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. Introduction

ECOView host software provides a graphical user interface that allows users to configure, collect, view, and upload data from a variety of *ECO* instruments. The flexible *ECO* meters require minimal setup and configuration to run properly. Section 2 provides a "walk-through" to setting up and obtaining data from *ECO* meters.

Required components for testing *ECO* meter:
1. *ECO* meter.
2. A host PC.
3. Power source: either a test cable (optional equipment, with a 9V battery and six-pin and DB-9 connectors), OR a 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), user's guides, and sample output files.

"**Real Time**" (RT) *ECO* meters: not all of the functions in the ECOView host software are available, as the RT meters do not have
1. memory for internally logging data
2. a time clock for data time stamping.

These exceptions are noted where applicable in the manual.

2. Setup and Operation

ECO meters are designed to work with the ECOView host software and are easily configured for a variety of applications. We strongly recommend you read through this section to get your meter up and running **before** deployment.

1. Make sure the 9 volt battery is disconnected from the (optional) test cable, or if using a regulated power supply, it is off. For testing output functionality, the protective cap may be left on the meter.

2. Insert the host program CD into the host computer. Copy all files to a desired location on the host computer's hard drive. Install ECOView.

3. Plug the test cable's DB-9 connector into the host computer's serial port and connect the instrument to the test cable, then connect the test cable to a 9V battery or regulated power supply.

4. Start the program by double-clicking ECOView.exe. The screen below will appear.
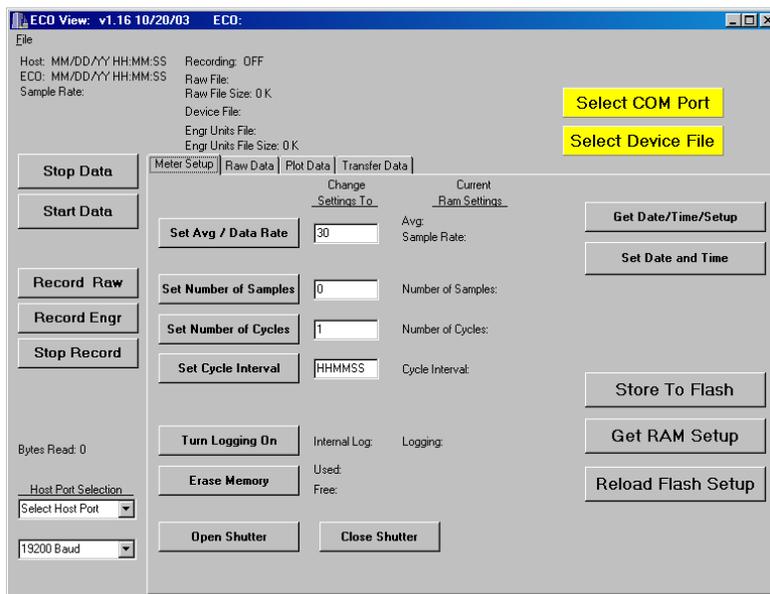
Meter Setup tab

5. Click the yellow Select COM Port button. Select the appropriate COM port and baud rate (19200 is default) for meter–PC communication.

6. Click the yellow Select Device File button, then choose the instrument-specific device file from the CD to load.

Chlorophyll Fluorometers only:

These meters ship with two device files (See Section 5.5 for samples). The "standard" processes data in counts. The second has an additional column that processes records into µg/l in a terminal program, and if used with ECOView provides for plotting of processed units. When either fluorometer device file is loaded into ECOView, an FL-Setup tab appears.

Turn processed (µg/l) data on by selecting the Turn Engr Output OFF/ON button, then storing to the meter's memory.
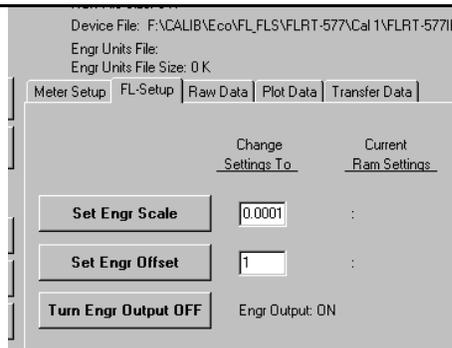
Standard output sample						Processed output sample					
Date	**Time**	**Chl Ref**	**Chl Sig**	**Therm**		**Date**	**Time**	**Chl sig (µg/l)**	**Ref**	**Chl sig**	**Therm**
6/14/2005	7:57:55	5194	75	16380		6/14/2005	7:57:55	26.99	5194	3535	544
6/14/2005	7:57:56	5199	76	16380		6/14/2005	7:57:56	26.91	5194	3525	544
6/14/2005	7:57:57	5201	75	16380		6/14/2005	7:57:57	27.06	5201	3544	545

Incoming data can be viewed in either counts or µg/l in the Plot Data tab.

