



RAPTOR-IPG User Guide

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

RAPTOR-IPG · User Guide

- Ross Part Number: **8929DR-004-04**
- Release Date: September 15, 2020.

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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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Safety Notices

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

Statement of Compliance

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

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

EMC Notices

US FCC Part 15

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

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

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

Canada

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

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

European Union

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



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

Australia/New Zealand

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

Korea

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

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

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

International

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

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

Maintenance/User Serviceable Parts

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

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

Environmental Information

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

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

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



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

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Introduction

This guide covers the installation, configuration, and use of the RAPTOR-IPG IP/SDI Media Processing Engine. The following chapters are included:

- “**Introduction**” summarizes the guide and provides important terms, and conventions.
- “**Before You Begin**” provides a brief product overview and installation requirements for the RAPTOR-IPG.
- “**Hardware Overview**” describes the RAPTOR-IPG hardware components including the supported rear modules.
- “**Physical Installation**” provides instructions for the basic physical installation of the RAPTOR-IPG card in an openGear frame.
- “**Cabling**” provides an overview of the connecting senders and receiver devices to the rear module of the RAPTOR-IPG card.
- “**Getting Started**” outlines how to display the RAPTOR-IPG interfaces in DashBoard, and how to re-name the card for easy identification.
- “**Configuring the Ethernet Settings**” provides instructions for configuring the RAPTOR-IPG network settings.
- “**Transport Protocol Setup**” provides information for setting up communications using third-party protocols.
- “**Configuring the Timing Settings**” provides instructions for configuring the card to use Precision Time Protocol, and specifying a reference source.
- “**Configuring the Receivers**” provides instructions for configuring a receiver channel for video streaming.
- “**Configuring the Senders**” provides instructions for configuring the ASI outputs, and the IP outputs.
- “**Setting up the Network Streams**” outlines how to define the network sources that the RAPTOR-IPG can access.
- “**Operation**” provides general information for operating the RAPTOR-IPG.
- “**Ultritouch-2 Support**” provides information for using an Ultritouch-2 panel to operate and monitor the RAPTOR-IPG.
- “**Monitoring**” describes the stream monitoring features and how to upgrade the card software in the DashBoard interfaces.
- “**Upgrading the Software**” outlines how to upgrade the RAPTOR-IPG the options available in DashBoard
- “**DashBoard Interface Overview**” summarizes the functions, menus, and parameters of the RAPTOR-IPG tabs, menus, and parameters in DashBoard.
- “**Technical Specifications**” provides the specifications for the RAPTOR-IPG.
- “**Service Information**” provides information on the warranty and repair policy for your RAPTOR-IPG.
- “**Software Licenses**” provides third-party software license information for your RAPTOR-IPG.
- “**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 RAPTOR-IPG:

- *DashBoard User Manual*, Ross Part Number: 8351DR-004
- *MFC-OG3-N and MFC-8322-S User Manual*, Ross Part Number: 8322DR-004
- *OGX-FR Series User Manual*, Ross Part Number: 8322DR-204
- *Ultritouch User Guide*, Ross Part Number: 2201DR-304

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 **Edit** dialog, click **Insert Above**.

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

Italic text is used to identify the titles of referenced guides, manuals, or documents. For example:

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

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 select **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 card.

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.

- **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

This chapter provides an overview of the RAPTOR-IPG and possible work flow examples.

Features

Some features of the RAPTOR-IPG include:

- IP packet transport to SDI video, and embedded audio
- Supports the following encapsulation modes:
 - › SMPTE ST 2110-10
 - › SMPTE ST 2110-20
 - › SMPTE ST 2110-30
 - › SMPTE ST 2110-50
- Two 10GbE interfaces support up to 6 Tx + 6 Rx video and 6 Tx + 6 Rx streams of audio
- Glitch-less PTP Grandmaster switchover
- Provides protection switching per SMPTE ST 2022-7
- SMPTE ST 2059 PTP slave support
- RAVENNA Session announcement, discovery, and registration
- NMOS IS-04 and IS-05 discovery, registration, and connection control
- Ember+ (BESS 1.1) connection control
- Full DashBoard control
- Support for Ultritouch-2 operation
- Supported by the OGX-FR series frames

What are Devices, Senders, Flow, and Streams?

Before proceeding, you may wish to review the following terms:

Device

A physical, virtual, or software application that may include multiple sources, destinations, senders, or receivers.

Essence

A single elementary logical media signal. For example, a video essence is one video channel. An audio essence is a single audio (mono) channel.

Flow

The continuous raw media content. It can contain more than one essence (e.g. an audio flow can contain multiple channels, and an SDI flow may contain audio and video essences).

A flow is independent of the transport protocol. For example, 48kHz LPCM audio is a flow; AES67 is one type of stream which can carry the flow.

Flows cannot generally be passed around natively, and need to be encapsulated in a stream. Flows from the same source are considered “editorially equivalent”, but may be encoded differently. For example, a video source may be encoded as 4:2:2 YPrPb uncompressed, 4:4:4 RGB uncompressed, and h.265 encoded. Each of these would be a separate flow from a common source.

Receiver

An element within a device which that receives exactly one stream, which contains one flow from a network.

Sender

An element within a device which presents exactly one flow, packaged as a stream onto a network.

Stream

One flow, encapsulated within a transport protocol. Examples include SMPTE ST 2110-20 Video, or SMPTE ST 2110-30 Audio (AES67).

Example of a Source and a Sender Device Work Flow

Figure 2.1 provides a general example of device, sender, flow, and stream where the **Device** is a dual-source video server producing multiple flows from the source labeled *Channel 1* including a full-resolution 4:2:2 flow, and an h.264 low-resolution proxy flow. The full-resolution flow then feeds two senders.

★ RAPTOR-IPG currently supports 1:1 mapping between source, flow, and sender for each of its SDI IN ports.

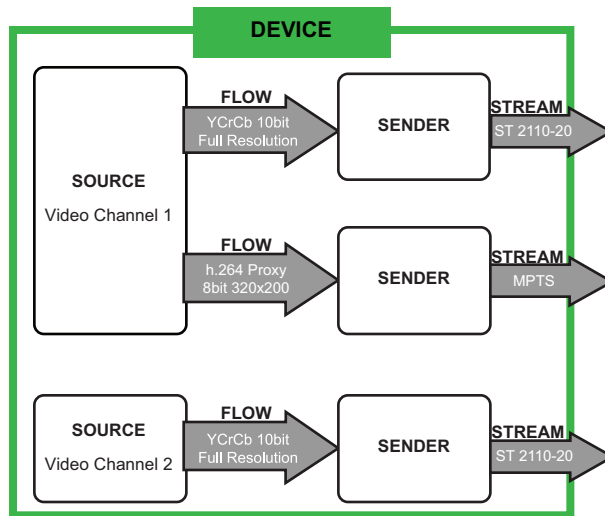


Figure 2.1 Example of a Generalized Device, Source, Sender, and Stream Work Flow

Example of a Receiver and Destination Device Work Flow

Figure 2.2 provides a generalized example of Device, Stream, Receiver, Flow, and Destination objects. In this example the destination object is a Multiviewer device with three PiPs (Picture-in-Picture) as destinations.

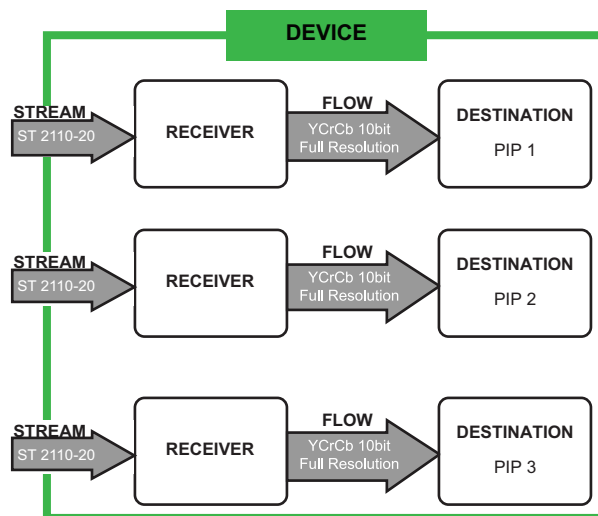


Figure 2.2 Example of a Generalized Device, Receiver, Destination and Flow Workflow

System Overview Diagram

In the context of the RAPTOR-IPG, Studio Video Over IP (SVIP) can be summarized in **Figure 2.3** where:

1. a **Source** feeds an SDI signal into an SDI IN BNC on one RAPTOR-IPG
2. an essence signal is packed into a **Stream** by the **Sender** onto the network
3. the **Stream** is re-assembled by the **Receiver** of the second RAPTOR-IPG
4. a **Destination** feeds the signal from the SDI OUT BNC on the second RAPTOR-IPG

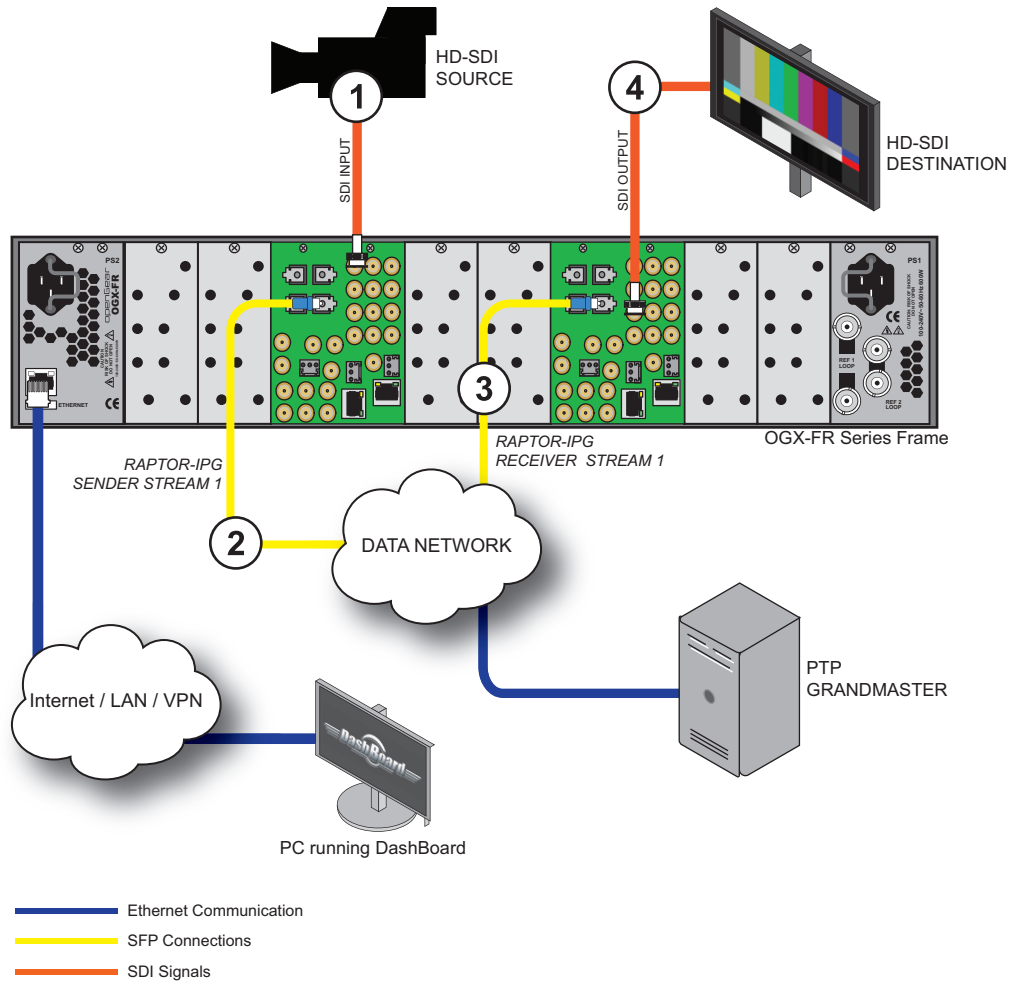


Figure 2.3 System Overview Diagram

Video/IP Flow Diagram

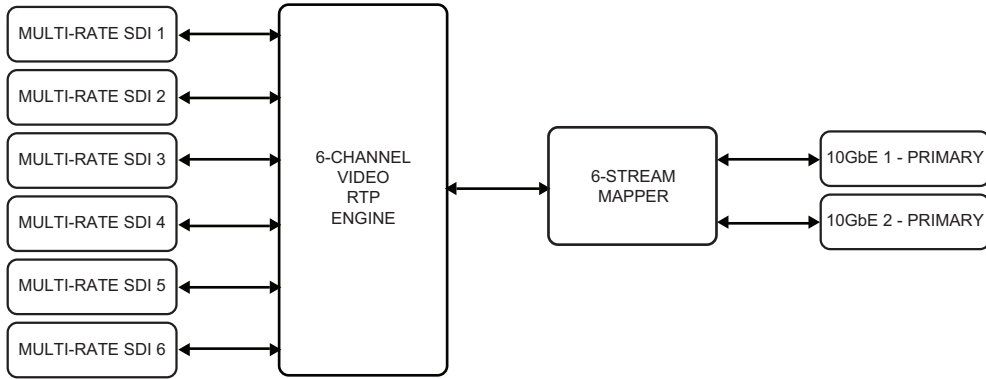


Figure 2.4 Video/IP Flow Diagram

Installation and Setup Overview

The generalized work flow of installing and configuring your RAPTOR-IPG is:

1. Download and install the latest version of the DashBoard client software.
2. Contact your IT department for the required IP addresses for your RAPTOR-IPG.
3. Physically install and cable the RAPTOR-IPG.
4. Use DashBoard to access the RAPTOR-IPG.
5. Use the Initial Setup Wizard to configure the basic settings for your module.
6. Define the Network Stream Groups.
7. Make your connections.

Hardware Overview

This chapter presents information on the RAPTOR-IPG card-edge controls and features.

Overview

Up to five RAPTOR-IPG modules may be installed into an openGear or an OGX-FR series frame.

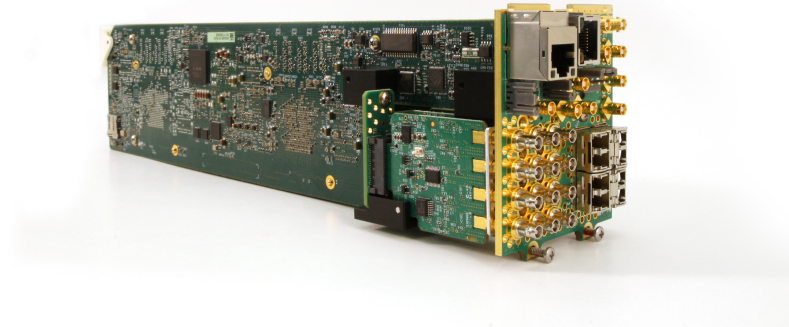


Figure 3.1 Example of the RAPTOR-IPG

Each RAPTOR-IPG consists of:

- a main PCB
 - an audio daughter card
 - a rear module
- ★ The RAPTOR-IPG assembly requires four slots in the openGear frame.

Main PCB Overview

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

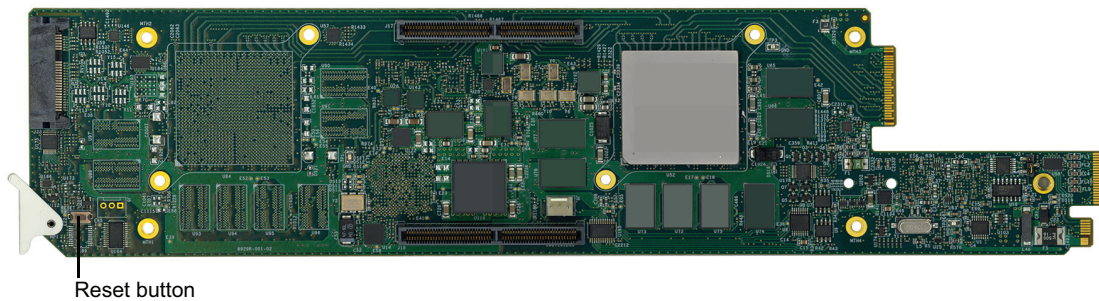


Figure 3.2 RAPTOR-IPG — Base Card Components

Reset Button

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

Micro SD Card

The main PCB also includes a Micro SD card. This SD card is located on the back face of the main PCB and above the ejector. (Figure 3.3)

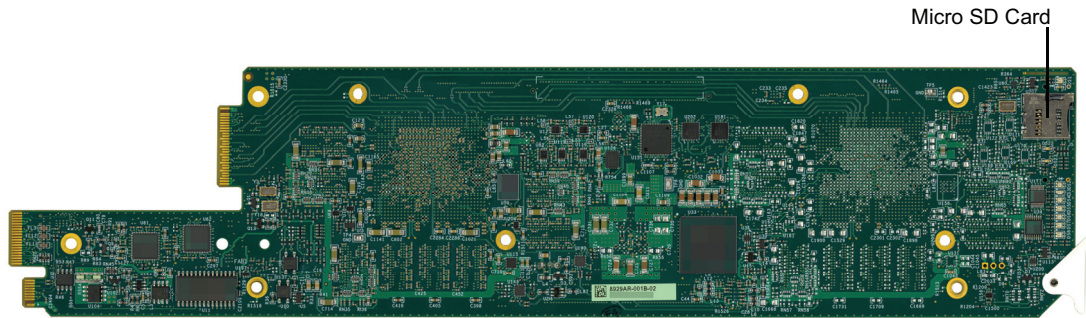


Figure 3.3 RAPTOR-IPG — Micro SD Card Location

★ Ensure the SD card is properly seated in its slot on the PCB before installing the RAPTOR-IPG in the openGear frame.

Card-edge LEDs

When the card is powered and operational:

- LED DS1 is lit red
- LEDs DS22 and DS23 are lit green.

Any other LED pattern could indicate a problem and Tech Support should be consulted.

RAPTOR-IPG Rear Module Overview

This section provides an overview of the connections and cabling designations for each rear module the RAPTOR-IPG supports.



Notice — Installing the RAPTOR-IPG in a frame other than the openGear could damage the card, the rear module, or both.

For More Information on...

- connecting specific signals to your rear module, refer to the chapter “Cabling” on page 25.

The RAPTOR-IPG requires the 8322AR-319A rear module. The following connections are available:

- 2 SFP+ for 10GbE network interface
- 6 HD-BNC inputs (3G SDI)
- 6 HD-BNC outputs (3G SDI)

Refer to **Figure 3.4** for the implemented cabling designations.

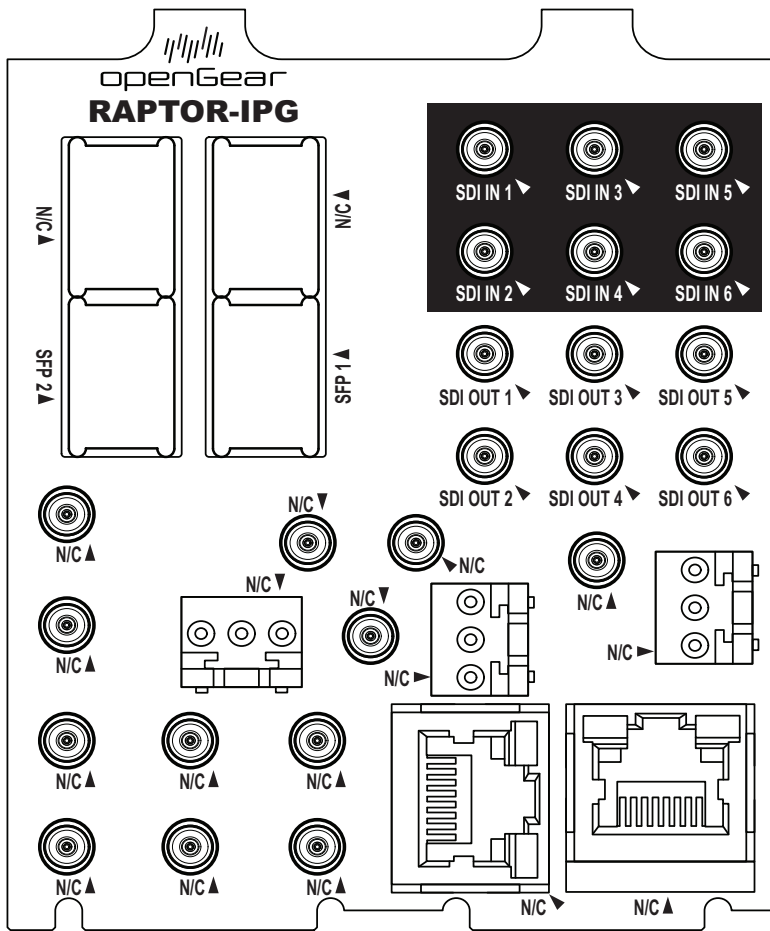


Figure 3.4 RAPTOR-IPG — Implemented Connections

Physical Installation

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

For More Information on...

- the technical specifications for the RAPTOR-IPG, refer to the chapter “**Technical Specifications**” on page 97.

Before You Begin

These installation guidelines assume the following:

- Ensure the openGear frame is properly installed. Refer to the frame’s *User Guide* for details.
- A valid IPV4 address is available for the RAPTOR-IPG.
- A PTP Grandmaster is configured and available for communicating with the RAPTOR-IPG.
- A network switch is configured in Boundary Clock mode and available for communicating with the RAPTOR-IPG.

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.*

Working with Fiber Optic Connectors

Keep the following in mind when working with fiber optic connectors:

- Every time you are required to insert a connector into a device or mating sleeve, you must clean the connector. All exposed surfaces of the ceramic ferrule must be clean. Follow your facility practices of cleaning fiber optic connectors.
- Connectors must always be inserted into a device or have a dust cap on.
- A poor optical connection is often similar to a poor electrical connection. Try removing the connector, cleaning, and re-inserting the connector. A bad connection can result in experiencing signal instability, high loss, or a noisy signal.

Installing the RAPTOR-IPG into the openGear Frame

Installing an RAPTOR-IPG card into the openGear frame requires you to remove the blank plates in the designated frame slots, install the required rear module into the frame rear panel, and then install the RAPTOR-IPG assembly into the required frame slots.

Removing a Blank Plate from the openGear 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. Each rear module occupies four slots in the frame, but accommodates one card.

- ★ Each rear module requires you to remove two Blank Plates (covering four slots) in the openGear frame.

To remove a blank plate from the openGear frame

1. Locate the slots in the openGear frame you wish to install the RAPTOR-IPG into. 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
2. Use a Phillips #1 screwdriver to unfasten each blank plate from the openGear backplane.
3. Remove each blank plate from the chassis and set aside.

Installing the Rear Module into the openGear Frame

The rear module requires four slots in the openGear frame. You must affix the rear module to the frame backplane using the two retaining screws located at the top of the rear module.



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.*

To install a rear module into the openGear frame

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

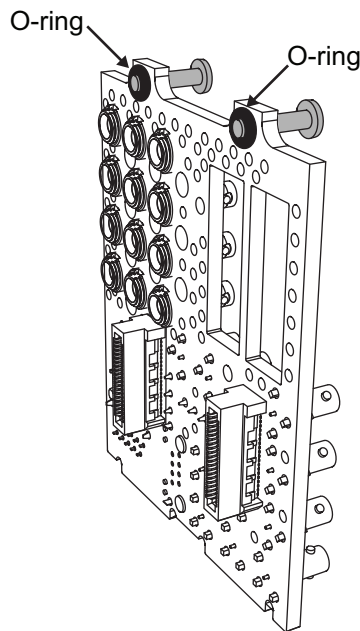


Figure 4.1 Rear Module Backplane — Adjusting the O-rings

2. Seat the bottom of the rear module in the seating slots at the base of the openGear frame's backplane.
 3. Align the top holes of the rear module with the holes on the top-edge of the frame backplane.
 4. Using a Phillips screwdriver and the provided screws, fasten the rear module to the backplane.
- ★ Do not fully tighten the screws until after the RAPTOR-IPG card is installed and alignment with the rear module is verified.

