

Section 2 Installation

2-1 Introduction

This section contains installation recommendations, unpacking, inspection, and installation instructions for the Multicarrier Cellular Amplifier. Carefully read all material in this section prior to equipment unpacking or installation. Also read and review the operating procedures in Section 3 prior to installing the equipment. It is important that the licensee perform these tasks correctly and in good faith. If applicable, carefully review the Federal Communications Commission (FCC) rules as they apply to your installation. **DON'T TAKE CHANCES WITH YOUR LICENSE.**

2-2 Electrical Service Recommendations

Powerwave Technologies recommends that proper AC line conditioning and surge suppression be provided on the primary AC input to the +27 Vdc power source. All electrical service should be installed in accordance with the National Electrical Code, any applicable state or local codes, and good engineering practice. Special consideration should be given to lightning protection of all systems in view of the vulnerability of most transmitter sites to lightning. Lightning arrestors are recommended in the service entrance. Straight, short ground runs are recommended. The electrical service must be well grounded.

Each amplifier system should have its own circuit breaker, so a failure in one does not shut off the whole installation. Circuit breakers should be capable of handling the anticipated inrush current (normally 25% over equipment maximum current draw), in a load center with a master switch. A 70-amp circuit breaker installed in the power distribution unit is recommended for each amplifier. Either 2 or 4 AWG DC wire should be installed for each amplifier based on the cable design and length.

Table 2-1 Averaged Current

Amplifier Power	No. Of Amplifiers	3 Sector Averaged Current	2 Sector Averaged Current	1 Sector Averaged Current
140	12	588		
140	9	441	504	
140	6	294	336	378
140	1	49	56	63

2-3 Air Conditioning

Each G3S-800-140-031 amplifier generates 5971 BTUs of heat at full power. A fully populated MCR30829-1-3 subrack operating at full power will generate 17,913 BTUs of heat. A full three-sector site employing three fully populated MCR30829-1-3 subracks will generate 53,739 BTUs of heat at full power (360W per subrack). A five-ton air conditioner is needed to cool this Powerwave equipment. A full three-sector site probably needs at least a five-ton air conditioner to cool all of the site's equipment, based on heat load averaging as described in table 2-2. Since all the amplifiers are not running at full capacity at the same time in normal operation, table 2-2 describes the heat load for a 3 sector (70%), 2 sector (80%) and omni (90%) site. Perform a site survey to determine actual air conditioning needs.

Table 2-2 Averaged Heat Loading

Amplifier Power	No. Of Amplifiers	3 Sector Averaged BTU's	2 Sector Averaged BTU's	1 Sector Averaged BTU's
140	12	50,156.4		
140	9	37,617.3	42,991.2	
140	6	25,078.2	28,660.8	32,243.4
140	1	4,179.7	4,776.8	5,373.9

2-4 Unpacking And Inspection

This equipment has been operated, tested and calibrated at the factory. Only in the event of severe shocks or other mistreatment should any substantial readjustment be required. Carefully open the container(s) and remove the amplifier module(s). Retain all packing material that can be reassembled in the event that the unit must be returned to the factory.

CAUTION

Exercise care in handling equipment during inspection to prevent damage caused by rough or careless handling.

Visually inspect the amplifier module for damage that may have occurred during shipment. Check for evidence of water damage, bent or warped chassis, loose screws or nuts, or extraneous packing material in the connector or fans. Inspect the rear panel connector for bent connector pins. If the equipment is damaged, a claim should be filed with the carrier once the extent of any damage is assessed. We cannot stress too strongly the importance of IMMEDIATE careful inspection of the equipment and the subsequent IMMEDIATE filing of the necessary claims against the carrier if necessary. If possible, inspect the equipment in the presence of the delivery person. If the equipment is damaged, the carrier is your first area of recourse. If the equipment is damaged and must be returned to the factory, write or phone for a return authorization. Powerwave may not accept returns without a return authorization. Claims for loss or damage may not be withheld from any payment to Powerwave, nor may any payment due be withheld pending the outcome thereof. WE CANNOT GUARANTEE THE FREIGHT CARRIER'S PERFORMANCE.

