SPAD 502DL Plus Chlorophyll Meter

DATA LOGGER MANUAL

Item # 2900PDL

Spectrum®
Technologies, Inc.

CONTENTS

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 between 7:30 am and 5:30 p.m. CST,
FAX (815)436-4460,
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General Overview

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 contain 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.

Quick start guide

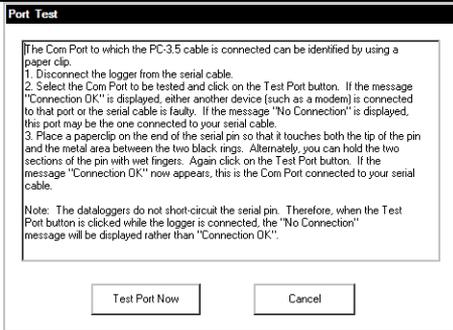<u>Identifying the correct Com Port</u>

FieldScout software is used to communicate with the data logging SPAD meter. The software allows you to download the meter as well as select GPS options for data collection.

Before contacting the meter, you must identify the Com Port associated with the serial port. This procedure is outlined on pages 4 - 5. The interface cable must be connected to the PC but <u>disconnected</u> from the meter. If you have the gray serial cable, you may also need a USB-Serial adapter. Note that this is a 2-part test. An erroneous "Connection OK" message can appear if you have selected the Com Port associated with your computer's internal modem.

<u>Downloading data</u>

1. Connect the black cable to the computer and into the meter.

2. Turn the meter on. For 10 seconds, the meter will be in **Communication** mode and the green LED will be blinking. Press the **Down Load** button. If the meter is contacted while in **Communication** mode, it will remain in that mode until the meter is turned off. If the meter is not contacted within 10 seconds, it will transition to **Measurement** mode (indicated by a steadily glowing LED). Turn the meter on and off to return to **Communication** mode.

3. After the meter has been completely downloaded, the software will prompt you to save the file. Name the file and select the location where it is to be saved (the default location is the FieldScout directory). The software will then give you the option of clearing the internal data logger. Select the appropriate response. When the download is complete, the meter can be disconnected from the cable.

Identifying the Correct Com Port

Port Test

The Com Port to which the PC-3.5 cable is connected can be identified by using a paper clip.
1. Disconnect the logger from the serial cable.
2. Select the Com Port to be tested and click on the Test Port button. If the message "Connection OK" is displayed, either another device (such as a modem) is connected to that port or the serial cable is faulty. If the message "No Connection" is displayed, this port may be the one connected to your serial cable.
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. Alternately, you can hold the two sections of the pin with wet fingers. Again click on the Test Port button. If the message "Connection OK" now appears, this is the Com Port connected to your serial cable.

Note: The dataloggers do not short-circuit the serial pin. Therefore, when the Test Port button is clicked while the logger is connected, the "No Connection" message will be displayed rather than "Connection OK".

Test Port Now   Cancel

The computer **Com**munications **Port** to which the cable is connected can be identified by using a paper clip.

1. Disconnect the serial cable from the meter.

2. To bring up the **Port Selection** screen, click on the **Com Port** Button, select the com port to be tested and click the **Port Test** button. Click the **Test Port Now** button. If the message "Connection OK" is displayed, another device (such as a modem) is probably connected to that port. If the message "No Connection" 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 Now button. If the message "Connection OK" now appears, this is the com port connected to your serial cable.

paper clip
or wire
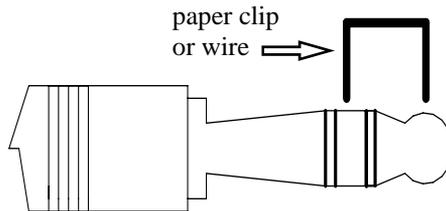
NOTE: The meter does not short-circuit the serial pin. Therefore, when the **Test Port Now** button is clicked while the meter is connected, the "No Connection" message will be displayed.

4

GPS CONNECTION

Cable Connections
A GPS/DGPS cable (item # 2950CV5) is required to connect the SPAD meter to a GPS unit. This cable has a 9-pin male connection and a stereo pin that connects to the meter's data port. You will also need a cable that allows the GPS unit to connect to a 9-pin male serial port. If this cable doesn't come standard with your GPS unit, it should be available from the manufacturer. This cable is generally used to upload information from a computer to the GPS unit. These components should be connected as shown in the figure below.

