WinFrog Device Group:	ROV
Device Name/Model:	Micro CTD (2" Micro CTD)
Device Manufacturer:	Falmouth Scientific, Inc. 1400 Route 28A Cataumet, MA 02534 USA
Device Data String(s) Output to WinFrog:	See Telegram Specification section below.
WinFrog Data String(s) Output to Device:	NONE
WinFrog Data Item(s) and their RAW record:	ROVDATA 496 BOTTOMDEPTH 911

DEVICE DESCRIPTION:

This is a driver designed to read CTD and other data provided by the instrument. It is located in the ROV group as it's likely to be attached to an ROV. This instrument provides: Conductivity, Temperature, Pressure, Time and Date, Salinity, and Sound Velocity. Additionally there are 6 analogue DC channels (0-5v) each coupled with a 12-bit A to D converter. The instrument must be set up to automatically stream data to WinFrog. WinFrog does not support the set up of the instrument. See the manufacturer's manual for information on how to set it up for continuous output of data.

DEVICE CONFIGURATION INSTRUCTIONS

### WINFROG I/O DEVICES > EDIT I/O:

Serial
Configurable Parameters

WINFROG I/O DEVICES > CONFIGURE DEVICE:

There are two tabs on this configuration dialog box that allow you to configure WinFrog for use with this instrument. WinFrog expects the primary data to come first followed by the DC data. Some or all of the primary and DC channel data may not be included in the telegram.

Primary Channels Tab

The instrument can be set up to select only a few of the six primary channels. When some channels are not present, the fields shift in the telegram thus WinFrog must be informed which channels are present. The dialog below shows the tab. Check each box whose data is present in the telegram. **Note** WinFrog expects the data to be in the order listed. Additionally, select the method to convert pressure to depth. The depth can be applied to the vehicle if enabled. The atmospheric pressure entered in the edit box will be subtracted from the pressure observation before the depth is computed.
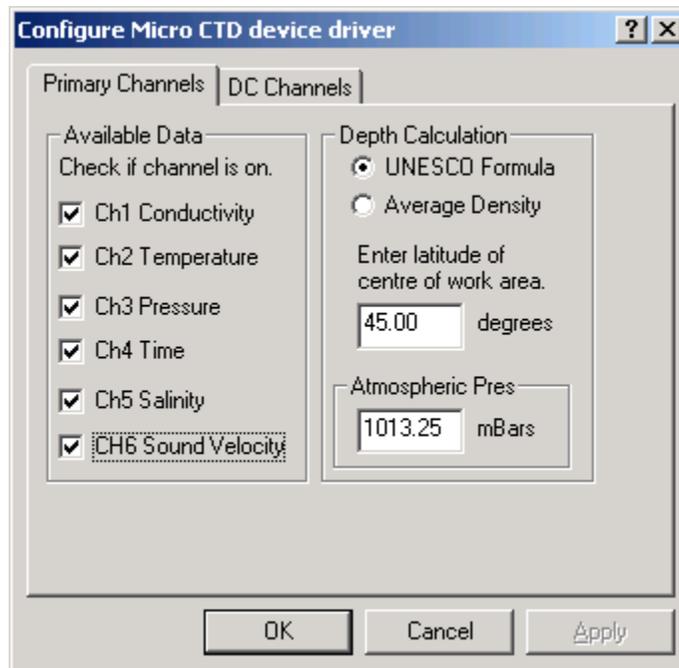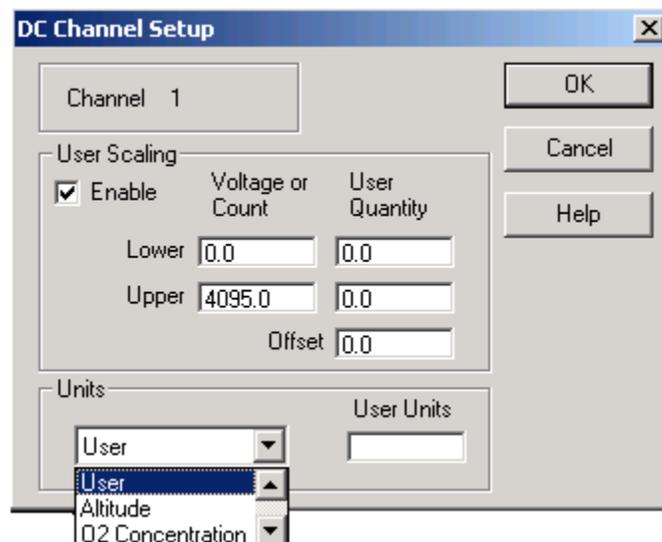

