



***Redwing CDMA  
AirLink Cellular Modem***

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**Instruction Manual for use in  
IS-95B Circuit Switched/Voice Mode**

03/27/06

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# ***Redwing CDMA AirLink Cellular Modem***

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## **1. Introduction**

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

## **2. Specifications**

### **2.1 Base Station Requirements**

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

### **2.2 Datalogger Site Equipment**

- Redwing CDMA modem—includes power cable; the modem is configured using the CellSet.exe program prior to installation
- Datalogger—CR510, CR10(X), CR23X, CR7, 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, or CR5000 RS-232 port
- L14394 Redwing 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.
  - L14453 Omni 0 dBd ½ Wave Dipole Whip Cellular Antenna
  - L14454 Yagi 8 dBd Cellular Antenna with 10' Cable
- 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.
- When using the switched 12 V terminal, the modem can typically be powered with a BP12 battery, CH100 charger/regulator, and MSX10 solar panel.

## 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. Desired area code and local prefix. Choose the same area code and prefix as the calling PC to ensure that calls are billed at local rates, even if the phone is used outside the local calling area.

\*For modem activation, further information, and assistance in selecting the most suitable cellular plan, please call 1-866-928-4465 or email [info@thinktel.ca](mailto:info@thinktel.ca)

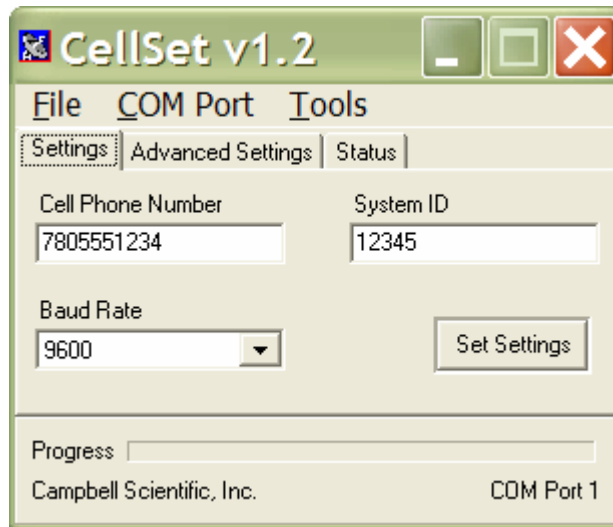
NOTE: Indicate to the account representative that you would like to open a new account using your modem in IS-95B circuit switched/voice mode. The service provider does not need the Redwing modem to activate the account.
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### 3.2 Program the Modem

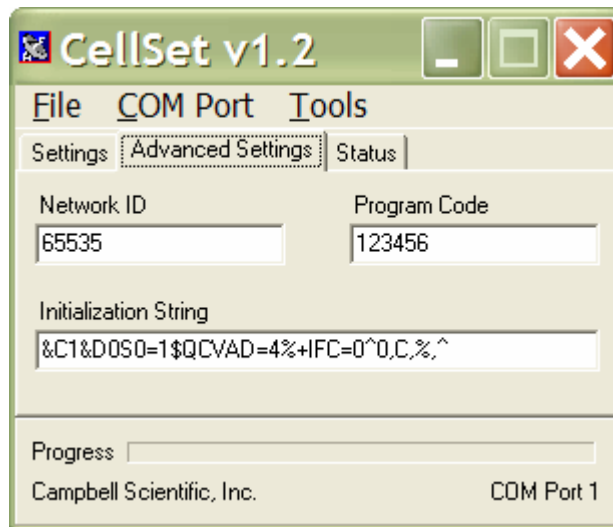
Program the modem with CELLSET.EXE, available from Campbell Scientific. CELLSET.EXE is available for download from <http://www.campbellsci.com/resource.html#ini>. Click on cellset.exe to download.

Appendix A describes how to program the modem via a terminal emulator; however, programming via a terminal emulator is only recommended if there are problems with the CELLSET.EXE programming.

1. Connect the phone to your computer COM port with a standard 9-pin serial cable.
2. Apply 12 volts to the phone. Red lead to +, black lead to -.
3. Start CELLSET.EXE.
4. Select the COM PORT that you are using from the tool bar.



