AirLink PinPoint XT

User Guide

SIERRA

WIRELESS

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 PinPoint XT are used in a normal manner with a well-constructed network, the Sierra Wireless AirLink PinPoint XT 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 PinPoint XT, or for failure of the Sierra Wireless AirLink PinPoint XT to transmit or receive such data.

Safety and Hazards

Do not operate the Sierra Wireless AirLink PinPoint XT 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 PinPoint XT **MUST BE POWERED OFF**. The Sierra Wireless AirLink PinPoint XT can transmit signals that could interfere with this equipment.

Do not operate the Sierra Wireless AirLink PinPoint XT in any aircraft, whether the aircraft is on the ground or in flight. In aircraft, the Sierra Wireless AirLink PinPoint XT **MUST BE POWERED OFF**. When operating, the Sierra Wireless AirLink PinPoint XT 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 PinPoint XT may be used at this time.

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6,191,741	6,199,168	6,339,405	6,359,591	6,400,3366,516,2046,561,8516,643,501
6,653,979	6,697,030	6,785,830	6,845,249	6,847,8306,876,6976,879,5856,886,049
6,968,171	6,985,757	7,023,878	7,053,843	7,106,5697,145,2677,200,512D442,170
D459,303				

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5,414,796	5,416,797	5,490,165	5,504,773	5,506,8655,511,0735,535,2395,544,196
5,568,483	5,600,754	5,657,420	5,659,569	5,710,7845,778,338

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

www.sierrawireless.com

Revision History

Revision number	Release date	Changes
1.x	Q2: 2009	Guide updated with ALEOS Release 4.0 content.
2.x	Q1: 2010	User Guide rebranded to current corporate standards.

Contents

1: Introduction to the PinPoint XT

- Connecting to your
    cellular provider
- EV-DO
- Connection
    methods
- Networking
- Applications
- Software
- Documentation

The PinPoint XT is a compact, intelligent and fully-featured mobile communications platform. Expanded I/O functionality in a separate connector includes four digital inputs, three analog inputs and two relay outputs unleashing extensive remote instrumentation possibilities.

Its high-precision 50-channel GPS receiver coupled with the rich embedded intelligence provided by ALEOS™ technology make PinPoint XT the perfect choice for a broad set of mobile enterprise, public safety, fleet management and AVL solutions.

Figure 1-1: Sierra Wireless AirLink PinPoint XT

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

- Persistent Network Connectivity
- Over-The-Air (OTA) Upgrades
- Wireless Optimized TCP/IP
- Real-Time Notification
- Real-Time GPS Reporting
- GPS Store and Forward
- Packet Level Diagnostics
- Device Management & Control

- Protocol Spoofing

Figure 1-2: Powered by ALEOS

A wireless solution is not complete until you have software tools to manage the devices monitoring your valuable equipment. Using the AirLink Control Environment (ACE), ACEWare is the device management and monitoring application suite for Sierra Wireless AirLink devices powered by ALEOS.

Figure 1-3: ACEware Logo

The ACEware suite encompasses an application internal to the firmware (ACEmanager), Windows-based applications (ACEview and Modem Doctor), and a web-hosted application (ACEnet). 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 any further information.

Note: ACEview requires the Microsoft .NET Framework v. 2.0 and Microsoft Windows 98, Windows 2000, Windows XP, or later. You can obtain the Microsoft .NET Framework from Microsoft at: http://www.microsoft.com/.

ACEmanager

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.
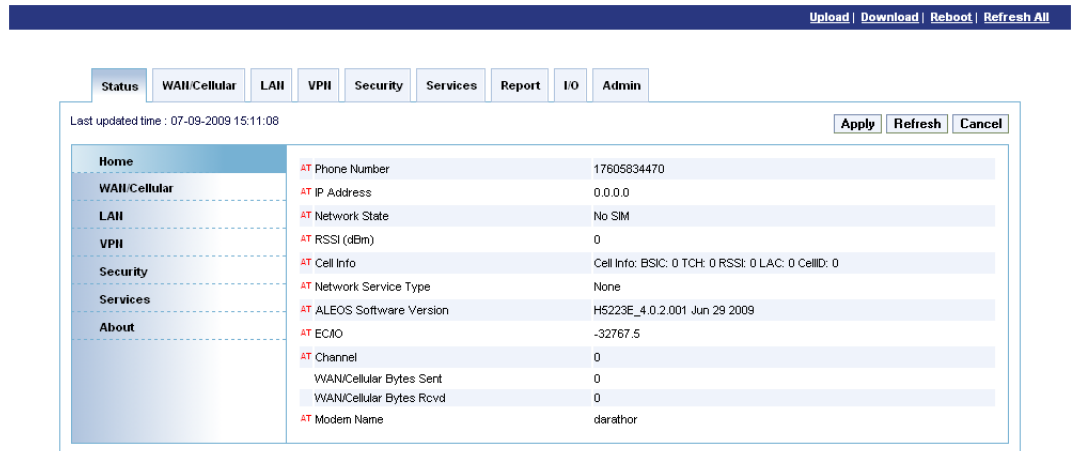
Figure 1-4: ACEmanager

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 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, GPS settings, and much more. After configuring one modem, use the template feature to copy that device configuration to other devices.

Tip: *Configuration steps and examples in this guide use ACEmanager.*

ACEview

ACEview is an efficient status and connection monitoring application with a low-profile, easy to read interface. In ACEview, you can also update PRL.

Figure 1-5: ACEview

Modem Doctor

Modem Doctor and Modem Doctor USB is a troubleshooting and diagnostics utility. This utility will allow you to get a log file of the PinPoint XT activity which you can then send to Sierra Wireless support or erase the current configuration completely.
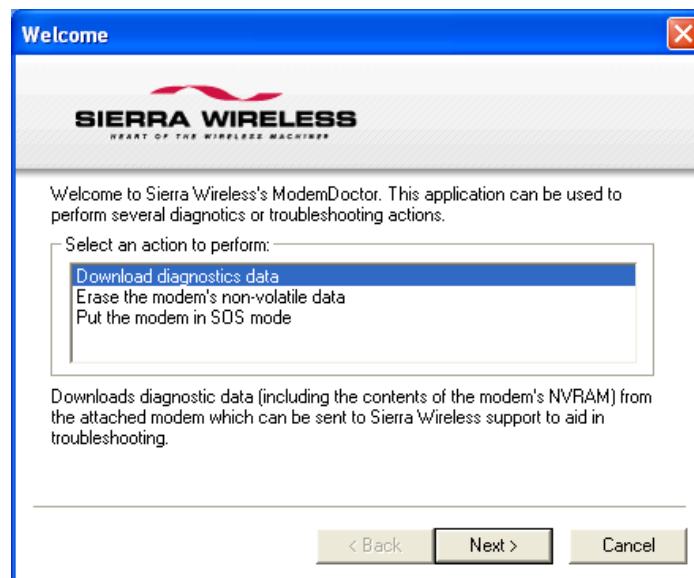
Figure 1-6: Modem Doctor

Connecting to your cellular provider

The PinPoint XT uses your cellular provider as an ISP (Internet Service Provider) to connect you to the Internet.