DC Channels

The instrument can be set up to select only a few of the six DC channels. When some channels are not present, the fields shift in the telegram thus WinFrog must be informed which channels are present. The dialog below shows the tab. In the Available Data group box, check each box whose data is present in the telegram. Then click the set up button to allow conversion of the digitized voltage to real world units. See below for information on the set up. The last group, Check to add data to event file, will add the quantity to the event record in the *.DAT file but you must also check the *Analogue* box on the ROVDATA data item configuration dialog (see below). The value is added with the units in one field; see appendix B, File Formats, of the WinFrog manual for details of this data. **Note** WinFrog expects the data to be in the order listed.
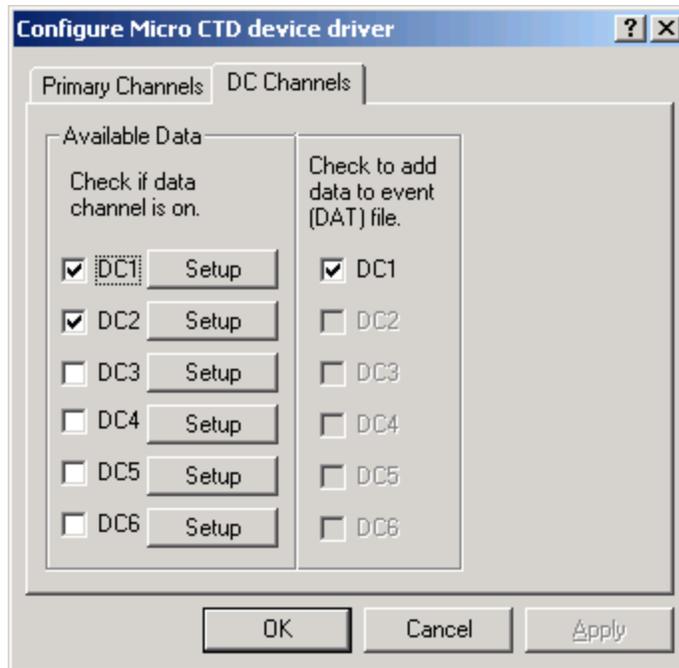
Setup

Clicking the set up button allows you to apply scaling to the digitized voltage. The dialog below opens when any of the set up buttons are clicked.

The upper box indicates the channel that these parameters will be applied to. The DC channels are 0 to 5volts and are digitized with a 12-bit A to D converter. The value that is sent by the CTD is the 12 bit digitized value – it is not converted to volts. Thus the range of the value that WinFrog will receive for each DC channel is 0 to 4095. To convert this value to the original quantity, enable the scaling and enter the parameters below.

User Scaling

Enable
Check if scaling is required. If left unchecked, the value stored will be 0 to 4096.

Voltage or Count
Lower
Enter the lowest value that the instrument attached to the CTD will output as digitized by the CTD. Usually 0.

Upper
Enter the highest value that the instrument attached to the CTD will output as digitized by the CTD. Usually 4095, however, if the highest value the third party instrument outputs is x volts, convert this to a count by the following:

$$Count = 4095 - (5 - x)4095/5$$

And round it to the nearest integer.

Note: You cannot enter the same value for the upper and lower count. If this is done, no scaling will be applied.

User Quantity
Lower
Enter the actual quantity that corresponds to the lowest count. This value will be in the units the instrument measures in, e.g. metres.

Upper
Enter the actual quantity that corresponds to the highest count. This value will be in the same units as above.

Offset
This value is in the same units as the User Quantity. It is added to the result after scaling the count.

E.g. The Benthos PSA916 altimeter outputs data in the range of 0 to 4.98v, which represents 0 to 99.99m. Thus for the lower count value enter 0 and the upper count value enter 4079. For the user quantity enter 0 and 99.99 for the lower and upper values respectively. The offset value is 0.

Units

Drop Down

There are three quantities WinFrog will recognize and process accordingly, these are: Altitude, Oxygen concentration, and Oxygen saturation. All other quantities obtained from the DC channels will be stored in the 496 record.

User

Select this one if this channels value is not one of the above three, then enter the units of the quantity in the adjacent **User Units** edit box.

Altitude, O$_2$ Concentration, or O$_2$ Saturation

Select the appropriate item. The units are predetermined.

Note on scaling.

The following formula is used to compute the user quantity.

$$Value = \frac{UpperUserQuantity - LowerUserQuantity}{UpperCount - LowerCount}(ObservedCount - LowerCount) + Offset$$

WINFROG VEHICLE > CONFIGURE VEHICLE DEVICES > DEVICE DATA ITEM > EDIT:

Adding the Micro CTD device creates two data items: ROVDATA and BOTTOMDEPTH. Once the data items have been added to the vehicle, they must be edited to suit the application.

