WET Labs

ECOView
Host Software for *ECO* Meters

User's Guide

The user's guide is an evolving document. If you find sections that are unclear, or missing information, please let us know. Please check our website periodically for updates.

WET Labs, Inc.
PO Box 518
Philomath, OR 97370
(541) 929-5650
www.wetlabs.com

# Table of Contents

1. Setup and Checkout

ECOView host software provides a graphical user interface that allows users to configure, collect, view, and upload data from a variety of *ECO* instruments. Required components for testing the *ECO* meter using ECOView:

1. *ECO* meter.
2. A host PC.
3. Power source:
   a. Test cable (optional equipment) and a 9V battery or regulated power supply.
   b. Regulated power supply and connectors—pin 1 is ground and pin 4 is power on the *ECO* meter.
4. The CD that shipped with the *ECO* meter, which contains the ECOView software, *ECO* device file(s), and user's guides.

Note that for "**Real Time**" (RT) *ECO* meters not all of the functions in the ECOView host software are available, as the RT meters do not have memory for internally logging data or a time clock for data time stamping. These exceptions are noted where applicable.

1.1   Setup

1. Insert the host program CD into the host PC.

2. Copy ECOView.exe application and .dev file(s) from the CD to a desired location at the root level on the host PC.

3. Plug the test cable's DB-9 connector into the host computer's serial port and connect the instrument to the test cable.

4. Start the program by double-clicking ECOView.exe. The Meter Setup screen (below) will appear.
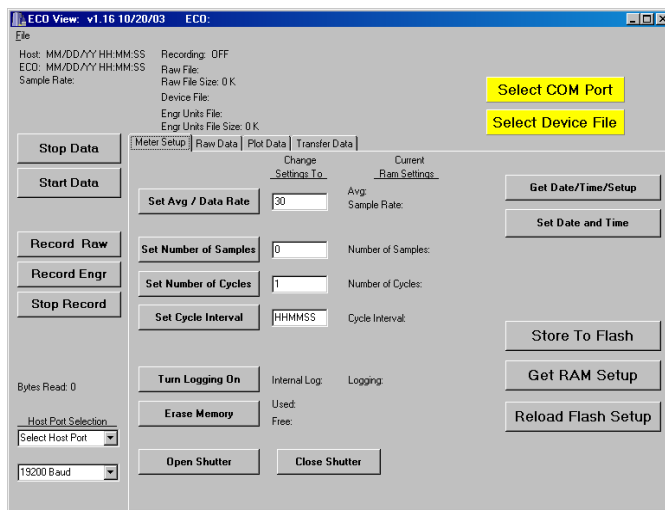
5. Click the yellow Select COM Port button and select the appropriate COM port. (The default baud rate of 19200 does not need to be selected.)

6. Click the yellow **Select Device File** button and choose the instrument-specific device file (.**dev**) from its saved location on the host PC (or from the WET Labs-supplied CD).


Chlorophyll Fluorometers only:
These meters ship with two device files (See Section 3.5 for samples). The "raw" outputs data in counts. The second outputs an additional column in µg/l. When either fluorometer device file is loaded into ECOView, an **FL-Setup** tab appears.

To view chlorophyll in µg/l, follow the three steps below. Otherwise, go to step 7.

a. Select the **FL.xxxIENGR.dev** device file. The **Plot Data** tab will appear. To view incoming data in processed units (µg/l), select **Engr Units** from the pulldown menu.
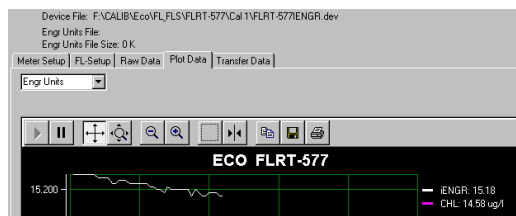
b. Select **Turn Engr Output OFF/ON** to activate the additional column of processed (µg/l) data.

c. Select **Store to Flash** to store in meter's flash memory.

Raw output sample

Date	Time	N/U	Chl Sig	Therm
6/14/2008	7:57:55	695	75	533
6/14/2008	7:57:56	695	76	534
6/14/2008	7:57:57	695	75	533

Processed output sample

Date	Time	Chl sig (µg/l)	N/U	Chl sig (raw)	Therm
6/14/2008	7:57:55	26.99	695	3534	544
6/14/2008	7:57:56	26.97	695	3544	544
6/14/2008	7:57:57	27.06	695	3544	545

---

7. To save data from the meter, create a folder, or the filename when prompted, in the host PC's "root" file structure.
   - Select **Record Raw** and create a filename
   - Select **Record Engr** and create a filename.

   The host computer will simultaneously save time-synchronized .raw and .eng files.

8. For *ECO* meters capable of internally logging data, logging is enabled (factory-set) under the Meter Setup tab.
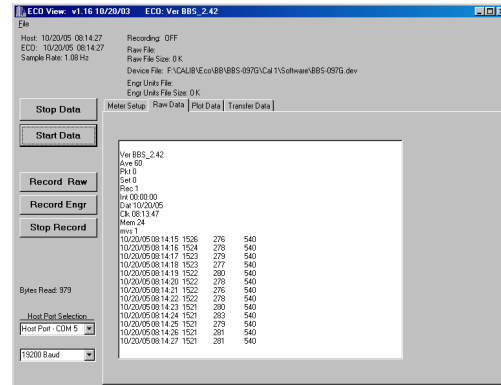
Internal logging is ON.

