

**OPERATOR'S MANUAL**

**PCS REPEATER**

**MODEL R231**

**P/N 001-0231-001**

**MARCH 2002**

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### GUARANTEE

This unit is guaranteed for a period of one year from the date of shipment against failure due to defective parts or improper assembly.

This guarantee is limited to replacement of defective material and does not cover damages or other costs resulting from the use of this material whether used correctly or otherwise.

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## SECTION 1. GENERAL INFORMATION

### **1.1 INTRODUCTION**

1.1.1 Scope of Manual. - This manual is intended to familiarize personnel installing the R231 PCS Repeater with all pertinent aspects of the amplifier. Included in this manual are a brief physical description, a technical summary, installation and operating data.

1.1.2 Purpose of Equipment. - The R231 Repeater is used as a drop-in booster for PCS signals. It will simultaneously amplify signals in the PCS transmit band in one direction and the PCS receive band in the opposite direction. A typical use of the R231 is to provide PCS phone coverage in enclosed areas.

1.1.3 Physical Description. - The unit, shown in Figure 3-1, is designed to be mounted on a flat surface. The unit has two N connectors for antenna connections. Four color coded indicators provide visual display of the unit's operating status.

1.1.4 Electrical Description. - The unit provides approximately 43 dB of gain for signals in the 1850 - 1910 MHz band in the direction of J1 to J2 (distribution to base) and the same amount of gain for signal in the 1930 - 1990 MHz band in the opposite direction (J2 to J1).

1.1.4.1. - An AC-DC external power source is used to provide power via a power jack on the unit.

1.1.4.2. - The unit monitors bias conditions of all active devices in the RF path. Under normal operating condition the green indicators will be on. If one of these devices draws more or less than a predetermined limit then a red indicator will go on.

### **1.2 TECHNICAL SUMMARY**

The power requirements, performance characteristics and dimensions and weight of the R231 Repeater are summarized in Table 1-1.

TABLE 1-1. Performance Characteristics and  
Salient Features of the R231 PCS Repeater

Parameter	Specification
1. Input Power:	15 to 32 VDC @ 500 mA Max.
2. Frequency Range:	
- Base Receive (Uplink)	1851MHz to 1909 MHz
- Base Transmit (Downlink)	1931 MHz to 1989 MHz
3. Rated RF Input:	-32 dBm Maximum (single channel)
Note: The following specifications apply in both directions	
4. Gain:	43 dB $\pm$ 3 dB
5. Impedance (Input and Output):	50 Ohms
6. VSWR:	2:1 Typical
7. Rated Output Power:	+12 dBm Typical (1 signal)
8. 3 <sup>rd</sup> Order Output IP:	+30 dBm Typical
9. Environmental Limits	
(a) Ambient Temperature Range:	-30°C to 60°C Operating
(b) Ambient Relative Humidity:	Up to 90%
10. Dimensions:	
(a) Enclosure Dimensions:	10" L x 9.1" W x 2" H 254.0mm L x 231.6mm W x 50.8mm H
(b) Mounting Holes Dimensions:	8.4" x 8.0" (213.4mm x 203.2mm)
(c) Weight:	2.0 Lbs (0.9 Kg)
11. Connections:	
RF Input/Output:	Type N Female
DC Supply:	DC Power Jack

NOTE: Specifications apply only across the customer's actual bands,  
not across the whole PCS spectrum.

**NOTE IMPORTANT RATING INFORMATION**

Manufacturer's rated output power of this equipment is for single carrier operation. For situations when multiple carrier signals are present, the rating would have to be reduced as per Table 1-2, especially where the output signal is re-radiated and can cause interference to adjacent band users. This output power reduction is to be achieved by reduction of input power.

TABLE 1-2 Rated Power Output for Linear Operation  
(for intermodulation products 50 dB down)

The Total Composite output power in multiple tone or wideband signals shall NOT exceed the following level or else it may result in improper operation of the device and cause interference.

Parameter	Specification
Base Transmit (Downlink) Power:	+6 dBm
Portable Transmit (Uplink) Power:	+6 dBm

## **SECTION 2. INSTALLATION, OPERATING AND MAINTENANCE INSTRUCTIONS**

### **2.1 UNPACKING AND INSPECTION**

The following checks are recommended after receipt of the equipment from shipping agent:

1. Check for any external damage that could have occurred in transit. If damage is found, report to the shipping agent and to the supplier immediately.
2. Check that all items on the packing slip are present. If any are missing, report to the supplier immediately.

