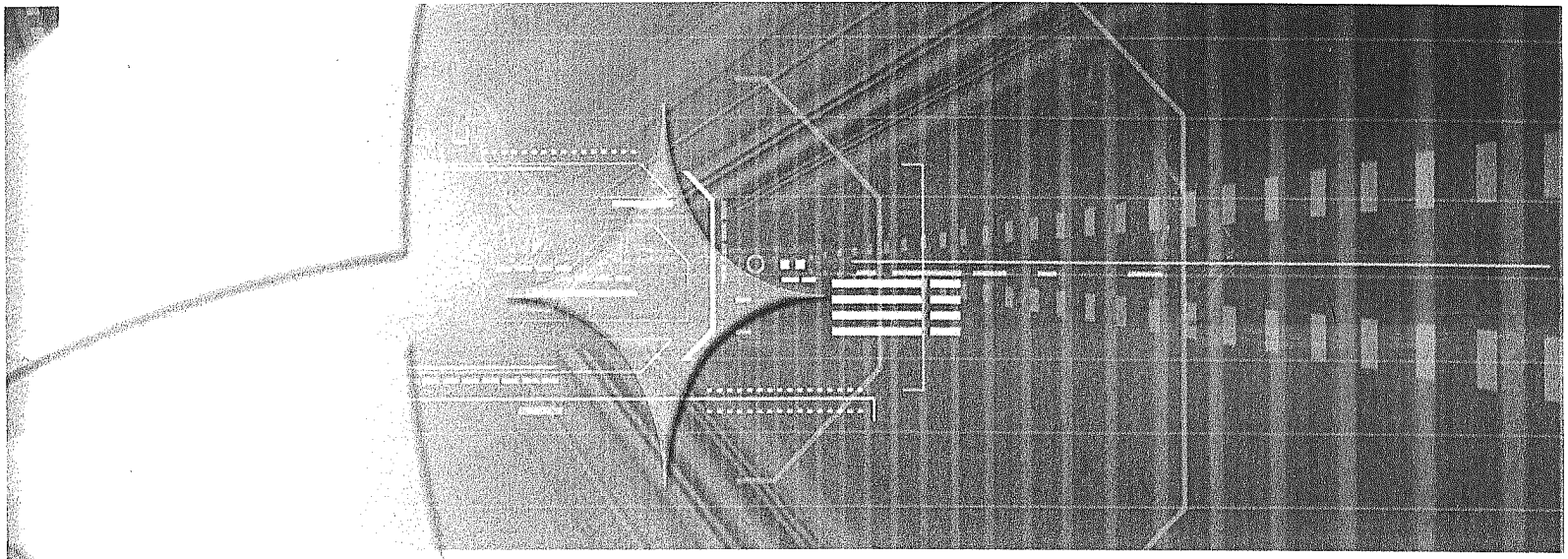
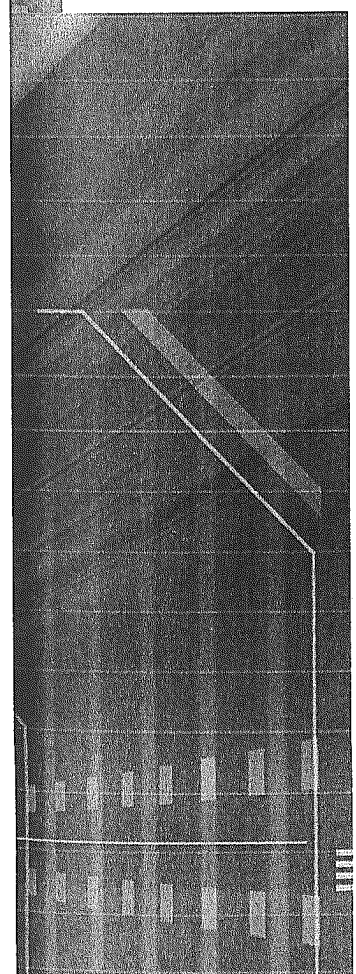


iDIRECT
TECHNOLOGIES



iDirect 3000 series™
and
iDirect 5000 series™
Satellite Router

INSTALLATION AND SAFETY MANUAL

iDirect 3000 series™
and
iDirect 5000 series™
Satellite Router

Installation and Safety Manual

July 25, 2005

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The specifications and information regarding the products in this manual are subject to change without notice. All statements, information, and recommendations in this manual are believed to be accurate, but are presented without warranty of any kind, express, or implied. Users must take full responsibility for their application of any products.

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1 About This Manual

Thank you for purchasing an iDirect 3000 series™ or iDirect 5000 series™ Satellite Router!

This manual provides the safety and compliance information, and hardware installation procedures for the 3000 series and 5000 series.

1.1 Intended Audience

This manual is intended for use by the VSAT (Very Small Aperture Terminal) equipment installer, System Engineer, and Network Operator responsible for maintaining the iDirect Network. Only qualified service personnel should install and operate the 3000 series and 5000 series Satellite Router Solutions. Familiarity with cabling and wiring practices is beneficial.

In this document, the 3000 series and 5000 series are often referred to as IDUs (Indoor Units) while radios and LNBs are collectively referred to as ODUs (Outdoor Units).

1.2 Document Conventions

This manual was crafted with the reader in mind. In that regard, a Note icon (illustrated below) provides helpful tips and reminders that assist you in successful and safe operation of iDirect system hardware. The Note icon also provides suggestions or references to material not contained in this manual.

NOTE **Reader take note!**

1.2.1 Safety Definitions

Table 1 below illustrates and defines the symbols that are used throughout this manual to alert the user to possible danger or when to use caution.

Table 1: Safety Definitions

Symbol	Warning Type	Definition
	**WARNING/ CAUTION**	When you see this alert symbol and the WARNING or CAUTION heading, strictly follow the warning instructions to avoid personal injury, equipment damage or loss of data.
	**DANGER**	Electric shock hazard: When you see this symbol and the DANGER or WARNING heading, strictly follow the warning instructions to avoid electric shock injury.

1.2.2 Documentation Feedback

iDirect has made every effort to ensure the correctness and completeness of the material in this manual. Please send your comments and/or feedback to:

iDirect, Inc.
Attn: Documentation Department
13865 Sunrise Valley Drive
Herndon, VA 20171
email: Docs@idirect.net

2 iDirect 3000 series™ and 5000 series™ Satellite Routers

iDirect is proud to offer the 3000 series and 5000 series remote satellite routers, which increase processing power by at least four times over our legacy release. The 3000 series and 5000 series provide a low-maintenance and user-friendly remote environment, while allowing for expansion of up to nine IP addresses (5000 series only). This manual will explain how to safely install and maintain the 3000 series and the 5000 series and also includes important safety information.

- **iDirect 3000 series™ Satellite Routers** are designed for small to medium-sized enterprise customers with basic remote networking needs. Able to deliver broadband access of up to 18 Mbps downstream and 4.2 Mbps upstream, the 3000 Series router can support all of your IP applications remotely, including VoIP and basic Video.

- **iDirect 5000 series™ Satellite Routers** are designed for the most demanding applications for your most bandwidth-intensive users. They were developed specifically to support the business-critical applications of enterprise customers.

The following table itemizes the differences between the 3000 series and the different 5000 series models.

Table 2: Differences between the 3000 series and 5000 series Satellite Routers

Feature	3100	5100	5150
Encryption	Not Available	Not Available	3DES/AES
LAN Ports in Switch	Single LAN Port	Single LAN Port and Supports Ethernet Redundancy with 8 Port Switch	Single LAN Port and Supports Ethernet Redundancy with 8 Port Switch
Max Total IP Throughput (Mb/s)	22.2 (Mb/s)	22.2 (Mb/s)	22.2 (Mb/s)
Oscillator	Standard	Ovenized/High Stability	Ovenized/High Stability

2.1 iDirect 3000 series™ Satellite Router Physical Description

The 3000 series is 11.5" wide x 9.675" deep and 2.0" high. It weighs 3.75lbs.

The front panel of the 3000 Series has five LEDs: TX, RX, NET, STATUS, and POWER. The definitions of these LED indicators are discussed in detail in *Section 5.7.1*.

Its rear panel has three LEDs: POWER, BUC POWER and LNB POWER. The definitions of these LED indicators are discussed in detail in *Section 5.7.2*.

The rear panel also holds six interface connectors, which are described in *Section 5.3*.

