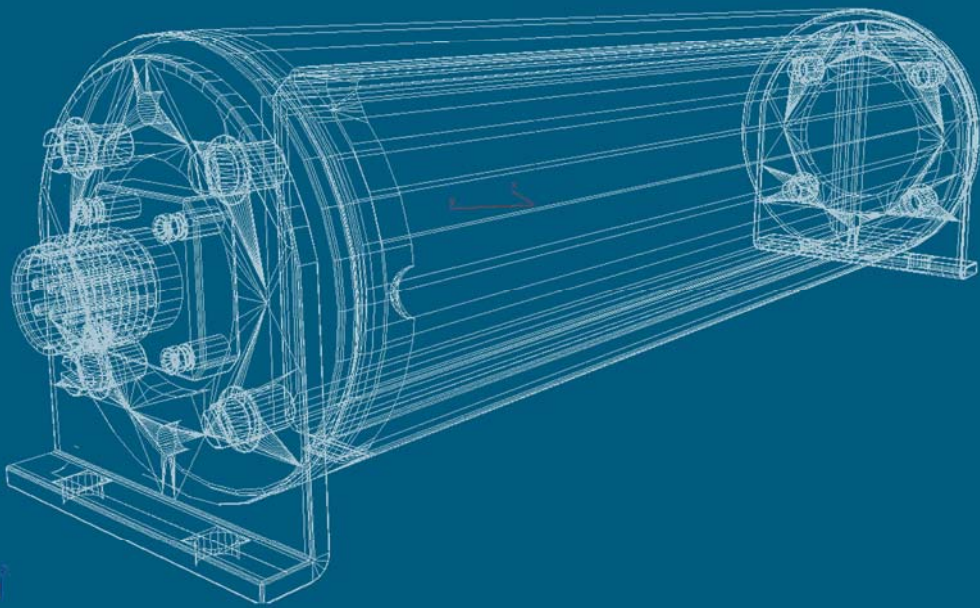




MiniTXT

Technical Manual



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Document Rev G

Table of Content

INTRODUCTION	1
1.0. General Description	1
1.1. Warnings and Notes	1
INSTALLATION	2
2.0. System Contents.....	2
2.1. Unpacking and Inspection	2
2.2. Physical Installation	2
2.3. Electrical Installation	3
OPERATING INSTRUCTIONS.....	4
3.0. Initial Power-on	4
3.1. Configuring the Unit	4
3.1.1. Using MiniTxt Software.....	5
3.1.1.1. Connecting the software to the MiniTxt.....	5
3.1.1.2. Sending commands to the MiniTxt.....	7
3.1.1.3. Testing the MiniTxt	8
3.1.2. Using a Terminal Programme	10
3.1.3. Description of Commands.....	11
3.2. Sleep Time.....	12
3.3. Operating the Unit.....	12
DATA INPUT	13
4.0. Introduction	13
4.1. MDL TrimCube	13
4.2. MiniTilt	13
4.3. DigiLog	14
4.4. CDL1	14
4.5. SKR-80/82	15
4.6. TSS1.....	15
4.7. MiniRLG1.....	16
4.8. NMEA HEHDT	16
4.9. NMEA PRDID Format.....	16
4.10. EM3000	17
4.11. TSS2.....	17
SPECIFICATIONS.....	18
11.0. Power	18
11.1. Serial Communications.....	18



11.2. Physical	18
11.3. Environmental.....	18
TECHNICAL DRAWINGS	19
12.0. 1000M Version.....	19
12.1. 2000M Version.....	20
12.2. 3000M Version.....	21
CONTACTING CDL	22
14.0. By Phone	22
14.1. By email.....	22
14.2. Out of hours.....	22

Table of Figures

Figure 2.1: Burton 15-08 Female Face View	3
Figure 3.1: Software start.....	5
Figure 3.2: Select com port.....	6
Figure 3.3: 9600bps selected.....	6
Figure 3.4: Software connected to the MiniTxt.....	7
Figure 3.5: Command received successfully	8
Figure 3.6: Test data being sent	9

Table of Tables

Table 2.1: MiniTxt Connections.....	3
Table 3.1: Baud rate settings	4
Table 3.2: Serial Levels	4
Table 5.1: EM3000 Fields	17

INTRODUCTION

1.0. GENERAL DESCRIPTION

The CDL MiniTxt is an LED matrix display which can read attitude strings from various equipment and display it either in a field by field manner or by scrolling the text.

