

INSTRUCTION MANUAL



Raven CDMA1X (C3211) Airlink Cellular Modem

March 2008



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1 Introduction

The Raven CDMA Airlink Cellular Modem is a full-duplex, 1xRTT cellular modem that communicates with a base station PC via Code Division Multiple Access (CDMA) network and Public Switched Telephone Network (PSTN). The Raven CDMA modem is for use on Bell, Alliant, ManitobaTel, and SaskTel networks only.

The Raven CDMA is a rugged, intelligent wireless data platform designed to enable real-time, two-way communications with remote assets. The AirLink Embedded Operating System (ALEOS) is the power inside the Raven. ALEOS has its own embedded TCP/IP stack which enables transmission of serial data from non-IP devices. ALEOS enables several functions including remote configuration and diagnostics, packet assembly and disassembly (PAD) for UDP or TCP, and telemetry protocol spoofing and conversion.

The modem is accessed through the Internet using TCP/IP communications protocol using a Static or Dynamic IP address.

- A Static IP address is permanently assigned to a particular account and will always be used whenever the Raven connects to the Internet.
- A Dynamic IP address is assigned on a “need to have” basis. A dynamic IP address is used with a service such as IP Manager (Section 5.4) to translate a dynamic IP address to a domain name, so that the Raven can be contacted by name as if it had a static IP.

A Service Provider account can be set up for a Static or Dynamic IP address; a Static IP is preferred.

2 Specifications

2.1 Base Station Requirements

- PC with Hayes-compatible modem, running Campbell Scientific LoggerNet or PC400 software.
- Subscription to Bell, Aliant, ManitobaTel, or SaskTel CDMA networks with coverage at the datalogger site.

2.2 Datalogger Site Equipment

- Raven CDMA modem—includes power cable. The modem is configured using the Wireless Ace 3G program prior to installation. Wireless Ace 3G can be downloaded from www.Airlink.com

- Datalogger—CR510, CR10(X), CR23X, CR7, CR1000,CR 3000, CR5000, or CR2XX
- SC105 or SC932A Interface—connects the modem to the CR510, CR10(X), or CR7 dataloggers' CS I/O port
- L14392 Null Modem Cable—connects the modem to the CR23X, CR2XX, CR1000, CR3000 or CR5000 RS-232 port
- L14394 Raven Mounting Kit—includes mounting hardware for securing the modem to below referenced environmental enclosure and a 9-pin male to 9-pin female cable.
- Antenna—the following antennas are available from Campbell Scientific, sites near the edge of the CDMA coverage may require the Yagi antenna. Contact a CSC Applications Technician for help in determining the best antenna for your application.
 - C2100 3dBd External Omni Antenna (800 MHz and 1.9 Mhz bands)
 - L14453 Omni 0 dBd ½ Wave Dipole Whip Cellular Antenna (800 MHz only)
 - L14454 Yagi 8 dBd Cellular Antenna with 10' Cable (800 Mhz only)
- Power Supply (see power considerations)
- Environmental Enclosure— ENC 10/12, ENC 12/14, or ENC 16/18

2.3 Power Considerations

- A power cable included with the modem connects to the datalogger's 12 V or switched 12 V terminal. Connection to the switched 12 V terminal allows the datalogger to switch power to the modem during scheduled transmission intervals if desired.

'CR1000 Series Datalogger

'Description:

'CR1000 Program Example to control power to Raven CDMA 1X

'Turn on Raven CDMA 1X for two hours each day from 9:00 a.m. to 11:00 a.m.

'Wiring:

'Raven CDMA 1X:

'Red Wire - SW12V

'Black Wire - G

'Main Program

BeginProg

Scan (1,Sec,0,0)

```
'Turn on Raven CDMA1X at 9:00 a.m.  
If IfTime (9,24,Hr) Then  
SW12 (1 )  
EndIf  
  
'Turn off Raven CDMA1X at 11:00 a.m.  
If IfTime (11,24,Hr) Then  
SW12 (0 )  
EndIf  
  
NextScan  
EndProg
```

3 Configuration

3.1 Establish Cellular Service

Prior to contacting the cellular service provider, have the following information on hand:

1. Electronic Serial Number (ESN). The ESN is found on the unit label.
2. Contact the provider; tell the account representative that you would like to open a new account. Ask for a 1X Data Plan account with a static IP or, if you prefer, dynamic IP. The provider will give you a 10-digit phone number and an IP address (for static IP account only).

NOTE: The service provider does not need the Raven modem to activate the account.

3.2 Program the Modem

1. For the following steps you will need to download Wireless Ace 3G Modem Doctor and an Activation Wizard (that is matched to your selected carrier provider) from the Utilities page at http://www.airlink.com/support/modems/modem_utils.asp
2. Each provider has a specific Wizard. Please ensure you have downloaded the Wizard that corresponds to your provider.
3. XP users can use the smaller version of Wireless Ace 3G which does not include the .Net framework.
4. You will also need a working template file (.xml) to program the modem. Template files are available from Campbell Scientific's Website: (www.campbellscientific.ca/downloads).
5. Connect the modem to a com port on the PC using a direct RS232 connection and attach a dual band antenna to the Raven..

