

# **Bathy2 Operating Manual**



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# 1 Introduction

The Bathy2 is designed to meet customer bathymetric requirements for a reliable, accurate and robust instrument with flexible functionality to suit specific operations up to 6000m depth.

## Density corrected depth data directly from one instrument

An evolution of the popular Midas BathyPack, the new Bathy2 uses state-of-the-art sensors to generate density corrected depth with all calculations taking place in real time, in the instrument. This removes the need for data passing up and down the vehicle umbilical and, as a result provides precision depth and height data with a minimum of latency, vital for accurate level and positioning data especially when operating with Inertial sensors.

This new instrument brings together the benefits of density corrected output directly from one instrument, alongside the flexibility of interfacing and optional third-party pressure sensor, Digiquartz, and Valeport interchangeable pressure modules to allow users enhanced accuracy at different operational depths.

- Titanium housing
- RS232 or addressable RS485 data output
- ASCII and Modbus RTU output protocols
- Ethernet option (factory fit)
- Choice of calibrated data formats
- Interchangeable pressure sensor module
  - Pressure ranges from 10 to 600Bar (approx. 100m to 6,000m water)
  - Titanium diaphragm pressure sensor
  - No external diaphragms, oil reservoir or oil-filled tubes
  - Long term calibration stability
  - 2 year recommended recalibration cycle
- TEOS 10 seawater properties of water computation for depth calculation
- Choice of sampling modes

## Improved user experience

Improving the user experience has been a key driver in the development of this superior bathymetric instrument and the addition of dedicated data output for INS allows bathymetric data to be efficiently communicated directly with users' own operational software.

Other helpful benefits include the flexible pressure options using Valeport's interchangeable pressure sensors, these field-swappable sensor heads make it easy for users to select the correct pressure for their working depth bringing benefits of exceptional reliability and a higher degree of accuracy.

Designed for surveyors requiring bathymetric data from underwater vehicles Designed for surveyors requiring bathymetric data from ROVs, underwater vehicles or drop structures, Bathy2 also has an external pressure sensor input option for Digiquartz referencing. This comprehensive bathymetric package offers other useful parameters such as Altitude through an interface to a Valeport VA500 altimeter and other popular third party alternatives.

## Seamless data transfer

Data transfer is via Ethernet <u>or</u> RS232/RS485 interfaces and the Bathy2 Interpreter function via the Valeport Configure software allows data out on extra ports (serial or TCP/IP serial) in industrystandard formats, this facility also allows for an atmospheric pressure data input to be fed to the instrument.



The Bathy2 converts pressure measurements to depth, taking account of the local variations in water column density to ensure the highest possible accuracy. In addition, Bathy2 accepts data from an altimeter to provide height above the seabed, scaled using the on-board Valeport "time of flight" sound velocity sensor, thus giving an overall location of the device within the water column. This concept is not new, the Bathy2 Pack builds on the standard specification you would expect, with several unique features that significantly enhance the performance of the product:

- Temperature compensated piezo-resistive pressure sensor that provides ±0.01% accuracy (full scale) with better stability and durability than a resonant quartz type sensors. In addition, there is no oil reservoir to protect the sensor, allowing easier maintenance and faster deployment. The Bathy2 has interchangeable pressure modules that allow the most suitable range to be selected for the operational depth of the project, maximising the potential accuracy of the system.
  - If required an external pressure sensor e.g. Digiquartz can also be interfaced as a separate unit and used in preference of the integrated unit. This should be interfaced to the AUX IN port
- Valeport's own inductive coil conductivity sensor, constructed from advanced composite materials to eliminate the effects of pressure on sensor performance, is used as part of the sensor suite. Other inductive cells can distort under pressure, giving errors in the measurement – even a few µm is enough to put the sensor out of specification at depth. The Valeport cell has no such errors. Inductive cells also have an advantage over electrode conductivity sensors, in that they are less susceptible to contamination by oil, growth or debris.
  - Full "in situ" factory calibration; inductive conductivity cells are affected by the presence of any object (conductive or non-conductive) that lies within the sensor's field (within approx. 5cm).
     Valeport's factory calibration against a salinometer, performed with all other sensors and guard in close proximity, guarantees in-field accuracy. A simple "resistor calibration" actually does nothing more than verify sensor operation. Further, the digital measurement technique virtually eliminates drift in sensor calibration, removing the need for "field calibration" procedures.
- Unique "synchronised sampling" means that all sensors are sampled at precisely the same instant, not in sequence. This removes alias and latency errors from the measurements.
- Altimeter input fitted as standard just plug in a correctly configured instrument.
- Titanium housing as standard; no corrosion issues, and a maximum depth rating of 6000m. Note that a selection of pressure sensor ranges are available, so your instrument's depth rating may be limited to less than the full 6000m.
- Full TEOS 10 calculations for a more accurate depth calculation; the system integrates the water density variations to calculate the depth from pressure, not the simplified method of averaging the density.
- The Bathy2 can be setup for operation using Valeport's Configure App.
- All data can be viewed on a topside PC, so no dedicated control unit is required. The intuitive Bathy2 Interface App allows you to view and distribute data, serially or through Ethernet protocols.
- The Bathy2 Interface App can interface an atmospheric pressure sensor for real-time compensation, the Bathy2 is updated without interrupting operations.

In summary, the Bathy2 sets out to "de-mystify" the accurate calculation of depth from water pressure. State of the art sensing technology gives you accurate data; precise calculations give you accurate answers; simple PC software gives you total control. Getting the right answer has never been easier.

# 2 Sensors

The Bathy2 is fitted with the following sensors:

## 2.1 Pressure Sensor

A high accuracy, 0.01% of full scale, temperature compensated piezo-resistive pressure transducer.

The Pressure Module is interchangeable

Sensor Type	Strain Gauge
Range: individual modules	10, 20, 30, 50, 100, 200, 300, 400 or 600 Bar 1 bar is approximately equal to 10m depth
Resolution:	0.001
Accuracy:	±0.01% of full range
Response Time:	1 millisecond
Units	dBar   Pascal   PSI

#### 2.1.1 Interchangeable Pressure Sensor Modules

The Interchangeable Pressure Sensor Modules, with a titanium diaphragm, can be swapped to best suit the operational depth of the project. The accuracy of the sensor is a factor of the full-scale capability of the sensor - 0.01% and not the measured pressure. A 600 Bar module will offer the same  $\pm 0.60$ m accuracy at 6000m as it will at 250m while a correctly selected 30 Bar Pressure Module, for an operation at 250m, will provide an accuracy  $\pm 0.03$ m

Bar	Maximum Operational Depth (metres)	Accuracy (0.01%) (± metres)
10	100	0.01
20	200	0.02
30	300	0.03
50	500	0.05
100	1000	0.10
200	2000	0.20
300	3000	0.30
400	4000	0.40
600	6000	0.60

Prior to changing out a Pressure Module the Bathy2 the instrument should be thoroughly rinsed in fresh water and dried.

A Pressure Module should ideally be changed in dry lab conditions but if this is not possible every effort must be made to keep water out of the module socket. Check the module and socket for any water and if found dry everything thoroughly before fitting. If water does get into the socket it could cause the connector to corrode.

A special tool is provided to unscrew the fitted module and screw its replacement securely into place. Never use excessive force.





The three prongs should be carefully inserted into the lock screw cap of the Pressure Module and turned counter-clockwise (when looking directly at the module) to loosen it. Keep turning until the Pressure Module gently pops out of the socket. The tool will engage with the Pressure Module and allow you to very gentle pull if required.

Before fitting a replacement, Pressure Module check all surfaces for wear - especially the lock screw cap. Check the O rings are clean and free of any debris, wear or damage. There is no need to grease the O rings. The closing action of the system does not rely on surfaces sliding over one another and grease might attract debris that would compromise the seal.

The replacement Pressure Module should be placed into the socket with the connector approximately lined up with its pair. Fine adjustment is achieved by the shape of the module housing in the socket.

Engage the screw cap into the threads of the socket and then use the tool to tighten the Pressure Module into place. The module should be screwed down until the shoulder of the lock screw cap is in line with the shoulder of the titanium end-cap as shown below:



Do not over tighten.

## 2.2 Temperature Sensor

Temperature		
Туре	Fast Response PRT (with guard)	
Range	-5 to +35°C	
Accuracy	±0.005°	
Resolution	0.002°	
Units	°C   °F	



# 2.3 Conductivity Sensor

Conductivity	
Туре	Valeport Inductive Coil
Range	0 – 80mS/cm
Accuracy	±0.01mS/cm
Resolution	0.002mS/cm
Stability	<±0.01mS/cm/year
Units	dBar   Pascal (Pa)   PSI

Be aware that when installing the Bathy2 there must be a minimum or 0.15 metres between the Conductivity sensor and any other metal object. The metal housing and protection cage around the senor have been calibrated out.

