



OPERATOR'S MANUAL

BIDIRECTIONAL REPEATER

MODEL R307B

P/N 001-0307-002

NOVEMBER 2002

RESTRICTION ON DISCLOSURE OF DATA

This document contains information proprietary to P.G. Electronics and any disclosure or use of this information or any reproduction of this document for other than the specific purpose for which it is intended is expressly prohibited except as P.G. Electronics may otherwise agree in writing.

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.

TABLE OF CONTENTS

<u>Paragraph</u>		<u>Page</u>
SECTION 1. GENERAL INFORMATION		
1.1	INTRODUCTION	1-1
1.1.1	Scope of Manual	1-1
1.1.2	Purpose of Equipment	1-1
1.1.3	Physical Description	1-1
1.1.4	Electrical Description	1-1
1.2	TECHNICAL SUMMARY	1-1
SECTION 2. THEORY OF OPERATION		
2.0	GENERAL	2-1
SECTION 3. INSTALLATION, OPERATING AND MAINTENANCE INSTRUCTIONS		
3.1	UNPACKING AND INSPECTION	3-1
3.2	INSTALLATION	3-1
3.3	OPERATING AND MAINTENANCE INSTRUCTIONS	3-2

LIST OF FIGURES

<u>Figure</u>	<u>Title</u>	<u>Page</u>
2-1	R307B Repeater Block Diagram	2-2
3-1	Installation Data	3-3

LIST OF TABLES

<u>Table</u>	<u>Title</u>	<u>Page</u>
1-1	Performance Characteristics and Salient Features of the R307B Repeater	1-2
1-2	Rated Power Output for Linear Operation	1-3

SECTION 1. GENERAL INFORMATION

1.1 INTRODUCTION

1.1.1 Scope of Manual. - This manual is provided to familiarize personnel installing the R307B Repeater with all pertinent aspects of the repeater. Included in this manual are a brief physical description, a technical summary, and installation and operating data.

1.1.2 Purpose of Equipment. - The R307B Repeater is used as a drop-in booster for the SMR band (800 MHz trunking). It will simultaneously amplify signals in the uplink band in one direction and the downlink band in the opposite direction. A typical use of the R307B is to provide signal coverage in enclosed areas.

1.1.3 Physical Description. - The unit, shown in Figure 3-1, is designed to be mounted on a flat vertical surface. The unit has two SMA connectors for antenna connections and a DC power jack for connection to the external AC-DC power source supplied with the unit.

1.1.4 Electrical Description. - The unit provides a maximum or approximately 60 dB of gain for signals in the uplink band in one direction and the same amount of gain for signals in the downlink band in the opposite direction.

The external AC-DC power source supplied with the unit is used to provide power via a power jack (center positive) on the unit.

Two LED indicators show the operating status of the unit.

1.2 TECHNICAL SUMMARY

The power requirements, performance characteristics and dimensions and weight of the R307B Repeater are summarized in Table 1-1.

TABLE 1-1

Performance Characteristics and Salient Features of the R307B Repeater

Parameter	Specification
1. Input Power:	9 to 12 VDC @ 1 A Max. (12 VDC Adapter is supplied with the unit)
2. Frequency Range:	
- Base Receive (Uplink)	806 - 821 MHz
- Base Transmit (Downlink)	851 - 866 MHz
Note: The following specifications apply in both directions	
3. Maximum Gain:	60 dB Typical
4. Attenuator Range:	31 dB in 1 dB Steps
5. Impedance (Input and Output):	50 Ohms
6. VSWR:	2:1 Typical
7. Intermodulation (IMD)* :	-48 dBc Typ. @ +13 dBm 2-Tones (At Max. Gain)
8. Output 1 dB Compression Point	+22 dBm Typical
9. 3 rd Order Output IP:	+40 dBm Typical
10. Environmental Limits	
(a) Ambient Temperature Range:	0°C to 50°C Operating
(b) Ambient Relative Humidity:	Up to 85%
11. Dimensions:	
(a) Enclosure Dimensions:	6.7" L x 5.3" W x 1.0" H (170mm L x 135mm W x 25mm H)
(b) Mounting Hole Spacing:	5.9" (150mm)
(c) Weight:	2.2 Lbs (1 Kg)
12. Connectors:	
RF Input/Output:	Type SMA Female
DC Supply:	DC Power Jack (Center Positive) (Use 12 VDC Adapter supplied with unit)

* Note: The total composite output power rating is +16 dBm. Refer to Table 1-2 for definition of composite output power rating.

