GPI-8941 Series User Guide

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Our mission is to:

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

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

If anything at all with your Ross experience does not live up to your expectations be sure to reach out to us at *solutions@rossvideo.com*.

David Ross
CEO, Ross Video
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Ross Video Code of Ethics

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

1. We will always act in our customers' best interest.
2. We will do our best to understand our customers' requirements.
3. We will not ship crap.
4. We will be great to work with.
5. We will do something extra for our customers, as an apology, when something big goes wrong and it's our fault.
6. We will keep our promises.
7. We will treat the competition with respect.
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.)*

GPI-8941 Series · User Guide

- Ross Part Number: **8941DR-004-09**
- Release Date: November 22, 2019.

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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.

Notice

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

Safety Notices

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

Statement of Compliance

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

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

EMC Notices

US FCC Part 15

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

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

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

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

Canada

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

Cet appareil numerique 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

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

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

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

Type of Equipment	User's Guide
A급 기기 (업무용 방송통신기자재)	이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.
Class A Equipment (Industrial Broadcasting & Communication Equipment)	This equipment is **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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Contents

Introduction

This guide provides an overview of the GPI-8941 General Purpose Interface Processor. The following chapters are included:

- "**Introduction**" summarizes the guide and provides important terms, and conventions.
- "**Before You Begin**" provides general information to keep in mind before installing and configuring your GPI-8941.
- "**Hardware Overview**" an overview of the card-edge controls of the GPI-8941 and the supported rear module.
- "**Physical Installation**" provides instructions for the physical installation of a GPI-8941 card.
- "**GPIO Cabling**" outlines the GPIO cabling designations for the GPI-8941 based on the card type.
- "**Reference Cabling**" provides general information for connecting a reference signal for the GPI-8941.
- "**Serial Cabling**" provides general information on cabling the serial adapter port on the rear module.
- "**Using DashBoard**" provides an overview of launching DashBoard and accessing the GPI-8941 interfaces in the DashBoard window.
- "**Basic Configuration**" provides instructions for configuring the GPI-8941 using the options available in DashBoard.
- "**Setting up Remote Control**" outlines how to specifying the communication protocol for a GPI output, and to set up communications on the Serial or Ethernet port.
- "**Configuring the GPI Inputs**" outlines how to configure each GPI input using the options in DashBoard.
- "**Configuring the GPI Outputs**" outlines how to configure each GPI output using the options in DashBoard.
- "**Monitoring**" provides an overview of the available options for monitoring the inputs and outputs of the card.
- "**Software Upgrades**" outlines how to upgrade the software on the GPI-8941 using the options in DashBoard.
- "**DashBoard Menus**" summarizes the menus and parameters of the GPI-8941 tabs in DashBoard.
- "**Technical Specifications**" provides the specifications for the GPI-8941.
- "**RossTalk Protocol**" provides additional information on the RossTalk protocol when used with the GPI-8941.
- "**Software Licenses**" provides third-party software license information for your GPI-8941.
- "**Service Information**" provides information on the warranty and repair policy for your GPI-8941.
- "**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 GPI-8941:

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

Documentation Conventions

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

Interface Elements

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

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

User Entered Text

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

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

Referenced Guides

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

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

Menu Sequences

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

Important Instructions

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

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

Contacting Technical Support

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

Our 24-hour Hot Line service ensures you have access to technical expertise around the clock. After-sales service and technical support is provided directly by Ross Video personnel. During business hours (Eastern Time), technical support personnel are available by telephone. After hours and on weekends, a direct emergency technical support phone line is available. If the technical support person who is on call does not answer this line immediately, a voice message can be left and the call will be returned shortly. This team of highly trained staff is available to react to any problem and to do whatever is necessary to ensure customer satisfaction.

- **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

The GPI-8941 cards provide an interface between openGear agents, such as DashBoard, and hardware devices that communication via the General Purpose Interface (GPI). Some devices produce outputs (GPI outputs) that are intended to either control other devices or signal their own status. When these signals are connected to inputs (GPI inputs) on the rear module, the card communicates the state of the GPIs via the openGear protocol (OGP) to DashBoard. Similarly, the GPI-8941 card accepts commands via OGP that cause it to product GPI outputs to control external devices.

Table 2.1 Card Models

Card Model	Number of GPI Inputs	Number of GPI Outputs
GPI-8941-I16	16	0
GPI-8941-O16	0	16
GPI-8941-I16-O16	16	16
GPI-8941-I32	32	0
GPI-8941-O32	0	32

Features

The GPI-8941 includes the following features:

- Ability to individually select isolated/pull-to-ground setting for each GPI input
- Ability to individually select contact-closure/voltage-source setting for each GPI output
- Supports the Image Video™ GPI485 serial protocol
- Supports the Image Video™ GPInet protocol over Ethernet
- Supports RossTalk protocol over Ethernet
- Reports status and configuration remotely via DashBoard Control System
- Fits openGear frames
- 5-year transferable warranty

Workflow Diagram

Some devices produce GPI outputs that are intended to either control other devices or signal their own status. When these signals are connected to GPI inputs on the GPI-8941 card, it will communicate the state of the inputs via the openGear protocol (OGP) to DashBoard. Similarly, the GPI-8941 card will accept commands via OGP that cause it to product GPI outputs to control external devices. The GPI-8941 card also communicates to/from other devices via the RossTalk protocol, the Image Video™ GPInet or GPI485 protocols.

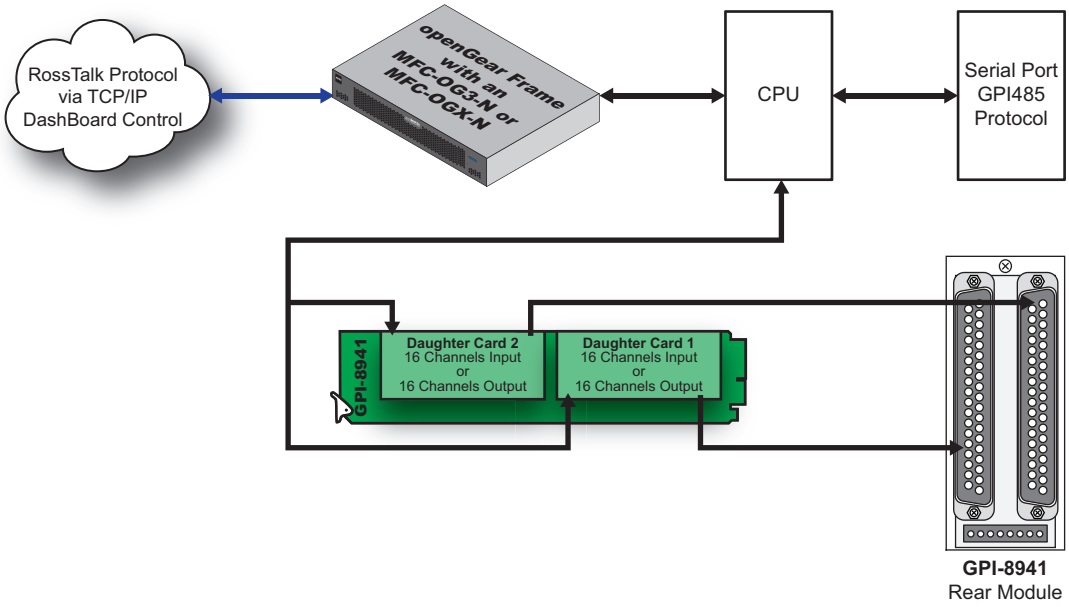


Figure 2.1 Simplified Workflow Diagram

Input Circuit Diagrams

This section provides simplified input circuit diagrams for the GPI-8941.

Figure 2.2 provides a simplified circuit diagram for isolated inputs.

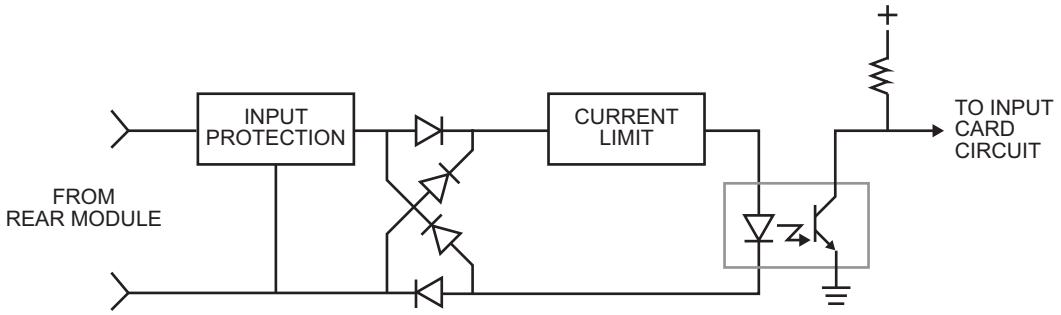


Figure 2.2 Simplified Circuit Diagram — Isolated Inputs

Figure 2.3 provides a simplified circuit diagram for pull to ground inputs.

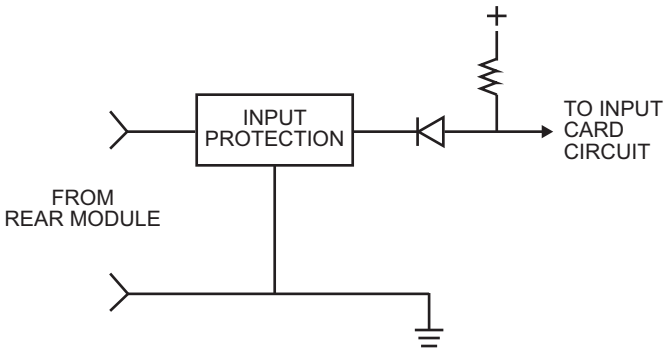


Figure 2.3 Simplified Circuit Diagram — Pull to Ground Inputs

Output Circuit Diagrams

This section provides simplified output circuit diagrams for the GPI-8941.

Figure 2.4 provides a simplified circuit diagram for contact closure outputs.

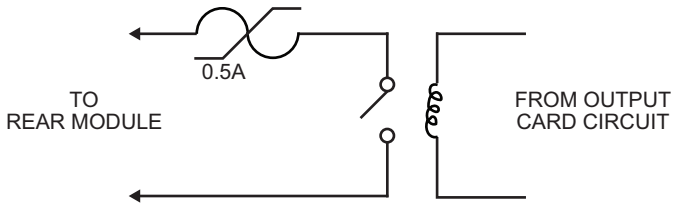


Figure 2.4 Simplified Circuit Diagram — Contact Closure Outputs

Figure 2.5 provides a simplified circuit diagram for voltage source outputs.

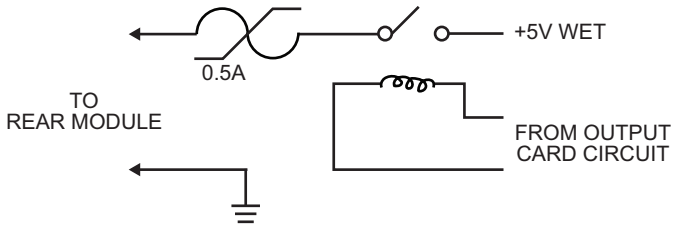


Figure 2.5 Simplified Circuit Diagram — Voltage Source Outputs

User Interfaces

Each card includes the following interfaces.

★ The GPI-8941 cards do not support DataSafe.

DashBoard Control System

DashBoard Control System enables you to monitor and control openGear frames and cards from a computer. DashBoard communicates with other cards in the frame through the MFC-OG3-N or MFC-OGX-N. The DashBoard software and manual are available for download from our website.

For More Information on...

- installing and using DashBoard, refer to the ***DashBoard User Manual***.
- the available menus in DashBoard, refer to the chapter "**DashBoard Menus**" on page 57.

Card-edge Controls

The front-edge of each card features LED indicators for the power, and communication activity.

For More Information on...

- the card-edge LEDs, refer to the section "**Control and Monitoring Features**" on page 17.

Hardware Overview

This chapter provides an overview of the card-edge controls of the GPI-8941.

Card-edge Controls for the GPI-8941

This section provides information on the jumpers, buttons and LEDs for the GPI-8941. Refer to **Figure 3.1** for the location of the card-edge features.

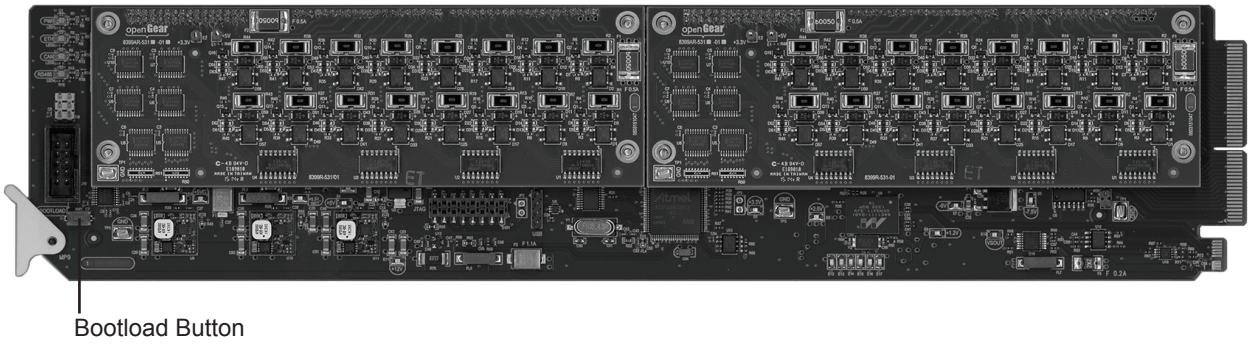


Figure 3.1 GPI-8941 — Card Control Locations

Bootload Button

This button for factory service in the unlikely event of a complete card failure. Do not press this button unless instructed to do so by Ross Technical Support personnel.

Control and Monitoring Features

This section provides information on the card-edge LEDs for the card. Refer to **Figure 3.2** for the location of the LEDs and controls.

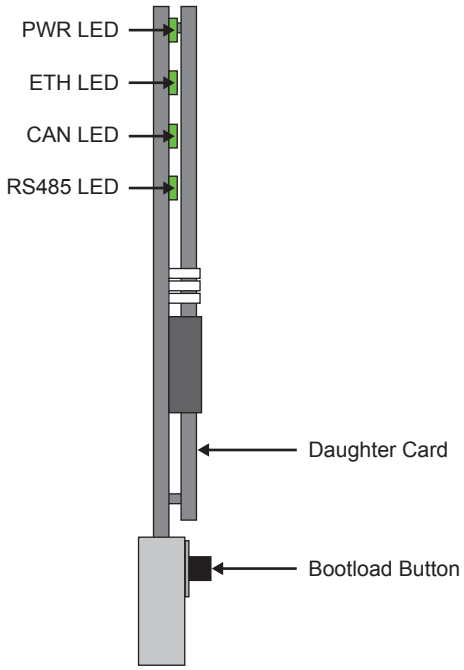


Figure 3.2 Card-edge Controls

Status and Selection LEDs

The front-edge of the card has LED indicators for the power, video input status, and communication activity. Basic LED displays and descriptions are provided in **Table 3.1**.

Table 3.1 LEDs on the Card-edge

LED	Color	Display and Description
PWR	Green	When lit green, this LED indicates that the card is functioning normal and that no anomalies have been detected.
	Flashing Green	When flashing green, this LED indicates the bootloader is waiting for a software upload.
	Flashing Green and Orange	When lit green with flashing orange, this LED indicates there is a signal error, such as a missing or invalid input or reference.
	Orange	When lit orange, this LED indicates the card is powering on.
	Red	When lit red, this LED indicates the card is not operational.
	Off	When off, this LED indicates there is no power to the card.
ETH	Green	When green, this LED indicates that network communication is occurring.
	Off	When off, this LED indicates there is no network connection to the card.
CAN	Flashing Green	When flashing green, this LED indicates that CAN Bus traffic is occurring.
	Off	When off, this LED indicates there is no communication between the card and the MFC-OG3-N or MFC-OGX-N via the CAN Bus in the openGear frame.
RS485	Flashing Green	When flashing green, this LED indicates that serial communication is occurring.
	Green	When green, this LED indicates that the GPI485 is selected as the protocol and the communication is normal. When green, this LED indicates that Port Test is selected as the protocol and will be unlit when a character is received.
	Red	When red, this LED indicates there are no valid GPI485 protocol messages.
	Flashing Red	When flashing red. this LED indicates there are valid messages but no data for the cards groups are being received.
	Off	When off, this LED indicates there is no serial communication to the card and None is selected as the Serial protocol.

Supported Rear Modules

The **8399AR-533** Full Rear Module is required when installing the GPI-8941 in an openGear frame. Each rear module occupies two slots in the frame and accommodates one card.

There are two male DC-37 terminal block connectors on each rear module. Each DC-37 connector on the rear module provides thirty-seven pins. Depending on the card model, the pins may be allocated for GPI inputs, GPI outputs, or a combination.

★ Ensure to use only the supplied back-shells (Ross part number 30-01038) with a back-shell maximum thickness of 0.645" (16.4mm).

For More Information on...

- the number of GPI inputs and outputs for your card, refer to **Table 2.1**.
- cabling the GPI inputs and outputs, refer to the chapter "**GPIO Cabling**" on page 23.
- reference cabling, refer to the chapter "**Reference Cabling**" on page 31.
- serial cabling, refer to the chapter "**Serial Cabling**" on page 33.

Physical Installation

If you have questions pertaining to the installation of GPI-8941, please contact us at the numbers listed in the section "**Contacting Technical Support**". Our technical staff is always available for consultation, training, or service.

Caution — *The DFR-8310 series, the DFR-8320 series, and the DFR-8321 series frames do not support the GPI-8941 cards. You must install the GPI-8941 in an OG3-FR or OGX-FR series frame with an MFC-OG3-N or MFC-OGX-N. Installing the GPI-8941 card and rear module in a frame other than an OG3-FR or OGX-FR series frame can damage the card, the rear module, or both.*

Before You Begin

These installation guidelines assume the following:

- The openGear frame is properly installed.
- The MFC-OG3-N or MFC-OGX-N in the openGear frame is running software version 2.92 or higher.

