

**GE MDS GPA-9 Manual**  
**P/N draft**  
**Rev D.**



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# 1 Important Information

## 1.1 RF Exposure



Professional installation required. The radio equipment described in this guide emits radio frequency energy. Although the power level is low, the concentrated energy from a directional antenna may pose a health hazard.

Do not allow people to come closer than 1.12 meters, (3.7 feet) to the antenna when the transmitter is operating with a unity gain antenna.

This is an RF amplifier, the maximum ERP for this FCC band is 500 watts, this equates to an RF safety distance of 3.82 meters.

Please consult the FCC website below for RF safety distances, using different antenna gain configurations which affect the ERP.

More information on RF exposure can be found on the Internet at:  
[www.fcc.gov/oet/info/documents/bulletins](http://www.fcc.gov/oet/info/documents/bulletins).

## 1.2 FCC Approval Notice

This device is offered as a licensed Amplifier per FCC Part, 90. It is approved for use under the following conditions: Changes or modifications not expressly approved by GE MDS will void the user's authority to operate the equipment.

## 1.3 FCC Part 90 Information

For FCC Part 90, valid frequencies are 896-940 MHz at up to 500 Watts ERP

Caution; Only use authorized antennas that meet the FCC license requirements. Use of unauthorized antennas, cables, and/or coupling devices not conforming with ERP/EIRP for outdoor/indoor will void the licensee's license to operate.

WARNING: This is NOT a CONSUMER device. It is designed for installation by an installer approved by an ISSED licensee. You MUST have an ISSED LICENCE or the express consent of an ISSED licensee to operate this device.

AVERTISSEMENT: ce n'est PAS un appareil CONSOMMATEUR. Il est conçu pour être installé par un installateur approuvé par un titulaire de licence ISSED. Vous devez avoir une LICENCE ISSED ou le consentement exprès d'un titulaire de licence ISSED pour utiliser cet appareil.

## Introduction

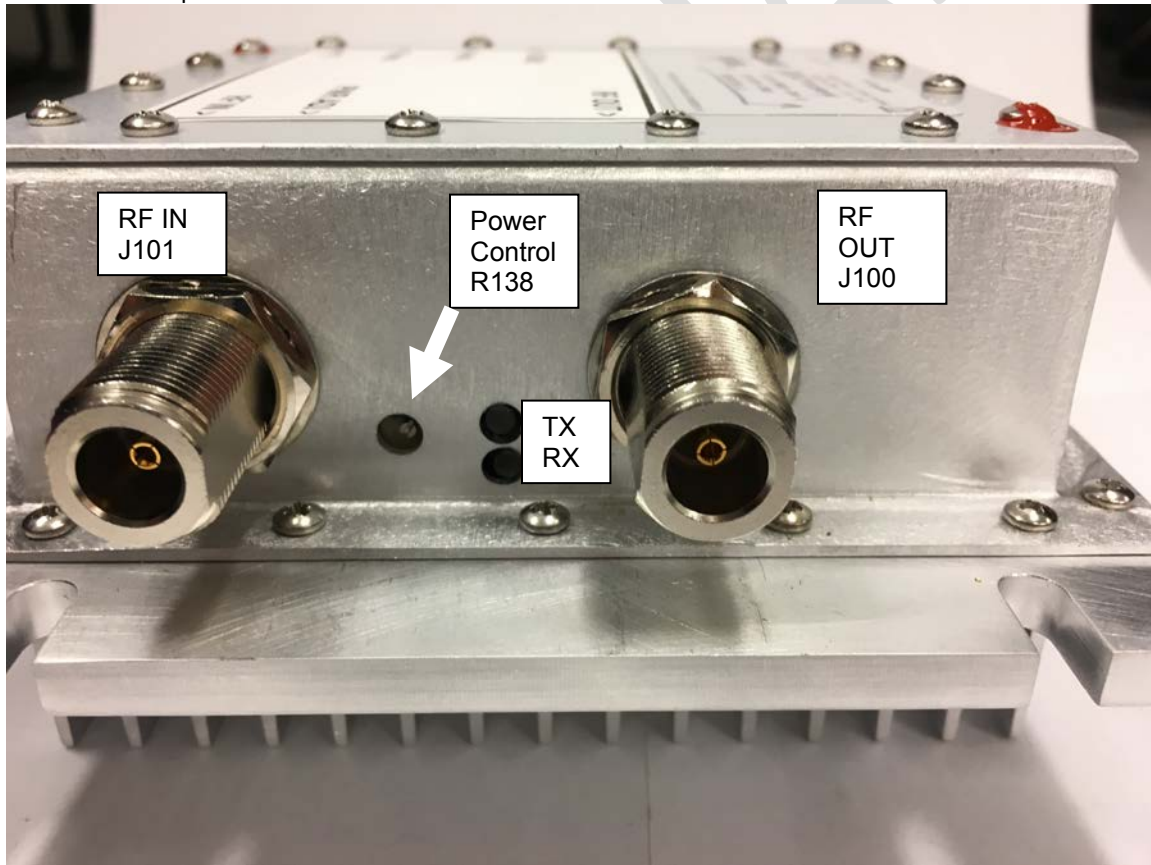
The GPA-9 is an RF power amplifier designed for use in the 896-940MHz frequency range at up to 40 Watts. The A version is intended to serve as a 100% duty cycle amplifier for MDS SD9 and other MDS radios operating in point-to-multipoint repeater or base applications.

