DLS-400

A member of the Data Dolphin Family of Data Logging Systems

Remote Monitoring Solution

Data Dolphin Installation and Usage Manual

Last Revision: September 2023

Note to the user:

This manual may cover items not specific to your system and was prepared as a reference for the many typical uses of the DLS-400.

Please ensure all fittings and glands are tight as they may have come loose during shipping or with temperature changes.

Table of Contents

Bill of Materials Data Logging System (Model 400)

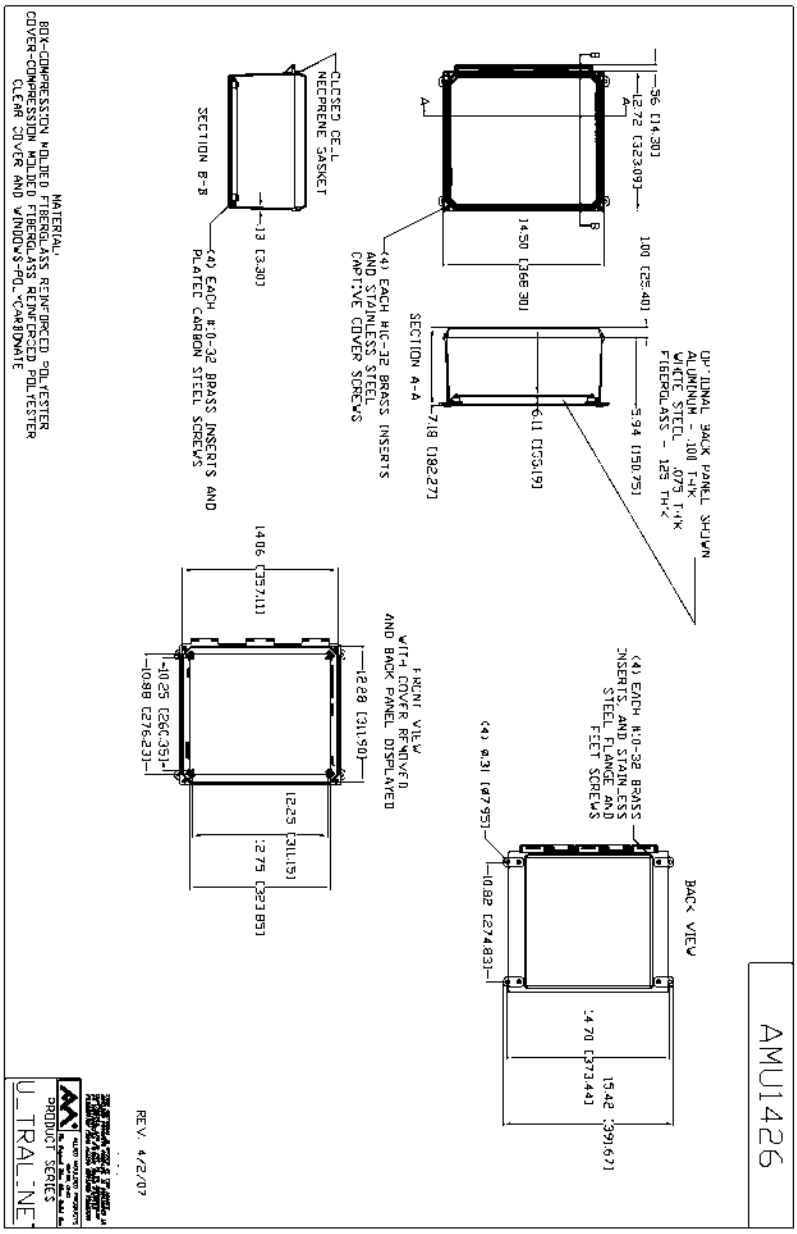
Bill of Materials DLS-400:

- DD-400 Data Logger
- Internal Cellular Modem
- Solar Controller
- Fibreglass Enclosure (14" x 12" x 6")
- Enclosure Brackets
- Rechargeable Lead Acid Battery
- Lightning Arrester
- 5db Whip Antenna
- 65cm Antenna Cable
- 4m Antenna Cable

- Solar Panel with Cables
- Solar Panel Brackets

- 5’ Tripod
- 10’ or 20’ Pop Up Mast

Mechanical Drawings



DD-400 Specifications

Input Channels

Maximum Input Voltage: 0 V to +2.5 V (0-20mA)
Analog Voltage Resolution: 1 µV
A/D Bits: 24
Input Impedance: 20 Gohm
Scan Interval: 3 to 100 Hz
Excitation Channels: 2
Excitation Voltage 1: +2500 mV
Excitation Voltage 2: +5000 mV

- 8 - 24bit Single Ended Analogs or 4 Differentials or Combination of both (1 Differential = 2 Analogs)
- 5 - 10bit Single Ended Analog
- 2 - Frequency
- 3 - SDI-12 Addresses/Devices
- 4 - Counter/Status
- 2 - Totalizers

Power Requirements

Power Supply: 6 to 25 VDC
Quiescent Current: < 400 µAmp (Typical)
Processing Current: 3 mA

Memory

Flash Memory: 4 MB
Data Values: 233,472 (1 Precision Input)

Case Material

Extruded Aluminum

Dimensions

Size (cm) 20.32 x 7.62 x 8.89
Size (inches) 8 x 3 x 3.5
Weight DD-400 with radio module, battery and antenna 0.918kg (2.024lbs)

Operating Temperature Range

Standard -40 to +60°C
Extended -55 to +80°C

SMC-02 Specifications

Power Requirements

Solar Panel Input Range: 14 to 30 VDC
Solar Panel Wattage Range: Up to 40 W (Typical)
Load Current Range: Up to 4 A

Memory

Flash Memory: 4 MB
Data Values: 233,472 (1 Precision Input)

Case Material

Polyamide Enclosure

Dimensions

Size (cm) 9.0 x 2.25 x 7.5
Size (inches) 3.5 x 0.88 x 2.95
Weight: 0.025kg (0.055lbs)

Operating Temperature Range

Standard -40 to +60°C

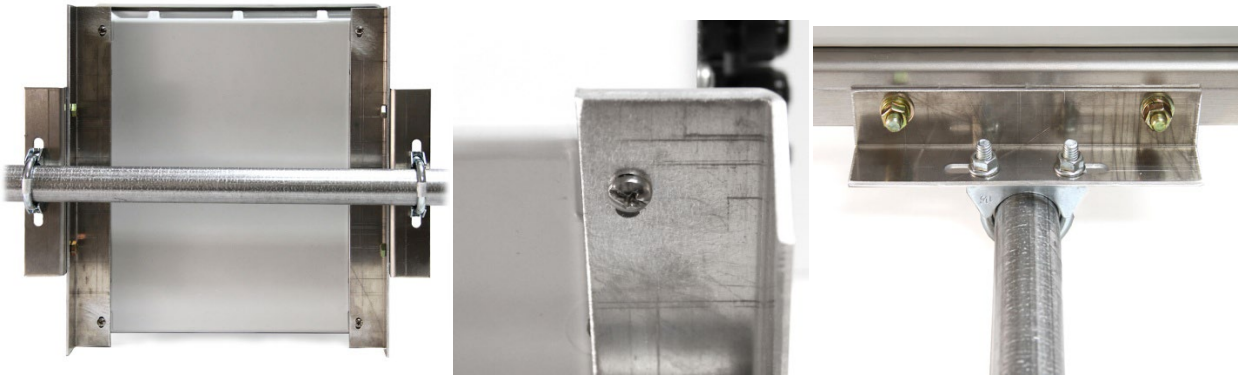
Installation of the Enclosure Brackets

Step 1

Brackets for pole mounting the fibreglass enclosure and/or the solar panel are available. Bracket hardware is to be assembled like the following:

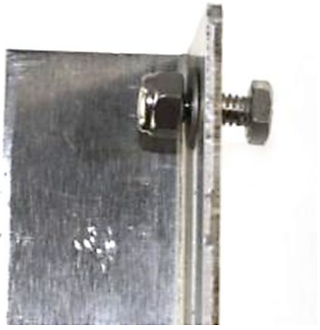
Find the U-Bolts that will attach to the brackets on the fibreglass box. The same type of U-Bolts will also be used to mount the solar panel. Bushings may be necessary on the U-Bolt to clamp tightly to the mast. Newer bracket assemblies are slotted to allow different U Bolt sizes.

The Enclosure is attached to the bracket as shown below. Old style brackets (2013 or older) require feet which are attached with screws to the fibreglass enclosure. New style brackets (2014) attach directly to the enclosure.



Mounting the Solar Panel

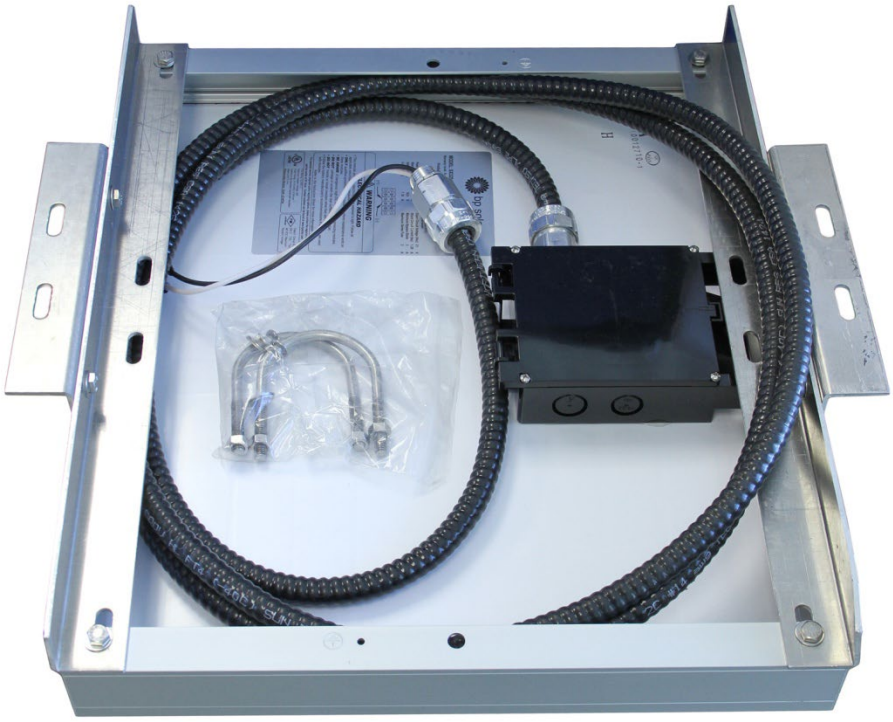
To bolt the brackets together, or to the panel, follow the order as shown in the figure below.



Bolt both sets of Long brackets to the short brackets. When finished both sets should look like this.

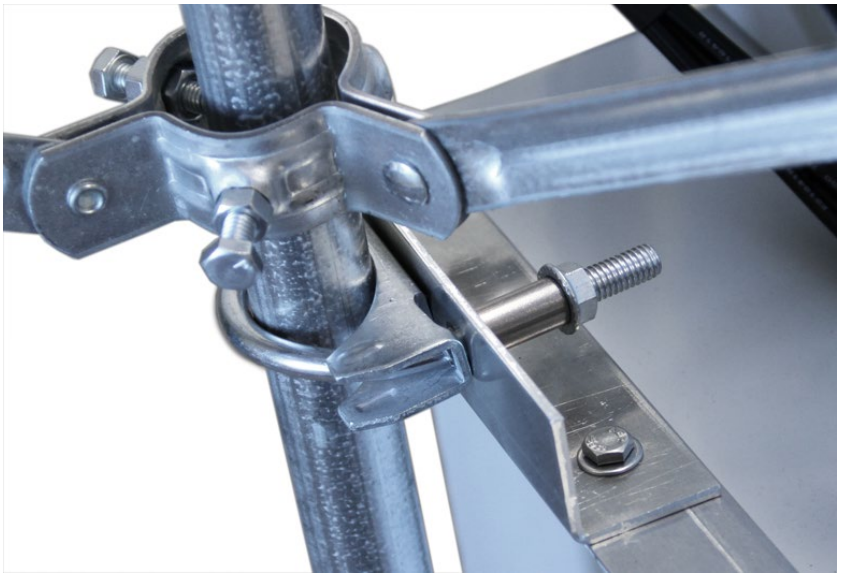
Mount the top bracket in to the pre-existing in the solar panel frame.

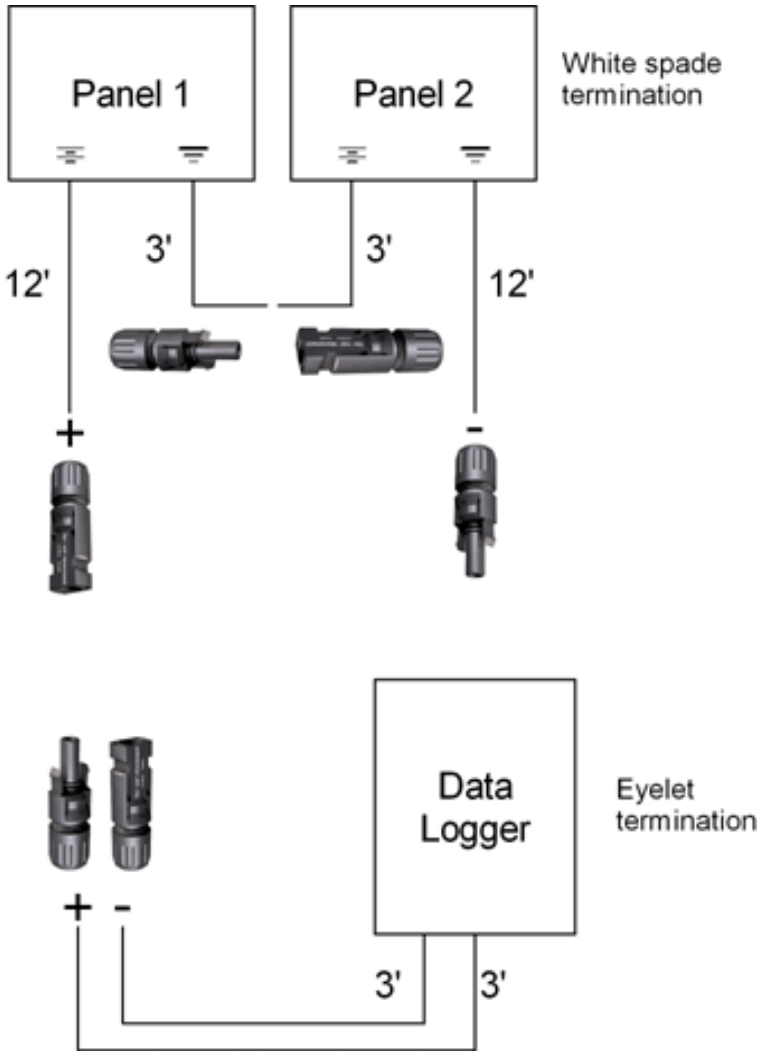
Mount the bottom bracket in to the pre-existing holes on the bottom end of the panel.



The panel, with both brackets mounted. (Older tech-cable style shown)

Hold the solar panel or fibreglass enclosure up to the pole they are to be mounted to and slide the U-Bolts over and attach to brackets as shown. Washers or bushings may be necessary as shown below if the pipe is not large enough. Newer bracket assemblies can utilize a range of U Bolts for different pipe diameters.





If your system is 24V powered then you will have two panels in series. The panels mount side by side on the same bracket. Mount and connect Type 1 and Type 2 panels together with the short cables. The longer MC4 cables go into the DLS-400 enclosure.

DO NOT CONNECT POWER UNTIL EVERYTHING IS MOUNTED, THE ANTENNA IS INSTALLED, AND ALL SENSOR WIRING IS VERIFIED AS CORRECT

Communications Connections (DLS-400)

Communications Connections (DLS-400)

DLS-400 Cellular Radio Antenna

Insert the grounding arms and tighten them down with an Allen key through the holes on top. Then attach the other end of the N to N cable to the MBC-800 and thread on the antenna itself.

Strap the antenna to the mast using the hose clamps in an upright position.

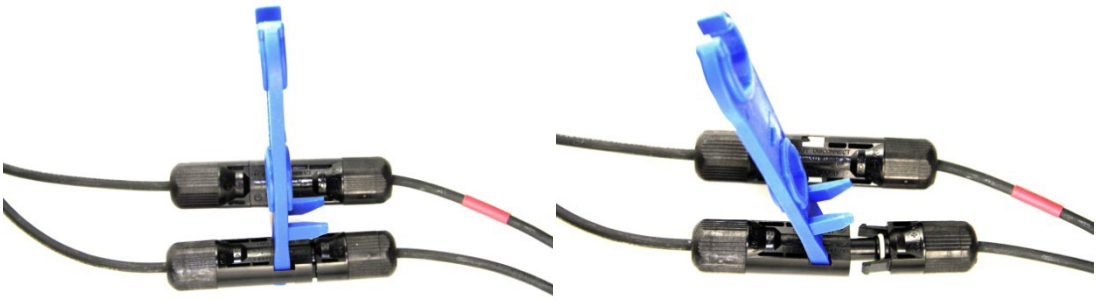
The N to N antenna cable is attached from the antenna to the bulk head on the DLS-400.

Solar Power Connections (All Models)

The solar panel cables are pre- wired through the DLS-400 enclosure.

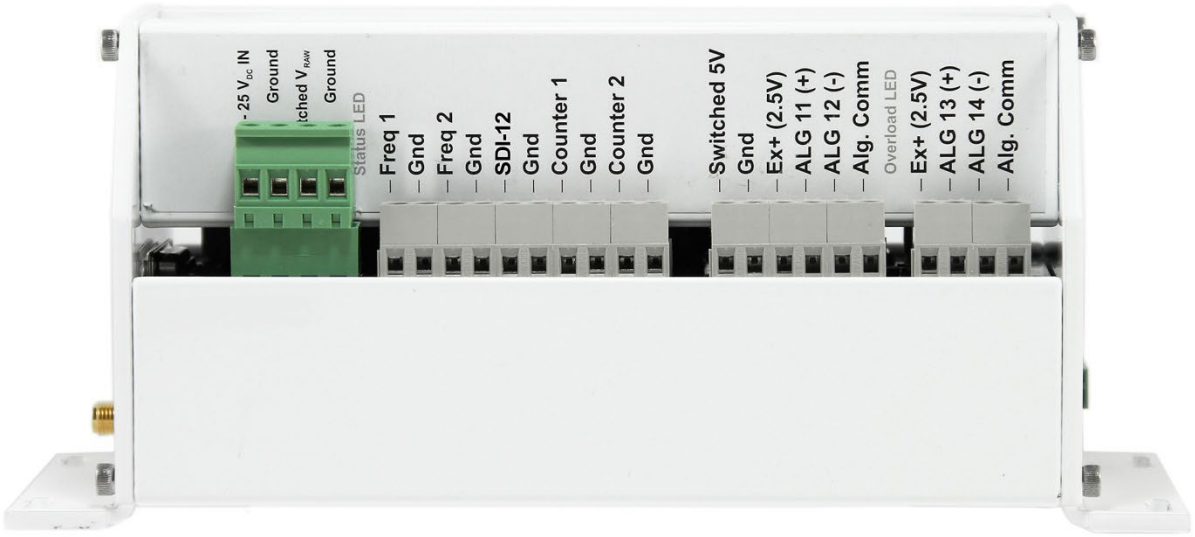
The wires from the cable are pre-connected to the terminals of the solar module controller inside the enclosure. The **red jacketed** wire is positive voltage from the panel, and the **black** wire is the negative.

MC4 connectors plug into each other from the panel to the enclosure providing the battery with charge. The blue hand tool is used to disconnect the connectors.



Simply push the tool into the slots and twist it to release.

DD-400 Terminal Descriptions



Previous Generations

Screw Terminal	Description
6-25 V_{DC} IN	Power Input for the Data Logger
Ground/Gnd/Alg. Comm	Power and Signal Ground
Switched V_{RAW}	Sensor Excitation. Switched from Power Input
Freq 1/Freq 2	Frequency Inputs
SDI-12	SDI-12 Input. Can accept addresses 0, 1, and 2
Counter 1/Counter 2	Rain Gauge, Counter, Status Inputs
Switched 5V	Sensor Excitation. 5V
Ex+ (2.5V)	Sensor Excitation. 2.5V
ALG 11/ALG 12/ALG 13/ALG 14	24 bit Precision Analog Inputs

Revision H (2014)

Screw Terminal	Description
6-25 V_{DC} IN	Power Input for the Data Logger
Ground/Gnd/Alg. Comm	Power and Signal Ground
Switched V_{RAW}	Sensor Excitation. Switched from Power Input
Freq 1/Freq 2	Frequency Inputs
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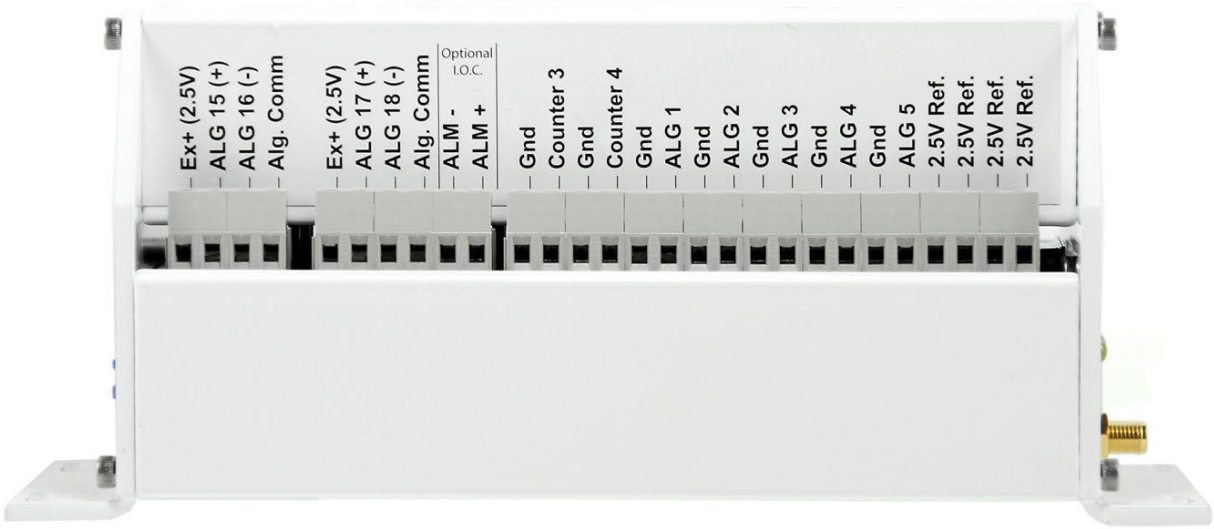
Counter 1/Counter 2	Rain Gauge, Counter, Status Inputs
Switched 5V	Sensor Excitation. 5V
Ex+ (2.5V)	Sensor Excitation. 2.5V
ALG 11/ALG 12/ALG 13/ALG 14	24 bit Precision Analog Inputs



Screw Terminal	Description
Ex+ (2.5V)	Sensor Excitation. 2.5V
ALG 15/ALG 16/ALG 17/ALG 18	24 bit Precision Analog Inputs
Alg. Comm/Gnd	Power and Signal Ground
ALM -/ALM +	External Alarm Trigger
Counter 3/Counter 4	Rain Gauge, Counter, Status Inputs
ALG 1/ALG 2/ALG 3/ALG 4/ALG 5	10 bit Standard Analog Inputs
2.5V Ref.	Sensor Excitation. 2.5V

Port	Description
SMA Female Bulkhead (Gold)	Cellular Modem Antenna Port
RS-232 DB9	Serial Communication Port
Yellow/Green/Red LEDs	Modem Status Indicators
3 Pin Green Plug	RS-485 or CAN Communication (Optional)
16 Pin Blue Plug	External Modem or Radio Port

Sensor Connections

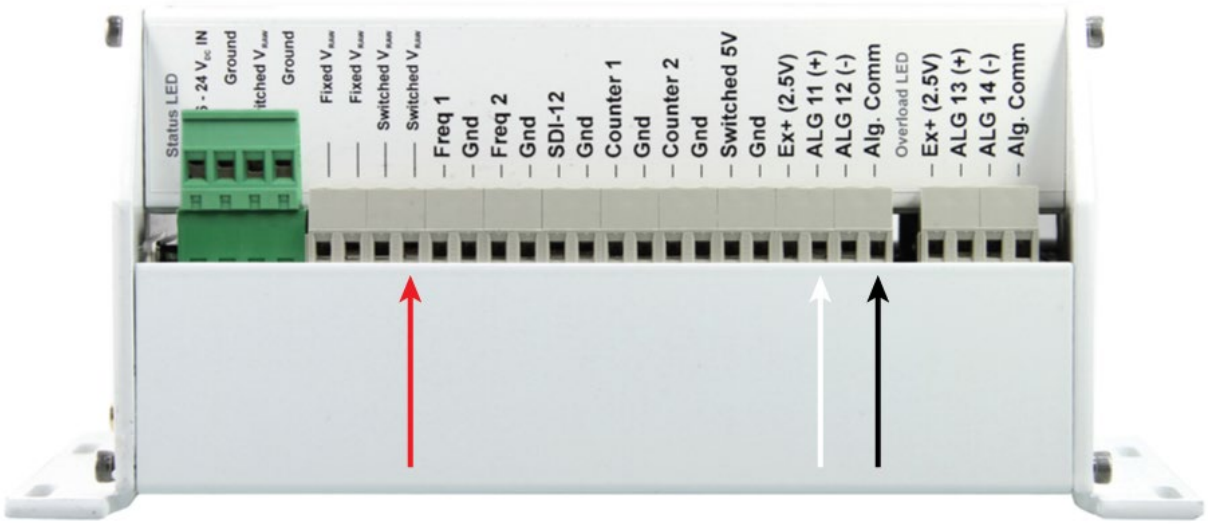
Before You Start!

Do NOT connect sensors while data logger equipment is already powered up.

There is the possibility that the data logger or sensor could become damaged if care is not taken while working on the equipment.

Always wire equipment with the power disconnected, and verify your wiring before re-applying power to ensure safe and proper operation for the lifetime of your data logger.

Generic 0.0-2.5V Input



Connect the wires from your sensor to the data logger as shown. The colors shown here are suggested, but may not match your device exactly. Power is connected to the Switched Vraw output and Ground with the output from the sensor going into ALG 11.

* Analog 11 is shown as the input in the example above. This is the typical first input of choice, but inputs 11, 12,13,14,15,16,17, and 18 are all valid inputs.

You must scale the input signal to match your units with linear equation coefficients. Eg.

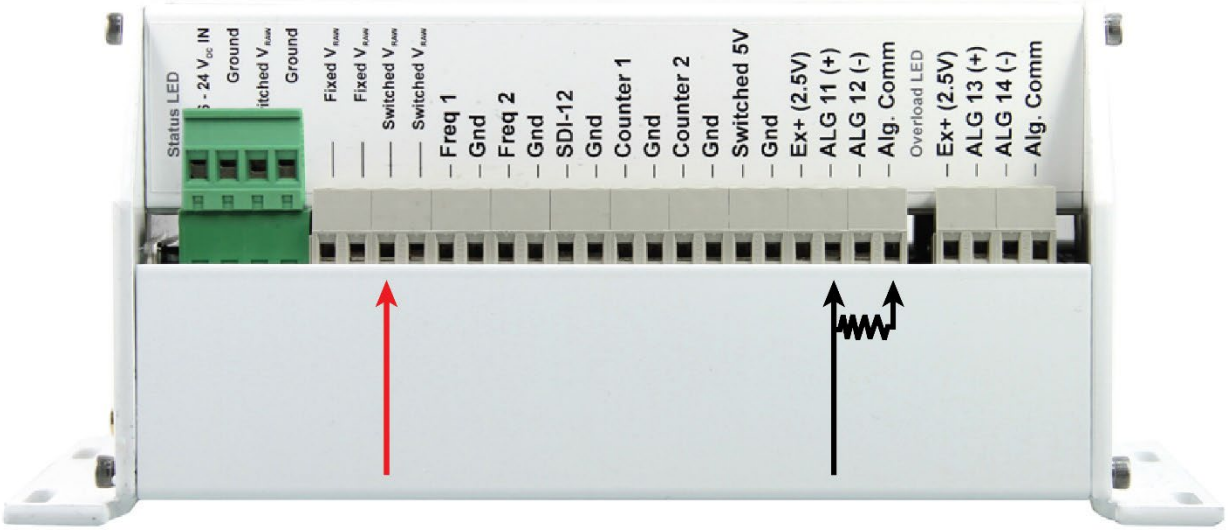
V	Units
0.0	0
2.5	50

m	20.0
b	0.0

For example if your sensor outputs 0.0V for 0.0 example units and 2.50V for 50 example units, you would calculate an m of 20 and b of 0 to enter into the Precision Input as a “Linear Equation” scaling in the Setup tab.

This can easily be done by using the SLOPE() and INTERCEPT() functions in Excel.

Generic 4-20mA Input



For a two wire 4-20mA sensor the V+ or V DC is connected to Switched Vraw and the V- or GND is connected to ALG 11 and a precision 100 ohm shunt resistor is tied between the input and Alg. Comm.

For a three wire 4-20mA sensor the V+ or V DC is connected to Switched Vraw and the V- or GND is connected to Ground. The signal output is connected to ALG 11 and a precision 100 ohm shunt resistor is tied between the input and Alg. Comm.

You must scale the input signal to match your parameter with linear equation coefficients.

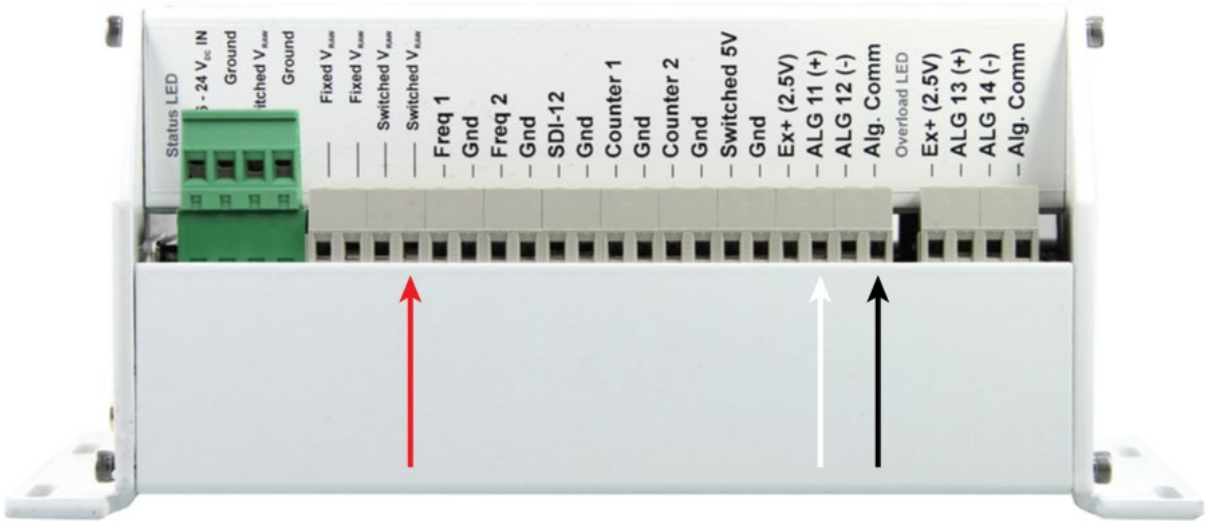
V = I/R	Units
0.4	5000
2	10000

m	3125.0
b	3750.0

For example if your sensor outputs 4 mA (which becomes 0.4V with the 100 ohm shunt) corresponding to 5000 example units and 20 mA (2.0V) for 10000 example units, you would calculate an m of 3125 and b of 3750 to enter into the Precision Input in the Setup tab.

This can easily be done by using the SLOPE() and INTERCEPT() functions in Excel.

Submersible Level Probe - Analog output



Pressure Probe	DD-400 Terminal
RED	Switched Vraw
BLACK	Alg. Comm
WHITE	ALG 11 (+)

The pressure probe comes with the wiring harness and gland pre-attached, and is to be fed through the open hole on the DLS-400 case and tightened securely.

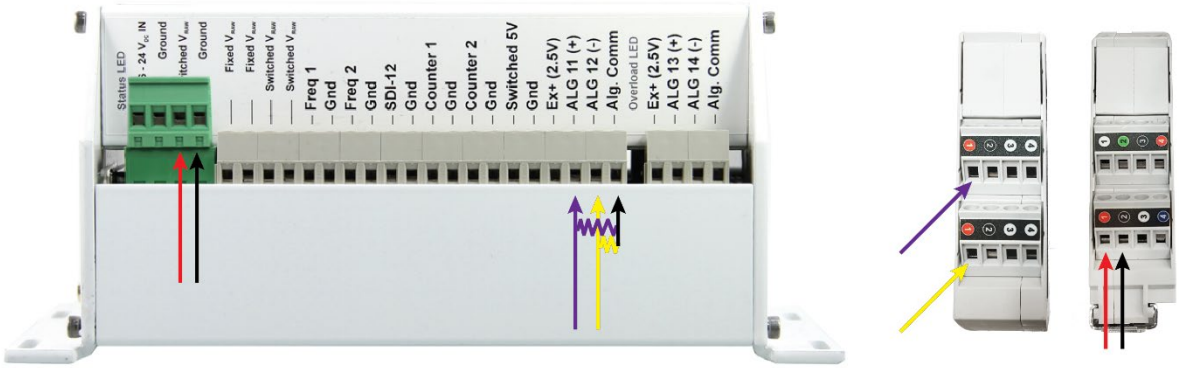
The pressure probe has a vent tube that needs to be connected to the desiccant inside the case.