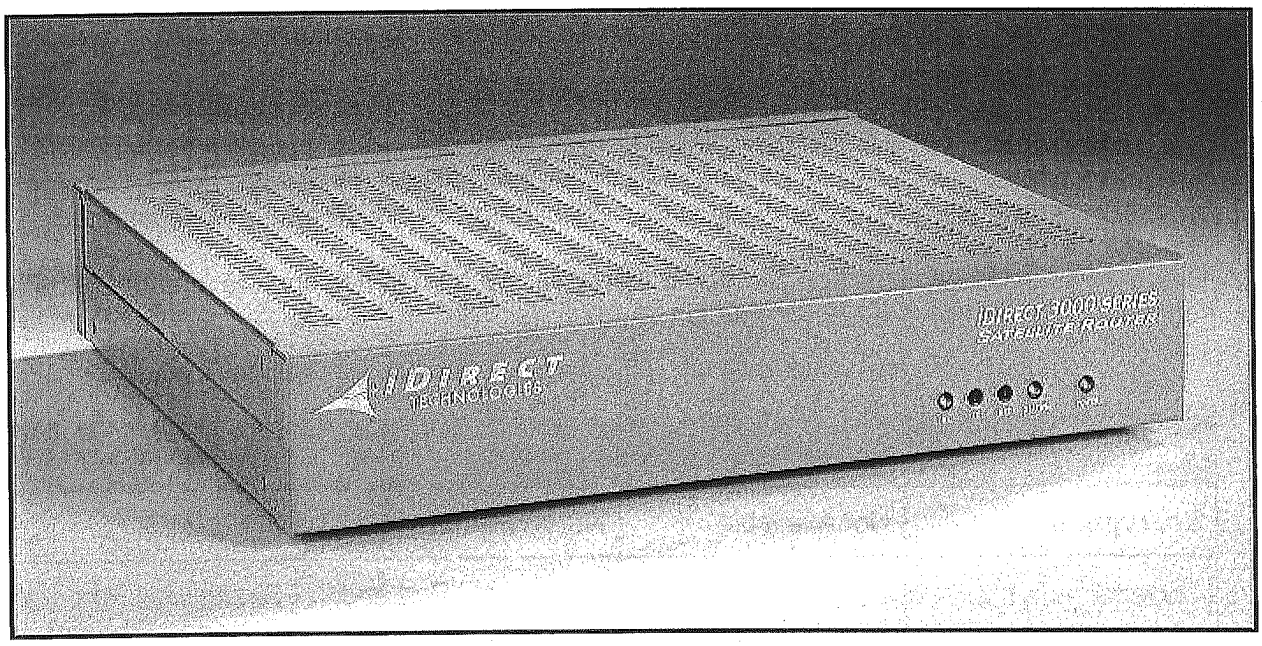


Figure 1: Front View of the iDirect 3000 series™ Satellite Router

2.2 iDirect 5000 series™ Satellite Router Physical Description

The 5000 series is 11.5" wide x 9.675" deep and 2.0" high. It weighs 3.75lbs.

The front panel of the 5000 Series has five LEDs: TX, RX, NET, STATUS, and POWER. The definitions of these LED indicators are discussed in detail in *Section 5.7.1*.

Its rear panel has three LEDs: POWER, BUC POWER and LNB POWER. The definitions of these LED indicators are discussed in detail in *Section 5.7.2*.

The rear panel also holds fourteen interface connectors, which are described in *Section 5.4*.

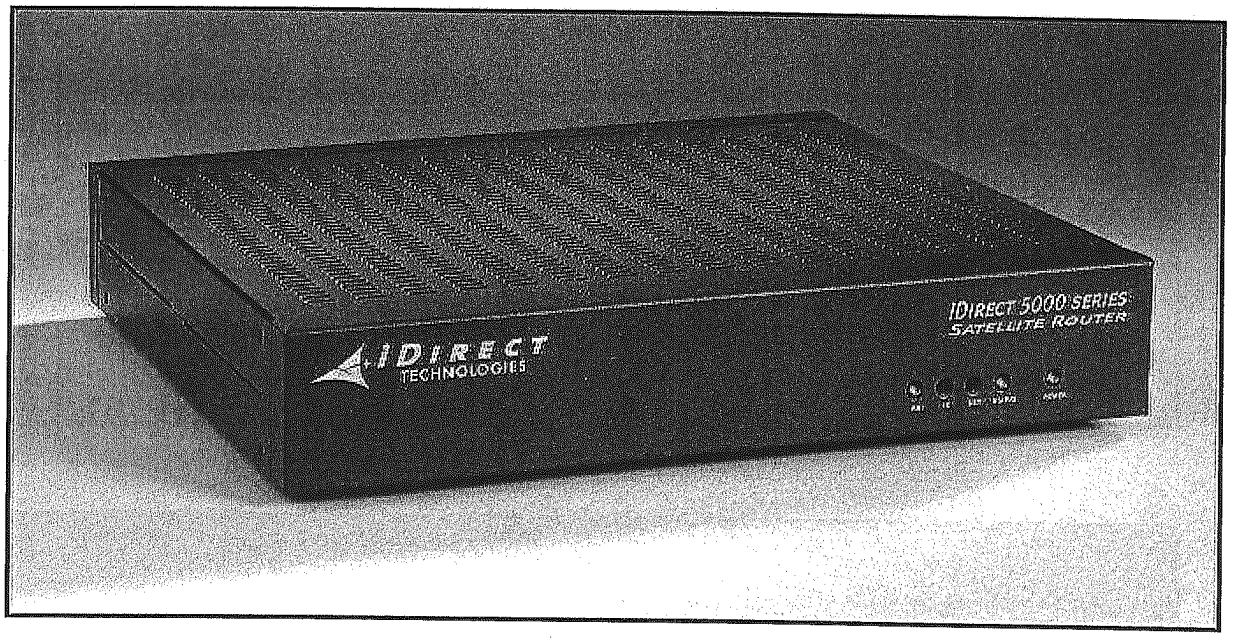


Figure 2: Front View of the iDirect 5000 series™ Satellite Router

2.3 Rack-Mount Trays

A Rack-Mount Tray (optional) can be purchased for mounting the iDirect 3000 series™ or iDirect 5000 series™ Satellite Router in a 19" rack. The Rack-Mount Tray is 19" wide x 11.75" deep and 3.5" in height (48.5cm x 30cm X 9cm). It weighs 5 lbs.