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 or by gain reduction and not by an attenuator at the output of the device.

TABLE 1-2**Rated Power Output for Linear Operation**

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. The composite output power rating is defined as the total average RMS output power of all inband signals. The unit should be operated at or below this level to ensure linear operation with low distortion. This holds true for any number of carriers with total average power adding up to the composite output power rating listed in the table below.

Parameter	Specification
Base Transmit (Downlink) Power:	+16 dBm
Portable Transmit (Uplink) Power:	+16 dBm

NOTE: See NOTE in Section 3.3.

SECTION 2. THEORY OF OPERATION

2.0 GENERAL

The R307B is a bidirectional repeater, providing a maximum of approximately 60 dB gain in the SMR uplink and downlink bands. The block diagram of the R307B is shown in Figure 2-1.

2.1 - The unit is composed of amplifiers and diplexers as well as voltage regulation circuits. The downlink signal enters the unit via Base Antenna connector (the common port of diplexer U2). The signal passes through the high band port of diplexer U2 to drive amplifier 2. The output of amplifier 2 is fed into the high band port of diplexer U1 and then is output at the Distribution Antenna connector.

2.2 - The unit's operation in the uplink band is similar to the downlink band discussed in section 2.1 above but uses amplifier 1 and the low band ports of diplexers 1 and 2 to provide gain from the Distribution Antenna to the Base Antenna.

2.3 - The total current drawn by the uplink amplifier is approximately 450 mA. Similarly, the total current for the downlink amplifier is 450 mA.

2.4 - The R307B Repeater requires external DC power to be supplied through its DC power connector (center positive). An external AC-DC adapter is provided with the unit.

2.5 - The unit contains a downlink power detection circuit which signals an alarm if the unit is operated above its rated downlink output power level. If the downlink output power rating is exceeded, the red "ALARM" LED on the bottom of the unit is illuminated. The operator **must** then reduce the gain of the unit by increasing the "DOWNLINK" attenuator setting such that the unit is operated within its downlink power capability as specified in Table 1-2. Refer to Section 3: Installation, Operating and Maintenance Instructions. (See NOTE in Section 3.3).

2.6 - The unit contains an uplink ALC circuit. This circuit prevents overloading of the uplink amplifier due to excessive uplink signal levels into the "DISTRIBUTION" port. (See NOTE in Section 3.3).