The sensor head should be mounted in the fluid being measured securely such that it does not move up or down causing incorrect measurements. Please consult with an engineer on a per application basis for the best methods.

Connect the wires from the pressure probe level sensor to the data logger as shown.

* Analog 11 is shown as the input in the example above. This is the typical first input of choice, but inputs 11, 12,13,14,15,16,17, and 18 will all work with the “Level Probe- Analog output”

RST VW0420 Vibrating Wire Interface



VW0420	Wire Color	DD-400 Terminal
P2 9-24V (Power) ① +	Red	Switched V_{RAW}
P2 9-24V (Power) ② -	Black	Ground
P3 4-20 mA (Vibrating Wire) ① +	Purple	ALG 11(+)
P3 4-20 mA (Thermistor) ① +	Yellow	ALG 12(-)

There is a 100 ohm resistor between each ALG input and Alg. Comm to convert the 4-20mA signal to voltage for the data logger to read.

Additional interfaces wire to the other ALG input pairs in the same way.

Working range for the input is 0.4 to 2.0V. Error status is 0.3V

Power loops from V Switched Raw to each of the power inputs on the interfaces. Power also then feeds into the 4-20mA loop which then goes to the data logger input with the termination resistor.

If you have 1-2 interfaces, set your DD-400 Sample Rate to 5 seconds, if you have 3-4 interfaces set it to 7 seconds. In the VW0420 software set the first interface to a 2 second Sampling Rate, second interface to a 3 second Sampling Rate, third interface to a 4 second Sampling Rate, and the fourth interface to a 5 second Sampling Rate to help avoid plucking at the same time.

Set slope and intercept to match 0.4V for 4mA limit and 2.0V for 20mA limit vibrating wire reading. Here the vibrating wire value is set up for B units and the temperature input is set up for degrees Celsius. Engineering units is disabled in the VW0420 so check the 20mA and 4mA limit provided by the VW0420

Host software in the Output Units tab in this instance with limits of 5000 and 10000 gave **m = 3125.0**, and **b = 3750.0** after slope and intercept were calculated for the VW. For the temperature sensor, **m = 25** and **b = -10.**

Calibration certificates will have a better low and high range for the sensor to input here!

B Units

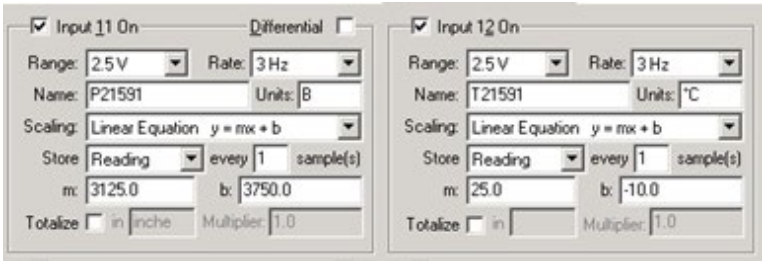
0.4	5000
2	10000

Temperature

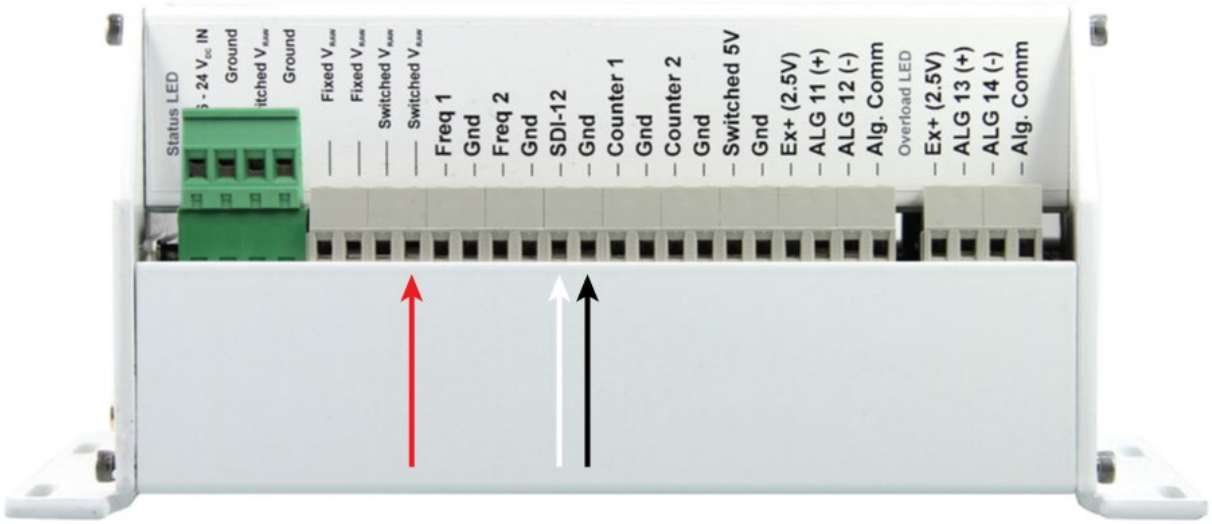
0.4	0
2	40

m	3125.0	**m**	25
b	3750.0	**b**	-10

Enter in these coefficients in Data Dolphin 2 for your logger.



Schlumberger Water Services DIVER – SDI12 Connections



Pressure Probe	DD-400 Terminal
RED	Switched Vraw
BLACK	Ground
WHITE	SDI-12 (up to 3 Devices)

The DIVER is attached to the Diver Data Cable as normal and the other end that normally connects to the USB Interface Cable is simply cut and wired to the Diver-DCX module. A yellow jacketed cable from the DCX module connects to the switched power on the green terminal block and the SDI-12 data line to the grey terminal block.

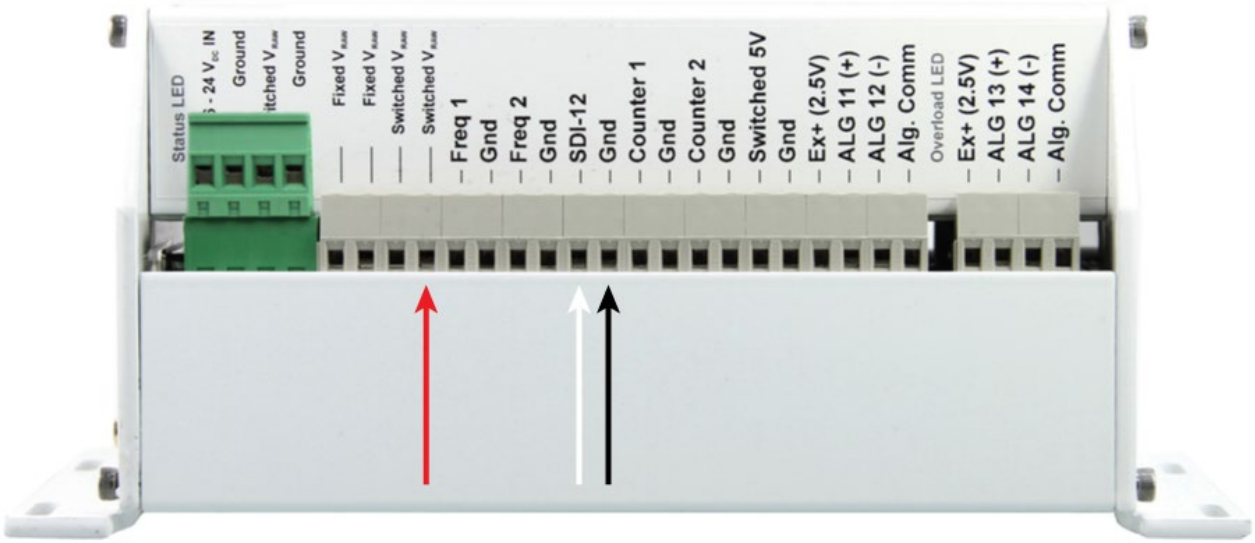
The Diver Data Cable has a single conductor with shield that is inserted into the center and ring terminals of the DCX. Center being the stranded center wire, and ring being the shield.

Strip the wire jacket off and twist the shield together to form a pin and tin it with solder. Tin the center wire as well. The yellow jacket wire will provide the power and SDI-12 signal connections to the DD-400. Verify inside the DCX that the red is in +12, black is GND, and white in LINE.

SDI-12 Parameters

Parameter #	Parameter Description
0	Pressure [cmH2O]
1	Temperature [°C]
2	Conductivity [mS/cm]
3	Atmospheric Pressure [cmH2O]
4	Water Level [cmH2O]

Solinst Levelogger – SDI12 Connections



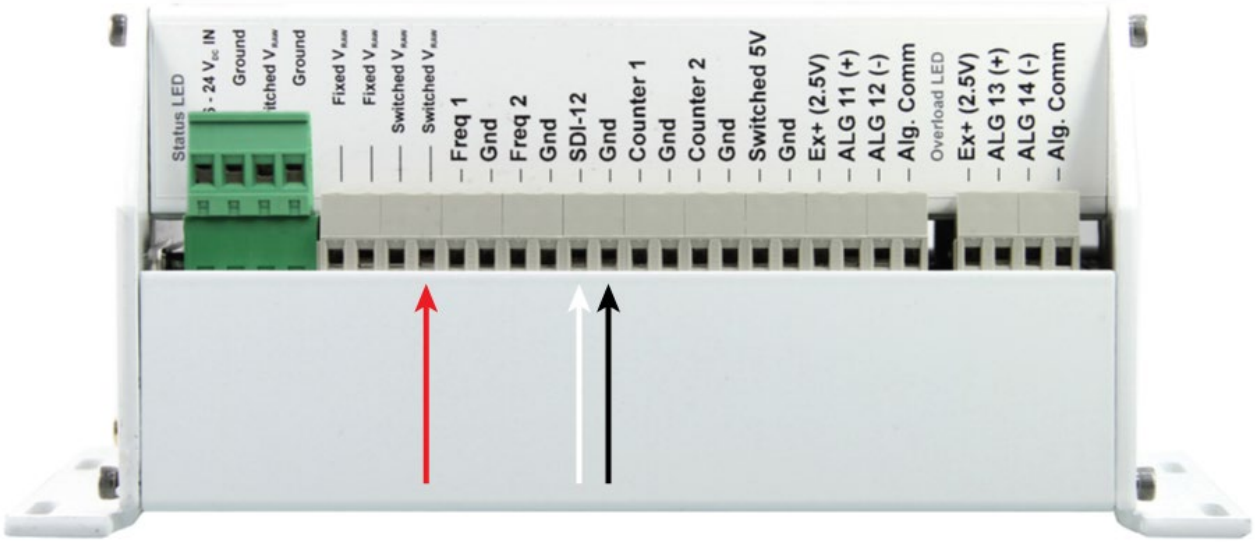
Pressure Probe	DD-400 Terminal
RED	Switched Vraw
BLACK	Ground
WHITE	SDI-12 (up to 3 Devices)

The Solinst SDI-12 Interface provides power and SDI-12 communication to the DD-400 data logger. Warning: The interface is not waterproof and needs to be inside the DLS-400 enclosure so the cable will have to be disconnected from the interface screw terminals and run through a gland to protect the interface from the outside elements.

SDI-12 Parameters

Parameter #	Parameter Description
0	Temperature [°C]
1	Depth [mH2O]
2	Conductivity [mS/cm]

Level Troll – SDI12 Connections



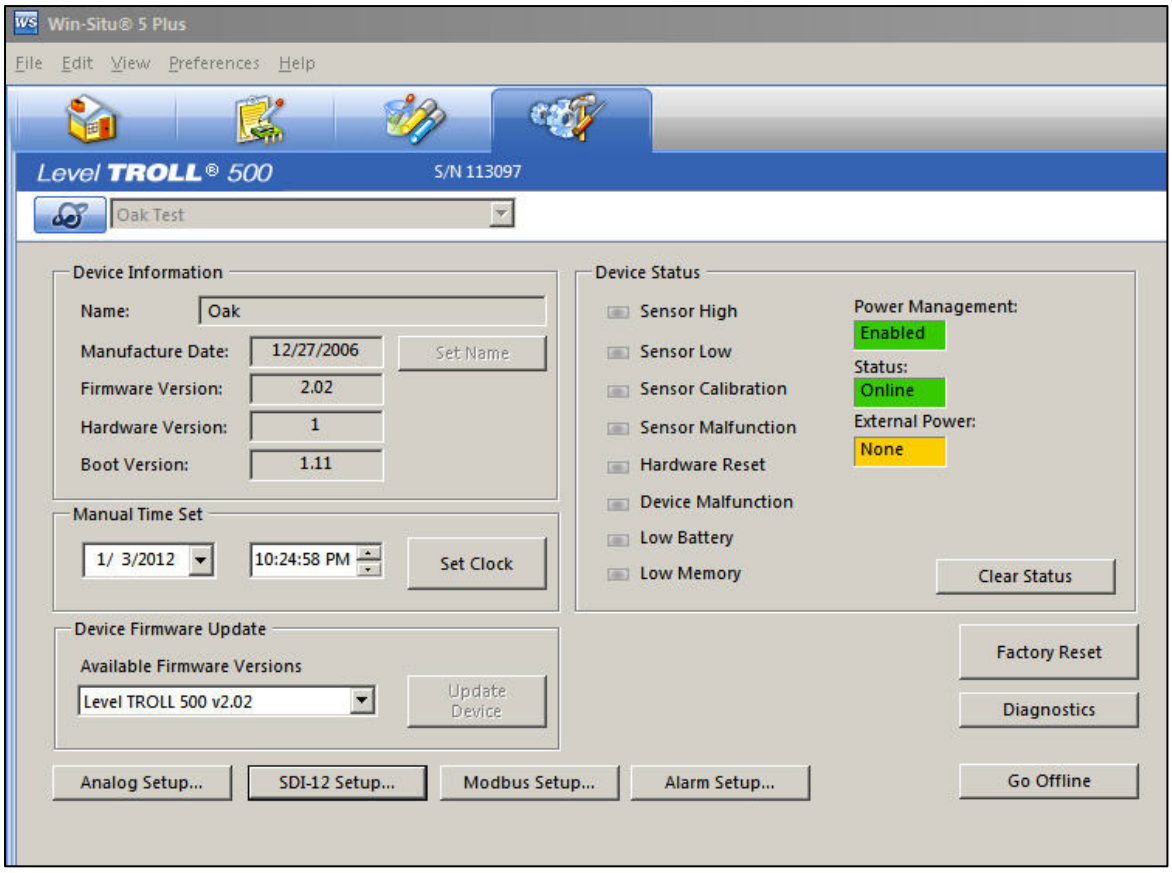
Pressure Probe	DD-400 Terminal
RED	6- to 25 Vdc IN
BLACK	Gnd - Ground
WHITE	SDI-12(up to 3 Devices)

The In-Situ device must be connected through a bulkhead connector that passes through the DLS-400 enclosure.

Each device MUST be on its own SDI-12 Address!

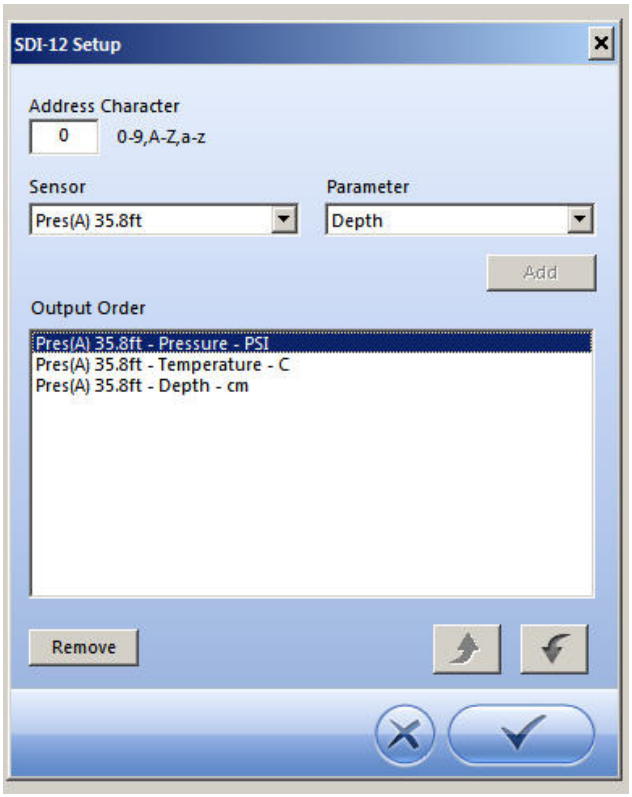
For example set the LevelTROLL to SDI-12 Address 0, and the BaroTROLL to Address 1.

The Level Troll has to be programmed to use the SDI-12. Start the Win-Situ software and go to the setup screen.



Press the SDI-12 Setup button.

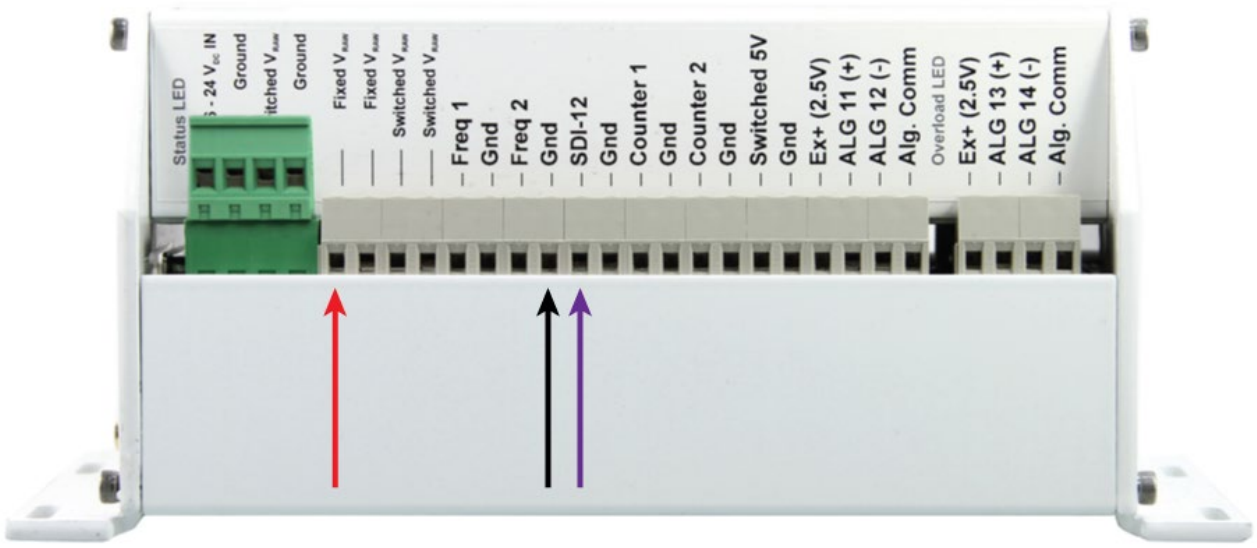
On the SDI-12 setup screen choose the parameters that you want to record and in the order that you want them.



Press the check mark when done.

Please note that the Level Troll needs to be logging for the SDI-12 values to be updated

YSI 6 Series Sonde – SDI12 Connections



Pressure Probe	DD-400 Terminal
RED	Fixed Vraw
BLACK	Gnd - Ground
PURPLE	SDI-12 (up to 3 Devices)

The YSI Sonde must be set up to for which sensors are present on the unit, and which it will report back for the DD-400 to record.

Use YSI EcoWatch software with the RS-232 dry cable and bring up the Sonde Terminal to program the unit. Consult YSI documentation for further explanation if necessary.

When the sonde terminal window has appeared press **Enter** and wait until a # prompt appears. From here you can type **menu** and you will now see the sonde main menu. You will want to set up the sensors attached and have their parameters set up for reporting.

Configuration is fairly straightforward since the sonde is being used as a sensor that is being polled for SDI-12 data and any of the advanced uses (such as internal logging as a secondary measure) are left to the user.

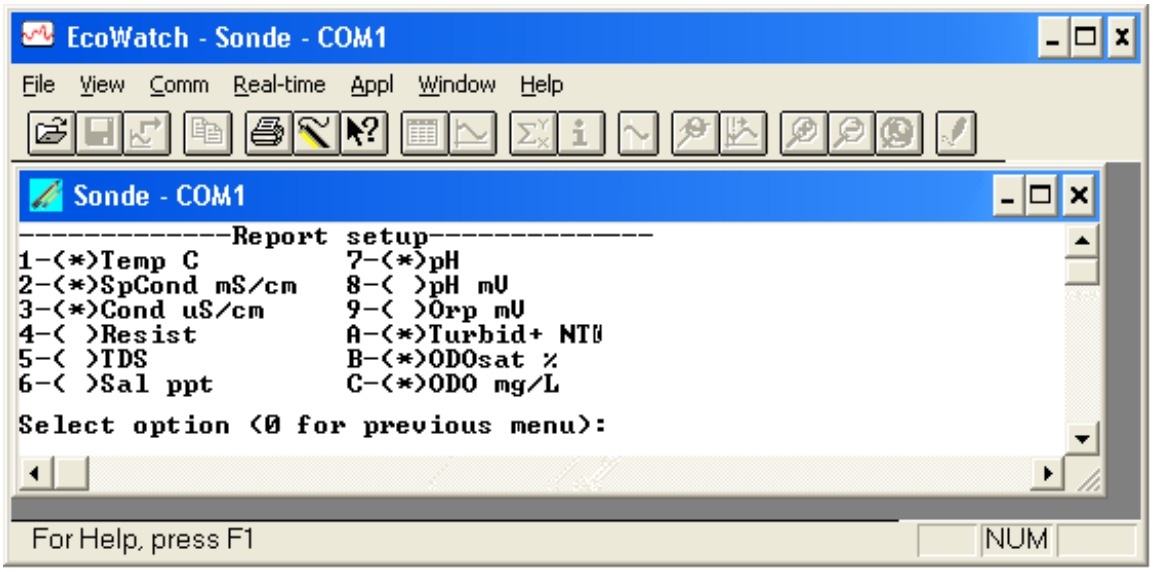
The first screen presented will be a menu as shown here.

```
------------------Main-------------------
1-Run                5-System
2-Calibrate          6-Report
3-File               7-Sensor
4-Status             8-Advanced

Select option (0 for previous menu):
```

Option 7 contains the menu for setting which sensors are enabled.

```
------------Sensors enabled------------
1-( )Time
2-(*)Temperature
3-(*)Conductivity
4-(*)Dissolved Oxy
5-(*)ISE1 pH
6-( )ISE2 Orp
7-( )ISE3 NONE
8-( )ISE4 NONE
9-( )ISE5 NONE
A-(*)Optic-T Chlorophyll
B-(*)Battery

Select option (0 for previous menu):
```

Time is not necessary inside the YSI since the timestamp is recorded in the DD-200 or DD-400 data logger with the sensor parameters.



Your own configurations will vary depending on the application, but these menu captures can serve as a useful reference.

```
-------------System setup--------------
1-Date & time
2-Comm setup
3-Page length=25
4-Instrument ID=NotSet
5-Circuit board SN:00013F38
6-GLP filename=00013F38
7-SDI-12 address=0
8-Language:English

Select option (0 for previous menu):
```

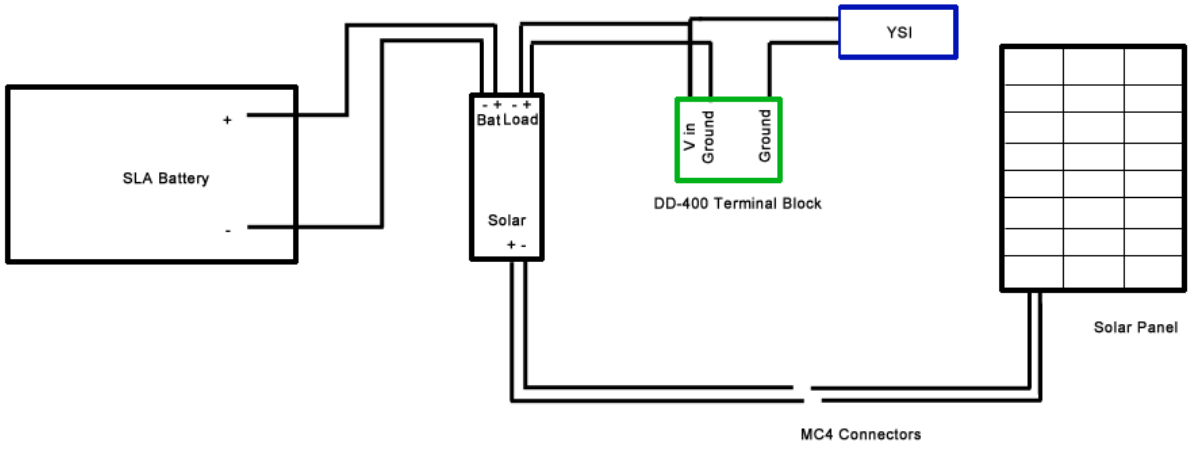
SDI-12 address is set to 0, and can be any of 0, 1 or 2 when used with the DD-200 or DD-400. Your own conventions might dictate which address is used depending on configurations if sondes move from station to station as a way to organize the data.

```
-------------Advanced setup-----------
1-(*)VT100 emulation
2-( )Power up to Menu
3-( )Power up to Run
4-( )Comma radix
5-(*)Auto sleep RS232
6-(*)Auto sleep SDI12
7-( )Multi SDI12
8-( )Full SDI12

Select option (0 for previous menu): 0
```

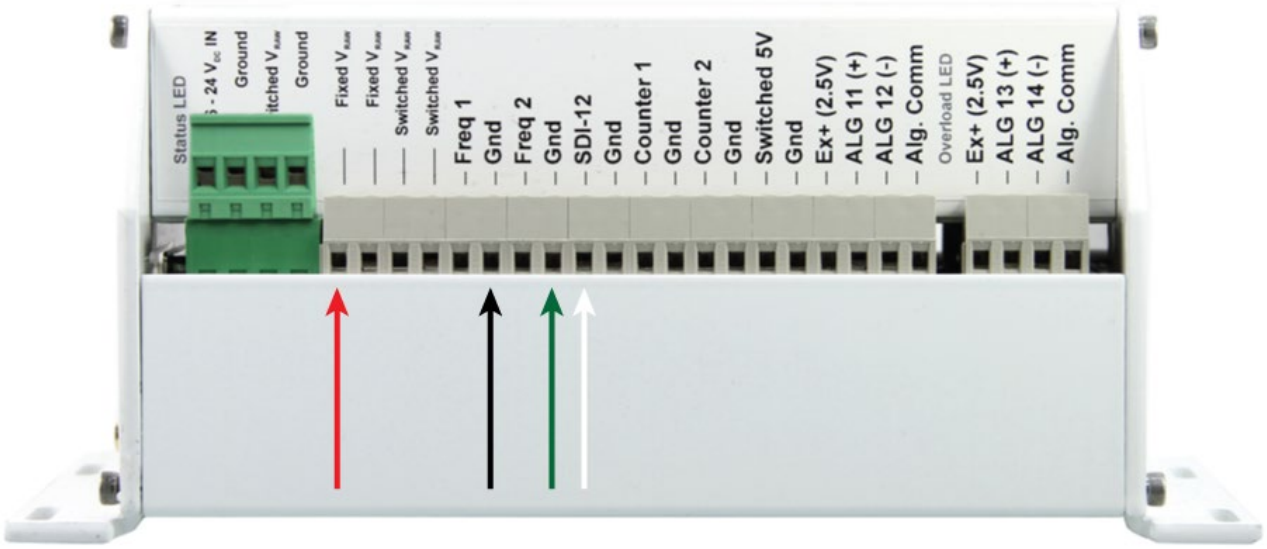
Ensure Auto sleep SDI12 is turned on.

The DD-200 or DD-400 will from then on poll the sonde using the Data Dolphin sample rate period for these measurements and then record them. When using with ViewDataNow you will then have to enter in which parameters are configured in order to view graphs and export all of your data correctly.

The following diagram shows a typical electrical layout of the system when powering a sonde.



YSI EXO – SDI12 Connections



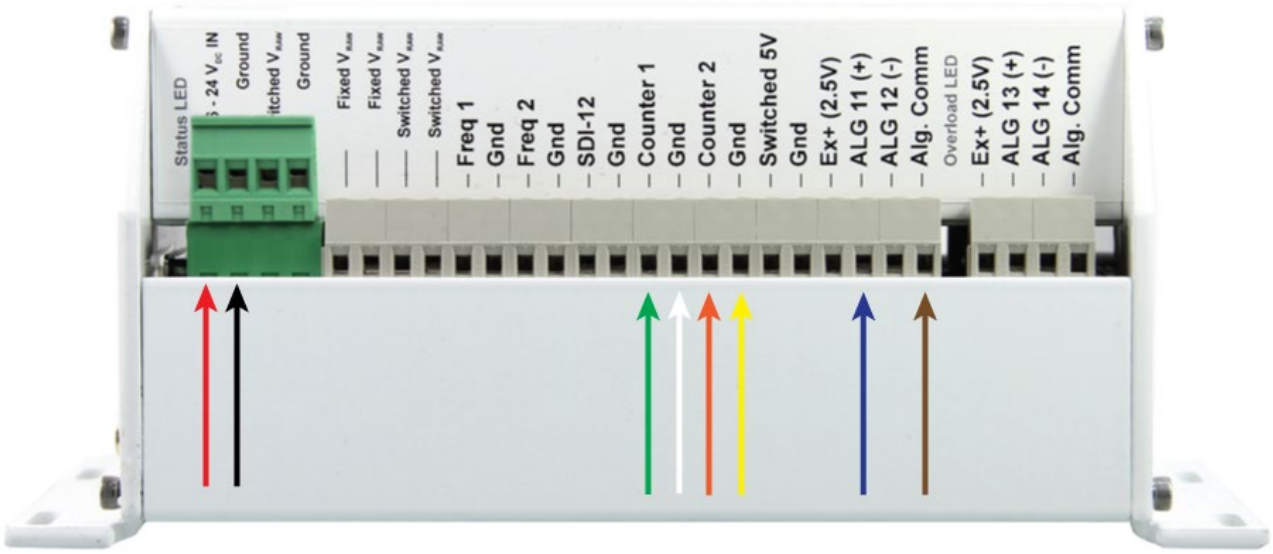
Pressure Probe	DD-400 Terminal
RED	Fixed Vraw
BLACK	Ground
WHITE	SDI-12 (up to 3 Devices)
GREEN	SDI-12 Ground

The EXO Signal Output Adapter provides an external power source to the EXO and SDI-12 communication with the DD-400 data logger. Warning : The interface is not waterproof and needs to be inside the DLS-400 enclosure so the flying lead cable will have to be run through a gland and connected to the interface screw terminals to protect the interface from the outside elements.

The EXO Signal Output Adapter

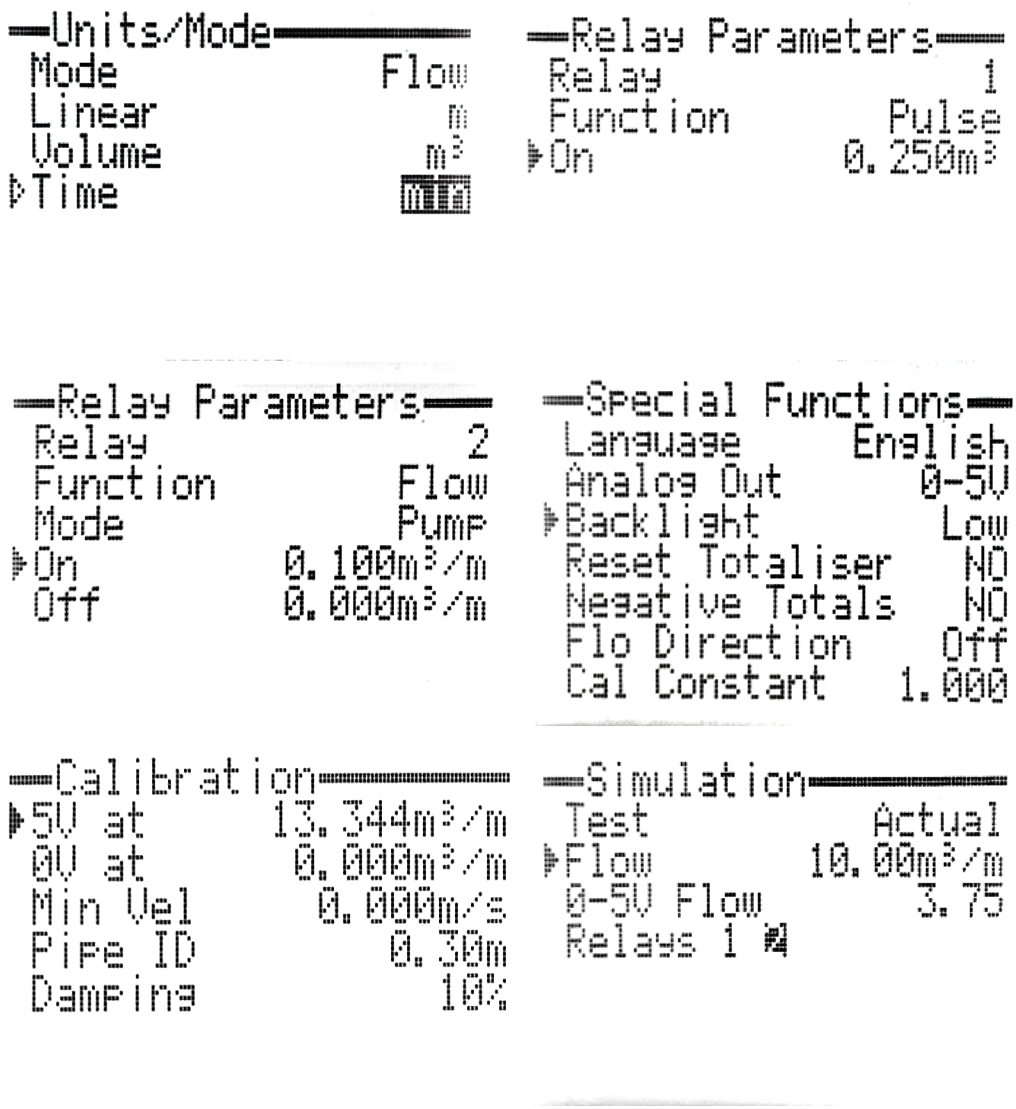
Ensure that the EXO is configured for SDI-12 output. Make note of the parameters being output and their order for setup when used with a DD-400 with telemetry and the ViewDataNow web application.

