DataScout Modem

PRODUCT MANUAL

Items 3920, 3921, 3922M, 3923M, 3924M, 3928M, 3928MB, and 3929M

Spectrum® Technologies, Inc.

Introduction

Thank you for purchasing a DataScout Modem.

Access to SpecConnect.net web portal and the WatchDog Mobile App is purchased separately. Please contact your distributor or Spectrum sales representative to order.

DataScout modems are compatible with WatchDog Retrievers as well as the 2000-Series Full and Mini Weather Stations. See Page 8 for minimum firmware requirements.

DataScout modems collect data from attached weather station or Retriever and send the data periodically to SpecConnect.net.

Tri-Color LED conveys information on battery level, signal and signal strength, as well as diagnostic information.

The DataScout modem can be powered with AC current or with solar power. The Solar Power Package (item 3999) is sold separately.

Table Of Contents

This manual will familiarize you with the features and operation of your new DataScout Modem. Please read this manual thoroughly before launching the units.

For customer support or to place an order, call Spectrum Technologies, Inc. at 800-248-8873 or 815-436-4440, FAX at 815-436-4460, or e-mail at info@specmeters.com.

www.specmeters.com

Spectrum Technologies, Inc.
3600 Thayer Court
Aurora, IL 60504

General Overview

SpecConnect Solution

The SpecConnect solution is comprised of environmental sensors whose data is transmitted wirelessly by the DataScout modem to the web where it can be viewed anywhere in the world.

Retrievers/Pups

The Retriever and Pups are used to build Spectrum's wireless sensor network solution. They use a mesh style of communication, which allows any Pup within the network to wirelessly route data from another Pup back to the Retriever. The mesh network

is ideal for locations with multiple microclimates within close proximity of one another
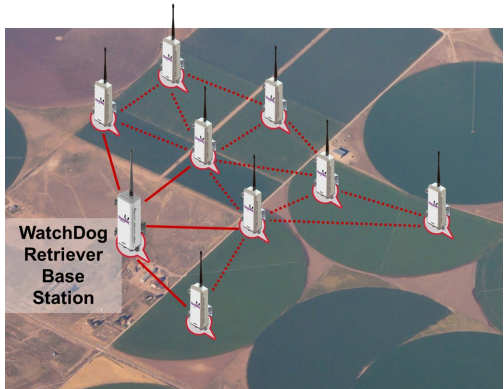
Weather Stations

The WatchDog Full and Mini weather stations are ideal when one or two logger locations are sufficient to capture environmental conditions at any given site.

SpecConnect Web Portal/WatchDog Mobile App

The DataScout modem communicates weather data directly to the SpecConnect web portal and the WatchDog Mobile App. You can update the configuration and view current conditions and alerts on both platforms. View historical data and set alerts on a PC.

4
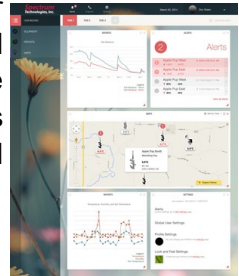
Models

The DataScout modems are available with cellular or WiFi communication options. The cellular modems have no provision for batteries. They are typically powered by the solar panel package (item 3999). The WiFi version can be powered by a solar panel or an AC/DC adapter.

Item	Description
3921	Discontinued
3922, 3922M	Cellular, CDMA 2G, Discontinued
3923, 3923M	Cellular, HSPA+ 3G (North America)
3924M	Cellular, HSPA+ 3G (EMEA, APAC, Latin America)
3928M	Cellular, LTE-M
3928MB	Cellular, LTE-M (includes batteries)
3929	Cellular, LTE-M (EMEA, APAC, Latin America)
3920	WiFi, AC/DC Powered

Your DataScout package should contain
- Product Manual
- Antenna & antenna stabilizer sleeve
- Item 3926: AC/DC Power Adapter (item 3920 only)
- Mounting brackets and enclosure
- U-bolt, clamp, and nuts
- Screws (2) for back of unit
- 2 communication cables (gray for WatchDog 2000 station, black for WatchDog Retriever)

a   b

Antennas for the a.) cellular and b.) WiFi modems

Getting Started

Get your DataScout running in the following ten steps.
- Gather up all of the accessories (brackets, cables, etc.) into one location for easier setup.