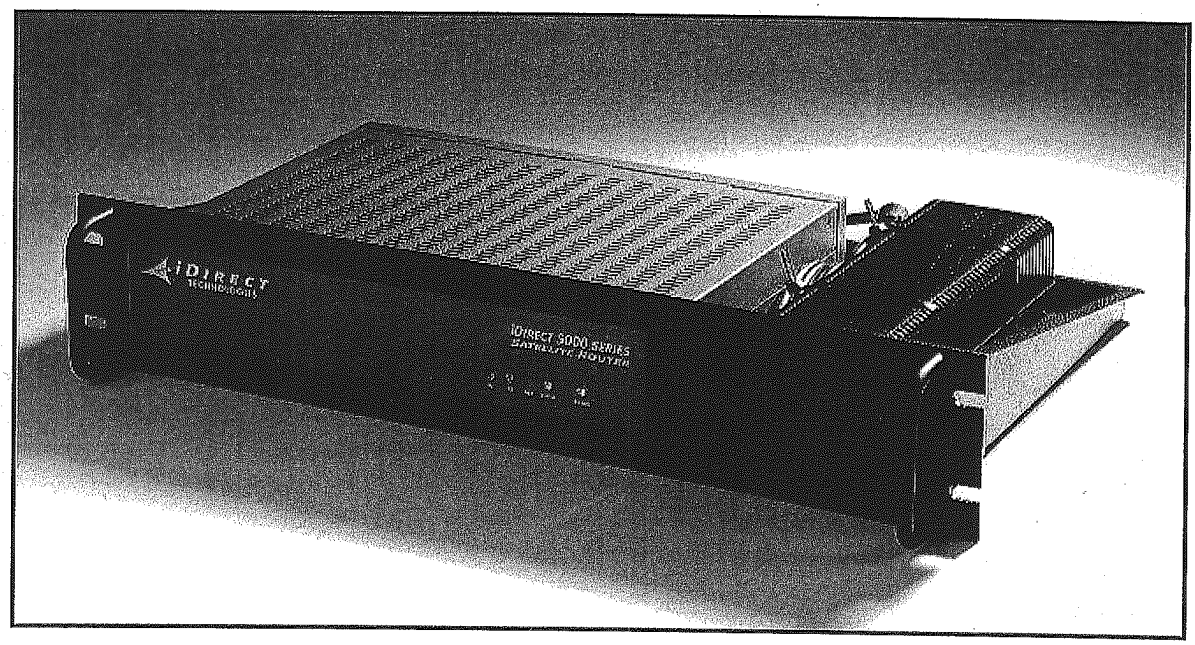


Figure 3: Front View of a Satellite Router in a Rack-Mount Tray

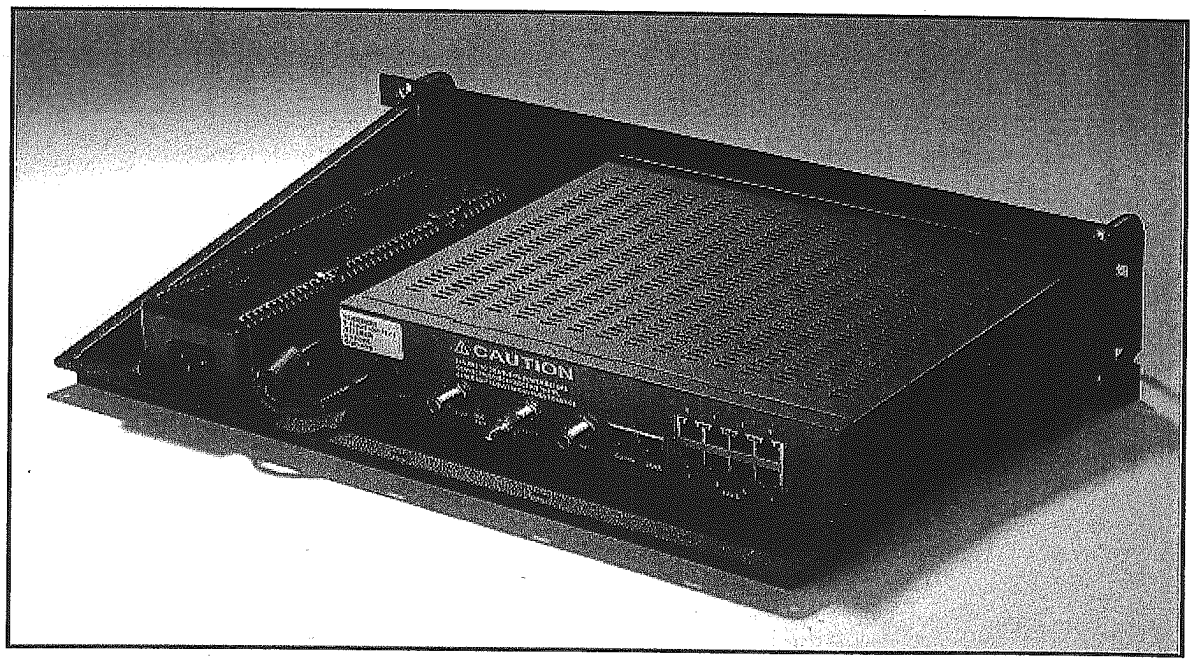


Figure 4: Rear View of a Satellite Router in a Rack-Mount Tray

3 Safety Measures

Follow the safety guidelines in this manual carefully. They will help protect the iDirect 3000 series™ or iDirect 5000 series™ Satellite Router from potential damage and help ensure your own personal safety. These safety measures have been translated into multiple languages and are listed in Appendix B. Keep this safety information handy where you can easily refer to it, if necessary.

You should read this entire manual before you attempt to install or use your 3000 series or 5000 series Satellite Router.

- **Heed Warning Labels** – Adhere to all warnings listed on the product's warning labels and in the operating instructions.
- **Follow Instructions** – Follow all operating and usage instructions carefully.

NOTE **See Section 1.2.1 for a description of the Warning icons that are used in this manual.**

3.1 Passwords

CAUTION

Change your password as soon as possible. iDirect strongly recommends changing your passwords at the time of installation.

3.2 Installation Safety Guidelines

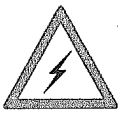
During installation, observe the following safety guidelines.

WARNING

Ventilation: Slots and openings on the chassis are provided for ventilation and to ensure reliable operation of the product. To protect the chassis from overheating, these openings must ***NOT*** be blocked or covered at all times. This product should not be placed in a built-in installation, such as a "bookcase" or enclosed rack, unless proper ventilation is provided or the manufacturer's instructions have been adhered to.

DANGER

AC Polarization: This product is equipped with a cord plug that will fit into the power outlet only one way. Do not modify the plug by defeating this feature. If the plug does not fit, contact your electrician to replace your outlet or get the proper power cord. To prevent electric shock or impair performance, do not use this plug with an extension cord or outlet unless you can fully insert the blades without blade exposure.



DANGER

Power Sources: Operate this product only from the type of power source indicated on bottom of approved power supplies (100-240VAC/50/60Hz). If you are not sure of the type of power supply at your site, consult your teleport operator or local power company.

DANGER

Power Cord Protection: Power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them; pay particular attention to cords at plugs, convenience receptacles, and at the point where they exit the product.

DANGER

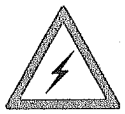
Overloading: Do not overload wall outlets, extension cords, or integral convenience receptacles as this can result in a risk of fire or electrical shock

DANGER

Electrical Safety: For electrical safety, power line operated equipment accessories connected to this unit should bear the UL, NRTL, CE listing mark and should not be modified so as to defeat the safety features. This will help avoid any potential hazard from electrical shock or fire. If in doubt, contact qualified service personnel.

DANGER

Water and Moisture: To reduce the risk of fire or electrical shock, do not expose this product to rain or moisture.



DANGER

Lightning: For added protection, unplug this product from the wall outlet (and disconnect the antenna and cable system) during a lightning storm or when it is left unattended and unused for long periods of time. Doing so will prevent damage to the product from lightning and power-line surges.

WARNING

Heat: The product should be situated away from heat sources such as radiators, heat registers, stoves, or other products (including amplifiers) that produce heat.

WARNING

Accessories: To avoid personal injury or damage to the iDirect 3000 series™ and iDirect 5000 series™ Satellite Routers, do not place the chassis on any unstable rack, cart, stand, table, or bracket. Any mounting of the product should follow the manufacturer's instructions.

WARNING

Attachments: Do not use attachments unless recommended by the manufacturer as they may cause hazards or damage to equipment.

WARNING

Restricted Access: This unit is intended for installation in restricted access areas. A restricted access area is where access can only be gained by service personnel through the use of a special tool, lock and key or other means of security, and is controlled by the authority responsible for the location.

DANGER

Grounding: Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.

3.3 Operational and Maintenance Safety

As you use your iDirect 3000 series™ or iDirect 5000 series™ Satellite Router, observe the following safety guidelines.

WARNING

Cables: Never use any other RF cable than what is supplied or recommended by iDirect.

WARNING

Ventilation: Slots and openings on the chassis are provided for ventilation and to ensure reliable operation of the product. To protect it from overheating, these openings must not be blocked or covered. If there is any dust build up on the vent openings of the 3000 series or 5000 series chassis, vacuuming is recommended to remove these particulate to ensure proper airflow.

DANGER

Cleaning: Do not use liquid cleaners or aerosol cleaners. Use a cloth for wiping up dust or use a vacuum cleaner to remove dust.

WARNING

Object and Liquid Entry: Never push objects of any kind into the 3000 series or 5000 series through any openings as they may "short out" parts that could result in a fire or electric shock. Never spill liquid of any kind on the 3000 series or 5000 series Satellite Router.

3.4 Safety Guidelines to Observe During Servicing

When your iDirect 3000 series™ or iDirect 5000 series™ Satellite Router requires service, observe the following safety guidelines.

WARNING **Servicing:** Do not attempt to service the 3000 series or 5000 series internal assemblies yourself, as opening and removing covers may expose you to dangerous voltages or other hazards. There are no user serviceable parts inside. Opening the units will void the warranty. Refer all servicing to qualified service personnel.

WARNING **Conditions Requiring Service:** Unplug the 3000 series and 5000 series from the AC Power outlet and refer servicing to qualified service personnel under the following conditions:

a. When the power supply cord or plug is damaged.

b. If liquid has been spilled on, or objects have fallen into, the 3000 series or 5000 series or it has been exposed to water.

c. If the 3000 series or 5000 series does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions. Other adjustments may result in damage and will often require extensive work by a qualified technician to restore the 3000 series or 5000 series Satellite Router to its normal operation.

d. If the 3000 series or 5000 series has been dropped or if the chassis has been damaged.

e. When the 3000 series or 5000 series exhibit a distinct change in performance.

4 Pre-Installation Safety Measures and Procedures

The safety precautions and steps you must follow to install the iDirect 3000 series™ or iDirect 5000 series™ Satellite Router are presented in the following sections.

NOTE **It is extremely important to read all safety precautions thoroughly before proceeding with any pre-installation or installation procedures.**

4.1 Observing Safety Precautions

When installing the IDU, observe all caution and warning statements. The following guidelines will help ensure your safety and protect the equipment. However, these guidelines may not cover all of the potentially hazardous situations you may encounter during installation.

4.1.1 General Safety Recommendations

- The installation of the IDU must comply with the national and local electrical codes:
  - In the United States, the National Fire Protection Association (NFPA) 70, United States National Electric Code.
  - In Canada, the Canadian Electric Code, Part 1, CC22.1
  - In other countries, the International Electromechanical Commission (IEC) Recommendation 364, part 1 through part 7.

Review the safety instructions in Section 3, "Safety Measures", and the safety warnings and compliances listed in Appendix B at the end of this document, before installing, configuring, or performing maintenance on the system.

- Always remove or disconnect ALL power connections before installing or removing a chassis.
- Keep the staging area clear and free of dust during and after installation.
- Keep tools, IDU components, and shipping boxes away from walkway area.
- The IDU operates safely when it is used in accordance with its marked electrical ratings and product usage instructions.

WARNING Only Trained and qualified personnel should be allowed to install or replace this equipment.

WARNING This equipment is to be installed and maintained by service personnel only as defined by AS/NZS 3260 Clause 1.2.14.4 Service Personnel.

DANGER Before working on the ODU equipment, unplug the power cord from AC power source.

WARNING Do not remove IDU chassis enclosure. Do not touch internal circuitry when the power cord is connected.