Greyline DFM – Analog and Relay Connections



Pressure Probe	DD-400 Terminal	Definition
RED	6- to 25 Vdc IN	Power to DD-400
BLACK	Ground	Ground
WHITE	Counter 1	Pulse from DFM
GREEN	Gnd	Ground
ORANGE	Counter 2	Flow Status from DFM
YELLOW	Gnd	Ground
BLUE	ALG 11 (+)	Flow Rate from DFM
BROWN	Alg. Comm	Ground

Configuration of the DFM and DD-400 must be done so total volume and flow rates can be correctly recorded. The following are the settings the DFM used when tested with the DD-400.



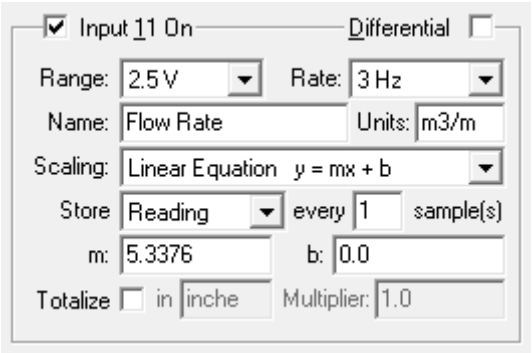
Use Simulation to test your unit by artificially creating a flow to measure and be output to the data logger. The relays will click and you can also measure with a volt meter the flow rate output on ALG 11 to verify everything is connected.

When configuring the DD-400 you must calculate the coefficient for your pipe with the full scale flow rate.

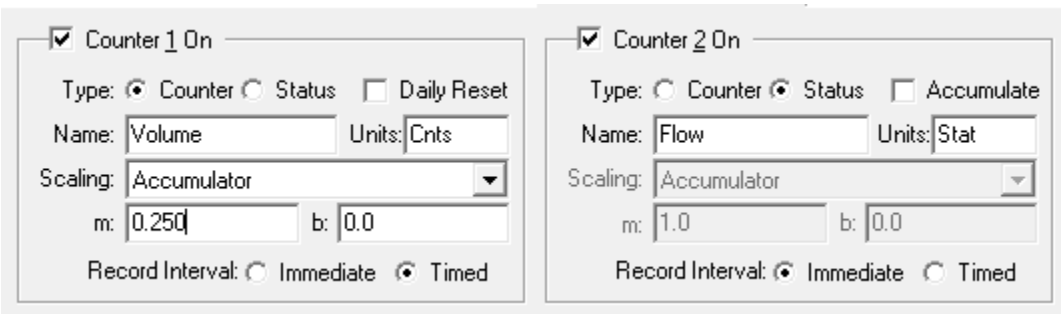
The DFM outputs 0-5V but the DD-400 reads 0-2.5V so a precision resistor divider is used to divide the 0-5V in half. This conditioned signal is connected to ALG 11 on the DD-400 with the blue and brown wire pair.

Using Data Dolphin 2 software, set the m and b for Input 11 after it is calculated using Excel with the SLOPE() and INTERCEPT() functions, or with any other tools you prefer.

	x's	y's
No Flow	0	0
Max Flow	2.5	13.344
m=	5.3376	
b=	0.00	

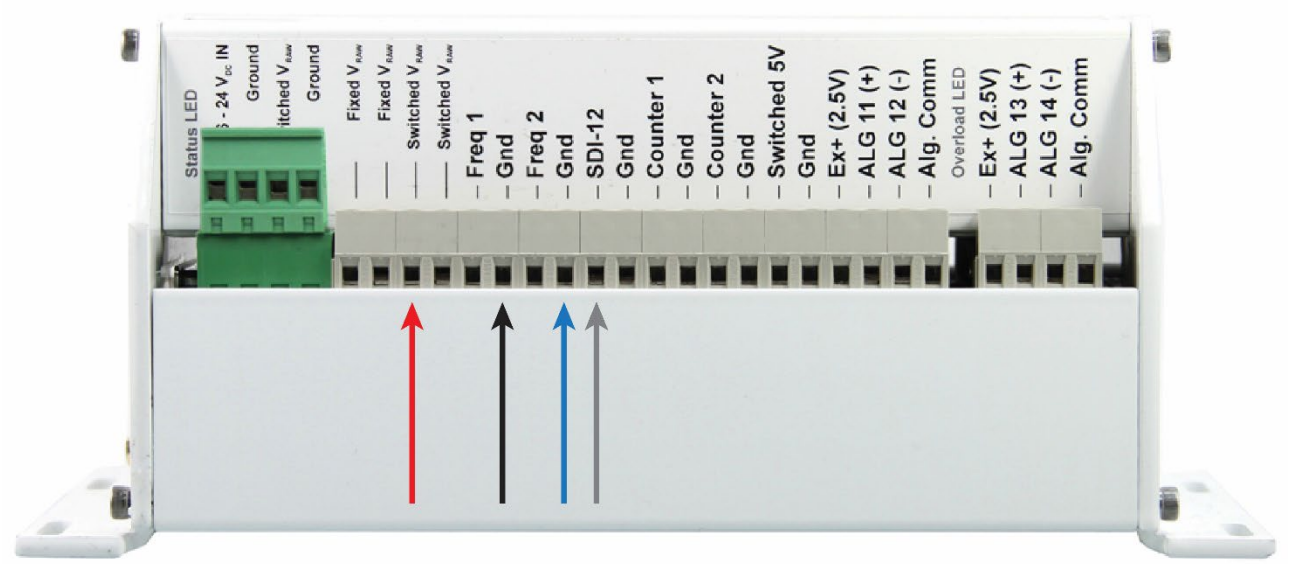


The pulse counter input must also be set with an m that corresponds to the Relay 1 Pulse value. In the above testing it was set to 0.250 m^3 per pulse. These values will depend on the ID of your pipe so ensure you calculate this for each station.



Apply your settings and the pulse and flow rate outputs from the DFM will now be recorded correctly.

OTT PLS – SDI12 Connections

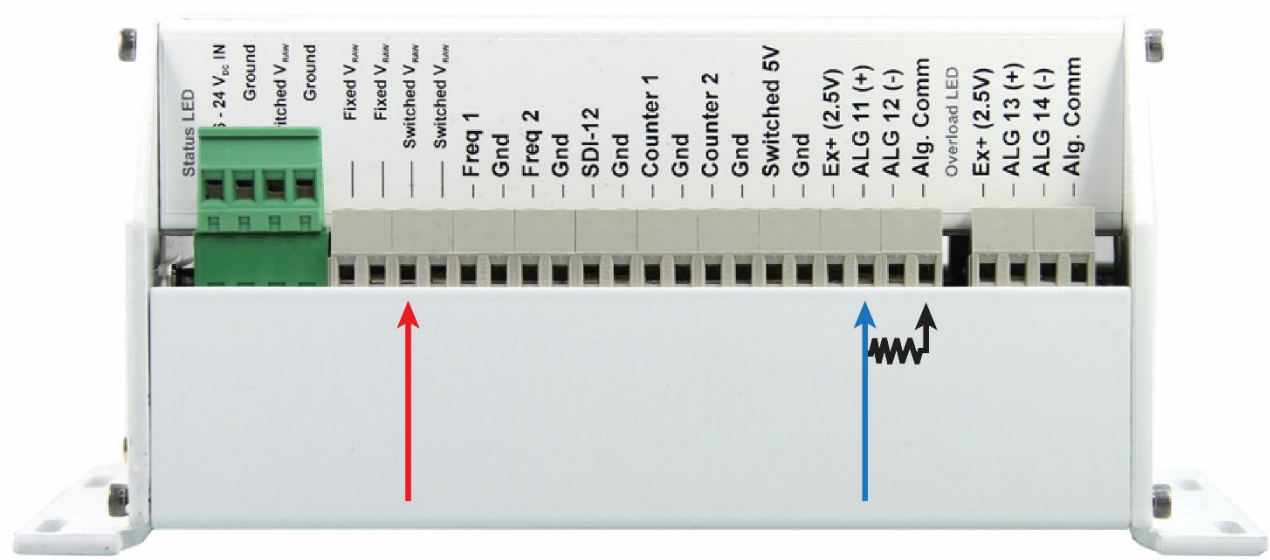


Pressure Probe	DD-400 Terminal
RED	Switched Vraw
BLACK	Ground
GRAY	SDI-12
BLUE	Ground

The factory setting for the SDI-12 address is 0. Factory level setting is for meters.

A Minimum Sensor Stabilization time of 8 seconds should be allowed for the device to boot up and take a measurement.

OTT PLS – 4-20mA Connections



Pressure Probe	DD-400 Terminal
RED	Switched Vraw
BLUE	ALG 11

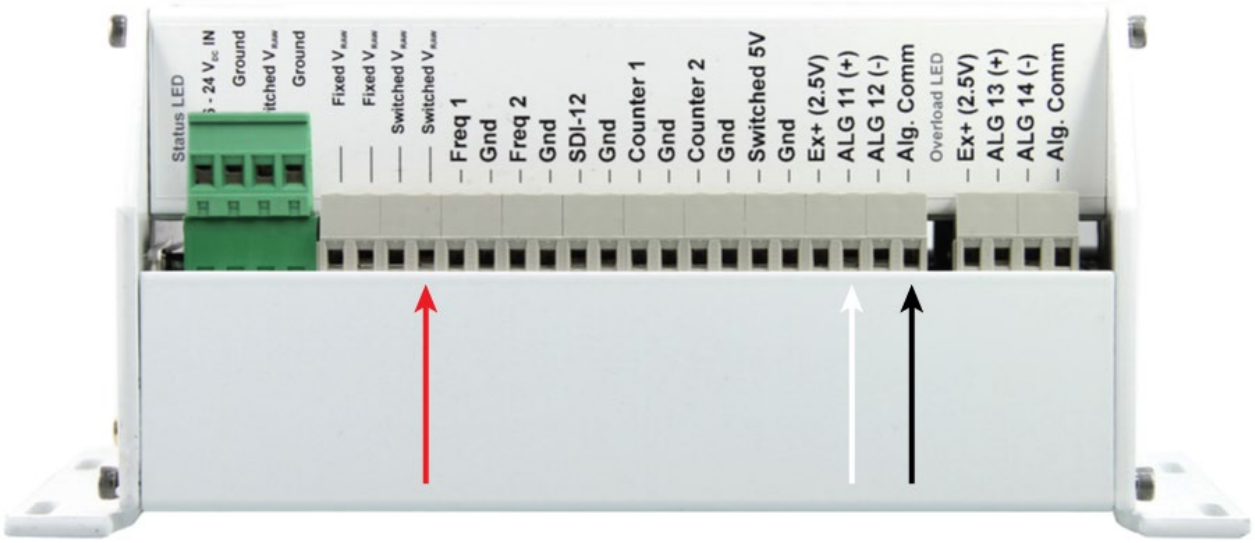
A precision 100 ohm shunt resistor is tied between the input and Alg. Comm. You must scale the input signal to match your parameter with linear equation coefficients.

V = I/R	Meters
0.4	0
2	10

For example if your sensor outputs 4 mA (which becomes 0.4V with the 100 ohm precision resistor) corresponding to 0 meters and 20 mA (2.0V) for 10 meters, you would calculate an m of 6.25 and b of -2.5 to enter into the Precision Input m and b in the Setup tab.

This can easily be done by using the SLOPE() and INTERCEPT() functions in Excel.

VAISALA PTB110 Barometer – 0-2.5V Connections



PTB110	DD-400 Terminal
Pin 2 – Output Ground	Alg. Comm
Pin 3 – Supply Ground	Gnd
Pin 4 – Supply Voltage	Switched V_{RAW}
Pin 5 – Output Voltage	ALG 11

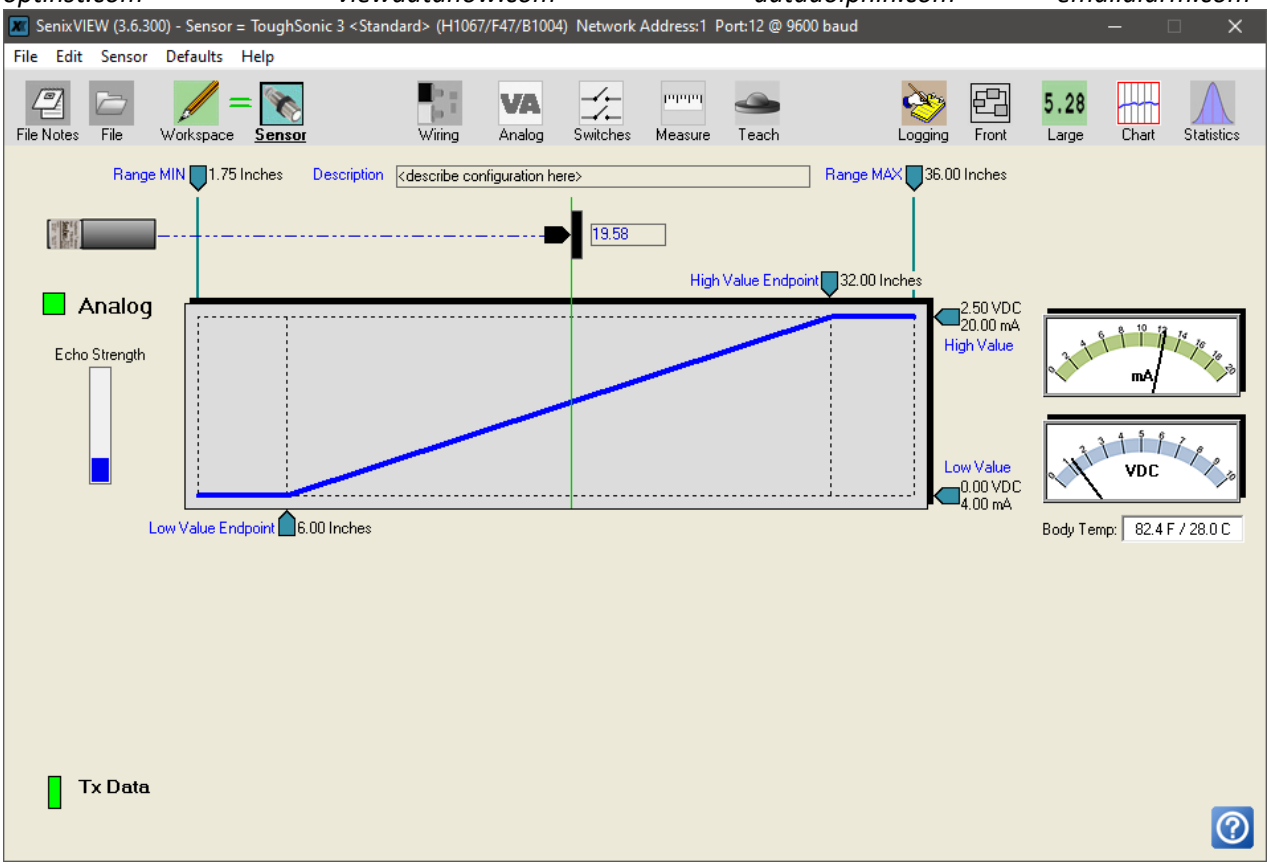
A sensor stabilization of 3 seconds is recommended.

Range	m	b
500-1100 hPa	240	500
600-1100 hPa	200	600
800-1100 hPa	120	800
800-1060 hPa	104	800
600-1060 hPa	184	600

Senix ToughSonic 3 – 0-2.5V Connections

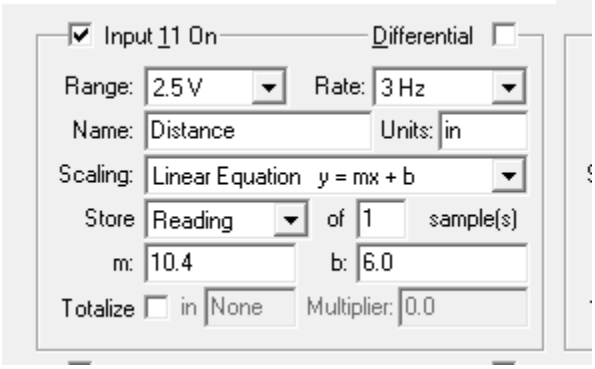
ToughSonic	DD-400 Terminal
Brown – Supply Voltage	Switched V_{RAW}
Blue – Supply Ground	Gnd
White – Voltage Output	ALG 11

A sensor stabilization of 3 or more seconds is recommended.



Scaling of the sensor should be set such that the maximum expected range outputs 2.50V and the minimum expected range outputs 0.00V

As an example, this sensor was programmed to work between 6.00” and 32.00” for 0-2.5V which gives the following:



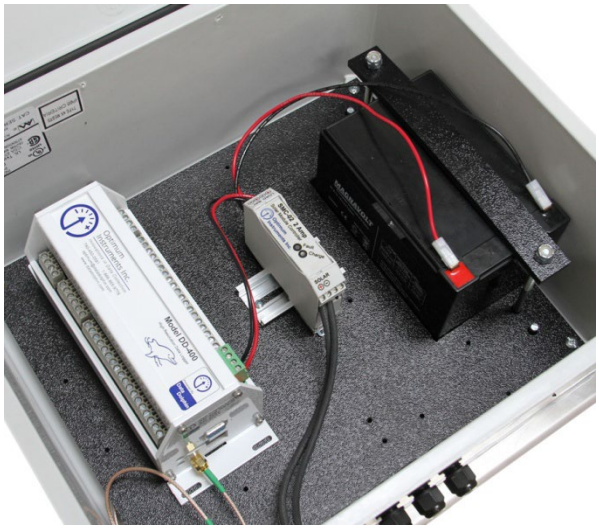
Slope 10.4 and offset of 6.0

Installation of the Battery (All Models)

The DLS-400 is shipped with the battery disconnected. Locate the 12 volt battery in the main fibreglass case and the wiring harness coming from the solar module controller. Start by removing the protector terminal covers

Then connect the **black** wire to the **black** negative terminal on the battery.

Next connect the **red** wire to the **red** positive terminal on the battery and push it all the way on.



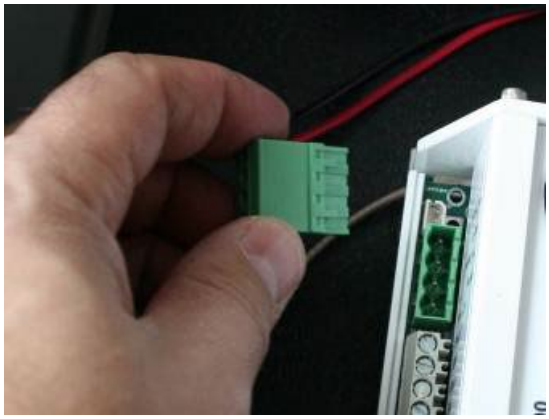
(DLS-400 unit pictured)

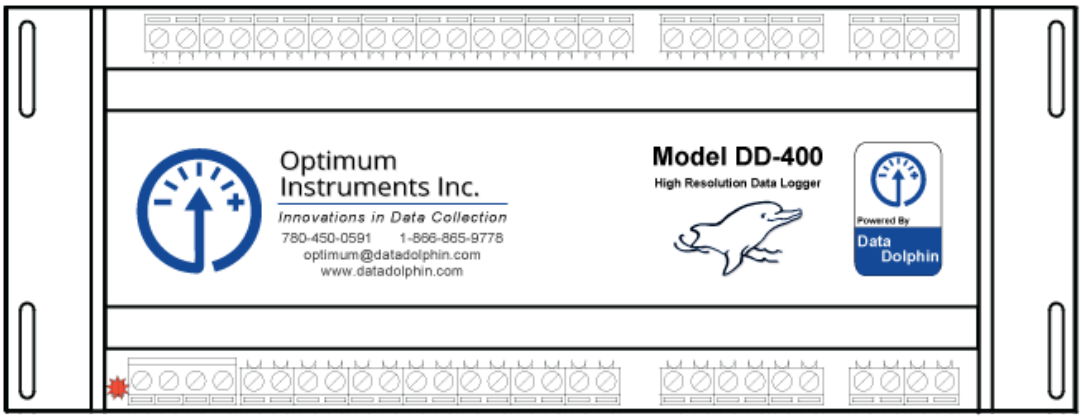
If your system is 24V the batteries will have connectors to mate to internal wiring harnesses. There is no worry about which connector goes to which side as they can mate correctly either way. To install your batteries insert the first one with the terminals on the left side and slide it into the right position. Then drop in the next battery with the terminals to the right beside the first one.

Powering up the DLS-400

On DLS-400 or DLS-400-SAT models make sure the antenna is attached securely and all other connections are properly tightened.

To power up the processor plug the green terminal into the processor as shown below.



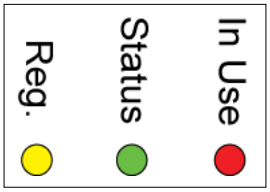


The DD-400 will tick and the red light will flash letting us know that the clock is not set. Using a notebook and the Dolphin software you can set the clock.

On a DLS-400-SAT the clock setting can be skipped by letting it time out and the light will flash green then go out.

On a DLS-400 the red light will flash for a moment before alarming and calling into the server. Once it connects and gets the current time, a tone will be heard while the LED is green and the ticking will stop. The following page describes the steps during this process in more detail.

Cellular Radio Power Up Sequence and LED Description



The Yellow Registration LED on the side of the DD-400 should also be on steady and will eventually start flashing. A flashing yellow LED means that we have found a cellular service provider and have successfully signed in with a valid account.

Yellow LED - Register:
- On while attempting to become Registered
- Flashes at a 2s interval when registered successfully.

Green LED - Status:
Flashes:
- Every 1s while idling (while registered but not attached)
- Every 3/4s while setting up connection to the cellular provider.
- Every 1/2s while trying to make a server connection.
- Every 1/4s while connected to the server.

Red LED - In Use:
On when connected to a server, off otherwise.

RSSI (Received Signal Strength) is defined as a measure of the radio signal strength received by the DLS-400 from the Network Service Provider tower of the current RF (Radio Frequency) channel being used.

Generally, it is an indication of how well the DLS-400 is communicating with the Cellular tower(s). The signal value is usually given in units of decibels (dBm), and it ranges in value from -30 dBm to the value of -115 dbm. The table below presents the DLS-400s signal levels from the viewpoint of practical use.

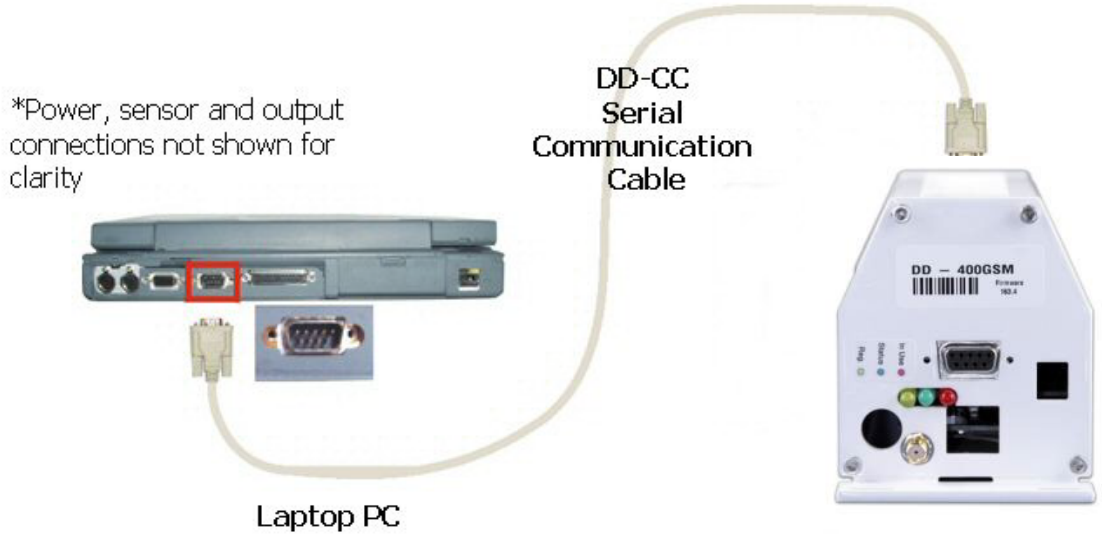
RSSI Value	Expected Quality of Communications
-30dBm to-70 dBm	**Excellent**
-71 dBm to -80 dBm	**Very Good**
-81 dBm to -90 dBm	**Good to Fair**
-91 dBm to -100 dBm	**Weak to Spotty**
-101 dBm to -110 dBm	**Infrequent to Unusable**
<-110 dBm	**Unusable**

Quick Guide on Setting Up Your COM Port

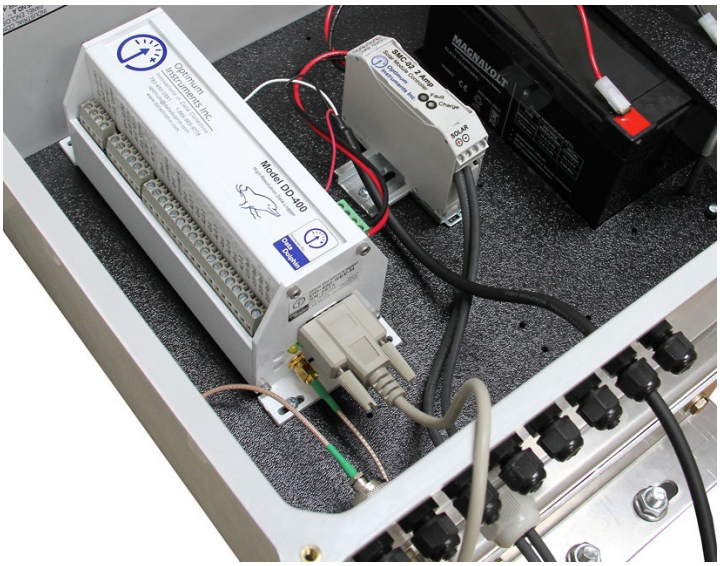
Connecting your Logger to your Computer

If your computer has a COM port - Connecting via RS-232 (DB9)

Attach a standard RS-232 Communications cable from your computer to your Dolphin Data Logger. See illustration below.



Computer and DD-400 Data Logger



If PC only has USB ports - Connecting via Universal Serial Bus (USB)

Attach as above to the Data Logger except also add the USB to Serial Bus Adaptor to the cable.

USB to RS-232 Adaptor

Driver Installation

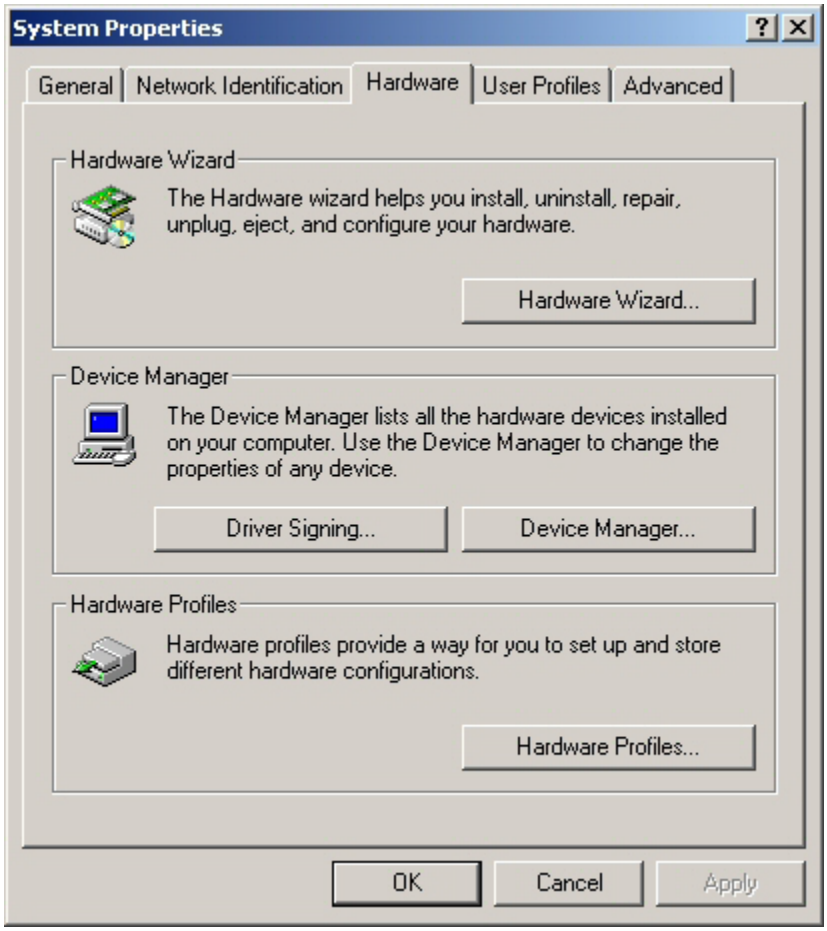
Follow the steps below on installing the USB to Serial Bridge Cable for the first time:

1. Power on both computers where you will connect the USB to Serial Bridge Cable and make sure that the USB port is enabled and working properly.
2. Plug in the USB cable into the USB port and Windows will detect an USB Device and run the **Add New Hardware Wizard** to assist you in setting up the new USB Composite Device.
3. Insert the USB to Serial Bridge Cable driver diskette or CD into the computer and click **Next** to continue:
    a. Select **Search for the best driver for your device** and click **Next**.
    b. Select **Specify a location** and click **Browse**. Change the folder of your floppy drive or CDROM (i.e.: **A:\ WIN98,WIN98SE,WIN2000**) and click **OK**.
    c. Double check the directory that Windows prompts. Click **Next**.
    d. Windows will detect the driver and shows the **USB to Serial Bridge Cable**. Click **NEXT** to continue until installation is complete.

Add New Hardware Wizard

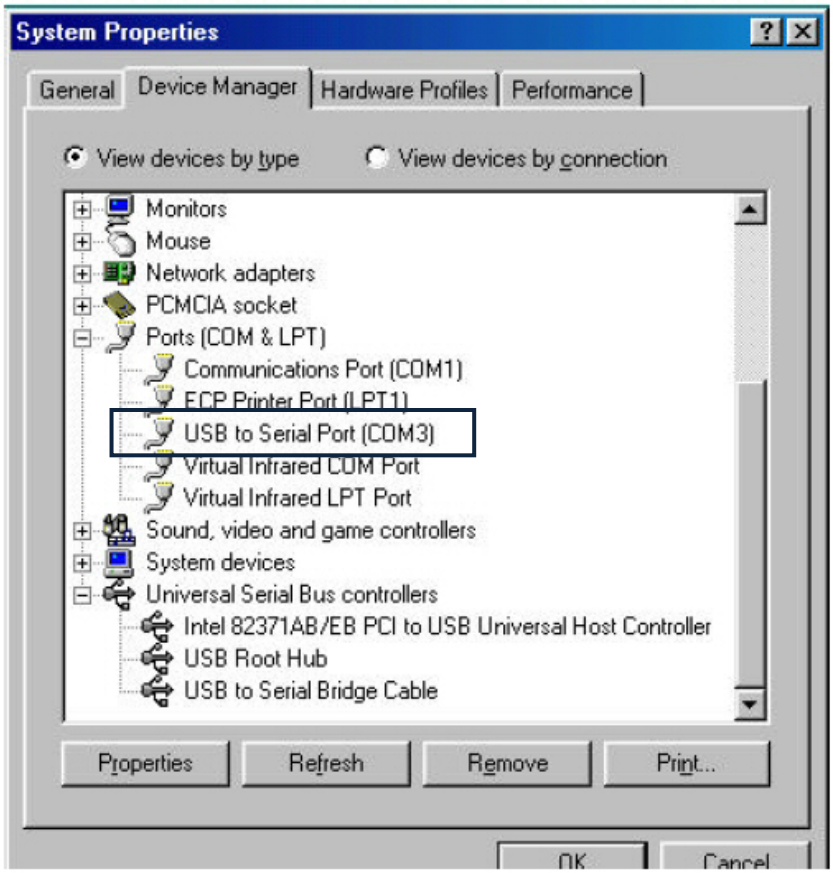
e. Click Next to continue and let Windows copy the needed files to your hard disk. Click **Finish** while installation is complete.

f. Click on START, and then select Settings and then Control Panel. Double click on System and choose the Hardware tab. Click on the Device Manager tab.