Steps of a connection:

1. When your PinPoint XT is powered on, it automatically searches for cellular service using CDMA-based cellular technology.

2. Your PinPoint XT establishes a PPP (Point to Point Protocol or "dial" up connection) link to your cellular provider network, also called registering on the network, and receives an IP address.

3. When your PinPoint XT has received its IP address from your cellular provider, a connection to the Internet or the cellular network is also available for computers or other devices connected directly to the PinPoint XT.

The PinPoint XT will perform routing for all internet traffic to and from the computers or other end devicse.

With the PinPoint XT in Ethernet Public mode, only one device connected to the Ethernet port will receive the public IP address which is the one provided by the cellular network. In Ethernet Private mode, with a hub or switch connected to the Ethernet port, the PinPoint XT will provide NAT for a range of computers or other devices connected to the switch or hub and Internet access to all of them.

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 PinPoint XT might not always receive the same address each time it connects with your cellular provider.
- Static addresses are permanently assigned to a particular account and will always be used whenever your PinPoint XT 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 provider includes a dynamic IP address and you need a static IP, please consult your your cellular provider Representative for more information about changing your account for static IP support.*

If you need to contact your PinPoint XT, a device connected to the PinPoint XT, or a host system using the PinPoint XT 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 PinPoint XT using TCP/IP, the IP address given to your modem by your cellular provider cannot be a private or internal IP address (such as a special private network) unless you are on the same network or inside that network's firewall (such as with frame relay).*

EV-DO

CDMA (Code Division Multiple Access) is the underlying digital radio network technology used by many cellular providers across the globe and is prevalent in North America.   To provide backward compatibility and seamless connections in a wider range of locations, Sierra Wireless EV-DO products your PinPoint XT will fall back to 1x when EV-DO is not available.

Sierra Wireless is certified with your cellular provider, a prominent North American 1x and EV-DO carrier.

EV-DO revision A is an enhancement on the original revision 0 adding expanded upload capabilities and a more robust connection overall. In addition to increasing the downlink speed, revision A also increases the uplink speed. In addition, it is backwards compatible and automatically connects with existing and broadly deployed EV-DO Rev. 0 and 1x networks ensuring reliable and pervasive connectivity.

Security

1x data transmissions are highly secure. Originally developed based upon the "spread spectrum" pioneered by the US Department of Defense, security in CDMA technologies is obtained by spreading the digital information contained in a particular signal of interest over multiple coded paths, over a much greater bandwidth than the original signal.

Connection methods

You can connect the PinPoint XT to a USB or a Ethernet (RJ45) on a computer. When connected to a USB or Ethernet port, the PinPoint XT behaves like a network card.

USB

The PinPoint XT 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.

It is recommended that you use a USB 2.0 cable with your PinPoint XT and connect directly to your computer for best throughput.

Virtual serial port

The PinPoint XT supports one virtual serial port over USB. This VSP can be used, for example, to send AT commands, or to run many serial based applications such as HyperTerminal®.

Networking

IPSec

The IP protocol that drives the Internet is inherently insecure. Internet Protocol Security (IPSec), which is a standards-based protocol, secures communications of IP packets over public networks.

IPSec is a common network layer security control and is used to create a virtual private network (VPN).

The advantages of the IPSec feature includes:

* Data Protection: Data Content Confidentiality allows users to protect their data from any unauthorized view, because the data is encrypted (encryption algorithms are used).
* Access Control: Access Control implies a security service that prevents unauthorized use of a Security Gateway, a network behind a gateway or bandwidth on that network.
* Data Origin Authentication: Data Origin Authentication verifies the actual sender, thus eliminating the possibility of forging the actual sender's identification by a third-party.
* Data Integrity: Data Integrity Authentication allows both ends of the communication channel to confirm that the original data sent has been received as transmitted, without being tampered with in transit. This is achieved by using authentication algorithms and their outputs.

The IPSec architecture model includes the Sierra Wireless AirLink gateway as a remote gateway at one end communicating, through a VPN tunnel, with a VPN gateway at the other end. The remote gateway is connected to a Remote network and the VPN is connected to the Local network. The communication of data is secure through the IPSec protocols.
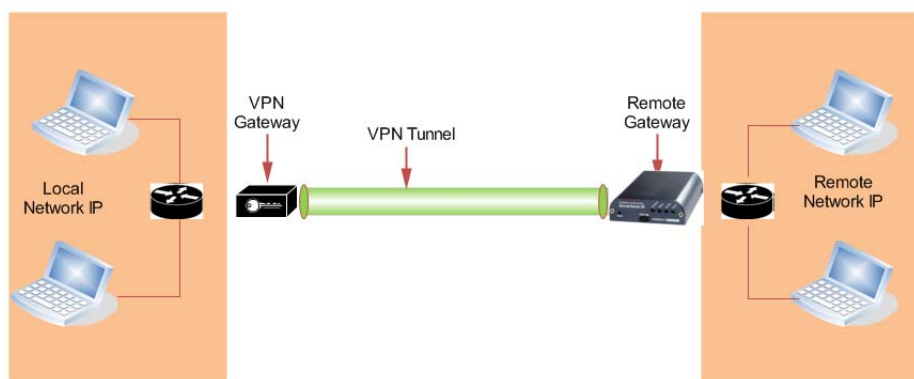
Figure 1-7: IPSec Architecture

GRE

GRE (Generic Routing Encapsulation) tunnel is used to carry non-IP packets through an IP Network. Non -IP packets, that are send over the GRE tunnel, need to be first encapsulated. Hence, ALEOS is used to configure and encapsulate non-IP packets and transmit over IP through the GRE tunnel.

Applications

Events Reporting

Events Reporting is Sierra Wireless AirLink's modem's new software feature provided via ACEmanager, that allows the users to generate reports from the events that take place. Event Reporting Protocol is an intuitive embedded protocol, which automatically formats the messages based on an event trigger. The messages generated are then reported to the remote server.

Software

The PinPoint XT modem comes with the following software:

- AceView, the software for the PinPoint XT which allows you to monitor your connections.
- The driver that forms the interface between the PinPoint XT and your Windows operating system when using USB virtual Ethernet or USB virtual serial.
- The firmware that is stored in non-volatile memory and includes ACEmanager.

  The PinPoint XT has an embedded radio module, also made by Sierra Wireless, Inc. There are two firmware programs on the device—one stored on the controller board of the PinPoint XT and one on the radio module.

  The firmware was loaded into the radio module and controller board when the PinPoint XT was assembled. As new versions of the software and firmware are released, they are posted at www.sierrawireless.com.

