Raven XE

User Guide

SIERRA WIRELESS
HEART OF THE WIRELESS MACHINE®

Important Notice

Due to the nature of wireless communications, transmission and reception of data can never be guaranteed. Data may be delayed, corrupted (i.e., have errors) or be totally lost. Although significant delays or losses of data are rare when wireless devices such as the Sierra Wireless AirLink Raven XE are used in a normal manner with a well-constructed network, the Sierra Wireless AirLink Raven XE 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. Sierra Wireless accepts no responsibility for damages of any kind resulting from delays or errors in data transmitted or received using the Sierra Wireless AirLink Raven XE, or for failure of the Sierra Wireless AirLink Raven XE to transmit or receive such data.

Safety and Hazards

Do not operate the Sierra Wireless AirLink Raven XE in areas where blasting is in progress, where explosive atmospheres may be present, near medical equipment, near life support equipment, or any equipment which may be susceptible to any form of radio interference. In such areas, the Sierra Wireless AirLink Raven XE **MUST BE POWERED OFF**. The Sierra Wireless AirLink Raven XE can transmit signals that could interfere with this equipment.

Do not operate the Sierra Wireless AirLink Raven XE in any aircraft, whether the aircraft is on the ground or in flight. In aircraft, the Sierra Wireless AirLink Raven XE **MUST BE POWERED OFF**. When operating, the Sierra Wireless AirLink Raven XE can transmit signals that could interfere with various onboard systems.

Note: Some airlines may permit the use of cellular phones while the aircraft is on the ground and the door is open. Sierra Wireless AirLink Raven XE may be used at this time.

The driver or operator of any vehicle should not operate the Sierra Wireless AirLink Raven XE while in control of a vehicle. Doing so will detract from the driver or operator's control and operation of that vehicle. In some states and provinces, operating such communications devices while in control of a vehicle is an offence.

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Portions of this product may be covered by some or all of the following US patents:

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.

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United States patent numbers: 5128925, 5398247

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		E-mail:	support@sierrawireless.com
Sales Desk:		Phone:	1-510-624-4200 1-604-232-1488
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	Web:		www.sierrawireless.com

Consult our website for up-to-date product descriptions, documentation, application notes, firmware upgrades, trouble-shooting tips, and press releases:

www.sierrawireless.com

Revision History

Revision number	Release date	Changes
1.x	Q3:2008	Raven XE documentation created and revised.
2.x	Q3:2008	Raven XE documentation content updated per release and revised.

Contents

1: Introduction to the Raven XE

- ALEOS™
- AceWare™
- Connecting to your cellular provided
- GSM Communication

The Raven XE is an intelligent wireless gateway, powered by ALEOS™, and optimal for providing primary or backup network connectivity for any high-reliability/ high-availability applications.Class I Divison 2 certified as nonincendive equipment, the Raven Series is ideally suited for use in hazardous environments.

The Raven XE is the perfect solution for any device with an Ethernet connection that requires pervasive connectivity including PCs, routers, network equipment and POS/ATMs as well as commercial automation equipment.

Powered by ALEOS™, Raven XE modems are designed to maintain a reliable, consistent network connection. With a ethernet interface and a vast library of machine protocols, the Raven XE is a workhorse for industrial and mission critical applications.

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

Figure 1-1: Sierra Wireless AirLink Raven XE

ALEOS™

ALEOS, the embedded core technology of the Sierra Wireless AirLink products simplifies installation, operation and mainte- nance 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

Figure 1-2: Powered by ALEOS

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 Sierra Wireless AirLink products powered by ALEOS.

These modem utilities, except AceNet, are free of charge to those who own Sierra Wireless AirLink modems. You can download the applications and their user guides from the Sierra Wireless AirLink Solutions web site: http:// www.sierrawireless.com/support. Contact your dealer or Sierra Wireless 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 Sierra Wireless AirLink communications platforms in real- time.

Simplified Deployment

AceManager provides the ability to remotely set up and configure your Sierra Wireless AirLink 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 pinpoint 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 Sierra Wireless AirLink 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 Sierra Wireless AirLink 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.

Modem Doctor

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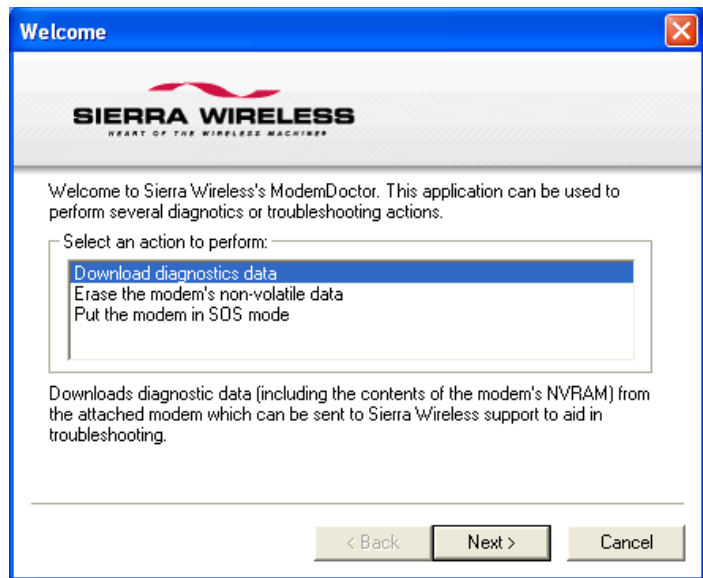

Figure 1-3: Modem Doctor

Connecting to your cellular provided

The Raven XE uses your cellular provided as an ISP (Internet Service Provider) to connect you to the Internet.

Steps of a connection:

1. When your Raven XE is powered on, it automatically searches for cellular service using HSUPA/HSDPA.

2. Your Raven XE establishes a link to the your cellular provided network, also called registering on the network, and receives an IP address.

3. When your Raven XE has received its IP address from your cellular provided, a connection to the Internet or the cellular network is also available for a computer or other device connected directly to the Raven XE.

Figure 1-4: Connecting to the Internet

The Raven XE 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 Raven XE will provide a connection for one device to the Internet at a time. In Private Mode, the Raven XE will provide NAT (Network Address Translation) for the computer or other end device.

Note: The Raven XE 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 Raven XE, 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.

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 Raven XE might not always receive the same address each time it connects with your cellular provided.

- Static addresses are permanently assigned to a particular account and will always be used whenever your Raven XE 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 since 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 provided includes a dynamic IP address and you need a static IP, please consult your your cellular provided Representative for more information about changing your account for static IP support.*

If you need to contact your Raven XE, a device connected to the Raven XE, or a host system using the Raven XE 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 Raven XE using TCP/IP, the IP address given to your modem by your cellular provided 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).*

GSM Communication

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 Raven XE 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 Raven XE will fall-back to GPRS for the connection to your cellular provided 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

- Power Connector

Features and Benefits

- Embedded Intelligence
- Low Power Consumption
- Compact Size
- Rugged Aluminium Case
- High-Speed Processor (ARM 9)
- High-Speed 2-way Data
- 10/100 Mbps Ethernet Port
- Persistent Network Connectivity
- Remote Management and Configuration
- Class I Div 2 Certified

Technology

- HSUPA

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

Bands

- TriBand for UMTS/HSDPA/HSUPA
  - 850/1900/2100 MHz
- Quad Band GPRS/EDGE
  - 850/900/1800/1900 MHz

Environmental

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

Power Consumption: (@12V DC)

- Transmit (Typical/Max) 140/250 mA
- Idle 35 mA
- Input Current 30 mA to 300 mA
- Input Voltage 9 - 28V DC

Standards/Approvals

- Carrier specific approvals
- CE (Class A device per EN55022)
- RoHS
- FCC
- Industry Canada
- PTCRB
- This apparatus is suitable for use in Class I, Division 2, Groups A, B, C, D or unclassified or non-hazardous locations.
- CE
- PTCRB

Warning: *Explosion Hazard - Substitution of any components may impair suitability for Class I, Division 2.*

Host Interfaces

- Ethernet: 10BaseT RJ-45
- USB Type B 5 Pin mini
- Antenna Connection:
  - Cellular - 50 Ohm SMA
  - Receive Diversity - 50 Ohm SMA
  - I/O Ports: 2

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.*

Dimensions

- 75mm x 27mm x 103mm
- 185 grams

Application Interfaces

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

LED Indicators

- Network

- Signal
- Activity
- Power
- Reset Button

Power Connector

	4	3	
Digital I/0			Digital I/O
Ground (black)	2	1	Power (red)

Power (red)
Ground (black)
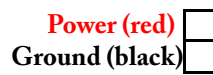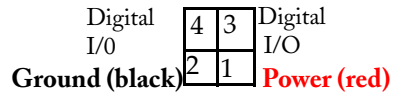
Figure 2-1: Power Connector (not to scale)

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

Note: Raven XE I/O Port 4 is software configurable.

3: Activating Raven XE on your cellular provided

This chapter provides step-by-step directions for activating your Raven XE on your cellular provided's network.
"

Installing the SIM

The Subscriber Identity Module (SIM) in the Raven XE 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 Sierra Wireless Representative.

1. Before you start

If the SIM was pre-installed, unless you need to set a custom APN, activation of your modem is complete.

Cellular Account Required

- **Cellular Account Required**- To use your modem, you need to have a SIM with an active account in a data plan, with your cellular provider (EDGEor HSUPA/HSDPA).

Software Required

- **AceManager** - Graphical interface for entering most AT Commands. You can download AceManager from the Sierra Wireless AirLink Solutions website: http://www.sierrawireless.com/support/. A default installation of this utility is assumed later in these directions

Hardware Required

- **Ethernet cable** - An Ethernet cable is required.

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 with an available Ethernet portserial port.

Tools Required

- **Small Phillips screw driver** - The Phillips screw driver is the one which is also called a plus (+) or X screw driver.
- **Slim stylus** - A PDA stylus, an unbent paperclip, or other such item.

Figure 3-1: Faceplate

Warning: *Explosion Hazard. Do Not remove or replace Plug-in Modules unless power has been disconnected or the area is known to be free of ignitible concentrations of flammable Gasses or vapors.*

1. Opening the Case

a. Unplug the Raven XE power and all cables.

b. Using a small phillips head screw driver, remove the screws on the front of the Raven XE.

2. Remove the SIM from the card

a. Carefully remove the SIM card from the card you received from your cellular provided.

Figure 3-2: Sample of the SIM card

3. Insert the SIM

a. Gently press the SIM card to click it into place.

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

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

Figure 3-3: Insert SIM in to the modem

4. Finishing the SIM installation

When the faceplate is replaced and secured, the installation of the SIM is complete. Secure the front of the Raven XE with the screws.

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.