Static Discharge

Throughout this chapter, please heed the following cautionary note:

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

Removing the Blank Plates from the Rear Panel

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

To remove a blank plate from the openGear frame

1. Locate the slots in the openGear frame you wish to install the GPI-8941 into.
2. Use a Phillips screwdriver to unfasten the required blank plate from the frame backplane.
3. Remove the blank plate from the chassis and set aside.

✶ You must remove one Blank Plate (covering two slots) in the frame.

Installing the Rear Module into the openGear Frame

If the rear module is already installed in the frame, proceed to the section.

To install a rear module into the openGear frame

1. Ensure that the openGear frame is properly installed. Refer to the manual for your frame for details.
2. Seat the bottom of the rear module in the seating slots at the base of the frame's backplane.
3. Align the top holes of the rear module with the screw holes on the top-edge of the frame backplane.
4. Using a Phillips screwdriver and the provided screw, fasten the rear module to the backplane.

✶ Do not fully tighten the screws until after installing the card and you have verified that the GPI-8941 card aligns with the rear module.

Installing the GPI-8941 Card into a Frame

The slot the GPI-8941 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 when using the 8323AR-325 rear module.

Table 4.1 Card Slot Combinations — 8323AR-325

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

To install the GPI-8941 into the openGear frame

1. Locate the slot the GPI-8941 card will slide into.
2. Verify that the GPI-8941 card aligns with the rear module.
3. Using a Phillips screwdriver fasten the rear module to the backplane using the provided screws.

✶ Do not over tighten the screws.

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

GPIO Cabling

This chapter outlines the GPI input and output cabling designations for the GPI-8941.

Overview

The general purpose interface (GPI) connectors are male 37-pin DC sub-miniature connectors with 4-40 jack-screws for mating connector locking.

Inputs

There are two types of GPI inputs: isolated (dry) and pull-to-ground (wet).

- **Isolated Inputs** — The isolated input range is 4-30VDC, either polarity, the current is limited to 3mA. Each input is optically isolated from the other inputs and the main card circuit. To maintain the isolation between the external device and the card, the external device must supply the power for the inputs. If isolation is not required, or if the external device is not able to supply the power for the input, either use the Pull-to-Ground input type or use an external power source to 'wet' the circuit.
- **Pull-to-Ground Inputs** — A pull-to-ground input is activated when the path between the input + pin and the circuit ground pin is closed. The external device closing the path must be capable of pulling 3mA to ground. The open circuit voltage on the input + pin is 5VDC.

Outputs

The general purpose interface (GPI) outputs are Form A (SPST) relay contacts that close when the output is activated. Each output is isolated from the other outputs and the main card circuit except when the output is configured as Voltage source. The relay contacts are rated at a maximum as outlined in Table 7.1 on page 7-2.

There are two types of GPI outputs: contact closure (dry) and voltage source (wet).

- **Contact Closure Outputs** — A contact closure output provides a low resistance path between the two pins when the output is activated, and an open circuit when the output not activated. Each output is isolated from the other outputs and the main card circuit.
- **Voltage Source Outputs** — A voltage source output provides +5VDC on the + pin activated, and 0V when the output is not active. The other pin is ground.

Pinout Mapping

The rear module includes two general purpose interface (GPI) connectors (referred to as Left and Right). What connector(s) your card requires depends on the card model.

Table 5.1 summarizes the required connector and the pins on the rear module based on the card model.

Table 5.1 Card Models

Card Model	Left Connector	Right Connector
GPI-8941-I16	GPI 1-16 Inputs	Not Used
GPI-8941-I32	GPI 1-16 Inputs	GPI 17-32 Inputs
GPI-8941-O16	GPO 1-16 Outputs	Not Used
GPI-8941-O32	GPO 1-16 Outputs	GPO 17-32 Outputs
GPI-8941-I16-O16	GPI 1-16 Inputs	GPO 17-32 Outputs

Figure 5.1 illustrates the left DC-37 connector on the rear module. This connector is always GPI 1-16 and is labeled as Expansion 1 (input or output) in the DashBoard > Product tab.

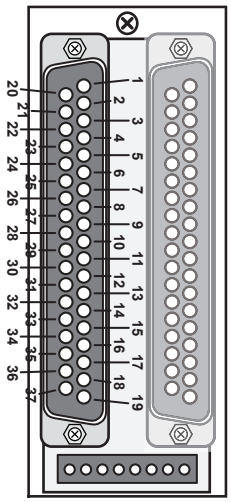


Figure 5.1 Left Connector

Figure 5.2 illustrates the pinouts for the right DC-37 connector on the rear module. This connector is always GPI 17-32 and is labeled as Expansion 2 (none, input, or output) in the DashBoard > Product tab.

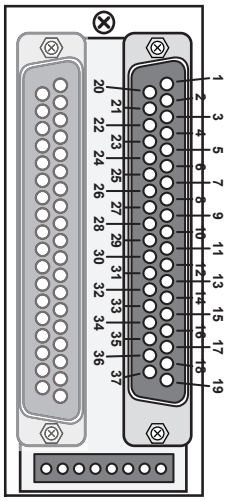


Figure 5.2 Right Connector

GPI-8941-I16 Pinouts

Left Connector Input Function GPI 1-16 Expansion 1							Right Connector Input Function - Not Connect GPI 17-32 Expansion 2 - No Connect						
GPI #	Isolated	Pull-to-Ground	PIN		Pull-to-Ground	Isolated	Isolated	Pull-to-Ground	PIN		Pull-to-Ground	Isolated	GPI #
				1	Chassis GND	Chassis GND				1	Chassis GND	Chassis GND	
	Circuit GND	Circuit GND	20				Circuit GND	Circuit GND	20				
				2	N/C	N/C				2	N/C	N/C	
1	Input 1A	Input 1+	21				N/C	N/C	21				17
				3	Circuit GND	Input 1B				3	N/C	N/C	
2	Input 2A	Input 2+	22				N/C	N/C	22				18
				4	Circuit GND	Input 2B				4	N/C	N/C	
3	Input 3A	Input 3+	23				N/C	N/C	23				19
				5	Circuit GND	Input 3B				5	N/C	N/C	
4	Input 4A	Input 4+	24				N/C	N/C	24				20
				6	Circuit GND	Input 4B				6	N/C	N/C	
5	Input 5A	Input 5+	25				N/C	N/C	25				21
				7	Circuit GND	Input 5B				7	N/C	N/C	
6	Input 6A	Input 6+	26				N/C	N/C	26				22
				8	Circuit GND	Input 6B				8	N/C	N/C	
7	Input 7A	Input 7+	27				N/C	N/C	27				23
				9	Circuit GND	Input 7B				9	N/C	N/C	
8	Input 8A	Input 8+	28				N/C	N/C	28				24
				10	Circuit GND	Input 8B				10	N/C	N/C	
9	Input 9A	Input 9+	29				N/C	N/C	29				25
				11	Circuit GND	Input 9B				11	N/C	N/C	
10	Input 10A	Input 10+	30				N/C	N/C	30				26
				12	Circuit GND	Input 10B				12	N/C	N/C	
11	Input 11A	Input 11+	31				N/C	N/C	31				27
				13	Circuit GND	Input 11B				13	N/C	N/C	
12	Input 12A	Input 12+	32				N/C	N/C	32				28
				14	Circuit GND	Input 12B				14	N/C	N/C	
13	Input 13A	Input 13+	33				N/C	N/C	33				29
				15	Circuit GND	Input 13B				15	N/C	N/C	
14	Input 14A	Input 14+	34				N/C	N/C	34				30
				16	Circuit GND	Input 14B				16	N/C	N/C	
15	Input 15A	Input 15+	35				N/C	N/C	35				31
				17	Circuit GND	Input 15B				17	N/C	N/C	
16	Input 16A	Input 16+	36				N/C	N/C	36				32
				18	Circuit GND	Input 16B				18	N/C	N/C	
	Circuit GND	Circuit GND	37				N/C	N/C	37				
		Circuit GND		19	N/C	N/C				19	N/C	N/C	

GND = Ground

N/C = Not Connected

GPI-8941-I32 Pinouts

Left Connector Input Function GPI 1-16 Expansion 1							Right Connector Input Function GPI 17-32 Expansion 2						
GPI #	Isolated	Pull-to-Ground	PIN		Pull-to-Ground	Isolated	Isolated	Pull-to-Ground	PIN		Pull-to-Ground	Isolated	GPI #
				1	Chassis GND	Chassis GND				1	Chassis GND	Chassis GND	
	Circuit GND	Circuit GND	20				Circuit GND	Circuit GND	20				
				2	N/C	N/C				2	N/C	N/C	
1	Input 1A	Input 1+	21				Input 17A	Input 17+	21				17
				3	Circuit GND	Input 1B				3	Circuit GND	Input 17B	
2	Input 2A	Input 2+	22				Input 18A	Input 18+	22				18
				4	Circuit GND	Input 2B				4	Circuit GND	Input 18B	
3	Input 3A	Input 3+	23				Input 19A	Input 19+	23				19
				5	Circuit GND	Input 3B				5	Circuit GND	Input 19B	
4	Input 4A	Input 4+	24				Input 20A	Input 20+	24				20
				6	Circuit GND	Input 4B				6	Circuit GND	Input 20B	
5	Input 5A	Input 5+	25				Input 21A	Input 21+	25				21
				7	Circuit GND	Input 5B				7	Circuit GND	Input 21B	
6	Input 6A	Input 6+	26				Input 22A	Input 22+	26				22
				8	Circuit GND	Input 6B				8	Circuit GND	Input 22B	
7	Input 7A	Input 7+	27				Input23A	Input 23+	27				23
				9	Circuit GND	Input 7B				9	Circuit GND	Input 23B	
8	Input 8A	Input 8+	28				Input 24A	Input 24+	28				24
				10	Circuit GND	Input 8B				10	Circuit GND	Input 24B	
9	Input 9A	Input 9+	29				Input 25A	Input 25+	29				25
				11	Circuit GND	Input 9B				11	Circuit GND	Input 25B	
10	Input 10A	Input 10+	30				Input 26A	Input 26+	30				26
				12	Circuit GND	Input 10B				12	Circuit GND	Input 26B	
11	Input 11A	Input 11+	31				Input 27A	Input 27+	31				27
				13	Circuit GND	Input 11B				13	Circuit GND	Input 27B	
12	Input 12A	Input 12+	32				Input 28A	Input 28+	32				28
				14	Circuit GND	Input 12B				14	Circuit GND	Input 28B	
13	Input 13A	Input 13+	33				Input 29A	Input 29+	33				29
				15	Circuit GND	Input 13B				15	Circuit GND	Input 29B	
14	Input 14A	Input 14+	34				Input 30A	Input 30+	34				30
				16	Circuit GND	Input 14B				16	Circuit GND	Input 30B	
15	Input 15A	Input 15+	35				Input 31A	Input 31+	35				31
				17	Circuit GND	Input 15B				17	Circuit GND	Input 31B	
16	Input 16A	Input 16+	36				Input 32A	Input 32+	36				32
				18	Circuit GND	Input 16B				18	Circuit GND	Input 32B	
	Circuit GND	Circuit GND	37				Circuit GND	Circuit GND	37				
				19	N/C	N/C				19	N/C	N/C	

GND = Ground

N/C = Not Connected

GPI-8941-O16 Pinouts

Left Connector Output Function GPI 1-16 Expansion 1							Right Connector Output Function - No Connect GPI 17-32 Expansion 2 - No Connect						
GPI #	Contact Closure	Voltage Source	PIN		Voltage Source	Contact Closure	Contact Closure	Voltage Source	PIN		Voltage Source	Contact Closure	GPI #
				1	Chassis GND	Chassis GND				1	Chassis GND	Chassis GND	
	Circuit GND	Circuit GND	20				Circuit GND	Circuit GND	20				
				2	N/C	N/C				2	N/C	N/C	
1	Output 1A	Output 1+	21				N/C	N/C	21				17
				3	Circuit GND	Output 1B				3	N/C	N/C	
2	Output 2A	Output 2+	22				N/C	N/C	22				18
				4	Circuit GND	Output 2B				4	N/C	N/C	
3	Output 3A	Output 3+	23				N/C	N/C	23				19
				5	Circuit GND	Output 3B				5	N/C	N/C	
4	Output 4A	Output 4+	24				N/C	N/C	24				20
				6	Circuit GND	Output 4B				6	N/C	N/C	
5	Output 5A	Output 5+	25				N/C	N/C	25				21
				7	Circuit GND	Output 5B				7	N/C	N/C	
6	Output 6A	Output 6+	26				N/C	N/C	26				22
				8	Circuit GND	Output 6B				8	N/C	N/C	
7	Output 7A	Output 7+	27				N/C	N/C	27				23
				9	Circuit GND	Output 7B				9	N/C	N/C	
8	Output 8A	Output 8+	28				N/C	N/C	28				24
				10	Circuit GND	Output 8B				10	N/C	N/C	
9	Output 9A	Output 9+	29				N/C	N/C	29				25
				11	Circuit GND	Output 9B				11	N/C	N/C	
10	Output 10A	Output 10+	30				N/C	N/C	30				26
				12	Circuit GND	Output 10B				12	N/C	N/C	
11	Output 11A	Output 11+	31				N/C	N/C	31				27
				13	Circuit GND	Output 11B				13	N/C	N/C	
12	Output 12A	Output 12+	32				N/C	N/C	32				28
				14	Circuit GND	Output 12B				14	N/C	N/C	
13	Output 13A	Output 13+	33				N/C	N/C	33				29
				15	Circuit GND	Output 13B				15	N/C	N/C	
14	Output 14A	Output 14+	34				N/C	N/C	34				30
				16	Circuit GND	Output 14B				16	N/C	N/C	
15	Output 15A	Output 15+	35				N/C	N/C	35				31
				17	Circuit GND	Output 15B				17	N/C	N/C	
16	Output 16A	Output 16+	36				N/C	N/C	36				32
				18	Circuit GND	Output 16B				18	N/C	N/C	
	Circuit GND	Circuit GND	37				N/C	N/C	37				
				19	N/C	N/C				19	N/C	N/C	

GND = Ground

N/C = Not Connected

GPI-8941-O32 Pinouts

Left Connector Output Function GPI 1-16 Expansion 1							Right Connector Output Function GPI 17-32 Expansion 2						
GPI #	Contact Closure	Voltage Source	PIN		Voltage Source	Contact Closure	Contact Closure	Voltage Source	PIN		Voltage Source	Contact Closure	GPI #
				1	Chassis GND	Chassis GND				1	Chassis GND	Chassis GND	
	Circuit GND	Circuit GND	20				Circuit GND	Circuit GND	20				
				2	N/C	N/C				2	N/C	N/C	
1	Output 1A	Output 1+	21				Output 17A	Output 17+	21				17
				3	Circuit GND	Output 1B				3	Circuit GND	Output 17B	
2	Output 2A	Output 2+	22				Output 18A	Output 18+	22				18
				4	Circuit GND	Output 2B				4	Circuit GND	Output 18B	
3	Output 3A	Output 3+	23				Output 19A	Output 19+	23				19
				5	Circuit GND	Output 3B				5	Circuit GND	Output 19B	
4	Output 4A	Output 4+	24				Output 20A	Output 20+	24				20
				6	Circuit GND	Output 4B				6	Circuit GND	Output 20B	
5	Output 5A	Output 5+	25				Output 21A	Output 21+	25				21
				7	Circuit GND	Output 5B				7	Circuit GND	Output 21B	
6	Output 6A	Output 6+	26				Output 22A	Output 22+	26				22
				8	Circuit GND	Output 6B				8	Circuit GND	Output 22B	
7	Output 7A	Output 7+	27				Output 23A	Output 23+	27				23
				9	Circuit GND	Output 7B				9	Circuit GND	Output 23B	
8	Output 8A	Output 8+	28				Output 24A	Output 24+	28				24
				10	Circuit GND	Output 8B				10	Circuit GND	Output 24B	
9	Output 9A	Output 9+	29				Output 25A	Output 25+	29				25
				11	Circuit GND	Output 9B				11	Circuit GND	Output 25B	
10	Output 10A	Output 10+	30				Output 26A	Output 26+	30				26
				12	Circuit GND	Output 10B				12	Circuit GND	Output 26B	
11	Output 11A	Output 11+	31				Output 27A	Output 27+	31				27
				13	Circuit GND	Output 11B				13	Circuit GND	Output 27B	
12	Output 12A	Output 12+	32				Input 28A	Output 28+	32				28
				14	Circuit GND	Output 12B				14	Circuit GND	Output 28B	
13	Output 13A	Output 13+	33				Output 29A	Output 29+	33				29
				15	Circuit GND	Output 13B				15	Circuit GND	Output 29B	
14	Output 14A	Output 14+	34				Output 30A	Output 30+	34				30
				16	Circuit GND	Output 14B				16	Circuit GND	Output 30B	
15	Output 15A	Output 15+	35				Output 31A	Output 31+	35				31
				17	Circuit GND	Output 15B				17	Circuit GND	Output 31B	
16	Output 16A	Output 16+	36				Output 32A	Output 32+	36				32
				18	Circuit GND	Output 16B				18	Circuit GND	Output 32B	
	Circuit GND	Circuit GND	37				Circuit GND	Circuit GND	37				
				19	N/C	N/C				19	N/C	N/C	