Documentation

This *PinPoint XT User Guide* describes how to:

- Install the PinPoint XT hardware.
- Connect the radio antennas.
- Connect a notebook computer and other input/output (I/O) devices.
- Interpret the LEDs on the PinPoint XT and the indicators in the AceView software.

This *User Guide* is provided as a PDF (Portable Document Format) file on the installation CD or from the Sierra Wireless support website.

Tools and Reference Documents

User Guide	Description
ALEOS User Guide	This document discusses software configuration in ACEmanager and explains all the ALEOS features.
ACEview User Guide	This document explains the use of this utility tools which is used to view and monitor the connection state of a Sierra Wireless AirLink device.
ACEnet User Guide	This document explains the use of ACEnet services for remote management of Sierra Wireless AirLink device.

2: Specifications

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Features and Benefits

- Embedded Intelligence
- Low Power Consumption
- High-Speed Processor
- High-Speed 2-way Data
- USB and I/O Port
- High-Sensitivity GPS Receiver
- Persistent Network Connectivity
- Remote Management and Configuration
- Extensive Vehicle Telemetry
- Integrated with 3rd Party Tracking Applications
- Rugged for Extreme Environments

Technology

With Fallback to:
- CDMA 1x EV-DO (Revision 0)
- CDMA 1xRTT
- CDMA IS-95

Bands

- 800 Mhz Cellular
- 1900 Mhz PCS

Environmental

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

Power Consumption: (@12V DC)

- Transmit/Receive (Typical/Max) 250/300 mA
- Low Power Mode 32 mA
- Input Voltage 9 - 28V DC

Standards/Approvals

- Carrier specific approvals
- FCC
- PTCRB
- Industry Canada

Host Interfaces

- USB2.0 Full Speed (Mini-B5)
- I/O: 6 Programmable I/Os, 3 Analog/Digital
- Antenna Connection:
  - Cellular - 50 Ohm SMA
  - GPS - 50 Ohm SMA

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

Dimensions

- 76mm x 27mm x 121mm
- 317 grams

Application Interfaces

- TCP/IP, UDP/IP, DHCP, HTTP, SNMP, SMTP, SMS, MSCI, NMEA, TAIP, GPS, and more

LED Indicators

- Network
- GPS
- Power

Interface Port Pin-Outs

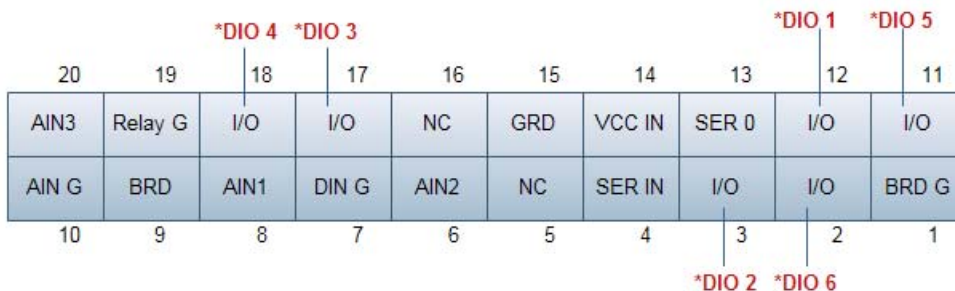*Digital I/Os (DIO 1 to 6) in ACEmanager, in correspondence to the Pin-Outs, is shown in the diagram.*

		*DIO 4	*DIO 3						*DIO 1	*DIO 5
20	19	18	17	16	15	14	13	12	11
AIN3	Relay G	I/O	I/O	NC	GRD	VCC IN	SER 0	I/O	I/O
AIN G	BRD	AIN1	DIN G	AIN2	NC	SER IN	I/O	I/O	BRD G
10	9	8	7	6	5	4	3	2	1

*DIO 2 *DIO 6

Figure 2-1: PinPoint XT I/O Port Diagram (not to scale)

The relay contacts are rated for 30 Vdc max and 500mA max

Table 1: Pin-out

11 - Programmable I/O	1- Board Ground
12 - Programmable I/O	2 - Programmable I/O
13 - Serial Out Rx (3.3V)	3 - Programmable I/O
14 - VCC IN (Input Voltage)	4 - Serial Input Tx (3.3V)
15 - Ground	5 - NC (No Connect)
16 - NC (No Connect)	6 - Analog Input 2
17 - Programmable I/O	7 - Digital In Ground
18 - Programmable I/O	8 - Analog In1 (IGT)
19 - Relay Ground	9 - Board 3.3V
20 - Analog Input 3	10 - Analog In GND

Power Connector

The power connection is integrated into the I/O port.

3: Activating your PinPoint XT on your cellular provider

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

OMA-DM

PinPoint XT is an embedded router solution that supports Network Initiated (NI) OMA-DM Device Configuration (DC) and PRL Updates (PRL) on the Sprint network. The PinPoint XT firmware registers notifications with the MC5727 radio module for OMA-DM NI alerts and session state and processes them appropriately. The alert response instructs the radio module to immediately process the NI OMA-DM command. When the OMA-DM session state is IDLE, PinPoint XT records the session type and session result code and then re-establishes the data connection.

Hands Free Activation (HFA)

PinPoint XT automatically detects the radio module installed during system startup. If the radio module is CDMA technology, PinPoint XT will check the current provisioning state and if necessary execute HFA. For devices that have previously been provisioned the HFA routine is bypassed.

Activating PinPoint XT

To activate your PinPoint XT, follow the instructions below:

1. Connect the PinPoint XT with antennas.

2. Plug the power cable to the power connector on the back panel of the PinPoint XT.

3. Connect your computer to the PinPoint XT with an ethernet cable.

4. Observe the LEDs, as indicated in Chapter 4, Indicator Lights section.

Wait approximately 30 seconds, to allow the PinPoint XT to initialize and go over the air.

Updating PinPoint XT firmware

For installing the latest firmware version (.exe file), you can go to the Sierra Wireless website: http://www.sierrawireless.com/support.

For the updater tool to execute, please install the USB drivers available on the website before executing the .exe file.

