

# SPAD 502 Plus Chlorophyll Meter

## PRODUCT MANUAL

Item # 2900PDL



***Spectrum***<sup>®</sup>  
***Technologies, Inc.***

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This manual will familiarize you with the features and operation of your new data logging SPAD meter. Please read this manual thoroughly before using your instrument. For customer support, or to place an order, call Spectrum

Technologies, Inc.

(800)248-8873 or (815) 436-4440  
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FAX (815)436-4460,  
e-mail: [info@specmeters.com](mailto:info@specmeters.com).  
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Spectrum Technologies, Inc  
12360 S. Industrial Dr. East  
Plainfield, IL 60585

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## **GENERAL OVERVIEW**

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Thank you for purchasing the data logging SPAD 502Plus Chlorophyll meter from Spectrum Technologies, Inc. This operation manual deals with the features that are unique to the internal data logger. Information on general meter operation is contained in the accompanying Instruction manual.

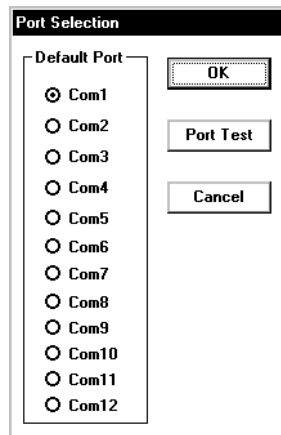
The integrated data logger allows the user to easily collect field data with the SPAD chlorophyll meter. The logger can be used with or without GPS/DGPS. After a set of data has been collected, it is transferred to a PC using Field Scout software. The data is in ASCII text file format and can be exported into mapping software or popular spreadsheet software for analysis.

# IDENTIFYING THE CORRECT COM PORT

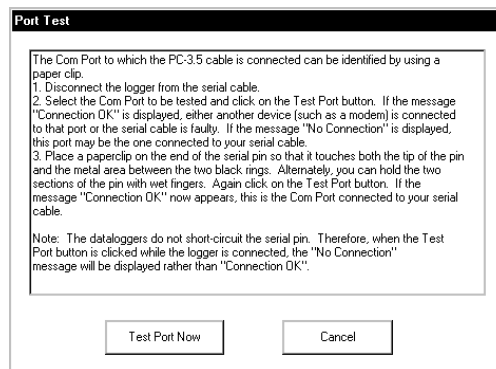
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The computer **Communications Port** to which the PC-3.5 serial cable is connected can be identified by using a paper clip

1. Disconnect the meter from the serial cable.
2. Click on the **Com Port** button on the main software screen. This will bring up the **Port Selection** screen.



3. Select the Com port to be tested and click on the **Port Test** button. In the **Port Test** screen, click the **Test Port Now** button.



4. If the “Connection OK” message box (see fig. 1) is displayed, another device (such as a modem) is probably connected to that port. This is not the port you will be using with your meter. If the “No Connection” message box (see fig. 2) is displayed, this port may be the one connected to your serial cable and you can proceed to the next step.

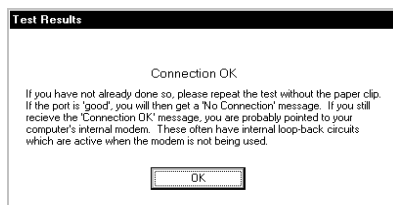


Figure 1

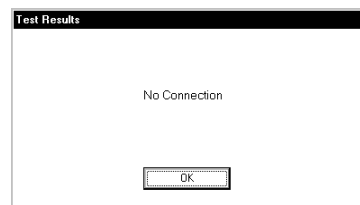


Figure 2

5. 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 (see fig. 3). Again click on the **Test Port Now** button. If the message “Connection OK” now appears, this is the Com port connected to your serial cable.