Installing the RAPTOR-IPG Card into an openGear Frame

The slot the RAPTOR-IPG 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 4.1** for valid slot combinations.

Table 4.1 Card Slot Combinations

Rear Module is Installed in	Card 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 RAPTOR-IPG into the openGear frame

1. Locate the slot the RAPTOR-IPG card will slide into.
 2. Verify that the RAPTOR-IPG card aligns with the rear module.
 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.
 5. Secure the rear module to the backplane using a Phillips screwdriver and the two retaining screws.
- ★ Do not over tighten the retaining screws.

Cabling

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

For More Information on...

- the technical specifications for the RAPTOR-IPG, refer to the chapter “**Technical Specifications**” on page 97.
- the cabling designations, refer to the chapter “**Cabling Guide**” on page 87.

Cabling the Ethernet Ports

The RAPTOR-IPG is connected to your network via the openGear frame so that it can interface with the devices and the computer running the DashBoard client software. After the RAPTOR-IPG is installed in the frame, DashBoard is used to configure the network settings for the RAPTOR-IPG.

- ★ If difficulties or problems are experienced when connecting the RAPTOR-IPG to a network hub, contact your network administrator.

This section presents a general overview of the Ethernet connection process. The exact steps for connecting your RAPTOR-IPG to your facility via an Ethernet network depend on the network requirements of your facility. You must provide an Ethernet connection to the openGear frame as outlined in the user guide that accompanied your frame. The Ethernet connection on the frame is used for communications, and software upgrades using DashBoard.

For More Information on...

- cabling the Ethernet port on the openGear frame, refer to the frame’s *User Guide*.

Before You Begin

Keep the following in mind before connecting the Ethernet ports on the rear module to your network:

- 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.

Cabling the SFP Ports



Caution — *Never attempt to look down the barrel of a connected fiber or device transmitting an optical signal. The transmitted light is not in the visible spectrum and may cause permanent eye damage. Turn off all laser sources before disconnecting devices.*

The primary function of SFP modules is to provide up to two additional Ethernet ports for the RAPTOR-IPG. Each SFP provides a 10GbE network interface and can be configured to send and receive network streams in DashBoard. The SFP designations are the same regardless of the rear module used.

- ★ Contact Ross Technical Support for a list of supported SFP modules.



Caution — *Every time you are required to insert a connector into a device or mating sleeve, you must clean the connector. All exposed surfaces of the ceramic ferrule must be clean. Follow your facility practices of cleaning fiber optic connectors. Connectors must always be inserted into a device or have a dust cap on.*

To connect an SFP port to a network port

1. Remove the dust caps from each of the SFP port connectors on the rear module.
 - Refer to **Figure 5.1** for connector location.
 - Refer to the “**Important Laser Safety Measures and Notices**” document that accompanied your card for safety information when handling fiber optic components.

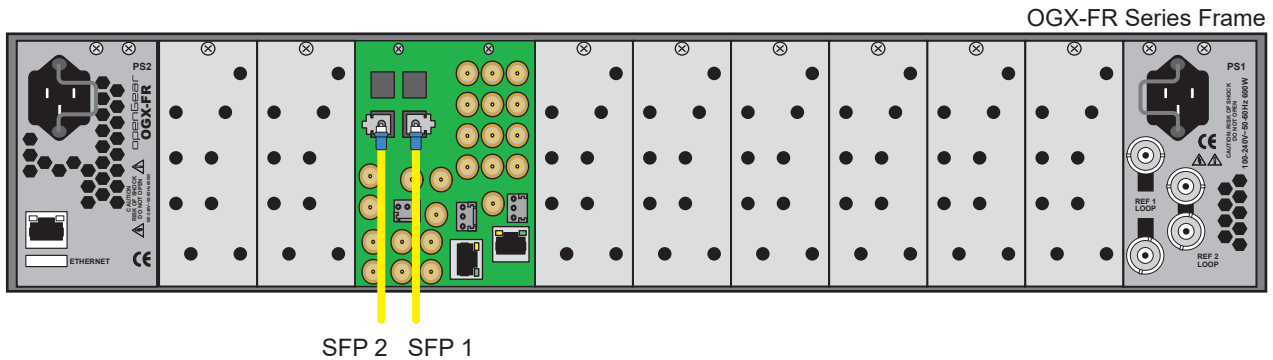


Figure 5.1 RAPTOR-IPG — SFP Port Connections on the 8322AR-319A

2. Ensure that the exposed surface of the ceramic ferrule of each connector is clean. Refer to the section “**Working with Fiber Optic Connectors**” on page 21 for cleaning tips.
3. Cable your rear module as required. (**Figure 5.1**)

Video Signal Cabling

Each rear module provides connections for up to six SDI inputs and six SDI outputs.

SDI Inputs

Connect your input video signals to the six SDI IN HD-BNCs on the rear module as required. Refer to **Figure 5.2**.

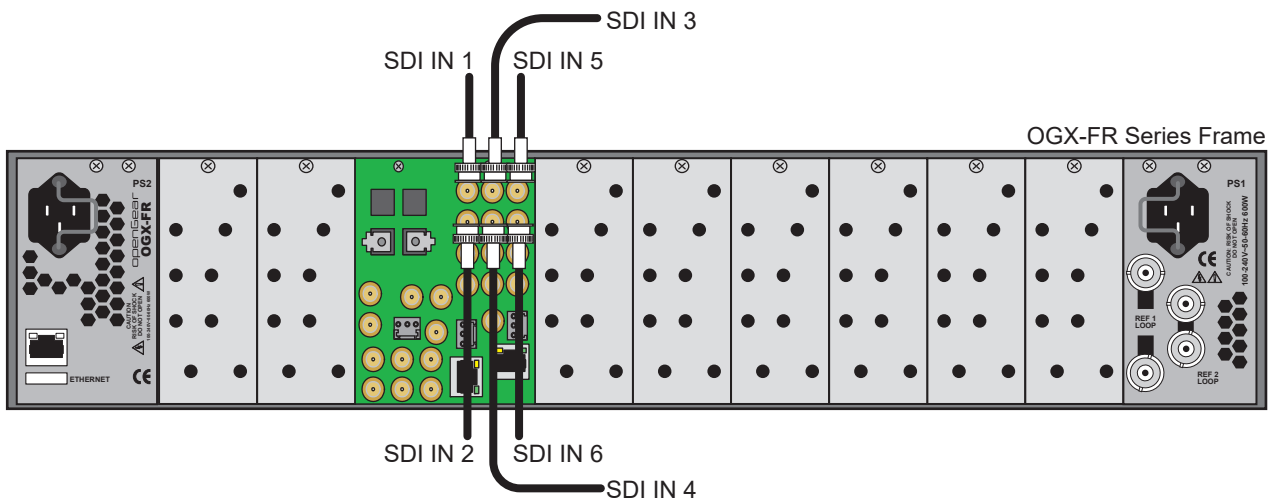


Figure 5.2 Rear Module Cabling — SDI Inputs

SDI Outputs

Connect your destination devices to the six SDI OUT HD-BNCs on the rear module. Refer to **Figure 5.3**.

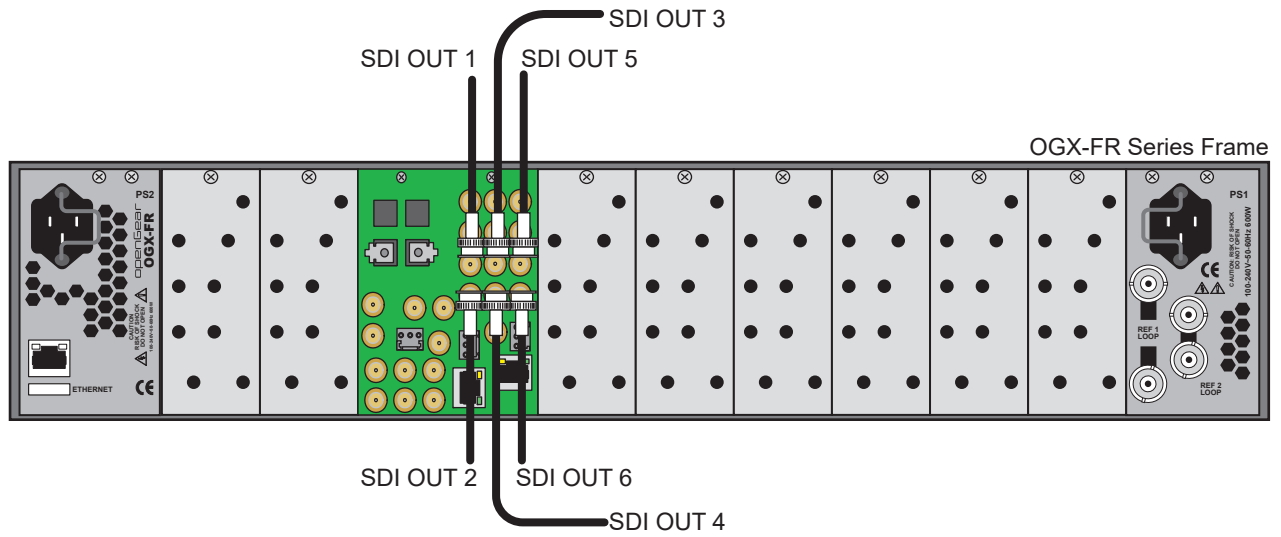


Figure 5.3 Rear Module Cabling — SDI Outputs

Getting Started

This chapter provides instructions for launching DashBoard, assigning an initial IP address to the RAPTOR-IPG, and accessing the tabs and menus in DashBoard.

Before You Begin

Ensure that:

- A valid IPV4 address is available for the RAPTOR-IPG.
- A PTP Grandmaster is configured and accessible for the RAPTOR-IPG.
- A network switch is configured in Boundary Clock mode and available for communicating with the RAPTOR-IPG.
- ★ Ensure that your facility IT Department provided the required network settings to be assigned to the RAPTOR-IPG and each SFP port you plan to enable.
- An MFC-OG3-N or an MFC-8322-N Network Controller Card installed in your openGear frame.
- The openGear frame that houses the RAPTOR-IPG displays in the Basic Tree View of DashBoard.
- The RAPTOR-IPG displays as a sub-node in the openGear frame tree.

Configuration Overview

The generalized work flow of configuring your RAPTOR-IPG is summarized in **Figure 6.1**.

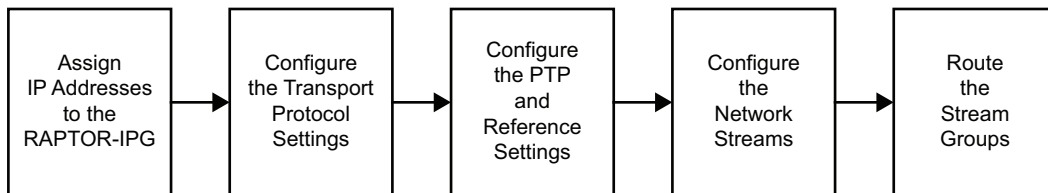


Figure 6.1 Process for Configuring a RAPTOR-IPG

Launching DashBoard

DashBoard must be run on a computer that is connected to the same network as the RAPTOR-IPG.

For More Information on...

- downloading and installing the DashBoard client software, refer to the *DashBoard User Manual*.
- the RAPTOR-IPG interfaces in DashBoard, refer to the chapter “**DashBoard Interface Overview**” on page 69.

To launch DashBoard

1. Ensure that you are running DashBoard software version 9.0 or higher.
2. Launch DashBoard by double-clicking its icon on your computer desktop.

Configuring the Initial Network Settings

Once the RAPTOR-IPG is physically installed and cabled to your facility network, you will need to assign it an initial static IP Address in order to display the card menus, options, and status fields in DashBoard. Establishing an initial IP Address enables DashBoard to communicate with the RAPTOR-IPG and update the Basic Tree View with the RAPTOR-IPG sub-nodes.

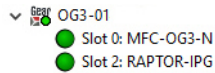


Figure 6.2 RAPTOR-IPG without a Sub-node

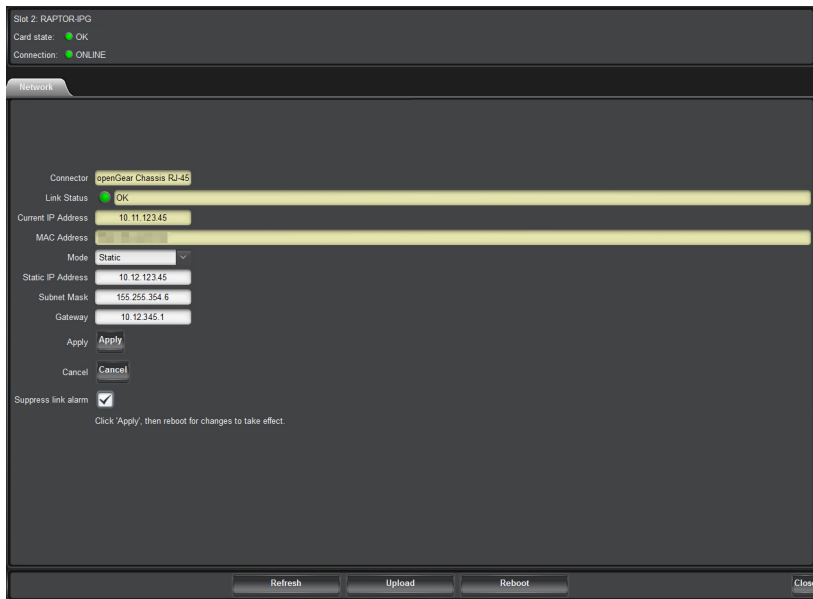


Figure 6.3 RAPTOR-IPG with a Sub-node

To assign the initial network settings for the RAPTOR-IPG

1. Launch DashBoard.
2. Expand the openGear frame node to display a list of sub-nodes.
- ★ Each sub-node represents a card installed in that frame.
3. Double-click the **RAPTOR-IPG** node under the frame node.

The **Network** interface displays in DashBoard.



4. Use the **Mode** menu to select **Static**.
5. Use the **Static IP Address** field to assign a unique IP Address to the RAPTOR-IPG card.
6. Use the **Subnet Mask** field to assign the subnet mask for the card.
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**.
9. To apply the new network settings, click **Reboot**. This button is located at the bottom of the **Network** interface. The card is temporarily taken off-line during the reboot.
10. Verify the new network settings:
 - a. Expand the openGear frame node to display a list of sub-nodes.
 - b. Expand the **RAPTOR-IPG** node.
 - c. Double-click the **RAPTOR-IPG** sub-node in the Tree View.
 - d. Select the **Advanced** tab in the right pane of the DashBoard window.
 - e. Select the **Ethernet I/O** tab.

Using the Initial Setup Wizard

Double-click the **RAPTOR-IPG** sub-node in the Tree View of DashBoard and select the **Initial Setup** tab.

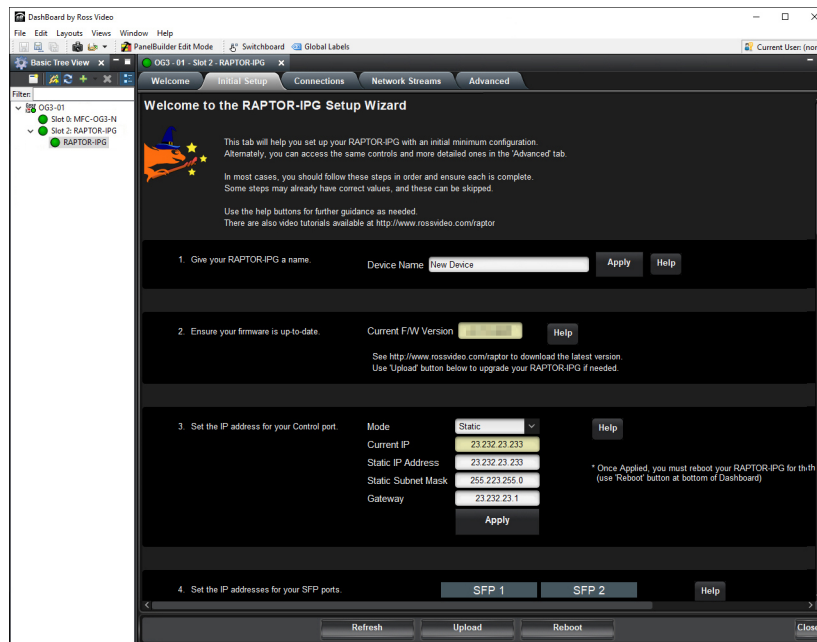


Figure 6.4 Example of the Initial Setup Tab

Use the **Initial Setup Wizard** to configure the following settings:

- Re-name the RAPTOR-IPG in DashBoard
- IP Address for the CONTROL port
- IP Address for each SFP port
- System Frame Rate
- PTP Timing System
- Audio Packet Time
- Audio Channel Count mode
- Sender Sources

These steps are further described in the proceeding chapters.

Accessing the RAPTOR-IPG User Interfaces in DashBoard

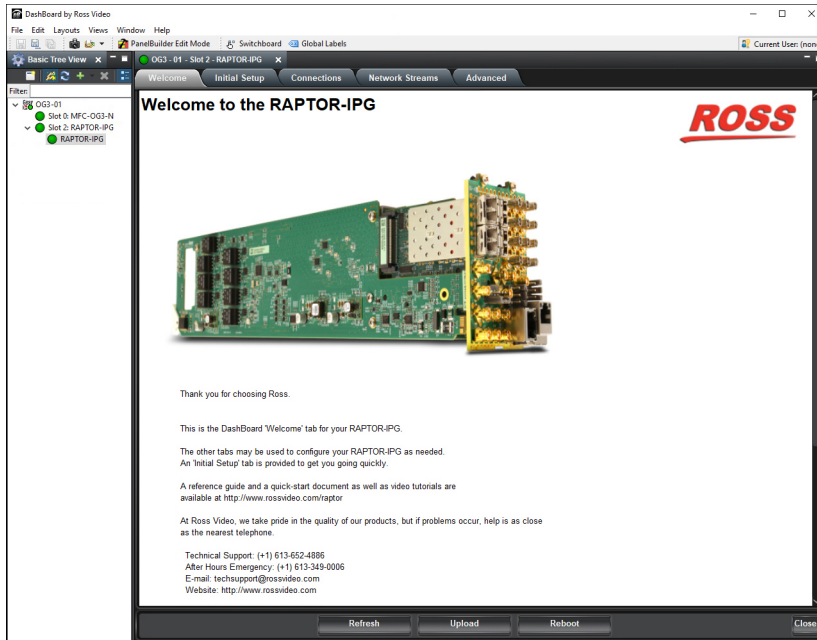
The user interfaces are accessed by double-clicking the RAPTOR-IPG node in the DashBoard Tree View. This procedure assumes that you have launched DashBoard on your computer and a valid IP Address assigned to the RAPTOR-IPG.

★ If you cannot access the user interfaces, refer to the section “**Configuring the Initial Network Settings**” on page 29.

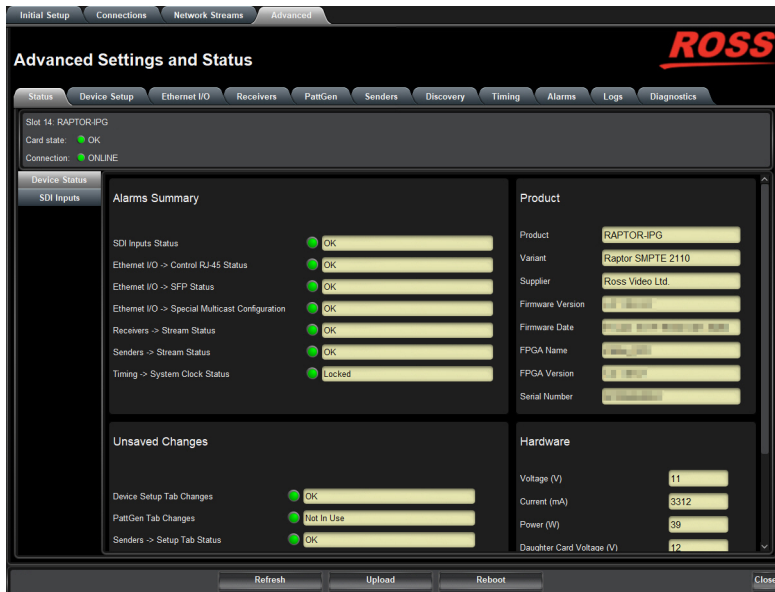
To access the RAPTOR-IPG user interfaces in DashBoard

1. In the Basic Tree View of DashBoard, locate the openGear frame the RAPTOR-IPG is installed in.
2. Expand the openGear frame node to display a list of sub-nodes.
3. Expand the RAPTOR-IPG node.
4. Double-click the **RAPTOR-IPG** sub-node to display the RAPTOR-IPG interface in the right pane of the DashBoard window.

The Dashboard window is organized into a series of tabs with the **Welcome** tab automatically selected.



5. Select a tab to display its options in the right-side of the Dashboard window. In the example below, the user selected **Advanced**.



Configuring the Ethernet Settings

The RAPTOR-IPG provides up to two SFP ports that can be populated with Ethernet connectors. The openGear frame also provides Ethernet connections via the ports on its rear panel, and the Network Controller Card installed in the frame. This chapter outlines how to configure each of these ports.

★ If difficulties or problems are experienced when assigning IP addresses, contact your network administrator.

Configuring the Internal Frame Ethernet Settings

You can specify the network settings that will be used when the RAPTOR-IPG utilizes the GigE network switch available on the Network Controller Card installed in the same openGear frame.

The port on the Network Controller Card enables RAPTOR-IPG to communicate with DashBoard and with other cards in the same openGear frame.

★ Ross Video recommends using a static IP Address.

To specify the network settings for the RAPTOR-IPG to use via the Network Controller Card

1. In the Tree View of DashBoard, expand the RAPTOR-IPG node.
- ★ If the RAPTOR-IPG does not display a sub-node, refer to the section “**Configuring the Initial Network Settings**” on page 29.
2. Double-click the **RAPTOR-IPG** sub-node.
3. Select **Advanced > Ethernet I/O**.

The screenshot shows the 'Advanced Settings and Status' window in the Ross DashBoard. The 'Ethernet I/O' tab is selected, displaying configuration options for three network interfaces: SFP 1, SFP 2, and openGear Chassis RJ-45. Each interface has fields for Link Status, Current IP, MAC Address, Mode, Static IP Address, Subnet Mask, and Gateway. The 'openGear Chassis RJ-45' interface is highlighted. To the right, a 'Status' section shows temperature, wavelength, part number, and bandwidth usage for SFP 1 and SFP 2. At the bottom, there are buttons for Refresh, Upload, Reboot, and Close.

Network Setup	SFP 1	SFP 2	openGear Chassis RJ-45
Link Status	OK	OK	OK
Current IP	12.34.12.30	12.22.22.123	12.288.24.483
MAC Address	00-0F-9B-03-1A-A2	00-0F-9B-03-1A-A3	00-0F-9B-02-BB-FA
Mode	Static	Static	Static
Static IP Address	12.34.12.30	12.22.22.123	12.288.24.483
Subnet Mask	255.255.255.0	255.255.255.0	255.255.255.0
Gateway	0.0.0.0	0.0.0.0	10.232.24.1

Status	SFP 1	SFP 2
Temperature (Celsius)	22	31
Wavelength (nm)	850	850
Part Number	SFP-10GSR-85	LCP-10G3A4EDR-W A
Rx Bandwidth Used	18.629 kbps	22.899 kbps
Tx Bandwidth Used	1.148 kbps	4.221 kbps

4. Locate the **openGear Chassis RJ-45** column of the tab.
5. If you are manually configuring the Ethernet settings for the RAPTOR-IPG:
 - a. Use the **Mode** menu to select **Static**.
 - b. Use the **Static IP Address** field to specify the new static IP Address for the RAPTOR-IPG. This is the address the card will use within the openGear frame.
 - c. Use the **Subnet** field to specify the subnet mask for your network.
 - d. Use the **Gateway** field to specify the gateway for communication outside of the local area network (LAN).
6. If you want the network settings to be automatically obtained, select **DHCP** from the **Mode** menu.