1. Attach Antennas
Antennas connected to the DataScout and Retriever should be deployed in a vertical orientation.

2. Remove power from Station/Retriever

3. Mount DataScout with Station/Retriever (p. 14)
Use the included brackets and hardware to mount the DataScout with the Weather Station or Retriever.

4. Connect Station/Retriever to DataScout (p. 8)
Use the cable appropriate for the unit being attached (Black -Retriever, Gray - WatchDog 2000 Series).

5. Connect Power to DataScout (p. 8)
Connect Solar Power Package or AC-DC power cable to DataScout

6. Connect to Access Point - WiFi modem only (p. 9)
There are 2 methods for connecting the WiFi modem to an access point. One uses the smartphone itself. The second uses a USB flash drive.

7. Perform Connection Test (p. 12 - 13)
Hold button for 2 seconds to perform a connection test to verify that the DataScout has good network connectivity.

8. Go To Speconnect.net or the WatchDog Mobile App (p. 18 - 19)
Go to specconnect.net on your PC or use your SmartPhone to open the mobile app. Log in with your username and password.

9. Set Time Zone (p. 18 - 19)
Navigate to the Equipment page on SpecConnect or the mobile app. Click the Configure button for your Weather Station or Retriever and set the local time zone.

10. View and Manage your Data
View your data, set alerts, and make configuration changes to your Weather Station or Retriever & Pups Units.

Specifications - General

Waterproof	IP65 (with waterproof glands)
External Interfaces	Communication: USB Station/Retriever: Modular Connector 3.5mm PC jack not used
Operating Temperature	14 to 130 °F (-10 to 55 °C)
Station Serial Interface	9600 Baud
WatchDog Firmware Requirement	Retriever: 02.01.01 or greater 2000 Series Full Station: 7.6 or greater 2000 Series MiniStation: 4.1 or greater
Power	Solar (item 3999): 5W panel, AC/DC: Max 17VDC
LED	3-color (Red, Amber, Green)
Enclosure Dimensions	3.75 x 2 x 8 in (9.5 x 5.2 x 20.2 cm)
Weight	0.61 lbs (0.28 kg)

Disclaimer

After assembly, and prior to shipment, DataScout modems are 100% functionally tested. Altering components or using non-approved accessories with your DataScout will void the warranty. Damage resulting from the changing or modification of any internal components, including SIM cards, will be the sole responsibility of the customer. The use of 3rd party SIM cards will drastically reduce Spectrum Technology's ability to provide technical support for DataScout modems. Data continuity when using 3rd party SIM cards cannot be guaranteed.

Pre-Deployment Configuration

Established Retriever/Pup network
- Use the Retriever and Pup Launch Utility (RPLU) to confirm the mesh network is still functioning and that all the Pups are reporting to the Retriever. Consult the "Retriever & Pup Wireless Network" Product Manual for complete details.
- Check the Retriever firmware version. The firmware version can be checked in the Retriever tab of the RPLU by floating your mouse over the serial number.
- If necessary, update the Retriever to the latest firmware version. Firmware updates are available at www.specmeters.com.
- Remove power (batteries or solar panel) from the Retriever.
- Proceed to Installation instructions (p. 14).

Caution: Failure to remove the batteries from the Retriever or Weather Station before connecting the DataScout modem will lead to equipment damage.

Retriever/Pup Network being set up at time of DataScout installation
Once the mesh has been confirmed with the Retriever and Pup Launch Utility (RPLU), be sure to unplug PC cable from Retriever. Leaving it connected will prevent data from transmitting to SpecConnect.net. Connect modem to Retriever and power cycle it. See "Retriever & Pup Wireless Network" Product Manual for complete details.