### **2.2 INSTALLATION**

The Repeater is designed for mounting on a flat surface. The unit can be mounted in any orientation as desired although it is practical to select a mounting position which allows the indicators to be seen.

Proceed as follows:

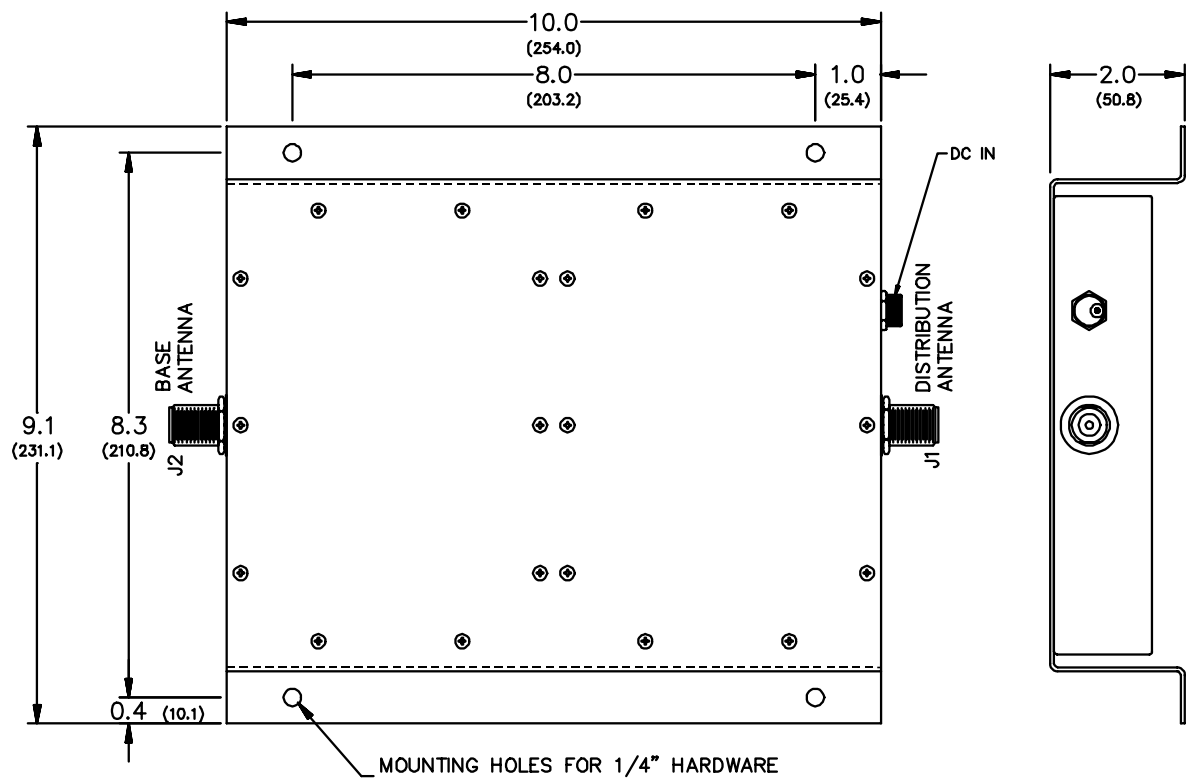
1. Locate a suitable mounting location, allow a clearance of at least 5 inches (13 cm) to route mating cable and connectors to the unit. Drill four pilot holes on a 8.4 x 8 inch center for No.10 fasteners.
2. Connect J2, "BASE ANTENNA" to the cable leading to the base antenna.
3. Connect J1, "DISTRIBUTION ANTENNA" to the cable leading to the distribution antenna(s).
4. Connect the external DC power source to the DC input. The unit may be powered by DC voltages in the range of 15-32 V. The unit is typically powered with the P.G. Electronics PS217 18 VDC adapter.

### **2.3 OPERATING INSTRUCTIONS**

The R231 PCS Repeater has no internal or external controls. When powered the unit will amplify signals in both the uplink and downlink bands.

When the green light is on, bias conditions of active devices in the RF paths are within specifications. The red light goes on whenever any active device in the RF path has failed. Corrective action is to service the amplifier.





CONNECTOR REFERENCE	SIGNAL DESCRIPTION	TYPE
J1	BASE RECEIVE INPUT (UPLINK) BASE TRANSMIT OUTPUT (DOWNLINK)	N
J2	BASE TRANSMIT INPUT (DOWNLINK) BASE RECEIVE OUTPUT (UPLINK)	N
DC IN	15-32 VDC INPUT	POWER JACK

Figure 2-1. Installation Data