Remote Configuration Guide

iR1600 Rugged Modem
iR1600 GPS-Enabled Modem

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IMPORTANT!
Please Read Safety Notice on Page 61 before using the iR1600 Modem.

Last Updated
RFM-6005-5015
June 2004

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FCC COMPLIANCE

DECLARATION OF CONFORMITY
Per FCC CFR 47 2.989

Responsible party name: **eLutions, Inc.**
Address: **5905 Breckenridge Parkway**
Suite F
Tampa, FL 33610
Phone number: **1-800-836-9909**

Hereby declares that the product:

Product name: **iR1600 GPS-Enabled Modem**
Model Number: **6000-C5-RFM**

Product name: **iR1600 Rugged Modem**
Model Number: **6100-C5-RFM**

Conforms to the following regulation:

FCC Part 15, subpart B
FCC Part 90, subpart S
Class B Digital device

Date: **March 8, 2004**

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 and 90 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. The equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference or by one or more of the following measures:

-- Reorient or relocate the receiving antenna.
-- Increase the separation between the equipment and receiver.
-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-- Consult the dealer or an experienced radio/TV technician for help.

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INTRODUCTION

Thank you for purchasing the iR1600 modem. Once installed and configured, the iR1600 modem provides you with reliable, wireless data communication within the iDEN® network. This chapter includes:

Box Contents

The iR1600 modem ships with the following:

- iR1600 Modem
- CD with documentation
  - Installation Guide
  - Configuration Guide
  - Quick Reference Guide (for operators/end users)
  - Warranty Card
  - Getting Started - Installation and Usage Requirements
  - CD with Remote Configuration Tool Kit
    - Remote Configuration (Over-the-Air) Guide

Documentation

Documentation for the iR1600 consists of three guides, an Installation Guide, Configuration Guide and a Remote Configuration Guide. This document, the iR1600 Remote Configuration Guide provides you with instructions on how to:

- Install the Over the Air Tool Kit.
- Retrieve and view remote device parameters.
- Perform remote over the air (OTA) configuration changes.
- Perform firmware updates remotely.

The iR1600 Configuration Guide provides you with instructions on how to:

- Install the iDEN® Packet Data Applet (for data services).
- Set up Windows Components.
- Configure the modem's operating modes.
- Configure data encryption parameters.
- Configure the Access Control List for IP Address.
- Configure BSAP protocol for translation to IP Address.
- Use AT Commands to configure the modem.

The iR1600 Installation Guide provides you with instructions on how to:

- Mount the modem in a mobile environment (vehicle installation).
- Mount the modem in a fixed environment.
- Install and connect the required components (power cables, antennas, etc.).
- Verify the installation.
- Connect and configure your computer and I/O devices (e.g. Remote Terminal Units (RTU), sensors, controllers, etc.).
- Troubleshoot common installation problems.

eLutions' Customer Care

For network, installation or device issues contact:

- eLutions Wireless Support Center by phone at 1-888-349-4338 or by email at customersupport@elutions.com

When you call, please have a detailed description of your problem. To provide you with fast and quality support, our Customer Care representative may ask for the following:

- Computer operating system (Windows 95/98/NT/2000/CE)
- Version of the operating system (e.g. NT 4, Windows 95 Version B, CE 2.1, etc.)
- Information regarding the modem (most can found on the diagnostic menu)
- Geographic location of use
- The modem's operating mode
- Other configuration settings

TOOLKIT INSTALLATION

The Remote Over the Air (OTA) Configuration toolkit is a GUI (Graphical User Interface) application provides an administrator with the ability to remotely configure the iR1600 modem or perform remote firmware updates. This chapter contains detailed steps for installing the remote configuration toolkit. This chapter includes:

Operating Requirements

The remote configuration toolkit requires that your computer have Java 2 Runtime Environment SE version 1.4.2_02 (or higher) program installed.

Installation Process

The necessary file(s) to install the toolkit are contained in the "OTA Toolkit" folder located on the documentation CD. The following steps describe how to install and run the remote configuration GUI application.

Create Source Directory

NOTE: Over the air configuration and updates can only be performed on modems that are in either the Gateway or AVL operating mode.

1. Create a directory where all the files will be stored on your computer's c:\ drive (e.g. OTA Toolkit)

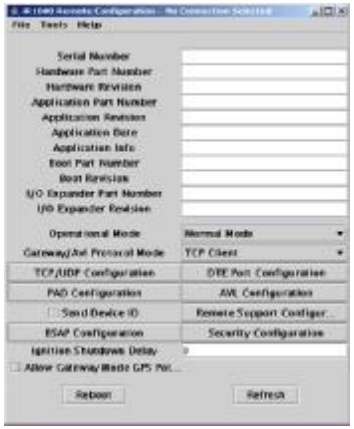
2. Insert the CD into your computer and locate the **pluscfg.jar** file.
3. Copy the **pluscfg.jar** file to the newly created directory.

Run the Application

1. To run the Remote Configuration application, locate the **pluscfg.jar** file.

   NOTE: Make sure that your host computer is connected to the Internet.

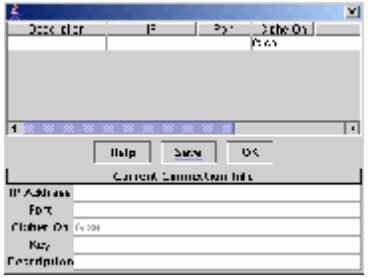
2. **Double-click** on the .jar file to launch the application.
3. The **iR1600 Remote Configuration** window appears with "No Connection Selected" on the screens' title.



Enter Connection Parameters

1. From the **Remote Configuration** window, select the ***File à*** **Connect** option from the window's toolbar.

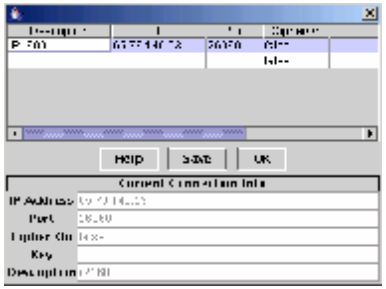
2. The **Connection** window opens. **Click** on the blank fields under each column heading and enter the following parameters:
   - **IP address** of remote modem(s) that you want to configure.
   - **Port number** of the remote modem(s) that you want to configure.
   - **Enable (true)** or **disable (false)** the CipherOn parameter, if applicable.
   - Decipher **key** number, if applicable.



NOTE: All the fields will be blank when you initially access the Remote Configuration application.

3. Click the **Save** button to save the information entered.
4. **Repeat** steps **2** and **3** for additional remote modems.

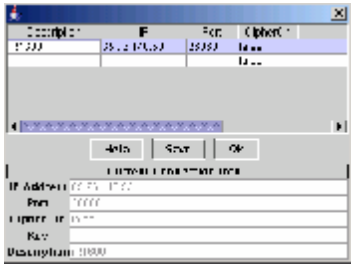
5. The information entered for each column will appear on the bottom portion of the screen. **Click** on the ***OK*** to close the window when you are done entering all the information.



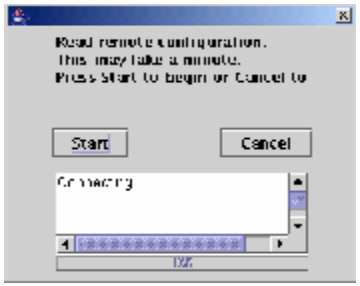
Connect to Remote Modem

1. From the **Remote Configuration** window, select the **Connect** option.

2. The **Connection** window opens. Locate and select the IP address of the remote modem that you want to connect with. The connection information appears on the bottom portion of the screen. **Click** on the **OK** to close the window.



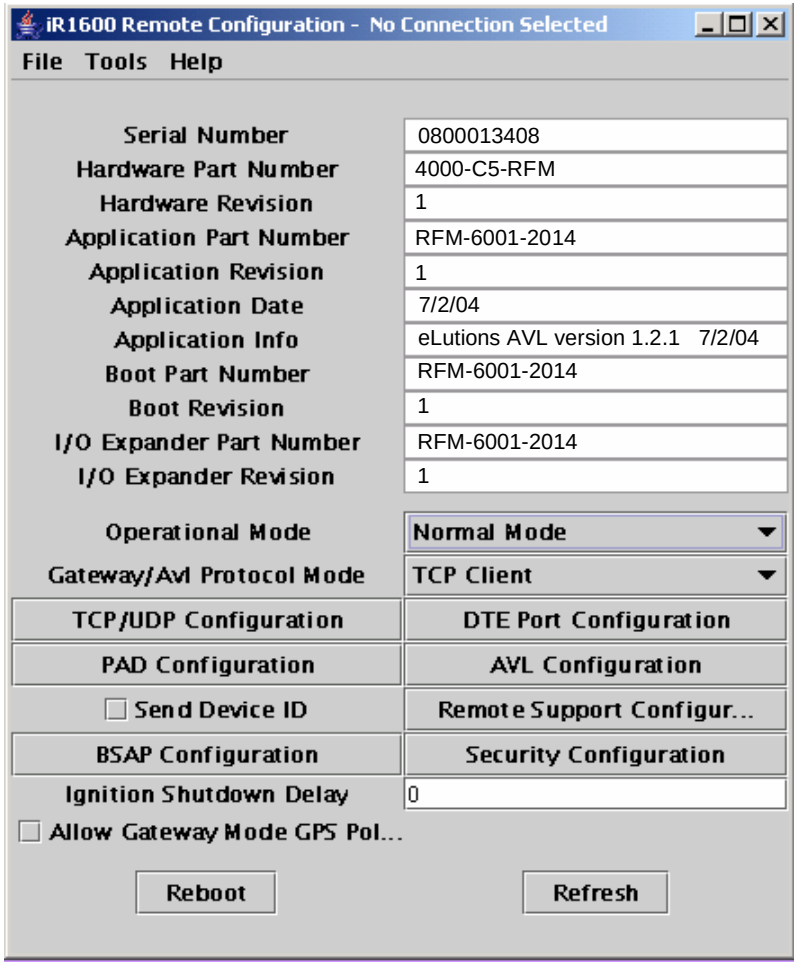
3. You are returned to the **iR1600 Remote Configuration** window. Notice that the window now displays the IP address of the remote modem on the title bar. Click the **Refresh** button to initiate connection. A message confirming the connection attempt appears.



NOTE: The remote modem's operating mode must be set to Gateway mode and the Restrict Support IP must be set to "NO" for connection to be successful.

