WatchDog®

1000 Series
Micro Stations

PRODUCT MANUAL

Models
1650, 1525, 1450, 1425,
1400, 1250, 1225, 1200, 1115

Spectrum®
Technologies, Inc.

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This manual will familiarize you with the features and operation of your new WatchDog Micro Station. Please read this manual thoroughly before using your instrument. For customer support, or to place an order, call Spectrum Technologies, Inc. at 800-248-8873 or 815-436-4440 between 7:30 am and 5:30 p.m. CST, FAX at 815-436-4460, or E-Mail at info@specmeters.com. www.specmeters.com

Spectrum Technologies, Inc
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General Overview

Thank you for purchasing a WatchDog 1000 Series Micro Station.

NOTE: All models of the 1000 Series stations have four external ports. For most models, one or more are not used. They are present on all models to simplify manufacturing and to retain the port plug securely (see below).

This manual describes how to use your WatchDog Station and how to keep it working accurately for many years. Read this manual thoroughly in order to make effective use of your data logger.

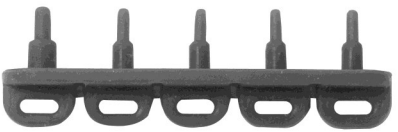
The WatchDog Micro Station series will allow you to record and visually monitor environmental conditions at remote sites. The WatchDog's liquid crystal display (LCD) eliminates the need to download the data logger to observe current conditions.

These stations give you the flexibility to change external sensors as your needs vary. Simply plug the sensor into the station port and configure the station to the corresponding sensor through the software.

Download the accumulated data at your convenience using the powerful SpecWare software. SpecWare will present the data in graphical and tabular form. Use the software to calculate growing degree days and chill hours, and/or view daily, monthly, and yearly reports. Optional disease models aid the user with Integrated Pest Management decisions.

All WatchDog 1000 Series Micro Stations can run on SpecWare 9 version 9.02 or higher. Firmware 9.61, Build 0312 is required to support second generation Micro Stations (with purple faceplate labels or Mfg Code 1800). Either the Pro or Basic versions may be used. The Pro version is required for disease models and custom reporting. If you have an earlier version of SpecWare 9, you can download a free update at www.specmeters.com.

The WatchDog station includes a flexible plug to help guard against insect infiltration through the computer and sensor ports. You can cut the plug along the embossed lines with ordinary scissors to allow for sensor plugs. If you do this, you may wish to connect the smaller remaining parts with light string to avoid losing them if dropped.



Model Specifications

Model	Internal Sensors	External Ports (Channels)
1115	None	1 (A)
1200	None	2 (A, D)
1225	Temperature	1 (A)
1250	Temperature / Relative Humidity	None
1400	None	4 (A, B, C, D)
1425	Temperature	3 (A, B, D)
1450	Temperature / Relative Humidity	2 (A, D)
1525	Temperature	4 (A, B, C, D)
1650	Temperature / Relative Humidity	4 (A, B, C, D)

Temperature range: -40 to 185ºF (-40 to 85ºC)
Accuracy: ±1.1ºF (±0.6°C) at -4 to 122°F (-20 to 50°C),
else ±2.2°F (±1.2°C)

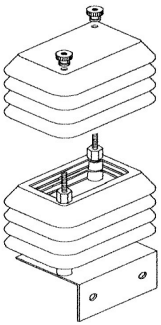
RH range: 0 - 100%
Accuracy at 77°F (25°C):
Generation 1: ±3% within 10 - 90% RH, else ±5%
Generation 2*: ±2.5%

Operating Temperature Range: -22° to 130°F (-30° to 55°C)

** Models with purple faceplate labels or Mfg Code 1800*

Installation and Placement

WatchDog Micro Stations, or mini-weather stations, have the versatility to be located in any micro-climate for recording weather data. The optional sensors and radiation shield include hardware for attaching them to a 1" to 1¼" (2.5-3cm)outside diameter mast (pipe). Use a 5' - 10' (2-3m) length of conduit or pipe as the mast mount. When purchasing and/or cutting the mast to size, plan on placing 1½' - 2' (0.5m) of the mast into the ground. Refer to the illustration as an example of how to install your "mini-weather station."



For outdoor and greenhouse use, the WatchDog station must be placed in a radiation shield to protect it from solar radiation and other sources of reflected heat. The radiation shield also protects the station from rain. Place the WatchDog inside the radiation shield by unscrewing the two finger-nuts and removing the top of the radiation shield.

