



Where Automation Connects.



RadioLinx[®]

RLXIC-EH

Intelligent Cellular

RadioLinx Intelligent Cellular Ethernet
Gateway for HSPA (3G GSM) Networks

May 29, 2009

USER MANUAL

Important Notice

Because of the nature of wireless communications, transmission and reception of data can never be guaranteed. Data may be delayed, corrupted (that is, it may have errors) or be totally lost. Although significant delays or losses of data are rare when wireless devices such as the RadioLinx Intelligent Cellular products are used in a normal manner with a well-constructed network, the RadioLinx Intelligent Cellular products (RLXIC-EH) should not be used in situations where failure to transmit or receive data could result in damage of any kind to the user or any other party, including but not limited to personal injury, death, or loss of property. ProSoft Technology accepts no responsibility for damages of any kind resulting from delays or errors in data transmitted or received using the RadioLinx Intelligent Cellular products, or for failure of the RadioLinx Intelligent Cellular products (RLXIC-EH) to transmit or receive such data.

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5,515,013	5,629,960	5,845,216	5,847,553	5,878,234
5,890,057	5,929,815	6,169,884	6,191,741	6,199,168
6,339,405	6,359,591	6,400,336	6,516,204	6,561,851
6,643,501	6,653,979	6,697,030	6,785,830	6,845,249
6,847,830	6,876,697	6,879,585	6,886,049	6,968,171
6,985,757	7,023,878	7,053,843	7,106,569	7,145,267
7,200,512	D442,170	D459,303		

and other patents pending.

Licensed under the following Nortel Networks Limited patents:

United States patent numbers: 5128925, 5398247

France patent numbers: 2665993, 2653959, 2659812, 2745091

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RLXIC-EH User Manual

May 29, 2009

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1 Introduction to the RLXIC-EH

In This Chapter

- ❖ ALEOS™ 8
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Powered by ALEOS™, RLXIC-EH modems are designed to maintain a reliable, consistent network connection. With a serial interface and a vast library of machine protocols, the RLXIC-EH is a workhorse for industrial and mission critical applications. Class I Division 2 certified as nonincendive equipment, the RLXIC Series is ideally suited for use in hazardous environments.

Key applications include utilities, manufacturing, automation, oil and gas, SCADA, telemetry, Homeland Security, and asset monitoring.



POWERED BY: ALEOS

1.1 ALEOS™

ALEOS, the embedded core technology of the RadioLinx Intelligent Cellular products, simplifies installation, operation and maintenance of any solution, and provides an always-on, always-aware intelligent connection for mission-critical applications. ALEOS enables:

- Persistent Network Connectivity
- Over-The-Air (OTA) Upgrades
- Wireless Optimized TCP/IP
- Real-Time Notification
- Extensive Machine Protocols
- Packet Level Diagnostics
- Device Management & Control
- Protocol Spoofing

1.2 AceWare™

A wireless solution is not complete until you have software tools to manage the devices monitoring your valuable equipment. AceWare™ is the device management and monitoring application suite for RadioLinx Intelligent Cellular products powered by ALEOS.

These modem utilities, except AceNet, are free of charge to those who own Intelligent Cellular modems. You can download the applications and their user guides from the ProSoft Solutions web site: www.prosoft-technology.com. Contact your dealer or ProSoft Technology representative for information on AceNet.

AceManager, the AceWare remote configuration and monitoring tool, simplifies deployment, and provides extensive monitoring, control and management capabilities. AceManager gives you the power to monitor and control your RadioLinx communications platforms in real time.

Simplified Deployment

AceManager provides the ability to remotely set up and configure your RadioLinx Intelligent Cellular products. Remote device setup and configuration reduces the deployment timeline of your wireless solution, and provides a quicker path to ROI.

Templates allow you to easily configure other devices in your fleet with identical settings, ensuring a simple, accurate deployment.

Monitor and Control

AceManager allows an administrator to remotely monitor a modem's status, health, and configuration settings. The user interface displays signal strength, cell site information, byte counters, and error conditions, enabling you to locate any issues, and troubleshoot immediately.

AceManager enables remote configuration and parameter settings to be changed or reset instantly over the air, change a device's port configuration, IP address settings, and much more. After configuring one modem, use the template feature to copy that device configuration to other modems.

Tip: Configuration steps and examples in this guide use AceManager.

AceNet, the enterprise grade productivity enhancing tool, enables you to efficiently deploy, and monitor RadioLinx Intelligent Cellular products on a large scale.

Network Monitoring

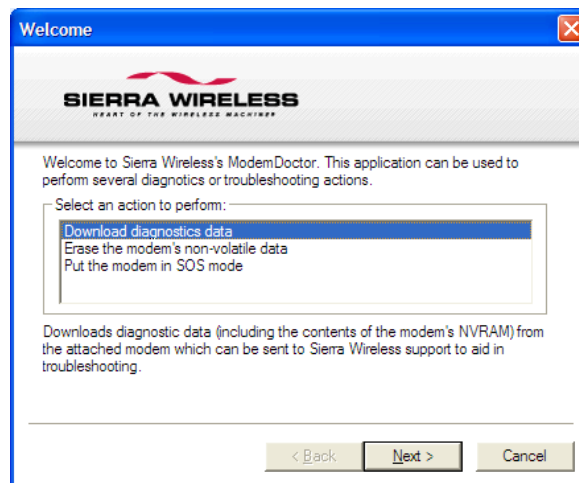
AceNet allows you to efficiently deploy, monitor, and maintain wireless networks of any size by enabling you to quickly configure an entire group of RadioLinx modems to the same parameter settings using templates built with AceManager.

To ensure your implementation is optimal, users can easily see when modems are out of contact, and periodically poll each device for performance statistics.

AceView is an efficient status and connection monitoring application with a low-profile, easy to read interface.

1.2.1 Modem Doctor

Modem Doctor is a troubleshooting and diagnostics utility. This utility will allow you to get a log file of the RLXIC-EH activity which you can then send to ProSoft Technology support, erase the current configuration completely, and temporarily set the RLXIC-EH to a known configuration to aid in trouble shooting (SOS mode).

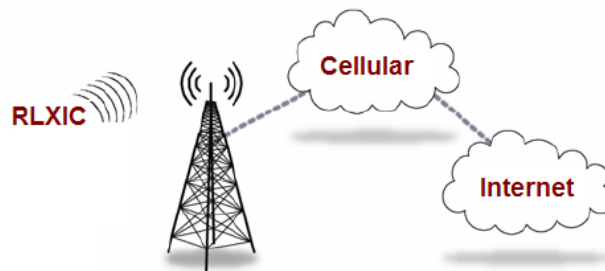


1.3 Connecting to your cellular provider

The RLXIC-EH uses your cellular provider as an ISP (Internet Service Provider) to connect you to the Internet.

1.3.1 Steps of a connection:

- 1 When your RLXIC-EH is powered on, it automatically searches for cellular service using GSM/GPRS.
- 2 Your RLXIC-EH establishes a PPP (Point to Point Protocol or "dial" up connection) link to the your cellular provider network, also called registering on the network, and receives an IP address.
- 3 When your RLXIC-EH has received its IP address from your cellular provider, a connection to the Internet or the cellular network is also available for a computer or other device connected directly to the RLXIC-EH.



The RLXIC-EH will perform a **one-to-one** routing for all internet traffic to and from the computer or other end device. One-to-one means that your RLXIC-EH will provide a connection for one device to the Internet at a time. In Private Mode, the RLXIC-EH will provide NAT (Network Address Translation) for the computer or other end device.

Note: The RLXIC-EH does not provide advanced routing required by one-to-many (several devices connected to one port). If you need to have more than one device connected to the Internet through your RLXIC-EH, you will need to have a router connected to the modem. The modem would provide the one-to-one connection to the router with the router configured to provide a broader NAT service to the other devices connected to it.

1.3.2 Dynamic vs. Static IP Addresses

There are two types of addresses on networks: dynamic and static.

- Dynamic addresses are assigned on a "need to have" basis. Your RLXIC-EH might not always receive the same address each time it connects with your cellular provider.
- Static addresses are permanently assigned to a particular account, and will always be used whenever your RLXIC-EH connects to the Internet. The IP address will not be given to anyone else.

Most ISPs (cellular included) use dynamic IP addresses rather than static IP addresses, because it allows them to reuse a smaller number of IP addresses for a large number of customers. A dynamic IP address is suitable for many common Internet uses, such as web browsing, looking up data on another computer system, or other client functions (such as data only being sent out or only being received after an initial request).

Tip: If your account with your cellular provider includes a dynamic IP address, and you need a static IP, please consult your cellular provider Representative for more information about changing your account for static IP support.

If you need to contact your RLXIC-EH, a device connected to the RLXIC-EH, or a host system using the RLXIC-EH from the Internet, you need to have a known IP (such as one which is static) or domain name (an IP address which is converted by a DNS server into a word based name). If you have a dynamic IP address for your modem, you can use a Dynamic DNS service (such as IP Manager) to translate your IP address into to a domain name.

Caution: If you want to connect remotely to your RLXIC-EH using TCP/IP, the IP address given to your modem by your cellular provider cannot be a private or internal IP address (such as a custom APN or special private network Data Link) unless you are on the same network or inside that network's firewall (such as with frame relay).

1.4 GSM Communication

Many GSM Networks have been upgraded to support HSUPA.

GSM Networks use SIM cards which are smart cards containing the account holder's details. A SIM can generally be moved from one device to another allowing for account portability and flexibility.

HSUPA

HSUPA (High-Speed Uplink Packet Access) is a cellular technology which most closely resembles a broadband synchronous connection. The upload and download speeds are maximized to provide a faster throughput, reaching speeds up to 2.0 Mbit/s for the uplink and 7.2 Mbit/s for the downlink.

Please check with your network provider on the availability of HSUPA.

HSDPA

HSDPA (High-Speed Downlink Packet Access) is a cellular technology allowing for higher data transfer speeds. In HSDPA mode of operation, max speeds are up to 7.2 Mbit/s in the downlink and 384 kbit/s in the uplink. HSDPA uses Adaptive Modulation and Coding (AMC), fast packet scheduling at the Node B (Base Station) and fast retransmissions from Node B (known as HARQ-Hybrid Automatic Repeat Request) to deliver the improved downlink performance vs. UMTS and EDGE.

HSPDA (and HSUPA) falls back to UMTS, EDGE or GPRS (in order of precedence). This feature allows you to have seamless connectivity no matter where your RLXIC-EH is.

UMTS

UMTS (Universal Mobile Telecommunications System) supports up to 1920 kbit/s data transfer rates, although most users can expect performance up to 384 kbit/s. A UMTS network uses a pair of 5 MHz channels, one in the 1900 MHz range for uplink and one in the 2100 MHz range for downlink.

EDGE

EDGE (Enhanced Data rates for GSM Evolution) provides end-to-end packet data services with an enhanced connectivity building on GPRS technology and using the established GSM networks. EDGE provides higher transmission rates and better transmission quality for data than GPRS. EDGE can carry data at speeds typically up to 384 kbit/s in packet mode.

When EDGE is not available, your RLXIC-EH will fall-back to GPRS for the connection to your cellular provider to provide continued connectivity.

GPRS

General Packet Radio Service (GPRS) is packet-switched with many users sharing the same transmission channel, but only transmitting when they have data to send. This means that the total available bandwidth can be immediately dedicated to those users who are actually sending at any given moment, providing higher utilization where users only send or receive data intermittently. GPRS provides speeds of 30-70 kbps with bursts up to 170 kbps.

2 Specifications

In This Chapter

❖ Power Connector.....	15
------------------------	----

2.1.1 Features and Benefits

- Embedded Intelligence
- Low Power Consumption
- High-Speed Processor
- High-Speed 2-way Data
- Serial and USB Port
- Machine Protocols
- Simple Integration with Legacy Equipment
- Persistent Network Connectivity
- Remote Management and Configuration
- Suitable for use in Class I, Division 2, Groups A, B, C, D or unclassified or non-hazardous locations

2.1.2 Technology

- HSUPA
 - With Fallback to:
 - HSDPA
 - UMTS
 - EDGE
 - GPRS (MS-12)
 - GSM

2.1.3 Bands

- TriBand for UMTS/HSDPA/HSUPA
 - 850/1900/2100 MHz
- Dual Band diversity for HSUPA, optimized by region
 - Europe: 850/2100MHz
 - North America: 850/1900 MHz
- Quad Band GPRS/EDGE
 - 850/900/1800/1900 MHz

2.1.4 Environmental

- Operating Temperature:
 - -30° to 70° Celsius
- Storage Temperature:
 - -40° to 85° Celsius

2.1.5 Power Consumption: (@12V DC)

- Transmit/Receive (Typical/Max) 350/450 mA
- Idle 104 mA
- Input Current 40 mA to 120 mA
- Input Voltage 9 - 28V DC

2.1.6 Standards/Approvals

- Carrier specific approvals
- FCC
- Industry Canada

2.1.7 Host Interfaces

- Ethernet: 10BaseT RJ 45
- Digital Input: 1 contact
- USB Type B 5 Pin mini
- Antenna Connection:
 - Cellular - 50 Ohm SMA

Warning: The antenna should be installed no closer than 20 cm from the human body. It is one of the RSS-102 requirements for devices not requiring SAR.

2.1.8 Dimensions

- 76mm x 25mm x 92mm
- 160 grams

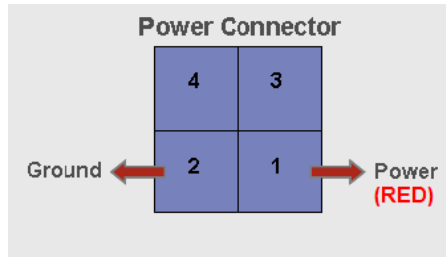
2.1.9 Application Interfaces

- TCP/IP, UDP/IP, DHCP, HTTP, SNMP, SMTP, SMS, MSCI, Binary, Modbus, and more

2.1.10 LED Indicators

- Network
- Signal
- Activity
- Power

2.2 Power Connector



Warning: Explosion Hazard - Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

3 Activating RLXIC-EH on your cellular provider

In This Chapter

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- ❖ Configuring the APN..... 19

This chapter provides step-by-step directions for activating your RLXIC-EH on your cellular provider's network.

3.1 Installing the SIM

The Subscriber Identity Module (SIM) in the RLXIC-EH is a smartcard that securely stores the key identifying a cellular subscriber. Generally, you will only need to install a SIM once in the life of the modem, and it may be pre-installed by your ProSoft Technology Representative.

3.1.1 Before you start

If the SIM was pre-installed, activation of your modem is complete.

Cellular Account Required

- **Cellular Account Required** - To use your modem, you need to have an active account with a data plan.

Software Required

- **AceManager** - Graphical interface for entering most AT Commands. You can download AceManager from the ProSoft Technology website: www.prosoft-technology.com. A default installation of this utility is assumed later in these directions

Hardware Required

- **Ethernet cable** - An Ethernet cable
- OR
- **USB cable** - A USB 2.0 A/Mini-B Cable

Note: Until you install a driver for the USB port, you cannot use your USB port to configure the modem.

- **Power adapter and a power source** - You will need a power supply and power source for the modem.
- **PC or laptop** - To configure the modem, you will need a computer .

Tools Required

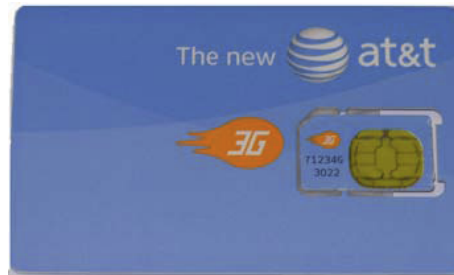
- **Small Phillips screw driver** - The Phillips screw driver is the one which is also called a plus (+) or X screw driver.

3.1.2 Opening the Case

- 1 Unplug the RLXIC-EH power and all cables.
- 2 Using a small Phillips head screw driver, remove the screws on the front of the RLXIC-EH.

3.1.3 Remove the SIM from the card

- 1 Carefully remove the SIM card from the card you received from your cellular provider.



3.1.4 Insert the SIM

- 1 Gently press the SIM card to secure in place.



Note: The card and SIM may be a different color than these examples.

- 2 Gently press the SIM to click it into place.

Tip: The top of the card faces the bottom of the modem.

3.1.5 *Finishing the SIM installation*

When the faceplate is replaced and secured, the installation of the SIM is complete.

3.2 **Configuring the APN**

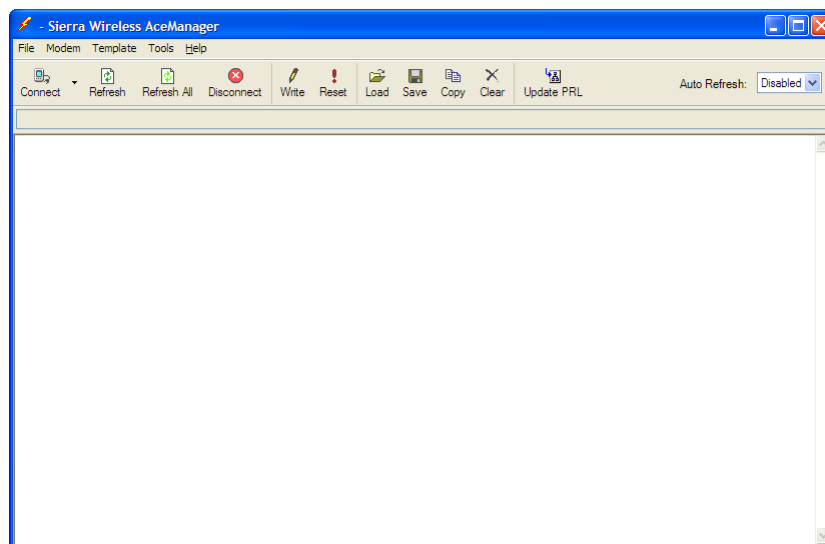
The APN (Access Point Name) is the way your modem knows how it will be communicating with the network. The APN allows custom IP addressing and tailoring your company's wireless IP solution to meet the security and IP addressing requirements of your applications.

Note: Most accounts use the default addressing solution of Private or Public IP addresses supplied by the Internet and Proxy APNs. Only if you have a Static or Custom IP address should you need to configure a custom APNs.

The default APN is `Internet`. If you need a different APN, use AceManager to configure it.

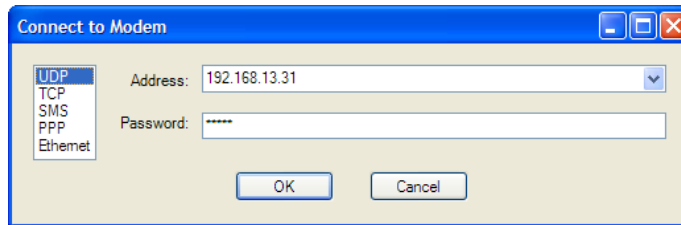
3.2.1 *Start AceManager*

START > ALL PROGRAMS > AIRLINKCOMMUNICATIONS > ACEMANAGER > ACEMANAGER



3.2.2 Connect to the Modem

- 1 Click the **CONNECT** button.



- 2 Select **TCP**, **UDP**, or **PPP**.

Enter the connection information.

- For UDP or TCP, enter 192.168.13.31 as the IP address.
- For PPP, select the COM port to which the modem is connected.

Note: The simplest way to connect to the modem is through a USB cable. Refer to Universal Serial Bus (USB) (page 37) for information on how to install the necessary drivers for a USB connection.

- 3 Enter the password. The default password will be entered for you.
- 4 Click **OK**.

3.2.3 Enter the APN

- 1 Select **CELLULAR** from the menu on the left side of AceManager (under "Groups")
- 2 Type your APN in the New Value field of ***NETAPN**.

Optional: If you need to configure your modem for a custom APN, after entering the APN, there is additional information you will need to enter.

- a Select **Misc** from the menu on the left side under the Common group.
- b Enter the NAI into the new value field for ***NETUID** and enter your network password into the new value field for ***NETPW**.

3.2.4 Write the Settings to the RLXIC-EH

- 1 Click the **WRITE** button on the tool bar of AceManager.
- 2 Wait for the message "Write Successful" to appear in the status bar.
- 3 Reset the RLXIC-EH.

4 Hardware Installation of the RLXIC-EH

In This Chapter

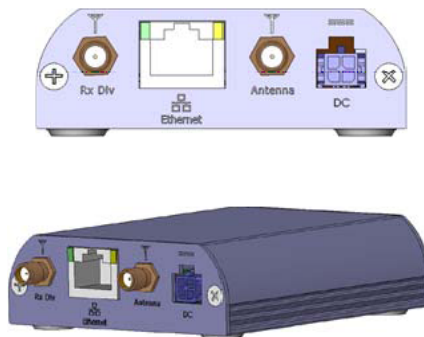
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- ❖ Connecting Antennas 26

Note: During installation, please be sure that the cables are secure but do not bear any additional weight that could loosen the connector from the unit.

Your RLXIC-EH should be mounted in a position that allows easy access for the cables so they are not bent, constricted, in close proximity to high amperage, or exposed to extreme temperatures. The LEDs on the front panel should be visible for ease of operational verification. You should ensure that there is adequate airflow around the modem but that it is kept free from direct exposure to the elements, such as sun, rain, dust, etc.

Caution: The RLXIC-EH is in a hardened case, and designed for use in industrial and extreme environments. However, unless you are using cables expressly designed for such environments, they can fail if exposed to the same conditions the RLXIC-EH can withstand.

Note: This device is not intended for use within close proximity of the human body. Antenna installation should provide for at least a 20 CM separation from the operator.



