*ECO*View

Host Software for Second-generation 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

ECOView host software provides a graphical user interface that allows users to configure, collect, view, and upload data from a variety of ECO instruments. ECOView is compatible with the second-generation (shorter) ECO instruments and is not backwardly compatible with the longer meters.

ECOView software is a full-featured program allowing users a number of new capabilities, including:

- Configuring a variety of digital instruments
- Viewing real-time data collection
- Collecting data either internally to a meter (if equipped) and/or externally directly to the host computer.

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 (second generation).
2. A host computer running Windows 95 or newer operating system.
3. A test cable (ships with six-pin and DB-9 connectors and switch box that contains a 9V battery.)
4. Banana jacks and power supply, if using a separate power supply.

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

ECOView is compatible with Windows operating systems from Win95 up; however, there may be some configuration issues with Win2000 and XP. Contact WET Labs if issues arise.

2. Setup and Operation

ECO meters are designed to work with the ECOView host software and are easily configured for a variety of applications using ECOView.

This chapter is designed to guide you through getting the *ECO* meter up and running for testing prior to deployment. Refer to the ECOView Reference chapter for more details about the options for collecting, viewing, and saving data in ECOView.

2.1 Setup

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. Set the test cable power module switch to "OFF" prior to connecting the test cable to the instrument.

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).

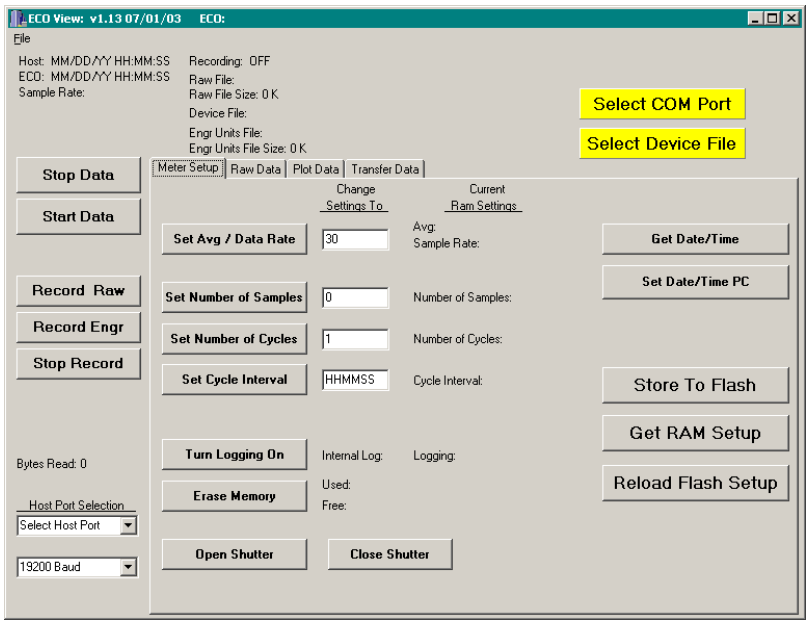


Figure 1. Meter Setup tab

5. Turn on power to the meter by switching the test cable to the "ON Batt" position to supply power to the meter. (If connected to a separate power supply, use "ON Aux." setting.).

6. Click the yellow Select COM Port button. A pop-up window (Figure 2) will appear that allows you to select the COM port and the baud rate for meter–PC communication.
   - Note that you can also select the COM port and baud rate from the pull-down menus in the lower left corner of the ECOView program.

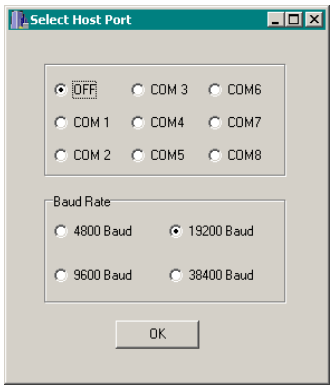


Figure 2. COM Port and baud rate window

7. Press the yellow Select Device File button, then choose the instrument-specific device file to load. The yellow button will disappear after the device file is loaded.
   - Note that you can also select Load Device File from the File pulldown menu at the top of the window.

