

HydroLite-TM™

A quick start guide/user manual.

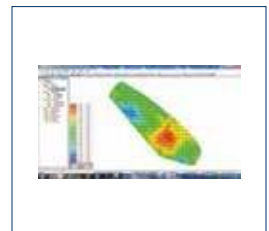


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HydroLite-TM™

1. Introduction

What do you do when your topo survey meets water? The HydroLite-TM™ is designed to be the “land surveyor’s” echosounder, and provide topographic elevations through bodies of water. It’s lightweight, very portable, battery powered, very easy to use, and sends depths via Bluetooth OR 9-pin Serial directly to your Land Survey software. The depths are added to your rod height and elevation to give you a RAW .CSV “topo” file of your survey area.

2. Equipment Supplied

- HydroLite pole kit
- SonarMite MILSpec Bluetooth echosounder
 - internal battery
 - Bluetooth™
 - IP65 weatherproofing
 - MILSpec connectors and caps
- 200 kHz echosounder transducer
 - digital smart transducer
 - 7-degree beam
 - bottom tracking technology
 - QA sonar strength signal
 - breakaway design
- 12-volt power supply/charge
 - rapid charge
 - discharge feature
 - charge disconnect when battery is fully charged
- Serial interface cable
 - used for data transfer
- Quick Start Manual, including
 - Sound Velocity Charts: Freshwater / Seawater
 - setup guides for GPS antenna by manufacturer
- Training USB Drive
 - user manual
 - other programs
- 1-year warranty parts & labor

3. Options

- GPS antenna
- datalogger
- software



4. Getting Started

4.1 Assemble the pole kit

Assemble the pole kit and attach to the boat. The pole should be as straight as possible. The transducer should be in water before turning it on.

4.2 Plug in the transducer

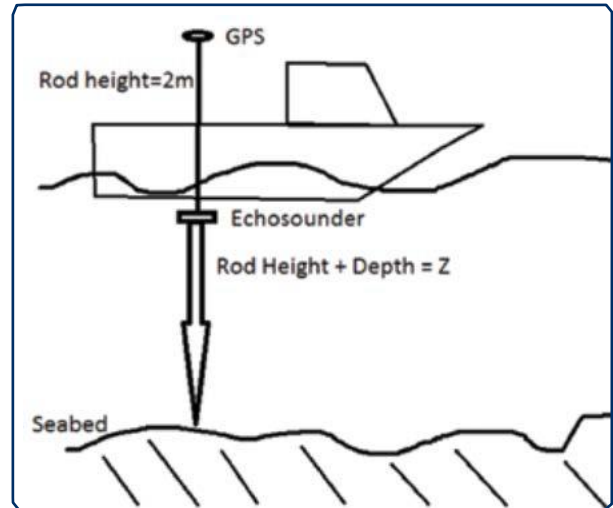
Plug the transducer into the echosounder. The left LED light will flash continuously indicating the echosounder is turned on. The transducer should be lower than the bottom of the boat. If not, the hull could reflect return soundings (multi-path).

4.3 Attach the GPS antenna

Attach the GPS antenna to the top of the pole and turn it on. Give it 2-10 minutes to track satellites. Ensure the GPS antenna has a clear view of the sky at all times.

4.4 Set the device

Depending on the GPS/data collector, follow the appropriate startup guide for that specific system. Follow the same set-up process you would if running a standard topographic survey; including survey style, job configuration, geodesy etc. You will be running a continuous survey; we recommend using the interval by time function rather than the interval by distance (every 1 second).



Typical setup for using the HydroLite-TM

5. Things to check before calling technical support

5.1 Position of HydroLite-TM Pole:

Is the pole as straight as possible? Is the transducer in water and lower than the bottom of the boat?

5.2 Is there a blinking red light on the faceplate?

5.3 Is the transducer making a ticking sound?

If not, unplug the transducer, then plug in again.

5.4 Bluetooth:

If using Bluetooth, is there a solid blue light on the faceplate? If not, check Bluetooth pairing and connection.

5.5 Serial Connection:

Baud rate = 4800

For models prior to 2012: Baud rate = 9600

5.6 Data format:

Ensure you are using the correct data output format—should be “Old SonarMite Format” for Trimble Access, Trimble Survey Controller, Carlson SurvCE and Topcon Magnet Field. Leica software uses “Simple ASCII”. See below for procedure to change output format.

6. Troubleshooting:

If all things above are working properly, you have 2 troubleshooting routes; WCOM32 (PC) and Sonarmite APP (Android).

Both will allow you to diagnose problems with: battery voltage, output format, sound velocity and Bluetooth. Example of output string below. More in depth description given on page 11.

```
1 0.00 0 0 0 10.3 00 0
```

First character is an identifier, if anything other than 1 you will see ? in software (if so, please call technical support)

Second character is depth 1 (you need to be in water to see depth)

Third, fourth and fifth characters are place holders

Sixth character is battery voltage (if under 10.3 you will see some sporadic data)

Seventh character is confidence interval (we generally ignore this)

Eighth and final character is another place holder

6.1 PC:

Download Troubleshooting Tools can be found in the wcom32.exe app:

www.seafloorsystems.com/support/software-support

Baud Rate: 4800; Data Bits: 8; stop bits: 1, No parity

6.2 Android:

Basic troubleshooting can be solved through the SonarMite App, found in the Google Play Store. ONLY Android devices, NO Apple.

Connect to generic Bluetooth settings on phone before opening APP. Once paired open APP, press blue drop down, select device, PRESS connect on screen

7. Transducer Removal from HydroLite-TM

To remove the transducer, unscrew the section containing the transducer from the remaining pole kit. At a 45-degree angle, place the transducer head on a protective pad, and press firmly until it releases.

To view on YouTube:

<https://www.youtube.com/watch?v=6MqtkR7Q0SE>



7.A: Place transducer on protective pad.



7.B: Press down firmly until it releases.

8. Contacting Technical Support

Phone: (530) 677-1019

Email: info@seafloorsystems.com

Hours: Monday - Friday, 8:30 a.m. - 5:00 p.m. Pacific Time

HydroLite-TM™ Schematic



GPS Antenna
(optional)



SonarMite-MILSpec singlebeam echosounder

2-Foot Pole Section

SonarMite Echosounder
in Velcro™ Pouch



Transducer

Transom Mount



2-Foot Pole Section

Pole Transducer
Mounting Bracket



Survey Point



HydroLite-TM in rugged carry case with Quick Start Manual

Step 7—SonarMite settings

7c. Connect to terminal program:

7c1. Sonarmite via Bluetooth:

7c2. WCOM32 Bluetooth or serial to laptop.
(Software is included on SonarMite CD ROM)

7d. View streaming data:

Control-F: cycles through the output formats below

Control-S: saves the output format

Control-R: resets the system to default output (the
unit MUST be in system format for
this to work.)

7d1. Format Old SonarMite (example below)

```
1 0.48 0 0 0 8.9 115 0
1 0.48 0 0 0 8.9 115 0
1 0.48 0 0 0 17.8 116 0
1 0.48 0 0 0 8.9 115 0
1 0.48 0 0 0 8.9 115 0
```

“Old SonarMite” format is the default format used by
Trimble (except Terrasync), Carlson, SM Mobile
and HYPACK.

0.48 represents the depth.

8.9 represents the volts output of the internal
battery.

115 represents the sounding return quality number
from 70 to 135.

7d2. Format ASCII mode (example below)

```
0.48
0.48
0.48
0.48
```

ASCII mode is mainly for Leica users;
0.48 represents the depth.

7d3. Format 2 DBT NMEA mode (example below)

```
$SMDBT,1.6,f,0.48M,,#5C
$SMDBT,1.6,f,0.48M,,#5C
$SMDBT,1.6,f,0.48M,,#5C
$SMDBT,1.6,f,0.48M,,#5C
$SMDBT,1.6,f,0.48M,,#5C
$SMDBT,1.6,f,0.48M,,#5C
```

This is a standard NMEA output which can be
used with various logging software, including
Trimble Terrasync

7d6. Format 6 Polled mode (example below)

This will be blank.

7d7. Format 7 mode for system settings (example below)

```
SYS> 54 0.48 109 109 0 116 1500 0.2 0
SYS> 54 0.48 109 109 0 116 1500 0.2 0
SYS> 54 0.48 109 109 0 116 1500 0.2 0
SYS> 54 0.48 109 109 0 116 1500 0.2 0
SYS> 54 0.48 109 109 0 116 1500 0.2 0
SYS> 54 0.48 109 109 0 116 1500 0.2 0
SYS> 54 0.48 109 109 0 116 1500 0.2 0
```

This is the system format.

Sound velocity output can be changed using
this method:

Control-U: increases from the default 1500

Control-D: decreases in increments of 10

When satisfied with sound velocity:

Control-S: save

Control-F: to reach desired output format.

Control-S: save again

F.A.Q.

Is dual frequency required?

Dual frequency echosounders were originally designed for use by sea going vessels to report reliable, low frequency depths in deep water situations, and more accurate, high frequency navigation within shallow areas. Low frequency is of limited use in shallow hydrographic surveys. Reasons are as follows:

- physical accuracy is outside IHO specifications
- power consumption prohibits true portable use
- minimum depth possible outside survey requirements

Can mud thickness be measured with dual frequency?

The residual difference between low and high frequency shown on an echogram gives the impression that mud thickness can be measured. In fact, the trace gives an impression of soft sediment. However, in most sounders, this is the difference in reflected energy as a result of simple penetration of higher power low frequency signals plotted against the low power high frequency returns.

To measure mud thickness and avoid litigation on wrong results, the surveyor should use equipment specifically designed for geophysical measurements such as a sub-bottom profiler, penetrometer, seismograph or a simple bottom sample.

Is a bar check required?

Many older technology echosounders needed to “warm up” before they became stable. In addition to their internal frequency/timing circuits, varying with ambient conditions, the physical parameters that effect speed of sound in water also varied with location. The accepted solution was a “barcheck”—where a large plate was lowered in a specified sequence where the depth measured by the echo sounder to the plate was compared with an absolute stave or tape measurement. This method ensured that all variable parameters were included in the calibration, as a gross check the barcheck was normally also performed at the start and end of a survey.