WARNING The BUC power requirement must match the proper IDU voltage. The BUC may sustain damage if used with the incorrect power supply.

4.1.2 Electrical Safety

The IDU is designed to operate with the following +24VDC power supplies (typical) or with +48 power supplies (5000 series only):

- Ault Incorporated: PW122RA2400F02; PW122KA2400F02; PW122RA4800F02 (optional on 5000 series only)
- Operating Tech: OTE-120-24-3

DANGER **Do not use any power supply other than what is supplied with the IDU.**

WARNING **The BUC power requirement must match the proper IDU voltage. The BUC may sustain damage if used with the incorrect power supply.**

Follow these basic guidelines when you are working with any electrical equipment.

- Disconnect all power and external cables before installing or removing the chassis.
- Do not work alone when potentially hazardous conditions exist.
- Never assume that power has been disconnected; always check.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe. Never install equipment that appears damaged.
- Carefully examine your work area for possible hazards, such as wet floor, ungrounded power extension cables, and missing safety grounds.

DANGER **Do not work on the system, or connect or disconnect cables, during periods of lightning activity.**

4.1.3 Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) damage, which occurs when electronic cards or components are improperly handled, can result in complete or intermittent failure.

Use the following guidelines for preventing ESD damage.

- ***Never touch the connector pins.***
- Handle the IDU *only* by the metal enclosure.
- Avoid contact between the connector pins and clothing. ESD voltages on clothing can cause damage.

4.2 Mechanical, Environmental, Power and Network Specifications

Ensure that the installation site can accommodate the mechanical and environmental specifications of the IDU. The following specifications pertain to both the iDirect 3000 series™ and iDirect 5000 series™ Satellite Routers.

4.2.1 Mechanical and Environmental Specifications

<table>
<tr><td>Dimensions</td><td>2.0 (H) x 11.5 (W) x 9.675 (D) inches</td></tr>
<tr><td>Weight:</td><td>3.75 pounds (1.7 Kg)</td></tr>
<tr><td>Heat Dissipation:</td><td>22W (82 BTU/Hour); IDU only</td></tr>
<tr><td>Airflow:</td><td>Natural Convection Cooling</td></tr>
<tr><td>Ambient Temperature
Operational:

Storage:</td><td>
32° to 113°F (0° to 45°C) at 10,000 Feet
32° to 122°F (0° to 50°C) at Sea Level
-30° to 176°F (-34° to 80°C)</td></tr>
<tr><td>Temperature Gradient</td><td>0.5°C/min (3000 series); 1.0°C/min (5000 series)</td></tr>
<tr><td>Relative Humidity:
Operational:
Storage:</td><td>
0 to 90% non-condensing
5 to 93%</td></tr>
<tr><td>Altitude:
Operating:
Storage:</td><td>
≤ 10,000 feet (3048m)
≤ 30,000 feet (9144m)</td></tr>
<tr><td>Operational Vibration:
(10 minutes per axis)</td><td>The IDU chassis will remain operational when exposed to 0.21 grms with the following profile:
<table>
<tr><td>Freq</td><td>Slope</td><td>PSD</td></tr>
<tr><td>5 to 350 Hz</td><td>0</td><td>0.0001 g2/Hz</td></tr>
<tr><td>350 to 500 Hz</td><td>-6dB/octave</td><td></td></tr>
<tr><td>500 Hz</td><td>0</td><td>0.00005 g2/Hz</td></tr>
</table></td></tr>
<tr><td>Operational Shock:</td><td>The IDU chassis shall remain operational when exposed to 10g, 10ms half sine on x, y, z axis.</td></tr>
</table>

4.2.2 Power Specifications

The iDirect 3000 series™ and iDirect 5000 series™ Satellite Routers generate minimal heat; typical power consumption is 20W for the IDU. Ensure that the installation site can accommodate the power specifications of the IDU.

Input Voltage	+24 VDC (from External Power Supply); +48 VDC (optional on 5000 series only)
Power Supply Model Number	Use only with the following model numbers: ▪ Ault Incorporated: PW122RA2400F02; PW122KA2400F02; PW122RA4800F02 (optional on 5000 series only) ▪ Operating Tech: OTE-120-24-3
Input Voltage Range:	100 – 240 V~ (VAC) Single Phase
Frequency:	50 – 60 Hz
3000 Series Current Consumption: **at 90 VAC:** **at 254 VAC:**	≤ 3.0 Amps maximum 1.25 amp typical (with 4W BUC and LNB) 0.50 amp typical (with 4W BUC and LNB)
5000 Series Current Consumption: **at 90 VAC:** **at 254 VAC:**	≤ 3.0 Amps maximum 1.32 amp typical (with 4W BUC and LNB) 0.53 amp typical (with 4W BUC and LNB)
Protection:	▪ Internal, primary current fuse, inside power supply ▪ Over current protection ▪ Short protection
Power Factor Correction	Complies with EN61000-3-2 and EN61000-3-3
Efficiency:	86% typical
Input Transient Response:	0.5msec for 50% load change typical
AC Input Connector:	IEC-320-C14, 3 pins receptacle on External Power Supply
AC Power Cord	18 AWG, country dependent

4.2.3 Network Configuration Specifications

Network Topology	Star (3000 Series) / Point to Point SCPC (5000 Series)
Multiple Access	TDM (Downstream) D-TDMA aka Deterministic TDMA (Upstream)
Symbol Rates	Downstream: 64 ksps up to 15 Msps* Upstream: 64 ksps up to 7.5 Msps*
Modulation	QPSK, BPSK
IP Data Rates	Downstream: 128 kbps – 22.2 Mbps Upstream: 64 kbps – 4.2 Mbps
FEC	Downstream: TPC Rate 0.431, 0.533, 0.793, or 0.879 Upstream:TPC Rate 0.431, 0.533, 0.66, or 0.793

* These symbol rates are achievable only under certain FEC and modulation conditions.

4.2.4 RF Specifications

For RF connector specifications, see *Section 5.3 and 5.4*.

Frequency Range:	
Transmit:	950-1700 MHz
Receive:	950-1700 MHz
Frequency Tuning Step Size:	
Transmit:	38 Hz
Receive:	Sub-Hertz with Demodulator
RF Power Range:	
Transmit:	-35 to +7 dBm
Receive:	-65 to +0 dBm composite
RF Power Adjustability: **Transmit:**	0.5 dB Nominal Step Size
Receive:	Under AGC for all valid Rx input power range
Typical Transmit and Receive Phase Noise (dBc/Hz) at:	
1 KHz	-83
10 KHz	-83
100 KHz	-96
1 MHz	-112
Typical Phase Jitter:	
14 KHz to 1 MHz	≤ 1.8° rms
Transmit Carrier Suppression:	≥ 30 dBc
Discrete Spurs within Modulation Bandwidth:	≥ 35 dBc
Discrete Spurs, harmonics and non-harmonics:	≥ 50 dBc with output ≥ -15 dBm
Modulator Spectral Shaping	Intelsat: IESS-309 (See figure 9-1)
Transmitter On/Off Ratio	≥ 50 dBc with output power ≥ -15 dBm

4.3 Tools and Supplies

The following tools and supplies are recommended for a typical IDU installation.

Table 3: Recommended Tools and Supplies

Quantity	Description
1	Number 2 Phillips screwdriver (for rack mounting)
1	F-Connector Crimping Tool
1	RG-6 Coax Stripper
1	Coax / Wire Cutter
1	DB-9 to RJ-45 Adapter
1	Straight LAN Cable