The system features a programmable auto power off, and can be 'awoken' by shining a light onto the left hand edge of the display.

The unit will display "no data" text when no data is received by the display after a predetermined time period.

The unit is entirely configurable through the serial port, with no need to open it up to set switches. Software is supplied with the unit to make the configuration process as simple as possible.

1.1. WARNINGS AND NOTES

Throughout the manual the following symbols are used:



Indicates a warning. Failure to follow these instructions will result in serious injury, damage to equipment or incorrect operation of equipment.



Indicates a note. This indicates important information that should be followed to ensure correct operation of the unit.



When using the remote 'wake up' feature that the amount of light required to activate the MiniTXT can be considerably more than needed on the surface. This is due to absorption of light in water and scattering due to air bubbles or water particulates. In some cases ROV lighting can prove to be inadequate and there is a limit to the sensitivity of the light detection circuit, beyond a certain point the unit will 'false trigger' by sunlight. When using this function it will be necessary to test the system in water using the ROV in order to ascertain that enough lighting is available. By setting the MiniTXT delay time to a value of zero this function can be disabled, i.e. the system is permanently 'on'. When using this setting in a CDL RemoteGyro system the display accounts for less than 20% of the current used, this can be reduced further by lowering the brightness and reducing the display time.

INSTALLATION

2.0. SYSTEM CONTENTS

When the system is received it should comprise of the following components:

1. MiniTxt sub sea unit
2. 2 mounting brackets (attached)
3. 1.2m Burton tail for connection to the unit
4. Instruction Manual
5. Software CD
6. Transit case

2.1. UNPACKING AND INSPECTION

The system was shipped from CDL in a specially designed transit case that contains cavities that exactly fit each system component. This transit case should ensure that the equipment reaches its destination in perfect working order.



Retain the original transit case so that this may be used to transport the system when necessary. Improper packing whilst the unit is being transported will invalidate the warranty of the unit.

On receipt of the equipment, the contents of the packing case should be carefully unpacked and checked against the items on the shipping documents for any errors or omissions. If the equipment or transit case has been fitted with a CDL MicroShock device (or similar) then the device should be checked in case the system has suffered any damage during transit. It is recommended that the original packing case be used for subsequent transportation of the equipment.

In particular the clear Perspex tube should be inspected for any damage.

2.2. PHYSICAL INSTALLATION

The unit should be placed where it can be easily seen whilst in use sub sea. Mounting details are shown in section 6.0

The depth rating of the unit is 1000M



Should you wish to use a MiniTxt beyond its stated rating please contact CDL for assistance BEFORE using the unit.

2.3. ELECTRICAL INSTALLATION

The MiniTxt has a single Burton 15-08 connector. This is used for pre deployment configuration of the unit and for receiving data during a mission from connected devices.

Table 2.1 shows the pin outs for this connector. Figure 2.1 shows the pin orientation on the connector.

Pin	Name	Function	RS 232	RS 422
1	+24v DC out	+24v DC		
2	+24vRtn	DC Ground		
3	TxA	Comms	Tx	Tx +
4	TxB	Comms	N/C	Tx -
5	RxA	Comms	Rx	Rx +
6	RxB	Comms	Ground	Rx -
7	Reserved			
8	Reserved			

Table 2.1: MiniTxt Connections

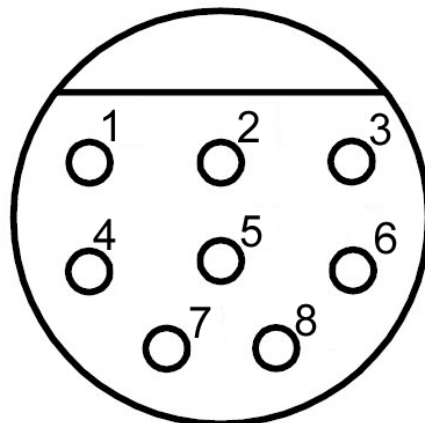


Figure 2.1: Burton 15-08 Female Face View



Failure to power the unit from an 18-30 VDC source could result in permanent damage to the unit

OPERATING INSTRUCTIONS

3.0. INITIAL POWER-ON

When the MiniTxt is initially powered it displays a welcome sequence, either as a scrolling or a flashing display.