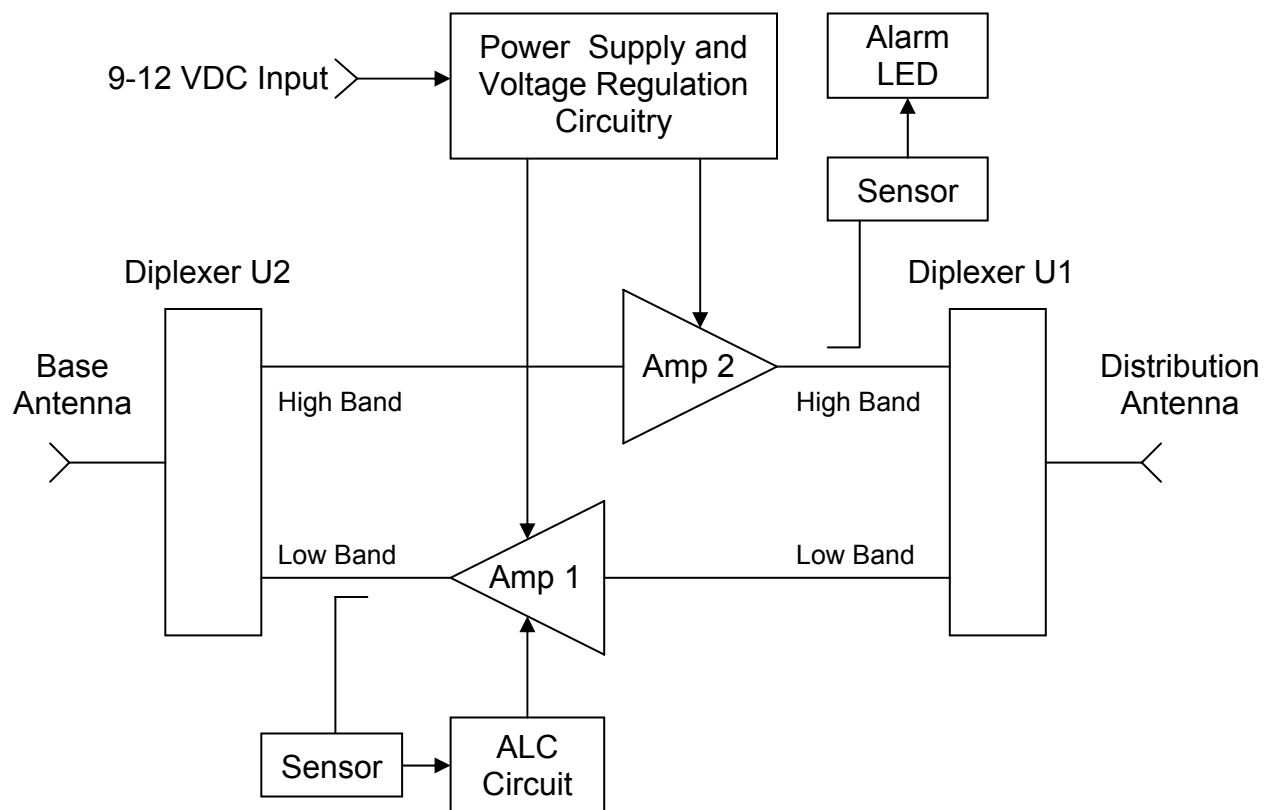


Figure 2-1 R307B Repeater Block Diagram

SECTION 3. INSTALLATION, OPERATING AND MAINTENANCE INSTRUCTIONS

3.1 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.

3.2 INSTALLATION

The Repeater is designed for mounting on a flat surface. The unit can be mounted in any orientation as desired. Proceed as follows:

1. Locate a suitable mounting location allowing a clearance to route mating cable and connectors to the unit. Drill 2 holes on 5.9" centers.
2. Adjust uplink and downlink attenuators to their correct settings. The internal independent uplink and downlink attenuators can be set by the DIP switches on the bottom of the unit. Steps are available for 1 dB, 2 dB, 4 dB, 8 dB and 16 dB of attenuation. Setting the switch to "ON" inserts the corresponding attenuation value. Refer to figure 3-1 for location of the uplink and downlink attenuator switches. In most installations, these attenuators are typically set to the same value.
3. Mount the unit to the wall.
4. Connect "BASE ANTENNA." to the cable leading to the base antenna.
5. Connect "DISTRIBUTION ANTENNA." to the cable leading to the distribution antenna(s).
6. Connect the supplied external DC power source to the DC input. The unit may be powered by DC voltages in the range of 9-12 VDC (center positive) . The unit is typically powered with the 12 VDC adapter provided with the unit.

3.3 OPERATING AND MAINTENANCE INSTRUCTIONS

When powered, the unit will amplify signals in both the uplink and downlink bands.

The unit does not require any regular maintenance.

The internal independent uplink and downlink attenuators can be set by the DIP switches on the bottom of the unit. Steps are available for 1 dB, 2 dB, 4 dB, 8 dB and 16 dB of attenuation. Setting the switch to "ON" inserts the corresponding attenuation value. Refer to figure 3-1 for location of the uplink and downlink attenuator switches.

The green "POWER" LED indicates that the unit is receiving DC power and is operating.

NOTE: The red "ALARM" LED indicates that the unit is being operated above its rated downlink output power level. The operator **MUST** then reduce the gain of the unit by increasing the "DOWNLINK" attenuator setting such that the unit is operated within its downlink power capability as specified in Table 1-2. (Refer to Note and Table 1-2 on page 1-3.) Levels should be measured at the "DISTRIBUTION" port to ensure that the unit is operated within its downlink power capability as specified in Table 1-2.