NOTE: You may experience a slight delay (a few seconds) this is because the application is trying to acquire the remote modem's parameters to display.

4. If the connection to the remote modem was successful, the remote modem's values will be displayed on the upper portion of the **iR1600 Remote Configuration** window.


iR1600 Remote Configuration - No Connection Selected
File Tools Help
Serial Number
0800013408
Hardware Part Number
4000-C5-RFM
Hardware Revision
1
Application Part Number
RFM-6001-2014
Application Revision
1
Application Date
7/2/04
Application Info
eLutions AVL version 1.2.1 7/2/04
Boot Part Number
RFM-6001-2014
Boot Revision
1
I/O Expander Part Number
RFM-6001-2014
I/O Expander Revision
1
Operational Mode
Normal Mode
Gateway/Avl Protocol Mode
TCP Client
TCP/UDP Configuration
DTE Port Configuration
PAD Configuration
AVL Configuration
Send Device ID
Remote Support Configur...
BSAP Configuration
Security Configuration
Ignition Shutdown Delay
0
Allow Gateway Mode GPS Pol...
Reboot
Refresh

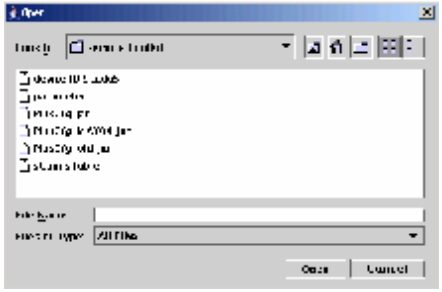
Save Configuration

The Save Configuration option allows you to save the remote modem's current or modified settings to a specific file location or disk.

1. Configure or change the values of the modem's parameter, as necessary.
2. To save this configuration select ***File à Save Config***. The **Save** screen appears.
3. Use the drop-down arrow on the **Save In:** field of the screen to locate and select the directory or folder where the file will be stored.
4. Enter the name of the file in the **File Name:** field of the screen then **click** the **Save** button.

Load Configuration

The Load Configuration option allows you to load a previously saved configuration to a remote modem.



1. To load saved configurations select ***File à Load Config***. The **Open** screen appears.
2. Use the drop-down arrow on the **Look In:** field of the screen to locate the directory or folder where the desired file is stored.
3. **Click** on the desired file from the list of stored files. The selected file will appear in the **File Name:** field.
4. **Click** the **Open** button to load the saved configurations.

Write Configuration

The Write Configuration option allows you to send the loaded configuration information to the remote modem.

1. To send the loaded configurations to the remote modem select ***File à Write Config***. A message box appears.
2. Select the **Start** button to send the configuration to the modem. A message will appear while the information is being sent.
3. When the status bar (located at the bottom of the screen) displays "100%", the send process is complete.
4. **Click** the "**X**" icon to close the window.

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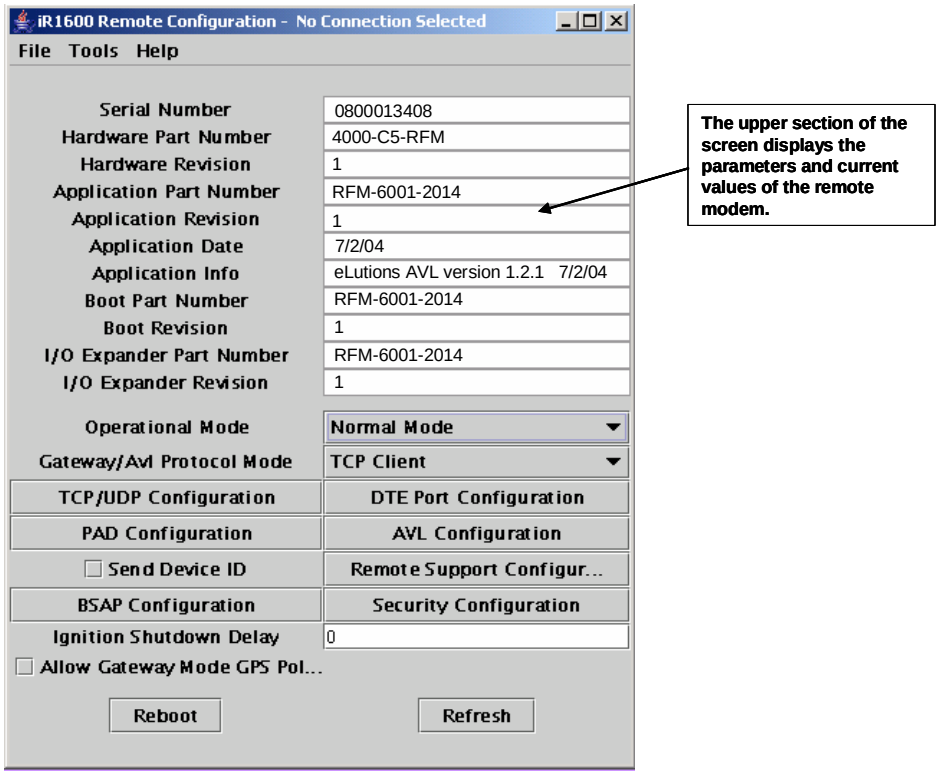
USING THE TOOLKIT

This chapter contains information on the configuration options available and detailed instructions on how to remotely update or configure the iR1600 modem. This chapter includes:

Remote Configuration Screen - Modem Values

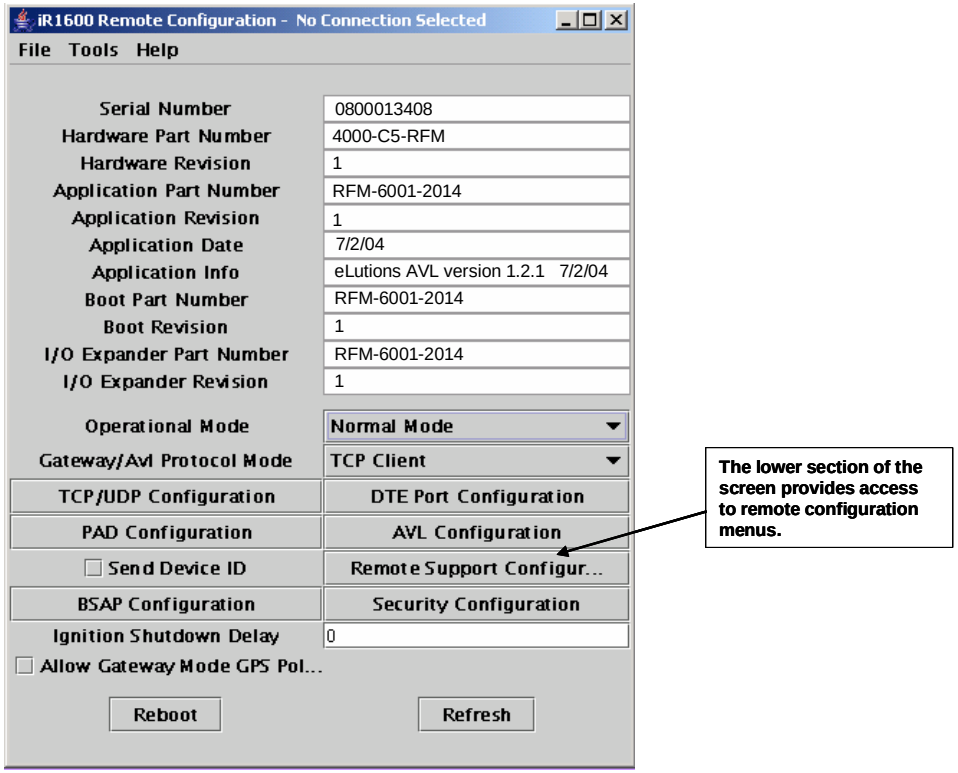
The upper section of the iR1600 Remote Configuration screen displays the modem parameter and current values.



The following table describes the parameters and values that are displayed on this section of the iR1600 Remote Configuration screen.

Parameter	Description
Serial Number	This is the serial number assigned to the modem.
Hardware Part Number	This is the part number of the modem. The iR1600 GPS-Enabled modem is part number 6000-CF-RFM and the Non-GPS part number is 6100-C5-RFM.
Hardware Revision	This value indicates the number of times the hardware was revised for the modem.
Application Part Number	This is the part number of the Remote Configuration toolkit.
Application Revision	This is the number of times the Remote Configuration toolkit has been revised.
Application Date	This is the date that the Remote Configuration was updated.
Application Info	This is the information regarding the specific application which the modem is connected. This field may typically display the application's version number, date, etc.
Boot Part Number	This is the part number for the boot used for the remote modem.
Boot Revision	This is the number of times the boot has been revised.
I/O Expansion Part Number	This is the part number for the input/output expansion that was used for this modem.
I/O Expansion Revision	This is number of times the input/output expansion part was revised for this modem.

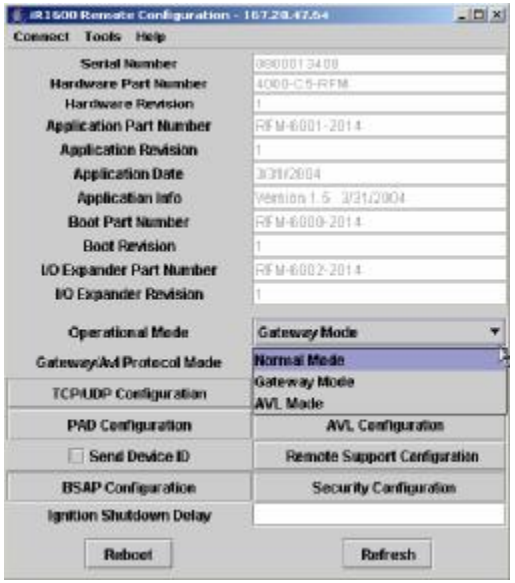
Remote Configuration Menu Options



Option	Description
Operational Mode	This parameter displays the current operating mode of the remote modem and allows you to change the operating mode from a drop-down selection list located to the right of the parameter.
Gateway/AVL Protocol Mode	This parameter displays the current protocol for the modem's Gateway/AVL mode and allows you to change the protocol from a drop-down selection list located to the right of the parameter.