8. **Fluorometers only:** Once the device file is loaded, an additional fluorometer setup tab will appear (Figure 3).

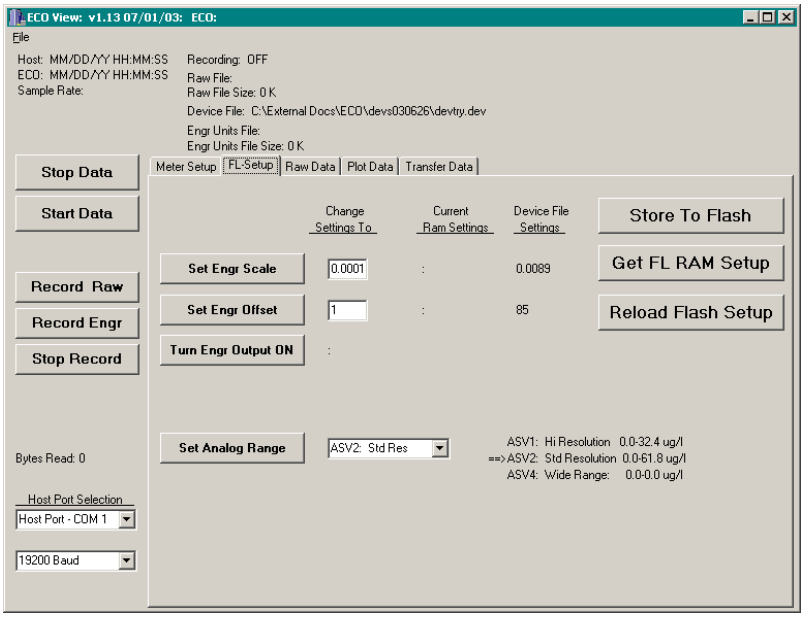


Figure 3. Fluorometer Setup tab

Important: ECO fluorometers ship with two device files (See Section 5.1 for samples). One is the "standard," and is used to process data in counts. The other is used to process records when the engineering units output is turned on.

- Load the standard device file, making sure that the Turn Engr Output toggle button value is OFF in the Change Settings To column.

It is generally not necessary to change the other settings as they are factory-set in the meter's device file. Refer to section 3.3.1 for details on changing the other settings and using the "i*xxx*" device file.

9. Data collection begins when power is supplied to the meter.

10. Go to the Raw Data tab and view the scrolling data.

Note

Different meters use different baud rates. If data scrolling in the Raw Data tab is gibberish, try a different baud rate until the tab-delimited columns of ASCII data appear in the Raw Data tab.

11. Press the Stop Data button.

2.2 Meter Configuration

In the Meter Setup tab, you may change configuration settings below according to your application. To change settings, Click in the white input area in the Change Settings To column, and input the desired value. The meter must be stopped (select Stop Data) to change settings. Click on the associated setting button to the left. The new value will appear under the Current Ram Settings column and be stored in the meter's RAM (temporary) memory. The yellow Setup Not Stored warning will remain until you select Store to Flash.

Set Avg/Data Rate: The number of data measurements taken that combine into each reported value. Capability ranges from 1 to 65535. This setting determines the rate of output. The higher the number, the lower the sampling rate, which is displayed on the main window in the upper left corner and in the meter setup tab.

Set Number of Samples: The number of measurements coming from the instrument. Range is 0 to 65535. Selecting "0" will result in continuous operation.

Set Number of Cycles: The number of measurements the instrument will collect between low power ("sleep") states. It is configurable from 0 to 65535. Not applicable for RT meters.

Set Time Interval: The time interval between reported 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.

Example Settings:
Set Avg/Data Rate = 55
Set Number of Samples = 60
Set Number of Cycles = 24
Set Time Interval = 010000

The instrument will collect 60 samples, approximately one second apart, once every hour for 24 hours.

✓ **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.

Store to Flash to save your settings.

- If you do not want to save settings, the meter will use the settings shown under Current Ram Settings and the yellow warning Setup Not Stored will remain visible.

2.3 View Data

1. Select Start Data, then go to the Raw Data tab to view the data (in counts) 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.

