

XI-202

Iridium Satellite Relay with GPS location

Integrators Manual

Version 1.0
March 2013

Xeos Technologies Inc.
2 Bluewater Rd.
Bedford, Nova Scotia, Canada
B4B 1G7
(902) 444-7650
www.xeostech.com



Table of Contents

1. General Description.....	3
2. Device Preparation.....	3
2.1 Setting up your Iridum Account.....	3
2.2 Making the connection.....	3
3. Device Configuration.....	4
3.1 USB Diagnostic Port.....	4
3.2 Configuration Commands.....	4
3.2.1 Timer Intervals.....	4
3.2.2 Serial Port Configuration.....	5
3.3 Remote Configuration.....	5
4. Serial Relay.....	6
4.1 Mobile Originated Messages.....	6
4.2 Mobile Terminated Messages.....	6
5. Test Button and LED Behavior.....	7

1. General Description

The XI-202 Iridium Relay unit is designed to relay bi-directional RS-232 level data over the Iridium Satellite network. The XI-202 also comes equipped with a GPS Receiver module. It will transmit its GPS location, as well as status and health messages to a remote user over the Iridium Satellite Network, at user-defined intervals.

2. Device Preparation

2.1 Setting up your Iridium Account

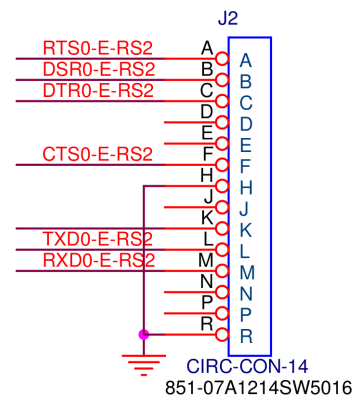
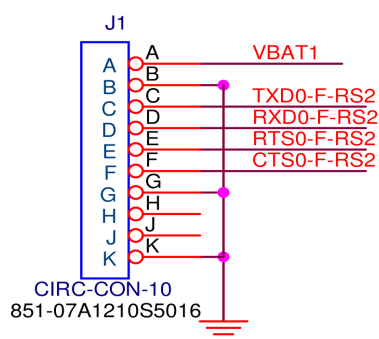
The XI-202 Relay comes equipped with a 9602 Iridium SBD Transceiver. This modem must be provisioned prior to use. The modem supports SBD (Short Burst Data) messages through E-mail or directIP connectivity. Please contact Xeos Technologies for more information about provisioning.

2.2 Making the connection

The front panel of the XI-202 Relay has 5 connectors to connect to various devices. The USB (USB-Mini) is used as a diagnostic I/O port for the device. The user can set various settings on the device through this port, as well as receive diagnostic output. It is also where the device will accept firmware upgrades.

The TNC and SMA connectors are for the supplied Iridium and GPS antenna respectively. These antennas must be installed in a location with a clear, unobstructed view of the sky.

The 10 pin circular Sourieu connector contains the power connections, as well as serial port 2. The 14 pin circular Sourieu connector contains the serial port 1 connections. Here are the pin-outs for the two connectors:



The power leads (J1-A J1-B) are connected to the red(+) and black(-) flying leads on the supplied cable. They require a DC power supply of 9V (minimum) to 22V (maximum). The supplied cables also include two DE-9 connectors for RS-232 level data.

3. Device Configuration

All of the settings on the XI-202 relay can be configured either by connecting the USB diagnostic port to a serial port terminal, or by sending configuration commands from a remote location over the Iridium Satellite Network.

3.1 USB Diagnostic Port

To connect to the USB diagnostic port, you will first need to download a driver for the Silicon Labs CP2102 USB chip contained in the unit. The driver can be found here:

<http://www.silabs.com/products/mcu/Pages/USBtoUARTBridgeVCPDrivers.aspx>

After downloading and installing the driver, connect the supplied USB-mini cable between the XI-202 and your computer. Your computer should assign the XI-202 a COM port number, that will show up as “Silicon Labs.....” under ports in the Windows Device Manager.

To communicate with the XI-202 you will need a serial port terminal program. We recommend uCon, it can be found here: http://www.umonfw.com/releases/ucon_install.exe

The port settings for the XI-202 are:

Baud Rate: 57.6K

Data Bits: 8

Parity: None

Stop Bits: 1

All flow control disabled.

After connecting to the device with your terminal, you can issue a “\$h” to return a list of available commands on the device. This document will review only the commands necessary for proper device configuration.

3.2 Configuration Commands

The only settings the end user will likely need to configure are the GPS Interval Timer, Iridium Message Check Timer, Status Message Timer, Serial Port Used, and Serial Port Baud Rate. To retrieve a table of the current settings, issue the following command:

```
$settings 2
```

3.2.1 Timer Intervals

There are 3 timer intervals that can be configured by the end user:

GPS interval timer is how often the unit will attempt to attain its current GPS position and store it in memory. This timer can range from 5 minutes to 1 day. The default is 1 hour. To change this timer, issue the following command:

```
$cfg tGPS 3h
```

Where 3h (3 hours) is the new interval. This command accepts “m” as minutes, “h” as hours and “d” as days. To configure the GPS timer to gather a position every 10 minutes, issue the following command:

```
$cfg tGPS 10m
```

The Iridium message check timer is how often the unit will connect to the Iridium Satellite Network to check for new incoming messages. This timer is also how often the unit will send out its latest record\ GPS position. Therefore it is recommended to have the GPS interval timer set to a value equal or greater than the Iridium message check timer. This timer can range from 5 minutes to 1 day. The default is 1 hour.