2-5 Installation Instructions (refer to figures 1-1 and 2-1)

The G3S-800-140-031 amplifier module is designed for installation in a subrack for connection of DC power, RF, and monitor cables.

To install the amplifier proceed as follows:

1. Install the subrack in an equipment rack and secure in place, based on the installation instructions from the appropriate manual for the subrack being installed.
2. Connect the subrack RF output to a high quality transmit filter. Powerwave recommends that a 500W average power / 10KW instantaneous peak power rated filter be used in most applications.
3. Connect the combined transceiver output(s) to the RF Input port of subrack.
4. Connect the alarm cable(s) to the alarm port of subrack.

WARNING

Verify that all circuit breaker switches on the power distribution panel are in the OFF position. Turn off external primary DC power before connecting DC power cables.

5. Connect positive primary power and negative primary power to the subrack. Tighten the subrack power connections.
6. Verify that the plug-in amplifier's front panel On/Off switch is in the Off position.
7. Inspect the 21-pin D-Sub male combo connector on the rear of each amplifier before installing the amplifier in the amplifier subrack. Verify that all pins are straight, no pins are recessed, that the alignment shield is not bent, and no packing material is embedded in the connector.

CAUTION

Forcing the amplifier into the subrack at too fast a rate may cause the pins on the 21-pin D-sub connector of the amplifier to become recessed or broken.

8. Install the plug-in amplifier module(s) in the subrack. Tighten left and right thumbscrews until finger tight. Tighten the thumbscrews with a slotted screw driver about 1/8 of a turn past finger tight.
9. Check your work before applying DC voltage to the system. Make certain all connections are tight and correct.
10. Turn the power distribution circuit breakers back on.
11. Measure primary DC input voltage. DC input voltage should be $+27 \text{ Vdc} \pm 1.0 \text{ Vdc}$. If the DC input voltage is above or below the limits, call and consult Powerwave before you turn on your amplifier system.
12. Refer to section 3 for initial turn-on and checkout procedures.

2-6 Amplifier Module Connectors

The amplifier has three connectors on the right rear of the module. The larger is a 21-pin male D-Sub combo, which provides the status, alarm, control, and power connections. The smaller BMA coaxial female connectors provide the RF connections. Refer to figure 2-1.

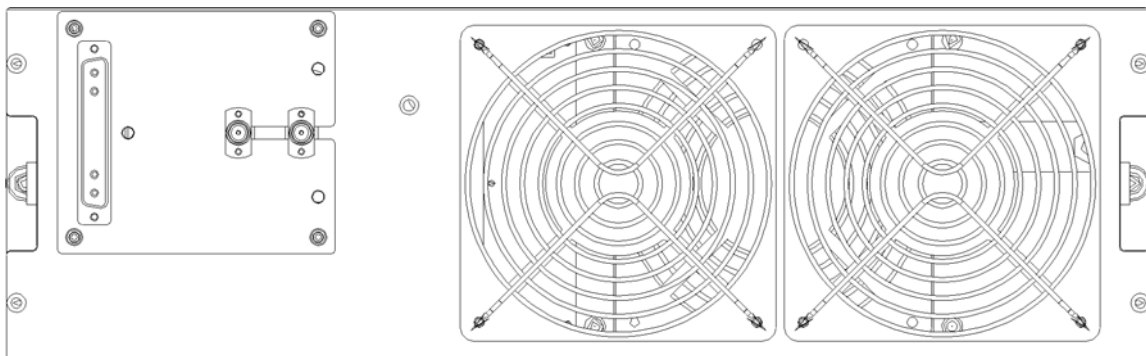


Figure 2-1 G3S-800-140-031 Amplifier, Rear View

2-6.1 Amplifier Module Status, Alarm, Control, And Power Connector

The amplifier has a separate remote alarm and control connector, which may be used by the host system to monitor and control the individual amplifier modules. The status, alarm, control, and power connections on the amplifier connector are made through a 21-pin male D-Sub combo connector (figure 2-2) and are listed and described in table 2-3.

