



# Tsunami.GX

## Quick Install Guide



## Third Edition, July 2004

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### Regulatory Notice

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.

Shielded cables and I/O cords must be used for this equipment to comply with the relevant FCC regulations.

Changes or modifications not expressly approved in writing by Proxim may void the user's authority to operate this equipment.

This device complies with Part 15 of FCC rules and RSS-210 of Industry Canada. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

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**WARNING!** *This product must be installed and serviced by trained personnel only.*

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### PRODUCT SAFETY INSTRUCTIONS

This product should be installed, used, and maintained by experienced telecommunications personnel only.

When installed, this equipment is to be connected to a Lightning/Surge Protection Device that meets all applicable national Safety requirements.

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**WARNING!** *To avoid injury, risk of fire, and damage, do not connect this product directly to an antenna. Ensure that proper lightning isolation is also provided between this unit and other equipment.*

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Equipment is to be used and powered by the type of power source indicated on the marking label only.

Lynx.GX radios are intended to be connected to a  $\pm 24$  VDC or  $\pm 48$  VDC power source, which must be electrically isolated from any AC sources and reliably earthed.

Only a DC power source that complies with the Safety Extra Low Voltage (SELV) requirements in the Standard for the Safety of Information Technology Equipment, including Electrical Business Equipment, CAN/CSA C22.2, No. 950-95 \* UL 1950, Third Edition, can be used with this product.

A 15-Amp circuit breaker is required at the power source. In addition, an easily accessible disconnect device should be incorporated into the facility wiring.

Always use copper conductors only for all power connections.

Do not connect or disconnect the power cable to the equipment when the other end of the cable is connected to the DC power supply.

The maximum room ambient temperature (T<sub>mra</sub>) for this product is 50° C. When installed in a closed or multiunit rack, consideration should be given to installing this equipment in an environment compatible with the T<sub>mra</sub>.

Equipment is suitable for mounting on concrete or other noncombustible surfaces only.

### WARNING!

***This equipment must be earthed. If you are not using the power supply provided by Proxim, you must connect the earthing conductor of your power source to the earthing terminal located on the back of the unit; or, connect an earthing conductor between the unit's earthing terminal and your earthing point. For safe operation, always ensure that the unit is earthed properly.***

*This Quick Install Guide is targeted for professional installers and provides only the higher level tasks associated with installing the Lynx.GX. For detailed installation and configuration information, see Lynx.GX 90 Installation and Management provided on the CD-ROM enclosed with your product.*

## STEP 1. GATHER REQUIRED TOOLS

- #2 & #3 Phillips (cross-tip) screwdrivers
- Small and large blade standard screwdrivers
- Adjustable 6-inch or 8-inch wrenches
- Weatherproofing material (Vinyl electrical tape, waterproof splicing tape (or butyl tape, or self-vulcanizing adhesive)
- Several coaxial fixed attenuators rated DC to 6 GHz, totaling 100 dB of attenuation
- Laptop Computer with Ethernet port
- Wire strippers
- RJ-45 crimping tool
- Soldering iron
- One low-loss coaxial cable, N-to-N male
- RF power meter
- Bit error rate test set
- 6-foot CAT5 cables, 1 cross-over, 1 straight-through
- Digital multimeter
- DC power source capable of supplying 200 Watts, or two radio AC adapters
- Cellular telephone or 2-way radio
- Optional 5.725 to 5.850 GHz variable RF attenuator (Attenuation of this part can replace one or more of the fixed attenuators)

## STEP 2. UNPACK SHIPPING BOX CONTENTS

The boxes should be left intact and sheltered until arrival at the installation site.

If the shipping container shows signs of damage, notify the transportation company immediately. Upon receipt, inspect contents to make sure no parts are missing or damaged.

You should retain all the packaging materials (including all internal boxes). In the unlikely event that you must return the equipment to the factory, use the original packing materials for return shipment. The packaging materials also are recommended for transporting the equipment from location to location.

Each Tsunami.GX shipment includes one GX Indoor Unit (IDU), one GX RF Unit (RFU), and accessory kits as shown in the tables below.



See the *Tsunami.GX Installation and Management* manual for specific model numbers.

## GX Installation Kits

Contents	
GX RFU Installation Kit	GX RFU Rack Mount Kit <sup>(1)</sup> 19" or 23" (1 ea.) RFU Grounding Cable (1 ea.)
GX IDU Installation Kit	GX IDU Rack Mount Kit <sup>(2)</sup> (19" or 23") (1 ea.) IDU Grounding Cable (1 ea.) IDU-to-RFU Interface Cable 12" (1 ea.) IDU DC Power Cord w/CD 3-Pin Terminal Block (1 ea.) Custom Cable Kit RJ-45 <sup>(4)</sup> (1 ea.) Custom Cable Kit DB9 <sup>(5)</sup> (1 ea.) Rubber Table Mount Feet (4 ea.)
Doc and Software CD-ROM	Release Notes, Installation and Maintenance Manual, Quick Install Guide, MIBs
GX Quick Install Guide	(printed) (1 ea.)

