![FEDERAL SIGNAL Safety and Security Systems]

PAGASYS® GEN II
Remote Amplifier and Controller

Models: GENII-RC and GENII-RA700

Description, Installation, and User Manual

Limited Warranty

This product is subject to and covered by a limited warranty,
a copy of which can be found at www.fedsig.com/SSG-Warranty.
A copy of this limited warranty can also be obtained by written
request to Federal Signal Corporation, 2645 Federal Signal Drive,
University Park, IL 60484, email to info@fedsig.com or
call +1 708-534-3400.

This limited warranty is in lieu of all other warranties, express or
implied, contractual or statutory, including, but not limited to the
warranty of merchantability, warranty of fitness for a particular
purpose and any warranty against failure of its essential purpose.

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1.0 Safety Messages

⚠ WARNING

It is important to follow all instructions shipped with this product. This device is to be installed by trained personnel who are thoroughly familiar with the country's electric codes and will follow these guidelines as well as local codes and ordinances, including any state or local noise-control ordinances.

Planning

- If suitable warning equipment is not selected, the installation site for the system is not selected properly, or the system is not installed properly, it may not produce the intended optimum audible warning. Follow the Federal Emergency Management Agency (FEMA) recommendations.

- If the system is not activated in a timely manner when an emergency condition exists, it cannot provide the intended audible warning. It is imperative that knowledgeable people, who are provided with the necessary information, be available at all times to authorize activation.

- The sound output of the system is capable of causing permanent hearing damage. To prevent excessive exposure, carefully plan placement, post warnings, and restrict access to areas near loudspeakers. Review and comply with any local or state noise control ordinances as well as OSHA noise exposure regulations and guidelines.

- Activating the system may not result in people taking the desired actions if those to be warned are not properly trained about the meaning of warning sounds. Users should follow FEMA recommendations and instruct those to be warned of corrective actions to be taken.

After installation, service, or maintenance, test the system to confirm that it is operating properly. Test the system regularly to confirm that it will be operational in an emergency.

1.1 Safety Messages to Installers

People's lives depend on your safe installation of our products. It is important to follow all instructions shipped with this product. This device is to be installed by a trained electrician who is thoroughly familiar with the National Electrical Code and/or Canadian Electrical Code and will follow the NEC and/or CEC Guidelines as well as all local codes.

The selection of the mounting location for this system, its controls, and the routing of the wiring are to be accomplished under the direction of the Facilities Engineer and the Safety Engineer. Listed below are some other important safety instructions and precautions you should follow:

- Electrocution or severe personal injury can occur when performing various installation and service functions such as making electrical connections, drilling holes, or lifting equipment. Therefore, only experienced electricians should install this product in accordance with national, state, or province and any other electrical codes having jurisdiction. Perform all work under the direction of the installation or service crew safety foreman.

- Read and understand all instructions before installing, operating, or servicing this equipment.

- All effective warning sounds may, in certain circumstances, cause permanent hearing loss. Take appropriate precautions, such as wearing hearing protection. The maximum sound level exposure limits specified in OSHA 29 CFR 1910 should not be exceeded.

- For optimum sound distribution, do not install the loudspeakers where objects would block any portion of the front of the system.

- Establish a procedure to check the signal system for proper activation and operation routinely.

- Any maintenance to the unit MUST be performed by a trained electrician in accordance with NEC Guidelines and local codes or a Federal Signal certified Service Provider.

- Never alter the unit in any manner.

- The nameplate should NOT be obscured, as it contains cautionary and/or other information of importance to maintenance personnel.

- After installation and completion of the initial system test, provide a copy of these instructions to all personnel responsible for the operation, periodic testing, and maintenance of the equipment.

- File these instructions in a safe place and refer to them when maintaining and/or reinstalling the device.

Failure to follow all safety precautions and instructions may result in property damage, serious injury, or death.

Installation and Service

- After installation or service, test the system to confirm that it is operating properly. Test the system regularly to confirm that it will be operational in an emergency.

- If future service and operating personnel do not have these instructions to refer to, the system may not provide the intended audible warning, and service personnel may be exposed to death, permanent hearing loss, or other bodily injuries. File these instructions in a safe place and refer to them periodically. Give a copy of these instructions to new recruits and trainees. Also give a copy to anyone who is going to service or repair the system.

- To reduce the risk of electric shock, do not perform any servicing other than what is contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel. Always test the system before using it after repairs have been made.

Ethernet Wiring

- Unless shielded or run in conduit, Ethernet wiring must be at least six feet from bare power wiring or lightning rods and associated wires, and at least six inches from other wire (for example, antenna wires, doorbell wires, wires from transformers to neon signs), steam or hot water pipes, and heating ducts.

- Do not place Ethernet wiring or connections in any conduit, outlet, or junction box containing high voltage electrical wiring.

Symbol Definition
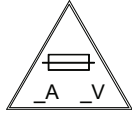
Indicates to reduce the risk of fire, replace the fuse as marked.

Pay careful attention to the notice located on the equipment.

Read and understand the information contained in this manual before attempting to install or service the system.

2.0 General Description

2.1 Introduction

This document is a description, installation, and user manual for the PAGASYS® GEN II Remote Controller (GENII-RC) and PAGASYS® GEN II Remote Amplifier (GENII-RA700). Its intended audience are those assigned to use and maintain the system.

2.2 Overview

PAGASYS GEN II is a fully featured Public Address/General Alarm (PA/GA) system that includes support for standalone controller operation, A/B controller hot-standby (high-integrity system), and full A/B system redundancy (duplicated system).

The PAGASYS GEN II family includes the GENII-RC Remote Controller and the GENII-RA700 Remote Amplifier: low-cost, networked PA/GA system components that are fully compatible with the rest of the PAGASYS GEN II family.

In particular, the GENII-RC and GENII-RA700 products are designed to leverage IP network communication and Dante® audio-over-IP digital audio to provide easy, robust, and low-cost PA/GA to both local and remote sites.

3.0 GENII-RC Remote Controller

The GENII-RC Remote Controller is part of the PAGASYS GEN II product family. It provides comparable features to a PAGASYS GEN II full controller in a space-efficient 2U rack-mountable chassis. In addition to built-in audio and I/O capabilities, it is fully compatible with all PAGASYS GEN II I/O boards and amplifiers and can be included in a PAGASYS GEN II networked system with other GENII-RCs and/or GEN II full controllers.