1. Start AceManager

Start > All Programs > AirLink Communications > AceManager 3G > AceManager 3G
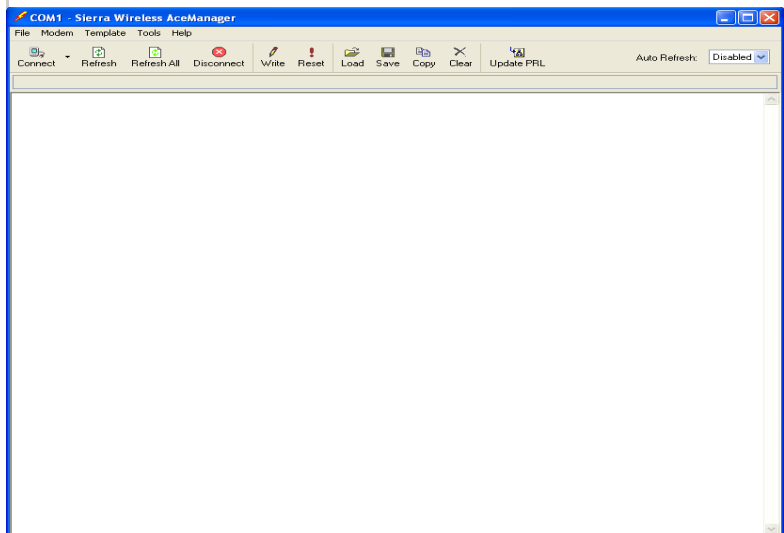
Figure 3-4: AceManager

2. Connect to the Modem

 a. Click the Connect button.
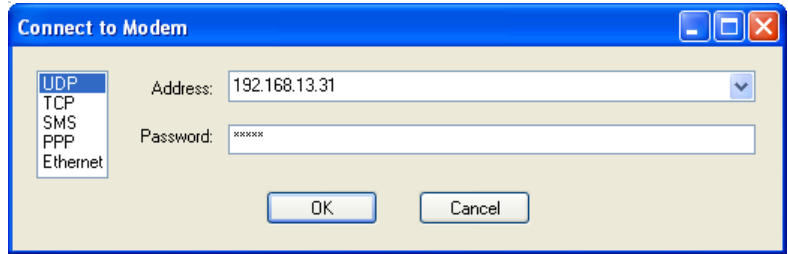
b. Select PPP.

c. Select TCP or UDP.

d. 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.

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

f. Select *OK*.

3. Enter the APN

a. Select *EDGE/HSDPA/HSUPA* from the menu on the left side of AceManager (under "Groups")
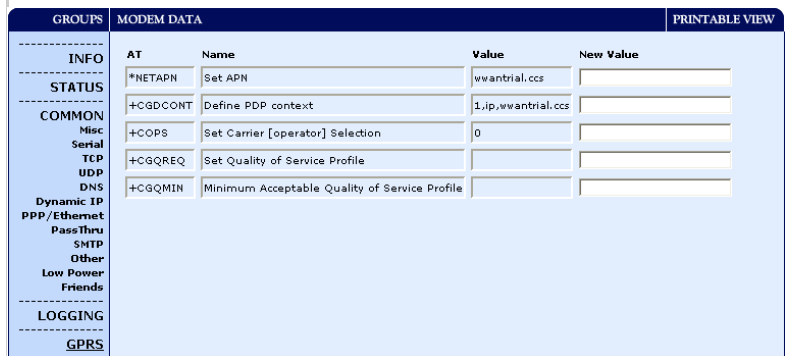
Figure 3-5: AceManager : EDGE/HSDPA

b. Type your APN in the New Value field of ***NETAPN**.

Figure 3-6: AceManager : EDGE/HSDPA - *NETAPN

c. Select PPP.

d. Select TCP or UDP.

e. 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.

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

g. Select *OK*.

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.

1. Select *Misc* from the menu on the left side under the Common group.

Figure 3-7: AceManager : Misc

2. Enter the NAI into the new value field for *NETUID and enter your network password into the new value field for *NETPW.

*Figure 3-8: AceManager : Misc - *NETUID, *NETPW*

4. Write the Settings to the Raven XE

a. Click the Write button on the tool bar of AceManager.

b. Wait for the message "Write Successful" to appear in the status bar.
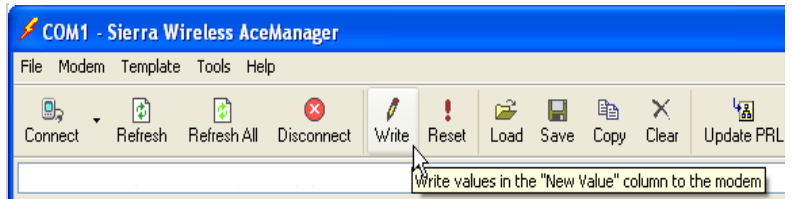
Figure 3-9: AceManager : Write

    c.   Reset the Raven XE.

4: Hardware Installation of the Raven XE

- Connecting to Power
- Connecting to a Computer or other Device
- Indicator Lights
- Mounting

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 Raven XE 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 Raven XE 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 Raven XE can withstand.*
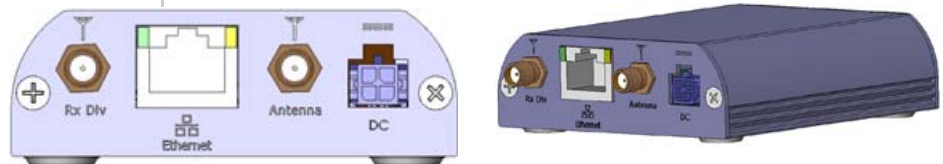
Figure 4-1: Raven XE Connectors

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's 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 Raven XE will work with most PCS cellular antennas with a SMA connector that works in the high and low frequencies of the cellular technology of your modem. Connect the primary antenna or primary RF cable directly to the antenna connector on the back of the Raven XE.

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.*

Note: Use of receive diversity for EV-DO is optional. Data transmission and reception may be adversely affected if it is not used.

To provide for diversity in the signal reception, connect the second antenna to the second antenna port (SMA, labeled Rx Div ANT2) on the back of the Raven XE.

Caution: *If you are not using a diversity antenna, you should disable the receive diversity option. In Ace Manager in the 1x/EV-DO group, configure *EVDODIVERSITY.*

Connecting to Power

The Raven XE digital I/O port consists of a 4 pin power connector, which includes two digital I/O ports. Port 4 is software configurable, while port 3 is Digital Input only and not software configurable.

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.

Figure 4-2: Digital 1/0 Port

Your Raven XE 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 Raven XE.

Note: When using a DC power source (such as a solar cell), Sierra Wireless 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 Raven line modems. In the Raven XE, 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.*

Connecting to a Computer or other Device

Figure 4-3: Ethernet

The Ethernet port of your Raven XE can be connected directly to a computer or other Ethernet device with either a cross-over cable or a straight-through cable. The Ethernet port on the Raven XE is auto-sensing and connects at 10baseT. 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 cross-over cable.

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

Figure 4-4: USB

Your Raven XE'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 Raven XE 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 Raven XE has a standard mini-B connector.

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

Indicator Lights

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

Figure 4-5: Raven XE Indicator lights

- **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.

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 PinPoint modem on the remote network.
- **Power** - Indicates the power adapter is connected and there is power getting to the Raven XE.
- The **Reset button** (on the left side of the Raven XE) 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 several seconds (count approximately 30 seconds, and wait for the power light to go off after the light pattern stops), the ALEOS configuration settings will return to the factory defaults.

Caution: *If you reset the modem configuration using the reset button, you may to reconfigure your APN.*

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.

Mounting

An optional accessory for your Raven XE is a mounting kit, which includes a bracket. The bracket is designed to snugly cradle the modem and hold it in place where you need it. You can use a strap around the bracket and modem for extra security. The bracket can be attached to a stationary location using #6 screws with the mounting hole diameter approximately 0.150".

The instructions to bracket installation is following:

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 Raven XE between Alignment ears.

3. Engage top groove in body of Raven XE with two tabs.

4. Push on far side of Raven XE in center so that it touches side of Bracket.

5. Press down and release when upper groove on far side of Raven XE, aligns with tabs.

6. Release to complete installation in to 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.
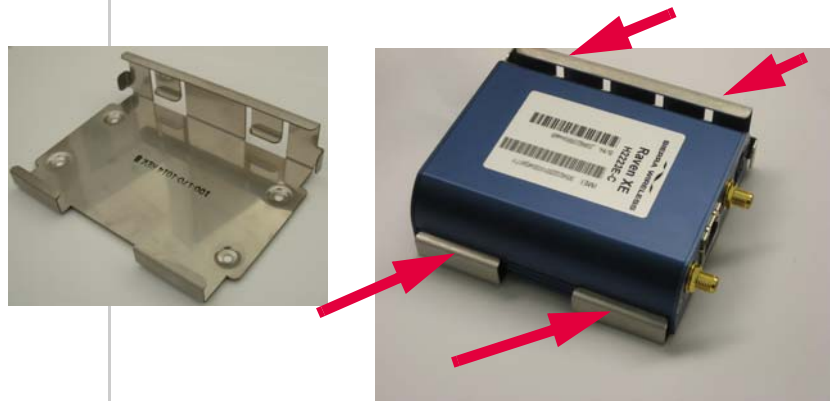
Figure 4-6: Optional Mounting Bracket
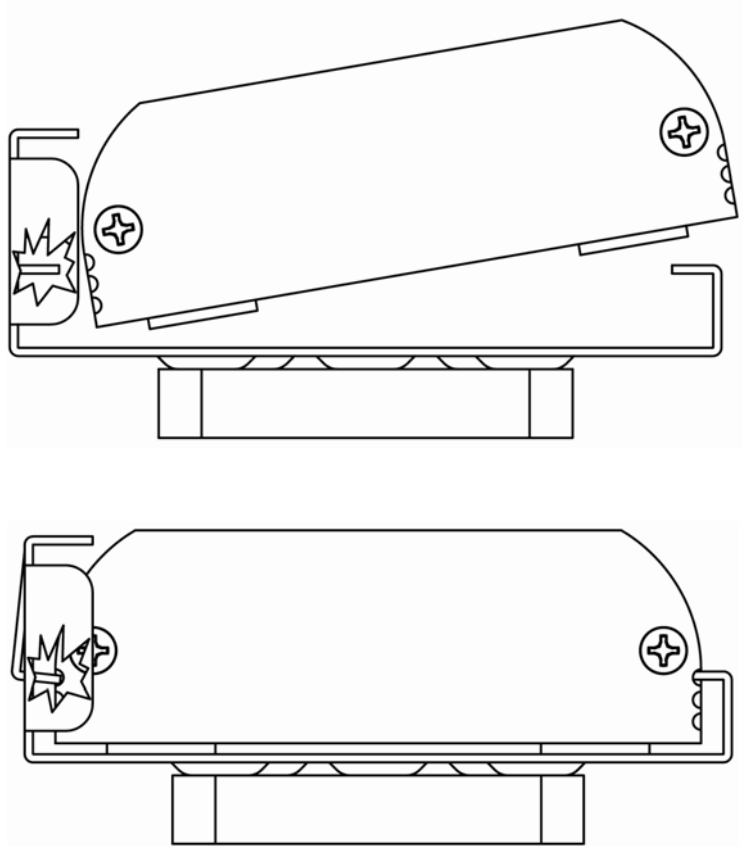
Figure 4-7: Mounting bracket installation
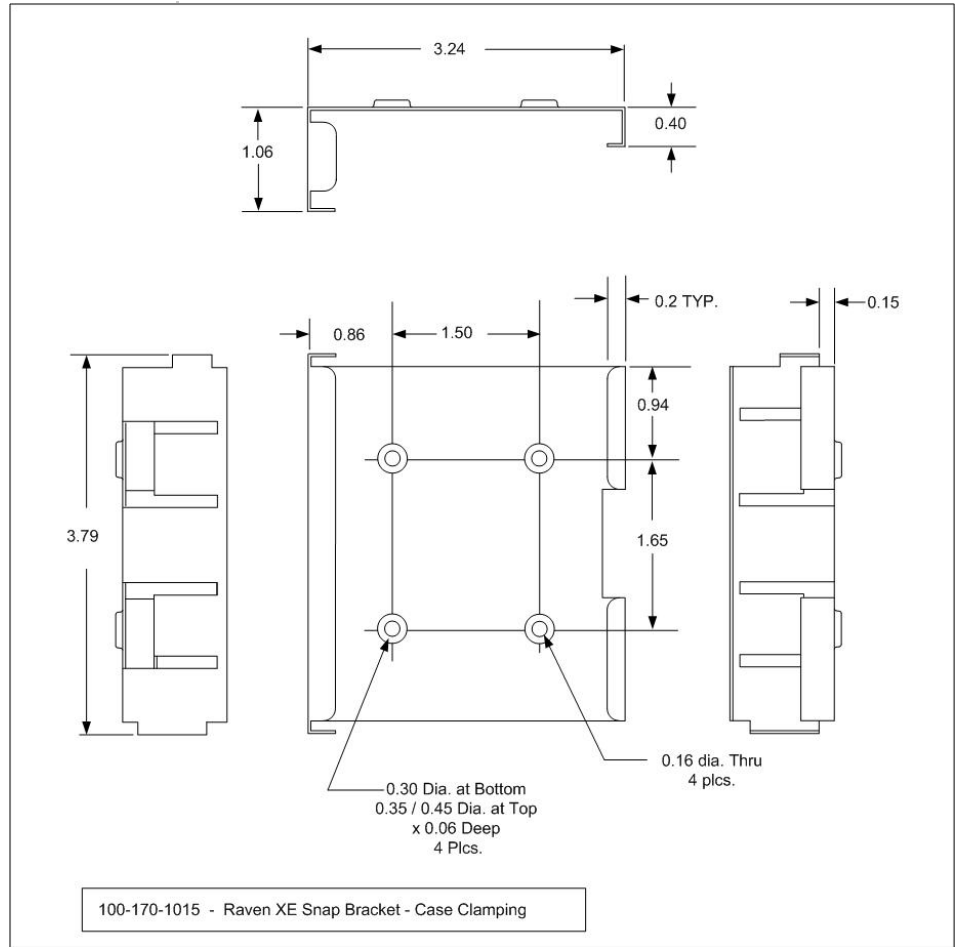
Figure 4-8: 100-170-1015 : Mounting Bracket for Raven XE