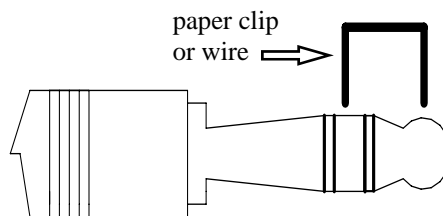


Figure 3

Note: If you are using a USB-Serial adapter, it is necessary to install the driver that accompanies the hardware. When the adapter is plugged in, it will create the necessary Com Port.

# GPS CONNECTION

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The data logger searches for a GPS signal when the meter is powered up. When a signal is detected, the meter's flash pattern will change from simply blinking on and off to a pattern of 3 quick flashes separated by a short pause. If a signal is found, latitude and longitude values will be added to the data file (see p. 8). If a GPS signal is **not** found when powering up, the meter will not search for it when taking readings. If the meter is turned off and back on, it will again search for the GPS signal. Be sure the meter is in **Measurement** mode (see p. 7) before taking any readings.

When taking a geo-referenced data measurement, the LED will turn off while collecting the GPS signal. The meter is again ready to take a reading when the LED returns to a steady glow. If the data logger loses the GPS signal, the LED will flash briefly before returning to **Measurement** mode. In this case, check the GPS battery status as well as the connection to the data logger.

## GPS Settings

Your GPS unit should be set to NMEA 0183 input/output messages. This standard requires your unit be set to the following:

GGA data string	4800 baud rate
Timing - 1 second	8 data bits
No parity	1 stop bit

**Tip: If you have your GPS unit set properly and have checked the connection but still are not getting geo-referenced data, uncheck the box requiring the digital correction in "Meter Settings" screen (pp. 10 - 11) .**

## DATA LOGGER OPERATION

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The data logger has two different modes of operation: **Communication** and **Measurement**. These modes are indicated by the green LED at the base of the meter. When this light is flashing, the meter is in **Communication** mode. When the light glows steadily, the meter is in **Measurement** mode.

### Communication Mode

When the meter is turned on, it will be in **Communication** mode for approximately 10 seconds. While in this mode, the green LED will flash. It is only in this mode that a user can initiate a logger communication (download or reconfiguration). If communication between the logger and software is attempted during this 10-second period, the logger will remain in **Communication** mode indefinitely. The meter must be turned off and then on to change to **Measurement** mode (see following section).

### Measurement Mode

Approximately 10 seconds after turning on the meter, the LED light will glow steadily. This indicates the logger is in **Measurement** mode. In this mode, you can calibrate the SPAD meter and record data. When you are finished collecting data, the meter must be put into **Communication** mode by turning it off and back on (see previous section). If you are collecting data from several sites and need to turn off the SPAD meter between data collection sessions, wait until the meter transitions from **Communication** to **Measurement** mode before resuming.

### Calibration

The procedure for calibrating the meter is given in the accompanying meter instruction manual.

# DATA FILES

	A	B	C	D	E	F
1	Name: Wanjiru					
2	Serial #: 123					
3	Datum: WGS 84					
4	Longitude	Latitude	SPAD	Other Info		
5	Logger Started: 14:14:32					
6	-88.200028	41.657193	39.8	SPAD No.1		
7	-87.080793	40.453403	60	SPAD No.2		
8	-87.08079	40.453402	62.6	SPAD No.3		
9	-87.080795	40.453403	60	SPAD No.4		
10	Logger Started					
11	31.9 SPAD No.1					
12	36.1 SPAD No.2					
13	5.5 SPAD No.3					
14	26.8 SPAD No.3					
15	28.5 SPAD No.4					
16						

Figure 4: Sample data showing results of data collected with and without GPS activated. Note: GPS signal not found when recording data in lines 11 through 15.

## Data File Structure

The data is stored in comma-delimited text files. These files can be opened with text-editing software (e.g. Microsoft Word) or spreadsheet software (e.g. Excel). When opened in a spreadsheet (see fig. 4), it is possible to manipulate the data based on your own application.