WatchDog 2000-series Weather Stations
No pre-deployment configuration is necessary for the WatchDog Weather Stations. Note that the Weather Station firmware version must be 7.6 or higher (Full Station), 4.1 or higher (Mini Station), or 3.5 or higher (Model 2800 Weather Station) for use with the DataScout.

Caution: Failure to remove the batteries from the station before connecting the DataScout modem will lead to weather station damage.

Cellular (CDMA, HSPA, LTE-M Models)
The Cellular Models come pre-configured with cellular access. No additional network setup is necessary.

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WiFi models - USB Flash Drive

The following steps outline how to connect the DataScout modem to the desired WiFi network by use of a USB drive.

1. Create a new text file in the root folder of a FAT32 formatted USB drive. It is recommended that this file be created using Notepad rather than Word.
2. Give the file the name "DSWIFI" (all capital letters). Note: Some computers will show the file extension, which is ".txt".
3. On the first line of the text file, type the network's SSID (network ID).
4. On the second line, type the PASSPHRASE (network password) of the network.
5. After saving the file and safely ejecting the USB drive, insert it into the DataScout.
6. Press and hold the DataScout's button for approximately 8 seconds (until the LED turns red) then release the button.
7. The LED will light solid amber while the file is being loaded and the network connection is being established. Once the DataScout successfully connects to the network, the LED will briefly flicker green.
8. If the LED flashes red, the network connection failed. After 5 attempts, the LED will light red for two seconds and no further attempts will be made. If this occurs, please check the following:
    a. Verify that the USB drive is completely inserted into the DataScout.
    b. Verify that the USB drive is formatted as FAT32.
    c. Verify that the DSWIFI.txt file contains the network SSID and PASSPHRASE.
    d. Verify that the SSID and PASSPHRASE match the network's settings.
9. If the LED didn't light solid amber after releasing the button, but instead began flashing amber, then the file was not found or the USB drive was not detected.

**WiFi models - Access Point Provisioning with Smartphone**
The following steps outline how to connect the DataScout modem to the desired WiFi network using a smartphone.
Note: Because a PC will typically expect a WiFi access point to be linked to the internet, the following procedure may work better on a smartphone.

1. Hold button until the light turns off (approximately 8 seconds) to enter WiFi provisioning mode. The DataScout will create a WiFi network access point called "DataScout WiFi" and the light will the flash amber.

2. From PC, smart phone, or tablet, find and connect to the network that was created in Step 1. No password is necessary to connect to the network.

3. Type the following URL into your device's web browser to bring up the DataScout Setup screen:
www.datascoutsetup.com

4. Click the "Network Settings" button on that screen.

5. From the WiFi Network Settings screen, choose the "Select an Existing Network" option.
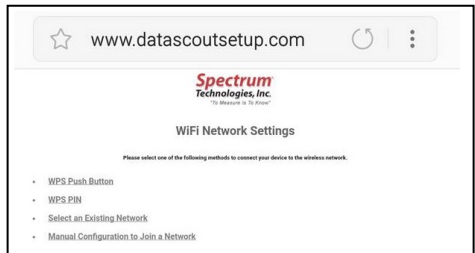
6. Select your Access Point from the list of available networks.
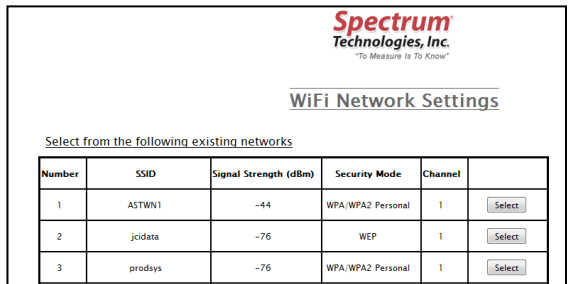
7. Only the Access Point name (SSID) and pass-phrase fields need to be populated. The pass-phrase is whatever is set as the WiFi pass-word. If either are en-tered incorrectly, return to step 1 to repeat the Access Point Provision-ing process. Once you have entered the correct information, click the "Next" button.
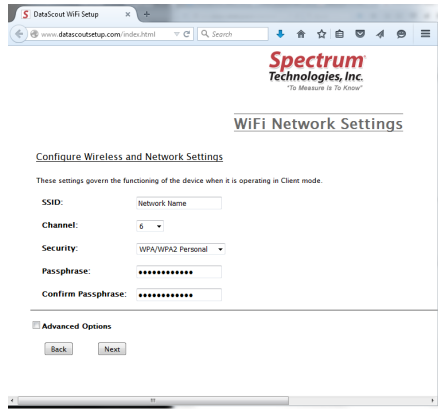
8. Click the "Save" button on the Wireless Configuration Sum-mary screen to bring up the Wireless Settings screen. Click "Apply Settings". The PC will display a message that the wireless settings have been saved. The DataScout will at-tempt to connect to the WiFi network (the connection with your PC, smart phone or tablet will be terminated). If suc-cessful, the LED will briefly glow green within 1 to 2 minutes and then shut off. If the light is still blinking amber after 3 minutes, the provisioning has failed. At this point, quickly press and release the button to remove it from provisioning mode or remove and return power to the modem. Return to step 1 to repeat the process.

