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# **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.

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## 1. Introduction

ECOVView 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. The following sections provide a “walk-through” to setting up and obtaining data from *ECO* meters.

Required components for testing *ECO* meter:

1. *ECO* meter.
2. A host computer running Windows 95 or newer operating system.
3. A test cable (optional equipment) with a 9V battery and six-pin and DB-9 connectors.
4. Banana jacks and power supply, if using a separate power supply.

**“Real Time”** (RT) *ECO* meters: not all of the functions in the ECOView host software are available, as the RT meters do not have

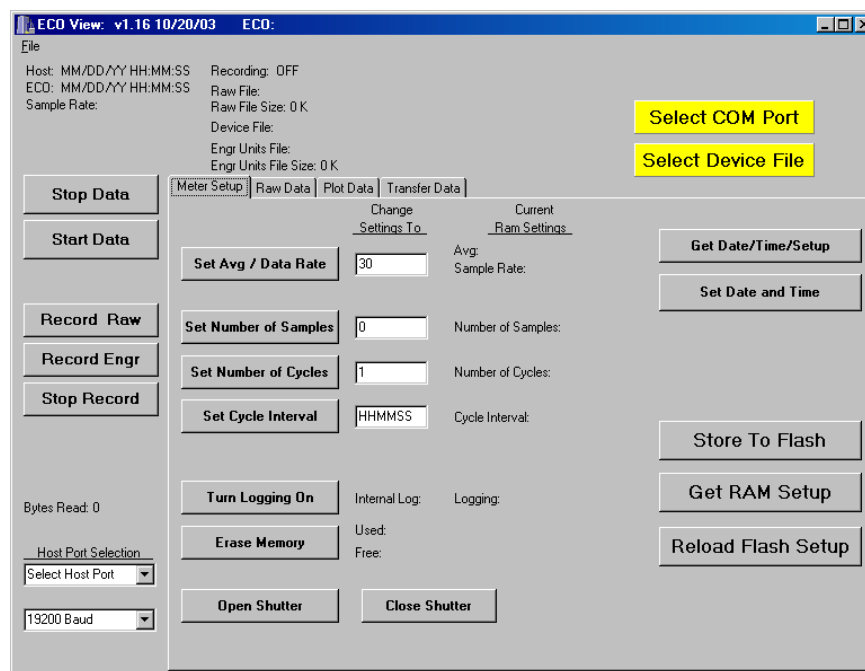
1. memory for internally logging data
2. a time clock for data time stamping.

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. Insert the host program CD into the host computer. Copy all files to a desired location on the host computer's hard drive. It may be desirable to create a shortcut to the program for future ease of use.
2. Make sure the 9 volt battery is disconnected from the test cable (optional equipment).
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 (or the shortcut). The screen below will appear (Figure 1).



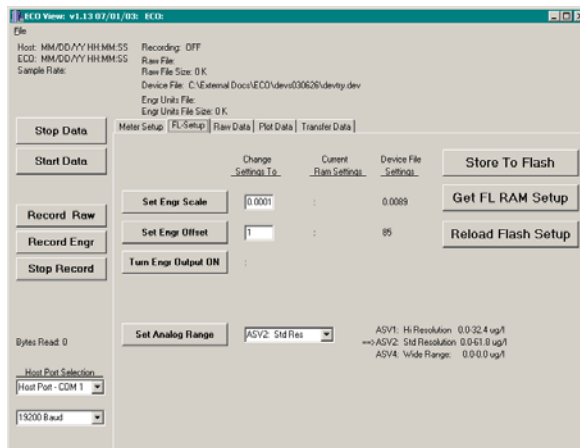
**Figure 1.** Meter Setup tab

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 to load.

**Chlorophyll Fluorometers** ship with two device files (See Section 5.5 for samples). The “standard” processes data in counts. The other processes records into µg/l or ppb when the engineering units output is turned on in ECOView.

When the “processed data” device file is loaded and the Turn Engr Output toggle button is pressed, an additional fluorometer setup tab will appear (Figure 2).