GND = Ground

N/C = Not Connected

GPI-8941-I16-O16 Pinouts

Left Connector Input Function GPI 1-16 Expansion 1							Right Connector Output Function GPI 17-32 Expansion 2						
GPI #	Isolated	Pull-to-Ground	PIN		Pull-to-Ground	Isolated	Contact Closure	Voltage Source	PIN		Voltage Source	Contact Closure	GPI #
				1	Chassis GND	Chassis GND				1	Chassis GND	Chassis GND	
	Circuit GND	Circuit GND	20				Circuit GND	Circuit GND	20				
				2	N/C	N/C				2	N/C	N/C	
1	Input 1A	Input 1+	21				Output 17A	Output 17+	21				17
				3	Circuit GND	Input 1B				3	Circuit GND	Output 17B	
2	Input 2A	Input 2+	22				Output 18A	Output 18+	22				18
				4	Circuit GND	Input 2B				4	Circuit GND	Output 18B	
3	Input 3A	Input 3+	23				Output 19A	Output 19+	23				19
				5	Circuit GND	Input 3B				5	Circuit GND	Output 19B	
4	Input 4A	Input 4+	24				Output 20A	Output 20+	24				20
				6	Circuit GND	Input 4B				6	Circuit GND	Output 20B	
5	Input 5A	Input 5+	25				Output 21A	Output 21+	25				21
				7	Circuit GND	Input 5B				7	Circuit GND	Output 21B	
6	Input 6A	Input 6+	26				Output 22A	Output 22+	26				22
				8	Circuit GND	Input 6B				8	Circuit GND	Output 22B	
7	Input 7A	Input 7+	27				Output 23A	Output 23+	27				23
				9	Circuit GND	Input 7B				9	Circuit GND	Output 23B	
8	Input 8A	Input 8+	28				Output 24A	Output 24+	28				24
				10	Circuit GND	Input 8B				10	Circuit GND	Output 24B	
9	Input 9A	Input 9+	29				Output 25A	Output 25+	29				25
				11	Circuit GND	Input 9B				11	Circuit GND	Output 25B	
10	Input 10A	Input 10+	30				Output 26A	Output 26+	30				26
				12	Circuit GND	Input 10B				12	Circuit GND	Output 26B	
11	Input 11A	Input 11+	31				Output 27A	Output 27+	31				27
				13	Circuit GND	Input 11B				13	Circuit GND	Output 27B	
12	Input 12A	Input 12+	32				Input 28A	Output 28+	32				28
				14	Circuit GND	Input 12B				14	Circuit GND	Output 28B	
13	Input 13A	Input 13+	33				Output 29A	Output 29+	33				29
				15	Circuit GND	Input 13B				15	Circuit GND	Output 29B	
14	Input 14A	Input 14+	34				Output 30A	Output 30+	34				30
				16	Circuit GND	Input 14B				16	Circuit GND	Output 30B	
15	Input 15A	Input 15+	35				Output 31A	Output 31+	35				31
				17	Circuit GND	Input 15B				17	Circuit GND	Output 31B	
16	Input 16A	Input 16+	36				Output 32A	Output 32+	36				32
				18	Circuit GND	Input 16B				18	Circuit GND	Output 32B	
	Circuit GND	Circuit GND	37				Circuit GND	Circuit GND	37				
				19	N/C	N/C				19	N/C	N/C	

GND = Ground

N/C = Not Connected

Reference Cabling

The GPI-8941 accepts a black-burst or tri-level sync input from either of the openGear frame **REF** ports. A reference is needed if vertically timed switching is required.

For More Information on...

- configuring a timing window, refer to the section "**Setting up the Vertical Reference Timing Window**" on page 39.
- the reference inputs on the openGear frame, refer to its user guide.

Reference Cabling

Connect a reference source to the **REF1** or **REF 2** BNCs on the openGear frame. Refer to **Figure 6.1** for BNC locations. Ross Video does not supply this cable.

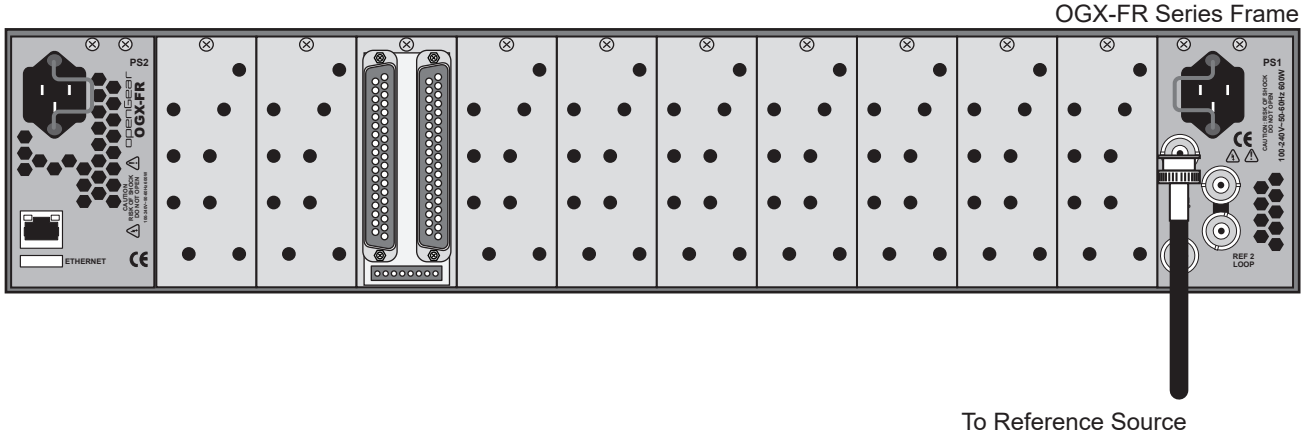


Figure 6.1 Cabling — Reference Input BNCs on the Frame

Serial Cabling

The **Serial** adapter port on the rear module provides an RS-485 connection. The port supports the Image Video™ GPI485 serial protocol for control and status reporting. Refer to the user manual for your external device for the specific pinout information and the required port to use.

For More Information on...

- serial protocol, refer to the section "**Enabling the GPI-8941 for the GPI485 Serial Protocol**" on page 42.

Serial Adapter Port on the Rear Module

The **Serial** adapter port on the rear module is located under the two DC-37 GPI connectors. The Serial port is a Molex® 8-circuit with a 2.00mm pitch micro Latch. A cable assembly is supplied with the GPI-8941 that provides a female DE-9 connection. **Figure 7.1** provides the pinout mapping for the **Serial** adapter port on the rear module.

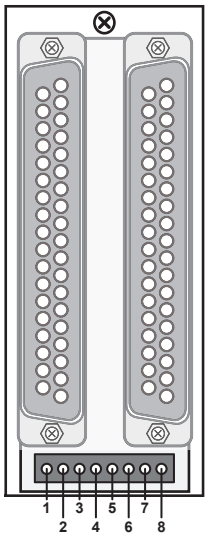


Figure 7.1 Pinouts — Serial Connector on the Rear Module

Table 7.1 provides the pinout assignment for the **Serial** DE-9 connector on the serial interface cable to the Serial port on the rear module.

Table 7.1 Pinouts for the Serial Interface Cable

Serial DE-9 Connector		Function	Direction	Serial Port on Rear Module
	1	No connection		1
6		Ground		2
	2	Tx-	From GPI-8941	5
7		Tx+	From GPI-8941	6
	3	Rx+	To GPI-8941	3
8		Rx-	To GPI-8941	4
	4	Ground		7
9		No connection		8
	5	No connection		

Serial Interface Cable

The serial interface cable (Ross P/N 8941CR-100) with a DE-9 female connector on one end and a 8-pin serial adapter (female) connection on the other end.

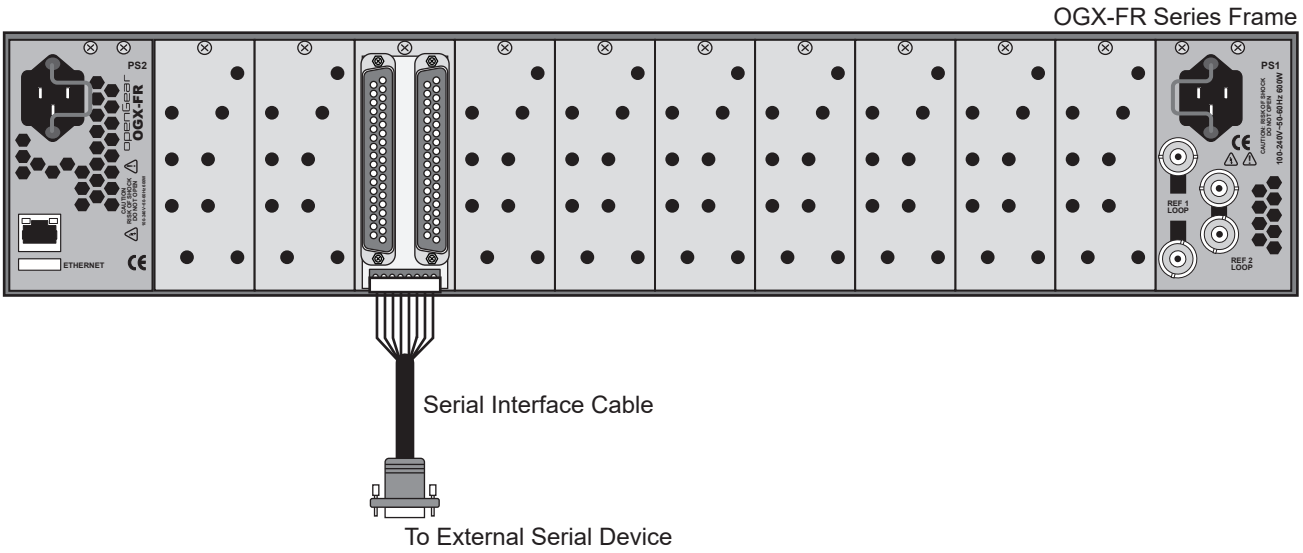


Figure 7.2 Example — GPI 8941 Serial Port to an External Serial Device

Using DashBoard

The DashBoard Control System enables you to monitor and control openGear frames and cards from a computer. DashBoard communicates with cards in the openGear frame through the MFC-OG3-N or MFC-OGX-N Network Controller Card. This controller card is required in order to use DashBoard to monitor the GPI-8941.

Before You Begin

Before proceeding, ensure that DashBoard software version 6.2.0 or higher is installed on a PC connected to your facility network. The DashBoard software and user manual are available from the Ross Video website.

For More Information on...

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

Accessing the GPI-8941 in DashBoard

Ensure that the openGear frame with the GPI-8941 card(s) is displayed in the Tree View located on the left-side of the DashBoard window. It may take 30 seconds or more to update the Tree View. Consult the ***MFC-OG3-N and MFC-8322-S User Guide*** and ***DashBoard User Manual*** should the Tree View not display the GPI-8941 node.

To launch DashBoard

1. Ensure that you are running DashBoard software version 6.2.0 or higher.
2. Launch DashBoard by double-clicking its icon on your desktop.

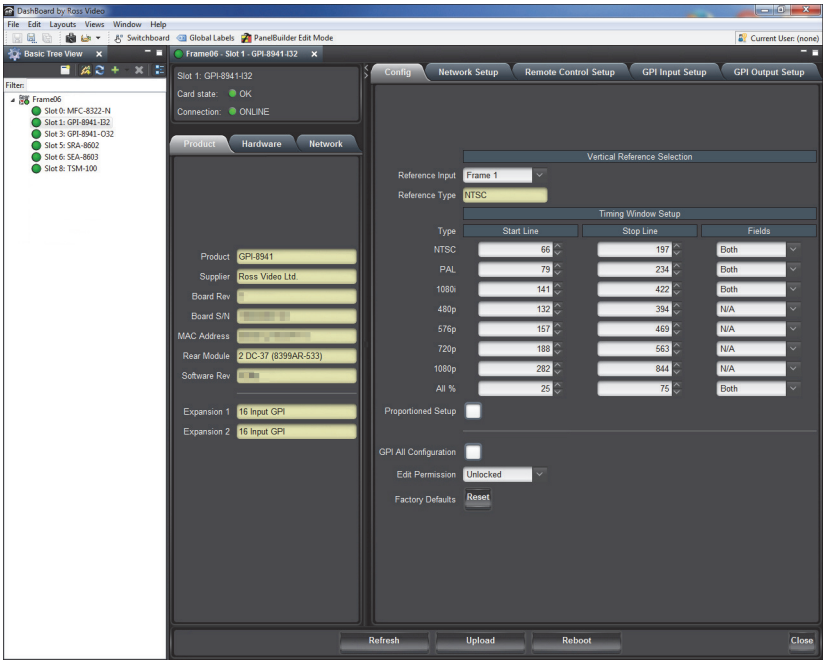
To access the GPI-8941 in DashBoard

1. From the **Tree View**, expand the node for the openGear frame your cards are installed in.

   A list of cards installed in the frame displays.

2. Double-click the node for a card to display its menus in the right-side of the DashBoard window.

   In the example below, the node for Frame 6 is expanded to show a list of cards including a GPI-8941-I32 and a GPI-8941-O32.



DashBoard Interfaces Overview

You configure your GPI-8941 card using the DashBoard application, which is available from our website. The DashBoard user manual can also be downloaded from our website.

The GPI-8941 user interface is depicted below. It is divided into a status panel on the left, and a configuration panel on the right. Each panel has multiple tabs, corresponding to the various functions in the card.

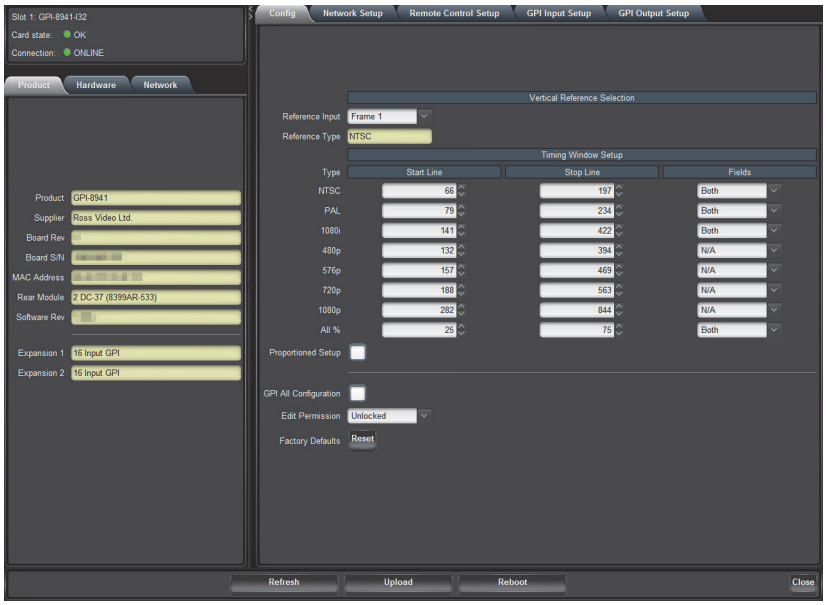


Figure 8.1 Example of the GPI-8941-I32 Interface in DashBoard

The following tabs are available:

- **Product, Hardware, Network** — These tabs provide general read-only information on the card, including firmware version, uptime, temperatures, and other parameters.
- **Config** — This tab provides options for selecting a reference source, defining the vertical timing window, and enabling the simultaneous GPI configuration feature.
- **Network Setup** — This tab is used to specify an IP addresses for the card.
- **Remote Control Setup** — This tab is used for specifying the protocols the GPI-8941 card will use to communicate with external devices.
- **GPI Input Setup** — When your card provides GPI inputs, this tab is populated with setup menus. This tab is divided into two sub-tabs: Setup and Report. Use the Setup sub-tab to define each GPI Input connection on the rear module. Use the Report sub-tab to configure how reports are sent back to the external controlling and monitoring devices.
- **GPI Output Setup** — When your card provides GPI outputs, this tab is populated with setup menus. This tab is divided into three sub-tabs: Setup, Report, and Control. Use the Setup tab to define each GPI output connection on the rear module. Use the Report sub-tab to configure how reports are sent back to the external controlling and monitoring devices. Use the Control tab to enable or restrict control of the GPI outputs by the specified protocols.

For More Information on...

- the read-only fields in the status tabs, refer to the section "**Status Tabs**" on page 57.
- the Network Setup tab, refer to the section "**Network Setup Tab**" on page 60.
- the other tabs in DashBoard for your card, refer to the chapter "**DashBoard Menus**" on page 57.

Basic Configuration

This chapter provides instructions for configuring the GPI-8941 using the options available in DashBoard.

✶ This chapter assumes that DashBoard is launched on your computer and the GPI-8941 interface displays in the right-side of the DashBoard window.

Before You Begin

Verify or note the following before configuring your GPI-8941 card:

- The GPI-8941 card uses electro-mechanical relays. From the time the command to close is give until the contacts physically close can take tens of milliseconds. Also, changing a mechanical relays state may result in contact bounce.
- The GPI-8941 card updates Dashboard status of inputs and outputs approximately once per second.
- Your computer is running DashBoard version 8.0 or higher.
- The openGear frame that houses the GPI-8941 card is installed on the same network as your DashBoard client computer or to a network that has a route to the network your DashBoard client computer is on.
- The GPI-8941 card must be installed in an openGear frame with an MFC-OG3-N or MFC-OGX-N.
- The MFC-OG3-N or MFC-OGX-N in your openGear frame is running software version 2.92 or higher. This information is displayed in the **Product** tab.
- The **Default Port Speed** for the GPI-8941 card is set to **100Mb/s**. This setting is located in the **Network** tab for the Network Controller Card.

For More Information on...

- the MFC-OG3-N or MFC-OGX-N, refer to its user guide.
- connecting your openGear frame to a network, refer to the user guide for your frame.

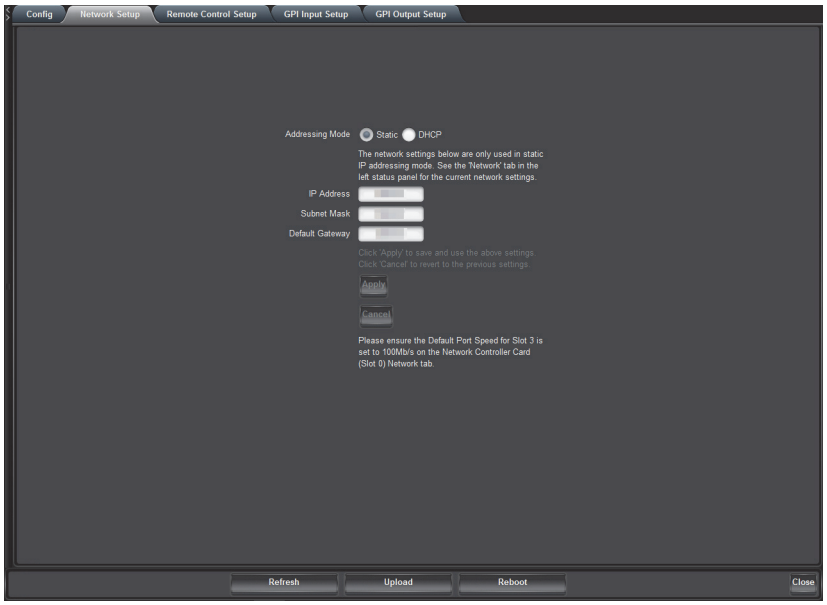
Assigning an IP Address to the Card

The GPI-8941 card takes advantage of the internal Ethernet interface connected to the switch on the MFC-OG3-N or MFC-OGX-N in the openGear frame. This enables the GPI-8941 card to use RossTalk and GPInet commands to trigger GPI Outputs and report GPI Input events.

