

DataScout® Modem Product Manual

APPLIES TO THE FOLLOWING ITEM #'S

US/CANADA

3920 WiFi
3928M LTE-M
3933M LTE-CAT4
3928MB LTE-M + Battery Pack

INTERNATIONAL

3929M LTE-M Global
3929MB LTE-M Global + Battery Pack
3934M LTE-CAT4 Europe
3935M LTE-CAT4 Asia Pacific



GENERAL OVERVIEW

Thank you for purchasing a DataScout Modem. This manual describes the modem's general features and operations.

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

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.

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.

Your DataScout package contains

- Antenna, Antenna Stabilizer Sleeve, and Antenna Holder
- 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)

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

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

PRODUCT DETAILS

Specifications

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

Disclaimer

After assembly, and prior to shipment, DataScout modems are 100% functionally tested. Altering components or using nonapproved 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

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.

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.

WiFi models - USB Flash Drive

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

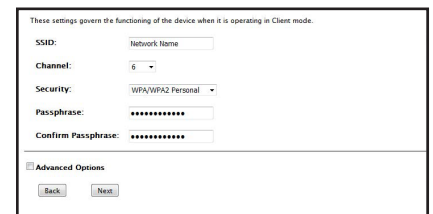
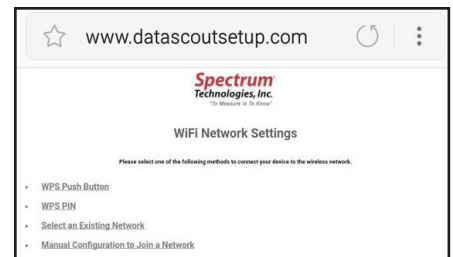
1. Create a new text file in the root folder of a FAT32 formatted USB drive. It is recommended that this file be created using Notepad rather than Word.
2. Give the file the name "DSWiFi" (all capital letters). Note: Some computers will show the file extension, which is ".txt".
3. On the first line of the text file, type the network's SSID (network ID).
4. On the second line, type the PASSPHRASE (network pass-word) 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

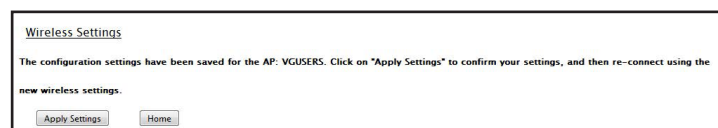
The following steps outline how to connect the DataScout mo-dem to the desired WiFi network using a smartphone.

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 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 password. If either are entered incorrectly, return to step 1 to repeat the Access Point Provisioning process. Once you have entered the correct information, click the "Next" button.
8. Click the "Save" button on the Wireless Configuration Summary 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 attempt to connect to the WiFi network (the connection with your PC, smart phone or tablet will be terminated). If successful, 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.
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.



WiFi Network Settings				
Select from the following existing networks				
Number	SSID	Signal Strength (dBm)	Security Mode	Channel
1	ASTWNI	-44	WPA/WPA2 Personal	1
2	jcidata	-76	WEP	1
3	prodsys	-76	WPA/WPA2 Personal	1



SETUP

Get your DataScout running in the following ten steps.

- Gather up all of the accessories (brackets, cables, etc.) into one location for easier setup.

Tools recommended for installation

- 7/16-inch (11-mm) wrench
- Phillips screwdriver

1. Attach Antenna

When used with a Retriever, the DataScout is normally mounted horizontally, but the cellular antenna should be vertical. The antenna is hinged, and a plastic holder is included to keep the antenna vertical.

