

Instruction Manual
Model 2135D
Flowmeter Data Interface Module
and
Flow-Soft Software
Version 3.01



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1.0 Introduction

This manual provides installation and operation instructions for the Model 2135D Flowmeter Data Interface Module and for Flow-Soft Application Software, which provides the user with the ability to record time and water velocity data on a computer.

2.0 2135D Flowmeter Data Interface Module

General

The 2135D Flowmeter Data Interface Module provides the interface between a computer or a data logger with a serial interface port.

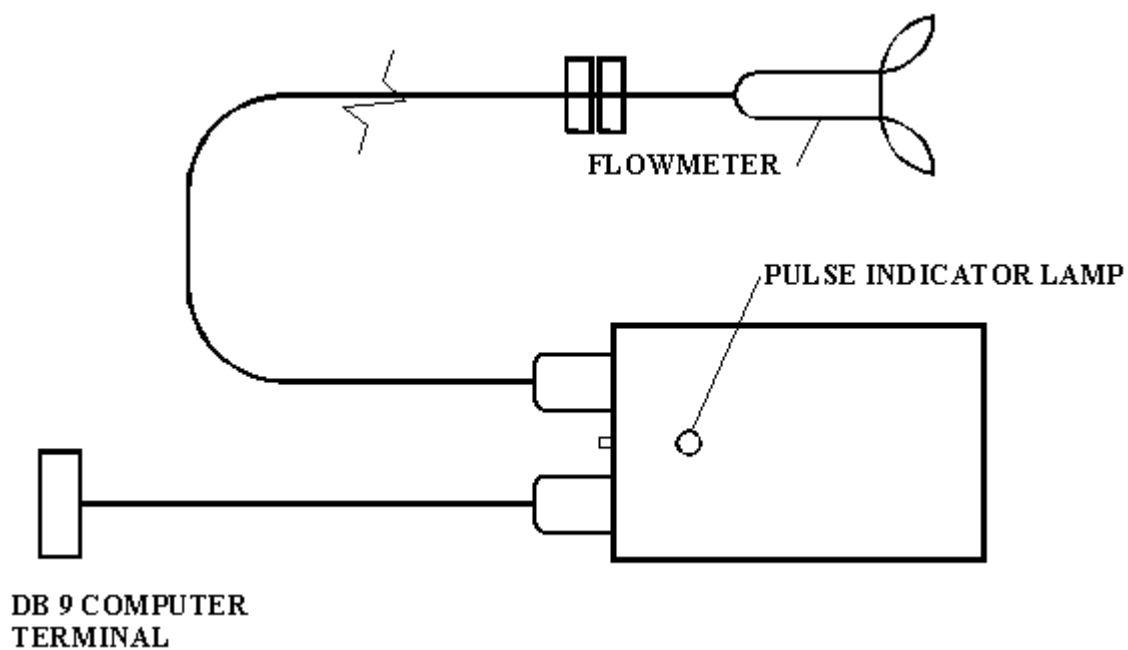
The Model 2135D is microprocessor controlled and is designed to provide data derived from the Model 2031 series Flowmeter, manufactured by General Oceanics Inc. The flowmeter incorporates a magnetically triggered switch that sends pulses at a rate proportional to the fluid speed. The circuitry within the Model 2135D converts these pulses into fluid velocity. The unit calculates the fluid velocity using a highly stable crystal controlled time base.

The microprocessor uses the fluid velocity value to calculate the accumulated distance in real time.

When using Flow-Soft, fluid velocity may be displayed in cm/sec., m/sec., ft/sec. or knots. Distance is displayed in the same units. When using HyperTerminal or equivalent, the velocity units are in cm/sec, distance in m/sec. The circuitry is housed in a ABS case designed to provide years of low maintenance use in harsh environments. Ten meters of connecting cable is provided.

