



## **Warranty**

***This warranty applies for one year from shipping date.***

**TX RX Systems Inc.** warrants its products to be free from defect in material and workmanship at the time of shipment. Our obligation under warranty is limited to replacement or repair, at our option, of any such products that shall have been defective at the time of manufacture.

**TX RX Systems Inc.** reserves the right to replace with merchandise of equal performance although not identical in every way to that originally sold.

**TX RX Systems Inc.** is not liable for damage caused by lightning or other natural disasters. No product will be accepted for repair or replacement without our prior written approval. The purchaser must prepay all shipping charges on returned products. **TX RX Systems Inc.** shall in no event be liable for consequential damages, installation costs or expense of any nature resulting from the purchase or use of products, whether or not they are used in accordance with instructions. This warranty is in lieu of all other warranties, either expressed or implied, including any implied warranty or merchantability of fitness. No representative is authorized to assume for **TX RX Systems Inc.** any other liability or warranty than set forth above in connection with our products or services.

## **Terms and Conditions of Sale**

**PRICES AND TERMS:** Prices are FOB seller's plant in Angola, NY domestic packaging only, and are subject to change without notice. Federal, State and local sales or excise taxes are not included in prices. When Net 30 terms are applicable, payment is due within 30 days of invoice date. All orders are subject to a \$100.00 net minimum.

**QUOTATIONS:** Only written quotations are valid.

**ACCEPTANCE OF ORDERS:** Acceptance of orders is valid only when so acknowledged in writing by the seller.

**SHIPPING:** Unless otherwise agreed at the time the order is placed, seller reserves the right to make partial shipments for which payment shall be made in accordance with seller's stated terms. Shipments are made with transportation charges collect unless otherwise specified by the buyer. Seller's best judgement will be used in routing, except that buyer's routing is used where practicable. The seller is not responsible for selection of most economical or timeliest routing.

**CLAIMS:** All claims for damage or loss in transit must be made promptly by the buyer against the carrier. All claims for shortages must be made within 30 days after date of shipment of material from the seller's plant.

**SPECIFICATION CHANGES OR MODIFICATIONS:** All designs and specifications of seller's products are subject to change without notice provided the changes or modifications do not affect performance.

**RETURN MATERIAL:** Product or material may be returned for credit only after written authorization from the seller, as to which seller shall have sole discretion. In the event of such authorization, credit given shall not exceed 80 percent of the original purchase. In no case will Seller authorize return of material more than 90 days after shipment from Seller's plant. Credit for returned material is issued by the Seller only to the original purchaser.

**ORDER CANCELLATION OR ALTERATION:** Cancellation or alteration of acknowledged orders by the buyer will be accepted only on terms that protect the seller against loss.

**NON WARRANTY REPAIRS AND RETURN WORK:** Consult seller's plant for pricing. Buyer must prepay all transportation charges to seller's plant. Standard shipping policy set forth above shall apply with respect to return shipment from TX RX Systems Inc. to buyer.

## **Disclaimer**

Product part numbering in photographs and drawings is accurate at time of printing. Part number labels on TX RX products supercede part numbers given within this manual. Information is subject to change without notice.

## **Symbols Commonly Used**



**WARNING**



**CAUTION or  
ATTENTION**



**High Voltage**



**Use Safety  
Glasses**



**ESD  
Electrostatic  
Discharge**



**Hot Surface**



**Electrical Shock  
Hazard**



**NOTE**  
**Important  
Information**

**For Class A Unintentional Radiators**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

**WARNING**

**Changes or modifications not expressly approved by TX RX System Inc. could void the user's authority to operate the equipment.**

*This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.*

**WARNING**

To satisfy FCC RF exposure requirements for transmitting devices, a separation distance of 87 Centimeters or more should be maintained between the UPLINK antenna of this device and persons during device operation. To satisfy FCC RF exposure requirements for transmitting devices, a separation distance of 30 Centimeters or more should be maintained between the DOWNLINK antenna of this device and persons during device operation. To ensure compliance, operations at closer than these distances is not recommended.

The antenna used for this transmitter must not be co-located in conjunction with any other antenna or transmitter.

## Antenna System Installation

The antenna or signal distribution system consists of two branches. An uplink branch typically uses an outdoor mounted, unidirectional gain antenna such as a yagi and a downlink signal radiating system consisting of a network of zero-gain whip antennas or lengths of radiating cable usually mounted inside of the structure.