5. Under the Settings tab, enter the 10-digit phone number to be programmed into the phone.
6. Enter the SID. If you do not have the SID, try entering zero.
7. For CR10(X), CR510, CR7, 21X, or CR200 dataloggers, set the baud rate to 9600. For CR23X or CR5000 dataloggers, set the baud rate to 38400 (when using the RS232 port).
8. Click on the Advanced Settings. The Network ID should be set to 65535.



9. A 6-digit Program Lock Code is written on the box the Redwing CDMA modem was shipped in. Enter this code in the Program Code area.
10. Verify that the Initialization String is set to &C1&D0S0=1\$QCVAD=4%+IFC=0^0,C,%,^

11. Click on the Settings tab and press “Set Settings” button to program the phone.
12. A message saying “Power cycle modem for settings to take effect” will be displayed on the screen to indicate that the settings were transferred. Click OK

### 3.3 Setup LoggerNet (Option A)

1. Select Add Root | TapiPort.
2. Add a TapiRemote to the TapiPort.
3. Add a datalogger to the TapiRemote.



4. On the TapiPort page:
  - a. Select Communications Enabled.
  - b. If you are using the Call-back feature of the datalogger on any of your stations, select Call-Back Enabled.
  - c. Select your installed modem on the Tapi Line.
  - d. Extra Response Time can remain as 0 seconds.
5. On the TapiRemote un-check “Use Tapi Dialing Properties.”
6. Enter the phone number of the CDMA phone.
7. Apply the changes and test.

### 3.4 Setup LoggerNet (Option B)

2. Select Add Root | ComPort.
3. Add a PhoneBase to the ComPort.
4. Add a PhoneRemote to the Phone Base.
5. Add a datalogger to the Phone Remote.



6. On the ComPort page:
  - a. Select Communications Enabled.

- b. If you are using the Call-back feature of the datalogger on any of your stations, select Call-Back Enabled.
  - c. Select the ComPort that is connected to your modem from the drop-down menu.
  - d. Extra Response Time can remain as 0 seconds.
7. On the PhoneBase page:
- a. Select Communications Enabled.
  - b. Select the modem that you are using from the Modem Type list.
  - c. For CR10(X), CR510, CR7, 21X, or CR200 dataloggers, set the baud rate to 9600. For CR23X or CR5000 dataloggers, set the baud rate to 38400 (when using the RS232 port).
  - d. Extra Response Time can remain at 0 seconds.
8. On the PhoneRemote page:
- a. Select Communications Enabled.
  - b. The Delay can remain at 0 milliseconds.
  - c. Enter the Phone Number.
9. Apply the changes and test.

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**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 serial cable or a blue ribbon cable between the phone and the SC932A.

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# ***Appendix A. Configuring Modem with a Terminal Emulator***

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**NOTE** Programming the modem with a terminal emulator is not recommended. Please first attempt programming with the CELLSET.EXE program available from Campbell Scientific.

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## **Items needed:**

- Computer with a COM port.
- 9-pin cable to connect between the computer and the Redwing.
- A terminal program on the computer “HyperTerminal”.
- 12 volt DC applied to the Redwing.
- CDMA account

## **A.1 HyperTerminal Setup**

HyperTerminal can be found on most Windows computers under Start | Programs | Accessories | Communications.

Under “Connect using”, select the COM port you will be using.

Set COM Properties to:

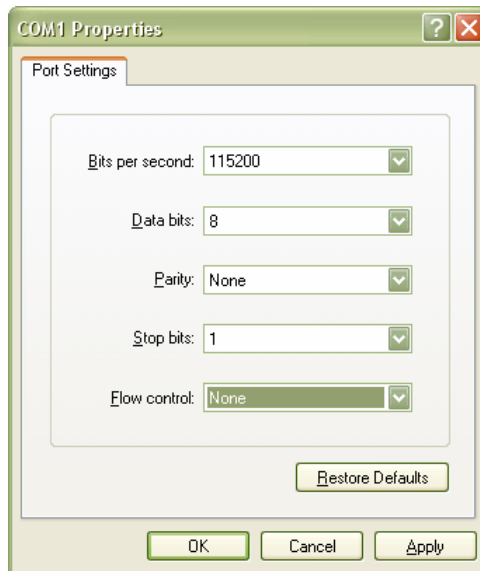
Bits per second (baud) = 115200

Data bits = 8

Parity = None

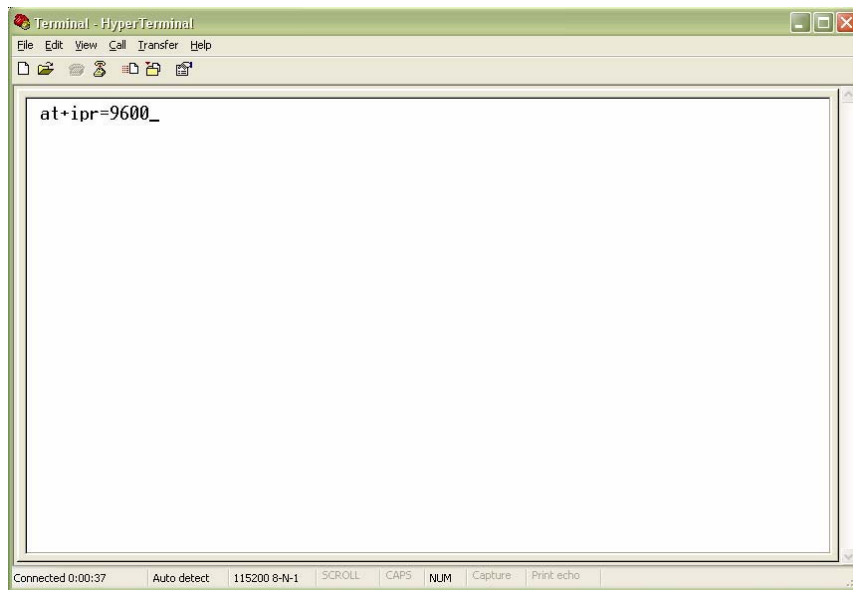
Stop bits = 1

Flow control = None



Apply power to the modem and connect it to the computer via the 9-pin serial cable.

Enter the following AT command: `at+ipr=9600` and then press Enter.



This has now changed the baud rate from 115200 to 9600. You need to change the baud rate in HyperTerminal to 9600 now. At the top of the HyperTerminal window select **Call | Disconnect**. Select **File | Properties | Configure**. Change the baud rate to 9600. Select OK. Select **Call | Call**.

## A.2 Programming the Redwing's Phone Number

Your provider should give you a Phone number and a System Identification (SID) number to program into the Redwing.

Do the following substituting the phone lock code, phone number and SID with yours:

*(Example: Phone lock code – 123456)*

- Type **AT~NAMLCK=123456** then press Enter.

*(Example: Phone number - 7805551234, SID – 78910, NID - 65535)*

- Type **AT~NAMVAL=0,7805551234,78910,65535** then press Enter.

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**NOTE**

There are no O's in the above strings, they are Zero's.

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Remove the power from the Redwing and power it up again.

You can type **AT~NAMVAL?0** to make sure your phone was programmed correctly.

You will receive a response confirming the phone number, system ID, and network ID.

## A.3 Programming the Redwing for Use with a Datalogger

The Redwing needs a few settings changed in it to power-up ready to work with the datalogger.

Enter the following:

- Type **AT+ATINIT=&C1&D0S0=1\$QCVAD=4%+IFC=0^0,C,%,^** then press Enter.

A response of **&C1&D0S0=1\$QCVAD=4;+IFC=0,0** should show on the screen.

- Type **AT+ATINITSTATE=1** then press Enter.

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**NOTE**

In the above strings, all “0” = zero.

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Remove the power from the modem and power it up again.

You can type **AT+ATINIT?** to make sure your phone was programmed correctly.

The modem should be ready to use. Test the communications before deploying the modem.