Antennas selected should not exceed a maximum gain of 5 dBi under standard installation configuration. In more complex installations (such as those requiring long lengths of cable, and/or multiple connections), it is imperative that the installer follow maximum dBi gain guidelines in accordance with the radio communications regulations of the Federal Communications Commission (FCC), Industry Canada, or your country's regulatory body (if used outside the US).

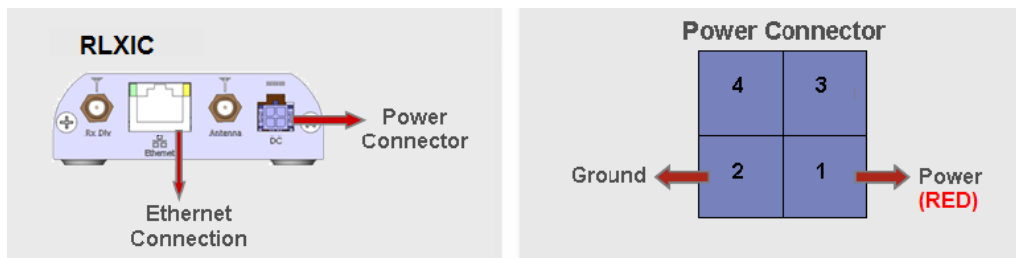
Your RLXIC-EH will work with most cellular antennas with a SMA connector. Connect the primary antenna or primary RF cable directly to the antenna connector on the back of the RLXIC-EH.

Note: The RLXIC-EH radio supports antenna diversity. If you plan to use only one antenna with the radio, you must configure the radio to disable antenna diversity. Refer to *RXDIVERSITY for more information (page 99).

Tip: When using a cable to an antenna placed away from the modem, minimize the length of your cable. All gain from a more advantageous antenna placement can be lost with a long cable to the modem.

4.1 Connecting to Power

This I/O port handles external input and output events. An external device can send digital input to the modem, through the digital I/O port.



Your RLXIC-EH can be used with either DC or AC, with the appropriate power adapter. DC cables and AC adapters are available as optional accessories in addition to the one included with your RLXIC-EH.

The color wires are:

- **BLACK** (2 conductor) = Ground
- **RED** (1 conductor) = Power

Note: When using a DC power source (such as a solar cell), ProSoft Technology recommends placing a fuse (1-2 Amp) on the line close to the power source to protect your power source from possible surges due to shorts or other line issues.

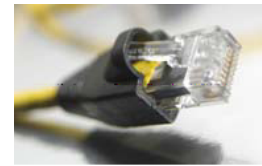
The DC power cable positive lead should be connected to the battery or power source positive terminal. The power cable negative lead should be connected to the battery or power source negative terminal.

Tip: The DC power cable has a white wire lead in addition to the power positive and negative. This is for a feature not present in the RLXIC line modems. In the RLXIC-EH, the white wire lead has no function and can be ignored.

Warning: Explosion Hazard - Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

4.2 Connecting to a Computer or other Device

The Ethernet port of your RLXIC-EH can be connected directly to a computer or other Ethernet device with either a crossover cable or a straight-through cable. The Ethernet port on the RLXIC-EH is auto-sensing and connects at 10Base-T. If you are connecting the modem to a hub or switch you should use a straight through cable or use the uplink port on the hub or switch with a crossover cable.



Tip: On some computers, the TCP receive window may be set to 16 kbytes. To optimize the throughput of your RLXIC-EH, it is recommended that you change the TCP window to 128 kbytes to 256 kbytes using a TCP Optimizer.

Your RLXIC-EH's full-speed (12 Mbit) USB 2.0 port can be connected directly to most computers or other devices using a standard full-speed USB 2.0 cable. If the computer or device you are connecting or the cable is not rated for full-speed, the modem will communicate at a reduced speed to match. The RLXIC-EH functions as a device, not a host.



When it is connected to a computer, the USB port should be seen as a COM port or Ethernet port after the applicable driver is installed.

The RLXIC-EH has a standard mini-B connector.

Warning: The USB port can only be used in a non-hazardous environment.

4.3 Indicator Lights

When your RLXIC-EH is connected to power and an antenna, there is a specific pattern to the lights to indicate its operation mode.

- **Network** - Indicates a successful connection to the cellular network with an IP address given, and a channel acquired.
- **Signal** - Light shows the strength of the signal, and may be nearly solid (strong signal) or flashing (weaker signal). A slow flash indicates a very weak signal.



4.3.1 RSSI LED Ranges

RSSI/Signal LED Status	Ranges of RSSI (dBm)
On Solid	Equal to or stronger than -69
Fast Blink	-70 to -79
Normal blink	-80 to -89
Slow Blink	-90 to -99
Extinguished	Equal to or weaker than -100

- **Activity** - Lights will flash as data is transferred to and from the RLXIC-EH modem on the remote network.
- **Power** - Indicates the power adapter is connected, and there is power getting to the RLXIC-EH.
- The **Reset button** (on the left side of the RLXIC-EH) has two functions. If it is quickly depressed and released, the modem will simply power cycle the internal hardware. If, however, the reset is depressed and held for 45 seconds (count 45 slowly, and wait for the power light to go off after the light pattern stops), the ALEOS configuration settings will return to the factory defaults.

4.3.2 Light Patterns

The LEDs on the front of the modem will respond in different patterns to indicate modem states.

- **Normal** - Each LED, mentioned above, is lit as applicable.
- **Start up** - The LEDs will cycle from left to right.
- **Configuration Reset** - The LEDs will cycle left to right, and then right to left 4 times.
- **Authentication Failure** - The Network, Signal, and Activity LEDs blink every 2 seconds.
- **Data Retry** - The Network, Signal, and Activity LEDs blink every 3 seconds.

4.4 Mounting

An optional accessory for your RLXIC-EH is a DIN-rail mounting kit, which includes a bracket. The bracket is designed to hold the modem in place on the DIN-rail.

To install the radio in the mounting kit, follow these steps.

- 1 Mount the bracket using number 6 screws. There are two holes each, to fasten screws, and minimum of one hole each end is required for mounting bracket.
- 2 Position RLXIC-EH between Alignment ears.
- 3 Engage top groove in body of RLXIC-EH with two tabs.
- 4 Push on far side of RLXIC-EH in center so that it touches side of Bracket.
- 5 Press down and release when upper groove on far side of RLXIC-EH, aligns with tabs.
- 6 Release to complete installation into mounting bracket.

To remove, press on the two edges of the modem and the brackets, as pointed by arrows in the diagram provided below. By doing this, the modem will snap out of the mounting bracket.

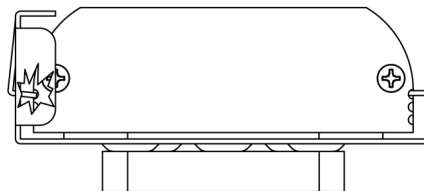
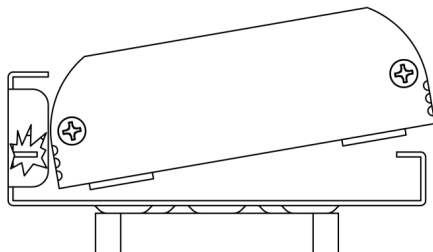
To mount the bracket on the DIN-rail, follow these steps

- 1 Position the mounting bracket on a 35 x 7.5mm DIN rail at a slight angle with the hook on the left side of the bracket hooked into the right side of the unit on the left.
- 2 Rotate the bracket onto the DIN rail with the top of the rail hooked under the lip on the rear of the bracket.
- 3 Press the bracket down onto the DIN rail until flush. The locking tab snaps into position and locks the bracket to the DIN rail.
- 4 If the bracket does not lock in place, use a screwdriver or similar device to move the locking tab down, press the bracket flush with the DIN rail and release the locking tab to lock the bracket in place.

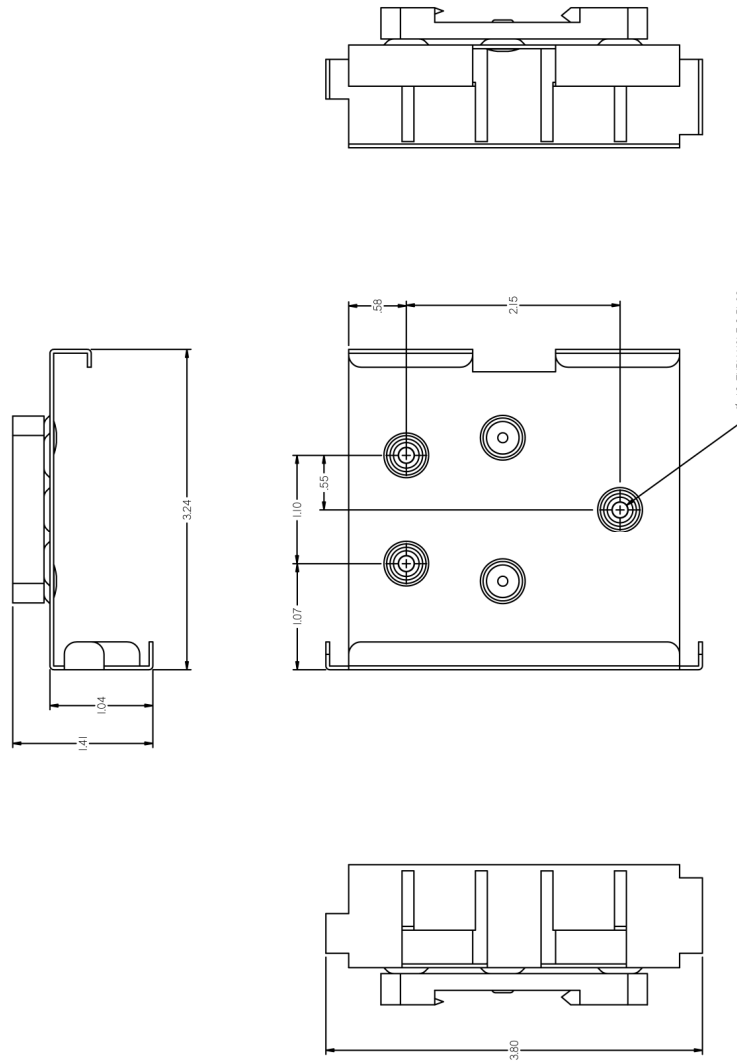
4.4.1 Optional Mounting Bracket



4.4.2 Mounting Bracket Installation



4.4.3 Mounting Bracket Dimensions



4.5 Connecting Antennas

The RLXIC-EH radio has two antenna ports. For best performance, ProSoft Technology recommends using two antennas.

If you plan to use only a single antenna, you must disable the setting *RXDIVERSITY in the radio configuration (page 99).

5 Configuring your RLXIC-EH

In This Chapter

- ❖ Using AceManager 28
- ❖ Using Templates 30
- ❖ Using a Terminal Application with AT Commands..... 34

With ALEOS as its "brain", the RLXIC-EH is a highly configurable device, more than just a "dumb" modem.

To configure your RLXIC-EH, you have two options. You can use the configuration and management applications of the AceWare suite or you can use a terminal emulator application such as HyperTerminal, PuTTY, or many others.

Because the AceWare applications are designed for ease of use, nearly all descriptions and screen shots of RLXIC-EH configuration in this guide and Application Notes are done with AceManager. In addition to the various chapters in this guide giving information and directions about using the features of your RLXIC-EH, the Configuration Commands appendix briefly describes all the commands available. To get a more expanded view of the other AceManager features, refer to the AceManager Guide.

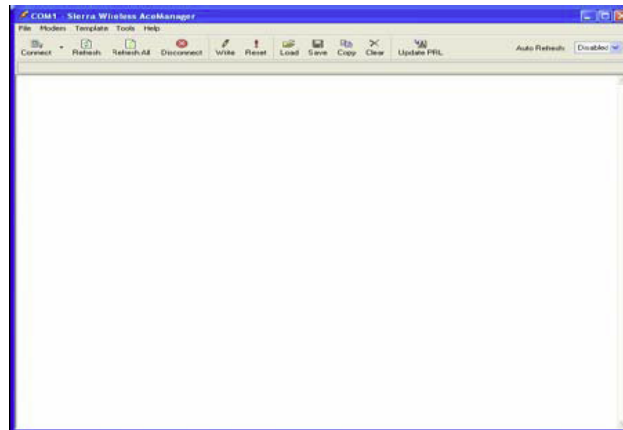
Refer to Configuration Commands for a full listing of the available commands (page 75).

5.1 Using AceManager

AceManager is a free utility and is available on the product CD or can be downloaded from the ProSoft Technology website.

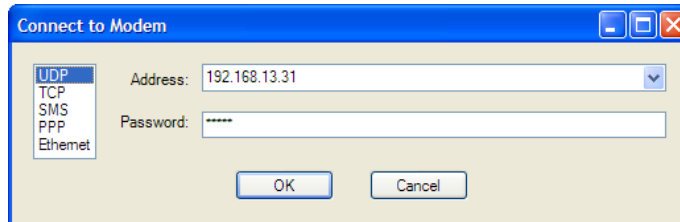
5.1.1 Start AceManager

START > ALL PROGRAMS > AIRLINK COMMUNICATIONS > ACEMANAGER



5.1.2 Connect to your RLXIC-EH

1 Click the **CONNECT** button.



2 Select a connection method:

- If you are connecting remotely, you can use UDP, TCP, or SMS.
- If you are connecting locally with the modem connected directly to your computer using a serial cable, you can use PPP.
- If you are connecting locally with the modem connected directly to your computer using an Ethernet cable, you can use UDP, TCP, or Ethernet.

3 Enter the connection information.

- For UDP or TCP, if you are connecting locally, use the *HOSTPEERIP of the modem to connect. The default for the *HOSTPEERIP is 192.168.13.31.
- For SMS, enter the phone number of the modem, and select your wireless carrier.
- For PPP, select the COM port to which the modem is connected.

4 Enter the password. The default password will be entered for you.

5 Click **OK**.

5.1.3 Enter the configuration options

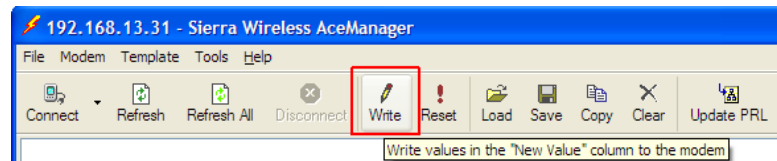
- 1 On the left side of AceManager is the **GROUPS** menu. Select the appropriate group as needed or directed.
- 2 Enter your changes in the **NEW VALUE** column by typing in the desired change or using the drop down menus.
- 3 The current configuration is shown in the **VALUE** column.

AT	Name	Value	New Value
S0	TCP Auto Answer	0	<input type="text"/>
S7	TCP Connect Timeout	30	<input type="text"/>
TCPT	TCP Idle Timeout	5	<input type="text"/>
TCPS	TCP Idle Timeout Secs	0	<input type="text"/>
S221	TCP Connect Response Delay	0	<input type="text"/>
S60	Telnet Echo Mode	1	<input type="text"/>
*ENQ	Enable ENQ on TCP Connect	0	<input type="text"/>

0-Disable
1-Enable

5.1.4 Write the changes to the modem

- 1 Click the **WRITE** button on the tool bar of AceManager.
- 2 Wait for the message "Write Successful" to appear in the status bar.



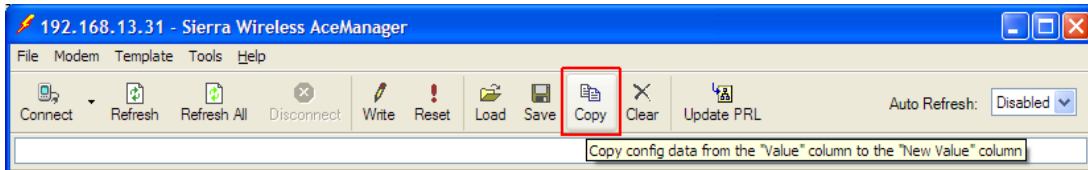
Tip: Some configuration settings will require you to reset the modem before they will take effect. You can reset the modem by using the Reset button in AceManager or by using the reset button on the modem. You can also reset the modem by cycling the power.

5.2 Using Templates

If you have a modem configuration that works well for your needs, using AceManager, you can save that modem's configuration as a template, and then apply it to other RadioLinx modems.

5.2.1 Creating the Template with AceManager

- 1 Configure the "master" modem.
- 2 Click the **COPY** button on the tool bar to transfer all the configured settings to the New Value column.

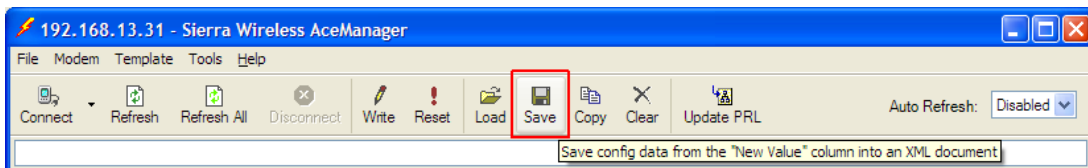


- 3 Remove settings that are specific to your "master" modem, or verify settings are applicable to all your modems.

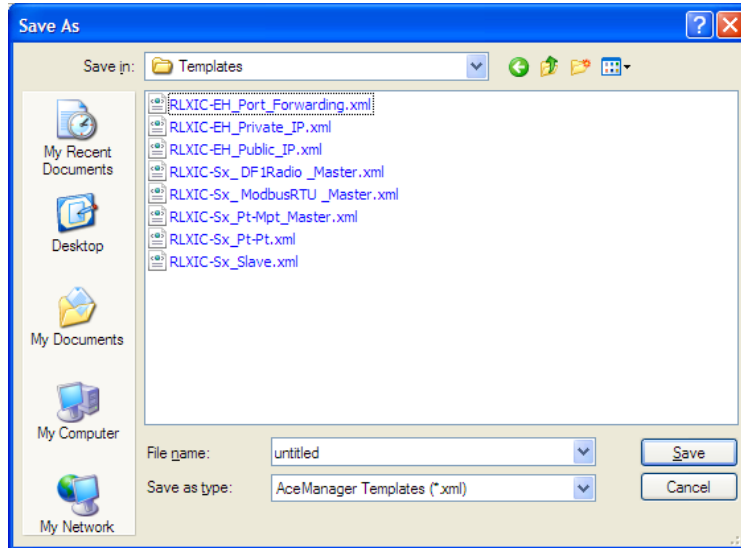
Note: Some of the configuration settings are specific to individual modems. You do not want to have those settings in your saved template otherwise the modems you configure with the template could cease to work with the cellular or local network.

- Cellular Technology specific settings (the EH group)
- *MODEMNAME
- *HOSTPRIVIP
- *HOSTPEERIP
- *HOSTUID
- *HOSTPW

- 4 Click the **SAVE** button on the toolbar.



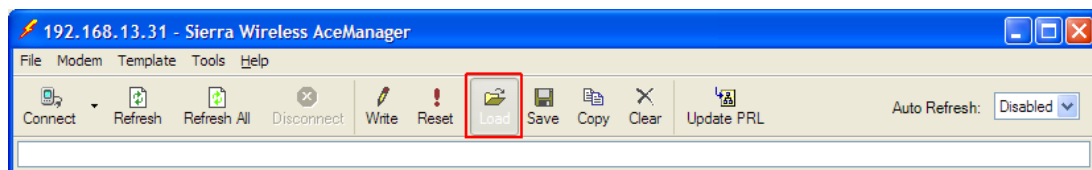
- 5 Type in a file name that is descriptive of the template (so you can find it easily later), and save it to a location on your computer.



5.2.2 Applying a Template to one modem with AceManager

You can use a template you created yourself, using the steps above, or a template provided by your Radiolinx representative or someone in your company who has set up a modem template. The template you wish to apply must be saved to your hard drive.

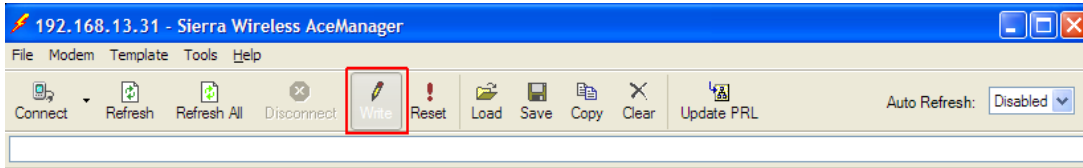
- 1 Load the template.
 - a Connect to the modem you want to configure using AceManager.
 - b Click the **LOAD** button on the toolbar.



- c Select the template you have saved (you may need to change folders if you saved it to a different location).
- 2 Verify the configuration settings.

Tip: After you load the template, it is best to go back over the AceManager groups to make sure all the settings are what you require.

- 3 Click the **WRITE** button on the toolbar to write the configuration to the modem. Wait for the "Write Successful" message.



- 4 Reset the modem.

Caution: Many of the configuration settings will not take effect until the modem has been reset.
Tip: You can use common settings on one modem to configure those same settings on another modem even of a different type. For example, you can use the Ethernet settings of a modem (such as RLXIC-EH) to configure the Ethernet settings of another RLXIC-EH. Settings not applicable to the modem on which you are loading the template, will be discarded.