✶ Use this procedure only if you need to assign the GPI-8941 series card a specific IP Address. This IP Address must be unique in your facility. Contact your IT Department for details.

To assign a specific IP address to the GPI-8941 card

1. From the **Tree View**, select the node for the GPI-8941 you want to configure.
2. Select the **Network Setup** tab.



3. If you are manually configuring the Ethernet settings:
   a. Select **Static** for the **Addressing Mode**.
   b. Enter the **IP Address**, **Subnet Mask**, and **Default Gateway** settings for the card.
   c. Ross Video recommends using a static IP Address.
4. If you want the network settings to be automatically obtained and your facility has a DHCP server, select **DHCP** for the **Addressing Mode**.
5. Click **Apply** to save the new settings.

Setting up the Reference

The **Config** tab in DashBoard enables you to specify which **REF** port on the openGear frame is the reference source for your card. You can also specify a vertical reference timing window based on a supported reference signal format.

For More Information on...

- cabling a reference source to your openGear frame, refer to the chapter "**Reference Cabling**" on page 31.

Selecting a Reference Source

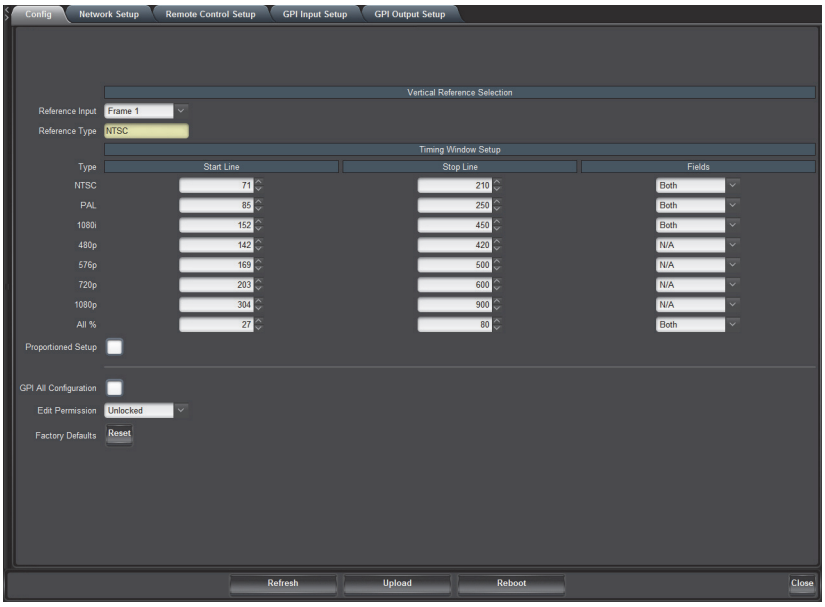
A reference source is used to co-ordinate the timing of selected GPI outputs so that they nominally occur in a specific interval of the video frame (with the timing uncertainty inherent in electromechanical relays). This step is not necessary for the GPI-8941-I16 and GPI-8941-I32 cards.

For More Information on...

- the options in the **Reference** menu, refer to the section "**Config Tab**" on page 59.

To select the reference source for your card

1. From the **Tree View**, select the node for the GPI-8941 card you want to configure.
2. Select the **Config** tab.



3. Select a reference source from the **Reference Input** menu.

   The **Reference Type** status field on the **Config** tab updates when a valid reference signal is detected.

Setting up the Vertical Reference Timing Window

The vertical reference is used to synchronize an output change timing window. Once you have selected the reference source, use the Timing Window options in DashBoard to specify the start and end of the timing window.

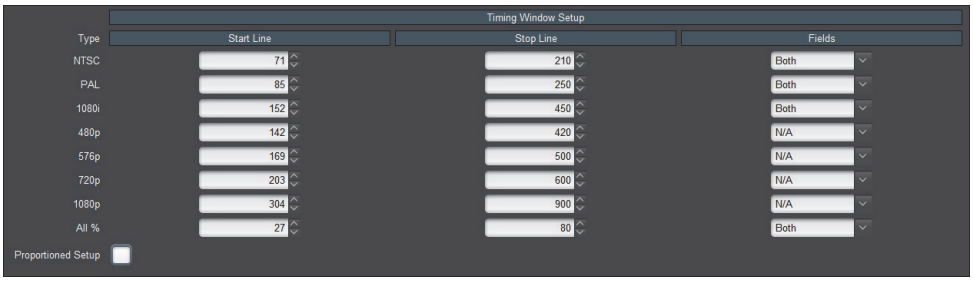
You can use a specific video format to define the Start and Stop Lines, or use the Proportional Enable option to affect all reference types as the same time (regardless of the video format). For example, setting the window to run from 16% (Start Line) to 89% (Stop Line) will give a 1080p signal a window that starts on line 173 and ends on line 961 whereas a 480p window starts on line 76 and ends on line 432.

Keep the following in mind before setting up the vertical reference timing for your card:

- Outputs that are configured to use the vertical reference will only change during the output change timing window.
- Output changes received outside the window will wait for the start of the next window.
- Outputs that are not configured to use the vertical reference will change immediately.

To set up the timing window using specific lines for a format

1. From the **Tree View**, select the node for the GPI-8941 card you want to configure.
2. Select the **Config** tab.
3. Locate the **Timing Window Setup** area of the tab.



4. Locate the video format for the reference signal in the **Type** list.
5. Use the **Start Line** field to specify the line in the video signal that marks the start of the timing window.

6. Use the **Stop Line** field to specify the line in the video signal that marks the end of the timing window.
7. Use the **Fields** menu to specify which fields the timing window will apply to. If you are using a progressive format signal, this menu is not applicable.
8. Repeat this procedure for each video format that your facility uses as a reference signal.

To set up the timing window based on a percentage

1. From the **Tree View**, select the node for the GPI-8941 card you want to configure.
2. Select the **Config** tab.
3. Locate the **Timing Window Setup** area of the tab.
4. Locate the **All%** row in the **Type** list. The cells in this row will be a *percentage* of the video field and not specific lines.
5. Select the **Proportioned Setup** box to apply the **All%** settings.
6. Use the **Start Line** field to specify the percentage of the video field that marks the start of the timing window.

✶ Notice how the fields in the Start Line column and Stop Line column update based on the value entered into the corresponding All% cell.

7. Use the **Stop Line** field to specify the percentage of the video field that marks the end of the timing window.

Setting up Remote Control

This chapter outlines how to specifying the communication protocol for a GPI output, and to set up communications on the Serial or Ethernet port.

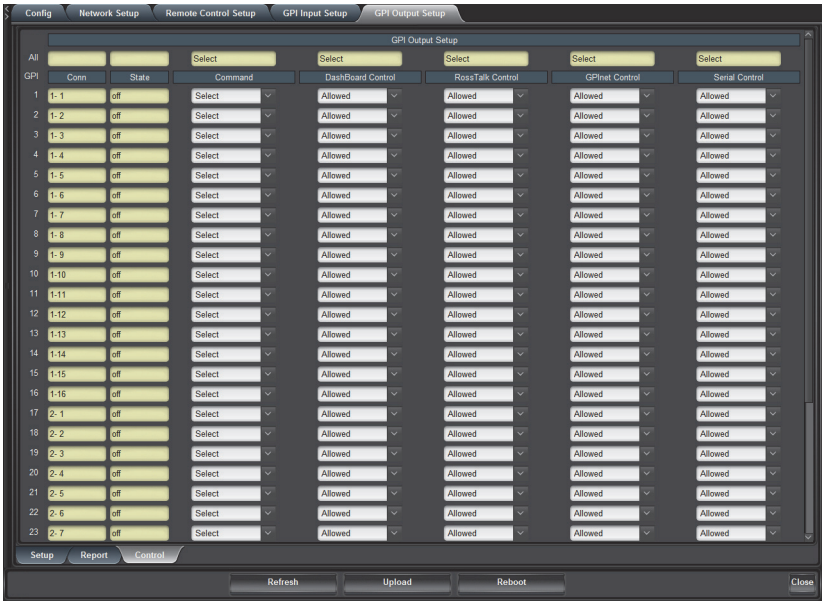
Specifying the Protocol for an Output

Each GPI Output can be configured to use or exclude the supported communication protocols.

✶ If the **GPI All Configuration** box is selected in the **Config** tab, you can change the settings for all GPI Outputs on the **Control** tab.

To specify the protocol for a GPI Output

1. From the **Tree View**, select the node for the GPI-8941 you want to configure.
2. Select the **GPI Output Setup** tab.
3. Select the **Control** tab located at the bottom of the **GPI Output Setup** tab.



1. Use the **Command** menu to control the GPI output directly from DashBoard and specify the trigger type usage for the specified GPI output connection. This is a control command sent from DashBoard where:
   - An **On** command will activate the output.
   - An **Off** command will deactivate the output.
   - A **Trigger** command will activate the output and then deactivate it after the **Pulse Width** setting.
2. Use the **DashBoard Control** menu to enable the user to change the control settings for the GPI output connection via the DashBoard menus (Allowed) or not (Not Allowed).

✶ When **DashBoard Command** is set to **Disable**, custom panels created in DashBoard using the OIDs will not be able to control the GPI.

3. Use the **RossTalk Control** menu to enable a RossTalk command to change the state of the GPI output connection (Allowed) or not (Not Allowed).
4. Use the **GPInet Control** menu to enable an GPInet Ethernet command to change the state of the GPI output connection (Allowed) or not (Not Allowed).

5. Use the **Serial Control** menu to enable a serial command to change the state of the GPI output connection (Allowed) or not (Not Allowed).
6. Repeat steps 1 to 5 for each GPI output connection you want to configure.

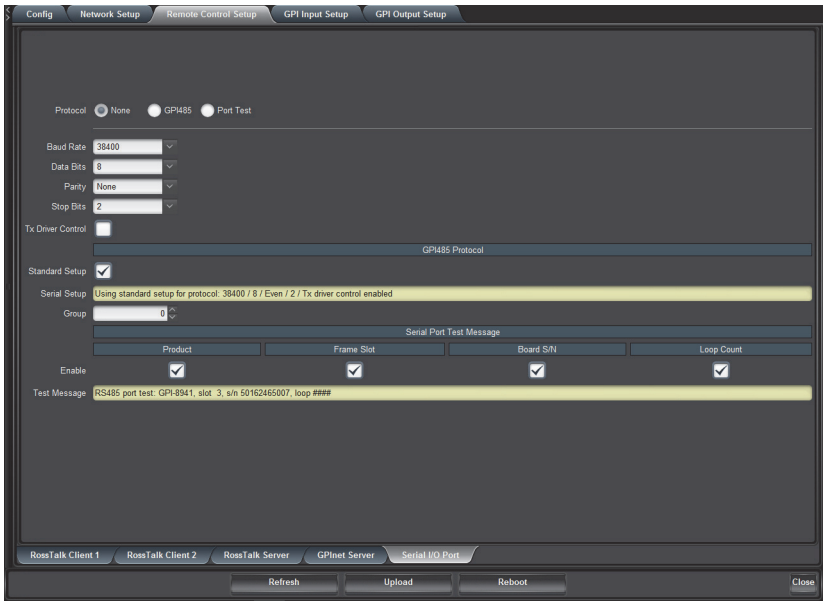
Enabling the GPI-8941 for the GPI485 Serial Protocol

Each card includes an RS-485 serial port interface on the rear module. This port enables the card to use the Image Video™ GPI485 Serial protocol for control and status reporting.

You must enable serial protocol communication via the options in the Remote Control Setup tab in DashBoard. There are two methods for configuring GPI485 serial communications: Standard (using the settings specified by the protocol) and Custom. This section outlines both methods.

To enable GPI485 standard serial communications

1. From the **Tree View**, select the node for the GPI-8941 you want to configure.
2. Select the **Remote Control Setup** tab.
3. Select the **Serial I/O Port** tab located at the bottom of the **Remote Control Setup** tab.
4. Select **GPI485** from the **Protocol** options.
5. Select the **Standard Setup** box in the **GPI485 Protocol** area.
   - The **Baud Rate**, **Data Bits**, **Parity**, **Stop Bits**, and **Tx Driver Control** settings in the Serial I/O Port Setup area are ignored.
   - The **Serial Setup** field in the **GPI485 Protocol** area reports the values that the protocol defines as standard.



To enable GPI485 custom serial communications

1. From the **Tree View**, select the node for the GPI-8941 card you want to configure.
2. Select the **Remote Control Setup** tab.
3. Select the **Serial I/O Port** tab located at the bottom of the **Remote Control Setup** tab.
4. Select **GPI485** from the **Protocol** options.
5. Configure the **Baud Rate**, **Data Bits**, **Parity**, **Stop Bits**, and **Tx Driver Control** settings as required for your device communicating with the GPI-8941 over the serial port.

Specifying a Group Number

The GPI485 serial protocol organizes all GPIs into groups of 8 up to a total of 64 groups. **Table 10.1** outlines the number of groups each card model supports.

Table 10.1 Groups Based on the Card Model

Card Model	Number of Groups
GPI-8941-I16	2
GPI-8941-O16	2
GPI-8941-I16-O16	2
GPI-8941-I32	4
GPI-8941-O32	4

To specify the first group number for the card

1. From the **Tree View**, select the node for the GPI-8941 card you want to configure.
2. Select the **Remote Control Setup** tab.
3. Select the **Serial I/O Port** tab located at the bottom of the **Remote Control Setup** tab.
4. Use the **Group** field in the **GPI485 Protocol** area to specify the first group that the card GPI are assigned to.

   For example, for a GPI-8941-I32 you could set the Group to 10. This would specify that GPI 1-8 on the card are in Group 10, GPI 9-16 are in Group 11, GPI 17-24 are in Group 12 etc.

   The GPI-8941-I16-O16 use the same groups to control the outputs and report the inputs. I.e. GPI inputs 1-8 will be reported on the first group and GPI outputs 1-8 will be controlled by the first group. GPI inputs 9-16 and GPI outputs will use the second group.

Setting up Remote Control via an Ethernet Protocol

The GPI-8941 card can communicate over Ethernet using the RossTalk protocol or the Image Video™ GPInet protocol. Use the options in the GPI-8941 Remote Control Setup tab to configure the Ethernet protocol that your card will use to communicate with external devices.

Before You Begin

Ensure the following tasks are completed:

- The MFC-OG3-N or MFC-OGX-N in your openGear frame is running software version 2.92 or higher. This information is displayed in the **Product** tab.
- The **Default Port Speed** for the GPI-8941 card is set to **100Mb/s**. This setting is located in the **Network** tab for the MFC-OG3-N or MFC-OGX-N.
- The openGear frame that houses the GPI-8941 series card is installed on the same network as your DashBoard client computer or to a network that has a route to the network your DashBoard client computer is on. Refer to the user guide for your frame for details on connecting your frame to a network.

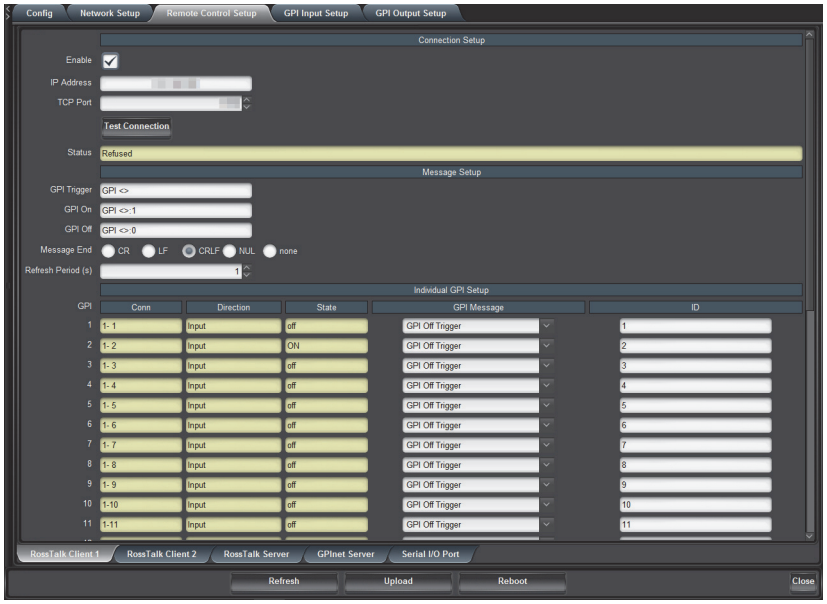
Setting up the RossTalk Clients

You can configure the GPI-8941 card to communicate with up to two external devices via the RossTalk protocol.

To setup communication with a RossTalk Client

1. From the **Tree View**, select the node for the GPI-8941 you want to configure.
2. Select the **Remote Control Setup** tab.

3. Select the **RossTalk Client 1** tab located at the bottom of the **Remote Control Setup** tab.



4. Use the **IP Address** field to specify the IP Address of the external device to send the RossTalk message to.
5. Use the **TCP Port** field to specify the port the external device connects to.
6. Click **Test Connection** to open and close a connection to the external device without sending any messages.