Sub-Contents	
(1) GX IDU Rack Mount Kit (19" or 23")	"L" IDU Rack Mount Brackets (2 ea.) 2-inch Extender Brackets (2 ea.) GX Rack Mount Screw Pack <sup>(3)</sup> (1 ea.)
(2) GX RFU Rack Mount Kit (19" or 23")	"L" RFU Rack Mount Brackets (2 ea.) 2-inch Extender Brackets (2 ea.) GX Rack Mount Screw Pack <sup>(3)</sup> (1 ea.)
(3) GX Rack Mount Screw Pack	Rack Mount Screws (4 ea.) Small Extender Bracket Screws (8 ea.)
(4) Custom Cable Kit RJ-45	RJ-45 Connectors (2 ea.)
(5) Custom Cable Kit DB9	Metal DB9 Connectors (1 ea.) DB9 Cable Sheaths (1 ea.)

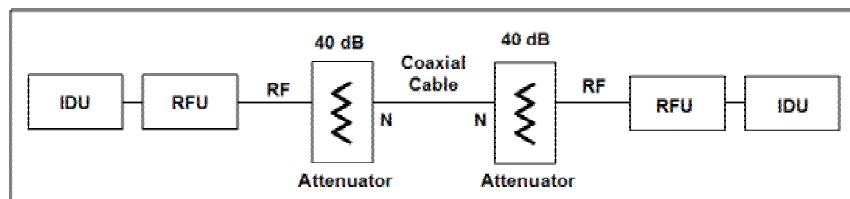
## STEP 3. TEST RADIOS BACK-TO-BACK

Back-to-back testing the radios before they are installed simplifies system trouble shooting later, should problems be encountered during system deployment. This testing isolates link problems caused by auxiliary equipment, installation, or the radio path, from potential radio hardware problems.

**Note:** Back-to-back testing must be performed to verify a radio problem before returning any radio to the factory for repair.

Back-to-back testing is performed with both radios at the same location.

When the equipment is connected as shown in the following figure, both radios should have no alarm conditions.



The optional variable RF attenuator allows "fade to threshold" testing to verify radio system gain.

The RF power allows each radio's output power to be verified.

Swapping IDUs from one end to the other can help determine whether the problem is with the IDU or the RF Unit.

### **WARNING!**

**The radios will be damaged if appropriate attenuation is not supplied between radios. You must provide a minimum of 50 dB between the two radios. At 50 dB attenuation, output power can be left at maximum output power.**

Several built-in loopback functions are implemented in the radio. They are:

**Local LB**

Local radio line interface is in loopback to the line connector (does not test the wireless link). This is useful for external equipment or circuit testing, including an external BER tester.

**Remote LB-int**

The far end or remote radio is set to loopback data so that the received microwave signal is sent back to the originating local radio. The radio uses an internally generated signal and external signals are ignored. This is useful for testing the entire radio link without using external test equipment.

**Remote LB-ext**

Similar to Remote LB-int, but an external signal is required locally. This is useful for testing the entire radio link and includes testing the physical connector to which the external test equipment is connected. Running this test on every interface from both ends of the radio link would completely test every interface connector and the complete radio link.

Only one loopback can be enabled per link at a time; that is, only one channel can be tested at a time and configuring a channel in loopback disables the current loopback. The front panel and Web interface loopback LED on the near-end and far-end radios informs the operator that the radio is configured in loopback mode.

1. Apply power to both radios; the radios will complete initializing in approximately one minute
2. Verify configuration settings (through the Web Interface) for proper configurations.
3. Verify the RF Link LED is green.

If desired, verify proper operations of network interfaces using appropriate test equipment.

## STEP 4. INSTALL THE RADIO UNITS

There are two primary ways to install the radio system.

**IDU and RFU Indoor Mounting**

Both units (the IDU and the RF Unit) are mounted indoors or in a suitable enclosure, stacked on top of one another, in a rack.

**IDU Indoor Mounting / RFU Outdoor Mounting**

The IDU is mounted indoors and the RF Unit is mounted outdoors near the antenna.

Complete the installation of all cables and the antenna system prior to connecting power.

**Installing the IDU and RFU Indoors**

For rack mounting, mount the IDU immediately below the RFU with no gap between the units. Leave the equivalent of one rack space above the total 2-unit space for the radio if any equipment is mounted above the radio system.

Set up the radio for mounting (using the rack mounting brackets enclosed with the screws in the shipping container) with the front edge projecting from the front face of a standard 19-inch rack.

Alternatively, you can reverse the rack-mounting brackets to install the unit at a flush position.

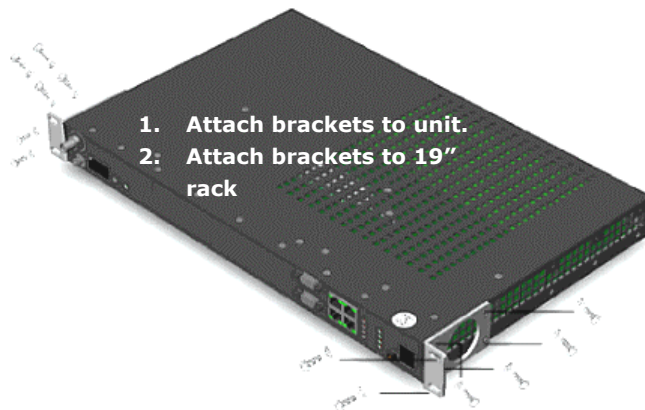
The radio has internal fans that intake on the left side and exhaust on the right side of the chassis. When rack mounting, leave a small gap between the outer edges of the radio and the inside edge of the rack.