2.1 Preparing for Use

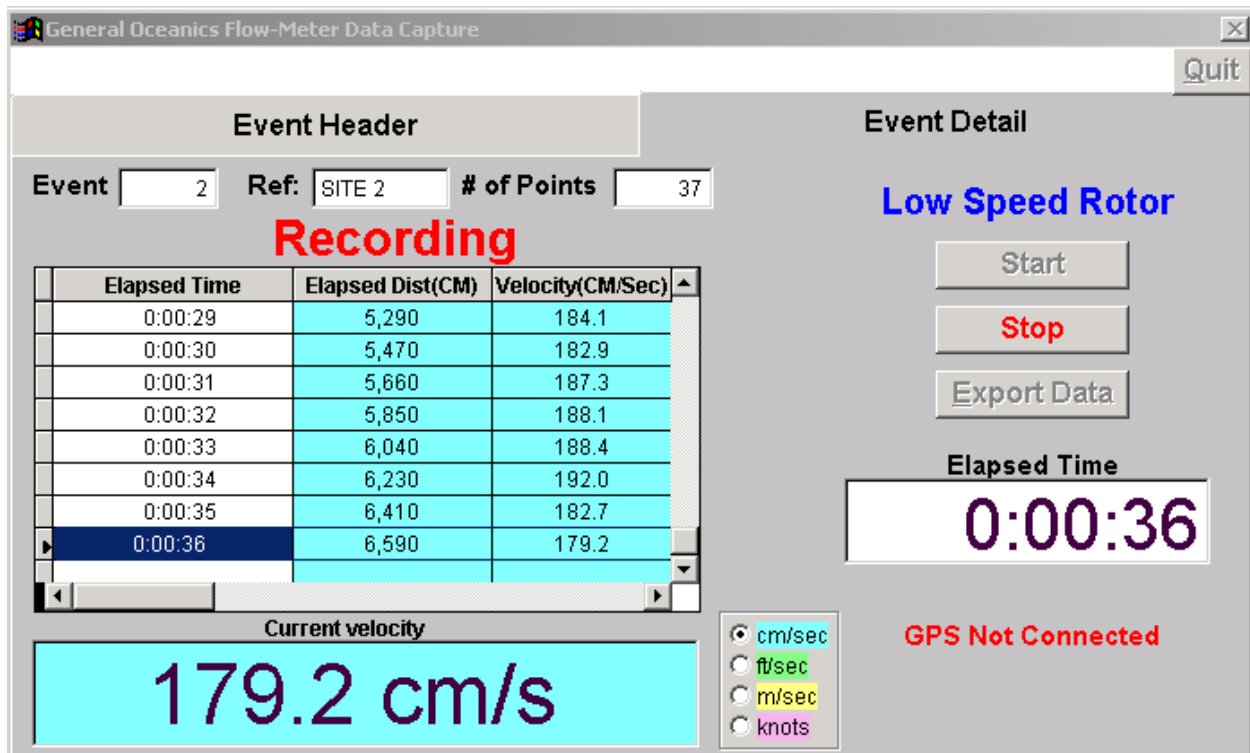
First connect the DB9 plug on the Model 2135D Flowmeter Data Interface Module to the serial port of the computer. Next connect the three pin female underwater connector to the Model 2031 Electronic Flow meter as shown below.



Next either install Flow-Soft Application Software as described in section 4.0 of this manual, or start a communication program such as HyperTerminal.

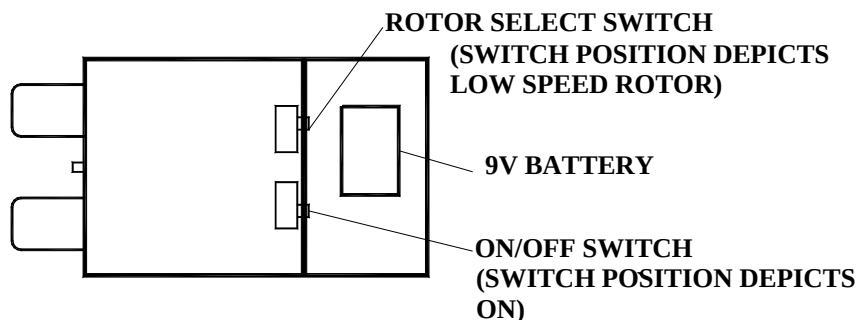
If using Flow-Soft, follow the installation and configuration procedures as described.

Then following the deployment instructions in section 4.6, go to the Event Detail screen as shown below. This will activate the serial port for operation.



Next identify the rotor type on the Flowmeter. The white three blade impeller is a high speed impeller; a gray two blade impeller is a low speed.

Remove the rubber protective boot surrounding the plastic 2135D case, then remove the battery compartment cover.



A set of switches, located on the inside of the battery compartment, allow the user to select the proper impeller type and to turn the unit on and off. Select the proper rotor type at this time.

H = High Speed Rotor
L = Low Speed Rotor

Do NOT install a 9 volt alkaline battery in the battery compartment at this time. Turn the ON/OFF switch to ON, and close the battery compartment cover.

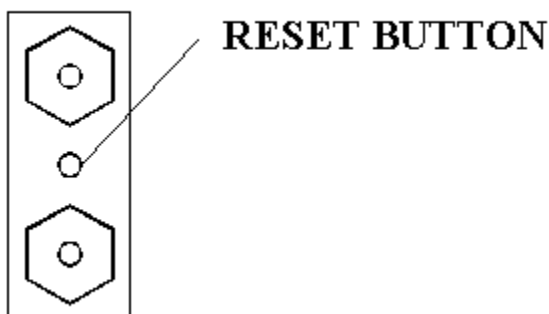
Check the operation of the unit by turning the rotor one complete revolution (360 degrees). The pulse indicator lamp should blink twice during this rotation.