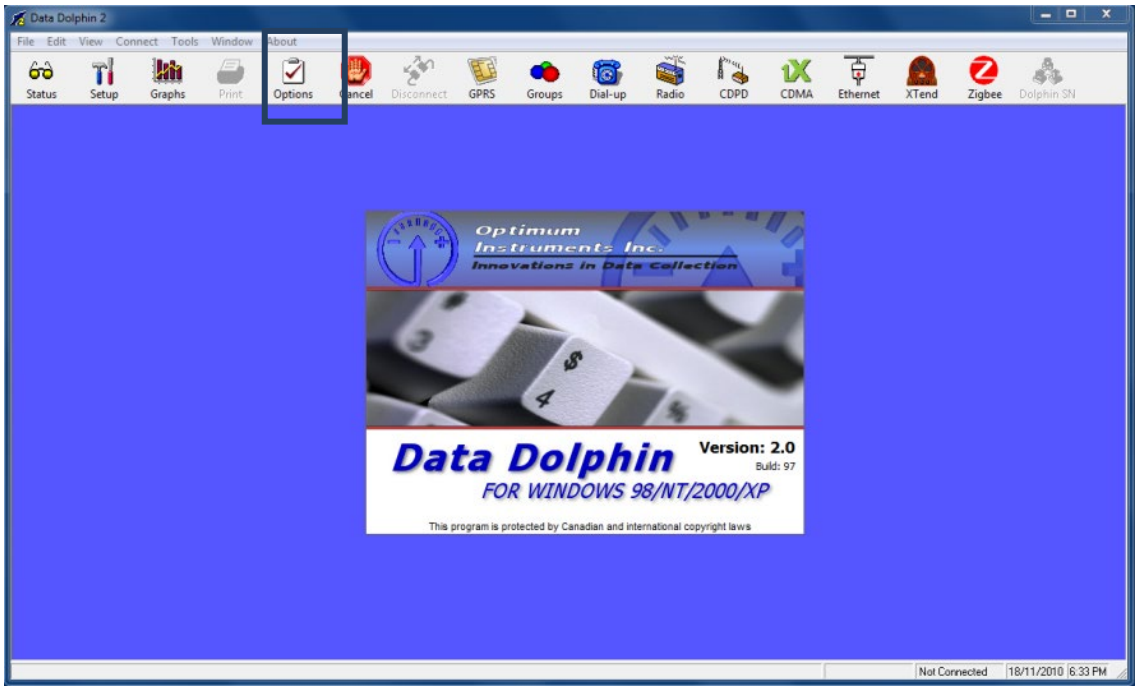
System Properties

g. After installing, the System will generate an additional COM Port, USB to Serial Port (COM3) for the connection to RS232 Serial Device. Your COM port may or may not be COM3.



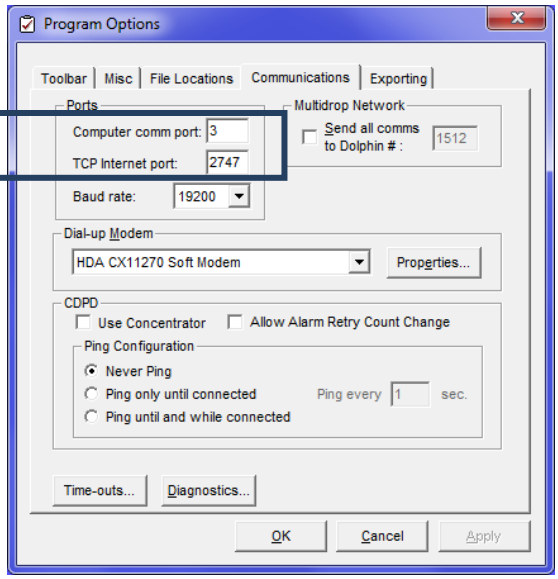
Device Manager

h. Use this port in your Data Dolphin Windows Configuration software as your Communications port.



Data Dolphin Software

Load Dolphin and click on the Options button located in the toolbar.

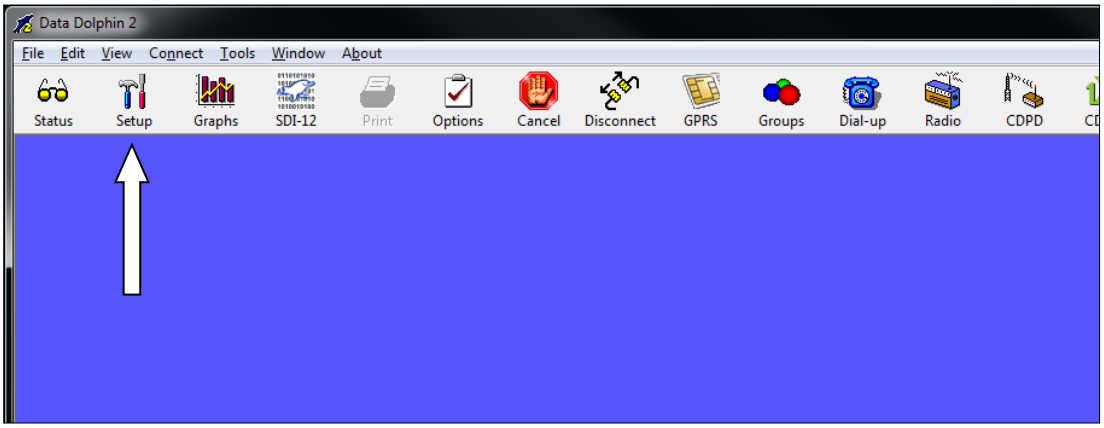


Data Dolphin Options

Select the communications tab and change the Communications port to your USB comm. Port from step g.

Configuring Inputs for your Data Logger

Reading the Current Setup of the Data Logger



Data Dolphin Setup

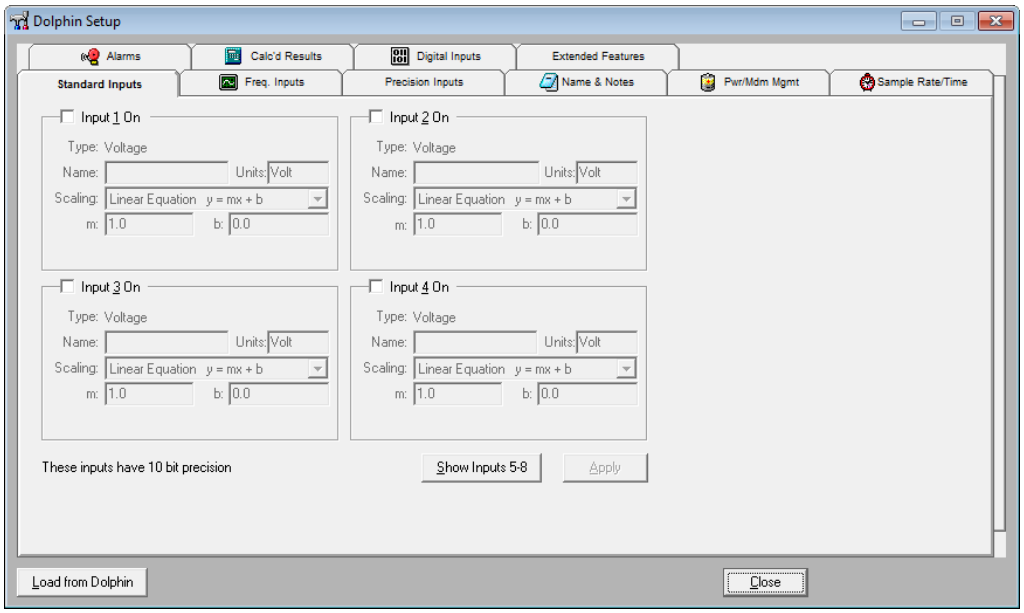
The Setup window accessed in the Data Dolphin software by clicking on the Setup button on the toolbar, gives the user a set of tabs for configuring all areas of the data logger. Inputs, Alarms, Name and Communications are configured with each on its own tab for grouping.

Once the window is opened press **Load from Dolphin** to bring in the current settings from your connected unit.

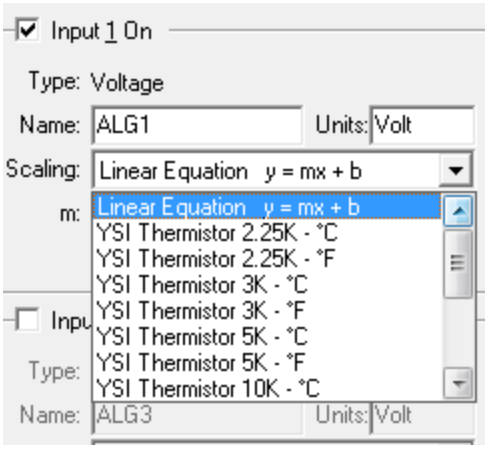
If you change a setting, you must press **Apply** for the change to be sent to the data logger and for it to take effect.

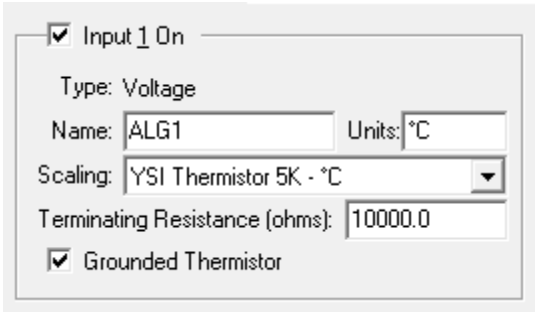
The data logger will not start recording until its clock has been set in the Sample Rate & Time tab.

Standard Inputs

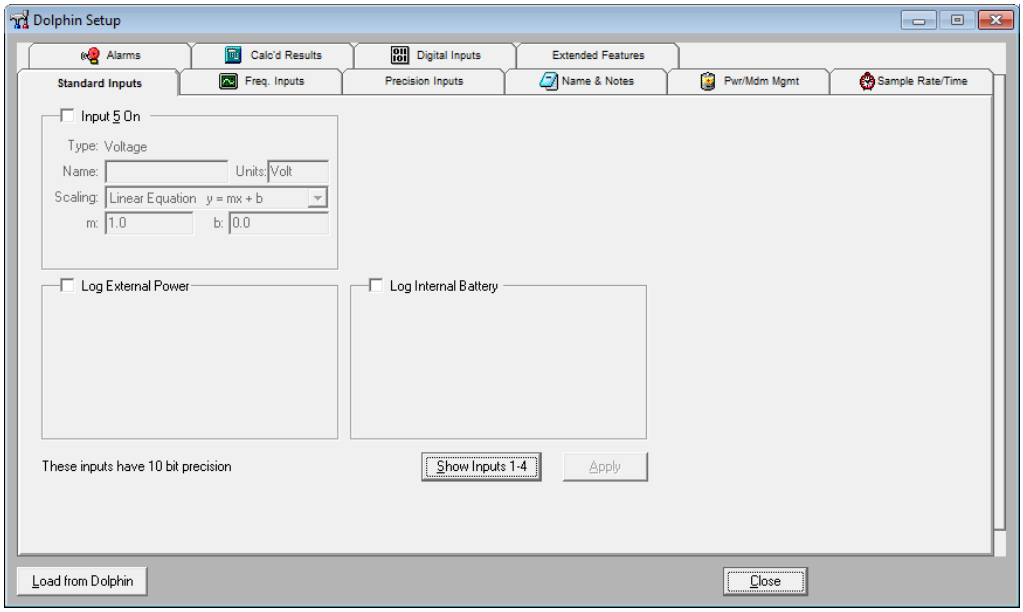


In the DD-400 and DD-200 these are 10 bit analog inputs. Linear equation scaling can be set, or if you are using a thermistor the drop down for Scaling can automatically set the coefficients appropriately.



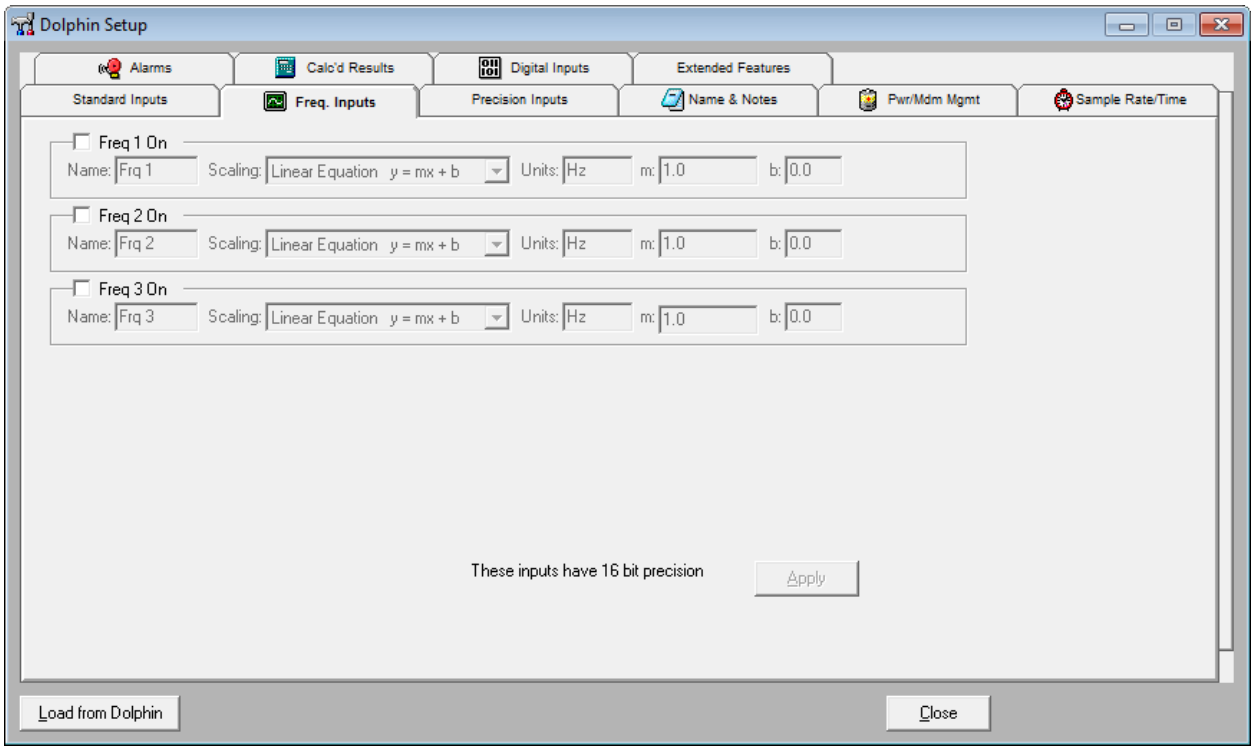


As an example Input 1 has a 5K thermistor with a 10K ohm terminated resistor. With this setup the thermistor is wired between Input 1 and Ground, and the termination resistor is wired between Ex+ (2.5V) and Input 1.



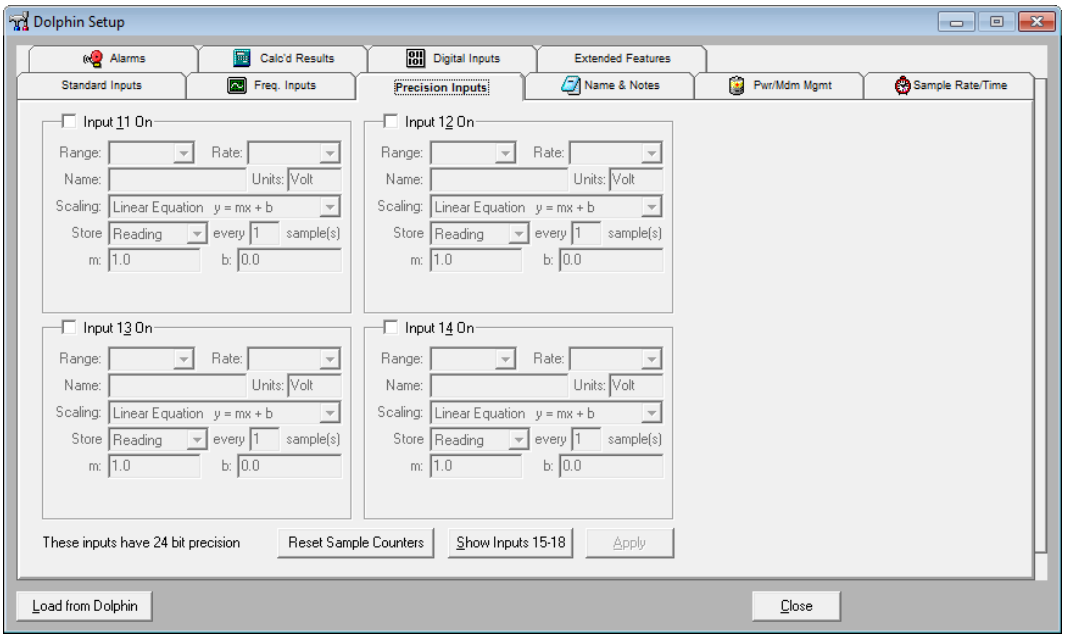
The Data Dolphin data logger can also record its external power source voltage in order to monitor battery levels. Internal Battery provides the voltage reading for the Switched 5V terminal for sensors that need 5V excitation.

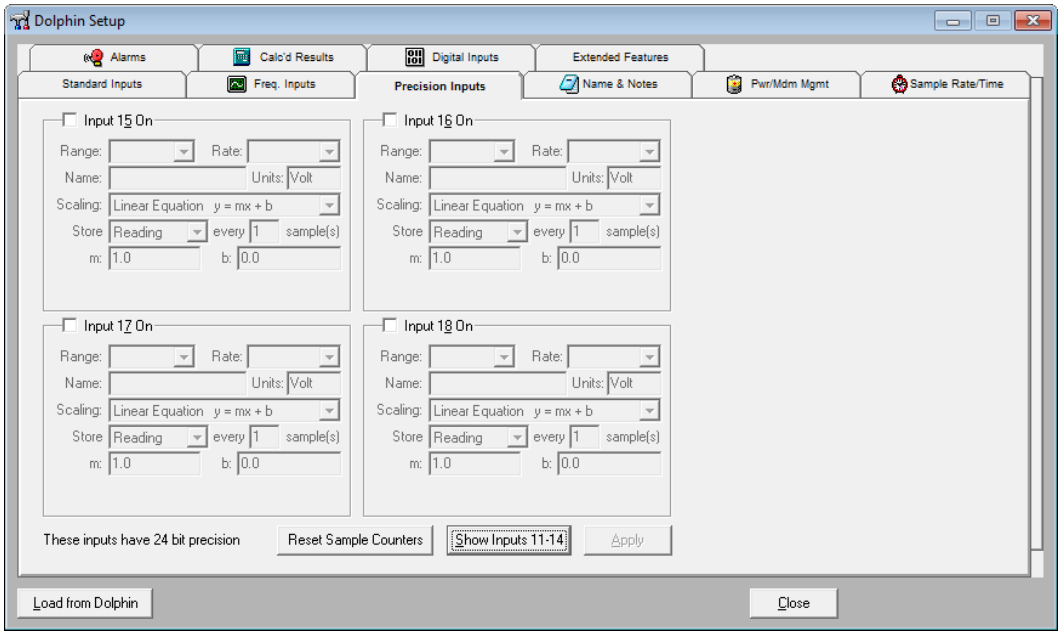
Frequency Inputs



Frequency inputs 1 and 2 can only be configured for frequency. Frequency Input 3 can be configured for use as an SDI-12 input for newer models of the DD-400 in the Extended Features tab.

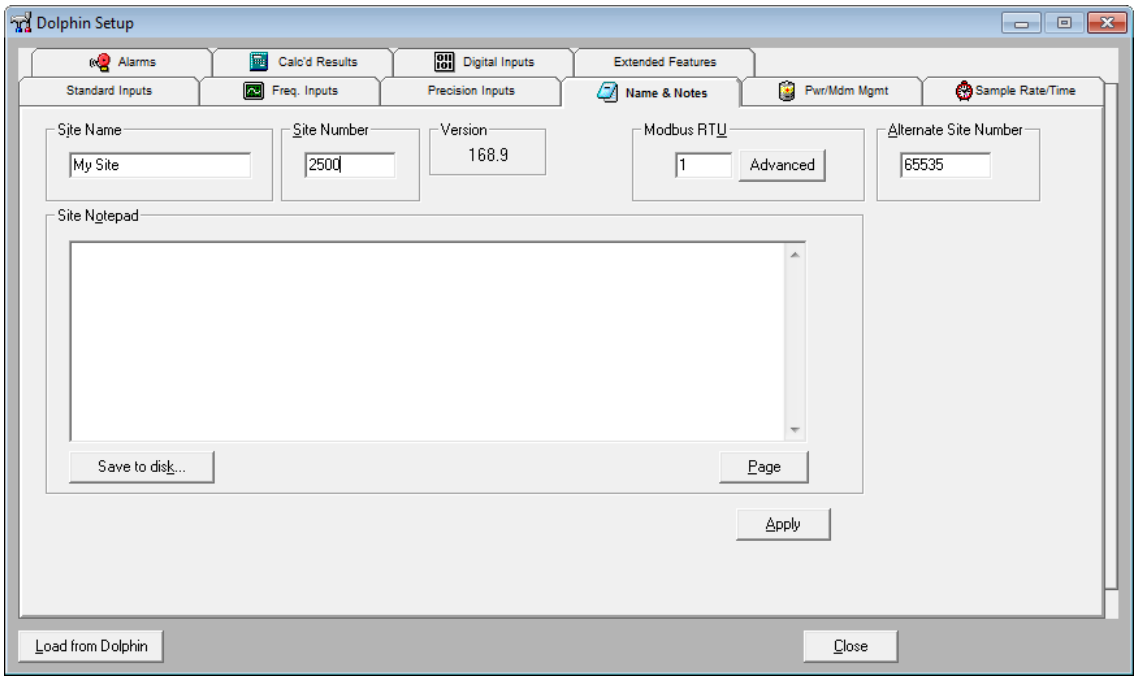
Precision Inputs





Precision Analog Inputs 11 through 18 have 24 bit precision. These are available on the DD-400 and will most likely be your most used inputs. They can also be configured as differentials with 11 and 12, 13 and 14, 15 and 16, and 17 and 18 being the pairs.

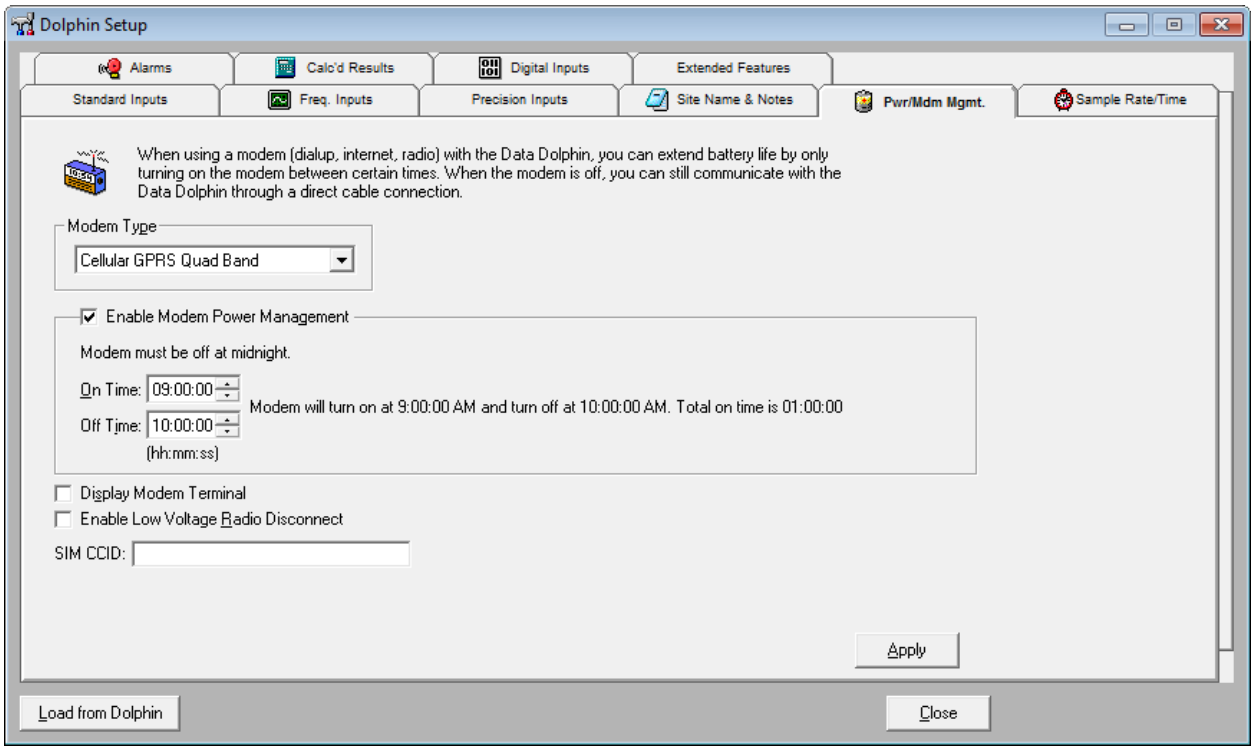
Site Name & Notes



On the Site Name and Notes tab you can give your data logger a name. This name will be the one that shows up in ViewDataNow along with the Site Number for one to uniquely identify their unit.

The Site Notepad is a scratch pad that can be used to leave notes for other colleagues on the data logger itself such as when it was installed or moved or sensor inputs changed.

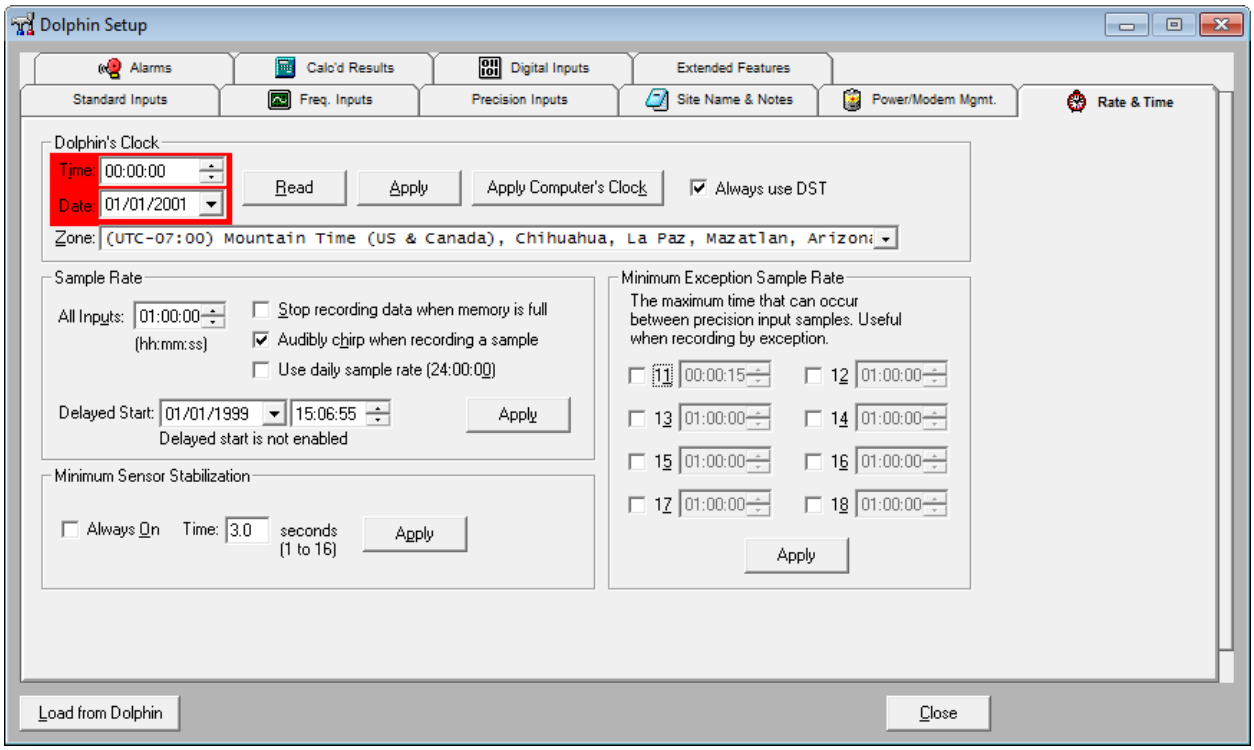
Modem and Power Management



This tab lets you select the telemetry that is installed in your data logger. If there is none then “None (RS-232 Only) will be selected.

For data loggers with a cellular modem you can also specify a time when the modem should turn on to accept remote connections. This is typically set for 30 minutes to an hour in the morning.

Sample Rate & Time

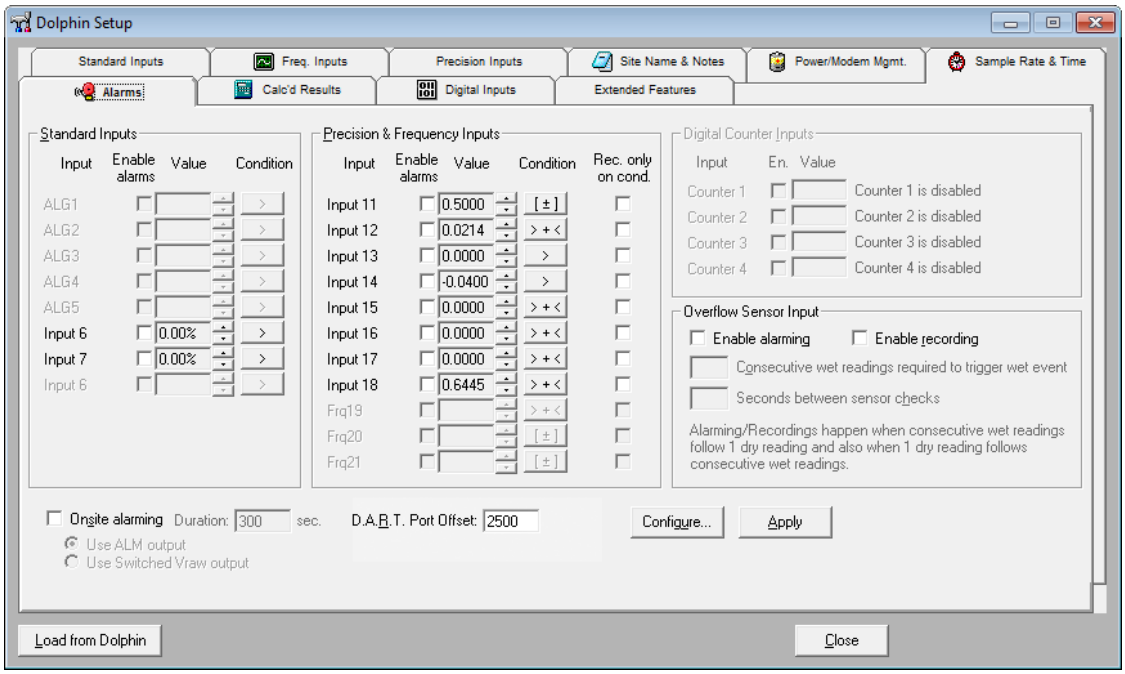


This is the tab that initiates the data logging once the Dolphins Clock has been set. You can set the time zone, and whether or not to always use DST. The time and date will be highlighted in red if the data logger is NOT currently logging with a correctly set clock.

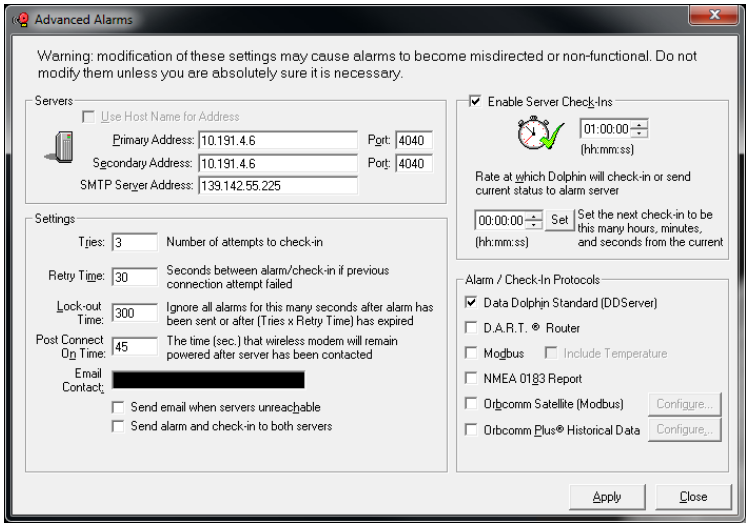
Sample rate is the period which the inputs will be recorded and stored into the data logger memory. For SDI-12 this is the period in which the SDI-12 device will be requested to provide its measurements as well. You can also align the sample rate by using the Delayed Start to a specific time for when the Sample Rate countdown should start.

Minimum Sensor Stabilization is also sometimes known as “sensor warm up time” and is the amount of time a sensor needs excitation, or to be turned on for, before a recording can be made. This is how long the Switched Vraw, Switched 5V, and Ex+ (2.5V) terminals will be on for before the sample is taken.

Alarms

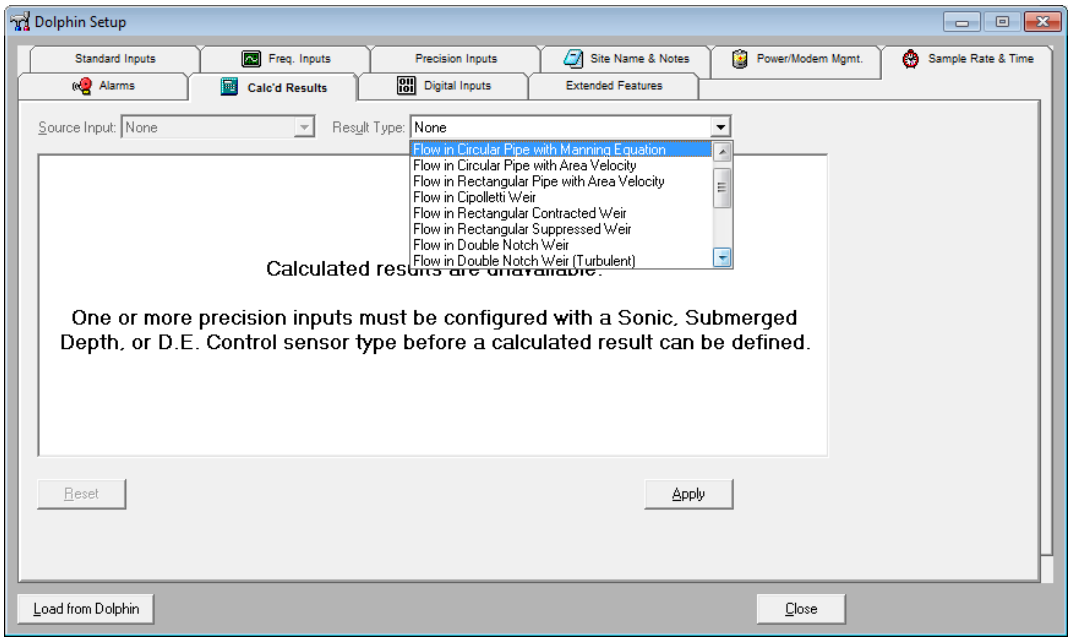


These alarms will watch the Precision Inputs for values that meet certain conditions. When an alarm is triggered this will force the data logger to contact the server if there is telemetry enabled send e-mail and/or SMS notifications.