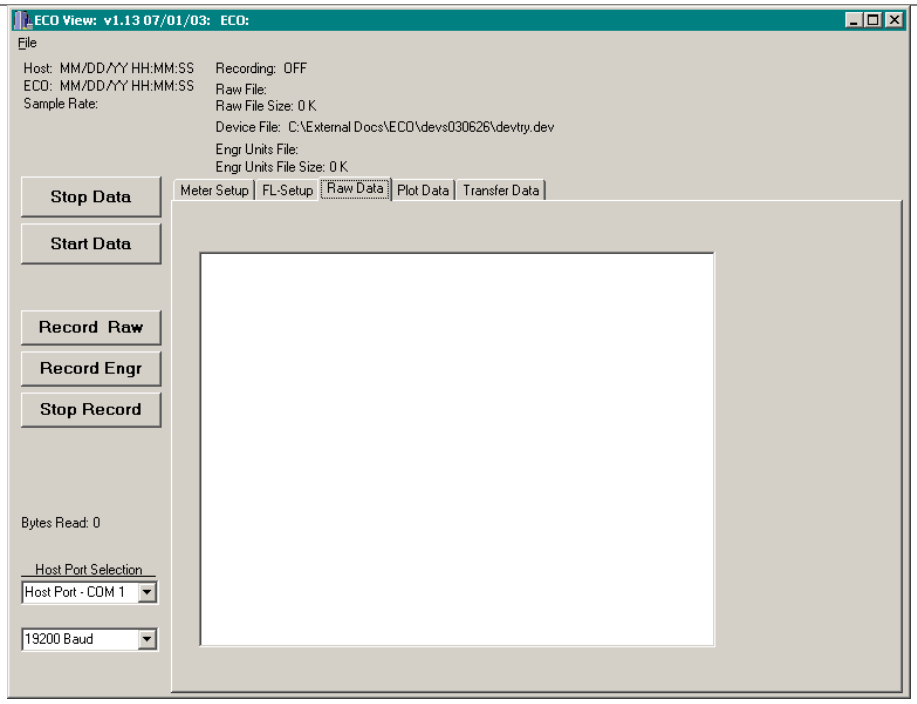


Figure 4. Raw Data tab

As incoming data scrolls into the main portion of the Raw Data tab, the Bytes Read to the left will increment.

2. Go to the Plot Data tab to view the data plot (Figure 5). The X-axis represents sample counts and the Y-axis represents data units, which are user-selectable. 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 µg/l (chlorophyll only) or ppb (parts per billion) (all others) if Engineering Units is selected.

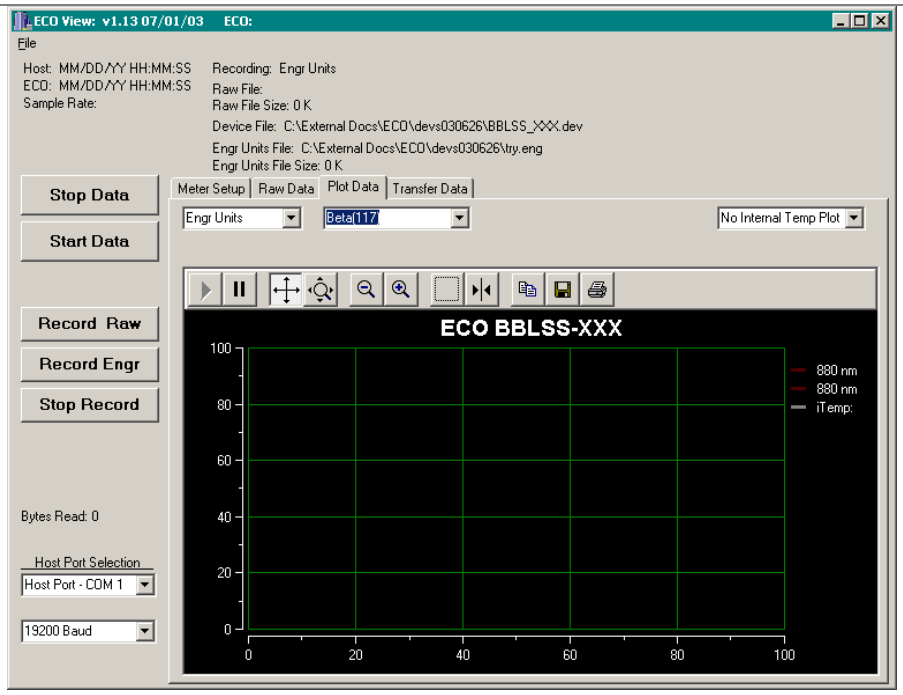


Figure 5. Plot Data tab

3. 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.