Note:

Most computers are able to supply their own power to the serial port. Therefore the installation of the 9 volt battery may not be necessary. If the pulse indicator lamp fails to operate as described above, then install a 9 volt alkaline battery and again turn the rotor one complete revolution and verify the pulse indicator lamp lights twice during this rotation.

The rubber protective boot may be reinstalled at this time, ensuring that the pulse indicator lamp faces outward so it may be visible during operation of the unit.

A push button reset is provided to re-initialize the unit. It may be necessary to utilize this button when interfacing the unit with a data logger, or using a terminal program such as HyperTerminal, to reset all parameters. When using Flow-Soft Application Software, it is not necessary to use this button.



Turning off the 2135D Flowmeter Data Interface Module

If a battery is installed, remove the battery cover and turn the ON/OFF switch to OFF. If no battery is required, simply powering down the computer will also turn the unit off.

2.2 Pocket PC and PDA Interface

The General Oceanics' Model 2135D can also be used with a wide variety of PDAs and Pocket PCs. If the device you wish to interface has a standard RS232 cable chances are you will be able to use it with the 2135D. Since most handheld devices, including the 2135D are DCE (data communication equipment) devices you MUST use a 'null modem' adapter to configure them properly. Not doing so could damage the devices. When using a 'null modem' adapter in this manner a 'gender changer' (male to male) is also required to mate the cables and connectors properly. Check with your PDA or Pocket PC, or other device, manufacturer to assure compliance with these specifications.

3.0 Specifications

Range and threshold :

-Model 2031H (standard rotor)

Threshold- 10cm/sec (1/5 Knot)

Range - 10 cm/sec (1/5 Knot) to 6.5 M/sec (13 knots)

-Model 2031HR6 (low speed rotor)

Threshold 6 cm/sec (3/25 Knot)

Range - 6 cm/sec (3/25 Knot) to 100 cm/sec (2 Knots)

Velocity- 0 to 999.9 m/sec, cm/sec, ft/sec or Knots

Distance-Accumulative to 131072 meters

Note: When using Flow-Soft Application Software, the distance and elapsed time are unlimited.

Elapsed Timer – 23 hours, 59 Minutes, 59 seconds

Operating Temperature - 0 to 50 Degrees Celsius

Accuracy- +/- 1% Full Scale

Enclosure –ABS housing.

Communications RS232C interface.

Battery Supply - 9 volt alkaline battery Minimum of 72 hours of continuous use.

Note: The battery may not be necessary as long as power is provided from the serial port.

Flowmeter interface cable

Length- 10 Meters (33 ft.)

Cable Type- 3 Cond., .165" dia. Neoprene

Breaking Strength- 36 kg (80 lbs)

Connector- Seacon RMG-3-FS w/Locking Sleeve

2030HCXX

Cable Extensions

The extension inserted between the plug of the Model 2031H flow meter (or 2031HR2) and cable 2131RCH.

Weight- .6 kg (1.3 lbs)

Length- 10 Meter increments

Cable Type- 3 Cond., .165" dia. Neoprene

Breaking Strength- 36 kg (80 lbs)

Connectors - Seacon RMG-3-FS w/Locking Sleeve Seacon RMG-3-MP w/Locking Sleeve

NOTE: The flow meter and display will operate with almost unlimited cable lengths however consideration should be given to the deployment if the cable itself is used for towing the flow meter. In high current or deep cast applications dynamic loading, strum or weight of the cable itself may approach or exceed its breaking strength. The cable can be easily married to a lift cable which would support the flow meter, weight, and any additional sensors deployed with the unit.

USE OF A STRAIN RELIEF IS ADVISED TO ENSURE SAFE OPERATION!

Serial interface Cable Specifications

Cable Type- Belden 9535 shielded 24 AWG 5 conductor

Breaking Strength- N/A

Connectors- Tyco/AMP #205203-1 D-sub (nine pin)

Raw Data Format

Prop Type High /Low Speed rotor	Hour	Min.	Sec.	Dist.	Speed	Carriage Return	Line Feed
H/L,	00,	00,	00,	00000,	0000,	CR,	LF

Port Settings

Bits per second: 9600 baud

Data bits: 8

Parity: None

Stop bits: 1

Flow control: None

4.0 Flow-Soft Flowmeter Application Software

4.1 Features

- Real-time display.
- Automatic storing of acquired data sets to log file.
Parameters: Elapsed Time, Distance, Velocity
- GPS input and data storage capability.
- Automatic serial communication setup.
- User selectable rotor type, speed and distance units.
- Export Data Feature- Saves the file for importing into a spread sheet such as Excel.