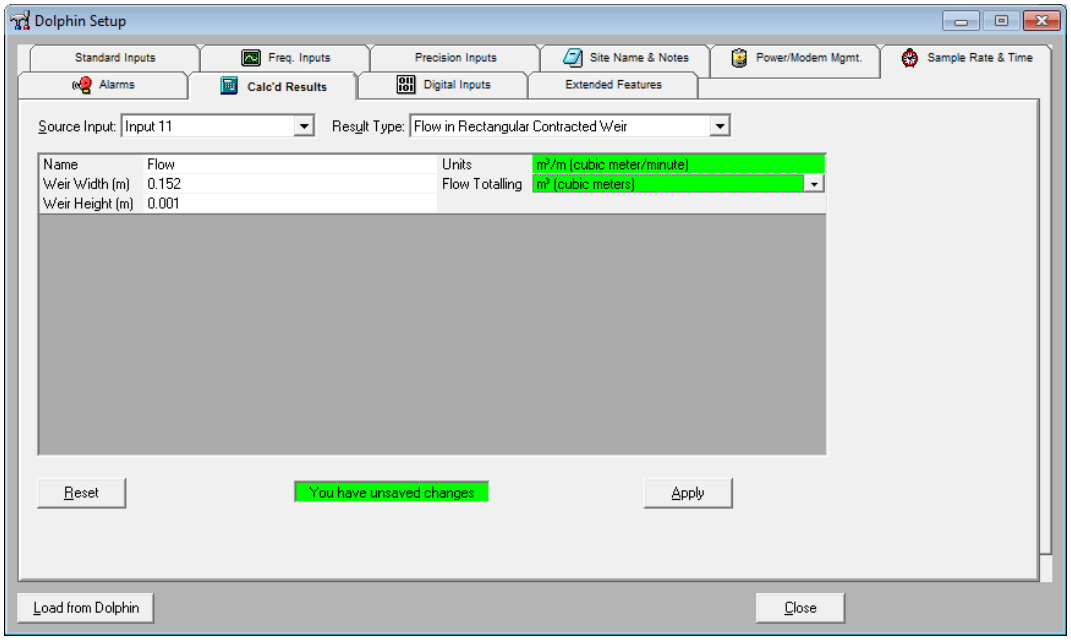


Press **Configure** from the Alarms tab to bring up the advanced alarm window where you can set the regular check in rate and protocols. Typical checks in rates are 4-6 hours, and Data Dolphin Standard should be enabled when a cellular modem is installed for most applications.

Calculated Results

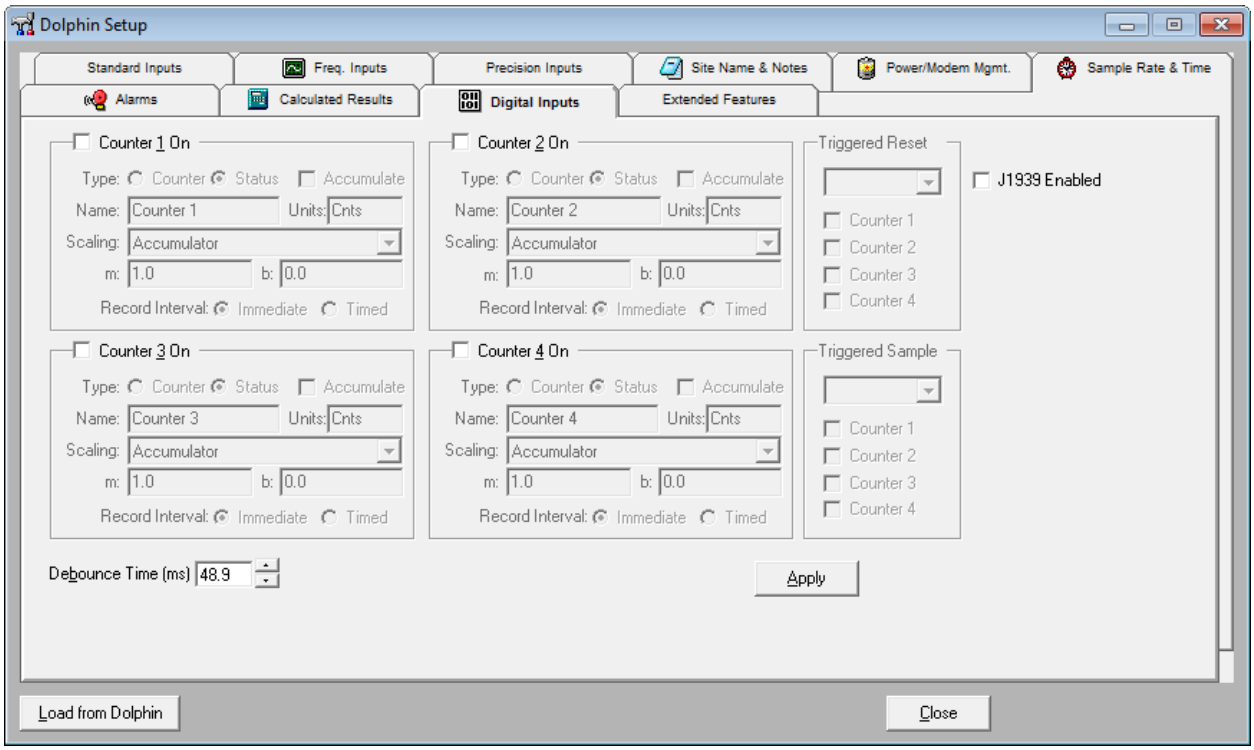


If you have enabled one of your Precision Inputs accordingly one can use calculated results to convert Submerged Depth to a flow rate and total volume using the appropriate calculation from the drop down.



For example a rectangular contracted weir is selected and output will be in m^3/min for flow and cubic meters for total volume.

Counter Inputs

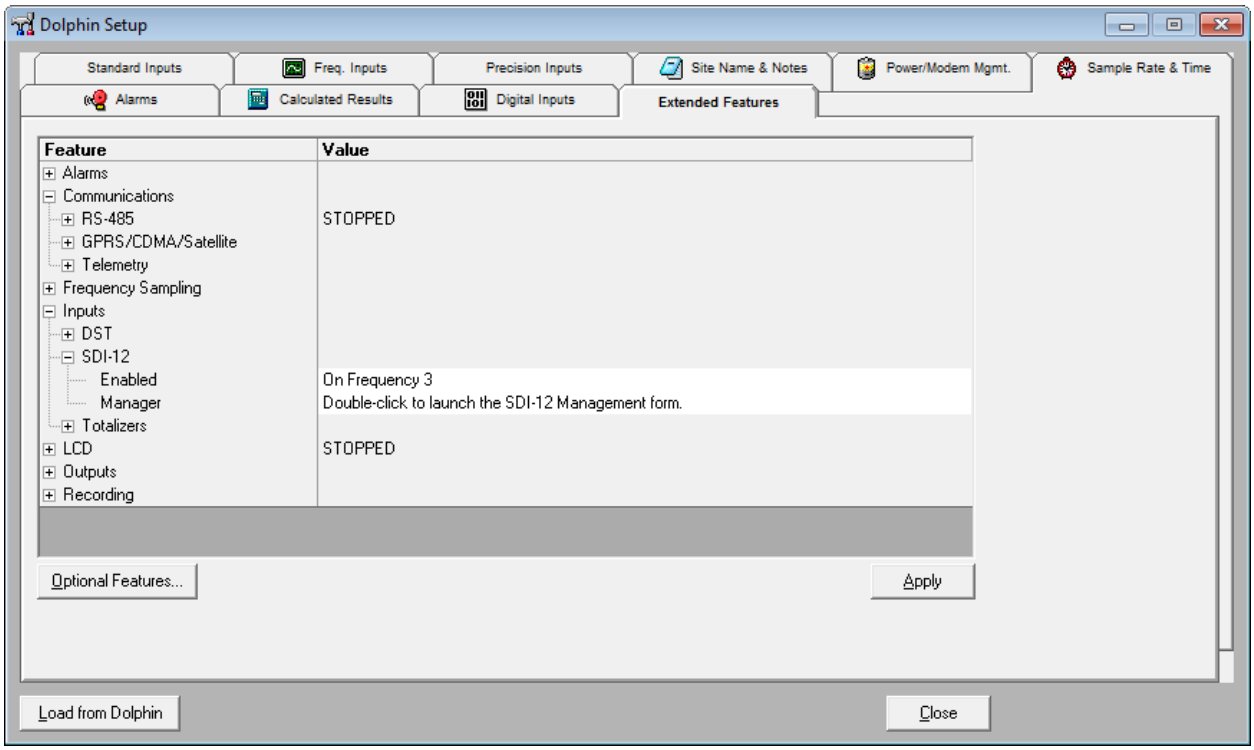


Counter Inputs can either be configured as a status or counter.Recording can also be based on the data logger sample rate or can be done at the moment the counter receives a signal.

Counter inputs that record immediately are typical for tipping rain gauge bucket installations. Counter inputs that recorded on a timed interval are typical for flow volume pulses from your sensing device.

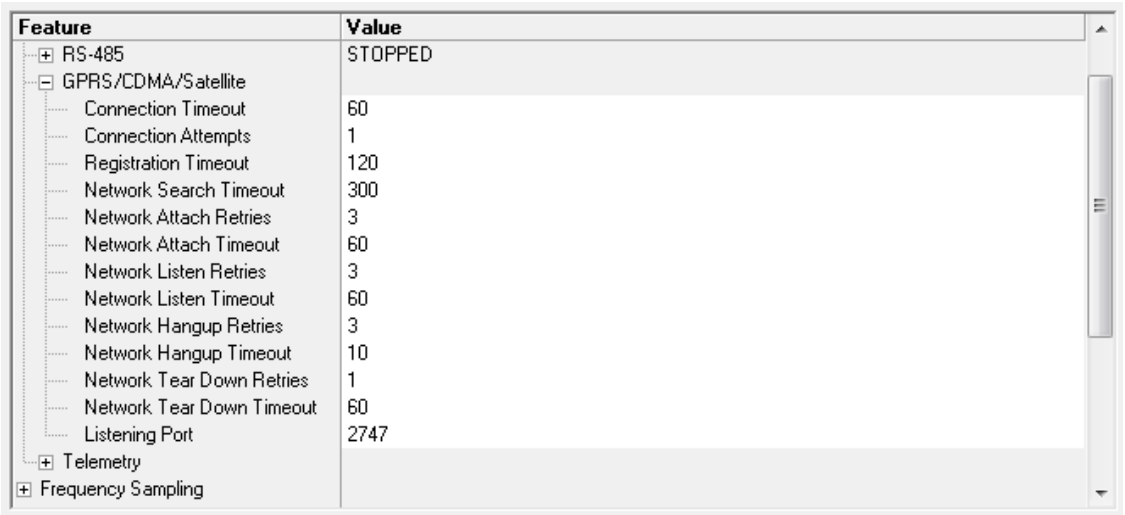
Counter inputs configured as status allow the data logger to record the state of an external device, such as a pump on or off.

Extended Features



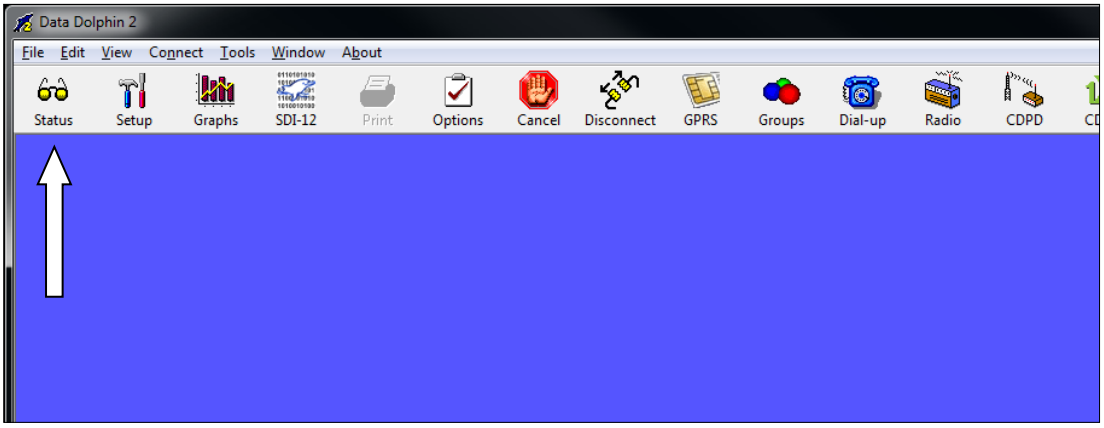
SDI-12 functionality can be enabled from the Extended Features on your Frequency 3 input. This is now the default for all DD-400 data loggers with firmware greater than 166.0.

Communications, GPRS/CDMA/Satellite timeouts and attempts should be set to the following when telemetry is used.



Downloading the Data and Status from your Data Logger

Reading the Current Status of the Inputs



Data Dolphin Status

The Status window accessed in the Data Dolphin software by clicking on the Status button on the toolbar, gives the user a live update of the measured values on the inputs of the data logger. A data logger can connect to a computer with the Data Dolphin software either remotely (with a wireless modem) or directly via a serial port connection.

Note that the names of the inputs displayed in this window are those entered when the inputs were initially programmed.

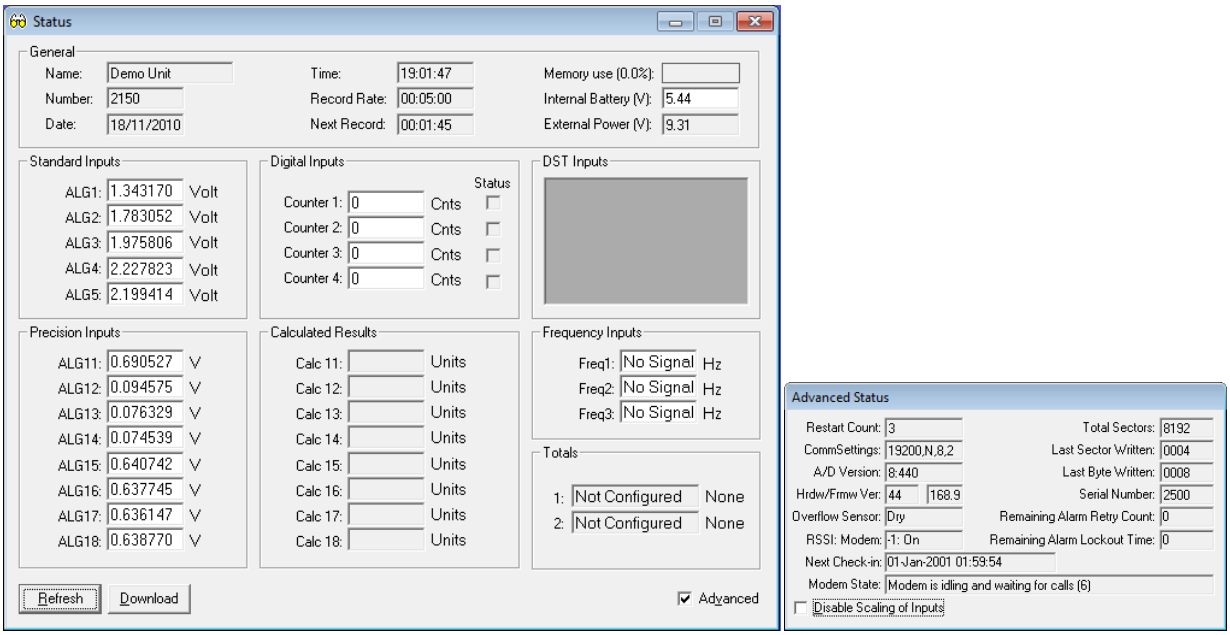


Figure 1: The Data Dolphin Software's Status window

Refreshing the status window

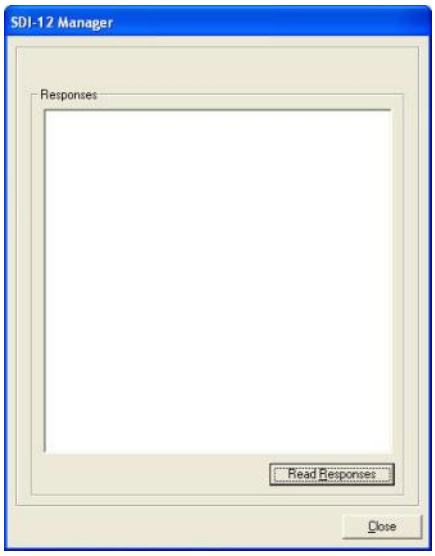
The information that the Status window displays is only valid at the time the window is opened or refreshed. As the actual measured levels are changing from second to second, the information in this window becomes less accurate and relevant as time goes by. Clicking on the "Refresh" button in the bottom right hand corner of the Status window will take a quick "snapshot" of all the inputs and operational parameters of the data logger.

Downloading the Data

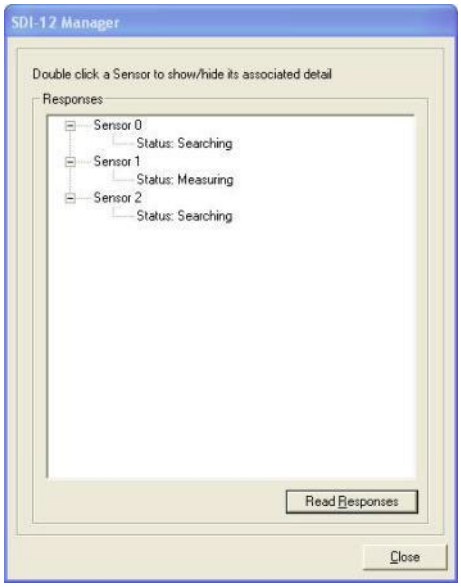
The data that is recorded by the data logger is stored in a permanent memory chip. Each record is time-stamped and stored in the memory in a normalized database fashion that allows different inputs to be turned on and off without restarting the data logger.

Reading SDI-12 Sensor Values

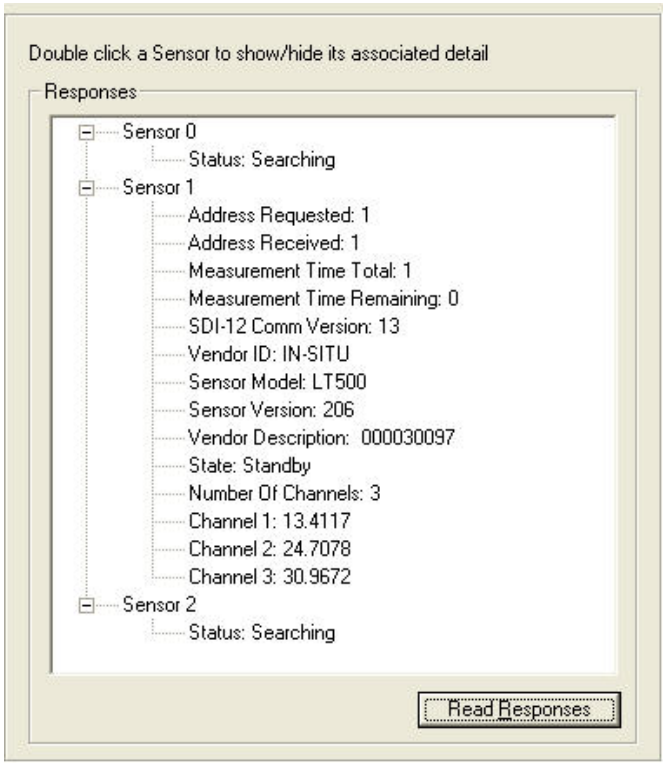
A second window will open as shown below when SDI-12 is enabled and the Status window display is opened or refreshed.



To read the attached SDI-12 sensors current values, press the “Read Responses” button. This will tell the data logger to poll the SDI-12 device for its current readings. Every time you press the button the progress will be shown if there is a measurement time remaining.



Pressing the “Read Responses” button a second time will show the progress or, if there read is done, it will show the values.



Please note that in some cases SDI-12 devices need to be logging (set from their software) for the SDI-12 values to be updated.

Downloading the collected data from the data logger to your PC

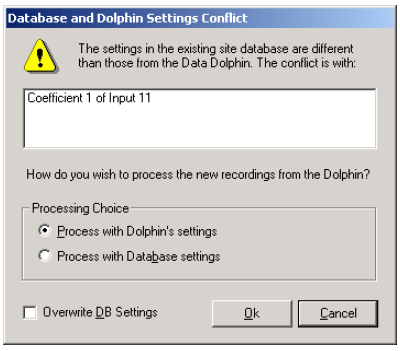
All data downloaded from the data logger is stored on your computer in a binary cache file and in a site database (data logger *internal serial number*.mdb) that contains the time of the record and the record's value in both a raw and scaled format.

To retrieve the data from the Data logger's memory, first establish a communication session with the unit. Next, select "Download Latest Data" from the "Tools" drop down menu or click on the "Download" button in the Status window. The progress of the download can be seen beside the "Memory Use" gauge of the Status window and at the bottom of the main window on the progress bar.

The Data Dolphin software will then update the site database on your PC with the most recent data that the data logger has collected. To do this, the Data Dolphin software will compare the time of the last record in the site database with the time of the most recent data logger reading. It will then download all data collected between these two times.

Data logger memory and site database conflicts

If the configuration of any your data logger inputs or settings have been altered since your last download, the settings stored in the site database on your computer and the settings in the data logger's memory will be in conflict. If this is case, the Data Dolphin software will not know which settings to apply to the new data that the data logger has collected, and the message box shown in Figure will appear. If you have altered them intentionally, click *Process with Dolphin settings* to use the settings in the data logger's memory. Click the *Overwrite DB settings* checkbox if you wish to overwrite the settings in your site database to reflect your new data logger configuration. If you have altered the data logger settings but still wish to process the new data using the old settings, then click *Process with Database Settings*. Whatever choice you make, click the *Ok* button to continue with the database processing.



Data Dolphin and database conflict message box

Loading the Data into Microsoft Excel

Exporting the Recorded non SDI-12 Data to a CSV File

To allow greater flexibility in viewing the recorded data, an export function is available in the *File* drop down menu. By exporting the data to a CSV (Comma Separated Variable) file and then opening the file with a spreadsheet program such as Microsoft Excel, it is possible to analyze and manipulate the data in ways that are not yet possible with the Data Dolphin software.

Exporting the recorded data to a CSV file

1. Select *Export Data to CSV File* from the *File* drop down menu as shown in Figure 1 below.

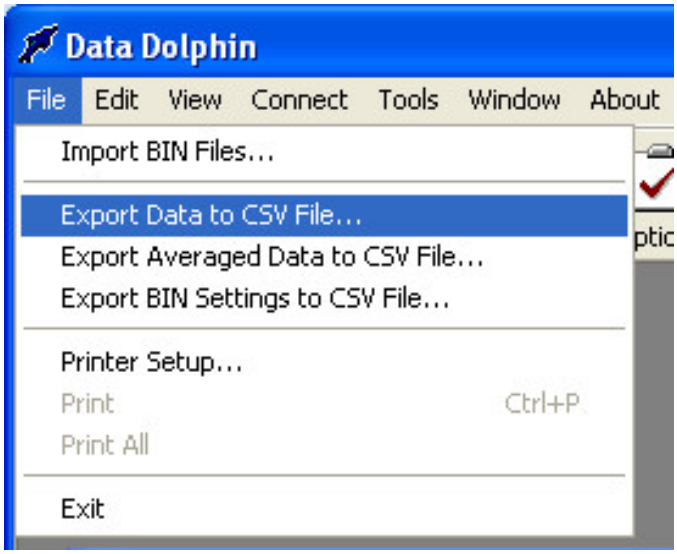


Figure 1. Export Data menu

2. Next, highlight the site or sites of interest by clicking on the site number in the sites list box. You can select multiple sites at once by holding down the Ctrl button as you click on the individual site numbers. You can also select a range of sites by selecting the first site in the range, depressing the shift key and clicking the last site in the range. You can also select a group of sites by selecting it from the Groups drop down list box above the site list.

3. Use the calendar control (Figure 2) to select the date range of the data to be exported. A separate CSV file will be created for each site that you have specified. Note that no CSV file will be generated if there is no data during your selected time period.

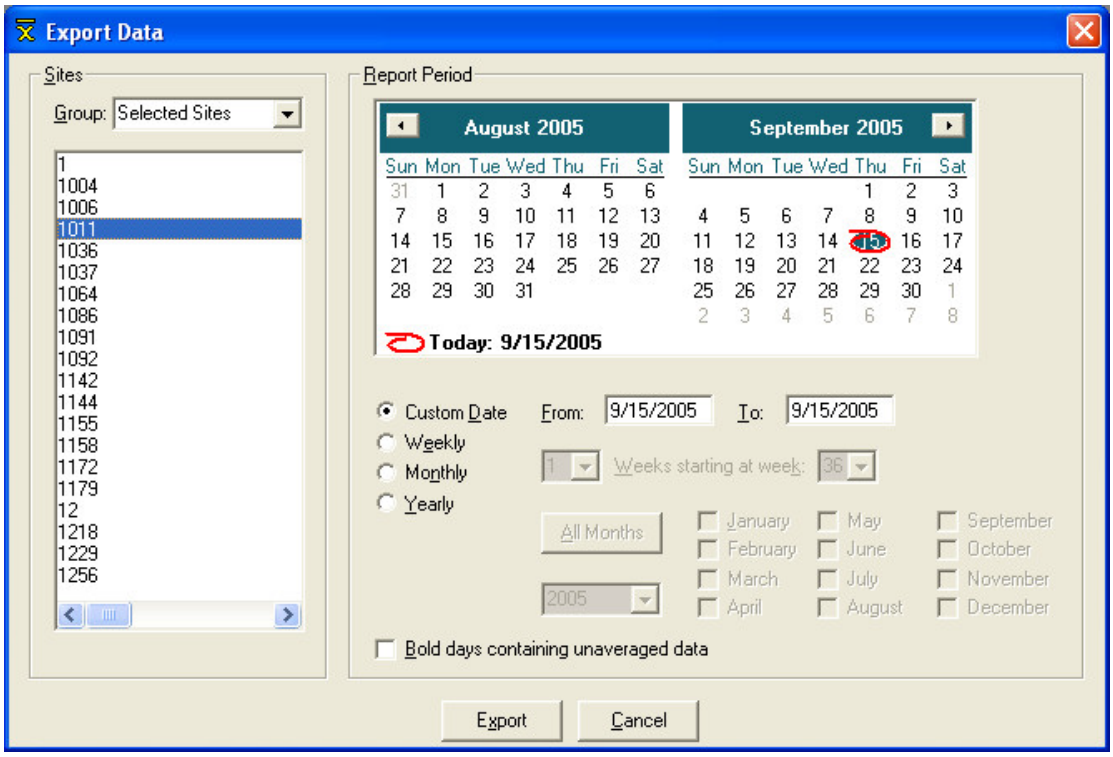


Figure 2. Export site and date selection

4. The 'Select Inputs to Export' input box (Figure 3) allows you to choose individual inputs of the sites or all of the recorded inputs at once by typing 'ALL'. If you wish to export calculated flow, enter input number 32. If there is no data for the time period you have selected in step 2 for a particular input, then that input will have a series of zeros entered into the CSV file.

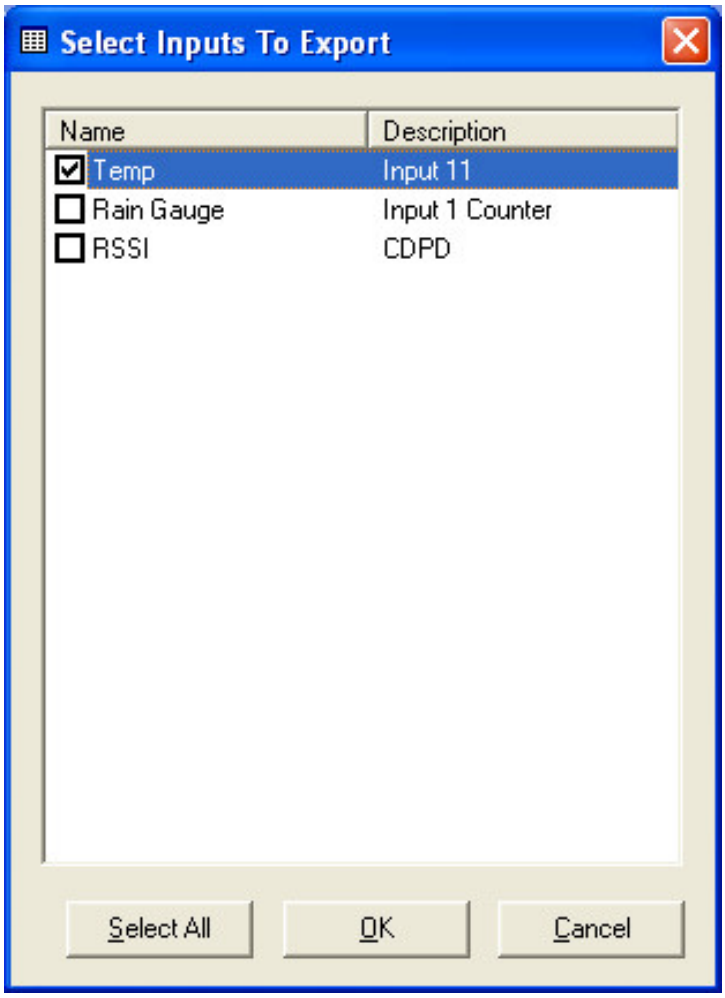


Figure 3. Selection of inputs to export

5. After choosing the inputs, you must then enter the name of the file that will be used to store the exported data. You will have to enter a separate filename for each of the sites you chose in step 2. Each of the sites will be processed individually, always with a prompt for a CSV file name (see Figure 4). If you do not add an extension to the name, the default of 'CSV' will be added automatically.

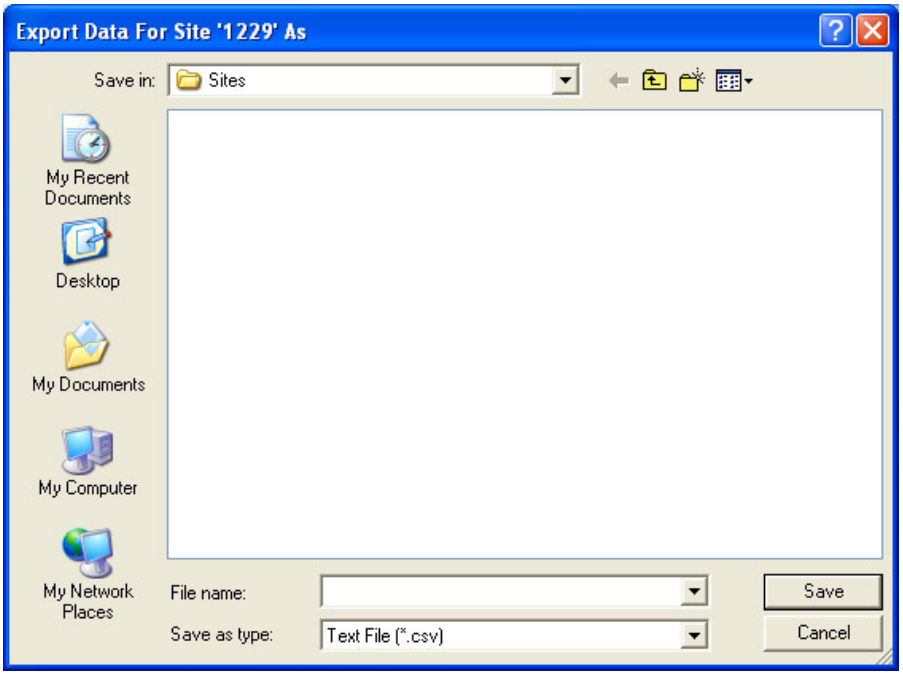
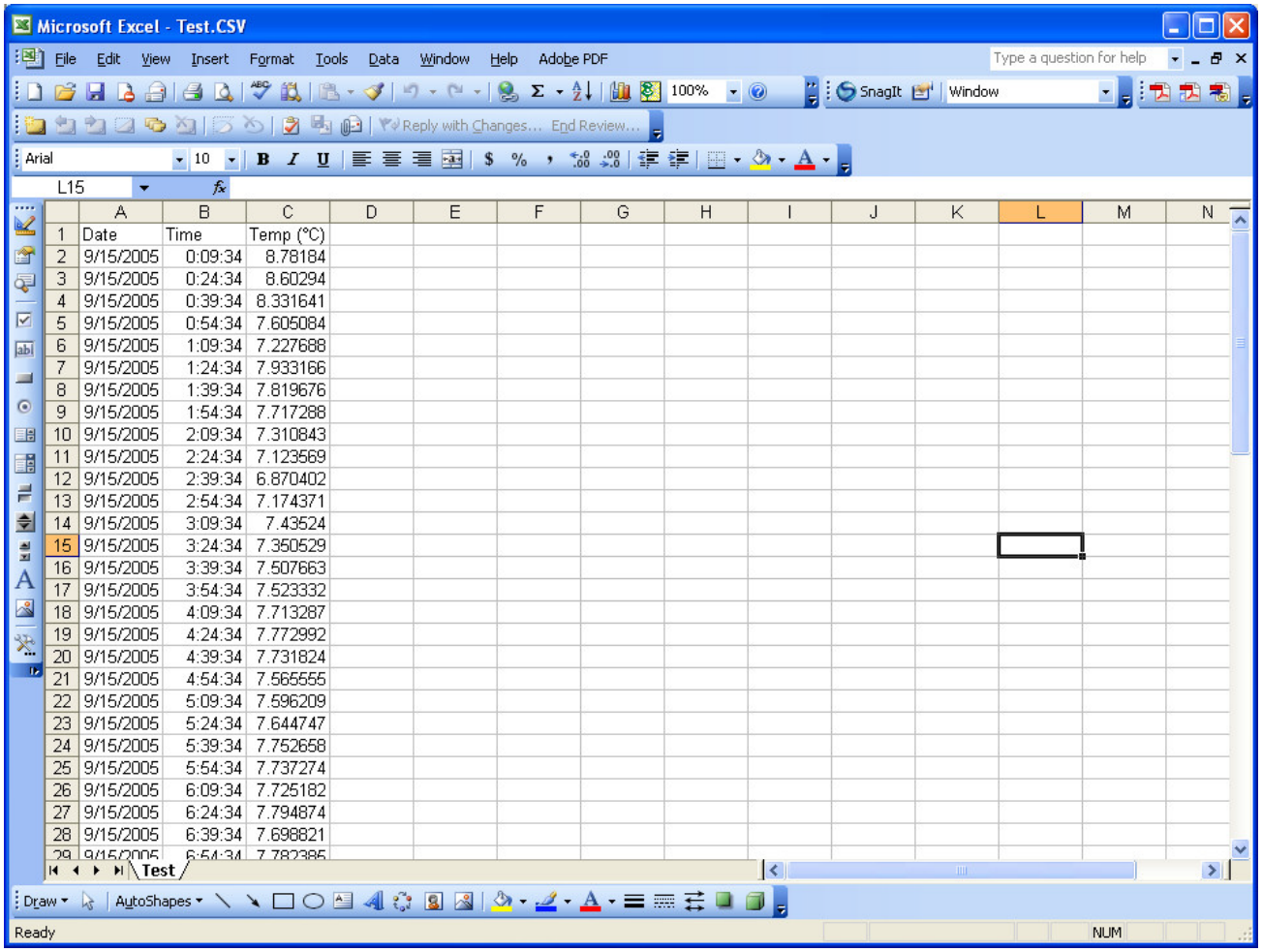


Figure 4. Selecting filename for exported data

An example of how the exported data might appear in Microsoft Excel is shown in Figure 5 below.