The downlink "ALARM" indicator and the uplink "ALC" circuit operate at approximately +20 dBm composite output power which limits interfering products below -13 dBm. Note that +20 dBm is higher than the +16dBm output limit in Table 1-2 which **MUST** be adhered to for proper linear multitone operation

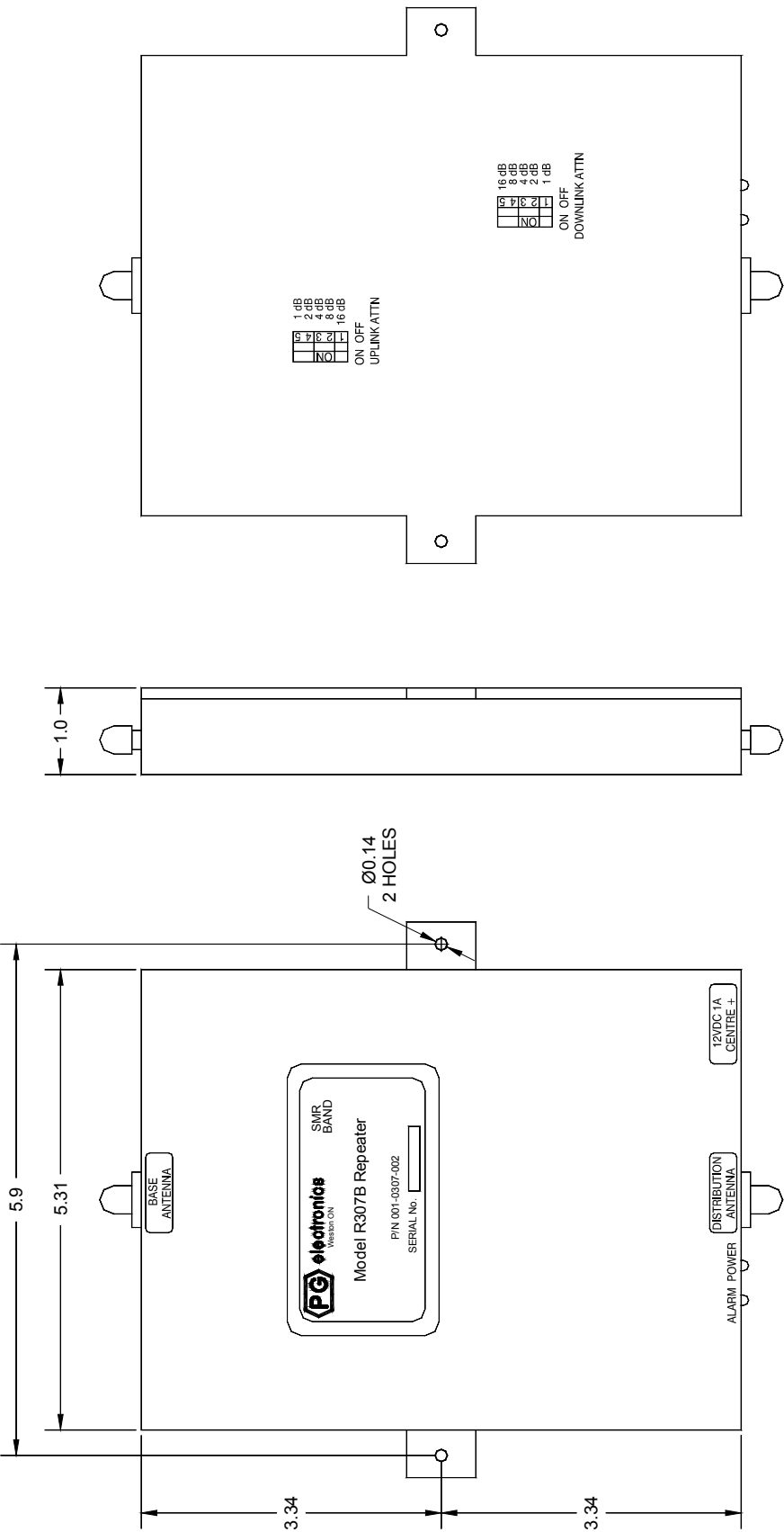


Figure 3-1. Installation Data