Data item: ROV,Micro CTD, ROVDATA

This data item is designed to pass specific ROV type data from this device to the vehicle. Highlight this data item in the vehicle's device list and click the Edit button to open the Configure ROV dialog box as seen below.
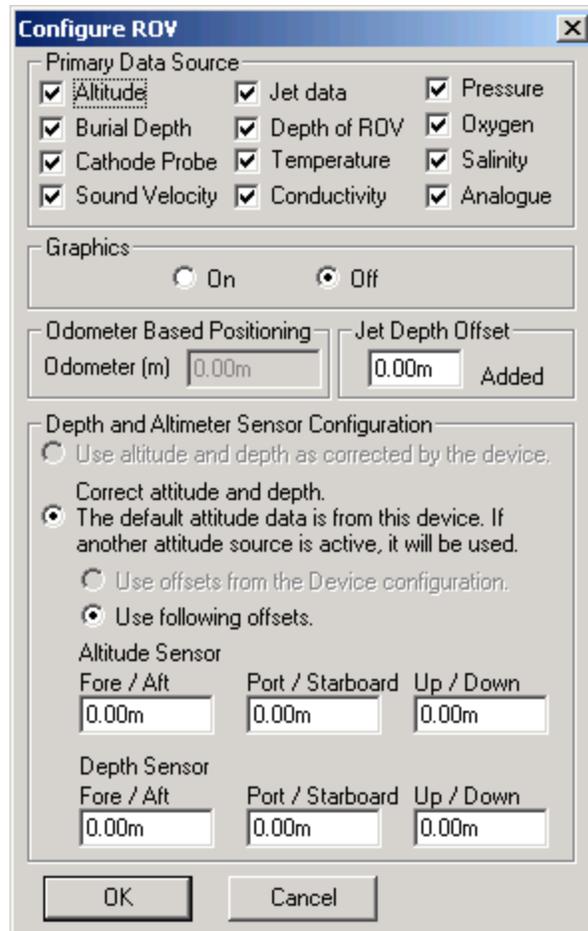
Primary Data Source Group Box

Selecting any of the checkboxes in this group causes the particular data, from this device, to be assigned to the vehicle. If it is not checked it will still be stored in the raw record. However, quantities that are not available from this device should not be checked, as this device will try to pass 0 to the vehicle thus possibly overwriting the value from another device. Similarly if two devices are observing the same quantity only one should be passing it to the vehicle. This device does not provide all of the items listed, uncheck all those not provided.

Altitude:

Checking this will result in this vehicle's altitude being determined from the observed altitude value found in the string from this device minus the altitude offset also found on this dialog. This value can be displayed in the Vehicle Text window as ROV Alt.

Unchecked will result in no calculation or assignment of the vehicle's altitude from this device. The raw data is still always recorded.

Sound Velocity:
Checking this will result in the sound velocity from the Micro CTD to be assigned to this vehicle and reported in event files, (*.DAT and *.LOG). This value cannot be displayed in the Vehicle Text window.

Depth of ROV:
Checking this will cause the depth of this vehicle's CRP to be determined from the pressure value (converted to depth) plus the depth offset below. This vehicle's elevation will be the negative of this value. This value will be used to calculate the bottom depth.

The bottom depth will be determined as:
Observed depth + Depth Offset + observed altimeter - altitude Offset
The offsets (see below) are not corrected for pitch and roll when determining the water depth.

Leaving this unchecked will result in this device obtaining the depth of the CRP from the vehicle itself, as opposed to assigning it to the vehicle as above. You must assign another device to determine the depth of the vehicle (e.g. USBL and assigning it as the source for depth).

Note: The observed altimeter value is always used for depth determination regardless of the prime/secondary altimeter setting.

Conductivity, Temperature, Pressure, Salinity, Oxygen:
Checking this will result in the quantity from the Micro CTD to be assigned to this vehicle and reported in event files, (*.DAT and *.LOG). These values cannot be displayed in the Vehicle Text window.

Analogue:
If one of the DC channels has been selected to be passed to the event files then check this box.

Remainder:
Not applicable to this device, leave unchecked.

Graphics:
Select the On radio button to display the device name and a square at the location of the tracked offset, within the Graphics and Bird's Eye windows.

Odometer Based Positioning:
Not applicable to this device.

Jet Depth Offset:
Not applicable to this device.