7. Set up the meter to save data:
   - Select Record Raw (data in counts) and create a filename
   - Select Record Engr (processed data) and a filename.

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

   For *ECO* meters capable of internally logging data: data logging is enabled (factory default) under the Meter Setup tab.

Turn Logging OFF	Internal Log:	Logging: ON	Internal logging is ON (default).
Turn Logging ON	Internal Log:	Logging: OFF	Internal logging is OFF.

8. Select the Raw Data tab to view the scrolling data as it is received by the host program Supply power to the meter. As shipped from the factory, the *ECO* should begin outputting data upon power-up. Select Start Data if necessary. Use the arrow keys or the Page Up/Page Down keys at the host computer to scroll through a file.

   As incoming data scrolls into the main portion of the Raw Data tab, the Bytes Read to the left will increment.
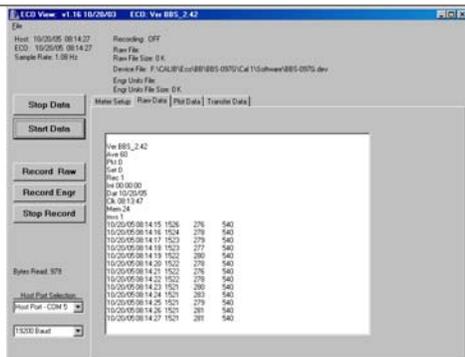
9. You may also view incoming data using the Plot Data tab. The X-axis represents sample counts and the Y-axis represents data units, which are user-selectable. Refer to section 3.5 for details on using features associated with this tab.
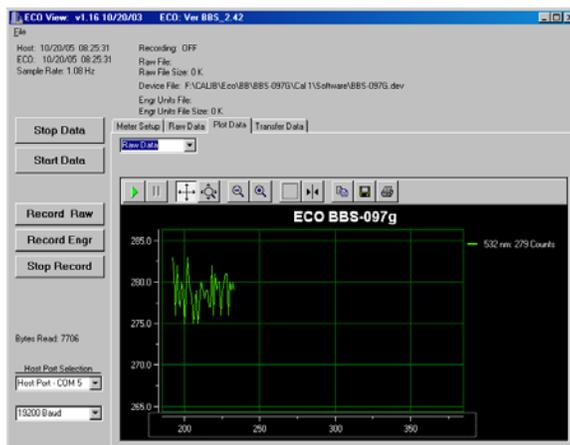
Note
If you have loaded the device file for a fluorometer, the backscatter pull-down menu will not appear.

10. Allow the meter to run a minute or two, or through a cycle you set up for testing output. If you've elected to Record Raw and Record Engr (step 9), the status of those files will be shown at the top of the ECOView screen.

Recording: Raw + Engr Units
Raw File Name: C:\hvz\try77.raw
Raw File Size: 16 K
Device File: C:\hvz\BBFL2-258.dev
Engr Units File: C:\hvz\try77eng.eng
Engr Units File Size: 56 K

Sample output files from a Triplet (one scattering, two fluorescence channels):

Processed data output

Count	Date	Time	Beta(660)	Betap(660)	bbp(660)	bb(660))	ur(raw)	CDOM(raw)
17	070706	065738	0.025359	0.025298	0.174839	0.175291	2088.0276	2.1312
18	070706	065738	0.025359	0.025298	0.174839	0.175291	2086.6770	2.3976
19	070706	065739	0.025365	0.025304	0.174882	0.175333	2094.7806	1.9536
20	070706	065739	0.025359	0.025298	0.174839	0.175291	2096.1312	2 2200
21	070706	065739	0.025359	0.025298	0.174839	0.175291	2089.3782	2.3088
22	070706	065739	0.025365	0.025304	0.174882	0.175333	2096.1312	2.3088

Raw data output (counts)