## 2.4 Sound Velocity Sensor

Sound Velocity (Measured)		
Туре	Valeport miniSVS (50mm type)	
Range	1400 – 1600 m/s	
Accuracy	±0.02 m/s	
Resolution	0.001 m/s	
Units	metres/second   feet/second	

## 2.5 Calculated Values

Salinity	
Method	Calculation (TEOS10)
Range	0.02 – 42 (calculation unverified at higher salinities)
Accuracy	±0.017 (at 500m depth)
Resolution	0.001
Units	g/Kg

Density	
Method	Calculation (TEOS10)
Range	994 – 1075 kg/m³
Accuracy	±0.016 kg/m³ (at 500m depth)
Resolution	0.001 kg/m³
Units	Kg/M <sup>3</sup>

Depth	
Method	Calculation (TEOS10)
Range	N/A
Accuracy	See Note Below
Resolution	1mm (software limited)
Units	Metres   Feet
2.5.1	



2.5.2 A Note About Depth Accuracy:

The true accuracy of the calculated Depth is a function of several parameters:

- The accuracy of the pressure sensor itself
- The error in density measurement resulting from the accuracy of the Conductivity measurement
- The error in density measurement resulting from accuracy of the Temperature measurement
- The error in density measurement resulting from accuracy of the Pressure measurement
- The significance of the above errors in relation to the depth range, and the ambient salinity and temperature conditions.
- The inherent accuracy of the equation used, which is estimated at 0.1m over 10000dBar
- The overall depth accuracy, therefore, relates to not only how good the sensors are, but will
  also vary according to the local conditions. For example, accuracy of a depth measurement in
  500m water at 5°C and a salinity of 35 ppt will be different to that in 500m water at 1°C and a
  salinity of 36ppt.

However, these variations are typically small, and it is therefore, reasonable to assume that the accuracy will be dominated by the performance of the pressure sensor and that of the UNESCO equation.

# 3 Electronic Specification

Power Source	External Supply Only	
Input Range	9 – 28V DC	
Consumption	Base system Base system + Digiquartz Base system + VA500 Base system + Digiquartz + VA500	195mA 225mA 370mA 410mA

Bathy2 can be further enhanced by interfacing a VA500 Altimeter to provide true water column height. The Bathy2 will route external power to an altimeter; ensure sufficient power is supplied to suit the altimeter used.

Data Output	RS232 & RS485 fitted as standard (choice made by pin selection on connector)	
	Ethernet (factory fit option)	
Protocol	8 data bits, 1 stop bit, no parity, no flow control	
Baud Rate	User selectable from 2400 to 230400 (factory default 115200)	
Update Rate	1, 2, 4 or 8Hz	



# 4 Physical Characteristics

#### 4.1.1 Materials

Housing & Bulkhead:	Titanium				
Connectors:	SubConn MCBH10F (power / COMMS)				
	SubConn MCBH6F (to altimeter)				
	SubConn MCBH4F for AUX output (INS)				
SubConn MCBH5F for Digiquartz input					
Specific connectors can be provided as required					
Weight:	<10 kg (in air)				

# 4.2 Dimensions - Bathy2 and Bathy2e





Serial COMs Endcap Ethernet COMs Endcap

## 4.2.1 Internal Pressure Sensor Datum



All offsets are programmed in metres regardless of what Height\Depth unit is programmed for data output purposes



# 5 Principle of Operation

Unlike its predecessor the Bathy2 caries out all computations on board the instrument. This reduces latency to a minimum and reduces topside equipment.

All depth output is relative to the instrument. Offsets are available to define this datum in relation to the internal pressure sensor, an external pressure sensor and an Altimeter if fitted.

The relationship between pressure and depth is not a simple one and is a function of the water density. More specifically, the water density at every single point in the water column affects the pressure depth relationship at the bottom. It is, therefore, a requirement to know the density of water at every point above the pressure sensor in order to accurately calculate the depth from the pressure value. The Bathy2 builds an array table, or profile, of the water density at a predefined rate through the water column as it descends. It also updates this table as it ascends, or moves around in the column during the deployment. The resolution of this profile is limited to a maximum of 6000 points, which means that in 6000dBar of water pressure (approximately 6000m), it will store a Density value for every dBar (~ 1 metre). Greater resolution is possible at shallower depths, e.g. 0.25dBar in 1500dBar pressure.

The full TEOS10 formula uses a density integration function rather than density averaging, and therefore, properly accounts for the compressibility of water. In water depths of less than 100m, this distinction is negligible - less than 1mm - but the error due to use of the simpler averaging method increases dramatically at greater pressures, approaching 1m at 1000m depth.

## 5.1 Explanation of SAAR Table

A notable difference of TEOS-10 compared with EOS-80 is the adoption of **Absolute Salinity** (rather than Practical Salinity) to be used in scientific journals to describe the salinity of seawater and to be used as the salinity argument in the TEOS-10 algorithms that give the various thermodynamic properties of seawater. Practical salinity is essentially measuring the distribution of ions in the seawater. Absolute salinity is based on the mass of all non-H2O material, whether it's ions, gases, or solids.

#### www.teos-10.org/pubs/TEOS-10 Manual.pdf

In brief, practical salinity concentrated solely on the conducting ions of seawater whilst Absolute salinity includes the mass of the non conducting compounds which have an influence on the density. The relationship between practical salinity and absolute salinity has a geographical distribution.

The worldwide data for these corrections is too large to store in the instrument, so to apply the correction a geographic lookup is performed and a SAAR (Salinity Absolute Anomaly Ratio) correction table generated by Valeport Configure and passed down to the Bathy2 for use in its density and depth calculations.

## 5.2 Explanation of Density Profile

As the Bathy2 passes through the water column, it uses temperature, conductivity and pressure to calculate point values of salinity and density. These values are then used to update a running integration process that computes the density of the water column above the instrument location and calculate the accurate depth of the instrument based on this data.



## 6 Communications

Control of the Bathy2 is achieved through the use of "\$ codes", as described in the sections below.

All commands must be "sent" by pressing the Enter key with the exception of the single '\$' character required to enter set up mode

## 6.1 Serial Comms - RS232 and RS485

Bathy2 is fitted with both RS232 and RS485 communications as standard. RS485 is enabled by grounding a pin in the communications lead (refer to <u>Wiring Section</u>).

Protocol is 8 data bits, 1 stop bit, no parity, no flow control.

Baud rate is factory set to 115200. User may choose between 2400 and 230400.

Fast data rates and longer data string outputs may not be possible with low baud rates

## 6.2 Serial Comms – Modbus

The Bathy 2 is fully compatible with Modbus RTU.

Modbus must be enabled to use a real-time atmospheric pressure correction through the Bathy2 Interpreter App.

Please contact Valeport if you would like to use Modbus and the relevant address can be provided.

## 6.3 Configure App – COMMUNICATIONS

Use the Configure App to setup the COMs settings as required see section Valeport Configure App



Modbus Status must be ON to operate with the Interpreter App.



# 7 Setting Up the Bathy2

Bathy2 can be configured for operation using Valeport's Configure App, available to download from <u>https://Valeport.Download</u>. See separate manual for general operation of the App. Specific operation with respect to the Bathy2 is outlined below.

The Bathy2 Interpreter App is also available to run alongside the Configure. The Interpreter App is used to view data, apply Atmospheric correction data and distribute specific data strings to up to 5 COM ports.

## 7.1 Start / Stop

When power is applied to the Bathy2, it will begin to operate according to the settings already programmed after a period of approximately 2 minutes. The most basic level of Stop / Start control is, therefore, by switching power on and off. The bathy2 will retain the density table on a power cycle.

# Code	Description
#	When the instrument is running, the Bathy2 may be put into set up mode at any time by typing the '#' character followed by the ENTER key. The device will respond with a command prompt '>' and wait the next instruction
	When interrupted an ERROR response is often seen. This is generated due to the <cr><lf> usually associated with the # and should not be interpreted as a problem with the Bathy2.</lf></cr>
	A "watchdog" function is in operation within the Bathy2 If the unit is interrupted with the '#' character, and no further command is received for a period of 2 minutes, the sensor will automatically begin sampling data using the existing settings
\$028	Starts sampling in the mode set, or takes a single reading if unit is in "Single" sampling mode



# 7.2 Valeport Configure App

Select your COM port and baud rate from the drop down menus, Select Bathy2 in the Instrument field and Click Connect

😤 Valeport Configure 2.0.76		-	×
	Port S	Settings	\$
$\odot$	Connection type: Port number: Baudrate:	Serial         ~           COM16         ~           115200         ~	
	Instrument: Offline Mode:	Bathy2 ~	
		Connect	

Once connected, it is advised that you 'Read' all the settings presently programmed into the instrument the Read Instrument button on the lower menu ribbon:

RUN	Run B2 Interpreter App	Read Instrument	Update Instrument	Back
			A	

All the settings will be downloaded and the appropriate fields will be populated ready for you to configure as required.