Internal logging is OFF.

1.2   Checkout

1. Supply power to the *ECO* meter. As shipped from the factory, *ECO* meters will immediately begin outputting data.

2. Select the Raw Data tab to view incoming data. The Bytes Read to the left will increment.

   You may also view incoming data using the Plot Data tab. The X-axis represents sample counts and the Y-axis represents data units, which are user-selectable. Refer to section 3.5 for details on using features associated with this tab.
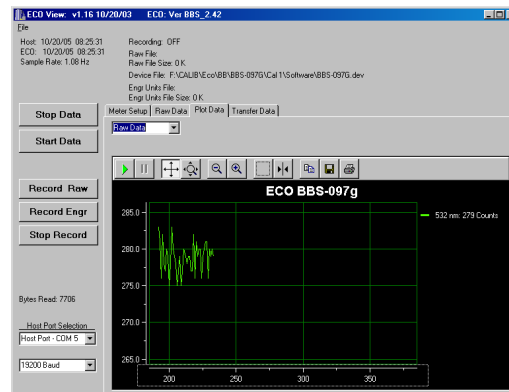
3. Allow the meter to run a minute or so. The Record Raw File Size and Record Engr File Size will increment.

4. **Check *ECO* Signal Response**: Remove the ECO's protective cap and check for signal response using the fluorescent stick that shipped with your meter, or your finger. As either object moves closer to the detector light, the output counts should increase toward saturation, approximately 16355 for single-channel meters, or 4120 for two-and-three-channel meters. PAR meters only: Cover the circular window with your finger or other solid object. Output counts should fall to approximately 50.

5. Select Stop Data.

6. Meters with internal memory:
   Transfer internally logged data to the host computer by selecting the Transfer Data tab, then Receive Data. Status indicators to the right of this button will display file upload progress.
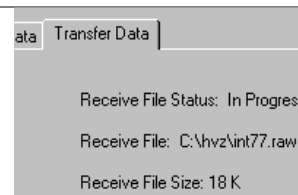
   Select Erase Memory either under the Transfer Data tab or the Meter Setup tab to delete the data stored in the meter (if so equipped).

Refer to Section 2.1 for details on setting up your meter for a specific application or data collection regime.

Sample output from a Triplet (scattering at 660 nm, chlorophyll and CDOM fluorescence):

Processed

Count	Date	Time	Beta(660)	Betap(660)	bbp(660)	bb(660)	CHL(ug/l)	CDOM(ppb)
57	061108	104831	0.014690	0.014629	0.101104	0.101556	31.3390	371.1890
58	061108	104832	0.014690	0.014629	0.101104	0.101556	31.3060	371.0980
59	061108	104833	0.014690	0.014629	0.101104	0.101556	31.3170	371.1890
60	061108	104834	0.014690	0.014629	0.101104	0.101556	31.3500	371.1890
61	061108	104835	0.014690	0.014629	0.101104	0.101556	31.3170	371.1890
62	061108	104836	0.014690	0.014629	0.101104	0.101556	31.3390	371.0980

Raw (counts)

| Date	Time	N/U	650nm	N/U	Chl	N/U	CDOM	therm
06/11/08	10:48:14	650	4120	695	2900	460	4120	549
06/11/08	10:48:15	650	4120	695	2895	460	4120	549
06/11/08	10:48:16	650	4120	695	2899	460	4120	549
06/11/08	10:48:17	650	4120	695	2895	460	4120	549
06/11/08	10:48:18	650	4120	695	2898	460	4120	549
06/11/08	10:48:20	650	4120	695	2898	460	4119	549
06/11/08	10:48:21	650	4120	695	2898	460	4119	549
06/11/08	10:48:22	650	4120	695	2897	460	4120	549

2. ECOView Reference

This section contains details about the various controls and options available in ECOView. Since many of these are discussed in the previous section, there is some overlap. This section is intended as a reference for specific controls and options.

2.1 Meter Setup Tab

Selections in the Meter Setup tab allow you to configure the meter for data collection and processing. Settings are stored in non-volatile flash memory, but run using values from RAM memory. Flash settings load into the RAM memory each time the meter is powered. Any changes made to the RAM settings must be stored into the flash memory if you want to use those settings the next time the meter is powered.