Important: Secure the external sensor wires to the mast just below the radiation shield with a plastic tie. This will insure that the sensor wires do not become disconnected while recording.

For the 1115 model, the sensor cable must be used with port A and a tipping bucket with pulsing output type of rain gauge. It will come with a pre-assembled waterproof enclosure.

If using a waterproof enclosure with a model other than the 1115, please refer to the WatchDog Micro Station waterproof Enclosure Product Manual available online at www.specmeters.com.

External Sensors

All WatchDog 1000 Micro Station models except the 1250 have external channels (ports) for additional sensor input. The following table lists some of the available optional sensors. See www.specmeters.com for a complete list. Most sensors include a 6-foot cable with pin-type connector. Items 3667-20, 6460-20, 6470-20, and 6450WD20 have 20 foot cables.

Item #	Description	Measurement Range	Accuracy
3665R	Tipping Bucket Rain collector	N/A	±2%
3666	Leaf Wetness Sensor	0(Dry) - 15(Wet)	N/A
3667, 3667-20	External (Soil) Temperature Sensor	-25 to 212ºF -32 to 100ºC	±1°F ±0.5°C
3670i	Silicon Pyranometer	1-1250 W/m^2	±5%
3668i, 3668i3, 3668i6	Quantum Light Sensor and Sensor Bars	0-2500 µmol $m^{-2}s^{-1}$	±5%
3676i	UV Light Sensor	0-200 µmol $m^{-2}s^{-1}$	±5%
6460, 6460-20	WaterScout SM 100 Soil Moisture Sensor	0% to saturation (typically 50%)	±3%
6470-6, 6470-20	WaterScout SMEC 300 Soil Moisture EC, Temperature Sensor	0% to saturation 0 to 10 mS/cm -25 to 212ºF	±3% ±2% ±0.5°C
3669	Soil Moisture Transducer	0-100 kPa	±2%
6450WD 6450WD20	Watermark Soil Moisture Sensor	0 - 200 cbars	N/A
6451	Irrigation Sensor	Switches at 5 psi	±1 psi
3673 3674	Input Cables for user-supplied sensor	0-2.5V 4-20mA	±0.005V ±1%

To connect the external sensor to the station, plug the sensor cable into the station port that has been programmed for that particular sensor. If the sensor is not connected, a "- - -" will appear on the LCD display for the respective logger port until the sensor is connected.

Port A is the only channel that will record rainfall data.

Program each channel (port) to a specific sensor through the SpecWare launch screen. Refer to the **SpecWare Software User's Guide** for more detailed instructions on launching and sensor configuration.

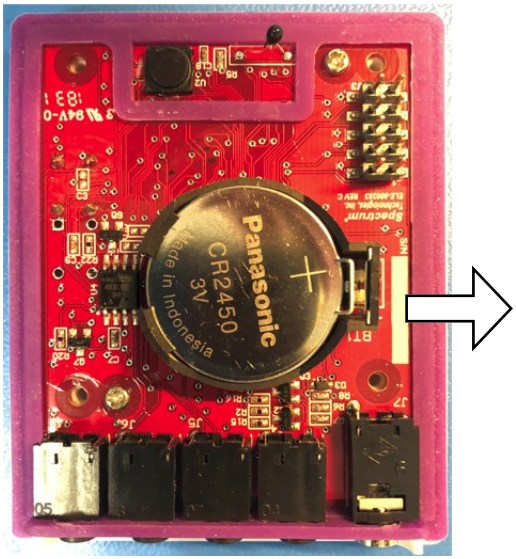
Battery Replacement

Each WatchDog Micro Station is powered by a 3 Volt CR2450 battery. The battery has a life of 12 months continuous use, and a 2-year shelf life. Battery life can be affected by extreme temperatures. The battery is user replaceable and can be purchased locally.

To replace the battery:

1. Remove the four screws from the back cover of the WatchDog.
2. Remove the back cover.
3. Squeeze the battery clip in the direction of the arrow below. If the battery does not pop up, press down on the opposite side at the same time.
4. Insert a new CR2450 battery, positive ("+") side up.
5. Confirm that the logger is working by checking if the black bars at the top and bottom of the LCD light for a few seconds.
6. Replace the back cover. Insert and tighten the four screws.

Note: To prevent ingress of water into the Micro Station, ensure the back cover is tightly secured. Failure to properly seal enclosure will void the warranty.