5.2.3 Optional: Applying one template to several modems simultaneously with AceNet

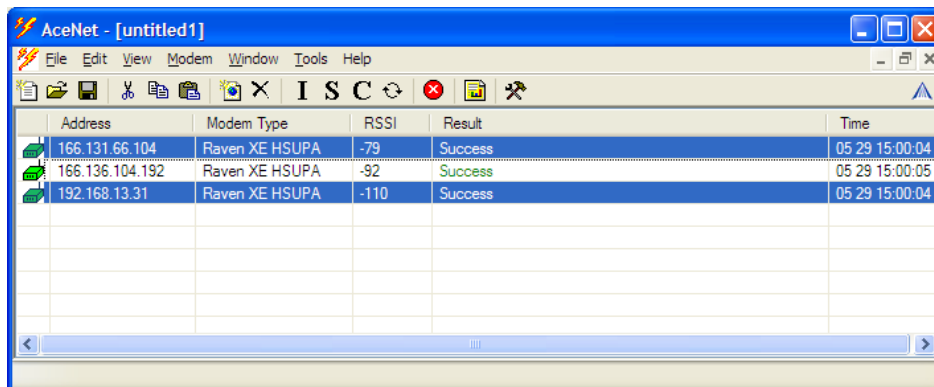
AceNet allows you to connect to and monitor several modems at the same time. For your convenience, you can also apply a single template to selected modems simultaneously.

Connecting to the modems with AceNet is covered in the *AceNet User Guide*.

Caution: When applying a template in AceNet, it is even more important to make sure there are no non-general settings in the template from the "master" modem.

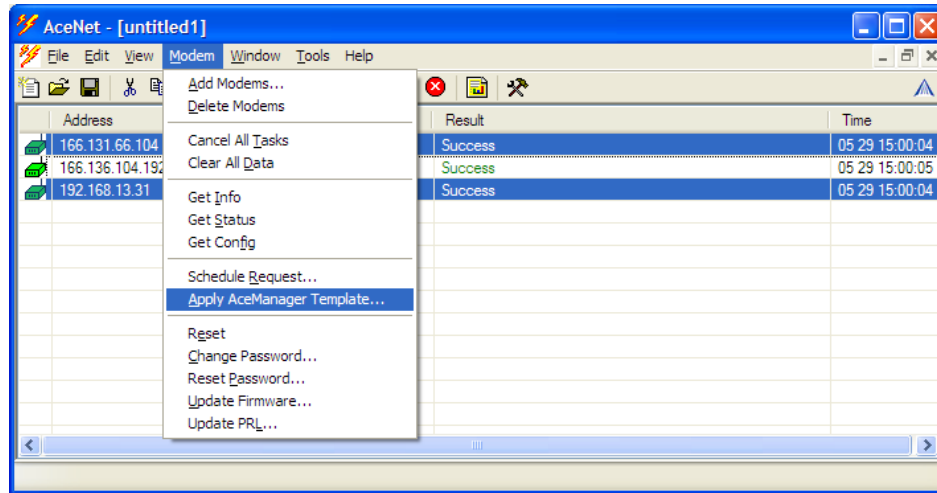
Unlike AceManager, AceNet does not check the modem type before applying the template. Settings not applicable, such as a USB setting from a RLXIC-EH template being applied to a modem of a different type, are not read by the receiving modem. You will get a "partial success" status if all items in a template cannot be applied by the receiving modem.

- 1 Select modems to configure with the template.

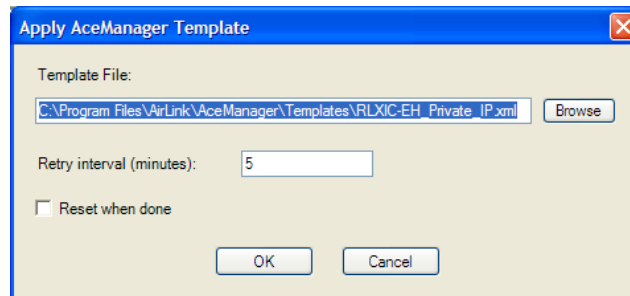


Tip: Click on the first with your mouse, and, with the control button held down, click the additional modem.

- 2 Select the **MODEM** option in the tool bar, and then select **APPLY ACEMANAGER TEMPLATE**.



- 3 Either type in the Template file name, or click browse, and select the template file you want to apply (you may need to change folders).

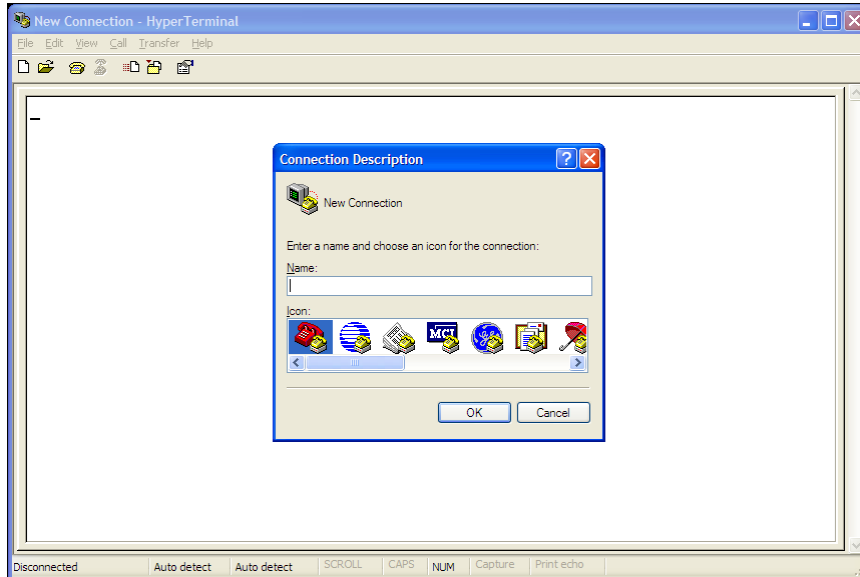


- 4 Set the Retry Interval and check if you want to have the modems Reset when the template has been applied.

5.3 Using a Terminal Application with AT Commands

You can access and configure your RLXIC-EH using a terminal application such as Microsoft HyperTerminal, PuTTY, or similar. The following directions are for HyperTerminal which is part of a standard installation of Windows XP.

START > ALL PROGRAMS > ACCESSORIES > COMMUNICATIONS > HYPERTERMINAL

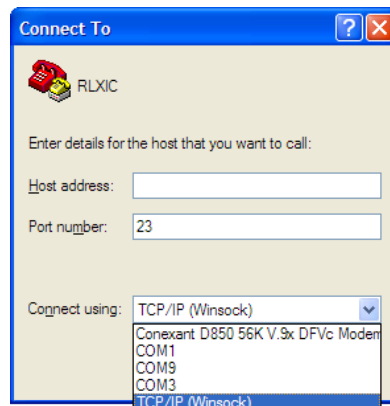


Choose a name and icon for your connection.

- 1 Choose a name for your connection, such as **RLXIC-EH** or **RADIOLINX SOLUTIONS**. The name and icon are only for your own reference so you can find the connection at a later date.
- 2 Click **OK**.

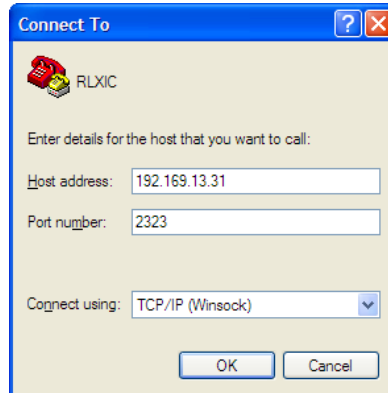
Connect To

- 1 Select **TCP/IP (Winsock)** for the "Connect Using".



Note: You can also connect using the virtual USB serial port. Refer to Using the USB virtual serial port with a Terminal Emulation Utility (page 46) for more information on configuring and using the virtual serial port.

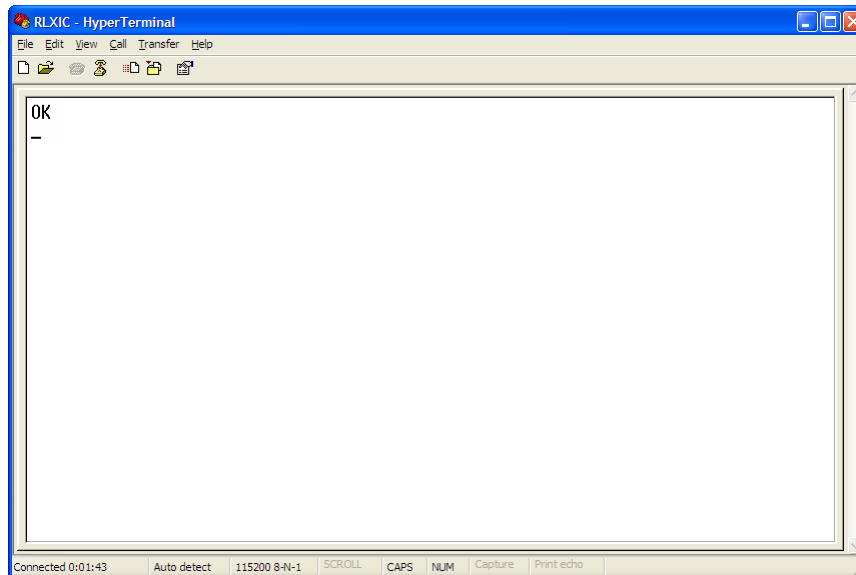
- 2 Type in 192.169.13.31 for Host Address.
- 3 Change the "Port Number" to 2332.



- 4 Click **OK**.

Connected

- 1 Type `AT` and press **ENTER**. You should get a reply of "OK" or "0".



- 2 To see what you are typing as you type it, you will need to turn on the echo and verbose mode. Type `ATE1V1` and press **ENTER**.
- 3 If you get a reply of "OK", then you entered the command successfully. If you get a reply of "0" or "ERROR", try entering the command again.

5.3.1 AT Commands

When using a terminal application, you will need to manually type in each command.

- For most commands, when you are entering them using a terminal connection, you will need to preface the command with AT (exceptions are noted), that is, `ATA` which is listed as `A`.
- Some commands have specific parameters while other commands will take whatever you type.
- Required variable parameters are denoted with italicized text, example, `Dn`. The *n* is variable.
- Acceptable parameters and/or specific formats are listed with each command.
- Most commands with parameters can be entered with `?` to read the current value (for example, `AT&D?` will respond with "2" if the default has not been changed).
- Optional parameters are denoted with square brackets [].
- AT Commands are not case sensitive. A capital "E" is the same as a lower-case "e".
- When you are using a terminal connection, if you enter a command which is recognized by the RLXIC-EH, it will respond with "OK". If the command is not recognized, the response will be "ERROR".
- Those commands applicable only to certain model numbers of the RLXIC-EH will be noted.

Caution: Symbols listed with commands, such as `*`, `/`, `&`, or `?`, are part of the command and must be included. Commands with symbols other than `*` may require PassThru mode.

6 Universal Serial Bus (USB)

In This Chapter

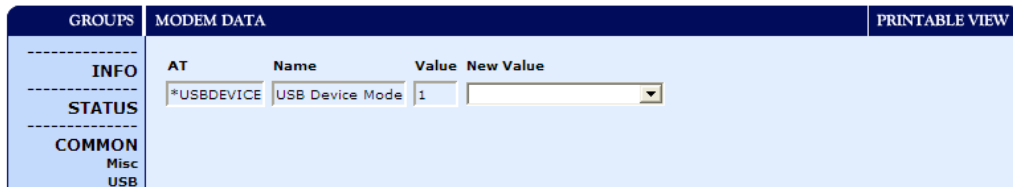
- ❖ Changing the USB port communication 37
- ❖ Installing the USB driver 38
- ❖ Using the Virtual Ethernet Port 45
- ❖ Using the Virtual Serial Port 46

The RLXIC-EH is equipped with a USB port which increases the methods by which you can send and receive data. The USB port can be set to work as either an Ethernet port or a virtual serial port. A driver installation is required to use the USB port in either mode.

Note: It is recommended that you use a USB 2.0 cable with your RLXIC-EH and connect directly to your computer for best throughput.

6.1 Changing the USB port communication

The command to change the port configuration is `*USBDEVICE`, and it is in the USB group of AceManager.



By default, the port is set to work as a virtual Ethernet port (`*USBDEVICE=1`).

To change the USB port to allow virtual serial port communication, disable the Ethernet port emulation, set `*USBDEVICE` to 0.

Note: If you use a terminal connection with the USB port to change `*USBDEVICE`, the change is immediate. Your connection will be terminated after inputting the command.

6.2 Installing the USB driver

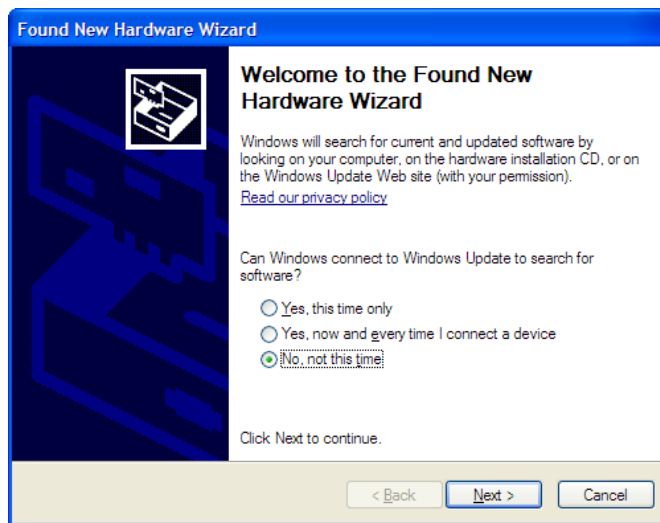
6.2.1 Set the Port Type

Virtual Ethernet port is the default setting for the USB port. If you want to install the virtual serial port, change the USB port configuration using the directions above.

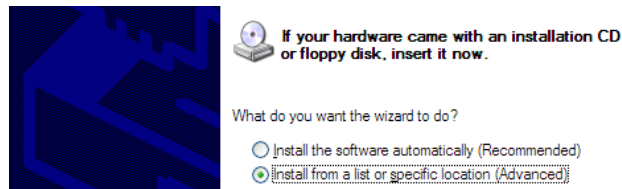
6.2.2 Connect the RLXIC-EH to your computer's USB port

When you connect the RLXIC-EH for the first time to a USB port on your computer, Windows should detect a new device, and prompt you to install the driver.

Note: Windows will see each port type as a different USB device, and will see every port on your computer separately. If you change the port type on the RLXIC-EH or connect to a different USB port on your computer or hub, Windows will see it as a new device.

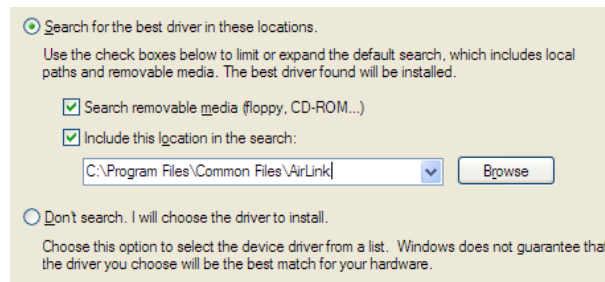


- 1 To start the install of the USB virtual Ethernet driver, select No, not this time, and click Next.
- 2 Select Install from a list of specific location, and click Next.

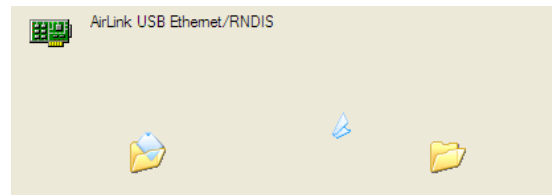


6.2.3 Install the driver from a specific location

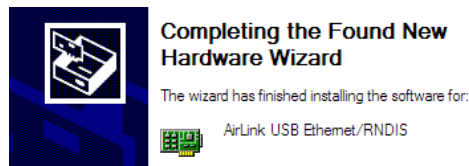
- 1 Select and/or enter the location of the driver.
 - If the driver is on the CD, and the CD is in your drive, you can just select Search removable media.
 - If you have installed AceManager or the Setup Wizard, the drivers have been conveniently copied to your hard drive. Enter C:\Program Files\Common Files\AirLink as the location to search.
 - If you will be installing the driver from a file downloaded from the ProSoft Technology website, select Include this location in the search, and type in the location where you downloaded the file.
- 2 Click **NEXT**.



After you select the location, the installation should begin. If you get a message asking if you want to continue the installation, click **CONTINUE ANYWAY**.



- 3 Click **FINISH** to complete the installation. The driver should be enabled without any need to reboot your computer.

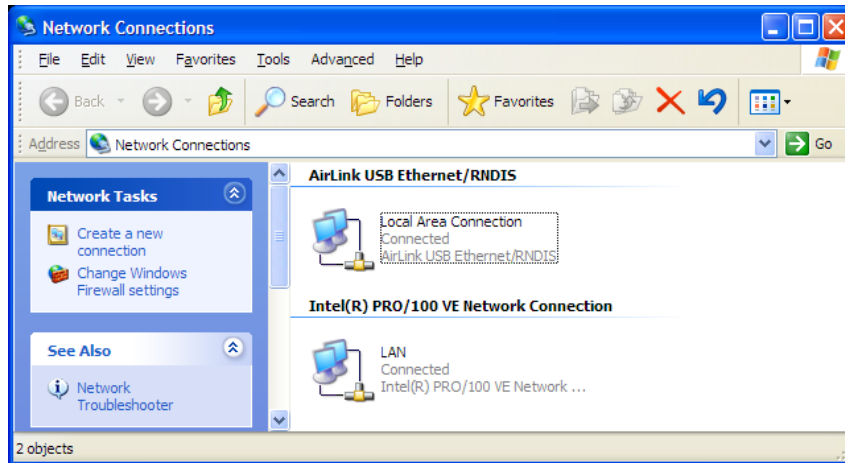


6.2.4 Optional: Verify and Configure the Virtual Port Settings

Virtual Ethernet

The USB Ethernet connection will show up in your Network Connections as a Local Area Connection.

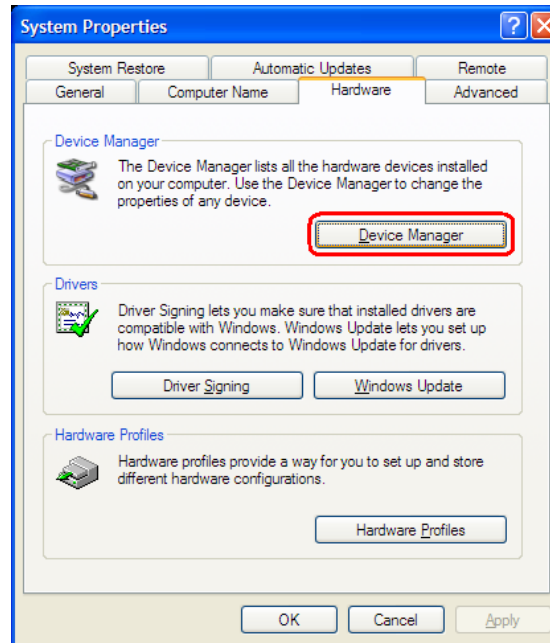
Tip: If you also have an Ethernet card on the computer or have installed the USB Ethernet to more than one USB port on your computer, the USB Ethernet may show up with a number.



You can also verify the installation by looking in the Device Manager.

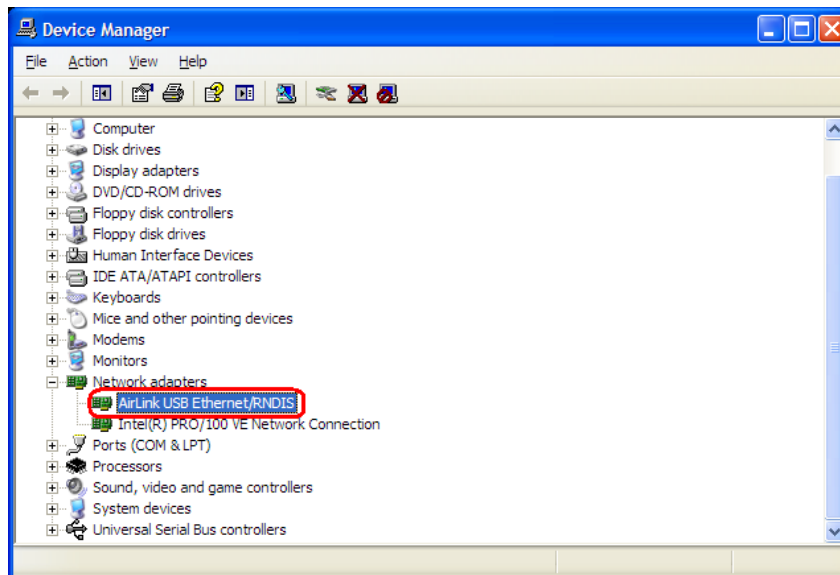
- 1 Click on **START > CONTROL PANEL**.
- 2 Double-click on the **SYSTEM** icon.

- 3 Select the **HARDWARE** tab, and click the **DEVICE MANAGER** button.



- 4 Click on the + in front of **NETWORK ADAPTERS**.

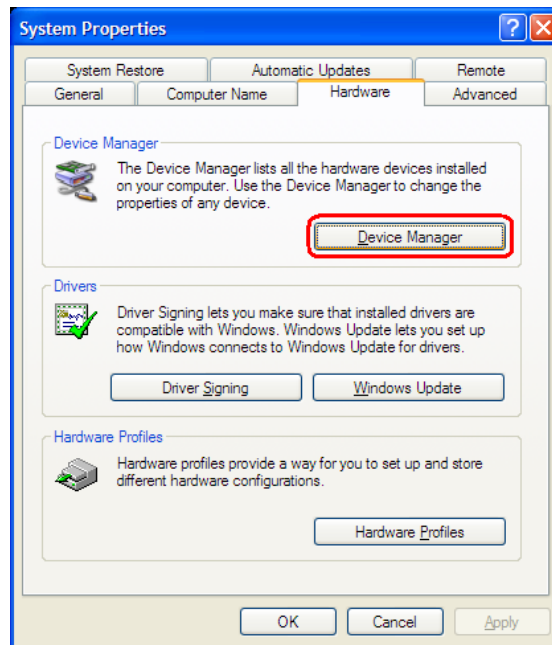
The newly installed driver, AirLink USB Ethernet/RNDIS, should be displayed. If the driver is displayed with a # and number behind the driver name (such as, AirLink USB Ethernet/RNDIS #2), it means more than one is installed on your computer, most likely for different USB port. More than one copy of the driver should not cause any problems, because only the connected port, and its driver, would be active.