There are several problems with this method:

- The location of the barcheck is only relevant to the water column at that particular barcheck location and time.
- Older analogue echosounders gave the user facilities to “fiddle” with many parameters during the survey, modern digital sounders do not expose settings such as gain and threshold.
- Older instruments do not record changes to instrument settings during the survey.
- Narrow beam sounders with bottom detection algorithms can misdetect the moving plate.
- Modern digital electronic timing components are very accurate and stable.

There is still a requirement for calibration of sound velocity, but if required, this should be measured using a calibrated sound velocity probe lowered through the water column to build a velocity profile.

A simple equivalent of the barcheck is to accurately visit with several locations within the survey area which have a known elevation, normally derived from GPS and a weighted tape. These points should be used as a reference throughout the duration of the survey.

Should pitch/roll angle be applied to the depth?

Many surveyors assume that sonar is like a laser being shone through the water and that the distance measured should be assumed is a hypotenuse measurement to be trigonometrically corrected by any pitch/roll angle that has been measured.

The best physical analogy of the echo sounder beam would be a torch light beam that is shone over an area, within that area there is a small piece of mirror that reflects the light at that point, sonar is very similar except that the reflected point is normally the closest point within the beam.

What is a narrow beam transducer?

The properties of a transducer are normally a function of its physical size/shape and its resonant frequency. The beam pattern of a given transducer is normally presented as a radial distribution pattern versus output power applied. This generally means that the spread (beamwidth) of the transmitted ultrasound increases with amplitude. Most modern echosounders use a digital signal processing (DSP) technique to reduce the power/gain of its transmitted signal and thus maintain the minimum beam width for a given transducer.

The advantage of a narrow beamwidth survey transducer is the ability to “see” into narrow valley shapes thus gain a clearer representative definition of the bottom surface being surveyed. This is contrary to the navigation use of an echosounder, which has a reasonably wide beamwidth, where the returned signal within the beam is the “shoalest” or shallowest point within the beam, obviously of more interest for hull clearance requirements.

Is my fishfinder okay for survey use?

Fishfinders are not designed for a survey application. Modern fishfinder type navigation echo sounders use quite sophisticated DSP techniques to show the bottom surface, bottom type, and fish in the water column. In particular, the depth values are either heavily averaged to show a smooth transition in numeric depth values or are optimized to show the shallowest depth seen in the particular beam area. Similarly, survey echosounders make efforts to remove anomalies such as fish swim bladder reflections from the measured data.

Do I require more pings per second?

Assuming the pings all return good values, the advantage of more pings per second is that the survey boat can travel faster and therefore cover much larger areas in a shorter time. The assumption that more pings provide higher quality dense survey data is not so. Density is a function of boat speed and is constrained by the limitations of transducer beamwidth as discussed above. More pings can also create more noise with the high degree of insonation in the water, particularly in shallow water situations with multipath reflections.

What is latency?

Latency is the time difference between a position and depth being recorded. The topic is extremely complex and can include some of the following sources of error. Generally latency will not be changed.

- GPS position correction source time differences
- Time of flight of ultrasound in water
- Serial transmission of data to, from and through computer systems
- Physical mounting of antennas and transducers In general the survey software attempts to minimize the error by recording a precise timestamp on each piece of data recorded, the sum of all latency sources can then be calculated by post-process adjustment of the data using a “patch test” algorithm. The degree of latency is dynamic so is always a function directly related to speed of the boat when data acquired, faster the boat then more potential latency.

What affects sound velocity?

The speed in which sound travels through water is directly proportional to the density of the water. The parameters which change the density are:

- turbidity—the amount of sediment in suspension within the water
- salinity—the amount of substance (normally salt) dissolved in the water
- temperature—the temperature of the water sample
- temperature—sum of water depth and barometric pressure

All of these parameters can vary considerably in any particular water column, but the assumption made with a singlebeam echosounder is:

- the sound travels near vertically and does not suffer any refraction
- the sound travels there and back and so the average of all condition changes

Contacting Technical Support

Phone: (530) 677-1019

Email: info@seafloorsystems.com

Hours: Monday - Friday, 8:30 a.m. - 5:00 p.m. Pacific Time

Speed of Sound — Freshwater

Speed of Sound in Freshwater							
Celcius/Meter				Fahrenheit/Meter			
Temp	Speed	Temp	Speed	Temp	Speed	Temp	Speed
4	1421.62	17.5	1474.38	39.2	1421.62	63.5	1474.38
4.5	1423.9	18	1476.01	40.1	1423.9	64.4	1476.01
5	1426.15	18.5	1477.62	41	1426.15	65.3	1477.62
5.5	1428.38	19	1479.21	41.9	1428.38	66.2	1479.21
6	1430.58	19.5	1480.77	42.8	1430.58	67.1	1480.77
6.5	1432.75	20	1482.32	43.7	1432.75	68	1482.32
7	1434.9	20.5	1483.84	44.6	1434.9	68.9	1483.84
7.5	1437.02	21	1485.35	45.5	1437.02	69.8	1485.35
8	1439.12	21.5	1486.83	46.4	1439.12	70.7	1486.83
8.5	1441.19	22	1488.29	47.3	1441.19	71.6	1488.29
9	1443.23	22.5	1489.74	48.2	1443.23	72.5	1489.74
9.5	1445.25	23	1491.16	49.1	1445.25	73.4	1491.16
10	1447.25	23.5	1492.56	50	1447.25	74.3	1492.56
10.5	1449.22	24	1493.95	50.9	1449.22	75.2	1493.95
11	1451.17	24.5	1495.32	51.8	1451.17	76.1	1495.32
11.5	1453.09	25	1496.66	52.7	1453.09	77	1496.66
12	1454.99	25.5	1497.99	53.6	1454.99	77.9	1497.99
12.5	1456.87	26	1499.3	54.5	1456.87	78.8	1499.3
13	1458.72	26.5	1500.59	55.4	1458.72	79.7	1500.59
13.5	1460.55	27	1501.86	56.3	1460.55	80.6	1501.86
14	1462.36	27.5	1503.11	57.2	1462.36	81.5	1503.11
14.5	1464.14	28	1504.35	58.1	1464.14	82.4	1504.35
15	1465.91	28.5	1505.56	59	1465.91	83.3	1505.56
15.5	1467.65	29	1506.76	59.9	1467.65	84.2	1506.76
16	1469.36	29.5	1507.94	60.8	1469.36	85.1	1507.94
16.5	1471.06	30	1509.1	61.7	1471.06	86	1509.1
17	1472.73			62.6	1472.73		

Source: UNESCO equation provided by National Physical Laboratory.

Speed of Sound — Seawater

Speed of Sound in Seawater @ 35 PPT / per Mille							
Celcius/Meter				Fahrenheit/Meter			
Temp	Speed	Temp	Speed	Temp	Speed	Temp	Speed
4	1466.86	17.5	1515.03	39.2	1466.86	63.5	1515.03
4.5	1468.95	18	1516.49	40.1	1468.95	64.4	1516.49
5	1471.02	18.5	1517.93	41	1471.02	65.3	1517.93
5.5	1473.07	19	1519.35	41.9	1473.07	66.2	1519.35
6	1475.09	19.5	1520.75	42.8	1475.09	67.1	1520.75
6.5	1477.08	20	1522.13	43.7	1477.08	68	1522.13
7	1479.05	20.5	1523.48	44.6	1479.05	68.9	1523.48
7.5	1481	21	1524.82	45.5	1481	69.8	1524.82
8	1482.93	21.5	1526.14	46.4	1482.93	70.7	1526.14
8.5	1484.83	22	1527.43	47.3	1484.83	71.6	1527.43
9	1486.71	22.5	1528.71	48.2	1486.71	72.5	1528.71
9.5	1488.56	23	1529.97	49.1	1488.56	73.4	1529.97
10	1490.39	23.5	1531.21	50	1490.39	74.3	1531.21
10.5	1492.2	24	1532.43	50.9	1492.2	75.2	1532.43
11	1493.98	24.5	1533.64	51.8	1493.98	76.1	1533.64
11.5	1495.74	25	1534.82	52.7	1495.74	77	1534.82
12	1497.47	25.5	1535.99	53.6	1497.47	77.9	1535.99
12.5	1499.18	26	1537.15	54.5	1499.18	78.8	1537.15
13	1500.87	26.5	1538.28	55.4	1500.87	79.7	1538.28
13.5	1502.53	27	1539.4	56.3	1502.53	80.6	1539.4
14	1504.18	27.5	1540.51	57.2	1504.18	81.5	1540.51
14.5	1505.79	28	1541.6	58.1	1505.79	82.4	1541.6
15	1507.39	28.5	1542.68	59	1507.39	83.3	1542.68
15.5	1508.96	29	1543.74	59.9	1508.96	84.2	1543.74
16	1510.51	29.5	1544.79	60.8	1510.51	85.1	1544.79
16.5	1512.04	30	1545.83	61.7	1512.04	86	1545.83
17	1513.55			62.6	1513.55		

Source: UNESCO equation provided by National Physical Laboratory.