Note

If you have loaded the device file for a fluorometer, the backscatter pull-down menu in step 3 will not appear.

Refer to Section 3.5 for details on selecting plot color and using the plot toolbar.

2.4 Save and Upload 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.

1. If you have an *ECO* meter capable of internally logging data and selected that option under the Meter Setup tab, you can transfer (upload) internally logged data to the host computer by selecting the Transfer Data tab, then Receive Data (Figure 6). Status indicators to the right of this button will display file upload progress.

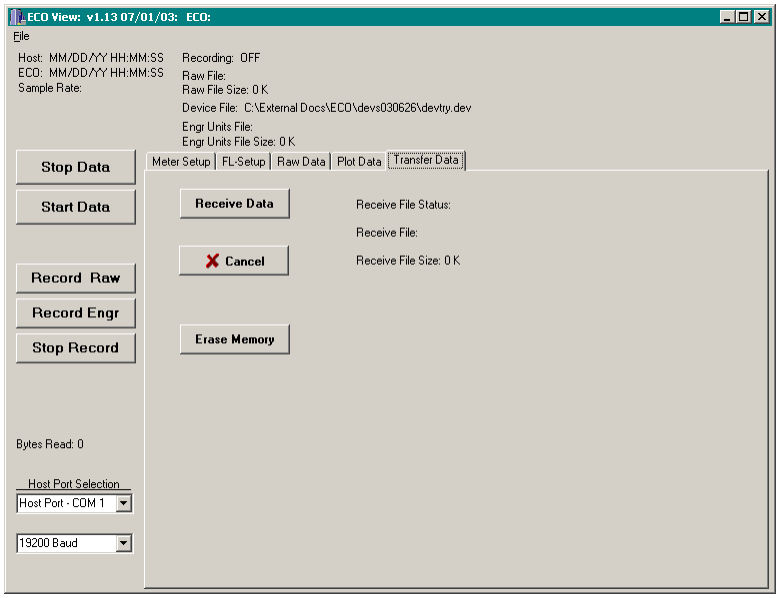


Figure 6. Transfer Data tab

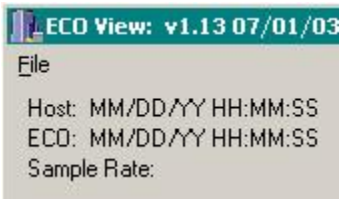
2. To erase the internal memory in the ECO meter, select Erase Memory either under the Transfer Data tab or the Meter Setup tab.

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

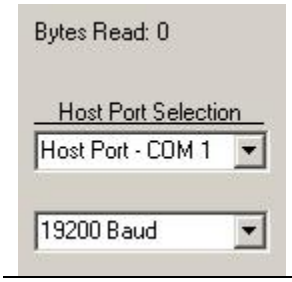
Status information is displayed in the top portion of the screen.



- **File**: Dropdown menu that with the following options:
  - 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. Selecting this option allows you to select a previously saved raw file to replay.
  - Advanced Setup: For factory use only
  - Exit. Quits the ECOView program.
- **Host**: Time according to the host computer
- **ECO**: 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.

- **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 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:

Stop Data (Stop Replay):
If Real Time Data is checked under the File pulldown menu, selecting this button will turn the instrument off.
If Replay Raw File is checked under the File pulldown menu, selecting this button stops replaying saved data.

Start Data (Start Replay):
If Real Time Data is checked under the File pulldown menu, selecting this button will start data collection.
If Replay Raw File is checked under the File pulldown menu, selecting this button stops 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 pulldown 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 7) 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.