4.2 Minimum PC Requirements

Operating system:	Microsoft Windows 98 or later
Memory:	64 MByte
CDROM:	Required
Disk:	>1 GByte
Monitor:	Color display
Graphical display:	resolution 800x600 or higher
Serial or USB ports:	2 (Note: If the GPS option is not used, only one serial or USB port is necessary.)
Printer Port:	1

4.3 Installation

Insert the *Flow-Soft* CD in the CDROM drive. Select Windows **Start**, then **Run**. Browse to select the CDROM drive, and then select setup.exe. Follow the on-screen installation instructions.

When completed, all required files will be copied to a new folder called “Flow-Soft”, on the drive you selected. A shortcut will be available on the desk top.

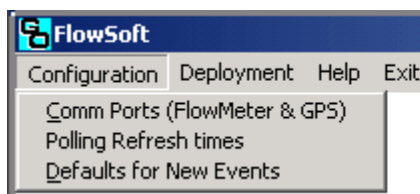
4.4 Operation

First, ensure that instructions previously described in the 2135D Flowmeter Data Interface Module section of the manual have been followed (section 3.1).

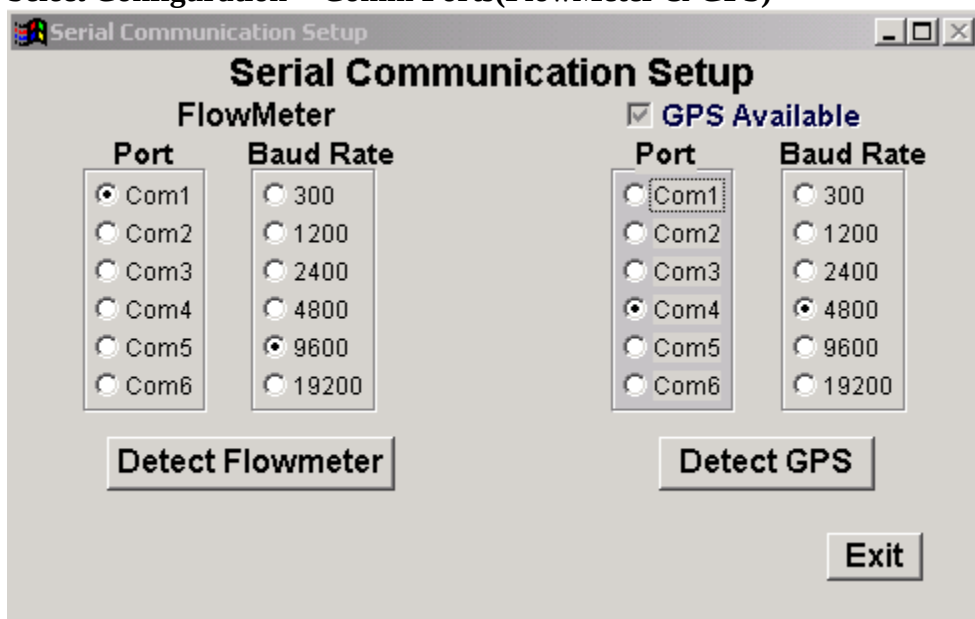
4.5 Configuration

4.5.1 Comm Ports

After starting *Flow-Soft*, the following main menu will appear.



Select **Configuration > Comm Ports(FlowMeter & GPS)**



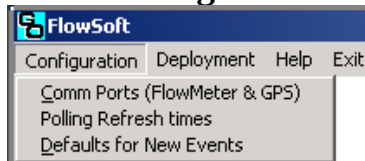
Left click the **Detect Flowmeter** button. This will automatically determine the proper communication port and baud rate to communicate with the 2135D Flowmeter Data Interface Module.

If a GPS (Global Positioning System) is to be interfaced with the system, insure that the GPS is connected to the computer, and then left click the **Detect GPS** button. The GPS unit must have the serial interface configured to send data using the NMEA 0183 protocol. Consult your GPS manual for instructions on how to accomplish this.

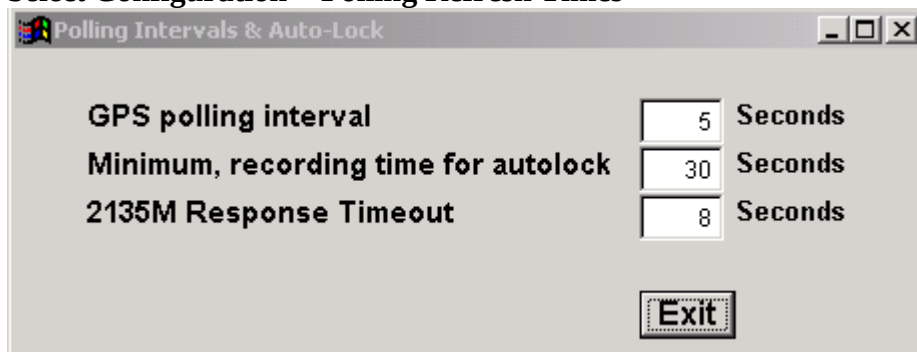
The Flowmeter and GPS parameters can be set manually but the detect buttons find or confirm your selections.