## 7.2.1 Configure App – INSTRUMENT Tab In the INSTRUMENT tab is a set of general parameters.

👘 Valeport Configure 2.0.76 Instrument configurat	ion: Bathy2				_	×
	OUTDUT	DDECOUDE			1	
COMMUNICATIONS UNITS	001901	PRESSURE	ALTIMETER	DENSITY PROFILE		
INSTRUMENT ID & FIRMWARE						
Instrument ID	01300030					
Serial Number	79961					
Bathy2 Firmware	04007184A1 10/01/202	2 17:00				
IIB Firmware	04007182B0 Aug 15 202	22 17:15				
INSTRUMENT TIME						
Instrument Time	23/08/2022 13:55:21					
Use System Time						
Set Up Custom Time						
SITE INFORMATION						
Site Information	Tests					
Latitude	-3.3333					
Longitude	-54					v
\$600 1500						
\$602 0.250						
>						¥
RUN Run B2 Interp	reter App Rea	ad Instrument	Update	Instrument	Back	
						_

#### **INSTRUMENT ID AND FIRMWARE**

• Read only – details of the instruments ID, serial number and firmware

#### **INSTRUMENT TIME**

The Bathy2 time - sink to UTC, local or project time as required.

- Instrument Time a display of the time currently set in the Instrument
- Use System Time tick this option to sync the Bathy2 to your PC time
- Set Up Custom Time click this option to edit the Instrument Time field as required

#### SITE INFORMATION

- Site Information free text of 29 characters for you to identify your project.
- Latitude Site Latitude
- Longitude Site Longitude

Latitude and Longitude is required for SAAR Table generation and should be in the approximate centre of the project location.



## 7.2.2 Configure App – COMMUNICATIONS Tab

ই Valeport Configure 2.0.76 Instrument configuration: Bathy2	-	$\times$
Eile		
INSTRUMENT COMMUNICATIONS UNITS OUTPUT PRESSURE ALTIMETER DENSITY PROFILE		
SERIAL		A
Baud Rate 115200bps V		
Parity None ~		
RS485		
RS485 Modes OFF - Disabled v		
MODBUS RTU		
Modbus Address 20 Modbus Status - ON   OFF ON V		
		۲
$\odot$		
\$600 1500-		A
\$602 0.250;		
PLIN Dup 82 Interpreter App Dead Instrument Lindate Instrument	Back	
Read instrument Opdate instrument	Dack	

- Select communications protocols as required.
- Modbus and RS485 address will be the same
- Modbus Status must be ON to operate with the Interpreter App.

## 7.2.3 Configure App – UNITS Tab

Select the required units from the dropdown menus.

a valeport configure 2010 insuranent configurat	ion: Bathy2					-	×
Ele		10					
INSTRUMENT COMMUNICATIONS UNITS	OUTPUT	PRESSURE	ALTIMETER	DENSITY PROFIL	E		
UNITS							13
Pressur	e Units Dec	bar (dbar)					
Temperatur	e Units Dea	rees Calsius (deo C)	U.				
Depth   Heigt	nt Units Metr	res (m) [¥]	1,000				
Sound Velocit	ty Units Metr	es per seconds (m/s)	~				
Conductivil	y Units matter	sigmens per centimete	er (mS/cm)				
	1.000	seriers ber contribu	or mission [				
							*
0							
<ul> <li>€</li> <li>\$6:0</li> <li>15:00</li> <li>\$6:0</li> </ul>							
<ul> <li>✓</li> <li>5600</li> <li>15000</li> <li>85002</li> <li>0.2 5002</li> </ul>							
<ul> <li>\$600</li> <li>\$600:</li> <li>\$600:</li> <li>\$000:</li> </ul>							

Standard units are as follows and will be used for all calculations.

dBAR

- Pressure
- Temperature °C
- Depth | Height metres
- Sound Velocity ms-1
- Conductivity mScm<sup>-1</sup>

Any changes to the above will be used in the appropriate output strings only.



## 7.2.4 Configure App – OUPUT Tab

🕆 Weport Configure 20.78 🔰 Instrument configuration: Bathy2 v2	- I ×
Be	
INSTRUMENT COMMUNICATIONS UNITS COLPO: PRESSURE ACTIMETER DENSITY PROFILE	
SAMPLING RATE	
Sampling Rate (Hz) 8 Hz	
OUTPUT	
Output Format VALEPORT V	
Data Header ON   OFF	
DEPTH DATA CONVENTION	
Depth Data Convention Standard V	
3	
500	÷
0.100	
Enable Timestamp	
RUN Run B2 Interpreter App Read Instrument Update Instrum	ent Back
	201

#### SAMPLING RATE

• Set your Sampling rate – 1, 2, 4 or 8Hz

#### OUTPUT

Use the dropdown menu to select your output string.

If you select VALEPORT as your output string there is an option to output a header with the string details on run #028.

VALEPORT must be selected if you intend to run the Bathy2 Interpreter App

## DEPTH DATA CONVENTION

Select a standard positive depth value or a TEOS10 negative depth value



## 7.2.5 Configure App – PRESSURE Tab

tile.	onfigure 2.0.78 Instrument configuration: Bathy2 v2		- ¤ ×
INSTRUMEN	NT COMMUNICATIONS UNITS OUT	PUT PRESSURE ALTIMETER DENSITY PROFILE	
Pressure	e Sensor Options		P
	Pressure Sensor Option External Pressure Sensor Vertical Offset Pressure Output Option - AUX OUT Port	INTERNAL V BATHY2 SELECTED V	
TARE			
	Set TARE Now TARE Value TARE Timestamp	Taker TAbre:           10:159           26/08/2022 13:50:50	
0			
10.159 5015 26/08/2022 15	Uciede		
2			

#### **Pressure Sensor Options:**

- Select which pressure sensor to use for the Calculated Depth
- External pressure offset in metres
  - this value is added to the depth if the External Pressure sensor is selected the internal pressure sensor is the Bathy2 datum point
- Pressure Output Option AUX OUT port
  - A RAW output is data directly from the pressure sensor in its native format and update rate
  - BATHY2 SELECTED is the selected Pressure Sensor Option device in PPPP.PP<CRLF> format | Bathy2 sampling rate | 115200 baud

#### Tare

- Use the button to observe and apply a Tare value
  - only to be used to remove atmospheric data while on the surface max value 20 dBar
- Tare Value this is the value of the Tare observed and applied OR set a manual Tare in the window and click on 'Update Instrument' to apply
- Tare Timestamp the time at which a TARE was observed



# 7.2.6 Configure App – ALTIMETER Tab Configure an Altimeter, if fitted

1 <sup>(1)</sup> Welsport Configure 2.0.78 Instrume	st configurations Bathy2	v2				5 <u>5</u> 5	12	×
Pie								
INSTRUMENT COMMUNICATION	S UNITS C	ureur	PRESSURE	ALTIMETER	DENSITY PROFILE			
ALTIMETER								1
P	Altimeter SV Option	MEA	SURED SV	<u> </u>				
Altimeter Ve	tical Offset in metres	0.35						
								10
2								
5905 0.350								
Enable Timeslamp								

- Altimeter SV Option use the dropdown menu to select which sound velocity you would like to use with the Altimeter measured using the SV sensor, calculated (TEOS10) or a fixed value
- Altimeter Fixed SV If you want to use a fixed sound velocity input it here
- Altimeter Vertical Offset offset from Bathy2 datum in metres
  - this value is added to the Altimeter Height if an Altimeter is interfaced



## 7.2.7 Configure App – DENSITY PROFILE Tab

This Tab is where the Density Profile is defined and the Absolute Salinity Anomaly Ratio (SAAR) Table is generated.