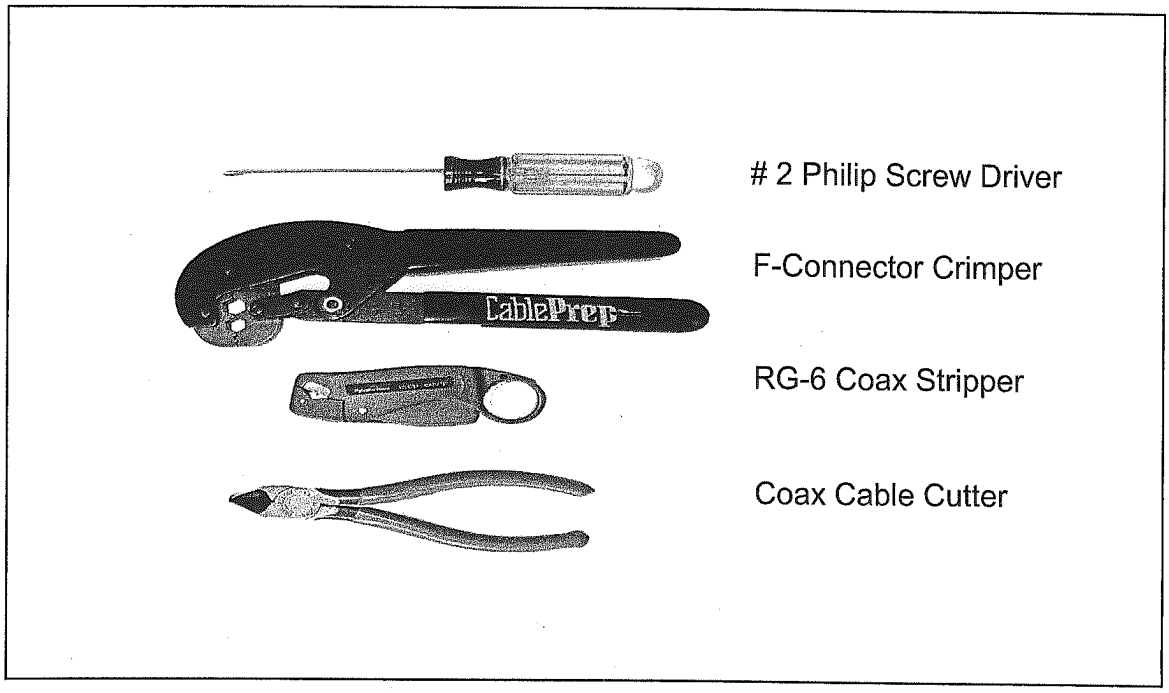
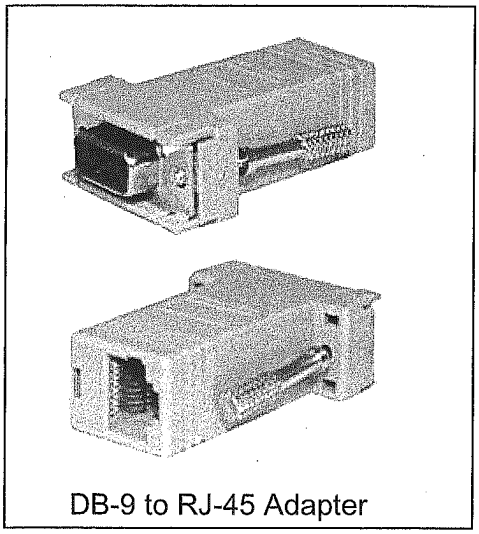


Figure 5: Installation Tools



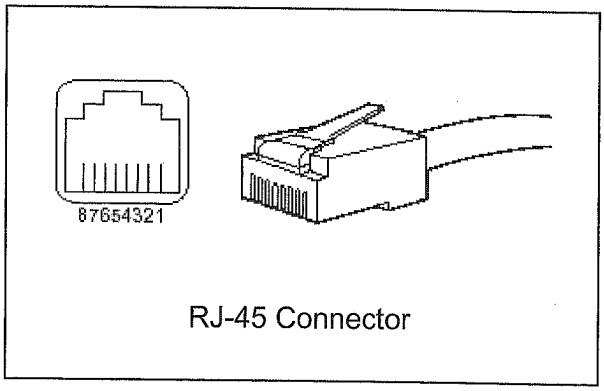


Figure 6: DB-9 to RJ-45 Adapter and Connector

You may need additional tools and equipment to install related equipment and cables. You may also require test equipment to check signal, power levels and communication links. See Console Port Cable Specifications and Pinout for RJ-45 pinouts.

4.4 Unpacking iDirect 3000 or 5000 series Satellite Router Equipment

The 3000 series or 5000 series may be shipped in one or more shipping containers, depending on the type of bundle purchased. Once you have received all the boxes, you should:

- Ensure the boxes are facing upward. (Refer to the box orientation arrows on the shipping container.)
- Inspect all shipping containers. If any damage or other signs of mishandling are evident, inform the carrier and either iDirect or the reseller.
- Remove the tape and any exterior covering from the box's lid.

NOTE

You should save the 3000 series and/or 5000 series Satellite Router shipping boxes after you have unpacked the system. You will need these boxes if you want to move or ship the system in the future.

Remove items from the box only as needed. Verify that you have received all of the proper 3000 series or 5000 series components and accessory items listed in your order, including the optional equipment you ordered.

4.4.1 Components Normally Included in an Order

Prior to installation, ensure that you have received all of the necessary components for a complete VSAT installation (*see* Figure 7 for an example). If any items are missing or damaged, please contact your Network Operator/Distributor for replacement.

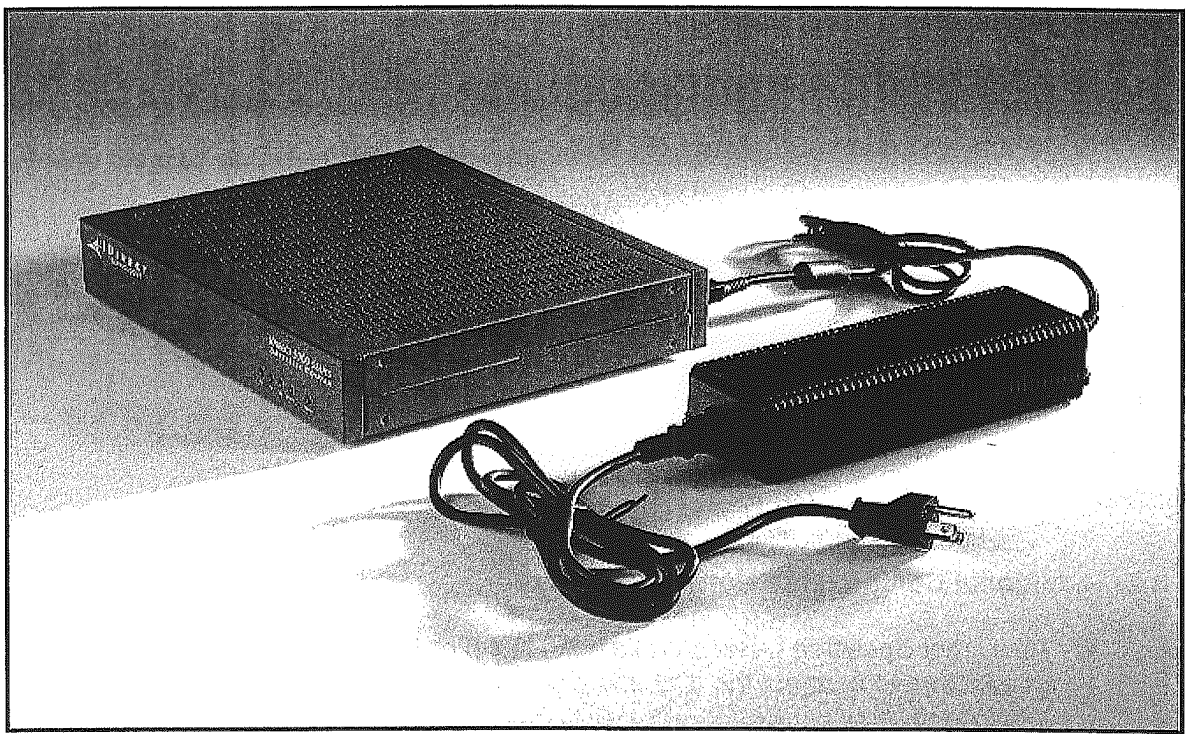


Figure 7: iDirect 5000 series™ Satellite Router with External Power Supply

A typical installation includes:

- An iDirect 3000 series™ or iDirect 5000 series™ Satellite Router with an external power supply
- An AC power cord appropriate for the country of installation
- An antenna ranging in size from 0.96m, 1.2m, 1.8m, or 2.4m for Ku band, and 1.8, 2.4m, and 3.8m for C-band
- An appropriate feed assembly for the antenna (OMT)
- A straight through Ethernet LAN cable
- Block Up Converter (BUC); 1W, 2W or 4W for Ku band and 2W or 5W for C-band
- Optional Ku Band Power Booster: 8W or 16W
- Optional C Band Power Booster: 10W or 20W
- Low Noise Blockconverter (LNB)
- Installation and Safety Manual

4.4.2 Additional Components Normally Required

- An iDirect Specified L-Band cable – An RG 6 or RG11 dual-coax cable and connectors to connect the IDU and ODU. Type F connectors, and sealant tape. (See Appendix A.)
- Non-Pen (Non-Penetrating) Roof Mount
- Ballast (anchor weight)

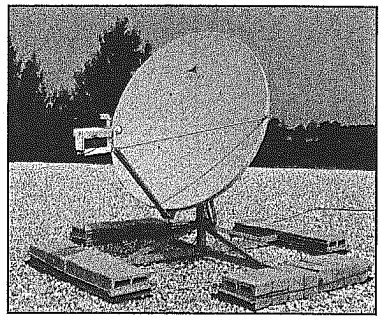
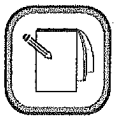


Figure 8: Typical Antenna with BUC and LNB



NOTE **For instructions on installing your antennae, refer to its manufacturer's Installation Guide.**

4.5 Repacking iDirect 3000 and 5000 series Satellite Routers

If your system is damaged, or if you need to move the chassis to another location, you will need to repack it in the original shipping boxes.

1. Remove all cabling connected to the IDU and ODU.
2. Place the IDU or ODU inside the original foam cutout in the shipping box.
3. Properly seal the box with packing tape.