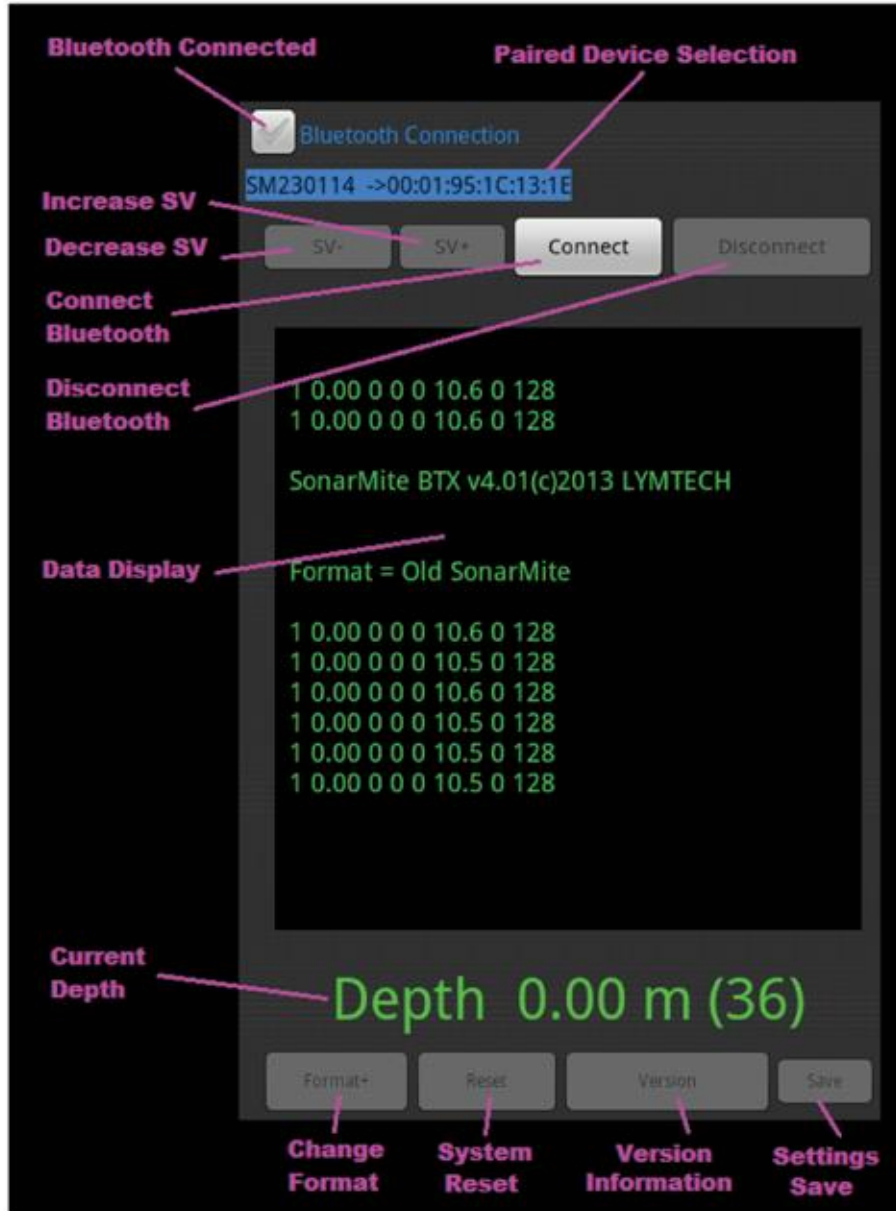
SonarMite Android Bluetooth App Ver 2.1

SonarMite App is an Android App designed to work with the popular **SonarMite** Bluetooth Echo Sounder using in hydrographic surveying applications. With the demise of Hyperterminal as a standard terminal application, the user is left with little choice for a simple communications program with serial data devices. Connecting via Bluetooth is cleaner than USB cable, there are no wires and the connection is independent of baud rate and other serial port settings. Most terminal programs are not easily configured with commands to directly interface with instruments such as **SonarMite**.

The App is dedicated to connecting to the **SonarMite** and providing most simple commands via pre-programmed buttons. Dedicated buttons give a more intuitive interface than using the dropdown keyboard or voice interface. Buttons include “**Format**” to change the data output format, “**Version**” will show the current firmware version and “**Reset**” will cancel any changes and set the instrument back to its default settings. It is advised not to use SonarMite+.

App Layout

The SonarMite App is a single layer program with all access from the main screen, to maximize the display area the screen only supports portrait mode and suppresses screen rotation.



Configuration

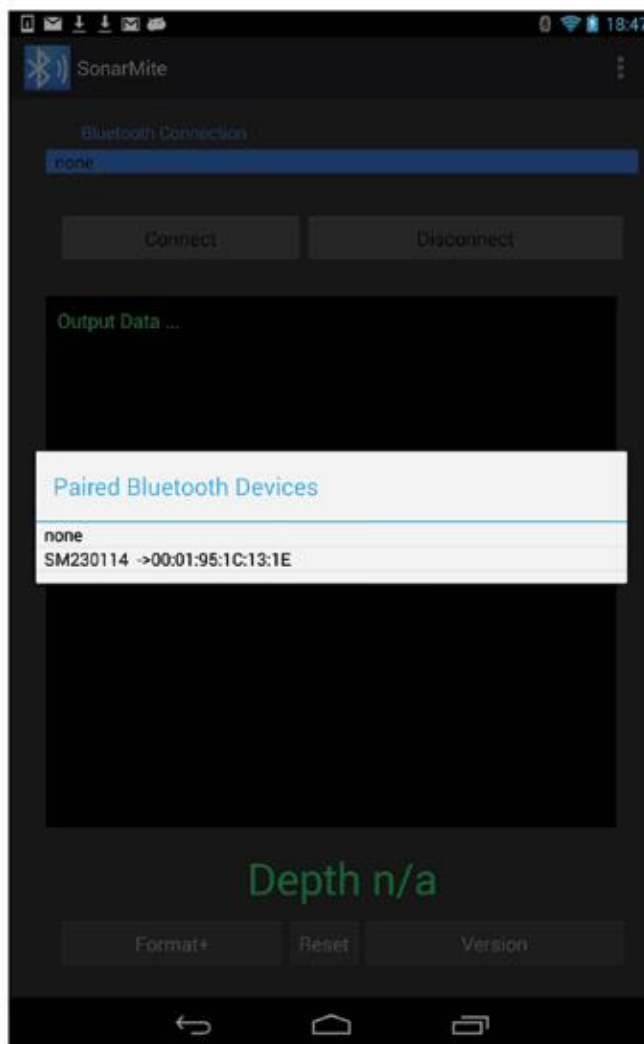
Before running the App - The SonarMite App does not override the system settings so before

the user launches the App they should configure the following system settings ...

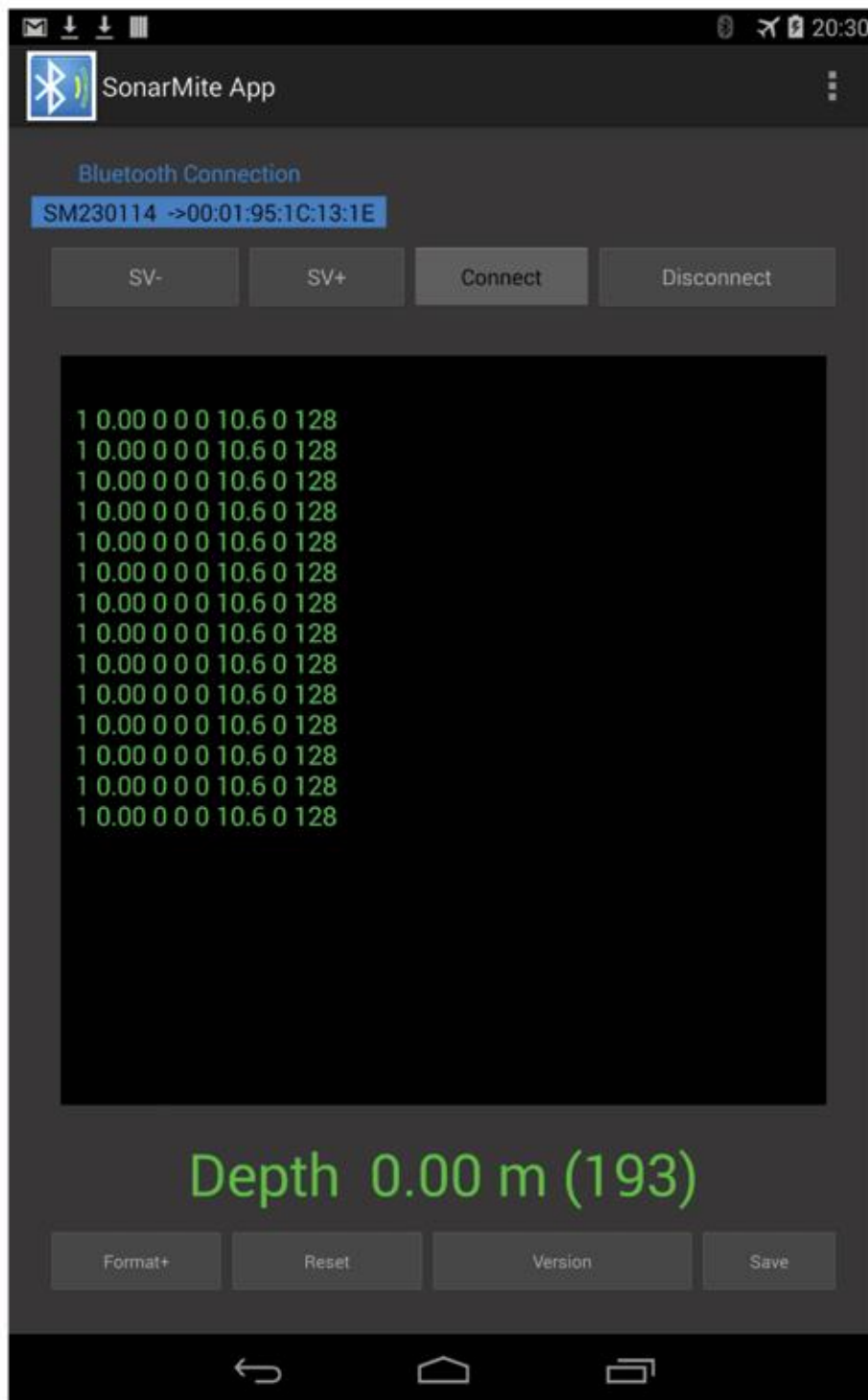
1 Enable Bluetooth, if the Android does not have or support Bluetooth an error message will be displayed and the application will halt. The App has been tested with all versions of the operating system that support Bluetooth.

2 Pair with the Device - Switch on the SonarMite, then using the system Bluetooth settings search for the device and when found 'Pair' with it. Once paired the system will retain the settings for this device so it need not be located for future connections.

3 Clicking the Paired devices Spinner (currently showing 'none') and select the device ...



4 Press the Connect button, the transmit LED on the SonarMite should illuminate and data should start to appear scrolling in the data window...