A short 12" TNC-TNC coaxial cable is included in the RFU accessory kit. Use this to connect the IDU to the RFU when both are installed indoors.

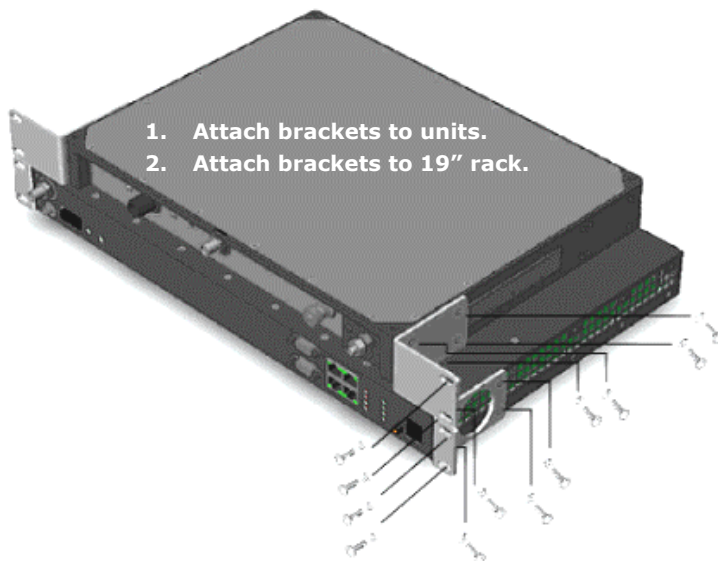
To rack-mount the IDU and RFU:

1. Gather all the parts contained in the GX IDU Installation Kit.
2. Set the unit on a flat surface and, using a screwdriver, remove the front screws on each side of the unit that match up to the holes of the rack mounting flange. You must remove these screws to prepare the unit for bracket attachment.
3. Attach the "L" IDU Rack Mount Brackets to each side of the IDU using the long mounting screws that are contained in the GX Rack Mount Screw Pack.

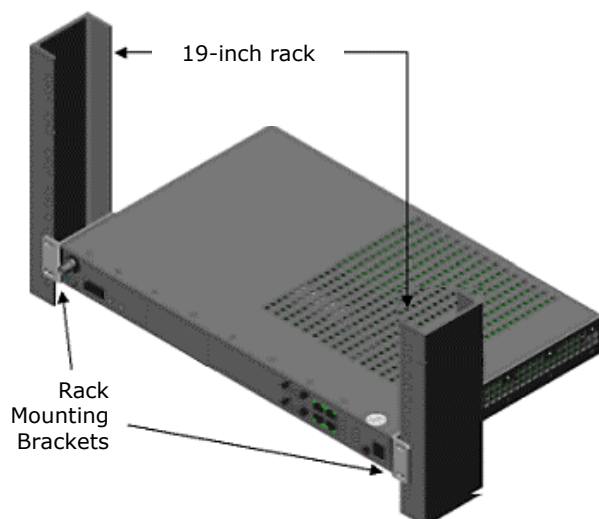
The following figure illustrates mounting bracket attachment for the IDU only (occupying one space in a 19-inch rack).



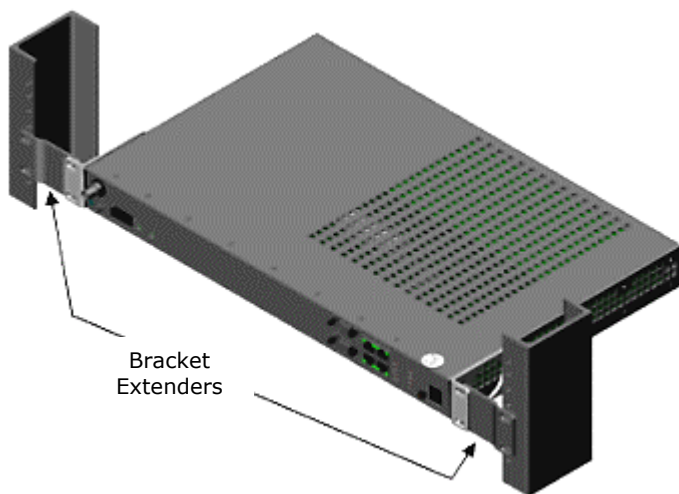
Attach the "L" RFU Rack Mount Brackets to each side of the RFU using the long mounting screws that are contained in the GX Rack Mount Screw Pack. The following figure illustrates mounting bracket attachment for the combined IDU and RFU (occupying two spaces in a 19-inch rack).



4. Position the radio in the rack and align the holes in the mounting bracket with the holes in the rack. Two screws for each bracket should be used into the rack (these screws are not included).



If you are installing the IDU in a 23-inch rack, you must use the 2-inch extender brackets and attach them to the rack mounting brackets (with the screws provided in the GX Rack Mount Screw Pack), as shown in the following figure:



5. Insert two screws and lock washers, appropriate for your rack, into each of the mounting brackets and tighten.

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**IMPORTANT!**

***When the RFU is rack mounted, it must be mounted directly above the IDU and facing with the connectors forward in the same direction as the connector panel of the IDU (as shown).***

***The IDU fan exhaust is used to cool the RFU in a rack mount configuration. Also, if one unit is projection mounted, both units should be projection mounted. In either configuration, an empty rack mount space is required above and below the configuration.***

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## Installing the RFU Outdoors

The outdoor RFU installation consists of these tasks:

- Installing the mounting brackets and mounting plate onto the pole (using two band clamps).
- Mounting and securing the RFU on the mounting plate.