NOTE **For warranty service, obtain a Return Material Authorization (RMA) number from your reseller or iDirect prior to shipping. If you are a direct customer of iDirect, you may contact iDirect's TAC directly to obtain an RMA number and shipping instructions. Follow the shipping instructions, complete the RMA form and attach the form to the outside of the shipping box.**

5 Installing iDirect 3000 and 5000 series Satellite Routers

The 3000 series and 5000 series are designed for indoor use only. The quiet, air-cooled chassis can be placed on a table top or can be rack-mounted with a 2U opening.

5.1 Before Installation: Perform All Pre-Installation Procedures

Ensure that you have read all safety precautions and performed all of the pre-installation procedures.

5.2 Mounting the iDirect 3000 series™ or iDirect 5000 series™ Satellite Router

The IDU can be mounted on a desktop or shelf, or on a rack using the optional Rack-Mount Tray. (The Rack Mount Tray is sold separately.)

5.2.1 General Guidelines for All Mounting Configurations

For any installation, when installing the IDU, follow these guidelines:

- When selecting the site, consider accessibility, availability of power, signal, network cable connections and the possibility of future expansion.
- Plan for access to both the front and rear of the IDU chassis.
- Ensure that the room where the IDU operates has adequate ventilation. Ambient air temperature may not cool the IDU chassis to acceptable operating temperatures without adequate ventilation. The ambient temperatures and other environmental specifications are listed in this manual under "Mechanical and Environmental Specifications."
- Select a suitable IDU installation location away from any area that tends to collect dust.
- Do not install the IDU chassis on the floor.

WARNING

Install the IDU chassis in a location where access is unobstructed. The louvered openings of the enclosure must not be blocked. Any obstruction to the louvered openings will disturb the natural convection cooling. Failure to follow this warning will result in performance degradation or damage due to over heating.

5.2.2 Guidelines for IDU Desktop or Shelf Mounting

If the IDU chassis is mounted in an enclosed shelf, follow the guidelines below:

- Ensure that the shelf has adequate ventilation.
- An enclosed shelf should have openings on the sides and top to provide air movement. Additional fans/blowers may be required if the ambient air in the enclosed shelf exceeds 40°C.

5.2.3 Guidelines for Flush Rack Mounting

If the IDU chassis is flush-mounted in a 19 inch rack, follow the guidelines below:

- You must use the Rack Mounting Tray Kit (The Rack Mounting Tray Kit is sold separately).
- The IDU chassis can be mounted with either the front or the rear of the chassis panel facing the aisle.
- The IDU Rack Mount Tray requires a minimum of two rack units (3.5 inches or 8.9 cm) of vertical rack spaces. You should measure the proposed rack location before mounting the chassis.
- If the IDU chassis is mounted in an enclosed rack, ensure that the rack has adequate ventilation. An enclosed rack should have louvered sides and top with fans to provide cooling air.
- Before using a particular rack, check for obstructions, such as a power strip, that could impair rack-mount installation.

WARNING **Install the chassis in the rack where access to the connectors is unobstructed. Do not block the vents.**

WARNING **To prevent bodily injury when mounting or servicing the IDU chassis in a rack, you must take special precautions to ensure that the rack(s) remains mechanically stable. The equipment rack must be firmly secured to the foundation/floor and/or secured to the adjacent racks.**

5.2.4 Procedure for Rack Mounting the 3000 or 5000 series Satellite Router

1. Position the front panel of the IDU chassis into the front rectangular opening of the Rack-Mount Tray.

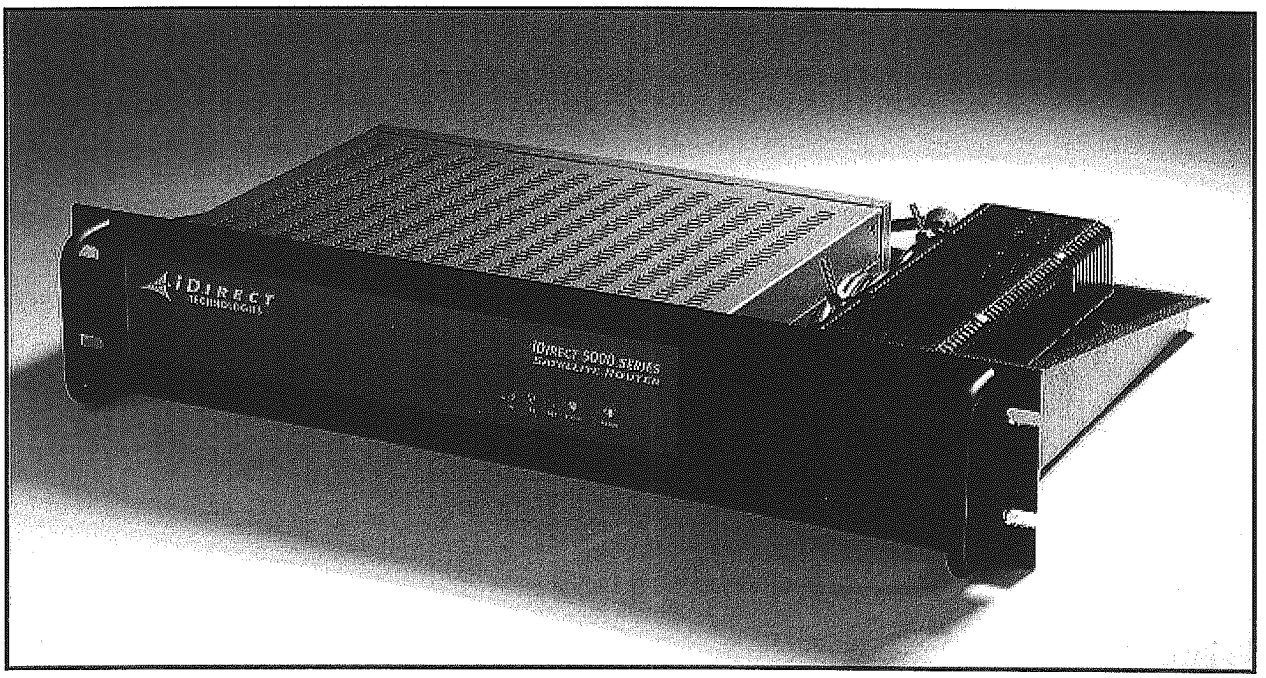


Figure 9: Front View of an iDirect 5000 series™ Satellite Router in a Rack-Mount Tray

2. Carefully slide the IDU into position on the tray between the side of the tray and the tray's L-shaped mounts (*see* Figure 10).

3. Remove the four pan-head screws from the Rack-Mount Tray kit.

4. Using a number 2 Phillips head screwdriver, insert the screws through the side of the Rack-Mount Tray and the tray's L-shaped mounts and tighten them into the empty screw-holes of the remote's casing. The arrows in Figure 10 point to the location of the four screws.

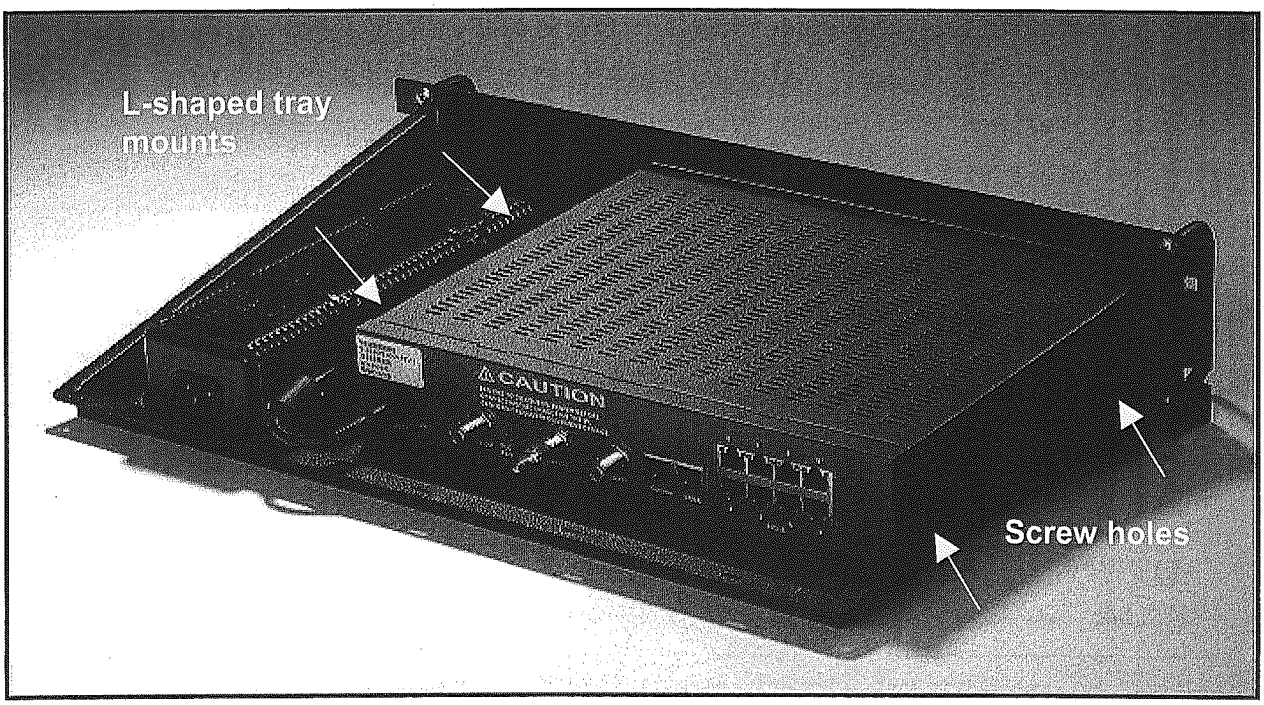


Figure 10: Rear View of an iDirect 5000 series™ Satellite Router in a Rack-Mount Tray

5. Place the External Power Supply on the Rack-Mount Tray. Be sure the IEC-320-C14 AC inlet of the External Power Supply faces the rear of the Rack-Mount Tray.