The sequence is started by:

“CDL”

Then followed by the version number, typically:

“V01”

Finally the baud rate and serial level are displayed:

“Rx Lyyy”

Tables 3.1 and 3.2 show the options for the baud rate and level.

Displayed Value	Unit baud rate (bps)
R1	2400
R2	4800
R3	9600
R4	19200
R5	38400

Table 3.1: Baud rate settings

Displayed Value	Unit serial level
L232	RS232
L422	RS422 (4-wire)

Table 3.2: Serial Levels

This information can then be used to configure the MiniTxt or terminal software correctly.



When the unit is operating in RS422 mode an RS232 to RS422 converter will be required to connect the unit to a PC.

3.1. CONFIGURING THE UNIT

The MiniTxt is configured entirely through the serial port. A test lead should be made up that connects the power and communications lines as shown in table 2.1. If the unit is in RS422 mode then the RS422 wires should be connected to a converter box.

3.1.1. Using MiniTxt Software

Software is shipped with the unit that allows it to be configured and tested. It is up to the user to wire a test lead to connect the MiniTxt to a PC correctly.

3.1.1.1. Connecting the software to the MiniTxt

The MiniTxt should be connected to the PCB via a serial cable, or via an RS232/RS422 converter if in RS422 mode. The unit should then be powered and the software run.

Figure 3.1 shows how the software looks when it is first run.

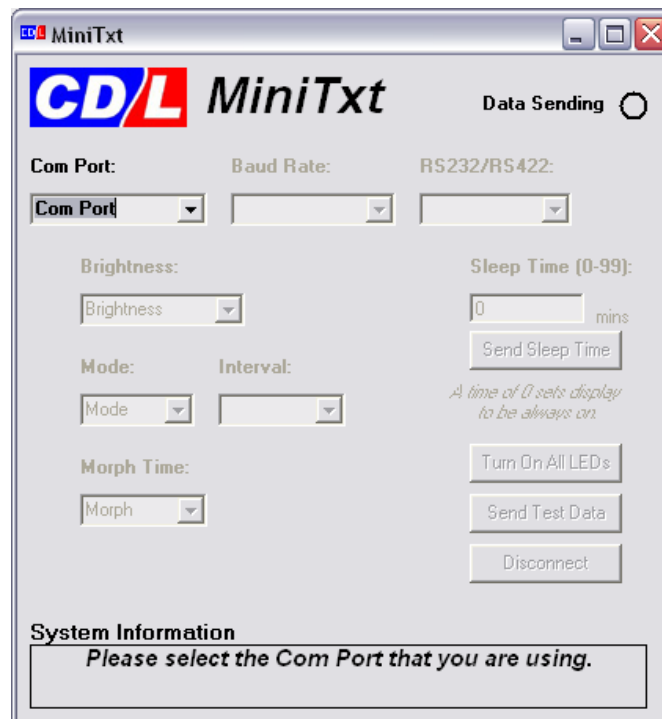


Figure 3.1: Software start

The Com port that the MiniTXT is connected to should be selected from the list. Figure 3.2 shows Com port 1 being selected. The software automatically determines what com ports are available on the PC.

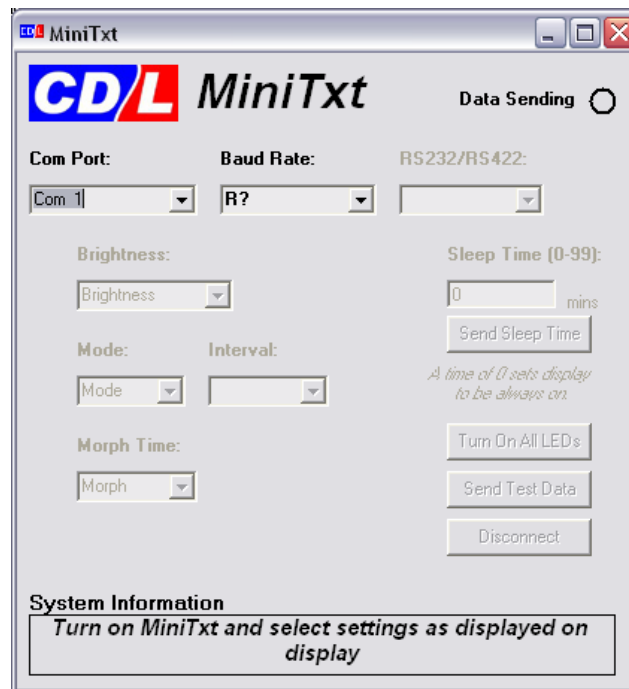


Figure 3.2: Select com port

The MiniTXT displays its current baud rate as a code, see table 3.1. Select the correct baud rate from the drop down menu, figure 3.3 shows 9600 bps being selected.