To configure individual GPIs

1. In the **Individual GPI Setup** area, locate the row for the GPI you wish to configure for the message.
2. Use the **GPI Message** menu to select the type of message sent for that GPI. Choose from the following:
   - **GPI On Trigger** — sends a GPI trigger message when the GPI goes from off to on.
   - **GPI Off Trigger** — sends a GPI trigger message when the GPI goes from on to off.
   - **GPI Level** — sends a GPI On message when the GPI goes from off to on and a GPI Off message when the GPI goes from on to off. The GPI will also be automatically refreshed if the Refresh Period is not set to zero (0).
   - **No message** — does not send messages for the GPI.
3. Use the **ID** field to specify a GPI identification string that is inserted in place of the <> in each GPI message. Each ID can be up to 4 characters.

To configure the RossTalk message to send to an external device

1. If the **GPI Message** menu is set to **GPI On Trigger** or **GPI Off Trigger**:
   a. Use the **GPI Trigger** field to send a GPI trigger message where <> is replaced by the GPI ID specified in step 3 above.
   b. Enter a message that is no longer than 32 characters.
2. If the **GPI Message** menu is set to **GPI Level**:
   a. Use the **GPI On** and **GPI Out** fields to send as GPI Level messages where <> is replaced by the GPI ID specified in step 3 above.
   b. Enter a message that is no longer than 32 characters.
3. Use the **Message End** options to specify what is sent at the end of each GPI message. Refer to Table 6.7 on page 7 for a list of options.
4. If the **GPI Message** is set to **GPI Level**, use the **Refresh Period** field to specify the number of seconds between automatic refreshing of the GPI level messages.

Setting up Communications for a RossTalk Server

The section is applicable if the GPI-8941 card needs to open a TCP port for a RossTalk server.

To communicate with a server via RossTalk

1. From the **Tree View**, select the node for the GPI-8941 you want to configure.
2. Select the **Remote Control Setup** tab.
3. Select the **RossTalk Server** tab located at the bottom of the **Remote Control Setup** tab.
4. Use the **TCP Port** field to specify the port number external devices will use to connect to the GPI-8941 card.
5. Select the **Enable** box.
6. Click **Apply** at the bottom of the tab to save the new settings.

Troubleshooting RossTalk Communications

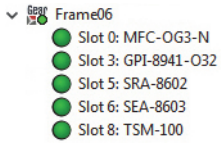
This section provides troubleshooting tips should you experience issues creating a RossTalk connection.

Verify the MFC-OG3-N or MFC-OGX-N Card Software Version

Ensure the MFC-OG3-N or MFC-OGX-N in your openGear frame is running software version 2.92 or higher.

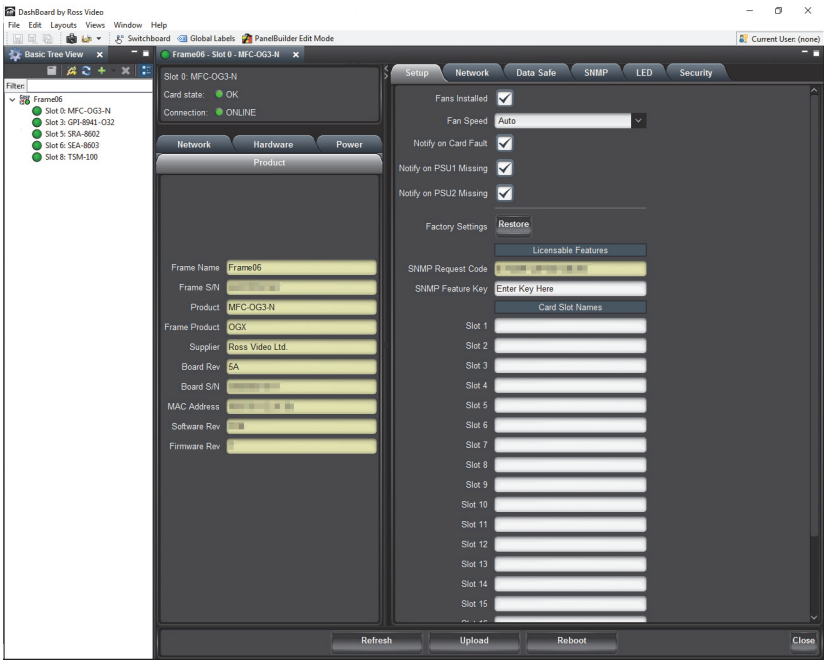
To verify the MFC-OG3-N or MFC-OGX-N software version

1. In the Basic Tree View of DashBoard, locate the openGear frame that houses the GPI-8941 card.
2. Double-click the openGear frame node in the Basic Tree View to display a list of sub-nodes.



3. Double-click the **Slot 0** sub-node.

   The interface for the MFC-OG3-N or MFC-OGX-N displays in the DashBoard window.



4. Select the **Product** tab.
5. Verify that the **Software Rev** field reports a version of 2.92 or higher.

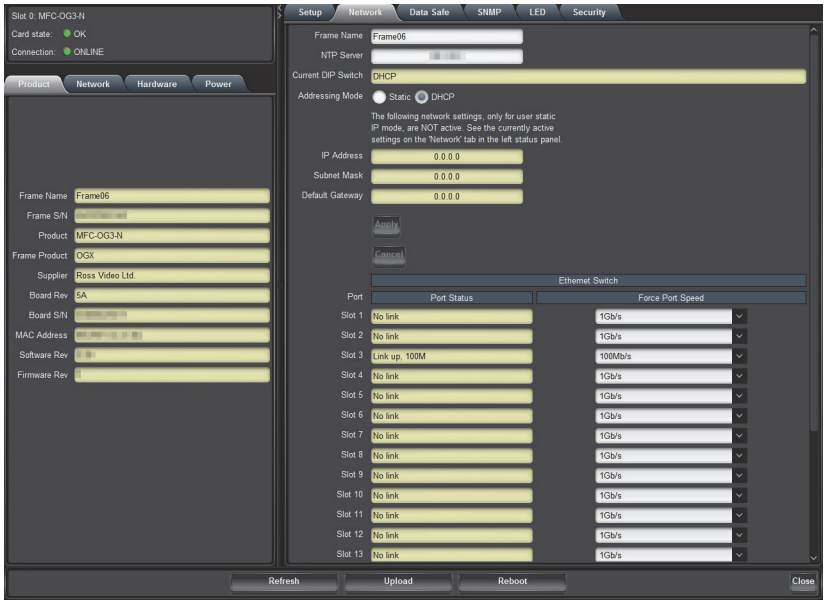
   In the example provide in 3, the card reports a version of 3.00.

Verify the Default Port Speed for the GPI-8941Card

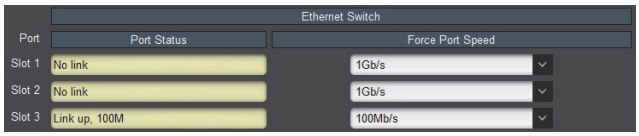
Ensure that the Default Port Speed for the GPI-8941 card is set to 100Mb/s on the MFC-OG3-N or MFC-OGX-N.

To verify the Default Port Speed for the GPI-8941 card

1. Display the MFC-OG3-N or MFC-OGX-N window as outlined in steps 1 to 3 of the procedure "**To verify the MFC-OG3-N or MFC-OGX-N software version**" on page 45.
2. Select the **Network** tab.



3. Locate the slot for the GPI-8941 card in the **Ethernet Switch** area of the **Network** tab.
4. Verify that the **Force Port Speed** field for the slot is set to 100Mb/s.



Verify the IP Address of the GPI-8941 Card

Ensure the GPI-8941 card has a valid IP address assigned to it. Check that network address is valid for your installation.

To verify the IP Address of your GPI-8941 card

1. Display the GPI-8941 card interface in DashBoard as outlined in "**To access the GPI-8941 in DashBoard**" on page 35
2. Select the **Network** tab.
3. Verify the **Current Network Settings** fields are reporting the correct information.
4. To update the network settings for your GPI-8941 card:
   a. Contact your IT Department to obtain a valid IP address.
   b. Follow the instructions given in "**Assigning an IP Address to the Card**" on page 37.

Verify that the GPI-8941 Card is Available on the Network

Ping the GPI-8941 card using the **Command Prompt** function of your DashBoard client computer. Refer to the documentation for your client computer for details on using the Command Prompt.

Verify the GPI-8941 RossTalk Client is Configured Correctly

Ensure that the GPI-8941 RossTalk client is configured correctly for your system.

To verify the GPI-8941 RossTalk client is valid

1. Display the GPI-8941 card interface in DashBoard as outlined in "**To access the GPI-8941 in DashBoard**" on page 35
2. Select the **Remote Control Setup** tab.
3. Select the sub-tab for the RossTalk Client you want to verify.
4. Locate the **Connection Setup** area of the sub-tab.

5. Verify that the **Enable** box is selected.
6. Verify that the destination IP Address specified in the **IP Address** field is correct.
7. Verify that the port address specified in the **TCP Port** field is correct. The default RossTalk port is 7788.

Test the RossTalk Connection

Once you verified the setup as outlined in the previous sections, you may want to test the RossTalk connection between the GPI-8941 card and the external device.

To test the RossTalk connection

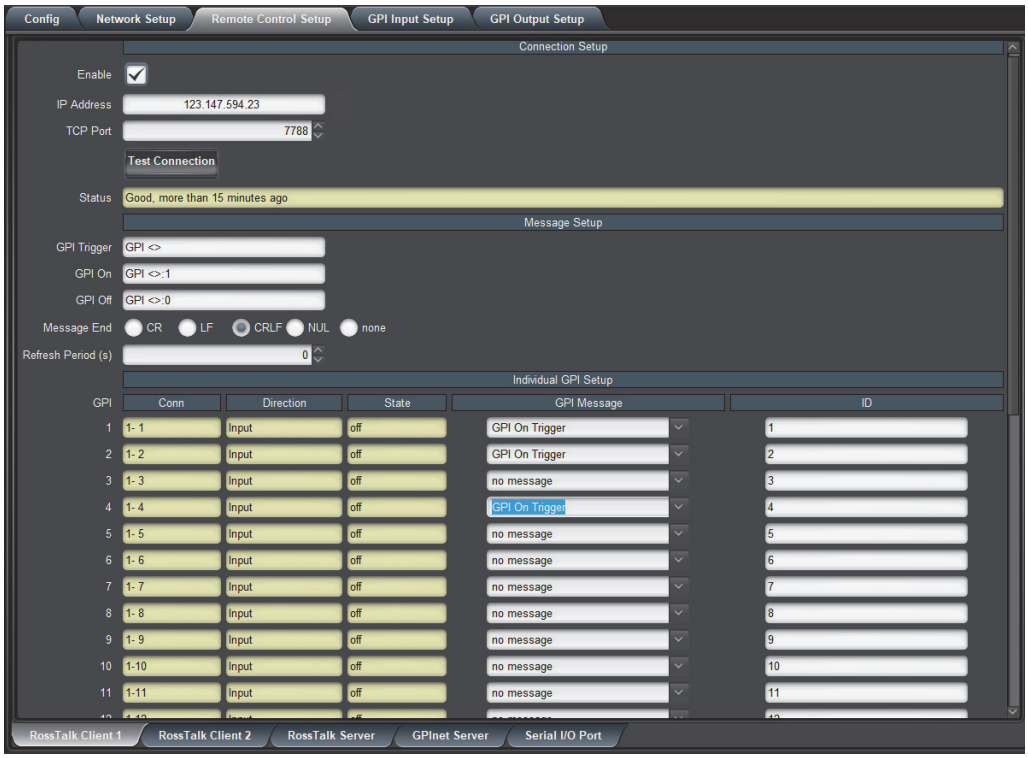
1. Display the GPI-8941 card interface in DashBoard as outlined in "**To access the GPI-8941 in DashBoard**" on page 35
2. Select the **Remote Control Setup** tab.
3. Select the sub-tab for the RossTalk Client you want to verify.
4. Click **Test Connection**.
5. Ensure that the **Status** field of the **Remote Control Setup** tab reports the message "**`Good`**".
6. If the **Status** field reports an error:
   a. Verify that the destination equipment is correctly setup for RossTalk communications.
   b. Verify that the destination equipment can be pinged using a Command Prompt.
   c. Verify that port 7788 is open on the destination equipment.

Verify that the GPI-8941 Card Can Send GPI Messages

Ensure that the GPI-8941 card is configured to send individual GPI messages. Keep the following in mind:

- The most common configuration is to send when triggered ON.
- The GPI Trigger message setup will send "**`GPI <>`**". The "**`<>`**" will be replaced with what is in the ID box.

In the below example, GPI 1, 2 and 4 will send messages when triggered on.



Setting up Communications via the GPInet Protocol

This section is applicable when the GPI-8941 card will use the Image Video™ ethernet protocol for control and status reporting.

To enable GPInet Ethernet communications for the card

1. From the **Tree View**, select the node for the GPI-8941 card you want to configure.
2. Select the **Remote Control Setup** tab.
3. Select the **GPInet Protocol** tab located at the bottom of the **Remote Control Setup** tab.
4. Select **GPInet Enable** box.
5. Use the **GPInet UDP Port** field to specify the port number external devices will use to connect to the GPI-8941 card.
6. Click **Apply** at the bottom of the tab to save the new settings.

Configuring the GPI Inputs

This chapter applies if you have the following cards:

- GPI-8941-I16
- GPI-8941-I32
- GPI-8941-I16-O16

Configuring a GPI Input

The number of GPI Inputs displayed in the GPI Input Setup tab depends on the card model you are using. The examples in this section feature the GPI-8941-I32 and the number of GPIs on your card may differ from what is presented here. You must configure each GPI Input that will be used to communicate with your external device.

Each GPI Input can be configured independently by setting its Type, Polarity, and Toggle behaviors in the **GPI Input Setup** > **Setup** tab. You can also choose to configure all inputs with the same settings.

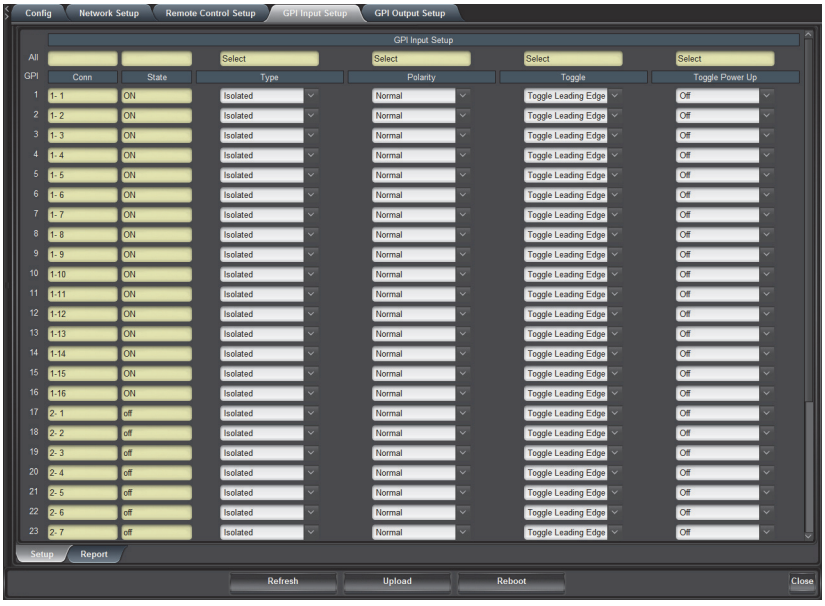
✶ If the **GPI All Configuration** box is selected in the **Config** tab, you can change the settings for all GPI Inputs on the **Setup** tab.

For More Information on...

- the options in the **Setup** tab, refer to the section refer to the section “GPI Input Setup Tab” on page 12.

To configure a specific GPI input

1. From the **Tree View**, select the node for the GPI-8941 you want to configure.
2. Select the **GPI Input Setup** tab.
3. Select the **Setup** sub-tab located at the bottom of the **GPI Input Setup** tab.



4. Use the **Type** menu to specify whether the contact closure is Wet or Dry. Choose from the following:
   - **Isolated** — The GPI is activated when driven by an external voltage. (Dry)
   - **Pull to Ground** — The GPI is activated when the +Input is connected to ground. (Wet)
5. Use the **Polarity** menu for level-triggered GPI inputs to set whether triggers are **Normal** (Active High) or **Inverted** (Active Low).

6. Use the **Toggle** menu to specify how the GPI Input will assert. Choose from the following:
   - **No Toggle** — Select when you want to assert a particular state for a GPI Input where High is ON and Low is OFF.
   - **Toggle Leading Edge** —When the GPI Input state is OFF, a toggle from Low-to-High will set the state to ON. The next toggle from Low-to-High will change the state to OFF.
   - **Toggle Trailing Edge** — When the GPI Input state is OFF, a toggle from High-to-Low will set the state to ON. The next toggle from High-to-Low will change the state to OFF.
7. Use the **Toggle Power Up** menu to determine the state of the GPI Input after a card power cycle.
8. Repeat steps 4 to 7 for each GPI input you wish to configure.

Configuring the GPI Outputs

This chapter applies if you have the following cards:

- GPI-8941-O16
- GPI-8941-O32
- GPI-8941-I16-O16

Configuring the GPI Outputs

The number of GPI Outputs displayed in the GPI Output Setup tab depends on the card model you are using. The examples in this section feature the GPI-8941-O32 and the number of outputs on your card may differ from what is presented here.

