Introduction

The iR1600 series modems include capabilities such as embedded TCP/IP stack, alternate serial protocol conversion, store-and-hold forward for GPS coordinates, three (3) operating modes (Normal, AVL or Gateway), and integration for a handheld speaker-microphone to enable voice communication. The expanded features make the iR1600 even more powerful while still maintaining the same ruggedized, flexible and reliable form factor.

This quick reference guide provides important information for operating your modem.

Getting Started

The modem is designed to power up or turn ON when an ignition signal is sensed.

Power Up from Mobile Environment (Vehicle):
1. Turn ON your iR1600 modem by simply starting your vehicle.
2. The modem automatically turns on and connects to the iDEN® network (this process may take up to 3 minutes).
3. Turn on your mobile device (e.g., laptop, Mobile Data Terminal (MDT), etc.).
4. Use your mobile device to receive or send information.

Power Up from Fixed Environment (Building or Desktop):
1. Turn ON your iR1600 modem by plugging the power connector into a 12-volt DC power supply.
2. Turn on your mobile device (i.e. laptop, MDT, etc.).
3. Use your mobile device to send and receive information.

Modem Features

The following diagram highlights the iR1600 features, as they appear on the front panel of the iR1600 GPS-Enabled and Rugged modems.
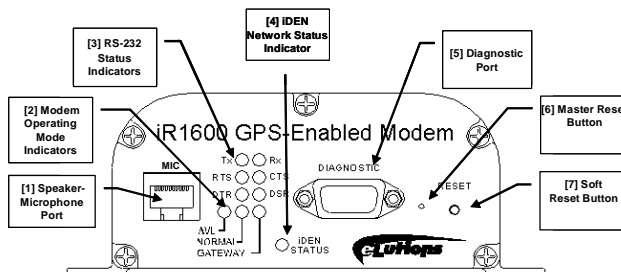
Feature Descriptions

Descriptions of the modem's features are listed below:
1) **Handheld Speaker-Microphone Interface** - The modem is equipped with an integrated port for connection to an external microphone-speaker device, enabling voice communication.
2) **Modem Operating Mode Status LEDs –** These lights indicate what mode the modem is operating in (see Operating Mode Table).
3) **Modem Status LED** – These status lights indicate whether the modem is receiving or transmitting data.
4) **iDEN® Status LED** – This status light indicates whether the modem is connected within the iDEN® network.
5) **Modem's Diagnostic Port** – This allows you to connect a DB9 serial cable to a computer and retrieve the modem's diagnostic menus and information.
6) **Master Reset Button** – This button is recessed and when pressed, it will cause the modem to perform a hard reboot and register with the iDEN® network.
   WARNING: We do not recommend that you perform this command unless otherwise instructed by an eLutions Customer Care representative.
7) **Reset Button** – When pressed, this button will cause the modem to perform a soft reboot.

Modem Operating Modes

The iR1600 provides three separate modes of operation or communication described below.

- **AVL:** In this mode, the modem uses the internal GPS receiver to send GPS NMEA sentences over the packet data network to a specific IP address and port number. The data is encapsulated into UDP or TCP packets, which allows it to be transmitted over the iDEN® packet data network to a pre-defined IP address.

  NOTE: Only the iR1600 GPS-Enabled modem can operate in the AVL mode and send AVL messages.

- **GATEWAY:** In this mode, the modem receives basic serial data from the host device via the user port, and encapsulates it into UDP or TCP packets. The data is sent out over the iDEN® packet data network to a pre-defined IP address.

- **NORMAL:** In this mode, an IP enabled host device may utilize the iDEN® packet data network via a PPP connection to the iR1600 modem. Alternately, a non-IP enabled host may make an iDEN® circuit switched connection using standard Hayes AT commands.

Operating Mode Indicators

Signal	Color	Indication
AVL	Solid Red	The modem is operating in AVL mode.
Normal	Solid Red	The modem is operating in Normal Mode.
Gateway	Solid Red	The modem is operating in Gateway Mode.

Note: When the modem is in diagnostic mode, all of the operating mode indicators will be off.