3.1 GENII-RC Features

3.1.1 Audio

Audio inputs are selectable from among 8 analog and 16 Dante® digital audio inputs. Analog inputs are designed for access panels but can be used for other analog audio sources. Dante® inputs can accept audio from any Dante® network audio source, including GENII-RA700 amplifiers.

Audio output uses 2 PAGASYS GEN II amplifier audio paths and 16 Dante® outputs. Depending on the configuration, the system can support either two or four simultaneous broadcasts. Audio outputs can be used to drive PAGASYS GEN II amplifiers or provide audio to external systems.

Table 1 GENII-RC Audio

GENII-RC Configuration	Amplifiers	Simultaneous Broadcasts
Standalone, Duplicated	Analog with or without Remote	2
Standalone, Duplicated	Remote Only	4
High Integrity	Any	2

Dante® audio is also used in networked PAGASYS GEN II systems to support global access panels (GAPs) and to allow multiple PAGASYS GEN II controllers to share audio. In a networked PAGASYS GEN II system, this distributed audio routing makes the overall system robust in the face of localized failures.

3.1.2 Digital I/O

Eight built-in digital inputs can be software configured as either "wet" (detects external voltage) or "dry" (detects an external contact closure) contacts. Each input can be configured, alone or in combination with other inputs and internal system states, to control virtually any PAGASYS GEN II function, including broadcasts, beacons, and digital outputs.

Eight built-in digital outputs provide relay closures to external equipment. Digital outputs can be configured to open or close in response to virtually any combination of digital inputs and internal system states.

3.1.3 Access Panels

Up to eight PAGASYS GEN II access panels and/or mic stations can be connected.

3.1.4 PAGASYS GEN II I/O Cards

Any combination of up to 63 PAGASYS GEN II I/O cards can be connected to provide additional I/O, cabinet fan control and monitoring, and beacon control and monitoring.

3.1.5 PAGASYS GEN II Amplifiers

PAGASYS GEN II amplifier chassis can be connected, providing up to 128 amplifiers, optionally including standby amplifiers and ISMT support.

3.1.6 System Robustness

GENII-RCs can function as individual nodes or in combination with other controllers. For redundancy, each node can be configured as high-integrity (A/B controllers sharing I/O boards and amplifiers) or as fully duplicated (A/B controllers each with their own I/O boards and amplifiers).

Each node, whether standalone, high-integrity, or duplicated, can also participate in a PAGASYS GEN II network system. Network systems are fully heterogeneous, supporting combinations of standalone, high-integrity, and duplicated nodes of both GENII-RCs and GEN II full controllers. GAPs can be configured to communicate with multiple nodes to ensure system alarm activation and monitoring even in the face of local failures.

GENII-RCs continually run self-checks to ensure that any fault is detected and reported in a timely manner.

3.2 GENII-RC Specifications

Table 2 GENII-RC Environmental and Physical Specifications

Operating temperature range	32˚F to 131˚F (0˚C to +55˚C)
Humidity range	0-95%, non-condensing
Dimensions (Height x Width x Length)	3.5 x 19.0 x 14.6 inches (88 x 483 x 371 mm)
Weight	7.7 lb (3.5 kg)

Table 3 GENII-RC Power Input, AC Model

Input voltage range	100-264 Vac
Frequency	50-60 Hz
Max current	1.3 A at 100 V
Max operating power	130 W

3.2.1 GENII-RC Front panel

Figure 1 GENII-RC Front Panel
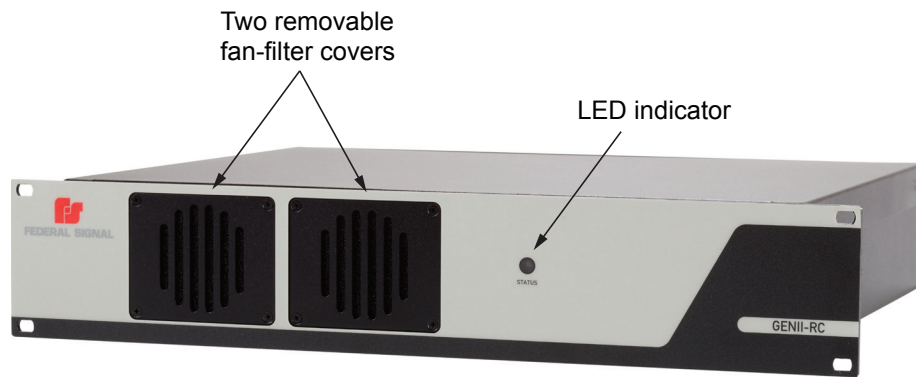
The GENII-RC controller has the following:

- Two removable fan-filter covers

  - Replaceable filters: replacement filters can be purchased as a service part from Federal Signal

- LED indicator: the RC has a bi-color LED on the front panel that can indicate green, yellow, or off and can flash. See Table 4 for LED state indications.

Table 4 GENII-RC LED State Indications

Condition	Indication Method
CPU running	Solid Green
Booting or bad configuration (Software fallback)	Fast flashing Yellow
Hardware fallback or no power	Off

3.2.2 Rear Panel
Figure 2 GENII-RC Rear Panel

Table 5 GENII-RC Inputs and Outputs

Digital inputs (8)	• Dry-contact mode
	    • Max output voltage: 5.5 V (open circuit)
	    • Max output current: 5 mA (short circuit)
	• Wet-contact mode
	    • Max input voltage: 30 V
	    • Min input voltage to activate: 5 V
	    • Input current: 5 mA at 24V

Programmable relay outputs (8)	• Configuration: SPDT (single-pole, double-throw) • Rated current: 1 A • Rated voltage: 48 Vdc
RJ45 Ethernet ports (2)	• Speed: 1 Gigabit • Internal connection: Ethernet switch (acts as a 2-port switch) • Dante® network audio: yes
RJ45 A/B link interface port (1)	• Used for interconnecting GENII-RCs in A/B systems • For pinout, see "Table 8 RJ45 Connections" on page 17
RJ45 I/O interface port	Supports up to 63 daisy-chained GEN II I/O boards. **NOTE**: If power usage of the cards on the port exceeds 0.5 A, a power injector I/O card is needed. See the PAGASYS® GEN II manual 25500458 for information on I/O card power usage.
RJ45 Amp interface port (1)	• Max amplifiers: 128 GEN II amplifiers • Standby amp support: yes • ISMT support: optional, requires ISMT cards