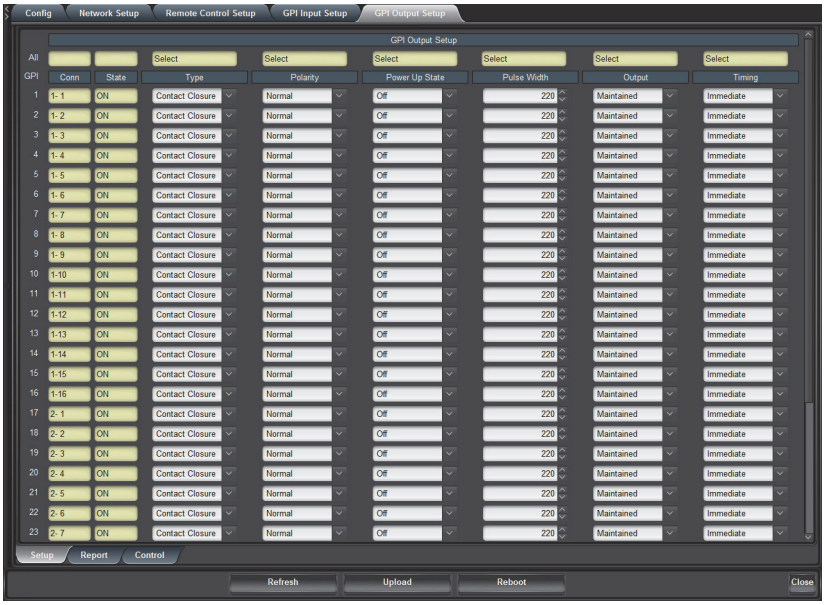
✶ If the **GPI All Configuration** box is selected in the **Config** tab, you can change the settings for all GPI Outputs on the **Setup** tab.

For More Information on...

- the options in the **Setup** tab, refer to the section "**Setup Tab**" on page 65.
- configuring a Timing Window, refer to the section "**Setting up the Vertical Reference Timing Window**" on page 39.

To configure a GPI Output

1. From the **Tree View**, select the node for the GPI-8941 you want to configure.
2. Select the **GPI Output Setup** tab.
3. Select the **Setup** tab located at the bottom of the **GPI Output Setup** tab.



4. Use the **Type** menu to specify whether the circuit is Wet or Dry. Choose from the following:
   - **Contact Closure** — When the output is on the output pins are connected together by a pair of relay contacts. When the output is off the output pins are not connected. The output pins are isolated from the card circuit. (Dry)
   - **Voltage Source** — When the output is on the + output pin is connected to an internal +5VDC power supply. When the output is off the + output pin is not connected. The other output pin is always connected to ground. (Wet)
5. Use the **Polarity** menu for level-triggered GPI outputs to set whether triggers are **Normal** (Active High) or **Inverted** (Active Low).
6. Use the **Power Up State** menu to set the state of the GPI Output after a card power cycle.
7. Use the **Pulse Width** menu to specify the number of milliseconds (mS) a pulse will be sent.
8. Use the **Output** menu to specify the behavior of the GPI Output. Choose from the following:
   - **Pulse** — select this option to generate a pulse when triggered. The pulse must be completely finished before it can be triggered again.
   - **Maintained** — select if the GPI output is level triggered where ON is High and OFF is Low. The Pulse Width setting is ignored.
   - **Retrig. Pulse** — the card will generate a pulse when triggered. If the card receives anther trigger before the end of the pulse, the pulse will be extended by the Pulse Width time.
9. Use the **Timing** menu to specify whether to use the Timing Window options specified in the **Config** tab. Choose from the following:
   - **Immediate** — the **Timing Window** settings are ignored. Commands are executed without pauses.
   - **Synced** — the **Timing Window** settings are applied. Commands are executed during the Timing Window as determined by the Start and Stop lines for the reference signal in use.

✶ If the GPI output is set to Synced and if the reference is not configured or invalid, the timing is immediate.

Monitoring

You can enable the GPI-8941 card to generate reports on the status of each GPI. Use the settings in the Report tab to control how or if the status messages are sent to the external devices.

Monitoring the GPI Input Status

Reports can be generated on the RossTalk commands, or Serial commands. If you enable reporting, the card reports on the GPI Input events for the specified input. For edge-triggered GPI inputs, the card reports can report both rising and falling edges. For level-triggered GPI inputs, the state is OFF or ON (the polarity is defined in the section "**Configuring a GPI Input**" on page 49).

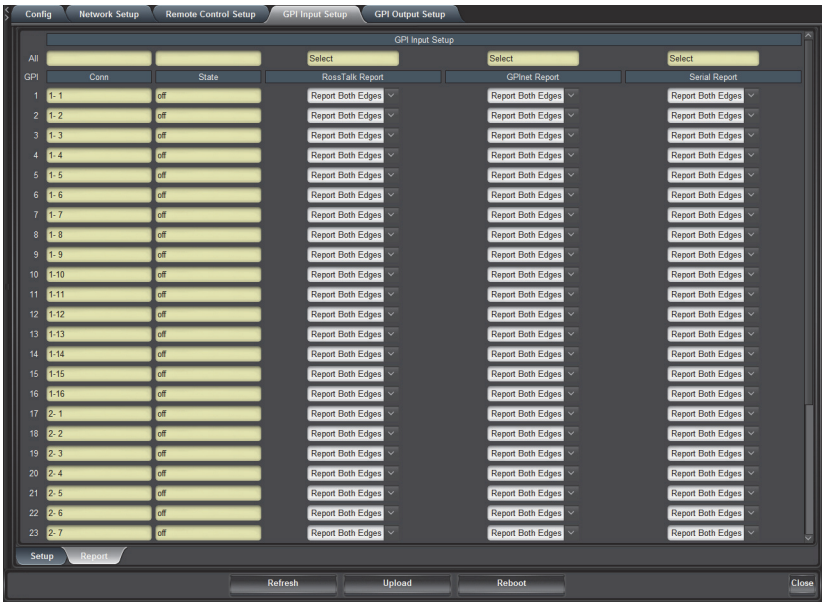
★ If the **GPI All Configuration** box is selected in the **Config** tab, you can change the settings for all GPI Inputs on the **Report** tab.

For More Information on...

- the **GPI Input Setup** tab, refer to the section "**GPI Input Setup Tab**" on page 12.
- the messages displayed in the **State** read-only fields of the Report tab, refer to the section "**Report Tab**" on page 13.

To set up reporting on the RossTalk commands for the GPI inputs

1. From the **Tree View**, select the node for the GPI-8941 card you want to monitor.
2. Select the **GPI Input Setup** tab.
3. Select the **Report** tab located at the bottom of the **GPI Input Setup** tab.



4. Use the corresponding **RossTalk Report** menu to specify when an action is reported via the RossTalk protocol. Refer to **Table 6.12** for a list of options.
5. Use the corresponding **Serial Report** menu to track the serial commands the card acts upon. Refer to **Table 6.12** for a list of options.

Monitoring the GPI Output Status

The GPI-8941 card handles all GPI Output commands in the order received. The card reports status to all active connections. A report can be generated, for each GPI output, detailing the commands sent via the GPI output connection on the rear module.

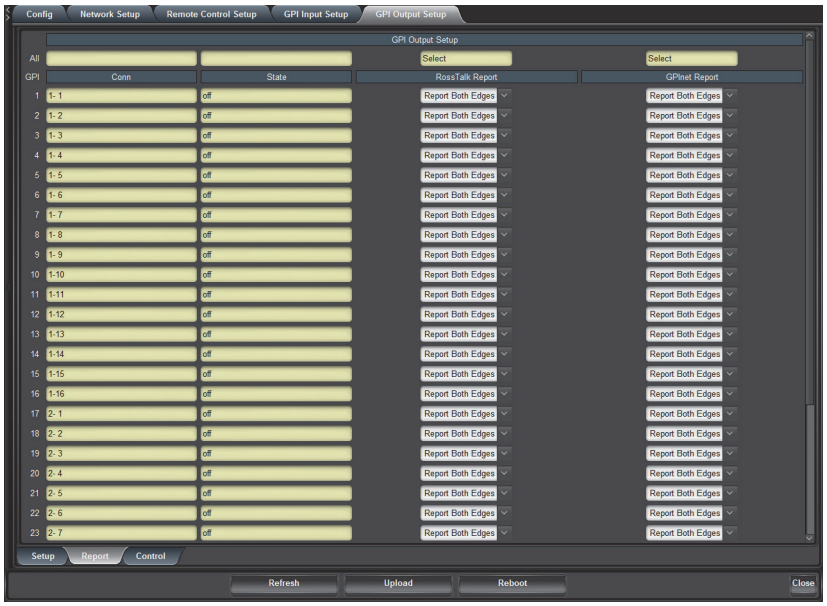
✶ If the **GPI All Configuration** box is selected in the **Config** tab, you can change the settings for all GPI Outputs on the **Report** tab.

For More Information on...

- the **GPI Output Setup** tab, refer to the section "**GPI Output Setup Tab**" on page 66.
- the messages displayed in the Report tab, refer to the section "**Report Tab**" on page 15.

To set up reporting on the commands for the GPI outputs

1. From the **Tree View**, select the node for the GPI-8941 card you want to monitor.
2. Select the **GPI Output Setup** tab.
3. Select the **Report** tab located at the bottom of the **GPI Output Setup** tab.



4. Use the corresponding **RossTalk Report** menu to specify when an action is reported via the RossTalk protocol.
5. Use the corresponding **GPInet Report** menu to specify when an action is reported via the GPInet protocol.
6. Repeat steps 4 to 5 for each GPI output connection.

Software Upgrades

This section provides instructions for upgrading the software for your card using the DashBoard Control System client software. The DashBoard client enables you to upload software updates to the card.

To upload software to the card

1. Contact Ross Technical Support for the latest software version file.
2. In DashBoard, display the **Device** tab of the card by double-clicking its status indicator in the **Basic Tree View**.
3. From the **Device** tab, click **Upload** to display the **Select File for upload** dialog box.
4. Navigate to the *.bin upgrade file you wish to upload.

   DashBoard automatically selects the last directory that you loaded from.
5. Click **Open** to display a confirmation dialog box.

   This dialog box displays the selected file name, type, size, and the file creation date.
6. From the **Confirmation** dialog box, select one of the following:
   - **Cancel** — Select this option to cancel the upload of the file and return to the **Device View**.
   - **Continue** — Select this option to upload the file. While uploading, an **Uploading Progress** dialog opens.

✶ Clicking **Cancel** while uploading will leave the card in an invalid state. Do not click **Cancel** unless the uploading progress has stopped completely for 60 seconds or more. If upload fails, repeat the upload process from DashBoard. If the upload process fails again, refer to the section "**Bootload Button**" on page 89.

7. Monitor the upgrade progress bar displayed in DashBoard while the software is upgraded on your card.
8. To complete the upgrade process, the card automatically reboots.

✶ The communications processor of the card requires approximately 30 seconds to re-start and re-establish network communications.

- The card automatically saves all your settings before starting the reboot process.
- The status of all the cards in the frame are grayed out until the reboot process is complete.

DashBoard Menus

This chapter provides a brief summary of the menus available for the GPI-8941. Default values are indicated with an asterisk (*).

✶ Before proceeding, ensure that you are running DashBoard software version 6.2.0 or higher. The DashBoard software and user manual are available to download from the Ross Video website.

Status Tabs

This section summarizes the read-only information displayed in the **Status** tabs. The fields in the **Status** tabs vary in severity from green (valid), yellow (caution), to red (alarm). DashBoard reports the most severe alarm for a single field. Alarm colors are noted within the tables as text set in brackets next to the menu parameter name.

Product Tab

Table 15.1 summarizes the read-only information displayed in the **Product** tab.

Table 15.1 Product Tab Items

Item	Parameters	Description
Product	#	Indicates the card model
Supplier	Ross Video Ltd.	
Board Rev	#	Indicates the board issue of the PCB
Board S/N	#	Indicates the serial number of the PCB
MAC Address	#	Reports the MAC address for the card
Rear Module	#	Describes the rear module installed with the card in the openGear frame
Software Rev	##.##	Indicates the software version
Expansion #	16 Input GPI	Indicates the daughter card(s) installed on the main PCB
	16 Output GPI	

Hardware Tab

Table 15.2 summarizes the read-only information displayed in the **Hardware** tab.

Table 15.2 Hardware Tab Items

Item	Parameters	Description
HW Status	#	Indicates if the card hardware components are operating correctly with no errors
Voltage (mV)	#	Measured input voltage
Current (mA)	#	Total current consumption of card
Wet Voltage (mV)		Indicates, in millivolts, the wetting voltage regulator output
CPU Headroom	#	Processing power available
RAM Available	#	On-board processing memory available

Table 15.2 Hardware Tab Items

Item	Parameters	Description
Uptime (h)	#	Indicates the number of hours since the last reboot of the card
Configuration Bank	#	Increments each time the card settings are saved to non-volatile memory

Network Tab

Table 15.3 summarizes the read-only information displayed in the **Network** tab.

Table 15.3 Network Tab Items

Item	Parameters	Description
Current Network Settings		
Addressing Mode	Static	User manually supplied the Ethernet settings
	DHCP	Card will acquire network settings automatically
IP Address	#.#.#.#	Reports the IP address assigned to the card
Subnet Mask	#.#.#.#	Reports the subnet mask assigned to the card
Default Gateway	#.#.#.#	Reports the gateway for communications outside of the local area network (LAN)
MAC Address	#	Reports the MAC address for the card
RossTalk Protocol		
TCP Port	#	Reports the TCP port number that remote devices are connected to when using the RossTalk protocol to communicate with the card
Sessions	x of y active	Reports the current RossTalk connections where: • **x** represents the number of external devices communicating with the card via the RossTalk protocol • **y** represents the maximum number of devices the card can support via the RossTalk protocol
GPInet Protocol		
UDP Port	#	Reports the UDP port number that remote devices are connected to when using the GPInet protocol to communicate with the card
Sessions	x of y active	Reports the current GPInet connections where: • **x** represents the number of external devices communicating with the card via the GPInet protocol • **y** represents the maximum number of devices the card can support via the GPInet protocol

Config Tab

Table 15.4 summarizes the sub-tabs available in the **Config** tab.

Table 15.4 Config Tab Items

Item	Parameters	Description
Vertical Reference Selection		
Reference Input[a]	Off	No reference input signal is supplied to the card
	Frame 1*	The GPI-8941 card uses the reference signal available via the **REF 1** port on the openGear frame
	Frame 2	The GPI-8941 card uses the reference signal available via the **REF 2** port on the openGear frame
Reference Type (read-only)	Undefined	The reference format is not supported by the card
	Off	Indicates that a reference signal is either invalid or unavailable, or the Reference Input menu is set to Off
	#	Indicates the detected format of the reference signal
Timing Window Setup - Type #		
Start Line	#	Specifies the first line of the timing window for the card. Refer to **Table 15.5** for a list of default values.
Stop Line	#	Specifies the first line of the timing window for the card. Refer to **Table 15.5** for a list of default values.
Fields	Both	The timing window will be applied to Field 1 and Field 2 (if the reference format is interlaced)
	Odd Only	The timing window will be applied to Field 1 (if the reference format is interlaced)
	Even Only	The timing window will be applied to Field 2 (if the reference format is interlaced)
	N/A	This is automatically selected for progressive format types
Proportioned Setup	Selected	Changes done in a field are proportionally applied to the same column in the other format types. Changes can be made in any type; it does not have to be done in the All% type. A field must be changed for the automatic proportioned changes to be done.
	Cleared*	Changes in a field will not change other fields.
GPI All Configuration	Selected	Enables you to configure all GPI Inputs or Outputs using the same settings. The cells in the **All** row of the **Setup** tabs are now editable.
	Cleared*	Disables this feature.
Edit Permission	Unlocked	Menu options are unlocked and editable from DashBoard
	Locked	All menu items, except this one, are read-only
Factory Defaults	Reset	Resets all card editable parameters to the factory default values

a. This menu is not applicable when using a GPI-8941-I16 or GPI-8941-I32.

Default Values

Table 15.5 lists the default values for the video formats listed in the Timing Window Setup area of the **Config** tab.

Table 15.5 Config Menu Default Values — Based on Type

Type	Start Line	Stop Line	Fields
NTSC	66	197	Both
PAL	79	234	Both
1080i	141	422	Both
480p	132	394	N/A
576p	157	469	N/A
720p	188	563	N/A
1080p	282	844	N/A
All%	25	75	Both

Network Setup Tab

Table 15.6 summarizes fields in the **Network Setup** tab.

Table 15.6 Network Setup Tab Items

Item	Parameter	Description
Addressing Mode	Static	User manually supplies the Ethernet settings. This is the recommended setting.
	DHCP*	Automates the assignment of the Ethernet settings
IP Address	###.###.###.###	The IP Address for the card
Subnet Mask	###.###.###.###	The subnet mask for the card
Default Gateway	###.###.###.###	The gateway for communication outside of the local area network (LAN)
Apply		Applies and saves any changes made on the **Network Setup** tab
Cancel		Changes are not applied to the **Network Setup** tab

Remote Control Setup Tabs

The Remote Control Setup tab is organized into the following sub-tabs: RossTalk Client 1, RossTalk Client 2, RossTalk Server, GPInet Server, and Serial I/O Port. This section summarizes each sub-tab.

RossTalk Client Tabs

You can configure up to two independent RossTalk Client connections. The options for each client are the same.

Table 15.7 RossTalk Client Menu Items

Item	Parameter	Description
Connection Setup		
Enable	Selected	Enables the card to use the RossTalk protocol to communicate with an external device
	Cleared*	Disables the use of RossTalk protocol to communicate with an external device

Table 15.7 RossTalk Client Menu Items

Item	Parameter	Description
IP Address	#.#.#.#	Specifies the IP Address of the external device the card will send messages to
TCP Port	#[a]	Specifies the TCP port number of the external device the card will send messages to
Test Connection		Sends a test message to the external device located at the specified IP Address
Status (read-only)	#	Reports on the connection between the card and the external device
Message Setup		
GPI Trigger	GPI <>	The message indicates that the GPI was triggered; replace <> with the ID assigned to the GPI in the Individual GPI Setup area.
GPI On	GPI <> : 1	The message indicates that the GPI is active; replace <> with the ID assigned to the GPI in the Individual GPI Setup area.
GPI Off	GPI <> : 0	The message indicates that the GPI is not active; replace <> with the ID assigned to the GPI in the Individual GPI Setup area.
Message End	CR	The end of the message is represented by the ASC symbol for a carriage return
	LF	The end of the message is represented by the ASC symbol for a line feed
	CRLF	The end of the message is represented by the ASC symbols for a carriage return and line feed. This is the default.
	NUL	The end of the message is represented by the ASC symbol for a NUL pointer
	none	No indication for when the message ends
Refresh Period (s)	#	Specifies the number of seconds the card will wait before re-sending the message to the external device. A value of 0 disables the automatic refreshing. This setting is only applicable for GPIs with the GPI Message set to GPI Level.
Individual GPI Setup - GPI #		
Conn (read-only)	x-y	Indicates the input pair on the rear module for. For example `Con 1-9` indicates Pair 9 on the first connector of the rear module.
Direction (read-only)	Input	The card is a model that provides GPI inputs
	Output	The card is a model that provides GPI outputs
State (read-only)	OFF	Indicates the specified GPI is not active
	ON	Indicates the specified GPI is active

Table 15.7 RossTalk Client Menu Items

Item	Parameter	Description
GPI Message	no message	No message is sent even if this GPI is active. This is the default.
	GPI On Trigger	A message is sent, as configured in the Message Setup area, to the external device when the specified GPI is triggered
	GPI Off Trigger	A message is sent, as configured in the Message Setup area, to the external device after the specified GPI is triggered
	GPI Level	A message is sent, as configured in the Message Setup area, to the external device when the specified GPI is on the falling edge
ID	#	Specifies an unique identifier (using a maximum of four characters) for the GPI to be used in RossTalk messages between the card and the external device

a. RossTalk uses fixed ports to talk to the GPI-8941 series card. The default is Port 7788.