Note that for RT meters, only the Set Avg/Data Rate, Set Number of Samples, and Analog Range configuration settings apply.
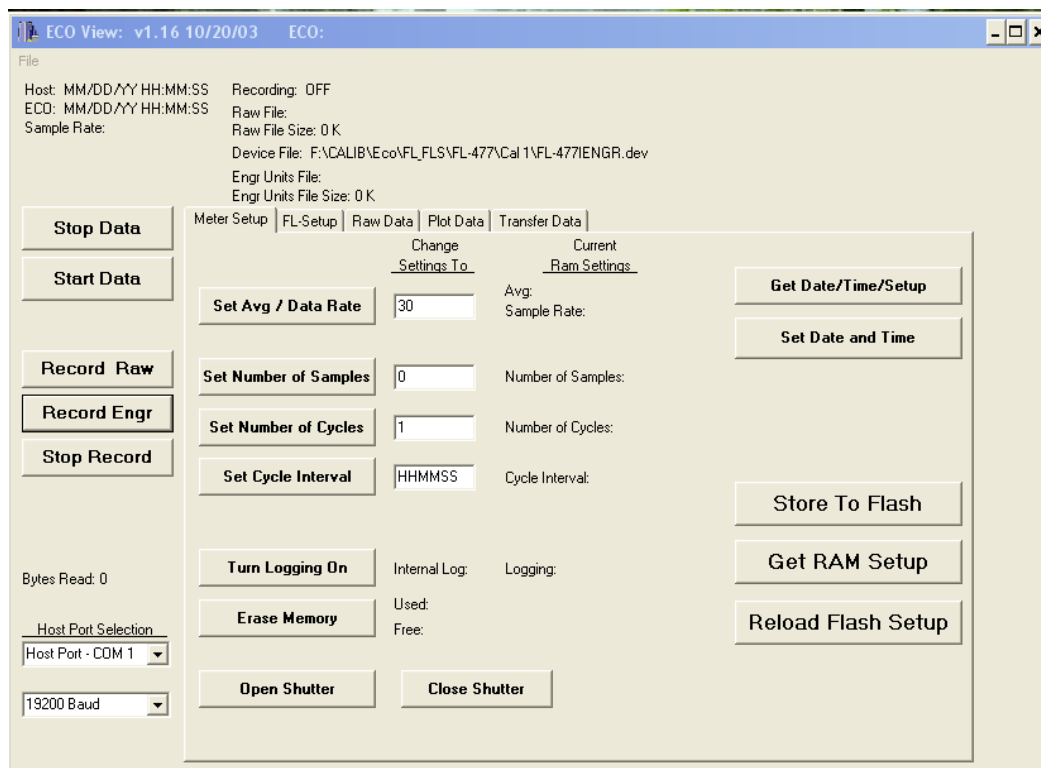
The Current Ram Settings column in the middle of the Meter Setup window indicates which settings are currently stored in the meter's RAM memory.

The Change Settings To column allows you to input the settings that will be written to RAM when you select the associated button on the left. Settings cannot be changed when the meter is "sleeping" (in a low power state) or collecting data.

Store Settings To Flash Memory

Inputting the desired settings, followed by selecting the associated button, then pressing Store to Flash will write the settings into the meter's flash memory. These settings are overwritten each time they are changed and Store To Flash is pressed. To restore the values stored to flash memory, press Reload Flash Setup.

Changing Settings in Meter's RAM Memory

Inputting the desired setting in the Change Settings To column, then pressing the associated button to the left will change the setting(s) in the meter's RAM. The yellow status box will display Setup not Stored, but the meter will use the values in the Current Ram Settings column when collecting data. To store the current settings, Press Store To Flash.

ECO meters are factory-configured to run continuously at approximately 1Hz with internal logging (if meter is so equipped) turned on. You may change the configuration settings below according to your application in the Meter Setup tab.

Factory default settings in ECOView:

Meter Setup Tab	Raw Data Tab	Description
Set Avg / Data Rate	Ave 30	Number of measurements that constitute a sample.
Set Number of Samples	Pkt 0	One row of output; "0" is continuous operation.
Set Number of Cycles	Set 0	Number of samples between low power states; "0" is continuous operation.
Turn Logging OFF	Rec 1	"1" is ON; "0" is OFF.
Set Cycle Interval	Int 00:00:05	hours:minutes:seconds; the low power time between cycles (groups of samples).

1. The meter needs to be in a "ready" state to accept parameter changes: make sure power is supplied to the meter. Select Start Data if necessary, then Stop Data.

2. Click in the white input area under the Change Settings To column and input the desired value.

3. Click the associated button to the left.

4. Select Store To Flash to save the new settings in the *ECO* meter. Settings stored to the meter will appear under the Current RAM Settings column.

WET 🌐 Labs

Configurable Settings

Set Avg / Data Rate

Change Settings To: 60
Current Ram Settings: Average: 60, Sample Rate: 1.08 Hz

This setting determines the rate of output. Selectable from 1 to 65535. The higher the number, the lower the sampling rate (Hz). Approximate **Average** values:

	single-channel	**two-channel**	**three-channel**
1 Hz	55	28	28
2 Hz	25	15	6

Set Number of Samples

0
Number of Sample: 0

The number of samples (a row of data) coming from the instrument. Selectable from 0 to 65535. Selecting "0" will result in continuous operation.

Set Number of Cycles

0
Number of Cycles: 0

Not applicable for RT meters.

The number of "groups" of samples the instrument will collect between low power ("sleep") states. It is configurable from 0 to 65535.

Set Cycle Interval

000005
Cycle Interval: 00:00:00

Not applicable for RT meters.

The time interval between cycles (groups of measurements) in HHMMSS. Enter time in "000000" format, without colons. Note that the time interval **must** be set for 5 seconds or more. ECOView ignores this parameter if Set Number of Cycles is set at 0.

Turn Logging OFF

Internal Log: Logging: ON

Turn Logging ON

Internal Log: Logging: OFF

Not applicable for RT meters.

ECO meters are equipped to internally log up to approximately 1 Mb of data (approximately 90,000 samples).