5 Pressing disconnect or making the App lose top window will force any open Bluetooth connection to close. This is to prevent the connection consuming power when it is out of focus. **The depth display is only shown when the unit is in SonarMite output format.**

Version Changes 18th March 2014

2.1 - SAVE Button added - This will save any format or SV changes on the SonarMite so they will appear on the device at start up or reboot.

2.1 - SV+ and SV- Buttons added - These will increase/decrease the Sound Velocity by 10 m/s when the format is in the SYS> output format.



Trimble Survey Controller/Access

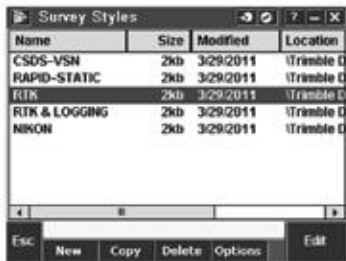
To Configure Survey Style

Upload custom style sheet (delimited w/depth applied).

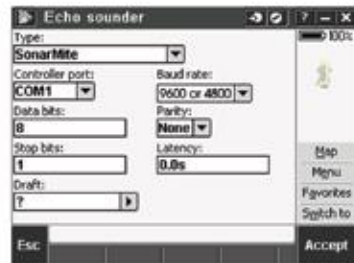
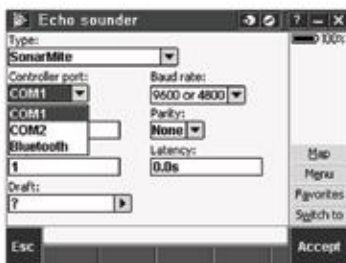
From the Trimble Access menu, tap settings / survey styles / <Style name>



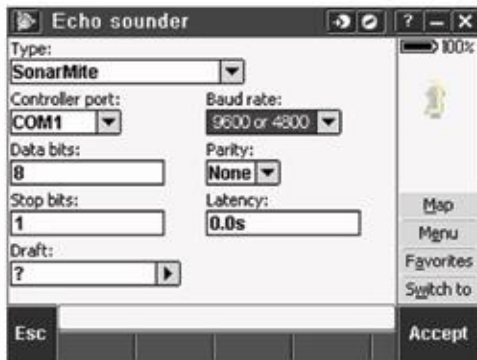
Tap Echosounder. Select an instrument from the type field.



Configure the Controller port: If you set the Controller port to Bluetooth, you must configure the Echosounder bluetooth settings. If you set the Controller port to COM 1 or COM 2, you must configure the port settings.

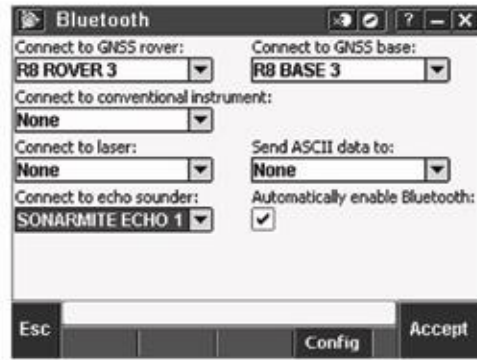


Latency and draft are normally left at 0. The latency caters for echo sounders where the depth is received by the controller after the position. General survey software uses the latency to match and store the depth when it is received with continuous topo points that were saved previously. Tap accept and then tap Store to save changes.

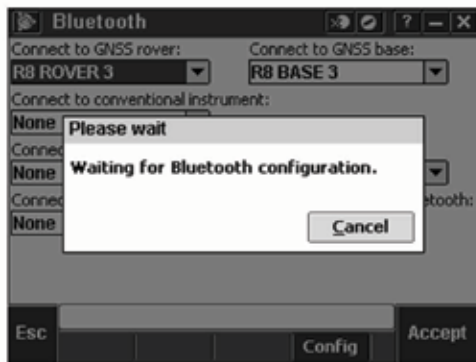


Bluetooth Partnership

Tap Settings from the main Trimble Access menu. Tap connect to continue. Select Bluetooth. Survey styles - log by time, GPS output every .5 seconds



Tap Config and make sure that Bluetooth is switched on. On a TSC2 controller, make sure that the [turn on Bluetooth] and [Make this device discoverable to other devices] check boxes are selected. On a Trimble CU (model 3) controller, select the power tab and then make sure that the [enable bluetooth] and [Discoverable] check boxes are selected. On a Trimble CU controller, make sure that the [Enable Bluetooth] checkbox is selected.



Start a scan on the controller. On a Trimble Tablet, Tap [Add a device]. On a TSC2 controller, tap the [devices] tab and tap. [New Partnership...]. On a Trimble CU (Model 3) controller, tap the [scan device] tab and then tap [scan]. On a Trimble CU controller, tap [Scan Device]. (Do not use [stop] - wait for the scan to complete.) Tip - Be sure that the transducer is plugged into the TXR before selecting the bluetooth partnership.



Start a scan on the controller. On a Trimble Tablet, Tap [Add a device]. On a TSC2 controller, tap the [devices] tab and tap. [New Partnership...]. On a Trimble CU (Model 3) controller, tap the [scan device] tab and then tap [scan]. On a Trimble CU controller, tap [Scan Device]. (Do not use [stop] - wait for the scan to complete).



The controller searches for other Bluetooth devices within range. Once the scan is complete, highlight the Bluetooth device to connect to: On a Trimble Tablet tap [Next].



The Ohmex SonarMite typically uses a PIN/Passkey set to: 1111 or 0000 if the unit is a version two or older. Version 3 or the latest MILSpec SonarMite the PIN/Passkey is: 1234

Leave the serial port box empty. Tap finish and the bluetooth will be configured.

Data Collection Tip:

When starting Data Collection, it should be configured as follows:

- Continuous Topo
- by Time

Trimble Terrasync Setup

*If using a Trimble GeoExplorer® (or having trouble with any other controller), please proceed to Step 5.

1.0 How to connect to SonarMite through Bluetooth:

- 1.1 Start -> Settings -> Connections -> Bluetooth
- 1.2 Ensure Bluetooth is turned on.
- 1.3 Search for Devices -> Select SonarMite Serial Number
- 1.4 Pass Key is either 1111 or 1234
- 1.5 Leave “Serial Port” box unchecked.
- 1.6 Tap “COM Ports” tab and assign the SonarMite an Outgoing Port (Port 8 or 9) — refer to **Illustration 1**.

2.0 Configure TerraSync to use SonarMite as an External Device:

- 2.1 Tap upper dropdown (section) and select “Setup” — refer to **Illustration 2**.
- 2.2 Tap “External Sensors” — refer to **Illustration 3**.
- 2.3 Check Sensor 1 (or SonarMite) and tap “Properties”.
- 2.4 Set “Port” to the COM you assigned the SonarMite to.
- 2.5 Baud: 9600, Data Bits: 8, Stop Bits: 1, Parity: None.
- 2.6 Set Prefix to: \$SMDBT.
- 2.7 Set Suffix to: ,f (this will bring depths in as feet).
- 2.8 Set Receive mode to Unsolicited.
- 2.9 All logging intervals to either 1s or 5s.
- 2.10 Set data destination to Uninterpreted.

3.0 Configure the rest of TerraSync as you normally would.

4.0 Start Logging Data to a File:

- 4.1 Check that the SonarMite is outputting data.
 - 4.1.1 Verify that your data point are continuously logging — refer to **Illustration 4**.
 - 4.1.2 Tap upper dropdown and select “Status”.
 - 4.1.3 Tap lower dropdown and select “Sensor”.
 - 4.1.4 Verify that the sensor is active and sending numerical data

5. If Using Trimble GeoExplorer or Other Controller

- 5.1 Press New Outgoing Port and add the SonarMite device as Port 5.
- 5.2 Continue with the rest of directions and choose Port 5 rather than port 8 or 9— refer to **Illustration 1**.

6. Contacting Technical Support:

Phone: (530) 677-1019

Email: info@seafloorsystems.com

Hours: Monday - Friday, 8:30 a.m. - 5:00 p.m. Pacific Time

Illustration 1

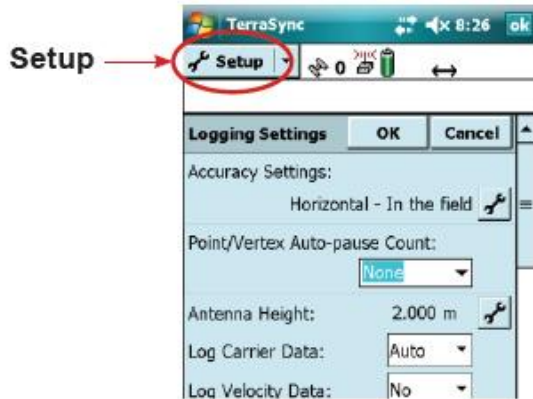


Illustration 2

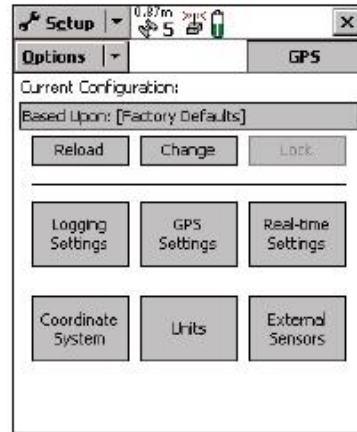


Illustration 3

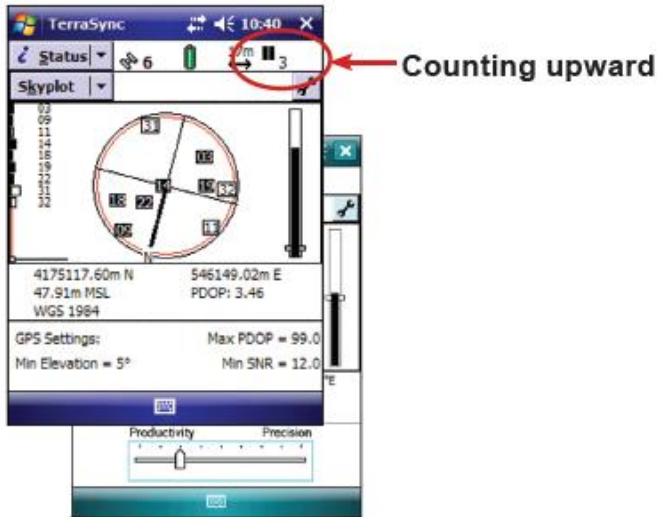


Illustration 4



SCS900 with SonarMite Echosounder

Summary

Brief instructions on how to use SCS900 and a SonarMite echosounder for a small hydrographic survey.