Turn Engr Output ON



**Figure 2.** Fluorometer Setup tab

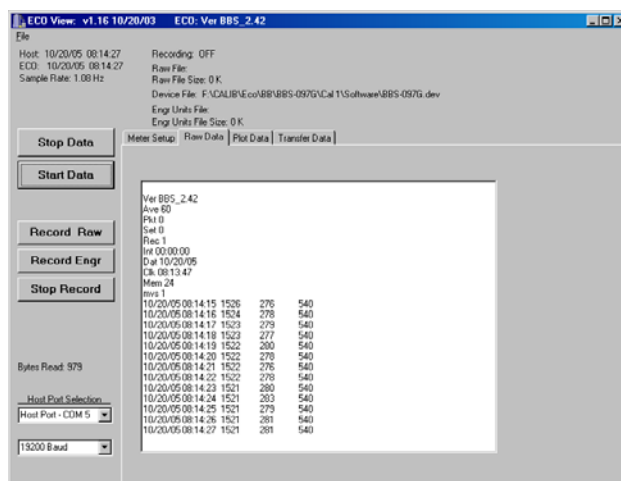
- There are five user-adjustable configuration settings in ECOView. The factory defaults are sufficient for checking meter operability and for a number of applications. Refer to section 3 for details and examples regarding these settings.

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

To change settings (if necessary):

- Make sure power is supplied to the meter.
- Stop the meter if it's running (select Stop Data).
- Click in the white input area in the Change Settings To column and input the desired value.
- Click the associated button to the left.
- Select Store To Flash to save the new settings in the ECO meter.

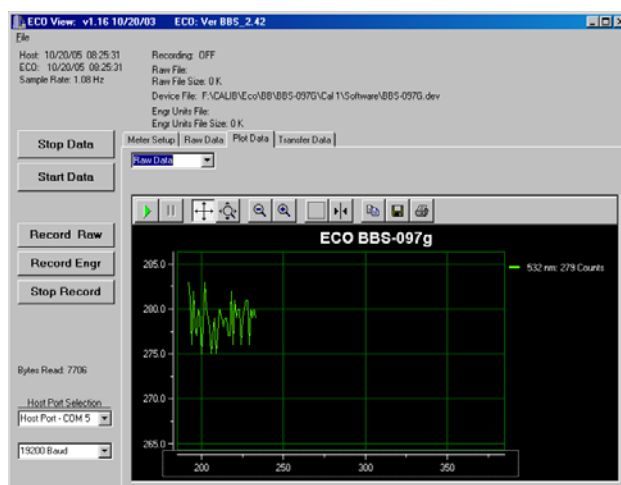
8. Supply power to the meter, then select **Start Data**. Select the **Raw Data** tab to view the scrolling data as it is received by the host program (Figure 3). Use the arrow keys or the Page Up/Page Down keys at the host computer to scroll through a file.



**Figure 3. Raw Data tab**

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 (Figure 4). 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.



**Figure 4. Plot Data tab**

### Note

If you have loaded the device file for a fluorometer, the backscatter pull-down menu will not appear.

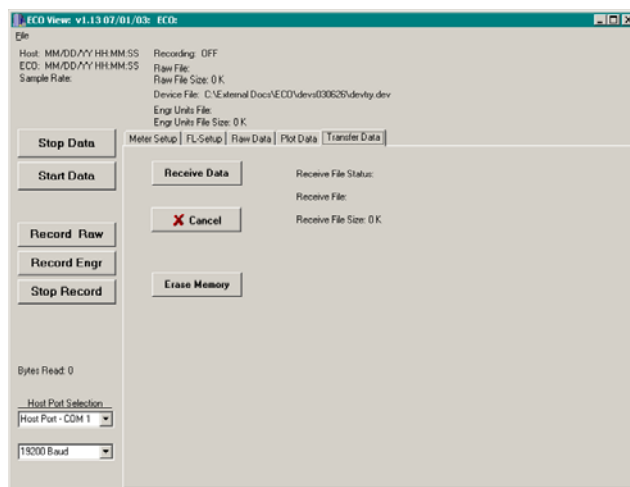


10. **Saving data:** You may simultaneously save both raw and processed data to the host PC. To save data to the host computer, select **Record Raw** (data in counts) and create a filename and/or **Record Engr** (processed data) and a filename. Select **Start Data**. The host computer will save time-synchronized .raw and .eng files.

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

|                         |                               |                                   |
|-------------------------|-------------------------------|-----------------------------------|
| <b>Turn Logging OFF</b> | Internal Log:    Logging: ON  | Internal logging is ON (default). |
| <b>Turn Logging ON</b>  | Internal Log:    Logging: OFF | Internal logging is OFF.          |

You can transfer (upload) internally logged data to the host computer by selecting the **Transfer Data** tab, then **Receive Data** (Figure 5). Status indicators to the right of this button will display file upload progress.



**Figure 5.** Transfer Data tab

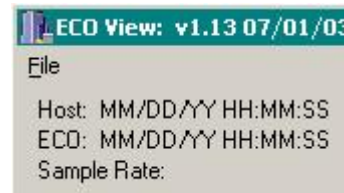
11. To erase the internal memory in the ECO meter, select **Erase Memory** either under the **Transfer Data** tab or the **Meter Setup** tab.