RossTalk Server Tab

Table 15.8 summarizes the **RossTalk Server** options available in DashBoard.

Table 15.8 RossTalk Server Menu Items

Item	Parameter	Description
Enable	Selected	Enables the use of RossTalk protocol to control the card.
	Cleared*	Disables the use of RossTalk protocol to control the card
TCP Port	#[a]	Specifies the TCP port number remote devices will connect to when using RossTalk protocol
Sessions (read-only)	x of y active	Reports the current RossTalk connections where: • **x** represents the number of external devices communicating with the card via the RossTalk protocol • **y** represents the maximum number of devices the card can support via the RossTalk protocol
No warnings		No unsaved changes are made to the RossTalk protocol setup
WARNING		There are unsaved changes to the RossTalk protocol setup
Apply		Applies and saves any changes made in this tab
Cancel		Discards any unsaved changes made in this tab

a. RossTalk uses fixed ports to talk to the GPI-8941 series card. The default is Port 7788.

GPInet Tab

Table 15.9 summarizes the options available in the **GPInet** tab.

Table 15.9 GPInet Menu Items

Item	Parameters	Description
Enable	Selected	Enables the use of GPInet protocol to control the card
	Cleared*	Disables the use of GPInet protocol to control the card
UDP Port	#[a]	Specifies the UDP port number that remote devices will connect to when using GPInet protocol
Sessions (read-only)	x of y active	Reports the current GPInet connections where: • **x** represents the number of external devices communicating with the card via the GPInet protocol • **y** represents the maximum number of devices the card can support via the GPInet protocol
No warnings		No unsaved changes are made to the GPInet protocol setup
WARNING		There are unsaved changes to the GPInet protocol setup
Apply		Applies and saves any changes made in this tab
Cancel		Discards any unsaved changes made in this tab

a. The default value is 10016.

Serial I/O Port Tab

Table 15.10 summarizes the options in the **Serial I/O Port** tab.

Table 15.10 Serial I/O Port Menu Items

Item	Parameter	Description
Protocol[a]	None*	Disables the use of the Serial port to control the card. Any incoming data from an external device/service connected to the Serial port is ignored.
	GPI485	Enables the use of GPI485 serial protocol to control the card
	Port Test	Select this option to troubleshoot the **Serial** port. Do not use this selection while the Serial port is connected in a multi-drop serial bus as it may interfere with other devices on the serial bus.
Baud Rate	1200	Selects the bit rate for the external device connected to the **Serial** port
	2400	
	9600	
	19200	
	38400*	
	115200	
Data Bits[b]	7	Sets the number of data bits transmission (character length)
	8*	

Table 15.10 Serial I/O Port Menu Items

Item	Parameter	Description
Parity	None*	Sets the Parity type
	ODD	
	EVEN	
Stop Bits	1	Sets the number of stop bits transmission
	2*	
Tx Driver Control	Selected	The serial transmit driver is enabled only when the card is sending serial data and is disabled at all other times. This is typically used when connected to a multi-drop serial bus.
	Cleared*	Disables this feature
GPI485 Protocol		
Standard Setup	Selected*	Automatically sets the Baud Rate, Data Bits, Parity, Stop Bits, and Tx Driver Control values to those stipulated by the GPI485 Protocol
	Cleared	Applies the Baud Rate, Data Bits, Parity, Stop Bits, and Tx Driver Control values specified in the Remote Control Setup tab
Serial Setup (read-only)	#	Indicates the Baud Rate, Data Bits, Parity, Stop Bits, and Tx Driver Control values currently in use by the GPI485 Protocol
Group	#[c]	Sets the first GPI485 protocol group used by the card
Serial Port Test Message		
Product	Selected	Includes the product name in the test message
	Cleared*	Omits the product name from the test message
Frame Slot	Selected	Includes the card's openGear frame slot number in the test message
	Cleared*	Omits the slot number from the test message
Board S/N	Selected	Includes the serial number in the test message
	Cleared*	Omits the serial number in the test message
Loop Count	Selected	Includes an incrementing count in the test message
	Cleared*	Omits the count from the test message
Test Message (read-only)	#	Displays the message that would be sent on the serial port if the Protocol is set to Port Test. This fields changes as the boxes above are selected or cleared. The incrementing loop count is in this field as ####.

a. The default values for the Serial Port parameters, bit rate, data bits, parity, and stop bits are protocol dependent.
b. The GPI485 protocol always uses 8 Data Bits regardless of what the value is set to.
c. The default value is 0.

GPI Input Setup Tab

The sub-tabs available in the **GPI Input Setup** tab enable you to configure the functions, trigger, and polarity of each input for the GPI-8941 card. The number of inputs depends on the card model.

✶ The GPI Input Setup tab menus are only available when using a card model that provides GPI inputs.

Setup Tab

Table 15.11 summarizes the menu options in the **Setup** sub-tab of the GPI Input Setup tab.

Table 15.11 Setup Menu Items

Item	Parameters	Description
GPI #		
Conn (read-only)	x-y	Indicates the input pair on the rear module for. For example `Con 1-9` indicates Pair 9 on the first connector of the rear module.
State (read-only)	OFF	Indicates the specified GPI is not active
	ON	Indicates the specified GPI is active
Type	Pull-to-Ground	In a two-terminal input circuit, one terminal is grounded. The second terminal is at a high logic level when open, and can be externally connected to ground to assert it low.
	Isolated	In a two-terminal input circuit, both terminals are isolated from ground; activated by a current flowing through the two terminals.
Polarity	Normal	The GPI reports a trigger when the input has a Low to High transition
	Inverted	Sets the polarity of the trigger where a High-to-Low transition starts the function.
Toggle	No Toggle	Select when you want to assert a particular state for a GPI Input where High is ON and Low is OFF
	Toggle Leading Edge	When the GPI Input state is OFF, a toggle from Low-to-High will set the state to ON. The next toggle from Low-to-High will change the state to OFF.
	Toggle Trailing Edge	When the GPI Input state is OFF, a toggle from High-to-Low will set the state to ON. The next toggle from High-to-Low will change the state to OFF.
Toggle Power Up	Off	Set the specified GPI Input toggle to OFF when the card recovers from a loss of power
	On	Set the specified GPI Input toggle to ON when the card recovers from a loss of power
	Last State	Set the specified GPI Input toggle to the last known state before the card lost power

Report Tab

Table 15.12 summarizes the options in the **Report** sub-tab.

Table 15.12 Report Menu Items

Item	Parameters	Description
GPI #		
Conn (read-only)	x-y	Indicates the input pair on the rear module. For example `Con 2-12` indicates Pair 12 on the second connector of the rear module.
State (read-only)	Off	Indicates the specified GPI is not active
	On	Indicates the specified GPI is active
RossTalk Report	No Reports	The GPI does not report RossTalk messages
	Report Both Edges	A RossTalk report is sent on any input transition
	Leading Edge Only	A RossTalk report is sent when the input see a low to high edge
	Trailing Edge Only	A RossTalk report is sent when the input sees a High to low edge
GPInet Report	No Reports	The GPI does not report GPInet messages
	Report Both Edges	A GPInet report is sent on any input transition
Serial Report	No Reports	The GPI does not send serial reports
	Report Both Edges	The GPI sends a serial report whenever it detects a transition on the input

GPI Output Setup Tab

The sub-tabs available in the **GPI Output Setup** tab enable you to configure the functions, trigger, and polarity of each output for the GPI-8941. The number of outputs depends on the card model.

✶ The GPI Output Setup tab menus are only available when using a card model that provides GPI outputs.

Setup Tab

Table 15.13 summarizes the settings in the **Setup** tab.

Table 15.13 Setup Menu Items

Item	Parameters	Description
GPI #		
Conn (read-only)	x-y	Indicates the output pair on the rear module. For example `Con 2-12` indicates Pair 12 on the second connector of the rear module.
State (read-only)	OFF	Indicates the specified GPI is not active
	ON	Indicates the specified GPI is active
Type	Voltage Source	In a two-terminal output, the two logic states are defined by either an open circuit or a DC voltage between the two terminals.
	Contact Closure	In a two-terminal output, both terminals are isolated from ground. This provides either an open or closed circuit between the two terminals to signal two states.

Table 15.13 Setup Menu Items

Item	Parameters	Description
Polarity	Normal	Sets the polarity of the output. Normal polarity has a Low-to-High transition starting the pulse.
	Inverted	Sets the polarity of the output. Inverted polarity has a High to Low transition starting the pulse.
Power Up State	Off	Set the specified GPI output to OFF after a card power cycle
	On	Set the specified GPI output to ON after a card power cycle
	Last State	Set the specified GPI output to the last known state before the card power cycle
Pulse Width	20-30000	Specifies the number of milliseconds the pulse will occur
Output	Maintained	The output is level based. The output will be High for ON and Low for OFF.
	Pulse	The GPI will generate a pulse when triggered. Further triggers are buffered until the pulse has completed.
	Re-trigger Pulse	The GPI will generate a pulse when triggered. If the GPI receives anther trigger before the end of the pulse, the pulse will be extended by the Pulse Width time.
Timing	Immediate	The GPI will change state immediately upon receiving a trigger. The settings in the Timing Window Setup menus are ignored.
	Synced	When a trigger is received, the GPI will wait until the timing window before changing state. The settings in the Timing Window Setup menus are applied.

Report Tab

Table 15.14 summarizes the options in the **Report** sub-tab.

Table 15.14 Report Menu Items

Item	Parameters	Description
GPI #		
Conn (read-only)	x-y	Indicates the output pair on the rear module. For example `Con 2-12` indicates Pair 12 on the second connector of the rear module.
State (read-only)	Off	Indicates the specified GPI is not active
	On	Indicates the specified GPI is active

Table 15.14 Report Menu Items

Item	Parameters	Description
RossTalk Report	No Reports	No RossTalk reports are generated for this GPI
	Report Both Edges	When the GPI output state is changed, a RossTalk report is sent
	Leading Edge Only	When the specified GPI output transitions form Low to High a RossTalk report is sent
	Trailing Edge Only	When the specified GPI output transitions from High to Low a RossTalk report is sent
GPINet Report	No Reports	No GPInet reports are sent for this output
	Report Both Edges	When the specified GPI output transitions a GPInet report is sent.

Control Tab

Table 15.15 summarizes the options in the **Control** sub-tab.

Table 15.15 Control Menu Items

Item	Parameters	Description
GPI #		
Conn (read-only)	x-y	Indicates the output pair on the rear module. For example `Con 2-12` indicates Pair 12 on the second connector of the rear module.
State (read-only)	Off	Indicates the specified GPI is not active
	On	Indicates the specified GPI is active
Command	Select	The Command field displays this message when no parameter is selected
	Off	For maintained outputs, sets the output to off. For Pulse and Re-triggered Pulse outputs, this is ignored.
	On	For Maintained outputs, this sets the output to on. For Pulse or Re-triggered Pulse outputs, this starts the pulse.
	Trigger	For Maintained outputs, this sets the output to on and then the output will automatically go off after the Pulse Width time. For Pulse or Re-triggered Pulse outputs, this starts the pulse.
	Disabled	The Command field displays this message when the Dashboard Control is set to Not Allowed (user input is ignored)
DashBoard Control	Not Allowed	The GPI ignores Off, On, and Trigger commands from Dashboard. The Command field displays `Disabled`.
	Allowed	The specified GPI Output acts on any commands sent via a DashBoard client

Table 15.15 Control Menu Items

Item	Parameters	Description
RossTalk Control	Not Allowed	The specified GPI Output ignores RossTalk commands
	Allowed	The specified GPI Output acts on RossTalk commands
GPInet Control	Not Allowed	The specified GPI Output ignores GPInet commands
	Allowed	The specified GPI Output acts on GPInet commands
Serial Control	Not Allowed	The specified GPI Output ignores serial commands
	Allowed	The specified GPI Output acts on serial commands

Technical Specifications

This chapter provides technical information for GPI-8941.

✶ Specifications are subject to change without notice.

GPI Input Specifications

Table 16.1 Technical Specifications — GPI Inputs

Item	Specifications
Isolated Input	3mA max @ 4-30VDC
Input Pull to Ground	• +5V supplied by the card • 3mA maximum (2000ohms or less)

GPI Outputs Specifications

Table 16.2 Technical Specifications — GPI Outputs

Item	Specifications
Wet Output	5V 20mA per contact
Dry (Relay) Outputs	30V 0.5A 10W maximum

Environment

Table 16.3 Technical Specifications — Environment

Item	Specifications
Operating Range	5°C to 40°C ambient

Power

Table 16.4 Technical Specifications — Power

Item	Specifications
Total Power Consumption	>8W typical

RossTalk Protocol

The GPI-8941 can be controlled from a remote editor or computer via RossTalk commands. These commands can be sent to these openGear cards over an Ethernet connection (TCP/UDP) or via a serial port (RS-232/RS-485) on the card's rear module.

This chapter provides additional information on the RossTalk protocol used with the GPI-8941.

Before You Begin

Keep the following in mind when implementing the RossTalk protocol:

- All messages start with the command or message class, followed by one or more spaces, followed by a command.
- All parameters are separated from the command and other parameters by zero or more spaces, followed by a colon (:), followed by zero (0), or more spaces.
- All messages must end in an ASCII carriage return (0x0D), ASCII line feed (0x0A), or an ASCII null character (0x00). A combination of these characters is acceptable, i.e. carriage return, line feed is okay.
- Commands and parameters are available in two forms, verbose and non-verbose (terse). For example, to configure an asynchronous GPI report the verbose command is "`ConfigStatusMsg`" and the terse command is "`C`".
- All commands and parameters can be sent using the verbose or terse form. The commands and parameters are not case sensitive.
- Reports and status messages from the GPI can be due to an Event (e.g. a GPI state has changed), a Request (e.g. a GPI has been queried for its status), or a Config report command.

Examples

Gets all module status using verbose parameters. Verbose message return is on.

Command:

GPI ModuleQuery :AllInfo

Response:

GPI ModuleStatus:Type:GPI-8941

GPI ModuleStatus:Inputs:16

GPI ModuleStatus:Outputs:16

Commands and parameters are not case sensitive; spaces around the colons are optional. Thus the following are all equivalent:

Command:

GPI ModuleQuery : AllInfo

gpi modulequery : allinfo

GPI ModuleQuery:AllInfo

gpi modulequery:allinfo

GPI MODULEQUERY: ALLINFO

Response:

GPI ModuleStatus:Type:GPI-8941

GPI ModuleStatus:Inputs:16

GPI ModuleStatus:Outputs:16

Commands and parameters can be mixed using both verbose and terse forms. Thus the following are all equivalent:

Command:

GPI ModuleQuery : AllInfo

GPI ModuleQuery : A

GPI ModuleQuery :a

gpi modulequery:a

Response:

GPI ModuleStatus:Type:GPI-8941

GPI ModuleStatus:Inputs:16

GPI ModuleStatus:Outputs:16

As the response is configured via the Verbose command, it will respond to terse commands with a verbose response.

Sessions

Up to 7 RossTalk sessions can take place concurrently, each with its own unique configuration and GPI reporting control setup. Typically the session configuration and GPI reporting control setup is done at the start of a session; however, they can be changed at any time. When configured to send reports for GPI outputs, the GPI-8941 card will report GPI changes from any source (any active RossTalk session, GPI485, DashBoard, GPInet sessions, etc.).

Sample Session 1

Session assumes that we only are interested in GPI 1 (an input) and when it becomes active/high, we wish to make GPI 17 (an output) inactive/low.