7. Click **Apply** to save the new settings.
8. Reboot the RAPTOR-IPG as follows:
 - a. Click **Reboot**. This button is located on the bottom of the **Ethernet I/O** tab.
 - b. Monitor the reboot progress.

Configuring the SFP Ports

By assigning an IP Address to each SFP port, you are able to uniquely identify it on the network and control it via the DashBoard interface. Each SFP port on the rear module can be configured for media traffic for the RAPTOR-IPG.

This section outlines how to configure the network settings for the SFP ports on the rear module.

For More Information on...

- the SFP designations on the rear module, refer to the section “**RAPTOR-IPG Rear Module Overview**” on page 18.

To update the network settings for an RAPTOR-IPG SFP port

1. In the Tree View of DashBoard, expand the RAPTOR-IPG node.
2. Double-click the **RAPTOR-IPG** sub-node.
3. Select **Advanced > Ethernet I/O**.
4. Locate the options for the SFP you wish to configure.
5. If you are manually configuring the Ethernet settings:
 - a. Use the **Mode** menu to select **Static**.
 - b. Use the **Static IP Address** field to specify the new static IP Address for the RAPTOR-IPG. This is the IP Address that is used to control and communicate with the specific SFP port.
 - c. Use the **Subnet** field to specify the subnet mask for the SFP port.
6. If you want the network settings for the SFP port to be automatically obtained, select **DHCP** from the **Mode** menu.
7. Click **Apply** to save the new settings.
8. Repeat this procedure for the second SFP port you wish to configure.
9. Reboot the RAPTOR-IPG as follows:
 - a. Click **Reboot**. This button is located on the bottom of the **Ethernet I/O** tab.
 - b. Monitor the reboot progress.

Using a Multicast Whitelist

Through DashBoard, the RAPTOR-IPG senders can be configured with any destination multicast IP address in the range of 225.x.x.x to 239.x.x.x. Receivers on the RAPTOR-IPG can also be configured to connect to a network stream with any multicast destination IP address in the same range. If you require exceptions to this default configuration, you can create a programmable whitelist of up to eight entries that specify the exceptions.

Defining a Multicast Whitelist

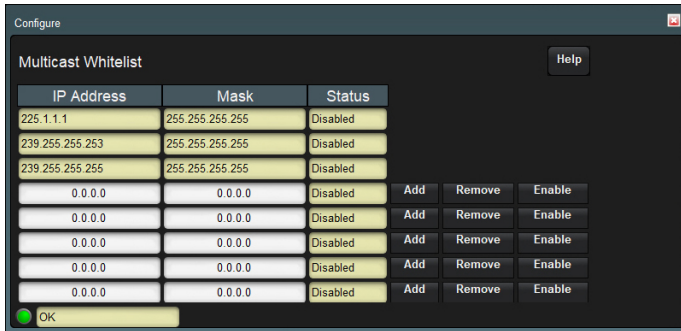
You can create a programmable whitelist of up to eight entries with three read-only entries and five user configurable entries. Each whitelist entry includes: a 32bit IP address, a 32bit IP address mask, and 1bit entry enable. Defining a whitelist entry is done via DashBoard using the options in the Advanced > Ethernet I/O tab.


- ★ The addresses 225.1.1.1, 239.255.255.255, and 239.255.255.253 are automatically added to the whitelist as the three read-only entries.

To define a multicast whitelist

1. In the Tree View of DashBoard, expand the RAPTOR-IPG node.
2. Double-click the **RAPTOR-IPG** sub-node.
3. Select **Advanced > Ethernet I/O**.
4. Locate the **Special Multicast Addresses** area on the tab.
5. Click **Configure**.

The **Multicast Whitelist** dialog opens.



6. Use the first row of editable **IP Address** and **Mask** fields to define the first network stream exception.
7. Click **Add** to create the entry in the list.
8. Click **Enable** for the new entry.
9. Repeat steps 6 to 8 for the remaining rows to define additional streams you wish to exclude.
10. To close the dialog, click  in the top right corner of the dialog.

Transport Protocol Setup

This chapter provides information on the distribution methods the RAPTOR-IPG supports.

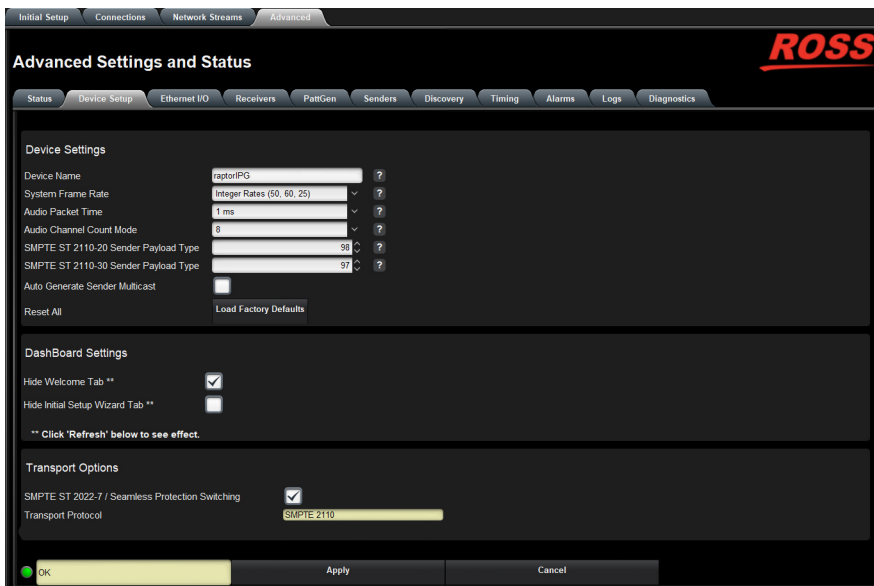
Specifying the Sender Payload Type

You can specify the methodology the RAPTOR-IPG will use for encapsulating the data to send to the downstream equipment in your system.

★ Changes to the RAPTOR-IPG code settings requires a reboot of the card to commit the changes.

To specify the sender payload type for the RAPTOR-IPG

1. In the Tree View of DashBoard, expand the RAPTOR-IPG node.
2. Double-click the **RAPTOR-IPG** sub-node.
3. Select **Advanced > Device Setup**.



4. Use the **SMPTE ST 2110-20 Sender Payload Type** field to specify the 7bit numeric value that identifies the SMPTE 2110-20 RTP payload format the RAPTOR-IPG supports. The default is 98.
5. Use the **SMPTE ST 2110-30 Sender Payload Type** field to specify the 7bit numeric value that identifies the SMPTE 2110-30 RTP payload format the RAPTOR-IPG supports. The default is 97.
6. Click **Apply** to save the new settings.
7. Reboot the RAPTOR-IPG as follows:
 - a. Click **Reboot**. This button is located on the bottom of the **Device Setup** tab.
 - b. Monitor the reboot progress.

Registration and Discovery

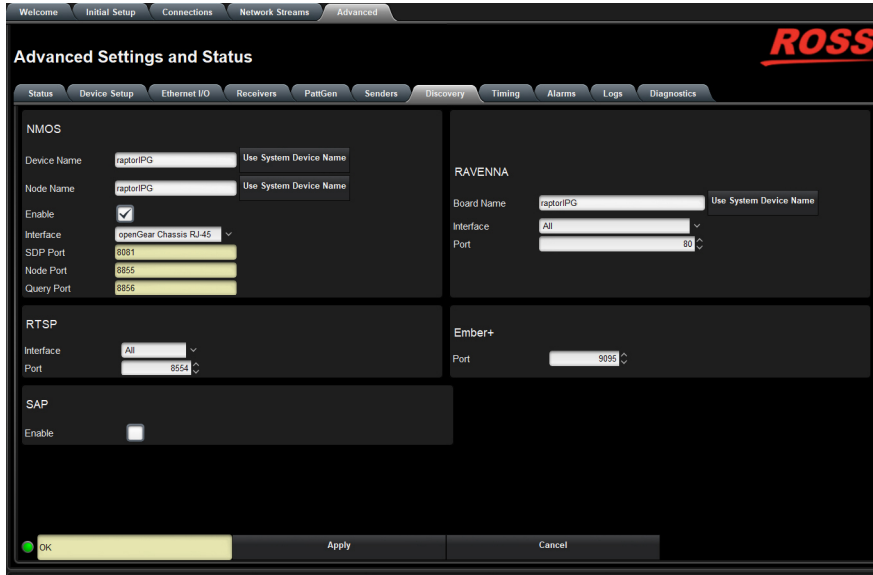
The RAPTOR-IPG supports media distribution based on RAVENNA, RTSP, NMOS, and Ember+. This section outlines how to configure the RAPTOR-IPG for each protocol.

RAVENNA Support

This section outlines how to configure the RAPTOR-IPG for the open standard for real-time media over IP (AES67).

To configure the RAPTOR-IPG as a RAVENNA device

1. In the Tree View of DashBoard, expand the RAPTOR-IPG node.
2. Double-click the **RAPTOR-IPG** sub-node.
3. Select **Advanced > Discovery**.



4. Locate the **RAVENNA** area in the tab.
5. To re-name the card, perform one of the following:
 - Use the **Board Name** menu to specify a unique identifier for the card in the RAVENNA network; or
 - Click **Use System Device Name**.
6. Use the **Interface** menu to specify what port on the rear module the RAPTOR-IPG will use for RAVENNA communications.
7. Use the **Port** menu to specify the port assigned to the RAPTOR-IPG within the RAVENNA network.
8. Click **Apply** to save the new settings.
9. Reboot the RAPTOR-IPG as follows:
 - a. Click **Reboot**. This button is located on the bottom of the **Discovery** tab.
 - b. Monitor the reboot progress.

RTSP Support

This section outlines the required settings when establishing communications between RAPTOR-IPG and an external device via the Real Time Streaming Protocol (RTSP).

To configure the RAPTOR-IPG as an RTSP device

1. In the Tree View of DashBoard, expand the RAPTOR-IPG node.
2. Double-click the **RAPTOR-IPG** sub-node.
3. Select **Advanced > Discovery**.
4. Locate the **RTSP** area in the tab.

5. Use the **Interface** menu to specify what physical port the RAPTOR-IPG uses for RTSP communications.
6. Use the **Port** field to specify the TCP port the protocol uses to send and receive messages.
7. Click **Apply** to save the new settings.
8. Click **Reboot** to apply the new settings. This button is located at the bottom of the interface.
The RAPTOR-IPG is temporarily taken off-line during the reboot.
9. Monitor the reboot progress.

Ember+ Support

★ RAPTOR-IPG implements BESS v1.1 for Ember+ support to communicate with third-party controllers.

Keep the following in mind when setting up an Ember+ connection with RAPTOR-IPG:

- Ensure that all network streams have a consistent audio channel count.
- Audio shuffling is not supported in Ember+ setups.
- RAPTOR-IPG supports one-to-many connections (where one source can be routed to multiple targets).
- The video and audio offsets set in DashBoard are automatically applied for Ember+ connections. Refer to the section “**Configuring the Video Delay and Audio Offset**” on page 46 for details on setting these offsets.

Video Signal Mapping for Ember+

Each Group in the Ember+ tree represents a different physical SDI interface on RAPTOR-IPG (Group 1 represents SDI 1, Group 2 represents SDI 2, etc.) The video SDI signal in the network stream is mapped to Video 1 in the Ember+ client.

Audio Channel Mapping for Ember+

There are 16 audio channels per SDI signal (and therefore 16 channels per group since each group represents an SDI signal). Channels in the network stream are mapped to the corresponding audio channels in the Ember+ client in a 1-to-1 mapping.

In each channel count mode, the Sender configuration must first be created in DashBoard to show up in the Ember+ tree. If a Sender is not set up through DashBoard for one of these sets of channels, then the Audio sub-groups will not contain an SDP file. If a Sender is created without following the channel mapping configuration above, the Ember+ tree contents will not be correct.

16-channel Audio Count Mode

In 16-channel count mode, there is only one Audio sub-group (Audio 1) per Group. Each SDI/Group has 16 channels, so all channels are represented as a single sub-group of that SDI signal. (**Figure 8.1**)

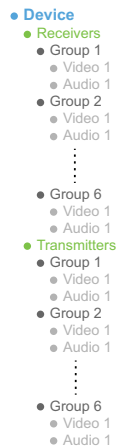


Figure 8.1 Ember+ Tree Example — Channel Count Mode Set to 16

In **Figure 8.1**, the Receivers > Group 1 > Audio 1 represents the receiver that maps to audio channels 1 to 16 of SDI 1; Receivers > Group 2 > Audio 1 represents the receiver that maps to audio channels of SDI 2. When connecting a 16-channel network stream to one of these targets, the 16 channels from the network stream will be mapped to the corresponding audio channels in a 1-to-1 mapping.

In **Figure 8.1**, the Transmitters > Group 1 > Audio 1 represents the sender that maps to audio channels 1 to 16 of SDI 1. The Transmitters > Group 1 > Video 1 group represents the video of the SDI signal.

8-channel Count Mode

If the channel count mode is set to **8**, each SDI/Group includes 2 audio sub-groups (Audio 1-8 and Audio 9-16 respectively). The Video 1 sub-group represents the video of the SDI signal. (**Figure 8.2**)

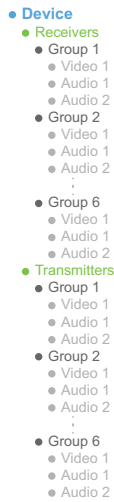


Figure 8.2 Ember+ Tree Example — Channel Count Mode Set to 8

In **Figure 8.2**, the Receivers > Group 1 > Audio 1 represents the receiver that maps to audio channels 1 to 8 for SDI 1; Receivers > Group 1 > Audio 2 represents the receiver that maps to audio channels 9 to 16 for SDI 1. When connecting an 8-channel network stream to one of these targets, the 8 channels from the network stream will be mapped to the corresponding audio channels in a 1-to-1 mapping.

In **Figure 8.2**, the Transmitters > Group 1 > Audio 1 represents the sender that maps to audio channels 1 to 8 for SDI 1; Audio 2 maps to the sender that maps to audio channels 9 to 16 for SDI 1; etc.

4-channel Count Mode

If the channel count mode is set to **4**, each SDI/Group includes 4 audio sub-groups (Audio 1-4, Audio 5-8, Audio 9-12, and Audio 13-16 respectively). The Video 1 sub-group represents the video of the SDI signal. (**Figure 8.3**)

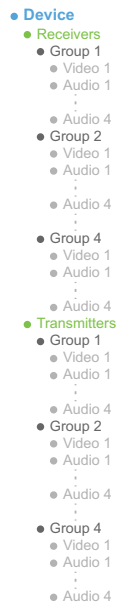


Figure 8.3 Ember+ Tree Example — Channel Count Mode Set to 4

In **Figure 8.3**, the Receivers > Group 1 > Audio 1 represents the receiver that maps to audio channels 1 to 4 for SDI 1; Receivers > Group 1 > Audio 2 represents the receiver that maps to audio channels 5 to 8 for SDI 1, etc. When connecting a 4-channel network stream to one of these targets, the 4 channels from the network stream will be mapped to the corresponding audio channels in a 1-to-1 mapping.

In **Figure 8.3**, the Transmitters > Group 1 > Audio 1 represents the sender that maps to audio channels 1 to 4 for SDI 1; Audio 2 maps to the sender that maps to audio channels 5 to 8 for SDI 1; etc.

2-channel Count Mode

If channel count mode is set to **2**, there are 8 audio sub-groups with 2 channels each per SDI/Group. The Video 1 sub-group represents the video of the SDI signal. (**Figure 8.4**)

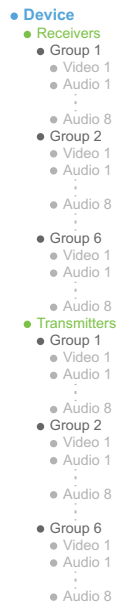


Figure 8.4 Ember+ Tree Example — Channel Count Mode Set to 2

In **Figure 8.4**, the Receivers > Group 1 > Audio 1 represents the receiver that maps to audio channels 1 and 2; Receivers > Group 1 > Audio 2 represents the receiver that maps to audio channels 3 and 4; etc. When connecting a

2-channel network stream to one of these targets, the 2 channels from the network stream will be mapped to the corresponding audio channels in a 1-to-1 mapping.

In **Figure 8.4**, the Transmitters > Group 1 > Audio 1 represents the sender that maps to audio channels 1 and 2; Audio 2 maps to the sender that maps to audio channels 3 and 4; etc.

1-channel Count Mode

If channel count mode is set to **1**, there are 16 audio sub-groups (Audio 1-16) with 1 channel each. The Video 1 sub-group represents the video of the SDI signal. (**Figure 8.5**)

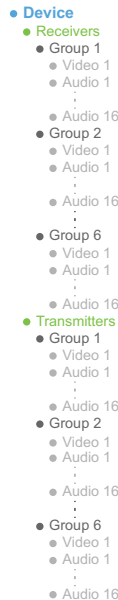


Figure 8.5 Ember+ Tree Example — Channel Count Mode Set to 1

In **Figure 8.5**, the Receivers > Group 1 > Audio 1 represents the receiver that maps to audio channel 1 of SDI 1; Receivers > Group 1 > Audio 2 represents the receiver that maps to audio channel 2 of SDI 2; etc. The Video 1 group represents the video of the SDI signal.

In **Figure 8.5**, the Transmitters > Group 1 > Audio 1 represents the sender that maps to channel 1 of SDI 1; Audio 2 maps to the sender that maps to audio channel 2 of SDI 2; etc. The Video 1 group represents the video of the SDI signal.

Establishing a Connection

★ Before proceeding, ensure that SDP patching is enabled with the Ember+ client to establish audio receivers on the RAPTOR-IPG.

To establish a connection between the Ember+ client and the RAPTOR-IPG

1. Add the RAPTOR-IPG in the Ember+ client interface using the IP Address assigned to the RAPTOR-IPG.
2. In Dashboard:
 - a. Navigate to RAPTOR-IPG **Advanced** > **Discovery** tab.
 - b. Locate the **Ember+** area in the tab.
 - c. Set the **Port** field to the same value as assigned in the Ember+ client interface. The default value for the **Port** field is 9095.
3. In the Ember+ client, set the TCP port to the same value you specified in step c for the RAPTOR-IPG.

Specifying the Audio Channel Count Mode on the RAPTOR-IPG

By default, the Channel Count mode is set to 8 but this value can be edited in Dashboard.

★ You will need to reboot the RAPTOR-IPG before the Ember+ tree is updated with the new Channel Count mode.

To set the Audio Channel Count mode on the RAPTOR-IPG

1. In DashBoard, navigate to the **Advanced > Device Setup** tab.
2. Use the **Audio Channel Count Mode** menu to specify the number of channels in each group.
3. Click **Apply**.

Configuring the RAPTOR-IPG for Ember+

For most setups, you will only need to create the Senders in DashBoard for the RAPTOR-IPG. Refer to the section “**Mapping the Audio Channels to a Sender Stream**” on page 54 for details.

For other setup types, you will need to configure the Senders, and then use the Ember+ controller interface (e.g. Lawo VSM) to map the sources to the targets. Refer to the documentation that came with your controller for details.

SAP Support

This section outlines how to enable the RAPTOR-IPG to use the Session Announcement Protocol (SAP) when broadcasting multicast session information.

To configure the RAPTOR-IPG to use SAP for multicast broadcasting

1. In the Tree View of DashBoard, expand the RAPTOR-IPG node.
2. Double-click the **RAPTOR-IPG** sub-node.
3. Select **Advanced > Discovery**.
4. Locate the **SAP** area in the tab.
5. Select the **Enable** box.
6. Click **Apply** to save the new settings.
7. Click **Reboot** to apply the new settings. This button is located at the bottom of the interface.

The RAPTOR-IPG is temporarily taken off-line during the reboot.

8. Monitor the reboot progress.

NMOS Support

This section outlines the required settings on the RAPTOR-IPG to establish communications via the Network Media Open Specifications (NMOS).

To configure the RAPTOR-IPG as an NMOS device

1. In the Tree View of DashBoard, expand the RAPTOR-IPG node.
2. Double-click the **RAPTOR-IPG** sub-node.
3. Select the **Advanced > Discovery**.
4. Locate the **NMOS** area in the tab.
5. To re-name the card, perform one of the following:
 - Use the **Board Name** and/or **Node Name** menus to specify a unique identifier for the RAPTOR-IPG in the NMOS network; or
 - Click **Use System Device Name**.
6. Use the **Interface** menu to specify what port on the RAPTOR-IPG rear module uses for NMOS communications.
7. Select the **Enable** box.
8. Click **Apply** to save the new settings.

9. Reboot the RAPTOR-IPG as follows:
 - a. Click **Reboot**. This button is located on the bottom of the **Discovery** tab.
 - b. Monitor the reboot progress.

Setting up Protection Switching

The RAPTOR-IPG enables a user to protect their streams to ensure mission critical operation. Using SMPTE ST 2022-7 they can run the same video and audio over two separate, redundant networks in case an error occurs with any hardware.

★ This section is only applicable if your system requires protection switching.

Before You Begin

Ensure that:

- your source is capable of sending SMPTE ST 2022-7 streams
- the RAPTOR-IPG is set up within a protection switching network

Enabling the Protection Switching Feature

By default, the SMPTE ST 2022-7 Protection Switching feature is enable. Once enabled, the Receivers, and Network Streams tabs update to include options for configuring the Protection Switching streams.

★ This feature is reset when the **Load Factory Defaults** button is selected.

To enable the Protection Switching feature

1. In the Tree View of DashBoard, expand the RAPTOR-IPG node.
2. Double-click the **RAPTOR-IPG** sub-node.
3. Select **Advanced > Device Setup**.
4. Locate the **Transport Options** area of the **Device Setup** tab.
5. Select the **SMPTE ST 2022-7/Seamless Protection Switching** box.
6. Click **OK** in the prompt confirming that all sessions will be removed.
7. Click **Apply**.
8. Click **Reboot** to apply the new settings. This button is located at the bottom of the interface.

The RAPTOR-IPG is temporarily taken off-line during the reboot.

9. Monitor the reboot progress.

Configuring the RAPTOR-IPG for Protection Switching

You will need to assign a unique IP address to each **video** stream (e.g. primary 239.1.1.1, secondary IP 239.1.1.2).

★ Each stream should be assigned a unique IP address.

To configure the RAPTOR-IPG for protection switching

1. Configure the primary and secondary Receiver streams as outlined in “**Configuring a Receiver**” on page 49.
- ★ The UDP value can be the same or different for the primary and secondary streams.
2. Configure the primary and secondary Network streams. Refer to “**Adding a Network Stream**” on page 57.
 3. Click **Reboot**. This button is located on the bottom of the interface.
 4. Monitor the reboot progress.

Configuring the Timing Settings

The RAPTOR-IPG supports the Precision Time Protocol (PTP) as defined in the IEEE 1588-2008 standard and the SMPTE ST 2059 specification.

Specifying a Reference Format Rate

RAPTOR-IPG requires a PTP master on the media network to drive its timing. By default, the RAPTOR-IPG is configured to run as a PTP slave. If there is no lock to PTP, the RAPTOR-IPG will not receive IP streams.

★ You can also change these settings via the **Advanced > Device Setup** tab.

To specify a frame rate for the RAPTOR-IPG video signals

1. Display the RAPTOR-IPG interfaces in DashBoard as outlined in the procedure “**To access the RAPTOR-IPG user interfaces in DashBoard**” on page 31.
2. Select the **Initial Setup** tab.
3. Use the **System Frame Rate** menu to specify a video frame rate that is compatible with the SDI signals that the RAPTOR-IPG will output.
4. Click **Apply**.
5. Click **Reboot** to apply the new setting.

★ The System Frame Rate setting will not be applied until the PTP is locked.

Configuring the PTP Settings

From the Timing tab in DashBoard, you can synchronize the card to real-time clocks of other devices in the same network.