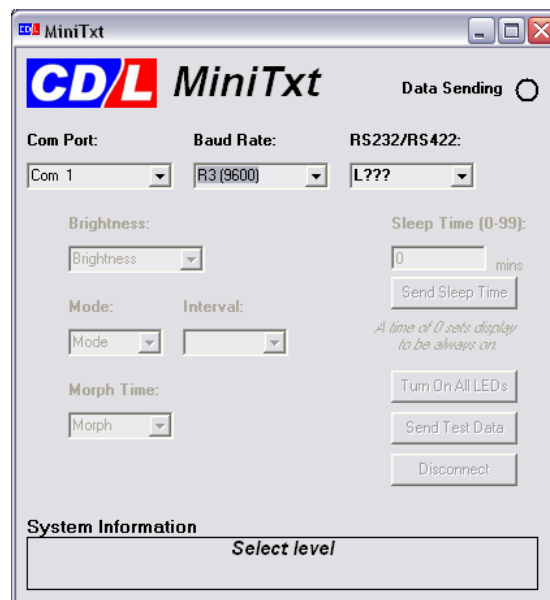


Figure 3.3: 9600bps selected

Finally the level can be selected. This has no effect on the PC other than letting the software know what the unit is currently set at. Once the level has been selected the software will try to connect to the MiniTXT.

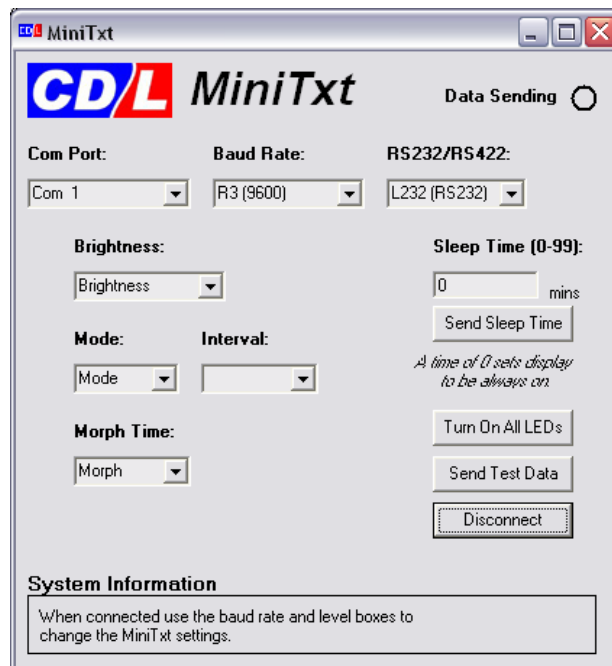


Figure 3.4: Software connected to the MiniTxt

Once the software connects to the MiniTXT then all the configuration boxes become available to be changed. If the software cannot connect to the MiniTXT at the selected baud rate it will try all other possibilities. If no connection is possible then the user should check the wiring to the unit.

3.1.1.2. Sending commands to the MiniTXT

Commands can be sent by simply selecting the desired values from the drop down menus. The command is then automatically sent.

The software checks that all commands have been received correctly and displays a confirmation, see figure 3.5