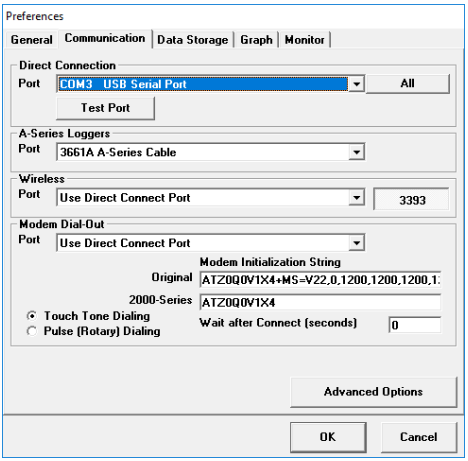
Identifying the Correct Com Port

The computer **Com**munications **Port** to which the PC-3.5mm serial cable is connected can usually be identified by clicking the Com Port button on the main screen to bring up the **Port Selection** screen. It can also be found by using a paper clip. The procedure is:

1. Disconnect the serial cable from the meter.

2. Bring up the **Communications** tab of the **Preferences** screen.

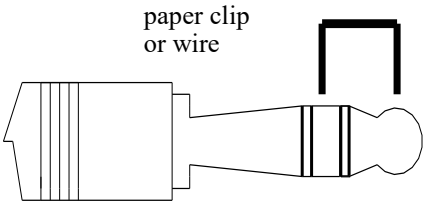
3. Select the COM port to be tested. It will be identified as "USB Serial Port".



4. Click the **Test Port** button. If the “Connection OK” message is displayed, another device (such as a modem) is probably connected to that port. If the “No Connection” message is displayed, this port may be the one connected to your serial cable and you can proceed to the next step.

3. Place a paperclip on the end of the serial pin so that it touches both the tip of the pin and the metal area between the two black rings. Again click on the **Test Port** button. If the “Connection OK” message now appears, this is the com port connected to your serial cable.

Note: The meters do not short -circuit the serial pin. Therefore, when the **Test Port** button is clicked while the meter is connected, the “No Connection” message will be displayed.



Connecting to the Computer

To launch and/or download data from the station, connect the station to a computer via the data transmission cable (item 3661U). This cable is shipped when the SpecWare software package is ordered.

The **only time** *you must have the WatchDog connected to the computer is during the launching and downloading of the data.* After the station has been launched, and/or downloaded, disconnect the station and place it in the environment you wish to monitor.

If the computer will not connect with the station, you may need to change the battery or change the comm port settings (see the **SpecWare Software User's Guide**).

Digital Display

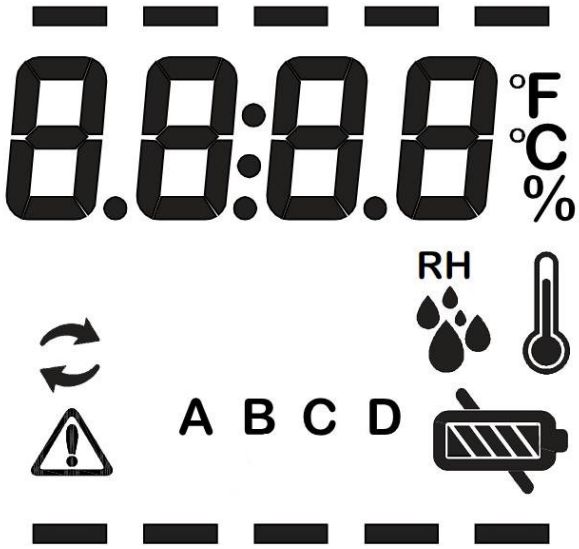
The digital LCD display is a key feature of the WatchDog 1000 Micro Stations. A visual display of the on-site readings correlates to the sensor configuration of the logger.

Press the button to the right of the LCD to read all the sensors and activate the display. The display will cycle through all sensors four times, then shut off. The displayed sensor values will not be updated unless you press the button again.

The A, B, C, D indicators will light to identify any external sensor values. If dashes ("——") are displayed, a sensor is not plugged into the port. For station models with internal sensors, the temperature and RH icons will light when their values are displayed.

If the "Sync" icon (the two circular arrows) is lit, it means the logger is full and no longer recording data. The logger must be connected to a data shuttle or a PC running SpecWare to download the data and begin logging again.

The battery icon displays the relative battery life remaining. At the lowest level, the diagonal bar lights to indicate that there is almost nothing left.