Example Settings

Moored Data Collection
Set Avg/Data Rate = 55
Set Number of Samples = 60
Set Number of Cycles = 24
Set Cycle Interval = 005900
Turn Logging On/Off= On
The instrument will collect 60 samples, approximately one second apart, once every hour for 24 hours, internally logging data.

| **Profiling Data Collection** |
|---|
| Set Avg/Data Rate = 55 (or 1 Hz) |
| Set Number of Samples = 0 |
| Set Number of Cycles = n/a |
| Set Cycle Interval = n/a |
| Turn Logging On/Off= On |
| |
| The meter will begin collecting samples approximately once per second, internally logging data, until power is removed. |

✓ **Operation Tip**

If you configure the Set Number of Samples to a low number (less than 5) the meter will sample the specified number of times, then may go into a sleep state and you will be unable to communicate with it. This is common for moored operations, where the meter may be set up to take a few samples every several hours. Between samples, the meter will be in a low power "sleep" state, during which time communication is disabled.

To "wake" the meter and re-establish communication, turn off power to the meter for one minute. Select Stop Data several times at approximately 2 times per second while applying power. When the settings menu appears at the bottom of the Raw Data tab, communication has been re-established. Make any desired changes at the Meter Setup tab.

2.1.1   Fluorometer-only Configuration

When a fluorometer device file is loaded, ECOView will display the FL-Setup tab below. ECOView supports *ECO* chlorophyll, CDOM, rhodamine, uranine (fluorescein), phycocyanin, and phycoerythrin fluorescence meters.
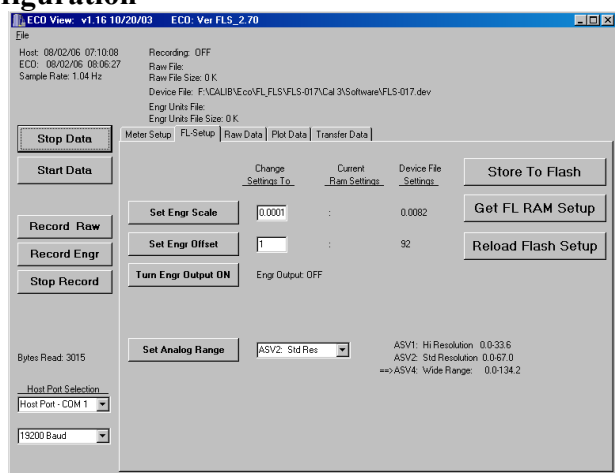
Note

Processed output for chlorophyll is in µg/l and ppb for all other fluorometers.

As in the Meter Setup tab, The Current Ram Settings column in the middle of the Meter Setup window indicates which settings are currently stored in the meter's memory.

The Change Settings To column allows you to input the settings that will be written to RAM when you select the associated button on the left. Settings cannot be changed when the meter is "sleeping" (in a low power state) or collecting data.

The Device File Settings column displays device file settings that are currently stored in the fluorometer's flash memory.

	Change Settings To	Current Ram Settings	Device File Settings
Set Engr Scale		0.0082	0.0082
Set Engr Offset		92	92

Set Engr Scale: Changing this value will change the setting in the meter. ECOView uses the meter's device file to calculate processed output (in µg/l) from the meter's signal. Refer to your meter's characterization sheet for details.
Set Engr Offset: "Dark Counts" value, saved in the meter, used in conjunction with the scale for output.

Both Scale and Offset are set at the factory and are user-configurable (fluorometers only).

— iENGR: 0.79
— CHL: 0.79 ug/l

Note that if you change the Scale Factor and the Engineering Offset in the meter, you must change the device file for ECOView to correctly process data using meter settings.

As a check, ECOView provides the meter output in white and the software (using the device file) output in pink. If the values are not the same or very close, check both the meter settings and the device file values and make sure they are saved in the meter and the software.

Turn Engr Output ON   Engr Output: OFF

When the standard .dev file is loaded, toggle the Engr Output to OFF. Output will be displayed in counts in the Raw Data tab.

Turn Engr Output OFF   Engr Output: ON

When the processed data (IENGR.dev) device file is loaded, toggle the Turn Engr Output to ON. An additional column of output in µg/l will display in the Raw Data tab,

Meter Setup | FL-Setup | Raw Data | Plot Data | T
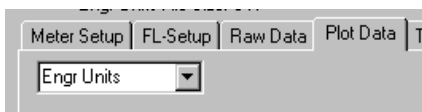
Engr Units

Data may be viewed in µg/l and counts by selecting Engr Units in the Plot Data tab.

Set Analog Range   ASV4: Wide Range ▾

ASV1: Hi Resolution 0.0-31.6
ASV2: Std Resolution 0.0-63.2
==>ASV4: Wide Range: 0.0-126.4

Analog Range: Allows you to select a sensitivity range for analog output. The default is ASV4, Wide Range resolution.