RJ45 Access Panel ports (8)	• Each can be used for AP or as general-purpose audio input • Nominal audio input level: 0 dBu (0.775 V_{RMS}) • For pinout, see "Table 8 RJ45 Connections" on page 17
RJ11 Fault relay contact (1)	• Indicates unrecoverable controller fault • Configuration: SPDT (single-pole, double-throw) • Rated current/max-peak current: 1 A • Rated voltage/max-switching voltage: 48 Vdc • For pinout, see "Table 8 RJ45 Connections" on page 17
RS232 console ports (2)	• Used only for field upgrades and diagnosis. • Standard 3-pin RS232 DB9 (no hardware flow control)
SD card slot (1)	• Used only for field upgrades. • Filesystem: FAT (exFAT is not supported)

3.3 GENII-RC System Faults

There are a number of faults the GENII-RC can raise or report. Many of these faults include an "entity" and a "sub-entity," which specifies where the error occurred. For example, in a Critical Path Fail fault, the entity is the amplifier ID, and the sub-entity is the amplifier path.

Table 6 GENII-RC System Faults

Fault	Description
Amp Psu Overvolt	An amplifier power supply reports over-voltage.
Amp Psu Undervolt	An amplifier power supply reports under-voltage.
Bad Params	A fan-monitor I/O board has been sent an invalid configuration.
Bad Manufacturing Data	An I/O board or amplifier reports bad manufacturing data.
Code Assert	An I/O board has encountered a recoverable software failure.
Code Memory Crc	The controller, an I/O board, or an amplifier has detected its firmware image in memory is corrupt.
Config Crc	The controller configuration in memory has changed or become corrupt.
Config Defaulted	An unconfigured I/O board or amplifier has started and has configured itself with the defaults.
Crc File Missing	The controller cannot validate a firmware or data file on disk because its accompanying CRC file cannot be found.
Critical Path Fail	An audio path from the controller to the output of an amplifier is not working correctly.
DC Supply Overvolt	The controller power supply reports over-voltage.
DC Supply Undervolt	The controller power supply reports under-voltage.
Earth Fault	An amplifier speaker circuit has a conductive path to earth ground.
Fan Fail	An amplifier fan has failed.
Lower Fan Fail	A fan-monitor I/O board lower fan has failed.

Fault	Description
Upper Fan Fail	A fan-monitor I/O board upper fan has failed.
File Corrupt	A firmware or data file on disk has failed validation on the controller.
File Missing	A firmware or data file on disk cannot be found on the controller.
Firmware Mismatch	The A and B controllers in a duplicated or high-integrity system are not running identical firmware, or the controller and DSP firmware versions are not compatible.
Flash Error	An I/O board or amplifier has encountered a flash memory failure.
Flash Read Timeout	An I/O board or amplifier cannot read its flash memory.
Gain Error Major	An amplifier's output is below 50% of nominal gain.
Gain Error Minor	An amplifier's output is 50-70% of nominal gain.
Hardware Not Available	The controller configuration specifies hardware that does not exist.
I2c Bus Failure	An I/O board or amplifier has an I^2C bus failure.
I2c Init Failed	A beacon-monitor I/O board was unable to initialize its I^2C bus.
I2c Transaction Failed	A beacon-monitor, isolated input, or monitored input I/O board encountered a problem with its I^2C bus.
Impedance Too High	An amplifier or ISMT speaker has measured an impedance above the configured valid range.
Impedance Too Low	An amplifier or ISMT speaker has measured an impedance below the configured valid range.
In Test Mode	An I/O board or amplifier has been put in test mode via its console.
Input Overload	An amplifier input has exceeded the permitted signal level.
Inputs Defaulted	An unconfigured isolated or monitored input I/O board has started and configured its inputs with the defaults.
Internal Config Error	An I/O board has encountered a configuration error.
Internal Failure	The controller cannot validate or load a system file or a recorded message file.
Line Open	A monitored input I/O board input has detected an open circuit.
Line Short	A monitored input I/O board input has detected a short circuit.
Loop Broken	An amplifier speaker circuit loop has broken.
Lost Comms	The controller is no longer able to communicate with an I/O board, virtual I/O board, amplifier, access panel, or peer controller.
Network Audio Fault	The DSP has encountered a problem with the Dante® audio.
Network Config Fault	The controller is unable to load the netconfig.
Nor Flash Crc	The controller NOR flash has become corrupt.
Output Overload	An amplifier output has exceeded the permitted signal level.
Over Temp Major	An amplifier output has been shut down due to overheating.
Over Temp Minor	An amplifier output has had its power reduced due to overheating, or a fan-monitor I/O board is reporting the rack is over-temperature.
Pcp Node Id Mismatch	An I/O board software address does not match its hardware address.

Fault	Description
Pcp Node Type Mismatch	An I/O board reports its type as different from the type in the controller configuration.
Pilot Tone Fail	An audio input pilot-tone signal has fallen below the configured threshold.
Pilot Tone Stale	An audio input pilot-tone signal has not been measured within the configured period.
Psu Fault	The controller power supply has encountered a fault.
Spi Bus Failure	An I/O board or amplifier has a SPI bus failure.
Spi Transaction Failed	An amplifier has encountered a problem with its SPI bus.
Speaker Short Circuit	An amplifier speaker circuit has a short circuit.
Spkr Mon Uncalibrated	An amplifier is unable to perform impedance monitoring because it is uncalibrated.
Stack Overflow	The controller, an I/O board, or an amplifier has encountered a stack overflow.
Statistics Reset	A beacon-monitor or fan-monitor I/O board has reset its statistics.
Sys State Healthy	There are no reported major or minor faults.
Sys State Major Fault	There is at least one reported major fault.
Sys State Minor Fault	There are no reported major faults, but there is at least one reported minor fault.
Under Temp	A fan-monitor I/O board is reporting the rack is under-temperature.
Unexpected Reset	An I/O board or amplifier has reset unexpectedly.
Unexpected Uptime	An I/O board or amplifier has reported less uptime than expected.
Unknown Fault	An I/O board or amplifier has encountered an unknown fault.
User Fault	A user-defined fault has occurred on the controller.