5: Configuring your Raven XE

-

With ALEOS as its "brain", the Raven XE is a highly configurable device, more than just a "dumb" modem.

To configure your Raven XE, 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.

Since the AceWare applications are designed for ease of use, nearly all descriptions and screen shots of Raven XE 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 Raven XE, 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.

 A full listing of all the configuration commands for you modem are in Appendix A.

Using AceManager

AceManager is a free utility and is available on the product CD or can be downloaded from the Sierra Wireless America website:http://www.sierrawireless.com/support/AirLink/default.aspx.

1. Start AceManager

Start > All Programs > AirLink Communications > AceManager
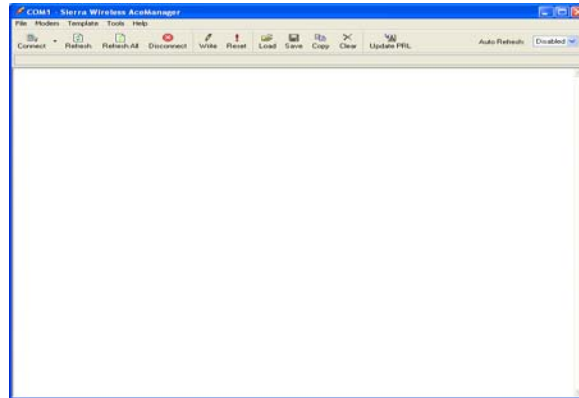
Figure 5-1: AceManager

2. Connect to your Raven XE

    a. Click the Connect button.
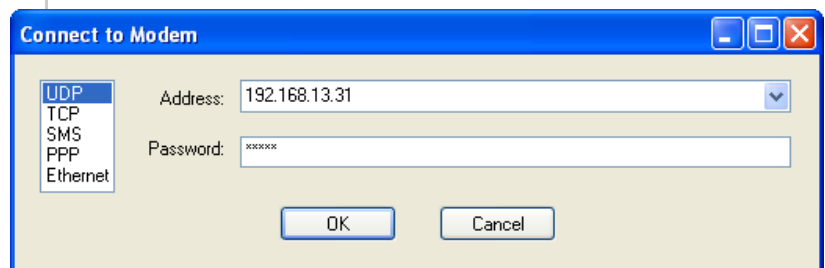
Figure 5-2: AceManager : Connect to Modem

    b. 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.

    c. 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.

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

e. Select *OK*.
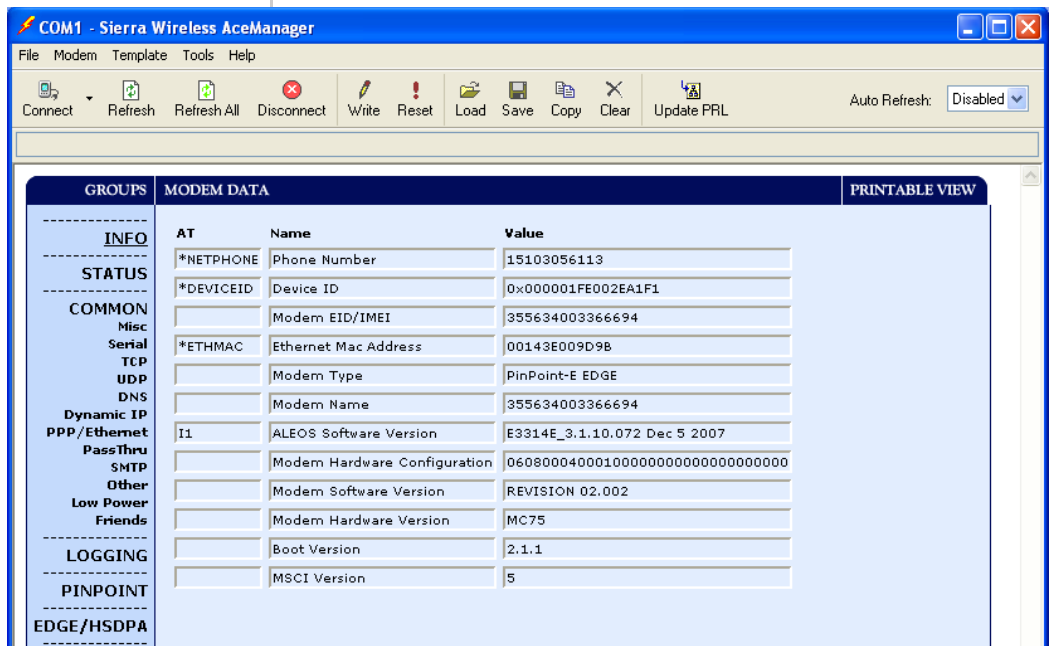
Figure 5-3: AceManager : Connected

3. Enter the configuration options

a. On the left side of AceManager is the *Groups* menu. Select the appropriate group as needed or directed.

b. Enter your changes in the *New Value* column by typing in the desired change or using the drop down menus.

c. The current configuration is shown in the *Value* column.
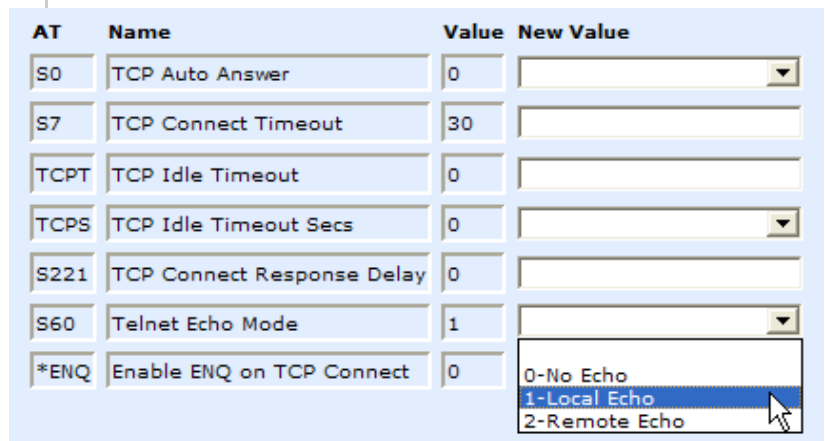
Figure 5-4: AceManager : Changing values

4. Write the changes to the modem

a. Click the Write button on the tool bar of AceManager.

b. Wait for the message "Write Successful" to appear in the status bar.
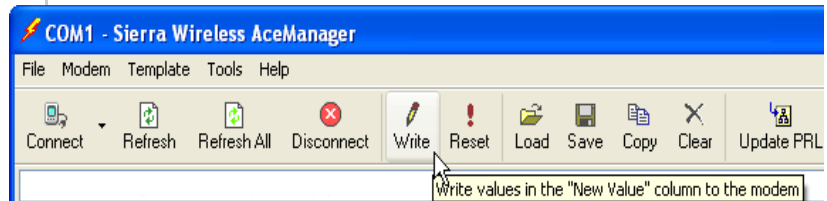
Figure 5-5: AceManager : Write

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.*

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 Sierra Wireless AirLink modems.

1. Creating the Template with AceManager

a. Configure the "master" modem.

b. Click the *Copy* button on the tool bar to transfer all the configured settings to the New Value column.
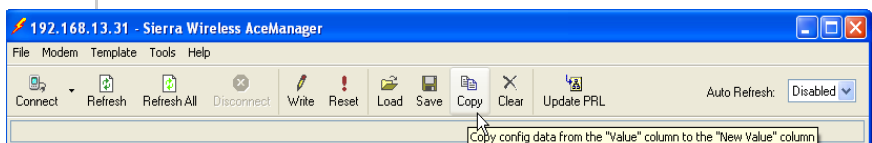
Figure 5-6: AceManager : Copy

c. Remove settings which 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 (EDGE/HSDPA group)
- *MODEMNAME
- *HOSTPRIVIP
- *HOSTPEERIP
- *HOSTUID
- *HOSTPW

d. Click the *Save* button on the toolbar.
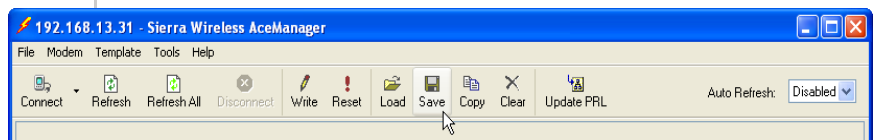
e. Type in a file name that is descriptive of the template (so you can find it easily later) and save it to a location on your computer.
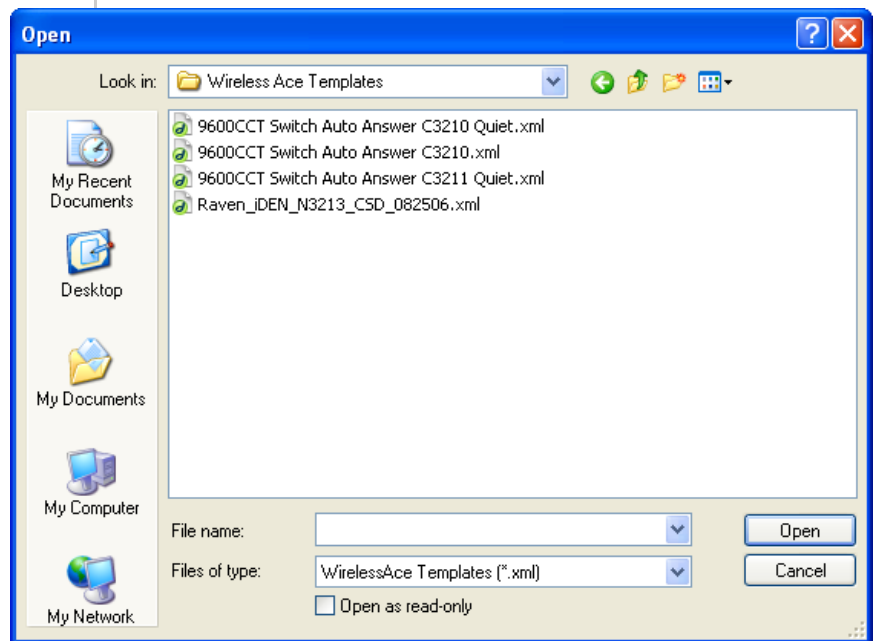
Figure 5-7: AceManager : Save Template

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 AirLink 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.

a. Load the template.