2.1.2 PAR Sensor-only Configuration

When a PAR device file is loaded, ECOView will display the PAR-Setup tab below. Selections here will allow you to create device files, and configure the PAR depending on whether it is immersed in water or not.
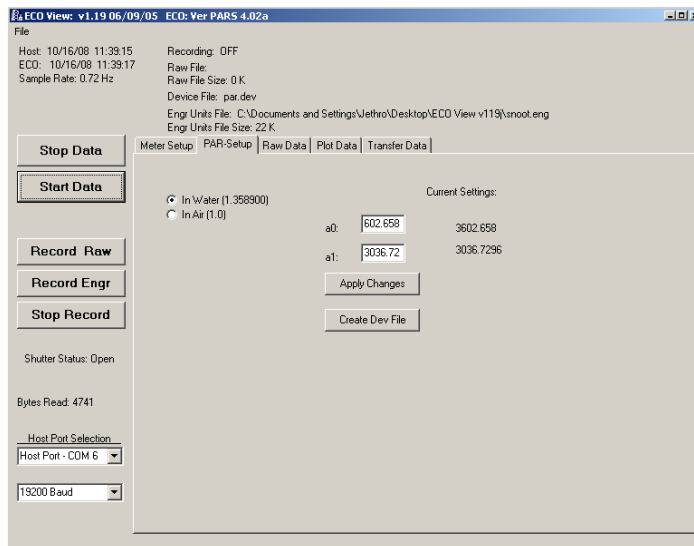
To change calibration coefficients:
- Enter new values into the a0 and a1 boxes.
- Select Apply Changes to store the new values in the meter.

To create a device file that ECOView can read, make your changes, then select Create Dev File. You will be prompted to provide a file name.

2.2 Raw Data

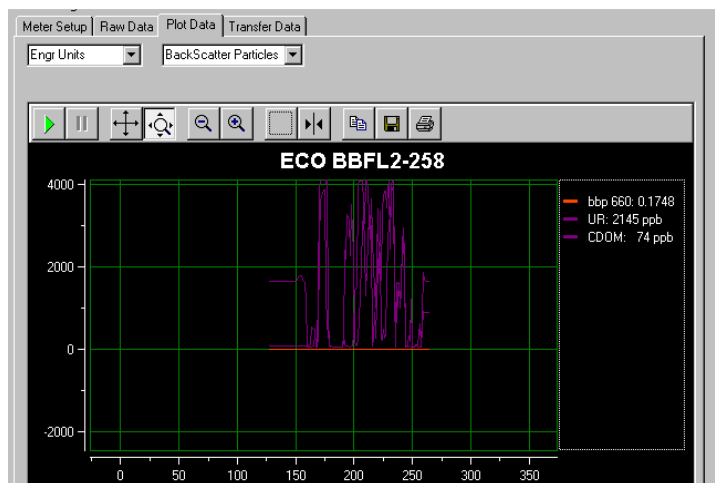The Raw Data tab allows you to view data in real-time.

It also provides configuration information at the end of every sampling sequence.

Use the arrow keys or the Page Up/Page Down keys at the host computer to scroll through a file.
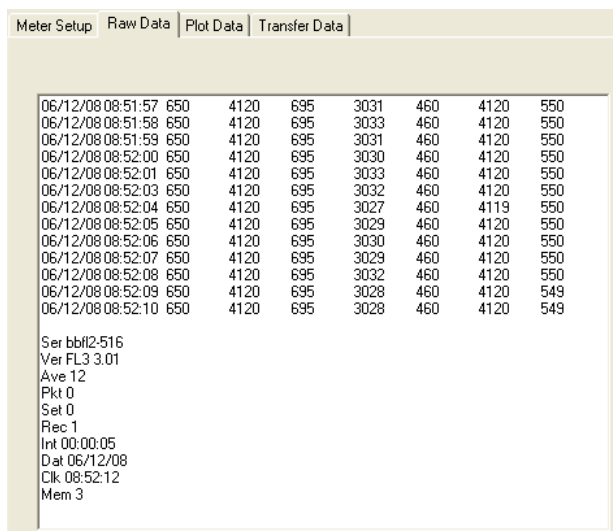
2.3   Plot Data

The Plot Data window provides a variety of options to plot incoming data.


2.3.1 Output Type

Scattering meters*:* if Engineering Units is selected, the backscatter calculation pull-down menu control will allow you to select one of the following for BB meters:

- Beta (117)—The total volume scattering
- Beta-Particle—The volume scattering of particles only
- bbp—Backscattering of particles
- bb—Total backscattering.
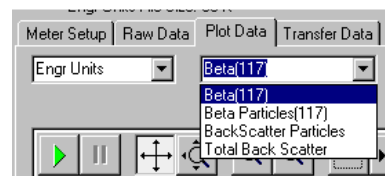
Fluorometers: Output can be plotted in either µg/l or counts if the meter's IENGR.dev file is loaded and the Turn Engr Output button in the FL-Setup tab is toggled ON.

Output will plot in counts only if the standard device file is loaded.
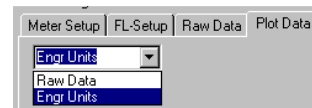
See Section 3.5 for sample device files.