Tip: *Copy the USB Serial Driver.inf file to your desktop. Then power up the PinPoint XT and connect USB. Install from specific location and point to this .inf file. For detailed instructions on installing the USB drivers, please refer to Universal Serial Bus Application Note.*

1. Connect the PinPoint XT to your computer using anUSB cable.

2. Connect the power adapter and antennas to your PinPoint XT.

3. Install the PinPoint XT executable file by running the **.exe** file and follow the prompts.

    a. A Sierra Wireless firmware update welcome screen appears. Click on Next.
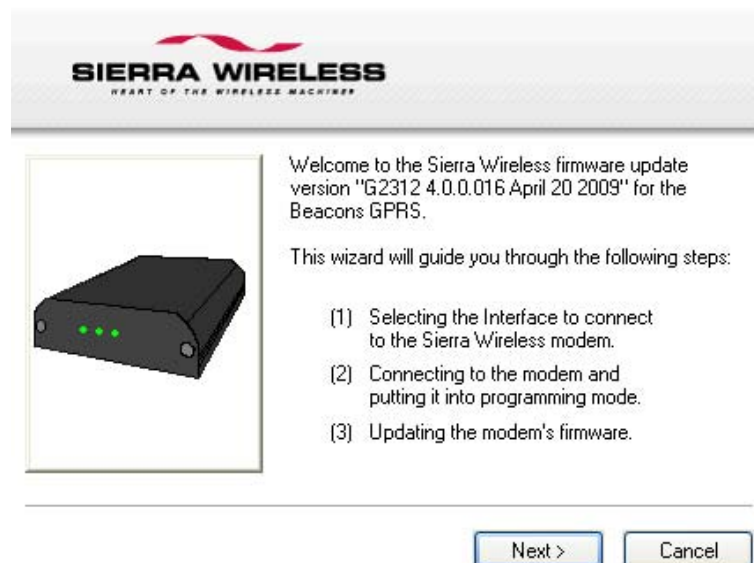

Figure 3-1: Launch Screen

    b. Choose the interface you want to program the modem through and click on Next.

Note: You can use Boot interface only when a serial cable connection is established.

The default private for Ethernet is also in a different subnet from the other connection types.

Table 3-1: Factory Defaults

Interface	PinPoint XT	Connected Device
Ethernet Private default	192.168.13.31*	192.168.13.100
USB/NET	192.168.14.31	192.168.14.100
DUN	192.168.15.31	192.168.15.100
Wi-Fi*	192.168.17.31	192.168.17.100

*can be changed via ACEmanager

Figure 3-2: Configuration: Interface selection

    c. The next screen will prompt you to reset the modem manually. Click on Next after resetting the modem manually.

Installation begins and can take up to a few minutes.

Once the installation is complete, you will get a confirmation screen.

Verifying USB connection

Verify that your USB is connected as USB/net by checking the Network
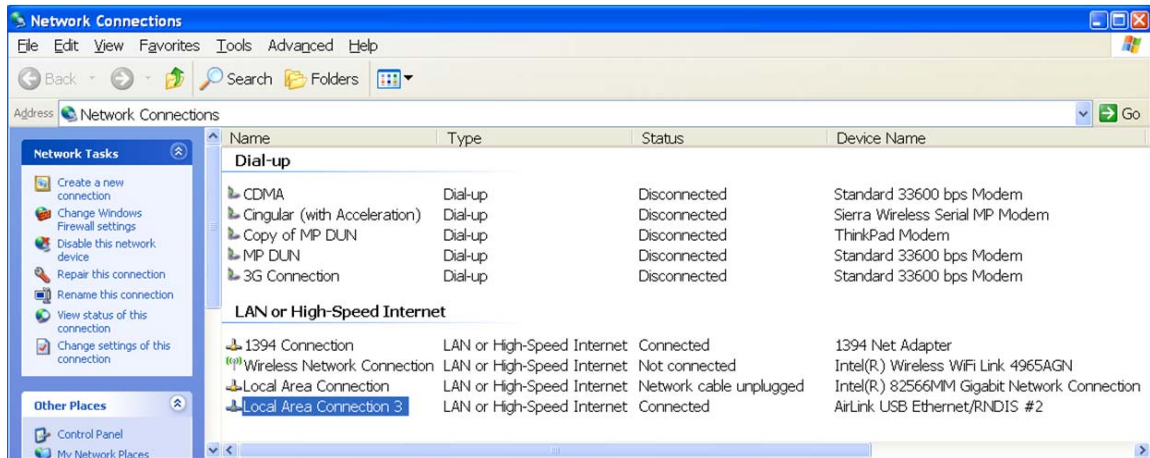Connections window in your computer.

Figure 3-3: Verify USB Connection

Confirming IP Address

Check the IP Address in your Local Area Connection window.
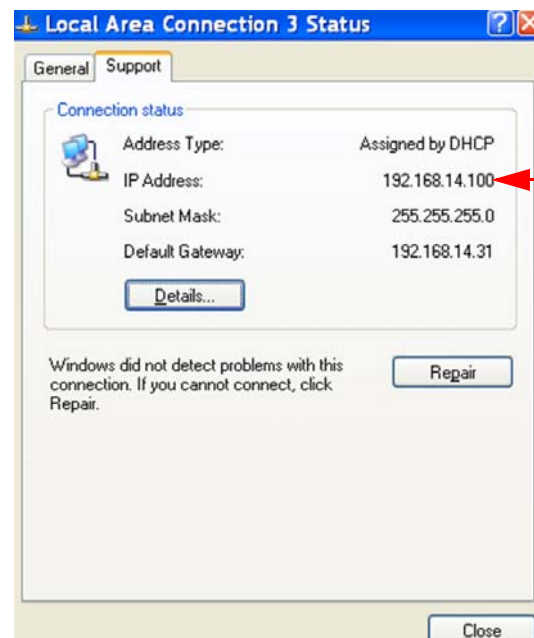

Figure 3-4: Confirm IP Address

Configuring through ACEmanager

ACEmanager is a free utility. Follow the steps below to connect to ACEmanager for configuring the modem.

- Ensure PinPoint XT connectivity to access ACEmanager.
- Go to: http://192.168.13.31:9191 the first time you connect to ACEmanager.

Activating Using AT Commands

An alternate method to configure and activate your PinPoint XT is by using AT commands sent directly to the modem with a terminal application.

Caution: *It is not possible to activate the PinPoint XT using either ACEmanager or ACEnet.*

1. Set telnet timeout in to 20 minutes.
2. Save the telnet setting.
3. 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.

   `AT*NETUID=[NAI]`
4. Enter the password of your account. This information should be provided by your carrier. You may not need this step.

   `AT*NETPW=[password]`
5. Verify ALEOS has established communication to the internal hardware.
6. Enter the activation command appropriate for your type of account. The SID and NID are optional and only required if your account type uses them.
   · If you have the same number for the MIN and MDN or MSID:

   `AT*PROVISION=MSL,MDN[,SID,NID]`
   · If you have the different numbers for the MIN and MDN or MSID:

   `AT*PROVISION2=MSL,MDN,MIN/MSID[,SID,NID]`

Using Direct Commands to the Internal Hardware

Use only if the ALEOS method is unsuccessful.

Activating the Modem

1. Put modem into passthru mode to by-pass ALEOS. This will allow direct communication with the wireless module for programming. Entering passthru will take 10-15 seconds and will return an 'OK' when it is complete.

   `AT\APASSTHRU`
2. Verify you are in Passthru mode.

AT!STATUS

3. Unlock the module.

AT~NAMLCK=MSL

4. Set the MDN and MSID.

AT~NAMVAL=0,MDN,MSID,0,65535

5. Verify the settings are what you intended to enter.

AT~NAMVAL?0

6. Reset the module.

AT!RESET

7. Press the reset button on the front of the modem. When the modem restarts, it should register on the network.

PassThru mode through AT Command

Issuing the "**AT\APASSTHRU**" from a terminal emulation enters the PassThru 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**.