C Valeport Configure 2.0.76 Instrument configuration: B	etiry2								-	x
Bie	-				000015					
INSTRUMENT   COMMUNICATIONS   UNITS	OUTPUT	PRESSURE	ALTIMETER	DENSITY	PROFILE					
DENSITY PROFILE										17
Max Pressure Bin Size	(dBar) 60 (dBar) 0.1	0 dbar 字								
SAAR TABLE (Absolute Salinity Anomaly R	stio)									
Bathy2 SAAR Tatke Ge	neration	Calculate								
O         Date         Time         Conductivity         Pressure Temperature           VVP1-MM-DD         HH-MM855222         NS/CM         DBJR         C           (24/05/2022 17/56/16] (0.13 Hz)         2022-00-24         17/56/01/812         F	Attimeter M MVS -0.006 D.136 -0.006 D.133	SoundWeb M M 22.470 0.000 22.470 0.000	Depth TotalDepth KG/M3 KG/M3 G 0.000 0.242 0 0.000 0.239 0	PointDe 105 DBAR 242 997.007 239 997.007	rsity ProfileDensity D6AR 1024.9720.000 10.000 1024.9720.000 10.000	SakritySR D.000 D.000	PressureBaro	PressureExt		a a
	RU	N	Run 82 Interpre	ter App	Read Instrument		Ipdate Instrument		Back	1

## **Density Profile**

- Max Pressure (dBar) what is the maximum depth of your survey site?
  - This value must be greater than that depth on site
  - The greater the selected depth the larger the observation bins will be and the coarser the profile fewer bins
- Bin Size (dBar) read only the bin size in dBar
  - calculated by dividing the Max Pressure by 6000
  - The profile is made up of 6000 lines.

click	Update Instrument	to apply all changes
-------	-------------------	----------------------

#### SAAR Table

- Bathy2 SAAR Table Generation use the **Calculate** button to generate the table and program it to the Bathy2.
  - Before Clicking the button, you must have:
    - defined your site Latitude and Longitude INSTRUMENT Tab
    - Selected the Max Pressure on site and therefore, the bin size for the profile
  - You can follow progress of the process:

SAAR TABLE (Absolute Salinity Anomaly Ratio)					
Bathy2 SAAR Table Generation					
Calculations in progress					
22 %					



On completion you will be presented with the following dialogue box:



If you change the Max Pressure (dBar) setting the SAAR Table will be reset in the instrument You must regenerate the table using the Calculate button

The SAAR Table generation tool is not valid for either the Baltic or Caspian Sea



## 7.3 Bathy2 Interpreter App

The Bathy2 Interpreter App is provided alongside the Valeport Configure App to provide a mechanism to:

- 1. Distribute the Bathy2 data to a number of COM ports that can be of different format and baud rate
- 2. Provide Atmospheric data corrections to the instrument

The App can be initiated from Configure or run independently

late Time Conductivity Pressure Temperature YYY-MM-DD HH:MM:SS.ZZZ MS/CM DBAR C 24/08/2022 17:56:16] [0.13 Hz] 2022-08-24 17:56:00.812 24/08/2022 17:56:17] [1 Hz] 2022-08-24 17:56:01.812	Altimeter         SoundVelo           M         M/S         M         M           -0.006         0.136         22.470         0.000           -0.006         0.133         22.470         0.000	Depth         TotalDepth         PenifDensity         ProfileDensity           KG/M3         KG/K3         BBAR         DBAR         DBAR           0.000         -0.242         -0.242         B97.667         1024.9720.000         10.000           0.000         -0.239         -0.239         997.667         1024.9720.000         10.000	SalinitySR PressureBaro Pressur 0.000 0.000	reExt
	RUN	Run B2 Interpreter App Read Instrument	Update Instrument	Back

# 7.3.1 Configuring the Interpreter App Launch the program:

	-1010	- II
Beturn To Co	nfigure	
	loot	incoming Data
Benz P	e conto - Aaut 11220 - Faily New -	Ram Mode Date Time Cond Heasure Temp Advictor 57 Depth Mar Spin Park D HVMD Stank America Ex
Atresphere	COV C TCPIP # Manual C Rates	
ONDAX STREET	Odanat * COM - TCTMM - Meas Port COM - Rawd INGO -	Desperiment         Desperiment           Verson         2000-01-01         01:001000         0000         10:000         0000         0000         0000
Output thing 2	CLODM CLICPHP # Note	(IIII)
Chipse Bring 3	COM C TOMP is fixed	
Culper mong 4	C COM C TOPPP + Note	

- Set the Bathy2 COMs port up as required
- click Run Mode to receive data. The Bathy2 must be set to VALEPORT output format
- select how you will receive Atmospheric data serially, TCP/IP or Manually
  - data should be in dBar and format: PPPP.PPP<CRLF>
  - a manually entered value can be typed into the window click send to send it to the Bathy2
- You can select up to 5 output string of the same or different format. Configure the port as required and select the output string format from the dropdown menu:





## 7.4 Interfacing an Altimeter

To Set up a VA500 Altimeter to operate with a Bathy2 send the following commands to the Altimeter using a terminal program:

#082;TRITEC<CR>

#059;9600

M4

The output from the Altimeter must be in this form for the Bathy2 to recognise the data.

There is a configuration button in the Valeport Configure App that will set the VA500 up as required on a single click.

## 7.5 Interfacing an External Pressure Sensor through AUX IN Port

For an external pressure sensor to be interfaced to the Bathy2 it must be set up as follows:

- Standard Digiquartz data string e.g. \*00019.914<CRLF>
- 115200 baud rate, 8N1
- 4Hz update rate



# 8 Manual Setup Commands

Code	Followed by	Operation			
\$003	<cr><lf></lf></cr>	Read: serial number of the instrument			
\$009	;pp.ppp <cr><lf></lf></cr>	Set: Tare Value			
\$010	<cr><lf></lf></cr>	Read: Current Tare			
\$011	<cr><lf></lf></cr>	Read: Site information			
\$012	;Site Information <cr><lf></lf></cr>	Set: Site Information			
\$014	<cr><lf></lf></cr>	Read: firmware version of the instrument			
\$015	<cr><lf></lf></cr>	Read: Tare Timestamp			
\$016	;x <cr><lf></lf></cr>	Set: Sampling Rate – 1, 2, 4, 8 Hz			
		\$016;4 = 4Hz			
\$017	<cr><lf></lf></cr>	Read: Sampling Rate			
\$019	;xxxx <cr><lf></lf></cr>	Set: baud rate in the instrument			
		\$019; 115200 = 115200 baud			
\$020	;header <cr><lf></lf></cr>	Set: Header output status			
		\$020;0 = OFF			
		\$020;1 = ON			
\$021	<cr><lf></lf></cr>	Read: Header output status			
\$022	;P <cr><lf></lf></cr>	Set: Pressure output units			
		\$022;0 = dBar			
		\$022;1 = Pascal (Pa)			
		\$022;2 = PSI			
\$023	<cr><lf></lf></cr>	Read: Pressure output units			
\$024	;T <cr><lf></lf></cr>	Set: Temperature output units			
		\$024;0 = °C			
		\$024;1 = °F			
\$025	<cr><lf></lf></cr>	Read: Temperature output units			
\$026	;d <cr><lf></lf></cr>	Set: output units for Depth/Height			
		\$026;0 = Metres			
		\$026;1 = Feet			
\$027	<cr><lf></lf></cr>	Read: output units for Depth/Height			
\$028	<cr><lf></lf></cr>	Set: units into run mode			
\$030	;c unit <cr><lf></lf></cr>	Set: Sound Velocity output units			
		\$030;0 = M\s			
		\$030;1 = F\sF			
\$031	<cr><lf></lf></cr>	Read: Sound Velocity output units			
\$032	;C <cr><lf></lf></cr>	Set: Conductivity output units			
		\$032;0 = mS/cm			
		\$032;1 = μS/cm			
\$033	<cr><lf></lf></cr>	Read: Conductivity output units			
\$042	;parity <cr><lf></lf></cr>	Set: Run Time Parity			
		\$042;0 = None			
		\$042;1 = Odd			
<b><b>((((((((((((</b></b>		$\psi_{42,2} = EVan$			
\$043		Read: Parily			
\$U48 ¢040		Set: External Pressure Sensor (AUX IN) Offset			
\$049 ¢050		Reau: External Pressure Sensor (AUX IN) offset			
\$U52 ¢052		Set: Instrument Time ;aa;mm;yy;nn;mm;ss <cr></cr>			
\$053		Read: Instrument Time			
\$409	;modbus_slaveid <cr><lf></lf></cr>				
\$410	<0K> <lf></lf>	Set: Modbus Address (d35 = # d36 = \$ do not use )			