### 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.

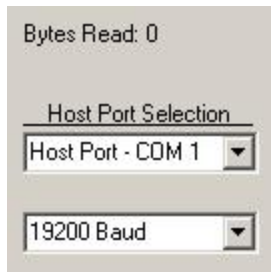
#### 3.1 Status

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



- **File:** Dropdown menu that with the following options:
  - o Load Device File. Allows you to select and open a device file.
  - o Real Time Data. This is the default, allowing you to view data as it is received.
  - o Replay Raw File. Selecting this option allows you to select a previously saved raw file to replay.
  - o Advanced Setup: Factory use only
  - o Alternate Commands: Factory use only
  - o Exit. Quits the ECOView program.
- **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**
  - o OFF: no data being sent and saved to host.
  - o Raw: raw data is being sent and saved to host.
  - o Engr: engineering units data is being sent and saved to host.
  - o 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 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:



If Real Time Data is checked under the File pull down menu, selecting Stop Data will turn the instrument off.



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



If Replay Raw File is checked under the File pull down menu, selecting Stop Replay stops replaying saved data.



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

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.

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

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



**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 you to select a device file to open, then an additional window to create a file name for saving the processed data. Note that even though the device file can be opened from the Plot Data window or the File dropdown menu, Record Engr is the only place that processed data can be saved.

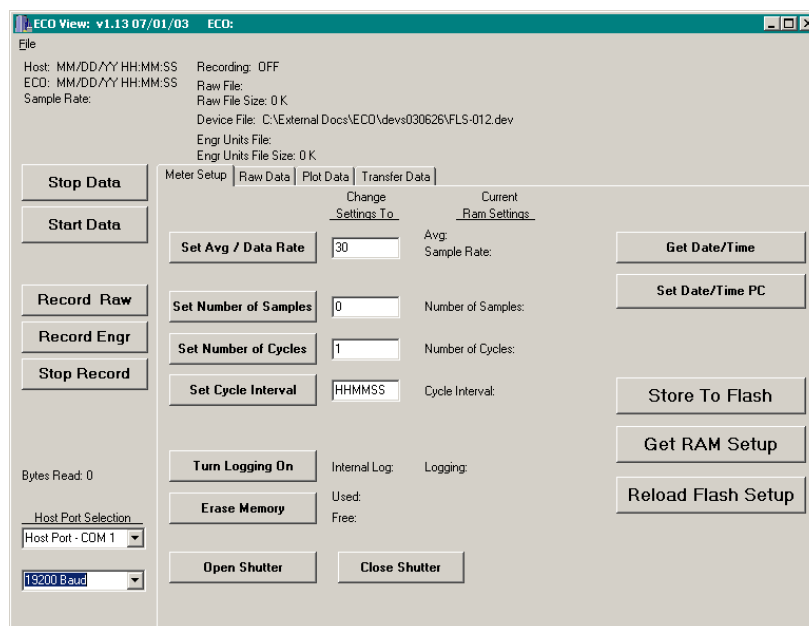
**Stop Record:** Ends a recording session.

You can simultaneously collect both raw and engineering data:

1. Select Record Raw. Input a filename.
2. Selecting Record Engr. Input a filename.
3. Press Start Data. Time-synchronized raw and engineering unit files will be saved on the host computer.

### 3.3 Configuration Settings

Selections in the Meter Setup tab (Figure 6) 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.



**Figure 6.** Meter setup options

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 restore the values listed under the Current Ram Settings column, press Get Ram Setup.
- 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 |
|-----------------------|-------------------------------------------------------------------------------|--------------|
| Set Avg / Data Rate   | Number of measurements that constitutes a sample. Set to approximately 1 Hz.  | Ave 60       |
| Set Number of Samples | one row of output; "0" is continuous operation.                               | Pkt 0        |
| Set Number of Cycles  | Number of samples between low power states; "0" is continuous operation.      | Set 0        |
| Turn Logging OFF      | "1" is ON; "0" is OFF.                                                        | Rec 1        |
| Set Cycle Interval    | hours:minutes:seconds; the low power time between cycles (groups of samples). | Int 00:00:05 |

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.

Note that power to the meter must be cycled before the changed settings will appear in the Raw Data window.