TCP/UDP Configuration	This option takes you to the TCP/UDP Configuration menu where parameters such as IP address, port and socket times can be specified.
DTE Port Configuration	This option takes you to the DTE Port Configuration screen where DTE parameters such as data rate, stop bits and flow control can be specified.
PAD Configuration	This option takes you to the PAD (Packet Assembler/Disassembler) Configuration screen where you can specify the parameters such as when to send data that is received from the DTE.
AVL Configuration	This option takes you to the AVL Configuration screen where the operational characteristics of the AVL mode can be configured for the iR1600.
Send Device ID	This option specifies whether the iR1600 serial number should be sent with the data when the modem is in Gateway mode or AVL operating modes.
Remote Support Configuration	This option takes you to the Remote Support Configuration screen that allows you to specify the parameters for configuring the iR1600 remotely.
Security Configuration	This option takes you to the Security Configuration screen where you can enable or disable the modem of data encryption and enter the Cipher key information.
BSAP Router Configuration	This option takes you to the BSAP Router Configuration screen where you can enter the IP addresses and communication parameters for modems that will be utilizing the BSAP feature.
Ignition Shutdown Delay	This option allows you to set the delay period (in seconds) that the modem will wait before shutting down. The delay timer will commence when an ignition sense is no longer detected (e.g., vehicle is turned off).

Modem Operational Mode



The following table describes the different operating modes available.

Option	Description
Normal Mode	This is the factory default mode. In this mode, the modem port is connected to the i30 radio board. The modem can operate in circuit switched or packet data connections.
Gateway Mode	This mode allows a non TCP/IP enabled device to connect to the modem port and communicate within the iDEN® packet data connection. In this mode, the modem provides a virtual serial connection over the IP network. The modem can accept serial data from the device via the modem port (the DTE). Serial data is placed in IP packets and sent to a predefined port and IP address on the network. Serial data received from the IP network is removed from the IP packets and sent to the DTE.

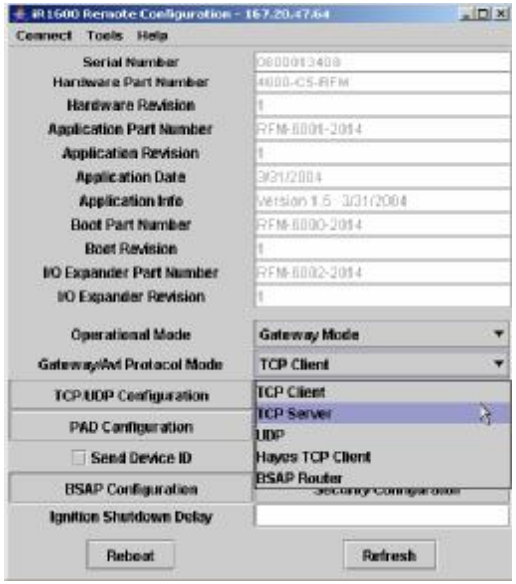
AVL Mode	This mode allows the internal GPS receiver to send GPS NMEA sentences, over the packet data network, to a specific port and IP address. When AVL mode is activated, the modem and GPS ports are deactivated.

Select Operating Mode

The iR1600 modem is configured to default to Normal mode. The following steps describe how to change the modem's operating mode and configure the modem's communication parameters.

1. From the **Remote Configuration screen, click** on the arrow displayed next to the Operational Mode value.
2. A drop-down list with the available operating modes appears. **Click** on the desired operating mode.
3. The new value appears next to the **Operating Mode** option.
4. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

Gateway/AVL Protocol Mode



Option	Description
TCP Client	**In Gateway mode**, this selection will cause the iR1600 to use TCP for the transport layer protocol and function as a client and initiate the connection to a TCP server. **In AVL mode,** this selection will cause the iR1600 to use TCP for the transport layer. When AVL pushes data on a timed basis, it always acts as a client and initiates a connection to a server. In this mode, the modem can be polled for AVL data by using the "?P" command string.

Option	Description
TCP Server	**In Gateway mode**, this selection will cause the iR1600 to use TCP for the transport layer protocol and function as a server and listen for connections from a TCP client. **In AVL mode,** this selection will cause the iR1600 to use TCP for the transport layer. When AVL pushes data on a timed basis, it always acts as a client and initiates a connection to a server. It also has the option of acting as a server and can listen for connections and can be polled for AVL information.
UDP	**In Gateway and AVL modes,** this selection will cause the iR1600 to use UDP for the transport layer protocol.
Hayes TCP Client	This mode only effects Gateway mode and is a subset of TCP client mode. This mode partially emulates the Hayes compatible packet data mode of the iO1000 modem. When set to this mode, the iR1600 will accept AT commands from the DTE.
BSAP Router	This mode allows the routing of BSAP messages between a host computer (BSAP Level 0) and remote controllers (BSAP LEVEL 1-6) through the iDEN® network. Each end, both the host computer, and the remote controllers are set up to expect a direct wired serial interface. (The same as if they were direct wired). The iR1600 accepts the serial BSAP messages and delivers the messages to the proper point. **Remote Modem -** The iR1600 connected to the remote device should be configured to operate in UDP Gateway mode. **NOTE: When setting up the BSAP network, both the host and remote DTE configuration must be set to NO FLOW CONTROL.**

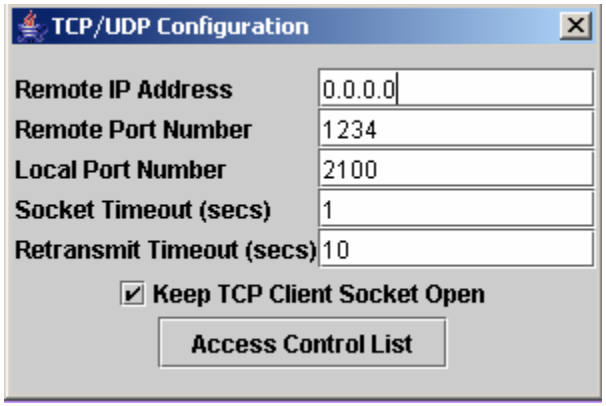
Select Protocol

The following steps describe how to change the modem's Gateway/AVL protocol.

1. From the **Remote Configuration screen, click** on the arrow displayed next to the Gateway/AVL Protocol value.
2. A drop-down list with the available protocols appears. **Click** on the desired protocol.
3. The new value appears next to the Gateway/AVL Protocol option.
4. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

TCP/UDP Configuration

The iR1600 TCP/UDP Configuration menu allows you to set the communication parameters for the modem. Descriptions of these options are listed below.



Option	Description
Primary Remote IP Address	The primary remote IP address specifies the node to which the iR1600 will communicate. **TCP Client** – in this mode, the address must be set to a valid IP address to which the iR1600 will connect and communicate. **TCP Server** - in this mode, the remote IP address can be set to a valid IP address to indicate that the iR1600 should restrict communications to only the node at that address or other IPs that have been defined on the Access Control List (ACL). If you want to allow the iR1600 to communicate with any node at any IP address, then the value "0.0.0.0." should be entered. **UDP mode** – in this mode, the address must be set to a valid IP address to which the iR1600 will send UDP packets. If you want to allow the iR1600 to communicate with any node at any IP address, then the value "0.0.0.0." should be entered. If the value is set to "0.0.0.0", then the modem will send data to the address it last connected with.

	Hayes TCP Client - this field has no impact in Hayes TCP Client mode. **AVL mode** – in this mode, the address must be set to a valid IP address to which the iR1600 will connect and communicate. If this value is set to 0.0.0.0, AVL mode will not push data. **NOTE: Currently, the iR1600 can only communicate with one node at a time.**
Remote Port Number	The remote port number specifies the TCP or UDP port to which the iR1600 will connect and communicate. **TCP Client** – in this mode, the address must be set to a valid port number to which the iR1600 will connect and communicate. **TCP Server** – in this mode, this value is not used. **UDP** – in this mode, the address must be set to a valid port number to which the iR1600 will send UDP packets. The modem will send data to the port that it connected with last. **Hayes TCP Client** - this field has no impact in Hayes TCP Client mode. **AVL** – in this mode, this value must be set to a valid port number to which the iR1600 will connect and communicate. If the port number is set to 0, AVL mode will not push data.

Local Port Number	The local port number specifies the TCP or UDP port through which the iR1600 will communicate. **TCP Client** – in this mode, the value is not used. **TCP Server** – in this mode, the value must be set to the port number to which the iR1600 will listen. **UDP** – in this mode, the address must be set to a valid port number to which the iR1600 will listen for UDP packets. **Hayes TCP Client** - this field has no impact in Hayes TCP Client mode. **AVL** – in this mode, to allow the iR1600 to be polled for AVL data, this value must be set to a valid port number to which the iR1600 will listen for the polling request. If this value is set to 0, then the iR1600 cannot be polled for AVL data.
Socket Timeout	As mentioned previously, TCP is a connection-oriented protocol. Sometimes connections become abandoned for various reasons. To have the iR1600 cleanup abandoned connections, set the socket timeout field. After the specified number of seconds of no activity (either transmission or receive) on that socket, the iR1600 will close out the socket. If this value is set to 0, the iR1600 will not close idle sockets. The selection of this value should be carefully chosen and should take into account the communication system as a whole. **NOTE: This value is only used for TCP connections. The value for this parameter must be greater than the retransmit timeout.** The range for this parameter is 0-65535 seconds. This parameter defaults to 60 seconds, which is the recommended setting for this parameter.

Retransmit Timeout	As part of its error recovery mechanism, TCP may need to resend a packet. It knows to resend the packet because it did not receive an acknowledgement when it previously sent the packet. When selecting this value, you should keep in mind the transit time for the packet to be sent to the remote node, and for the transit time for the acknowledgement to be received from the remote node. Care should be taken to not set this number too high, since this may cause an inordinate amount of time to recover from an error and the remote system may view this as an error. We recommend setting the value in the range of 5 to 10 seconds. **NOTE: The value is only used for TCP connections and has no effect in UDP mode. The value for this parameter must be less than the socket timeout.**
Keep TCP Client Socket Open	In TCP Client mode, the iR1600 does not open a connection to the server until it has received data from the DTE (and has met one of the events defined in the PAD configuration). This ensures that a connection won't be opened that will then sit idle and unused. There are times when this is not always advantageous. For example, if the DTE has no data to send, but the server does want to send data to the DTE, the server will have to wait for the DTE to have data before the connection is opened. To set the iR1600 where it will immediately open the socket and to keep it open (regardless of whether the DTE has data to send) you should set this value to Yes. **NOTE: This setting will work in conjunction with the socket timeout. A socket timeout may occur, causing an open connection to be closed.** This parameter is not used in TCP Server mode since other PCs. Similarly controls the socket, this parameter is not used in the UDP connection.
Access Control List Configuration	When the modem is in either Gateway or AVL operating mode, it will act as a "listener" and will use the ACL to query for available IP addresses. This option provides access to the Access Control List Menu where IP addresses can be specified.