Code	Followed by	Operation
\$411	<cr><lf></lf></cr>	Set: Modbus Status
		\$411:0 = OFF
		\$411:1 = ON
\$412	·modbus_mode <cr><le></le></cr>	Read: Modbus Mode
\$500	altimeter sy options(R><	Set: Altimeter Sound Velocity option
ψ000		
	F2	\$500.0 - Measured
		\$500,1 - Calculated (TEAS TO)
<b><b><b><b></b></b></b></b>		5000,2 – Fixed (see cilia 5000)
\$501	<ur><lf></lf></ur>	Read: Altimeter Sound Velocity option
\$504	;altimeter_offset <cr><lf></lf></cr>	Set: Altimeter offset (in metres, always)
		\$504;-1.20
\$505	<cr><lf></lf></cr>	Read: Altimeter offset
\$506	;altimeter_fixedsSVvalue <cr< td=""><td>Set: Altimeter fixed Sound Velocity value (in m\s,</td></cr<>	Set: Altimeter fixed Sound Velocity value (in m\s,
	> <lf></lf>	always)
		\$506;1500
\$507	<cr><lf></lf></cr>	Read: Altimeter fixed Sound Velocity value
\$600	<cr><lf></lf></cr>	Read: Density Profile maximum pressure (dBar)
\$601	:6000 <cr><lf></lf></cr>	Set: Density Profile maximum pressure (dBar)
	,	\$601.0 = 600 dBar
		601:0 = 1500  dBar
		601:1 = 3000  dBar
		601;7 = 6000  dBar
¢602		Read: Density Profile recelution
\$002 ¢c04		Read: Deta Output format
\$004 \$005		
\$605	;output_format <cr><lf></lf></cr>	Set: Data Output format
		\$605;0 = VALEPORT
		\$605;3 = TRITECH
		\$605;4 = SEAKING
		\$605;5 = DIGIQUARTZ
		\$605;6 = UK90_STD
		\$605;7 = WINSON_PROC
		\$605;8 = IN-SITU SENSORS
		\$605;9 = SVX2
\$606	<cr><lf></lf></cr>	Read: Site Latitude
\$607	;user Latitude <cr><lf></lf></cr>	Set: Site Latitude (-90 to 90)
		\$607;50.426 = 50° 25' 34" North
		\$607;-50.426 = 50° 25' 34" South
\$608	<cr><lf></lf></cr>	Read: Site Longitude
\$609	;user Longitude <cr><lf></lf></cr>	Set: Site Longitude (-180 to 180)
	, _ 0	\$609;90.426 = 90° 25' 34" East
		\$609;-90.426 = 90° 25' 34" West
\$613	:table:start line:endline	Output:
	<cr><lf></lf></cr>	Memory Tables [0   1   2 ]:start line:end line
		Where
		$[0] = A \parallel$
		[1] = Density
		[2] = SAAR TABLE - INDEX and SAAR VALUE
		For Example - $\$613.0.0 6000$ "
\$600	redec CP>2 E>	Set: RS/85 mode
ψυΖΖ	,13400_11100E>UK/>LF/	$e^{2} - \Delta = \Delta$
		$\psi_{022,0} = OFF = Disableu$
		$\phi_{C22}$ , I – UN – Full Duplex
		$\phi ZZ_{z} = ON - Hall Duplex$
<b>.</b>		$p_{22}$ = ON – Hait Duplex (no cmd echo)
\$623	<cr><lf></lf></cr>	Read: RS485 mode



Code	Followed by	Operation
\$630	;pressure_ins <cr><lf></lf></cr>	Set: AUX port Pressure output option
		\$630;0 = RAW INTERNAL
		\$630;1 = RAW EXTERNAL
		\$630;2 = CORRECTED (pressure sensor option - \$633)
\$631	<cr><lf></lf></cr>	Read: AUX port Pressure output option
\$632	<cr><lf></lf></cr>	Read: Pressure Options
\$633	;pressure_options <cr><lf></lf></cr>	Set: Pressure Sensor used in calculations
		\$633;0 = INTERNAL
		\$633;1 = EXTERNAL



## 8.1 Pressure Tare

The Interchangeable pressure sensor fitted in the Bathy2 measures absolute pressure, that is, it includes atmospheric pressure. The pressure Tare function allows the atmospheric pressure (as measured by the sensor, normally before deployment) to be removed from the observations so the output is simply the pressure of water.

The pressure Tare observation should be taken with the sensor in the same orientation as it will be deployed (horizontal, pointing up or pointing down) to negate any effects of the weight of the sensing element itself

- Whilst this effect is small, it is an unnecessary contribution to the error budget

Code	Description
\$009	Measure Tare (observes current pressure reading and programs the Tare value)
\$009;nnnn.nnn	Sets specific Tare in dBar Example: #009;10.325 sets Tare to 10.325dBar
\$010	Read the current Tare value in the units set at the time it was observed

## 8.2 Set Latitude and Longitude

The Latitude and Longitude are required to calculate the Absolute Salinity Anomaly Ratio lookup table.

# Code	Description
\$607;nn.nnn	Sets the local operating latitude in decimal degrees Example: \$607;50.426 Sets latitude to 50.426° (50° 25' 34") North North is positive South is negative
\$606	Read the Latitude set in the instrument
\$609;ee.eee	Sets the local operating longitude in decimal degrees Example: \$609;-3.426 Sets latitude to 3.426° (3° 25' 34") West East is positive West is negative
\$608	Read the Longitude set in the instrument



# 9 Data Output Formats

The Bathy2 has a selection of different data output formats built in, allowing easy interface to software packages and third-party instrumentation.

The Bathy2 Interpreter App is supplied with the Bathy2 as part of the Configure App. The Interpreter can be used to distribute up to 5 data strings of different formats to 5 COM ports or TCP/IP addresses.

## 9.1 Data String Formats

#### 9.1.1 Format: VALEPORT

This is the default output string and must be selected to operate with the Bathy2 Interpreter App.

Command:	\$605;0							
Format:	yyyy-mm-dd^hh:mm:ss.sss^CC.CCC^pppp.ppp^TT.TTT^hh.hhh^ccccc.ccc^pppp.ppp ^dddd.ddd^dddd.ddd^DDDD.DDD^DDDD.DDDD^s.sss^AA.AAA <cr><lf></lf></cr>							
Notes:	Field	Format	Units					
	Date	yyyy-mm-dd						
	Time	hh:mm:ss.sss						
	Conductivity	222.22	MS/CM   µS/CM					
	Pressure (selected)	pppp.ppp	DBAR   Pa   PSI					
	Temperature	tt.ttt	°C   °F					
	Altimeter height	hh.hhh	M F					
	(zero if not interfaced)							
	Sound Velocity (measured)	000.0000	M/S   F/S					
	Depth	dddd.ddd	DBAR   Pa   PSI					
	Total Depth (Instrument dept + Altimeter)	dddd.ddd	M F					
	Point Density	DDDD.DDD	KG/M3					
	Profile Density	DDDD.DDD	KG/M3					
	Salinity	S.SSS	G/KG					
	Barometric Pressure\TARE value	pp.ppp	DBAR					
	External Pressure Sensor Data (zero if not interfaced)	pp.ppp	DBAR					
	The string data delimiter is a Tab (^)							

Date	Time	<b>Cond</b> 'tivity	Pressure	Temp	Altimeter	Sound	Depth	Total	Point	Profile	Salinity	Pressure	Pressure
		-				Velocity	-	Depth	Density	Density	•	Baro	Ext
YYYY-MM-	HH:mm:SS	mS/cm	dbar	deg C	m	m/s	m	m	kg/m3	kg/m3	g/kg	dbar	dbar
DD				-					-	-			
2021-11-19	17:13:20	0.126	10.317	18.562	0.120	1478.152	0.252	0.372	998.546	1009.402	0.068	10.100	10.374
2021-11-19	17:13:20	0.120	10.317	18.562	0.120	1478.152	0.252	0.372	998.544	1009.402	0.065	10.100	10.376
2021-11-19	17:13:20	0.118	10.317	18.561	0.120	1478.154	0.252	0.372	998.543	1009.402	0.064	10.100	10.376

## 9.1.1.1 Header Message

When set to VALEPORT Output format a Header message can be sent each time the instrument is put into a run mode (\$028):

Code	Description
\$020;n	Enable   Disable Header output \$020;0 disables Header output \$020;1 enables Header output
\$021	Read header

#### The message contains the following information

>[HEADER]

Field	Setup Function	Read Parameter
DataStartTime=09/08/2022 15:32:39	-	
Latitude=-3.0000	\$607	\$606
Longitude=54.0000	\$609	\$608
DeviceSeries=Bathy2	-	
VpdVersion=2	-	
InstrumentCode=01300030	-	\$007
MainFirmware=04007182A9 Jul 8 2022 15:33	-	\$014
BathyFirmware=04007184A1 10/01/2022 17:00		
SiteInfo=Factory Test Site	\$012	\$011
SerialNumber=XXXXX	-	\$003
DensityProfileMaxPressure=xxxxx	\$601	\$600
DensityProfileResolution=xxxx	-	\$602
SamplingInterval=1.000	\$016	\$017