## Configurable Settings

|                            | Change<br>Settings To           | Current<br>Ram Settings             |
|----------------------------|---------------------------------|-------------------------------------|
| <b>Set Avg / Data Rate</b> | <input type="text" value="60"/> | Average: 60<br>Sample Rate: 1.08 Hz |

The number of data measurements that combine into each reported sample. Selectable from 1 to 65535. This setting determines the rate of output. The higher the number, the lower the sampling rate (Hz).

|                              |                                |                     |
|------------------------------|--------------------------------|---------------------|
| <b>Set Number of Samples</b> | <input type="text" value="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.

|                             |                                |                     |
|-----------------------------|--------------------------------|---------------------|
| <b>Set Number of Cycles</b> | <input type="text" value="0"/> | Number of Cycles: 0 |
|-----------------------------|--------------------------------|---------------------|

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

*Not applicable for RT meters.*

|                           |                                     |                          |
|---------------------------|-------------------------------------|--------------------------|
| <b>Set Cycle Interval</b> | <input type="text" value="000005"/> | Cycle Interval: 00:00:00 |
|---------------------------|-------------------------------------|--------------------------|

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.

*Not applicable for RT meters.*

|                         |               |             |
|-------------------------|---------------|-------------|
| <b>Turn Logging OFF</b> | Internal Log: | Logging: ON |
|-------------------------|---------------|-------------|

ECO meters are equipped to internally log up to approximately 1 Mb of data (between 50,000 and 65,000 samples).

|                        |               |              |
|------------------------|---------------|--------------|
| <b>Turn Logging ON</b> | Internal Log: | Logging: OFF |
|------------------------|---------------|--------------|

*Not applicable for RT meters.*

## Example Settings

| Moored Data Collection                                                                                                         | Profiling Data Collection                                                                                               |
|--------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Set Avg/Data Rate = 55                                                                                                         | Set Avg/Data Rate = 55 (or 1Hz)                                                                                         |
| Set Number of Samples = 60                                                                                                     | Set Number of Samples = 0                                                                                               |
| Set Number of Cycles = 24                                                                                                      | Set Number of Cycles = n/a                                                                                              |
| Set Cycle Interval = 010000                                                                                                    | 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

Once the device file for a fluorometer is loaded, ECOView will display the FL-Setup tab (Figure 8). ECOView supports *ECO* chlorophyll, CDOM, rhodamine, uranine (fluorescein), phycocyanin, and phycoerythrin fluorescence meters.

### Note

Engineering units output for chlorophyll is in  $\mu\text{g/l}$ , and ppb for all other fluorometers.

Selections here allow you to configure fluorometer-specific preferences for scale and offset values.

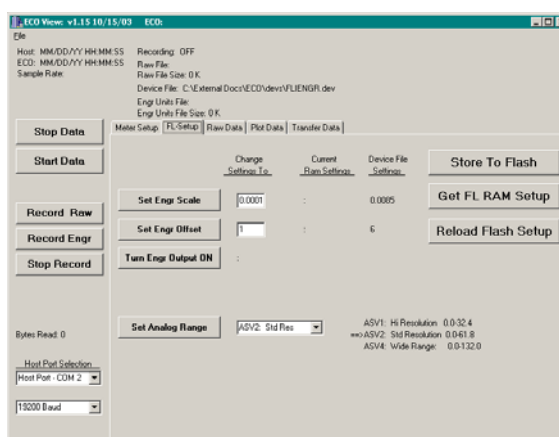


Figure 7. Fluorometer Setup tab

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 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.

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



**Set Engr Scale:** This value is used to derive processed output (in  $\mu\text{g/l}$  or ppb) from the meter's signal for output. Refer to the instrument-specific characterization sheet for details.

**Set Engr Offset:** Clean water offset value, used in conjunction with the scale for output.



**Turn Engr Output ON:** When toggled on (value displayed in the Change Settings To column, the device file "ixxx" (xxx represents the meter type) must be loaded. Output is displayed in engineering units in the column to the right of the date and time in the raw data tab.

**Turn Engr Output OFF:** When toggled off (value displayed in the Change Settings To column, the standard device file (no "i" in the filename) must be loaded. Output will be displayed in counts in the column to the right of the date and time in the raw data tab.

See Section 5.1 for sample device files.



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

### Store Settings To Flash Memory

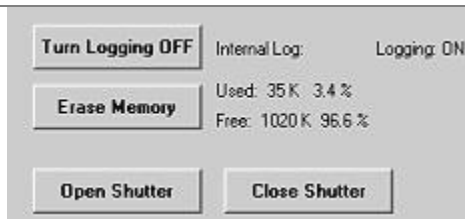
Selecting the desired settings, then pressing Store to Flash will write the settings into the meter's flash memory. These settings are overwritten each time they are changed and Store To Flash is pressed.

### 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.
- To restore the values listed under the Current Ram Settings column, press Get RAM Setup.
- To retrieve settings from the flash memory, press Reload Flash Setup.