Spectrum
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"To Measure Is To Know"

WiFi Network Settings

Wireless Settings

The configuration settings have been saved for the AP: VGUSERS. Click on "Apply Settings" to confirm your settings, and then re-connect using the new wireless settings.

Apply Settings   Home
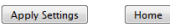
9. Perform the Signal/Comm test (see p. 13) to confirm the DataScout modem is now communicating properly with the network. If no connection is indicated, repeat the process from step 1.

Button & LED Information

This section describes how the button on the DataScout is used to perform diagnostic and functional tasks. It also explains what information is conveyed by the LED. This information is summarized on the labels (Figures 1 and 2) affixed inside the door of each unit.

Button Functions

The length of time the DataScout button is pressed determines which function it performs. The LED has 3 colors; green, amber, and red.

Battery State: Press and immediately release the button to check whether or not it is currently getting power from the solar 3999 power package or AC power. The explanation of each color is given in the *Battery State* column of the figures. Because the solar power package provides 6V rather than 9, the LED will never show green when using that power source.

Signal/Communication Strength: Press and hold the button until the light comes on (approximately 2 seconds) to initiate a test of the signal strength and/or communication state.

Cellular: If the DataScout has good signal strength and can connect to the SpecConnect servers, the LED will light Green. Amber indicates that it can connect but has low signal strength. If there is no connection (bad cellular signal or server cannot be reached), the LED will light Red.

DataScout Cellular Button and LED Information

Button Push	Response		
Short Press	Battery State		
2 Sec Hold	Signal Strength/Comm. Test		

LED Color	Battery State	Signal/ Comm.	Flashing
Green	Good & Charging	Good & Connected	Data RX
Amber	Good & Not Charging	Low & Connected	Data TX
Red	Low & Not Charging	Not Connected	Error

Figure 1. Cellular DataScout reference label

WiFi: If the DataScout can connect to the SpecConnect servers, the LED will light Green. Amber indicates that it is connected to WiFi but cannot reach the servers (internet service to access point may be down). If there is no connection at all to your local WiFi network, the LED will light Red.

DataScout Wi-Fi Button and LED Information

Button Push	Response		
Short Press	Battery State		
2 Sec Hold	Connection Test		
8 Sec Hold	Wi-Fi Setup		

LED Color	Battery State	Connect State	Flashing
Green	Good & Charging	Web Connected	Data RX
Amber	Good & Not Charging	Wi-Fi Connected	Data TX
Red	Low & Not Charging	Not Connected	Error

Figure 2. WiFi DataScout reference label

WiFi Provisioning: For the DataScout WiFi modem (item 3920), there is one additional button function: WiFi Provisioning. Press and hold the button until the light turns on and continually blinks amber (approximately 8 seconds) to initiate the provisioning sequence to setup the DataScout with the desired WiFi Access point. See p. 9 for details on WiFi provisioning.