★ There are several criteria that PTP clocks compare to determine who will be master and who will be slave (called the Best Master Clock Algorithm, or BMCA), and they are evaluated in order: Priority1, clock class, accuracy, scaled log variance, Priority2, clock ID (similar to the MAC address). Practically, Priority1 is the only setting configured on all clocks to control the outcome of the Grandmaster election. If Priority1s are equal, the next criterion is evaluated (clock class) and the criteria are evaluated in succession until a Grandmaster is determined.

To update the PTP settings for the RAPTOR-IPG

1. Display the RAPTOR-IPG interfaces in DashBoard as outlined in the procedure “**To access the RAPTOR-IPG user interfaces in DashBoard**” on page 31.
2. Select the **Initial Setup** tab.

★ You can also change these settings via the **Advanced > Device Setup** tab.

3. Select the **Slave Only** box to define the RAPTOR-IPG as only a slave and never a Boundary Clock or Grandmaster device.
4. Use the **Domain** field to specify the sub-domain the PTP clock is assigned to.

★ There can be multiple PTP domains operating concurrently within a network. The domain is a field in all PTP message headers. Messaging between entities are segregated by domain (e.g. The card is an endpoint configured for domain 128 and ignores messages from a neighboring clock configured for domain 127).

5. If you did not select the **Slave Only** box and the card matches the primary Grandmaster election criterion for your network:
 - a. Select **Advanced > Timing** tab.
 - b. Use the **Priority 1** field to define the first 8bit clock field.

- c. Use the **Priority 2** field to define the backup 8bit clock field.

Configuring the Video Delay and Audio Offset

The SDI Outputs options in the Timing tab enable you to adjust the timing of each SDI output independently.

A SDI output may be timed relative to the incoming stream or PTP epoch time as follows:

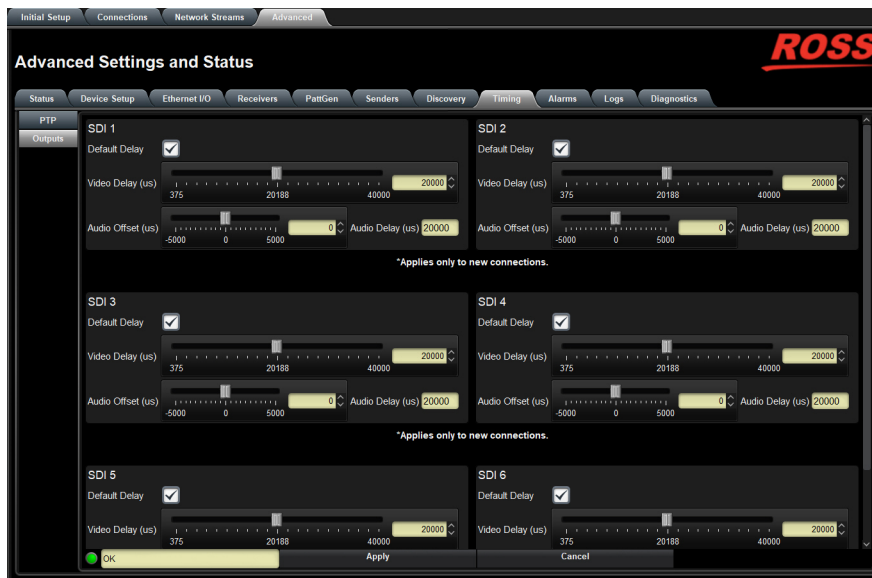
- When timed relative to the input stream, the source will be delayed a fixed offset from the sender's RTP timestamps. This allows for non-PTP aligned sources to be passed through with fixed latency.
- When timed relative to the PTP epoch, the SDI outputs will be aligned to the frame boundaries defined in SMPTE 2059-1, relative to the PTP epoch.

★ Use this procedure if you need to adjust the timing of each output independently. Otherwise it is recommended to keep these settings at the default values.

To adjust the timing for an SDI output

1. Display the RAPTOR-IPG interfaces in DashBoard as outlined in the procedure “**To access the RAPTOR-IPG user interfaces in DashBoard**” on page 31.
2. Select **Advanced > Timing**.
3. Click **Outputs**.

The **Timing** tab updates to display the timing options for each SDI output.



4. Locate the options for the SDI Output you want to adjust the timing for.
5. To automatically apply the default delay value of 2000us¹, select the **Default Delay** box for the output.
6. To manually configure the delay and offset values for an output:
 - a. Verify that the SDI **Default Delay** box is cleared.
 - b. Use the **Video Delay** slider to adjust the relative position of the video output start of frame as an offset to the reference.
 - c. Use the **Audio Offset** slider to adjust the relative position of the audio start position as an offset to the reference.

1. If the audio packet time is 1ms (1000us), the default video delay is 20000us and the audio delay is 20000us. If the audio packet time is 125us, the default video delay is 2000us and the audio delay is 2000us

★ Audio delay is specified relative to the video timing.

7. Click **Apply** to save the new settings.
8. Refresh the connection as follows:
 - a. Select the **Receivers** tab.
 - b. Locate the row for the output you need to refresh the connection for.
 - c. Click **Disconnect**.

The applicable **Output Status** field reports “**Off**” and the Destination SDI reads “**Disconnected**” for both the **Video** and **Audio** fields.

- d. Select the **Connections** tab.
- e. Locate the output you need to refresh the connection for.
- f. Click **Connect**.

Setting the Audio Packet Time

You can add an offset to the audio streams if you suspect the audio packets may be received out of order or delayed. This enables the video stream to stay in sync with the audio stream.

★ Applying a new Audio Packet Time automatically removes all Sender and Destination audio streams. It is recommended to set the Audio Packet Time before configuring your audio streams.

To set the audio packet time

1. Display the RAPTOR-IPG interfaces in DashBoard as outlined in the procedure “**To access the RAPTOR-IPG user interfaces in DashBoard**” on page 31.
2. Select **Advanced > Device Setup**.
3. Locate the **Device Settings** area of the tab.
4. Use the **Audio Packet Time** menu to specify the amount of time that RAPTOR-IPG will add as an offset to the audio streams.
5. Click **Apply**.
6. Verify that the audio streams have re-connected by viewing their status:
 - a. Select the **Connections** tab.
 - b. Locate the audio streams row in the Destinations area of the tab.
 - c. Verify the read-only fields display “**Connected**”.
 - d. If the audio streams do not automatically connect, navigate to the **Network Streams** tab and verify the settings for the audio streams.

Configuring the Receivers

Once you configure your Network Stream groups, you can connect each Network Stream to a Destination using the options in the **Connections** tab.

For More Information on...

- the assigning a Receiver to a Stream, refer to the chapter “**Operation**” on page 59.

Configuring a Receiver

Each configured Receiver enables the RAPTOR-IPG to advertise to Senders how much data it can receive and buffer.


To name a receiver

1. Display the RAPTOR-IPG interfaces in DashBoard as outlined in the procedure “**To access the RAPTOR-IPG user interfaces in DashBoard**” on page 31.
2. Select **Advanced > Receivers**.




3. Locate the row for the SDI signal you wish to configure.
4. Use the **Name** field to specify a unique identifier for the receiver.
★ This identifier is used to help identify the receiver within your system and in the DashBoard **Connections** interface.

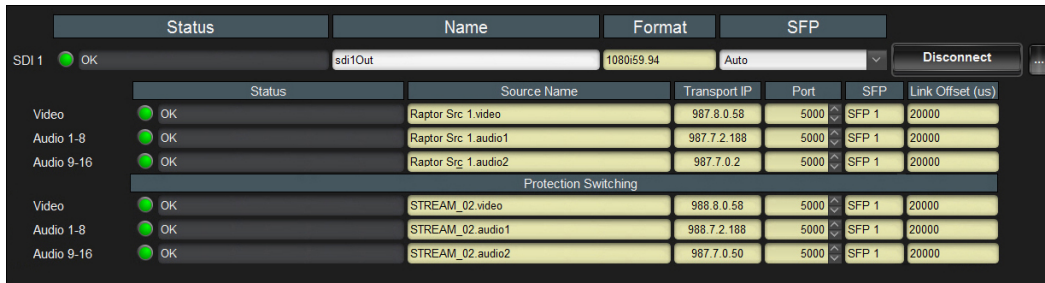
To assign an SFP to a receiver

1. Display the RAPTOR-IPG interfaces in DashBoard as outlined in the procedure “**To access the RAPTOR-IPG user interfaces in DashBoard**” on page 31.
2. Select **Advanced > Receivers**.
3. Use the **SFP** menu to assign the SDI signal to an SFP connection on the rear module.
4. Click  to expand the monitoring options for the SDI signal.
5. Verify the source(s) for the SDI are correct and no errors are reported.

To verify the protection switching feature

1. Ensure the **ST 2022-7/Seamless Protection Switching** box is selected as outlined in the section “**Setting up Protection Switching**” on page 44.
2. Select **Advanced > Receivers**.
3. Locate the row for the SDI signal you wish to configure for protection switching.
4. Click  to expand the options.

The **Protection Switching** options display as two separate rows under the SDI. In the example below, the button was selected for SDI 1.



The screenshot shows a configuration table for SDI 1. The main table has columns for Status, Name, Format, and SFP. Below it, a 'Protection Switching' section is expanded, showing two rows of configuration for Video, Audio 1-8, and Audio 9-16. Each row includes a status indicator (OK), source name, transport IP, port, SFP, and link offset.

Status	Name	Format	SFP		
SDI 1 ● OK	sdi1Out	1080i59.94	Auto	Disconnect ...	
Status	Source Name	Transport IP	Port	SFP	Link Offset (us)
Video ● OK	Raptor Src 1.video	987.8.0.58	5000	SFP 1	20000
Audio 1-8 ● OK	Raptor Src 1.audio1	987.7.2.188	5000	SFP 1	20000
Audio 9-16 ● OK	Raptor Src 1.audio2	987.7.0.2	5000	SFP 1	20000
Protection Switching					
Video ● OK	STREAM_02.video	988.8.0.58	5000	SFP 1	20000
Audio 1-8 ● OK	STREAM_02.audio1	988.7.2.188	5000	SFP 1	20000
Audio 9-16 ● OK	STREAM_02.audio2	987.7.0.50	5000	SFP 1	20000

- ★ Protection switching streams are assigned when a connection is made in the **Connections** tab. Refer to the section “**Routing the Signals**” on page 60 for more information.

Using the Disconnect Button

Clicking the **Disconnect** button for a session immediately stops that session and outputs black. This is helpful:

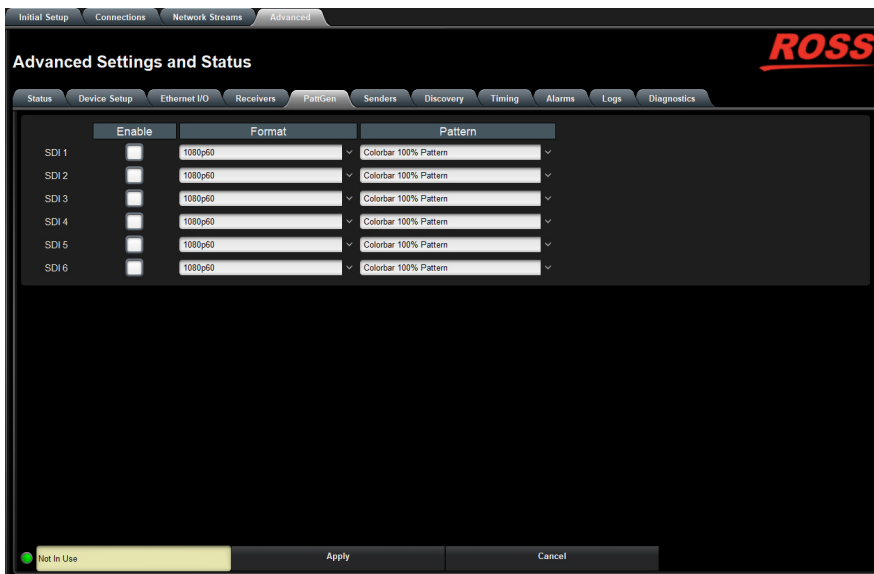
- to free up SFP bandwidth
- if the source is invalid or missing
- if the source includes data that you do not want to output
- to update the previous receiver with the latest settings (once the Disconnect button is clicked again)

Assigning a Test Pattern to the SDI Output

You can specify the type of internally generated test pattern to output.

To assign a test pattern to an SDI output

1. Display the RAPTOR-IPG interfaces in Dashboard as outlined in the procedure “**To access the RAPTOR-IPG user interfaces in Dashboard**” on page 31.
2. Select **Advanced > PattGen**.



3. Locate the row for the SDI signal you wish to output a test pattern on.
4. Use the **Format** menu to specify the video format for the test pattern output.
5. Use the **Pattern** menu to specify the pattern to display on the output.
6. Select the **Enable** box to allow the SDI connection to output the test pattern.
7. Click **Apply** to save the new settings.

Configuring the Senders

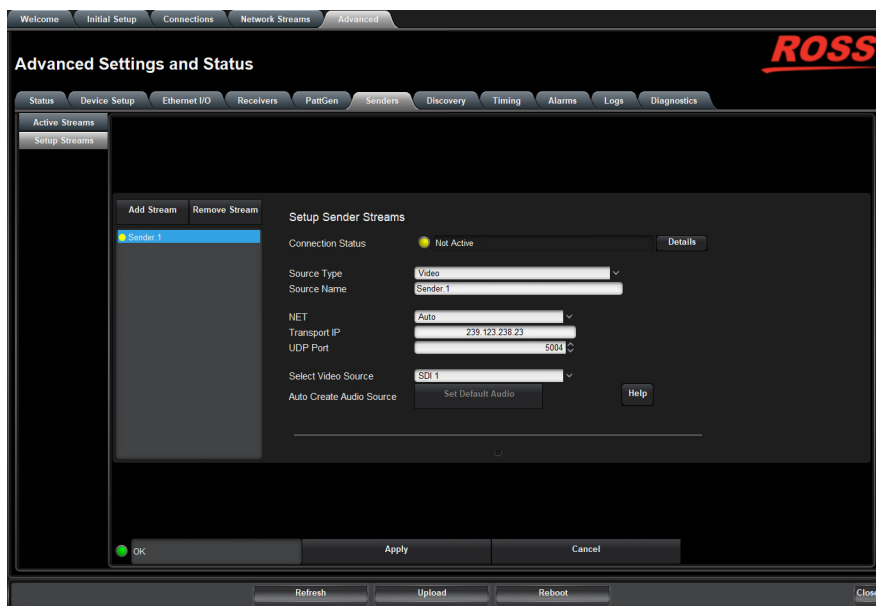
For each SDI signal, you need to specify the IP encapsulation properties for the active video and audio.

Configuring the Active Video Properties

Before you begin, make a note of the **SFP Bandwidth Allocation** for the SFP ports to determine the available capacity on each port. This information is displayed in the top portion of the **Advanced > Senders > Active Senders** tab.

To configure the active video properties for an SDI signal

1. Display the RAPTOR-IPG interfaces in DashBoard as outlined in the procedure “**To access the RAPTOR-IPG user interfaces in DashBoard**” on page 31.
2. Selected **Advanced > Senders > Setup Streams**.



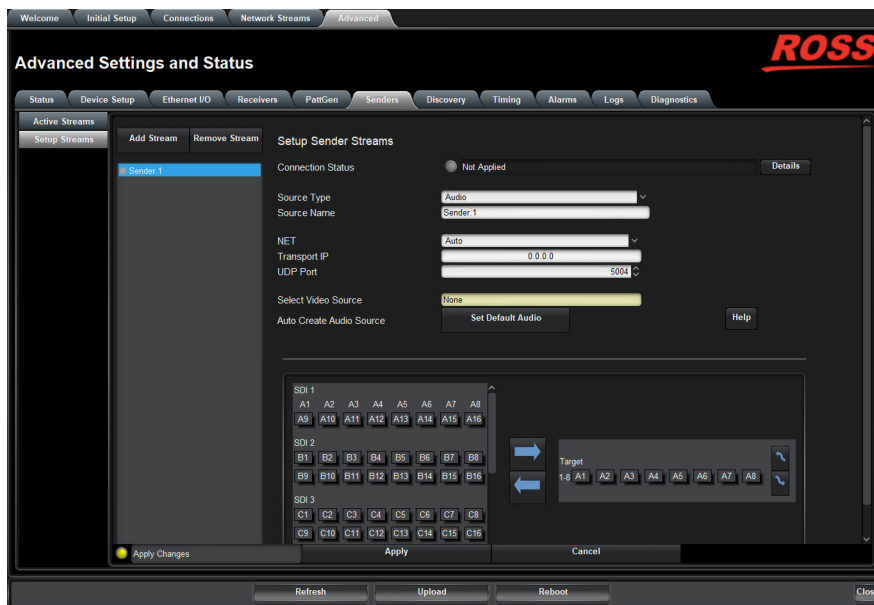
3. Click **Add Stream**.
4. Use the **Source Type** to select **Video**.
- ★ The **Auto Create Audio Source** button is now disabled.
5. Use the **Source Name** field to override the auto-detected name of the data stream with a unique identifier for the stream.
- ★ This identifier is used to help identify the sender within your system and in the DashBoard **Connections** interface.
6. Use the **NET** menu to select the network interface used to transmit the data stream to the selected SFP port on the rear module.
- ★ It is recommended to not edit the **Transport IP**, and **UDP Port** fields as these fields are auto-populated by the advertised stream.
7. Use the **Select Video Source** menu to assign an SDI input signal to the steam.
8. Click **Apply** to save the new settings.

Configuring the Active Audio Properties

Before you begin, make a note of the **SFP Bandwidth Allocation** for the SFP ports to determine the available capacity on each port. This information is displayed in the top portion of the **Advanced > Senders > Active Senders** tab.

To configure the active video properties for an SDI signal

1. Display the RAPTOR-IPG interfaces in DashBoard as outlined in the procedure “**To access the RAPTOR-IPG user interfaces in DashBoard**” on page 31.
 2. Selected **Advanced > Senders > Setup Streams..**
 3. Click **Add Stream**.
 4. Use the **Source Type** to select **Audio**.
- ★ The **Select Video Source** menu is now read-only and the Audio Map displays at the bottom of the tab.



5. Use the **Source Name** field to override the auto-detected name of the data stream with a unique identifier for the stream.
- ★ This identifier is used to help identify the sender within your system and in the DashBoard **Connections** interface.
6. Use the **NET** menu to select the network interface used to transmit the data stream to the selected SFP port on the rear module.
- ★ It is recommended to not edit the **Transport IP**, and **UDP Port** fields as these fields are auto-populated by the advertised stream.
 7. Click **Apply** to save the new settings.
 8. Proceed to the next section.

Mapping the Audio Channels to a Sender Stream

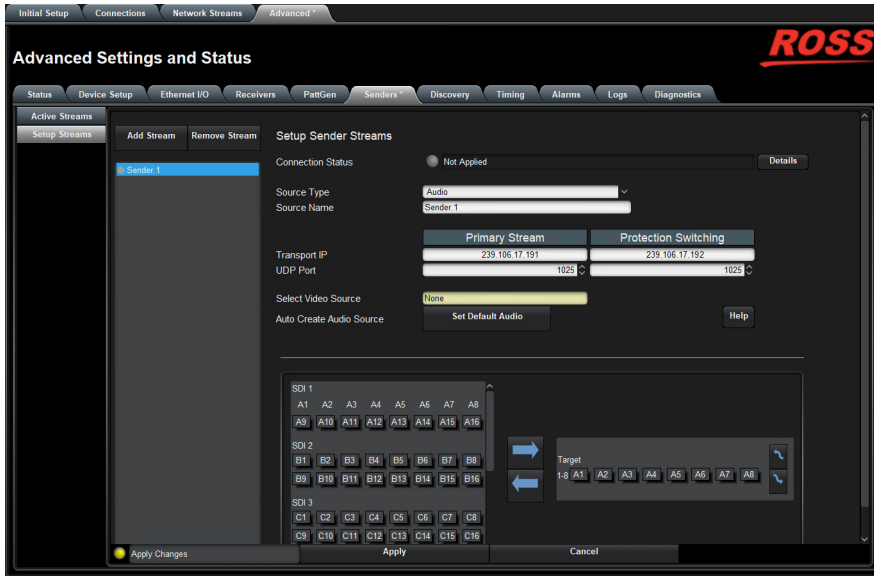
You can choose to apply the default audio channel map or assign the channels as required by your system. Both methods are described in this section.

To map the audio channels to a sender stream using the default channel map

1. Click **Set Default Audio**.

The **Audio Channels** map updates to display the default channel map.

★ In the example below, the Audio Channel Count is set to 8, resulting in a target with 8 streams.



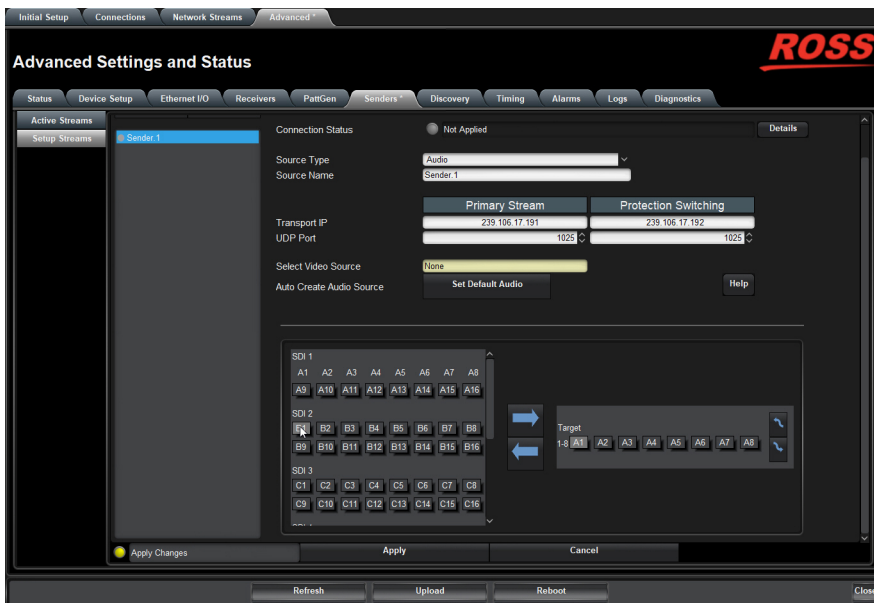
2. Click **Apply** to save the new settings.

To customize the audio channel mapping for a sender stream

★ An audio channel can only be assigned to one sender.

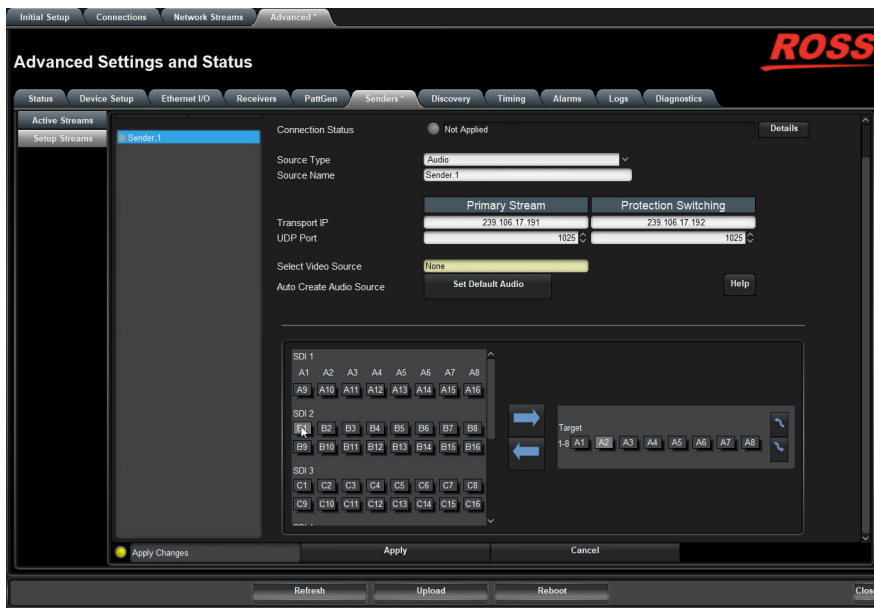
1. In the **Audio Channels** map, select the channels to include in the audio stream.