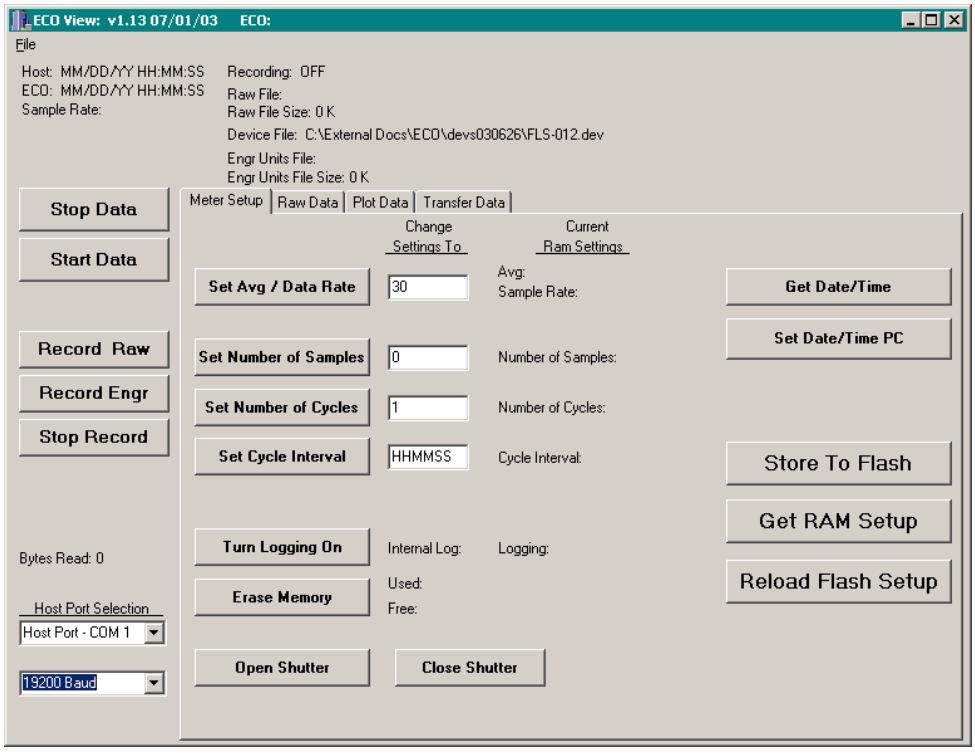


Figure 7. Meter setup options

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
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. 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.

Set Average/Data Rate
The number of data measurements taken that combine into each reported value. Capability ranges from 1 to 65535. This setting determines the rate of output. The higher the number, the lower the sampling rate, which is displayed on the main window in the upper left corner and in the meter setup tab.

Set Number of Samples
The number of measurements coming from the instrument. Range is 0 to 65535. Selecting "0" will result in continuous operation.

Set Number of Cycles
The number of measurements will collect between low power ("sleep") states. It is configurable from 0 to 65535. Not applicable for RT meters.

Set Time Interval
The interval between reported 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.

✓ 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 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 fluoresence meters.

Note

Engineering units 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.