To facilitate assembly, installing the carriage bolts to the top holes of the RFU can be partially completed on the ground before being raised to the pole assembly.

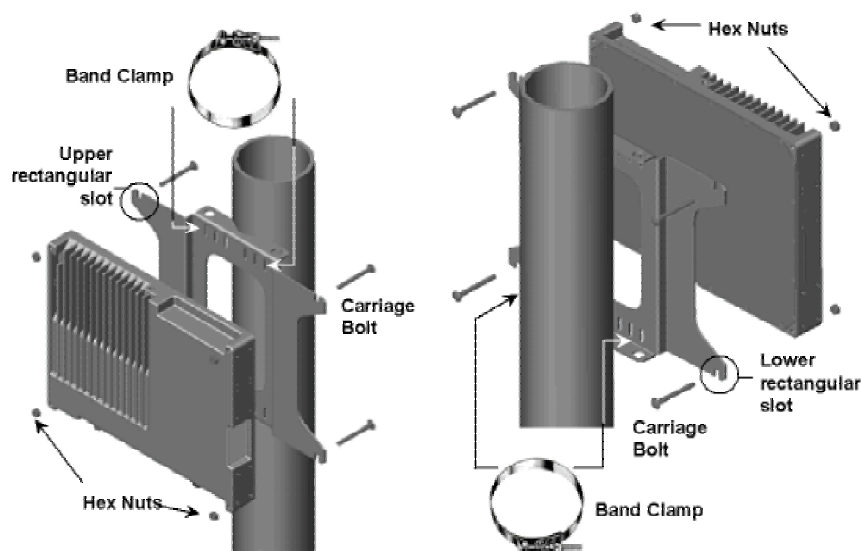
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**Note:** Installing the RFU outdoors requires the use of the optional GX RF UNIT Outdoor Mounting Kit (Proxim part ACC-GX-RF-2, item number 61688), sold separately. The GX RF UNIT Outdoor Mounting Kit contains the items necessary for secure pole mounting of the RFU. See "Tsunami.GX Spares and Accessories" for part numbers and ordering information. If the RFU is mounted outdoors on both ends of the link, you must order two outdoor mounting kits.

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### Installing the Mounting Plate

1. Obtain the optional GX RF UNIT Outdoor Mounting Kit (Proxim part ACC-GX-RF-2, item number 61688).
2. Hold the mounting plate with the upper and lower V-cut tabs in contact with the pole.
3. Wrap a band clamp around pole/mast and through the vertical slots near the top of the mounting plate. Repeat for lower slots.



4. Tighten both band clamps sufficiently to prevent the mounting plate from rotating on the pole/mast; you can now mount the RFU onto the bracket assembly.

### Mounting the RFU

1. Orient the RFU for mounting onto the mounting plate as previously shown so that the connectors are pointed down and the heatsink fins are facing away from the bracket.
2. Mount the RFU using carriage bolts and the self-locking hex nuts.
3. Ensure that the heads of the carriage bolts are properly aligned with the notches in the mounting plate and placed firmly against the mounting plate prior to tightening the self-locking hex nuts.
4. Install the RF lightning arrestor that connects to the antenna cable to the RFU Type-N connector labeled To Antenna.
5. Install the IF/DC-passing lightning arrestor that connects to the IDU cable to the RFU TNC connector labeled To IDU
6. Attach the shortest possible grounding cable to the ground post of the RFU and route to a proper low impedance ground point. This step is extremely critical, as it represents the ground path for the lightning/surge protectors and the RFU. Unless the ground point represents a broadband (10 KHz to 100 MHz), low impedance, ground, the surge protection will be ineffective. Step 5. Install the Antennas

The installation information discussed in this section is generic. For installation procedures specific to the antenna you are installing, refer to the antenna manufacturer's documentation.

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**WARNING (FCC requirement for implementation in the USA): Any antenna used for the transmitter must be fix-mounted on outdoor permanent structures with a separation distance of at least 1.5 meters from all persons during normal operation. Antennas must be professionally installed. Installers must be provided with antenna installation instructions and transmitter operating conditions, including antenna co-location requirements of CFR47 Part 1.1307(b)(3), for satisfying RF exposure compliance.**

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### STEP 5. MOUNT THE ANTENNA

The installation information discussed in this section is generic. For installation procedures specific to the antenna you are installing, refer to the antenna manufacturer's documentation.

Antennas should be ordered with the suitable mounting kit specific to the site requirements. They should be very rigidly mounted on a stable structure meeting twist and sway requirements. Adequate room for azimuth and elevation adjustment from the rear must be provided.

The antenna polarization must be the same at both ends of the link, either *vertical* or *horizontal*.

In general, antenna mountings require a support pipe that is vertically plumb, otherwise it may not be possible to aim the antennas properly. The entire structure must be adequately grounded for lightning protection. The antenna system must always be installed according to the manufacturer's instructions.