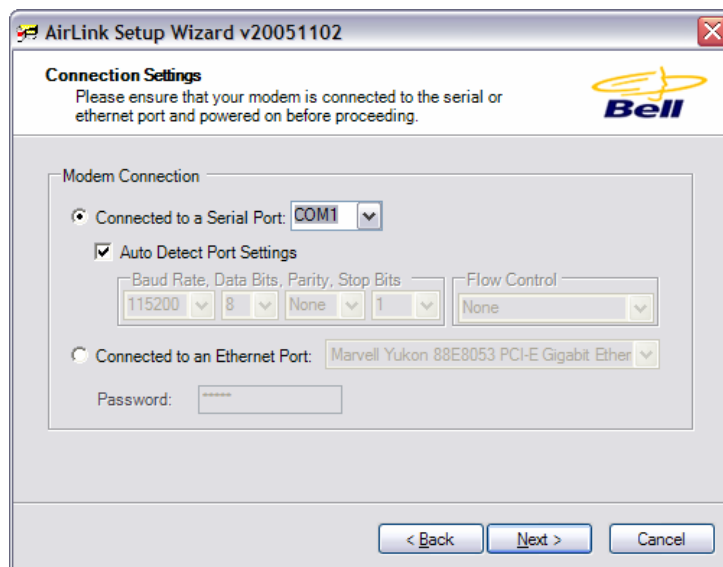
6. Start the Activation Wizard.

4 Activation Wizard

1. Uncheck "Setup a DUN connection" and click Next.



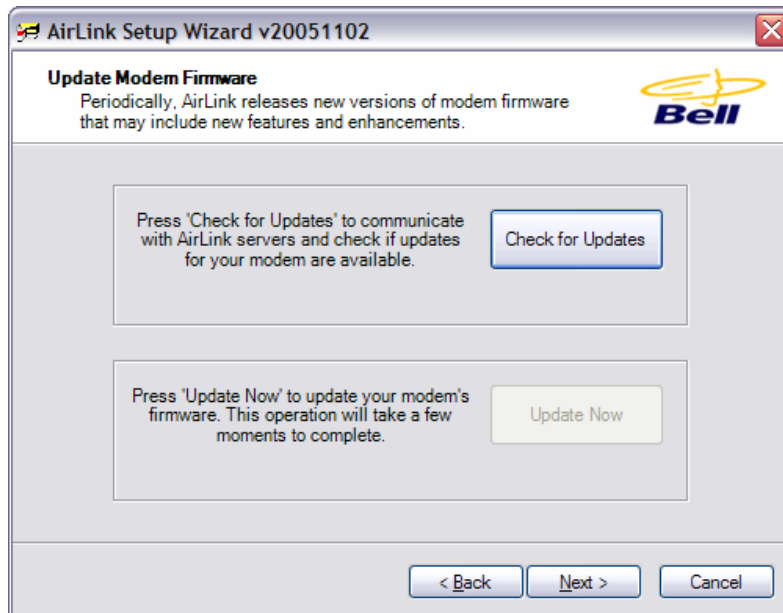
2. Key in the COM port you are using and click Next.