#### Instrument output format

[COLUMNS]	Туре	Format
Date	String	YYYY-MM-DD
Time	String	HH:MM:SS.ZZZ
Conductivity	Float	MS/CM   µS/CM
Pressure	Float	DBAR   Pa   PSI
Temperature	Float	°C °F
Altimeter (zero if not interfaced)	Float	M   F*
selected SV and offset applied		
Sound Velocity - observed	Float	M/S   F/S
Depth	Float	M  F*
Total Depth (Calculated depth + Altimeter)	Float	M   F*
Point Density	Float	Kg/M <sup>3</sup>
Profile Density	Float	Kg/M <sup>3</sup>
Salinity	Float	g/Kg
Pressure Barometric (TARE if not interfaced)	Float	DBAR
Pressure External AUX IN port (zero if not interfaced)	Float	DBAR

\* - single setting



#### 9.1.2 Format: TRITECH

Command: \$605;3

## 9.1.3 Format Seaking

Command: \$605;4

#### 9.1.4 Format: Digiquartz

This format emulates the Paroscientific Digiquartz sensor output

Command:	\$605;5		
9.1.5 Format: L	JK90_STD		
Command:	\$605;6		

## 9.1.6 Format: WINSON\_PROC

Command: \$605;7

#### 9.1.7 Format: VALEPORT SVX2

Command: \$605;9



## 9.2 Modbus RTU over RS485

Modbus RTU as implemented in the Bathy2 is an industry standard interface protocol that will run over RS232 or RS485.

The Baud rate is variable 4800 to 19200 with 8N1 or 8E1 framing.

This conforms to the minimum requirements of the MODBUS standard of 9600 and 19200 baud with 8E1 framing.

Full set up and operation through Modbus is outside the scope of this document, please contact Valeport for further details.

See section Instrument Communications Setup for details on how to enable Modbus



# 10 Wiring Details

## 1.1 BathyPack Main Bulkhead Connector

10 Way Female SubConn MCBH10F	Function
1	Power Ground
2	Power +V
3	RS422TxA
4	RS422TxB
5	RS422RxA
6	RS422RxB
7	RS232 Tx (To PC)
8	RS232 Rx (From PC)
9	RS232 Ground
10	N/C

Note: For half-duplex RS485 communications link Pin 3 to Pin 5, and Pin 4 to Pin 6 in the cable.

# 1.2 BathyPack Altimeter Bulkhead Connector

6 Way Female SubConn MCBH6F	Function
1	Sensor Power Ground / RS232 Ground
2	RS232 Rx In to BathyPack
3	RS232 Tx Out of BathyPack
4	Sensor Power (+24V max)
5	RS485B
6	RS485A

## 1.3 RS232 3m Y lead (as supplied)

10 Way Male SubConn MCIL10M	4mm Banana Plugs	9 Way D Type	Function
1	BLACK		Power Ground
2	RED		Power +V
3			
4			
5			
6			
7		2	RS232 Tx (To PC)
8		3	RS232 Rx (From PC)
9		5 (link to 1,6,8,9)	
		SHELL	RS232 Ground
10			Link to RS232 Ground



## 10.1.1 Serial Connection

6 Way Male SubConn (MCIL6M)		
PIN	FUNCTION	
1	RS232 GND	
2	RS232 Tx (Out of sensor) or RS485A	
3	RS232 Rx (Into sensor) or RS485B	
4	+V	
5	Link to Pin 1 for RS485 Not Connected for RS232	
6	Power GND	

## 10.1.2 Ethernet Connection

WIRE TYPE /	WIRE COLOUR	END 1: SCDBH13FT2 Su	FUNCTION	
		CONNECTOR	PIN	
20 AWG	BLACK	13 Way SubConn	1	External Power (-Ve)
coloured wires	WHITE	Bulkhead	3	External Power (+Ve)
	ORANGE		2	Screen (Not
				connected)
	RED		12	Not connected
GREE	GREEN		13	Not connected
CAT5E patch cable	WHITE/GREEN		11	Bi-Dir_DA+ (Rx +)
	GREEN		10	Bi-Dir_DA- (Rx -)
	WHITE/ORANGE		9	Bi-Dir_DB+ (Tx +)
	ORANGE		8	Bi-Dir_DB- (Tx -)
	WHITE/BLUE		7	Bi-Dir_ DC-
	BLUE		6	Bi-Dir_DC+
	WHITE/BROWN		5	Bi-Dir_ DD+
	BROWN		4	Bi-Dir_ DD-

#### 10.1.2.1 Ethernet Y lead

END 1: 13 WAY MALE SUBCONN		WIRE COLOUR	END 2: RJ45 CONNECTOR		END 3: BANANA PLUG	FUNCTION	
CONNECTOR	PIN		CONNECTOR	PIN	CONNECTOR	PIN	
SubConn,	1	Black			Black 4mm Plug	1	-V
13 way male	3	White			Red 4mm Plug	1	+V
SCDBH13MBR	2	Orange					Screen (Not Connected)
	4	Brown	RJ45 Cable	8			Bi-Dir_ DD-
	5	Brown/White	Mount	7			Bi-Dir_ DD+
6 Blue 7 Blue/White 8 Orange	Connector	4			Bi-Dir_ DC+		
	Blue/White		5			Bi-Dir_ DC-	
	Orange		2			Bi-Dir_DB- (Tx -)	
	9	Orange/White		1			Bi-Dir_DB+ (Tx +)
10	10	Green		6			Bi-Dir_DA- (Rx -)
	11	Green/White		3			Bi-Dir_DA+ (Rx +)
	12	Red					Not Connected
	13	Green					Not Connected



# 11 Ethernet – Bathy2e

The Bathy2 can be optionally fitted with a Transmission Control Protocol/Internet Protocol (TCP/IP) Ethernet module set up in Dynamic Host Configuration Protocol (DHCP). This means the instrument will automatically be assigned an IP address. Depending on how your router works, it should go back to that IP address each time it is interfaced although this is not guaranteed unless you provide it with a fixed IP in the router configuration.

#### 11.1.1 Setting up Ethernet Connectivity

The Bathy2 has a Lantronix Ethernet module that will need to be configured. You can download the Lantronix Device Installer software from <u>https://www.lantronix.com/products/deviceinstaller/</u>.

Connect the miniIPS2e to the network and run the software. If the device is not found after a few moments press Search, top left



Once the module has been found click on XPort to reveal the IP address - in the example above: 192.168.8.155

Click on the IP Address in the left hand panel to reveal more information in the right hand panel

#### Select Web Configuration

File Edit View Device Tools Help Disearch Collisions Calculate Statement P Disparate Statement	t Provisioning File . 57 Generate Device File	
🔒 🚉 Lations Deveus - I deveu(s)	Device Info Configuration Records Status Record	Web Configuration Julies Configuration
E Second Area Connection (192,168 8,120)	a Reload Info	~
E Say XPort 05 - ferrovane v6 10	Property	Value
S 192 183 8 193	Karne	XPort-06
	DATE Distant March	

Select the green arrow to reveal the password entry dialogue

SE Lastron, francismular 440.7		CE 10 (1)
He lift Yaw Davis Table Help		
Diesen Copiers Chickel Chicgs # Otherste .	Ingent Prantessang File @ Seewate Desca File	
- Se Lutton Oricei - Letecogi	Territor Info Configuration Territoria Status Research Web Configuration Tables Configuration	~
D Const Area Convention (198, 198, 511)	Aukana Majari Majari 100.0.7000	·(=)+0 ===
10 424 57ml 00, Name of 10 22 102 500 2100	b	~

Do not enter a Username or Password - simply select OK

Windows Boosely	18
DeviceInstaller.exe	
The server 192,198 0,155 is asking for your username and activities	
That server also reports "(out)"	
Warning: Your username and password will be part using basis authentikation on a connection that is o't secure.	ŝ
Jachane	
Faulterd	
Remember my crecter flats	
Office Carrol	



## Select: Connection

Ensure settings are similar to those shown below:

<u>ଜ</u>	Connection Settings		
Network			
Server	Channel 1		
Serial Tunnel	Connect Protocol		
Channel 4	Emiscal TCP V		
Serial Settings			
(Connection)	Connect Mode		
Channel 2	Passive Connection: Active Connection:		
Serial Settings	Accept		
Connection	Incoming: Yes V Active Connect None V		
Configurable Pins	Password Own @W		
Apply Settings	Required: Ores @ ND Start Character: (a 00 (in Hex)		
	Password: Modern Mode: None V		
	Nodem Escape Sequence		
Apply Defaults	Pass Through:   Yes O No Show IP Address After RING:   Yes O No		
	Endpoint Configuration:		
	Local Port 50 Remote Port 0		
	Auto increment Local Port for active		
	connect Remote Hast 0.0.0.0		
	•		
	Common Options:		
	Contect Response: None		
	Terminal Use Oxec @No. 100: Block M		
	Name: Hostist One @No Coo. Dank *		
	Disconnect Mode		
	On Mdm_Ctrl_In Drop: O Yes ® No Hard Disconnect ® Yes O No		
	Check EOT(Ctrl-D): O Yes INo Inactivity Timeout : 0 (mins:secs)		
	OK		
	200		

## Protocol: TCP

The Local Port number should be less than 10000.

```
Do not select or accept a Local Port number 23
Local Port number 23 is reserved for TelNet
```

Remote Port: 0

#### Select: Apply Settings

Perform a new search after the settings have been completed.