1. Connect to the modem you want to configure using AceManager.

2. Click on the *Load* button on the toolbar.
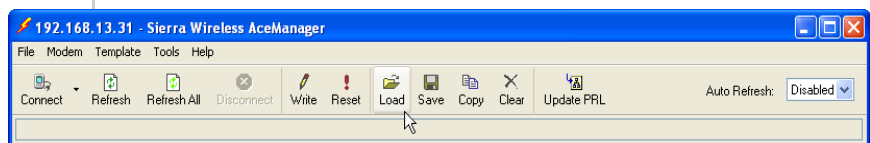
Figure 5-8: AceManager : Load

3. Select the template you have saved (you may need to change folders if you saved it to a different location).

b. Verify the configuration settings.

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

c. Click the *Write* button on the toolbar to write the configuration to the modem. Wait for the "Write Successful" message.
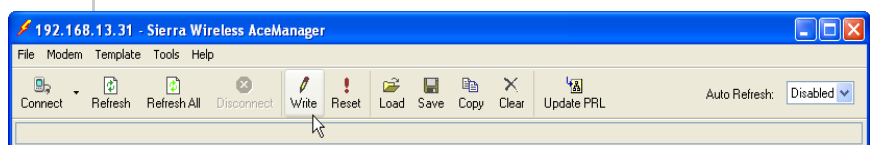
Figure 5-9: AceManager : Write

d. 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 serial settings of a modem (such as PinPoint X or Raven X) to configure the serial settings of a Raven XE. Settings not applicable to the modem on which you are loading the template, will be discarded.*

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 Raven XE template being applied to a Raven XE, 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.

    a. Select modems to configure with the template.
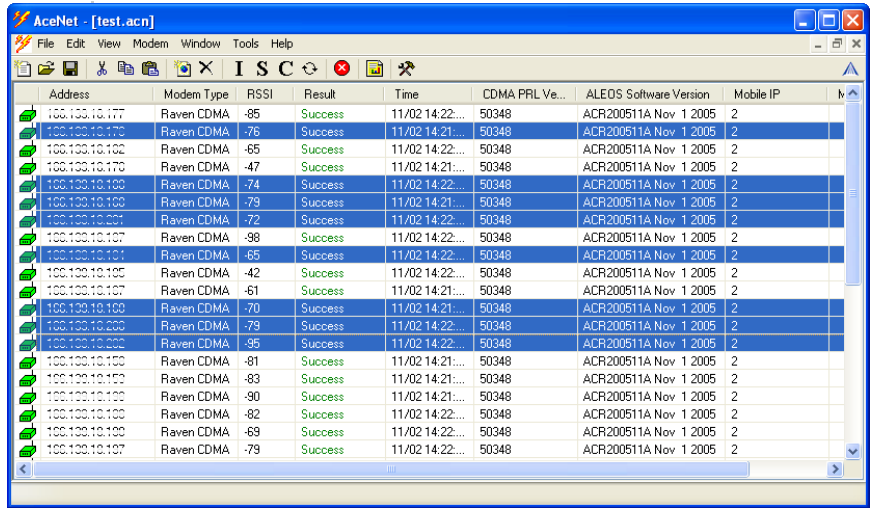
Figure 5-10: AceNet : Selected modems

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

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b. Select the *Modem* option in the tool bar and then select *Apply AceManager Template*.
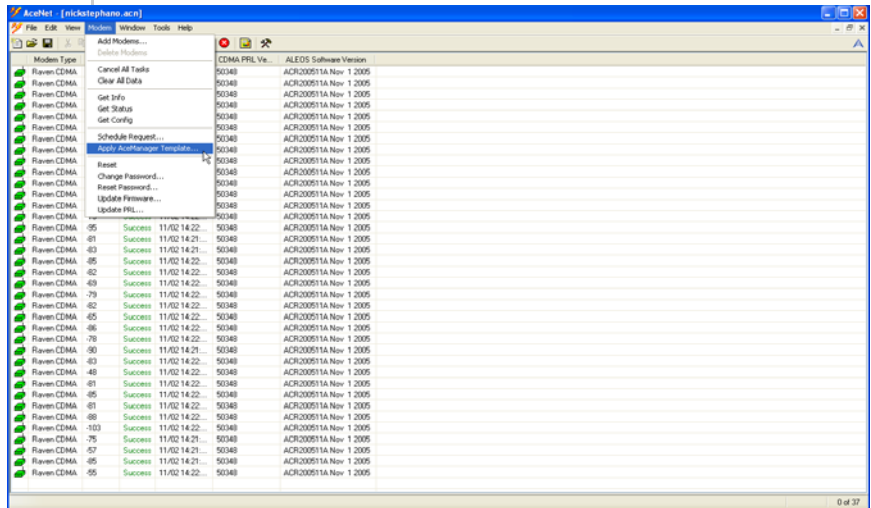
Figure 5-11: AceNet : Modem menu

c. 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).
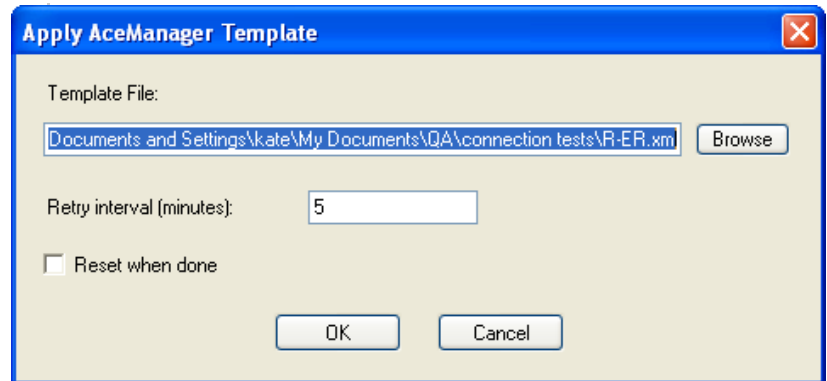
Figure 5-12: AceNet : Template select

> **d.** Set the Retry Interval and check if you want to have the modems Reset when the template has been applied.

Using a Terminal Application with AT Commands

You can access and configure your Raven XE 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
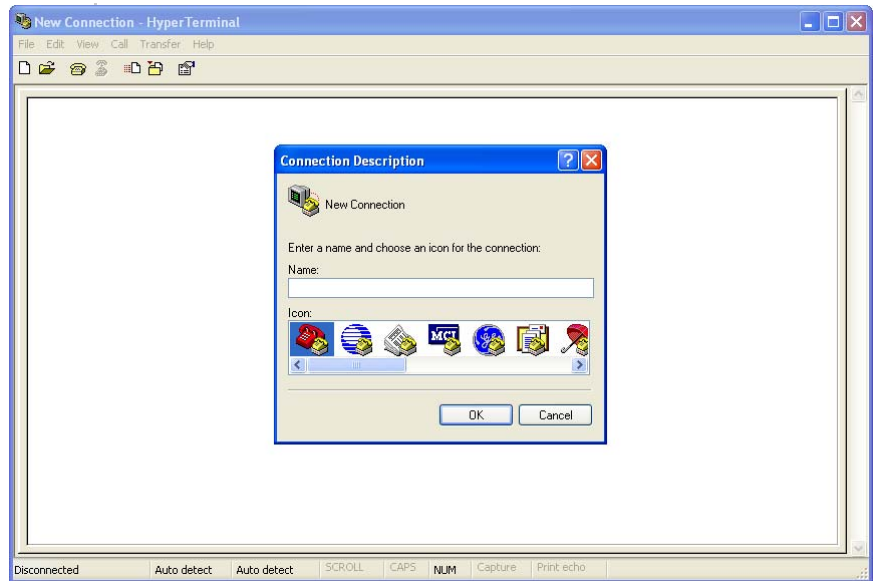
Figure 5-13: HyperTerminal

1. Choose a name and icon for your connection.

a. Choose a name for your connection, such as *Raven XE* or *Sierra Wireless AirLink Solutions*. The name and icon are only for your own reference so you can find the connection at a later date.

Tip: *If you want to have a connection saved for both local and remote, it is recommended the connection name reflect the connection type, i.e. Raven XE local.*

b. Select O*K*.

2. Connect To
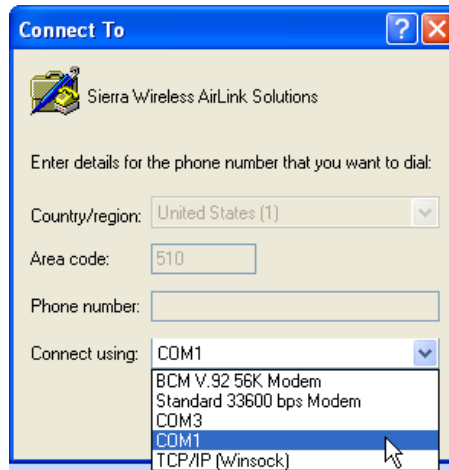
Figure 5-14: Connect To

a. Select *TCP/IP (Winsock)* for "Connect Using".

b. Type in *192.169.13.31* for Host Address.

c. Change the "Port Number" to *2332*.
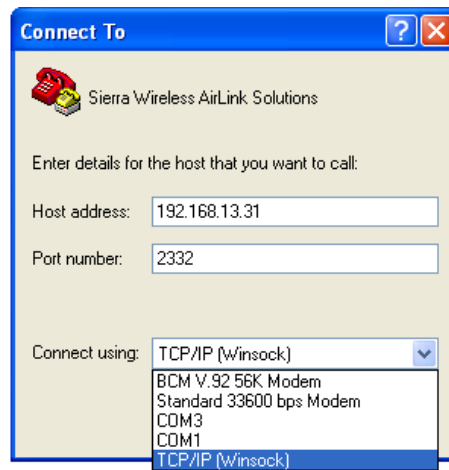
d. Select O*K*.