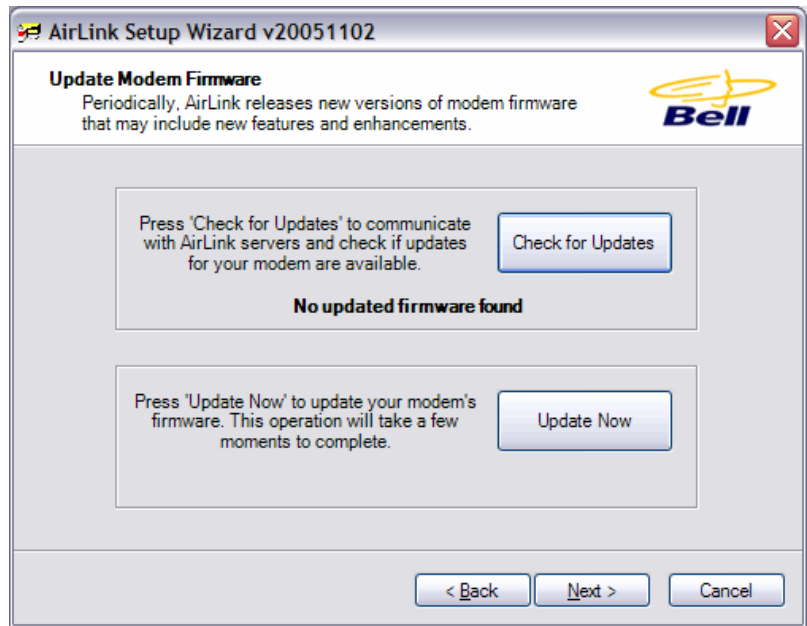


3. Wait until the ESN number field has updated before proceeding

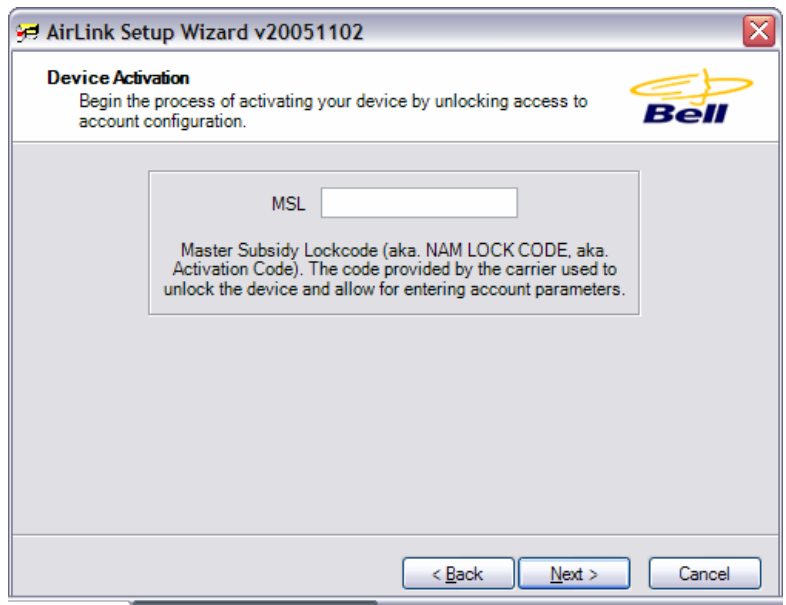


4. Click Check for Updates and if there are updates available, press the 'Update Now' button.






5. A 6-digit Program Lock Code is written on the box the Raven CDMA modem was shipped in. Enter this code in the MSL area. If the Lock Code only has 5 digits put a "0" in front of the number to make it 6 digits.




6. Enter the 10 digit phone number provided by the carrier in the MDN field. The number will be echoed in the lower field.


AirLink Setup Wizard v20051102

Device Activation
Enter the appropriate account values provided by the carrier.



MDN 

Mobile Directory Number
The ten digit phone number provided by the carrier.
This is the number known to the outside world.


MIN/MSID 

Mobile Identification Number/Mobile Subscriber ID
The ten digit number assigned by the carrier for
internal use only. May be the same as MDN.

< Back Next > Cancel

AirLink Setup Wizard v20051102

Device Activation
Enter the appropriate account values provided by the carrier.



MDN

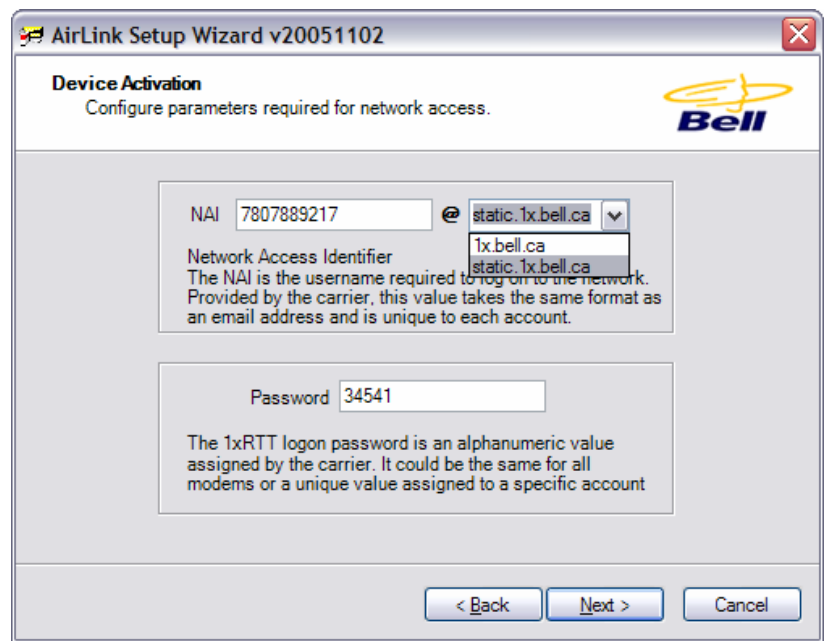
Mobile Directory Number
The ten digit phone number provided by the carrier.
This is the number known to the outside world.