## STEP 6. CONNECT CABLES

Some general guidelines when installing RF cabling:

- RF transmission line must never be kinked, twisted, or deformed in any way.
- Pay close attention to the transmission line specifications for bend radius when installing.
- Check the electrical integrity of the transmission line, including all connectors, with a simple DC check between the center conductor and outer conductor
- Short flexible low-loss jumper cables may be required to avoid sharp bends in the primary transmission line, or to limit stress on either connection.
- Support the transmission line in a tray on horizontal runs and by hangers on vertical runs.
- Space hangers according to manufacturer instructions (typically every five feet under conditions of no ice and not greater than 85 mph winds).
- Ground the transmission line using the manufacturers grounding kit
- Install grounds at the antenna, at the bottom of the antenna structure (if applicable), and where the transmission line enters the structure.
- Ground long transmission line runs at least every 100 feet.
- Install proper lightning protection devices.
- Utilize a proper broadband ground system
- Use manufacturer-specified connectors and termination tools.
- Follow termination instructions precisely.
- Always check the DC integrity of cables for continuity and shorts prior to their use.

### Antenna

The radios are equipped with an N-type female connector at the antenna port.

A low-loss 50-ohm cable terminated with N-type Male connectors is required as the transmission line between the RFU and the antenna. The return loss presented by the transmission line at the RFU interface should be as high as possible (20 dB minimum recommended).

The length of the antenna transmission line should be kept as short as possible to minimize losses.

### Outdoor-Mounted RFU

When the RFU is mounted near the antenna, the RF transmission line can be pre-terminated with N-male connectors at both ends, and attached from the antenna feed to the lightning/surge protector on the RFU.

In areas of severe winter weather, steps should be taken to support the cable using proper hardware to alleviate potential stress caused by ice loading.

It will also be necessary to install IF cabling between the RFU and the indoor mounted IDU.

Two IF cables are required, one between the RFU and the building egress point, the other from outside the building egress point to the IDU.

Both cables will be terminated with N-male type connectors on one end, and TNC-male connectors on the other.

The N-male ends of the cables will mate with the N-female lightning/surge protector (Nextek PTC-ONF-ONF-09S is recommended) located at the building egress point. The TNC-male connector ends of each cable will mate with the RFU and IDU.

### Indoor-Mounted RFU

When the RFU has been mounted indoors, it is only necessary to provide and install RF cabling between the indoor mounted RFU and the antenna, since the co-located equipment is connected with the short supplied IF cable.

Two RF cables terminated with N-male type connectors are required. One cable will connect the antenna to the N-female lightning/surge protector (Polyphaser AL-LSXM recommended), located immediately outside of the building egress point. The other cable will connect the indoor mounted RFU to the lightning/surge protector outside of the building egress point.

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**Note:** When connecting the cables to the lightning/surge protector, be sure to connect the cable from the IDU to the "protected side" of the surge protector.

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In all cases, outdoor RF connectors must be properly weatherized. This is accomplished by over-wrapping the connectors with self annealing waterproof splicing tape (the type used for installing submersible pumps in wells), waterproof butyl tape, or self vulcanizing adhesive, then over-wrapping with vinyl electrical tape for UV protection.

## System Grounding

All lightning/surge protectors and equipment must be properly connected via a low-inductance ground strap or cable to a broadband (10 kHz to >100 MHz) ground point. The steel superstructure of a multistory building may constitute such a ground point.

It is also possible that the building may already have a communications ground system installed on each floor that may be extended as a usable ground point.

Always consult local building and electrical safety codes, and the building facilities engineer. Some localities have more stringent safety codes than the National Electrical Code.

## Connecting Power

The radios do not have a power on/off switch. When you connect the DC power, the unit powers up, and is operational in about one minute.

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**Note:** When first powered up, the second LED from the left column lights up red, then the bottom one flashes red. If these conditions continue after one minute, there is a problem powering up the radio and the unit should be returned.

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There can be up to 200mW of RF power present at the antenna port.

Before power is applied:

- Terminate the antenna port (either connected to an antenna or an appropriate 50-ohm load, such as provided by a fixed RF attenuator).
- Connect the cable between the IDU and the RFU.

The IDU can be powered separately (with no cable or RFU present), but do not connect the RFU without removing power first; then connect the IDU-to-RFU cable and re-apply power.

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### **WARNING!**

**Connect all cables between the IDU and the RFU before applying power to the IDU— Do not apply DC power to the IDU if the RFU antenna connect is not terminated. Likewise, remove power from the IDU before removing any cables between the two units.**

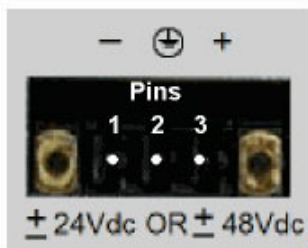
**DC voltage is conducted on the IF coaxial cable; improper installation of the cable while power is applied could result in damage to the equipment. Be sure to read "Product Safety Instructions" in Chapter 2 before installing this product.**

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Power is connected using the terminal block contained in the accessory kit. The terminal connector is a 3-pin mating connector.

Use the pin information listed in following tables, along with the associated figures, to wire the terminal and connect the DC power supply properly. For DC power return connection, connect to the opposite voltage (either the -DC or the +DC Pin).