The following steps describe how to set or change the parameters on the TCP/UDP Configuration menu.

Set the Remote IP Address

1. From the **Remote Configuration** menu, **click** on the **TCP/UDP Configuration** option.
2. The **TCP/UDP Configuration** menu appears.
3. Enter or change the remote IP address in the Remote IP Address field then **click** the "**X**" (close window) icon.
4. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

Set the Remote Port Number

1. From the **Remote Configuration** menu, **click** on the **TCP/UDP Configuration** option.
2. The **TCP/UDP Configuration** menu appears.
3. Enter or change the remote port number in the Remote Port Number field then **click** the "**X**" (close window) icon.
4. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

Set the Local Port Number

1. From the **Remote Configuration** menu, **click** on the **TCP/UDP Configuration** option.
2. The **TCP/UDP Configuration** menu appears.
3. Enter or change the local port number in the Local Port Number field then **click** the "**X**" (close window) icon.
4. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

Set the Socket Timeout Parameter

1. From the **Remote Configuration** menu, **click** on the **TCP/UDP Configuration** option.
2. The **TCP/UDP Configuration** menu appears.
3. Enter or change the timeout parameter in the Socket Timeout field then **click** the "**X**" (close window) icon.

4. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

Set Retransmit Timeout Parameter

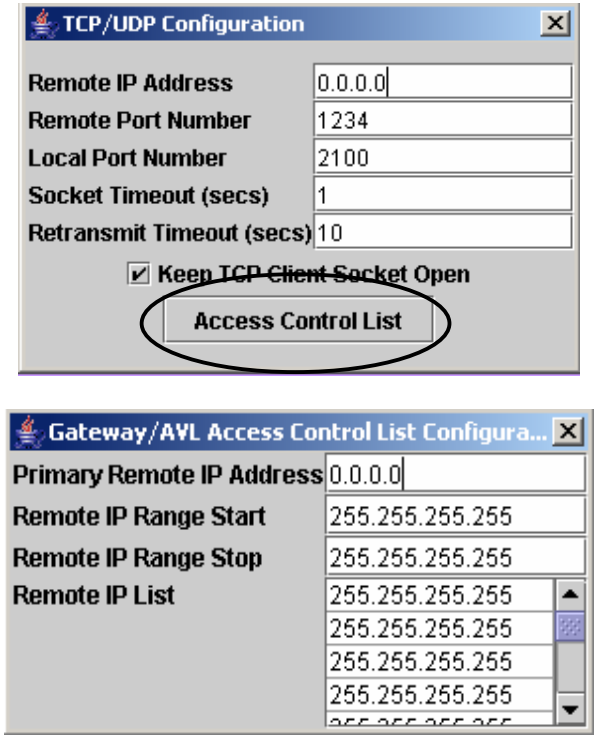
1. From the **Remote Configuration** menu, **click** on the **TCP/UDP Configuration** option.
2. The **TCP/UDP Configuration** menu appears.
3. Enter or change the timeout parameter in the Retransmit Timeout field then **click** the "**X**" (close window) icon.
4. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

Enable/Disable Keep TCP Client Socket Open

1. From the **Remote Configuration** menu, **click** on the **TCP/UDP Configuration** option.
2. The **TCP/UDP Configuration** menu appears.
3. From the **TCP/UDP Configuration** menu, **click** on the box next to the **Keep TCP Client Socket Open** parameter to place a check mark in the box and enable the feature. Click on the box again to remove the check mark and disable the feature. **Click** the "**X**" (close window) icon.
4. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

Access Control List Configuration Menu – Gateway/AVL

The iR1600 Gateway/AVL Access Control List (ACL) Configuration Menu allows you to populate IP addresses for query. The menu is a look-up table that can store a range of IP addresses and up to 30 IP addresses within the list. When the modem is in either Gateway or AVL operating mode, it will act as a "listener" and will use the ACL to query for IP addresses specified on this list.



Option	Description
Primary Remote IP Address	The primary remote IP address specifies the node to which the iR1600 will communicate. TCP Client – in this mode, the address must be set to a valid IP address to which the iR1600 will connect and communicate. **TCP Server** - in this mode, the remote IP address can be set to a valid IP address to indicate that the iR1600 should restrict communications to only the node at that address.
	If you want to allow the iR1600 to communicate with any node at any IP address, then the value "0.0.0.0." should be entered. **UDP mode** – in this mode, the address must be set to a valid IP address to which the iR1600 will send UDP packets. **Hayes TCP Client** - this field has no impact in Hayes TCP Client mode.
	AVL mode – in this mode, the address must be set to a valid IP address to which the iR1600 will connect and communicate. If this value is set to 0.0.0.0, AVL mode will not push data. **NOTE: Changes to this parameter can be made on either the Access Control List Configuration Menu or from the TCP/UDP Configuration Menu.** **NOTE: Currently, the iR1600 can only communicate with one node at a time.**
Remote IP Address Range Start	This option allows you to enter the start value of the IP addresses that will be queried. This parameter accepts a dotted-decimal IP numbers that range from 0 to 255.
Remote IP Address Range Stop	This option allows you to enter stop value of the IP addresses that will be queried. This parameter accepts a dotted-decimal IP numbers that range from 0 to 255.
Remote IP Address List	This option allows you to enter the individual IP addresses (up to 30) that will be queried. This parameter accepts a dotted-decimal IP numbers that range from 0 to 255.

The following steps describe how to enter IP addresses on the Access Control List Configuration menu.

Set the Remote IP Address

1. From the **Remote Configuration** menu, **click** on the **TCP/UDP Configuration** option.
2. The **TCP/UDP Configuration** menu appears. Select the **Access Control List** option.
3. The **Gateway/AVL Access Control List** menu appears.
4. Enter or change the remote IP address in the Remote IP Address field then **click** the "**X**" (close window) icon.
5. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

Set the Remote IP Range – Start Value

1. From the **Remote Configuration** menu, **click** on the **TCP/UDP Configuration** option.
2. The **TCP/UDP Configuration** menu appears. Select the **Access Control List** option.
3. The **Gateway/AVL Access Control List** menu appears.
4. Enter or change the start value for the range of IP addresses in the Remote IP Range Start field then **click** the "**X**" (close window) icon.
5. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

Set the Remote IP Range – Stop Value

1. From the **Remote Configuration** menu, **click** on the **TCP/UDP Configuration** option.
2. The **TCP/UDP Configuration** menu appears. Select the **Access Control List** option.
3. The **Gateway/AVL Access Control List** menu appears.
4. Enter or change the stop value for the range of IP addresses in the Remote IP Range Stop field then **click** the "**X**" (close window) icon.
5. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

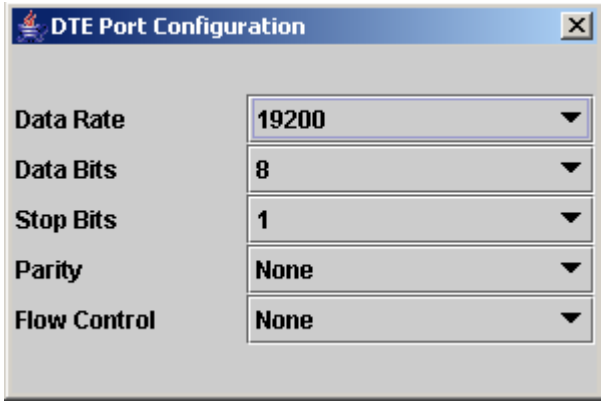
Set ACL Address List

1. From the **Remote Configuration** menu, **click** on the **TCP/UDP Configuration** option.
2. The **TCP/UDP Configuration** menu appears. Select the **Access Control List** option.
3. The **Gateway/AVL Access Control List** menu appears.
4. Select the arrow to bring up the list of IP address. Select the number from the list that you want to enter or change the IP address value. **Click** the "**X**" (close window) icon.
5. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

DTE Configuration Menu

This menu configures communication parameters on the iR1600 to control how it communicates to the DTE in Gateway mode.

NOTE: These settings are only used in Gateway mode and do not change the communications settings to the radio card in the iR1600.



The following table lists the parameters and descriptions available on the DTE Configuration Menu.

Option	Description	Recommended Setting
Data Rate	This option allows you to select the desired date rate (300 to 115200) that the iR1600 will communicate while in Gateway mode.	19200
Data Bits	This option allows you to select the number of data bits (5 thru 8) when the iR1600 is communicating in Gateway mode.	8
Stop Bits	This option allows you to select the number of stop bits (1 or 2) when the iR1600 is communicating in Gateway mode.	1
Parity	This option allows you to select the parity (None, Even or Odd) when the iR1600 is communicating in the Gateway mode.	None
Flow Control	This option allows you to select the flow control (None or Hardware) that the iR1600 will use when communicating in Gateway mode.	Either None or Hardware. Hardware is recommended for Gateway Mode.

The following steps describe how to set or change the parameters on the DTE Configuration menu.

Select Date Rate

1. From the **Remote Configuration** menu, **click** on the **DTE Configuration** option.
2. The **DTE Configuration** menu appears.
3. Select the value from the drop-down list for the Data Rate then **click** the "**X**" (close window) icon.
4. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

Select Stop Bits

1. From the **Remote Configuration** menu, **click** on the **DTE Configuration** option.
2. The **DTE Configuration** menu appears.
3. Select the value from the drop-down list for the Stop Bits then **click** the "**X**" (close window) icon.
4. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

Select Parity

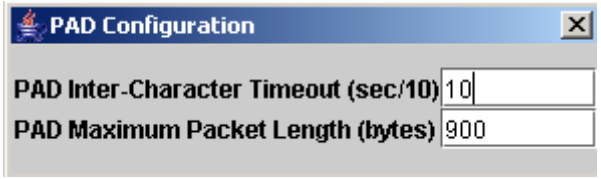
1. From the **Remote Configuration** menu, **click** on the **DTE Configuration** option.
2. The **DTE Configuration** menu appears.
3. Select the value from the drop-down list for the Parity then **click** the "**X**" (close window) icon.
4. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

Select Flow Control

1. From the **Remote Configuration** menu, **click** on the **DTE Configuration** option.
2. The **DTE Configuration** menu appears.
3. Select the value from the drop-down list for the Flow Control then **click** the "**X**" (close window) icon.
4. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

PAD Configuration Menu

The PAD (Packet Assembler/Disassembler) Configuration Menu allows you to configure the events that will trigger the modem to send data that is received from the DTE to the remote. These parameters are used only when the modem is operating in the Gateway mode. The iR1600 only sends data when at least one of the trigger events is true. The two values are used in conjunction to provide the operational characteristics of Gateway mode. You should carefully consider the entire system when setting these values.