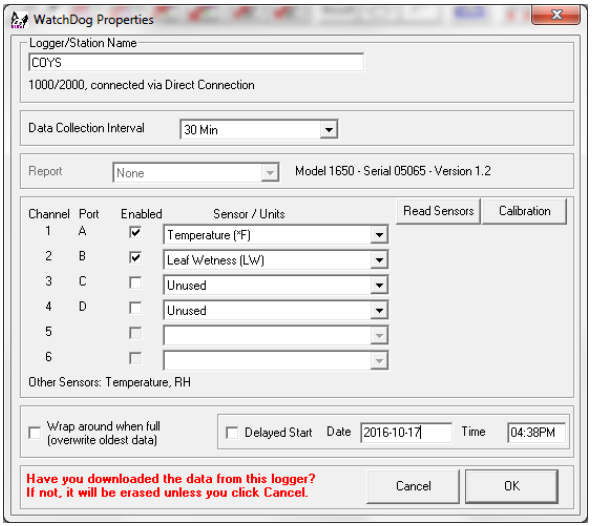


SpecWare Software

SpecWare Pro or Basic software (version 9.02 or higher*) is required for use with the WatchDog Micro Station. SpecWare software is an integral part of the WatchDog station system. The software installation file is downloaded from the Spectrum Technologies website.

Configuring the Station

Use the **Properties** button in the WatchDog Manager, the **Launch/Set** Properties toolbar button, or the **Launch/Set** option in the Logger menu to bring up the **WatchDog Properties** screen. This screen is used to configure the logger for the specific external sensors being used, and to set the measurement interval, ranging from 1 to 60 minutes. The station has a capacity of 10,500 intervals. Therefore, if it is set to a 30 minute interval, it can record 209 days of data.



The logger continues recording data even when the **WatchDog Properties** screen is opened. If the **OK** button is clicked, any configurations are saved, the data is cleared, and data collection restarts. If the **Cancel** button is clicked, the logger configuration is not updated, no data is cleared, and the logger continues logging.

When the “Wrap around when full” option is unchecked, the station will stop recording data when it reaches its storage capacity. If this option is checked, it retains all 10,500 data intervals, erasing the oldest each time it records a new data point. In this mode, the station never has to be relaunched - it continues recording data as long as batteries are installed.

Downloading the Station

Use the **Readout** button in the WatchDog Manager, the **Get data** toolbar button, or the **Get WatchDog Data** option in the Logger menu to download and save the logged data. Downloading the logger does not interrupt data collection.

Once the data has been downloaded to the computer, SpecWare software offers a wide variety of Report options and Disease Model options. Refer to the **SpecWare Software User’s Guide** for more detailed instructions.

** Firmware 9.61, Build 0312 is required to support second generation Micro Stations (with purple faceplate labels or Mfg Code 1800).*

Trouble Shooting

Commonly asked questions include:

Q. Why will the station not connect with my computer?
A. Most commonly, the micro station needs a new battery, or the SpecWare comm port settings need to be changed (in SpecWare Preferences). Refer to SpecWare User's Guide for details.

Q. Why will the station not record rainfall?
A. Make sure rainfall sensor is plugged into port A, and that Port A is configured for rainfall through the launch screen.

Q. Why is the station displaying "- - -"?
A. The station will display dashes for the external sensors if 1.) the rainfall sensor is connected to the wrong port 2.) another external sensor is connected to the port meant to record rainfall or 3.) the sensor is not securely plugged into a channel port.

Q. Why is the station displaying and/or logging bogus, or out-of-range, readings?
A. The external sensors are not plugged into the correct ports.

Service and Support

The WatchDog Series 1000 Micro Stations are easy to use and reliable. Should you have a problem, or have questions:

Who do I contact?
Contact the company you purchased the data logger from: Spectrum Technologies, Inc. or an authorized Spectrum Dealer.

When Contacting Spectrum Technologies:
Please indicate that you need Technical Support. Be prepared to:

1. Provide details on the hardware and software configuration of your components including: manufacturer, model number, peripherals and versions of the operating system.

2. Completely describe the problem. The more information you provide, the faster and more accurately we will be able to respond.

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, 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.

DECLARATION OF CONFORMITY

CE

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

Model Numbers:	1115, 1120, 1200, 1225, 1250, 1400, 1425, 1450, 1525, 1650
Description:	WatchDog Micro Stations
Type:	Electrical equipment for measurement, control, and laboratory use
Directive:	2004/108/EC
Standards:	EN 61326-1:2006 EN 61000-4-2:1995, including A1:1998 and A2:2001 EN 61000-4-3:2002 EN 55011:2007

Michael J. Dunning, Weather Products Manager January 27, 2010

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