3.4 GENII-RC Installation and Setup

For specific configuration information, see the PAGASYS GEN II SYSTEM MANAGER Software (Model P-SYSMGR-G) manual document number 25500459.

To install the GENII-RC Remote Controller, connect the wiring as follows, and then configure the Remote Controller using the PAGASYS GEN II System Manager.

Remote Controller wiring:

- Connect AC power cable to the AC Power In port on the rear of the Remote Controller. AC Power connection uses a standard IEC C13 terminated power cable. The wall plug should be of a type used in the location the chassis is deployed. Federal Signal offers cables compatible with the Remote Controller with UK, EU, or US wall plugs. This cable is not included with the Remote Controller, as it differs on which wall plug is needed.

- Connect digital relay outputs as needed on the rear panel of the Remote Controller. Eight digital outputs use three pins for each relay output, NC (normally closed), C (common), and NO (normally open), and are dry relay contact only (circuit is only open or closed to pass current). Wire gauge used to connect to the digital outputs should support current and voltage in "Table 5 GENII-RC Inputs and Outputs" on page 12.

- Connect digital inputs as needed on the rear panel of the Remote controller. Eight digital inputs use +/- pins for each input and are programmable as dry contact only (circuit is only open or closed to pass current) or 24 Vdc input. Wire gauge used to connect to the digital inputs should support current and voltage in "Table 5 GENII-RC Inputs and Outputs" on page 12.

- Connect RS232 DB9 cable to serial console port to use PAGASYS GEN II System Manager to configure/controller the Remote Controller. Terminate the other end of the DB9 cable to the System Manager server.

- Connect a CAT5/6 cable to one of two Dante®-enabled RJ45 ports to enable communications with other networked PAGASYS GEN II equipment and allow the RC controller to send/receive Dante® digital audio.

- Connect an RJ11 cable to the Fault Relay port on the rear panel of the Remote Controller. Terminate the RJ11 cable to the monitoring terminal.

- If connecting the Remote Controller to standard PAGASYS GEN II amplifiers, connect the GENII amplifier RJ45 output ports using CAT5/6 cables to the PAGASYS GEN II amplifier input ports.

- If deploying the Remote Controller in an A/B redundant configuration, connect the A/B RJ45 port to the redundant controller A/B port using CAT5/6 cables.

- If using standard PAGASYS GEN II I/O cards, connect a CAT5/6 cable to the Remote Controller I/O expansion port, connecting the other end of the cable to one of the RJ45 comm ports on the I/O cards needed.

Figure 3 GENII-RC Rear Panel
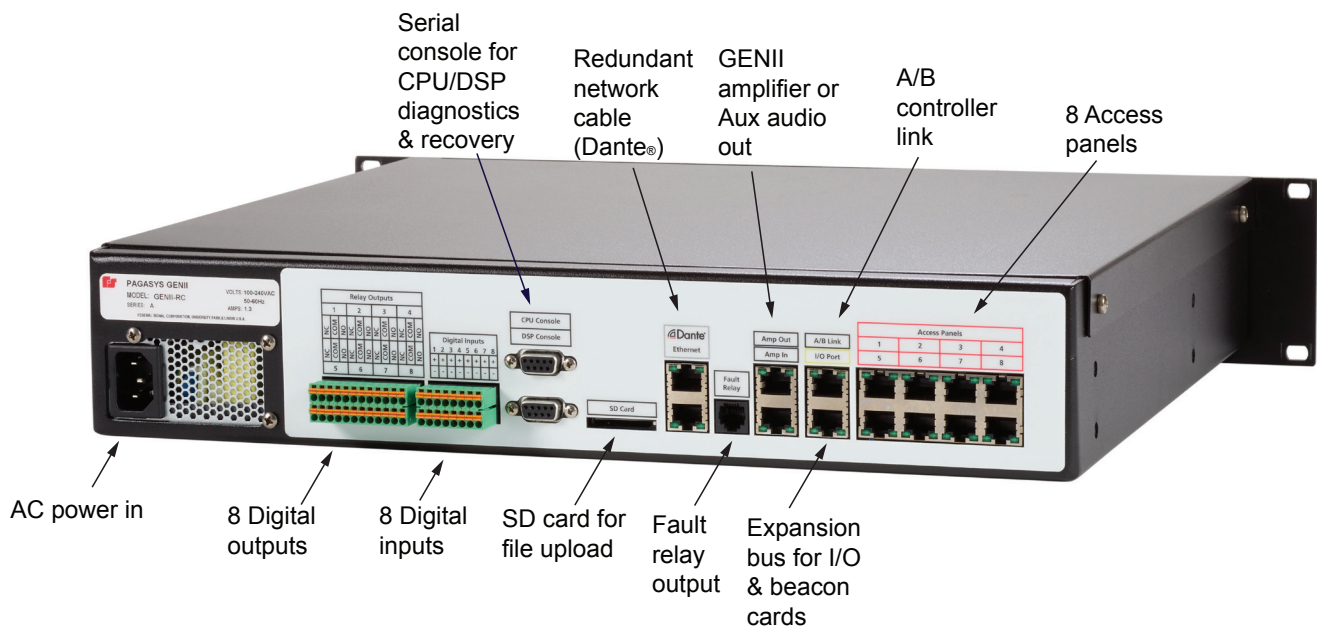
3.4.1 Access Panel Connection

If hardware Access Panels need to be connected to the Remote Controller, use CAT5/6 cables connected to the eight (8) Access Panel ports to connect to the remote access panels. If Access Panel CAT5/6 cables are not terminated to fit the RJ45 interface of the Remote Controller ports, the termination can be done on a Passive Terminal Block I/O (P-PTBC-G) card, and a CAT5/6 cable can be routed from the Passive Terminal Block I/O card to one of the Access Panel ports on the rear of the Remote Controller.

3.4.1.1 Using the AP Connection for Audio Input

Any AP connection that does not have a connected access panel can be used as an audio input by wiring the balanced external audio to pins 4 and 5. See "Table 8 RJ45 Connections" on page 17.

Nominal full-scale audio input is 0 dBu (0.775 V_{RMS}). Some adjustment is possible in the controller configuration by setting gain or attenuation on the input audio. Audio input levels above twice the nominal input level will clip in hardware.