The following table lists the parameters and descriptions available on the PAD Configuration Menu.

Option	Description
PAD Inter-Character Timeout	This parameter indicates a pause between received characters in tenths of a second. If the DTE stops sending characters for at least this amount of time, the iR1600 will send whatever data it has received up to that point from the DTE to the remote. The value is in tenths of a second, so if you want to send data after a two-second delay, the value should be set to 20.
PAD Maximum Packet Length	This parameter indicates the number of bytes of data to receive from the DTE before sending. For example, if this value was set to 20, after at least 20 bytes have been received from the DTE, the iR1600 will send 20 bytes of the received data. These two parameters work together to determine when data is sent. The following two examples best illustrate this using 20 for the inter-character timeout and 20 byte as the maximum packet length. 1. 19 characters are received from the DTE and then the DTE stops. After 2 seconds, the iR1600 sends the 19 received characters. 2. The DTE sends data to the iR1600 with no pauses. After 20 bytes have been received from the DTE, the iR1600 sends them.

The following steps describe how to set the parameters on the PAD Configuration menu.

Select PAD Inter-Character Timeout

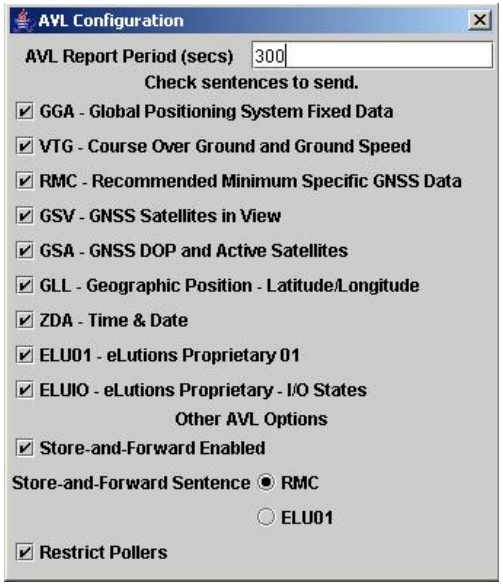
1. From the **Remote Configuration** menu, **click** on the **PAD Configuration** option.
2. The **PAD Configuration** menu appears.
3. Enter or change the timeout parameter in the PAD Inter-Character Timeout field then **click** the "**X**" (close window) icon.
4. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

Select PAD Maximum Packet Length

1. From the **Remote Configuration** menu, **click** on the **PAD Configuration** option.
2. The **PAD Configuration** menu appears.
3. Enter or change the parameter in the PAD Maximum Packet Length field then **click** the "**X**" (close window) icon.
4. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

AVL Configuration Menu

This menu is used to configure the operational characteristics of the iR1600 in AVL (Automatic Vehicle Location) mode. When in AVL mode, it is possible for the iR1600 to go out of cell coverage, meaning that it will not be able to report its GPS data (i.e. position, speed, etc.) back to the host system. The iR1600 has store and forward capabilities to handle the potential lost of GPS data. The store and forward parameters can be set up from the AVL Configuration Menu.



The following table lists the parameters and descriptions available on the AVL Configuration Menu.

Command	Description	Recommended setting
AVL Report Period	This parameter specifies how often the iR1600 will 'push' AVL (GPS) data to the remote. If the value is set to "**0**", this feature is disabled and the modem will never push AVL data to the remote.	

NMEA Sentence	This option specifies which NMEA sentences will be sent to the remote. If these options are set to **Yes**, the iR1600 will attempt to send the chosen sentences at the requested interval or upon request. Refer to the NMEA specification for what is contained in each of these sentences and their format.	Any combination of one or more of the 7 available standard NMEA sentences and the 2 eLutions proprietary NMEA sentences can be configured to be sent to a remote host.
ELU01 (eLutions Proprietary) Sentence	This option specifies whether the eLutions proprietary sentence will be sent to the remote at the requested interval or upon request. If this option is set to **Yes**, the modem will send the eLutions proprietary sentence ($PELU01). Refer to the eLutions $PELU01 sentence table for what is contained in each of these sentences and their format.	Any combination of one or more of the 7 available standard NMEA sentences and the 2 eLutions proprietary NMEA sentences can be configured to be sent to a remote host.
ELUIO (eLutions proprietary) I/O Sentence	This option specifies whether the eLutions proprietary I/O sentence will be sent to the remote at the requested interval or upon request. If this option set to **Yes**, the modem will send the eLutions proprietary I/O sentence ($PELUIO). Refer to the eLutions $PELUIO sentence table for what is contained in each of these sentences and their format.	Any combination of one or more of the 7 available standard NMEA sentences and the 2 eLutions proprietary NMEA sentences can be configured to be sent to a remote host.
Store and Forward uses	This option allows you to select which sentence format the modem will use when the store and forward feature is enabled. If set to **RMC**, the modem will store the RMC (standard NMEA "Recommended Minimum Specific GPS/Transit Data") messages for sending when coverage is reestablished. If set to **ELU01**, the modem will store and forward the eLutions Proprietary sentence ($PELU01).	

Store and Forward mode	This option allows you to enable the store and forward feature on the modem. If set to **Yes**, the store and forward feature is enabled. If set to **No**, the store and forward feature is disabled.	
Restrict Pollers	This option specifies whether the iR1600 should restrict who may poll it for AVL data. If set to **Yes**, then only the remote with the Remote IP address specified in the TCP/UDP configuration menu may request AVL data. Otherwise, any remote may request the data.	

eLutions Proprietary Sentence ($PELU01)

Field	Format	Max Size	Notes	Source
Unit ID	XXXXXXXXXX,	11	Serial Number (optional)	iR1600
Identifier	$PELU01,	7	Specifies this message	…
UTC Time	HHMMSS.SSS,	11		RMC
Status	X,	2	Status = V when valid, A when not valid	RMC
Latitude	DDMM.MMMM,	10	North or South specified in next field	RMC
Latitude N/S flag	X,	2	N = North, S = South	RMC
Longitude	DDDMM.MMMM,	11	East or West specified in next field	RMC
Longitude E/W flag	X,	2	E = East, W = West	RMC
Speed over ground	SSS.S,	6	Knots	RMC
True Direction	DDD.D,	6	True Azimuth	RMC
UTC Date	DDMMYY,	7	Date	RMC
Magnetic Variation	DD.D,	5	Degrees	RMC
Variation Direction	F,	2	E = East, W = West	RMC
Satellites used	NN,	3	From $GPGGA message	GGA
MSL Altitude	XXXXX,	6	Meters (integer)	GGA
Geoid Separation	XXX,	5	Meters (signed integer)	GGA
PDOP	X.XX,	5	Position Dilution of Precision	GSA

Field	Format	Max Size	Notes	Source
HDOP	X.XX,	5	Horizontal Dilution of Precision	GSA
VDOP	X.XX,	6	Vertical Dilution of Precision	GSA
Digital Inputs	123I,	5	1 = ON, 0 = OFF (3 characters for 3 inputs plus ignition sense, I)	iR1600
Digital Outputs	12,	3	1 = ON, 0 = OFF (2 characters for 2 outputs) Currently Not Used.	iR1600
Analog Input1	XXXXX,	6	Analog 1 value (Decimal)	iR1600
Analog Input1 Mode	m,	2	Analog 1 mode m = mA, V = volts	iR1600
Analog Input2	XXXXX,	6	Analog 2 value (Decimal)	iR1600
Analog Input2 Mode	m	1	Analog 2 mode m = mA, V = volts	iR1600
Checksum	*CC	3	Checksum	Calc.
CR-LF	<CR><LF>	2		…
	Maximum Stored	tbd		
	Maximum Sent	tbd		

eLutions Proprietary I/O Sentence ($PELUIO)

Field	Format	Max Size	Notes	Source
Identifier	$PELUIO,	8	Specifies this message	…
Digital Inputs	123I,	5	1 = ON, 0 = OFF (3 characters for 3 inputs plus ignition sense, I)	iR1600
Digital Outputs	12,	3	1 = ON, 0 = OFF (2 characters for 2 outputs) Currently Not Used.	iR1600
Analog Input1	XXXXX,	6	Analog 1 value (Decimal)	iR1600
Analog Input1 Mode	m,	2	Analog 1 mode m = mA, V = volts	iR1600
Analog Input2	XXXXX,	6	Analog 2 value (Decimal)	iR1600
Analog Input2 Mode	m	1	Analog 2 mode m = mA, V = volts	iR1600
Checksum	*CC	3	Checksum	Calc.
CR-LF	<CR><LF>	2		…

The following steps describe how to set the parameters on the AVL Configuration menu.