In the example below, the user selected channel **B1**.



2. In the **Target** map, select the sender channel to assign the audio channel to.

In the example below, the user selected channel **A2**.



3. Click .
4. Click **Apply** to save the new settings.

Setting up the Network Streams

Once you have the Receivers and Senders configured on the RAPTOR-IPG, you must specify the available IP streams as network sessions for the RAPTOR-IPG.

Overview

You can configure a network source for the RAPTOR-IPG by assigning an advertised stream or adding a stream by manually specifying the IP stream credentials.

Advertised Streams

A network stream advertised by a node flows to multiple devices. The list of advertised RAVENNA streams available to the RAPTOR-IPG depends on the following card settings:

- Advanced > Timing > PTP
- Advanced > Setup > Transport Protocol

Manually Assigning a Stream

An IP stream can also be manually assigned as a network source for the RAPTOR-IPG. You will need the Transport IP Address, Port number, and DSCP value for the IP stream you want to add. This useful if you wish to access a network source that is not a RAVENNA device.

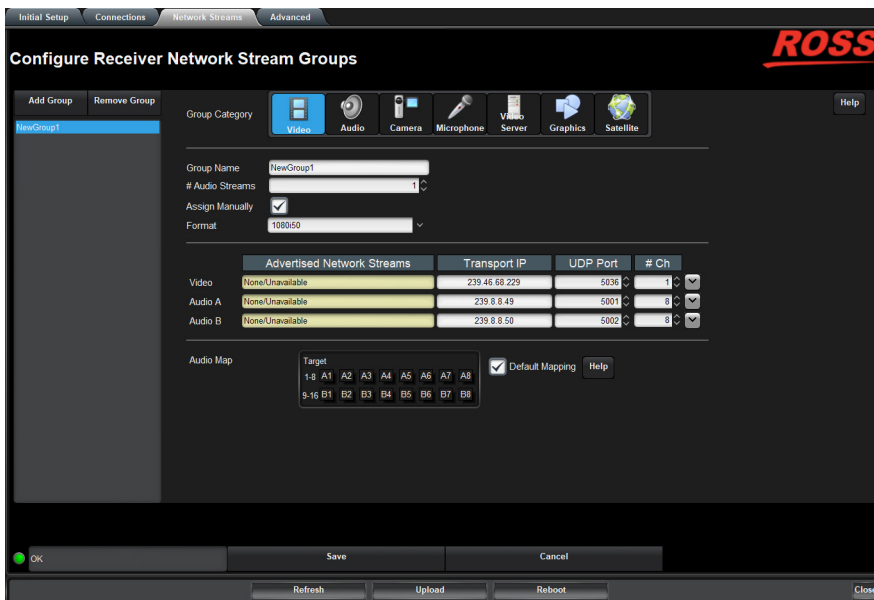
Adding a Network Stream

A network stream is identified in the Receivers and Connections tabs using the parameters specified in the Network Streams tab. Ensure to give each network source a unique name to ensure easy identification in DashBoard.

★ You cannot add a stream that is outside the range of 225.x.x.x to 239.x.x.x.

To add a new network source using an advertised stream

1. Display the RAPTOR-IPG interfaces in DashBoard as outlined in the procedure “**To access the RAPTOR-IPG user interfaces in DashBoard**” on page 31.
2. Select the **Network Streams** tab.



3. Click **Add Group**.

The fields in the **Network Streams** tab clear and the **Group Name** field displays “**NewGroup#**” where # is an auto-generated character.

4. Verify that the **Assign Manually** box is unselected (cleared).
5. Use the **Group Name** field to specify a unique identifier for the network source.
6. Use the **Advertised Stream** menu to specify the stream for the video and/or audio signals for the network source.

The **Format**, **Transport IP**, **UDP Port**, and **# Ch** fields are read-only and automatically update when a new selection is made in the **Advertised Stream** menu.

7. Use the options in the **Group Category** area to assign the network source to a Connections category.
8. Click **Save** to update the list in the Network Streams tab.

To add a new network source using a manually added stream

1. Display the RAPTOR-IPG interfaces in DashBoard as outlined in the procedure “**To access the RAPTOR-IPG user interfaces in DashBoard**” on page 31.

2. Select the **Network Streams** tab.

3. Click **Add Group**.

The fields in the **Network Streams** tab clear and the **Group Name** field displays “**NewGroup#**” where # is an auto-generated character.

4. Use the **Group Name** field to specify a unique identifier for the network source.
5. Select the **Assign Manually** box.

The **Format**, **Transport IP**, **UDP Port**, and **# Ch** fields are now editable.

6. Use the **Format** field to specify the video format for the network source data.
7. Use the **Transport IP** field to specify the Multicast IP Address for the network source.

★ Only multicast IP Address of 239.x.x.x and 232.x.x.x can be received by the RAPTOR-IPG. Contact Ross Technical Support if you need additional IP ranges.

8. Use the **UDP Port** field to specify the RTP port for the advertised stream.
9. Use the **# Ch** field to specify the number of audio channels available in the specified stream.
10. Use the options in the **Group Category** area to assign the network source to a Connections category.

★ Assigning network sources to specific Categories enables you to filter the sources on the Connections tab.

11. Click **Save** to update the list in the Network Streams tab.

To specify network streams for protection switching

1. Ensure the **ST 2022-7/Seamless Protection Switching** box is selected as outlined in the section “**Enabling the Protection Switching Feature**” on page 36.

2. Add a new network stream as outlined in the procedure “**To add a new network source using a manually added stream**” on page 58.

The **Protection Switching** options display as two separate rows.

3. Use the **Protection Switching** fields to assign the redundant video and audio streams to the RAPTOR-IPG.
4. Click **Save** to update the list in the Network Streams tab.

Operation

You can route the RAPTOR-IPG destinations and sources using the options in the Connections tab.

Connections Tab Overview

The Connections tab is organized into two areas: Destinations and Stream Sources.

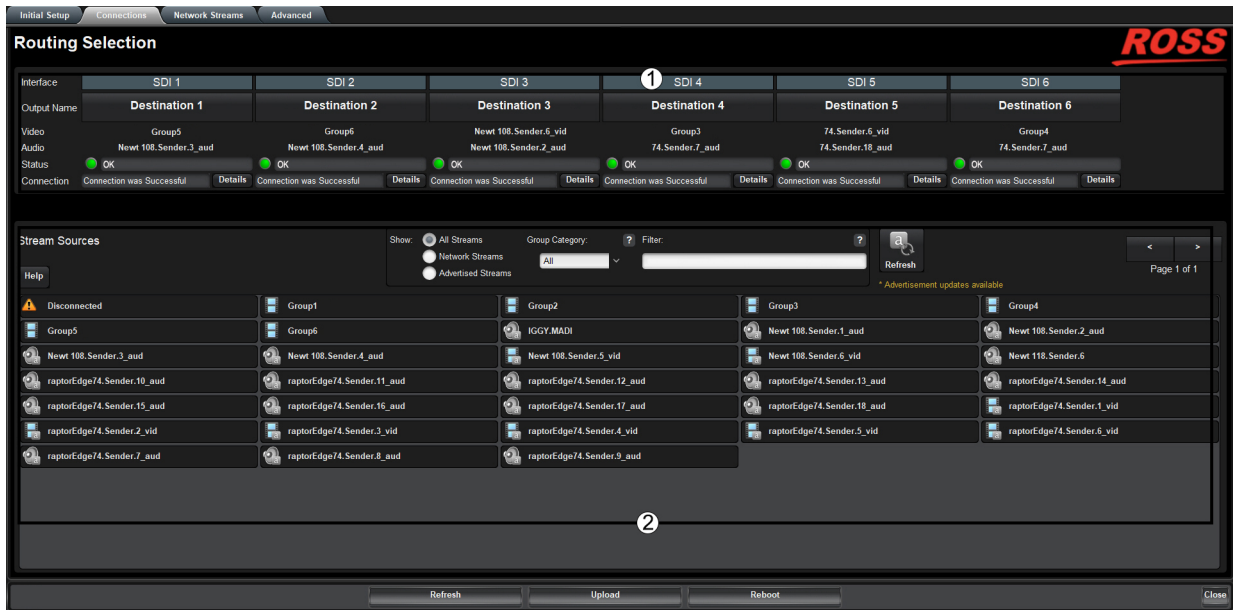


Figure 13.1 Example of a Populated Connections Tab

1. Destinations Area

This area displays the available destinations (outputs) in a series of rows. Each output is represented as a button which is clicked to include it in the routing switch. You can also assign the video, the video and audio, or just the audio, to the output. Video and Audio read-only fields report the Network Sources assigned to the output.

A Status read-only field reports overall communication status, whether any error conditions are occurring on the SDI output, or in the network source.

2. Stream Sources Area

This area displays the available inputs as selectable buttons. The options displayed here are determined by the network streams you configured via the Network Streams tab and the option selected in the **Show:** menu.

Routing the Signals

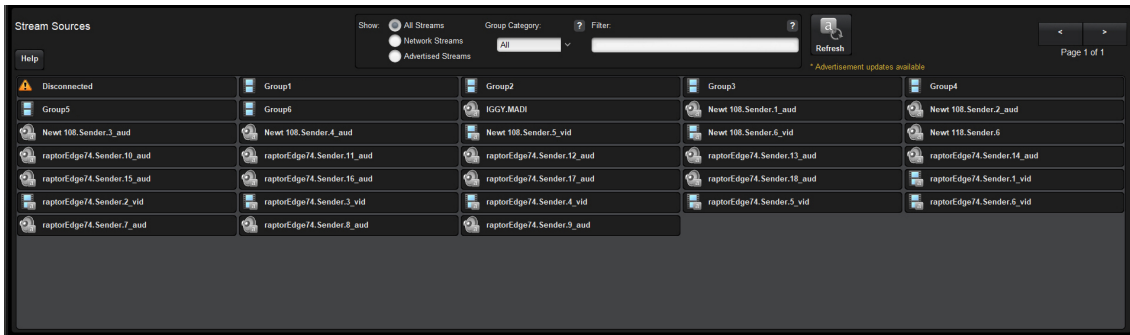
To route the video and audio signals you must first select an SDI output, then a network source. Keep in mind that routing occurs automatically after a Source button is selected.

To select an output

1. Display the RAPTOR-IPG interfaces in Dashboard as outlined in the procedure “**To access the RAPTOR-IPG user interfaces in Dashboard**” on page 31.
2. Select the **Connections** tab.
3. In the **Destinations** area, locate the button for the output you wish to route.
4. Click the required **Output** button.

To perform the switch

1. Display the RAPTOR-IPG interfaces in DashBoard as outlined in the procedure “**To access the RAPTOR-IPG user interfaces in DashBoard**” on page 31.
2. Select the **Connections** tab.
- ★ A hot take is performed when a Receiver/Source pair is selected (the switch happens immediately as there is no **Take** button to select). The switch will include the video plus all associated audio, as specified in the **Network Sources** tab.
3. In the **Stream Sources** area, locate the button for the input (Network Stream) you wish to route.



- ★ The associated **Video** and **Audio** fields report the video and audio signals of the selected Network Stream.
4. Click the required **Network Stream** button to perform the switch.

Performing a Breakaway

A breakaway selects a source within a group to be switched. This allows the RAPTOR-IPG to route video from one network stream, and audio from another network stream.

- ★ If video is selected for a particular interface in the Destinations area and the selected Stream Group has a video stream, a video receiver is created on the destination. If audio is selected for a particular interface in the Destinations area and the selected Stream Group has an audio stream, an audio receiver is created on the destination.

To set up a breakaway

1. Display the RAPTOR-IPG interfaces in DashBoard as outlined in the procedure “**To access the RAPTOR-IPG user interfaces in DashBoard**” on page 31.
2. Select the **Connections** tab.
3. Select the video to switch as follows:
 - a. In the **Destinations** area, select the video field of the interface you wish to include.
 - b. In the **Stream Sources** area, select the stream group you wish to route for video for this switch.
4. Select the audio to switch as follows:
 - a. In the **Destinations** area, select the audio field of the interface you wish to include.
 - b. In the **Stream Sources** area, select the stream group you wish to route for audio for this switch.

Ultritouch-2 Support

The Ultritouch-2 is a compact touchscreen panel that runs DashBoard and can be rack mounted or mounted at an operator's desk for convenient access. Once the RAPTOR-IPG is configured and communication between the card and the panel is established, the Ultritouch-2 can be used to switch streams on the RAPTOR-IPG and monitor stream status.

★ The RAPTOR-IPG does not support communications with an Ultritouch-4.


Connecting the openGear Frame and Ultritouch-2

Ultritouch-2 uses the open SLP protocol to locate devices on the same network as it is connected to. You must first set up communications between the openGear frame and the Ultritouch-2 panel before you access the RAPTOR-IPG interfaces, including the Connections window.

For More Information on...

- configuring and operating your Ultritouch-2, refer to the *Ultritouch User Guide*.

To set up a connection point between the openGear frame and Ultritouch-2

1. On the Ultritouch-2 panel, tap .

★ This button is located on the leftmost toolbar of the Ultritouch-2 interface.


2. Tap **Connected Devices**.
3. Tap **Add**.
4. Tap **TCP/IP DashBoard Connect/openGear Device**.
5. Use the **Device IP/Hostname** field to specify the IP Address for the openGear frame.
6. Use the **Device Name** field to specify the frame name.
7. Use the **Protocol** menu to specify whether the device communication language.
8. Use the **Port** field to specify the port on the device used for communicating with the frame.
9. Select the **Remember connection settings** for this device to retain the settings after a loss of communication.
10. Tap **Add Device**.
11. Select the frame from the **Connected Devices** table.
12. Tap **Connect**.

Accessing the RAPTOR-IPG Interfaces

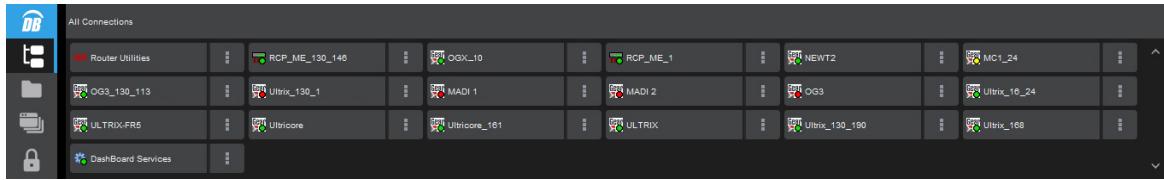
It is recommended to use the DashBoard client software to setup and configure the RAPTOR-IPG and then use Ultritouch-2 for control via the Connections interface. Keep the following in mind when using Ultritouch-2 to control the RAPTOR-IPG:

- The Welcome and Initial Setup interfaces are not available on the Ultritouch-2 panel.
- The Connections window automatically displays each time the RAPTOR-IPG interface is loaded onto the Ultritouch-2 panel.
- The Connections window is re-organized when displayed on an Ultritouch-2 with the Destination buttons in the left most window, and the Sources on the right.

To display the RAPTOR-IPG on the Ultritouch-2 panel

1. On the Ultritouch-2 panel, tap .

A list of devices communicating with the Ultritouch-2 displays.



2. Tap the icon for the openGear frame that houses the RAPTOR-IPG you want to access.
3. Tap the icon for the specific RAPTOR-IPG card you want to access.
4. Tap the icon for the menu you wish to display on the Ultritouch-2 panel.

The Connections window for the selected RAPTOR-IPG automatically displays on the Ultritouch-2 panel.

Monitoring


The RAPTOR-IPG interface in DashBoard reports Ethernet bandwidth, stream health, and PTP communications status.

★ All alarms are enabled by default.

Monitoring the Receiver Streams

The Receivers tab reports read-only status information for each SDI signal. You can disable or enable the monitoring of specific SDI streams using the options in the **Alarms** tab.

To monitor a specific receiver stream

1. Display the RAPTOR-IPG interfaces in DashBoard as outlined in the procedure “**To access the RAPTOR-IPG user interfaces in DashBoard**” on page 31.
2. Select **Advanced > Receivers**.
3. Locate the row for the SDI signal you wish to monitor.
4. Click  in the required row to display the video and audio status fields for an SDI signal.

Notes on Monitoring the Receiver Streams

This section briefly summarizes possible RAPTOR-IPG behavior when monitoring a receiver stream.

Receiver is configured to receive a stream, but the stream is absent

When a stream is absent (i.e. never detected, or was lost for an extended period of time), the RAPTOR-IPG does not output any SDI frames and the SDI link will be inactive.

If a stream was present, but is no longer, the receiver will be in a state of “frame replay” where the RAPTOR-IPG continuously outputs the last frame received. This will continue until either the stream resumes (in which case, the valid video will start playing again), or the receiver is disconnected. If the stream is disconnected, the RAPTOR-IPG will stop outputting data.

Receiver is not properly configured

The RAPTOR-IPG will not output data before a receiver is configured (e.g. start-up condition).

Tab is locked and displays an overlay message

The RAPTOR-IPG lost connection to the PTP Clock and is attempting to re-connect. Once the RAPTOR-IPG can lock to the PTP Clock, the tab is unlocked. The following tabs are not locked during a loss of PTP clock connection:

- Status
- Ethernet I/O
- Timing
- Setup

Monitoring the Video Streams

DashBoard reports the following diagnostic information for each video stream:

- the video frame buffer fill level over time
- the pixel buffer fill level over time
- counters for missing packets, invalid packets, frame drops and frame replays

- memory (read/write) statistics
- current RTP timestamp alignment errors
- stream interrupts (such as pending missing markers and/or frame drops)

You can also specify what information to monitor for each stream and specify which stream(s) to monitor:

- any connected video stream can be monitored
- primary and redundant stream information is monitored individually

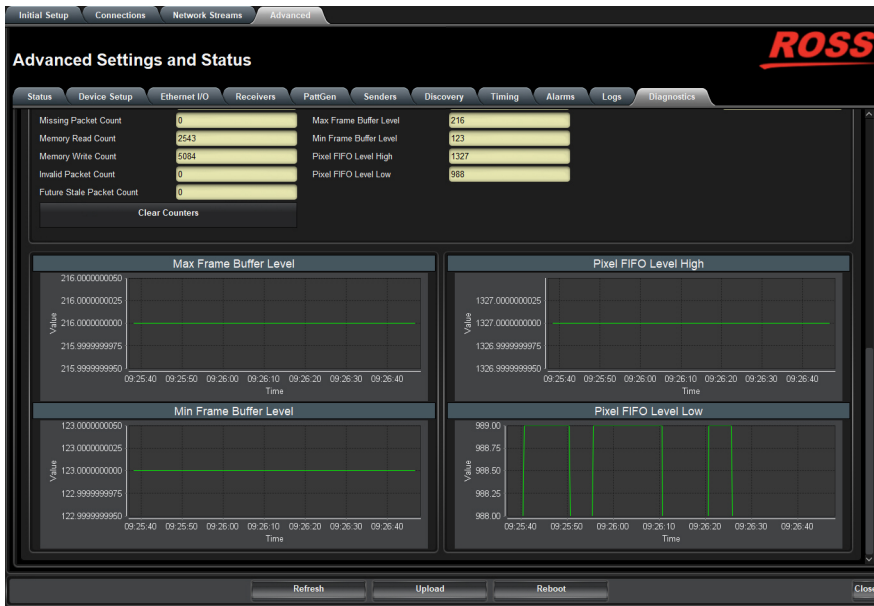
To view the video output statistics

1. Display the RAPTOR-IPG in DashBoard as outlined in “To access the RAPTOR-IPG user interfaces in Dashboard” on page 31.
2. Selected **Advanced > Diagnostics**.
3. Locate the **Video Output Stream Diagnostics** area.
4. From the **Interface Select** menu, specify the output you wish to monitor.
5. From the **Stream Select** menu, specify which network stream to monitor.

The **Video Output Stream Diagnostics** area updates to report information on the specified output and network stream. In the example below, the user selected SDI 3 for the output and Primary for the network stream.

The screenshot shows the 'Advanced Settings and Status' window for RAPTOR-IPG. The 'Diagnostics' tab is active, displaying 'Video Output Stream Diagnostics'. The 'Interface Select' is set to 'SDI 3' and 'Stream Select' is 'Primary Video Stream'. Below this, the Session ID is 562958719818786 and the Stream ID is 497723228931245. A table of events is shown with columns for Name, Pending, Status, Name, Pending, and Status. The events include State Packet Detected, Future Packet Detected, Invalid Packet Detected, RTP FIFO Overflow, RTP FIFO Underflow, Retrain Event, Wait For SOP, OOO Packet Detected, Frame Drop, Frame Replay, Frame Sync, Missing Packet, Missing Marker, FIFO Underflow, SOP Sync Lock, Frame Buf Underflow, Frame Sync Fallback, RTP Learn Lock, Pixel FIFO Overflow, and Pixel FIFO Underflow. At the bottom, there are sections for Stream Counters (Dropped Frames: 1, Replayed Frames: 0), Memory State (Memory Read Pointer: 365626816, Memory Write Pointer: 367969194), and RTP Alignment (Max RTP Timestamp Error Delta: 0, Min RTP Timestamp Error Delta: 0). Buttons for Refresh, Upload, Reboot, and Close are at the bottom.

6. To view the frame buffer levels or the pixel FIFO levels, scroll to the bottom of the tab.



Monitoring the Ethernet Status

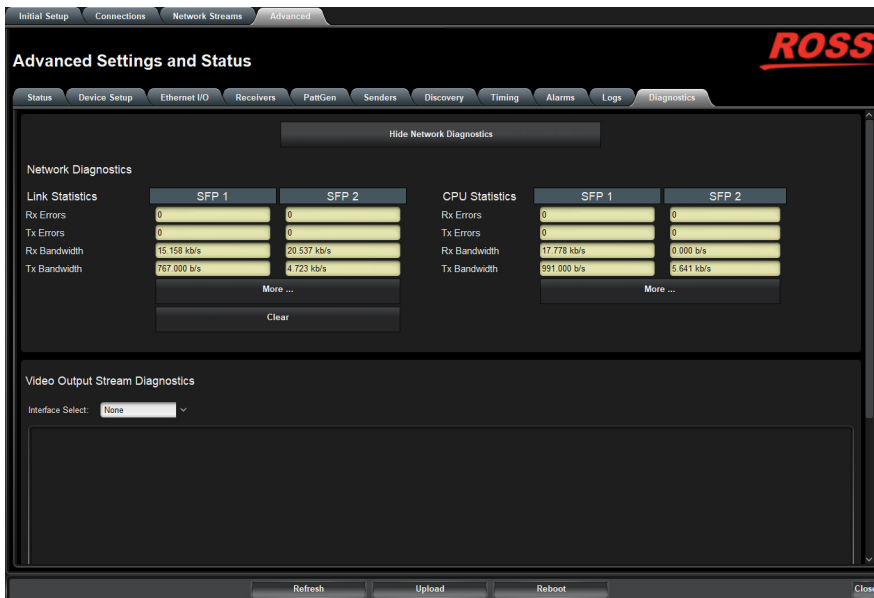
DashBoard provides an estimate of the actual bandwidth of the 10G Ethernet links:

- all packets received on the 10G Ethernet links (media and processor traffic)
- transmit bandwidth (packets sent from the processor to the Ethernet links)
- receive bandwidth (packets sent on the 10G link and forward to the processor)

DashBoard also provides counters for the receive errors, transmit errors, packet size ranges, and general bytes.

To view the network diagnostic statistics



1. Display the RAPTOR-IPG interfaces in DashBoard as outlined in the procedure “**To access the RAPTOR-IPG user interfaces in DashBoard**” on page 31.
2. Selected **Advanced > Diagnostics**.
3. Click **Show Network Diagnostics > OK**.



Upgrading the Software

The RAPTOR-IPG can be upgraded in the field using the **Ethernet** port on the openGear frame and the options available in DashBoard.