### **1.4 Product Description**

The GPA-9 power amplifier consists of an RF amplifier and PCB mounted to a heat sink, with a DC Power interface, PTT and input/output RF connections on the sidewalls of the chassis. DC power is supplied to the amplifier from a regulated and filtered DC source capable of supplying 10-16 Vdc at a maximum current of 10 Amperes. The DC power source should be current limited or have a protective fuse or circuit breaker.

### **1.5 Power Control Loop**

The GPA-9 amplifier uses a feedback circuit within the amplifier to control the output power. The set point is set by potentiometer R138, accessed near the RF input connector. Further, the PA performs TX/RX switching to provide a low loss receive path when not transmitting. The TX/RX control is performed by RF detection within the PA. There is also a PTT (Push to Transmit) input on the terminal strip.

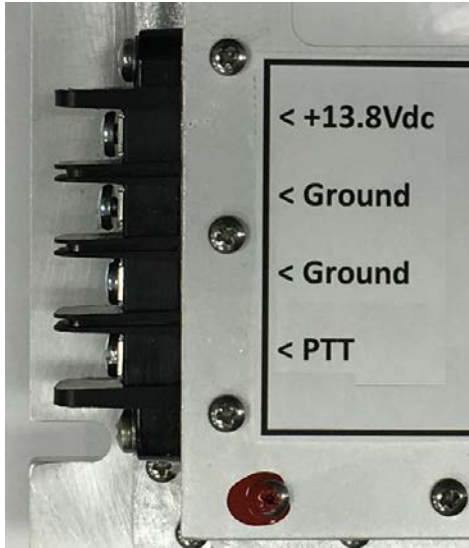


**Figure 1 – R138 Location**

## Interfaces

### 1.6 J102 Terminal Block

The J102 terminal block provides keying and power control signals.



**Table 1 – J102 Control Cable Pin Functions**

Pin	Function
Pin 1	13.8V nominal 10 amps DC input
Pin 2	Power supply Ground
Pin 3	ground
Pin 4	PTT (ground to transmit)

### 1.7 J100 RF Output

J100 is a 50 Ohm Female Type N connector.

### 1.8 J101 RF Input

J101 is a 50 Ohm Female Type N connector.