Date	Time	Red ref	Red sig	Uranine ref	Uranine sig	CDOM ref	CDOM sig	Therm
07/07/06	06:57:38	1395	4123	1429	1600	1104	80	544
07/07/06	06:57:38	1395	4123	1429	1599	1104	83	544
07/07/06	06:57:39	1394	4124	1430	1605	1105	78	544
07/07/06	06:57:39	1394	4123	1430	1606	1105	81	544
07/07/06	06:57:39	1394	4123	1430	1601	1105	82	544

11. You can transfer (upload) 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.
Tip: To speed data transfer, set the meter's data rate to 4 Hz.
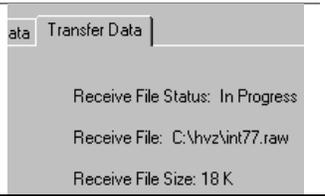
ata Transfer Data

Receive File Status: In Progress

Receive File: C:\hvz\int77.raw

Receive File Size: 18 K

data uploaded from meter (same as .raw above)

```
07/07/06 06:57:38    1395    4123    1429    1600    1104    80    544
07/07/06 06:57:38    1395    4123    1429    1599    1104    83    544
07/07/06 06:57:39    1394    4124    1430    1605    1105    78    544
07/07/06 06:57:39    1394    4123    1430    1606    1105    81    544
07/07/06 06:57:39    1394    4123    1430    1601    1105    82    544
07/07/06 06:57:39    1394    4124    1430    1606    1105    82    544
07/07/06 06:57:40    1394    4123    1430    1608    1105    81    544
```

12. To erase the internal memory in the ECO meter, select Erase Memory either under the Transfer Data tab or the Meter Setup tab.

2.1   Changing Meter Parameters

The factory default settings are sufficient for checking meter operability and for a variety of applications. Refer to section 3 for details and examples regarding these settings.

Setting		Factory default
Set Avg / Data Rate		Approximately 1 Hz (varies by model)
Set Number of Samples		0 (continuous operation)
Set Number of Cycles	*(N/A for RT models)*	0 (continuous operation)
Set Cycle Interval	*(N/A for RT models)*	00:00:05
Turn Logging OFF	*(N/A for RT models)*	ON

To change settings:
a. 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.
b. Click in the white input area under the Change Settings To column and input the desired value.
c. Click the associated button to the left.
d. 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.

3. 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.

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.

3.1 Status

Status information is displayed in the top portion of the screen.

```
File
Host: MM/DD/YY HH:MM:SS
ECO: MM/DD/YY HH:MM:SS
Sample Rate:
```

- Host: Date and time according to the host computer
- ECO: Date and time according to the meter (*does not apply to RT*).
  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 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: 0

Host Port Selection
Host Port - COM 1  ▾

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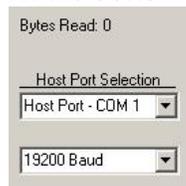
- Bytes Read indicates how much data the host program has received.
- Host Port allows selection of a specific COM port. Ports 1–8 are available.
- Baud rate is selectable at 4800, 9600, 19200 (default), and 38400.

3.2   Data Collection Control

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

Start Data / **Stop Data** — 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.

Record Raw / **Record Engr** / **Stop Record** —

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.
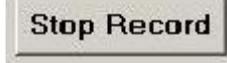
Stop Record: Ends a recording session.

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.

To obtain engineering units from the saved file, press the Record Engr button to select an output file prior to pressing the Start Replay button.

Data collected internally to the ECO 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.

Stop Replay / **Start Replay** — 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.