3. Connected
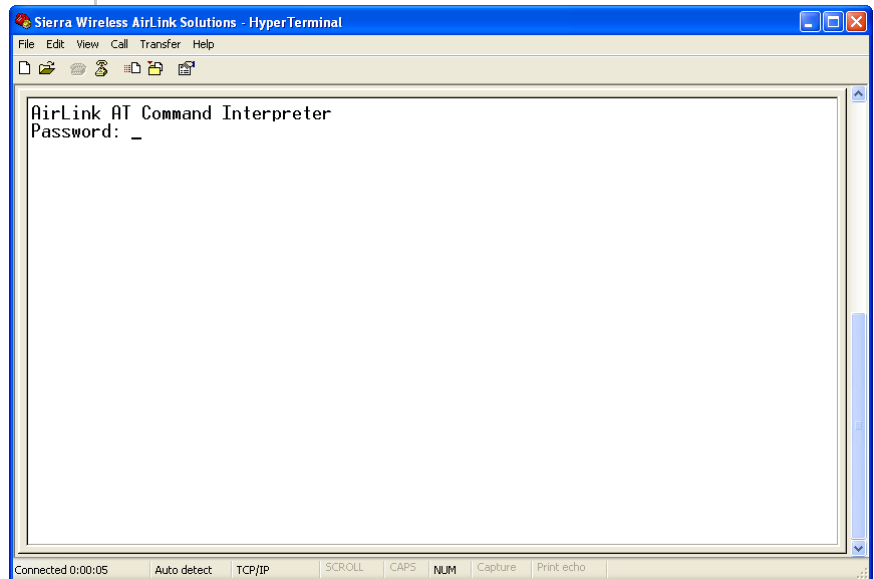
Figure 5-15: HyperTerminal : TCP/IP connected
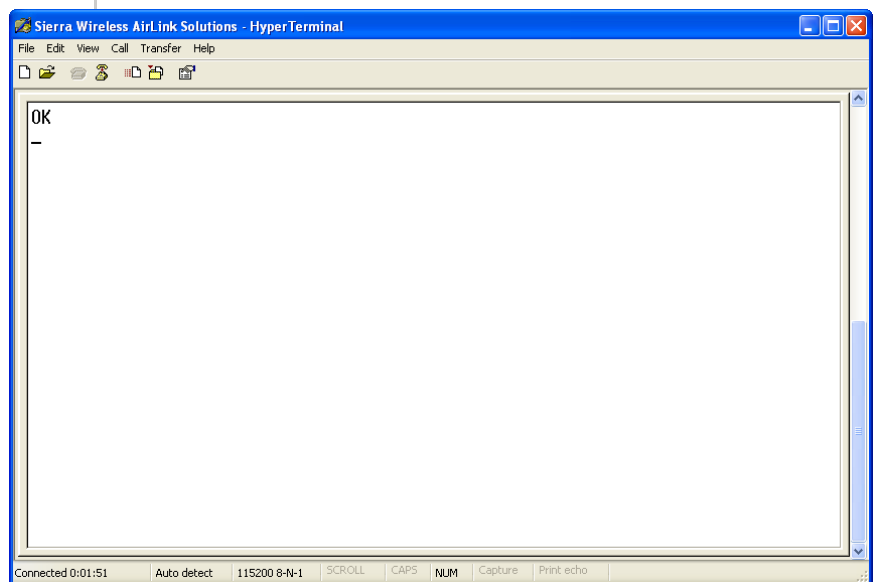
Figure 5-16: HyperTerminal : connected

a. If you are prompted for a password, enter *12345*.

b. Type *AT* and press *Enter*. You should get a reply of "OK" or "0".

a. Type *AT* and press *Enter*. You should get a reply of "OK" or "0".

> **b.** 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*.
>
> **c.** 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.

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), i.e. *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, D*n*. 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 Raven XE, 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 Raven XE 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)

6

- Changing the USB
  port communication
- Installing the USB
  driver
- Using the Virtual
  Ethernet Port
- Using the Virtual Serial
  Port

The Raven XE 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 a virtual 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 Raven XE and connect directly to your computer for best throughput.

Changing the USB port communication

The command to change the port configuration is *USBDEVICE and it is in the USB group of AceManager
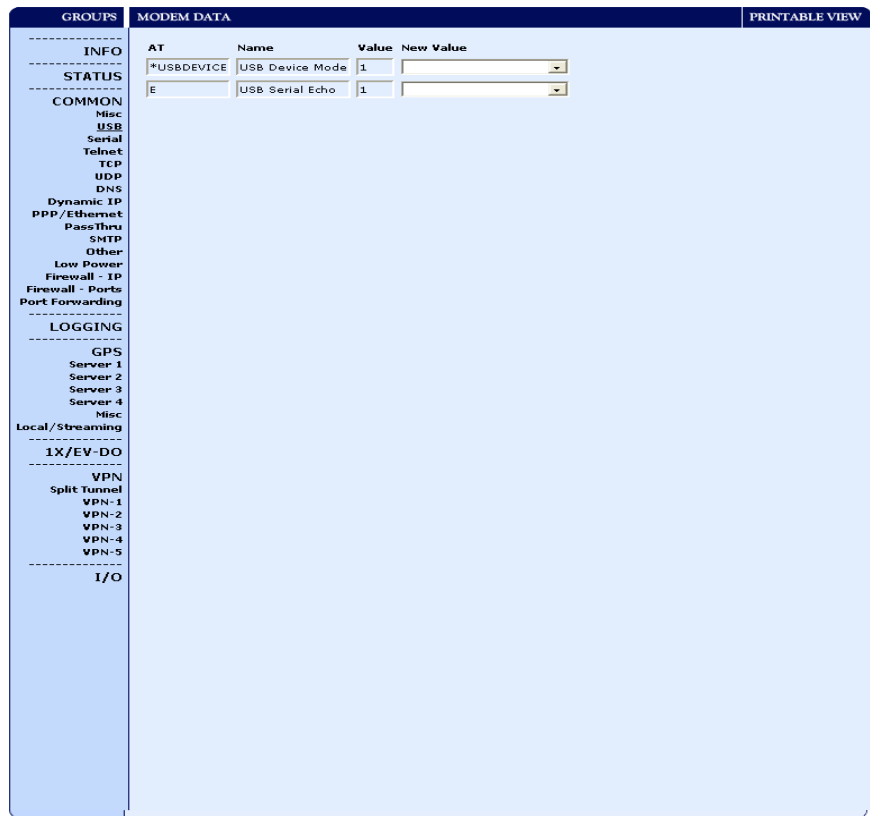
Figure 6-1: AceManager : USB

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, set *USBDEVICE to 0.

To disable the USB port, set *USBDEVICE to 2.

*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.*

Installing the USB driver

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.

2. Connect the Raven XE to your computer's USB port

When you connect the Raven XE 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 Raven XE or connect to a different USB port on your computer or hub, Windows will see it as a new device.

Figure 6-2: Found New Hardware Wizard

a. To start the install of the USB virtual Ethernet driver, select No, not this time and click Next.

b. Select Install from a list of specific location and click Next.

Figure 6-3: Hardware Wizard : Location options

3. Install the driver from a specific location

a. 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 Sierra Wireless website, select Include this location in the search and type in the location where you downloaded the file.

b. Click Next.
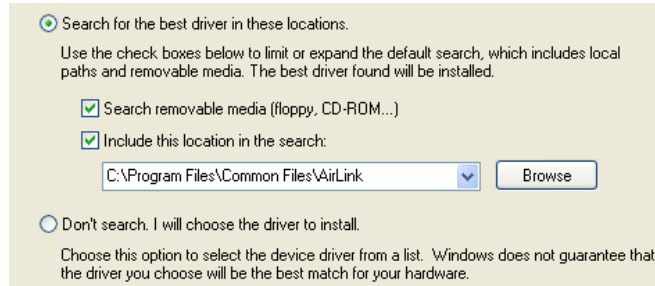
Figure 6-4: Hardware Wizard : Install location

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.
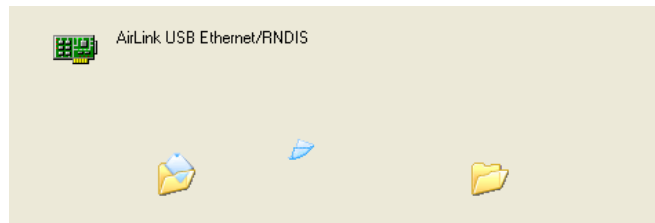
Figure 6-5: Hardware Wizard : Installing

c. Click Finish to complete the installation. The driver should be enabled without any need to reboot your computer.

Figure 6-6: Hardware Wizard : Finish

Note: If you are already connected to the modem with an Ethernet cable, when you complete the installation of the USB Ethernet driver, your computer will not use the USB connection initially. You may need to reboot your computer before you can use the USB port as an Ethernet connection to the modem.

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.*
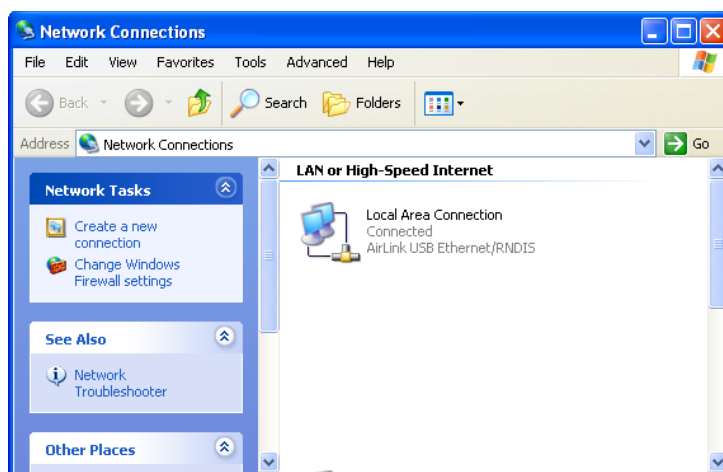
Figure 6-7: Network Connections

Note: By default, your Host IP is 192.168.14.100.

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

    a. Click on Start > Control Panel.

    b. Double-click on the System icon.

    c. Select the Hardware tab and click the Device Manager button.
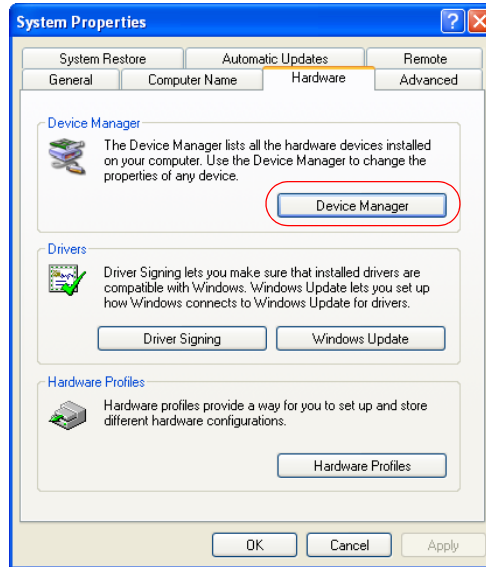
Figure 6-8: System Properties

> **d.** 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 since only the connected port and its driver would be active.
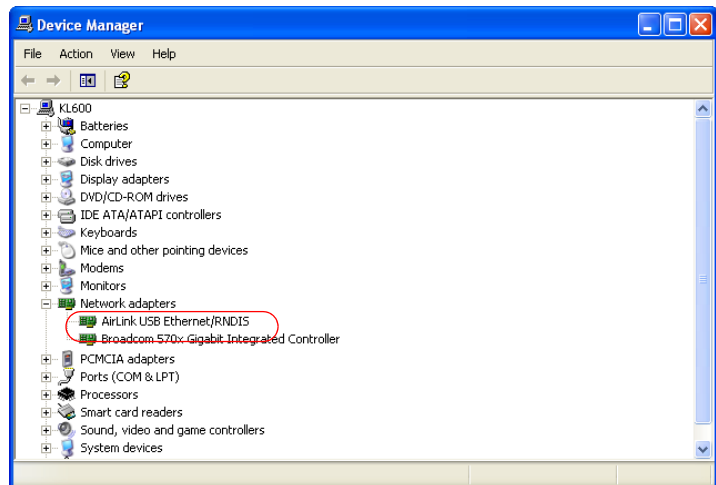
Figure 6-9: Device Manager - Ethernet

Virtual Serial

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

 a. Click on Start > Control Panel.

 b. Double-click on the System icon.