No connection between the return and the ground pin is necessary if the DC supply is floating relative to ground. If the DC supply return is desired to be at ground potential, connect the return to ground at the DC power plug. Be sure to connect the return to ground at the DC power plug and make sure that all equipment is grounded to proper station earth ground.



Negative DC Power Input Pin Assignment (-20 to -63 VDC)	
Pin Number	Function
1	Power (-DC)
2	Ground
3	Return (+DC)
Positive DC Power Input Pin Assignment (+20 to +63 VDC)	
Pin Number	Function
1	Return (-DC)
2	Ground
3	Power (+DC)

**Note:** Each radio terminal block must be fused externally with an 5-Amp maximum fuse. The DC power cable must be shorter than 3 meters (9.75 feet).

To wire the DC power, wire the power cable with an adequate current rating into the terminal block connector using the screw connections on the terminal block.

Suggested rating of external fuses and cables is 5 to 8 Amps (-120W to -240W) for 24V and 3 to 5 Amps (-144 W to -240 W) for 48V in order to accommodate inrush current at equipment power-up.

The radios consume less than 1.5 Amp at  $\pm 48V$ , less than 3.0 Amp at  $\pm 24V$  under steady-state conditions.

- If using **negative power**, connect the negative voltage to pin **1**. Connect the return connection to pin **3** and use an optional jumper to pin **2** for ground reference.
- If using **positive power**, connect the positive voltage to pin **3**. Connect the return connection to pin **1** and use an optional jumper to pin **2** for ground reference.

Use a digital voltmeter (DVM) to verify the voltage and polarity of the plug after wiring the terminal block for power and before inserting the plug into the IDU.

### Grounding

The ground connection is available using pin **2**. **Do not ground both sides of the power supply.**

All equipment must be properly grounded to a common station ground in order to avoid ground loops and injury to equipment and personnel.

A grounding screw and nut is provided on the left front panel of the IDU. Be sure to use the local electrical code to determine wire size and proper connection to the grounding screw.

**Note:** Proper grounding is important for protecting the unit against lightning, and personnel against shock hazard. A grounding screw post is provided on the front panel.

## STEP 6. ALIGN THE ANTENNA

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**Note:** For installation procedures specific to the antenna you are installing, refer to the antenna manufacturer's documentation

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There are two RSL voltages that can be read off of the radio for use in aligning the antennas.

- The IDU front panel has an RSL Test Point for a voltmeter probe.
- The RFU also has a voltage test point at the BNC connector.

Both the IDU RSL voltage and the RFU RSL voltage readings are identical: They can range from 0.9 volts for -90 dBm to 0.05 volts for -5 dBm.

This unique approach for measurement voltage makes it possible to read the RSL value directly off the DVM; for example: -60 dBm = 0.6V.

Keep in mind that a higher RSL results in a lower absolute voltage. Therefore, when you are 'peaking' an antenna, you actually are attempting to achieve the lowest voltage.

The larger the antenna, the more critical alignment becomes. For example, with a 2-foot dish at 5.8 GHz, the antenna can be moved only  $\pm 3$  degrees off the correct heading, and the receive signal level drops by 3 dB.

This compares with a 6-foot dish, which can be moved only  $\pm 1$  degree for the same degradation. In both cases, this corresponds to only a  $\pm 5/8$  inch movement at the outside diameter of the antenna.

- You must perform antenna alignment on one end of the link at a time.
- Keep one antenna stationary at all times.
- Fine-align each end several times, until the planned RSL is reached.

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**Note:** The RSL voltage is slightly delayed, so make small incremental adjustments during the fine alignment phase and wait for the RSL voltage to settle after each adjustment. When aligned to maximum RSL, ensure that all antenna mechanics are tightened without impacting the alignment.

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### *Coarse Alignment*

To coarse-align the antenna, normally set the antenna for flat elevation (no up-tilt or down-tilt) using a spirit level; point the antenna at a heading marker obtained using a compass/GPS (magnetic corrected) bearing.

In cases where station elevation differences result in a path inclination of more than 1 degree, setting antenna up/down tilt to within 1 degree using a clinometer is recommended. Otherwise, it may be very difficult to find the signal, particularly with 4 foot or larger antennas.

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**Note:** Use the instructions provided by the antenna manufacturer to verify that both antennas are on the same polarization; otherwise, the RSL will be approximately 25 to 30 dB below the calculated level.

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Once the coarse alignment is completed at both ends, the link can be powered and some level of reliable communication established. The voltage at the radio test point can be measured with a DVM to determine the relative receive RF signal level.

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**Note:** Be sure to read "Connecting Power" prior to powering up the radios.

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### *Fine Alignment*

When fine-aligning the antenna:

- Adjust the azimuth and then the elevation of the each antenna (first one end, then the other) several times in order to maximize the RSL voltage.
- Align the antennas using the RSL voltage of local RFU or IDU.
- If the RFU has not been installed near the antenna, it may be necessary to extend the RFU/IDU RSL Voltage to the antenna temporarily with CAT5 cable.
- Check RSL Against Predicted Results
- Because the maximum error-free receive signal level is -20 dBm, the receiver can produce errors above this level. In the case of an extremely short path, it may be necessary to slightly misalign the antenna to reduce the received signal level. In such cases, it is recommended that a slight amount of "up tilt" be used on either or both antennas to reduce signal level, and the possibility of interference.