# ***Appendix B. Redwing CDMA to RF400 Communications***

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## **B.1 Equipment Requirements**

### **B.1.1 Computer Base Station Requirements**

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

### **B.1.2 Redwing CDMA to RF400 Site Equipment**

- Redwing CDMA modem—includes power cable; the modem is configured using the CellSet.exe program prior to installation
- L14392 Null Modem Cable—connects the Redwing CDMA modem to the RF400 radio RS-232 port
- L14394 Redwing Mounting Kit—includes mounting hardware for securing the modem to below referenced environmental enclosure and a 9-pin male to 9-pin female cable.
- Redwing CDMA 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.
  - L14453 Omni 0 dBd ½ Wave Dipole Whip Cellular Antenna
  - L14454 Yagi 8 dBd Cellular Antenna with 10' Cable
- RF400 radio – includes SC12 cable and L10873 9-pin serial cable
- L14291 Field Power Cable for RF400
- RF400 Antenna – Several antennas are available for the RF400 and the proper one will be determined by the site specifics. Contact a CSC applications technician for help in determining the best antenna for your application.
- Power Supply
- Environmental Enclosure— ENC 10/12, ENC 12/14, or ENC 16/18

### **B.1.3 Datalogger Site Equipment**

- Datalogger—CR510, CR10(X), CR23X, CR7, CR5000, or CR2XX
- RF400 radio – includes SC12 cable and L10873 9-pin serial cable
- RF400 Antenna – Several antennas are available for the RF400 and the proper one will be determined by the site specifics. Contact a CSC Applications Technician for help in determining the best antenna for your application.
- Power Supply
- Environmental Enclosure— ENC 10/12, ENC 12/14, or ENC 16/18

## **B.2 Setup Redwing CDMA Modem**

Follow the steps to program the modem in Section 3.2 of this manual.

## **B.3 Setup RF400 Radio**

### **B.3.1 Redwing CDMA to RF400 Site Radio Settings**

1. Connect to the RF400 through the Com Port of the PC as it is explained in section 5.3.1 of the RF400 manual.
2. The RF400 Settings Main Menu must be displayed in HyperTerminal, in order to continue to the next step.
3. Select (1) Standard Setup.
4. Select (1) Active Interface.
5. Select (2) RS232.
6. Select (9) Return to Main Menu until you have returned to the Main Menu.
7. Select (2) Advanced Setup.
8. Select (1) Radio Parameters.
9. Select (3) AT Command Sequence Parameters
10. Select (1) AT Command Sequence Character. At the prompt for the character, type -. The new AT Command Sequence Character should be “-“.
11. Select (9) Return to Main Menu until you have returned to the Main Menu.
12. Select (5) Save All Parameters and Exit Setup.

### B.3.2 Datalogger Site Radio Settings

1. Connect to the RF400 through the Com Port of the PC as it is explained in section 5.3.1 of the RF400 manual.
2. The RF400 Settings Main Menu must be displayed in HyperTerminal, in order to continue to the next step.
3. Select (1) Standard Setup.
4. Select (3) Radio Address. At the prompt for the Radio Address, type the address you will be assigning the radio (1,2,etc). The address must be unique for each datalogger site.

## B.4 Setup LoggerNet

1. Select Add Root | ComPort.
2. Add a PhoneBase to the ComPort.
3. Add a PhoneRemote to the Phone Base.
4. Add an RF400 to the Phone Remote.
5. Add an RF400Remote to the RF400.
6. Add a datalogger to the RF400 Remote.



7. On the ComPort page:
  - a. Select Communications Enabled.
  - b. If you are using the Call-back feature of the datalogger on any of your stations, select Call-Back Enabled.
  - c. Select the ComPort that is connected to your modem from the drop-down menu.
  - d. Extra Response Time can remain as 0 seconds.
8. On the PhoneBase page:
  - a. Select Communications Enabled.
  - b. Select the modem that you are using from the Modem Type list.

- c. For CR10(X), CR510, CR7, 21X, or CR200 dataloggers, set the baud rate to 9600. For CR23X or CR5000 dataloggers, set the baud rate to 38400 (when using the RS232 port).
    - d. Extra Response Time can remain at 0 seconds.
- 9. On the PhoneRemote page:
  - a. Select Communications Enabled.
  - b. The Delay can remain at 0 milliseconds.
  - c. Enter the Phone Number.
- 10. On the RF400 page:
  - a. Select Communications Enabled.
  - b. The Maximum Time On-Line and Maximum Packet Size can be left as the default values.
  - c. Change the Attention Character to -.
- 11. On the RF400 Remote page:
  - a. Set the Radio Address to the same value that you set it to when you were changing the setting of the radio in HyperTerminal.
- 12. Apply the changes and test.