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. Display the RAPTOR-IPG interfaces in DashBoard as outlined in the procedure “**To access the RAPTOR-IPG user interfaces in DashBoard**” on page 31.
4. Select **Upload**, located near the bottom of the interface, to display the **Select file Upload** dialog.
5. Navigate to the ***.bin** file you want to upload.
6. Click **Open**.
7. If you are upgrading a single card:
 - a. Click **Finish**.
 - b. Proceed to step 9.
8. 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**.
 - e. Proceed to step 9.
9. 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 no longer displays once the upgrade completes.
 - The cards automatically reboot during the upgrade process.
 - 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 and the  button no longer displays.

DashBoard Interface Overview

RAPTOR-IPG groups the configuration, monitoring, and operating features as a series of tabs in the DashBoard client window. This chapter summarizes the RAPTOR-IPG interfaces, tabs, menus, and parameters.

Welcome Tab

The Welcome tab displays on initial start-up of the RAPTOR-IPG in DashBoard. Once the initial settings are configured, hide this tab by selecting the required box on the **Advanced > Device Setup** tab and clicking **Refresh**.

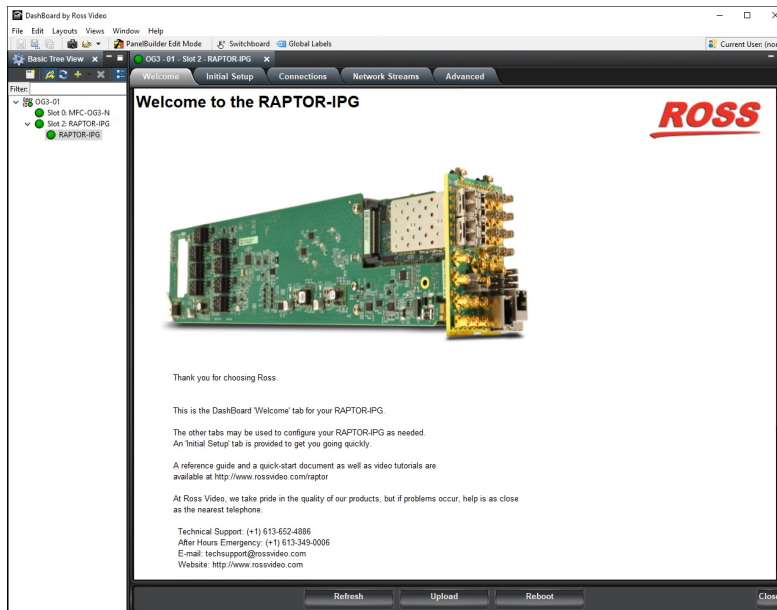


Figure 17.1 Example of the Welcome Tab

Initial Setup Tab

The Initial Setup tab helps you to quickly set up your RAPTOR-IPG and proceed to configure your Network Streams and Connections. These controls are also available in the Advanced tabs ("Advanced Tabs" on page 73).

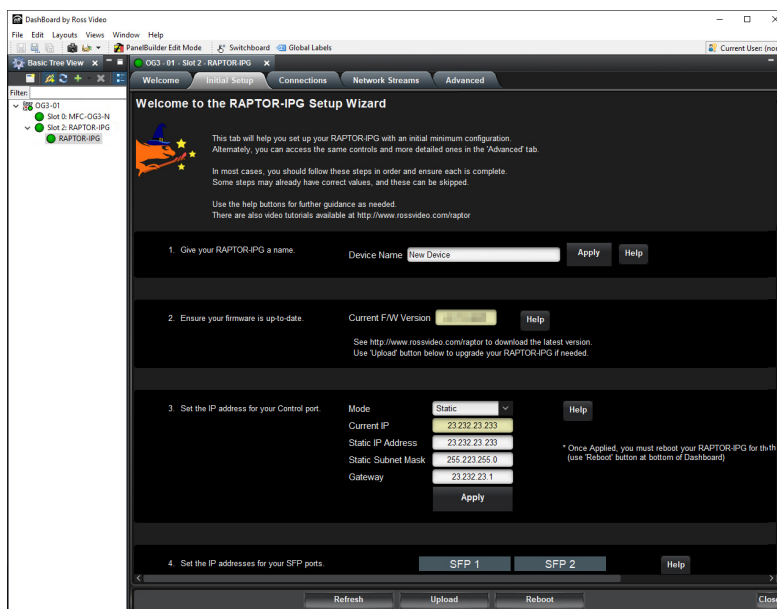


Figure 17.2 Example of the Initial Setup Tab

Connections Tab

The Connections tab is a patch-panel style interface that enables the RAPTOR-IPG to connect to available senders on the network. The tab is organized into two areas: Destinations and Stream Sources.

Destinations Area

The Destinations area is located at the top of the Connections tab and provides options for routing video and audio signals to the outputs on the RAPTOR-IPG. From this area you can quickly select outputs, and monitor the status of the output signals.

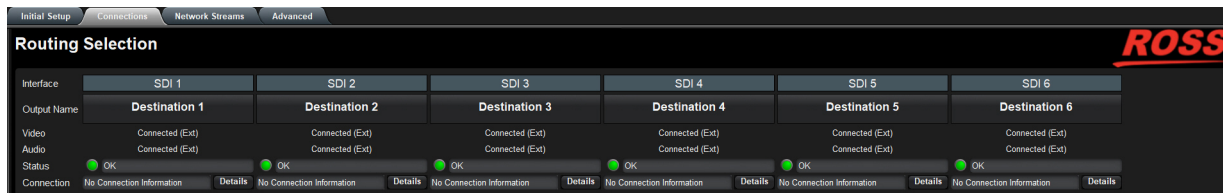


Figure 17.3 Connections Tab — Example of the Destinations Area

Table 17.1 summarizes the buttons, menus, and fields available in the Destinations area of the Connections tab.

Table 17.1 Connections Tab — Destinations Area

Item	Parameters	Description
Interface	SDI #	Indicates the physical connection on the RAPTOR-IPG
Output Name	#	Each button represents an output that is configured and available for switching
Video (read-only)	#	Indicates the network stream currently used by the specified output
Audio (read-only)	#	Indicates the network stream currently used by the specified output
Status (read-only)	OK (Green)	No errors are detected on this output
	Network Delay Too Big (Yellow)	The link offset selected by the user is smaller than the propagation delay of the network
	No packets received (Yellow)	The configured destination IP stream(s) is not receiving any packets; stream might not be on the network or experiencing other issues
	Not In Use (Gray)	This SDI output is disabled
	System clock is in failure (Red)	The RAPTOR-IPG is unable to re-obtain a stable clock source. Sessions cannot be created until this condition is fixed. It is recommended to navigate to the Advanced >Timing > PTP tab to check the status of the PTP and update the Configuration settings. Once PTP is locked again, the Network Groups will need to be disconnected and then re-connected to clear the alarm.

Table 17.1 Connections Tab — Destinations Area

Item	Parameters	Description
Status (read-only)	Param Out of Range (Red)	One of the following is occurring: <ul style="list-style-type: none"> • a Destination has an invalid setting • two receivers with the same network stream were created. The RAPTOR-IPG can only subscribe to a stream once.
Connection (read-only)	Connection was successful	Indicates the connection status between the selected input and output
	Not in Use	
	No Connection Information	
Details	Opens the Details dialog that reports the state of the connection	

Stream Sources Area

The Stream Sources area is located on the bottom half of the Connections tab. From this area you can route any source signal to an output, monitor its status, and filter the source available based on type.

Each button represents a configured network stream. You can filter what network streams are displayed via the **Filter** text field, the **Category** menu, or by selecting one of the **Show:** options.

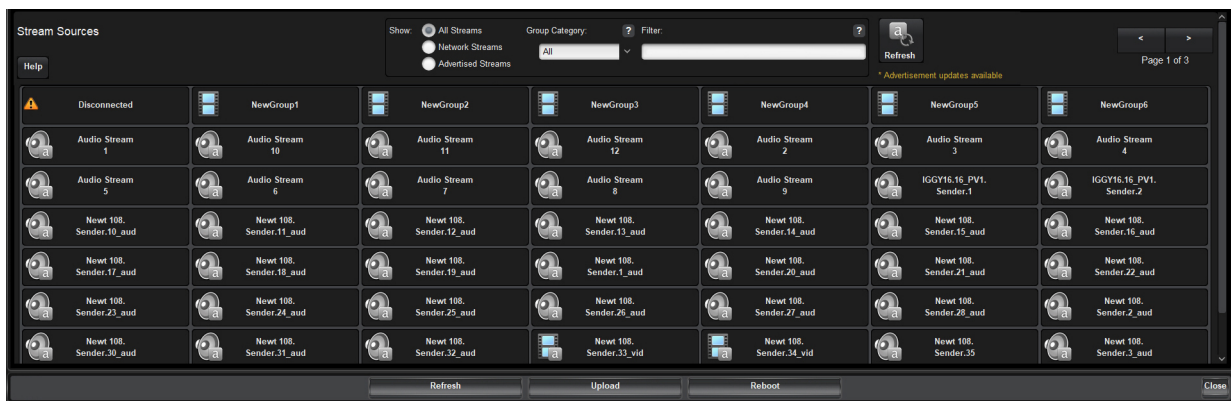


Figure 17.4 Connections Tab — Example of the Stream Sources Area

★ Once a **Destination** is selected, clicking a **Stream Source** button performs an immediate switch (a hot-punch).

Network Streams Tab

The Network Streams tab enables you to create and manage the IP streams in your system. There are two types of streams: advertised and manual. Advertised streams are those that the RAPTOR-IPG automatically detects as defined by the RAVENNA protocol. You can also define a stream by manually populating the Transport IP, Port, and DSCP fields for the video and audio signals. Once a network stream is defined, it is made available in the **Connections** tab.

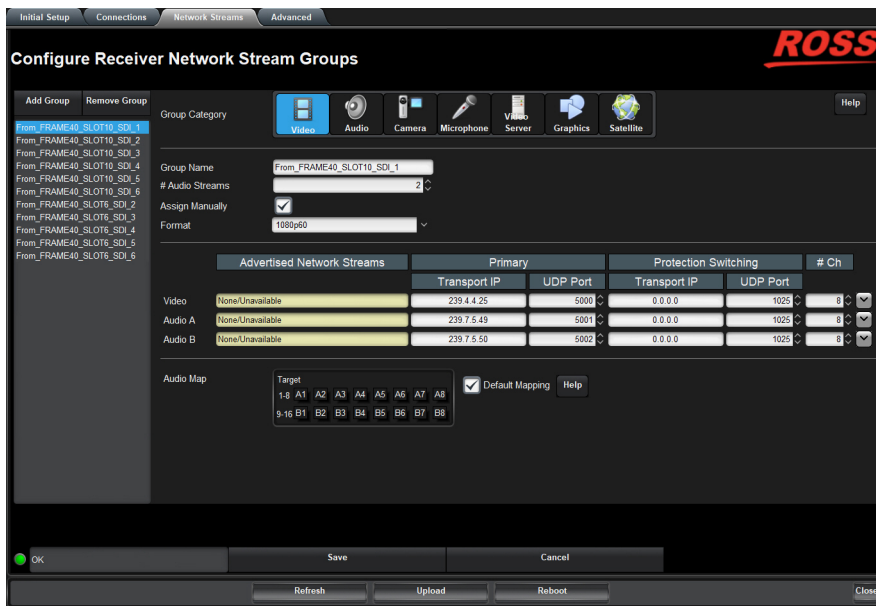


Figure 17.5 Network Streams Tab


Table 17.2 outlines the options displayed in the Network Streams tab starting from the left-most area of the tab.

★ If the ST 2022-7/Seamless Protection Switching box is selected in the Setup tab, an extra Video row and an extra Audio row displays for Protection Switching setup for a stream.

Table 17.2 Network Streams Tab

Item	Parameters	Description
Configure Receiver Network Stream Groups		
Add Group		Enables you to configure a new stream group
Remove Group		Deletes the selected group
Groups List	<name>	Lists the configured groups for the RAPTOR-IPG
Group Category		
Video		Assigns the stream to a type of data. This is useful when filtering the streams on the Connections tab.
Audio		
Camera		
Microphone		
Video Server		
Graphics		
Satellite		
Group Name	<text>	Specifies a unique identifier for the group
# Audio Streams	#	Specifies the number of audio streams available in the stream group. The default value is 2.
Assign Manually	Selected	Enables you to manually enter the Transport IP, Port, and DSCP fields for a specific session. This is useful when accessing non-RAVENNA streams.
	Cleared	The Transport IP, Port, and DSCP fields are determined by the assigned Advertised Stream

Table 17.2 Network Streams Tab

Item	Parameters	Description
Format	#	Specifies the video format of the signal available for the stream
Advertised Network Streams		
Video	None	Lists the discovered RAVENNA sessions. Select a session to auto-fill the Video and/or Audio fields.
	#	
Audio #	None	
	#	
Manually Specified Streams		
Stream Name	<name>	Assigns a unique identifier for the stream
Transport IP	##.##.##	Specifies the network socket for the video/audio data for the session. This value is auto-populated when you select an Advertised Stream.
UDP Port	#	Specifies the source port to connect to the advertised stream. This must match the source you are attempting to connect to.
# Ch	#	Specifies the maximum number of audio channels in the specified stream
	Click this button to display the Media Clock Offset field.	
Audio Map		
Target		Use the audio map to assign audio channels, and determine their hierarchy, to an audio stream
Default Mapping	Selected	Applies a default audio mapping of 1:1 where: <ul style="list-style-type: none"> • Target 1-8 is mapped to A1-A8 • Target 9-16 is mapped to B1-B8 etc.
	Cleared	The default audio map is not applied; user can assign audio channels as required
Edit	Click to display the audio map editing options	

Advanced Tabs

The Advanced sub-tabs expand the controls available in the Initial Setup tab.

Status Tab

The Status tab provides read-only hardware information, signal status, and general product information for your RAPTOR-IPG. There are two sub-tabs: Device Status and SDI Inputs.

Device Status Tab

The tab is organized into four distinct areas in the DashBoard window: Alarms Summary, Product, Unsaved Changes, and Hardware.



Figure 17.6 Example of the Status Tab — Device Status Tab Selected

Table 17.3 summarizes the read-only information displayed in the Alarms Summary area.

Table 17.3 Status Tab — Alarms Summary

Item	Parameters	Description
SDI Inputs Status		Reports the same information as the Advanced > Status > SDI Inputs status fields. Refer to Table 17.7 for more information
Ethernet I/O -> Control RJ-45 Status		Reports the same information as the Advanced > Ethernet I/O > Control RJ-45 > Link Status field. Refer to Table 17.10 for more information.
Ethernet I/O -> SFP Status		Reports the same information as the Advanced > Ethernet I/O > SFP # > Link Status fields. Refer to Table 17.10 for more information.
Ethernet I/O -> Special Multicast Configuration		Reports the same information as the Advanced > Ethernet I/O > Special Multicast Addresses fields.
Receivers -> Stream Status		Reports the same information as the individual alarms in the Receivers tab. Refer to the section “ Receivers Tab ” on page 80.
Senders -> Stream Status		Reports the same information as the Advanced > Senders tab
Timing -> System Clock Status		Reports the status of the PTP Clock connection

Table 17.4 summarizes the read-only information displayed in the Product area.

Table 17.4 Status Tab — Product

Item	Parameters	Description
Product	RAPTOR-IPG	Indicates the product name of the hardware
Variant		Indicates the software marketing code
Supplier		Indicates the supplier/manufacturer of the device
Firmware Version	#	Indicates the firmware version running on the card

Table 17.4 Status Tab — Product

Item	Parameters	Description
Firmware Date	#	Indicates the build date of the firmware running on the card
FPGA Name	#. #	Indicates the FPGA version running on the card
FPGA Version	#	
Serial Number	#	Indicates the assigned serial number of the card

Table 17.5 summarizes the read-only information displayed in the Unsaved Changes area.

Table 17.5 Status Tab — Unsaved Changes

Item	Parameters	Description
Device Setup Tab Changes		Reports if there are unsaved changes made to the Advanced > Device Setup tab
PattGen Tab Changes		Reports there are unsaved changes made to the Advanced > PattGen tab
Senders -> Setup Tab Changes		Reports if there are unsaved changes made to the Advanced > Senders > Setup Stream tab
Discovery Tab Changes		Reports if there are unsaved changes made to the Advanced > Discovery tab
Timing -> PTP Tab Changes		Reports if there are unsaved changes made to the Advanced > Timing > PTP tab
Timing -> Outputs Tab Changes		Reports if there are unsaved changes made to the Advanced > Timing > Outputs tab

Table 17.6 summarizes the read-only information displayed in the Hardware area.

Table 17.6 Status Tab — Hardware

Item	Parameters	Description
Voltage (V)	#	Measured input voltage
Current (mA)	#	Current consumption in milliamperes
Power (W)	#	Indicates the calculated total power of the card
Daughter Card Voltage (V)	#	Indicates the measure input voltage of the Daughter Card
Daughter Card Current (mA)	#	Indicates the Current consumption in milliamperes of the Daughter Card
Daughter Card Power (W)		Indicates the calculated power of the Daughter Card
FPGA Temperature	#	Indicates the FPGA Core temperature
Installation Details		Displays additional Hardware status read-only fields

SDI Inputs Tab

The SDI Inputs tab reports status information on the SDI inputs of the rear module.

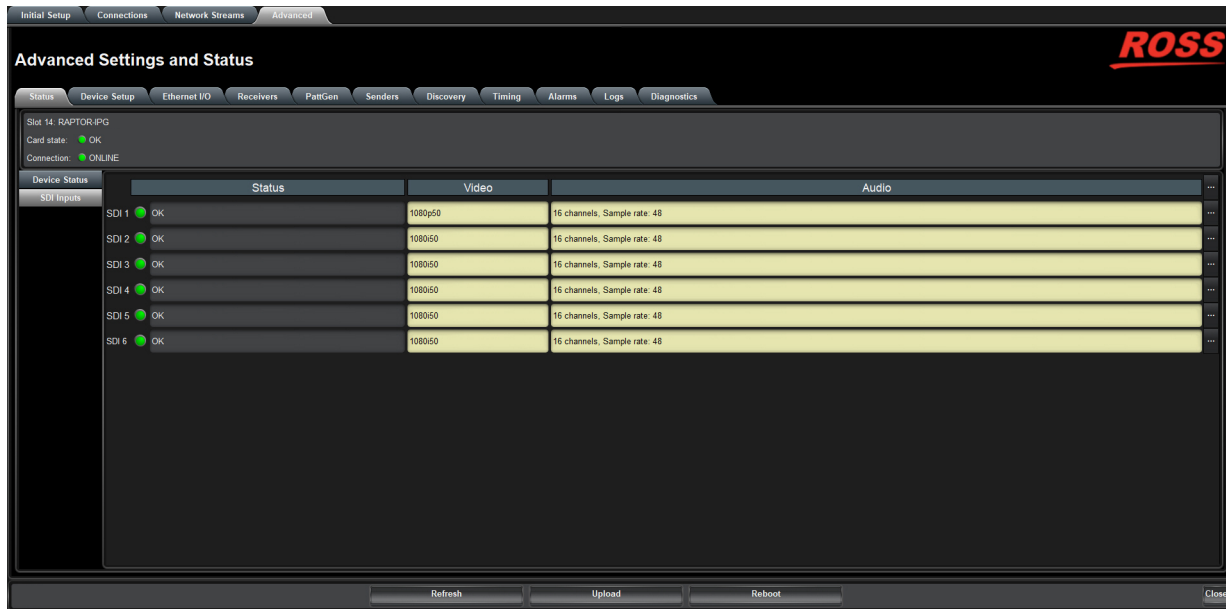


Figure 17.7 Example of the Status > SDI Inputs Tab

Table 17.7 summarizes the read-only information displayed in the SDI Inputs tab.

Table 17.7 Status Tab — SDI Inputs Tab


Item	Parameters	Description
SDI #		
Status	OK (Green)	Indicates the SDI input signal is detected and valid
	Audio Missing (Red)	Indicates one of the following is occurring: <ul style="list-style-type: none"> the SDI input signal is not detected the system frame rate does not match the input frame rate
Status	Unknown (Red)	Indicates the SDI input signal is not detected
	Frame Rate Mismatch (Red)	Indicates the system frame rate does not match the input frame rate
Video	#	Indicates the video input signal format
Audio	# channels, Sample rate: #	Indicates the number of audio groups that are present in the specified input signal, and the sample rate of the AES signal
		Displays additional audio status information for the specified SDI input signal

Table 17.8 summarizes the read-only information displayed when the  button is selected for an SDI row.

Table 17.8 SDI Inputs Tab — SDI Inputs, Additional Information

Item	Parameters	Description
Audio CH #	Present	Indicates the specified audio channel is detected
	No Signal	Indicates the specified audio channel is not available

Device Setup Tab

The **Device Setup** tab provides options to specify the device name, and transport options.

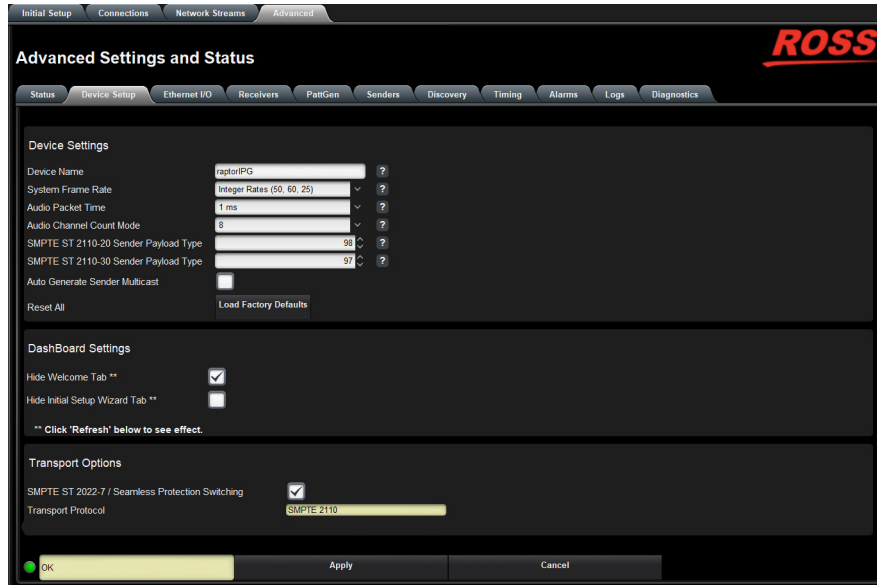


Figure 17.8 Device Setup Tab

Table 17.9 summarizes the options displayed in the Device Setup tab.

Table 17.9 Device Setup Tab

Item	Parameters	Description
Device Settings		
Device Name	<text>	Specifies a unique identifier for this RAPTOR-IPG. This name is used to identify the streams the RAPTOR-IPG is managing.
System Frame Rate	Integer Rates (50, 60, 25) Non-Integer Rates (59.94, 29.97)	Inputs, senders, and receivers must use a video format that matches this rate. This setting is updated and applied once PTP is locked.
Audio Packet Time ^a	#	Adds an offset to the audio streams if you suspect the audio packets may be received out of order or delayed. This impacts all connected audio streams. Applying a new Audio Packet Time automatically disconnects all audio streams.

Table 17.9 Device Setup Tab

Item	Parameters	Description
Audio Channel Count Mode	#	Specifies the maximum number of audio channel available for configuration. The default is 8.
SMPTE ST 2110-20 Payload Type	#	Specifies the 7bit numeric value that identifies the SMPTE 2110-20 RTP payload format the RAPTOR-IPG supports. The default is 98.
SMPTE ST 2110-30 Payload Type	#	Specifies the 7bit numeric value that identifies the SMPTE 2110-30 RTP payload format the RAPTOR-IPG supports. The default is 97.
Auto Generate Sender Multicast	Selected	Enables the RAPTOR-IPG to automatically assign a multicast address for any stream. This is the default.
	Cleared	An IP Address must be specified for each stream
Reset All	Load Factory Reset	Sets certain editable card settings to the default values
DashBoard Settings		
Hide Welcome Tab	Selected	The Welcome tab does not display in the DashBoard window
	Cleared	The Welcome tab displays in the DashBoard window
Hide Initial Setup Wizard Tab	Selected	The Initial Setup tab does not display in the DashBoard window
	Cleared	The Initial Setup tab displays in the DashBoard window
Transport Options		
SMPTE ST 2022-7 /Seamless Protection Switching	Selected	Enables you to protect your streams by allowing the RAPTOR-IPG ports to carry a protection stream when operating in a redundant network
	Cleared	Disables this feature
Transport Protocol (read-only)	#	Reports the standard used by the RAPTOR-IPG for video, audio, and clock synchronization

- a. It is recommended to set the Audio Packet Time before configuring your audio streams.