MIN/MSID

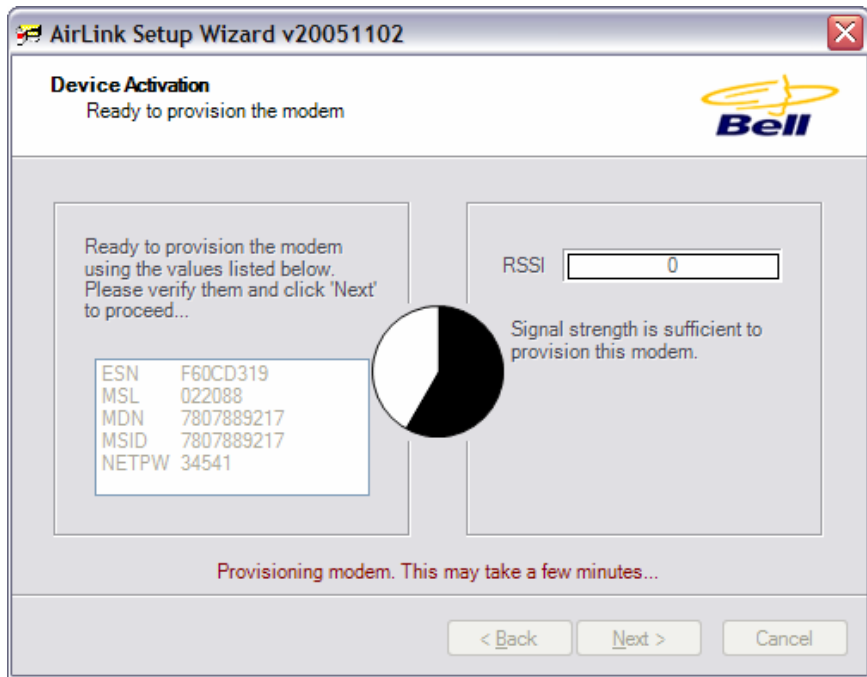
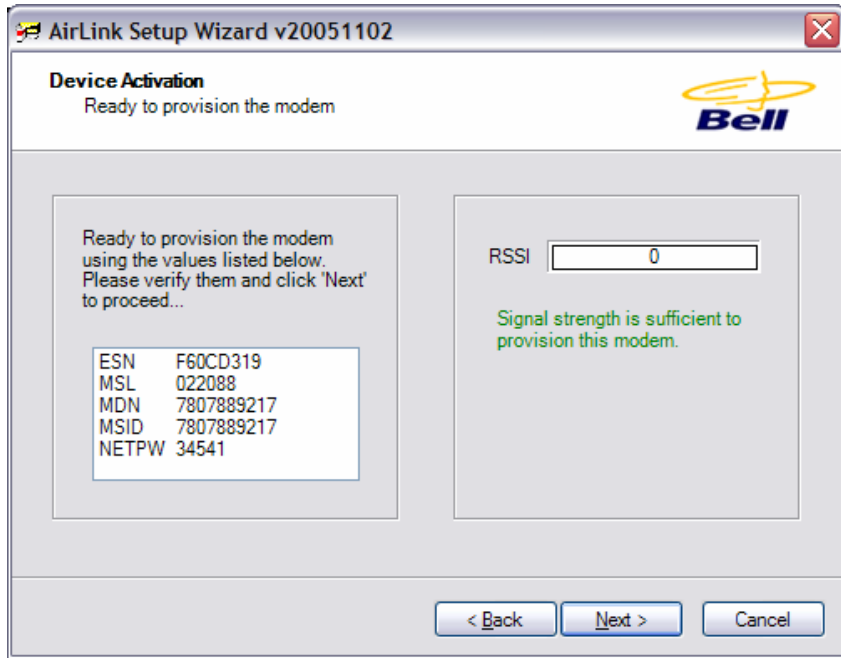
Mobile Identification Number/Mobile Subscriber ID
The ten digit number assigned by the carrier for
internal use only. May be the same as MDN.