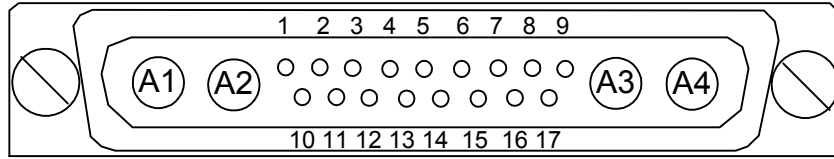


Figure 2-2 DC and Logic Connector (on Rear of G3S-800-140-031 Amplifier Module)

Table 2-3 Amplifier Module DC and Logic Connector Definition

Pin	Function	Description
A1	Power Input	+27 Vdc (Power Contact)
A2	Power Input	+27 Vdc (Power Contact)
A3	Ground	Ground (Power Contact)
A4	Ground	Ground (Power Contact)
1	RS485 +TxD	Serial Communication Data Out
2	RS485 +RxD	Serial Communication Data In
3	Service Loop	TTL input to Amp. Gnd. for special test mode (Note 1)
4	MCPA Disabled (Summary Fault)	TTL signal normally low indicates MCPA enabled. A high level indicates that the MCPA has been disabled. Over Power, Over Voltage takes one second to activate the signal.
5	Mod Addr 0	TTL input to Amp. Gnd. supplied by shelf to identify slot.
6	Mod Addr 1	TTL input to Amp. Gnd. supplied by shelf to identify slot.
7	TP1	TTL output. Future test point.
8	Manual Download	GND to download manually
9	DC on stat	TTL output. High indicates Amp is powered on.
10	RS485 –TxD	Serial Communication Data Out
11	RS485 –RxD	Serial Communication Data In
12	SCL7	No connection
13	SDA7	No connection
14	FP Disable Output	Output, GND if the front panel switch is in the OFF position; +5 volts indicates the front panel switch is in the ON position.
15	FP RST	Output, GND if the front panel switch is in the RESET position; +5 volts otherwise.
16	GND	Ground
17	Module Detect	Ground potential. Informs the subrack that an MCPA is plugged in.

Note 1: Service loop grounded allows the MCPA to be enabled or disabled by the front panel switch when not mounted in the shelf.

2-6.2 Amplifier Module RF Connector

The amplifier has separate RF connectors, which are used for the RF signal input and output. The RF connections on the amplifier connector are made through two BMA female coaxial connectors (figure 2-3) and are listed and described in table 2-4.

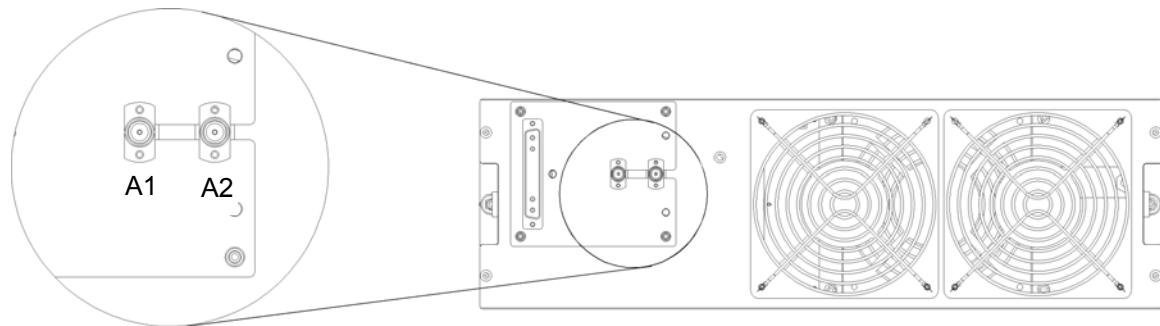


Figure 2-3 Amplifier RF Connector

Table 2-4 Amplifier RF Connector Definition

Pin	Function	Description
A1	RF Input	BMA Coaxial Female, Radiall
A2	RF Output	BMA Coaxial Female, Radiall