When finished, to save the information, left click **Exit**.

4.5.2 Polling Refresh Times



Select Configuration > Polling Refresh Times



A dialog box titled "Polling Intervals & Auto-Lock" with a standard Windows window frame. It contains three rows of settings, each with a label, a text input field, and a unit label. The first row is "GPS polling interval" with a value of "5" and unit "Seconds". The second row is "Minimum, recording time for autolock" with a value of "30" and unit "Seconds". The third row is "2135M Response Timeout" with a value of "8" and unit "Seconds". At the bottom center is an "Exit" button.

GPS polling interval	5	Seconds
Minimum, recording time for autolock	30	Seconds
2135M Response Timeout	8	Seconds

Exit

GPS polling interval - When a GPS is interfaced with Flow-Soft, this time interval represents the Latitude, and Longitude data update rate.

Minimum, recording time for autolock- This feature represents the time period after which a sampling Event will automatically become Locked. For further information see section 4.6, **Lock, Unlock and Start**.

2135 Response Timeout- Used on 2135 MEM only. (DO not alter this without consulting General Oceanics personel.)

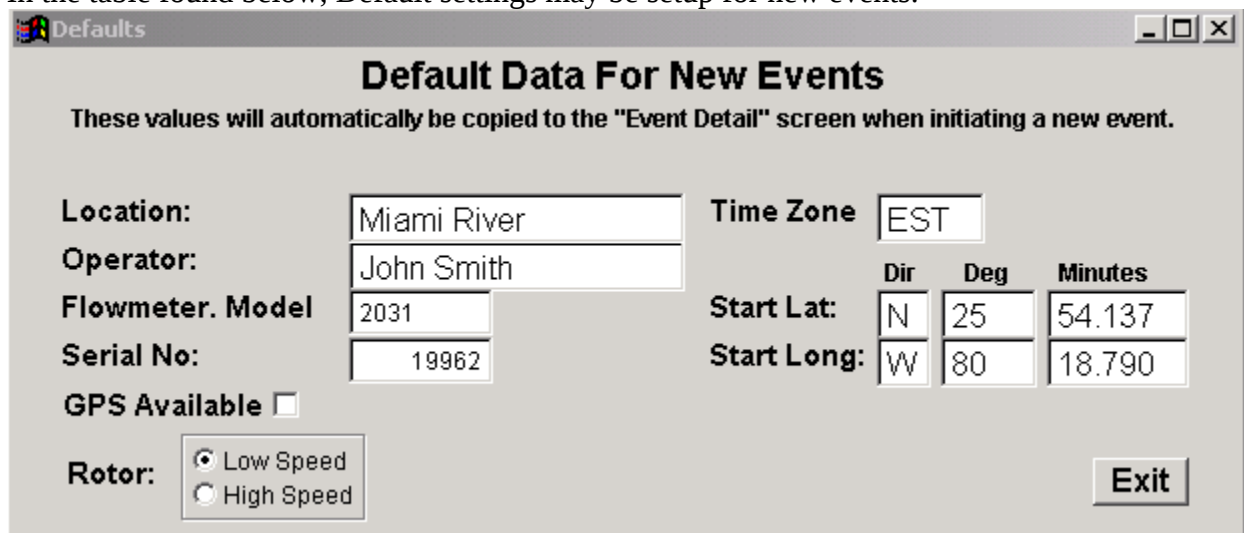
4.5.3 Defaults for New Events

Select Configuration> Defaults for New Events.



A screenshot of the FlowSoft application window. The title bar says "FlowSoft". The menu bar includes "Configuration", "Deployment", "Help", and "Exit". The "Configuration" menu is open, showing three options: "Comm Ports (FlowMeter & GPS)", "Polling Refresh times", and "Defaults for New Events".

In the table found below, Default settings may be setup for new events.



A dialog box titled "Defaults" with a subtitle "Default Data For New Events". Below the subtitle is a note: "These values will automatically be copied to the 'Event Detail' screen when initiating a new event." The dialog contains several input fields and a checkbox. On the left, there are labels for "Location:", "Operator:", "Flowmeter. Model", "Serial No:", "GPS Available", and "Rotor:". On the right, there are labels for "Time Zone", "Start Lat:", and "Start Long:". The "GPS Available" checkbox is unchecked. The "Rotor:" label has two radio button options: "Low Speed" (selected) and "High Speed". At the bottom right is an "Exit" button.