Table 7 GENII-RC Specifications

Nominal audio input level	0 dBu (0.775 V_{RMS}
Maximum audio input level	6 dBu (1.55 V_{RMS})
Maximum configurable audio gain	+30 dB
Maximum configurable audio attenuation	-100 dB

3.4.1.2 RJ45 Pinout

The pinout of the RJ45 connection are in the following table.

Table 8 RJ45 Connections

Pin	Function
1	RS422 TX+
2	RS422 TX-
3	RS422 RX-
4	audio input+
5	audio input-
6	RS422 RX+
7	ground
8	+12 V

4.0 GENII-RA700 Remote Amplifier

The GENII-RA700 Remote Amplifier is part of the PAGASYS GEN II product family. It provides two 350 W amplifiers, audio inputs, and I/O, all in a space-efficient 2U rack-mountable chassis. Use the GENII-RA700 to support loudspeakers, microphones, beacons, and I/O in remote locations connected only by a standard gigabit Ethernet link. The amplifiers can be banked in parallel, acting as a single 700 W amplifier, and support configurations with standby amplifiers. It can communicate with standalone, high-integrity, or duplicated controllers over a single or redundant Ethernet connections.

Figure 4 GENII-RA700 Front Panel

4.1 GENII-RA700 Features

4.1.1 Audio

Two analog inputs are available for converting local analog audio to Dante® audio for use over the network in a PAGASYS GEN II system. This means local analog audio (such as a microphone) can be the source for broadcasts in the networked PAGASYS GEN II system. The PAGASYS GEN II controller also uses Dante® to send broadcast audio to the GENII-RA700. The use of Dante® network audio makes it completely unnecessary to run any analog audio lines between the GENII-RA700 and its PAGASYS GEN II controller.

Two separate 350 W amp outputs connect to speakers. The speaker outputs can be wired in parallel to provide a single 700 W speaker output. The GENII-RA700 is designed for continuous duty at full output power. Models are available to support either 70 V or 100 V speakers.

Standby audio input and output connections allow an additional GENII-RA700 to serve as a standby amplifier.

4.1.2 Digital I/O

Four built-in digital inputs read external contact closures and forward their state to a PAGASYS GEN II controller. This allows local contact closures (such as push-to-talk) to be used by the overall system without the need to make special accommodation or run lines back to a PAGASYS GEN II controller.

Four built-in digital outputs provide relay closures to external equipment. Digital outputs are controlled over the network by a PAGASYS GEN II controller. One of the relays has a higher current capacity to directly support unmonitored beacons.

4.1.3 PAGASYS GEN II I/O Cards

Any combination of up to 63 PAGASYS GEN II I/O cards can be connected to provide additional I/O, cabinet fan control and monitoring, and beacon control and monitoring. The I/O cards are connected over the network to a PAGASYS GEN II controller and function as if they are directly connected to the controller. Note that the count of 63 cards does not include any necessary power-injector cards. For specific configuration information, see the PAGASYS GEN II SYSTEM MANAGER Software (Model P-SYSMGR-G) manual document number 25500459.

4.1.4 System Robustness

GENII-RA700 amplifiers continually run self-checks to ensure that any fault is detected and reported promptly. Speaker outputs are thermally and electrically monitored.

Supplemental GENII-RA700 amplifiers can act as dedicated standby amplifiers, taking over the speaker outputs of amplifiers that have failed.

4.2 GENII-RA700 Specifications

Table 9 GENII-RA700 Environmental and Physical Specifications

Operating temperature range	14˚F to 131˚F (-10˚C to +55˚C)
Humidity range	0-95%, non-condensing
Dimensions (Height x Width x Length)	3.5 x 19.0 x 18.0 inches (88 x 483 x 456 mm)
Weight	17.0 lb (7.7 kg)

Table 10 GENII-RA700 Power Input, AC Model

Input voltage range	100-264 Vac
Frequency	50-60 Hz
Max current	8.7 A at 10 V
Max operating power	870 W

Table 11 GENII-RA700 Power Input, DC Model

Input voltage range	40-56 Vdc
Max current	823 A at 40 V
Max operating power	870 W

Table 12 Amplifier

Quiescent power	45 W (0.375 A) at 120 Vac
Rated output voltage	70 V_{RMS} or 100 V_{RMS}, depending on model
Max output power	350 W per channel
Frequency Response	200-15000 Hz
THD	<1%
Sensitivity	0.775 V_{RMS} at 1 kHz

4.2.1 GENII-RA700 Front Panel

Figure 5 GENII-RA700 Front Panel

Two removable
fan-filter covers
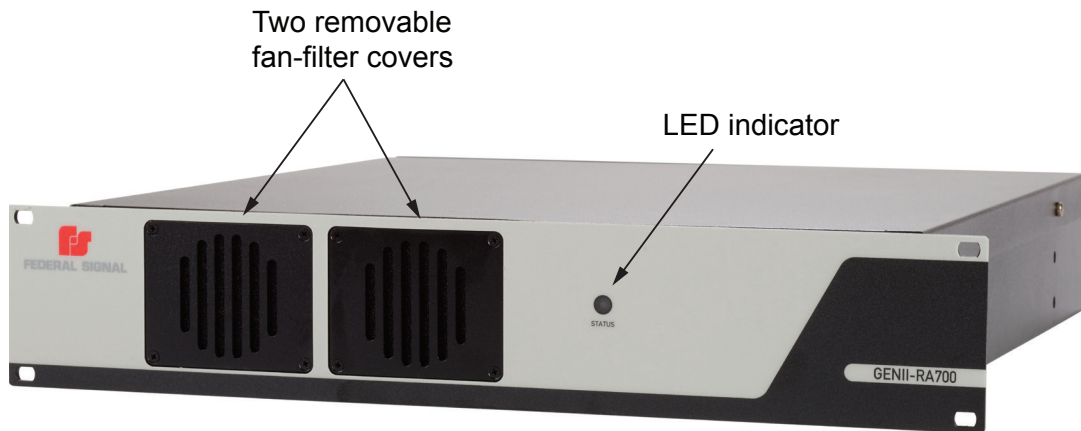
LED indicator

The GENII-RC controller has the following:

- 2 x Removable fan-filter covers

    - Replaceable filters: replacement filters can be purchased as a service part from Federal Signal

- LED indicator: the RA700 has a bi-color LED on the front panel that can indicate green, yellow, or off and can flash. See "Table 13 GENII-RA700 LED State Indications" below.