Figure 3-5: PassThru mode

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 PinPoint XT when it enters PassThru and other PassThru settings.

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

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.

4: Hardware Installation of the PinPoint XT

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- Reset Button
- 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 PinPoint XT 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 PinPoint XT 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 PinPoint XT can withstand.*

Figure 4-1: PinPoint XT 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).

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Your PinPoint XT will work with most cellular antennas with a connector. Connect the primary antenna or primary RF cable directly to the antenna connector on the back of the PinPoint XT.

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: Your PinPoint XT does not have a second antenna for received diversity. Received diversity is disabled by default.

GPS Antenna

Your PinPoint XT will work with most standard active GPS antennas. Connect the GPS antenna or cable directly to the threaded SMA connector.

Mount the GPS Antenna in the vehicle. The less the cable is wrapped and bound together, the better it will perform. Place it on the roof, or on the dash, or rear panel where it has a good view of the sky (greater than a 90 angle view of the sky).

There are three options for antenna mounts:

- Magnetic roof-mount
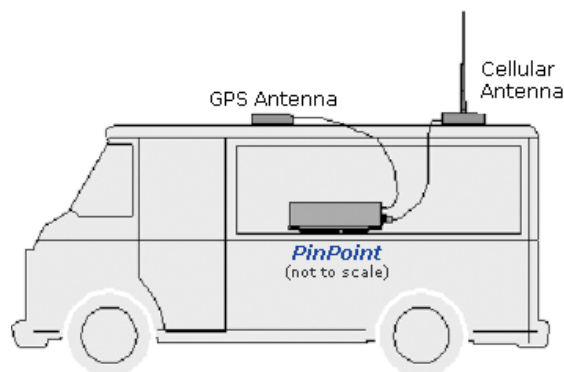- Through glass-mount
- Permanent mount

Figure 4-2: GPS Antenna Placement for a Vehicle

The PinPoint XT has a reset button on the front plate. For a quick power up cycle, you can hold down on the reset button. The power LED will come up. Holding down on the reset button for 25-30 seconds, sets the configuration in ACEmanager to factory default. When all the LEDs blink, reset is done.
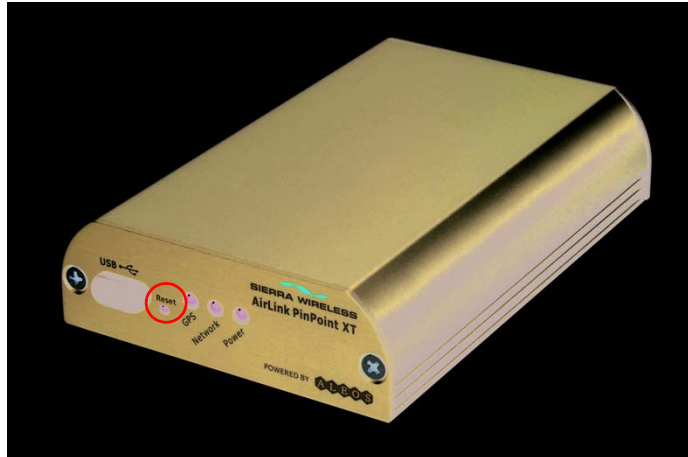
Figure 4-3: Reset Button

Connecting to Power

> ⚠ **Warning:** ***Risk of electric shock:*** *Only use the supply voltages listed in this user guide.*

> ⚠ **Warning:** *When using AC to DC adapter the ambient temperature should not exceed 40 ^{0}C.*

Your PinPoint XT 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 PinPoint XT.

The cable included with your PinPoint XT, is a DC cable with Standby Ignition Sense which connects to the 20-pin I/O connector. Other optional accessory cables include:

- A DC power cable with a DB-9 female serial connector (P/N 120-140-1021)
- A DC power cable with I/Os (P/N 120-140-1022),
- A fused DC power cable (P/N 120-140-1023),
- A DC power cable with a battery-charger circuit
- An auxiliary battery connector (P/N 120-140-1024)
- A DC power cable with 4-pin adaptor (P/N 120-140-1025) which connects to AC adaptor (P/N 120-100-1013).

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.

The PinPoint XT has an internal polysilicon circuit breaker that opens at 0.5 to 1.0 amps of current.

If you wish to use the Standby Ignition Sense (SISE) feature of your PinPoint XT, the wire of the DC power cable should be used to connect to your ignition. When SISE is enabled in the modem and the ignition sense connector is wired to your

vehicle, the ignition sense will provide a link to the modem to enable it to enter a low-power, standby mode when your vehicle is turned off and power up more quickly when the ignition is started.

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 4-4: USB

Your PinPoint XT'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 PinPoint XT 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 PinPoint XT has a standard mini-B connector.

Figure 4-5: I/O

Your PinPoint XT also has an I/O port with digital inputs, analog inputs, and relay outputs which can be connected to external devices.

The I/O port can use an optional I/O harness available through Sierra Wireless.

Indicator Lights

When solid, PinPoint XT indicates a successful connection. When your PinPoint XT is connected to power and an antenna, there is a specific pattern to the lights to indicate its operation mode.

Figure 4-6: PinPoint XT Indicator lights

- **Network** - Indicates a successful connection to the cellular network with an IP address given and a channel acquired.

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

- **GPS** - Indicates a GPS fix. When lit, the PinPoint XT has GPS coordinates to report.
- **Power** - Indicates the power adapter is connected and there is power getting to the PinPoint XT.

Caution: *If you reset the modem configuration using the reset button, you may need to reactivate your PinPoint XT with your cellular provider.*

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.
- **PassThru mode** - Network LED will blink.
- **Low Power** - All LEDs will be off except the power LED which will blink every 3 seconds.
- **Bad Firmware** - The Network LED will blink.
- **Incorrect Firmware** - The GPS LED will blink.