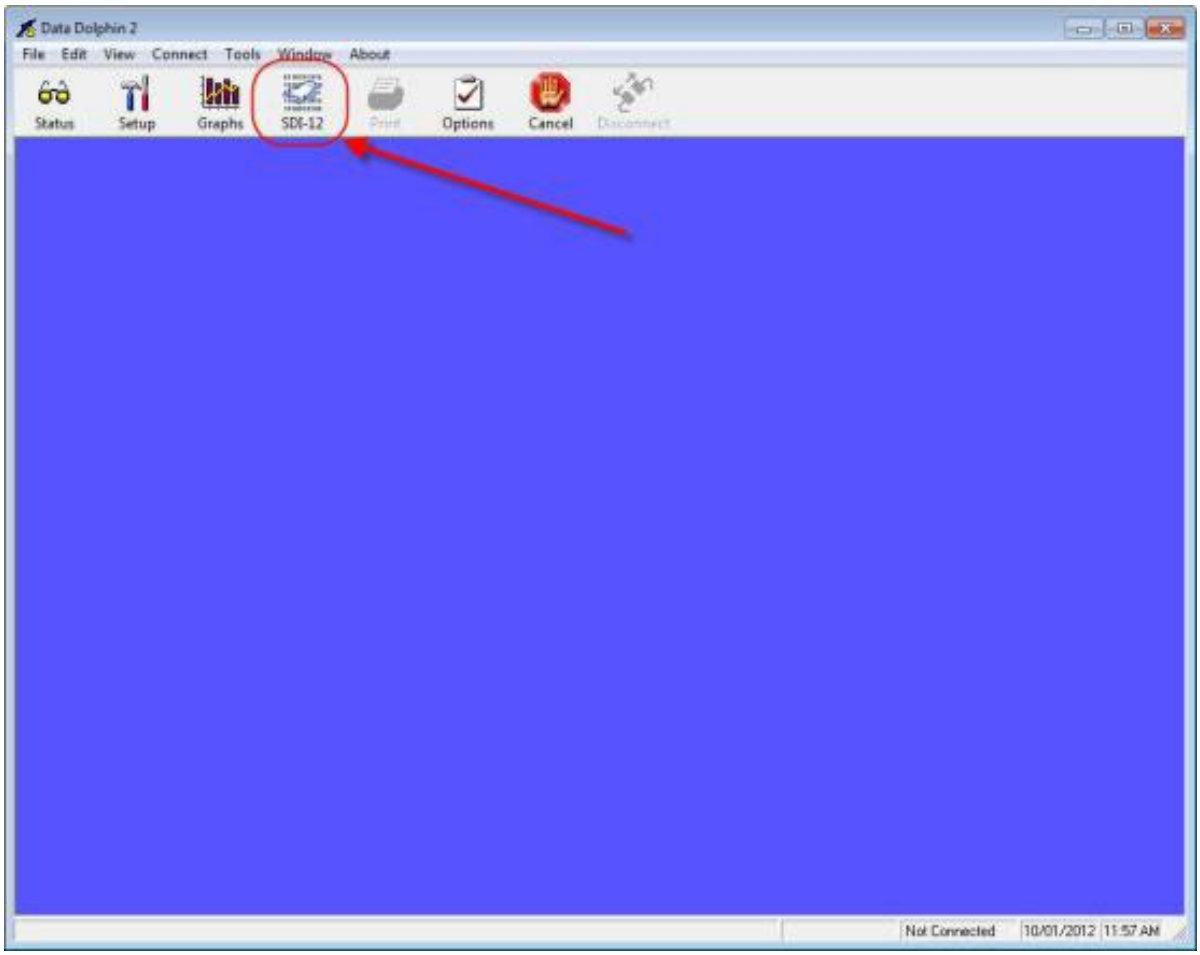
	A	B	C
1	Date	Time	Temp (°C)
2	9/15/2005	0:09:34	8.78184
3	9/15/2005	0:24:34	8.60294
4	9/15/2005	0:39:34	8.331641
5	9/15/2005	0:54:34	7.605084
6	9/15/2005	1:09:34	7.227688
7	9/15/2005	1:24:34	7.933166
8	9/15/2005	1:39:34	7.819676
9	9/15/2005	1:54:34	7.717288
10	9/15/2005	2:09:34	7.310843
11	9/15/2005	2:24:34	7.123569
12	9/15/2005	2:39:34	6.870402
13	9/15/2005	2:54:34	7.174371
14	9/15/2005	3:09:34	7.43524
15	9/15/2005	3:24:34	7.350529
16	9/15/2005	3:39:34	7.507663
17	9/15/2005	3:54:34	7.523332
18	9/15/2005	4:09:34	7.713287
19	9/15/2005	4:24:34	7.772992
20	9/15/2005	4:39:34	7.731824
21	9/15/2005	4:54:34	7.565555
22	9/15/2005	5:09:34	7.596209
23	9/15/2005	5:24:34	7.644747
24	9/15/2005	5:39:34	7.752658
25	9/15/2005	5:54:34	7.737274
26	9/15/2005	6:09:34	7.725182
27	9/15/2005	6:24:34	7.794874
28	9/15/2005	6:39:34	7.698821
29	9/15/2005	6:54:34	7.782385

Figure 5. Exported data in Excel

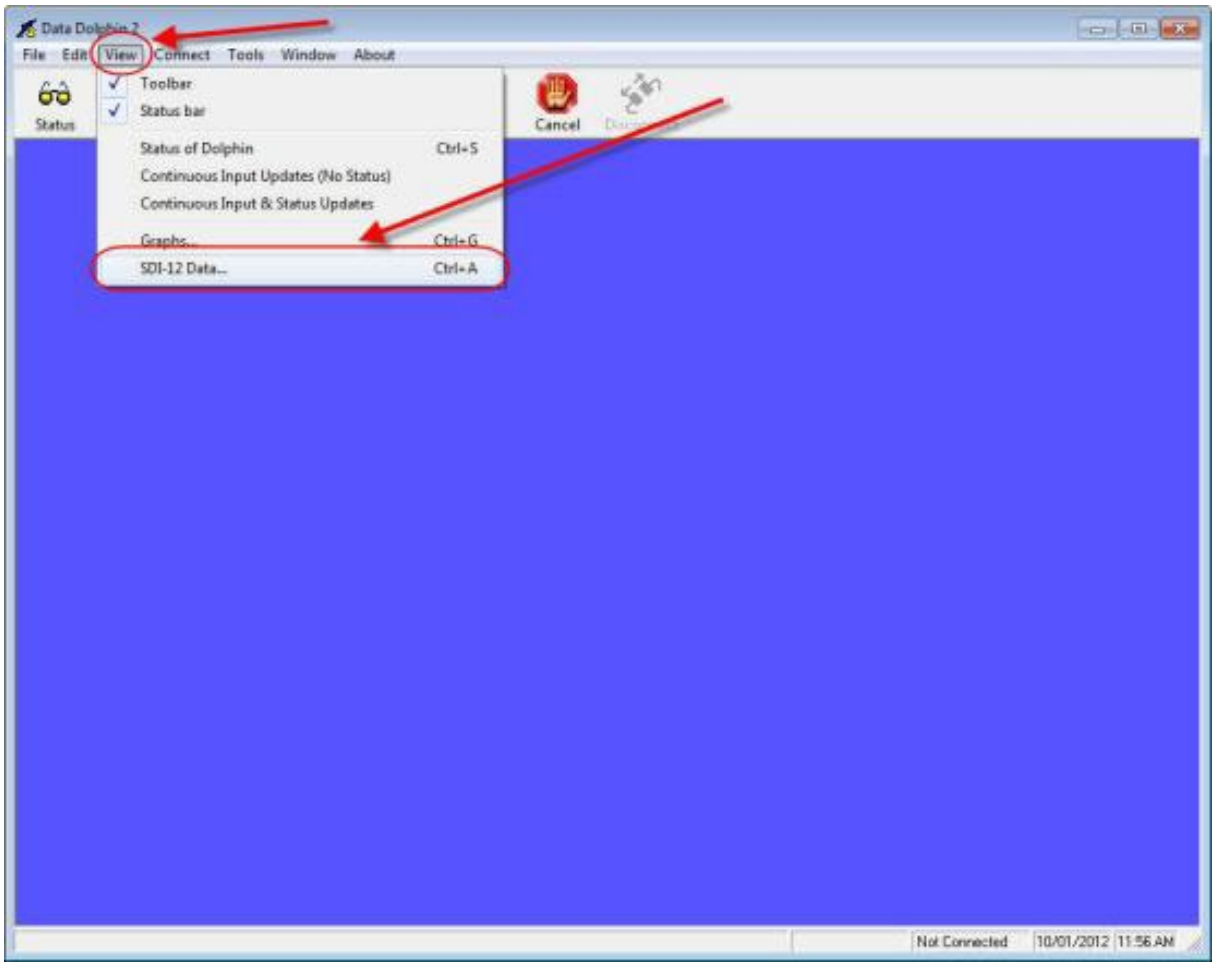
Viewing SDI-12 Data in Microsoft Excel

There are three different way to view SDI-12 data.

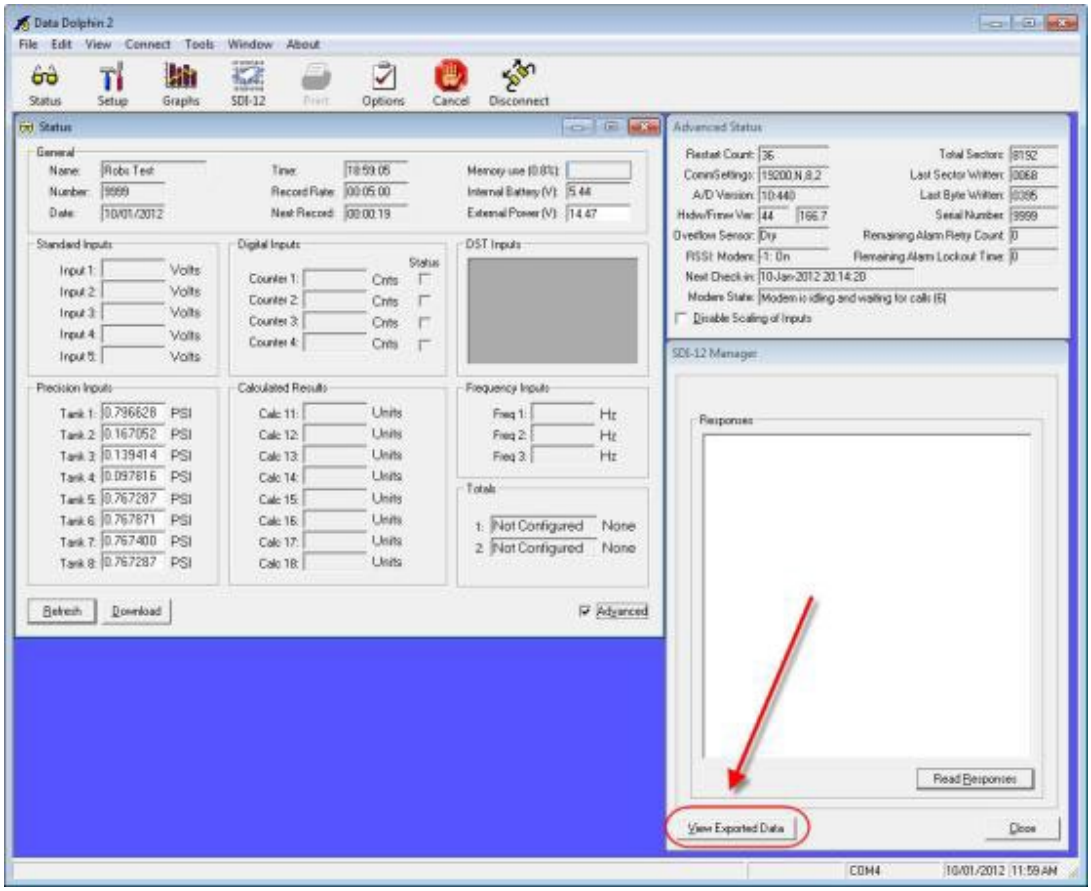
Method 1



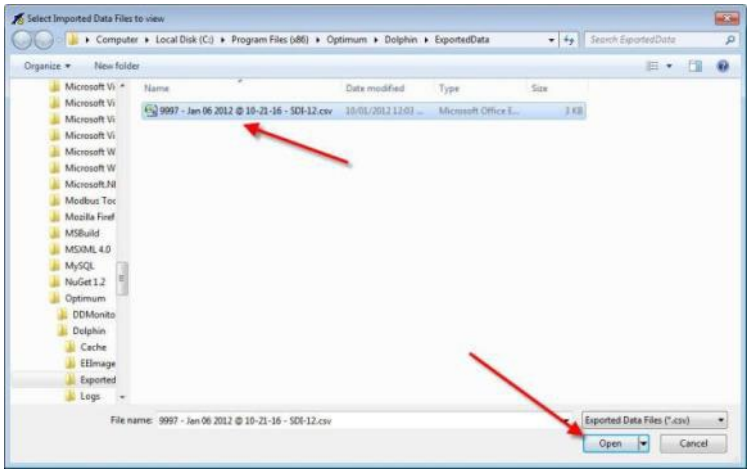
Method 2


Data Dolphin 2
File Edit View Connect Tools Window About
Status
Toolbar
Status bar
Status of Dolphin Ctrl+S
Continuous Input Updates (No Status)
Continuous Input & Status Updates
Graphs... Ctrl+G
SDI-12 Data... Ctrl+A
Cancel
Not Connected
10/01/2012 11:56 AM

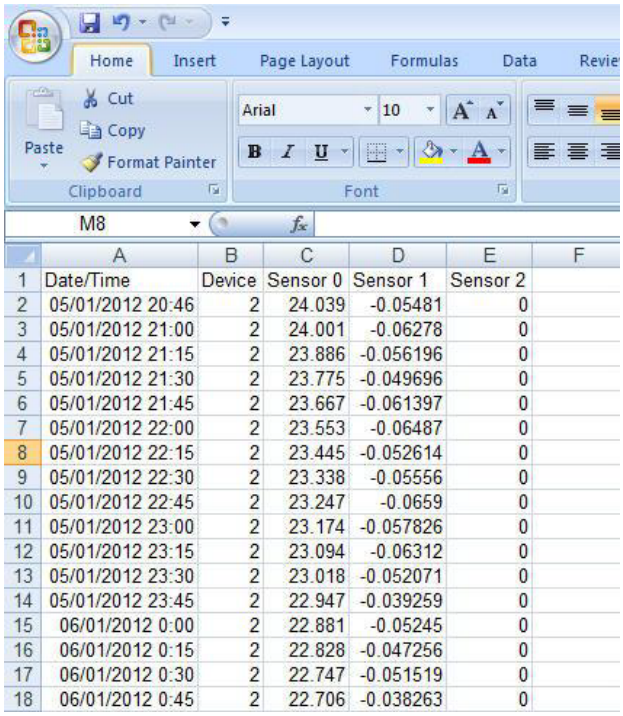
Method 3



This will open the following dialog where you can select a SDI-12 file to view.

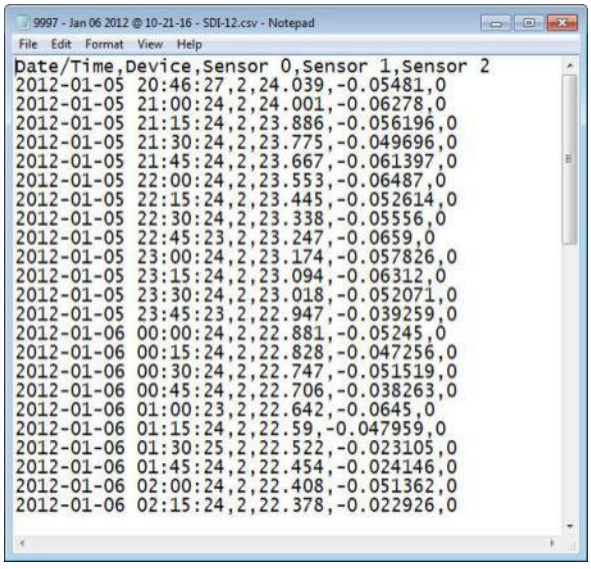


Once the file is selected click the open button and the file will be opened by Windows. Please note that if nothing is displayed make sureMicrosoft Excel is installed on your computer. If you do not have Excel you may open it with any text editor such as Notepad.



	A	B	C	D	E	F
1	Date/Time	Device	Sensor 0	Sensor 1	Sensor 2	
2	05/01/2012 20:46	2	24.039	-0.05481	0	
3	05/01/2012 21:00	2	24.001	-0.06278	0	
4	05/01/2012 21:15	2	23.886	-0.056196	0	
5	05/01/2012 21:30	2	23.775	-0.049696	0	
6	05/01/2012 21:45	2	23.667	-0.061397	0	
7	05/01/2012 22:00	2	23.553	-0.06487	0	
8	05/01/2012 22:15	2	23.445	-0.052614	0	
9	05/01/2012 22:30	2	23.338	-0.05556	0	
10	05/01/2012 22:45	2	23.247	-0.0659	0	
11	05/01/2012 23:00	2	23.174	-0.057826	0	
12	05/01/2012 23:15	2	23.094	-0.06312	0	
13	05/01/2012 23:30	2	23.018	-0.052071	0	
14	05/01/2012 23:45	2	22.947	-0.039259	0	
15	06/01/2012 0:00	2	22.881	-0.05245	0	
16	06/01/2012 0:15	2	22.828	-0.047256	0	
17	06/01/2012 0:30	2	22.747	-0.051519	0	
18	06/01/2012 0:45	2	22.706	-0.038263	0	

Opening the file in Notepad.



Graphing the Recorded Data

A powerful feature of the Data Dolphin Software is the ability to graph the recorded data.

(SDI-12 Data can be viewed in Excel only)

The data to be graphed is selected using the calendar selection window. Application specific graphs and tables can be generated using Optimum's accessory software packages. *PumpPro* software is used to produce pump station specific graphs and tables while *Rain Reporter* is used to generate rainfall intensity and IDF graphs and tables.

Graphing Functionality in the Data Dolphin Software

The Graph window

Click on the *Graphs* button on the tool bar or alternatively choose *Graphs* from the *View* drop down menu. This will open the ***Graph*** window, as shown in Figure 6 below:

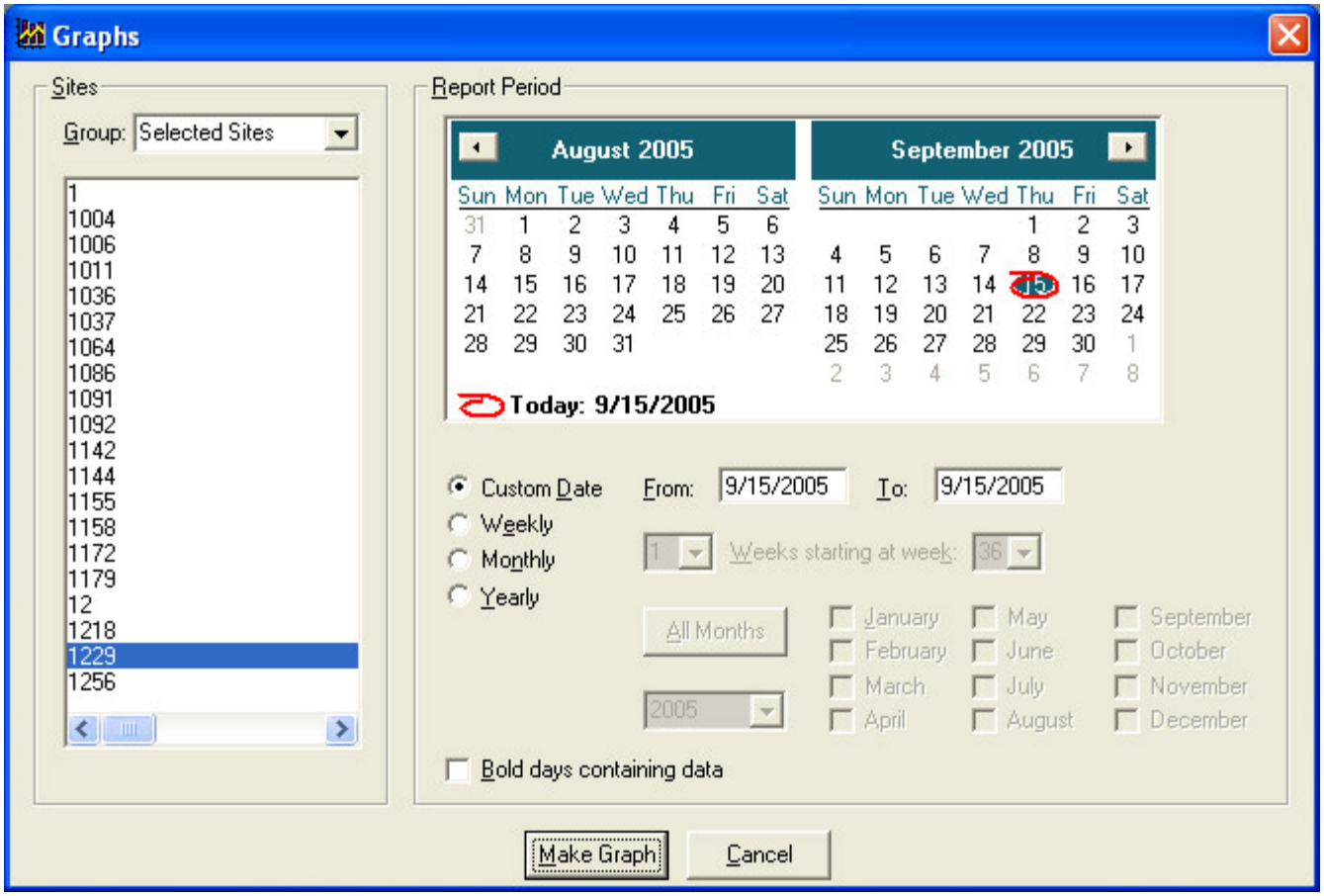


Figure 6: The Graph window

The ***Graph*** window consists of two distinct sections:

Sites: This box lists the unit numbers of sites that have a site database. A site database is automatically created when the raw data is retrieved from the Data Dolphin.

Report Period: This box allows the user to specify a specific time period to be reflected in the generated graphs.

Generating a graph of site data is a simple process of selecting the site for which you want to generate a graph and then a time period for that graph. Follow the steps for successful graph creation:

1. If you want to generate graphs for a designated group, choose the group name in the *Group* drop down box and a separate graph will be generated for each site defined in the group. Note that the selection box will be grayed out if you have not created any groups. Pick Selected Sites in the drop down box if you wish to generate a graph for a specific site.
2. Select the site or sites for which you want to generate a graph by clicking on their numbers. Hold down the CTRL key while selecting the site numbers to select multiple sites. A separate graph window will be generated for each site you select.
3. Now select the time period for your graph(s). The ***Graph*** window's intuitive time controls allow the user to quickly specify time periods.
    a. Click on the *Yearly* option button with your mouse if you want to graph the data for a specific year. When you click on this button, only the year combo box will be enabled near the bottom of the ***Graph*** window. Click on this drop down box to choose the year you wish to graph.
    b. Click on the *Monthly* option button to specify a month or months. The Month check boxes to the right of the year drop down box will be enabled when the *Monthly* option button is selected. Clicking the *All Months* button will place a check in all of the month check boxes.
    c. Click on the "Weekly" option button to pick a specific week in the year. The month and year controls will be disabled, and the calendar control and week controls will be enabled. The week controls consist of two drop down boxes as shown below in Figure 7:

Figure 7: Week controls

d. The first control selects the number of weeks, and the second control selects which week from a 52-week year to begin graphing. You can enter the desired values into these boxes with your keyboard, the mouse or by clicking on the calendar control above. Click on the *Custom Date* option button to graph a specific time range outside regular week and month boundaries. You can specify the dates by clicking on the *From* and *To* text boxes and entering the dates in your system date format. Another, more intuitive method would be to use a click and drag operation on the calendar control (see below).

e. Calendar control – A time period may be selected on this control by simply using a select and drag method. A month can be quickly selected by clicking on the month text to reveal a pop-up menu as shown below in Figure 8. You can also rotate through the months by clicking on the arrow buttons in the upper left-hand and right-hand corners.

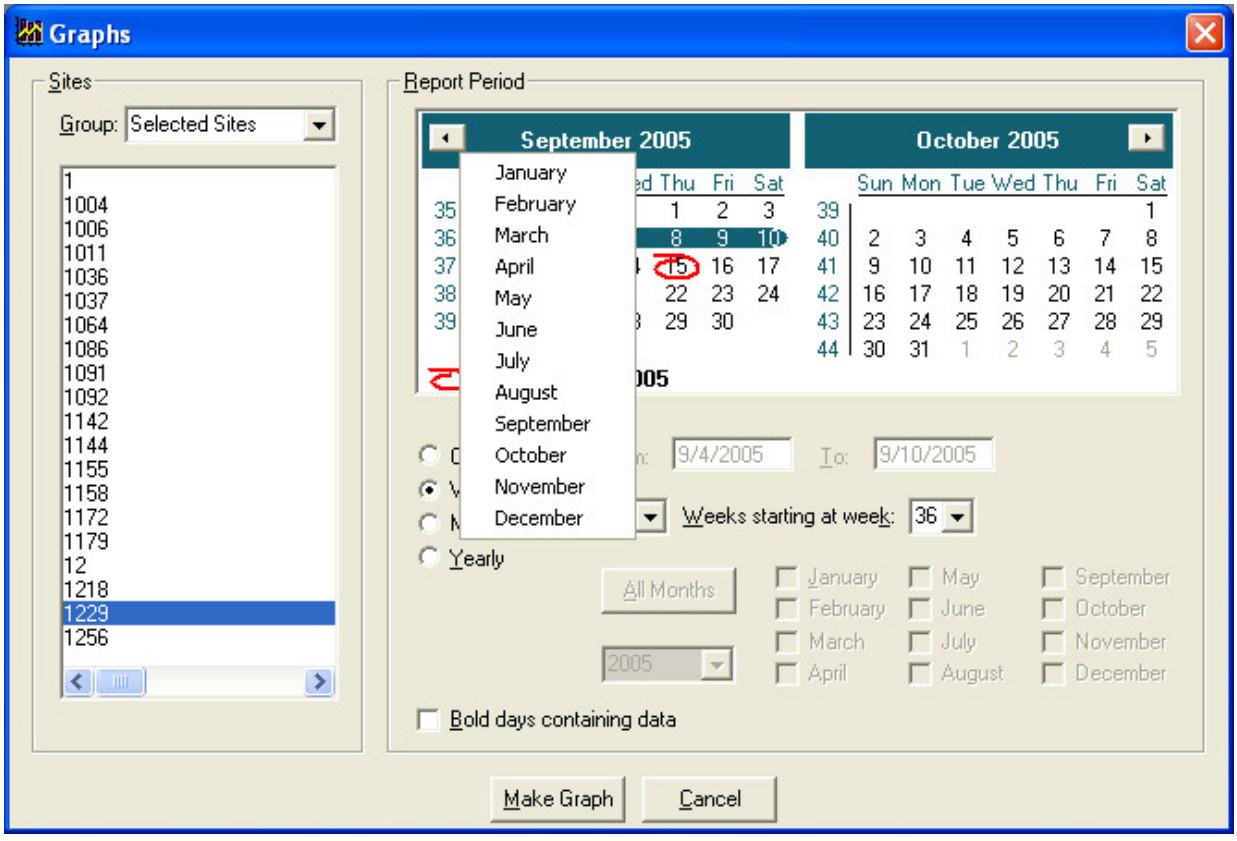


Figure 8: Graph selection with month drop-down

f. A year control can also be exposed by clicking on the year text. A scroll control will appear, to allow you to scroll up and down through the years.

g. The calendar control is only enabled for the *Weekly* and *Custom Date* options. In the *Weekly* option, a week or group of weeks can be selected, depending on the value set in the *Weeks* drop down box. For example, if a 3 is entered into this combo box, 3 weeks will be selected at a time. To select a week or group of weeks, simply click on any day of the week(s) you wish to graph on the calendar control. They will instantly be highlighted and the combo boxes below will be updated to reflect this selection.

h. When using the *Custom Date* option, click and drag functionality is enabled on the calendar control allowing you to pick a specific day or days within the two months currently being displayed. To specify a time range, select the start day by clicking on it, hold down the shift key and then select the end day.

i. For your reference, the current day is shown on the control with a red marker circle and printed in the bottom left-hand corner of the calendar control as shown in Figure 6.

4. Click *Make Graph*. This will bring up the input selection box, shown in Figure 9 below. After the sites and date range has been selected, the inputs to be graphed must be chosen. The inputs can be selected separately (1,3,8), sequentially (1-4) or all at once (ALL). If you wish to export calculated flow, enter input number 32.

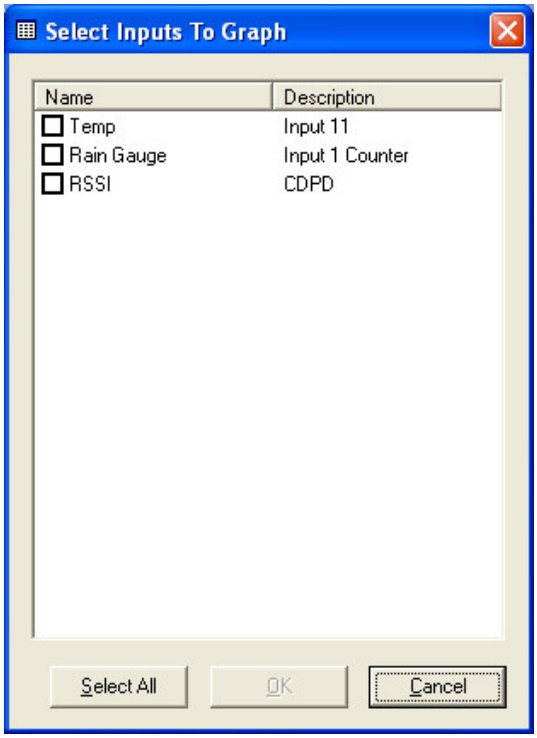


Figure 9. Selecting the inputs to graph

5. Click *OK*. Your computer will begin processing the data for the sites, time period and inputs you have specified. The progress of the current data processing operation will appear on the progress and status bars. When complete, a window similar to the one below in Figure 10 should appear.