Table 13 GENII-RA700 LED State Indications

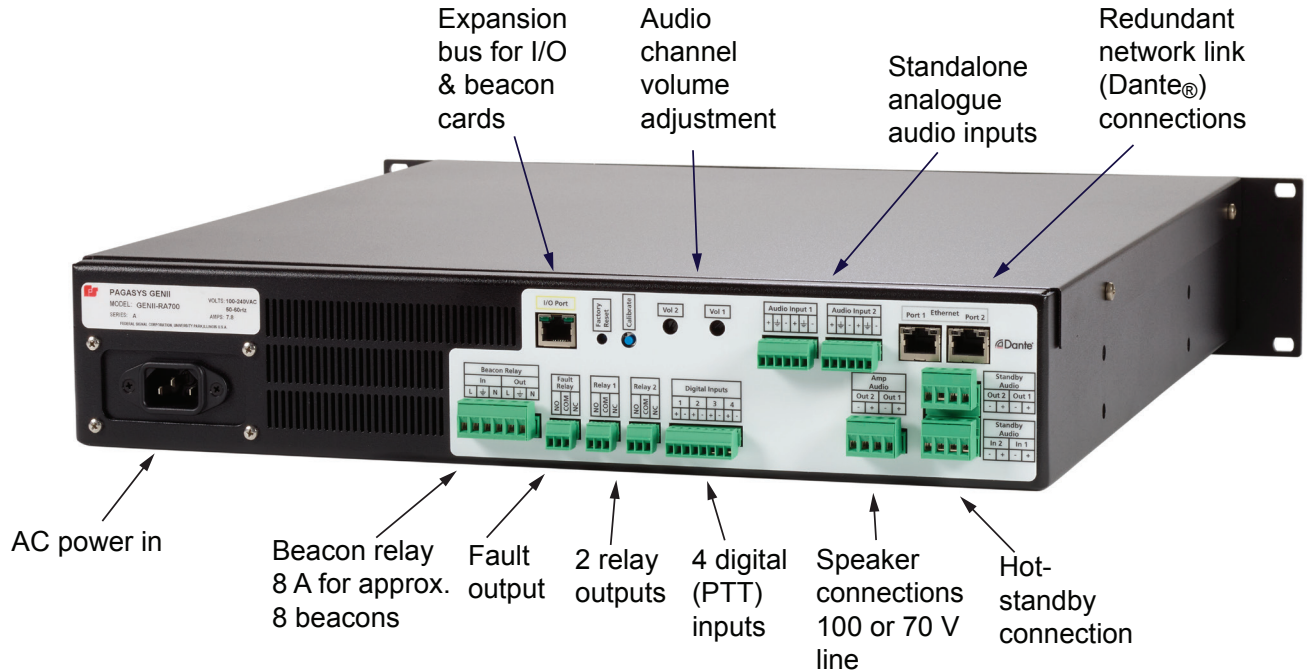| Condition	Indication Method
CPU State	Solid = CPU failed (or no power) Pulsed (ON or OFF) = CPU running OK
Connection State	Pulsed OFF = connected Pulsed ON = not connected
Fault State	Green = No faults Yellow = Fault (see fault list)

Figure 6 GENII-RA700 Rear Panel AC Chassis

Table 14 GENII-RA700 Inputs and Outputs

Audio inputs (2)	• Nominal audio input level: 0 dBu (0.775 V_{RMS}) • Pass-through connections for ease of daisy-chaining multiple chassis. • For pinout, see "Table 15 Audio Input Pinout" on page 22.
Amplifier outputs (2)	• Output voltage: 70 V or 100 V, depending on amplifier model • Output power: 350 W • For pinout, see "Table 16 Audio Output Pinout" on page 22.
Digital inputs (4)	• Dry contact only. • Max output voltage: 5.5 V (open circuit) • Max output current: 5 mA (short circuit)
Programmable relay outputs (4)	General-purpose relays (2) • Configuration: SPDT (single-pole, double-throw) • Rated current: 2 A • Rated voltage: 48 Vdc Fault relay (1) (can be used as a general-purpose relay if desired) • Configuration: SPDT • Rated current: 2 A • Rated voltage: 48 Vdc Beacon relay (1) (can be used as a general-purpose relay if desired) • Configuration: DPDT (double-pole, double-throw) • Pass-through ground connection (not connected to any GENII-RA700 ground) • Rated current/max-peak current: 10/20 A • Rated voltage: 250 Vac • For pinout, see "Table 17 Programmable Relay Outputs Pinout" on page 22.

RJ45 Ethernet ports (1)	• Speed: 1 Gigabit • Internal connection: Ethernet switch (acts as a two-port switch) • Dante® network audio: yes
RJ45 I/O interface port (1)	Supports up to 63 daisy-chained GEN II I/O boards.
Factory Reset button	For details see "4.2.2 Factory Reset Button" on page 23.
Calibrate button	Not used in GENII mode.
Volume controls (2)	Not used in GENII mode.

4.2.1.1 Pinout

The pinout for audio input are in the following table.

Table 15 Audio Input Pinout

Pin	Function
1	+
2	GND
3	-
4	+
5	GND
6	-

4.2.1.2 Pinout

The pinout for audio output are in the following table.

Table 16 Audio Output Pinout

Pin	Function
1	-
2	+
3	-
4	+

4.2.1.3 Pinout

The pinout for programmable relay outputs are in the following table.

Table 17 Programmable Relay Outputs Pinout

Pin	Function
1	Normally Open
2	Common
3	Normally Closed

4.2.2 Factory Reset Button

The factory reset button is used to erase all custom settings and revert the GENII-RA700 to GENII mode.

To perform a factory reset:

1. Press and hold the Factory Reset Button.

2. Power-cycle the GENII-RA700 (or power it on, if it was off).

3. Continue to hold the Factory Reset Button for 15 seconds.

4. Release the Factory Reset Button.

5. Power-cycle the GENII-RA700 again.

6. Done.

After a factory reset, the GENII-RA700's IP settings will reset to default; see "4.4.1 Network Configuration" on page 27. The Dante® settings will also revert to default, meaning the Dante® will lose its static IP address, name, and any redefined channel labels. It will be necessary to put the system on a network with a DHCP server so Dante® can request an IP address. Then, via the Dante® Controller, assign a static IP address and make any desired changes to the device name and its channel labels.