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

3.3   Configuration Settings

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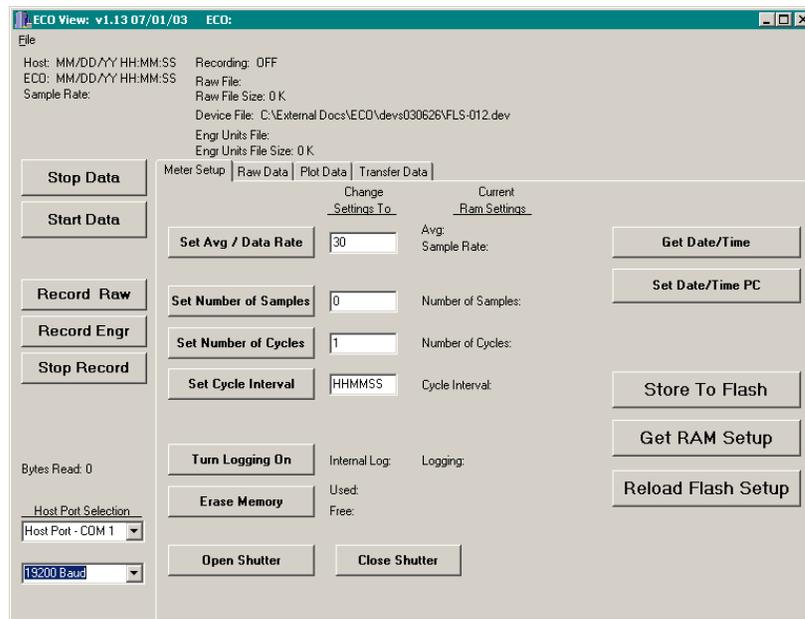
The Current Ram Settings column in the middle of the Meter Setup window indicates which settings are currently stored in the meter's RAM memory.

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 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 60	Number of measurements that constitute a sample. Set to approximately 1 Hz.
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).

To change settings:
1. Stop the meter if it's running (select Stop Data).
2. Click in the white input area in the Change Settings To column, and input the desired value.
3. Click the associated button to the left. Select Store To Flash to save the new settings in the ECO meter.

Configurable Settings

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:

1 Hz	● single-channel *ECOs*: ±55	● two-channel *ECOs*: ±28	● three-channel *ECOs*: ±28
2 Hz	● single-channel *ECOs*: ±25	● two-channel *ECOs*: ±15	● three-channel *ECOs*: ±6

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, using no 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 65,000 samples).

Example Settings

Moored Data Collection	**Profiling Data Collection**
Set Avg/Data Rate = 55	Set Avg/Data Rate = 55 (or 1 Hz)
Set Number of Samples = 60	Set Number of Samples = 0
Set Number of Cycles = 24	Set Number of Cycles = n/a
Set Cycle Interval = 005900	Set Cycle Interval = n/a
Turn Logging On/Off= On	Turn Logging On/Off= On
The instrument will collect 60 samples, approximately one second apart, once every hour for 24 hours, internally logging data.	The meter will begin collecting samples approximately once per second, internally logging data, until power is removed.

✓ **Operation Tip**

If you set the "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 depending on the settings. You will be unable to communicate with the meter. 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, go to the Raw Data tab, turn off power to the instrument for a 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 Setup tab.

3.3.1 Chlorophyll 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), and phycoerythrin fluorescence meters.

Note

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

Selections here allow you to configure fluorometer-specific preferences for scale and offset values.
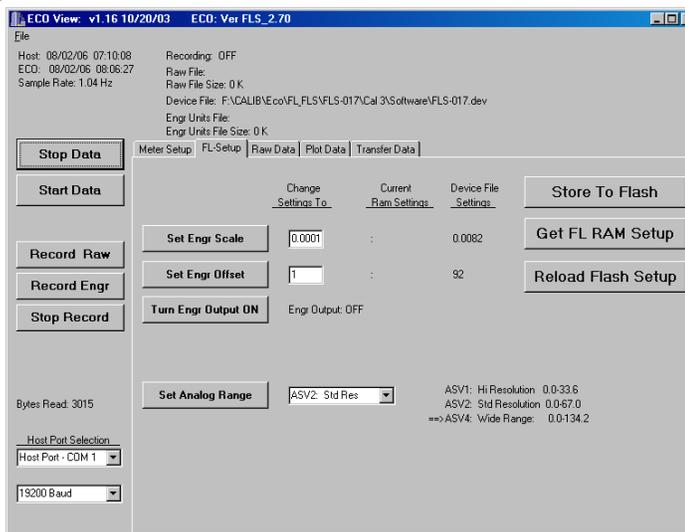
As in the Meter Setup tab, The Current Ram Settings column in the middle of the Meter Setup window indicates which settings are currently stored in the meter's memory.

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.

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 the instrument-specific 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).

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.

When the standard .dev file is loaded, toggle the Engr Output to OFF. Output will be displayed in counts in the Raw Data tab.
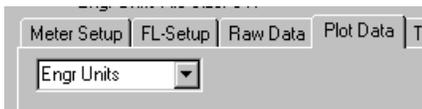
Note that incoming data may be viewed in µg/l by selecting Engr Units in the Plot Data tab.

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, and either counts or µg/l can be viewed in the Plot Data tab.