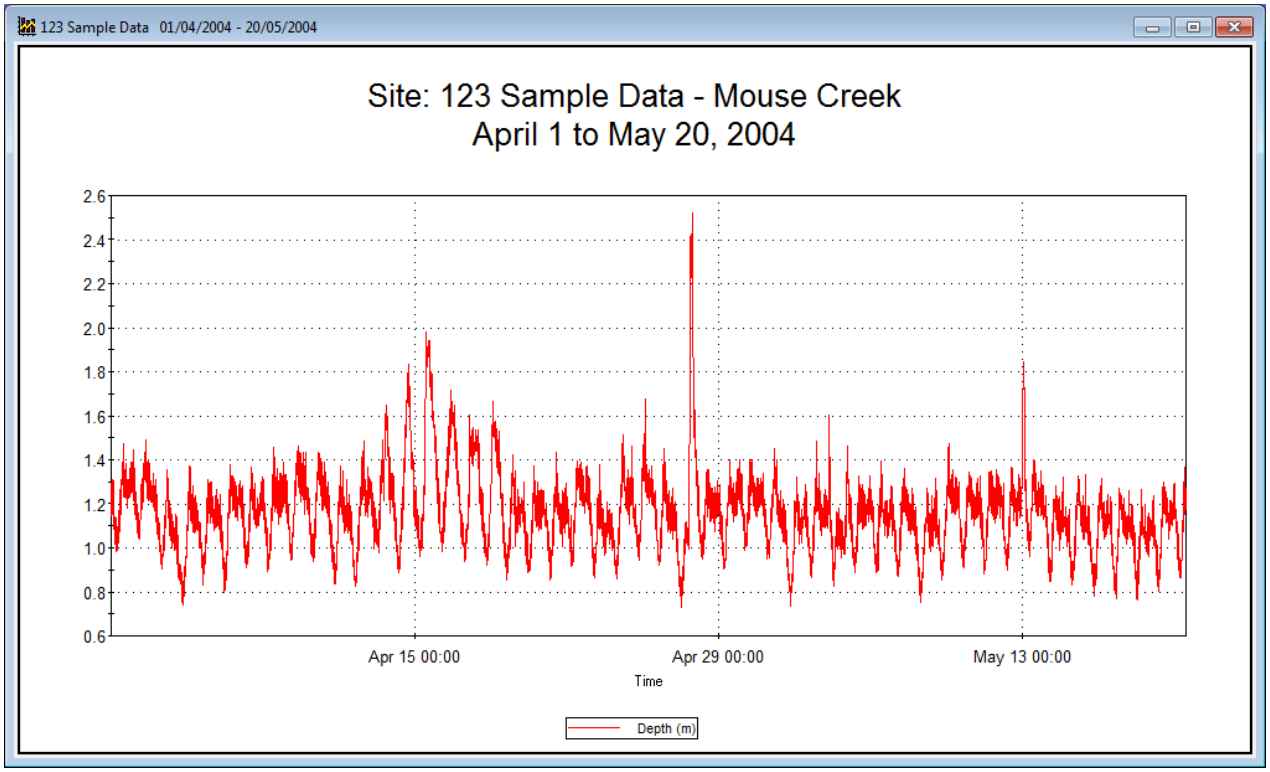


Figure 10: Graphing output window

6. If you do not get a graph window after following steps 1-4 above, then it is likely that the site database contains no valid data for the time period you specified.

7. To find the value of any point on the graph, simply hold your mouse pointer over the point, and the time and intensity values at that point in time will be displayed below the graph as shown in Figure 11.

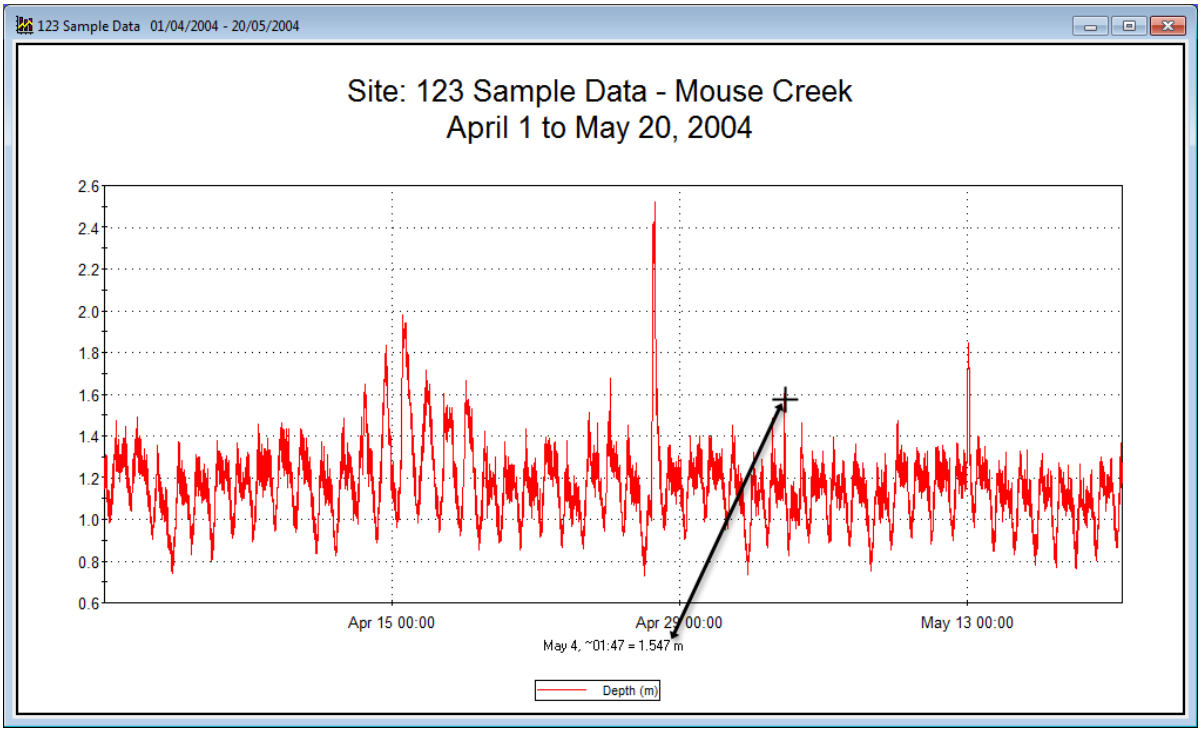


Figure 11 : Graph output with cursor data display

Advanced Graphing Options

For more advanced control of your graph window, you will want to open the ***2D Chart Control Properties*** window.

To open this properties window, simply right-click with your mouse pointer on any ***Graph Output*** window. A small pop-up menu, similar to the one displayed in Figure 13 will appear.

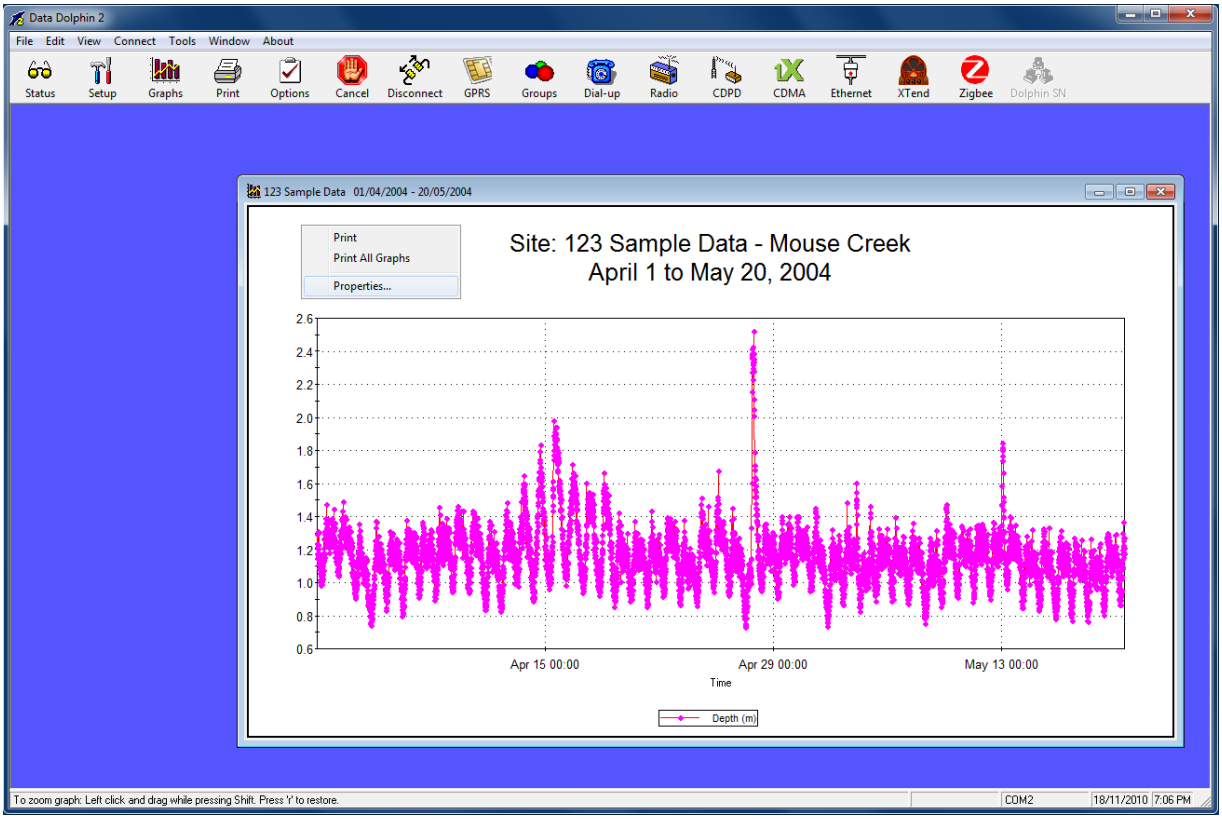


Figure 12. Right click the graph to expose the graph properties

Next, select and click *Properties*. This will open the ***2D Chart Control Properties*** window, as shown in Figure 13. For help on using this properties window, click on the *Help* button in the bottom right hand corner. Note that any changes you make in the ***2D Chart Control Properties*** window will only apply to the current graph you are modifying. These changes will be lost as soon as this graph is closed.

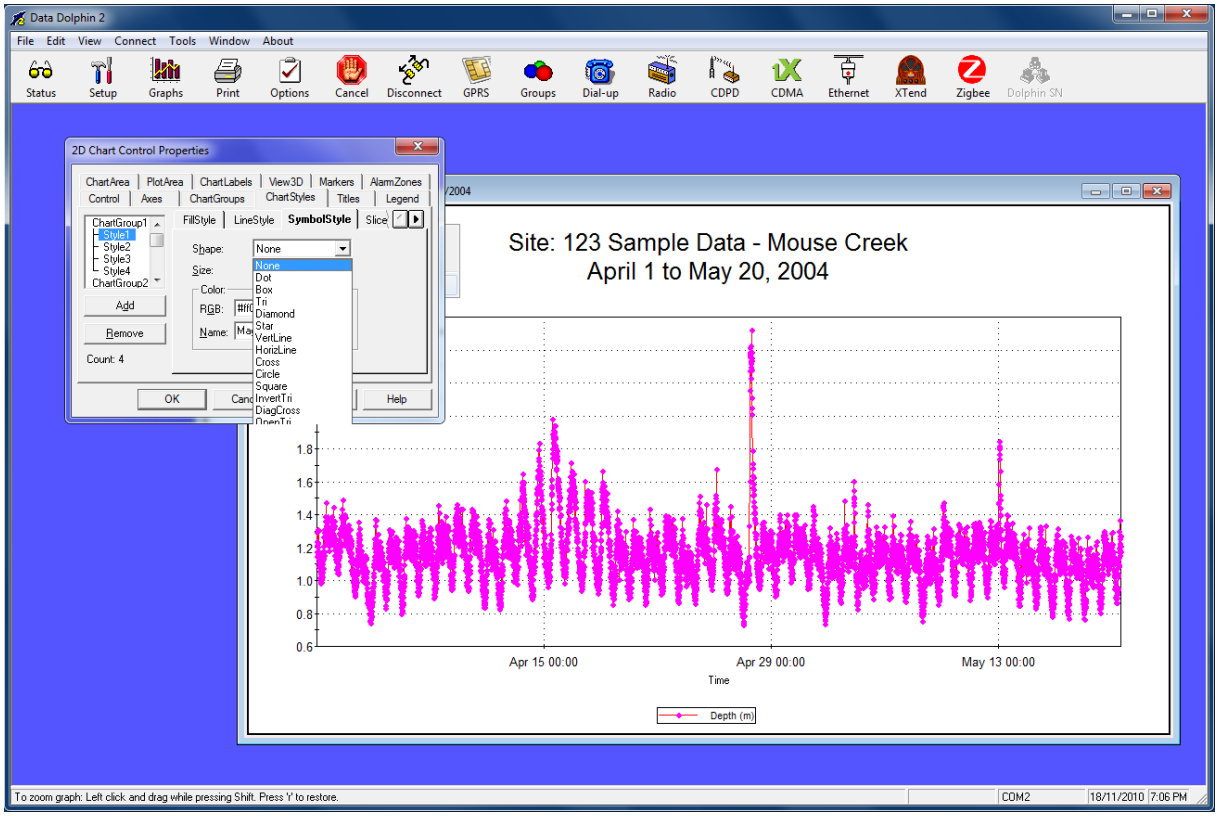


Figure 13: Advanced graph properties

Printing Graphs

The Data Dolphin Software provides three different ways to print a graph. Print a graph by

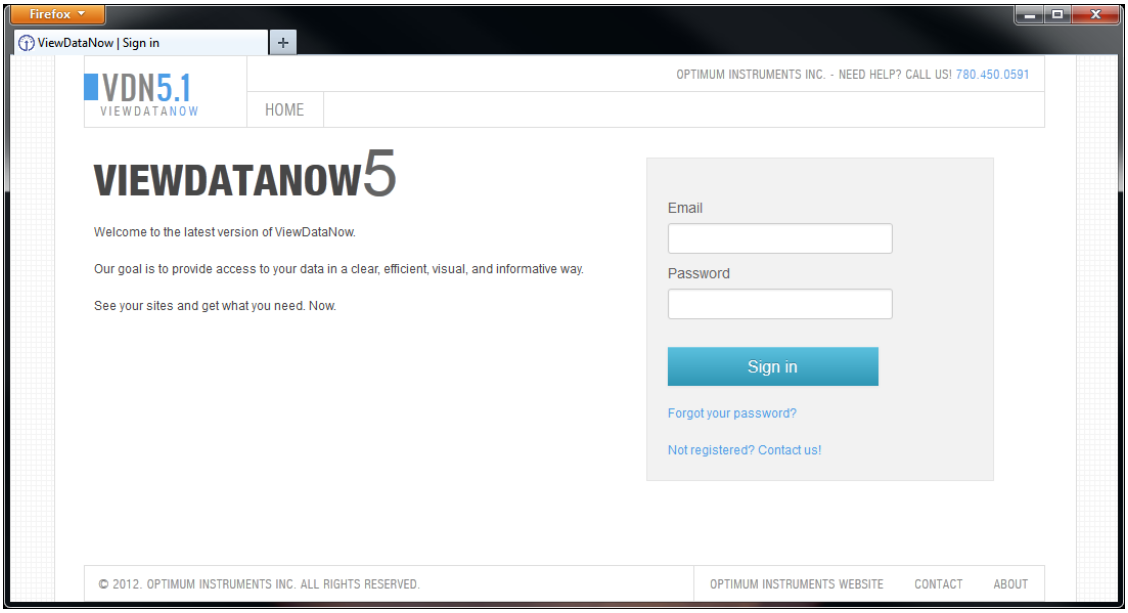
1. Clicking on a graph so that it is selected as the current graph. Then click the Print button on the toolbar. The graph will be printed by your system's default printer.
2. Selecting a graph to print, and then selecting *Print* under the *File* drop down menu.
3. Right clicking on the graph you wish to print, and selecting *Print* from the pop-up menu.

To print multiple graphs, make sure the graphs for all the sites you wish to print are open. Next, select *Print All* from the *File* menu ***OR*** right click on a graph and select *Print All Graphs* from the pop-up menu to print all the currently open graphs.

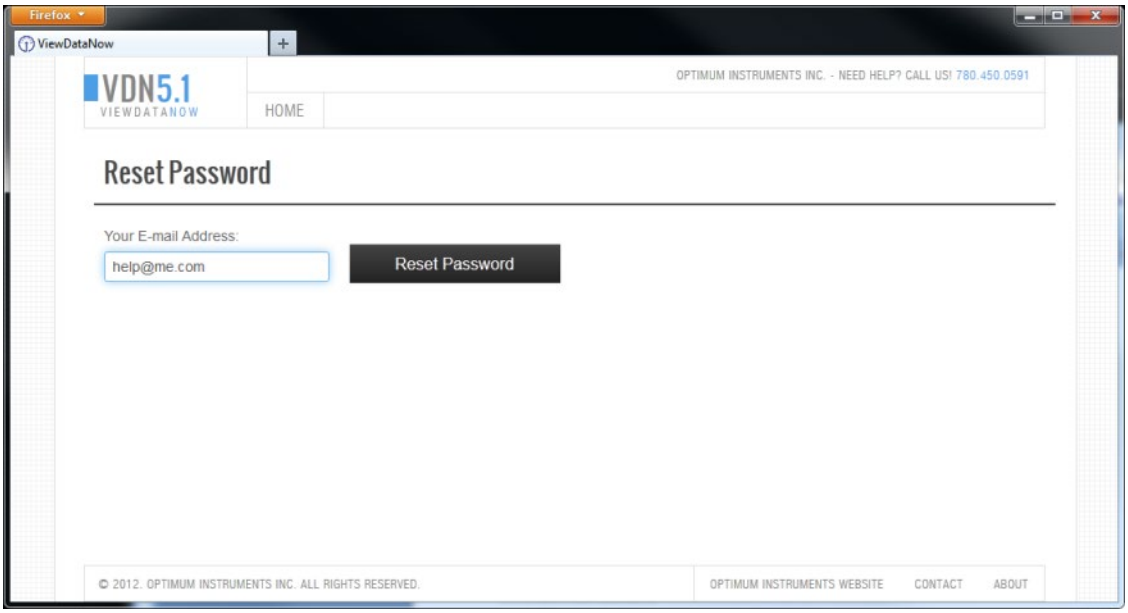
ViewDataNow

VDN is going to be getting a bit of a facelift and we want to just give everyone a heads up, as well as take a look at how to navigate through the site and use some of the new features.

Main Welcome

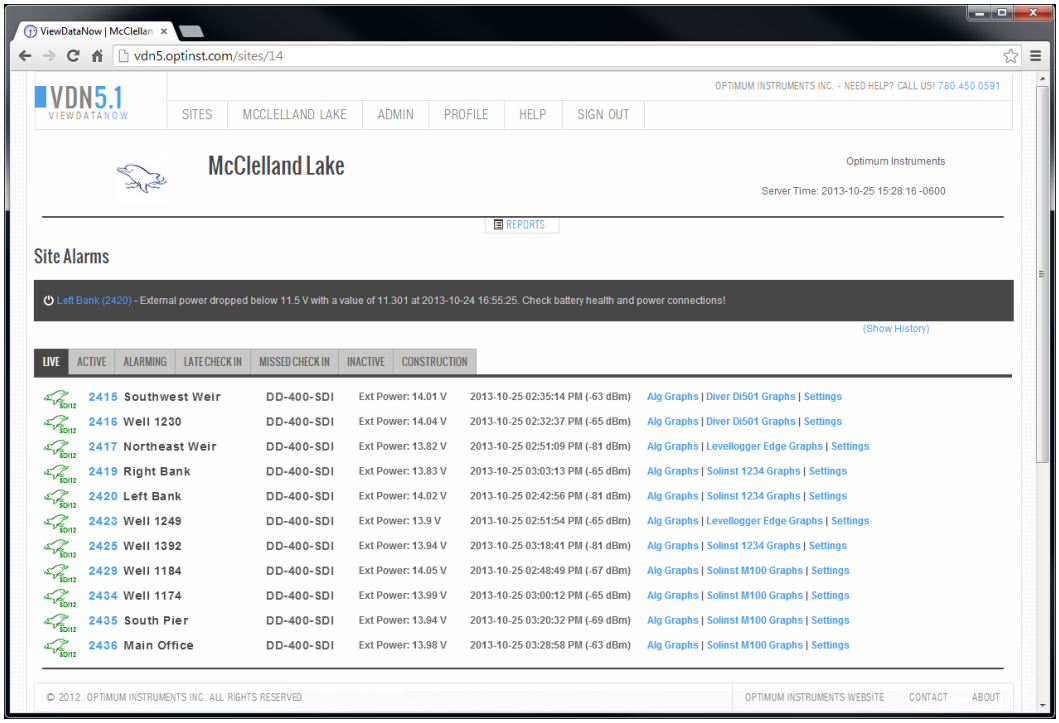


Log in with your e-mail and password. If you forgot it you can follow the “Forgot your password?” link to have a reset code sent.



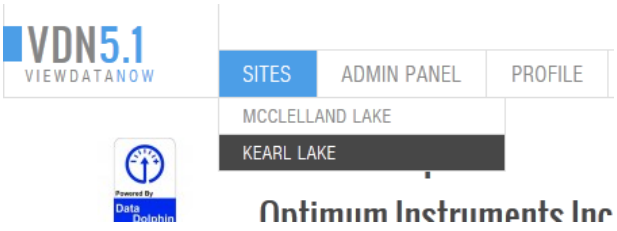
We're in!

This will be the first thing you see when you log in. The tiles are still there but the menu has been moved completely to the top. Your available sites, some administration tools, profile, help and the sign out links are all across the top.



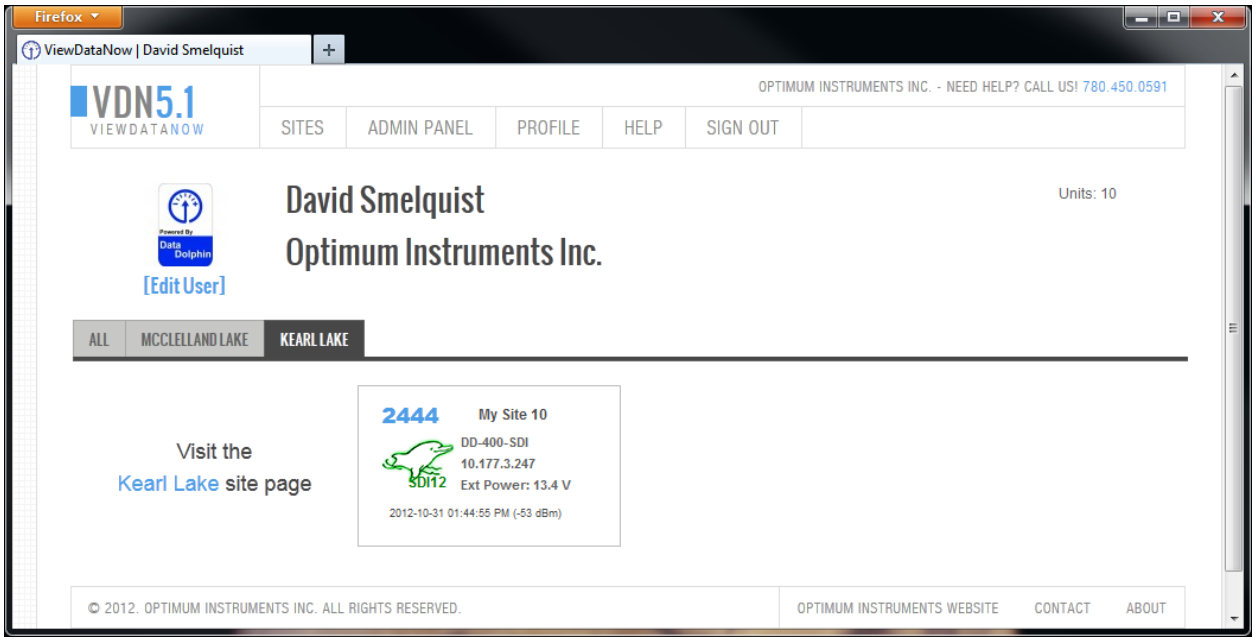
As usual green data loggers have made their check-in, orange have missed a few, and red data loggers have been missing for over a day. Loggers can be marked as inactive or under construction and will be a teal color. You can use the toolbar in the middle to filter based on status.

Some menus contain sub menus.



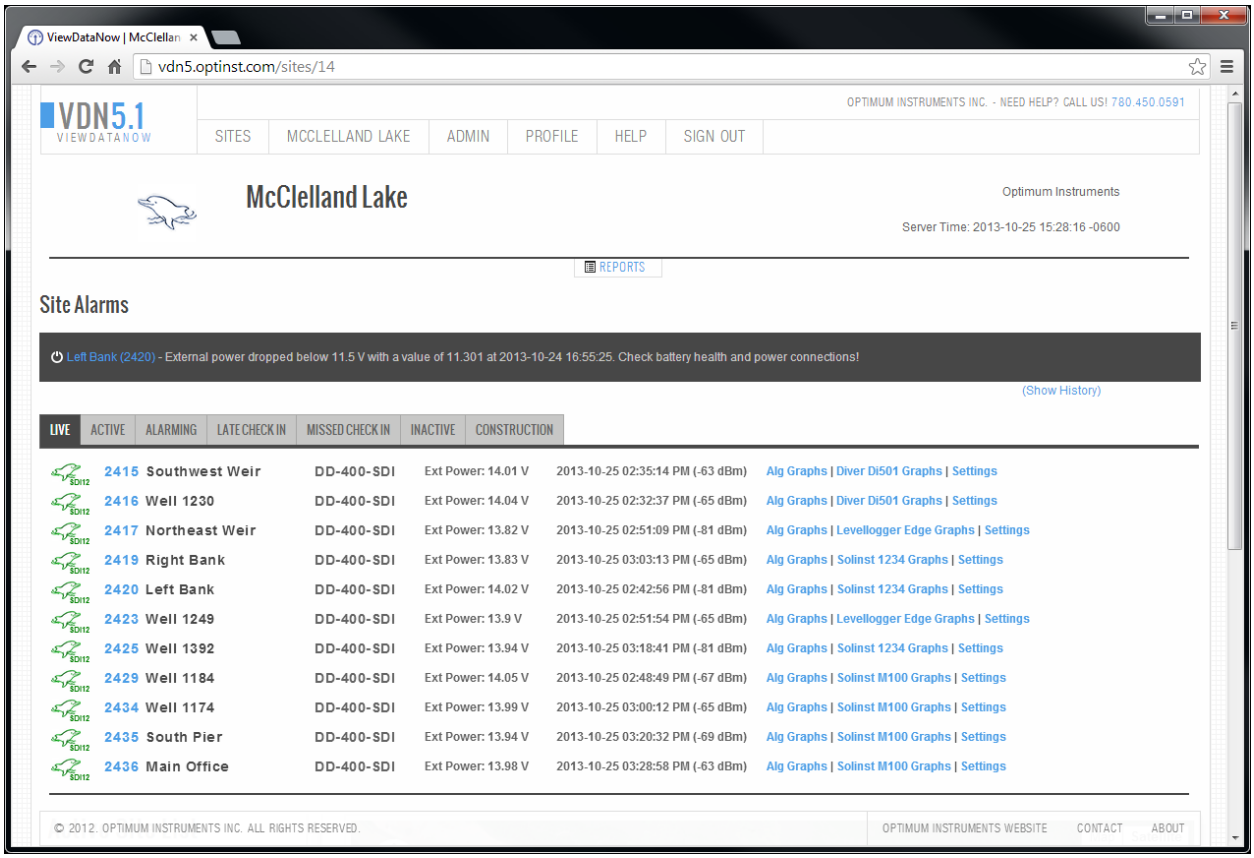
Just hover over the items with your mouse to see the available sub-menu choices.

Above the data logger tiles area is a menu that allows one to filter by the various sites they have.



For example, selecting the filter for the data loggers that are under the Kearl Lake Site will hide the McClelland Lake data loggers and only show unit 2444 in this case.

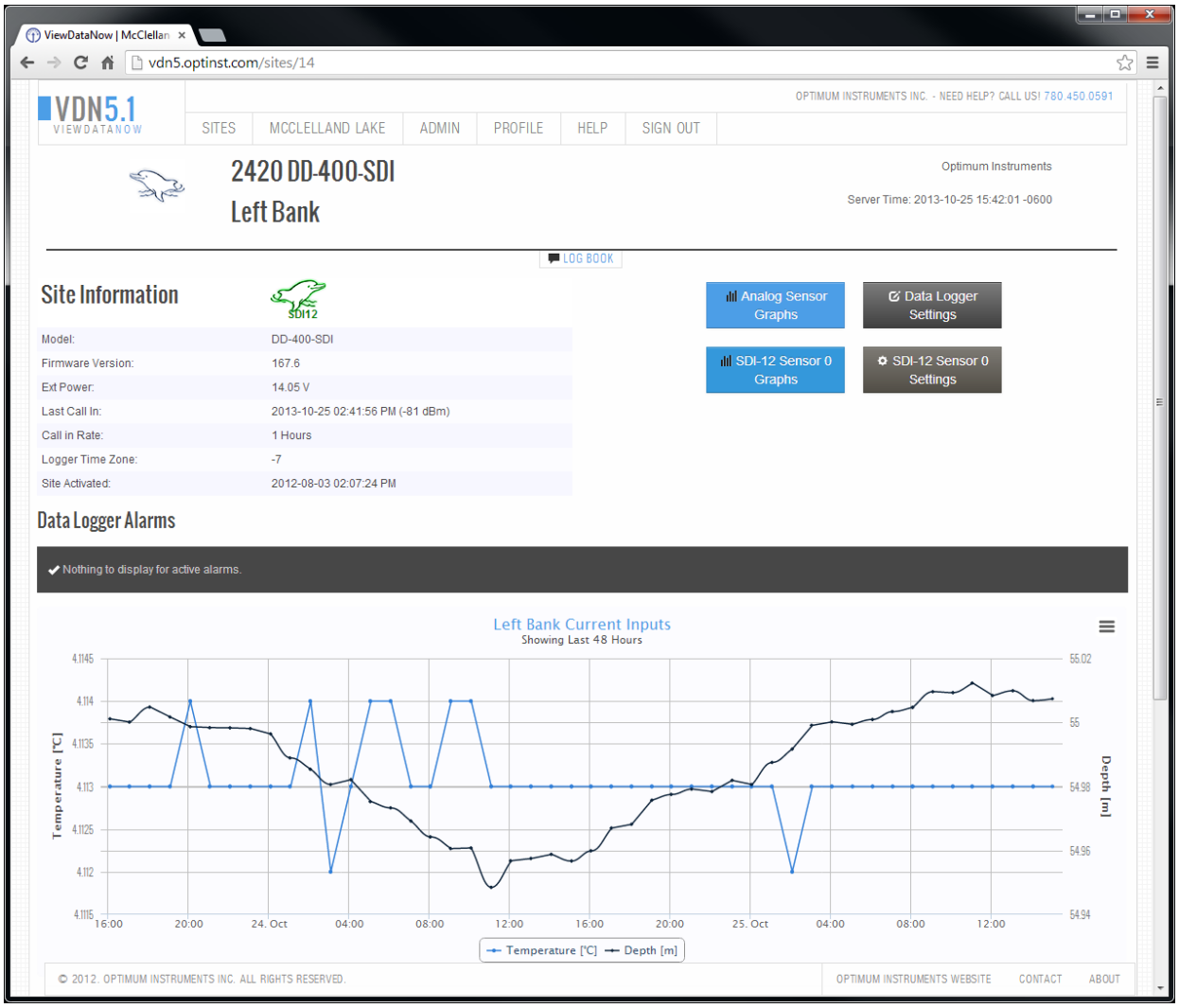
Site Page



Data loggers that belong to the site appear on the site page.

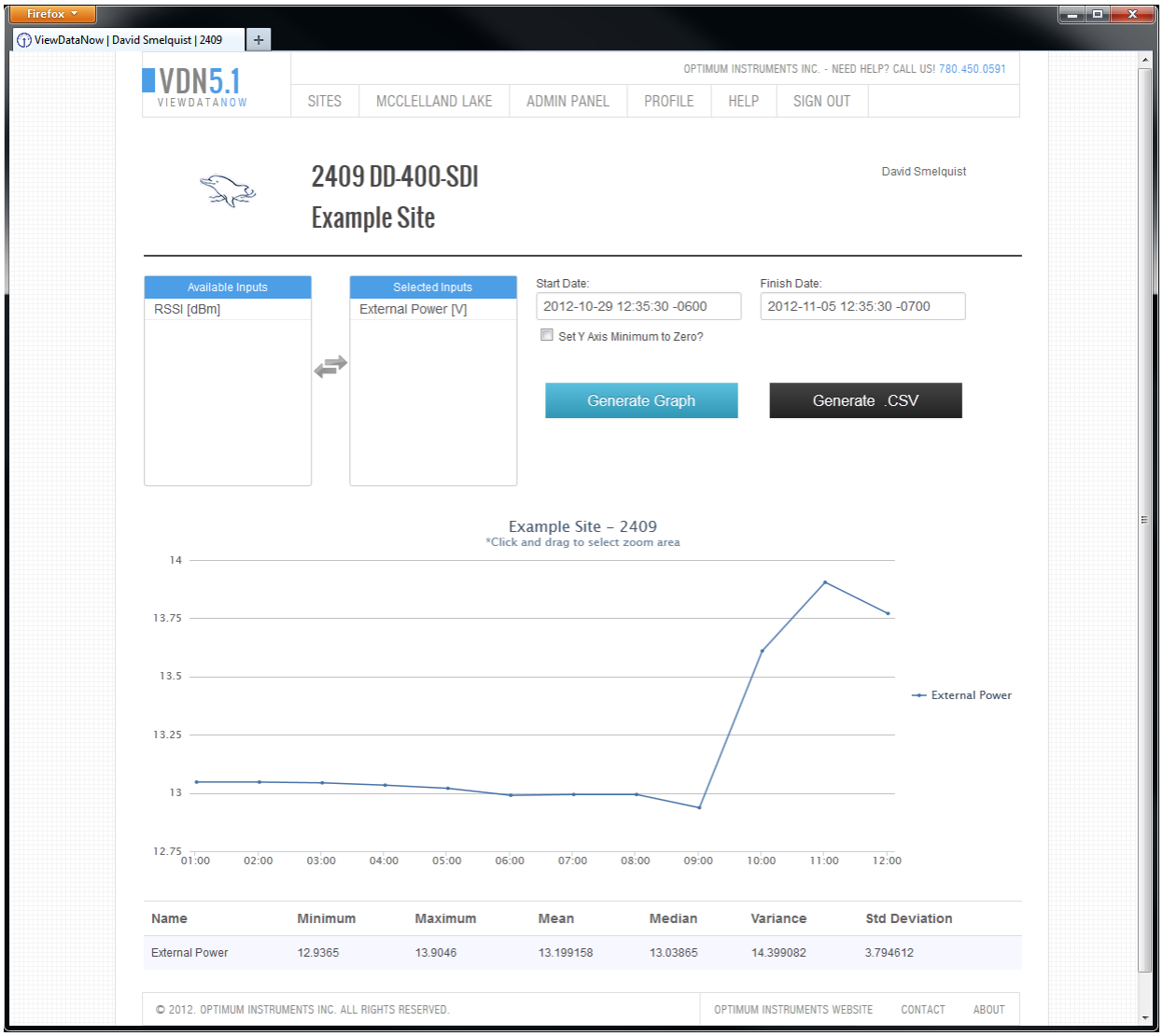
Further below is a map of the data loggers in the site (not shown)

Data logger Page



Here you will see some details about your unit, and some preview graphs of the sensors connected. The legends for the graphs are clickable in order to toggle which parameters are shown in the graph area. Guest users will not be able to access the settings areas of the page.