LED Indicators

iDEN® Network Status Indicators

Color	Indication
Blinking Red	Modem is attempting to connect to the iDEN® network
Solid Red	Out-of-Range – the modem is not connected to the iDEN® network. If the modem status changes from blinking green back to solid red, the signal has been lost and the modem is attempting to re-acquire. **NOTE: If after a period of several minutes the status does not return to green, you may be out of range. The modem will attempt to re-acquire automatically when you are back in range.**
Blinking Green	In-Range – the modem is connected to the iDEN® network.
Solid Green	In Use – iDEN® network communications is in progress. This LED will only reflect solid green when the modem is operating in circuit switched mode.
Off	Off – vehicle ignition is off or has experienced loss of 12V input power.

The iDEN® STATUS indicators differ, depending on the type of connection the modem is operating in. The following tables describe the iDEN® STATUS indicators for the Packet Data and Circuit Switched Data connection modes.

Packet Data

Signal	Color	Indication
iDEN® STATUS	Blinking Green	In-range (modem is connected to the iDEN® network) but idle (not passing data).
iDEN® STATUS	Blinking Green	The modem is in use – iDEN® network communication is active and is passing data.

Circuit Switched Data

Signal	Color	Indication
iDEN® STATUS	Blinking Green	In-range (modem is connected to the iDEN® Network) but idle (not passing data).
iDEN® STATUS	Solid Green	The modem is in use – iDEN® network communication is active and is passing data.

Signal Status Indicators

Signal	Color	Indication
Tx	Green	Modem is transmitting data to the host system.
Tx	Off	Modem is not transmitting data.
Rx	Green	Modem is receiving data from the host system.
Rx	Off	Modem is not receiving data.
RTS	Green	Request To Send from host system has been asserted.
RTS	Off	Request To Send is not asserted.
CTS	Green	Clear To Send from modem is asserted.
CTS	Off	Clear To Send is not asserted.
DTR	Green	Host system is ready.
DTR	Off	Host system is not ready.
DSR	Green	Modem is ready.
DSR	Off	Modem is not ready.

Common Problems

What's the Problem?	What it means:	How to Resolve:
Nothing happens when I power up the modem.	This indicates that there is no power being supplied to the modem.	There are several things that could be wrong. Go through this list and eliminate all the possible problems: • Is the ignition on? • Is the ignition bypass plug inserted into the IGNITION connector on the modem (for building installations)? • Check the power supply and make sure that everything is connected properly. • Is the battery voltage at least 12 volt? • Check the cables and wiring.

The modem has power but the LED Status light is not blinking green.	- You may not be within coverage area. - Signal strength may be weak.	• Antenna may be loose. Check to make sure the antenna is properly connected. • Reposition the antenna.
GPS is slow.	It is normal for GPS to take up to 5 minutes to acquire the first reading.	• Wait for an appropriate amount of time for communication to take place. If attempts are taking longer than 5 minutes, contact your technology administrator.
GPS does not operate.	Either: - Coverage in the area is bad. - Antenna may be improperly installed or is defective.	• Verify that the antenna has direct line of sight to satellite. GPS does not operate effectively indoors. • Move to another area.
Modem will not power down.	The wiring to the modem may not be connected properly.	• Check the ignition sense wiring to be sure that it is connected. • Verify that the diagnostic port is plugged in correctly. • Check LED status to see if the modem is communicating.
The modem doesn't appear to be communicating.	This could indicate a number of things (see the How to Resolve column to eliminate the possibilities).	• Is data cable plugged into the diagnostic port? • Is data cable connected properly to the mobile device or computer? • Check the RSSI (Receive Signal Strength Indicator) • Check coverage: • Move to another location to see if coverage is not affected. • Verify that your account has been activated. Contact your technology administrator or designated field care representative.

NOTE: The Status LED remains red for up to 3 minutes after power is applied to the iR1200 or immediately after the Reset button is pressed.

Safety Notice

The following important information will allow you to safely operate the iR1600 and iR1600 GPS-Enabled modems.

Safe Operating Guidelines

Your modem contains a transmitter and receiver. When it is ON, it receives and transmits radio frequency (RF) energy. This product is authorized by FCC Rule Part 47CFR 2.989 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 radio's antenna and the human body.

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 guide may want to consult their physician or device manufacturer 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.