Radio Activity
In addition to responding to button presses, the LED will intermittently flash to indicate data activity. It will flash green when it receives data from the network or the attached Station/Retriever. It will flash amber when transmitting data. If the LED flashes red, it is an indication of a problem with reception and/or transmission of data to/from the network/servers. See "Troubleshooting" (p. 20) for more details.

Note: The no-button flash sequences occur automatically and may possibly overlap with other LED activity.

Installation

After completing the pre-deployment steps (pages 8 - 11), the DataScout is ready for installation.

Tools recommended for installation
- 7/16-inch (11-mm) wrench
- Phillips screwdriver

The DataScout is powered by the solar power package (item 3999). If a weather station was being powered by the weather station-specific solar power package (item 3999WD) solar panel, you can replace the adapter for the AUX port with the adapter for the snap connector (item ELE-000240). If an existing station or Retriever was being powered with AA batteries or an earlier solar panel, the 3999 solar power package will replace those power options. All batteries must be removed to prevent leakage.

1. Attach the antenna to the DataScout.

2. Mount the DataScout to the tripod or another pole/surface using the provided bracket and U-bolts/screws. See figures 3 and 4.

3. Confirm the weather station or Retriever is not powered up. Connect the DataScout to the AUX port of your Weather Station or Retriever using the appropriate cable (Black-Retriever, Gray-Weather Station). Screw the strain-relief gland into the threaded hole on the bottom of the housing.

4. Apply power to the DataScout by connecting to the solar power package.

   a. Mount the solar panel using provided hardware. Ensure that the panel is unobstructed and facing the equator. Note that even partial shade will drastically reduce the effectiveness of the solar panel. See the Solar Power Package Product Manual for instructions on wiring the solar panel to the modem.

   b. If using the WiFi DataScout without the solar power package, connect the AC/DC adapter and plug into a wall outlet.

When power is attached, weather station or Retriever should immediately power up as well.

- The DataScout will flash green for approximately 30 seconds. It will then briefly flash amber and shut off.

- The Retriever will go into Setup mode, flash green for approximately 30 seconds, and then flash amber. See Retriever & Pups Wireless Network product manual for further details.

- The weather station will beep and the display will illuminate.

5. Wait 1 minute after powering the DataScout modem to check signal strength and confirm acceptable communication. Press and hold the DataScout button until the light comes on (approximately 2 seconds) to initiate the test. If, after several attempts, communication is still unsuccessful (red LED), try moving the DataScout to an area with better signal coverage.

Figure 3. WatchDog 2000 Series Station and DataScout

Figure 4. Retriever and DataScout

Completing On-line Set-up

- After purchasing SpecConnect products, you will receive an email with instructions on how to log in. To download the mobile app, search "Watchdog Mobile" in your app or Google Play store.

- When logging in, the equipment list should include all WatchDog Weather Stations and Retriever & Pups for which you have active subscriptions. Please contact Spectrum to add equipment to this list.

- After connecting your DataScout to your WatchDog station (or Retriever) and connecting power, it can take up to 1 hour for SpecConnect.net and your DataScout to fully synchronize.

- After synchronization, you will be able to click the "Configure" button (fig. 5) next to the WatchDog Weather Station, Retriever, or Pup. **You MUST SELECT THE TIME ZONE and set your GPS coordinates (fig. 6) on WatchDog Stations and Retrievers to begin receiving data on the site.**
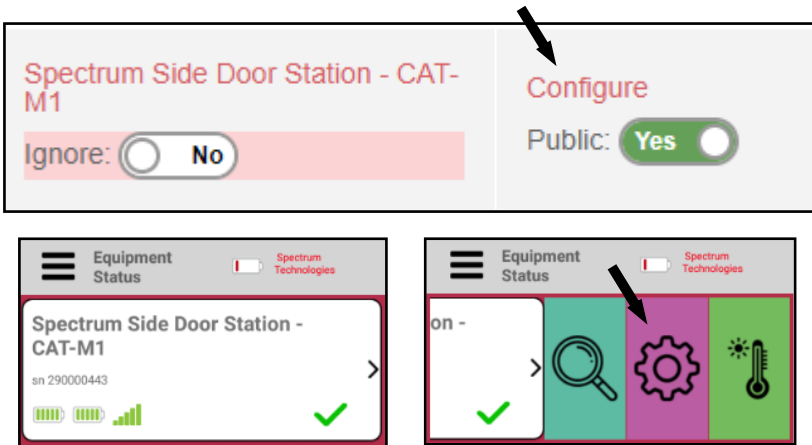