Location:	Miami River	Time Zone	EST		
Operator:	John Smith	Start Lat:	Dir	Deg	Minutes
Flowmeter. Model	2031		N	25	54.137
Serial No:	19962	Start Long:	W	80	18.790
GPS Available	☐				
Rotor:	☒ Low Speed ☐ High Speed				

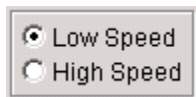
Exit

Location, Operator, Flowmeter Model, Serial No., Time Zone, Start Lat:, and Start Long:, are alpha numeric fields. They are used as the default settings in the Event Detail. This information is also captured in the log file header.

GPS Available A / (check) in the GPS Available box indicates that you want to use the GPS interface. Flow-Soft will continue to attempt to interrogate the GPS. If there is no GPS data, then Flow-Soft will indicate an error if the com port configured does not exist, or it will display “Lost Satellite Reception” if the com port is legitimate but doesn’t receive data from the GPS.

If GPS is not being used and recording the location of an event is desired, you may enter manually the Lat and Long so that it will be added automatically to each new event, instead of having to enter it with each new event. If you are using the GPS option, then the starting Lat and Long should be left blank.

Rotor:



This field is used to identify the rotor which is installed on the Flowmeter. This must match the switch setting on the 2135D Data Interface Module.

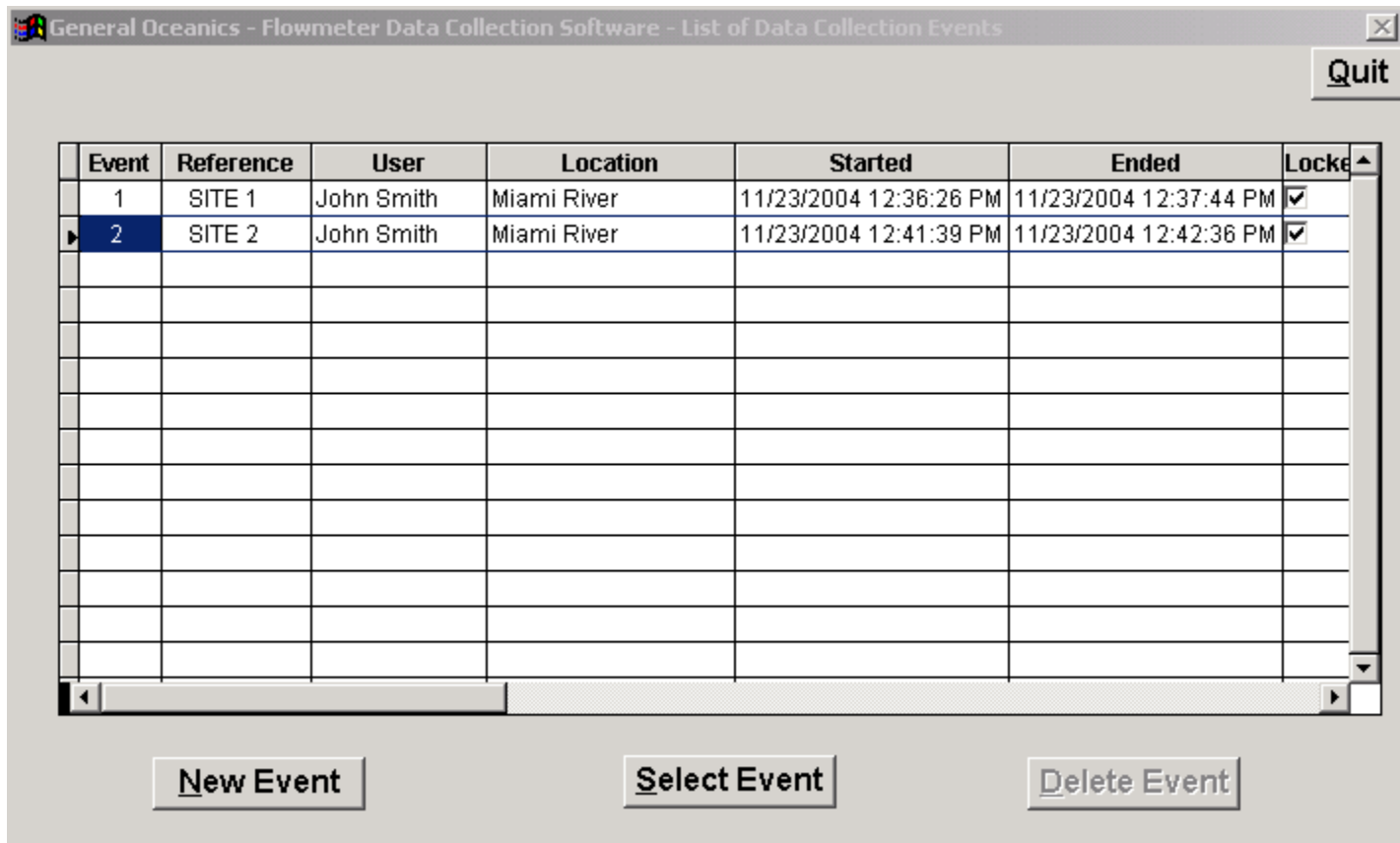
When finished, to save the information, left click **Exit**.