Ethernet I/O Tab

Use the options in the Ethernet I/O tab to set the network settings for the 1GbE connection via the Network Controller card in the openGear frame, and the two SFP ports on the card rear module.

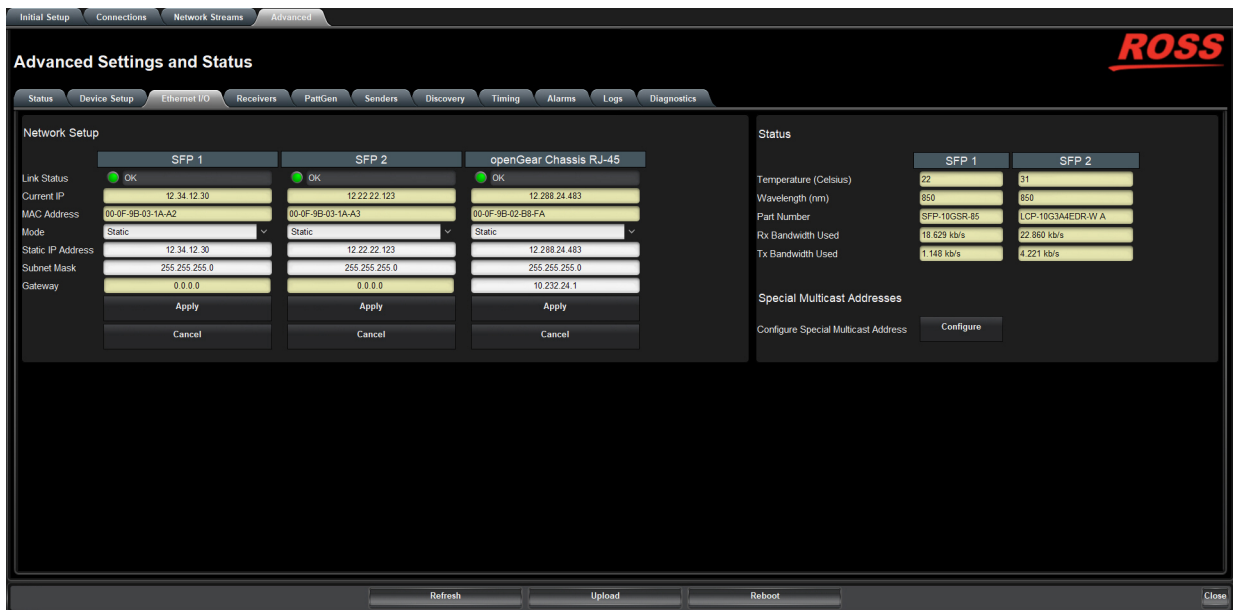


Figure 17.9 Ethernet I/O Tab

Network Setup Area

Table 17.10 summarizes the fields and menus displayed for configuring the network settings of the SFP ports and the RJ-45 port on the openGear frame.

Table 17.10 Ethernet I/O Tab

Item	Parameters	Description
Link Status (read-only)	OK (Green)	The link for the Network Controller Card is valid
	Link Down (Red)	The link for the Network Controller Card is invalid (fails)
Current IP (read-only)	###.###	Indicates the IP Address currently assigned to the card
MAC Address (read-only)	#	Indicates the MAC Address currently assigned to the card
Mode	Static	The user manually supplies the network settings for the card
	DHCP	Automates the assignment of the network settings for the card
Static IP Address	####.####.####.####	Specifies the static IP Address for the card the user wants to manually assign
Subnet Mask	###.###	The subnet mask for the card
Gateway	###.###	The gateway for communications outside of the local area network (LAN)

Status Area

Table 17.11 summarizes the read-only fields displayed for each SFP port.

Table 17.11 Ethernet I/O — Status

Item	Parameters	Description
Temperature (Celsius)	#	Internal temperature as reported by the specified SFP port
Wavelength (nm)	#	Indicates the transmitted wavelength
Part Number	#	Indicates the part number of the module installed in the specified SFP port
RX Bandwidth Used	#	Reports the amount of data the RAPTOR-IPG is currently receiving on the specified SFP port
TX Bandwidth Used	#	Reports the amount of data the RAPTOR-IPG is currently transmitting on the specified SFP port
Special Multicast Addresses		
Configure Special Multicast Address	Click Configure to display the Configure Multicast Whitelist dialog. The dialog includes the items listed below.	
IP Address	# (read-only)	The addresses 225.1.1.1, 239.255.255.255, and 239.255.255.253 are automatically added to the whitelist as read-only entries
	0.0.0.0	Adds the network stream to the Multicast Whitelist
Mask	# (read-only)	Specifies the Mask value for the read-only Multicast Whitelist IP Addresses
	0.0.0.0	Specifies the Mask value for the specified Multicast Whitelist IP Address
Status (read-only)	Enabled	Indicates the specified network stream is added to the whitelist and cannot be used as a network stream for a receiver or sender
	Disabled	Indicates the specified network stream is added to the whitelist but is currently available as a network stream that can be assigned to a receiver or sender
Add	Creates a new entry in the whitelist	
Remove	Deletes the entry from the whitelist	
Enable	Keeps the entry but adds it to the allowed IP Addresses that are made available to the RAPTOR-IPG. If an IP Address is enabled as a whitelist entry, then it cannot be used as an audio or video stream.	

Receivers Tab

The **Receivers** tab provides details on each of the IP receivers of the RAPTOR-IPG. The Receivers tab is organized into two sub-tabs: Status and X-Connect.

Status Tab

The top of the Status tab displays a read-only field for each available SFP on the RAPTOR-IPG rear module. These fields report the bandwidth allocated by the Receiver SFP port.

★ The value displayed within each bar indicates the port utilization by the active receivers.

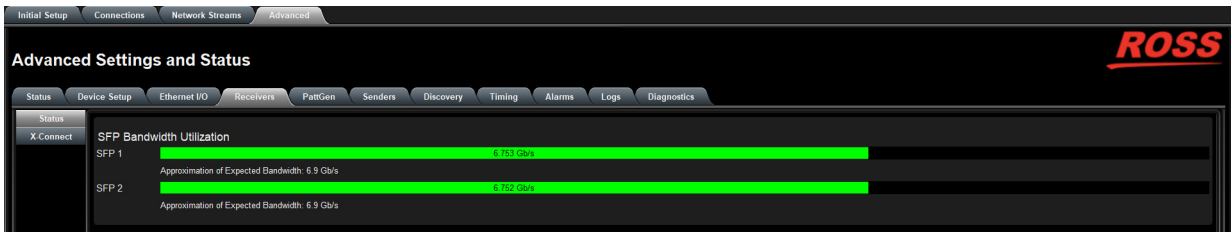


Figure 17.10 Receivers Tab — Example of the SFP Bandwidth Bar

If the bandwidth bar is green, the allocated bandwidth is just below 100%.

The SDI Receiver area of the tab, located at the bottom, reports each SDI as a row in the tab and provides the items and parameters.

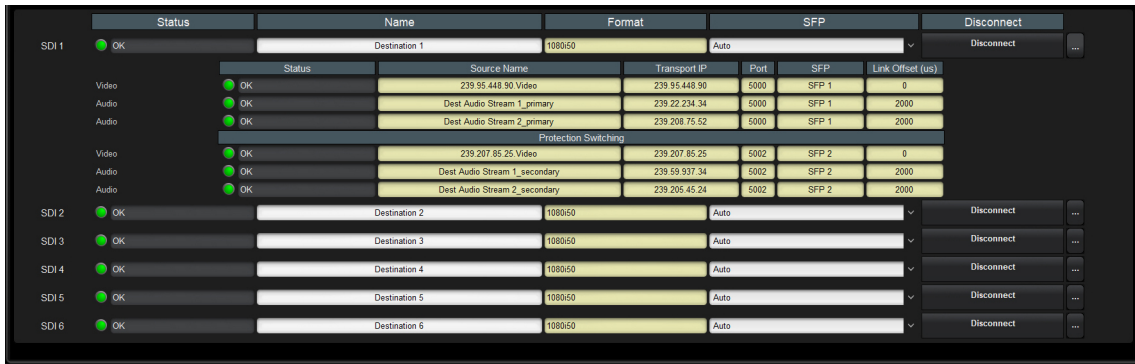


Figure 17.11 Receivers Tab — Example of the SDI Receiver Area

Table 17.12 outlines the read-only fields and menus available to configure the receiver settings for each SDI.

Table 17.12 Receivers Tab — SDI Receiver Configuration Area

Item	Parameters	Description
Status (read-only)	OK (Green)	No errors are detected on this SDI connection
	Network Delay Too Big (Yellow)	The link offset selected by the user is smaller than the propagation delay of the network
Status (read-only)	No packets received (Yellow)	The configured receiver IP stream(s) is not receiving any packets; stream might not be on the network or experiencing other issues
	Not in Use (Gray)	This SDI connection is disabled
	PTP Unstable, try again (Red)	The RAPTOR-IPG is unable to obtain a stable clock source. Sessions cannot be created until this condition is fixed. It is recommended to navigate to the Timing > PTP tab to check the status of the PTP and update the Configuration settings.
	Param Out of Range (Red)	One of the following is occurring: <ul style="list-style-type: none"> Two receivers with the same network source were created. RAPTOR-IPG can only subscribe to a stream once The wrong format is detected
Name	<text>	Assigns an unique identifier to the receiver stream

Table 17.12 Receivers Tab — SDI Receiver Configuration Area

Item	Parameters	Description
Format (read-only)	#	Indicates the video format detected on the stream
	Unknown	Indicates the detected format is unsupported or the destination is not connected
SFP	SFP #	Specifies the SFP port when subscribing to streams
	Auto	The card automatically selects the available SFP
Disconnect	Stops that session and the Receiver outputs black	


Table 17.13 summarizes the information that displays when the  button is selected at the end of a row.

Table 17.13 Receivers Tab — Additional Status

Item	Parameters	Description
Video		
Status (read-only)	OK (Green)	No errors are detected on the video signal
	Not in Use (Gray)	This SDI video stream is disabled
Source Name	xx.yy.video	The source name is determined by the stream that is connected
Transport IP	###.###	Specifies the IP Address for the video session
	<blank>	The card firmware provides an IP when the session is created
Port	#	Indicates the port associated with the IP address and the communication protocol for the video essence
SFP	#	Indicates the SFP port on the rear module that the video signal is derived from
Link Offset (us)	#	Reports the Video Delay value set in the Timing > SDI Outputs tab for the SDI output
Audio #		
Status	OK (Green)	No errors are detected on the audio signal
	Not in Use (Gray)	The audio channels are disabled or unavailable
Source Name	xx.yy.audio#	The source name is determined by the stream that is connected
Transport IP	###.###	Specifies the IP Address for the audio session
	<blank>	The card firmware provides an IP when the session is created
Port	#	Indicates the port associated with the IP address and the communication protocol for the audio essence

Table 17.13 Receivers Tab — Additional Status

Item	Parameters	Description
SFP (read-only)	#	Indicates the SFP port on the rear module that the audio signal is derived from
Link Offset (us)	#	Reports the Audio Offset and/or Audio Delay values set in the Timing > SDI Outputs tab for the SDI output

X-Connect Tab

The **X-Connect** tab provides read-only details on the audio mapping of the current audio receiver session(s).

Table 17.14 outlines the Receiver Audio Mapping read-only fields on the X-Connect tab.

Table 17.14 Receivers > X-Connect Tab

Item	Parameters	Description
Receiver Audio Mapping - SDI # / Destination #		
Session	#	Indicates the specific network session
Stream	#	Indicates the specific network stream assigned to the session
Chan #	#	Indicates the input channel assigned to the specified SDI # /Destination # output channel

PattGen Tab

The PattGen tab provides options for independently configuring a pattern generator for each SDI output. (**Figure 17.12**)

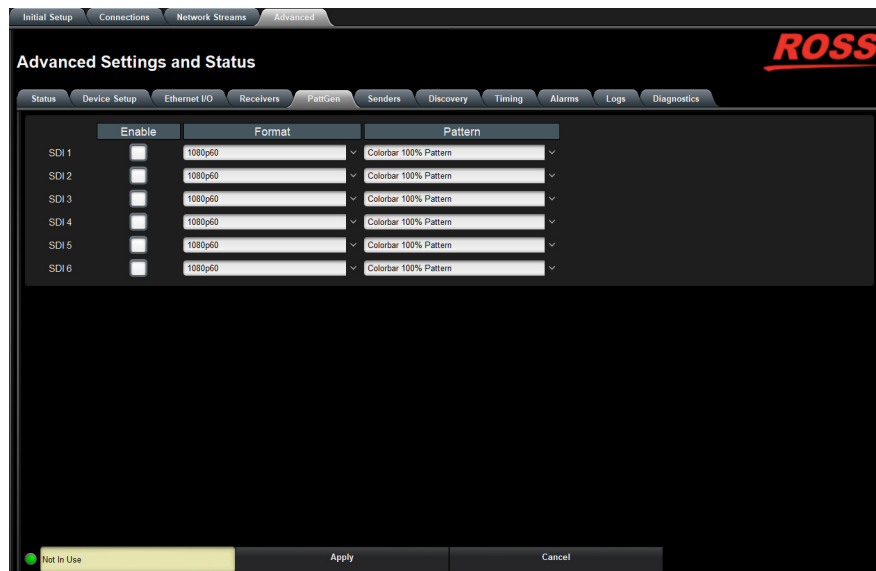


Figure 17.12 PattGen Tab

Table 17.15 summarizes the options displayed in the PattGen tab.

Table 17.15 PattGen Tab

Item	Parameters	Description
SDI #		
Enable	Selected	The specified output outputs the test pattern assigned using the Pattern menu
	Cleared	Disables the pattern generator for the specified output
Format	#	Specifies the video format for the pattern generator
Pattern	Colorbar 100% Pattern	Specifies the type of test pattern to output. Note that the test pattern replaces all of the output picture but not the HANC, while the VANC is blanked
	Colorbar 75% Pattern	
	Pathological Pattern	

Senders Tab

The **Senders** menus are organized into two sub-tabs: Active Streams and Setup Streams.

Active Streams Tab

The **Active Streams** tab reports the SFP bandwidth utilization. If a bandwidth bar is green, the allocated bandwidth is below 75%.

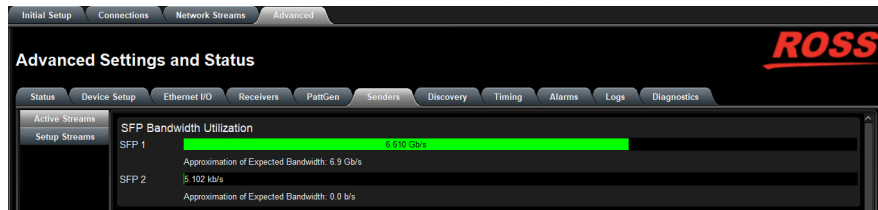


Figure 17.13 Senders Tab — Example of an SFP Bandwidth Allocation Status Area

Table 17.16 lists the fields that display below the SFP Bandwidth Utilization area on the tab.

Table 17.16 Senders — Active Streams Tab

Item	Parameters	Description
Video Streams		
Name ^a	<text>	Provides a unique identifier for the video data available on the specified SDI input
Status (read-only)	OK (Green)	The sender streams are operating correctly without errors
	Apply Changes (Yellow)	One or more settings were changed on the Setup Streams tab. You must click Apply to update the settings on the RAPTOR-IPG.

Table 17.16 Senders — Active Streams Tab

Item	Parameters	Description
Status (read-only)	PTP Unstable, try again (Red)	The RAPTOR-IPG is unable to obtain a stable clock source. Sessions cannot be created until this condition is fixed. It is recommended to navigate to the Advanced > Timing > PTP tab to check the status of the PTP and update the Configuration settings.
	Param Out of Range (Red)	One of the following is occurring: <ul style="list-style-type: none"> • a sender was configured with an invalid setting. • two senders with the same network source were created. The RAPTOR-IPG can only subscribe to a stream once.
	SDI Not Present (Red)	A valid SDI signal is not detected on the specified SDI BNC of the RAPTOR-IPG
	Marked for Removal (Red)	The user has disabled the sender but has not clicked the Apply button yet
Transport IP	###.##.	Specifies the IP Address for the video session
UDP Port	#	Indicates the port associated with the IP address and the communication protocol for the video
SFP	#	Indicates the SFP port the specified sender stream is assigned to
Pause	<ul style="list-style-type: none"> • Pauses the video stream from sending • The button label changes to Resume 	
Remove	<ul style="list-style-type: none"> • Removes the video stream from the current session. Note that the stream is not removed from the Setup Streams tab. • The Setup Streams tab now reports the “Not Active” error message 	
Audio Streams		
Name	<text>	Provides a unique identifier for the audio channels available on the specified SDI input
Status (read-only)	Reports the audio activity of the session	
Transport IP	###.##.	Specifies the IP Address for the audio session
UDP Port	#	Indicates the port associated with the IP address and the communication protocol for the audio essence
SFP	#	Indicates the SFP port the specified sender stream is assigned to
Pause	<ul style="list-style-type: none"> • Pauses the audio stream from sending • The button label changes to Resume 	
Remove	<ul style="list-style-type: none"> • Removes the audio stream from the current session. Note that the stream is not removed from the Setup Streams tab. • The Setup Streams tab now reports the “Not Active” error message 	

- a. When the sender is first enabled, the streams are named using the nomenclature: systemdevicename.sendername.video.

Setup Streams Tab

The **Setup Streams** tab allows you to configure the sender streams for the RAPTOR-IPG. The configuration options in the Setup Streams tab provides options for enabling, re-naming, selecting the source, and the communication settings for each SFP.

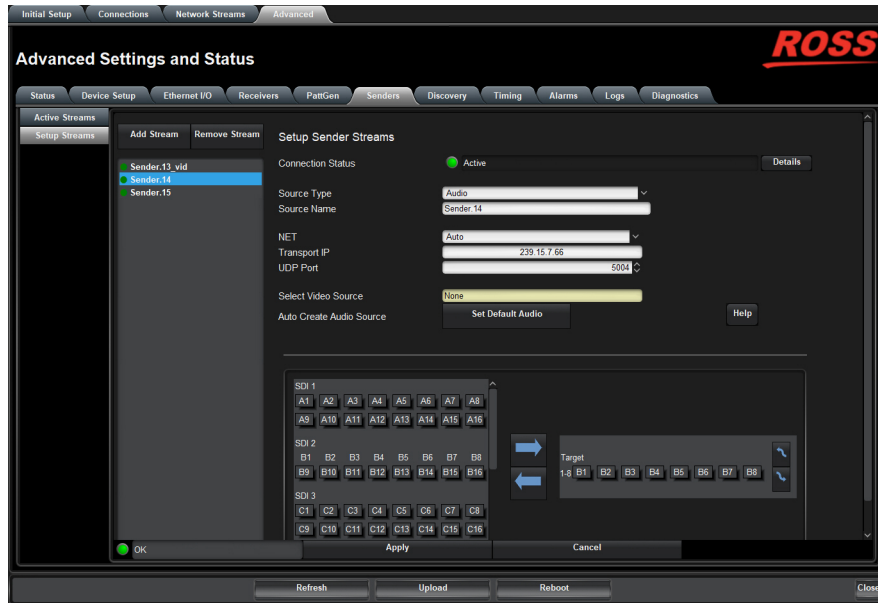


Figure 17.14 Senders — Setup Streams Tab

Table 17.17 summarizes the menus and fields available in the Setup Streams tab.

Table 17.17 Senders — Setup Streams Tap

Item	Parameters	Description
Add Stream		Creates a new entry in the Senders list
Remove Stream		Deletes the entry from the Senders list
Connection Status		Indicates whether the stream assigned to this sender group is active or not
Source Type	Video	Specifies the type of data that the new stream will transport
	Audio	
Source Name	<text>	Provides a unique identifier for the SDI input signal. This name is used to identify the data within your network.
NET	Auto	The RAPTOR-IPG automatically selects the available SFP port for the sender stream
	SFP #	Assigns the specified SFP port to the sender stream
Transport IP	#	Specifies the IP Address for the primary stream of this session
	<blank>	If the Device Setup > Allow Random IP box is selected, the RAPTOR-IPG firmware provides an IP when the session is created.
UDP Port	#	Indicates the port associated with the IP address and the communication protocol for the primary stream

Table 17.17 Senders — Setup Streams Tap

Item	Parameters	Description
Select Video Source	SDI #	Source Type is set to Video. Specifies the SDI IN port on the RAPTOR-IPG chassis that will supply the data.
Auto Create Audio Source	Set Default to Audio	Enabled if Source Type is set to Audio. Automatically maps the audio channels to the output channels in a 1:1 ratio This button is disabled when the Source Type is set to Video .

Discovery Tab

The Discovery tab provides options for configuring communications via the supported protocols.

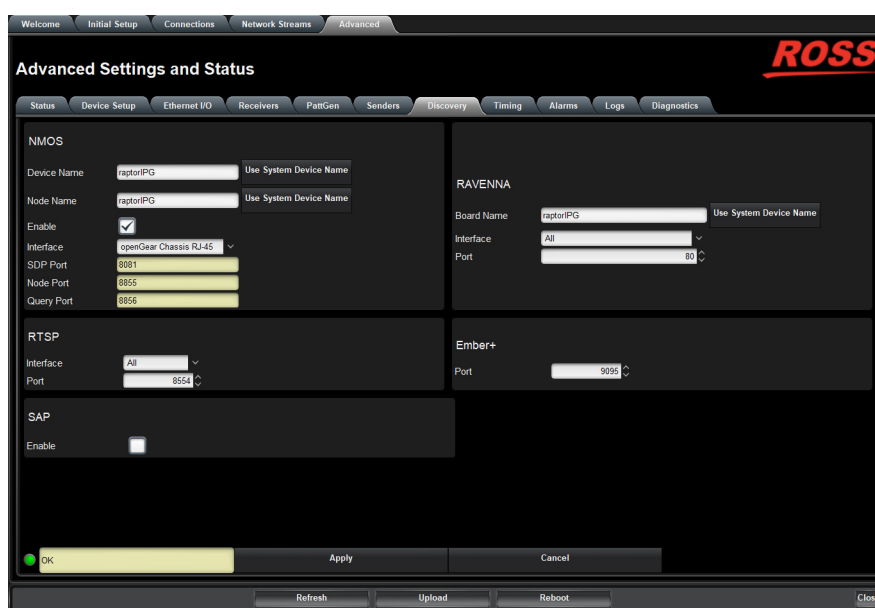


Figure 17.15 Discovery Tab

Table 17.18 summarizes the options displayed in the Discovery tab.