Virtual Serial

You can verify the installation by looking in the Device Manager.

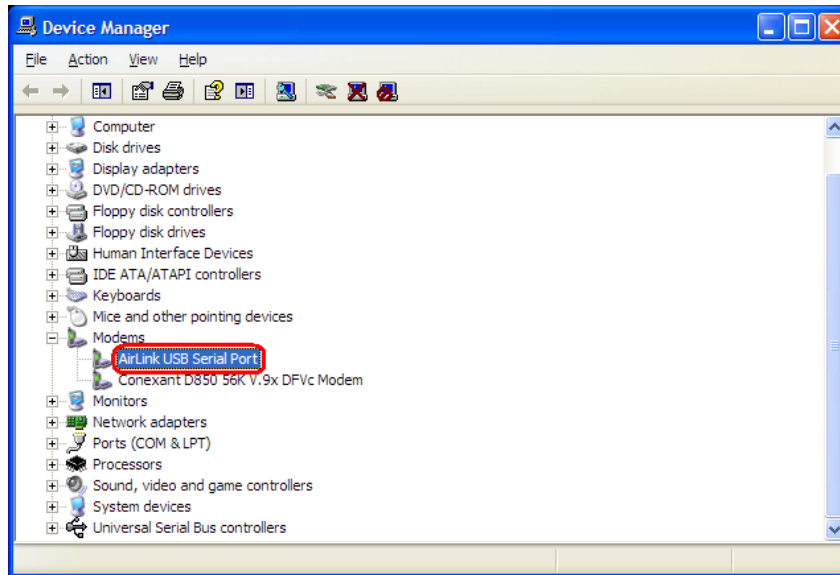
- 1 Click on **START > CONTROL PANEL**.
- 2 Double-click on the **SYSTEM** icon.
- 3 Select the **HARDWARE** tab, and click the **DEVICE MANAGER** button.



- 4 Click on the **+** in front of **MODEMS**.

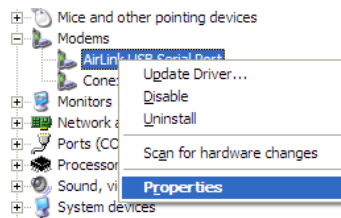
The newly installed driver, AirLink USB Serial Port, should be displayed.

Tip: If the driver is displayed with a # and number behind the driver name (such as, AirLink USB Serial Port #2), it means more than one is installed on your computer, most likely for different USB port. More than one copy of the driver should not cause any problems, because only the connected port, and its driver would be active.

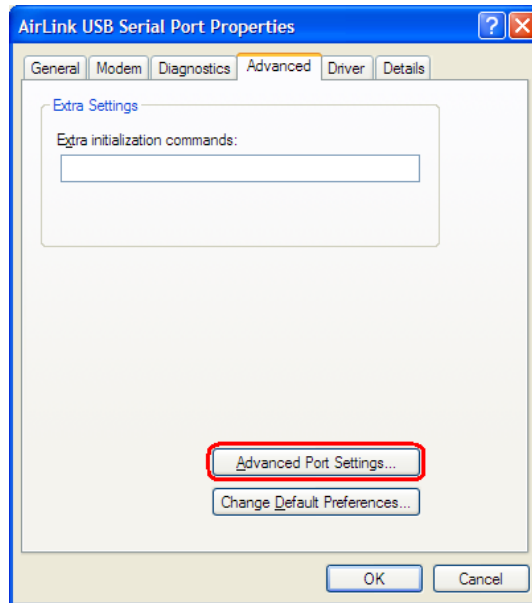


To connect to the modem using the USB virtual serial, most applications or utilities will require you to select or enter the serial (COM) port number. The USB connection will appear as a standard serial port, so you will need to determine its number to connect to it. The driver installation will automatically assign a port or you can change it if you wish to another unused port.

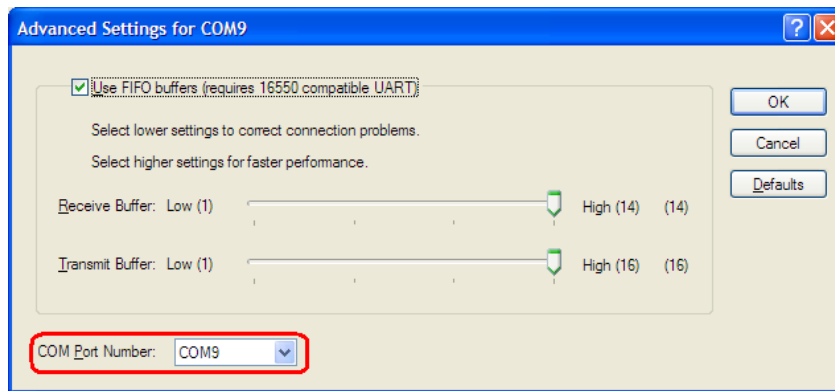
- 1 From the Device Manager, right click on the driver name, and select Properties.



- 2 Select the Advanced tab, and click the Advanced Port Settings button.



- 3 At the bottom of the screen, the current port used will be listed. Use the drop down menu to select an available COM port number if you need to change it.

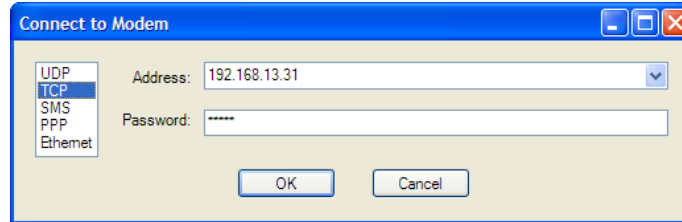


6.3 Using the Virtual Ethernet Port

After the driver is installed, you can use the USB port just like a standard Ethernet port.

6.3.1 Using USB Ethernet with AceManager

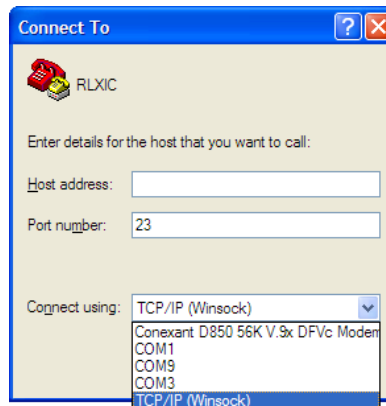
In AceManager, use the UDP or TCP connection, and enter the IP address of the modem (192.168.13.31 by default), and the password (12345 by default).



6.3.2 Using USB Ethernet with a Terminal Emulation Utility

Configure your terminal application for telnet communication.

- 1 In HyperTerminal, select TCP/IP (Winsock)
- 2 Use the IP address of the modem (192.168.13.31 by default) as the destination, and use the telnet port of the modem (2332 by default).



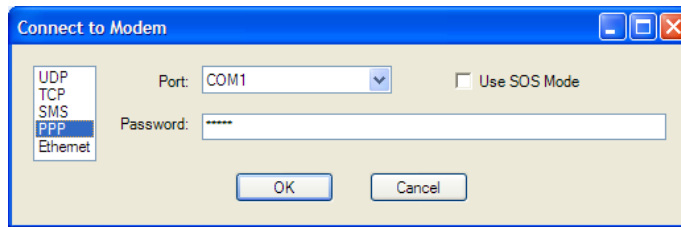
- 3 Enter the modem password (12345 by default) when requested.

6.4 Using the Virtual Serial Port

After the driver is installed, you can use the USB port just like a standard serial port.

6.4.1 Using the USB virtual serial port with AceManager

In AceManager, the USB virtual serial port connection will appear as a standard serial port. Use the PPP connection, and select the COM# serial port of the USB connection.



Tip: You will need to open AceManager after you connect the USB cable to your computer for AceManager to have access to the USB Serial PORT.

6.4.2 Using the USB virtual serial port with a Terminal Emulation Utility

- 1 Select the serial port of the USB connection when prompted for a COM port.
- 2 Change the Bits per Second to 115200 (default), Data Bits to 8, Parity to None, Stop Bits to 1, and Flow Control to Hardware.
- 3 You should also need to make sure your connection uses Auto Detect for the terminal emulation.

7 Data Communication and Host Modes

In This Chapter

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Note: This section describes general communication options for the RLXIC-EH. For specific information regarding configuration of the RLXIC-EH for different industrial applications, refer to the application notes and templates on the RadioLinx CD.

The RLXIC-EH plays the part of a HOST when a computer or another device is connected directly to its port, and routes data to/from the connected device to the cellular network.

Caution: The RLXIC-EH moves data from one port to the cellular network in a simple one-to-one routing. It does not employ a routing table or any complicated routing protocol.

Tip: If you need to have one-to-many routing, you can connect the RLXIC-EH to a router. The router would provide the multiple routing, and the RLXIC-EH would provide one-to-one for the router to the cellular network and the Internet.

As the host, the RLXIC-EH can use different communication modes:

7.1.1 Basic Modes

- **AT:** The RLXIC-EH accepts and responds to standard AT commands.
- **PassThru:** Direct connection to internal hardware (OEM Module) of the RLXIC-EH.
- **Telnet:** The RLXIC-EH auto-answers TCP connections to allow terminal emulation using either a local USB Ethernet connection or remotely using the cellular connection.

Tip: By default, the RLXIC-EH is in AT Mode, and allows AT Commands to be entered via terminal connection (through the local port connection) or remotely (through the cellular network). PassThru Mode can only be exited by resetting the RLXIC-EH. All serial modes are entered by use of a startup mode command.

7.1.2 Serial Modes

- **PPP Mode:** The RLXIC-EH uses PPP to communicate with a device or computer connected to the serial or USB port.
- **SLIP Mode:** The RLXIC-EH uses SLIP to communicate with a device or computer connected to the serial or USB port.

- **UDP and UDP PAD:** Any data received on the serial port is assembled into UDP packets, and sent to the session's associated IP address and Port (described later). Any responses received from the associated IP address and port destined for the Device Port are unwrapped, and sent out the serial port.
- **TCP and TCP PAD:** Any data received on the serial port is packaged into TCP messages, and sent to the associated connection's IP address and Port (described later). Any data received from the TCP peer is unwrapped and sent out the serial.

7.1.3 Data Communication

- **Public and Private Modes:** The method used by the RLXIC-EH to pass an IP address to a connected device.
- **Keepalive:** How the RLXIC-EH maintains its connection to the cellular network.

7.2 Basic Modes

7.2.1 AT Mode

Using a terminal connection, AT commands are used to configure the modem, command it to do something, or query a setting. For a full listing of the AT commands, refer to the appendix. AceManager is a graphical user interface for most AT Commands.

- AT commands must always be terminated by **<CR>** (ASCII character 0x0D), a carriage return (pressing enter on the keyboard). Some may also include a new line or line feed **<LF>**.
- If **E=1** (Echo On), the AT command (including the terminating <carriage return) will be displayed (output) before any responses.
- Two settings affect the format of AT command output: **V** (Verbose), and **Q** (Quiet).
- If **Q=1** (Quiet On), no result codes are output whatsoever, so there is no response generated by a (non query) command.
- If **Q=0** (Quiet Off), result codes are output. The format of this output is then affected by the Verbose setting.

If Quiet mode is off, the result code is affected as follows:

For **V=1** (Verbose mode), the textual result code is surrounded by a carriage return and new line. Any AT query response is also surrounded by a carriage return and new line.

For **V=0** (Terse mode), a numeric result code is output with a single trailing carriage return (no new line is output), while any AT query response is followed by a carriage return and new line (there is no preceding output).

- For example, possible output to the AT command "AT" with carriage return (assuming quiet mode is not on) is:
carriage return - if V=0
carriage return and new line OK another carriage return and new line - if V=1

Note: These commands work for the port on which they are executed. For example, if the user types ATE1, and then AT&W using a serial port connection, it will set the serial port to Echo On.

7.3 Serial Modes

7.3.1 PPP

In PPP mode, the RLXIC-EH acts as a PPP server, providing an IP address, and DNS servers (if available) to the connected device or computer.

PPP mode is entered from the AT mode by using any of the following commands:

- AT\APPP
- ATDT10.0.0.1
- ATDT10001
- ATD#19788 or #777 *99***1#
- CLIENT

In response to any of the preceding commands, the RLXIC-EH will respond with CONNECT a carriage return and new line and is ready for the host to begin PPP negotiations. The IP received by the host in the resulting negotiation will either be a private (non-routable) IP address or a public (network-routable) IP address provided by the network, depending on the settings of ***HOSTPRIVMODE**. If ***HOSTPRIVMODE=1**, the value of the private IP address can be determined beforehand by querying **S110**. The private IP address to be used can be defined with the command **AT*HOSTPRIVIP=192.168.100.33**, substituting the desired IP address.

GROUPS	MODEM DATA			PRINTABLE VIEW
INFO	AT	Name	Value	New Value
STATUS	*HOSTPRIVMODE	Use Private IP	1	<input type="text" value="1"/>
COMMON	*HOSTPRIVIP	Host Private IP	192.168.13.100	<input type="text" value="192.168.13.100"/>
Misc		DHCP network mask	255.255.255.0	<input type="text" value="255.255.255.0"/>
USB	*HOSTPEERIP	Modem Local IP	192.168.13.31	<input type="text" value="192.168.13.31"/>
DNS	*HOSTNETMASK	Ethernet Host network mask	0.0.0.0	<input type="text" value="0.0.0.0"/>
Dynamic IP	*HOSTAUTH	Host Authentication Mode	0	<input type="text" value="0"/>
PPP/Ethernet	*HOSTUID	Host User ID	ZCFzUUeLycb2ug01L+3Ikw==	<input type="text" value="ZCFzUUeLycb2ug01L+3Ikw=="/>
SMTP	*HOSTPW	Host Password	ZCFzUUeLycb2ug01L+3Ikw==	<input type="text" value="ZCFzUUeLycb2ug01L+3Ikw=="/>
Other	*DHCPSEVER	DHCP Server Mode	1	<input type="text" value="1"/>
Firewall		Host Network 2	0.0.0.0	<input type="text" value="0.0.0.0"/>
Port Forwarding		Host network mask 2	255.255.255.255	<input type="text" value="255.255.255.255"/>
LOGGING		Host Network 3	0.0.0.0	<input type="text" value="0.0.0.0"/>
REPORT		Host network mask 3	255.255.255.255	<input type="text" value="255.255.255.255"/>
Server 1		Default Interface	0	<input type="text" value="0"/>
CELLULAR		Default IP	0.0.0.0	<input type="text" value="0.0.0.0"/>
IPSEC				
GRE				
I/O				

Using a private IP insulates the PPP client from changes in IP addresses of the underlying network. The will perform basic NAT-like address translation on all packets.

If a public IP address is being used, any changes in the IP (as determined by the wireless network) will result in the PPP link to the host being disconnected, requiring the host to reinitiate it. The public IP is passed to the host in the PPP negotiations, so when the network forces a change, the modem has to force the host to renegotiate the PPP link to make this happen.

7.3.2 SLIP

SLIP mode is entered by using the "**AT+SLIP**" command. As in PPP Mode, the IP address that the host assumes is affected by the setting of *HOSTPRIVMODE. SLIP does not negotiate the IP address with the connected device or computer, so before making a SLIP connection, the SLIP driver on that device or computer must be configured to use the IP address specified by querying **S110**.

- When the modem is in UDP PAD (Packet Assembly and Disassembly) Mode, all characters received on the serial port are assembled into UDP packets, and sent to the remote IP address/port or the RLXIC-EH, and any packets received from the same IP/port--destined for the device port of RLXIC-EH (see *DPORT)--are disassembled, and dumped onto the serial line.

A UDP session is initiated by one of the following events:

- Using the Dial UDP (DP) AT command (example, ATDP192.168.3.23/3456).
- Setting the Startup Mode Default (MD) to 3 (UDP) so that a UDP session is entered automatically when the modem registers onto the network. Serial data will be sent to the IP/port specified in S53.

Incoming UDP packets will be processed out the serial port if

- UDP auto answer is enabled (S82=2);
- The destination IP address matches that in S53 (if Friends Mode is enabled, the IP address also needs to be present on the Friends List);
- Or allow any IP is set (AIP=1);
- The modem is in AT mode (not in a current UDP or TCP session).

UDP packet assembly is affected by the values of S50 (PAD Forwarding Time-out) and S51 (PAD Forwarding Character). Data received in the serial buffer will be transmitted when the idle inter-character time-out specified in S50 (in tenths of seconds) occurs or when a character is received that matches S51 (if non-zero).

7.3.3 UDP Auto Answer

UDP auto answer (previously called UDP half-open) is set with S82=2. When set, the RLXIC-EH will automatically establish a UDP session to the source IP address, and port of the UDP packet received. The RLXIC-EH will remain "locked" to this one remote IP/port until no data is sent or received for the time interval defined in the UDP auto answer time-out (S83). During this session, packets from other IP/port addresses will be rejected, unless *UALL is set. Whether or not an incoming packet will cause the modem to enter a UDP session is always dependent on the S53 and AIP settings.

The Normal UDP Mode (MD3) can be combined with UDP auto answer to cause the incoming serial data to be sent in UDP packets (instead of being treated as AT commands), while allowing sessions to be established from different UDP sources. A UDP session will be initiated either by incoming serial data or by an incoming UDP packet. The session, started by either method, will be terminated when no data has been sent or received for the S82 period. After the session terminates, another may be initiated by either means.

When idle, after the time-out has occurred, the modem is in AT command mode on the serial port, and any valid AT command may be entered during this time.

Tip: It is best to ensure the idle time-outs for TCP and UDP are never 0 if you're going to be using auto-answer, or either PAD mode. In those circumstances, you will want the modem to close the socket if the connection goes idle for too long, particularly if the other side does not normally close the connection.

When the session is initiated by serial data, the new session will be established using the destination address specified in S53. The S53 setting can be changed if the connect to last UDP setting (*UDPLAST=1) is set. The address in S53 will be updated to reflect the address of the last session initiated by an incoming UDP packet. So that when new data is received over the host serial port while in the idle state, a session will be re-established with the last address. (This behavior is the same as the previous Hybrid2 (MD6) mode).

Tip: TCP auto answer (S0) may also be set simultaneously with UDP auto answer. Then, when in the idle state, the modem will accept either a TCP or UDP incoming packet, and enter a TCP or UDP session as appropriate.

Reliable UDP

Reliable UDP adds a simple protocol on top of UDP to provide reliable delivery of data. When data is received from the host serial port, a 2 byte header is added to the data, containing a message type and a sequence number. The RLXIC-EH will continue to send this data (buffering any received data in the meantime) until it receives an acknowledgement with this sequence number. If an acknowledgement is not received within the time-out period (specified in S7), the data will be retransmitted. This will continue until an acknowledgement is received or the modem is reset. Likewise any UDP packets received by the RLXIC-EH are expected to have this simple header. The RLXIC-EH will issue an acknowledgement for any valid packets which are received.

To configure the RLXIC-EH for a normal UDP session, you need to set the Startup Mode Default to 73 (ATMD73). If you are using two modems, configure the Destination IP and Port in each to point to each other. Serial data will then be sent reliably between the two.

Caution: Although it adds reliability, the simple implementation of the Reliable UDP mode in the RLXIC-EH does not check for duplicate packets.

UDP Multicast Mode

UDP Multicast mode results in any data received from the host serial port being sent to all the clients in the address list. The remote port number is taken from S53. To avoid flooding the network, the packets are sent to each client with a 20ms pause in between. The receipt of UDP packets works as in normal UDP mode (that is, bound by the value S53 and/or AIP). Because it may take a while to transmit the data to all hosts (especially if all 20 Modbus entries are used and name resolutions are required), new data received from the host port is buffered until current transmissions to all hosts are finished.

Enter the list of target IPs in the address list (ADDR LIST). The index numbers in the list are not used. Configure for a normal UDP session. Set the Startup Mode Default to 83 (ATMD83). Configure the Destination port to match the device port of the remote modems.

7.3.4 TCP and TCP Pad

When the RLXIC-EH is in a TCP session, all characters received on the serial port are assembled into TCP packets, and sent to the mode's remote IP address/port, and any packets received from the remote end of the TCP connection are disassembled, and dumped onto the serial line.

A TCP connection is established by one of the following methods:

- Using the Dial TCP (DT) AT command. For example, **ATDT192.168.3.23/3456**.
- TCP auto answer is enabled (**S1**), a TCP connection request is received, and the modem is not in a data session.
- Data is received on the serial port, and
 - The Startup Mode Default (**MD**) is **4** (auto TCP)
 - The remote TCP destination, as defined in S53, successfully responds to the TCP connection request.

The value of **S7** (TCP Connection Time-out) specifies the number of seconds to wait, after initiating a TCP connection attempt, for a successful connection to be established. If the connection has not been successfully established before the time-out occurs, ERROR/BUSY is returned.

TCP packet assembly is affected by the values of **S50** (PAD Forwarding Time-out) and **S51** (PAD Forwarding Character). Data received in the serial buffer will be transmitted when the idle inter-character time-out specified in S50 (in tenths of seconds) occurs or when a character is received that matches **S51** (if non-zero).