The toolbar allows for a variety of changes to the way data is plotted. Note that changes to the plot will not affect the data recording. In addition to the toolbar options, you can click on the numbers of either axis and change the values by dragging.

|		
▷	**Resume**	Resume tracking. If the triangle is green, this button may need to be pressed to resume tracking.
‖	**Pause**	Pause tracking. This stops the scrolling of the X-axis.
↕	**Axes Scroll**	Drag either axis up or down, right or left.
↕	**Axes Zoom**	Zoom the axis up or down, right or left. Allows user to scale the axes for coarser or finer plotting.
⊖	**Zoom Out**	Decrease the zoom by 2x.
⊕	**Zoom In**	Increase the zoom by 2x.
▢	**Zoom Box**	Draw a box on the plotting area and zoom all axes around selected area.
▸◂	**Cursor**	Slide the resulting bar to a specific data point.
▤	**Copy**	Send a copy of the current plot to the host PCs clipboard.
▤	**Save**	Save a copy of an image of the current plot to a file.
▤	**Print**	Send a snapshot of the data plot to a printer.

2.4   Transfer Data

Internally logged data from the meter can be uploaded to the host computer using the Transfer Data tab. *Does not apply to RT meters.*

✓ *Tip: Change the meter's* Data Rate *to 4 Hz to reduce data transfer time.*
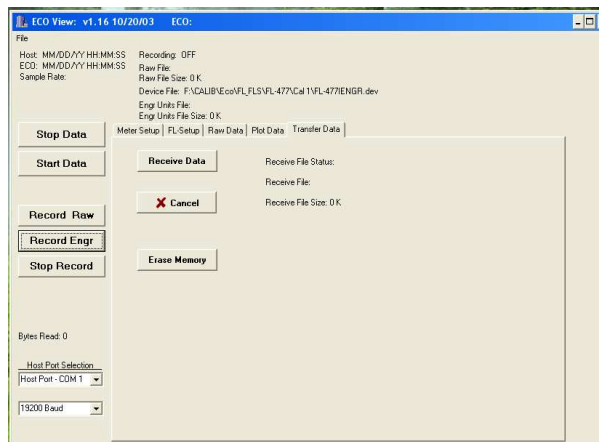
Receive Data: Clicking this button brings up a window that asks you to name the file to save, and saves it to a user-specified location as a .raw file type.

Cancel: Stops the "receive" (upload) process.

Erase Memory: Clicking this button will erase the 1 Mb memory in the instrument. The available memory is displayed at the bottom of the **Meter Setup** window. (Memory can also be erased in the **Meter Setup** window.)

The status messages **Receive File Status**, **Receive File**, and **Receive File Size** indicate the progress of the file transfer from the meter to the host computer.

2.5 Data Collection Control

Instrument control options are on the left side of the window:

If **Real Time Data** is checked under the **File** pull down menu, selecting **Start Data** will start data collection. **Start Data** will stop data collection.

2.6 Other Controls
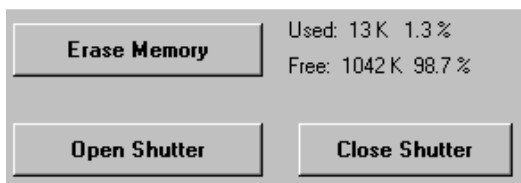
Erase Memory: Allows you to erase data stored within the instrument. Each data measurement taken by the meter uses approximately 20 bytes of memory: the total memory capacity is approximately 50,000 measurements.

Not applicable for RT meters.

Open/Close Shutter: Allows user to open or close the *bio-wiper™* (FL- and BB-equipped units only) by selecting the appropriate button.

Get Date/Time: Pressing this button will retrieve the date and time from the meter.

Set Date/Time PC: Pressing this button will send the host PC's current date and time settings to the meter.

Store To Flash: Pressing **Store to Flash** will save the configurations you selected into the meter's flash memory, where they will stay until they are changed and **Store to Flash** is pressed again.

Get RAM Setup: Retrieves the temporary settings from the RAM memory that appear under the Current Ram Settings column.

Reload Flash Setup: Retrieves settings from the flash memory.

Record Raw: Opens window to input a file name for saving the data to be recorded. Data will be logged to the host PC.

Record Engr: Opens a window that prompts for a filename for processed data. Note that Record Engr is the only place that processed data can be saved.

Stop Record: Ends a recording session.

You can simultaneously collect both raw and engineering data:
1. Select Record Raw. Input a filename.
2. Select Record Engr. Input a filename.
3. Press Start Data. Time-synchronized raw and engineering unit files will be saved on the host computer.

Data collected internally to the meter or data saved by the ECOView host program may be replayed in ECOView:
1. Select File/Replay Raw Data from the menu bar.
2. Select a file name to be replayed. This will change the Stop Data and Start Data buttons to Stop Replay and Start Replay.
3. Press the Start Replay button.

If Replay Raw File is checked under the File pull down menu, selecting Stop Replay stops replaying saved data. Start Replay (or Resume Replay) starts or resumes replaying saved data.

To resume real time data collection, select File/Real Time Data from the pull-down menu.

File: Dropdown menu that with the following options:
- Load Device File: Allows you to select and open a device file.
- Real Time Data: This is the default, allowing you to view data as it is received.
- Replay Raw File: Allows you to select a previously saved raw file to replay.
- Advanced Setup: Factory use only.
- Alternate Commands: Factory use only.
- Exit: Quits the ECOView program.

2.7 Status Information

Meter status information is displayed in the top portion of the screen.