 c. Select the Hardware tab and click the Device Manager button.
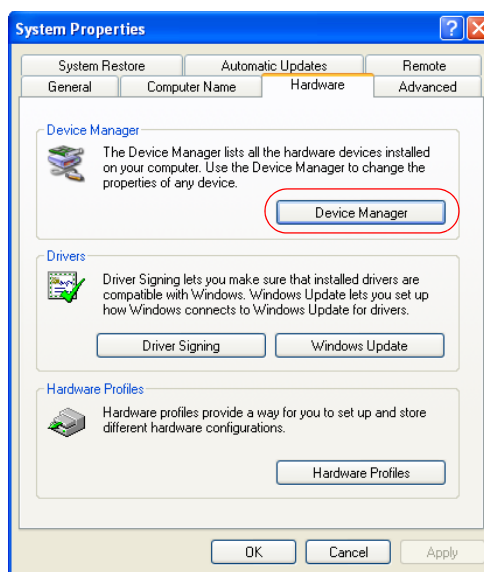
Figure 6-10: System Properties

 d. 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 since only the connected port and its driver would be active.*
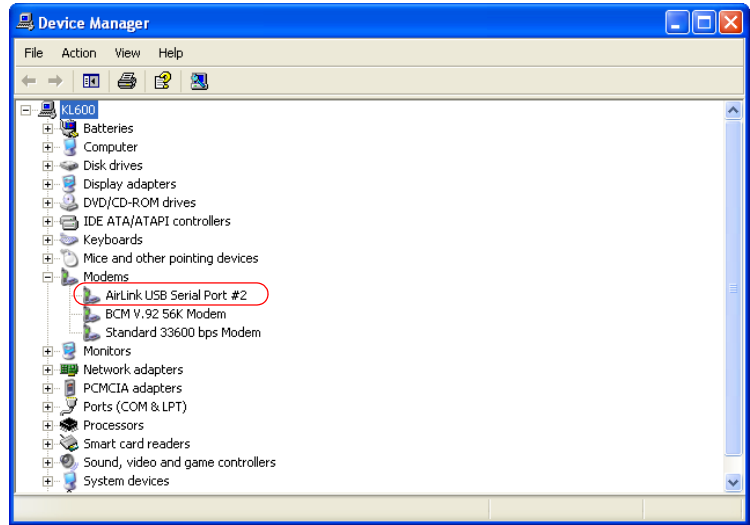
Figure 6-11: Device Manager - Serial

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.

a. From the Device Manager, right click on the driver name and select Properties.
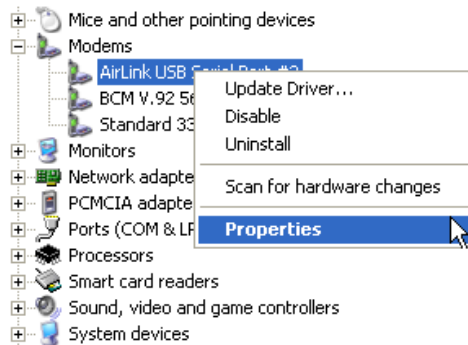
Figure 6-12: Device Manager : Driver menu

b. Select the Advanced tab and click the Advanced Port Settings button.
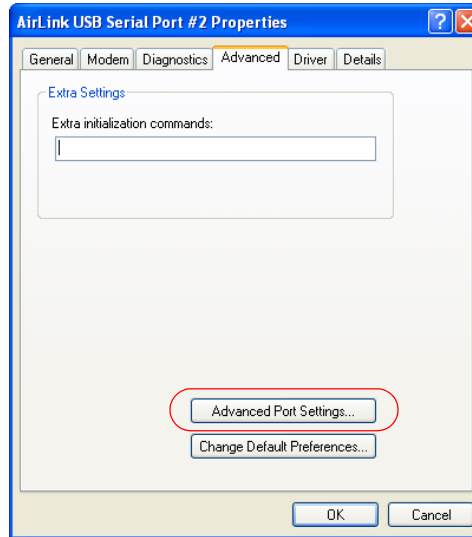
Figure 6-13: Driver Properties

c. 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.
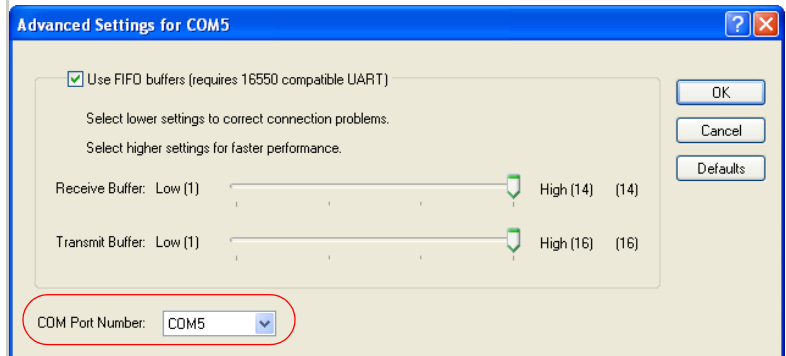
Figure 6-14: Advanced Settings

Note: The COM port number assigned by driver installation is the next port that is available.The port number might vary depending on the number of devices connected (using serial or virtual serial).

Using the Virtual Ethernet Port

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

Using USB Ethernet with AceManager

In AceManager, use the UDP or TCP connection and enter the IP address of the modem (*192.168.14.31* by default) and the password (*12345* by default).
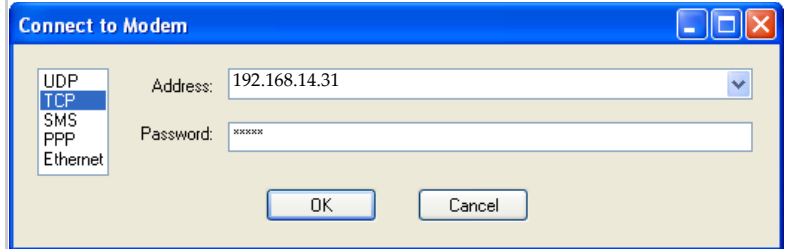
Figure 6-15: AceManager : TCP

Using USB Ethernet with a Terminal Emulation Utility

Configure your terminal application for telnet communication.

    a. In HyperTerminal, select TCP/IP (Winsock)

    b. Use the IP address of the modem (*192.168.14.31* by default) as the destination and use the telnet port of the modem (*2332* by default).
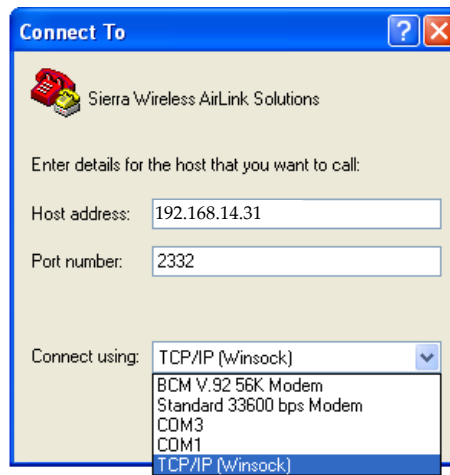
Figure 6-16: HyperTerminal : TCP

    c. Enter the modem password (*12345* by default) when requested.

Using the Virtual Serial Port

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

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.
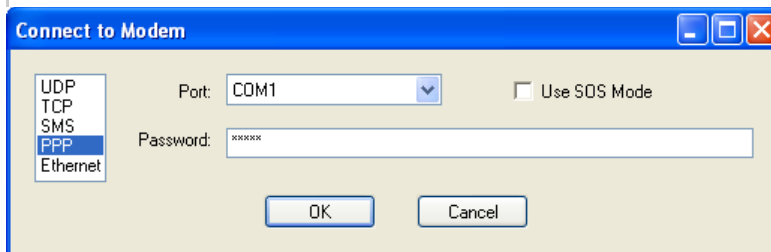
Figure 6-17: AceManager : PPP

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.*

Using the USB virtual serial port with a Terminal Emulation Utility

a. Select the serial port of the USB connection when prompted for a COM port.

b. Change the Bits per Second to 115200 (default), Data Bits to 8, Parity to None, Stop Bits to 1, and Flow Control to Hardware.

c. You should also need to make sure your connection uses Auto Detect for the terminal emulation.

7: Inputs, Relay Outputs, and Power Status

- Sub-section
- Sub-section

The Raven XE has special features for use in and M2M environment. The Raven XE can be configured to monitor the inputs and respond to specific types of events. These features can be configured to your needs.

Capturing External Events using Inputs

As part of its power connector, the Raven XE is equipped with an I/O interface for use in instrumentation applications. This includes 1 digital input and 1 digital output which can be connected, via a special I/O adapter cable, to sensors and switches to monitor status and remotely control equipment.

Figure 7-1: Raven XE

Digital Input

By measuring contact closures on switches, the digital inputs can report a simple open or closed state. Each of the four digital inputs can be wired to the two ground signals via a switch. When the switch is open, the input will read "OPEN". When the switch is closed and the input is connected to ground, the input will read "CLOSED".
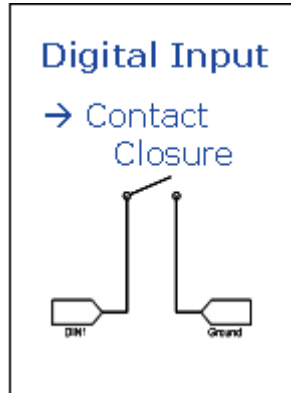
Figure 7-2: Digital Input Contact Closure

- When a door or other latch is opened or closed.
- Counting pulses or other electronic events.
- When a gauge reaches a certain point.
- When a container fills or empties.
- When a switch or valve is opened or closed.
- When the tow bar is raised or lowered.
- Connected to a sensor, the level of fuel in a vehicle.
- When the trunk of a vehicle is opened or closed.
- When the ignition is turned on or off.
- Lorsqu'une jauge atteint une certaine valeur.

Connecting devices to the IO Port

Note: Before you install the Raven XE in its final location, be sure to cover all exposed wiring.

You can purchase an optional I/O Power Cable for the Raven XE which can be used to attach devices to the combination I/O port and power connector. The harness has pre-wired leads to allow you to customize your own connections. The wires are paired and color-coded.
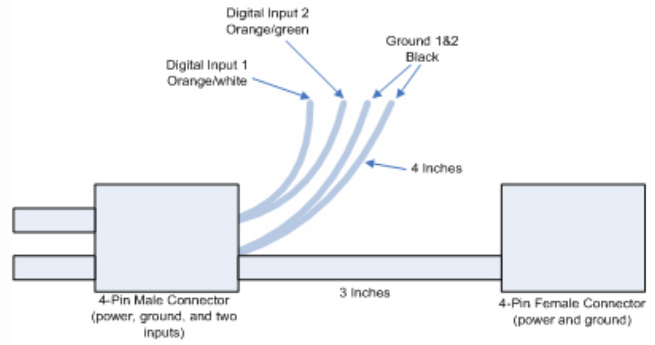
Figure 7-3: I/O Connector Diagram

Caution: *Never apply voltage to the Digital inputs. The inputs can only be switched open or closed to ground.*

Monitoring the Input and Output

You can monitor the status of the digital inputs using ACEmanager, AT Commands, or with special reports sent by email, SMS, or other report types using Event Reporting. In ACEmanager, select the I/O group.

Figure 7-4: ACEmanager : I/O

Power Effect on device State

Once the transition from powered on to standby, low-power mode starts, the device will change state to AT mode. This results in the current mode being gracefully terminated. For the brief period when the device is preparing for low-power mode, the device will remain in AT mode. At that time, it won't auto-answer, ATD will fail, etc. Once low-power mode is entered, the device will then discard any data received on the host port.