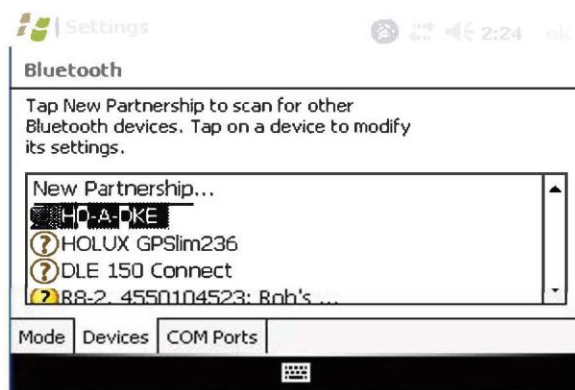
In Trimble's SCS900 software it is possible to combine the depths of an SonarMite echosounder and the positions or optical instruments.

In order to do so, a DLL and program should be stored in the following order \Program Files\Trimble SCS900 there are different programs available, one for each type of data logger. In this document the TSC2 was used (Windows Mobile 5).

It is possible to create a shortcut of the executable in the folder \Windows\Start Menu enabling the software to be started from the start menu. First of all, the echosounder should be connected to the data logger, this can be done using a serial connection, i.e. via Bluetooth (it is also possible to use a serial cable if the GPS receiver supports Bluetooth).

Pairing Bluetooth Devices

Assuming the SonarMite is not paired yet, go to Start>Settings>Connections and select Bluetooth. Make sure the checkboxes are both ticked (turn on Bluetooth and make this device discoverable to other devices) now select the page devices. At this stage, turn on the already armed SonarMite by connecting the transducer (the green light flashes briefly) now select new partnership and the scanning procedure will start. After all discoverable devices are found, select the SonarMite (usually named SM*****, ***** stands for the the serial number) and select next.



Enter the passkey (usually this is 1111) and enter the partnership settings, by checking the serial port service. After this, the SonarMite is visible under the tab Devices.



After this, the serial port has to be assigned by selecting the tab COM ports and select New Outgoing Port. Again select the SonarMite and select Next. Now deselect (uncheck) secure connection and select Finish. Remember the comport number assigned to this service (in this case COM 8)

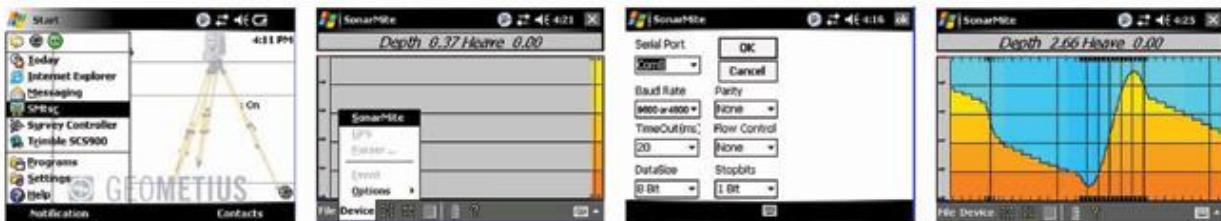


Starting a Hydrographic survey

In order to combine the depths from the SonarMite and the positions in SCS900 it is essential the SonarMite software is started and remains running during the survey.

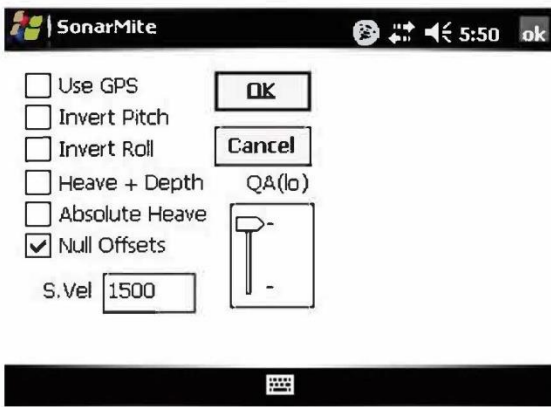
Starting the SonarMite Software

If a shortcut is created, select Start>Smtsc. If the shortcut is not created, find the executable located under \Program Files\Trimble SCS900. If the software is not registered, please register on Ohmex's website <http://ohmex.com/register.htm>



Now select Device>SonarMite and select the previously assigned COM port (in this case COM 8) Leave the other settings as per default (9600 or 4800,8,n,1 no flow control) Select OK and the echo sounder should now return depths. It is possible to fine-tune the Quality threshold, it is advised to leave it low in order to pass all data. Leave the SonarMite software running and continue with the next part. If you encounter problems (unable to connect etc) reset the TSC2 (switch Bluetooth back on) and retry. If this fails, start from the beginning (pairing devices)

In the latest version of the SonarMite SW or SCS900, it is now possible to set the sound velocity. To do this, double tap the center of the SonarMite screen and the following display appears.



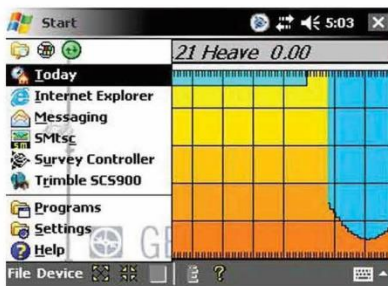
The functions that display, select Device>SonarMite and select the previously assigned COM port (in this case COM 8) Leave the other settings as per default (9600,8,n,1 no flow control) Select OK and the echo sounder should now return depths. It is possible to fine-tune the Quality threshold, it is advised to leave it low in order to pass all data. Leave the SonarMite software running and continue with the next part. If you encounter problems (unable to connect etc) reset the TSC2 and SonarMite.

The concept of Sites, Designs and Work orders are assumed as common knowledge. If not, please refer to the SCS900 manual. If a folder structure is prepared by the Survey office, simply start SCS. If not, it is assumed the following files are selectable on the data logger:

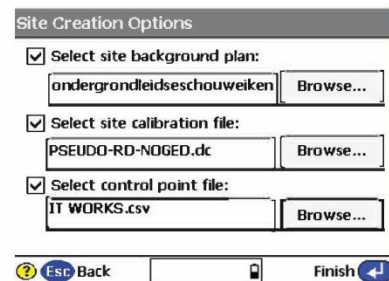
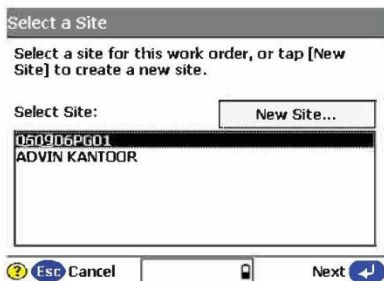
- Design (DXF or TTM)
- Site Calibration (or DC file)
- Control points or Bench Marks (TXT)
- Background map

In this example we take this step, which is not required if a folder structure is prepared by the Survey office.

Before starting the Hydrographic survey, be sure to check the system setup by measuring a bench mark. Start SCS900 and create a new Work Order Select the site or create a new one (A site contains the items mentioned above) in this case a new site is created.



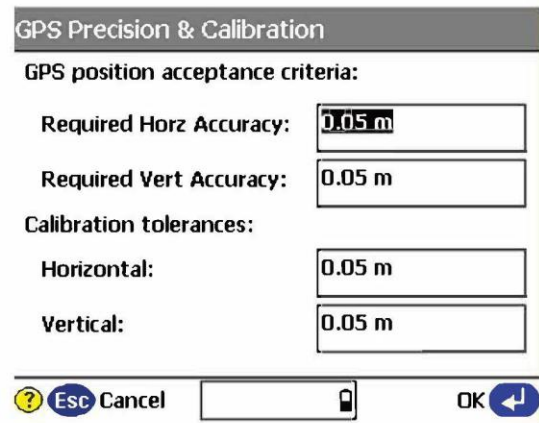
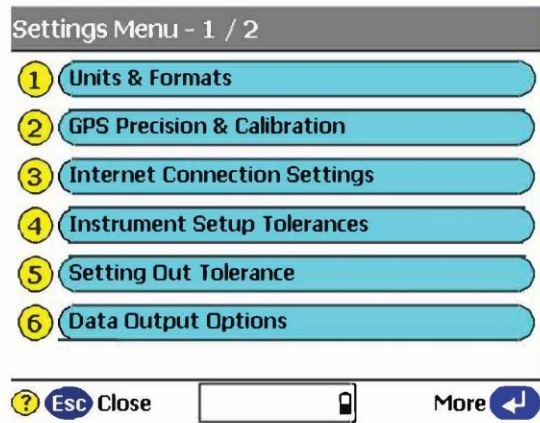
In the new site, the various files are selected, a minimum is the site calibration file (DC file) in order to get the proper coordinate system, or a csv file containing control points (Since it is recommended to check the system setup, a .csv file is important). Currently this site calibration can contain a Geoid model, but **CAN NOT** contain a shiftgrid!..



If no calibration file (DC) is at hand, it is possible to calibrate the site using the known points in the .csv file. Simply select calibrate site in the Systems Setup menu.