The first two lines of the data file give the logger's name and serial number. The third line indicates that latitude and longitude are referenced to the 1984 World Geodetic Survey datum. The fourth line shows the column headings for the rest of the data file.



The data is separated into 4 fields: Latitude and Longitude (blank if a GPS unit was not connected), SPAD and Other Info. The last 2 fields are the data value and reading number respectively.

### **Relationship between the SPAD buttons and the data logger**

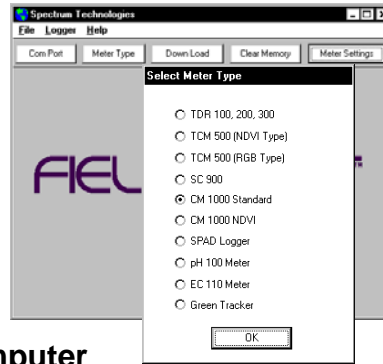
Logging sessions are started and completed by turning the meter on and off. The start of a logging session is indicated by the data line “Logger Started.” If a GPS signal was found at the start of a logger session, a time stamp is included on the “Logger Started” line.

The data logger captures two pieces of information. The data records sent by the SPAD meter following a measurement and the accompanying GPS coordinates (if the receiver has been correctly connected and located, see p. 6). The SPAD data record consists of only the sample number and the measurement value. Pressing the **AVERAGE** button does not prompt the SPAD meter to send a data record. Pressing the **1 DATA DELETE** button causes the SPAD meter to move the sample number back to the previous value. Only the most recent data point can be deleted. The **1 DATA DELETE** button does not erase anything from the data file itself. However, data points that have been deleted can be identified by locating consecutive data records that have the same sample number (see lines 13 and 14 in fig. 4). Pressing the **ALL DATA CLEAR** button simply sets the sample number back to 1. No data will be cleared out of the data file as a result of hitting this button.

# LOGGER SOFTWARE

## Meter Type

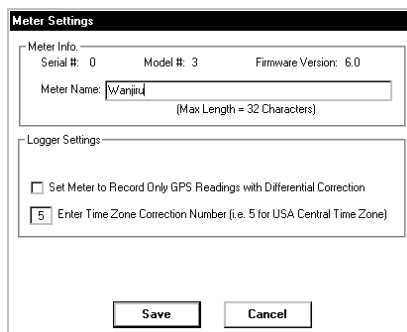
The Field Scout software supports all of Spectrum Technologies' portable data logging meters. Be sure to select the SPAD Meter from the **Select Meter Type** screen



## Connecting to your Computer

To communicate with the data logger, connect the gray interface cable to the SPAD meter's RS-232 port. The port is located at the bottom of the meter and is covered by a black cap. Open the software and turn on the meter so it is in **Communication** mode (see Data Logger Operation, p. 7). In order to communicate through your computer, the COM port assigned to your serial port must be selected. For most machines with a hard wired serial port, this will be COM 1. If you are having trouble connecting, try selecting another COM port or performing the Port Test (pp. 4-5). The Com Port can be selected by clicking the COM port toolbar button or by clicking "Select Comm Port" from the File menu.

## Meter Settings

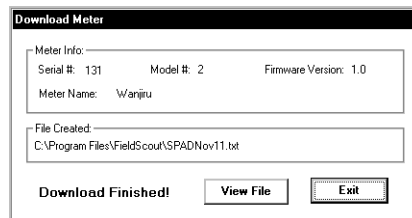


Clicking on this button will bring up the **Meter Settings** screen. This screen allows you to configure the data logger. The **Meter Name** will be the title on the first line of the downloaded files.

If the box below the logger name field is checked, the logger will store GPS data only if it has been differentially corrected. If the differential correction is not found, only the SPAD reading will be stored in the data file. A time zone correction should be entered in the last box. Appendix 1 (p. 13) lists time zone corrections for several cities.