#### Select: Serial Settings:

	Serial Settings
Network	Channel 1
Serial Tunnel Hostist	Disable Senal Port
Channel 1	Port Settings
Connection	Protocol: RS232 V Flow Control None V
Channel 2 Serial Settings	Baud Rate 230400 V Data Bits 8 V Parily. None V Stop Bits 1 V
Configurable Pins	Pack Control
Apply Settings	Enable Packing     Isle Cap Time: 12 msec      Match 7 Bds Sequence: 0 Yes @ Ale     Sect Etyme Immediate: @ Yes 0 He
Apply Defaults	Match Bytes: 04/00 04/00 Send Trailing Bytes:   None O One O Two (Here)
	Flush Mode
	Flush Input Buffer Flush Output Buffer
	With Adive Connect: O Yes  No With Adive Connect: O Yes  No
	With Passive Connect. O Yes @ No With Passive Connect. O Yes @ No
	At Time of Disconnect: O Yes @ No At Time of Disconnect: O Yes @ No
	OK

## Baud Rate on Channel 1: 230400

Flow Control: None

#### Click on: Apply Settings

Perform a new search after the settings have been applied to ensure they have been saved.

## 11.1.1.1 If No Lantronix Devices are Found

If no Lantronix devices are found, this can happen if you are using an Ethernet to Serial converter, click on the Options button: Options and check that you have the correct network adaptor selected.

2 Lantronix DeviceInstaller 4.4.0.7				
File Edit View Device Tools Help				
🔎 Search 🕼 Options ) 🖨 Exclude 🛭 🔌 Assign IP				
Euronix Devices - 0 device(s)	Name	User Name	User Group	IP Address Ha
Ethemet (10.0.2.37)	No Devices Were Found!			
😰 Optic	15			×
Network	Customization			
Use th	following network adapter:			
Name		IP Address	Subnet mask:	
Ett	ernet	10.0.2.37	255.255.0.0	
	ernet 3	169.254.0.176	255.255.0.0	

Once a new network adaptor has been selected, click on the Search button: *Search* to locate and interface to the uvSVXe.



## 11.1.1.2 Fixed IP

To set a fixed IP address for the unit follow the wizard in the Lantronix App

🔑 Search 🛛 🙄 Options 🧲	Exclude 🔇 Assign IP 🎯 Upgrade 🛛 🦉	Import Provisioning File	Generate Device File
Sassign IP Address		×	
	Assignment Method		
12 Control	Would you like to specify the IP address or should the unit get its settings from a server out on the network?		
1000	Obtain an IP address automatically		
MEAS	Assign a specific IP address		
	TCP/IP Tutorial		
	< Back Next > Cancel Help		

11.1.2 Instrument Communications Setup



# 12 Care & Maintenance

The Bathy2 are remarkably robust, being primarily constructed of titanium. The only maintenance required, other than periodic recalibration as necessary or recommended at maximum of 2 years, is to keep the sensor as clean as possible. The instrument should be rinsed with freshwater when recovered and any debris or growth gently removed.

Do not attempt to remove the acetal Lock Screw Cap from the Pressure Module. If debris is caught under the cover attempt to remove it under slowly flowing water, use no tools. If this fails contact Valeport for further advice. If the sensor diaphragm is damaged in any way it will have to be replaced.

The instrument should be stored in its box when not in use. It is not necessary to remove the Interchangeable Pressure Sensor Module during storage.

Any damage to this diaphragm will render the Pressure Module warranty invalid

## 12.1 Calibration

The Bathy2 Interchangeable Pressure Modules can be returned to Valeport or one of its approved laboratories for recalibration.

Pressure sensors should be calibrated biennially



# 13 Updating the Bathy2

On occasion there will be updates to the Bathy2 firmware.

## 13.1 Updating the Intelligent Interface Board Firmware

The firmware will be available on https://valeport.download.

# Select Bathy2 from the dropdown list to be presented with software and firmware relevant to Bathy2.

Windows Software				
Product	Description	Suitable for:	Version/Size	Get
Bathy2 Interpreter	Software application to interpret incoming Bathy 2 data and convert it to various Output Formats. + Valeport + Valeport (old) + Tritech + SeaKing + Digiquartz + UK90_STD + Winson_Proc + Winson_Proc (subsea) What's new? Added TCP Input option for incoming Atmospheric data. Added TCP Output option for exporting Interpreted data.	+ Bathy2	1.0.09 4.1 MB	
Valeport Configure	Valeport Configure is a generic program developed to operate with a number of Valeport Instruments; a specific module being loaded for each The list of instruments compatible with Configure will increase over time. Some important points to note about the download: Presently available for windows 10 PC only. Functionality: Instrument set up and set to work. What's new? Regarding to previous version, configuration file for Type-804 is updated.	+ Bathy2 + minilPS2 + uvSVX + Hyperion + Type 804 + Type 804 + Type 810 + Type 812	2.0.31 15.99 MB	
Valeport Bootloader	A software tool to update your instrument to the latest firmware. What's new? Renamed BathyPack2 to Bathy2	+ All SWiFT variants + All Hyperion variants + minilPS2 + uvSVP + uvSVX + Type 804 + EnviroLog + Bathy2	2.025 2.55 MB	

Firmware				
Product	Description	Suitable for:	Version/Size	Get
Bathy2 Intelligent Interface Board Firmware	The latest firmware version for your instrument. If you have any doubts as to the compatibility of this firmware with your instrument please contact Valeport before attempting to upgrade. This firmware should be loaded into your instrument using the Valeport Bootloader software tool; available to download from this page. What's new? Bathy2 Firmware	+ Bathy2	B0 136.56 KB	

Download and install Valeport Bootloader – a shortcut should be added to your desktop:



Download and save the .zip file - do not 'unzip' it.



## 13.2 Valeport Bootloader App

Run the software and select Bathy2 from the dropdown list:

Valeport Bootloader - 2.	0.2.5			×
File Help				
This Computer's Power				
Instrument		~		
	UVSVP			
	miniIPS2 Hyperion			
	Type 804			
	Altimeter			
	Bathy2	¥		
		Ne	xt	
		-		
	ALEPOR			
V				
			_	
fi 🚲 🏏 in 4	St. Peter's Quay, Totnes, Devon, TQ9 5EW Ur	ited Kingd		

In the Firmware File: field use the dialogue button to select the zip file you downloaded earlier or simply drag and drop it on the window.

In the Device to Update: field use the drop down list to select the COM port the instrument is interfaced to

🜠 Valeport Bootloader - 2.0 File Help	0.2.5			×
This Computer's Power:	Running on Mains Power			
Instrument:	Bathy2	$\sim$		
Parity:	None	~		
	Please ensure the Instruments parity is set to 'Nor	ne'.		
Baud Rate:	115200	$\sim$		
	Please ensure the Instruments baud rate is 11520	0.		
Firmware File :	C:\Users\xxxxxxxxx\Downloads\04007182B0.zip	æ		
	Either select the file using the box above, or drag file onto this form	the		
Device to Update:	-	~		
	COM2 COM16			
		Nex	¢t	
_	$\frown$			
	ALEPOR			
	<u> </u>			
fi 👬 🎽 in 🦚	St. Peter's Ouav, Totnes, Devon, TO <u>9-5EW Unite</u>	d Kinada		

Once the instrument has been recognised it will show the installed firmware:



🚾 Valeport Bootloader - 2.0	).2.5	-		×
Eile Help				
This Computer's Power:	Running on Mains Power			
Instrument:	Bathy2	~		
Parity:	None	Ý		
	Please ensure the Instruments parity is set to 'No	ne'.		
Baud Rate:	115200	~		
	Please ensure the Instruments baud rate is 11520	00.		
Firmware File :	C:\Users\xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	ŝ		
	Either select the file using the box above, or drag file onto this form	, the		
Device to Update:	COM16	~		
	Device Firmware is currently 04007182A9 Jul 8 2	022		
	2.55			
		Nex	xt	
	$\frown$			
	ALEPOR	Т		
V	$\checkmark$			
TA You we in the	Valeport Ltd		~	
	St. Peter's Quay, Totnes, Devon, TQ9 SEW Unit	ed Kingdo	мп	