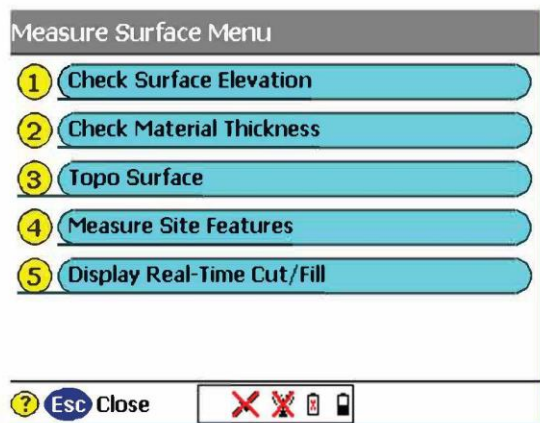
System Settings

It is possible to set the required accuracies under Settings , this can vary from one jobsite to another. There is a difference in acceptance criteria (will it store a position and depth or not) and the Calibration tolerance (will it accept a System Setup check)

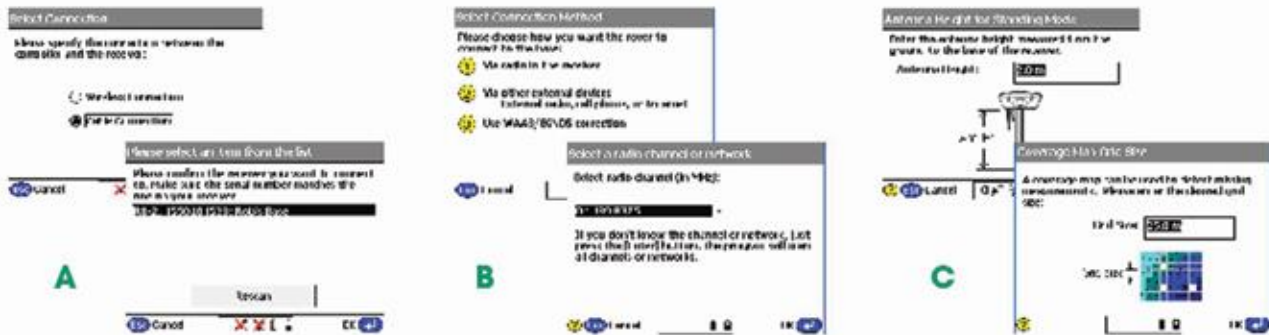


System Setup

Now it's time to start the rover, Select System Setup and Setup Rover, or go directly to Measure Surface. Topo Surface and SCS900 will prompt you to set up a GPS rover. In this process, follow the instructions on screen.



The instructions will take you step by step through the system setup. It will ask you if the receiver is connected by cable or Bluetooth (a), if it uses an internal, external radio or other correction method (b), and the coverage map grid size and antenna height (c)



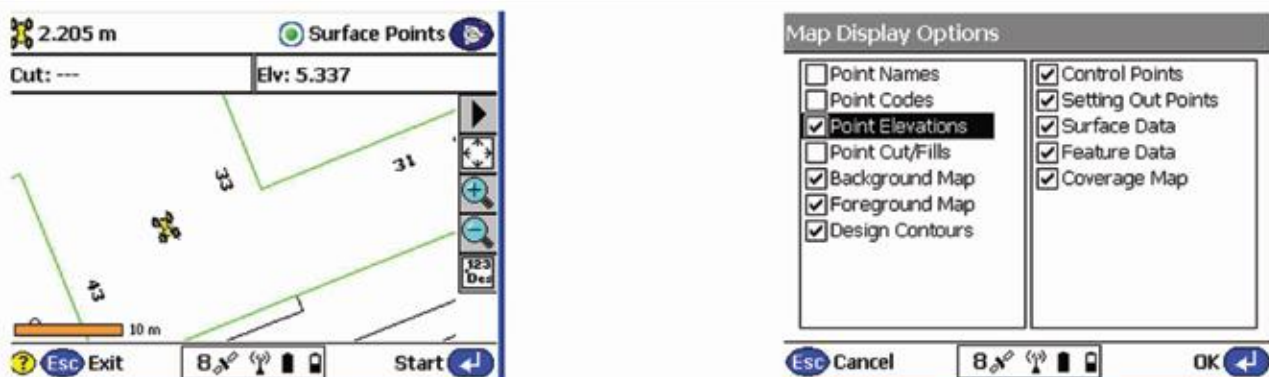
Once started, SCS900 will ask you if you want to check the system setup, it is advised to do so. After the System Setup is completed and checked, the topo survey can start. Bear in mind there are survey methods, shown in the top left corner. These are Standing (red figure) Walking (yellow figure) and on vehicle mode (yellow quad). Those methods automatically set the position update rate and the different antenna heights. Changing this mode can be done by clicking it. For a hydrographic survey, select the vehicle mode (click here) and enter the height from the bottom of the transducer to the bottom of the antenna.



Finally select the measurement density required for the job, this will make the system log at a minimum interval or elevation change.

Are you recording the bottom?

In order to check if the system is indeed setup to record the bottom, look at the difference of the elevation shown on top of the screen and the recorded point elevation. To annotate points with their elevation, select the take the following steps. Select the button 123 Des (buttons may be changed by selecting the black triangle) Check display Point Elevations and select OK.



Remember that if loads of points are stored, this option can slow down the CE device and make the map hard to read.

Now Start a measurement, SCS900 will prompt you for a point name (this will increment automatically) and a code (tip-this code can be used to identify a cross section number or profile number) After selecting OK again, a point is measured and stored, annotated with the actual height. In this example, the elevation of the bottom of transducer was 5.330, the measured depth was 0.377 (bucket) and the bottom is in that case 4.953.

Point Code

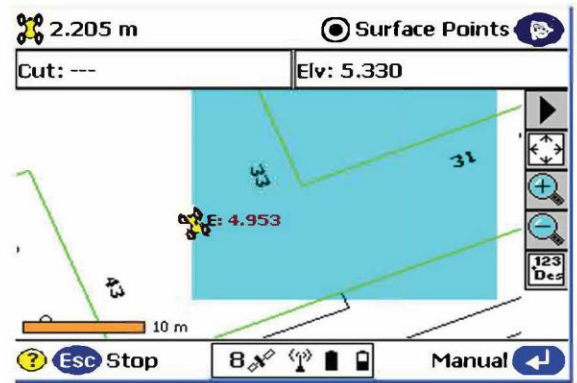
You can enter an optional code and name for the points:

Code:

Point Name:

Always prompt for each point

? Esc Cancel OK



Complete Work Order

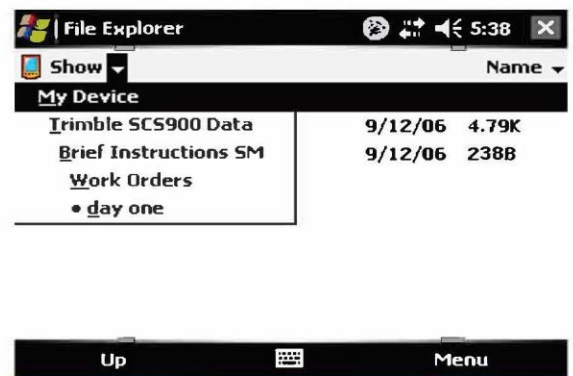
Once finished with the survey, the export files are written in the export folder those files consist of a record.TXT and report.txt optional a DXF can be written but remember this can consume a lot of memory.

Work Orders Menu

Site: Brief Instructions SM
 Current W.O.: day one
 Design: N/A

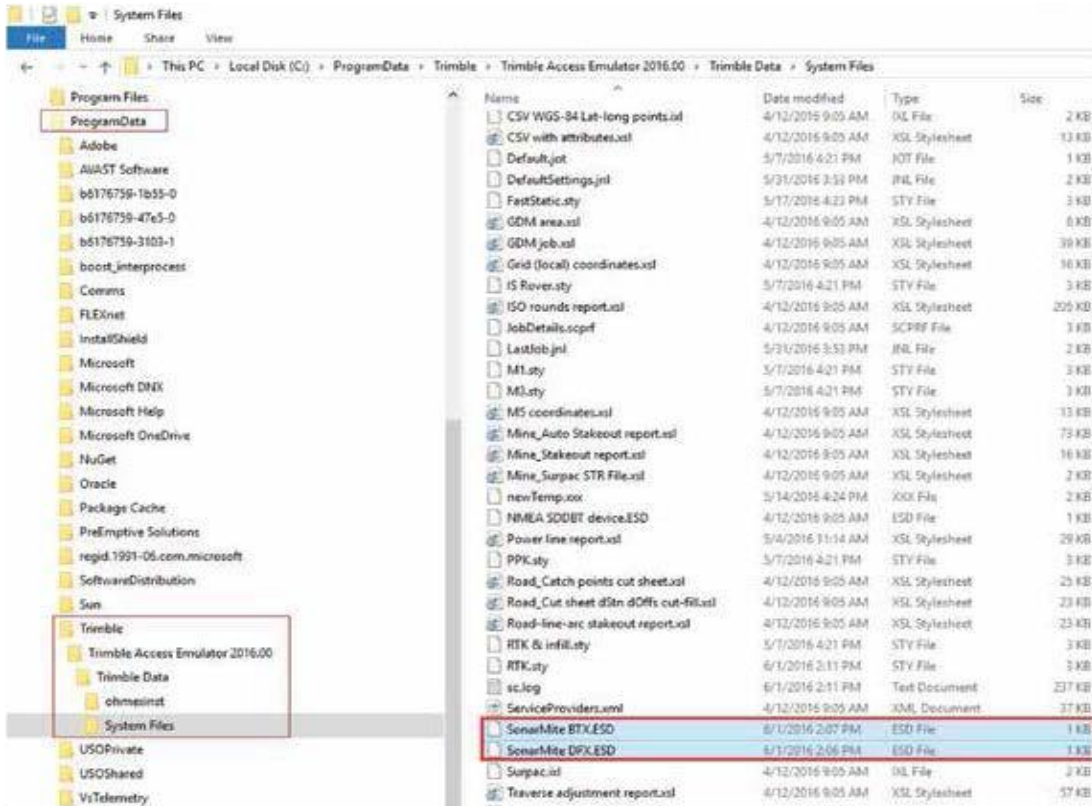
- 1 New
- 2 Open
- 3 Change Design
- 4 Complete Work Order
- 5 Export Data