4.3 GENII-RA700 System Faults

There are a number of hardware faults the GENII-RA700 can report to its PAGASYS GEN II controller.

4.3.1 Per Chassis

Each of the following represents a fault at the chassis level.

Table 18 Fault at the Chassis Level

Fault	Description	Resolution
Code CRC failed	The firmware has become corrupted.	Replace unit.
Stack overflow	An error in the firmware has corrupted the stack.	Reboot unit, report to Federal Signal.
Assert	An unexpected error has occurred in the firmware.	Reboot unit, report to Federal Signal.
Config defaulted	The configuration memory has become corrupted and has reverted to factory defaults.	Replace unit. Amplifier should continue to function in the interim after reconfiguration.
Profile error	The manufacturing information has become corrupted (serial number, build date, etc.).	Replace unit. Amplifier should continue to function in the interim.
PSU over-voltage	The power supply is overvoltage.	Replace unit.
PSU under-voltage	The power supply is under voltage.	Replace unit.
I²C bus failed	An internal serial bus has failed.	Replace unit.
DSP boot failed	The firmware was unable to boot the DSP.	Replace unit.
DSP link failed	The firmware cannot communicate with the DSP.	Replace unit.
DSP watchdog failed	The DSP has encountered a watchdog timeout.	Replace unit.
Fan 1 failed	Chassis fan 1 has failed.	Replace unit. Amplifier should continue to function in the interim, provided fan 2 is still working.
Fan 2 failed	Chassis fan 2 has failed.	Replace unit. Amplifier should continue to function in the interim, provided fan 1 is still working.

4.3.2 Per Amplifier

There are two faults of each of the following types, one for each amplifier channel.

Table 19 Fault Per Amplifier

Fault	Description	Resolution
Earth fault	The speaker circuit is shorted to Earth ground.	Check speaker circuit wiring.
Short-circuit fault	The speaker circuit has a short circuit.	Check speaker circuit wiring.
Low-impedance fault	The speaker circuit impedance is below the calibrated range.	Check speakers.
High-impedance fault	The speaker circuit impedance is above the calibrated range.	Check speakers.
Minor overtemp fault	The amplifier output power has been reduced due to overheating.	Check filter and airflow. Amplifier should continue to function at a reduced volume.
Major overtemp fault	The amplifier output has been shut down due to overheating.	Check filter and airflow.
Minor gain fault	The amplifier output is 50-70% of nominal gain.	Replace unit. Amplifier should continue to function at a reduced volume.
Major gain fault	The amplifier output is below 50% of nominal gain.	Replace unit.

4.4 GENII-RA700 Installation and Setup

For specific configuration information, see the PAGASYS GEN II SYSTEM MANAGER Software (Model P-SYSMGR-G) manual document number 25500459.

To install the GENII-RC Remote Amplifier, connect the wiring as follows, and then configure the Remote Amplifier using the PAGASYS GEN II System Manager.

- Connect AC power cable to the AC Power In port on the rear of the Remote Amplifier. AC Power connection uses a standard IEC C13 terminated power cable. The wall plug should be of a type used in the location the chassis is deployed. Federal Signal offers cables compatible with the Remote Amplifier with UK, EU, or US wall plugs. This cable is not included with the Remote Amplifier, as it differs on which wall plug is needed.

- Connect beacon relay output as needed on the rear panel of the Remote Amplifier. The beacon relay output uses six pins for the beacon relay output, three for input, Line (L), Common, and Neutral (N), and the same signals for output. The wire gauge used to connect to the digital outputs should support a maximum of 8 A. Typically, 12 gauge wire is used or per local electrical codes.

- Connect wires to the Fault Relay port on the rear panel of the Remote Amplifier. Terminate the wires to the monitoring terminal.

- Connect digital relay outputs as needed on the rear panel of the Remote Amplifier. Two digital outputs use three pins for each relay output, NO (normally open), C (common), and NC (normally closed), and are dry relay contact only (circuit is only open or closed to pass current). Wire gauge used to connect to the digital outputs should support current and voltage in "Table 14 GENII-RA700 Inputs and Outputs" on page 21.

- Connect digital inputs as needed on the rear panel of the Remote Amplifier. Four digital inputs use +/- pins for each input and are programmable as dry contact only (circuit is only open or closed to pass current) or 24 Vdc input. Wire gauge used to connect to the digital inputs should support current and voltage in "Table 14 GENII-RA700 Inputs and Outputs" on page 21.

- Connect the Remote Amplifier to speaker runs using wiring that can support up to 350 W (70 or 100 V_{RMS} depending on model). There are two different channels that can support independent speaker runs or zones on each Remote Amplifier model.

- The hot standby connections on the Remote Amplifier are used for standby audio, with two channels for audio input and two channels for output.

- If using standard PAGASYS GEN II I/O cards, connect a CAT5/6 cable to the Remote Amplifier I/O expansion port, connecting the other end of the cable to one of the RJ45 comm ports on the I/O cards needed.

- Connect audio input wiring if local external audio is needed with the Remote Amplifier. Two channels are available to be used with the two 350 audio channels in the Remote Amplifier.

- Connect a CAT5/6 cable to one of two Dante®-enabled RJ45 ports to enable communications with other networked PAGASYS GEN II equipment and allow the RC controller to send/receive Dante® digital audio.

4.4.1 Network Configuration

The user is responsible for setting the network configuration:

- IP address

- IP netmask

- Default gateway

- PCP base port

The factory default values are listed in the following table.

Table 20 Network Configuration Default Values

Name	Value
IP address	10.10.10.2
IP netmask	255.255.255.0
Default gateway	0.0.0.0 (no default gateway)
PCP base port	1024

Configuration is done via the web interface under Network Configuration, which using the factory default values, is at http://10.10.10.2.

4.4.2 Standby Wiring

Multiple Remote Amplifiers can be configured to have standby Remote Amplifiers to support working amplifiers. The standby Remote Amplifier must be the highest-numbered amplifier in the Networked Amplifier group (amplifiers 5 and 6 in the group below). All Remote Amplifiers in the Networked Amplifier Group must be daisy-chained as indicated in the following figure.