File

Host: 06/11/08 10:49:15
ECO: 06/11/08 10:48:46
Sample Rate: 1.02 Hz

Recording: Raw + Engr Units
Raw File Name: C:\Documents and Settings\Heidi\Desktop\test1.raw
Raw File Size: 1 K
Device File: F:\CALIB\Eco\BBFL2\bbfl2-516\Cal 1\BBFL2-516.dev
Engr Units File: C:\Documents and Settings\Heidi\Desktop\engr2.eng
Engr Units File Size: 2 K

- **Host**: Date and time according to the host computer.
- **ECO**: Date and time according to the meter (*does not apply to RT meters*).
  Both of these times are updated when the meter sends data (approximately once per second), when you press Get Date/Time, and when you press Store to Flash to send settings to the meter.

- **Sample Rate**: Sample rate in Hz, calculated from the value selected using Set Avg/Data Rate. Also appears in Meter Setup tab under Current Ram Settings.
- **Recording**
  - OFF: no data being sent and saved to host.
  - Raw: raw data is being sent and saved to host.
  - Engr: engineering units data is being sent and saved to host.
  - Raw and Engr: Both raw and engineering data are being sent and saved to host.
- **Raw File Name**: name of file data is being saved to.
- **Raw File Size**: size of data file being saved to host PC.
- **Device File**: name of the device file applied to data.
- **Engr Units File**: name of file processed data is being saved to.
- **Engr Units File Size**: size of processed data file being saved to host PC.

At the bottom left corner of the window:
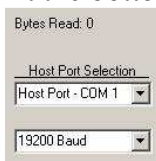
- Bytes Read indicates how much data the host program has received.
- Host Port allows selection of a specific COM port. Ports 1–8 are available.
- Baud rate is selectable at 4800, 9600, 19200 (default), and 38400.

3. ECOView Device Files

The ECOView program requires a device file to provide engineering unit outputs for any of its measurements. Except for the first line in the device file, all lines of information in the device file that do not conform to one of the descriptor headers will be ignored. Every ECOView device file has three required elements.

3.1 Plot Header

The first line in the device file is used as the plot header for the ECOView plots.

3.2 Column Count Specification

The Column Count Specification identifies how many columns of data to expect. It follows the format "Column=x." The Column Count Specification must be present before any of the Column Descriptions are listed.

3.3 Column Description

Every column in the *ECO* meter's output must have a corresponding Column Description in the device file. The following notation is used in identifying the elements of each Column Description.

x = the column number, starting with 1 as the 1st column
sc = scale
dc = dark count, same as offset
off = offset, same as dark count
mw = measurement wavelength—wavelength used by the sensor for its measurement
dw = display wavelength—display wavelength—wavelength/color range (380–780 nm)
v = measured volts dc

Valid Column Descriptions are listed in the subsections below.

3.3.1 Fluorescence Measurements
CHL=   x   sc   off
IENGR=   x
PHYCOERYTHRIN= x   sc   off
PHYCOCYANIN=   x   sc   off
URANINE=   x   sc   off
RHODAMINE=   x   sc   off
CDOM=   x   sc   off

3.3.2 Miscellaneous
Date=x   MM/DD/YY
Time=x   HH:MM:SS
N/U=x   Not Used

3.3.3 Scattering Measurements
Lambda=x sc   off   mw   dw   scatter sensor column

3.3.4 Turbidity Measurements

NTU=x   sc   off   turbidity measurement

3.3.5 PAR Measurements

PAR=x

3.4 Optional Scatter Sensor Parameters

There are several defaulted parameters that ECOView uses in the scatter calculations for BB meters. These parameters are (a) salinity, (b) water type—fresh or sea water, (c) Chi, and (d) theta—the measurement angle. The user may change these using the following device file elements (the values shown are the defaults).

Salinity=23   23 ppt
Water=Sea   Meter is assumed to be in salt water (Use "Pure" for fresh water)
XFactor=1.1   X Factor Correction Value
Theta=117   Back scattering angle

Single-sensor fluorometers have optional parameters that can be used to modify either the analog output or the internally calculated engineering units output.

To vary the output range of a single sensor fluorometer, use the following parameters:
maxvoltage=v
ASV1=sc1
ASV2=sc2
ASV4=sc4

where v is the maximum output of the sensor, and sc$x$ is an engineering units-per-volt scale for each scale setting. Multiply v by sc$x$ to get the maximum output value for each Analog Scale Setting. These parameters will appear on the FL-Setup tab of ECOView.

To change the internally calculated fluorescence values, the internal scale offset can be set by the user from the FL-Setup tab. They are listed as a reference of the factory setting for the user when the user manually adjusts the scale and offsets that are used in the engineering unit calculations. Engineering units are displayed through ECOView where appropriate. The parameters for changing the internally calculated engineering units are:

iengrscale=sc
iengroffset=off
iengrunits=label   where label is any continuous character string.