Analog Range: Allows you to select a sensitivity range for analog output. The default is standard resolution (Std Res).

3.4   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 shutter (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.

3.5   Plot Data

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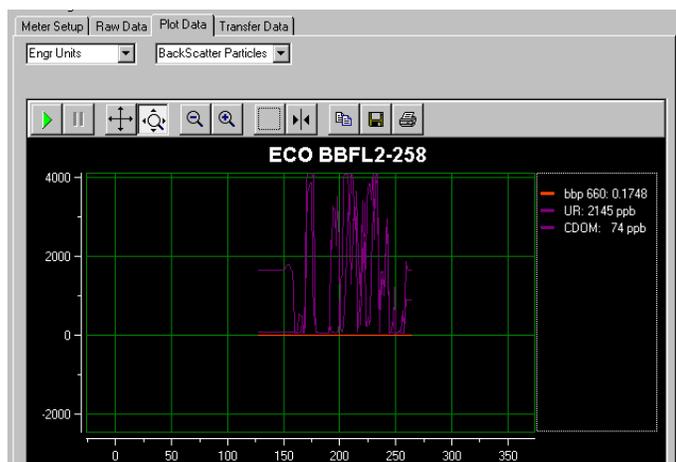
3.5.1 Output Type

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.
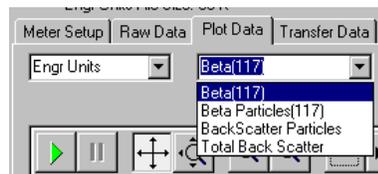
Fluorometers: Output can be plotted in either µg/l or counts if the meter's IENGR.dev file is loaded and the Turn Engr Output button in the FL-Setup tab is toggled ON.
Output will plot in counts only if the standard device file is loaded.
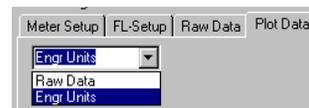
See Section 5.5 for sample device and output files.

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**	Not functional
🖨	**Print**	Send a snapshot of the data plot to a printer.

3.6 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.*
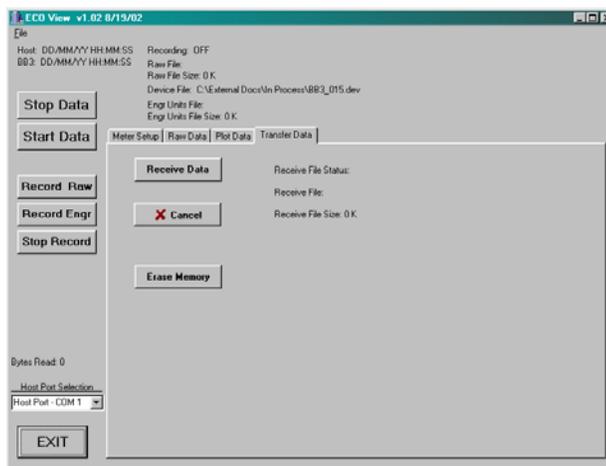
Receive Data: Clicking this button brings up a window that asks you to name the file to save, and saves it to a user-specified location as a .raw file type.

Cancel: Stops the receive 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 files being transferred from the meter to the host computer.

4. Terminal Communications

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

4.1 Interface Specifications

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

4.2 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
$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.

5. 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.

5.1 Plot Header

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

5.2 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.

5.3 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.

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

5.3.2 Miscellaneous
Date=x   MM/DD/YY
Time=x   HH:MM:SS
REF=x   Reference Counts—Currently not used by ECOView
N/U=x   The column is Not Used

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

5.3.4 Turbidity Measurements
NTU=   sc   off   turbidity measurement

5.4 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.

5.5   Sample Device Files

5.5.1   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: 01/23/03

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
REF=3
N/U=4
chl=4   0.0089    85.0
N/U=5
```

5.5.2   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, PC, PE. ppb for CDOM and uranine.
: 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
REF=4
chl=5 0.0085   6.0
N/U=6
```

Below is a sample BB3 (scattering) meter device file.

```
ECO BB3-xxx
Created on: 9/20/02

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

Below is a sample FLRT (Real-time Fluorometer) device file.

```
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
REF=4
chl=5   0.0078  110
N/U=6
```

Refer to www.wetlabs.com for additional device and output file samples.

WET ● Labs

Western Environmental Technology Laboratories Inc.

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