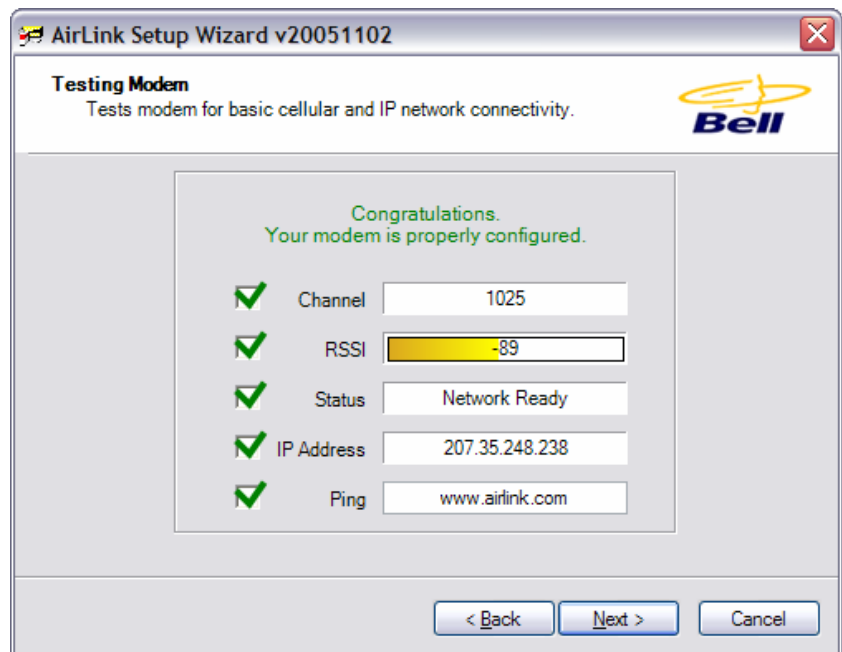
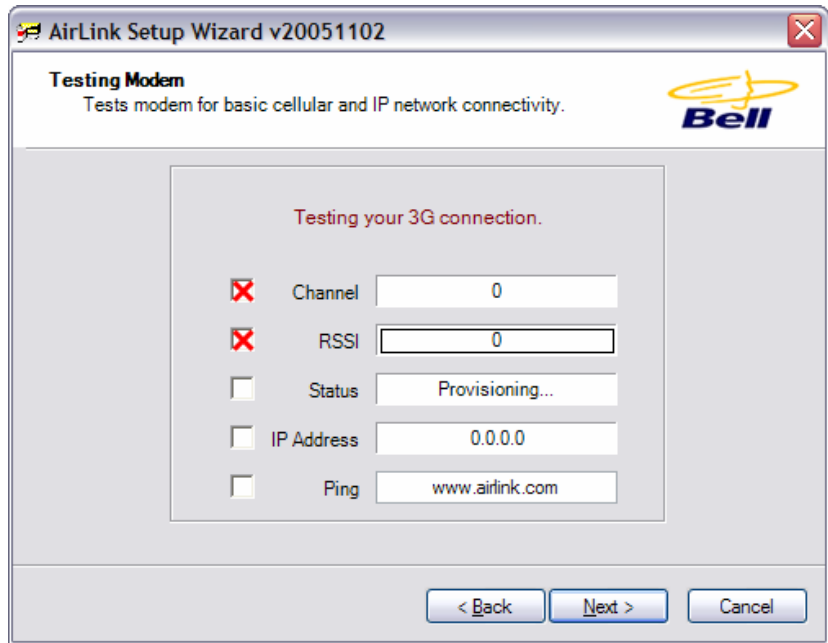
< Back Next > Cancel

7. The screen shown below is a confirmation of the input settings to this point. This password is the default network password and is different for each carrier Wizard. Unless instructed otherwise leave the password as it appears.
8. The next step will select the static IP server to connect to. For Bell Mobility select “static.1X.Bell.ca” (for static IP account). The password is the default network password and is different for each carrier Wizard. If you were provided with a network password enter it here, otherwise leave the password as it appears.



9. Clicking Next will provision the modem. During this process the modem will authenticate itself on the carrier network and register as an active device.

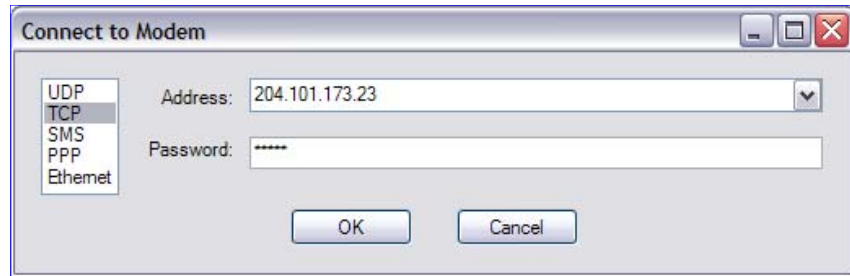




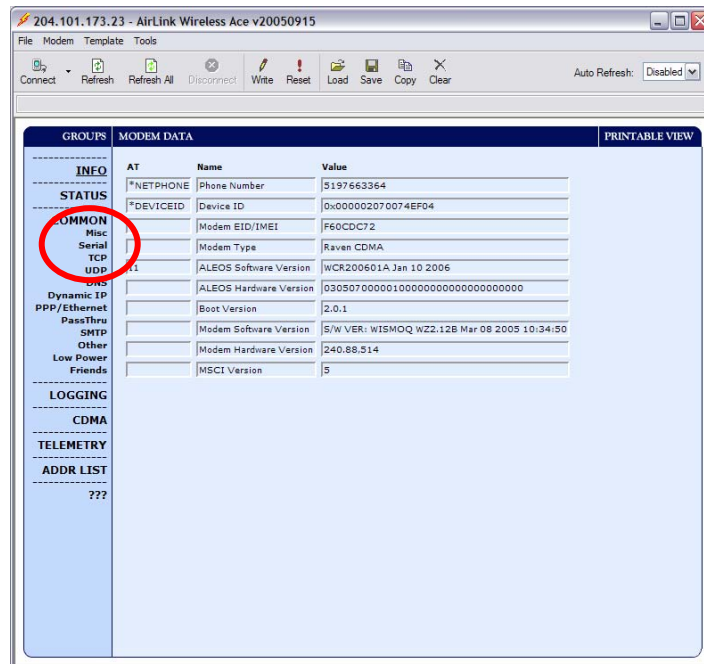
10. When the modem is finished all of the boxes will have a green check mark.
11. At this point the modem is now ready for advanced programming using Wireless Ace 3G.