The TCP session will be terminated if no data is transmitted or received for the time interval specified in **TCPT** and **TCPS**. TCPT is the number of minutes (TCPS=0) or seconds (TCPS=1) used for this idle time-out.

Caution: TCPT should never be 0 when using the TCP mode. A broken TCP session can result in the modem being left with a TCP Auto Answer

TCP auto answer (S0=1|2) also allows a TCP connection request to be "answered" when the modem is idle, not in a data session. The TCP connection request's destination port has to match the modem's device port.

Note: UDP auto answer may also be set simultaneously with TCP auto answer. Then, when in the idle state, the modem will accept either a TCP connection request or UDP incoming packet, and enter a TCP or UDP session as appropriate.

7.3.5 Hybrid Mode

Hybrid modes are supported mainly for legacy implementations. Some previous hybrid modes (MD=5, 6) are no longer implemented as special, unique modes. Now that UDP auto answer (UDP Half-open, S82=2) can be enabled in conjunction with UDP PAD mode (MD3), effectively this is the same as MD5 and MD6 previously accomplished. Setting MD5 and MD6 are still supported, but not recommended.

AT Command	Hybrid Mode (MD5)	Hybrid Mode2 (MD6)
MD	3	3
S82	2	2
S0	1	1
*UDPLAST	0	1

7.4 Data Communication

Note: The RLXIC-EH forwards messages to and from the cellular network for only ONE device per port. The RLXIC-EH is a one-to-one gateway, and does not have advanced routing features required to do one-to-many routing.

The primary purpose of the RLXIC-EH is to forward data from a single device connected to one of the ports to the cellular network, and, ultimately, under most circumstances, to the Internet in a **one-to-one** gateway configuration.

When the RLXIC-EH obtains its IP address from your cellular provider, it also obtains the network routing information necessary to forward messages to their routers which can then forward on from there. The RLXIC-EH then acts as a router for the device connected to it, forwarding to or from the cellular network.

Note: If you have a device connected to the serial port and the USB port, they will not be able to communicate to each other. Each port is routed separately to the cellular network with one-to-one routing for each.

7.4.1 Public and Private Mode

In Public Mode, the RLXIC-EH will pass the IP address assigned by the cellular network to the device connected to its port. Public Mode is the default mode for the RLXIC-EH.

If you need more control over which gateway address, device address, and netmask that is given out by the internal DHCP server, you can use the private host mode, *HOSTPRIVMODE, and set the internal network IP addresses. The RLXIC-EH will use NAT to forward packets to the end device.

Tip: When using Public mode, ProSoft Technology recommends connecting the modem directly to the computer or other end device. Using a hub or switch may prevent the RLXIC-EH from updating the IP address of the end device when an IP address is received from the cellular network.

In AceManager, the Private mode settings are part of the **PPP/Ethernet** group.

AT	Name	Value	New Value
*HOSTPRIVMODE	Use Private IP	1	
*HOSTPRIVIP	Host Private IP	192.168.13.100	
	DHCP network mask	255.255.255.0	
*HOSTPEERIP	Modem Local IP	192.168.13.31	
*HOSTNETMASK	Ethernet Host network mask	0.0.0.0	

- ***HOSTPRIVMODE** - Set to 1 to enable the explicit IP addresses.
- ***HOSTPRIVIP** - Set to the IP address you want the RLXIC-EH to give to your device.
- **DHCP network Mask** - The subnet mask that is passed to the DHCP client on the Host device.
- ***HOSTPEERIP** - Set to the IP address you want for the RLXIC-EH.
- ***HOSTNETMASK** - Set to the subnetmask, generally 255.255.255.0.

Tip: If you are using Private Mode (*HOSTPRIVMODE=1), you will need to make sure that *HOSTPRIVIP and *HOSTPEERIP are on the same subnet. If the subnet mask is 255.255.255.0, it is safe to use 192.168.x.y for each as long as the x is the same number (0 in the example screen shot above), and the y is different (1 and 2 in the example), and between 0 and 254.

Note: Regardless if the RLXIC-EH is configured for Public Mode or Private Mode, the same IP address will be given to all devices connected to any of the ports. While you can connect with each to the cellular network and the Internet, you cannot use the RLXIC-EH as a hub or router to communicate between them.

Internal DHCP Server

DHCP (Dynamic Host Configuration Protocol) has become a primary component of today's network environments. DHCP allows one server to automatically and dynamically allocate network IP addresses, and other network related settings (such as subnet masks, routers, etc.) to each computer or device without the need to set up each specifically or keep track of what addresses have already been used.

In a default configuration, the RLXIC-EH acts as a DHCP host to any device connected to its ports, providing that device with an IP address which can be used to communicate on the Internet. In Public Mode, that will be the IP address assigned by the cellular network. In Private Mode, that will be the IP address defined in *HOSTPRIVIP.

- 1 When the RLXIC-EH registers on the cellular network, it is assigned an IP address from your cellular provider, for example, 10.1.2.0.
- 2 Acting as a DHCP server, in Public Mode, when the RLXIC-EH receives a DHCP request from an Ethernet device connected via USB, it hands off the assigned address to the device, and sets up the default gateway address as 10.1.2.1. If the fourth octet is already a 1, it assigns 10.1.2.2 as the router address.
- 3 The RLXIC-EH also sends a /24 netmask (255.255.255.0 by default), and sets up a static route which maps 192.168.13.31 (or the address configured with *HOSTPEERIP if it is changed) to 10.1.2.1 (or 10.1.2.2 if that was what the gateway address was given as).

Tip: When PPPoE is used with the RLXIC-EH, DHCP is not needed. A tunnel is set up connecting a device (such as your computer or a router) with the modem. The device will then simply use the MAC address of the RLXIC-EH to send all outgoing packets.

Additional Connected Networks

If you have a router connected to the RLXIC-EH with additional networks configured behind that router, you can specify them in the PPP/Ethernet group of AceManager. Configure the Network the Host Network Mask for up to two additional networks.

7.4.2 Basic Routing

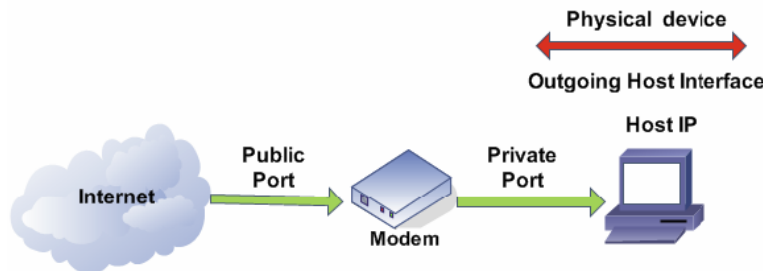
Expanding the capabilities of the RLXIC-EH, ALEOS features some basic routing to connected computers and networks.

Port Forwarding

Any data coming in on the defined Public Port will be passed to the corresponding Private Port connected to the physical interface specified and using the host IP address.

Note: This feature can be used only in private mode.

AT Name	Value	New Value
<input type="checkbox"/> Number of PF Entries	0	<input type="text"/>
<input type="checkbox"/> Public Port 1	0	<input type="text"/>
<input type="checkbox"/> Host I/F 1	4	<input type="text"/>
<input type="checkbox"/> Host IP 1	0.0.0.0	<input type="text"/>
<input type="checkbox"/> Private Port 1	0	<input type="text"/>
<input type="checkbox"/> Public Port 2	0	<input type="text"/>
<input type="checkbox"/> Host I/F 2	4	<input type="text"/>
<input type="checkbox"/> Host IP 2	0.0.0.0	<input type="text"/>
<input type="checkbox"/> Private Port 2	0	<input type="text"/>
<input type="checkbox"/> Public Port 3	0	<input type="text"/>
<input type="checkbox"/> Host I/F 3	4	<input type="text"/>
<input type="checkbox"/> Host IP 3	0.0.0.0	<input type="text"/>
<input type="checkbox"/> Private Port 3	0	<input type="text"/>
<input type="checkbox"/> Public Port 4	0	<input type="text"/>
<input type="checkbox"/> Host I/F 4	4	<input type="text"/>
<input type="checkbox"/> Host IP 4	0.0.0.0	<input type="text"/>
<input type="checkbox"/> Private Port 4	0	<input type="text"/>
<input type="checkbox"/> Public Port 5	0	<input type="text"/>
<input type="checkbox"/> Host I/F 5	4	<input type="text"/>
<input type="checkbox"/> Host IP 5	0.0.0.0	<input type="text"/>
<input type="checkbox"/> Private Port 5	0	<input type="text"/>



In AceManager, enter the fields in the Port Forwarding group.

- Number of PF Entries: Set value to number of used Port forward rules for performance gain. Each forwarding entry has four parameters:
 - Public Port: Port number of the Modem/Gateway.
 - Host/IF: Physical connection type to the modem. (USB, Ethernet, Serial).
 - Host IP: IP address of the connected device/computer.
 - Private Port: Port number on the connected device.

You can set a default in the PPP/Ethernet group, if you do not need:

- To forward to specific ports on your connected device, but you want all data to be directly used by ALEOS, or otherwise forwarded.
- To pass to only one connected device.

Note: The default settings are independent of the number of Port Forward entries, and can be used with port forwarding to pass anything not forwarded to specific ports.

- Default Interface: Choose the Default Interface desired (that is, Ethernet or USB or Serial).
- Default IP: Enter this option only when you want to forward ports not specified, to the default IP.

Firewall Functions

The RLXIC-EH can provide a basic firewall between the public and private networks. There are two types of firewall rules supported by the RLXIC-EH, IP filtering and port filtering.

AT	Name	Value	New Value
FM	Firewall Mode	0	<input type="text"/>
	Non-Friends Port Forwarding	0	<input type="text"/>
F0	Friends List IP0	0.0.0.0	<input type="text"/>
F1	Friends List IP1	0.0.0.0	<input type="text"/>
F2	Friends List IP2	0.0.0.0	<input type="text"/>
F3	Friends List IP3	0.0.0.0	<input type="text"/>
F4	Friends List IP4	0.0.0.0	<input type="text"/>
F5	Friends List IP5	0.0.0.0	<input type="text"/>
F6	Friends List IP6	0.0.0.0	<input type="text"/>
F7	Friends List IP7	0.0.0.0	<input type="text"/>
F8	Friends List IP8	0.0.0.0	<input type="text"/>
F9	Friends List IP9	0.0.0.0	<input type="text"/>
	Range 1 Start	0.0.0.0	<input type="text"/>
	Range 1 End	0.0.0.0	<input type="text"/>
	Range 2 Start	0.0.0.0	<input type="text"/>
	Range 2 End	0.0.0.0	<input type="text"/>
	Range 3 Start	0.0.0.0	<input type="text"/>
	Range 3 End	0.0.0.0	<input type="text"/>
	Port Filtering Mode	0	<input type="text"/>
	Firewall Port 1	0	<input type="text"/>
	Firewall Port 2	0	<input type="text"/>
	Firewall Port 3	0	<input type="text"/>
	Firewall Port 4	0	<input type="text"/>
	Firewall Port 5	0	<input type="text"/>

- **IP Filtering:** When enabled, only packets with source IP addresses matching those in a list or range of trusted hosts will be allowed through.
 - Friends List IP: Each entry can be configured to allow a single IP address, for example 64.100.100.2, or the IP addresses from a complete subnet, such as 64.100.10.255 allowing all IP addresses from 64.100.10.0 to 64.100.10.255.
 - Non-Friends Port Forwarding: Non-Friends port forwarding is like an allow rule for any of the forwarded ports. If it is enabled, the port forwarding rules apply to all incoming packets. If it is disabled, only Friends List IPs get through.
 - Start and End Range: Specify the IP address range that is allowed access, for example 64.100.10.2 to start and 64.100.10.15 to end would allow 64.100.10.5 but would not allow 64.100.10.16.

Note: Port Filtering Mode does not require to be set when you enable Non-Friends Port Forwarding.

- **Port Filtering Mode:** Independent of the IP filtering, this mode can be enabled to block ports specified or allow ports specified. When enabled, all ports not matching the rule will be allowed or blocked depending on the mode.
- **Firewall Port:** Specify the port you wish to have blocked or allowed, depending on the mode configured.
- **Packet Filtering:** Not available at this time.

7.5 Keepalive

Keepalive is used to test the connection to the cellular network by pinging an IP address after a specified period of inactivity. Keepalive is only recommended for users who have a remote terminated modem that infrequently communicates to the network or if you have experienced issues over time where the modem can no longer be reached remotely.

When Keepalive pings the IP address, an acknowledgement indicates there is an active connection to the network. If the RLXIC-EH does not receive a response from the IP address, it will make additional attempts according to a backoff algorithm before determining the Internet connection is not functioning properly. If it determines the connection is not functioning, the modem will then attempt to reconnect to your cellular provider to reestablish IP connectivity.

7.5.1 Configuring Keepalive

In AceManager, the Keepalive settings are part of the **OTHER** group.

AT	Name	Value	New Value
*IPPING	Keepalive Ping Time	0	<input type="text"/>
*IPPINGADDR	Keepalive Ping Address	<input type="text"/>	<input type="text"/>
*MSCIUPDADDR	Status Update Address	/0	<input type="text"/>
*MSCIUPDPERIOD	Status Update Period (Seconds)	0	<input type="text"/>
*TPORT	AT Telnet Port	2332	<input type="text"/>
*TELNETTIMEOUT	AT Telnet Port Timeout (Minutes)	2	<input type="text"/>
DAE	Disable AT Escape	0	<input type="text"/>
*DATZ	Disable ATZ Reset	0	<input type="text"/>
*SNTP	Enable time update	0	<input type="text"/>
*SNTPADDR	SNTP Server Address	<input type="text"/>	<input type="text"/>
*NETWDOG	Network Connection Wait	120	<input type="text"/>
*SNMPPORT	SNMP Port	0	<input type="text"/>
*SNMPSECLVL	SNMP Security Level	0	<input type="text"/>
*SNMPTRAPDEST	SNMP Trap Destination IP	/0	<input type="text"/>
*SNMPCOMMUNITY	SNMP Community String	public	<input type="text"/>

- ***IPPING** sets the interval, in minutes, you want Keepalive to test the network connection. To disable Keepalive, set *IPPING to 0 (default setting).

Note: The minimum time which can be set for Keepalive is fifteen minutes. If you set *IPPING for a value less than the minimum, the minimum value will be set.

- ***IPPINGADDR** sets the IP address you want to use for the connection test.

Caution: If *IPPINGADDR is left blank or is set to an invalid IP address (example, an IP which is unreachable or one which is not a valid IP address), modem performance will be adversely affected.

7.5.2 Data usage using Keepalive

Keepalive is an optional feature. If you frequently pass data with your modem, you most likely do not need to have Keepalive enabled. When using Keepalive, be aware that a ping moves approximately 66 bytes of data over the network, and is billable by your cellular provider. The following *IPPING settings will incur approximate monthly data usage in addition to any other data usage:

8 IP Manager

In This Chapter

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❖ Dynamic Names	63
❖ Using IP Manager with your RLXIC-EH.....	63
❖ Understanding DNS	65

If you have a fleet of RLXIC modems or even if you only have one, it can be difficult to keep track of the current IP addresses, especially if the addresses are not static but change every time the modems connect to Provider. If you need to connect to a modem, or the device behind it, it is so much easier when you have a domain name.

8.1.1 Reasons to contact the modem and/or the connected device:

- Requesting a location update from a delivery truck.
- Contacting a surveillance camera to download logs or survey a specific area.
- An oil derrick that needs to be triggered to begin pumping.
- Sending text to be displayed by a road sign.
- Updating the songs to be played on a juke box.
- Updating advertisements to be displayed in a cab.
- Remote access to a computer, a PLC, an RTU, or other system.
- Monitoring and troubleshooting the status of the modem itself without needing to bring it in or go out to it.

A dynamic IP address is suitable for many Internet activities such as web browsing, looking up data on another computer system, data only being sent out, or data only being received after an initial request (also called Mobile Originated). However, if you need to contact RLXIC-EH directly, a device connected to the modem, or a host system using your RLXIC-EH (also called Mobile Terminated), a dynamic IP will not give you a reliable address to contact (because it may have changed since the last time it was assigned).

Domain names are often only connected to static IP addresses because of the way most domain name (DNS) servers are set-up. Dynamic DNS servers require notification of IP Address changes so they can update their DNS records, and link a dynamic IP address to the correct name.

- Dynamic IP addresses are granted only when your RLXIC-EH is connected, and can change each time the modem reconnects to the network.
- Static IP addresses are granted the same address every time your RLXIC-EH is connected, and are not in use when your modem is not connected.

Because many cellular providers, like wire-based ISPs, do not offer static IP addresses or static address accounts cost a premium vs. dynamic accounts, IP Manager works with a Dynamic DNS server to receive notification from RLXIC modems to translate the modem's dynamic IP address to a fully qualified domain name. Thus, you can contact your RLXIC-EH directly from the Internet using a domain name.

8.2 Understanding Domain Names

A domain name is a name of a server or device on the Internet which is associated with an IP address. Similar to how the street address of your house is one way to contact you and your phone number is another, both the IP address and the domain name can be used to contact a server or device on the Internet. While contacting you at your house address or with your phone number employ different methods, using a domain name instead of the IP address actually uses the same method, just a word based name is commonly easier to remember for most people than a string of numbers.

Understanding the parts of a domain name can help to understand how IP Manager works, and what you need to be able to configure the modem. A fully qualified domain name (FQDN) generally has several parts.

- **Top Level Domain (TLD):** The TLD is the ending suffix for a domain name (.com, .net, .org, etc.)
- **Country Code Top Level Domain (ccTLD):** This suffix is often used after the TLD for most countries except the US (.ca, .uk, .au, etc.)
- **Domain name:** This is the name registered with ICANN (Internet Corporation for Assigned Names and Numbers) or the registry for a the country of the ccTLD (that is, if a domain is part of the .ca TLD, it would be registered with the Canadian domain registry). It is necessary to have a name registered before it can be used.
- **Sub-domain or server name:** A domain name can have many sub-domain or server names associated with it. Sub-domains need to be registered with the domain, but do not need to be registered with ICANN or any other registry. It is the responsibility of a domain to keep track of its own subs.

server123.example.com

- **.com** is the TLD
- `example` is the domain (usually noted as example.com, because the domain is specific to the TLD)
- `server123` is the subdomain or server name associated with the device, computer, or modem registered with example.com.

server123.example.com.ca

This would be the same as above, but with the addition of the country code. In this example, the country code (.ca) is for Canada.

Tip: A URL (Universal Resource Locator) is different from a domain name in that it also indicates information on the protocol used by a web browser to contact that address, such as www.prosoft-technology.com. www.prosoft-technology.com is a fully qualified domain name, but the http://, the protocol identifier, is what makes the whole thing a URL.

8.3 Dynamic Names

When an IP address is not expected to change, the DNS server can indicate to all queries that the address can be cached and not looked up for a long period of time. Dynamic DNS servers, conversely, have a short caching period for the domain information to prevent other Internet sites or queries from using the old information. Because the IP address of a modem with a dynamic account can change frequently, if the old information was used (such as with a DNS server which indicates the address can be cached for a long period of time) when the IP address changed, the domain would no longer point to the new and correct IP address of the modem.

If your RLXIC-EH is configured for Dynamic IP, when it first connects to the Internet, it sends a IP change notification to IP Manager. IP Manager will acknowledge the change, and update the Dynamic DNS server. The new IP address will then be the address for your modem's configured name.

After your modem's IP address has been updated in IP Manager, it can be contacted via name. If the IP address is needed, you can use the domain name to determine the IP address.

Note: The fully qualified domain name of your RLXIC-EH will be a subdomain of the domain used by the IP Manager server.

8.4 Using IP Manager with your RLXIC-EH

To allow your RadioLinX modem to be addressed by name, the modem needs to have a minimum of three elements configured. You can also configure a second dynamic server as a backup, secondary, or alternate server.

In AceManager, select **DYNAMIC IP**.

AT	Name	Value	New Value
*MODEMNAME	Modem Name	psmatt3500	
*DOMAIN	Domain		
*IPMANAGER1	IP Manager Server 1 (IP Adrs)	64.163.70.22	
*IPMGRUPDATE1	IPMServer1 Update (Minutes)	0	
*IPMGRKEY1	IPMServer1 Key	*****	
*IPMANAGER2	IP Manager Server 2 (IP Adrs)	64.163.70.23	
*IPMGRUPDATE2	IPMServer2 Update (Minutes)	0	
*IPMGRKEY2	IPMServer2 Key	*****	

- ***MODEMNAME** : The name you want for the modem. There are some restrictions listed below for the modem name.
- ***DOMAIN** : The domain name to be used by the modem. This is the domain name of the server configured for *IPMANAGER1.
- ***IPMANAGER1** : The IP address or domain name of the dynamic DNS server which is running IP Manager.
- ***IPMANAGER2** : The secondary server for the domain. While it is optional to have two servers configured, it is highly recommended.

Tip: You can use a domain name instead of the IP address for your IP Manager servers if you have DNS set up in your RLXIC-EH.

- ***IPMGRUPDATE1** and ***IPMGRUPDATE2**: How often, in minutes, you want the address sent to IP Manager. If this is set to zero, the modem will only send an update if the IP address changes (example, if your RLXIC-EH is reset or is assigned a different IP address).
- ***IPMGRKEY1** and ***IPMGRKEY2**: User defined password key which is used instead of RadioLinx secret key when using an IP Manager server other than the one provided by ProSoft Technology.

Restrictions for Modem Name

For the Modem Name, you should use something which is unique but also easy to remember. Your company name or the intended function of the modem are recommended. If you have more than one modem, and want to name them the same, you can append a number for each. Because it is an Internet domain name, there are some restrictions for the name.