Depth and Altimeter Sensor Configuration:
For all ROV devices except Deep Blue ROV, the radio button settings cannot be changed. See the Deep Blue ROV device documentation for information on setting these radio buttons.

Vertical offsets of the altitude and depth sensors, relative to the CRP, can be entered here. The Altitude Offset is the vertical distance (positive up) from the ROV's CRP to the acoustic beacon tracking the seafloor. The Depth Offset is the vertical distance (positive up) from the ROV's CRP to the sensor that provides depth information of the ROV.

The offset position will be corrected for pitch and roll then the vertical offsets will be applied to determine the depth of the ROV and height of the ROV above the bottom.

Data item: ROV, Micro CTD, BOTTOMDEPTH

Highlight this data item in the vehicle's device list and click the Edit button to open the Configure Sounder dialog box as seen below.

Calculation:
Set the type of calculation to Primary or Secondary using the appropriate radio button. WinFrog will only utilize (i.e. display and record) data from a Primary depth sensor device. If there is more than one Primary depth sensor attached to a vehicle's device list, WinFrog will not mean the data (as is done with positional devices), but rather alternate between the devices. Data from a Secondary status depth sensor will simply be monitored.

Graphics:
Select the On radio button to display a labeled square representing the location of the depth sensor in the Graphics and/or Bird's Eye windows.

Apply Tides:
If the Yes radio button is selected, WinFrog will apply tidal corrections to the observed water depths. Depths displayed in the Vehicle Text window and recorded in automatic event (i.e. .DAT, .SRC, and .RCV) and type 351 raw files will refer to the datum corrected depths. Note that type 411 raw data records will remain truly raw and will not reflect the tide correction.

The tide information can be supplied by a real time telemetry system or by predicted tide files. Either way, the tide "device" must also be attached to the same vehicle's device list. For more information, refer to documentation on Tide devices.

Soundings for Profile:
This section of the Configure Sounder dialog permits the collection of sounding data to an .mdb database file for display in WinFrog's Profile window. This collection is completely separate from automatic event or raw data collection.

> **Collect Data**
> Select this checkbox to enable the collection of data to an .mdb database file.

> **Interval Type**
> Select to utilize either Along Line or Actual Distance (i.e. between successive position updates) calculations for data collection intervals. Selecting Along Line requires that you also enable survey line tracking.

> **Distance Interval**
> Specify the distance interval at which the data will be collected.

> **Purge RAM**
> Sounding data is stored in the RAM memory of the computer. Any data collected which will not be required at later time can be deleted by selecting the Purge RAM checkbox, then clicking the OK button to exit the dialog box.

> **Database filename**
> Click the Browse button to define where and to what filename the .mdb file will be written. The file name and location is displayed here.

> **Abort Saving Data**
> Select this checkbox to abort saving data to the .mdb file. In other words, to save data to the .mdb file ensure that this box is NOT checked.

> **Display Soundings Data in Profile Window**
> Select this checkbox to enable the display of this data in WinFrog's Profile window.

Offsets
This section of the window allows for entry of offset values as measured from the vessel's Common Reference Point (CRP). Note that the Fore/Aft and Port/Stbd offsets are used for "cosmetic" visual purposes only: A depth sensor is not a positioning device, and hence its horizontal offsets have no application. If the depth sensor's position is to be recorded correctly, you must create and enable a vehicle Tracking Offset for that specific location. The offsets entered here can simply be used as a means of graphically confirming that the Tracking Offset values have been entered correctly.

The Depth Offset is applied; the entered value will be added to the received depth sensor data.

Depths displayed in the Vehicle Text window and recorded in automatic event (i.e. .DAT, .SRC, and .RCV) and type 351 raw files will refer to the corrected depths. Note that type 411 raw data records will remain truly raw and will not reflect the depth offset correction.

TELGRAM SPECIFICATION:

The data telegram from the Micro CTD is comma-delimited with no headers, if all six primary channels and all six CD channels have been selected for output the data will be as follows:

Field	Data
1	Conductivity (mmho/cm)
2	Temperature (C)
3	Pressure (dBars)
4	Time and date (hh:mm:ss mm-dd-yyyy)
5	Salinity (PSU)
6	Sound velocity (m/s)
7	DC channel 1 count
8	DC channel 2 count
9	DC channel 3 count
10	DC channel 4 count
11	DC channel 5 count
11	DC channel 6 count
12	CR-LF

If any channel is not selected for output that field is not present and the next field occupies its place.

e.g. The following telegram is from a Micro CTD with the first four primary channels enabled for output and two DC channels enabled.

+00.0463 ,+33.6216 ,+000.088 ,14:54:49 04-21-2005, 4045 ,4047