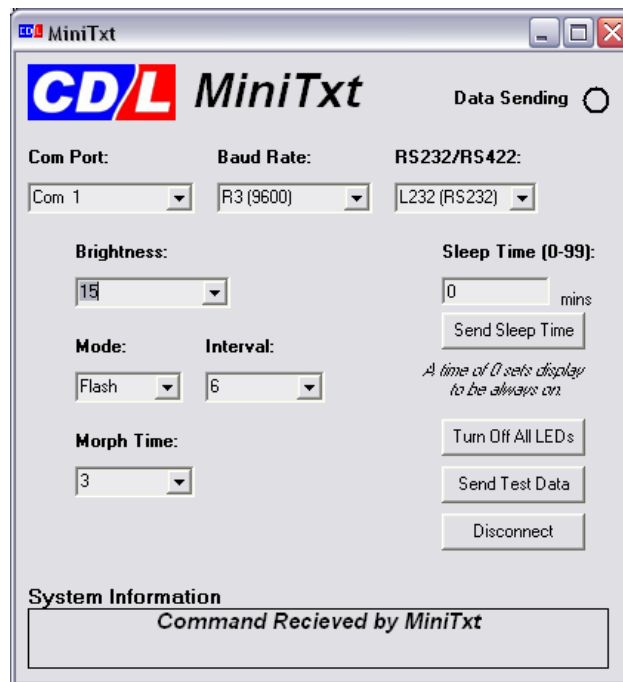


Figure 3.5: Command received successfully

If the user wants to change the baud rate then the baud rate box can be used to do this, this also applies to the RS232/RS422 level.



Once the level has been changed from RS232 to RS422 no further communication is possible with the unit until a converter box has been fitted.

3.1.1.3. Testing the MiniTXT

The software can also send a test string to the unit to check the functionality. To do this simply press “Send Test Data”. The software then sends a string with randomly generated values in it. These values are displayed in the software and change periodically, see figure 3.6.

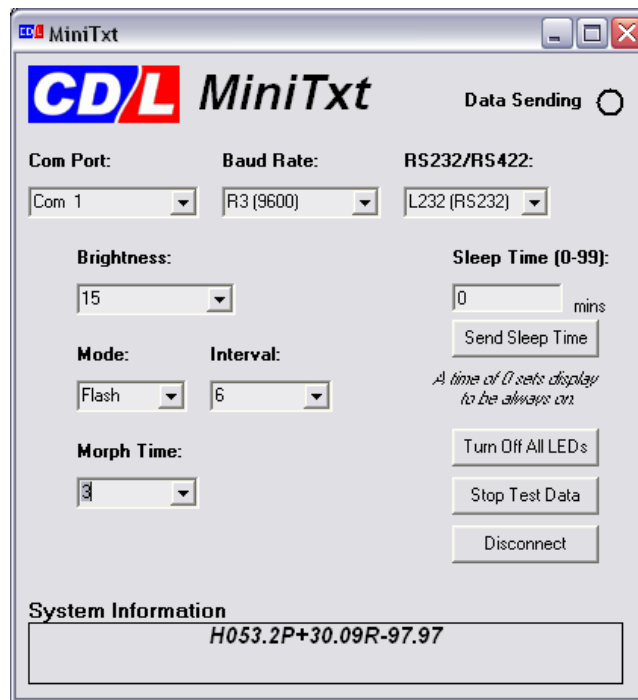


Figure 3.6: Test data being sent

3.1.2. Using a Terminal Programme

A terminal programme should be opened and configured to the baud rate displayed when the unit is turned on, see section 3.0.

All commands should be preceded by a ">" sign. The commands sent to the unit are echoed back. All commands should be followed by enter (CR). A list of the commands and explanations are given below. A list of commands is also transmitted by the device if it receives an incorrect command or ">?".

Commands are:

B0 to B15	Sets brightness level (0=dimkest, 15=brightest). Reply is "OK". Setting is saved in EEPROM.
C1 to C10	Set display to crawl mode, scrolling right to left at 1 to 10 characters per second. Disables flash display mode. Reply is "OK". Setting is stored in EEPROM.
D	Dump display data. Reply is current data, e.g. "H123.45 P+12.345 R+12.345 12345".
F1 to F15	Set display to flash mode, cycling between items (heading, pitch, roll, heave as available), showing each item for 1 to 15 seconds. Disables crawl mode. Reply is "OK". Setting is stored in EEPROM.
L232	Sets level to RS232. No reply given. Only first digit '2' is needed and checked. Setting is applied immediately and stored in EEPROM.
L422	Sets level to RS422. No reply. Only first digit '4' is needed and checked. Setting is applied immediately and stored in EEPROM.



When the unit is operating in RS422 mode an RS232 to RS422 converter will be required to connect the unit to a PC.