When the device is woken from low-power mode, the same behavior occurs as upon power on. The device starts in AT mode, and then after 5 seconds will enter the default start-up mode as it is configured for the modem.

8: Data Communication and Host Modes

8

- Basic Modes
- Data Communication

The Raven XE 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 Raven XE 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 Raven XE to a router. The router would provide the multiple routing and the Raven XE would provide one-to-one for the router to the cellular network and the Internet.*

As the host, the Raven XE can use different communication modes:

Basic Modes

- **AT**: The Raven XE accepts and responds to standard AT commands.
- **PassThru**: Direct connection to internal hardware (OEM Module) of the Raven XE.
- **Telnet**: The Raven XE 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 Raven XE 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 Raven XE. All serial modes are entered by use of a startup mode command.*

Data Communication

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

Basic Modes

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.

PassThru Mode

In PassThru mode, the Raven XE does not behave normally, all port communication is passed directly between the internal hardware and the computer connected directly to the modem. This mode can be used to configure hardware-specific settings. For example, provisioning, troubleshooting, communicating with legacy equipment, etc.

Caution: *ALEOS is disabled in PassThru Mode. You cannot use most ALEOS specific commands while the modem is in PassThru Mode. While in PassThru mode, you also cannot use AceManager to connect with the PinPoint.*

Issuing the "**AT\APASSTHRU**" from a terminal emulation enters this mode. The modem responds with OK, at which point a direct connection to the internal hardware is established. You can also configure the modem to enter PassThru mode on start up using **MD**.

Tip: *PassThru can only be exited by resetting or power-cycling the modem. This mode cannot be entered via a remote Telnet session.*

You can configure a string of AT commands to be sent to the Raven XE when it enters PassThru and other PassThru settings.

Figure 8-1: AceManager : PassThru

PassThru Mode allows only specific AT commands. Some ALEOS commands will be unavailable when the Raven XE is in PassThru mode. The commands usable also depend heavily on the modem model number (found on the label on the top of the Raven XE).

Note: Some internal hardware requires upwards of 20 seconds before AT commands can be entered, so be patient if there seems to be no response to AT commands.

Telnet Mode

In AceManager you can configure Telnet operation.

Figure 8-2: AceManager : S0

If you need to change the port for Telnet (for example, you have the default port blocked on your firewall), the option is on the Other tab. The default telnet port is *2332*. You can also change the Telnet timeout, if the connection is idle, default *2* minutes.

*Figure 8-3: AceManager : Other - *TPORT, *TELNETTIMEOUT.*

Data Communication

The primary purpose of the Raven XE 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 Raven XE obtains its IP address from your cellular provided, it also obtains the network routing information necessary to forward messages to their routers which can then forward on from there. The Raven XE 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 he 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.

Public and Private Mode

In Public Mode, the Raven XE 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 Raven XE.

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 Raven XE will use NAT to forward packets to the end device.

Tip: *When using Public mode, Sierra Wireless recommends connecting the modem directly to the computer or other end device. Using a hub or switch may prevent the Raven XE 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.

Figure 8-4: AceManager: PPP/Ethernet

- ***HOSTPRIVMODE** - Set to 1 to enable the explicit IP addresses.
- ***HOSTPRIVIP** - Set to the IP address you want the Raven XE 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 Raven XE.
- ***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 Raven XE 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 Raven XE 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 Raven XE 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 Raven XE registers on the cellular network, it is assigned an IP address from your cellular provided, let's say 10.1.2.0.

2. Acting as a DHCP server, in Public Mode, when the Raven XE 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 Raven XE 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 Raven XE, 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 Raven XE to send all outgoing packets.

Additional Connected Networks

If you have a router connected to the Raven XE 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.

Basic Routing

Expanding the capabilities of the Raven XE, 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.

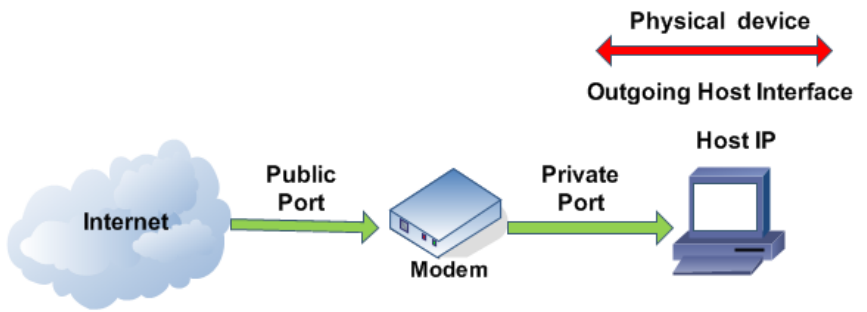*Figure 8-5: AceManager: Port Forwarding*

Figure 8-6: Port Forwarding

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 PPP is not available on the Raven XE.
  - Host IP: IP address of the connected device/computer.
  - Private Port: Port number on the connected device.
- Port Forwarding with range of ports (start and end): The Public Port 1 start and Public Port 1 end, allows ranges of ports to be forwarded, and or changed without individual entry. For example, if Public range is 8080 - 8090   to 80, this will cause 8086 to be forwarded to 86.

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 (i.e Ethernet or USB).
  - Default IP: Enter this option only when you want to forward ports not specified, to the default IP.

Firewall Functions

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

- **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 diabled, 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.
  - Outbound IP Filtering: Enable or disable Outbound IP filtering (0-OFF, 1- ON). Outbound Incoming traffic will create an outbound hole in the firewall, unless other restrictions apply to it. Access to Aleos ports are not blocked.

Note: In addition to the security settings in ALEOS, Inbound connections also require mobile terminated or Internet routable WAN/Cellular account.
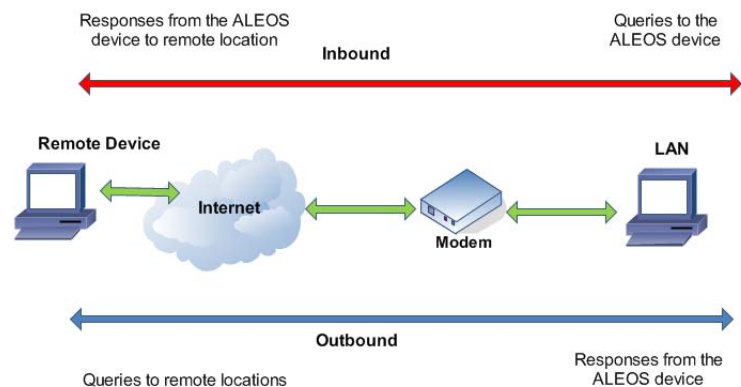

Figure 8-7: Outbound IP Filtering

Figure 8-8: AceManager: Firewall - IP

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.

Figure 8-9: AceManager: Firewall Ports

- **Firewall Port:** Specify the port you wish to have blocked or allowed, depending on the mode configured.
- **Packet Filtering:** Not available at this time.

Figure 8-10: AceManager: Firewall

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 Raven XE 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 provided to reestablish IP connectivity.

Configuring Keepalive

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

Figure 8-11: AceManager : Other

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

*Note: 15 minutes is the minimum time which can be set for Keepalive.
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.*

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 provided.   The following *IPPING settings will incur approximate monthly data usage in addition to any other data usage:

*IPPING	Estimated Usage
15 minutes	400k / month
30 minutes	200k / month
60 minutes	100k / month
120 minutes	50k / month

9: IP Manager

- Understanding Domain Names
- Using IP Manager with your Raven XE
- Understanding DNS

If you have a fleet of Sierra Wireless AirLink modems or even if you only have one, it can be difficult to keep track of the current IP addresses, especially if the addresses aren't 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 (car54.mydomain.com, where are you?).

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 derek 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 Raven XE directly, a device connected to the modem, or a host system using your Raven XE (also called Mobile Terminated), a dynamic IP won't give you a reliable address to contact (since 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 Raven XE is connected and can change each time the modem reconnects to the network.
- Static IP addresses are granted the same address every time your Raven XE is connected and are not in use when your modem is not connected.

Since many cellular providers, like wire-based ISPs, do not offer static IP addresses or static address accounts cost a premium vs. dynamic accounts, Sierra Wireless AirLink Solutions developed IP Manager to work with a Dynamic DNS server to receive notification from Sierra Wireless AirLink modems to translate the modem's dynamic IP address to a fully qualified domain name. Thus, you can contact your Raven XE directly from the Internet using a domain name.

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 (i.e. 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.

car54.mydomain.com

- *.com* is the TLD
- *mydomain* is the domain (usually noted as mydomain.com since the domain is specific to the TLD)
- *car54* is the subdomain or server name associated with the device, computer, or modem registered with mydomain.com

car54.mydomain.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* http:// www.sierrawireless.com. www.sierrawireless.com *is a fully qualified domain name, but the http://, the protocol identifier, is what makes the whole thing a URL.*

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. Since 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 Raven XE 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.

Once 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 Raven XE will be a subdomain of the domain used by the IP Manager server.

Using IP Manager with your Raven XE

To allow your Sierra Wireless AirLink 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.*

Figure 9-1: AceManager: Dynamic IP

- ***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 Raven XE.*

- ***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 Raven XE is reset or is assigned a different IP address).
- ***IPMGRKEY1** and ***IPMGRKEY2**: User defined password key which is used instead of AirLink secret key when using an IP Manager server other than the one provided by Sierra Wireless.

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. Since 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

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

Eairlink.com

As a service, Sierra Wireless maintains a IP Manager servers which can be used for any AirLink modem.

- ***DOMAIN** : eairlink.com
- ***IPMANAGER**1 : edns2.eairlink.com
- ***IPMANAGER2** : eairlink.com

Note: The IP Manager service from Sierra Wireless is currently not a guaranteed service though every effort is made to keep it operational 24/7.

Tip: *When using the IP Manager service offered by Sierra Wireless, since there are many modems using the service, it is even more imperative to have a unique name for your modem.*

Understanding DNS

The Raven XE 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 Raven XE 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 Raven XE using IP Manager).

Configuring DNS

Generally, when your Raven XE 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 Raven XE 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 Raven XE will be communicating with a device that has a domain name but changes its IP address frequently (such as another AirLink 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*.

Figure 9-2: AceManager: DNS

- ***DNS1** and ***DNS2** - The primary and secondary DNS servers set by Provider when your Raven XE 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.
- ***DNSUPDATE** - This command sets how often you want DNS Updates to be requested. Otherwise the Raven XE 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.

The "PPP-Peer" Domain Name

The Raven XE 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 Raven XE is not in PPP or SLIP address mode, "ppp-peer" will resolve to 0.0.0.0.

10: SNMP : Simple Network Management Protocol

- SNMP Configuration
- SNMP MIB Definition Sample

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 Raven XE, 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 Raven XE, 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 Raven XE can be configured as an SNMP agent and supports SNMPv2c and SNMPv3.

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 Raven XE, 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.

SNMP Traps

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

SNMP Configuration

To configure your Raven XE 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 Raven XE: the listening port, the security level, and the trap destination.

Figure 10-1: AceManager : Common > Other

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.*

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.

User Name and Password

The user name is '*user*'. The user name cannot be changed. The Raven XE's password is used as the SNMP password (default is '*12345*').