Command	Response	Notes
GPI SessionConfig : Verbose:ON		Turn on Verbose reporting
	GPI SessionStatus:Verbose:on	Card replies that verbose reporting is on
GPI S:B:1		Configure this session to use base 1
	GPI SessionStatus:Base:1	Card replies base 1 is in use for this session, GPIs will be numbered 1 to 32
GPI ModuleQuery : AllInfo		Confirm module type
	GPI ModuleStatus:Type:GPI-8941 GPI ModuleStatus:Inputs:16 GPI ModuleStatus:Outputs:16	Card replies that it is a GPI-8941 with 16 inputs and 16 outputs On this card, GPI 1-16 are inputs On this card, GPI 17-32 are outputs
GPI * : ConfigStatusMsg : None:Detailed		Configure all GPIs to not send GPI changes reports to this session

Command	Response	Notes
	GPI 1:0:Config:None:Detailed GPI 2:0:Config:None:Detailed GPI 3:0:Config:None:Detailed GPI 4:0:Config:None:Detailed GPI 5:0:Config:None:Detailed GPI 6:0:Config:None:Detailed GPI 7:0:Config:None:Detailed GPI 8:0:Config:None:Detailed GPI 9:0:Config:None:Detailed GPI 10:0:Config:None:Detailed GPI 11:0:Config:None:Detailed GPI 12:0:Config:None:Detailed GPI 13:0:Config:None:Detailed GPI 14:0:Config:None:Detailed GPI 15:0:Config:None:Detailed GPI 16:0:Config:None:Detailed GPI 17:0:Config:None:Detailed GPI 18:0:Config:None:Detailed GPI 19:0:Config:None:Detailed GPI 20:0:Config:None:Detailed GPI 21:0:Config:None:Detailed GPI 22:0:Config:None:Detailed GPI 23:0:Config:None:Detailed GPI 24:0:Config:None:Detailed	Card replies for each GPI, it will not be sending a report on changes to this session.
	GPI 25:0:Config:None:Detailed GPI 26:0:Config:None:Detailed GPI 27:0:Config:None:Detailed GPI 28:0:Config:None:Detailed GPI 29:0:Config:None:Detailed GPI 30:0:Config:None:Detailed GPI 31:0:Config:None:Detailed GPI 32:0:Config:None:Detailed	Card replies for each GPI, it will not be sending a report on changes to this session.
GPI 1 :C:Both:Detailed:SendStatusMsg		Configure GPI 1 to send a detailed report on leading/rising and trailing/falling edges, and report current GPI status
	GPI 1:off:Config GPI 1:ConfiguredStatusMsg:Both:Detailed	Card replies that GPI 1 will send a detailed report on both edges
GPI 17 :C:Trailing:Detailed:SendStatusMsg		Configure GPI 17 to send a detailed report on trailing/falling edges, and report current GPI status
	GPI 17:off:Config GPI 17:ConfiguredStatusMsg:Trailing:Detailed	Card replies that GPI 17 is off and will send a detailed report on trailing/falling edges
	GPI 1:1:Event	GPI 1 has had an event. This input is now active/high.
GPI 17 : 0		Set GPI 17 inactive/low

Command	Response	Notes
	GPI 17:off:Event	Card reports that GPI 17 has had an event, this is the trailing edge
	GPI 1:off:Event	Card reports that GPI 1 has had an event. This input is now inactive/low.

Sample Session 2

Session assumes that we want to know when GPI 1, 2, and 3 (inputs) go active and controls GPI 17, 18, and 19 (outputs).

Command	Response	Notes
GPI S:A:OFF		Turn auto-response off
	None	No configuration response since auto-response is off
GPI S:V:OFF		Turn verbose reporting off
	None	No configuration response since auto-response is off
GPI S:B:1		Configure this session to use base 1.
	None	No configuration response since auto-response is off
GPI *:C:N:D		Configure all GPIs to not send GPI change reports to this session.
	None	No configuration response since auto-response is off
GPI 1:C:L:D:S		Configure GPI 1 to send a detailed report on leading / rising and trailing / falling edges and report current GPI status.
	GPI 1:0:C	Card replies GPI 1 is off. No configuration response since auto-response is off.
GPI 2:C:L:D:S		Configure GPI 2 to send a detailed report on leading / rising and trailing / falling edges and report current GPI status
	GPI 2:0:C	Card replies GPI 2 is off. No configuration response since auto-response is off.
GPI 3:C:L:D:S		Configure GPI 3 to send a detailed report on leading / rising and trailing / falling edges and report current GPI status.
	GPI 3:1:C	Card replies GPI 3 is on. No configuration response since auto-response is off.
GPI 17:C:B:D:S		Configure GPI 17 to send a detailed report on trailing / falling edges and report current GPI status
	GPI 17:0:C	Card replies GPI 17 is off. No configuration response since auto-response is off.
GPI 18:C:B:D:S		Configure GPI 18 to send a detailed report on trailing / falling edges and report current GPI status.
	GPI 18:0:C	Card replies GPI 18 is off. No configuration response since auto-response is off.
GPI 19:C:B:D:S		Configure GPI 19 to send a detailed report on trailing / falling edges and report current GPI status.

Command	Response	Notes
	GPI 19:1:C	Card replies GPI 19 is on. No configuration response since auto-response is off.
GPI 19:0		Set GPI 19 inactive / low
	GPI 19:0:E	Card reports GPI 19 has had an event, this is the trailing edge

Module ID and Capabilities

These commands and responses allow the capabilities of the module to be queried.

Parameter			Description
	Terse	Verbose	
Command			
1	GPI	GPI	GPI command/message class
2	M	ModuleQuery	Module query command
3	T	Type	Request module type
	I	Inputs	Request number of GPI inputs
	O	Outputs	Request number of GPI outputs
	A	AllInfo	Request all information
Response			
1	GPI	GPI	GPI command/message class
2	M	ModuleStatus	Module status message
3	T	Type	Module type follows
	I	Inputs	Number of GPI inputs follows
	O	Outputs	Number of GPI outputs follows
4	GPI-8941	GPI-8941	Name of the module
	#	#	Number of inputs
	#	#	Number of outputs

Examples

Get all module status using verbose parameters. Verbose message return is on.

Command:

GPI ModuleQuery : AllInfo

Response:

GPI ModuleStatus:Type:GPI-8941

GPI ModuleStatus:Inputs:16

GPI ModuleStatus:Outputs:16

Get all module status using mixed verbose and terse parameters. Note the commands are not case sensitive and the spacing around the colon does not matter. Verbose message return is on.

Command:

GPI M:allinfo

Response:

GPI ModuleStatus:Type:GPI-8941

GPI ModuleStatus:Inputs:16

GPI ModuleStatus:Outputs:16

Get the module type using mixed verbose and terse. Verbose message return is off.

Command:

GPI modulequery: t

Response:

GPI M:T:GPI-8941

Session Control

These commands and responses allow the session characteristics to be set up and queried.

Message Auto-Response Control

This command controls whether an automatic response is sent after configuration messages. A response to this configuration command is sent automatically if the session auto-response is on or if Parameter 4 is a status request.

Parameter	Terse	Verbose	Description
Command			
1	GPI	GPI	GPI command/message class
2	S	SessionConfig	Session setup query command
3	A	AutoResponse	Auto-response control
4	0	off	Turn auto-response off (zero or off)
	1	on	Turn auto-response on (one or on)
	?	StatusReq	Request current auto-response setting
Response			
1	GPI	GPI	GPI command/message class
2	S	SessionStatus	Session setup status message
3	A	AutoResponse	Auto-response control
4	0	off	Auto-response is off
	1	on	Auto-response is on

Examples

Turn auto-response off.

Command:

GPI S:a:0 *(terse format)*

GPI SessionConfig : AutoResposne : Off *(verbose format)*

Response:

none

Turn auto-response on.

Command:

GPI S:A:1 *(terse format)*

GPI SessionConfig : AutoResposne : On *(verbose format)*

Response:

GPI SessionStatus:AutoResponse:on

Get the current session auto-response setting. Verbose message return is on.

Command:

GPI s:v:?

Response:

GPI SessionStatus:AutoResponse:on

Verbose Message Control

This command controls whether response messages use terse or verbose parameters. A response to this configuration command is sent automatically if the session auto-response is on or if Parameter 4 is a status request.

Parameter			Description
	Terse	Verbose	
Command			
1	GPI	GPI	GPI command/message class
2	S	SessionConfig	Session setup query command
3	V	Verbose	Verbose message control
4	0	off	Turn verbose messages off (zero or off)
	1	on	Turn verbose messages on (one or on)
	?	StatusReq	Request current verbose setting
Response			
1	GPI	GPI	GPI command/message class
2	S	SessionStatus	Session setup status message
3	V	Verbose	Verbose message control
4	0		Verbose messages are off (zero)
		on	Verbose messages are on

Examples

Turn verbose messages off.

Command:

GPI S:v:0 *(terse format)*

GPI SessonConfig : Verbose: Off *(verbose format)*

Response:

GPI S:V:0

Turn verbose messages on.

Command:

GPI S:V:1 *(terse format)*

GPI SessonConfig : Verbose:On *(verbose format)*

Response:

GPI SessionStatus:Verbose:on

Get the current session verbose setting. Verbose message return is on.

Command:

GPI s:v:?

Response:

GPI SessionStatus:Verbose:on

GPI Index Base Control

This command controls whether the GPIs are numbered from 0 or 1. A response to this configuration command is sent automatically if the session auto-response is turned on or if Parameter 4 is a status request.

If the GPI Index Base is set to 0, the GPIs on the card are numbered 0 to 31. If set to 1, the GPIs are numbered 1 to 32. This numbering is only for RossTalk protocol; in DashBoard the GPIs are always numbered 1 to 32.

Parameter			Description
	Terse	Verbose	
Command			
1	GPI	GPI	GPI command/message class
2	S	SessionConfig	Session setup query command
3	B	Base	GPI index base command
4	0	0	Set GPI numbering to start from 0 (zero)
	1	1	Set GPI numbering to start from 1 (one)
	?	StatusReq	Request current GPI index base setting
Response			
1	GPI	GPI	GPI command/message class
2	S	SessionStatus	Session setup status message
3	B	Base	GPI index base message
4	0	0	GPI numbering starts from 0
	1	1	GPI numbering starts from 1

Examples

Set GPI index base to start from 1. Verbose message return is on

Command:

GPI S:B:1

Response:

GPI SessionStatus:Base:1

Set GPI index base to start from 0. Verbose message return is on

Command:

GPI s:b:0

Response:

GPI SessionStatus:Base:0

Get the current session GPI index base setting. Verbose message return is off

Command:

GPI s:b:?

Response:

GPI S:B:0

Request All Session Settings

This command requests all session settings be returned. The responses are the same as the individual setting responses.

Parameter			Description
	Terse	Verbose	
Command			
1	GPI	GPI	GPI command/message class
2	S	SessionConfig	Session setup query command
3	?	StatusReq	Request all session settings

Examples

Request all session settings.

Command:

GPI S:? *(terse format)*

GPI SessionConfig : StatusReq *(verbose format)*

Response:

GPI SessionStatus:AutoResponse:on

GPI SessionStatus:Verbose:on

GPI Session:Status:Base:1

Asynchronous GPI State Reporting Control

This command allows the asynchronous GPI reporting of state changes to be controlled. A response to this command is sent automatically if the session auto-response is on or if Parameter 4 or 5 is a current configuration request. A GPI status message can also be requested by setting Parameter 6 to "`S`" or "`SendStatusMsg`". The returned status message is in the format configured by Parameter 5.

Parameter			Description
	Terse	Verbose	
Command			
1	GPI	GPI	GPI command/message class
2	#	#	Select GPI by index (0-31 or 1-32 as set by Index Base Control)
	*	AllGpi	Select all GPIs
3	C	ConfigStatusMsg	Configure asynchronous GPI report

Parameter			Description
	Terse	Verbose	
4	?	Query	Query current report edge configuration
	B	Both	Configure to report both edges
	L	Leading	Configure to report leading edge only
	T	Trailing	Configure to report trailing edge only
	N	None	Configure to not report any changes
	<empty>	<empty>	Do change the current configuration
5	?	Query	Query current report type configuration
	S	Simple	Configure to send a simple GPI status message
	D	Detailed	Configure to send a detailed GPI status message
	<empty>	<empty>	Do change the current configuration
6	S	SendStatusMsg	Request a GPI status report
	<empty>	<empty>	Do not request a GPI status report
Response			
1	GPI	GPI	GPI command/message class
2	#	#	GPI by index (0-31 or 1-32 as set by Index Base Control)
3	C	ConfiguredStatusMsg	Configuration Status
4	B	Both	Configure to report both edges
	L	Leading	Configure to report leading edge only
	T	Trailing	Configure to report trailing edge only
	N	None	Configure to not report any changes
5	S	Simple	Configure to send a simple GPI status message
	D	Detailed	Configure to send a detailed GPI status message

Examples

Set GPI 1 to report both edges, send detailed status messages, and send a GPI status report.

Command:

GPI 1 : ConfigStatusMsg : Both:Detailed:SendStatusMsgs

Response:

GPI 1:off:Config

GPI 1:ConfiguredStatusMsg:Both:Detailed

GPI State Control

These commands allow the state of the GPIs to be controlled.

GPI Trigger Control

This command triggers a GPI output. There is no auto-response to this command. Any changes to the GPI state are reported as configured by the Asynchronous GPI State Reporting Control command. The command is ignored by GPI inputs.

Parameter			Description
	Terse	Verbose	
Command			
1	GPI	GPI	GPI command/message class
2	#	#	Trigger GPI by index (0-31 or 1-32 as set by Index Base Control)
	*	AllGpi	Trigger all GPIs

Example

Trigger GPI 1.

Command:

GPI 1

Response:

<As set by ConfigStatusMsg>

GPI State Control

This command sets the state of the GPI output to active (on) or inactive (off). There is no auto-response to this command. Any changes to the GPI state are reported as configured by the Asynchronous GPI State Reporting Control command. The command is ignored by GPI inputs.

Parameter			Description
	Terse	Verbose	
Command			
1	GPI	GPI	GPI command/message class
2	#	#	Select GPI by index (0-31 or 1-32 as set by Index Base Control)
	*	AllGpi	Select all GPIs
3	0	Off	GPI is set to inactive (zero)
	1	On	GPI is set to active (one)

Example

Set GPI 17 to active (on)

Command:

GPI 17:1

GPI Status Request

This command requests a GPI status message for one or all of the GPIs.

Parameter			Description
	Terse	Verbose	
Command			
1	GPI	GPI	GPI command/message class
2	#	#	Select GPI by index (0-31 or 1-32 as set by Index Base Control)
	*	AllGpi	Select all GPIs
3	?	StatusReq	Requests a status response
4	D	Detailed	Requests a detailed status message
	<empty>	<empty>	Requests a simple status message

GPI Status Message

This message is sent due to a GPI changing to a reportable state, in response to a GPI Status Request command, or a status request in an Asynchronous GPI State Reporting Control command.

Simple Status Message

Parameter			Description
	Terse	Verbose	
Command			
1	GPI	GPI	GPI command/message class
2	#	#	GPI by index (0-31 or 1-32 as set by Index Base Control)
3	0	off	GPI is inactive/off (zero)
	1	on	GPI is active/on (one)

Detailed Status Message

Parameter			Description
	Terse	Verbose	
Command			
1	GPI	GPI	GPI command/message class
2	#	#	GPI by index (0-31 or 1-32 as set by Index Base Control)
3	0	off	GPI is inactive/off (zero)
	1	on	GPI is active/on (one)

Parameter			Description
	Terse	Verbose	
4	E	Event	The status message is due to a GPI change to a reportable state. Refer to the section "**Asynchronous GPI State Reporting Control**" on page 81 for details.
	R	Request	The status message is due to a detailed status request
	C	Config	The status message is due to a request in an Asynchronous GPI state reporting control command

Examples

Query GPI 17 for a simple status report.

Command:

GPI 17 : StatusReq

Response:

GPI 17:0

Query GPI 17 for a detailed status report.

Command:

GPI 17 : ?:D

Response:

GPI 17:0:Request

Software Licenses

This chapter provides third-party software license information for the GPI-8941 card. This product includes software components which are individually licensed under the following licenses.

lwIP

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This file is part of the lwIP TCP/IP stack.

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Service Information

Troubleshooting Checklist

Routine maintenance to this openGear product is not required. In the event of problems with your GPI-8941, the following basic troubleshooting checklist may help identify the source of the problem. If the frame still does not appear to be working properly after checking all possible causes, please contact your openGear products distributor, or the Technical Support department at the numbers listed under the "**Contact Us**" section.

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

Bootload Button

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

To reload the software on the card

1. Eject the card from the frame.
2. Press and hold the **Bootload** button, while re-inserting the card into the frame.
3. Release the button.
   - The **PWR** LED will flash green while the card is waiting for a new software load.
   - If a new software load is not sent to the card within 60 seconds, the card will attempt to restart with its last operational software load.
   - Software loads can be sent to the card via DashBoard.

Warranty and Repair Policy

The GPI-8941 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 GPI-8941 proves to be defective in any way during this warranty period, Ross Video Limited reserves the right to repair or replace this piece of equipment with a unit of equal or superior performance characteristics.

Should you find that this GPI-8941 has failed after your warranty period has expired, we will repair your defective product should suitable replacement components be available. You, the owner, will bear any labor and/or part costs incurred in the repair or refurbishment of said equipment beyond the FIVE (5) year warranty period.

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

This User Manual provides all pertinent information for the safe installation and operation of your openGear Product. Ross Video policy dictates that all repairs to the GPI-8941 are to be conducted only by an authorized Ross Video Limited factory representative. Therefore, any unauthorized attempt to repair this product, by anyone other than an authorized Ross Video Limited factory representative, will automatically void the warranty. Please contact Ross Video Technical Support for more information.

In Case of Problems

Should any problem arise with your GPI-8941, please contact the Ross Video Technical Support Department. (Contact information is supplied at the end of this publication.)

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

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

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.

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

CBR — constant bit rate.

CDN — content distribution network.

Contact closure output — a two-terminal output in which both terminals are isolated from ground, and which provides either an open or closed circuit between the two terminals to signal two states.

DashBoard — the DashBoard Control System.

Dry — a GPIO input/output circuit that does not apply any voltage to its terminals, relying instead on current provided by another wet GPIO connected to it.

DTVCC captions — CEA-708 captions.

Frame — the OGX-FR frame that houses the GPI-8941.

GPI — a general purpose interface.

Isolated input — a two-terminal input circuit in which both terminals are isolated from ground and which is activated by a current flowing through the two terminals.

MIB — management information base.

Network Controller Card — the MFC-OG3-N or MFC-OGX-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.

Production aperture — the image lattice that represents the maximum possible image extent in a given standard (e.g. the full size of all active pixels and active lines). For example, the 1080i production aperture would be 1920x1080.

Pull-to-ground input — a two-terminal input circuit in which one terminal is grounded. The other terminal is at a high logic level when open, and can be externally connected to ground to assert it low.

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

TCP — Transmission Control Protocol.

User — the person who uses the GPI-8941.

Voltage source output — a two-terminal output in which the two logic states are defined by either an open circuit or a DC voltage between the two terminals, one of which is connected to ground.

Wet — a GPIO input/output circuit that applies a voltage, and can therefore source a current through an interconnection to another device.

Wetting voltage — the voltage that is injected into an interconnection, normally by one device.