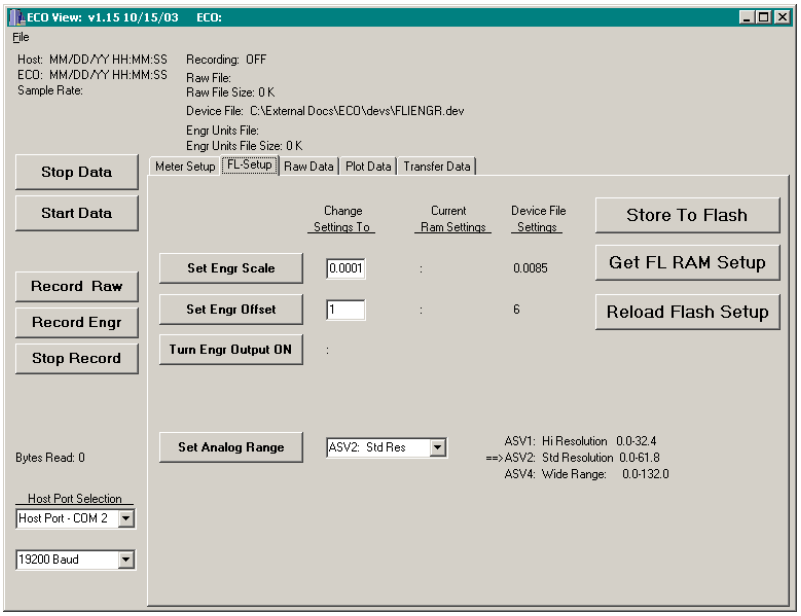


Figure 8. Fluorometer Setup tab

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 µg/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 "i*xxx*" (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).

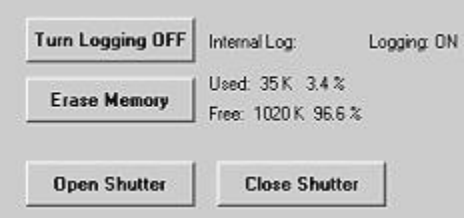
Store Settings To Flash Memory

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.



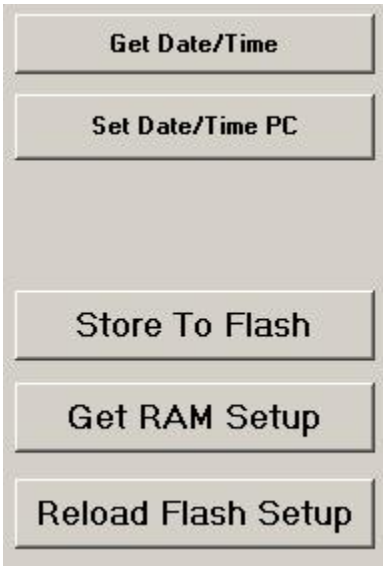
Turn Logging On/OFF: This toggles the data logging within the instrument. Click to turn internal logging on, then click Store Setup to save if desired. Not applicable for RT meters.

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

The following settings do not apply to RT meters.



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 in addition to the functions described in Section 2.3.

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.

	**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

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.

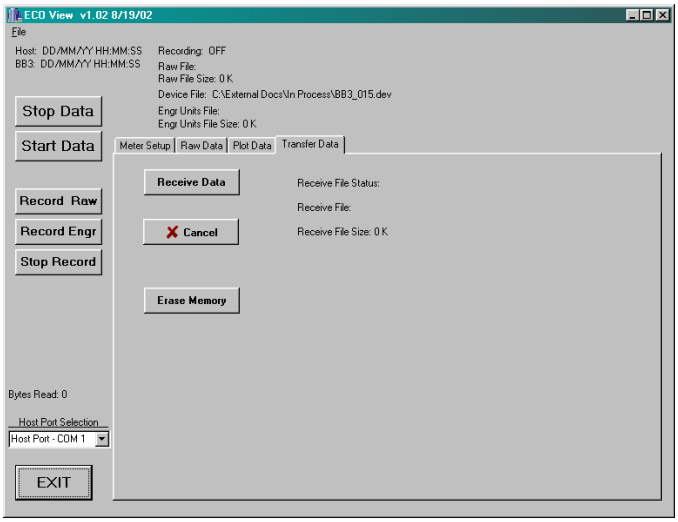


Figure 9. Transfer Data window

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.

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 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
PHYCOCYANIN=x sc off
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

LSS=x	sc	off	Light Scattering Sensor Measurement
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. The engineering unit’s 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

Below is the standard device file for an ECO chlorophyll fluorometer, which 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 will not be functional.

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

iengrunits=µg/l
iengrscaleoffset=4

: LSS=NTU
: iengrunits = µg/l for CHL, PC, PE. ppb for CDOM and uranine.
: 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
```

Below is the processed device file, which contains a column for displaying the meter's output in µg/l chlorophyll: load the appropriate device file 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

: LSS=NTU
: 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 BB3-999
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 FL(RT) (Real-time Fluorometer) device file.

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

iengrunits=µg/l
iengrscaleoffset=5

: chl=ug/l
: LSS=NTU
: iengrunits = µg/l for CHL, PC, PE. 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=6ECO
```

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