### Download

After clicking the **Download** button, a progress bar will confirm that data is being extracted from the logger. When completed, the **Save Data As** box will appear. From here you can give the data file a descriptive name and select a folder in which to save it. The folder selection field on the right allows you to browse to any folder in your system.



When the file has been saved, the software will give you the option of immediately viewing the file. The data file is stored as a comma-delimited text file (see p. 8) and may be viewed in any text editor or spreadsheet software.

### Clear Memory

Data is not automatically removed from the logger memory after a download. The **Clear Memory** button clears all data from the memory.

# SPECIFICATIONS

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**Measurement Capacity:**

- 1,488 data points with SPAD and DGPS
- 4,096 data points with SPAD

**Operating Environment:**

- Weather Resistant

**Battery Life:**

- 40 hours of logging

**Software Requirements:**

- Windows 3.1 or higher
- Field Scout Software (included)

# APPENDIX 1

## TIME ZONE CORRECTIONS

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Time Zone Correction	City
0	Dublin, Lisbon, London
3	Rio de Janeiro, Montevideo
4	Asuncion
5	Atlanta, Indianapolis, New York, Ottawa, Bogota, Montreal, Toronto
6	Guatemala City, Houston, New Orleans, Chicago, Mexico City, Winnipeg
7	Phoenix, Denver, Edmonton
8	San Francisco, Los Angeles, Vancouver
9	Anchorage
10	Honolulu
11	Wellington
13	Adelaide, Melbourne, Sydney
14	Vladivostok, Brisbane
15	Seoul, Tokyo
16	Beijing, Hong Kong, Manila, Singapore, Taipei
17	Hanoi, Jakarta, Vientiane
18	Calcutta, New Delhi
19	Kabul, Islamabad
20	Tehran, Abu Dhabi, Dubai
21	Moscow, Nairobi, Kampala, Riyadh
22	Ankara, Athens, Helsinki, Istanbul, Cairo, Johannesburg, Harare
23	Amsterdam, Barcelona, Berlin, Geneva, Paris, Prague, Rome, Brussels, Madrid, Stockholm, Warsaw, Lagos

# SERVICE AND SUPPORT

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In the unlikely event that you have a problem with the hardware or software, please read the following.

## **Who do I contact?**

**Contact the company that you bought the loggers from: Spectrum Technologies, Inc. or a Spectrum Authorized Dealer.**

Before calling, you can evaluate and often solve your problem if you try the following.

1. Read this manual and the help file in the software. It may only take a few moments to get the answer you need.
2. Write down the events that led to the problem. Have you changed anything in your computer recently? Are you doing anything differently?

**When Contacting Spectrum Technologies, Inc.** please indicate that you need Technical Support. Be prepared to:

1. Provide details on the hardware and software configuration of your computer 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**

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This product is warranted to be free from defects in material or workmanship for 1 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 is void if the Spectrum products have been damaged by customer error or negligence or if there has been an unauthorized modification.

## **Returning Products to Spectrum**

Before returning a failed unit, you must obtain a Returned Goods Authorization (RGA) number from Spectrum. You must ship the product(s), properly packaged against further damage, back to Spectrum (at your expense) with the RGA number marked clearly on the outside of the package. Spectrum is not responsible for any package that is returned without a valid RGA number or for the loss of the package by any shipping company.



This equipment has been manufactured for  
Spectrum Technologies, Inc.  
12360 S. Industrial Dr. East  
Plainfield, IL 60585 USA

The Manufacturer's **DECLARATION OF CONFORMITY** is on file at the above address, and certifies conformity to the following:

Model Number: 2900, 2900DL  
Description: Chlorophyll Meter  
Type: Electrical Equipment for Measurement, Control, and Laboratory Use

Directive: 2004/108/EC  
Standards: EN 61326-1 (2006), Class B

Douglas L. Kieffer,  
Soil/Water Products Manager

March 4, 2009

***Spectrum***<sup>®</sup>  
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