Set AVL Report Period

1. From the **Remote Configuration** menu, **click** on the **AVL Configuration** option.
2. The **AVL Configuration** menu appears.
3. Enter or change the value in the AVL Report Period field then **click** the "**X**" (close window) icon.
4. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

Select Sentence to Send

1. From the **Remote Configuration** menu, **click** on the **AVL Configuration** option.
2. The **AVL Configuration** menu appears.
3. **Click** on the box next to the sentence format that you want the modem to send then **click** the "**X**" (close window) icon.
4. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

Select eLutions Proprietary Sentence

1. From the **Remote Configuration** menu, **click** on the **AVL Configuration** option.
2. The **AVL Configuration** menu appears.
3. From the **AVL Configuration** menu, **click** on the box next to the **ELU01- eLutions Proprietary 01** parameter to place a check mark in the box and enable the feature. Click on the box again to remove the check mark and disable the feature. **Click** the "**X**" (close window) icon.
4. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

Select eLutions I/O Sentence

1. From the **Remote Configuration** menu, **click** on the **AVL Configuration** option.
2. The **AVL Configuration** menu appears.
3. From the **AVL Configuration** menu, **click** on the box next to the **ELU01- eLutions Proprietary I/O States** parameter to place a check mark in the box and enable the feature. Click on the box again to remove the check mark and disable the feature. **Click** the "**X**" (close window) icon.
4. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

Enable/Disable Store and Forward

1. From the **Remote Configuration** menu, **click** on the **AVL Configuration** option.
2. The **AVL Configuration** menu appears.
3. From the **AVL Configuration** menu, **click** on the box next to the **Store and Foward** parameter to place a check mark in the box and enable the feature. Click on the box again to remove the check mark and disable the feature. **Click** the "**X**" (close window) icon.
4. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

Select Store and Forward Sentence Format

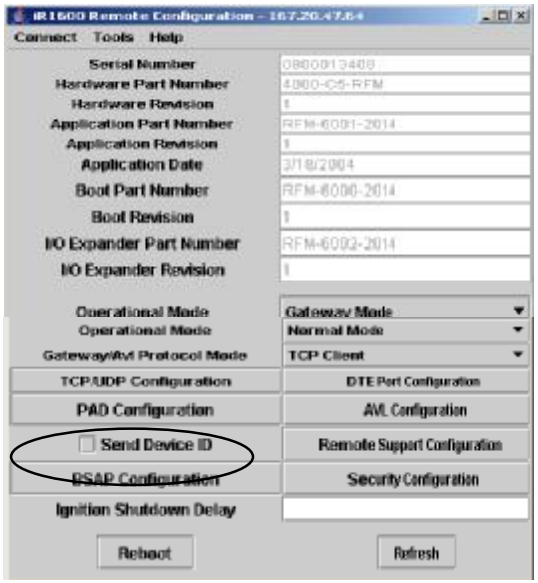
1. From the **Remote Configuration** menu, **click** on the **AVL Configuration** option.
2. The **AVL Configuration** menu appears.
3. **Click** on the box next to the Store and Forward sentence format that you want the modem to send then **click** the "**X**" (close window) icon.
4. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

Enable/Disable Restrict Poller

1. From the **Remote Configuration** menu, **click** on the **AVL Configuration** option.
2. The **AVL Configuration** menu appears.
3. From the **AVL Configuration** menu, **click** on the box next to the **Restrict Poller** parameter to place a check mark in the box and enable the feature. Click on the box again to remove the check mark and disable the feature. **Click** the "**X**" (close window) icon
4. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

Set Send Device ID Parameter

This option specifies whether the modem's serial number will be sent with the data when the operating mode is set to either Gateway or AVL mode. If this option is set to "**Yes**", the iR1600 will append the serial number at the beginning of a stream of data. Since TCP is a streaming protocol, chunks of data may be coalesced where multiple chunks of data appear within a single TCP packet. Therefore, the serial number may appear multiple times within a single TCP packet. TCP packetizing should be transparent to the remote application layer. UDP packets don't have the same constraints as TCP packets in this regard.

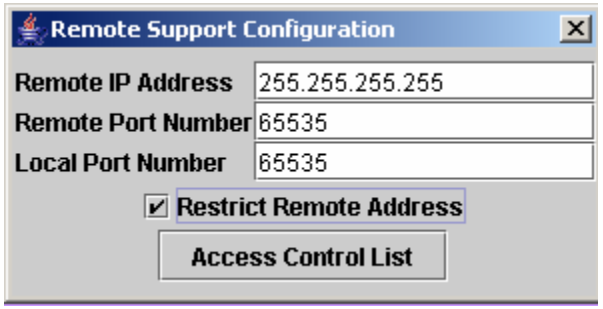


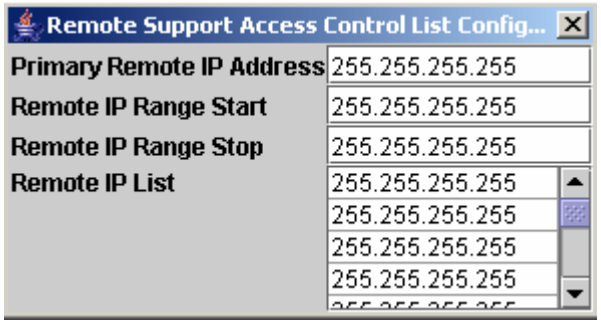
The following steps describe how to enable or disable the Send Device ID parameter.

1. From the **Remote Configuration** menu, **click** on the box next to the **Send Device ID** parameter to place a check mark in the box and enable the feature. Click on the box again to remove the check mark and disable the feature. **Click** the "**X**" (close window) icon.
2. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

Remote Support Configuration Menu

The Remote Support Configuration menu allows you to enter the IP addresses and communication parameters for the host and remote units to facilitate over the air updates and modem configuration.





Option	Description
Remote IP Address	This option allows entry of the remote IP address specifies the node to which the remote iR1600 (field devices) will listen to for over the air configuration.
Remote Port Number	This option allows entry of the remote port number specifies the node to which the remote iR1600 (field devices) will listen to for over the air configuration.
Local Port Number	This option allows entry of the local port number specifies the node to which the remote iR1600 (field devices) will listen to for over the air configuration.

Restrict Remote Address	This option allows you to restrict communication to a specified IP defined in option '1' and addresses on the Access Control List, if the parameter is set to "Yes". If the parameter set to 'No", then the restriction is disabled and opens communication up to any address.
Access Control List Configuration	This option takes you to the Access Control List Configuration menu where IP addresses of the field modems are entered. Addresses on this list will receive remote updates and configuration.

The following steps describe how to set the parameters on the Remote Support Configuration menu.

Set the Remote IP Address

1. From the **Remote Configuration** menu, **click** on the **Remote Support Configuration** option.
2. The **Remote Support Configuration** menu appears.
3. Enter or change the remote IP address in the Remote IP Address field then **click** the "**X**" (close window) icon.
4. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

Set the Remote Port Number

1. From the **Remote Configuration** menu, **click** on the **Remote Support Configuration** option.
2. The **Remote Support Configuration** menu appears.
3. Enter or change the remote port number in the Remote Port Number field then **click** the "**X**" (close window) icon.
4. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

Set the Local Port Number

1. From the **Remote Configuration** menu, **click** on the **Remote Support Configuration** option.
2. The **Remote Support Configuration** menu appears.
3. Enter or change the local port number in the Local Port Number field then **click** the "**X**" (close window) icon.
4. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

Enable/Disable Restrict Remote Address

1. From the **Remote Configuration** menu, **click** on the **Remote Support Configuration** option.
2. The **Remote Support Configuration** menu appears.
3. From the **Remote Support Configuration** menu, **click** on the box next to the **Restrict Remote Address** parameter to place a check mark in the box and enable the feature. **Click** on the box again to remove the check mark and disable the feature. **Click** the "**X**" (close window) icon.
4. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change

Set ACL Address List

1. From the **Remote Configuration** menu, **click** on the **Remote Support Configuration** option.
2. The **Remote Support Configuration** menu appears. Select the **Access Control List** option.
3. The **Remote Support Access Control List** menu appears.
4. Select the arrow to bring up the list of IP address. Select the number from the list that you want to enter or change the IP address value. **Click** the "X" (close window) icon.
5. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

BSAP Router Configuration Menu

The BSAP Router Configuration menu allows you to enter the IP Address and port information of devices that will route BSAP messages between a host computer (BSAP Level 0) and remote controllers (BSAP LEVEL 1-6) through the iDEN® network. Each end, both the host computer, and the remote controllers are set up to expect a direct wired serial interface. (The same as if they were direct wired). The iR1600 accepts the serial BSAP messages and delivers the messages to the proper point.

NOTE: The host modem can store up to sixty (60) remote devices' address. The complete IP address and BSAP address is entered on the BSAP Router Configuration Menu. If the Access Control List feature is being used on either host or remote modem, then the IP addresses must also be entered in the Access Control List l. Otherwise, the iR1600 should have their remote address in TCP/UDP mode configuration set to 0.0.0.0 (allow all).

NOTE: When setting up the BSAP network, both the host and remote DTE configuration must be set to NO FLOW CONTROL.

Enter IP Addresses

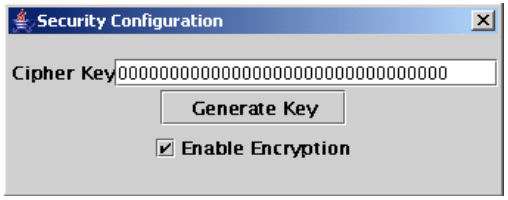
1. From the **BSAP Router Configuration** menu, enter the Local, Global and Route addresses for the BSAP routes for your network then **click** the "**X**" (close window) icon
2. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

NOTE: Enter the global address of the device if it is at Level 1 through 6 or enter the local address for devices at Level 1. When entering a global address, leave the local address set to 255 (not used). When entering a local address for a device at Level 1, the Global address may also be specified.

NOTE: The IP addresses entered in the BSAP Route Configuration menu must match the addresses entered in the Access Control List.

Security Configuration Menu

This option, available in the iR1600 Operating Mode Configuration menu, allows you to enable or disable the encryption feature for the modem. If this option is set to "Yes", then the encryption feature is enabled. If this value is set to "No", then the encryption feature is disabled. The cipher key information that will be validated for access is also entered on this menu.



NOTE: The modem must be set to Gateway mode for the encryption feature to work regardless of whether it is enabled on this menu.

The following steps describe how to set the parameters on the Security Configuration menu.

Enter Cipher Key Information

1. From the **Remote Configuration** menu, **click** on the **Security Configuration** option.
2. The **Security Configuration** menu appears.
3. Enter the key information in the Cipher Key field then **click** the "**X**" (close window) icon.
4. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

Generate Key

1. From the **Remote Configuration** menu, **click** on the **Security Configuration** option.
2. The **Security Configuration** menu appears.
3. **Click** the **Generate Key** button to obtain a system generated Cipher Key number.

4. The Cipher Key Changed dialog box appears. Click "**Yes**" to send the new key information to the modem.

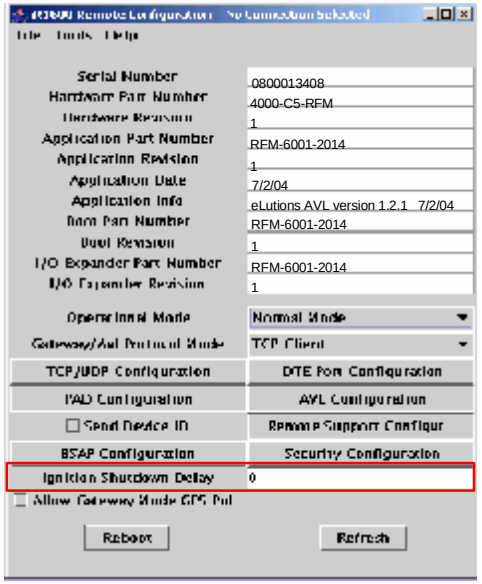
5. **Click** the "**X**" (close window) icon.
6. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

Enable/Disable Encryption

1. From the **Remote Configuration** menu, **click** on the **Security Configuration** option.
2. The **Security Configuration** menu appears.
3. From the **Security Configuration** menu, **click** on the box next to the **Enable Encryption** parameter to place a check mark in the box and enable the feature. Click on the box again to remove the check mark and disable the feature. **Click** the "**X**" (close window) icon.
4. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

Ignition Shutdown Delay

This option, available in the iR1600 Operating Mode Configuration menu, allows you to set the delay period (in seconds) that the modem will wait before shutting down. The delay timer will commence when an ignition sense is no longer detected (e.g., vehicle is turned off).