M0 to M3	sets morph (fade) time between flash mode updates, 0=fastest, 3=slowest. Reply is "OK". Setting is stored in EEPROM.
R1 to R5	sets baud rate; 1=2400, 2=4800, 3=9600, 4=19200, 5=38400. No reply. Setting is applied immediately and stored in EEPROM.
S0 to S99	Configure to enter sleep mode after N minutes. In sleep mode, the display is blanked but the device continues to update internal data from serial input. N=0 means disable sleep mode, so the display is always on. Wakeup is by light detection, receipt of any configuration command and at power up. Reply is "OK".
T	Toggle LED test mode. Reply is "ON" or "OFF". Test mode turns on all LEDs.
J0-J15	Configure Fields displayed on the MiniTXT. Set command as in the table below to display your required fields

Display	Heading	Pitch	Roll	Heave	Command
Heave	0	0	0	1	J1
Roll	0	0	1	0	J2
Roll & Heave	0	0	1	1	J3
Pitch	0	1	0	0	J4
Pitch & Heave	0	1	0	1	J5
Pitch & Roll	0	1	1	0	J6
Pitch, Roll & Heave	0	1	1	1	J7
Heading	1	0	0	0	J8
Heading & Heave	1	0	0	1	J9
Heading & Roll	1	0	1	0	J10
Heading, Roll & Heave	1	0	1	1	J11
Heading & Pitch	1	1	0	0	J12
Heading, Pitch & Heave	1	1	0	1	J13
Heading, Pitch & Roll	1	1	1	0	J14
Heading, Pitch, Roll & Heave	1	1	1	1	J15

3.1.3. Description of Commands

- Brightness (B): This can be set from 1 to 15, with one being the dimmest and 15 being the most bright. These figures are arbitrary and do not have units.
- Crawl (C): This can be set from 1 to 10 and refers to the rate at which the text scrolls across the displays. These figures are arbitrary and do not have units.
- Flash (F): This can be set from 1 to 15. This refers to the amount of time, in seconds, that each field is displayed on the MiniTXT
- Morph (M) This can be set from 0 to 3. This only applies when the unit is in flash mode. The morph figure affects the transition between one field and the next.
- Sleep (S) This can be set from 0 to 99. When set to 0 the display remains always on. When set between 1 and 99 the display will remain on for that number of minutes.



Note: Local conditions can sometimes make it difficult to get enough light in to the unit to activate it.

3.2. SLEEP TIME

The sleep time can be configured so that the unit is always on or goes off after a period between 1 to 99 minutes.



Note: Local conditions can sometimes make it difficult to get enough light to the unit to activate it.

To set the unit to be always on sleep time should be set to 0.

3.3. OPERATING THE UNIT

Once all the parameters are set as the user desires the unit can be connected to the source data device. In this situation only the RS232 Rx communication line or the RS422 Rx+ and Rx- communication lines need to be connected. However, connection of all comms lines will not result in incorrect operation.

DATA INPUT

4.0. INTRODUCTION

The MiniTXT will recognise the strings shown in the following sections. Where there are too many decimal places for the number of display elements the strings will be truncated.

The top left LED of the display will flash when data is being received by the unit.

The unit will display “no data” text when no data is received by the display after a predetermined time period.

4.1. MDL TRIMCUBE

HaaaaPbccccRdeeee<CR><LF>

Where:

aaaa	is Heading in degrees aaa(deg).a(decimal)
bcccc	is Pitch in degrees cc(deg).cc(decimal) b [+] bow down / [-] stern down see figure 5.2
deeee	is Roll in degrees ee(deg).ee(decimal) d [+] port down / [-] starboard down see figure 5.2

Number of characters in the string (including carriage return line feed): 19

4.2. MINITILT

PabbbbRcdddd<CR><LF>

Where:

abbbb	is Pitch in degrees bb(deg).bb(decimal) a [+] bow down / [-] stern down see figure 5.2
cdddd	is Roll in degrees dd(deg).dd(decimal) c [+] port down / [-] starboard down see figure 5.2

Number of characters in the string (including carriage return line feed): 14

4.3. DIGILOG

Haaaa**P**bcccc**R**ddeee**f**<CR><LF>

Where:

aaaa	is Heading in degrees
bcccc	is Pitch in degrees
	b [+] bow down / [-] stern down see figure 5.2
ddeeee	is Roll in degrees
	d [+] port down / [-] starboard down see figure 5.2
f	final flag:
	E Exact heading available
	S Gyro settling

Number of characters in the string (including carriage return line feed): 20

4.4. CDL1

Haaa.a**P**bccc.cc**R**ddee.ee**T**ff.f**D**gggg.gg**B**hh.h**A**ii**W**jj**L**Nkk**F**I<CR><LF>