Mounting

An optional accessory for your PinPoint XT 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 PinPoint XT between Alignment ears.
3. Engage top groove in body of PinPoint XT with two tabs.
4. Push on far side of PinPoint XT in center so that it touches side of Bracket.
5. Press down and release when upper groove on far side of PinPoint XT, 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.
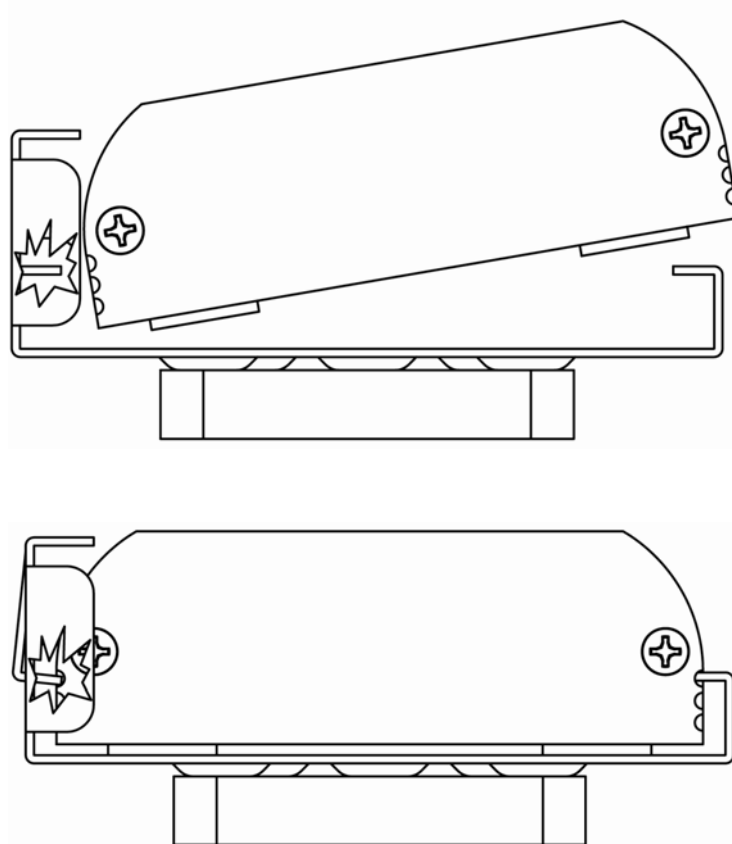

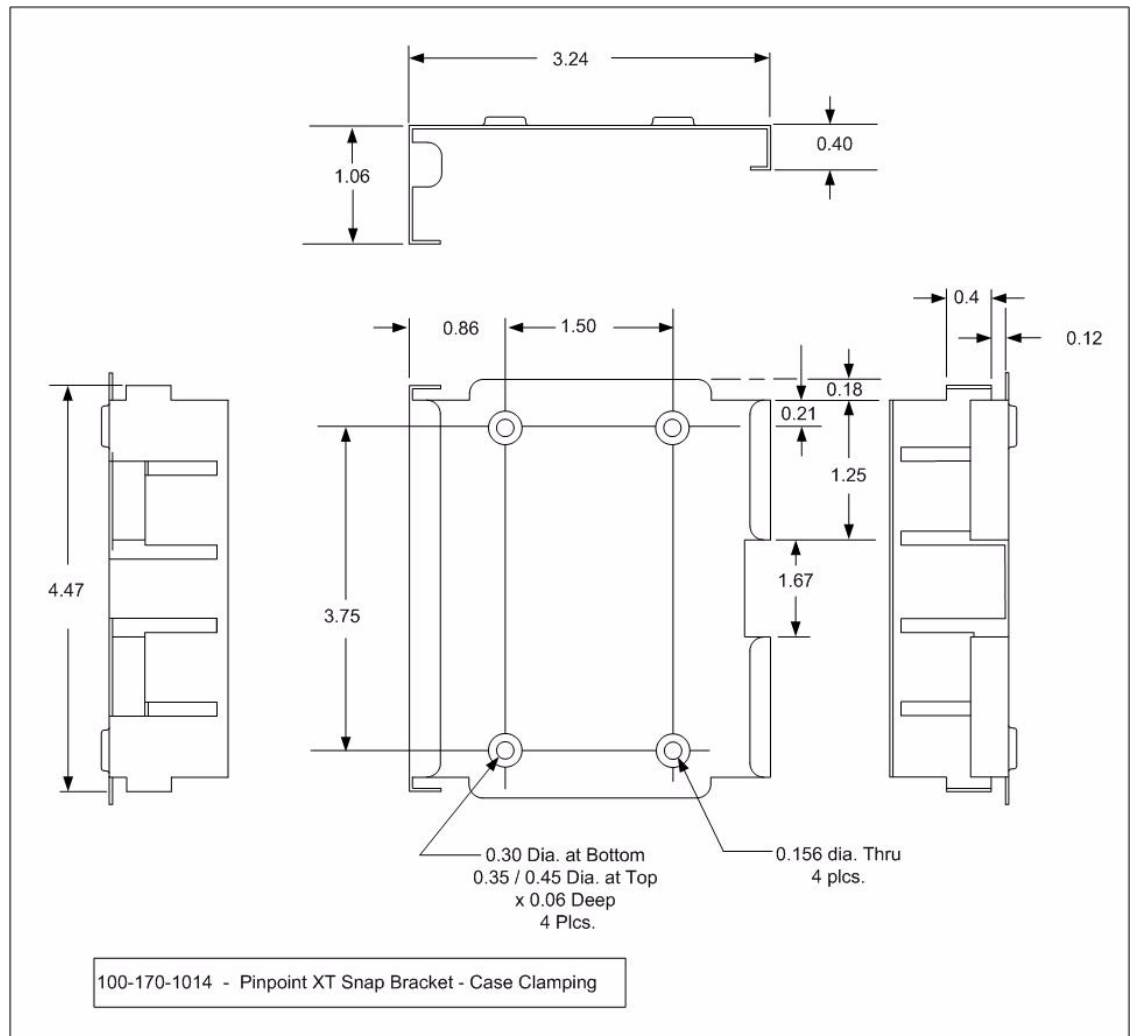*Figure 4-7: Mounting bracket installation*

Figure 4-8: 100-170-1014 : Mounting Bracket for PinPoint XT

5: Configuring the PinPoint XT

- ACEmanager
- Using a Terminal Application with AT Commands
- AT Command

With ALEOS as its "brain", the PinPoint XT is a highly configurable device.

To configure your PinPoint XT, 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.

ACEmanager

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 a Terminal Application with AT Commands

You can access and configure your PinPoint XT 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.

1. Choose a name and icon for your connection

   a. Choose a name for your connection, such as *PinPoint XT* 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. PinPoint XT local.*

---

   b. Select O*K*.

   c.

2. Connect to

Using USB/Serial:

   a. Select *COM1*, or the comport to which the modem is connected, for the "Connect Using".
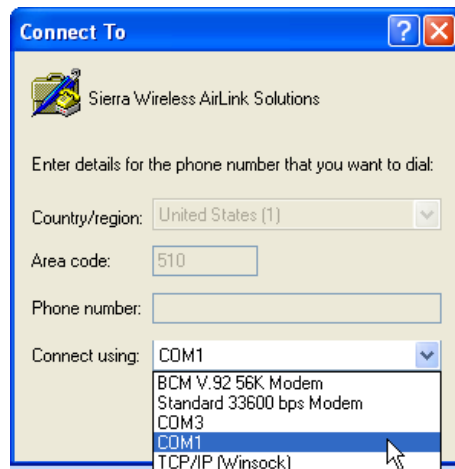
Figure 5-1: Connect To