Table 17.18 Discovery Tab

Item	Parameters	Description
NMOS		
Device Name	<text>	Assigns a unique identifier for the card when communicating with NMOS-based devices
	Use System Device Name	Applies the identifier to the card as assigned by the master NMOS device
Node Name	<text>	Name of the NMOS node being advertised
Enable	Selected	The RAPTOR-IPG is available as a NMOS device
	Cleared	The RAPTOR-IPG is unavailable as a NMOS device

Table 17.18 Discovery Tab

Item	Parameters	Description
Interface	openGear Chassis RJ-45	The RAPTOR-IPG uses the uses the RJ-45 port on the openGear frame for NMOS communications
	SFP #	The RAPTOR-IPG uses the specified SFP port on the rear module for NMOS communications
	All	The RAPTOR-IPG accepts NMOS requests via the RJ-45 port on the frame and all SFP ports
SDP Port (read-only)	#	Specifies the SDP HTTP port used to GET SDPS
Node Port (read-only)	#	Specifies the port the NMOS IS-04 Node service is listening on
Query Port (read-only)	#	Specified the port the NMOS IS-04 Query service is listening on
RAVENNA		
Board Name	<text>	Assigns a unique identifier for the RAPTOR-IPG when communicating with RAVENNA-based devices
	Use System Device Name	Applies the identifier to the RAPTOR-IPG as assigned by the master RAVENNA device
Interface	openGear Chassis RJ-45	The RAPTOR-IPG uses the RJ-45 port on the openGear frame for RAVENNA communications
	SFP #	The RAPTOR-IPG uses the specified SFP port on the rear module for RAVENNA communications
	All	The RAPTOR-IPG accepts RAVENNA requests via the RJ-45 port on the frame, and all SFP ports
Port	#	Specifies the communications port on the network that the RAPTOR-IPG uses for RAVENNA communications. The default is 80.
RTSP		
Interface	openGear Chassis RJ-45	The RAPTOR-IPG uses the RJ-45 port on the openGear frame for RTSP communications
	SFP #	The RAPTOR-IPG uses the specified physical SFP port for RTSP communications
	All	The RAPTOR-IPG accepts RTSP requests via the RJ-45 port on the frame and all SFP ports
Port	#	Specifies the TCP port the protocol uses to send and receive messages. The default is 8554.
Ember+		
Port	#	Specifies the communications port on the network that the RAPTOR-IPG uses for Ember+ communications. The default is 9095.

Table 17.18 Discovery Tab

Item	Parameters	Description
SAP		
Enable	Selected	The NEWT will use the Session Announcement Protocol (SAP) to broadcast multicast session information
	Cleared	Disables this feature

Timing Tabs

The system timing options for the card are organized into the following tabs displayed on the Timing tab: PTP, and Outputs.



Figure 17.16 Timing Tab — PTP

PTP Tab

Use the PTP tab to configure the PTP client settings for RAPTOR-IPG. This is where RAPTOR-IPG is pointed to an active Grandmaster.

Table 17.19 summarizes the options displayed in the PTP tab.

Table 17.19 Timing Tab — PTP

Item	Parameters	Description
Configuration		
Slave Only	Selected	Defines the RAPTOR-IPG as a slave only device in the system; the card cannot be used as a Grandmaster or Master device
	Cleared	Enables the RAPTOR-IPG to be used as a Grandmaster or Master device

Table 17.19 Timing Tab — PTP

Item	Parameters	Description
Profile	IEE1588:Default	Specifies the RAPTOR-IPG timing uses IEE1588 standard
	AES67:Media	Specifies the RAPTOR-IPG timing uses AES67: Media standard
	SMPTE:2059-2	Specifies the RAPTOR-IPG timing uses SMPTE 2059-2 standards. This is the recommended setting.
Custom PTP Profile	Selected	The Domain, Priority1, Priority2, Role status, Sync Interval, Announce Interval and Announce Receipt Timeout fields can be edited to create a custom PTP profile
	Cleared	The Domain, Priority1, Priority2, Role status, Sync Interval, Announce Interval and Announce Receipt Timeout fields are set to the default values of the selected PTP Profile.
Domain	#	Specifies that the card is within the specified group of clocks in your network
Priority1	#	Assigns the first priority level to the card during a Grandmaster election where a value of: <ul style="list-style-type: none"> • 1 is the highest priority • 255 is the lowest priority This menu is applicable when the Slave Only box is not selected
Priority2	#	Assigns the secondary priority level to the card during a Grandmaster election where a value of: <ul style="list-style-type: none"> • 1 is the highest priority • 255 is the lowest priority This menu is applicable when the Slave Only box is not selected
SFP #		
Role Status (read-only)	#	Indicates the role that the specified port is assigned to in the network system
Sync Interval	# ms	Specifies how often the SFP port on the RAPTOR-IPG sends Sync messages
Announce Interval	# ms	Specifies how often the SFP port on the RAPTOR-IPG sends Announce messages
Announce Receipt Timeout	#	Controls how long the SFP port on the RAPTOR-IPG will wait before declaring the Grandmaster absent and initiating a new election
Status (read-only)		
Current Reference	PTP SLAVE	Specifies that the RAPTOR-IPG is a Slave; using that system clock as the reference
	INTERNAL	Specifies that the RAPTOR-IPG is a master; using that system clock as the reference

Table 17.19 Timing Tab — PTP

Item	Parameters	Description
System Status	Locked	Status of PTP on the system
	Free run	
Interface Status	Locked	Status of PTP on the interface
	Acquiring	
	Fail	
Details	Reports details on detected Start of Frame (SOF) errors; a Locked Counter field reports the number of times the PTP connection was unlocked.	
Local (read-only)		
Local ID	#	Reports the ID number assigned to the RAPTOR-IPG within the system
Mean Path Delay (ns)	#	Average time in nanoseconds it takes a packet to traverse end to end from the PTP master
Offset From Master (ns)	#	Correction time offset from the master in nanoseconds
Min Delay Request Interval	#	Specifies how long the RAPTOR-IPG will wait for a delay request
Grandmaster		
Grandmaster ID	#	Reports the ID number assigned to the Grandmaster within the system
Priority1	#	Standard PTP fields used to determine who wins a PTP election
Priority2	#	
Clock Accuracy	#	Standard PTP field that states the accuracy of the system clock on the system
Clock Class	#	Standard PTP field that states the class of the clock used on the system
Show Advanced PTP Stats	Click this button to display read-only fields and an active graph that maps the RMS (average offset from master over time). Use the Configure Trigger Threshold dialog to set an alarm when a specified threshold is reached.	

Outputs Tab

The Outputs tab enables you to adjust the timing of each SDI output. **Table 17.20** summarizes the options displayed in the SDI Outputs tab for each SDI.

Table 17.20 Timing Tab — SDI Outputs

Item	Parameters	Description
Default Delay	Selected	The default for audio and video delays change based on the audio packet time set on the device If the audio packet time is 1ms (1000us) to default video delay is 20000us and audio delay is 20000us If the audio packet time is 125us to default video delay is 2000us and audio delay is 2000us
	Cleared	RAPTOR-IPG applies the delay and offset settings in the Outputs tab for the specified signal
Video Delay	#	Sets the video output delay relative to the selected reference
Audio Offset	#	Changes the link offset values used when a receiver is setup
Audio Delay (us) (read-only)	#	Reports the audio output delay (Video Delay value + Audio Offset value) relative to the selected reference

Alarms Tab

The **Alarms** tab enables you to manage the type of alarms the RAPTOR-IPG reports.

★ All alarms are enabled by default.

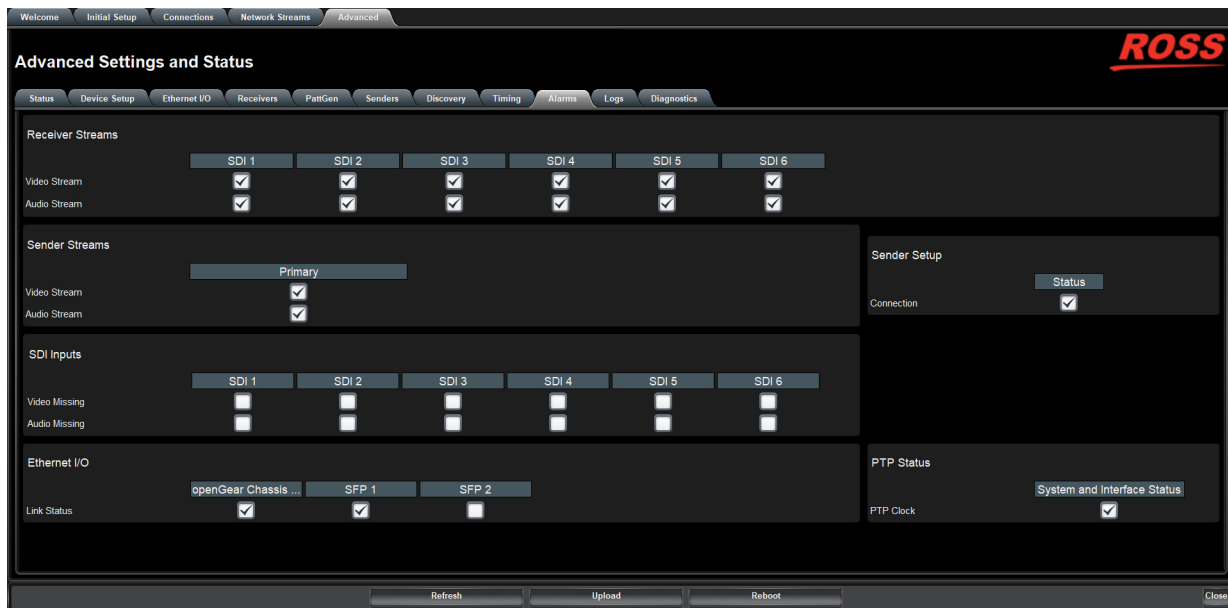


Figure 17.17 Alarms Tab

Table 17.21 summarizes the options displayed in the Alarms tab.

Table 17.21 Alarms Tab

Item	Parameters	Description
Receiver Streams - SDI #		
Video Stream	Selected	Enables the monitoring of the video stream. The status is reported in the Destinations area of the Connections tab.
	Cleared	Disables monitoring of this stream
Audio Stream	Selected	Enables the monitoring of the audio stream. The status is reported in the Destinations area of the Connections tab.
	Cleared	Disables monitoring of this stream
Sender Streams - Primary, Protection Switching		
Video Stream	Selected	Enables the monitoring of the video stream. The status is reported in the Sender tab.
	Cleared	Disables monitoring of this stream
Audio Stream	Selected	Enables the monitoring of the audio signal of the stream The status is reported in the Sender tab.
	Cleared	Disables monitoring of this stream
Sender Setup - Status		
Connection	Selected	Changes made to the Advanced > Senders > Setup Streams tab are reported in the Advanced > Status > Device tab
	Cleared	Disables monitoring of the menus on the Advanced > Senders tab. The Senders Status and Changes field in the Advanced > Device tab does not report any issues.
SDI Inputs - SDI #		
Video Missing	Selected	Enables the monitoring of the video signal of the specified SDI input. If the video signal is not detected, an error message displays in the Input Status tab.
	Cleared	Disables monitoring of the SDI video input
Audio Missing	Selected	Enables the monitoring of the audio signal of the specified SDI input. If the audio signal is not detected, an error message displays in the Input Status tab.
	Cleared	Disables monitoring of the SDI audio input
Ethernet I/O - openGear Chassis RJ-45		

Table 17.21 Alarms Tab

Item	Parameters	Description
Link Status	Selected	Enables the monitoring of the communications between the RAPTOR-IPG and the Network Controller card. If a link is not detected, an error message displays in the Ethernet > Link Status.
	Cleared	Disables monitoring of the communications between the RAPTOR-IPG and the Network Controller card
Ethernet I/O - SFP #		
Link Down	Selected	The corresponding field in the SFP Status tab reports when a link is not detected
	Cleared	Disables monitoring of the link status of the specified SFP port
PTP Status - System and Interface Status		
PTP Clock	Selected	The System Clock Status field reports when the connection to the PTP clock is lost
	Cleared	Disables monitoring of the PTP Clock status

Logs Tab

The Logs tab is organized into two sub-tabs: System Log and Captures.

System Log Tab

The System Log tab provides a system log interface that reports tasks, messages, and other operating information in a table format. This is useful when troubleshooting with the help of Ross Technical Support.

Captures Tab

The Captures tab displays a list of log entries that were captured.

Table 17.22 summarizes the options displayed in the Captures tab.

Table 17.22 Logs Tab — Captures

Item	Parameters	Description
Name	<text>	Lists the recent debug, core, and PCAP files currently available for download. Select the Refresh button in the top right corner to update the list.
Size (bytes)	#	Indicates the size of the file
Request Debug		Creates a file that captures the log entries and device status information of the RAPTOR-IPG
Duration [s]	#	Specifies the length of time (in seconds) to perform a packet capture (PCAP)
Packet Capture		Captures a PCAP file on the port specified in the Interface menu

Table 17.22 Logs Tab — Captures

Item	Parameters	Description
Interface	eth0	Captures a PCAP file for the openGear RJ45 port of the RAPTOR-IPG
	eth1	Captures a PCAP file for the SFP 1 port of the RAPTOR-IPG
	eth2	Captures a PCAP file for the SFP 2 port of the RAPTOR-IPG

Diagnostics Tab

The Diagnostics tab provides additional read-only information to help troubleshoot the network communication activity, and the video output stream status.

Network Diagnostics

This section summarizes the Network Diagnostics fields that are displayed after the **Show Network Diagnostics** button is selected.

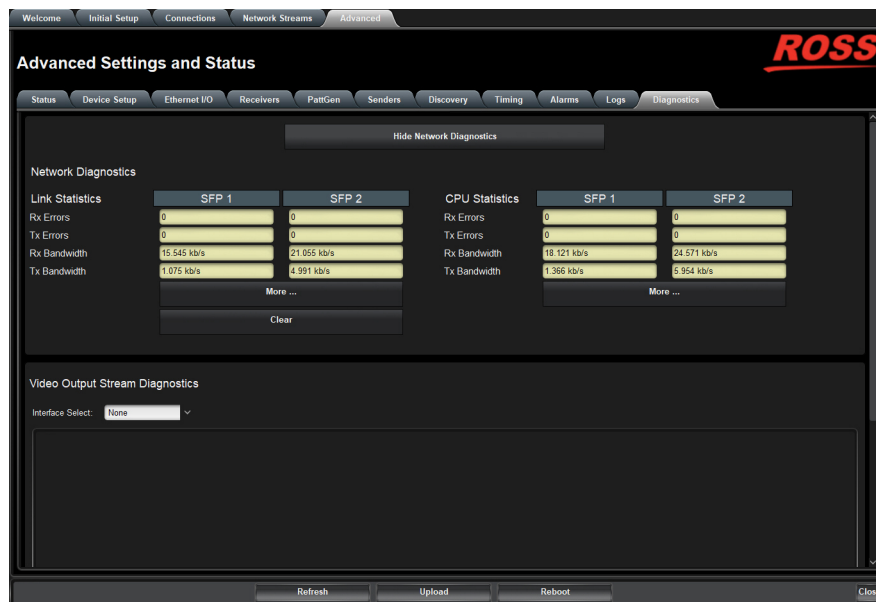


Figure 17.18 Diagnostics — Network Diagnostics

Table 17.23 summarizes the read-only fields displayed in the Diagnostics tab.

Table 17.23 Diagnostics Tab

Item	Parameters	Description
Network Diagnostics - SFP # > Link Statistics		
Rx Errors	#	Reports the total number of error packets which are received on the specified SFP port
Tx Errors	#	Reports the total number of error packets which are transmitted on the specified SFP port
Rx Bandwidth	#	Reports the amount of data the RAPTOR-IPG is currently receiving on the specified SFP port

Table 17.23 Diagnostics Tab

Item	Parameters	Description
Tx Bandwidth	#	Reports the amount of data the RAPTOR-IPG is currently transmitting on the specified SFP port
Network Diagnostics - SFP # > CPU Statistics		
Rx Errors	#	Reports the total number of errors packets received on the 10G link
Tx Errors	#	Reports the total number of errors packets sent on the 10G link
Rx Bandwidth	#	Reports the packets received on the 10G link and forwarded to the processor on the specified SFP port
Tx Bandwidth	#	Reports the packets sent from the processor to the Ethernet links on the specified SFP port

Video Output Stream Diagnostics

The Video Output Stream Diagnostics area can display the following information for any video stream:

- A graph of the Video Frame Buffer Fill level over time (with maximum and minimum levels indicated separately)
- A graph of the Pixel FIFO Fill level over time (with maximum and minimum levels indicated separately)
- A running count of missing packets, invalid packets, frame drops, frame replays
- A current view of memory statistics such as a read/write counter, the read/write pointers, the RTP timestamp alignment errors, and a view of per-stream interrupts (such as pending missing markers, and pending frame drops)

Any connected video stream can be monitored when they are connected. If disconnected, the video stream is also removed from the monitoring list in this tab.

The Video Output Stream Diagnostics area of the tab enables you to specify the SDI output and type of stream to monitor. **Figure 17.19** shows an example where the user is monitoring the video stream on SDI 1.

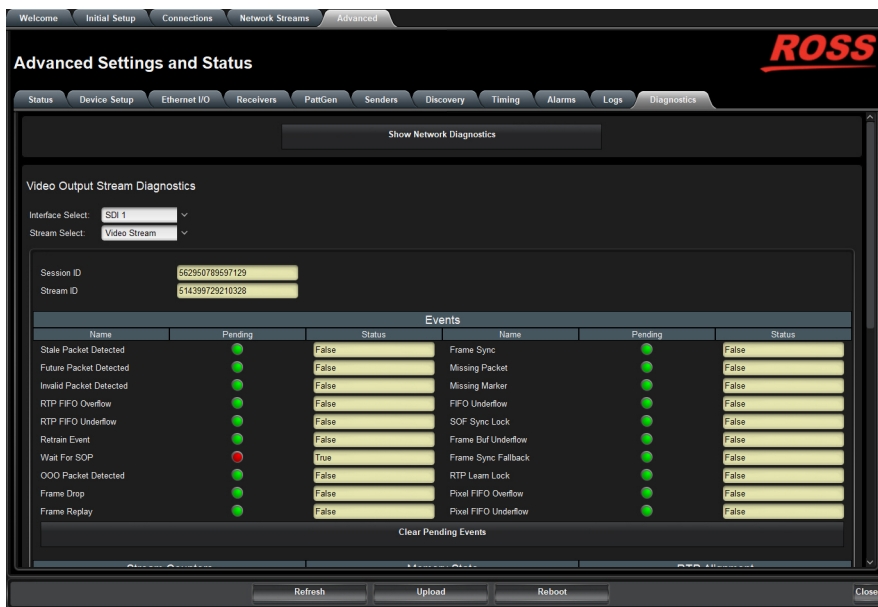


Figure 17.19 Diagnostics — Video Output Stream

Technical Specifications

This chapter provides technical information for RAPTOR-IPG. Note that specifications are subject to change without notice.

SFP Single Mode Connections

Transmitter Port

Table 18.1 Technical Specifications — Single Mode Transmitter Port

Item	Specifications
Number of Ports	2
Data Rate	10Gbps
Center Wavelength (typical)	1310nm
OMA Output Power (min.)	-5.2dBm
Extinction Ratio (min.)	3.5dB
Side Mode Suppression Ratio - SMSR (min.)	30dB
Optical Return Loss	12dB
Link Length (max.)	10km
Connector Type	Single-mode fiber Standard LC duplex fiber-optic connector

Receiver Port

Table 18.2 Technical Specifications — Single Mode Receiver Port

Item	Specifications
Number of Ports	2
Signaling Speed	10Gbps
Center Wavelength	1310nm
Overload (min.)	0.5dBm
Receiver Sensitivity in OMA (max.)	-12.6dBm
Stressed Receive Sensitivity OMA (max.)	-10.3dBm
Link Length (max.)	10km
Connector Type	Single-mode fiber Standard LC duplex fiber-optic connector

SFP Multi-mode Connections

Transmitter

Table 18.3 Technical Specifications — Multi-mode Transmitter Port

Item	Specifications
Number of Ports	2
Data Rate	10Gbps
Signaling Speed Variation from Normal	+/-100ppm
Center Wavelength (typical)	850nm
Spectral Width RMS (max.)	0.65nm
Average Output Power (min.)	-5dBm
Extinction Ratio (min.)	3
Optical Return Loss	12dB
Connector Type	Standard LC duplex fiber-optic connector

Receiver

Table 18.4 Technical Specifications — Multi-mode Receiver Port

Item	Specifications
Number of Ports	2
Signaling Speed	10Gbps
Signaling Speed Variation from Nominal	+/-100ppm
Center Wavelength	850nm
Overload (min.)	0dBm
Receiver Sensitivity in OMA (max.)	-11dBm
Stressed Receive Sensitivity OMA (max.)	-7.5dBm
Connector Type	Standard LC duplex fiber-optic connector

Multi-mode Fiber Link Length

Table 18.5 Multi-mode Fiber Link Length

Fiber Type	Category	Minimum Modal Bandwidth @ 850nm (MHz*km)	Operating Range (m)
62.5um MMF	FDDI	160	2-26
	OM1	200	2-33
50um MMF	OM2	500	2-83
	OM3	2000	2-300

SDI Inputs

Table 18.6 Technical Specifications — SDI Inputs

Item	Specifications
Number of Inputs	6
Standards Accommodated	1.485Gbps Component, SMPTE 292M
	2.97Gbps Component, SMPTE 424M
Impedance	75ohm
Return Loss	>15dB to 1.485Gbps
	>10dB to 2.97Gbps
Equalization (Belden 1694A cable)	>240m (787ft) @ 1.485Gbps
	>180m (490ft) @ 2.97Gbps
Connection	HD-BNC

SDI Outputs

Table 18.7 Technical Specifications — SDI Outputs

Item	Specifications
Number of Outputs	6
Impedance	75ohm
Return Loss	>15dB to 1.485Gbps
	>10dB to 2.97Gbps
Signal Level	800mV ±10%
DC Offset	0V ±50mV
Rise and Fall Time (20-80%)	1.485Gbps: <270ps, <100ps difference
	2.97Gbps: <135ps, <50ps 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
Overshoot	<10%
Connection	HD-BNC

Environment

Table 18.8 Technical Specifications — Environment

Item	Specifications
Maximum Ambient Temperature	40°C (104°F)

Power

Table 18.9 Technical Specifications — Power

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

Service Information

Routine maintenance to this openGear product is not required. In the event of problems with your RAPTOR-IPG card, the following basic troubleshooting checklist may help identify the source of the problem. If the card 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**” on page 12.

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** — Verify the power indicator LED on the openGear 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. **Reference Signal Status** — Verify that the reference (blackburst or tri-level) is supplied on one of the available reference inputs. Check the Reference Status field in DashBoard.
4. **Input Signal Status** — Verify that source equipment is operating correctly and that a valid signal is being supplied.
5. **Output Signal Path** — Verify that destination equipment is operating correctly and receiving a valid signal.
6. **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.

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The RAPTOR-IPG card 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 RAPTOR-IPG 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.

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In Case of Problems

Should any problem arise with your RAPTOR-IPG 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 RAPTOR-IPG 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.

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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](ftp://ds.internic.net/rfc/rfc1951.txt) (deflate format) and [rfc1952.txt](ftp://ds.internic.net/rfc/rfc1952.txt) (gzip format).

Glossary

The following terms are used throughout this guide:

Active image — the portion of the video picture area (production aperture) that is being utilized for output content. Active image excludes letterbox bars and pillarbox bars.

BMCA — Best Master Clock Algorithm

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

CBR — constant bit rate.

CDN — content distribution network.

DashBoard — the DashBoard Control System.

Device — a physical, virtual, or software application that may include multiple sources, destinations, senders, or receivers.

Essence — a single elementary logical media signal. For example, a video essence is one video channel. An audio essence is a single audio (mono) channel.

DF — Differentiated Services.

DTVCC captions — CEA-708 captions.

Flow — the continuous raw media content. It can contain more than one essence (e.g. an audio flow can contain multiple channels, and an SDI flow may contain audio and video essences).

Frame — the openGear frame that houses the RAPTOR-IPG.

HLS — HTTP Live streaming.

HTTP — Direct Hypertext Transfer Protocol.

MIB — management information base.

Network Controller Card — the MFC-8322-N or MFC-OG3-N and any available options unless otherwise noted.

NTSC captions — the CEA-608-D: Line 21 Data Services captions.

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

PAL — PAL-B and PAL-G unless otherwise stated.

PCR — program clock reference.

PID — packet identifier.

Receiver — an element within a device which that receives one stream, which contains one flow from a network.

RTMP — Real Time Messaging Protocol.

Sender — an element within a device which presents exactly one flow, packaged as a stream onto a network.

Stream — one flow, encapsulated within a transport protocol.

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

TCP — Transmission Control Protocol.

TOS — Type of Service.

TPG — Test Packet Generator.

TTL — Time To Live.

UDP — User Datagram Protocol.

