Gbps: <2.0UI jitter measured 10Hz-100kHz, <0.3UI above 100kHz, band limit @1188MHz
Overshoot	<10% (11.88Gpbs: <15%)
Connection	HD-BNC

Serial Port Specifications

✶ This section applies only to the 8322AR-318D rear module. The 8323AR-325 does not include a **Serial** port.

Table 43 Technical Specifications — Serial Port

Item	Specifications
Maximum Cable Lengths	
RS-232 Serial Interface	10m (33ft)
RS-422 Serial Interface	300m (984ft)

Refer to **Figure 20** and **Table 44** for pin-outs for the **Serial** port on the TES-8943 rear modules.

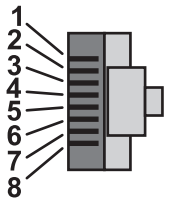


Figure 20 Serial Port Pinouts

Table 44 Serial Pinouts on the TES-8943

RJ45 Pin	RS-232	RS-422
1	n/c	Tx+
2	Rx	Tx-
3	Tx	Rx+
4	n/c	n/c
5	n/c	n/c
6	n/c	Rx-
7	GND	GND
8	GND	GND

GPIO

Table 45 Technical Specifications — GPIO

Item	Specifications
Absolute Maximum Voltage at Connector Pins	1.0V to +6.0V to prevent damage
GPI	
Input	• 4.7K ohm resistor pull-up to 5V for High • GND contact closure (or external logic) for Low • High In is >= 2.5V • Low In is <= 0.5V

Table 45 Technical Specifications — GPIO (Continued)

Item	Specifications
Tally	
Output	• Pulled to 5V with 4k7 ohm resistor for High • Driven to ground or Low through 30ohms • Maximum sink current 50mA to drive an external relay • To drive a logic gate input, sink current needs to be below 10mA (0.3V at pin)

Environment

Table 46 Technical Specifications — Environment

Item	Specifications
Max. Ambient Temperature	40°C (104°F)

Power

Table 47 Technical Specifications — Power

Item	Specifications
Max. Power Consumption	40W-80W (application dependent)

Service Information

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

1. **Visual Review** — Performing a quick visual check may reveal many problems, such as connectors not properly seated or loose cables. Check the card, the frame, and any associated peripheral equipment for signs of trouble.
2. **Power Check** — Inspect 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. **Input Signal Status** — Verify that source equipment is operating correctly and that a valid signal is being supplied.
4. **Output Signal Path** — Verify that destination equipment is operating correctly and receiving a valid signal.
5. **Unit Exchange** — Exchanging a suspect unit with a unit that is known to be working correctly is an efficient method for localizing problems to individual units.

Reloading the Software on the Card

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

To reload the software on the card

1. Eject the card from the frame.
2. Press and hold the **Bootload** button, while re-inserting the card into the frame.
3. Release the button.
   - The **OK/ERROR** LED flashes 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 re-start with its last operational software load.
   - Software loads can be sent to the card via the connection on the rear of the frame.

Loading the Factory Defaults

If required, the card menu parameters can be reset to the factory default values using the option available in the **Setup** tab. All parameters are reset except those listed in **Table 22**.

To reset the card to the factory default settings in DashBoard

1. Navigate to the Global interface as outlined in "**To display the Global interface in DashBoard**".
2. Select the **Setup** tab.
3. Click **Load Factory Defaults** to display the **Confirm** dialog.
4. Click **Yes** to load the factory default values for all menu parameters, or **No** to cancel the load and close the dialog.

✶ To ensure that the DashBoard fields display the updated settings, it is recommended to click the **Refresh** button, located at the bottom of the DashBoard window, after the factory defaults are fully loaded.

Warranty and Repair Policy

The TES-8943 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 card 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 card 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 openGear product. Ross Video policy dictates that all repairs to the card 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 card, 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 card. If required, a temporary replacement frame will be made available at a nominal charge. Any shipping costs incurred will be the responsibility of you, the customer. All products shipped to you from Ross Video Limited will be shipped collect.

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

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zlib

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The data format used by the zlib library is described by RFCs (Request for Comments) 1950 to 1952 in the files ftp://ds.internic.net/rfc/rfc1950.txt (zlib format), rfc1951.txt (deflate format) and rfc1952.txt (gzip format).

Glossary

The following terms are used throughout this guide:

AS — Automation System

Card — openGear terminal devices within openGear frames, including all components and switches.

DashBoard — the DashBoard Control System.

DID — Data ID

Frame — the openGear frame that houses the TES-8943 unless otherwise noted.

LTC — Linear Timecode.

MIB — management information base.

Network Controller Card — refers to the MFC-OG3-N and the MFC-OGX-N and any available options.

openGear frame — refers to the OG3-FR series and OGX-FR series frames unless otherwise noted.

SDID — Secondary Data ID

System— the mix of interconnected production and terminal equipment in your environment.

TES-8943 — refers to all versions of the TES-8943 unless otherwise noted.

User — the person who uses the TES-8943.

VBI — Vertical Blanking Interval