6. Connect the DC output cord of the External Power Supply to the IDU. The excess DC cord can be coiled up and tucked between the External Power Supply and the IDU. Use the supplied 17 inch wire ties to secure the External Power Supply to the tray.

7. Mount the Rack Mount Tray into the 19" rack.

5.3 iDirect 3000 series™ Satellite Router Rear Interface Connectors

The 3000 series, shown here, has six interface connectors as described below.

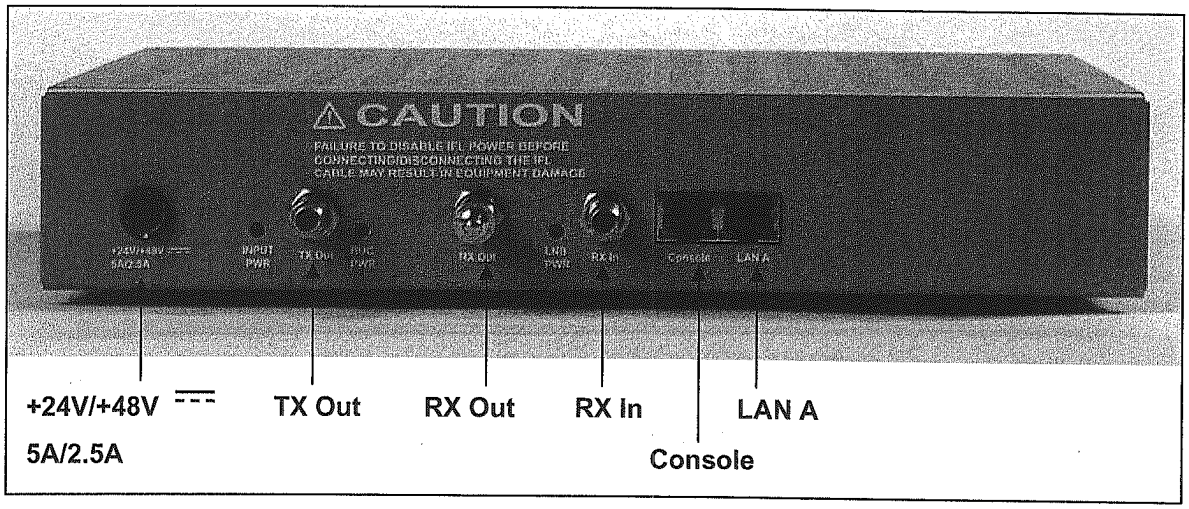


Figure 11: iDirect 3000 series™ Satellite Router Rear Interface Connectors

Table 4: iDirect 3000 series™ Satellite Router Connectors

Label	Connector Type	Interface and Purpose
+24/+48 ⎓ 5A/2.5A	Kycon KPJ-4S-S	DC input from External Power Supply (Note: 3000 series is only available in +24V)
TX Out	75 ohm, F-Type Female	L-band Transmit signal to Block UpConverter (BUC) capable of 10 MHz Reference and 24 VDC power to BUC
RX Out	75 ohm, F-Type with DC Blocked Termination Female	Monitor of the actual receive signal from LNB Output, -10 dB nominal composite, buffered
RX In	75 ohm, F-Type Female	L-band receive signal, capable of 10MHz Reference and DC power to LNB 75 ohm, F-Connector female
CONSOLE	RJ45	RS232, servicing serial connection console to PC or laptop
LAN A	RJ45	Cat. 5 STP or UTP cable, 10/100 Base-T Ethernet LAN port connects the 3000 series Satellite Router to the customer's LAN Hub/switch.

5.4 iDirect 5000 series™ Satellite Router Rear Interface Connectors

The 5000 series, shown below, has fourteen interface connectors as described below.

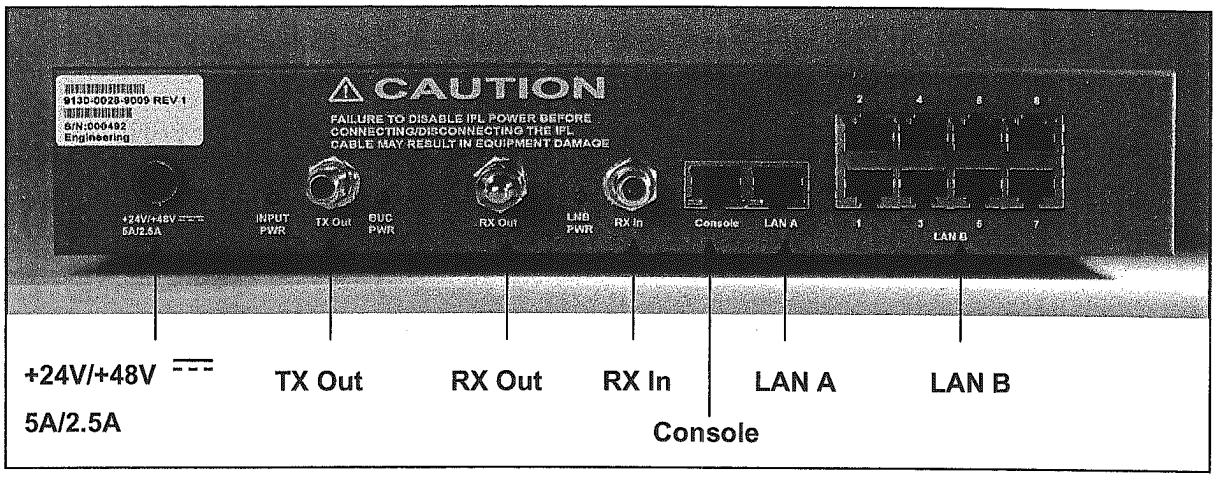


Figure 12: iDirect 5000 series™ Satellite Router Rear Interface Connectors

Table 5: iDirect 5000 series™ Satellite Router Connectors

Label	Connector Type	Interface and Purpose
+24/+48 ⎓ 5A/2.5A	Kycon KPJ-4S-S	DC input from External Power Supply (Note: +48V is optional)
TX Out	75 ohm, F-Type Female	L-band Transmit signal to Block UpConverter (BUC) capable of 10 MHz Reference and 24 VDC or 48VDC power to BUC
RX Out	75 ohm, F-Type with DC Blocked Termination Female	Monitor of the actual receive signal from LNB Output, -10 dB nominal composite, buffered
RX In	75 ohm, F-Type Female	L-band receive signal, capable of 10MHz Reference and DC power to LNB 75 ohm, F-Connector female
CONSOLE	RJ45	RS232, servicing serial connection console to PC or laptop
LAN A	RJ45	Cat. 5 STP or UTP cable, 10/100 Base-T Ethernet LAN port connects the 5000 Series Satellite Router to the customer's LAN Hub/switch.
LAN B	RJ45 (8 ports)	Cat. 5 STP or UTP cable, 10/100 Base-T Ethernet LAN port connects the 5000 series Satellite Router to the customer's LAN Hub/switch.

You can configure up to nine IP addresses on the 5000 series, one on LAN A and up to eight on LAN B. IP addresses are configured through the iSite software.

The LAN A port is normally assigned to the WAN (towards the VPN). Its IP address acts as a next hop for the VPN.

The LAN B ports are normally assigned to the user's local LAN (away from the VPN). Its IP address acts as a local gateway for local PCs.

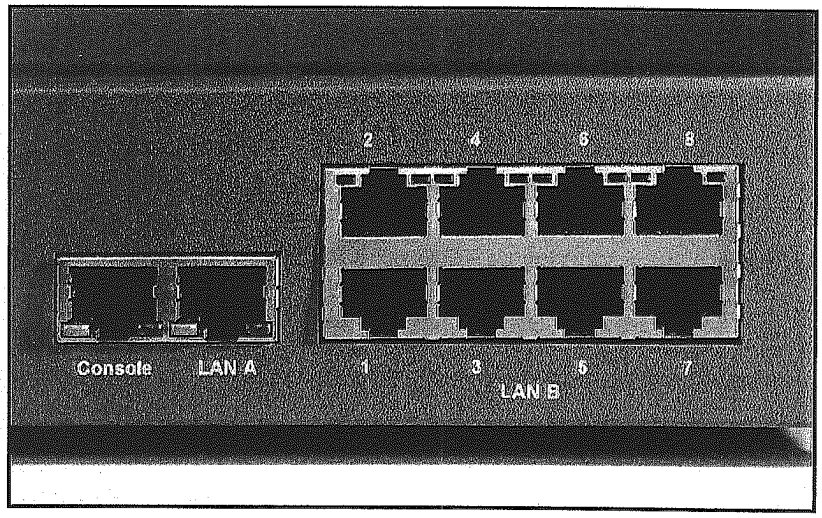


Figure 13: iDirect 5000 series™ Satellite Router LAN A and B Ethernet Ports

5.5 Connecting AC Power to the IDU

The IDU can be powered directly from the facility AC power source from 100 to 240 V~ (VAC). iDirect recommends that the chassis be powered from a low noise, low transient AC power source.