Graphing

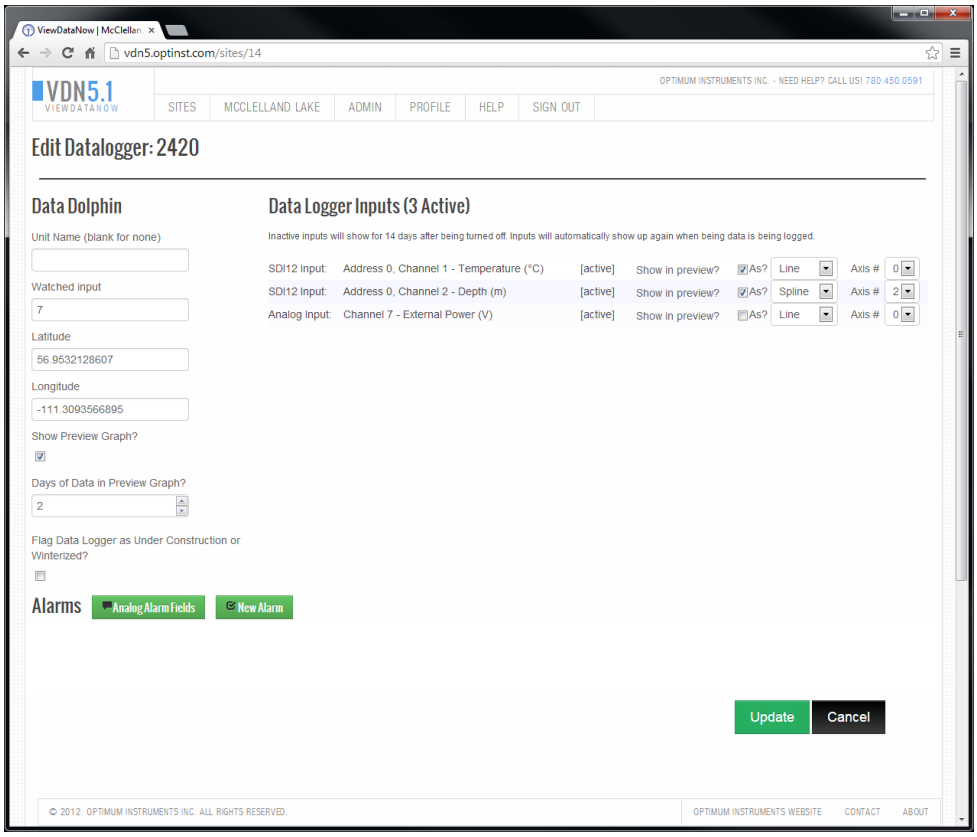


Select your inputs by clicking on them to shift from the Available Inputs to the Selected Inputs. You can then set your date range for the graph or csv export, and if you wish click the checkbox indicating you want to view your graph with a minimum y-axis value fixed to zero.

At the bottom are some additional statistics on your sensor inputs.

Analog and SDI-12 graphing and exporting both work in the same way.

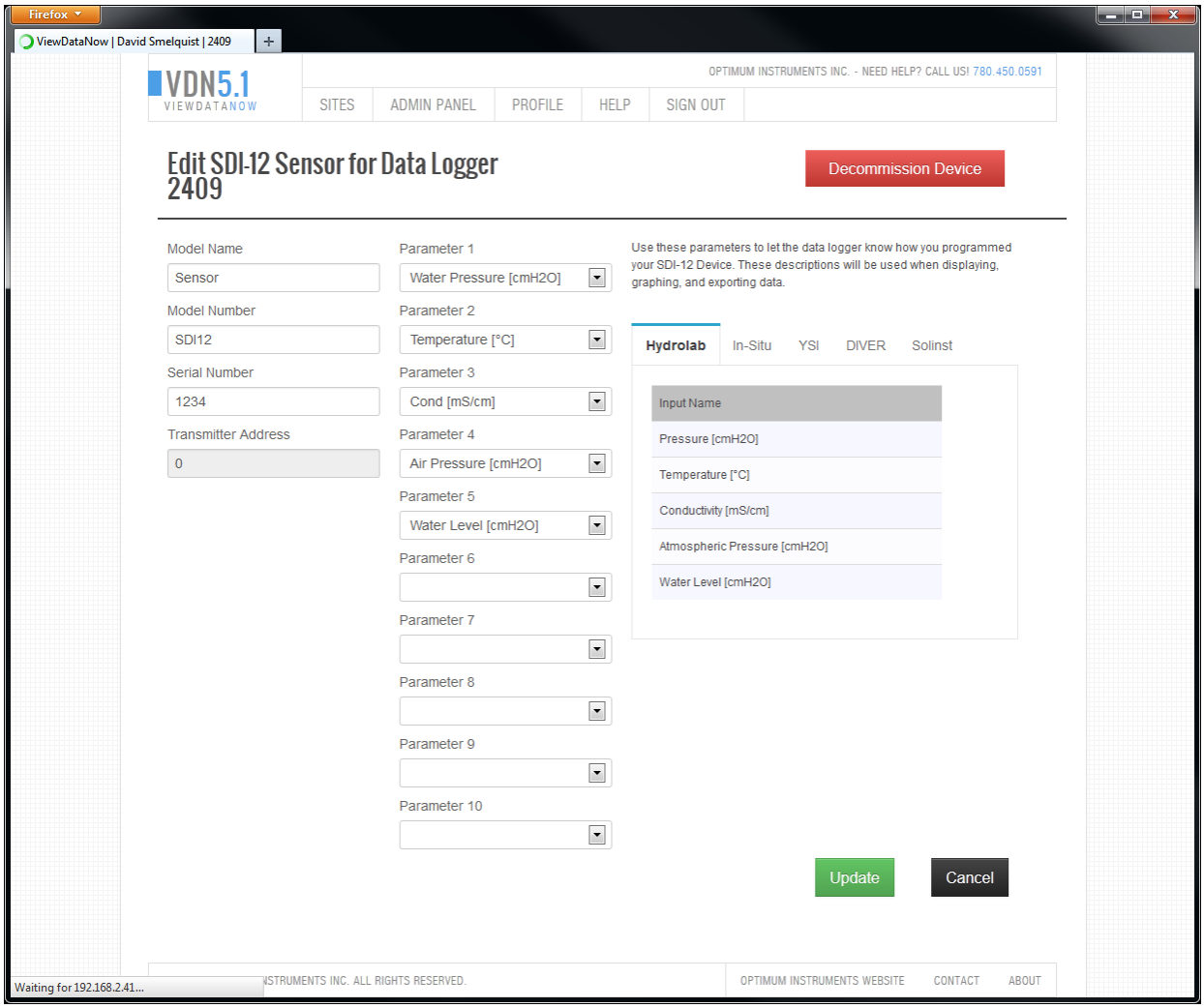
Data logger settings



Here you can change the model type, address, and the lat/long for your data logger. Lat/long takes priority over address and is used for placing icons on the map. As well you can toggle the preview graphs that show up on the data logger page.

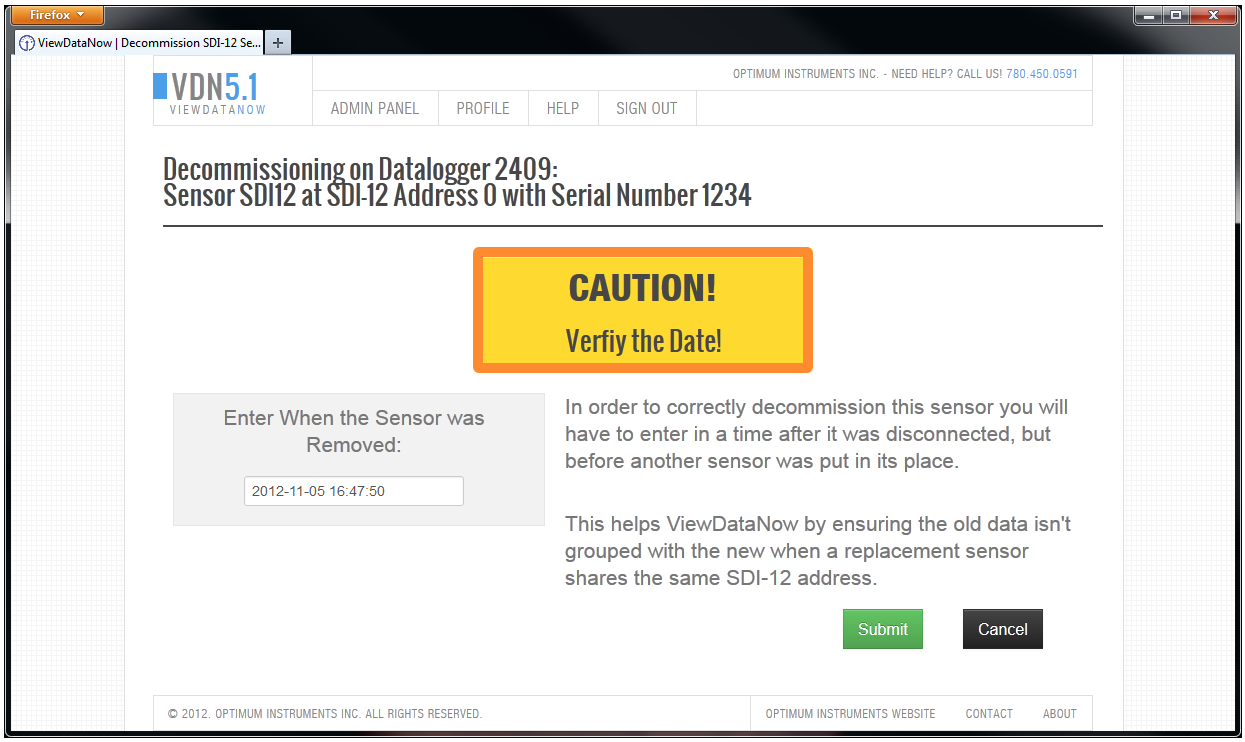
Flagging a data logger as under construction or parked for winter removes it from the top menu list and is indicated by a teal color icon. This keeps it separate from the currently running sites.

SDI-12 Sensor Settings Page

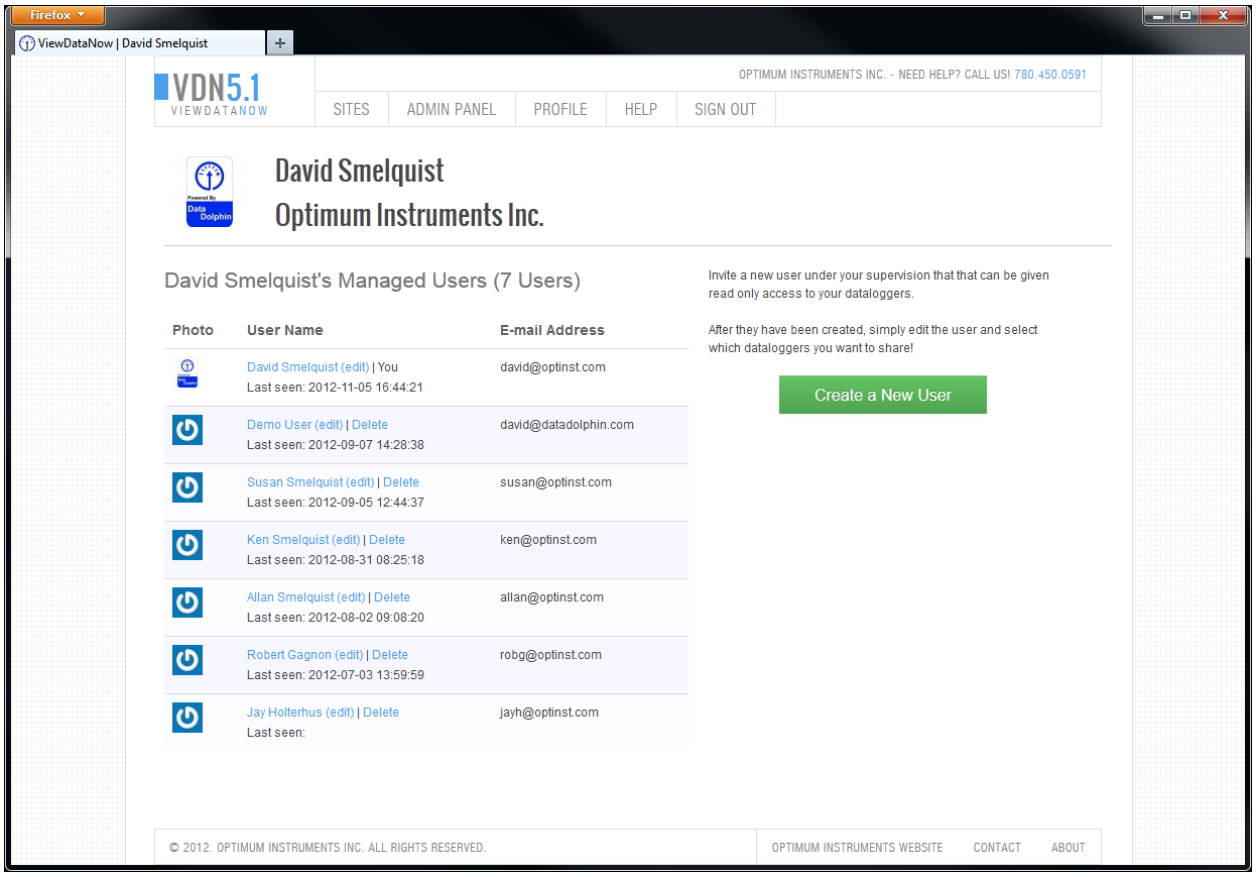


Some of the details for your sensor can be changed from here. This page also allows you to set up a custom alert for the sensor, as well as a link to decommission the SDI-12 sensor if it has been disconnected, or another took its place and you don't want the data to get mixed up.

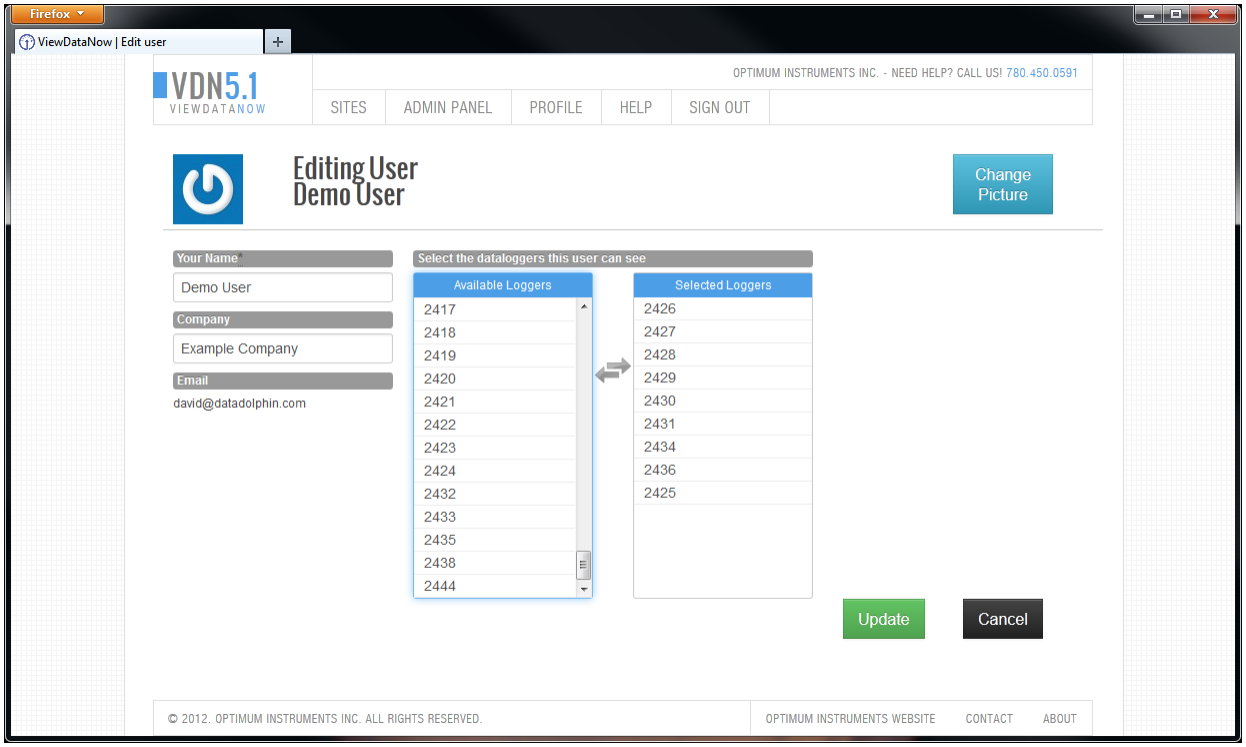
The Big Red Button



Manage users



You can add and edit users that are under your control. Simply click the edit button on a user to get to their profile page in order to give them access to some of your data loggers.

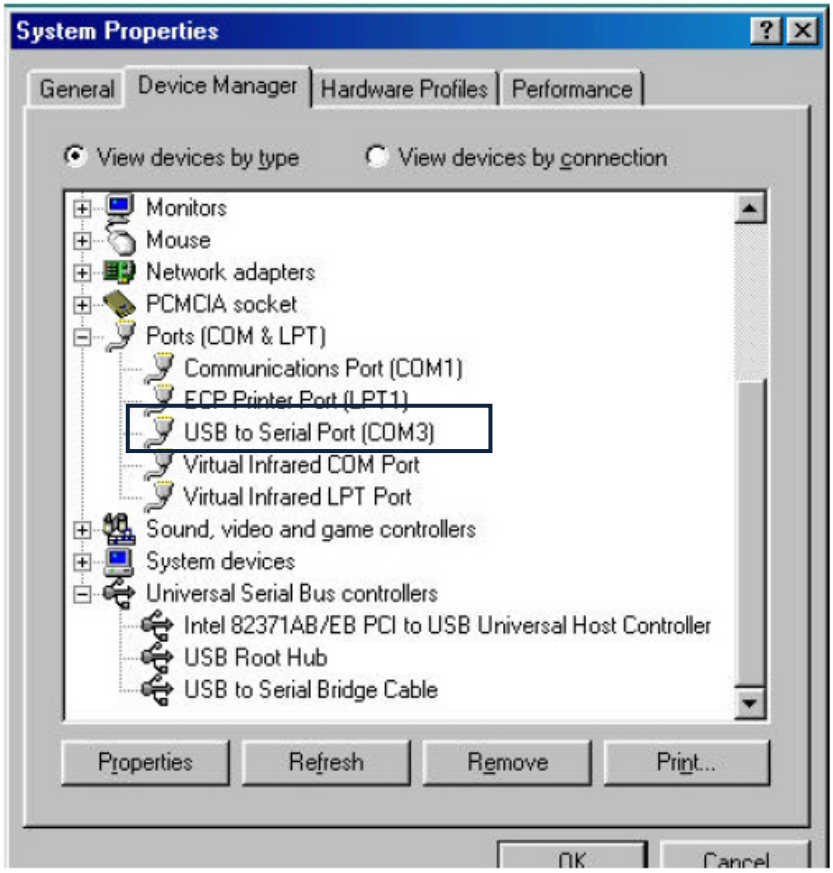


In the same way as selecting inputs for graphing and exporting you can click on data logger serial numbers to add them to the user you wish to share them with.

Updating the Firmware

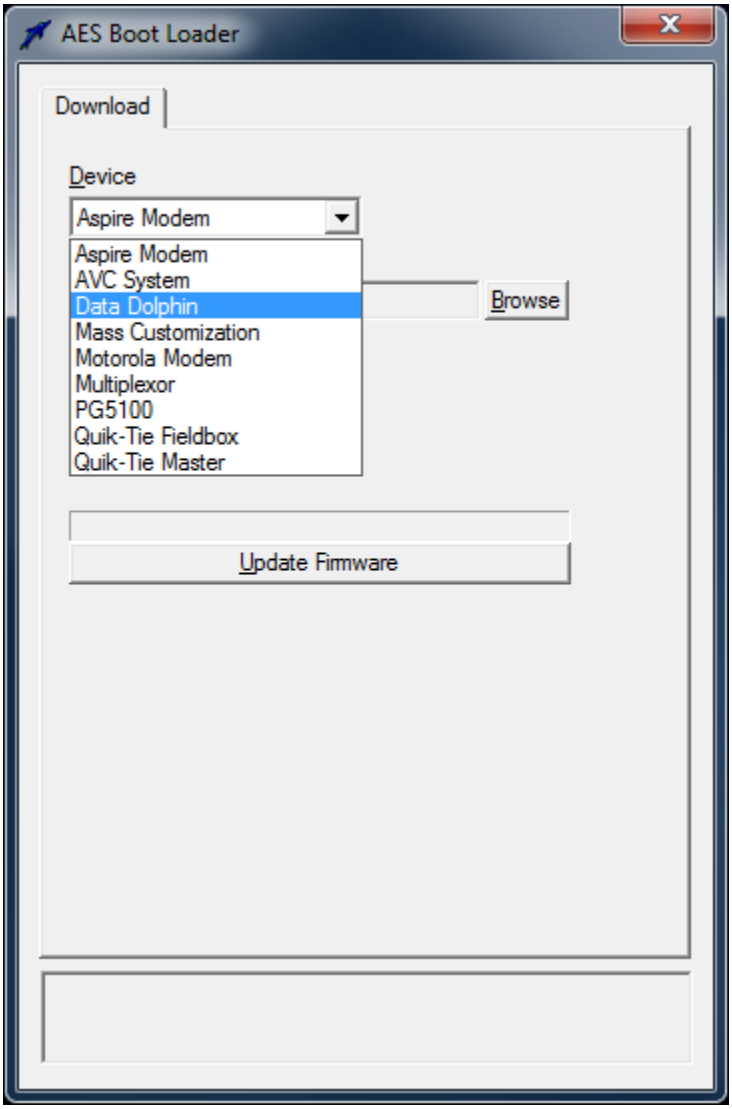
Optiloader

Note the COM port that you have connected to the Data Dolphin logger.



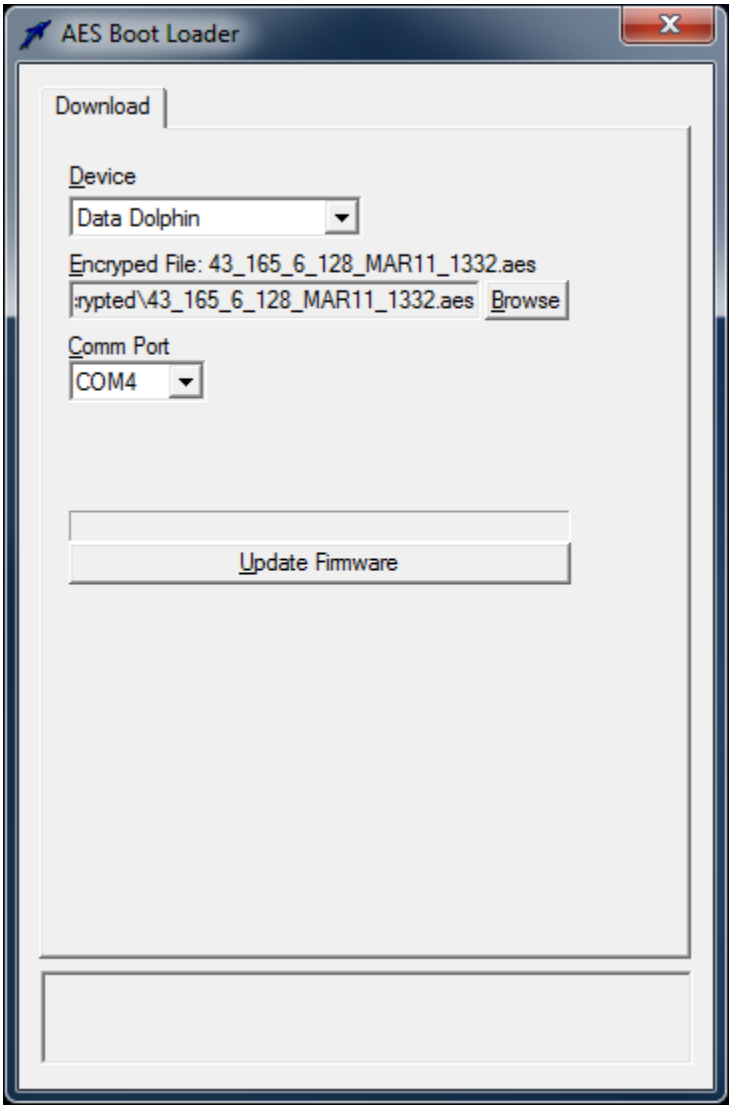
Now that the cable is connected to the unit we can start “OptiLoader.exe” program.

OptiLoader can be found on the website, www.datadolphin.com in the Support and Downloads section. The firmware upgrade file will be provided to you by Optimum Instruments. Start up OptiLoader now by double clicking on the exe from where you have downloaded it to.



Under Device select 'Data Dolphin' to be upgraded.

The bottom portion of the dialog contains a status box where status information is displayed. The box is read only and displays status information with the most current message at the top. Prior messages can be read by clicking in the box and navigating with the arrow keys.



Usage

1. Select the "Data Dolphin" setting for the **Device** to boot load.
2. Select the firmware file that is to be boot loaded into the device by clicking the **Browse** button and clicking **open** once you have located it on your computer.
3. Select the **Comm** Port (from Device Manager – Ports – Com) that is connected to the device. The application will detect all valid com ports on the computer.
4. When you are ready, cycle the power on the data logger and press **Update Firmware**.

5. The internal clock of the data logger will count down 8 seconds. It is during this time that the **Update Firmware** button must be pressed. If the 8 second boot load window passes, the Data Dolphin will start up for normal operation, and the logger will have to be reset to restart the boot load process again.

   Successful start of a boot load will be indicated by the progress indicator that appears above the **Update Firmware** button as well as in the status box at the bottom of the application. When the boot load completes (100%) the Data Dolphin will be restarted automatically.

6. Close the OptiLoader program by clicking the  button in the top-right corner.

Troubleshooting the DLS-400

Flow of Data

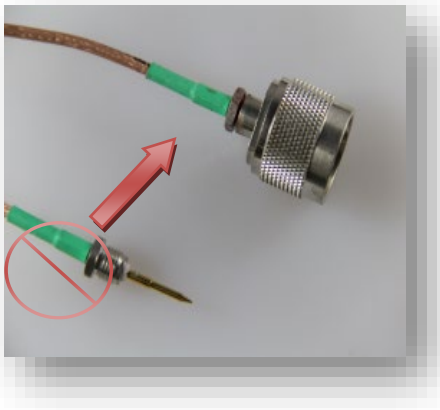
The flow of data through the system originates as a voltage at the level transmitter probe. This voltage is read by the logger, at programmable set intervals, this stored data is sent as a message via satellite. This message is received and transferred into a database where the values can be read on the ViewDataNow website.

Check List

- **ALWAYS make sure the Antenna is properly connected BEFORE power Is applied**
- Has the antenna been installed with a good clearance?
- Voltage is lower than expected across battery/solar panel/logger?
  See how to measure it below.
- LEDs on solar charger not as expected?
  Fault LED should be off and the charge LED will be on if there is sun shining on the solar panel
- LEDs on logger not as expected?
  The LED next to the green power connector should flash red for a short amount of time (10 to 60 seconds) after power up - then flash green and/or go out once it has contacted the server and had its clock set.
- LEDs on modem not as expected?
  See section above for all of the LED combinations and what they mean.

Check Antenna Connector

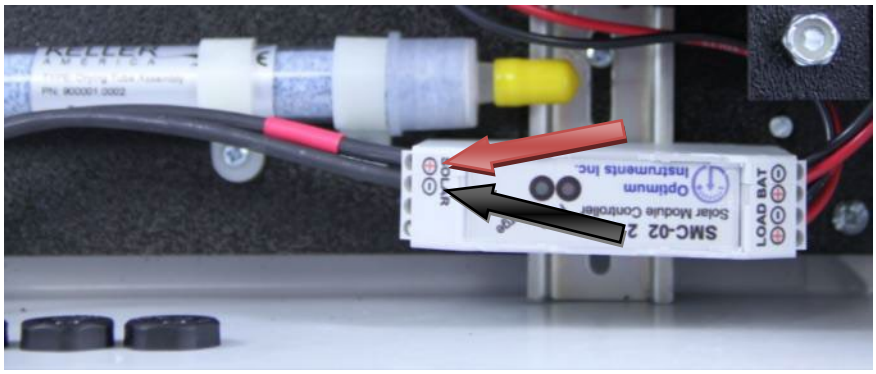
Is the connection between the Satellite Communicator and the lightning arrestor tightly screwed in? The back of the N connector may have become loose. Shown below is the back fully un screwed. This gold pin needs to be fully inserted into the back of the N connector and tightened fully.



Check DC Power

Has power making a good connection between the battery, solar panel controller, and logger? Measure the voltage across the logger power 6-25 VDC IN and Ground terminals. . You should see between 11.5 VDC to 13.5 VDC. To measure the power to the processor use a multi-meter set to volts DC and put the probes on the green power connector as shown. Check this location with the system running on solar only, as well as with the battery terminals connected to ensure the SMC-02 is working correctly.

Measure the voltage at the solar panel connection. You should see between 14 VDC to 21 VDC if the sun is shining.



Disconnect the solar panel and check that the system runs on just battery power as well in the case of a battery not holding any charge and in need of replacement.

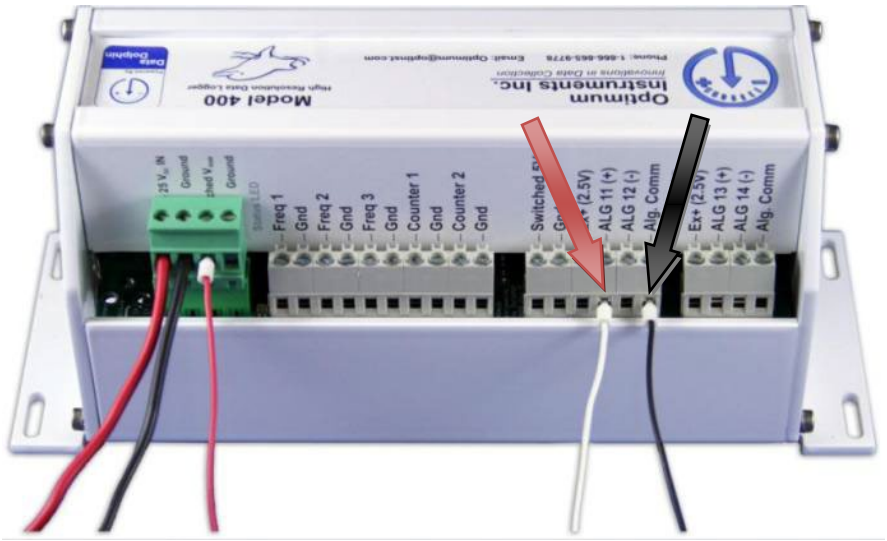
Check Level Transmitter

Has the Level Transmitter been connected correctly? The probe will have a label similar to the following:

The wire colors and connection is listed on this label. See the section "Level Transmitter –Analog output" wiring section in this manual.

The depth can be verified by measuring the voltage on the Level Transmitter as follows:

Cycle power to the data logger. Just when the red LED that is flashing beside the power connector stops flashing and turns green, read the DC voltage across the white and black wires



Given the voltage, the depth can be calculated using the formula:
Depth = voltage measured on the probe above * (range of Level Transmitter as it appears on the label attached) / 2.5. For example, with a voltage reading of 0.3 V and using a Level Transmitter labelled as having a 4 MH2O range we would expect a depth = 0.3 * 4 / 2.5 = 0.48 meters of water.

Calibration sheets can be retrieved from http://www.datadolphin.com/support

Compliance Statement

Operation is subject to the following two conditions: (1) This device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Specifications and operational details subject to change without notice.

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Mailing address:

Optimum Instruments Inc.
#201, 3132 Parsons Road
Edmonton, Alberta, Canada, T6N 1L6