Even though the antenna system may not be supplied or installed by TX RX Systems. The following points need to be observed because both the safety of the user and proper system performance depend on them.

- 1) Antenna system installation should only be performed by qualified technical personnel.
- 2) The following instructions for your safety describe antenna installation guidelines based on FCC Maximum RF Exposure Compliance requirements.
- 3) The uplink antenna is usually mounted outside and exchanges signals with the repeater base station or donor site. It is typically mounted permanently-attached to the building wall or roof. The gain of this antenna should NOT exceed 10 dB. Only qualified personnel should have access to the antenna and under normal operating conditions, no one should be able to touch or approach it within 87 Centimeters (35 inches).
- 4) The downlink or in-building signal distribution system is connected to the downlink booster port using coaxial cable. The distribution system may use radiating coaxial cable or a network 1/4 wave whip antennas whose gain does not exceed 0 dB for any radiator. These antennas should be installed so that the user cannot approach any closer than 30 Centimeters (12 inches) from the antenna.

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**GENERAL DESCRIPTION**

Signal boosters extend radio coverage into areas where abrupt propagation losses prevent reliable communication. No frequency translation (conversion) occurs with this device. The UHF version of Signal Booster II (SB II) is a broadband, bi-directional signal booster available in a variety of configurations as shown in **Table 1**. The product part number is used to describe each configuration available. The UHF version of SB II is available in the 450 to 512 MHz frequency band. Each of the three UHF sub-band types are identical except for differences in the input/output filtering used in the unit. This manual details the installation and operation of the 61-68-50 family of boosters which includes all three sub-bands within the UHF frequency range. The complete product family for the 61-68-50 boosters are listed in **Table 2**.

The system can be ordered in one of three maximum gain configurations including Full Gain (+80 dB gain max), Medium Gain (+60 dB gain max), and Low Gain (+45 dB max gain). The maximum gain of the system is determined by the exact type of cards plugged into the low and mid level slots as shown in the block diagrams at the back of this manual. The maximum gain of the uplink or downlink branch is adjustable and can be setup independently. In addition, the gain of each branch can be reduced up to 30 dB in 0.5 dB increments via software interface.

Three cabinet styles are available. The G1 suffix denotes a NEMA-4 style cabinet which is suitable for indoor or outdoor use. The G2 suffix denotes a stainless steel NEMA-4X style cabinet suitable for corrosive environments such as salt air and the RM suffix a rack mount version which is intended for indoor mounting only.

**UNPACKING**

It is important to report any visible damage to the carrier immediately. It is the customer's responsibility to file damage claims with the carrier within a short period of time after delivery (1 to 5 days). Care should be taken when removing the unit from the packing box to avoid damage to external heat-sink fins. Use caution because the heatsink fins can have somewhat sharp corners. Signal Booster II (SB II) weighs about 100 lbs. so use enough people when lifting the unit.

**INSTALLATION**

The following sections discuss general considerations for installing the booster. All work should be performed by qualified personal in accordance with local codes.

**Location**

The layout of the signal distribution system will be the prime factor in determining the mounting location of Signal Booster II. However, safety and serviceability are also key considerations. The unit should be located where it cannot be tampered with by the general public, yet is easily accessible to service personnel. Also consider the weight of

**61 - 70 - 50 - A2.0 - G1 (Example)**

TYPE	SUB-BAND	FAMILY	COARSE GAIN	BANDWIDTH	ENCLOSURE TYPE
61 = 2 Way	70 = 450 - 470 71 = 470 - 490 72 = 488 - 512	50 = Signal Booster II	A = 80 dB *	0.5 = 500 KHz 2.0 = 2.0 MHz	G1 = Painted, Nema4 G2 = Stainless, Nema4X RM = Rack Mount

\* Note: Factory preset to 50 dB. Please measure antenna isolation before resetting.

**Table 1:** Part number designations for 61-68-50.

Part	Gain (dB)	Freq Range (MHz)	Band Width	Enclosure
61-70-50-A2.0-G1	80	450-470	2.0MHz	NEMA 4
61-71-50-A0.5-G1	80	470-490	500KHz	NEMA 4
61-72-50-A0.5-G1	80	488-512	500KHz	NEMA 4

**Table 2:** SB II model 61-68--50 product family.