### 1.9 R138 Power Control Adjustment

R138 is used to adjust the RF power output of the amplifier in internal and mode. Turn the potentiometer clockwise for higher power and counterclockwise for lower power. RF output power will depend on power supply voltage (10-16V DC) and RF drive level (+27 to +30dBm)

### 1.10 LED Indicators

A pair of LED indicators are located next to the Power Adjustment. The lower indicator (GREEN) will indicate that DC power is applied and the PA is in the receive state. The upper indicator (RED) will indicate that the PA is in the transmit state. If both are on it indicates an Overtemperature fault. (See section 3.4)

## 2 Installation

### 2.1 Mounting the Unit

The GPA-9 A version is designed for mounting in a standard 19-inch rack cabinet using the 3U panel provided. Four screws (not provided) are required to attach the panel to the rack sides. This panel also serves as a heat sink for the PA module, and is normally mounted with the cooling fins facing outward.

The GPA-9 B version uses a smaller heatsink (intermittent duty) but has the same 4 mounting screws.

### 2.2 Connecting the Unit

Place the amplifier module in service by making the following cable connections.

1. Using low loss 50-ohm coaxial cable, connect the RF Input connector (J101) to the RF output connector of the MDS SD9 radio.
2. Using low loss 50-ohm coaxial cable, connect the RF Output connector (J100) to the station duplexer or antenna.
3. Connect 10-16 Vdc power supply (13.8V nominal) to the Power connector (J102). The outside pin is positive (+); the next is negative (-).

### 3.3 Alignment (Setting power output)

Adjusting RF Power Output

To check/set the amplifier's RF power output, proceed as follows.

1. Connect a wattmeter (rated for use at 900 MHz, and at least 40 watts) to the amplifier's RF output connector (J102).
2. Terminate the wattmeter into a 50-ohm, non-inductive load.
3. Set SD9 PWR=30dBm. (+27 to +30dBm is allowed)
4. Apply RF drive from 900 MHz radio and note the RF power indication at J100.
5. If necessary, adjust R138 (see Figure 2) with an insulated flat blade tool to achieve the desired output level. Access to this control is available near the RF input connector

### 3.4 Overtemperature Fault

If the flange temperature of the active device in the PA exceeds recommended limits (90C) the PA bias will be automatically removed reducing output power. At this time the GREEN LED will be ON at the same time as the RED LED when the unit is in transmit. When temperature falls within limits normal operation will return.

### 3.5 VSWR Fault

GPA-9 will automatically reduce output power if a high VSWR is detected.



**GPA-9B smaller heat-sink option**



**GPA-9 standard heat-sink option**

## Unit Specifications

**Table 2 – Unit Specifications**

Parameter	Specification
Operating Voltage	10-16 Vdc. 13.8V nominal
Maximum Current Draw	10 Amperes @ 13.8V, 40W RF Out.
RF Drive Power	SD9 PWR=30dBm
RF Out	+40 to +46 dBm (10-40 watts), adjustable
Duty Cycle (GPA-9A model)	100% up to full output power
Duty Cycle (GPA-9B model)	30% above 10 Watts
Operating Frequency	896-940 MHz
Mounting	standard 19-inch rack cabinet
Approximate Weight	5.15 lbs.
Dimensions (GPA-9A model)	5.25" H x 19" W x 2.88" D (13.34 H x 48.26 W x 7.31 D cm)
Dimensions (GPA-9B model)	5.25" H x 7" W x 2.88" D (13.34 H x 17.78 W x 7.31 D cm)
FCC Identifier	E5MDS-GPA-9
Name of Grantee	GE MDS LLC

## 3 Technical Assistance

For assistance, contact us using one of the following methods:

Telephone: 585.241.5510

E-mail: [gemds.techsupport@ge.com](mailto:gemds.techsupport@ge.com)

Web: [www.gemds.com](http://www.gemds.com)

## 4 Change Log

Version	Date	Author	Changes
A		D.McCarthy	Initial release
B	5/5/17	T Hodge	Corrections for FCC filing
C	5/15/17	T Mayo	Corrected nomenclature for GPA-9A and GPA-9B