- Must begin with a letter or number
- Can include a hyphen (-)
- Cannot contain spaces
- Must be no longer than 20 characters total

8.4.1 Data Usage for IP Manager Server Updates

The IP Manager update is a small packet sent to the server with a response sent back to the modem. If you have *IPMGRUPDATE1 or *IPMGRUPDATE2 set to any number but zero, the modem will send the update not only when it receives a new IP address but at the time interval as well. The data traffic could be billed by your carrier.

Each update is a total of 68 bytes from the modem with a 50 byte total response from the server for a round trip update of 118 bytes.

interval (minutes)	total bytes per day (24 hours)
10	16992 bytes
30	5664 bytes
60	2832 bytes
500	339.84 bytes

8.4.2 Eairlink.com

As a service, ProSoft Technology offers an IP Manager server, which can be used for any RadioLinx Intelligent Cellular modem.

Note: The IP Manager service is currently not a guaranteed service, although every effort is made to keep it operational 24/7.

- ***DOMAIN** : eairlink.com
- ***IPMANAGER1** : edns2.eairlink.com
- ***IPMANAGER2** : eairlink.com

Important: Because many modems use the IP Manager service, you must have a unique name for your modem.

8.5 Understanding DNS

The RLXIC-EH has the ability to query DNS servers in order to translate domain names into IP addresses. This allows you to use domain names in place of IP addresses for most of the configuration options requiring IP addresses. This is important if your RLXIC-EH will need to contact another modem or other device that has a domain name but an unknown or dynamic IP address (such as another remote RLXIC-EH using IP Manager).

8.5.1 Configuring DNS

Generally, when your RLXIC-EH receives its IP address from Provider as part of the connection process, it will also receive the DNS servers to use for resolving (or translating) names to IP addresses which it will automatically configure in the modem settings. Unless your RLXIC-EH will be used on a network with other modems or devices which have names internal to the local network or frequently changing IP addresses, the DNS servers provided by Provider should be all you need.

If the RLXIC-EH will be communicating with a device that has a domain name but changes its IP address frequently (such as another RadioLinx modem using IP Manager) or is on a network where devices are accessed by names rather than IP addresses, you will want to put in an alternate DNS (*DNSUSER) where that domain is updated, such as the IP Manager server the remote modem is using or the listing of IP addresses to names is kept.

If you need to manually configure DNS, in AceManager, select **DNS**.

AT	Name	Value	New Value
*DNSUPDATE	DNS Updates	0	<input type="text" value=""/>
*DNS1	Modem DNS Server 1	209.183.35.23	<input type="text" value=""/>
*DNS2	Modem DNS Server 2	209.183.35.23	<input type="text" value=""/>
*DNSUSER	Use Alternate DNS 1	0.0.0.0	<input type="text" value=""/>
	Use Alternate DNS 2	0.0.0.0	<input type="text" value=""/>

- ***DNSUPDATE** - This command sets how often you want DNS Updates to be requested. Otherwise the RLXIC-EH will only send updates when it is reset, powered up, or the IP address is granted by network changes.
- **Use Alternate DNS 2** - Set another DNS User.

Note: You can set up a second DNS User, if you have two DNS users.

- ***DNS1** and ***DNS2** - The primary and secondary DNS servers set by Provider when your RLXIC-EH gets its IP address.
- ***DNSUSER** - Set this, if desired, to an additional DNS server to query first before the primary or secondary (just as a hosts file is queried first on a computer). If ***DNSUSER** is set to 0.0.0.0, it will be ignored.

8.5.2 The "PPP-Peer" Domain Name

The RLXIC-EH uses the unqualified domain name of "ppp-peer" when it is in PPP or SLIP address mode to resolve the address of the device or computer connected via PPP or SLIP address. If the RLXIC-EH is not in PPP or SLIP address mode, "ppp-peer" will resolve to 0.0.0.0.

9 SNMP : Simple Network Management Protocol

In This Chapter

- ❖ SNMP Configuration..... 68
- ❖ SNMP MIB Definition Sample..... 70

The Simple Network Management Protocol (SNMP) was designed to allow remote management and monitoring of a variety of devices from a central location. The SNMP management system is generally composed of agents (such as your RLXIC-EH, a router, a UPS, a web server, a file server, or other computer equipment), and a Network Management Station (NMS) which monitors all the agents on a specific network. Using the management information base (MIB), an NMS can include reporting, network topology mapping, tools to allow traffic monitoring and trend analysis, and device monitoring.

Authentication ensures SNMP messages coming from the agent, such as the RLXIC-EH, have not been modified, and the agent may not be queried by unauthorized users. SNMPv3 uses a User-Based Security Model (USM) to authenticate, and, if desired or supported, message encryption. USM uses a user name and password specific to each device.

The RLXIC-EH can be configured as an SNMP agent, and supports SNMPv2c and SNMPv3.

9.1.1 Management Information Base (MIB)

The management information base (MIB) is a type of database used to compile the information from the various SNMP agents. Reports from various agents, such as the RLXIC-EH, are sent as data in form designed to be parsed by the NMS into its MIB. The data is hierarchical with entries addressed through object identifiers.

9.1.2 SNMP Traps

SNMP traps are alerts that can be sent from the managed device to the Network Management Station when an event happens. Your RLXIC-EH is capable of sending the linkUp trap when the network connection becomes available.

9.2 SNMP Configuration

To configure your RLXIC-EH to work as an SNMP agent, you can use either AceManager, or a terminal connection to configure the modem using AT commands. In AceManager, the SNMP commands are all part of the **Other** group under the **Common** group.

There are only three commands to set for SNMP in the RLXIC-EH: the listening port, the security level, and the trap destination.

*SNMPPORT	SNMP Port	0	
*SNMPSECLVL	SNMP Security Level	0	
*SNMPTRAPDEST	SNMP Trap Destination IP	/0	
*SNMPCOMMUNITY	SNMP Community String	public	

9.2.1 Listening Port

*SNMPPORT sets the port for the SNMP agent to listen on. If set to zero, default, SNMP is disabled.

Tip: SNMP generally uses port 161, however most Internet providers (including cellular) block all ports below 1024 as a security measure. You should be able to use a higher numbered port such as 10161.

9.2.2 Security Level

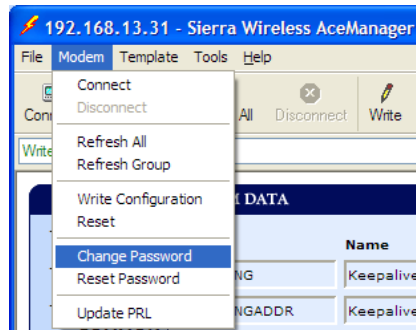
*SNMPSECLVL sets the security level and which version of SNMP communications are used.

- **0** - No security required. SNMPv2c and SMNPv3 communications are allowed.
- **1** - Authentication required. SNMPv3 is required to do authentication, and SNMPv2c transmissions will be silently discarded. Authentication is equivalent to the authNoPriv setting in SNMPv3.
- **2** - Authentication required, and messages are encrypted. SNMPv3 is required to do authentication. SNMPv2c, and SNMPv3 authNoPriv transmissions will be silently discarded. Authentication and encryption is equivalent to the authPriv setting in SNMPv3.

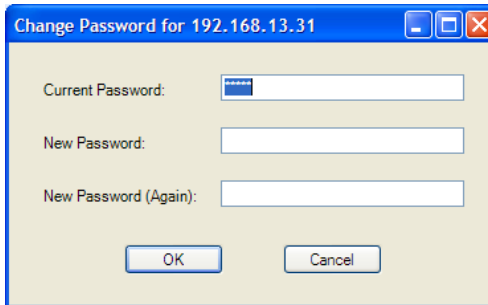
9.2.3 User Name and Password

The user name is "**user**". The user name cannot be changed. The RLXIC-EH's password is used as the SNMP password (default is "**12345**").

To change the password in the RLXIC-EH, select **Modem** from the top menu line in AceManager.



The current password will be pre-entered. As you type the new password and confirm it, the characters you type will be obscured by "x". For the password, you can use numbers, letters, and/or punctuation.



Caution: The password is case sensitive. "drowssaP" is not the same as "drowssap".

9.2.4 Trap Destination

*SNMPTRAPDEST needs to be set with the destination IP and port. If either are set to zero or empty, SNMP traps are disabled.

Note: Traps are sent out according to the SNMP security level (that is, if the security level is 2, traps will be authenticated and encrypted). Currently, the only trap supported is LinkUp.

9.2.5 Community String

The community string can be configured using *SNMPCOMMUNITY. The default is "public".

9.3 SNMP MIB Definition Sample

```
AIRLINK-MIB DEFINITIONS ::= BEGIN
IMPORTS
ObjectName FROM SNMPv2-SMI
MODULE-COMPLIANCE FROM SNMPv2-CONF;
org OBJECT IDENTIFIER ::= { iso 3 }
dod OBJECT IDENTIFIER ::= { org 6 }
internet OBJECT IDENTIFIER ::= { dod 1 }
private OBJECT IDENTIFIER ::= { internet 4 }
enterprises OBJECT IDENTIFIER ::= { private 1 }
airlink OBJECT IDENTIFIER ::= { enterprises 20542 }
general OBJECT IDENTIFIER ::= { radiolinx 1 }
common OBJECT IDENTIFIER ::= { radiolinx 2 }
status OBJECT IDENTIFIER ::= { radiolinx 3 }
gps OBJECT IDENTIFIER ::= { radiolinx 4 }
-- GENERAL --
phoneNumber OBJECT-TYPE
SYNTAX DisplayString (SIZE (10))
MAX-ACCESS read-only
STATUS current
::= { general 1 }
deviceID OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS read-only
STATUS current
::= { general 2 }
electronicID OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS read-only
STATUS current
::= { general 3 }
modemType OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS read-only
STATUS current
::= { general 4 }
aleosSWVer OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS read-only
STATUS current
::= { general 5 }
aleosHWVer OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS read-only
STATUS current
::= { general 6 }
modemSWVer OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS read-only
STATUS current
::= { general 7 }
modemHWVer OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS read-only
STATUS current
```

```

    ::= { general 8 }
  -- COMMON --
  date OBJECT-TYPE
  SYNTAX DisplayString
  MAX-ACCESS read-only
  STATUS current
    ::= { common 1 }
  otaProgrammingEnable OBJECT-TYPE
  SYNTAX INTEGER {
  disabled(0),
  enabled(1) }
  MAX-ACCESS read-only
  STATUS current
    ::= { common 2 }
  devicePort OBJECT-TYPE
  SYNTAX INTEGER(0..65535)
  MAX-ACCESS read-only
  STATUS current
    ::= { common 3 }
  netUID OBJECT-TYPE
  SYNTAX DisplayString
  MAX-ACCESS read-only
  STATUS current
    ::= { common 4 }
  netPW OBJECT-TYPE
  SYNTAX DisplayString
  MAX-ACCESS read-only
  STATUS current
    ::= { common 5 }
  requestPAP OBJECT-TYPE
  SYNTAX INTEGER {
  no(0),
  yes(1) }
  MAX-ACCESS read-only
  STATUS current
    ::= { common 6 }
  destinationAddress OBJECT-TYPE
  SYNTAX DisplayString
  MAX-ACCESS read-only
  STATUS current
    ::= { common 7 }
  destinationPort OBJECT-TYPE
  SYNTAX INTEGER(0..65535)
  MAX-ACCESS read-only
  STATUS current
    ::= { common 8 }
  serialPortSettings OBJECT-TYPE
  SYNTAX DisplayString
  MAX-ACCESS read-only
  STATUS current
    ::= { common 9 }
  serialPortFlowControl OBJECT-TYPE
  SYNTAX INTEGER {
  none(0),
  hardware(2),
  software(4) }

```

```
MAX-ACCESS read-only
STATUS current
 ::= { common 10 }
-- STATUS --
ipAddress OBJECT-TYPE
SYNTAX IpAddress
MAX-ACCESS read-only
STATUS current
 ::= { status 1 }
netState OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS read-only
STATUS current
 ::= { status 2 }
netChannel OBJECT-TYPE
SYNTAX INTEGER
MAX-ACCESS read-only
STATUS current
 ::= { status 3 }
rssi OBJECT-TYPE
SYNTAX INTEGER(-125..-50)
MAX-ACCESS read-only
STATUS current
 ::= { status 4 }
serialSent OBJECT-TYPE
SYNTAX INTEGER
MAX-ACCESS read-only
STATUS current
 ::= { status 5 }
serialReceived OBJECT-TYPE
SYNTAX INTEGER
MAX-ACCESS read-only
STATUS current
 ::= { status 6 }
hostMode OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS read-only
STATUS current
 ::= { status 7 }
powerMode OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS read-only
STATUS current
 ::= { status 8 }

fixObtained OBJECT-TYPE
SYNTAX INTEGER {
no(0),
yes(1) }
MAX-ACCESS read-only
STATUS current
 ::= { gps 1 }

satelliteCount OBJECT-TYPE
SYNTAX INTEGER
MAX-ACCESS read-only
```



```

STATUS current
 ::= { gps 2 }
latitude OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS read-only
STATUS current
 ::= { gps 3 }
longitude OBJECT-TYPE
SYNTAX DisplayString
MAX-ACCESS read-only
STATUS current
 ::= { gps 4 }
END
  
```

9.3.1 Display Responses

The string that is displayed for these objects is the same display for the corresponding AT Command.

Object	AT Command
phoneNumber	*NETPHONE?
deviceID	*DEVICEID?
electronicID	I3
aleosSWVer	I1
aleosHWVer	I1
modemSWVer	I2
modemHWVer	I2
date	*DATE?
otaProgrammingEnable	OPRG?
devicePort	*DPORT?
netUID	*NETUID?
netPW	*NETPW?
requestPAP	*HOSTPAP?
destinationAddress	S53
destinationPort	S53
serialPortSettings	S23
serialPortFlowControl	\Q
ipAddress	*NETIP?
netState	*NETSTATE?
netChannel	*NETCHAN?
rssi	*NETRSSI?
hostMode	*HOSTMODE?

9.3.2 Product ID

Each modem type has a unique ID associated with it so you can more easily identify the modem from its type on your network.

10 Configuration Commands

In This Chapter

- ❖ Info (Information) 75
- ❖ Status 77
- ❖ Common 79
- ❖ Logging 97
- ❖ Cellular 99

The configuration commands (AT commands) in this chapter are arranged according to their placement in AceManager.

Note: Some commands can only be configured using a terminal emulation and typed AT commands. Some commands also require PassThru mode.

Tip: You can use a fully qualified domain name instead of an IP address for most configuration options calling for an IP address if your RLXIC-EH is configured to use DNS. DNS settings frequently come directly from your cellular provider while your RLXIC-EH is registering on the cellular network, and receiving its IP address.

10.1 Info (Information)

The commands in the "Info" group have read-only parameters. They only provide information about the modem. Some of the information displayed in this group does not correspond directly to AT commands.

GROUPS	MODEM DATA		PRINTABLE VIEW
INFO	AT	Name	Value
----- STATUS -----	*NETPHONE	Phone Number	16086980341
COMMON	*DEVICEID	Device ID	0x00000260006A82F5
Misc		Modem Name	psmatt3500
USB		Modem EID/IMEI	354220010033500
DNS		Modem Type	Raven XE HSUPA
Dynamic IP	*ETHMAC	Ethernet Mac Address	00143E01589B
PPP/Ethernet	I1	ALEOS Software Version	H2223E_3.4.3.000 Feb 20 2009
SMTP		Modem Hardware Configuration	0c110000004000000000000000000000
Other		Modem Software Version	F1_0_0_12AP C:/WS/FW/F1_0_0_12AP/MSM7200R3/SRC/AMSS 2008/01/01 14:18:44
Firewall		Modem Hardware Version	MC8781
Port Forwarding		Boot Version	3.5.9
----- LOGGING -----		MSCI Version	5
REPORT			
Server 1			
----- CELLULAR -----			
IPSEC			
----- GRE -----			
I/O			

*NETPHONE?

The modem's phone number, if applicable or obtainable.

*DEVICEID?

The 64-bit device ID the modem uses to identify itself to the cellular network.

*ETHMAC?

The MAC address of the Ethernet port.

In

- **n=0** : Product name (for example, RLXIC-EH).
- **n=1** : The RLXIC-EH's firmware (ALEOS) version, hardware ID, and copyright.
- **n=2** : The internal hardware's firmware version, and relevant hardware ID.
- **n=3** : The hardware module's unique identification number or serial number.
- **n=5** : View active profile (the contents of the active registers). *Not displayed with AceManager.*

&V

View active profile, the contents of the active registers. *Not displayed with AceManager.*

10.1.1 Information Displayed in AceManager without AT Commands Listed

- **Versions of ALEOS, internal hardware, boot, and MSCI:** Versions of internally configured hardware and software.

10.2 Status

Most of the commands in the "Status" group have read-only parameters, and provide information about the modem. The Status Group has more fields that can be displayed on most screens. You can either resize your window or use the scroll bar on the side to display the remainder.

AT	Name	Value
*NETIP	Network IP	0.0.0.0
*NETSTATE	Network State	Connecting To Network
*NETSERV	Network Service Type	None
*NETCHAN	Channel	0
*NETRSSI	RSSI (dBm)	-110
+ECIO	EC/IO	-32767.5
*NETOP	Current Network Operator	, 0
+ICCID	SIM ID	
+CIMI	IMSI	310410235280477
	Host Mode	AT
	Host Signl Level	DCD: LOW DTR: LOW DSR: HIGH CTS: HIGH RTS: HIGH
*NETERR	Network Error Rate	0
	Network Bytes Sent	0
	Network Bytes Rcvd	0
	Network IP Packets Sent	0
	Network IP Packets Rcvd	0
	Host IP Packets Sent	5
	Host IP Packets Rcvd	6
	Number of System Resets	22
	IP Reject Count	0
*POWERIN	Power IN Voltage	12.01

*NETIP?

Note: If there is no current network IP address, 0.0.0.0 may be displayed.

The current IP address of the modem reported by the internal module, generally obtained from your cellular provider. This is the address can contact the RLXIC-EH from the Internet.

Tip: Use *NETALLOWZEROIP if you need to allow the display of an IP ending in a zero.

*NETSTATE?

The current network state:

- **Connecting To Network:** The RLXIC-EH is in the process of trying to connect to the cellular network.
- **Network Authentication Fail:** Authentication to the cellular network has failed. Verify settings to activate the RLXIC-EH.
- **Data Connection Failed:** The RLXIC-EH failed to connect, and it is now waiting a set time interval before it attempts to reconnect. Verify settings to activate the RLXIC-EH.

- **Network Negotiation Fail:** Network connection negotiation failed. This is usually temporary, and often clears up during a subsequent attempt.
- **Network Ready:** The RLXIC-EH is connected to the 1x cellular network, and ready to send data.
- **Network Dormant:** The RLXIC-EH is connected to the 1x cellular network, but the link is dormant. It will be woken up when data is sent or received.
- **No Service:** There is no cellular network detected.
- **Hardware Reset:** The internal module is being reset. This is a temporary state.

*NETSERV?

The type of service being used by the modem, for example Tech.

*NETCHAN?

The current active channel number.

*NETRSSI?

The current RSSI (Receive Signal Strength Indicator) of the RLXIC-EH as a negative dBm value.

Tip: The same information is displayed with the command S202?.

*NETOP?

The current cellular carrier from the modem's firmware version, for example, your cellular provider.

+ICCID

Subscriber Identity Module ID. .

*NETERR?

The EDGE or GPRS network bit error rate.

*POWERIN?

The voltage input to the internal hardware.

*HOSTMODE?

The current host mode (AT, PPP, UDP, etc.). If the RLXIC-EH is not in AT mode, telnet into the modem to execute this command.

+RCIQ

Current Cell Info Information. GPRS or EDGE Only.

10.2.1 Information Displayed in AceManager without AT Commands Listed

- **Bytes and Packets Received and Sent:** Network traffic for the applicable port.
- **Number of System Resets:** Counter of the number of system resets over the life of the modem or since the configuration was reset.
- **Bad Password Count:** Counter of the number of bad password attempts.
- **IP Reject Count or Log:** Rejected IP Data.
- **Temperature of the Internal Hardware Module:** The temperature of the internal radio module.

10.3 Common

The groups under the heading Common encompass those commands that are common to most RadioLinx modems.

10.3.1 Misc (Miscellaneous)

The commands of the "Misc" group are a variety of commands that do not directly fit in other categories.

AT	Name	Value	New Value
*DATE	Date and Time	02/01/2000 00:00:27	
OPRG	Enable Over-the-Air Programing	1	
*NETPHONE	Phone Number	16086980341	
	Force Static IP	0.0.0.0	
*DPORT	Device Port	12345	
*NETUID	Network User ID	xoewrlusla@wwan.ccs	
*NETPW	Network Password	thuPu8re2u	
*NETALLOWZEROIP	Allow Last Byte of net IP = Zero	1	
*HOSTPAP	Request PAP	0	
SS3	Destination Address		
SS3	Destination Port	0	
SS3	Default Dial Code	T	
	Enable Event Reporting	0	
	Enable AceWeb	1	

*DATE=[mm/dd/yyyy].[hh:mm:ss]

Sets and queries the internal clock. Either the date and time can be specified, or simply one of the two can be specified in which case the unspecified value will remain unchanged. The date and time are always specified 24-hour notation.

- **mm/dd/yyyy=date** in month/day/year notation
- **hh:mm:ss=time** in 24-hour notation

OPRG=*n*

Enables/disables over-the-air firmware upgrading of the RLXIC-EH. When ProSoft Technology releases a new version of ALEOS, you can upgrade your remote modems with OPRG enabled.