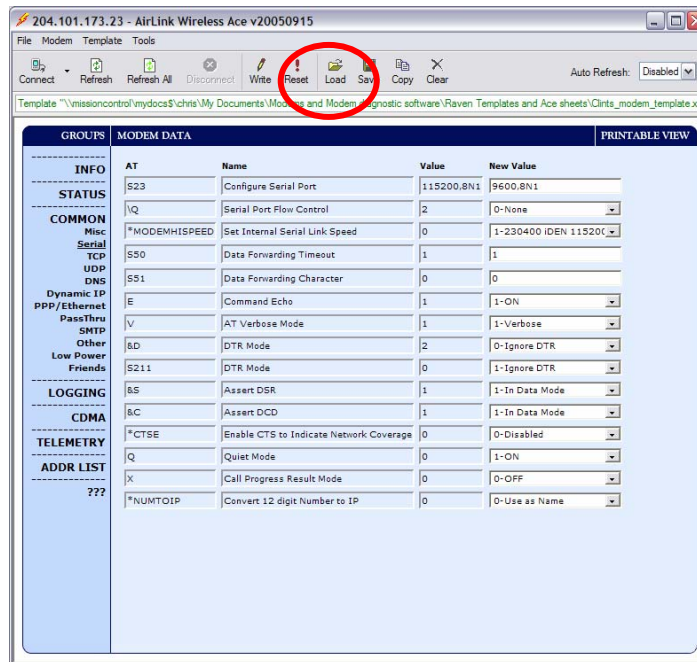
5 Setup Modem using Wireless Ace 3G.

1. The next steps program the Raven to function in IP mode.
2. Start Wireless Ace and apply power to the modem and select the Connect tab in the upper left corner of the menu selection bar. This connection is a wireless connection using IP addressing.
3. Connect using the default password as shown.

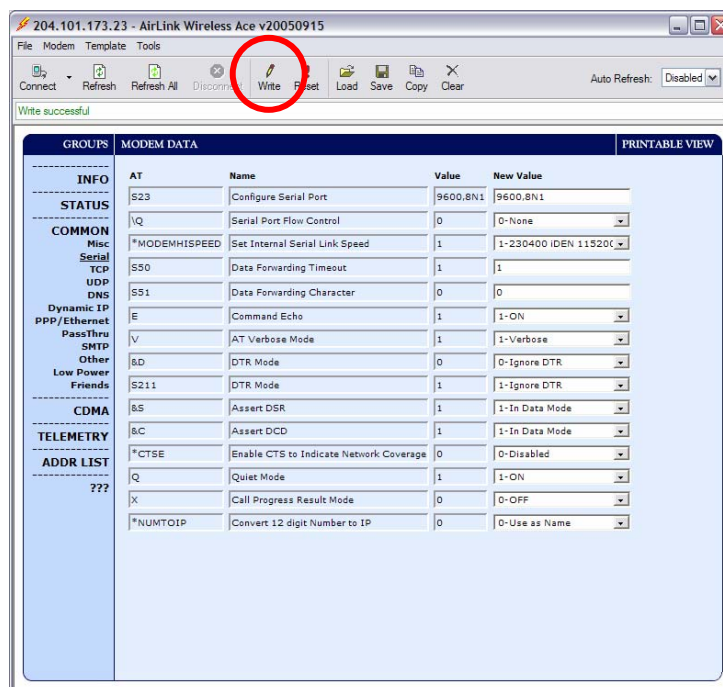


4. The next step assumes that you have a working template to load into the modem. This template is available from Campbell Scientific's website at www.campbellsci.ca/download. Use the "Load" option to select the template file to write to the modem.





- The new file parameters will appear in the “New Value” boxes as shown above.
- Next select the “Write” option and the parameters will be written to the modem. The “Write Successful” message will be displayed in the information bar.



7. At this point the modem is fully programmed to communicate to a Campbell Scientific datalogger at 9600 baud using a wireless IP connection.
8. Turn off the power to the modem and disconnect from the PC. Turn the power back on and the modem will register itself on the network within 2 minutes. To confirm this, make sure that the REG light is steady on. If the REG light is flashing the modem has not registered. In this case contact Campbell Scientific Canada at 780-454-2505 for advanced support.

5.1 Configuring the Raven for Dynamic IP

Dynamic IP addresses are granted only when a modem or other device is connected and can change each time the modem or device reconnects to the network.

IP Manager is a free service provided by AirLink for the Raven to translate a dynamic IP address into a fully qualified domain name so it can be contacted directly on the Internet. IP Manager translates a dynamic IP address to a fully qualified domain name so you can contact your Raven by name as if it had a static IP.