A properly designed radio path with properly aligned antennas should result in an optimized RSL that is within  $\pm 2$  dB of calculated RSL. If the RSL is optimized but is approximately 20 dB below the calculated level, the antennas may be aligned on a sidelobe, rather than the main antenna beam, and may require repeating the coarse aiming process.

If the RSL is 25 to 30 dB low, the antennas may be cross-polarized.

Other possible causes of low RSL may be a path reflection problem, or a clearance related diffraction problem.

## STEP 7. ADJUST OUTPUT POWER

In certain cases, you may need to adjust the output power lower from the factory setting; for example, to:

- Meet any required EIRP (Effective Isotropic Radiated Power) limits
- Avoid exceeding the maximum far-end RSL of -20 dBm
- Meet in-bound RSL requirements for a hub site location

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**Note:** In certain countries, Effective Isotropic Radiated Power (EIRP) limits dictate the maximum output power the radio can transmit, given transmission line loss and antenna gain. Consult with appropriate government agencies or Proxim Corporation if there is any question regarding maximum output power allowed.

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Using the Web browser interface through the NMS1 or NMS2 port, you can adjust the output power from factory settings. Select the **Sys Cfg** tab and choose from +5 to +25 dBm, in 1 dB steps, in the **Tx Power (dBm)** field.

If adjusting the output power to meet an EIRP limit, you must calculate the overall RF system gains and losses, including feeder losses for the type of transmission line installed and the antenna gain.

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**Note:** For the US and Canada, there is no EIRP limit for fixed point-to-point applications of this product.

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You can determine the radio transmit power for EIRP-limited installations using the following equation:

$$\text{Tx Power (dBm)} = \text{EIRP Limit (dBm)} + \text{Transmission System Losses (dB)} - \text{Antenna Gain (dB)}$$

## MANAGING WITH THE WEB INTERFACE

### Minimum Computer Requirements for NMS

The client PC should satisfy the following minimum requirements:

- CPU Processor speed greater than 1 GHz
- Web Browser: Internet Explorer, version later than 5.0; Netscape 6.3 and later
- 10/100 Ethernet Interface
- Windows® Operating System: Windows® 98 or later (including XP Home and Professional)

### Accessing the Radio

Use Windows Internet Explorer® or Netscape® to access the radio by entering its IP address in the browser address bar. The radios are configured at the factory with the default IP address of 10.0.0.1. Once you have successfully logged in to the radio, you can change the IP address from the **Admin** tab of the Web interface.

You can configure your computer to this subnet by setting its address to 10.0.0.x (where x is from 2 to 254 and not already used in the network) or use the command line interface through Telnet to change the IP addresses of the radios.

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**Note:** The PC connected to the near-end radio's NMS port must be on the same subnet as the near-end radio to communicate with each other.

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Change both the near-end and the far-end radio to the desired IP addresses. You may need to change the subnet of your PC many times to accomplish this as you change from the default IP address to your desired address scheme. Always save the new IP address configurations of the radios.

After changing the IP addresses, you must reconfigure the IP address of your computer to again match the subnet of the radio (following your Operating System guidelines for changing IP addresses).

## Initial Configuration

To access the two radios in a link, the two radios must use an external switch or a different network path . The default settings of all Tsunami.GX radios are:

IP Address: 10.0.0.1  
Subnet Mask: 255.0.0.0  
Gateway Address: 0.0.0.0

The next three steps should be accomplished while both radios are on a test bench. Additional details follow.

**Step 1:** Change the PCs IP address to the same subnet as 10.0.0.x. This allows you to address the local radio.

**Step 2:** Using the CLI, change the IP address, subnet mask, and default gateway of the two radios.

**Step 3:** Using the Web browser, review and configure any additional settings (such as enabling input T1 alarms or T1 line build-out) as necessary.

If using an external switch to combine main data and NMS data, both radios can be accessed at the same time. The browser for the near-end radio is opened using the IP address of the near-end radio. A second browser is opened using the far-end radio IP address..

Proxim recommends you use separate IP addresses for the two units.

## CONFIGURATION WITH THE WEB INTERFACE

You can use the Tsunami.GX Web Interface to configure channel interfaces, monitor alarms, check radio status, view event logs, change IP information, change SNMP Community Strings, and view details about the radio. Use a Cat 5 cable to connect the 10/100 Base-T interface on the PC to the NMS1 or NMS2 port on the radio.

### Initial Log-On

To access the Web Interface:

1. At your browser address field enter the default IP address <http://10.0.0.1> to open the **Logon** window.
2. Enter the following administrative logon username and default password (or your previously set password) in the corresponding fields on the logon page:

Username: **managers**      Password: **managers**

The Tsunami.GX radios ship from the factory with the default user name and password, as shown above. Change the password to another value and practice proper security management for limiting access to the configuration and control menu tabs through the browser.

The following table lists the tasks you can perform through the Web Interface.