- **n=0** : Disables
- **n=1** : Enables

*NETPHONE?

The modem's phone number, if applicable or obtainable.

*DPORT=*n*

The modem's Device Port which the modem is listening on for inbound packets/data/polls. Can also be set with the command S110.

- **n=1-65535**

*NETUID=*uid*

The login that is used to login to the cellular network, when required.

- **uid=user id** (up to 64 bytes)

*NETPW=*pw*

The password that is used to login to the cellular network, when required.

- **pw=password** (30 characters maximum)

*NETALLOWZEROIP=*n*

Allows the displayed IP address in *NETIP to end in zero (ex. 192.168.1.0).

- **n=0** : Do not allow.
- **n=1** : Allow.

*HOSTPAP=*n*

Use PAP to request the user login and password during PPP negotiation on the host connection.

- **n=0** : Disable PAP request (Default).
- **n=1** : Takes user login and password from Windows DUN connection, and copies to *NETUID and *NETPW.

S53=[*method*][*d.d.d*][/*ppppp*]

Destination IP address, port, and method. These are used as defaults for the D (Dial) AT command.

- **method= P** : UDP
- **method=T** : TCP
- **method=N** : Telnet

- **d.d.d.d**=IP address or domain name
- **ppppp**=the port address

Examples:

ATS53=T192.168.100.23/12345
ATS53=foo.earlink.com

Telnet to the specified IP at port 12345.

ATS53=192.168.100.23/12345

Query the specified IP at port 12345.

ATS53=/12345

Query port 12345.

Enable Event Reporting = n

Enable or disable Event Reporting, by selecting either 1-Turn on ER or 0-Turn off ER. If you choose to enable, click on Write, and then Refresh all to see all the ER fields.

- **n=0** : Disables
- **n=1** : Enables

+++

Note: +++ is not preceded by AT nor does it require a carriage return (enter). There must be an idle time (set by S50) on the serial port before and after this command.

AT Escape sequence. If the RLXIC-EH is in a data mode (any mode other than PassThru), this command causes the modem to re-enter AT command mode. The "+" is ASCII 0x2B. +++ is not available in AceManager.

Tip: DAE=1 disables the +++ command.

A/

Note: A/ is not preceded by AT.

Re-execute last command. A/ is not used in AceManager.

A

Manually answer an incoming connection. A is not used in AceManager.

D[method][d.d.d.d][ppppp] or D[method][@name][ppppp]

Dial a connection to a remote IP and Port using method. Cannot be configured in AceManager.

- **method=P** : Establish a UDP connection
- **method=T** : Establish a TCP connection

- **method=N** : Establish a Telnet connection
- **d.d.d.d=** IP address to contact
- **ppppp=** port to contact

Examples:

ATD - Dial (establish) default connection.

ATDP192.168.13.31/2332 - Dial (establish) UDP session to 192.168.13.31, at port 2332.

To end the connection, issue the +++ escape sequence or drop the DTR line (if Ignore DTR S211=0 or &D2). The default connection is set in S53.

If the method, IP address, or port is omitted, the values from S53 are used. If a telnet connection is requested (N), and the port is not supplied, port 23 will be used instead of the value from S53.

If a domain name is specified, the "@" symbol can be used to explicitly indicate the start of the name. For example, if ATDPHONY is issued, this will be interpreted as dial a UDP connection to "HONY". To dial using the default method to host "PHONY", one would issue ATD@PHONY.

Several special dialing numbers exist to make it easy to establish a PPP or SLIP connection with the modem. ATD#19788 or ATDT#19788 will establish a PPP connection (see \APPP) and ATDT#7547 will establish a SLIP connection (see \ASLIP).

Tip: The source port of the session is the Device Port (set by S110 or *DPORT).

DS=n

Allows a PPP connection to be initiated on the host port.

- **n=2** : Initiates the PPP connection.

Cannot be configured in AceManager.

Hn

Hang-Up Command.

- **n=1** : Hang-up

With an AT telnet connection, this command will terminate the host data mode, and return the RLXIC-EH to an AT mode. Cannot be accessed in AceManager.

O

Online (Remote): Causes the RLXIC-EH to go from Command State to data state. Cannot be configured in AceManager.

Vn

Command Response Mode.

- **n=0** : Terse (numeric) command responses
- **n=1** : Verbose command responses (Default).

Z

Reset the RLXIC-EH. In AceManager, this command is performed with the Reset option on the toolbar.

Tip: *DATZ=1 will disable Z.

&W

Writes all changed modem settings. If this command is not issued, any modified values will revert back to their previous values at modem reset. Cannot be configured in AceManager.

*STATICIP=d.d.d.d

Set the static IP required to be received from the network. If the modem does not get this IP address from the network, it will reset the internal hardware, and try again. The default is 0.0.0.0, which allows any IP address from the network.

- **d.d.d.d=IP address**

Example:

AT*STATICIP=192.168.1.23

Caution: STATICIP does not set the IP address of the modem, it merely tells the modem which IP address to expect. If the expected IP address is not granted while registering on the cellular network, the modem will try to register on the network again until it receives that IP address. If your account is set up for a dynamic IP address, and you set an address for *STATICIP, you may not be able to register on the network at all because there is no guarantee you will receive the same dynamic IP address again.

*STATUSCHK=n

Checks if an SMS message has been received by the modem.

- **n=1-255** : Seconds between checks.
- **n=0** : Never check.

*MODEMHISPEED

Set the internal serial link speed to the internal (radio) module.

- **n=0** : 115200 (default)
- **n=1** : 230400

10.3.2 DNS

This group includes commands specific to the modem being able to use domain names instead of IP addresses for other configuration options.

AT	Name	Value	New Value
*DNSUPDATE	DNS Updates	0	<input type="text"/>
*DNS1	Modem DNS Server 1	209.183.35.23	<input type="text"/>
*DNS2	Modem DNS Server 2	209.183.35.23	<input type="text"/>
*DNSUSER	Use Alternate DNS 1	0.0.0.0	<input type="text"/>
	Use Alternate DNS 2	0.0.0.0	<input type="text"/>

*DNSUPDATE=n

Indicates whether the modem should send DNS updates to the DNS server specified by *DNSUSER. These updates are as per RFC2136. They are not secure and are recommended only for a private network. In a public network, the IP Logger services should be used instead.

- **n=0** : DNS updates disabled (Default).
- **n=1** : DNS updates enabled.

*DNSn=d.d.d.d

Queries the DNS addresses. Your cellular carrier provides the DNS addresses while your modem is registering on their network.

- **n=1** or **2** : First and second DNS address.
- **d.d.d.d=IP address** of domain server.

*DNSUSER=d.d.d.d

Sets a user-provided DNS to query first when performing name resolutions in the modem.

- **d.d.d.d=IP address** of domain server

Note: You can set up a second DNS User, if you have two DNS users.

10.3.3 Dynamic IP

This group includes commands specific to dynamic DNS. Dynamic DNS allows the RLXIC-EH to use a dynamic IP address account, with an IP address that can change each time you connect, and still allow you to use a fully qualified domain name to contact the RLXIC-EH using IP Manager running on a server with a dynamic DNS updater.

AT	Name	Value	New Value
*MODEMNAME	Modem Name	rlxic	
*DOMAIN	Domain		
*IPMANAGER1	IP Manager Server 1 (IP Adrs)		
*IPMGRUPDATE1	IPMServer1 Update (Minutes)	0	
*IPMGRKEY1	IPMServer1 Key	*****	
*IPMANAGER2	IP Manager Server 2 (IP Adrs)		
*IPMGRUPDATE2	IPMServer2 Update (Minutes)	0	
*IPMGRKEY2	IPMServer2 Key	*****	

*MODEMNAME=name

Name of the RLXIC-EH (up to 20 characters long) to use when performing IP address change notifications to IP Manager. The value in *DOMAIN provides the domain zone to add to this name.

- **name=modem name** (for example, mymodem)

Example: if *MODEMNAME=mymodem and *DOMAIN=eairlink.com, then the modem's fully qualified domain name is mymodem.eairlink.com.

Automatically Generated Names:

#I3 - The ESN/IMEI will be used as the name.

#CCID - The CCID will be used as the name.

#NETPHONE - The phone number will be used as the name.

Tip: Each modem using IP Manager needs a unique name. Two modems cannot be called "mymodem". One could be "mymodem1" with the other as "mymodem".

*DOMAIN=name

Domain (or domain zone) of which the RLXIC-EH is a part. This value is used during name resolutions if a fully qualified name is not provided, and also for DNS updates. This value can be up to 20 characters long.

- **name=domain name** (that is, eairlink.com)

If *DOMAIN=eairlink.com, then when ATDT@remote1 is entered, the fully qualified name remote1.eairlink.com will be used to perform a DNS query to resolve the name to an IP address.

Tip: Only letters, numbers, hyphens, and periods can be used in a domain name.

**IPMANAGERn=[name][IP address]*

Sets a domain name or IP address to send IP change notifications to. Up to two independent IP Manager servers can be set, using either AT*IPMANAGER1 or AT*IPMANAGER2. Updates to a server can be disabled by setting that entry to nothing (for example, "AT*IPMANAGER1=").

- **n=1** : First IP Manager server.
- **n=2** : Second IP Manager server.
- **name=domain name**

**IPMGRUPDATEn=m*

Sets the number of minutes to periodically send an IP update notification to the corresponding server. This will occur even if the IP address of the RLXIC-EH does not change. *IPMGRUPDATE1 is used to set the refresh rate to *IPMANAGER1, while *IPMGRUPDATE2 is used with *IPMANAGER2. If the value is set to 0, then periodic updates will not be issued (that is, IP change notifications will only be sent when the IP actually changes).

- **n=1** : First IP Manager server.
- **n=2** : Second IP Manager server.
- **m=0, 5-255** : Number of minutes to send an update.

**IPMGRKEYn=key*

Sets the 128-bit key to use to authenticate the IP update notifications. If the key's value is all zeros, a default key will be used. If all the bytes in the key are set to FF, then no key will be used (that is, the IP change notifications will not be authenticated). AT*IPMGRKEY1 is used to set the key to use with AT*IPMANAGER1, while AT*IPMGRKEY2 is used to the key with AT*IPMANAGER2.

- **n=1** : First IP Manager server.
- **n=2** : Second IP Manager server.
- **key=128-bit key** in hexadecimal [32 hex characters]

10.3.4 PPP/Ethernet

This group includes commands specific to PPP (serial) or Ethernet connections between the RLXIC-EH and a connected device.

AT	Name	Value	New Value
*HOSTPRIVMODE	Use Private IP	1	<input type="text"/>
*HOSTPRIVIP	Host Private IP	192.168.13.100	<input type="text"/>
	DHCP network mask	255.255.255.0	<input type="text"/>
*HOSTPEERIP	Modem Local IP	192.168.13.31	<input type="text"/>
*HOSTNETMASK	Ethernet Host network mask	0.0.0.0	<input type="text"/>
*HOSTAUTH	Host Authentication Mode	0	<input type="text"/>
*HOSTUID	Host User ID	ZCFzUUeLycb2ug01L+3Ikw==	<input type="text"/>
*HOSTPW	Host Password	ZCFzUUeLycb2ug01L+3Ikw==	<input type="text"/>
*DHCPSEVER	DHCP Server Mode	1	<input type="text"/>
	Host Network 2	0.0.0.0	<input type="text"/>
	Host network mask 2	255.255.255.255	<input type="text"/>
	Host Network 3	0.0.0.0	<input type="text"/>
	Host network mask 3	255.255.255.255	<input type="text"/>
	Default Interface	0	<input type="text"/>
	Default IP	0.0.0.0	<input type="text"/>

*HOSTPRIVMODE=n

Set or query whether a private or public (network) IP is to be used when the Host initiates a 1x connection to the modem.

- **n=0** : Public (network) IP Mode: When the Host initiates a PPP connection, the host will be given the network IP address that was obtained from the cellular carrier while registering on the network. If the network issues a new IP address, the cellular connection will be closed (because the IP address has changed) and has to be re-initiated. (default).
- **n=1** : Private IP Mode: When the Host initiates a 1x connection, the host will be given the IP address specified in *HOSTPRIVIP. The modem will then perform 1 to 1 NAT-like address translation, which shields the Host from network IP changes.

*HOSTPRIVIP=d.d.d.d

Set or query the private IP address that is to be negotiated by the 1x connection if *HOSTPRIVMODE =1.

- **d.d.d.d=IP Address**

*HOSTPEERIP=d.d.d.d

Set or query the IP address that can be used to directly contact the RLXIC-EH after a cellular connection is established. If this value is not specified, 192.168.13.31 will be used.

- **d.d.d.d=local or peer IP address** of the modem.

Note: This is not normally used nor needed by user applications.

*HOSTNETMASK=n.n.n.n

Subnet mask for the host interface. Allows communication with a subnet behind the host interface.

- **n.n.n.n = subnet mask**, example 255.255.255.0.

*HOSTAUTH=n

Host Authentication Mode: Use PAP or CHAP to request the user login and password during PPP or CHAP negotiation on the host connection. The username and password set in *HOSTUID and *HOSTPW will be used.

- **n=0** : Disable PAP or CHAP request (Default).
- **n=1** : PAP and CHAP.
- **n=2** : CHAP

*HOSTUID=string

Host User ID for PAP or CHAP.

- **string=user id** (up to 64 bytes)

*HOSTPW=string

Host Password for PAP or CHAP.

- **string=password**

*DHCPSEVER=n

Act as a DHCP server for any Ethernet device connecting to the RLXIC-EH. DHCP (Dynamic Host Configuration Protocol) allows one device, the DHCP server, to provide dynamic IP addresses to any other device which requests them.

- **n=0** : Disabled. The RLXIC-EH will not send out replies to DHCP requests.
- **n=0** : Disabled (cannot be configured in AceManager).
- **n=0** : Disables the DHCP server.
- **n=1** : Enabled. The modem will act as the primary DHCP server for the network.
- **n=2** : Enabled if no other DHCP server is detected (default). If another DHCP server is detected on the network, the RLXIC-EH will not send out replies to DHCP requests.
- **n=0** : Disabled. The RLXIC-EH will not send out replies to DHCP requests.

10.3.5 SMTP

SMTP (Simple Mail Transfer Protocol) is the de facto standard for email transmission across the Internet. The RLXIC-EH can send messages using SMTP if it has been configured to use a mail server.

Note: You cannot send an Email with your RLXIC-EH unless the Email server you have configured allows your RLXIC-EH as a relay host. Talk to your network administrator to ensure you can send email through the email server using your RLXIC-EH.

SMS (Short Message Service) is another way to send messages via the cellular network. Most SMS commands require the modem to be in PassThru mode.

Note: SMS may not be supported by your account with your cellular carrier.

AT	Name	Value	New Value
*SMTPADDR	SMTP Server IP Address	<input type="text"/>	<input type="text"/>
*SMTPFROM	From email address	<input type="text"/>	<input type="text"/>
*SMTPUSER	User Name (optional)	<input type="text"/>	<input type="text"/>
*SMTPPW	Password (optional)	*****	<input type="text"/>
*SMTPSUBJ	SMTP Message Subject	<input type="text"/>	<input type="text"/>

*SMTPADDR=[d.d.d.d][name]

Specify the IP address or Fully Qualified Domain Name (FQDN) of the SMTP server to use.

- **d.d.d.d=IP Address**
- **name=domain name** (maximum: 40 characters).

*SMTPFROM=email

Sets the email address from which the SMTP message is being sent.

- **email=email address** (maximum: 30 characters).

*SMTPUSER=user

The email account username to authenticate with the SMTP server (*SMTPADDR) for sending email.

- **user=username** (maximum: 40 characters).

Note: Not required to use SMTP settings but may be required by your cellular carrier.

*SMTPPW=pw

Sets the password to use when authenticating the email account (*SMTPFROM) with the server (*SMTPADDR).

- **pw= password**

Note: Not required to use SMTP settings but may be required by your cellular carrier.

*SMTPSUBJ=subject

Allows configuration of the default Subject to use if one is not specified in the message by providing a "Subject: xxx" line as the initial message line.

- **subject=message subject**

*SMTPSEND=email[body]

Sends an email to the address specified, followed by the body of the email message. The email message is terminated and sent by entering a . or Ctrl-Z on an empty line. Cannot be configured with AceManager.

- **email=email address**
- **body=message body**

*SMTPSTATUS?

Returns the status of the last issued SMTP message (*SMTPSEND). If no status is available 0 is returned. After the status is read, it is cleared out. The status codes returned come from the SMTP server to which that the modem sent the request. Unless the receiving server is not standard, they follow the RFC for SMTP. Cannot be used with AceManager.

Example:

```
354 = send in progress
250 = sent ok
```

*NETSMS2EMAIL=n

Specify the SMS/E-mail server number. This maybe necessary to send an SMS message to an email address. Cannot be used with AceManager.

- **n=SMS/E-mail server number**

10.3.6 Other

AT	Name	Value	New Value
*IPPING	Keepalive Ping Time	15	<input type="text"/>
*IPPINGADDR	Keepalive Ping Address	pingtest.sierrawireless.com	<input type="text"/>
*MSCIUPDADDR	Status Update Address	/0	<input type="text"/>
*MSCIUPDPERIOD	Status Update Period (Seconds)	0	<input type="text"/>
*TPORT	AT Telnet Port	2332	<input type="text"/>
*TELNETTIMEOUT	AT Telnet Port Timeout (Minutes)	2	<input type="text"/>
DAE	Disable AT Escape	0	<input type="text"/>
*DATZ	Disable ATZ Reset	0	<input type="text"/>
*SNTP	Enable time update	0	<input type="text"/>
*SNTPADDR	SNTP Server Address		<input type="text"/>
*NETWDOG	Network Connection Wait	120	<input type="text"/>
*SNMPPORT	SNMP Port	0	<input type="text"/>
*SNMPSECLVL	SNMP Security Level	0	<input type="text"/>
*SNMPTRAPDEST	SNMP Trap Destination IP	/0	<input type="text"/>
*SNMPCOMMUNITY	SNMP Community String	public	<input type="text"/>

*IPPING=n

Set the period to ping (if no valid packets have been received) a specified address (*IPPINGADDR) to keep the modem alive (online).

- **n=0** : Disable pinging (default)
- **n=15-255** minutes

Note: 15 minutes is the minimum interval which can be set for Keepalive. If you set *IPPING for a value between 0 and 15, the minimum value of 15 will be set.

*IPPINGADDR=[d.d.d.d][name]

Set the IP address or valid internet domain name for the RLXIC-EH to ping to keep itself alive (online). *IPPING must to be set to a value other than 0 to enable pinging.

- **d.d.d.d=IP address**
- **name=domain name**

*MSCIUPDADDR=name[/port]

Modem Status Update Address - where Name/Port is the domain name and port of the machine where the modem status updates will be sent. The status parameters of the RLXIC-EH are sent in an XML format.

- **name=domain name**
- **port=port**

*MSCIUPDPERIOD=*n*

Modem Status Update Period - where *n* defines the update period in seconds.

- **n=0** : Disabled.
- **n=1-255** seconds

*TPORT=*n*

- Sets or queries the port used for the AT Telnet server. If 0 is specified, the AT Telnet server will be disabled. The default value is 2332.
- **n=0** : Disabled.
- **n=1-65535**

Tip: Many networks have the ports below 1024 blocked. It is recommended to use a higher numbered port.

*TELNETTIMEOUT=*n*

Telnet port inactivity time out. By default, this value is set to close the AT telnet connection if no data is received for 2 minutes.

- **n=minutes**

DAE=*n*

AT Escape Sequence detection.

- **n=0** : Enable
- **n=1** : Disable

*DATZ=*n*

Enables or disables reset on ATZ.

- **n=0** : Normal Reset (Default).
- **n=1** : Disable Reset on ATZ.

*SNTP=*n*

Enables daily SNTP update of the system time.

- **n=0** : Off
- **n=1** : On

*SNTPADDR=[*d.d.d.d*]/[*name*]

SNTP Server IP address, or fully-qualified domain name, to use if *SNTP=1. If blank, time.nist.gov is used.

- **d.d.d.d=IP address**
- **name=domain name**

*NETWDOG=*n*

Network connection watchdog: The number of minutes to wait for a network connection. If no connection is established within the set number of minutes, the RLXIC-EH modem resets.

- **n=0** : Disabled.
- **n=minutes** : Default = 120 min.

*SNMPPORT=*n*

This controls which port the SNMP Agent listens on.

- **n=0** : SNMP is disabled.
- **n=1-65535**

*SNMPSECLVL=*n*

Selects the security level requirements for SNMP communications.

- **n=0** : No security required. SNMPv2c and SNMPv3 communications are allowed.
- **n=1** : Authentication equivalent to "authNoPriv" setting in SNMPv3. SNMPv3 is required to do authentication, SNMPv2c transmissions will be silently discarded.
- **n=2** : Authentication and encryption, equivalent to "authPriv" setting in SNMPv3. SNMPv3 is required to do authentication and encryption, SNMPv2c and SNMPv3 authNoPriv transmissions will be silently discarded. Messages are both authenticated and encrypted to prevent a hacker from viewing its contents.

*SNMPTRAPDEST=*host/[port]*

Controls destination for SNMP Trap messages. If port is 0 or host is empty, traps are disabled. Traps are sent out according to the SNMP security level (that is, if the security level is 2, traps will be authenticated and encrypted). Currently, the only trap that can be generated is linkup.

- **host=IP address**
- **port=TCP port**

*SNMPCOMMUNITY=*string*

The SNMP Community String acts like a password to limit access to the modem's SNMP data.