? Esc Close



Trimble Access Drivers for SonarMite™ DFX

1) Copy the two SonarMite ESD files to Trimble Access 'System' directory



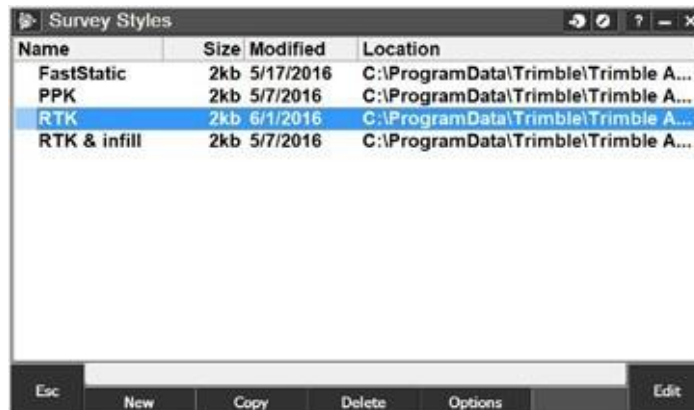
2) In Trimble Access menu screen select SETTINGS



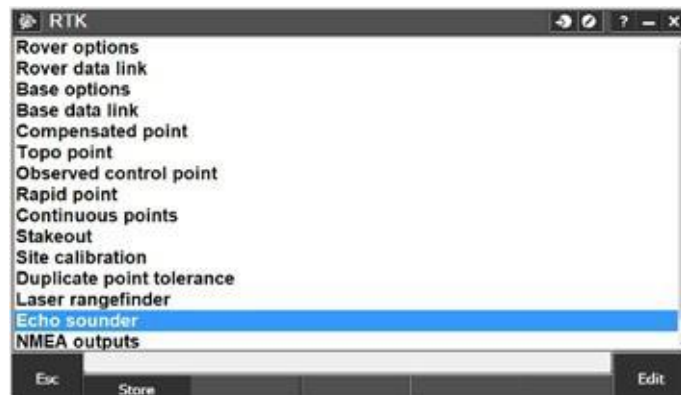
3) In the Settings Menu screen choose SURVEY STYLES



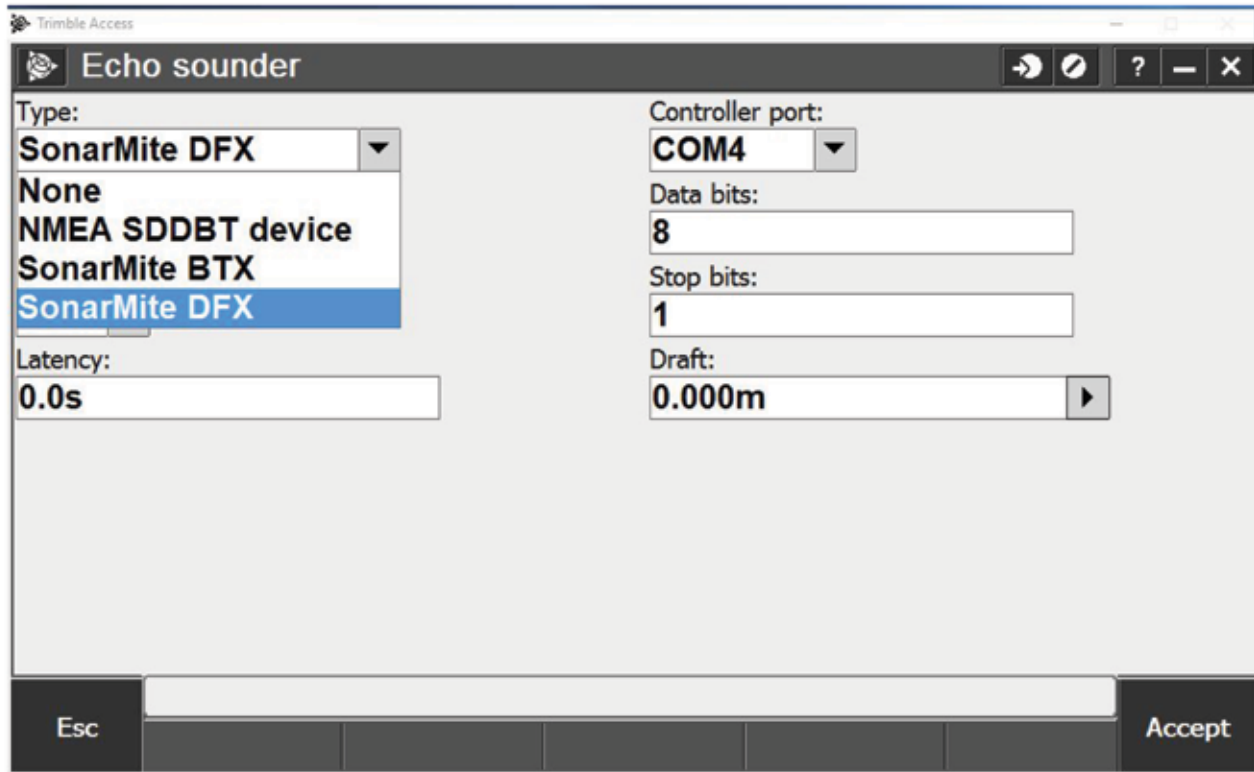
4) in the Styles screen select a style



5) Within the Style properties select ECHO SOUNDER



6) In E/S screen select type and the SonarMites will appear



7) Select required Echo Sounder configure then ACCEPT and STORE

SonarMite™ with Carlson SurvCE

Depth Sounder

Currently supported depth sounders are Sonarmite, Horizon, Hydrotrac, Innerspace, and Odom Digi-trace. If you have a different depth sounder, contact Carlson Software to discuss adding support for it. You can use a depth sounder with GPS to map an underwater surface. When the depth sounder is enabled, SurvCE will alternate between reading from GPS and reading from the depth sounder, so if you aren't using a depth sounder, you must be sure this feature has been deactivated, or you may experience slow GPS readings. When active, incoming Depth readings are viewable in Monitor/Skyplot. Elevation values in the Store Point screen are automatically depth adjusted.

To activate the Depth Sounder, follow these steps:

1. Plug in your Depth Sounder to any of your device's unused COM ports and turn it on.
2. Enter the Peripherals menu, and select the DEPTH SOUNDER tab, as shown right
3. Check Active
4. Select the Type of Depth Sounder you are using.
5. If the Unit Mode radios are not grayed, you will have to set the units to correspond to those output by the depth sounder.
6. Specify the Port the Depth Sounder is plugged in to.



Data Collection Tip:

When starting Data Collection, it should be configured as follows:

- **Auto by Interval**
- **by Time**

Connecting Viva controller to SonarMite Echosounder CS10/CS15 Settings



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Connecting Viva controller to SonarLite CS10/CS15 Settings - Introduction

The new Leica Geosystems Viva CS10 and CS15 controllers can be connected to an Echo Sounder by Bluetooth or by serial cable. The Ohmex 'SonarLite' legacy echo-sounder has a serial cable connection only; the SonarMite has both Bluetooth and serial options.

This slideshow covers the use of serial cable connection to the SonarLite and SonarMite (the process is the same), and also the minimal extra steps to use the SonarMite with Bluetooth.

For CS10 and CS15 dataloggers, the correct Leica cable to use is the GEV 162, connected to the Ohmex serial cable with Green connector.

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Connecting Viva controller to SonarLite

CS10/CS15 Settings

1. Switch on, choose GPS, and go to main screen.
2. Highlight option 3, Instrument.



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Connecting Viva controller to SonarLite

CS10/CS15 Settings

3. Choose option 2, 'Instrument connections' (or 'Connect to Instrument' if using icons)



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Connecting Viva controller to SonarLite

CS10/CS15 Settings

4. Choose option 2,
'All other connections'



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Connecting Viva controller to SonarLite

CS10/CS15 Settings

5. Highlight 'ASCII Input',
then Press F3, 'Edit'.

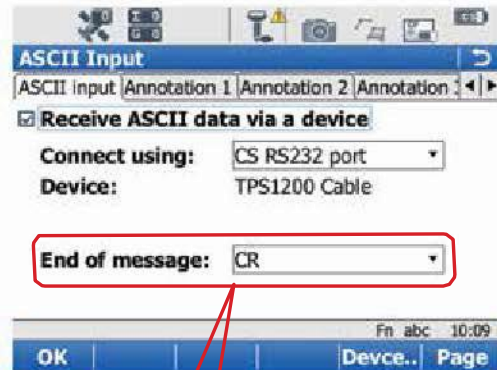


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Connecting Viva controller to SonarLite

CS10/CS15 Settings

6. Tick 'Receive ASCII data..'
7. At 'Connect using',
Choose 'CS RS232 Port'.
(7a. To use the SonarMite
via Bluetooth, select an unused
'CS Bluetooth' port)
8. Press F5 'Device'.



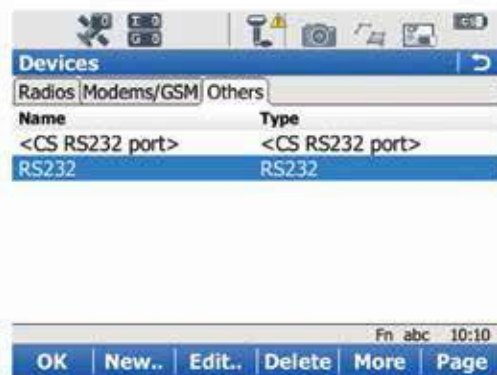
Not available in Smartwrx v5.70

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Connecting Viva controller to SonarLite

CS10/CS15 Settings

9. Press F6 to page to 'Others'
and highlight 'RS232'.
10. Press F2 'New'.



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Connecting Viva controller to SonarLite

CS10/CS15 Settings

11. Create new 'Name', eg 'Sonarlite'

12. Choose 'Baud rate' as 9600 or 4800

13. Press F1 'Store'.

New Device

Name:	Sonarlite
Type:	RS232
Baud rate:	9600 or 4800
Parity:	None
Data bits:	8
Stop bit:	1
Flow control:	None

Store

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Connecting Viva controller to SonarLite

CS10/CS15 Settings

The new device will appear.

