SONAVISION

CENTAUR

INSTALLATION MANUAL

Part Number: 5251-31-0002

TECHNICAL SUPPORT

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MAINTENANCE AND WARRANTY POLICY

Sonavision Limited warrants that its products are free from defects at the time of delivery and subject to the conditions listed below, undertakes to repair, or at its option replace, any product found to be defective in material or workmanship within one year after delivery, whichever is less, to the original purchaser by Sonavision Limited or its authorised representative.

CONDITIONS

1   Sonavision Limited must be immediately notified of any suspected defect and if advised by Sonavision Limited, the equipment subject to defect shall be returned to Sonavision Limited, freight prepaid.

2   This warranty does not cover defects which are caused as a result of improper usage, repair, maintenance, alteration or installation unless such activities have been undertaken by Sonavision Limited or its authorised representative.

3   On completion of any warranty work, Sonavision Limited will return the equipment, freight prepaid.

4   Sonavision Limited retains the sole right to accept or reject any warranty claim.

GENERAL WARNINGS

1   Lethal voltages are exposed within the surface control unit when the top cover is removed.

2   The surface control unit should always be disconnected from the mains supply before removing or operating any of the access panels.

3   The surface unit should be earthed at all times via the mains earth or the chassis stud at the rear of the control unit.

4   Both surface and subsea units contain electrostatically sensitive devices (ESSD).

RELATED INFORMATION

Description	Part Number

1   Introduction

The Centaur utilizes a precision Digiquartz pressure sensor and highly accurate echo sounder. Both of these sensors can be swapped by the user to optimize the Centaur for their particular use. Six Digiquartz depth sensors are available across a range of pressure and two frequencies for the echo transducer. These frequencies are 200 kHz (Red transducer) and 500 KHz (Blue transducer).

The device is power by 12 – 48 Volts d.c. and communicates over RS232 or RS485.

2   Functionally of the Centaur

2.1   Communication

The Centaur supports RS232 and RS485 on the following baud rates

4800
9600
19200
38400
115200

When power up the Centaur resorts to an RS232 / RS485 auto detection mode for 5 seconds. If no connection is established using the SV Protocol within this 5 second window the Centaur will resort to a fix mode of output emulating a UK94. The baud rate will be 9600 in this mode.

The factory default baud rate is 9600 this is changeable by the user.

2.2   Data Output

There are two methods of accessing the information acquired by the Centaur altimeter

2.2.1   Data on request via the SV protocol

Reading are requested and received by a system communicating with the SV protocol. When running in this mode, the SonaVision application software allows parameters within the Centaur to be read and certain ones can be varied. In addition, the software allows the user to output a number of industry-standard data string formats or a user-defined string format from an auxiliary serial COM port on the surface control PC.

2.2.2 UK94 output

The Centaur will emulate a UK94 bathy if no communication is established on RS232 or RS485 using the SV protocol. The baud rate will be set to a fixed 9600 in this mode and

2.3 Altimeter Range Selection

The Centaur allows a maximum range to be set by the user, this range is from the Centaur's transducer face to the object (one way). Any echo's received beyond this range are ignored.

If it is known that the Centaur is working no more than a certain distance from a target then it is recommended to set the maximum range to slightly more than this distance. This will focus and optimize the Centaur's AGC, analogue output and ping rate to the working distance.

2.4 Automatic Gain Control (AGC)

If enabled AGC will adjust the gain of the receiver in an appropriate fashion so that long range echoes are boosted increasing range capabilities and short range echoes are attenuated allowing accurate short range use.

2.5 Filtering Data

The data output from the device can be filtered using 1 of 5 filtering methods. Each method has 24 intensities meaning 120 unique algorithms for smoothing data are available.

Filter Method	Description
Mean	Add n number of samples and divide by n
Median	Order n samples in a sequential fashion and return the middle value.
Median 1	Order n samples in a sequential fashion and return the mean of the middle and 2 adjacent samples. (Average of 3 center values).
Median 2	Order n samples in a sequential fashion and return the mean of the middle and 4 adjacent samples. (Average of 5 center values).
Median 3	Order n samples in a sequential fashion and return the mean of the middle and 6 adjacent samples. (Average of 7 center values).

n can take any integer value between 8 and 31

2.5.1 Effects of Increasing Samples

Increasing the number of samples in the filtering method will delay the output data by the number of samples in the filtering method. If the Mean of 8 filtering method is applied then the output will be delayed by 8 samples. The effect can be seen below, the green line is the filtered version of the raw data.

Mean of 8

Mean of 31
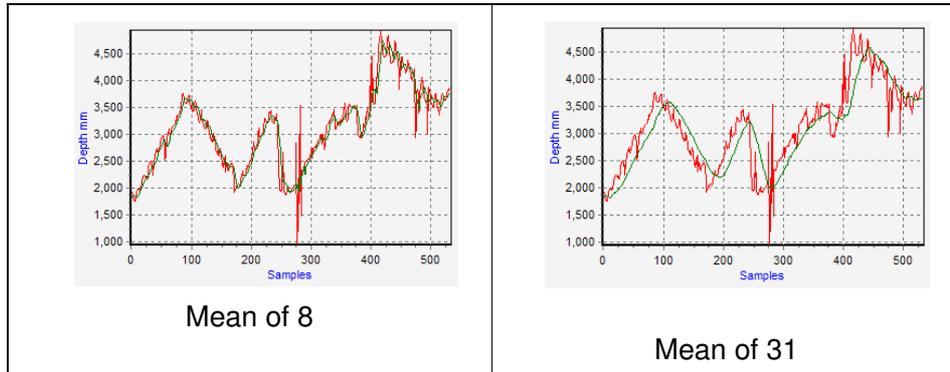
2.5.2 Choosing a Filtering Method

The choice of algorithm and the intensity to which it is used is based upon the environment and desired output. The Mean algorithm will smooth out any variations but not remove extremes so data may contain spikes that are error readings.