Task	Tab
View Factory Defined Radio Info	<i>Device</i>
Modify the Ethernet/T1/E1 Channel Interface Configurations	<i>Intf Cfg</i>
Configure Tx Power, Security Link ID, and Tx Channel Plan	<i>Sys Cfg</i>
View Current Status; Track RSL	<i>Status</i>
Monitor Input/Hardware/BER alarms	<i>Alarms</i>
View Alarm Log Entries	<i>Log</i>
View Support Information	<i>Contact</i>
Change System Passwords/Date, and Time; Spectrum Analyzer	<i>Admin</i>

## CONFIGURATION WITH TELNET

You can use the CLI through Telnet to assign new IP information to the radio, to change "managers" password and SNMP community strings, and view limited performance status.

To start a Telnet session:

1. From Windows, open a Command Prompt, or MS-DOS Prompt and enter the following:  
c:\>**Telnet <IP address>**  
Telnet issues a connection message.
2. Enter **managers** as the username and **managers** as the password (or your assigned password).
3. At the command prompt, enter **gxHelp** to view available commands. These commands are listed in the CONFIG port CLI section.
4. To end a Telnet session, enter the **logout** command. A config port session is unavailable until any telnet session has ended.

## CONFIGURATION WITH SNMP

The Tsunami.GX radios support SNMP v2C and earlier. All SNMP traffic (including traps, SET and GET commands) is sent and received through the NMS locally.

The following are required to configure and manage the Tsunami.GX radios using SNMP:

- A copy of the Proxim Tsunami.GX MIB files.
- A PC running an SNMP manager such as HP OpenView, Castle Rock SNMPc, or IpSwitch WhatsUp Gold.

Follow the instructions provided with the SNMP Management software to load and compile the MIB file. The MIB contains all the traps and configuration variables for the radio SNMP agent.

Use a ping utility to ensure your SNMP Manager can communicate with the Tsunami.GX radios. Set up the radio's SNMP Community strings using the Web Interface's **Admin** page or using the CLI interface.

## LED DESCRIPTIONS

Settings in italics are for normal, error-free operation.

RF LINK	
<b>Green</b>	<i>BER&lt;10<sup>-6</sup></i>
<b>Yellow</b>	Bit errors occurring (when $10^{-6} \leq 10^{-3}$ )
<b>Red</b>	Excessive bit errors or radio link failure ( $BER \geq 10^{-3}$ or sync loss)
<b>Flashing Red</b>	Link Security ID mismatch within the last minute
RF UNIT	
<b>Green</b>	<i>RF Unit OK</i>
<b>Red</b>	RF Unit alarm (Over-temp (>95°C), IDU to RFU communication failure, DC power loss, or RFU detected hardware failure)
CABLE	
<b>Green</b>	<i>Cable between system board and RF Unit is OK</i>
<b>Red</b>	Cable short longer than 5 seconds detected in the last minute
IDU	
<b>Green</b>	<i>IDU OK</i>
<b>Yellow</b>	IDU warning
<b>Red</b>	IDU alarm (all fans failed or over-temp (>65°C))
DATA INPUT	
<b>Green</b>	<i>Input alarm enabled; data present on all enabled channels</i>
<b>Yellow</b>	Input alarm disabled; data present on at least one channel
<b>Red</b>	Input alarm enabled; data not present on at least one enabled channel
<b>Off</b>	Input alarm disabled; data not present on all channels

## AIS OUT

<b>Off</b>	<i>Not injecting AIS or all ones in data stream</i>
<b>Yellow</b>	<i>Injecting AIS (all 1s) in data stream</i>

## NMS: LINK LED

<b>Green</b>	<i>Link on.</i>
<b>Off</b>	<i>Link off.</i>

## NMS: DUPLEX LED

<b>Green</b>	<i>Full duplex.</i>
<b>Blinking Green</b>	<i>Half duplex with collisions.</i>
<b>Off</b>	<i>Half duplex.</i>

## LOOPBACK

<b>Flashing Yellow</b>	<i>At least one data channel in loopback</i>
<b>Solid Yellow</b>	<i>Internal loopback has detected at least one error</i>
<b>Off</b>	<i>No loopbacks on any channels</i>

## TECHNICAL SUPPORT

If you are having a problem using a Tsunami.GX product and cannot resolve it with the information in "Troubleshooting" in the *Installation and Management* manual, gather the following information and contact Proxim Technical Support:

- What kind of network are you using?
- What were you doing when the error occurred?
- What error message did you see?
- Can you reproduce the problem?

Be sure to:

- Note the serial number of the product before installation. Keep this information in a safe place. The serial number is required to obtain support and can be found only on the back of the unit.
- Obtain an RMA number before sending any equipment to Proxim for repair.

**Access Knowledgebase:** [WANsupport@proxim.com](mailto:WANsupport@proxim.com)  
Ask your wireless WAN question and get an express response:

**E-mail Technical Support:** [WANtechnicalsupport@proxim.com](mailto:WANtechnicalsupport@proxim.com)

**Web Technical Support:** <http://www.proxim.com/support>

**Call Technical Support:** Toll Free **+1-866-674-6626** or **+1-408-542-5390**  
Hours: 6:00 a.m. to 5:00 p.m. M-F Pacific Time

## ENHANCED WARRANTY PACKAGES

Proxim's ServPak program delivers premium support services that complement your Tsunami.GX standard warranty. Available services include, warranty extension, 24x7x365 technical phone support and priority response, and next day priority hardware replacement. For more information, contact Proxim or your Proxim authorized reseller