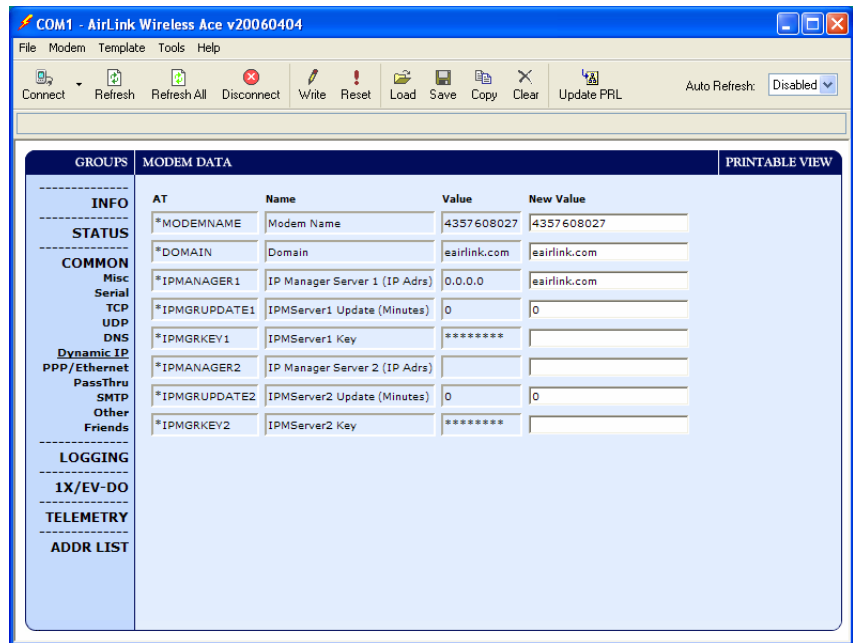
If the Raven is configured for Dynamic IP, when the Raven first connects to the Internet, it sends an IP change notification to IP Manager. IP Manager will acknowledge the change and update the DNS record. The changed IP address will then be the address for the Raven's configured name. Once the Raven's IP has been updated in IP Manager, it can be contacted via name.

Wireless ACE 3G is used to configure the Dynamic IP settings in your Raven so that it will use IP Manager as described below.

Connect with modem using Wireless Ace 3G. Select the Dynamic IP group to configure your modem to use IP Manager.

To configure your AirLink modem to be addressed by name, the modem needs to have four elements configured.

Enter names in the New Value fields for **MODEMNAME**, **DOMAIN**, **IPMANAGER1**, and **IPMGRUPDATE1**.



1. Modem name: A unique name for the modem (the 10-digit MDN number is recommended), as this ensures no one else has chosen it.
2. Domain: The domain name to be used by the modem (earlink.com).
3. IP Manager IP Address: The IP or domain name of the dynamic DNS server which is running IP Manager (earlink.com).
4. IP Manager update interval: How often you want the address sent to IP Manager. If this is set to zero, the modem will only send an update if the IP changes (i.e. if the modem is reset or is assigned a different IP).

Restrictions for Modem Name

- Must begin with a letter or number
- Can include a hyphen (-)
- Cannot contain spaces
- Must be no longer than 20 characters total

Click the **Write** icon to save the changes.

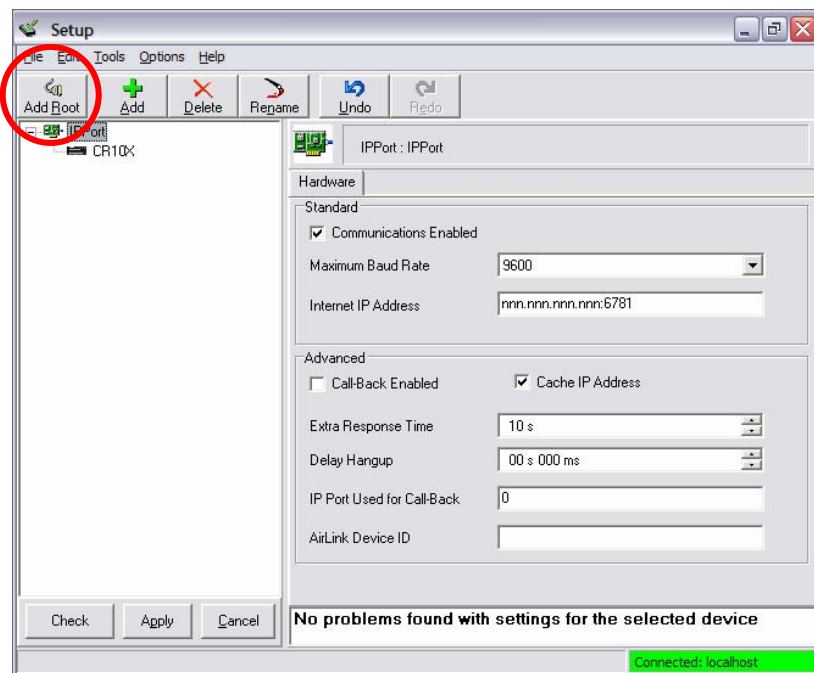
Click the **Reset** icon to restart the modem.