The Median type algorithms will very likely exclude any extremes and output only true measurements. Taking the mean of the center sample as Median 1 does effectively smoothes the true measurements. The further the sample is from the center the more likely it could be an incorrect reading. So using Median 3 on 8 samples of data is much more prone to errors than Median 1 on 8 samples. Increasing the number of samples will improve this but introduce delay.

2.5.3 Filtering Examples
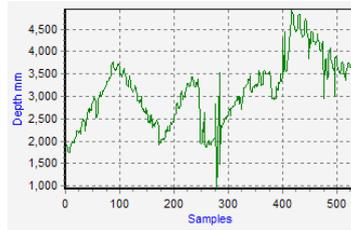
Unfiltered Data

	8 Samples	16 Samples	31 Samples
mean			
Median			
Median 1			
Median 2			
Median 3			

2.6   Changing Frequency

The electronics inside the Centaur support 200 kHz and 500 kHz. In order to change the operating frequency of the Centaur the transducer must be changed to one that is designed to operate on the required frequency. Refer to the "Centaur Service" manual (part number 5253-35-0001) for details on how to do this.

2.7   Changing Digiquartz

The Digiquartz can be swapped out to replace a faulty Digiquartz or to replace with one whose pressure range is suited to the required use. The following pressure ranges are available:

0 – 300 PSI
0 – 1000 PSI
0 – 2000 PSI
0 – 3000 PSI
0 – 6000 PSI
0 – 10000 PSI

2.8   Updating Firmware

The Centaur has been equipped with a boot loader allowing the user to update the firmware version. Reloading the firmware will not result in loss of settings.

3   Appendix A

3.1   String Output

3.1.1   UK94

Example: <STX>U04765924+01805003F<CR><LF>
Format: <STX>Upppppppp+tttttDDDD<CR><LF>

p is the pressure and is always a fixed length of 8. The value must be divided by 10000 to get the pressure in PSI.

t is the temperature and is always a fixed length of 5. The value must be divided by 100 to get the temperature in degrees Celsius.

D is the depth in hexadecimal. It is a 16 bit number with a range of 0x0000 to 0x0FFF, representing 0 to 30 m. The 4 hexadecimal ASCII character are capital letters.

The highest resolution this string can provide is 7.32 mm.

Formula to convert to depth:
In the formula D is assumed to be the decimal representation of the hexadecimal D

depth = (30 ÷ 4095) × D

Depth reading examples:
0000   displayed when an echo is lost
00AF   1.28 m
05B7   10.71 m

Other output string formats and user-programmability are explained in detail the Centaur/Echo Operation Manual (5253-31-0001). These are only available while running in SV communications protocol mode.
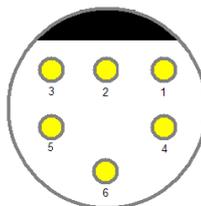
4   Appendix B

4.1   Main Connector Pin Out

Pin	Function
1	20mA current loop output
2	RS232 Ground
3	RS232 TX (data out) / RS485 -
4	RS232 RX (data in) / RS485 +
5	+12 to +48 (typ +24) Volts Power
6	0 Volts Power
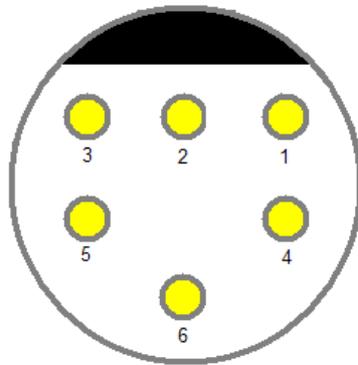
Centaur (Male) Connector View

4.2   Mini Valeport Connector Pin out

Pin	Function
1	RS232 Ground (Input to Centaur)
2	RS232 Tx (Input to Centaur)
3	RS232 Rx (output from Centaur)
4	+12 Volts Power (from Centaur)
5	N/C
6	Power Ground (from Centaur)

Centaur (Male) Connector View

5   Appendix C

5.1   Specification

Supply voltage	12 – 48 VDC,
Max power consumption	6 W
Typical current consumption	215 mA @ 24 VDC
Communications	RS232 / RS485 / Current loop (UK94 output only), 8-N-1 format
Output mode	Free running, interrogated, multidrop
Analogue Output	0 to a maximum of 10 volts d.c
Analogue resolution	0.024 % of range
*Analogue accuracy	0.24 % of range
Altitude resolution	0.1875 mm
*Altitude accuracy	±15 mm
Depth resolution	0.0001 % of full scale
Depth accuracy	0.01 % of full scale
Temperature resolution	0.01 ℃
Temperature accuracy	±0.5 ℃ over -10 ℃ to + 40 ℃
Storage temperature range	-20 ℃ to + 70 ℃
Operating temperature range	-10 ℃ to + 40 ℃
Length	300 mm
Diameter	88 mm
Main Connector	Burton 5507-2006-0004
Main Mating connector	Burton 5501-2006-0004
Mini Connector	Burton 5507-1506-0002
Mini Mating connector	Burton 5501-1506-0000

Housing material	Depth ratings
Aluminium	700 m
Aluminium	1400 m
Aluminium	2100 m
Titanium	4200 m
Titanium (Grade 5)	7000 m

Frequency	200 KHz	500 KHz
Range minimum	0.4 m	0. 3 m
Range Maximum	100 m	50 m
Beam width conical	10°	6°

*Dependent on sea bed conditions