4.6 Deployment

To begin, select from the main menu **Deployment>Record Event RealTime**.



The following menu will appear.



From this menu it is possible to begin a new sampling event, to view information relating to previous sampling, or to delete an event.

To begin a new sampling event, left click the **New Event** Button.

The following menu will appear.

General Oceanics Flow-Meter Data Capture

Event Header

Event Number: 2 Event Ref: SITE 2 (To be used for export file name)

Location: Miami River

User Name: John Smith

Started: 11/23/2004 12:47:21 PM

Ended: 11/23/2004 12:48:16 PM

Total Elapsed Time: 0:00:55

Notes:

Event Detail

Rotor: ☒ Low Speed ☐ High Speed

Beg.Lat/Long: N 26° 50.125' W 81° 19.870' [Get Position]

Total Distance: 101.1 # of Points: 56

[New Event] [Delete Event] **Event Locked** [Lock] [UnLock]

The table will be filled in with default information which was set up previously in **Defaults for New Events**. This table may be modified at this time if necessary.

Information from this screen is captured in the log file header.

The **Event Number** is assigned and automatically incremented by Flow-Soft after selecting the New Event button. It is the unique Log File Identifier.

Event Ref is used to identify the file name when data is exported to a spread sheet.

Rotor- This field is used to identify the rotor which is installed on the Flowmeter. This must match the setting on the 2135D Data Interface Module.

Location and **User Name** are alpha numeric fields that may be used to identify the site location and the user collecting the data.

Started and **Ended** are the start and end time and date of the deployment. This information is automatically obtained by Flow-Soft using the computers time and date settings.

Total Elapsed Time- The total elapsed time of the deployment.

Total Distance- The microprocessor in the 2135D Flowmeter Data Interface Module uses the fluid velocity value to calculate the accumulated distance in real time.

of Points- Represents the total number of samples recorded during the deployment.

Notes Information that is typed into this field, will be saved, and will be printed at the bottom of any log file printout that is made.

New Event This button is used to begin a new sampling event. (Same as the New Event button on the previous screen.)

Delete Event is used to delete or remove an event from the data base.

Lock and UnLock



These buttons are used to lock or unlock access to a particular sampling event. If the event is in the lock mode, then an event file may not be deleted or modified. If the current mode is unlocked, then the user may delete or modify an event file. In the above sample the Lock button is highlighted, while the Unlock is grayed out. Therefore the current status is in the unlocked mode.

Quit selecting this button will take the user to the Data Collection Event table screen.

To begin a new sampling event, make sure all pertinent fields are filled in, then left click select **Event Detail**.

General Oceanics Flow-Meter Data Capture

Quit

Event Header

Event Ref: # of Points

Recording

Elapsed Time	Elapsed Dist(CM)	Velocity(CM/Sec)
0:00:29	5,290	184.1
0:00:30	5,470	182.9
0:00:31	5,660	187.3
0:00:32	5,850	188.1
0:00:33	6,040	188.4
0:00:34	6,230	192.0
0:00:35	6,410	182.7
0:00:36	6,590	179.2