Figure 5. Configure button on SpecConnect (top) and WatchDog Mobile App (bottom).

- Turning the DST (Daylight Savings Time) switch on will enable automatic time updates when Daylight Savings Time begins and ends.

- The DataScout modems are designed to maximize battery life. Therefore, the unit periodically connects to SpecConnect.net to send data and receive any updated configuration settings.
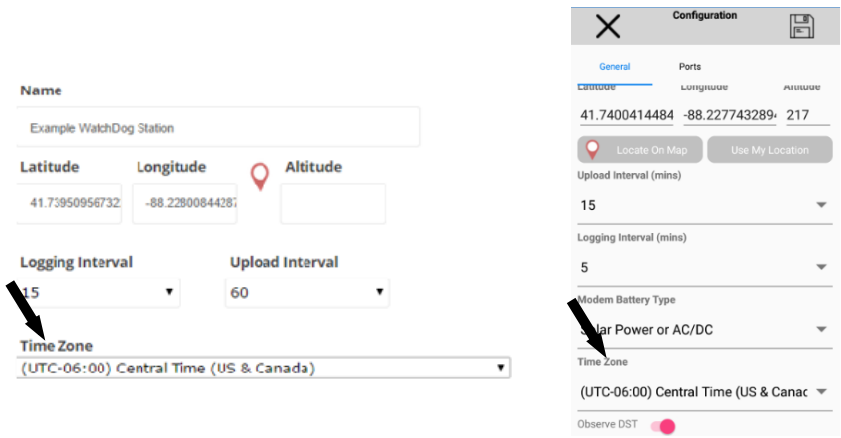

Figure 6. Setting the time zone on SpecConnect (left) and WatchDog Mobile App (right).

Updating Firmware

The firmware for the DataScout modem can be updated by the user. The current firmware version your modem is running can be obtained by contacting Spectrum Technologies technical support.
Note: All data on the modem is cleared when the firmware is updated.

The latest firmware version, as well as the link to the update files, is available on Spectrum's website at:

http://www.specmeters.com/technical-support/software-updates/datascout-software/

Update Procedure
1. Save the latest firmware update to a FAT formatted USB flash drive.
2. Completely remove power from the modem. Disconnect the solar panel cable or AC/DC cable.
3. Insert the flash drive into the modem. Wait 10 seconds.
4. Press and hold button while powering up the modem.
5. The LED will flash red then rapidly flash green until the update is completed. Once completed, the LED will then shut off.

Radio Information

Model	Frequency Bands	Network Type	Antenna
3922 3922M	800/1900 MHz	CDMA 1xRTT (2G)	Multi-band w/ SMA connector
3923, 3923M, 3924M	850/900/1800/ 1900/2100 MHz	HSPA+ (3G)	Multi-band w/ SMA connector
3928M 3928MB 3929M	LTE	B1, B2, B4, B5, B12, B13, B18, B19, B20, B26, B28	Multi-band w/ SMA connector
3920	2.4 GHz	ISM WiFi	Reverse polarity SMA

Regulatory Information

Model	FCC	IC
3922 3922M	RI7CE910-DUAL	5131A-CE910DUAL
3923, 3923M, 3924M	RI7HE910	5131A-HE910
3928M 3928MB 3929M	XMR201707BG96	10224A-201709BG96
3920	YOPGS2011MIES	9154A-GS2011MIES

Troubleshooting

1. Configuration changes are not showing up in Spec-Connect

To prolong battery life, the DataScout modem does not remain continuously connected to the internet and SpecConnect. Depending on how your DataScout modem is configured, **it can take up to 60 minutes** for settings to propagate to the modem, or for data to be sent to SpecConnect. Wait until, at least, 2 log intervals have elapsed. If the changes still do not appear, try resending the configuration from SpecConnect.