   b. Change or verify the settings:
   - Bits per Second: 115200 (default)
   - Data Bits: 8
   - Parity: None
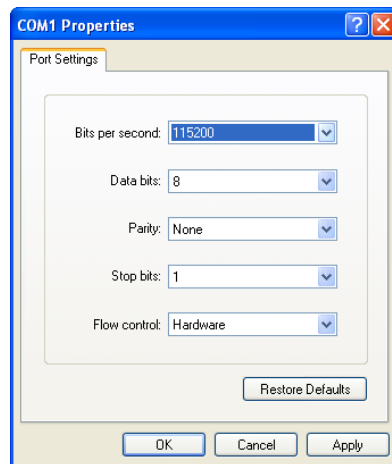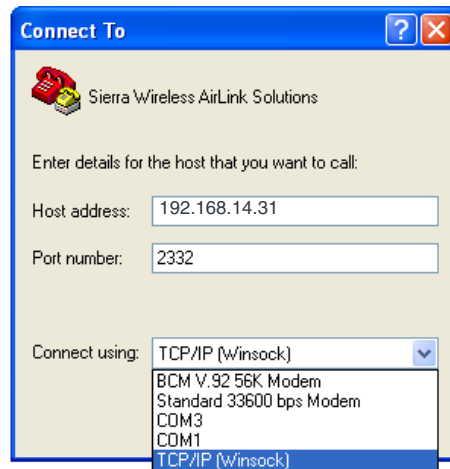   - Stop Bits: 1
   - Flow Control: Hardware.

Figure 5-2: Port Settings

Tip: *If you have configured the PinPoint XT for settings different than the defaults for Bits per Second, Data Bits, Parity, and/or Stop Bits, you will need to use your changed settings.*

   c. Select O*K*.

Using Ethernet:

   d. Type in *192.169.14.31* for Host Address.
   e. Change the "Port Number" to *2332*.

    f.   Select O*K*.

3. Connected

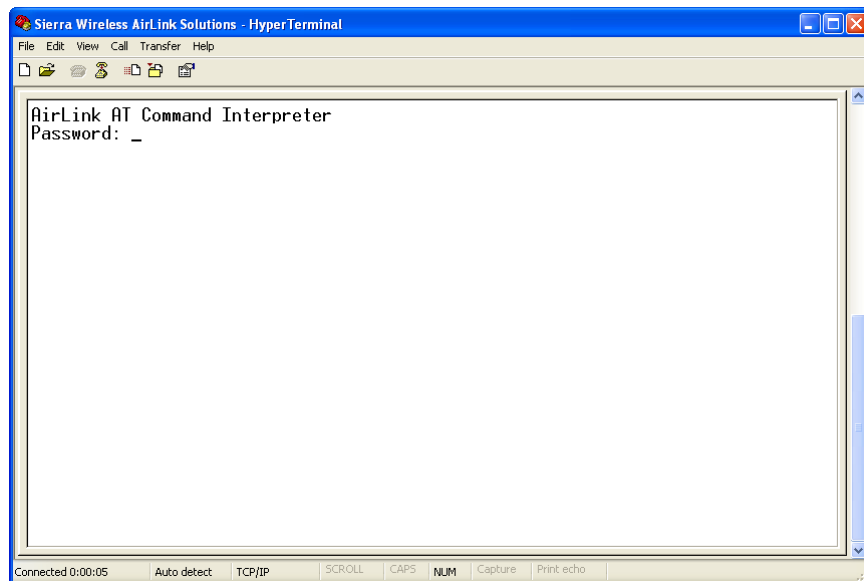Connecting on USB/net will prompt for password.

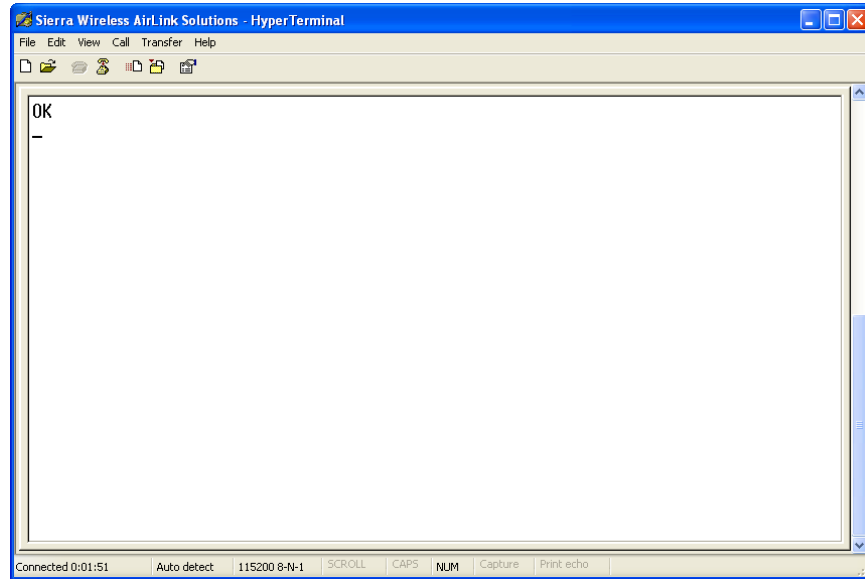*Figure 5-3: HyperTerminal : TCP/IP connected*

Figure 5-4: HyperTerminal : connected

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

Tip: *You will not be prompted for a password if you connect using a COM port.*

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

   c. 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*.

   d. 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 Command

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 PinPoint XT, 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 PinPoint XT 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: Inputs, Relay Outputs, and Power Status

The PinPoint XT has special features for use in a mobile environment. The PinPoint XT can be configured to monitor the input, respond to specific types of events, and even trigger a digital output. The PinPoint XT can also be configured to change its power mode in order to conserve power. These features can be configured to your needs.

Capturing External Events using Inputs

The PinPoint XT is equipped with a combination power and I/O port interface which includes 6 digital inputs, 3 analog inputs, and 2 relay outputs. The inputs and outputs may be connected to sensors and switches to monitor vehicle status and remotely control equipment.
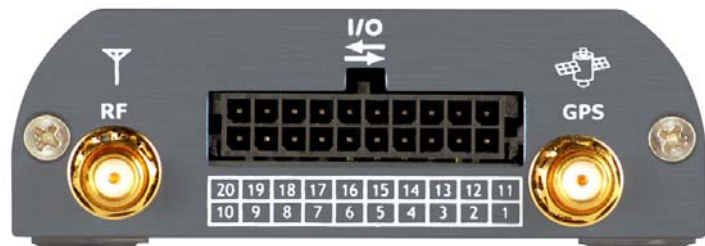

Figure 6-1: PinPoint XT combination I/O and power port

Analog Inputs

The analog inputs will report a specific voltage ranging from 0 to 30 in increments of 0.03 volts. This allows a fine degree of monitoring for a scaling device.

- Monitoring a voltage or power usage.
- Monitoring an oscilloscope.
- Monitoring temperature.