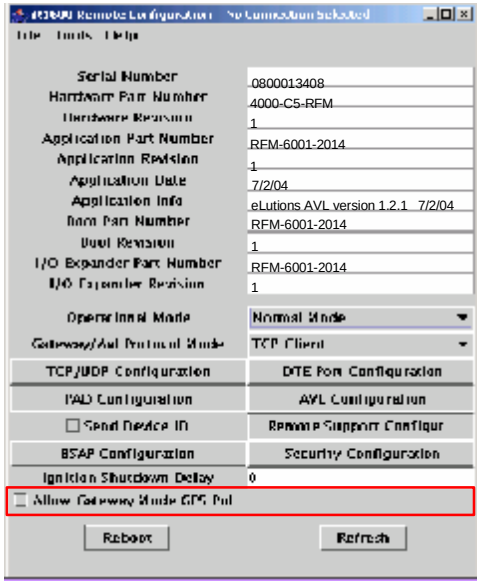
The following steps describe how to set the Ignition Shutdown Delay parameter.

Set Ignition Shutdown Delay Parameter

1. From the **Remote Configuration** menu, click on the blank field next to the **Ignition Shutdown Delay** option.
2. Enter the number of seconds you want to set for the delay parameter (0-65534 seconds). For example, if you want the modem to wait for 5 minutes before shutdown, then you would enter “300” (5 times 60 seconds=300) as the parameter.
3. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

Allow Gateway Mode GPS Polling

When enabled, this option allows the modem to poll for GPS data when it is operating in Gateway mode. The interval for polling is set within the AVL Configuration menu.

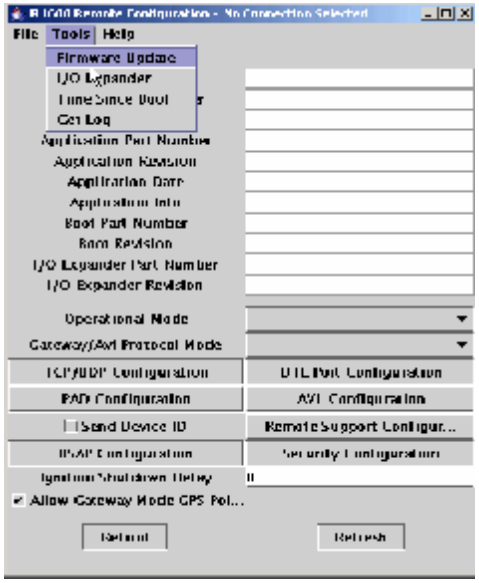


Enable Set Ignition Shutdown Delay Parameter

1. From the **Remote Configuration** menu, **click** on box to the left of the **Allow Gateway Mode GPS Polling** parameter to place a check mark in the box and enable the feature. Clicking on the box again will remove the check mark and disable the feature.
2. **Click** on the **Reboot** button located at the bottom of the **Remote Configuration** menu to save and initiate the change.

Firmware Update

This option allows you to update the remote modem's firmware.

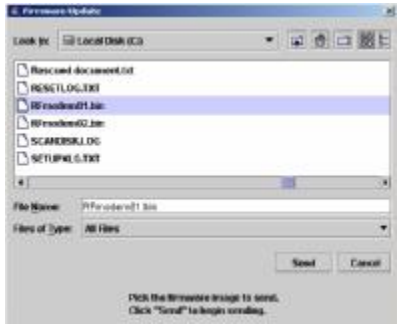


The following steps describe to how update a remote modem's firmware.

Update Remote Modem's Firmware

1. Connect to the desired remote modem (see detailed steps for connecting to a remote modem in this guide).
2. From the **Remote Configuration** menu bar, click on the **Tools** option.
3. Select the **Firmware Update** option from the **Tools** menu.

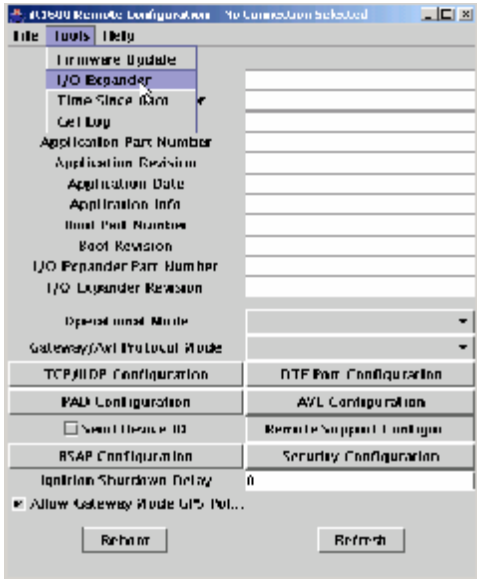
4. The **Firmware Update** screen appears. Select the file location and filename of the upgrade you want to send and click on **Send**.



5. As the program sends the upgrade file to the remote modem, you will notice that the Send button is disabled. A message will appear, indicating that the send process is completed.

I/O Expander

This option allows you to view and manage the remote modem's input/output parameters and values.

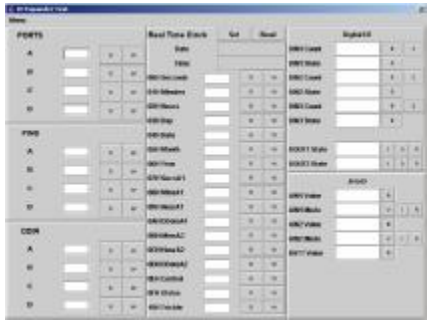


The following steps describe to how to view and update the modem's I/O values.

View Input/Output values

1. From the **Remote Configuration** menu bar, click on the **Tools** option.

2. Select the **I/O Expander** option from the **Tools** menu. The **I/O Expander Test** window appears.



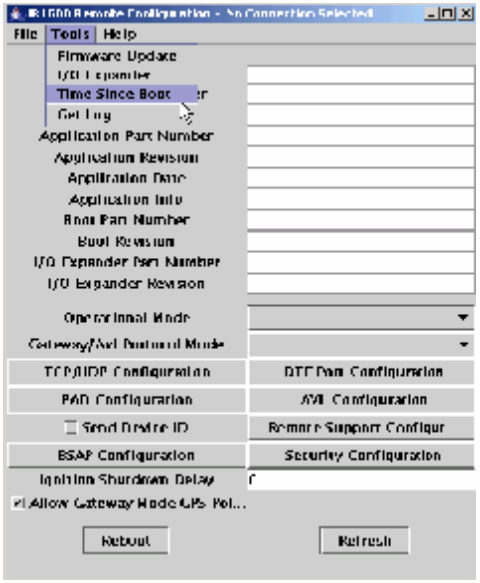
3. Select on the I/O value that you want to view then select the **"R"** button next to the value.
4. The modem's current value will display in the field.
5. **Click** the "**X**" (close window) button to return to the Remote Configuration window.

Update I/O Remote Values

1. From the **Remote Configuration** menu bar, click on the **Tools** option.
2. Select the **I/O Expander** option from the Tools menu. The **I/O Expander Test** window appears.
3. **Double-click** on the I/O value that you want to change. The field will turn blue.
4. Enter or change the I/O value then select the "**W**" button next to the value to save the change
5. **Click** the "**X**" (close window) button to return to the Remote Configuration window.

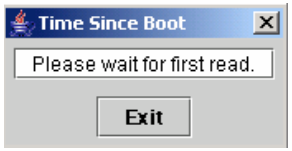
Time Since Boot

This option allows you to view the number of days that has lapsed since the modem was last booted.



View Time Since Boot

1. From the **Remote Configuration** menu bar, click on the **Tools** option.
2. Select the **Time Since Boot** option from the Tools menu.



3. The **Time Since Boot** window appears displaying a message that it is trying to acquire the information requested.
4. Once the information has been successfully acquired, the number of days will appear.
5. **Click** the “Exit” button to close the window and return to the Remote Configuration window.

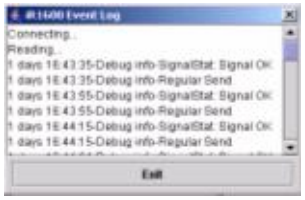
Get Log

This option allows you to view a log of events for the remote modem. The application will store up to 32 entries (events).

View Event Log

1. From the **Remote Configuration** menu bar, click on the **Tools** option.
2. Select the **Get Log** option from the Tools menu.
3. The **iR1600 Event Log** window appears displaying a message that it is trying to acquire the information requested.

4. Once the information has been successfully acquired, the logged events will appear.
5. **Click** the "Exit" button to close the window and return to the Remote Configuration window.



SAFETY NOTICE

The following information is important for the safe and efficient operation of the iR1600 modem. Please read this safety notice before operating the modem.

Safe and Efficient Operation Guidelines

Your modem contains a transmitter and receiver. When it is ON, it receives and transmits radio frequency (RF) energy. The modem operates in the frequency range of 806 MHz to 870 MHz and utilizes the digital modulation techniques. This product is authorized by FCC Rule Part 47CFR2.989 (b) which states that it should be used in such a way that it maintains a distance of at least 8 inches (20 cms) between the human body and the radio's antenna or modem. When you use your modem, the system handling your call controls the power level at which your modem transmits. The output power level typically varies from 0 mW to 700 mW.

Exposure to Radio Frequency Energy

Your modem is designed to comply with the United States Federal Communications Commission, Code of Federal Regulations; FCC part 90-sub part S, and FCC-part 15, Class B. The modem complies with FCC's national standards and guidelines regarding exposure of human beings to radio frequency electromagnetic energy.

Medical and Personal Electronic Devices

Most electronic equipment is protected from RF energy. However, certain equipment may not be shielded against RF signals being emitted from your modem.