- **string =string** of no more than 20 characters (default = public).

*TQUIT

Disconnects the telnet session. Not available in AceManager.

*RESETCFG

Wipe the non-volatile data in the modem. Cannot be used with AceManager.

Caution: You may need to reactivate your modem if you erase the non-volatile data.

10.3.7 Firewall

Firewall Mode can limit access to the RLXIC-EH from the cellular network and the Internet. Basic Firewall functions are available via AceManager.

Caution: If you are using Firewall mode you will not be able to use AceManager remotely or Telnet to the modem unless you are contacting the modem from one of the configured IP addresses.
 Note: Firewall mode will only prevent the RLXIC-EH modem from receiving data from those IP addresses not on the Friends List. It cannot prevent data, such as pings, from traversing the network to the modem which may billable traffic even though the modem does not receive the data.

AT	Name	Value	New Value
FM	Firewall Mode	0	<input type="text"/>
	Non-Friends Port Forwarding	0	<input type="text"/>
F0	Friends List IP0	0.0.0.0	<input type="text"/>
F1	Friends List IP1	0.0.0.0	<input type="text"/>
F2	Friends List IP2	0.0.0.0	<input type="text"/>
F3	Friends List IP3	0.0.0.0	<input type="text"/>
F4	Friends List IP4	0.0.0.0	<input type="text"/>
F5	Friends List IP5	0.0.0.0	<input type="text"/>
F6	Friends List IP6	0.0.0.0	<input type="text"/>
F7	Friends List IP7	0.0.0.0	<input type="text"/>
F8	Friends List IP8	0.0.0.0	<input type="text"/>
F9	Friends List IP9	0.0.0.0	<input type="text"/>
	Range 1 Start	0.0.0.0	<input type="text"/>
	Range 1 End	0.0.0.0	<input type="text"/>
	Range 2 Start	0.0.0.0	<input type="text"/>
	Range 2 End	0.0.0.0	<input type="text"/>
	Range 3 Start	0.0.0.0	<input type="text"/>
	Range 3 End	0.0.0.0	<input type="text"/>
	Port Filtering Mode	0	<input type="text"/>
	Firewall Port 1	0	<input type="text"/>
	Firewall Port 2	0	<input type="text"/>
	Firewall Port 3	0	<input type="text"/>
	Firewall Port 4	0	<input type="text"/>
	Firewall Port 5	0	<input type="text"/>

FM=n

Firewall mode - Only allow specified IPs to access the RLXIC-EH modem.

- **n=0** : Disable Firewall mode
- **n=1** : Enable Firewall mode - Only packets from friends will be accepted, packets from other IP addresses are ignored.

Fn=[d.d.d.d]

Friends List IP address.

- **n=0-9** Friends list index
- **d.d.d.d = IP address**

Using 255 in the IP address will allow any number.

Example: 166.129.2.255 allows access by all IPs in the range 166.129.2.0-166.129.2.255.

Tip: ATF? will return a list of all the current Fn settings.

Firewall Range

You can define three different ranges of start and end. All IP addresses between the start of the range and the end of the range would be allowed.

For example, if Range 1 Start was set to 192.168.13.50 and the Range 1 End was set to 192.68.13.95, then the IP address of 192.168.13.100 would not be allowed because it would be outside of the range; but 192.168.13.75 would be allowed.

Port Filtering Mode allows only the defined user ports and can block other ports. Port filtering can be configured to block connections on the specified ports (Blocked Ports), allow connections only on the specified ports (Allowed Ports), or not block or allow based on ports (Not Used). Each specified port will be allowed or blocked depending on the Port Filtering Mode.

Note: The Port Filtering is in addition to any port blocking or allowing done by the cellular provider. If the port is blocked by the cellular carrier, setting it for allowed here will have no effect, because the connection would be blocked before even reaching the RLXIC-EH.

10.3.8 Port Forwarding

Any data coming in on the defined Public Port will be passed to the corresponding Private Port connected to the physical interface specified and using the host IP address.

AT Name	Value	New Value
Number of PF Entries	0	<input type="text"/>
Public Port 1	0	<input type="text"/>
Host I/F 1	4	<input type="text"/>
Host IP 1	0.0.0.0	<input type="text"/>
Private Port 1	0	<input type="text"/>
Public Port 2	0	<input type="text"/>
Host I/F 2	4	<input type="text"/>
Host IP 2	0.0.0.0	<input type="text"/>
Private Port 2	0	<input type="text"/>
Public Port 3	0	<input type="text"/>
Host I/F 3	4	<input type="text"/>
Host IP 3	0.0.0.0	<input type="text"/>
Private Port 3	0	<input type="text"/>
Public Port 4	0	<input type="text"/>
Host I/F 4	4	<input type="text"/>
Host IP 4	0.0.0.0	<input type="text"/>
Private Port 4	0	<input type="text"/>
Public Port 5	0	<input type="text"/>
Host I/F 5	4	<input type="text"/>
Host IP 5	0.0.0.0	<input type="text"/>
Private Port 5	0	<input type="text"/>

Note: This feature can be used only in private mode.

Note: There are no AT commands for Port Forwarding parameters, they need to be configured using AceManager.

Number of PF Entries = n

Set value to number of used Port forward rules for performance gain. Each forwarding entry has four parameters.

- n = 1-5

Public Port = n

Port number of the Modem/Gateway.

- n = 8090

Host/IF = n

Physical connection type to the modem. (USB, Ethernet, Serial).

Host IP = d.d.d.d

IP address of the connected device/computer.

- **d.d.d.d = IP address**

Private Port = n

Port number on the connected device.

- **n= 80**

10.4 Logging

This group includes commands specific to the internal log.

Caution: Logging is intended for diagnostic purposes only. Extensive use of logging features can cause degraded modem performance.

AT	Name	Value	New Value
*DBGPPPLVL	PPP Logging Detail	1	<input type="text" value=""/>
*DBGIPLVL	IP Logging Detail	0	<input type="text" value=""/>
*DBGCOMMLVL	COM Port Logging Detail	0	<input type="text" value=""/>
*DBGETHLVL	Ethernet Logging Detail	0	<input type="text" value=""/>
*DBGDHCPLVL	DHCP Logging Detail	0	<input type="text" value=""/>

*DBGPPPLVL=n

Sets the logging level for the PPP stack.

- **n=0** : No logging
- **n=1** : Log client events (default)
- **n=2** : Log server events
- **n=3** : Log client and Server events

*DBGIPLVL=n

Sets the logging level for the IP subsystem.

- **n=0** : No logging
- **n=1** : Log errors (that is, invalid/corrupt packets, etc.).
- **n=2** : Log the header of all received packets. Note that this can quickly exhaust available space for the event log.
- **n=3** : Log the header of all received and sent packets. Note that this can quickly exhaust available space for the event log.

*DBGCOMMLVL=n

Set the logging level for the host or module COM port.

- **n=0** : No logging
- **n=1** : Host COM Port
- **n=2** : Module COM Port

DBGETHLVL=*n

Sets the logging level for the Ethernet port.

- **n=0** : No logging
- **n=1** : Log errors: invalid/corrupt packets, etc.
- **n=2** : Log the header of all received packets. Note that this can quickly exhaust available space for the event log.

DBGDHCPLVL=*n

Enable or disable internal DHCP logging.

- **n=0** : No logging
- **n=1** : Log DHCP events.

*NAI = [*name*]*

Enter the user name of your account (NAI). The user name is usually expressed as an email address with phone number of the account (example, 1234567@carrier.com). This information should be provided by your carrier. You may not need this step.

- **name=provided by carrier**

PHA = d.d.d.d

Set the IP address of the primary home agent.

- **d.d.d.d=IP Address**

SHA = d.d.d.d

Set the IP address of the secondary home agent.

- **d.d.d.d=IP Address**

*MHSS = *n**

Set the home agent shared secret key.

- **n=key**

*MASS = *n**

Set the AAA shared secret key.

- **n= AAA Key**

10.5 Cellular

This group includes commands specific to HSDPA, EDGE and GPRS. If you are not connecting to a modem which uses HSDPA, EDGE, or GPRS, you will not see this group in the menu.

AT	Name	Value	New Value
*NETAPN	Set APN	wwan.ccs	
*RXDIVERSITY	RX Diversity	1	1-Enable
+CGDCONT	Define PDP context	1,IP,wwan.ccs	
+COPS	Set Carrier [operator] Selection	0	0
+CGQREQ	Set Quality of Service Profile		
+CGQMIN	Minimum Acceptable Quality of Service Profile		

*NETAPN=apn

Easy entry of the APN. If left blank, the modem will attempt to use the default subscriber value as defined by the account.

- **apn=access point name**

*RXDIVERSITY

Enables or disables antenna diversity.

+COPS=mode,[format],[oper]

Manually specify an operator. Refer also to *NETOP.

- **mode=0** : Automatic - any affiliated carrier [default].
- **mode=1** : Manual - use only the operator <oper> specified.
- **mode=4** : Manual/Automatic - if manual selection fails, goes to automatic mode.
- **format=0** : Alphanumeric ("name") (G3x10 must use this format).
- **format=2** : Numeric
- **oper="name"**

+CGQREQ

Set Quality of Service Profile. Change should be at carrier's request. Normally not required to be changed.

+CGQMIN

Minimum Acceptable Quality of Service Profile. Change should be at carrier's request. Normally not required to be changed.

11 Support, Service & Warranty

In This Chapter

- ❖ How to Contact Us: Technical Support..... 101
- ❖ Return Material Authorization (RMA) Policies and Conditions..... 102
- ❖ LIMITED WARRANTY..... 103

ProSoft Technology, Inc. (ProSoft) is committed to providing the most efficient and effective support possible. Before calling, please gather the following information to assist in expediting this process:

- 1 Product Version Number
- 2 System architecture
- 3 Network details

If the issue is hardware related, we will also need information regarding:

- 1 Module configuration and contents of file
 - o Module Operation
 - o Configuration/Debug status information
 - o LED patterns
- 2 Information about the processor and user data files as viewed through and LED patterns on the processor.
- 3 Details about the serial devices interfaced, if any.

11.1 How to Contact Us: Technical Support

Internet	Web Site: www.prosoft-technology.com/support E-mail address: support@prosoft-technology.com
-----------------	--

Asia Pacific

+603.7724.2080, support.asia@prosoft-technology.com
Languages spoken include: Chinese, English

Europe (location in Toulouse, France)

+33 (0) 5.34.36.87.20, support.EMEA@prosoft-technology.com
Languages spoken include: French, English

North America/Latin America (excluding Brasil) (location in California)

+1.661.716.5100, support@prosoft-technology.com
Languages spoken include: English, Spanish

For technical support calls within the United States, an after-hours answering system allows pager access to one of our qualified technical and/or application support engineers at any time to answer your questions.

Brasil (location in Sao Paulo)

+55-11-5084-5178, eduardo@prosoft-technology.com
Languages spoken include: Portuguese, English

11.2 Return Material Authorization (RMA) Policies and Conditions

The following RMA Policies and Conditions (collectively, "RMA Policies") apply to any returned Product. These RMA Policies are subject to change by ProSoft without notice. For warranty information, see "Limited Warranty". In the event of any inconsistency between the RMA Policies and the Warranty, the Warranty shall govern.

11.2.1 All Product Returns:

- a) In order to return a Product for repair, exchange or otherwise, the Customer must obtain a Returned Material Authorization (RMA) number from ProSoft and comply with ProSoft shipping instructions.
- b) In the event that the Customer experiences a problem with the Product for any reason, Customer should contact ProSoft Technical Support at one of the telephone numbers listed above (page 101). A Technical Support Engineer will request that you perform several tests in an attempt to isolate the problem. If after completing these tests, the Product is found to be the source of the problem, we will issue an RMA.
- c) All returned Products must be shipped freight prepaid, in the original shipping container or equivalent, to the location specified by ProSoft, and be accompanied by proof of purchase and receipt date. The RMA number is to be prominently marked on the outside of the shipping box. Customer agrees to insure the Product or assume the risk of loss or damage in transit. Products shipped to ProSoft using a shipment method other than that specified by ProSoft or shipped without an RMA number will be returned to the Customer, freight collect. Contact ProSoft Technical Support for further information.
- d) A 10% restocking fee applies to all warranty credit returns whereby a Customer has an application change, ordered too many, does not need, etc.

11.2.2 Procedures for Return of Units Under Warranty:

A Technical Support Engineer must approve the return of Product under ProSoft's Warranty:

- a) A replacement module will be shipped and invoiced. A purchase order will be required.
- b) Credit for a product under warranty will be issued upon receipt of authorized product by ProSoft at designated location referenced on the Return Material Authorization.

11.2.3 Procedures for Return of Units Out of Warranty:

- a) Customer sends unit in for evaluation
- b) If no defect is found, Customer will be charged the equivalent of \$100 USD, plus freight charges, duties and taxes as applicable. A new purchase order will be required.

- c) If unit is repaired, charge to Customer will be 30% of current list price (USD) plus freight charges, duties and taxes as applicable. A new purchase order will be required or authorization to use the purchase order submitted for evaluation fee.

The following is a list of non-repairable units:

- 3150 - All
- 3750
- 3600 - All
- 3700
- 3170 - All
- 3250
- 1560 - Can be repaired, only if defect is the power supply
- 1550 - Can be repaired, only if defect is the power supply
- 3350
- 3300
- 1500 - All

11.2.4 Purchasing Warranty Extension:

- a) ProSoft's standard warranty period is three (3) years from the date of shipment as detailed in "Limited Warranty (page 103)". The Warranty Period may be extended at the time of equipment purchase for an additional charge, as follows:
- Additional 1 year = 10% of list price
 - Additional 2 years = 20% of list price
 - Additional 3 years = 30% of list price

11.3 LIMITED WARRANTY

This Limited Warranty ("Warranty") governs all sales of hardware, software and other products (collectively, "Product") manufactured and/or offered for sale by ProSoft, and all related services provided by ProSoft, including maintenance, repair, warranty exchange, and service programs (collectively, "Services"). By purchasing or using the Product or Services, the individual or entity purchasing or using the Product or Services ("Customer") agrees to all of the terms and provisions (collectively, the "Terms") of this Limited Warranty. All sales of software or other intellectual property are, in addition, subject to any license agreement accompanying such software or other intellectual property.

11.3.1 What Is Covered By This Warranty

- a) *Warranty On New Products:* ProSoft warrants, to the original purchaser, that the Product that is the subject of the sale will (1) conform to and perform in accordance with published specifications prepared, approved and issued by ProSoft, and (2) will be free from defects in material or workmanship; provided these warranties only cover Product that is sold as new. This Warranty expires three years from the date of shipment (the "Warranty Period"). If the Customer discovers within the Warranty Period a failure of the Product to conform to specifications, or a defect in material or workmanship of the Product, the Customer must promptly notify ProSoft by fax, email or telephone. In no event may that notification be received by ProSoft later than 39 months. Within a reasonable time after notification, ProSoft will correct any failure of the Product to conform to specifications or any defect in material or workmanship of the Product, with either new or used replacement parts. Such repair, including both parts and labor, will be performed at ProSoft's expense. All warranty service will be performed at service centers designated by ProSoft.
- b) *Warranty On Services:* Materials and labor performed by ProSoft to repair a verified malfunction or defect are warranted in the terms specified above for new Product, provided said warranty will be for the period remaining on the original new equipment warranty or, if the original warranty is no longer in effect, for a period of 90 days from the date of repair.

11.3.2 What Is Not Covered By This Warranty

- a) ProSoft makes no representation or warranty, expressed or implied, that the operation of software purchased from ProSoft will be uninterrupted or error free or that the functions contained in the software will meet or satisfy the purchaser's intended use or requirements; the Customer assumes complete responsibility for decisions made or actions taken based on information obtained using ProSoft software.
- b) This Warranty does not cover the failure of the Product to perform specified functions, or any other non-conformance, defects, losses or damages caused by or attributable to any of the following: (i) shipping; (ii) improper installation or other failure of Customer to adhere to ProSoft's specifications or instructions; (iii) unauthorized repair or maintenance; (iv) attachments, equipment, options, parts, software, or user-created programming (including, but not limited to, programs developed with any IEC 61131-3, "C" or any variant of "C" programming languages) not furnished by ProSoft; (v) use of the Product for purposes other than those for which it was designed; (vi) any other abuse, misapplication, neglect or misuse by the Customer; (vii) accident, improper testing or causes external to the Product such as, but not limited to, exposure to extremes of temperature or humidity, power failure or power surges; or (viii) disasters such as fire, flood, earthquake, wind and lightning.

- c) The information in this Agreement is subject to change without notice. ProSoft shall not be liable for technical or editorial errors or omissions made herein; nor for incidental or consequential damages resulting from the furnishing, performance or use of this material. The user guide included with your original product purchase from ProSoft contains information protected by copyright. No part of the guide may be duplicated or reproduced in any form without prior written consent from ProSoft.

11.3.3 Disclaimer Regarding High Risk Activities

Product manufactured or supplied by ProSoft is not fault tolerant and is not designed, manufactured or intended for use in hazardous environments requiring fail-safe performance including and without limitation: the operation of nuclear facilities, aircraft navigation of communication systems, air traffic control, direct life support machines or weapons systems in which the failure of the product could lead directly or indirectly to death, personal injury or severe physical or environmental damage (collectively, "high risk activities"). ProSoft specifically disclaims any express or implied warranty of fitness for high risk activities.

11.3.4 Intellectual Property Indemnity

Buyer shall indemnify and hold harmless ProSoft and its employees from and against all liabilities, losses, claims, costs and expenses (including attorney's fees and expenses) related to any claim, investigation, litigation or proceeding (whether or not ProSoft is a party) which arises or is alleged to arise from Buyer's acts or omissions under these Terms or in any way with respect to the Products. Without limiting the foregoing, Buyer (at its own expense) shall indemnify and hold harmless ProSoft and defend or settle any action brought against such Companies to the extent based on a claim that any Product made to Buyer specifications infringed intellectual property rights of another party. ProSoft makes no warranty that the product is or will be delivered free of any person's claiming of patent, trademark, or similar infringement. The Buyer assumes all risks (including the risk of suit) that the product or any use of the product will infringe existing or subsequently issued patents, trademarks, or copyrights.

- a) Any documentation included with Product purchased from ProSoft is protected by copyright and may not be duplicated or reproduced in any form without prior written consent from ProSoft.
- b) ProSoft's technical specifications and documentation that are included with the Product are subject to editing and modification without notice.
- c) Transfer of title shall not operate to convey to Customer any right to make, or have made, any Product supplied by ProSoft.
- d) Customer is granted no right or license to use any software or other intellectual property in any manner or for any purpose not expressly permitted by any license agreement accompanying such software or other intellectual property.

- e) Customer agrees that it shall not, and shall not authorize others to, copy software provided by ProSoft (except as expressly permitted in any license agreement accompanying such software); transfer software to a third party separately from the Product; modify, alter, translate, decode, decompile, disassemble, reverse-engineer or otherwise attempt to derive the source code of the software or create derivative works based on the software; export the software or underlying technology in contravention of applicable US and international export laws and regulations; or use the software other than as authorized in connection with use of Product.
- f) **Additional Restrictions Relating To Software And Other Intellectual Property**

In addition to compliance with the Terms of this Warranty, Customers purchasing software or other intellectual property shall comply with any license agreement accompanying such software or other intellectual property. Failure to do so may void this Warranty with respect to such software and/or other intellectual property.

11.3.5 Disclaimer of all Other Warranties

The Warranty set forth in What Is Covered By This Warranty (page 104) are in lieu of all other warranties, express or implied, including but not limited to the implied warranties of merchantability and fitness for a particular purpose.

11.3.6 Limitation of Remedies **

In no event will ProSoft or its Dealer be liable for any special, incidental or consequential damages based on breach of warranty, breach of contract, negligence, strict tort or any other legal theory. Damages that ProSoft or its Dealer will not be responsible for included, but are not limited to: Loss of profits; loss of savings or revenue; loss of use of the product or any associated equipment; loss of data; cost of capital; cost of any substitute equipment, facilities, or services; downtime; the claims of third parties including, customers of the Purchaser; and, injury to property.

** Some areas do not allow time limitations on an implied warranty, or allow the exclusion or limitation of incidental or consequential damages. In such areas, the above limitations may not apply. This Warranty gives you specific legal rights, and you may also have other rights which vary from place to place.

11.3.7 Time Limit for Bringing Suit

Any action for breach of warranty must be commenced within 39 months following shipment of the Product.

11.3.8 No Other Warranties

Unless modified in writing and signed by both parties, this Warranty is understood to be the complete and exclusive agreement between the parties, suspending all oral or written prior agreements and all other communications between the parties relating to the subject matter of this Warranty, including statements made by salesperson. No employee of ProSoft or any other party is authorized to make any warranty in addition to those made in this Warranty. The Customer is warned, therefore, to check this Warranty carefully to see that it correctly reflects those terms that are important to the Customer.

11.3.9 Allocation of Risks

This Warranty allocates the risk of product failure between ProSoft and the Customer. This allocation is recognized by both parties and is reflected in the price of the goods. The Customer acknowledges that it has read this Warranty, understands it, and is bound by its Terms.

11.3.10 Controlling Law and Severability

This Warranty shall be governed by and construed in accordance with the laws of the United States and the domestic laws of the State of California, without reference to its conflicts of law provisions. If for any reason a court of competent jurisdiction finds any provisions of this Warranty, or a portion thereof, to be unenforceable, that provision shall be enforced to the maximum extent permissible and the remainder of this Warranty shall remain in full force and effect. Any cause of action with respect to the Product or Services must be instituted in a court of competent jurisdiction in the State of California.

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