GPS Setting
Your GPS unit must be set for NMEA 0183 input/output messages. If the meter has trouble receiving the GPS signal, check that it has the following settings:
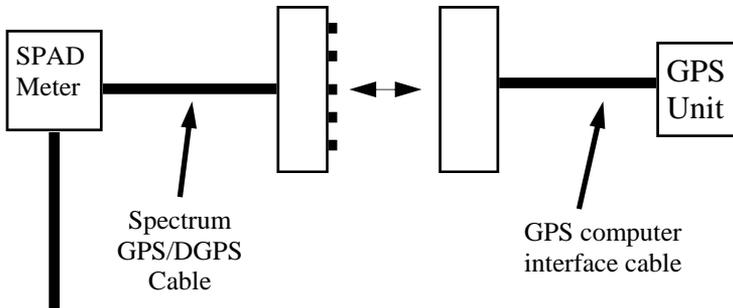
Data bits: 8   Stop bits: 1
Baud rate: 4800 bps   Parity: None
Timing: 1 second   GGA data string

SPAD Meter — Spectrum GPS/DGPS Cable — GPS computer interface cable — GPS Unit

Initial GPS connect

If the meter does NOT detect an incoming GPS signal, it will flash steadily for 10 seconds and then glow steadily once it gets into **Measurement** mode. If it does detect the GPS signal (satellites found etc..), it gives a series of 3 rapid flashes before going to the steady glow for **Measurement** mode. If a GPS signal is not found during power-up, the meter will not search for it when taking readings and no geo-referenced data will be collected during that sampling session. 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.

Taking measurements

If the meter did NOT detect the GPS initially, once in **Measurement** mode, the LED will go off and on very quickly when a measurement is taken.

If it did detect the GPS signal initially, once in **Measurement** mode, it will look for the GPS signal at the time of every measurement. There are two possibilities:

1. If it sees the GPS signal at the time of measurement, the LED will go off for a noticeably longer time and then come back on as a steady glow. Latitude and longitude values will be added to the data file. The meter is again ready to take a reading when the LED returns to a steady glow.
2. If it does NOT see the GPS signal at the time of measurement (signal lost, batteries die, cable gets pulled out), the LED will flash briefly and then come back on as a steady glow .

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

The data logger has two different modes of opera-tion: **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 stead-ily, the meter is in **Measurement** mode.

Communication Mode

When the meter is turned on, it will be in **Communi-cation** 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 be-tween the logger and software is attempted during this 10-second period, the logger will remain in **Com-munication** 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						

SPAD502Plus DL 2 (non simu

Figure 1: 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. 1), 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. 1). 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
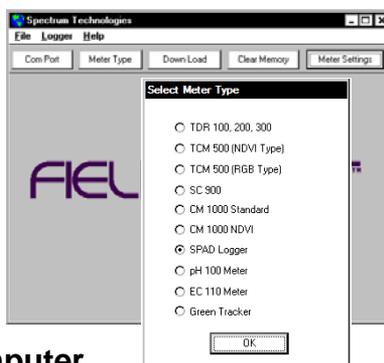

Connecting to your Computer

The SPAD software comes with a black PC interface cable. This cable connects to the USB port of your computer and to the meter's computer port. The meter's configuration can be modified by clicking on the Meter Settings button (see Meter Settings below). The Com Port, Meter Type, Download, Clear Memory and Meter Settings buttons are explained in the next two sections.

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.
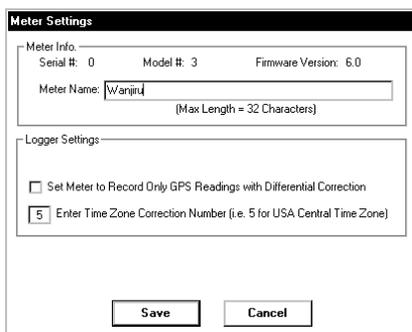

If the box below the logger name field is checked, the logger will store GPS data only if it has been differentially corrected. If the differential correction is not found, only the SPAD reading will be stored in the data file.

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.
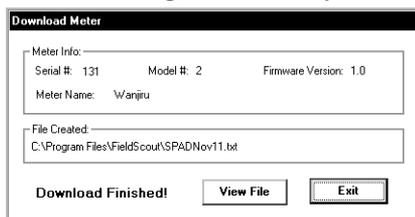
Clear Memory

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

Specifications

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)

Troubleshooting

Flashing LED - If the meter is in **Measurement** mode and the LED begins to flash quickly, it is an indication that the memory on the meter is full. The readings are still accurate, however they will not be stored. Use the Field Scout software to clear the memory (p. 11).

Appendix 1
Time zone corrections

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

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

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.

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