14. Press F1 'OK'.

Devices

Name	Type
<CS RS232 port>	<CS RS232 port>
RS232	RS232
Sonarlite	RS232

OK | New.. | Edit.. | Delete | More | Page

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Connecting Viva controller to SonarLite

CS10/CS15 Settings

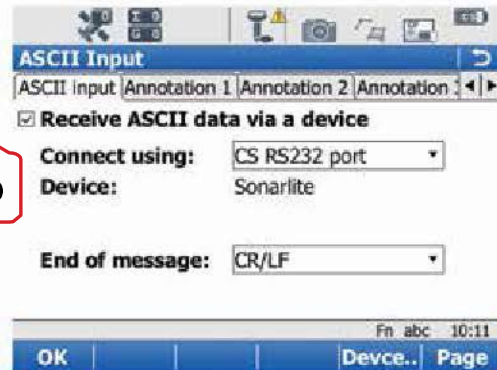
15. For 'End of message' choose
'CR/LF' (do not press OK yet)

Not available in Smartworx v5.70

(15.a If using Bluetooth, press

F4 'Search', identify the

SonarMite, and press F1 'OK' to accept the device)



11

Pg 11 of 13

- when it has to be right

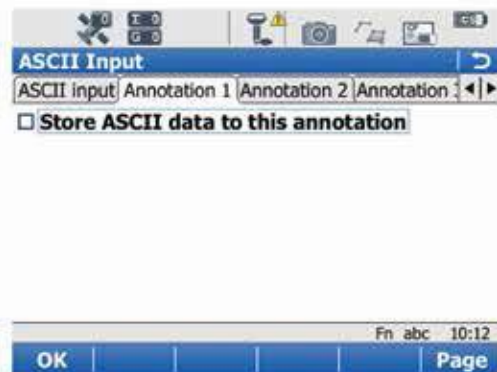


Connecting Viva controller to SonarLite

CS10/CS15 Settings

16. Press F6 and page to the tab
'Annotation 1'.

17. Tick the box 'Store ASCII data..'



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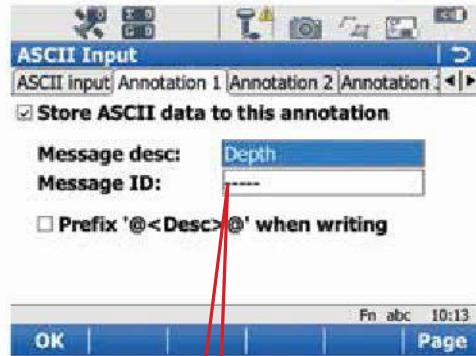
Connecting Viva controller to SonarLite

CS10/CS15 Settings

- 18. In the 'Message desc' box, enter a description, eg 'Depth'.
- 19. Press F1 'OK'.
- 20. Press F1 'OK' again to return to the opening screen..

And you have finished!

You can now use the 'Star' (favourites) key, scroll down to 'Hot Keys..' and select 'GPS – ASCII Input Status' on a hot-key to view the incoming depth data at any time.



STEP 18A. When starting a NEW job, you must come to this Message ID and place a <space> in the ID field. This field is reset every time you start Smartworx VIVA. Otherwise the DEPTH values will not be available.

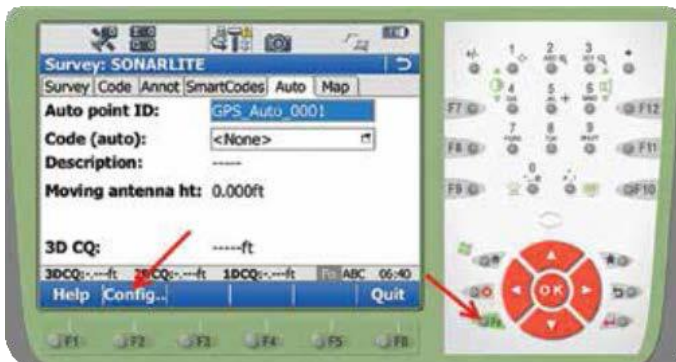
- when it has to be right



Tips on Data Collection:

Surveys must be performed using the following setting:

- AUTO tab (stores shots at intervals)
- AUTO POINTS (log every 1 or 5 seconds)



SonarMite™ with Leica 1200 GPS System

Getting Started

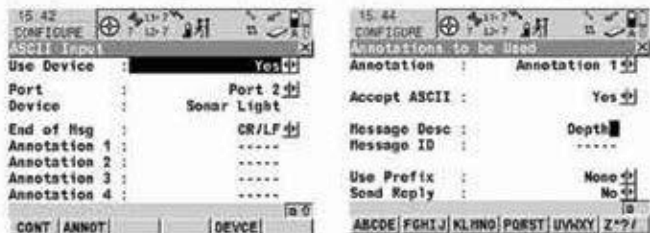
Setting Up ASCII Terminal Settings. From the main menu go to interfaces Command : Cont. Select your ASCII Input. Command : Cont.



Select the Use Device In Port 2 (or your choice) Command : Cont. Highlight the RS232 And select New Command : Cont.

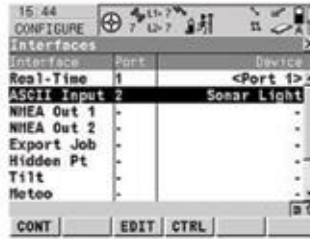
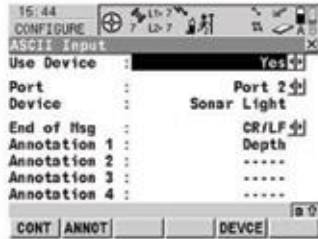


Type in your Name. We have used Sonar Light. Set the Rates as above. See Sonar light manual page 14. Command : Store. The GPS will now receive Data from the Sonar light. Command : Continue.



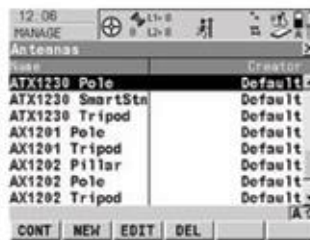
You must now set the end of message and Annotation 1. Command : Annot. Type in your Message description. We use Depth. Ensure the Accept ASCII is set to Yes. User Prefix is set to None. Send Reply is set to No. Command : enter.

The next screen should be as above confirming your settings. Command : Cont. Congratulations the Sonar light will now talk to the GPS. Command : Cont.



Antenna Set up procedure

From the main screen, (3) Management, (6) Antennas. Start with the ATX1230 Pole. This will bring over the correct phase offsets for your new set up. Command : NEW.



In the Name type in your description. In this instance we have used Bathymetric. Do not change other settings. In the IGS Screen change. IGS Name. Serial Number. Set Up Number. This gives your set up a unique IGS. Command : Store. Antenna is now set up : Note Antenna height must be set later !



Setting Antenna Configuration

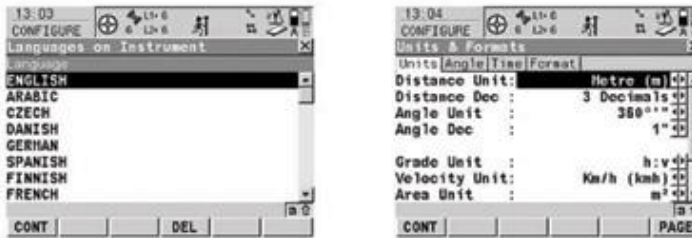
From the main menu. (3) Management. (5) Configuration Sets. Command : CONT. Select : NEW



Name your Configuration. Command : Store. Do not change. Command : Cont

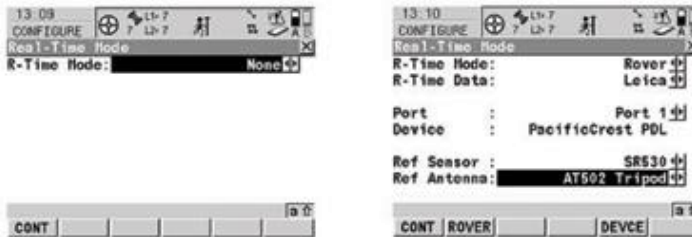


Do not change this screen unless you require different measurements (In the USA they use feet)
Command : Cont.

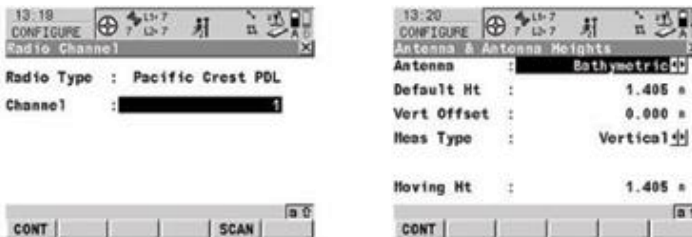


Setting the Configuration

The R-Time Mode must be changed to Rover by toggling the arrows. Command : Cont. This is where you set up your specific base station. In this instance we have used a SR530 Antenna with a Pacific Crest radio in port 1. Set on the AT502 Tripod. Command : Cont.



Set your required radio channel. This can be changed later if the channel is unavailable or corrupt
Command : Cont. Set the Antenna that you have already set up by toggling the arrows.
Ensure that the Default HT & Moving Ht are set to the dimension from the base of the transducer to the bottom of the antenna. Command : Cont.



GNSS receiver and Depth Sounder

Topcon Technical Support

- Writer: Javier Ramirez
- Product: Magnet field basic set up for Depth Sounder



These instructions are basic depth sounder set up for further detail in the equipment being used it will depend on the hardware and configuration being used (RTK, Optical, Network RTK, DGPS)



Add a new Configuration or you can edit an existing one | Choose the correction type



>>>Next 3 Times the Perirals set up button will be available | Also remember to use the correct driver for the depth sounder if driver not available select generic NMEA and the port information default is Bluetooth but serial is incorraged



Also remember that you can go to the topo module, then to the map view and tab on the screen to select depth
Note: Newer 2013 and 1/2 models use baud rate of 4800

Contact Technical Support for any additional questions – 1 (866) 486-7266



Seafloor Systems, Incorporated

4415 Commodity Way, Shingle Springs, CA 95682 · USA
(530) 677-1019 | info@seafloorsystems.com | www.seafloorsystems.com