Click the **Disconnect** icon to terminate communications with the modem.

6 Setup LoggerNet

1. Select Add Root | IPPort

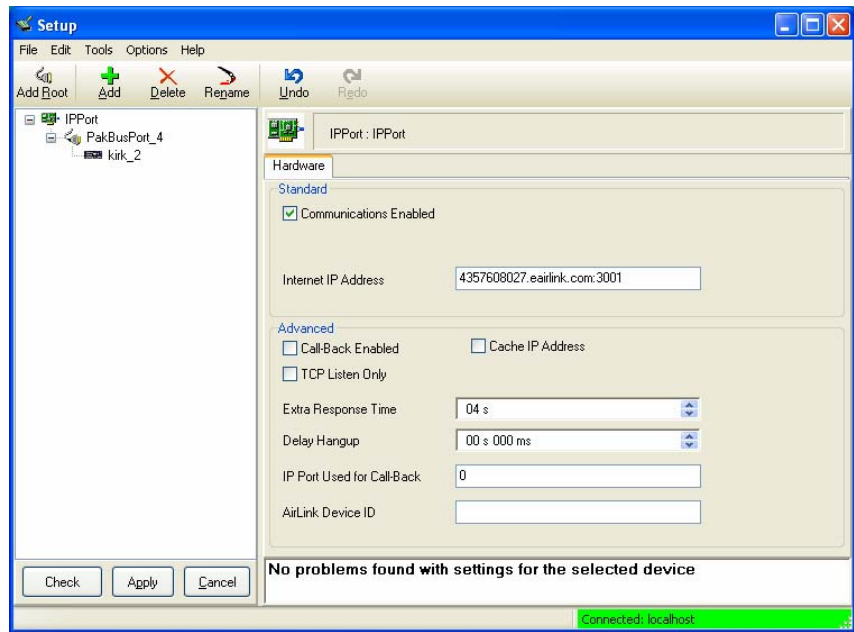
2. Add a Datalogger to the IP Port
3. **A.** On the IP Port page for static IP:
 - a. Select Communications Enabled.
 - b. In the Internet IP Address field, Enter the IP address of the modem followed by the Device port ID. This number is 6781 and is found in the “Common” tab settings of the Raven modem.
 - c. Change the maximum baud rate to one supported by the datalogger; In this case for the CR10X it is 9600.
 - d. Extra response time should be 10- 12 seconds.
 - e. Apply the changes.



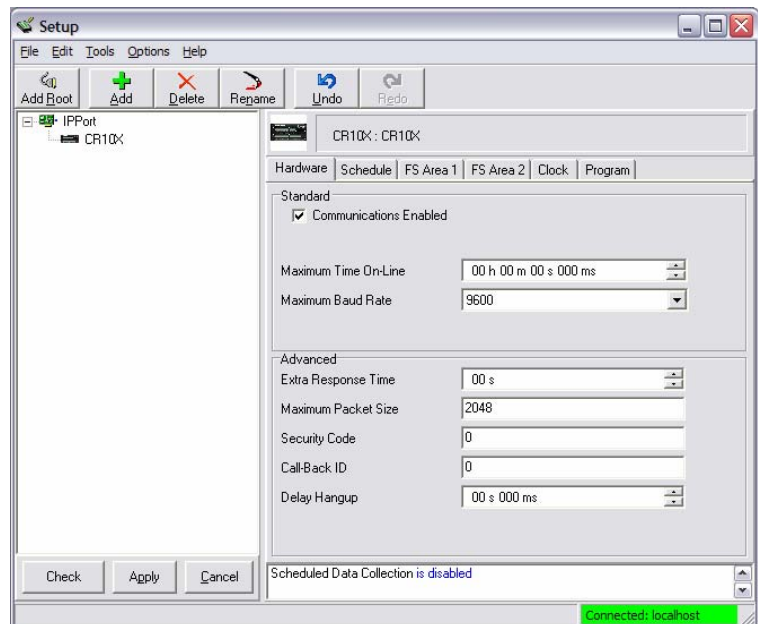
B. On the IP Port page for dynamic IP:

For a Dynamic IP using AirLink’s IP Manager, enter the internet IP address as:

xxxx.yyyy:3001, where xxxx is the modem name, yyyy is the Domain name, and 3001 is the port number.



4. Select the datalogger in the device map



5. Enter setup information for the datalogger as per the appropriate instruction manual.
6. Apply the changes.

NOTE

If you have a black SC12 cable, that is not Rev 1 or newer, it is a CS I/O cable only and will not work for RS-232. Connect the black SC12 cable between the datalogger and the SC932A. Use a 9-pin direct serial cable or a blue ribbon cable between the modem and the SC932A.