- Monitoring an incremental gauge.
- Monitoring an internal fan.
- Monitoring a vehicle payload.
- Monitoring the elevation of a tow bar.
- Monitoring a vehicle's battery use.
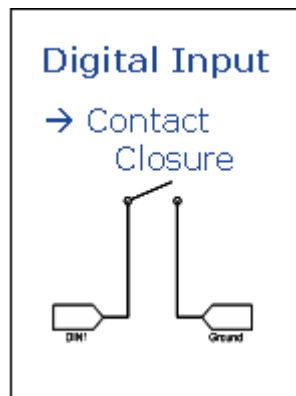
Digital Inputs

Figure 6-2: Digital Input Contact Closure

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".

- 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.

Relay Outputs

As an electronic switch which can be opened or closed (Normally Open relay), a relay can be used to transmit an action to another device by signalling to that other device an "on" or "off". As a Normally Open relay, the circuit of the relay is disconnected (open) unless it is active. When the relay is active, the circuit is connected (closed).

- Setting off an alarm or siren.
- Triggering a process to start on another device.
- Opening or closing a valve or switch.

- Locking or unlocking a door.
- Turning a light on or off.
- Opening the vehicle's trunk or doors.

Tip: *The relays are only capable of switching small loads. If you need a stronger signal, such as to open a door lock, you can connect the PinPoint XT's relay to a stronger solenoid relay which has enough power to cause the desired effect.*

Connecting devices to the I/O Port

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

You can purchase an optional I/O Wiring Harness for the PinPoint XT which can be used to attach devices to the I/O port. The harness has pre-wired leads to allow you to customize your own connections. The wires are paired and color-coded.

*Digital I/Os (DIO 1 to 6) in ACEmanager, in correspondence to the Pin-Outs, is shown in the diagram.
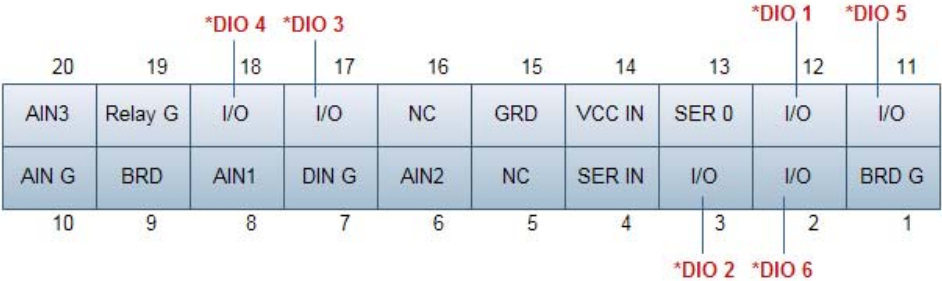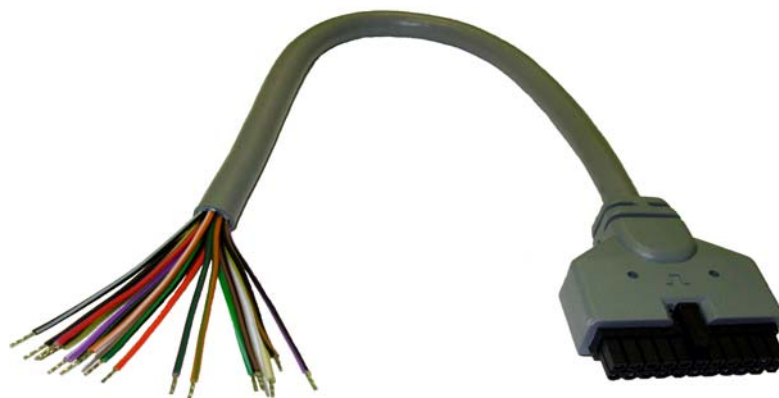
		*DIO 4	*DIO 3					*DIO 1	*DIO 5
20	19	18	17	16	15	14	13	12	11
AIN3	Relay G	I/O	I/O	NC	GRD	VCC IN	SER 0	I/O	I/O
AIN G	BRD	AIN1	DIN G	AIN2	NC	SER IN	I/O	I/O	BRD G
10	9	8	7	6	5	4	3	2	1
							*DIO 2	*DIO 6	

Figure 6-3: PinPoint XT I/O Port Diagram (not to scale)

Table 2: Pin-out

11 - Programmable I/O	1- Board Ground
12 - Programmable I/O	2 - Programmable I/O
13 - Serial Out Rx (3.3V)	3 - Programmable I/O
14 - VCC IN (Input Voltage)	4 - Serial Input Tx (3.3V)
15 - Ground	5 - NC (No Connect)
16 - NC (No Connect)	6 - Analog Input 2
17 - Programmable I/O	7 - Digital In Ground
18 - Programmable I/O	8 - Analog In1 (IGT)
19 - Relay Ground	9 - Board 3.3V
20 - Analog Input 3	10 - Analog In GND

Figure 6-4: I/O Wiring Harness, AirLink part number - 120-140-1022

Table 6-1: Wiring Color Corospondance

1. NC	**11.** Green
2. Black	**12.** Blue
3. Brown	**13.** NC
4. NC	**14.** Red
5. NC	**15.** Black
6. Red	**16.** NC
7. Orange	**17.** Violet (I/O)

Table 6-1: Wiring Color Corospondance

8. White	18. Grey (I/O)
9. NC	19. White (I/O)
10. Yellow	20. Pink (I/O)

Analog Inputs

Connect a wiring lead to an analog input (AIN) at 6, 8 or 20, and the ground at 10.

Digital Inputs

Connect a wiring lead to a digital input (DIN) at 17, 18, 3, 2, 11 or 12, and connect ground at 15 and 7, as applicable.

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

Relay Outputs

Connect the relay ground at 19.

Serial Port

The I/O also has the ability to have a serial port connection and the serial port input is 4 while serial port output is 13. The signal levels on the serial lines are Transistor Transistor Logic (TTL) and need to be level-shifted to true RS-232 levels when attaching to a PC or other terminal device. The DC power & serial I/O cable supplied by Sierra Wireless (P/N 120-140-1021) integrates a level shifter into the RS-232 DB-9, and can be connected directly to a terminal device's COM port.

Power Connection

In addition to the inputs and outputs, the I/O port connector is also the power connector. Connect the power to PIN# 14 and ground to PIN# 15.

Power Modes and Information

The PinPoint XT can be configured to switch power modes in response to specific events, such as when the voltage to the modem drops below a configured threshold or when the DTR changes, in order to conserve a vehicle's battery life. The stand-by state, low-power mode, will prevent the modem from draining the battery while allowing the modem to quickly power up to regular operation when it is needed.

You can configure Low Power mode using ACEmanager.

Wiring the PinPoint XT for Ignition Sense or DTR Event Trigger

When the Standby Ignition Sense is enabled and the ignition sense connector is wired to your vehicle, the ignition sense will provide a link to the modem to enable it to enter a low-power using standby mode.

The white wire from the optional I/O harness on the I/O port (PIN#8) should be used to connect to your ignition.

Power Effect on Modem State

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

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