2. Data is not showing up on SpecConnect

- Ensure that the serial number of the station or pup(s) connected to the modem is listed in the Equipment list of SpecConnect. Contact Spectrum if they do not appear in this list.

- If the serial number appears on the list, click "Configure" to ensure the time zone is set. Data from the modem will not be accepted until the time zone has been provided. Wait for two "upload intervals" to transpire to determine if data is being transmitted.

- If data is still not showing up in SpecConnect, check the following:

• Is the PC cable (item 3661U) still connected to the station, Retriever, or modem? If so, there will be no transmission to SpecConnect..
• Is there damage or water in the Retriever and modem enclosures?
• Are the modem and Retriever antennas firmly attached in an upright orientation?
• Is the weather station/pup powered up and connected to the modem with the appropriate cable (gray for weather station, black for Retriever)?
• Does the modem have adequate power and signal strength (use button press tests, pp. 12 - 13)?

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• Does the modem have adequate connection to the internet? Use 2-second button-press test or your cell phone to verify WiFi connectivity at modem location. Your cell phone should be connected to the same local WiFi network the modem is using. If not, try reconnecting to your WiFi hotspot (WiFi models), or relocating to an area which may have better signal coverage (all models).
• Check fuse on solar panel if using model 3999 or 3999WD.

3. Batteries are not recharging

Only model 3928MB currently ships with rechargeable batteries. Other models use an external solar panel (item 3999). If you have an older solar panel (doesn't have the sealed lead-acid battery), it is recommended that it be replaced with the model 3999 solar panel.

• Verify the solar panel is completely clean of any debris or dust build-up.
• Verify all connections are completely plugged in to battery terminal and not damaged.
• The green LED in the center of the charger (fig. 7) should be illuminated when there is sufficient sunlight and when the lead-acid battery is in need of charging.
• The solar panel should output 10.5V when the lead-acid battery connected is disconnected.
• Lead-acid battery should measure greater than 5.75V.

Figure 7. Solar panel battery charger

4. Modem indicates it is connected to the server, but no data is being sent to SpecConnect

Modem needs to be reset to the factory defaults

• Remove all power from DataScout. Detach the connector from the battery pack (if used) and/or disconnect the solar panel cable.
• Hold down button while re-attaching power to the device.
• Continue holding the button for at least 8 seconds.
• Check to ensure data flow is restored to SpecConnect.

Note: Data stored on the DataScout will be lost when performing this clearing process

Warranty

This product is warranted to be free from defects in material or work-manship for one year from the date of purchase. During the warranty period Spectrum will, at its option, either repair or replace products that prove to be defective. This warranty does not cover damage due to improper installation or use, lightning, negligence, accident, or unauthorized modifications, or to incidental or consequential damages beyond the Spectrum product. Before returning a failed unit, you must obtain a Returned Materials Authorization (RMA) from Spectrum. Spectrum is not responsible for any package that is returned without a valid RMA number or for the loss of the package by any shipping company.

CE

DECLARATION OF CONFORMITY

Spectrum Technologies, Inc.
3600 Thayer Court
Aurora, IL 60504 USA

Model Numbers:	3922M, 3923M, 3920, 3924M
Description:	DataScout Modem
Type:	Electrical equipment for measurement, control, and laboratory use
Directive:	2014/30/EU
Standards:	IEC 61000-4-2:2008
	IEC 61000-4-3:2006 including A1:2007 and A2:2010
	EN 55022:2010
	EN 61000-6-1:2007
	EN 61000-6-3:2007

Paul Martis, Project Manager—Weather   March 1, 2015

USA and Canada Conformity Standards:
       FCC Part 15 CFR Title 47: 2014
        ICES-003: 2012 Digital Apparatus (Industry Canada)

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