**Turn Logging On/OFF:** This toggles the data logging within the instrument. Click to turn internal logging on, then click **Store Setup** to save if desired. Not applicable for RT meters.

**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.

### 3.4 Other Controls



**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 allows a variety of options to plot incoming data.

#### 3.5.1 Plot Color Selection

Backscatter data is plotted in colors that approximately match the wavelength. These values may be changed according to personal preferences. Display characteristics can be changed by altering the display wavelength in the meter's device file.

The colors for pressure, temperatures, chlorophyll, CDOM, and fluorescein (uranine) are set to default colors and cannot be changed.

### 3.5.2 Plot Toolbar

The top of the plot area has a toolbar with eleven buttons, allowing a variety of changes to the way data is plotted. Note that changes to the plot will not affect the data recording.

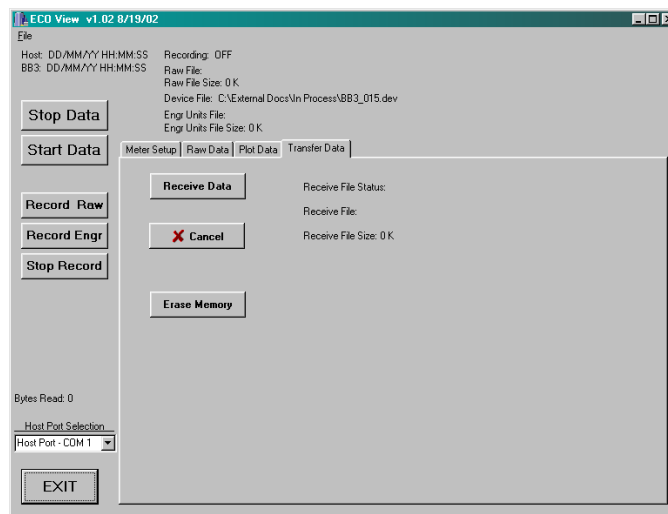
1. You can click on the numbers of either axis and change the values by dragging. Either **Raw Data** or **Engineering Units** can be viewed. Fluorometer measurements will be shown in raw counts if **Raw Data** is selected or  $\mu\text{g/l}$  (micrograms per liter, chlorophyll only) or ppb (parts per billion, all others) if **Engineering Units** is selected.
2. If **Engineering Units** is selected (Figure 5), 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.

If **Engineering Units** is not selected, the backscatter calculation option is ignored and all BB data is plotted in raw counts.

|                                                                                     |                    |                                                                                                       |
|-------------------------------------------------------------------------------------|--------------------|-------------------------------------------------------------------------------------------------------|
|    | <b>Resume</b>      | Resume tracking. If the triangle is green, this button may need to be pressed to resume tracking.     |
|    | <b>Pause</b>       | Pause tracking. This stops the scrolling of the X-axis.                                               |
|    | <b>Axes Scroll</b> | Drag either axis up or down, right or left.                                                           |
|    | <b>Axes Zoom</b>   | Zoom the axis up or down, right or left. Allows user to scale the axes for coarser or finer plotting. |
|    | <b>Zoom Out</b>    | Decrease the zoom by 2x.                                                                              |
|    | <b>Zoom In</b>     | Increase the zoom by 2x.                                                                              |
|    | <b>Zoom Box</b>    | Draw a box on the plotting area and zoom all axes around selected area.                               |
|    | <b>Cursor</b>      | Slide the resulting bar to a specific data point.                                                     |
|    | <b>Copy</b>        | Send a copy of the current plot to the host PCs clipboard.                                            |
|   | <b>Save</b>        | Not functional                                                                                        |
|  | <b>Print</b>       | Send a snapshot of the data plot to a printer.                                                        |

### 3.6 Transfer Data

The Transfer Data tab shown in Figure 9 allows the user to transfer internally logged data from the meter to the host computer. Does not apply to RT meters.



**Figure 8.** Transfer Data window

**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.



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**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=n.” 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 1<sup>st</sup> 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 scx is an engineering units-per-volt scale for each scale setting. Multiply v by scx 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

### 5.1.1 Fluorometer, unprocessed output

The standard device file for an ECO chlorophyll fluorometer contains no capability for displaying the meter's output in  $\mu\text{g/l}$  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

### 5.1.2 Fluorometer, processed output

The device file for obtaining processed data contains a column for displaying the meter's output in  $\mu\text{g/l}$  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= $\mu\text{g/l}$

iengrscaleoffset=5

: iengrunits =  $\mu\text{g/l}$  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](http://www.wetlabs.com) for additional device and output file samples.



### 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                |
|          |          |                                                                                |                                     |