Pacemakers

Operators should not use the modem if individuals with pacemakers are within 6 inches (0.15 meters) of the antenna.

Hearing Aids

The modem may interfere with hearing aid devices. Individuals who experience such interference should consult the hearing aid manufacturer to discuss alternative solutions.

Other Medical Devices

Individuals who have other medical devices not specifically mentioned in this safety notice may want to consult their physician or the manufacturer of the device to determine if it is adequately protected from external RF energy.

Interference with Other Electronic Devices

RF energy may affect improperly installed or inadequately protected electronic operating and entertainment systems in motor vehicles. Check with the manufacturer or representative to determine if these systems are adequately shielded from external RF energy. It is recommended that you also check with the manufacturer of any equipment that has been added to the vehicle.

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APPENDIX A: GLOSSARY

This glossary contains terms and definitions used within this guide. It is by no means exhaustive of terms that you may come across.

ASCII

American Standard Code for Information Interchange. A standard set of 128 characters, symbols and control codes used for computer communications. ASCII characters require 7 bits of data to send, but are often sent 8 bits at a time with the extra bit being a zero.

Asynchronous Communication

A method of sending data in which the bits can be sent at random times. Data transmission is not synchronized to a clock. With asynchronous transmission, each character is transmitted one at a time with a “start” bit at the beginning and one or more “stop” bits at the end. Any amount of time can elapse before the next character can be sent.

AT Command

An order entered into the computer to request your modem to perform certain actions, such as dial a telemodem number. AT commands are Hayes-compatible modem commands.

Baud

The signaling rate of a line, which is the number of transitions (voltage or frequency changes) that are made per second.

Baud Rate

Signaling speed of the modem. Common baud rates are 2400, 4800, 9600, 19200, and 56k.

Byte

A data unit of eight bits.

Circuit Switched Data

A networking technology that provides a temporary, but dedicated, connection between two stations no matter how many switching devices the data is routed through. Circuit Switch was originally developed for the analog-based telephone system in order to guarantee steady, consistent service for two people engaged in a phone conversation.

Command Mode

The mode that accepts AT commands. Also known as Terminal Mode. When your modem is in this mode, it is waiting to receive AT commands that you type from your communication software.

Communication Software

A computer program designed to connect your computer to an external source, such as another computer or a fax machine.

Configuration

The term configuration defines the hardware components that comprise a subsystem and system. It is a set of conditions or parameters that define the structure of an item such as the GPS processing and characteristics of the RS-232 interface ports.

Data Services

One of the functions of your iDEN® modem. Data services uses both circuit-switched and packet data transmissions.

DCD

Data Carrier Detect. An acceptable carrier signal received by the modem over the modem line. Also known as Received Line Signal Indicator (RLSI).

DCE

Data Communication Equipment. The equipment that establishes, maintains, and terminates a connection. It converts data into units of sound and vice versa for communication over telemodem or cellular networks.

Default

A factory preset choice that, under normal circumstances, works best for your system. You can either accept the default or change it.

Differential Capable

A term used to describe a GPS receiver capable of receiving and applying differential GPS corrections.

Differential GPS

A procedure of correcting GPS solutions to achieve improved position accuracy. Differential GPS provides 2 to 5 meter position accuracy. Differential accuracy is obtained by applying corrections determined by the stationary Differential Reference Station to the GPS data collected by the RPU (receiver processing unit) on-board the vehicle.

DNS

Domain Name Server. This is what converts names of domains (ex.: www.elutions.com) into IP addresses (ex. : 64.31.159.2). The DNS server that you use is generally situated with your access provider.

DTE

Data Terminal Equipment. A computer or hand-held device that generates and receives data, and provides functions that control data communications through a device like the modem.

Dial Up Networking (DUN)

A component in Windows that enables you to connect your computer to a network via modem. If your computer is not connected to a LAN and you want to connect to the Internet, you need to configure Dial-Up-Networking (DUN) to dial a Point of Presence (POP) and log into your Internet Service Provider (ISP). Your ISP will need to provide certain information, such as the Gateway address and your computer's IP address.

Firmware

A set of software computer/processor instructions permanently or semi-permanently resident in read-only memory.

Frequency

The number of vibrations per second of an audio or radio signal. Measured in hertz (Hz), Kilohertz (kHz), or megahertz (MHz). GPS frequencies are L1= 1575.42 MHz or L2= 1227.60 MHz.

GPS

(**G**lobal **P**ositioning **S**ystem) is a "constellation" of 24 well-spaced satellites that orbit the Earth and make it possible for people with ground receivers to pinpoint their geographic location. The location accuracy is anywhere from 100 to 10 meters for most equipment. Accuracy can be pinpointed to within one (1) meter with special military-approved equipment. The GPS is owned and operated by the U.S. Department of Defense but is available for general use around the world.

GPS Antenna

An antenna designed to receive GPS radio navigation signals.

GPS Processor

An electronic device that interprets the GPS radio navigation signals (received by the GPS antenna) and determines a location solution. The GPS processor may also be able to apply (and determine) differential GPs corrections.

GPS Receiver

The combination of GPS antenna and GPS processor.

Hand-Held Devices

Small computing appliances, such as palmtops, personal digital assistants and pen-based computers.

Hertz (Hz)

A frequency unit equal to one cycle per second.

Home Agent

The carrier or router responsible for determining the next network point to which a packet (data) should be forwarded toward its destination.

Internet

A series of interconnected local, regional, national and international networks, linked using TCP/IP. The Internet links many government, university, research and commercial sites. It provides e-mail, Web browsing and file transfer services.

Internet Service Provider (ISP)

Provides your computer with Internet access. Also known as Service Provider.

Intranet

A network based on TCP/IP protocols (an internet) belonging to an organization, usually a corporation, accessible only by the organization's members, employees or others with authorization. An Intranet's Web sites look and act just like any other Web sites, but the firewall surrounding an intranet fends off unauthorized access.

Kbps

Kilobits per second. Generally represented at 1000 bits per second.

Laptops

Portable computers, such as notebooks and sub-notebooks.

Local Area Network (LAN)

A computer network that spans over a relatively small area. Most LANs are confined to a single building or group of buildings.

Mobile IP

An IP enhancement that provides forwarding of traffic to moving users. It uses agents in the user's home network and in all foreign networks. When logging on to a remote network, users register their presence with the foreign agent, and the home agent forwards the packets to the remote network. Mobile IP permits mobile devices to inform a "visited" network that it is present and then arrange to have its home network forward data to it automatically.

Modem

An electronic device enabling digital data to be sent over analog transmission facilities. Converts a digital signal to analog and back to digital again. Modem stands for Modulator/De-Modulator.

NMEA

National Marine Electronics Association. An association that defines marine electronic interface standards for the purpose of serving the public interest.

Non-Routable IP

A communications protocol that contains only a device address and not a network address. It does not incorporate an addressing scheme for sending data from one network to another. Examples of non-routable protocols are NetBIOS and DEC's LAT protocols. Also some TCP'IP addresses are considered non-routable.

Non-Volatile Memory

Memory that holds its content without power. Permanently stored information that is not lost when you power off. ROMs, PROMs, EPROMs and flash memory are examples.

Packet of Data

A bundle or block of data, organized in a specific way for transmission.

Parallel Port

A low speed port, usually located on the rear of a computer, which usually connects to printers. Parallel ports transmit data simultaneously over eight “parallel wires” one byte at a time (as opposed to a serial port, which transmits data one bit at a time).

Parity Bit

Parity is a process for detecting whether bits of data have been altered during transmission. A Parity Bit is a non-data bit that is added to a group of data bits to check for transmission errors. Parity Bits are used in Parity checking which is an error-checking method in asynchronous transmission. The parity bit tells the receiving end of a transmission whether there should be an even or odd number of bits contained in that transmission.

PIN

Personal Identification Number.

PING

(Packet INternet Groper) An Internet utility used to determine whether a particular IP address is online. It is used to test and debug a network by sending out a packet and waiting for a response. A program used to test whether or not a network component is available.

PPP

(Point-to-Point Protocol) The most common method for connecting to the Internet. PPP provides serial line (dial-up) connectivity, authentication, compression and encryption between two computers and can handle several protocols simultaneously.

Protocol

Hardware and software standards that govern transmission between two communications devices. There are several layers, or levels, of functionality in a protocol. Each layer may be available, as a separate software component, or several layers may be combined into one.

Public IP Address

See Routable IP Address.

RAM

Random Access Memory is the working memory of the computer where you can enter information and call up data.

Routable IP Address (Public IP Address)

A communications protocol that contains a network address as well as a device address, allowing data to be routed from one network to another. Examples of routable protocols are SNA, OSI, TCP/IP, XNS, IPX, AppleTalk and DECnet.

RS-232

A communication standard for digital data. Specifies a number of signal and control lines. RS-232 is often associated with a 25-pin connector called DB-25.

Serial Port

An input/output (I/O) port transmits data one bit at a time, as opposed to a parallel port that transmits multiple (usually eight) bits simultaneously. RS232C is a common serial interface standard.

Service Specific Software

A program designed for a designated online service such as AOL.

Start Bit

A data bit used in asynchronous transmission to signal the beginning of the character.

Stop Bit

A data bit used in asynchronous transmission to signal the end of the character.

System Administrator

The person responsible for monitoring computer activity in a specified area, such as a company.

Synchronous Communication

A method of sending digital data in which the bits come at fixed, rather than random, times and are synchronized to a clock.

TCP/IP (Transmission Control Protocol/Internet Protocol)

The two best-know Internet protocols, often erroneously thought of as one protocol. TCP enables two hosts to establish a connection and exchange streams of data. TCP guarantees delivery of data and guarantees that packets will be delivered in the same order in which they were sent. IP acts as a postal system, allowing you to address a package and drop it in the system, but doesn't provide a direct link between you and the recipient. TCP/IP, on the other hand, establishes a connection between two hosts so that they can send messages back and forth for a period of time.

Terminal Mode

The mode that accepts AT commands. Also known as Command Mode. When your modem is in this mode, it is waiting to receive AT commands that you type from your communications software.

Transmission Rate

The rate at which data is transferred measured in bits per second. Common transfer rates are 9.6bps / 19200bps / 57600bps / 115200bps

UTC

Universal Time Coordinated. Uniform atomic time system/standard that is maintained by the US Naval Observatory. UTC defines the local solar mean time at the Greenwich Meridian.

UTC Offset

The difference between local time and UTC (Example: UTC – EST = 5 hours).

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