Current velocity

179.2 cm/s

☒ cm/sec
☐ ft/sec
☐ m/sec
☐ knots

Event Detail

Low Speed Rotor

Start

Stop

Export Data

Elapsed Time

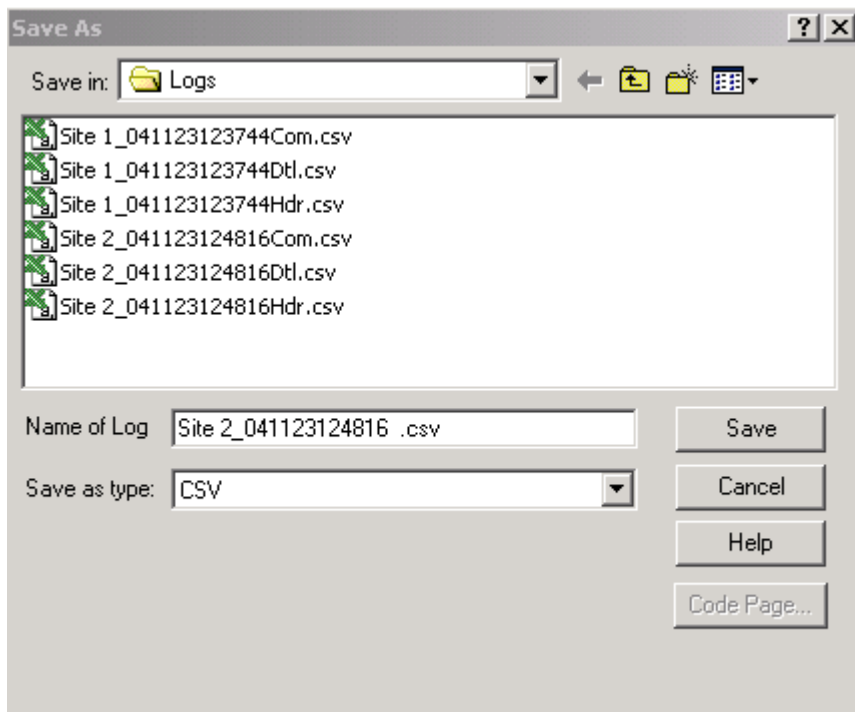
0:00:36

GPS Not Connected

Start- Selecting this button will allow the time, distance, velocity, latitude and longitude to be recorded and saved to the hard drive. “Start” is disabled if the Event displayed is locked (Lock button described previously). This prevents accidental erasure of data if an event is restarted. The Event record will automatically become Locked after the “**Minimum recording time for autolock**” is reached. This setting is found by selecting **Configuration > Polling Refresh Times**, as described in section 4.5.2.

Stop- The operator should only press this button when the deployment is complete. Selecting this function stops all data collection, and readies the system for a new deployment.

Export Data- Selecting the Export Data Button will save the file as a Comma delimited text file which may be imported into a spread sheet such as Excel. The names of these export files will be generated from a combination of the ‘Event Ref’ field that was entered for the event header, and the ending date/time of the event. This assures that the file will be easily recognized by the computer operator, and is assured of having a unique name. However, the computer operator may over-ride the file’s name when exporting. These files will have the extension (‘CSV’) instead of (‘TXT’).



The default file name (“**Name of log**”) as found in the example above, ”SITE 2_041123124816” is constructed as follows:

Event Ref name SITE 2_
 Date 041123 (year, month, day)
 Event end time 124816 (24 hour clock- hours, minutes, seconds)

Three different files will be saved with the following different extensions.

Com.csv Notes from the Event header screen (If there aren’t any notes, then this file will not be created).
 Dtl.csv Event detail
 Hdr.csv Header information

Sample event detail data imported to a spread sheet

	Event	Clock	Unit of Measure	Distance	Velocity	GPS if Connected
	A	B	C	D	E	
1	2	0:00:00	C	0	0	
2	2	0:00:01	C	170	178	
3	2	0:00:02	C	340	166.5	
4	2	0:00:03	C	520	183.4	
5	2	0:00:04	C	700	173.8	
6	2	0:00:05	C	880	179.6	

of Points- Represents the total number of samples recorded during the deployment.

Disable
Lost Satellite Reception
Last Position at 11:53:26 PM

The **Disable** button is used to stop GPS input.

☒ cm/sec
☐ ft/sec
☐ m/sec
☐ knots

Quit selecting this button will take the user to the Data Event Collection table screen.

[illegible]

19

Note: Before an event may be modified or deleted, it must be in the Unlocked mode.

Quit



Takes the user back to the main menu.

Selecting Exit will exit the program.

5.0 Conversion Tables

MULTIPLY	BY	EQUALS
centimeters/sec (cm/sec)	3.2808E-2	feet/sec
centimeters/sec (cm/sec)	1.9438E-2	Knots
cubic centimeters	6.102E-2	Cubic in.
cubic centimeters	2.642E-2	gallons (US liquid)
cubic feet	7.48052	gallons (US liquid)
cubic feet/second	6.46317E-1	million gal/day
cubic inches	1.6387E+1	cubic centimeters
fathoms	1.8288	meters
fathoms	6.0	feet
feet	1.6458E-4	nautical miles
feet	1.8939E-4	statute miles
feet	3.048E2	millimeters
feet of water	2.95E-2	atmospheres
feet/min	5.080E-1	cm/sec
feet/sec	5.9248E-1	knots
feet/sec	6.8182E-1	mph
gallons	3.785E+3	cubic centimeters
gallons	1.337E-1	cubic feet
gallons	3.785E-3	cubic meters
inches (in)	2.54	centimeters
kilometers	3.281E+3	feet
kilometers	3.937E+4	inches
kilometers	6.214E-1	statute miles
kilometers	5.399E-1	nautical miles
knots	1.852	kilometers/hour
knots	1.151	statute miles/hour
knots	1.688	feet/sec
knots	5.144E+1	cm/sec
meters	3.937E+1	inches
meters	5.4681E-1	fathoms

meters/sec	100	cm/sec
meters/sec	3.28	ft/sec
meters/sec	1.94	knots
meters/sec	2.24	mph