Click Next

🔀 Valepo	rt Bootloader - 2.0.2.5	48		×
<u>File H</u> el	0			
You hav with the 	e chosen to reprogram on COM16 file found at C: \Users\xxxxxxxx \Desktop\BootLoader Zip Files\040071	8280.zip	ñ	¥ 14
	Program now			
,	ALEPOR	[ <b>T</b>	Close	
f You	St. Peter's Quay, Totnes, Devon, TQ9 5EW United	d Kingdor	n	
Click	Program now			



#### You can monitor progress as the new firmware is bootloaded:

Naleport Bootloader - 2.0.2.5 ile <u>H</u> elp	<u>_</u> 7		×
You have chosen to reprogram on COM16 with the file found at C:\Users\nsmedley\Desktop\BootLoader Zip Entering programming mode Soft reset10 9 8 Device Reset successful. Programming device7 6 5 4	Files\0400718280.zij 3 2 1	D	
Programming Device 26%			
		Clos	e
	RT		

#### You will be informed when the process in complete





# 14 Ordering and Part Numbers

Part No.	Description
0608010	Bathy2 Base Unit - Titanium housing Fitted with: Fast Response PRT temperature sensor Pressure compensated conductivity cell 50mm path length sound velocity sensor Includes interfaces for Valeport VA500 altimeter External pressure sensor e.g. Digiquartz Auxiliary pressure output e.g. INS Supplied with Valeport Configure software   4m interface lead   operating manual and system transit case. Altimeter and PTSA Pressure Transducer are not included
0608010-XXX	Bathy2 Base System - Titanium housing Fitted with: 0.01% piezo-resistive, interchangeable pressure sensor (XXXBar) where XXX = 100, 200, 300, 400 or 600 Bar Fast Response PRT temperature sensor Pressure compensated conductivity cell 50mm path length sound velocity sensor Includes interfaces for Valeport VA500 altimeter External pressure sensor e.g. Digiquartz Auxiliary pressure output e.g. INS Supplied with Valeport Configure software   4m interface lead   operating manual and system transit case. Altimeter is not included
0608011-XXX	Bathy2 ETHERNET System - Titanium housing Fitted with: 0.01% piezo-resistive, interchangeable pressure sensor (XXXBar) where XXX = 100, 200, 300, 400 or 600 Bar Fast Response PRT temperature sensor Pressure compensated conductivity cell 50mm path length sound velocity sensor Includes interfaces for Valeport VA500 altimeter External pressure sensor e.g. Digiquartz Auxiliary pressure output e.g. INS Supplied with Valeport Configure software   4m interface lead   operating manual and system transit case. Altimeter is not included
PTSAXX	Interchangeable Pressure Sensor Module (XXX Bar)
0760089	Pressure Module removal tool



# 15 Declarations of Conformity

Any changes or modifications to the product or accessories supplied, that are not authorised by Valeport Ltd, could void the CE compliance of the product and negate your authority to operate it. This product has demonstrated CE compliance under conditions that include the use of shielded cables. It is important that you use shielded cables compliant with the product's conformance, to protect from potential damage and reduce the possibility of interference to other electronic devices

## 15.1 EU Declaration of Conformity – CE Mark

## 15.1.1 Bathy2

	,
Manufacturer:	Valeport Ltd
Address:	St Peter's Quay, Totnes, Devon, TQ9 5EW
Certification marking:	CE
Product Description:	Bathy2
We the manufacturer declare the following EU Directives and harn EMC Directive 2014/30/EU	at the product Bathy2, is in conformity with the nonised standard(s): Standards
EMC (Article 3.1b)	BS EN 61326-1:2013 (Basic Level)
RoHS Directive 2015/863/EU	Standards
Prevention (Article 4.1)	BS EN IEC 63000:2018
Name:	D.Lakin
Position:	Development Engineer
Place of issue:	Valeport Ltd, Totnes, UK
Date of issue:	08 November 2021
Signature:	MP-



#### 15.1.2 Interchangeable Pressure Module

	1	~				
$\mathbf{N}$	AL	. E	P	0	R	т
V	-					

# EU Declaration of Conformity

Manufacturer:	Valeport Ltd
Address:	St Peter's Quay, Totnes, Devon, TQ9 SEW
Certification marking:	CE
Product Description:	Interchangeable Pressure Sensor Module (IPSM)

We the manufacturer declare that the product **Interchangeable Pressure Sensor** Module (IPSM) is in conformity with the following EU Directives and harmonised standard[s]:

EMC Directive 2014/30/EU	Standards	
EMC (Article 3.1b)	BS EN 61326-12013 (Basic Level)	

RoHS Directive 2015/863/EU	Standards
Prevention (Article 4.1)	BS EN IEC 63000:2018

Name:	James Bishop	
Position:	Design Engineer	
Place of issue:	Valeport Ltd, Totnes, UK	
Date of issue:	27 February 2020	
Signature:	Josefy	

 
 Valeport Limited St. Peter's Quay, Totnes, Devon TQ9 SEW UK
 +44 (0/ 1805 869292 sales@tvoleport.co.uk
 With scale sampling respector to gene
 Image: Control of the sampling respector to gene</



# 15.2 UK Declaration of Conformity – UKCA Mark

## 15.2.1 Bathy2

	Valeport Ltd
Address:	St Peter's Quay Totnes Devon TO9 5EW
Certification marking:	UKCA
Product Description:	Bathy2
Electromagnetic Compatibility Regulations 2016	Standards
EMC	BS EN 60945/2002
ROHS Regulations 2012	Standards
ROHS Regulations 2012 SI 2012 No. 3032	Standards BS EN IEC 63000:2018
ROHS Regulations 2012 SI 2012 No. 3032 Name:	Standards BS EN IEC 63000:2018
ROHS Regulations 2012 SI 2012 No. 3032 Name: Position:	Standards       BS EN IEC 63000:2018       DLakin       Development Engineer
ROHS Regulations 2012 SI 2012 No. 3032 Name: Position: Place of issue:	Standards       BS EN IEC 63000:2018       DLakin       Development Engineer       Valeport Ltd. Totnes, UK
ROHS Regulations 2012 SI 2012 No. 3032 Name: Position: Place of issue: Date of issue:	Standards         BS EN IEC 63000:2018         DLakin         Development Engineer         Valeport Ltd. Totnes, UK         08 November 2021



## 15.2.2 Interchangeable Pressure Module

UN Decia	ration of comorning
Manufacturer:	Valeport Ltd
Address:	St Peter's Quay, Totnes, Devon, TQ9 SEW
Certification marking:	UKCA
Product Description:	Interchangeable Pressure Sensor Module (IPSM
Electromagnetic Compatibility Regulations 2016	Standards
EMC (SI 2016 No.1091)	BS EN 61326-12013 (Basic Level)
EMC (SI 2016 No.1091) ROHS Regulations 2012	BS EN 61326-12013 (Basic Level) Standards
EMC (SI 2016 No.1091) ROHS Regulations 2012 SI 2012 No. 3032	BS EN 61326-12013 (Basic Lavel) Standards BS EN IEC 630002018
EMC (SI 2016 No.1091) ROHS Regulations 2012 SI 2012 No. 3032	BS EN 61326-1:2013 (Basic Level) Standards BS EN IEC 63000:2018
EMC (SI 2016 No.1091) ROHS Regulations 2012 SI 2012 No. 3032 Name:	BS EN 61326-1:2013 (Basic Level) Standards BS EN IEC 63000:2018 Surya Dinesh
EMC (SI 2016 No.1091) ROHS Regulations 2012 SI 2012 No. 3032 Name: Position:	BS EN 61326-1:2013 (Basic Level) Standards BS EN IEC 63000:2018 Surya Dinesh Product Support Manager
EMC (SI 2016 No.1091) ROHS Regulations 2012 SI 2012 No. 3032 Name: Position: Place of issue:	BS EN 61326-1:2013 (Basic Level)         Standards         BS EN IEC 63000:2018         Surya Dinesh         Product Support Manager         Valeport Ltd, Totnes, UK
EMC (SI 2016 No.1091) ROHS Regulations 2012 SI 2012 No. 3032 Name: Position: Place of issue: Date of issue:	BS EN 61326-1:2013 (Basic Level)         Standards         BS EN IEC 63000:2018         Surya Dinesh         Product Support Manager         Valeport Ltd, Totnes, UK         16 June 2021