WARNING **Improper AC power source rating, excessive noise or transients, or undersized circuit breaker will result in service interruption.**

DANGER **Never disconnect the power to the IDU using the DC output power cord of the external power supply.**

WARNING **If you must remove power from the chassis, you should disconnect power using the AC power cord.**

5.5.1 Preparing Your PC/Laptop for Connection to the IDU

See sections 5.3 and 5.4 for more information about the interface connectors.

- Your PC/laptop is loaded with iDirect's iSite software. (Refer to the *iSite Quick Reference Guide* for more information.)
- Your PC/laptop contains a Network Interface Card (NIC) connected with a crossover cable to the 10/100 LAN port of the IDU.
- Your PC/Laptop is running console terminal software, such as HyperTerminal.

5.5.2 Checking Conditions before Powering Up the System

Check for the following conditions before you power up the IDU chassis.

- Verify that no RF coax cables are connected to the Tx and Rx ports on the rear of the chassis.

WARNING **Do not connect or disconnect the Tx or Rx IFL cable while the IDU is powered; this action may result in damage to the BUC, LNB, and/or IDU.**

- A DB9 to RJ45 adapter connects the COM Port of the PC/laptop to the Console port of IDU. (Typical terminal settings are: COM1 / 9600 / 8 / None / 1 / None)

5.5.3 Powering Up the System

After checking the setup as outlined above, power up the IDU as follows:

1. Connect DC output from the power supply to the +24 VDC or +48 VDC (optional on the 5000 series only) input of IDU.
2. Connect the AC cord to the external power supply, and then plug the AC power cord into the AC outlet.

Upon bootup, the power LED will illuminate green, and within several seconds the Status LED will flash green as the unit performs a self diagnostic test. If this test is successful the status LED will be illuminated green. If the test fails the status LED will be illuminated red.

After the initial hardware diagnostic the system will take approximately 1 minute to complete the boot up cycle, during which period the status LED will flash green. If the application successfully loads, the status LED will be illuminated solid green, if the application cannot start due to configuration or other errors, the LED will be illuminated solid red.

Table 6: LED Status

LED Label	LED Color
PWR	Solid Green
NET	Off
STATUS	Solid Green
TX	Off
RX	Solid Yellow

NOTE **The STATUS LED should always be green. A red STATUS LED indicates a malfunction of the IDU.**

WARNING **Do not connect or disconnect the Tx or Rx IFL cable while the IDU is powered on; this action may result in damage to the BUC, LNB, and/or IDU.**

WARNING **Always connect or disconnect power to the IDU with the AC power cord at the power supply unit. Never connect or disconnect power to the IDU with the DC cord from the power supply unit while it is being powered on; this action may result in damage the BUC, LNB, and/or IDU.**

5.6 Loading Your Network Specific Option File

After verifying the health of the IDU, the factory-default option file must be replaced with your network-specific option file. Normally, your network-specific option file is provided to you by your Network Operator or Reseller. This network-specific option file is created by configuring all of your network parameters via the Network Management System (NMS).

If this option file is not already loaded onto your PC, use the iSite application to download this network-specific ASCII option file onto your PC. Then use the iSite software to load your network-specific option file onto the remote, overwriting the default option file. You must load the proper option file before the IDU can be acquired into the network.

1. With the IDU booted up, use iSite on your PC or laptop to download the option file to the IDU via the IDU LAN port.
2. After the option file is loaded, reset the IDU via iSite or cycle the AC power (disconnect the AC cord for 2 seconds and then plug back in).

After the IDU is rebooted, the new option file configuration is active.

5.7 Monitoring LED Status Indicators

Once the IDU is powered up with the appropriate option file, check the LEDs to ensure the IDU is functioning properly.

5.7.1 Front Panel Power and Network LED Status Indicators

For diagnostic purposes, the IDU chassis has five LED indicators located on the front panel. The color of the LED indicates the state of the IDU (see Table 7 for details).

- The Power LED indicates whether the IDU is powered On or Off.
- The Status LED indicates the IDU's overall status.
- The Network LED indicates the IDU's network acquisition status.
- The Tx LED indicates the IDU's transmitter status.
- The Rx LED indicates the IDU's receiver status.

Table 7: Front Panel LED Indicators

LED Label	LED Color	Indicated Unit Status
PWR	OFF	Indicates that the IDU is powered Off or there is a Power Supply problem.
	GREEN	The IDU is powered On. The bootloader has started.
NET	GREEN	Indicates that the remotes have been acquired into the network.
	FLASHING GREEN	Indicates that the elements are in network acquisition.
	SOLID YELLOW	Indicates that the downstream SCPC is locked.
	FLASHING YELLOW	Indicates that the downstream SCPC is not locked.
STATUS	GREEN	IDU is functioning properly. The DRAM test is successful.
	FLASHING GREEN	Indicates that the unit is booting. The DRAM test is in progress.
	RED	Indicates a serious fault or failure in either software, hardware or configuration. May indicate that the DRAM test failed.
TX	GREEN	Indicates that the IDU's transmitter is enabled.
	YELLOW	Indicates that the IDU's transmitter is disabled.
RX	GREEN	Indicates that the IDU transmitter is successfully locked to the downstream.
	YELLOW	Indicates that the IDU is not locked to the downstream carrier.

5.7.2 Rear Panel LED Status Definitions

On the rear of the IDU are three LEDs that indicate whether or not certain components of the IDU are powered On or Off.

Table 8: Rear Panel LED Indicators

LED Label	LED Color	Indicated Unit Status
INPUT PWR	OFF	Indicates that the IDU does not have power.
	GREEN	Indicates that the IDU has power.
BUC PWR	OFF	Indicates that the BUC power is not being supplied.
	GREEN	Indicates that the BUC power (+24V/+48V) is being supplied.
	RED	Indicates a BUC problem or an IFL disturbance.
LNB PWR	OFF	Indicates that the LNB power is not being supplied.
	GREEN	Indicates that the LNB power (+19V nominal) is being supplied.
	RED	Indicates an LNB problem or an IFL disturbance.

5.8 Maintaining the Remote

The IDU requires basic maintenance to keep it running efficiently and to prolong its life. However, the only maintenance you should perform on the unit, without explicit directions from iDirect Technologies, is to maintain the temperature of the IDU and keep its external areas free from dust or dirt.

NOTE

There are no *user-serviceable* parts within the iDirect 3000 series™ or iDirect 5000 series™ Satellite Router. Do not attempt to repair/replace a malfunctioning or defective component/module. Doing so may void the warranty.

5.8.1 Temperature Control

The IDU has a built in temperature sensor. The temperature sensor measures the actual circuit board temperature. If the board temperature exceeds a defined threshold, the IDU will alert the NMS about the high temperature situation. See Section 4.2 for the proper temperature range.

Various conditions can cause the IDU chassis to have an elevated internal temperature, such as:

- objects blocking the enclosure vents
- dust accumulated on the enclosure or the vents
- the ambient temperature is elevated beyond the specified limits

5.8.2 Dust Removal

A dusty environment requires frequent maintenance.

With the unit powered down, use a *slightly* damp cloth with the excess moisture wrung out (not a saturated, wet or dripping cloth) to wipe away the dust that collects on the outside of the enclosure.

Vacuum the dust off the enclosure vents. Vacuum the circuit board through the enclosure vents, if possible.

6 iDirect Technical Support and Sales Information

In accordance with your contract, contact your local service representative or reseller, if further information is needed beyond the coverage of this manual.

NOTE

There are no *user-serviceable* parts within the iDirect 3000 series™ or iDirect 5000 series™ Satellite Router. Do not attempt to repair or replace a malfunctioned or defective component or module. Doing so may void the warranty. If the equipment is used in a manner not specified by the manufacturer, the protection provided in the equipment may be impaired.

Technical Assistance Center (TAC)

Technical support is available to customers with a current contract with iDirect. If you currently are a contracted iDirect customer, please check our customer-only, password-protected TAC web page at TAC.iDirect.net.

Customers will find useful information, such as the Technical Assistance Center's hours of operation, product documentation, release notes, procedures and a technical FAQ. Our web-based customer ticketing system for entering service issues and requesting RMAs is also located on our TAC web page.

If you are unable to find the answer to your question, iDirect Customer support is available by telephone, 703.648.8151, or you are welcome to enter a service issue through our web-based ticketing system.

If you are not a direct customer of iDirect, support can be provided at a billable rate using a major credit card for payment.

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If you are interested in purchasing iDirect products, please contact iDirect Corporate Sales by telephone or email.

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