- Remove the antenna if it has been attached to the DataScout.
- Remove the holder, plastic disk, and screws (2x) from the plastic bag (Figure 1)
- Set the holder on the DataScout, over the antenna connector. The flat portion of the base should be against the door flange. (Figure 2)

Figure 1



Figure 2



Figure 3



Figure 4



- Insert the antenna into the holder and turn it clockwise to screw it onto the connector. Finger tight the antenna as needed. Once it is snug, turn it slowly until the antenna hinge is visible through the opening on the left side of the holder.
- Gently bend the antenna at the hinge to 90°. Do not force it. If it doesn't bend easily, the hinge is pointing the other way, or it is not fully aligned with the opening. (Figure 3). Hold the DataScout as you want it installed and ensure that the antenna is pointed up.
- With the #1 Phillips screwdriver, attach the plastic disk using the Phillips screws. (Figure 4)

2. Remove power from Station/Retriever.

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

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

5. Connect Solar Power Package or AC-DC power cable to DataScout.

6. Connect to Access Point - WiFi modem only

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. Hold button for 2 seconds to perform a connection test to verify that the DataScout has good network connectivity.

8. Go To Specconnect.net or open the WatchDog Mobile App. Log in with your username and password.

9. 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 your data, set alerts, and make configuration changes to your Weather Station or Retriever & Pups Units.

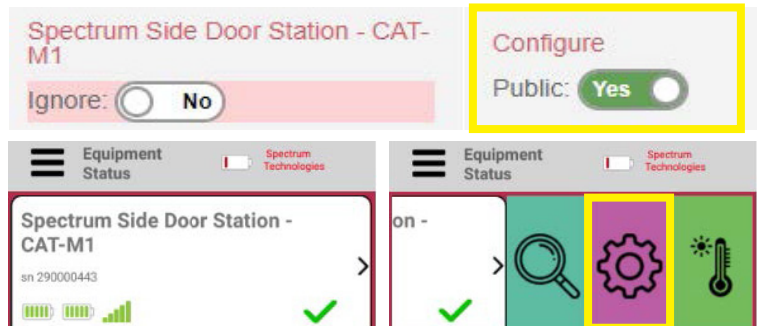


Completing Online Setup

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 (Figure 5) next to the WatchDog Weather Station, Retriever, or Pup. You MUST SELECT THE TIME ZONE and set your GPS coordinates (Figure 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)

Figure 6 (Left): SpecConnect configuration form

Name: Example WatchDog Station

Latitude: 41.73950956732 Longitude: -88.22800844287 Altitude: []

Logging Interval: 15 Upload Interval: 60

Time Zone: (UTC-06:00) Central Time (US & Canada)

Figure 6 (Right): WatchDog Mobile App Configuration screen

Configuration

General | Ports

Latitude: 41.7400414484 Longitude: -88.227743289 Altitude: 217

Locate On Map | Use My Location

Upload Interval (mins): 15

Logging Interval (mins): 5

Modem Battery Type: Solar Power or AC/DC

Time Zone: (UTC-06:00) Central Time (US & Canada)

Observe DST: []

OPERATIONS

Button and 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 7 and 8) 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.

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.

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.

Radio Activity

In addition to responding to button presses, the LED will intermit-tently 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.

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

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 7 Cellular DataScout reference label

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 8 WiFi DataScout reference label

UPDATING/TROUBLESHOOTING

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.

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 up-date is completed. Once completed, the LED will shut off.

Troubleshooting

1. Configuration changes are not showing up in SpecConnect

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?
- 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 (Figure 9) 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 9 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 workmanship 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, 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.

	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)	
	Proper Disposal of Waste Electrical and Electronic Equipment This symbol when found on the product or packaging indicates that this product shall not be treated as common waste and that an effort to recycle materials should be made or may be required. Disposal of used and depleted electrical & electronic equipment may be subject to local laws and regulations for proper collection and recycling initiatives in the local area. This is applicable to areas within the European Union and other participating countries including the USA. The recycling of materials will help to conserve natural resources and prevent negative consequences of inappropriate waste handling at the end of a product's usable life. For more information about the recycling of waste electrical and electronic equipment, please contact your local civic office, waste disposal service, or the shop where the item was purchased.

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"To Measure Is To Know"

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