Following the same format as above, the Iridium message check timer can be changed by issuing the following command:

```
$cfg tIRD 3h
```

Where 3h (3 Hours) is the new interval.

The status message timer is how often the unit will send out a message containing the status and health of the XI-202 Relay. The message contains the battery voltage, temperature (internal), maximum GPS SNR value, number of GPS satellites in view, GPS statistics, Iridium Statistics, and total data received by the device from the RS-232 ports. This timer can range from 30 minutes to 2 days. The default is 6 hours.

Following the same format as the other timer commands, the status message timer can be changed by issuing the following command:

```
$cfg tStat 3h
```

3.2.2 Serial Port Configuration

There are two main configurations the end user may want to define for the two serial ports. Only one serial ports can be active to accept input and output data, at any one point in time. To configure which serial port is active issue the following command:

```
$cfg serPort 2
```

Where 2 is referring to port 2.

The serial port baud defaults to 19.2K baud. To change the baud rate issue the following command:

```
$cfg baud 57600
```

Where 57600 is the new baud rate.

3.3 Remote Configuration

All of the settings mentioned in section 3.2 can also be configured from a remote location over the Iridium Satellite Network. To send a command over the iridium satellite network, compose a plain text file with a “.sbd” extension. In the file type the command, the same way as you would if you were communicating through the USB diagnostic port. The command must be followed by a blank empty

line in the file. An example SBD file can be found here:

<https://www.xeostech.com/sites/default/files/example.sbd>

Compose an e-mail to be sent to “data@sbd.iridium.com” with the subject line containing only the 15 digit IMEI of the device. The body of the e-mail is ignored. Send the created SBD file as an attachment to this e-mail. The XI-202 will receive this command file at its next Iridium Check Interval.

If you would like to retrieve the current settings table from a remote location, it is recommended that you use the “\$settings” command as opposed to the “\$settings 2” command used when communicating via USB. The “\$settings” command will return a more condensed version of the current device settings.

Using Iridium SBD Direct IP to communicate with the device is beyond the scope of this document.

4. Serial Relay

After the device is configured to your specifications, you can now use it to relay data to and from a connected RS-232 device over the Iridium Satellite Network.

4.1 Mobile Originated Messages

To send MO (Mobile Originated) data from the connected RS-232 device, connect a device to the active serial port on the XI-202 . The XI-202 Relay's serial ports are powered down when there is nothing connected to the serial ports. Please wait at least 100ms after connecting the RS-232 peripheral before beginning to send a data stream. To save power, power off the RS-232 peripheral's serial port to trigger the XI-202 to shut off its own serial port.

The data stream must begin with two opening angle brackets (<<) and end with two closing angle brackets (>>) anything outside the brackets will be ignored.

For example:

```
<<"This is a stream of data">>
```

The maximum size of the data stream is 1000 Bytes by default. This can be configured to up to 5000 Bytes by issuing the following command on the diagnostic port:

```
$cfg holdMax 5000
```

Any data streams larger than 330 Bytes will be broken up and sent in separate subsequent SBD messages. Each SBD message will have a 10 byte starting line added by the XI-202 of “DevData<CR><LF>”.

After the XI-202 Relay receives the “>>” characters, it will send out the message immediately.

4.2 Mobile Terminated Messages

To send a data stream to the connected RS-232 peripheral, compose a SBD file with the first line reading:

```
$OutPort
```

All subsequent lines after this will be sent to the connected RS-232 peripheral. Each SBD message file

has a 260 Byte limit. You can Download an example SBD message here:

<https://www.xeostech.com/sites/default/files/Example2.sbd>

After the SBD file is created, send it as an e-mail attachment to data@sbd.iridium.com with the subject line containing only the 15 digit IMEI number.

The \$OutPort command can also be issued on the USB diagnostic port. Issue it as follows:

\$OutPort

Data to peripheral line 1

xxx

Where xxx is the closing string for the data stream. A closing stream is not required for messages sent over Iridium.

5. Test Button and LED Behavior

When the XI-202 is powered on, it will begin flashing it's LEDs as described below, the LEDs will turn off by themselves after 10 minutes. To toggle the LEDs on or off, press the test button for less than one second. To reset the test status, hold the test button for longer than 1 second.

The LEDs behave as follows:

PWR Led:

- off when GPS and Iridium are off.
- blink green if iridium is on
- blink blue if GPS is on
- blink blue and green if both are on

DAS Led:

- flash yellow if no data ever received.
- green with short yellow flash if data received but not yet sent
- solid green if data receive and was sent

SAT Led:

Has two phases; a GPS phase and and Iridium phase.

- phase is yellow for both if no test has been done
- short double blink if test in progress (GPS blue, Iridium green)
- solid on for pass (GPS blue, Iridium green)
- solid red for fail