Tip: *The eight-character password requirement for SMNPv3 is not enforced by the PinPoint X Agent to allow the default password to function. Your SNMP administrator or MIS may require you to change to a more secure and/or longer password.*

To change the password in the Raven XE, select **Modem** from the top menu line in AceManager.
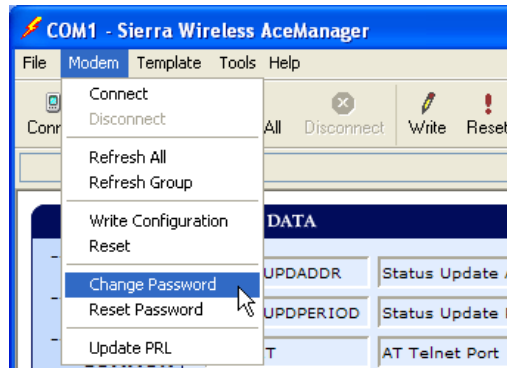
Figure 10-2: AceManager : Change Password menu option

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.
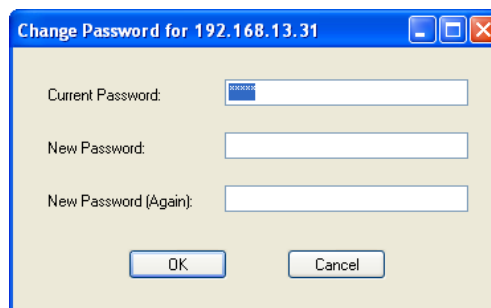
Figure 10-3: Change Password

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

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 (i.e. if the security level is 2, traps will be authenticated and encrypted). Currently, the only trap supported is LinkUp.

Community String

The community string can be configured using *SNMPCOM-MUNITY. The default is "public".

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 ::= { airlink 1 }
common OBJECT IDENTIFIER ::= { airlink 2 }
status OBJECT IDENTIFIER ::= { airlink 3 }
gps OBJECT IDENTIFIER ::= { airlink 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
```

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?

Object	AT Command
netPW	*NETPW?
requestPAP	*HOSTPAP?
destinationAddress	S53
destinationPort	S53
serialPortSettings	S23
serialPortFlowControl	\Q
ipAddress	*NETIP?
netState	*NETSTATE?
netChannel	*NETCHAN?
rssi	*NETRSSI?
serialSent	*not applicable for Raven-E*
serialReceived	*not applicable for Raven-E*
hostMode	*HOSTMODE?
powerMode	*POWERMODE? *PinPoint line modems only*
fixObtained	*PinPoint line modems only*
satelliteCount	*PinPoint line modems only*
latitude	*PinPoint line modems only*
longitude	*PinPoint line modems only*

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.

A: Configuration Commands

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

The commands available in AceManager will depend of the model number of your Raven XE and, in some cases, the version of the ALEOS firmware installed.

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 Raven XE is configured to use DNS. DNS settings frequently come directly from your cellular provided while your Raven XE is registering on the cellular network and receiving it's IP address.*

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.

Figure 1-1: AceManager : Info

*DEVICEID?

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

*ETHMAC?

The MAC address of the Ethernet port.

*NETPHONE?

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

&V

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

I*n*

- **n=0** : Product name (for example, Raven XE).
- **n=1** : The Raven XE'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.*

Information Displayed in AceManager without AT Commands Listed

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

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.

Figure 1-2: AceManager : Status

*HOSTMODE?

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

*NETERR?

The EDGE or GPRS network bit error rate.

*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 provided. This is the address can contact the Raven XE from the Internet.

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

*NETOP?

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

*NETRSSI?

The current RSSI (Receive Signal Strength Indicator) of the Raven XE as a negative dBm value.

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

---

*NETSERV?

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

*NETSTATE?

The current network state:

- **Connecting To Network:** The Raven XE 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 Raven XE.
- **Data Connection Failed:** The Raven XE failed to connect, and it is now waiting a set time interval before it attempts to reconnect. Verify settings to activate the Raven XE.
- **Network Negotiation Fail:** Network connection negotiation failed. This is usually temporary and often clears up during a subsequent attempt.
- **Network Ready:** The Raven XE is connected to the 1x cellular network and ready to send data.
- **Network Dormant:** The Raven XEis 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.

*POWERIN?

The voltage input to the internal hardware.

+ICCID

Subscriber Identity Module ID. .

+RCIQ

Current Cell Info Information. GPRS or EDGE Only.

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.

AT Commands Requiring PassThru mode

These commands are not displayed in AceManager.

+CCID

Subscriber Identity Module ID.

Subscriber Identity Module ID.

Common

The groups under the heading Common encompass those commands that are common to most Sierra Wireless AirLink modems. For example, a Raven X or PinPoint X will include groups with serial related commands, however, the Raven-E will not.

Misc (Miscellaneous)

The commands of the "Misc" group are a variety of commands that don't directly fit in other categories.

Figure 1-3: AceManager : Misc

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

+++

AT Escape sequence. If the Raven XE 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.*

Note: +++ is not proceeded 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.

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

A/

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.

H*n*

Hang-Up Command.

• **n=1** : Hang-up

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

O

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

OPRG=*n*

Enables/disables over-the-air firmware upgrading of the Raven XE. When Sierra Wireless releases a new version of ALEOS, you can upgrade your remote modems with OPRG enabled.

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

S53=[method][d.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.

V*n*

Command Response Mode.

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

Z

Reset the Raven XE. 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.

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

*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**

*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.

*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.

*NETPW=*pw*

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

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

*NETPHONE?

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

-

*NETUID=*uid*

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

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

*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 since 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

DNS

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

Figure 1-4: AceManager : DNS

*DNS*n*=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.

*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.

*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.

Dynamic IP

This group includes commands specific to dynamic DNS. Dynamic DNS allows the Raven XE 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 Raven XE using IP Manager running on a server with a dynamic DNS updater.

Figure 1-5: AceManager : Dynamic IP

*DOMAIN=*name*

Domain (or domain zone) of which the Raven XE 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** (i.e. 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.*

---

*IPMANAGER*n*=[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**

*IPMGRKEY*n*=*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 (i.e. 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]

*IPMGRUPDATE*n*=*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 Raven XE doesn't 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 (i.e. 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.

*MODEMNAME=*name*

Name of the Raven XE (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".*

PPP/Ethernet

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

Figure 1-6: AceManager : PPP/Ethernet

*DHCPSERVER=*n*

* Act as a DHCP server for any Ethernet device connecting to the Raven XE. 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 Raven X 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 Raven XE will not send out replies to DHCP requests.

* **n=0** : Disabled. The Raven X will not send out replies to DHCP requests.

*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

Tip: *For PPPoE, set *HOSTAUTH=1 or *HOSTAUTH=2.*

*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.

*HOSTPEERIP=*d.d.d.d*

Set or query the IP address that can be used to directly contact the Raven XE once 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.

*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**

*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 (since 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.

*HOSTPW=*string*

Host Password for PAP, or CHAP, or PPPoE.

- **string=password**

*HOSTUID=*string*

Host User ID for PAP, or CHAP, or PPPoE.

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

PassThru

PassThru Mode is used to communicate directly to the Raven XE internal hardware.

Caution: *While the modem is in PassThru mode, ALEOS is disabled. If you need to connect to the Raven XE while it is in PassThru mode, you will need to do so with a terminal application. Not all commands are available while the modem is in PassThru mode.*

Figure 1-7: AceManager : PassThru

\APASSTHRU

Sets the modem operation to pass through mode. This mode will pass any characters received on the port Ethernet directly to the internal hardware module and output any characters from the internal hardware module out the port Ethernet. This allows direct access/configuration of the hardware module. Once this mode is entered, the unit must be physically reset to return to normal operation. This command is not available in AceManager.

Note: This mode is not available through the remote AT telnet server. You will need to connect to the Raven XE with it connected directly to your computer.

Note: It may take up to 30 seconds for the hardware module to respond after CONNECT is output.

*CSX1=*n*

PassThru Echo : Echo data to the host.

- **n=0** : Data will be passed to the host.
- **n=1** : PASSTHRU mode will echo all host received data and will not pass the data to the modem while the modem is not asserting DCD.

Note: If the modem is asserting DCD, data will be passed from the host to the modem as it normally is when *CSX1=0.

*PTINIT=*string*

Any AT Command string to be passed to the OEM module before entering PASSTHRU mode, e.g. AT&S1V1, etc.

- **string=AT command(s)**

*PTREFRESH=*n*

Number of minutes of inactivity in PASSTHRU mode to resend the *PTINIT string to the hardware module.

- **n=0** : Disabled
- **n=1-255** minutes

*RESETPERIOD=*n*

In PASSTHRU mode, modem will be reset after this period if no data has been sent or received. Value is in hours.

- **n=0** : Disabled
- **n=1-255** hours

SMTP

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

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

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.

GROUPS	MODEM DATA				PRINTABLE VIEW
--------------- INFO --------------- STATUS --------------- COMMON Misc Serial TCP UDP DNS Dynamic IP PPP/Ethernet PassThru SMTP Other	AT	Name	Value	New Value	
	*SMTPADDR	SMTP Server IP Address			
	*SMTPFROM	From email address			
	*SMTPUSER	User Name (optional)			
	*SMTPPW	Password (optional)	********		
	*SMTPSUBJ	SMTP Message Subject			

Figure 1-8: AceManager : SMTP

*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**

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).

*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.

*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. Once read, the status 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
```

*SMTPSUBJ=subject

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

- **subject=message subject**

*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.

Other

Figure 1-9: AceManager : Other

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.

*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 Raven XE 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 Raven XE 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

*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 Raven XE modem resets.

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

*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.*

*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).

*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 (i.e. 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**

*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**

*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**

*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.*

---

*TQUIT

Disconnects the telnet session. Not available in AceManager..

Firewall

Firewall Mode can limit access to the Raven XE 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 Raven XE 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.

Figure 1-10: AceManager : Firewall

FM=*n*

Firewall mode - Only allow specified IPs to access the Raven XE 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.

F*n*=[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 since 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 since the connection would be blocked before even reaching the Raven XE.

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.

Figure 1-11: AceManager: Port Forwarding

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

Number of PF Enteries = 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 PPP is not available on the Raven XE.

•

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**

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.*
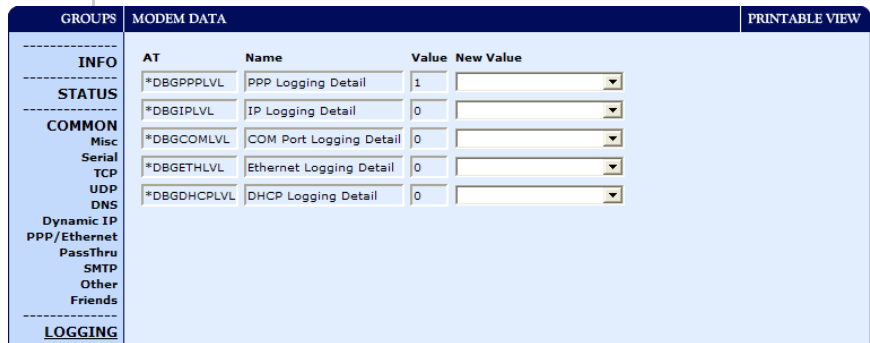

Figure 1-12: AceManager : Logging

*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

*DBGDHCPLVL=*n*

Enable or disable internal DHCP logging.

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

*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.

*DBGIPLVL=*n*

Sets the logging level for the IP subsystem.

- **n=0** : No logging

- **n=1** : Log errors (i.e. 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.

*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

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**

Edge/HSUPA

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.

Figure 1-13: AceManager : EDGE/HSDPA

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**

+CGQMIN

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

+CGQREQ

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

+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"**