3.5 Sample Device Files

3.5.1 Fluorometer, unprocessed output

The standard device file for an *ECO* chlorophyll fluorometer contains no capability for displaying the meter's output in µg/l chlorophyll. The Turn Engr Output ON toggle button in the FL-Setup tab of ECOView will not be functional.

```
ECO FL-001 Device File
Created on: 01/23/06

iengrscaleoffset=4

: column 4 = input scale factor and offset.

maxvoltage=4.98
asv1=6.5
asv2=12.4
asv4=26.5

COLUMNS=5
DATE=1
TIME=2
N/U=3
chl=4    0.0089    85.0
N/U=5
```

3.5.2 Fluorometer, processed output

The device file for obtaining processed data contains a column for displaying the meter's output in µg/l chlorophyll. Load the appropriate device file in ECOView and use the Turn Engr Output ON toggle button in the FL-Setup tab to activate this feature.

```
ECO FL-001
Created on: 01/23/03

iengrunits=µg/l
iengrscaleoffset=5

: iengrunits = µg/l for CHL. ppb for CDOM, uranine, phycocyanin and
phycoerythrin
: column 5 = input scale factor and offset.

maxvoltage=4.98
asv1=6.5
asv2=12.4
asv4=26.5

: Has internal CHL in meter output

COLUMNS=6
DATE=1
TIME=2
IENGR=3
N/U=4
chl=5 0.0085   6.0
N/U=6
```

3.5.3 Real-time Fluorometer (FLRT)

```
ECO FLRT-100
Created on: 11/12/03

iengrscaleoffset=5

: chl=ug/l
: iengrunits = µg/l for chlorophyll and phycoerythrin; ppb for CDOM
and uranine.
: column 5 = input scale factor and offset.

maxvoltage=4.98
asv1=6.394
asv2=12.7668
asv4=25.5414

: Has internal CHL in meter output

COLUMNS=6
DATE=1
TIME=2
IENGR=3
N/U=4
chl=5    0.0078   110
N/U=6
```

3.5.4 Scattering Meter

```
ECO BB3-xxx
Created on: 9/20/06

Columns=9
Date=1
Time=2
N/U=3
Lambda=4          0.0026  51.0     470      470
N/U=5
Lambda=6          0.0011  55.5     530      530
N/U=7
Lambda=8          0.0019  55.5     650      650
N/U=9
```

3.5.5 PAR Meter

```
ECO PAR-xxx
Created on: 10/06/08

COLUMNS=3
DATE=1
TIME=2
PAR=3
```
$im=1.3589$
$a_1=3036.7296$
$a_0=3602.6580$

Appendix: Terminal Communications

ECO sensors can be controlled from a terminal emulator or customer-supplied interface software. Hardware requirements and low-level interface commands for this type of operation follow.

Interface Specifications

- baud rate: 19200
- stop bits: 1
- data bits: 8
- flow control: none
- parity: none

Command List

Command	Parameters passed	Description
!!!!!	none	Stops data collection; allows user to input setup parameters. Note that if the meter is in a sleep state, the power must be turned off for a minute, then powered on while the "!" key is held down for several seconds. If this does not "wake" the meter, refer to the ECOView user's guide Operation Tip to "wake" a meter in a low power sleep state to enable inputting setup parameters.
$asv	1, 2, or 4	Analog scaling value. Counts will be divided by this for analog output: a value of 4 will make the analog output cover the whole output range; 2 will cover half, and 1 will cover only the bottom fourth of the 14-bit count range (fluorometers only).
$ave	single number, 1 to 65535	Number of measurements for each reported value
$cal	1 (on) or 0 (off)	Single-channel chlorophyll fluorometers only: toggles column outputting "processed" data (µg/l).
$clk	24hr format time, hhmmss	Sets the time in the Real Time Clock
$dat	date, format ddmmyy	Sets the date in the Real Time Clock
$emc	none	Erases the Atmel memory chip, displays menu when done
$get	none	Reads data out of Atmel memory chip. Prints "etx" when completed.
$int	24hr format time, hhmmss	Time interval between packets in a set
$mnu	none	Prints the menu, including time and date
$pkt	single number, 0 to 65535	Number of individual measurements in each packet
$rec	1 (on) or 0 (off)	Enables or disables recording data to Atmel memory chip
$rls	none	Reloads settings from flash
$run	none	Executes the current settings
$set	single number, 0 to 65535	Number of packets in a set
$sto	none	Stores current settings to internal flash
$ugl	0 to 255	µg/l conversion value (calculates slope x 10,000). Chlorophyll fluorometers only.

Revision History

Revision	Date	Revision Description	Originator
A	9/24/02	New document (DCR 243)	D. Romanko, W. Strubhar
B	11/18/02	Include RT meter functional limitations (DCR 253)	D. Romanko, W. Strubhar
C	12/4/02	Add analog range selectability (DCR 258)	D. Romanko, W. Strubhar
C1	1/24/03	Add "walk-through" section for startup and Fluorometer-only tab	D. Romanko, H. Van Zee, D. Whiteman
D	2/21/03	Approved "walk-through" section for startup and Fluorometer-only tab (DCR 270)	D. Romanko, H. Van Zee, D. Whiteman
D1	7/7/03	Update to software v. 1.13 (DRAFT)	D. Romanko
E	7/10/03	Update to software v. 1.13 (DCR 314)	D. Romanko
F	11/24/03	Operation tip from low power state (DCR 342)	W. Strubhar
G	12/7/05	Update user's guide (DCR 478)	H. Van Zee, R. Watte
H	8/15/06	Update user's guide (DCR 503)	M. Johnson, H. Van Zee
I	3/18/08	Change default ASV from 2 to 4 (ECN 285, DCR 573)	M. Johnson, H. Van Zee
J	3/9/09	Add PAR capability, revise software to v1.20, update user's guide (DCR 631)	J. Bell, H. Van Zee