Figure 7 Standby Wiring
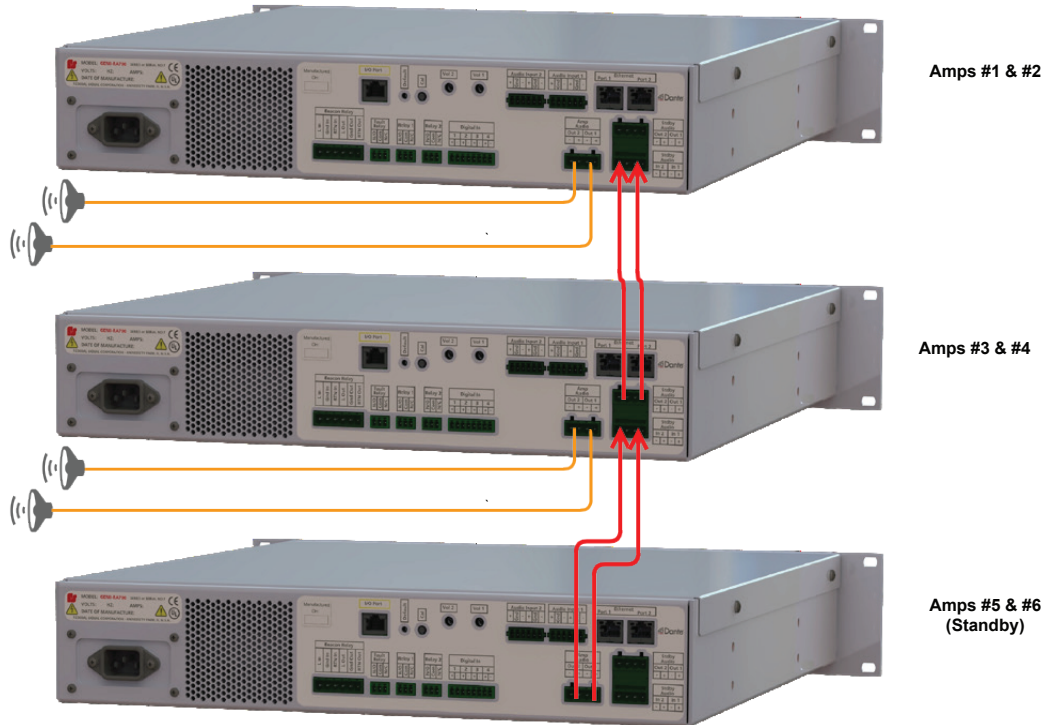
When configuring a standby Remote Amplifier in a Networked Amplifier Group, both Remote Amplifiers in a standby chassis must be configured with a standby zone, and only one standby chassis may be configured as a standby in a Networked Amplifier Group.

4.5 Remote Networking Configuration

For specific configuration information, see the PAGASYS GEN II SYSTEM MANAGER Software (Model P-SYSMGR-G) manual document number 25500459 or the PAGASYS GEN II Network Solution manual document number 25500595.

4.5.1 GENII Mode

The wiring for a GENII-RA700 for use in a GEN II system is simple: it is only necessary to connect the Ethernet and the speakers.

4.5.1.1 Dante Network Audio Connections

It is necessary to use the Dante® Controller software to interconnect the various PAGASYS components that use Dante® network audio.

NOTE: Do not confuse the Dante® Controller software with the PAGASYS GEN II full controller or GENII-RC (remote controller). Dante® Controller is software for a Windows® PC that allows you to interconnect Dante® network audio hardware. It is created and supplied by Audinate®, the creators of the Dante® network audio standard. A PAGASYS GEN II full controller and GENII-RC are hardware devices used to control and monitor a PAGASYS GEN II PA/GA system. They are created and supplied by Federal Signal and use Dante® network audio.

4.5.1.1.1 Standalone System

In a standalone system, there is only a single controller with scope A-master.

The network audio connections must be mapped in Dante® Controller as follows:

Controller scope	GENII-RA700 scope	Controller Dante® output	GENII-RA700 Dante® input
A-master	A-master	13	1
A-master	A-master	14	2
A-master	A-master	15	3
A-master	A-master	16	4

4.5.1.1.2 High-Integrity System

In a high-integrity system, there are two controllers, one with scope A-master and the other with scope B-standby. They share control of the amplifiers and I/O boards (that is, each amplifier or I/O board is scoped shared).

Because the controllers share the amplifiers, a given GENII-RA700 will be connected to both the A-master controller and the B-standby controller in the PAGASYS configuration, and the Dante® network audio connections will be established accordingly in Dante® Controller.

The network audio connections must be mapped in Dante® Controller as follows:

Controller scope	GENII-RA700 scope	Controller Dante output	GENII-RA700 Dante input
A-master	shared	13	1
A-master	shared	14	2
A-master	shared	15	n/c
A-master	shared	16	n/c
B-standby	shared	13	3
B-standby	shared	14	4
B-standby	shared	15	n/c
B-standby	shared	16	n/c

Where n/c means no connection.

4.5.1.1.3 Duplicated System

In a duplicated system, there are two controllers, one with scope A-master and the other with scope B-standby. Each has its own amplifiers and I/O boards (that is, each amplifier or I/O board is scoped either A-master or B-standby).

Because each controller has its own amplifiers, a given GENII-RA700 will be connected to either the A-master controller or the B-standby controller in the PAGASYS configuration, and the Dante® network audio connections will be established accordingly in Dante® Controller.

The network audio connections must be mapped in Dante® Controller as follows:

Controller scope	GENII-RA700 scope	Controller Dante output	GENII-RA700 Dante input
A-master	A-master	13	1
A-master	A-master	14	2
A-master	A-master	15	3
A-master	A-master	16	4
A-master	B-standby	13	n/c
A-master	B-standby	14	n/c
A-master	B-standby	15	n/c
A-master	B-standby	16	n/c
B-standby	A-master	13	n/c
B-standby	A-master	14	n/c
B-standby	A-master	15	n/c
B-standby	A-master	16	n/c
B-standby	B-standby	13	1
B-standby	B-standby	14	2
B-standby	B-standby	15	3
B-standby	B-standby	16	4

Where n/c means no connection.

Getting Service

If you are experiencing any difficulties, contact Federal Signal Technical Support at 800-524-3021 (US) or +1 708-534-4790 (International) or through e-mail at techsupport@fedsig.com. For instruction manuals and information on related products, visit http://www.fedsig.com/

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