Where:

aaa.a	is Heading in degrees
	aaa(deg).a(decimal)
bccc.cc	is Pitch in degrees
	ccc(deg).cc(decimal)
	b [+] bow down / [-] stern down see figure 5.2
ddee.ee	is Roll in degrees
	eee(deg).ee(decimal)
	d [+] port down / [-] starboard down see figure 5.2
ff.f	Not used
gggg.gg	Only available in POS units
hh.h	Not used
ii	Not used
jj	Not used
kk	Latitude
I	Fault flag

Number of characters in the string (including carriage return line feed): 54

4.5. SKR-80/82

4 characters (most significant first)

UART encoded with address encoding in bits 4 and 5 and BCD digit in bits 0-3

Bits 6 and 7 always zero

00110011=Hundreds digit 3

00100101=Tens digit 5

00010111=Units digit 7

00000010=Tenths digit 2

Heading 357.2 degrees

Number of characters in the string (including carriage return line feed): 4

4.6. TSS1

:aabbbbcdeeeefghhhhijkkkk<CR><LF>

Where:

:	is the start character for the string
aa	is horizontal acceleration
bbbb	is vertical acceleration
c	is a space character
d	is a space if positive or – if negative
eeee	is heave
f	is the status flag
g	is a space if positive or – if negative
hhhh	is roll
i	is a space character
j	is a space if positive or – if negative
kkkk	is pitch

4.7. MINIRLG1

Haaa.aaPbcc.cccRdeee.eeeMfgghhiiWjjjj.jjUkk.k<CR><LF>

Where:

aaa.aa	is Heading in degrees aaa(deg).aa(decimal)
bcc.ccc	is Pitch in degrees cc(deg).ccc(decimal) b [-] bow down / [+] stern down see figure 5.1
deee.eee	is Roll in degrees eee(deg).eee(decimal) d [-] port down / [+] starboard down see figure 5.1
f	is status digit see section 4.1 for details
gg	is the navigation monitor in ASCII hex
hh	is the validity byte in ASCII hex
ii	is the mode control logicals byte in ASCII hex
jjjj.jj	Only available in POS units
kk.k	Not used

Number of characters in the string (including carriage return line feed): 47

4.8. NMEA HEHDT

\$HEHDT,aaa.a,T<CR><LF>

or

\$HEHDT,aaa.a,T*bb<CR><LF>

Where:

aaa.a	is Heading in degrees aaa(deg).a(decimal)
bb	is a checksum not including \$ or *

Number of characters in the string (including carriage return line feed): 16

4.9. NMEA PRDID FORMAT

\$PRDID,abb.bb,cdd.dd,eee.ee<CR><LF>

Where:

a	is sign + or -
bb.bb	is pitch -30.00 to +30.00
c	is sign + or -
dd.dd	is roll -30.00 to +30.00
eee.ee	is heading 0 to 359.99

4.10. EM3000

The Simrad EM3000 format consists of a fixed length message using single byte unsigned, 2-byte unsigned and 2-byte twos-complement integer data elements. For the 2-byte elements, the least significant byte is transmitted first.

Status	Header	Roll		Pitch		Heave		Heading	
A0	90	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB

Where:

Element	Scaling	Format	Size	Value
Status		Unsigned	1 Byte	90h,91h,A0h
Header		Unsigned	1 Byte	90h
Roll	0.01 degrees	2's compliment	2 Bytes	-999 to 999
Pitch	0.01 degrees	2's compliment	2 Bytes	-999 to 999
Heave	0.01 m	2's compliment	2 Bytes	-999 to 999
Heading	0.01 degrees	Unsigned	2 Bytes	0 to 35999

Table 5.1: EM3000 Fields

Roll is positive with port side up. Pitch is positive with bow up. Status Byte indicates the following:

Value	Status
90h	Normal
91h	Reduced Performance
A0h	Invalid Data

4.11. TSS2

:aaaabcddddefgggg<CR><LF>

Where:

:	is the start character for the string
aaaa	is heading
b	is a space character
c	is a space if positive or – if negative
dddd	is pitch
e	is a space character
f	is a space if positive or – if negative
gggg	is roll

SPECIFICATIONS

11.0. POWER

Operating Power	15	W Max
DC Voltage	18-30	VDC

11.1. SERIAL COMMUNICATIONS

Digital Interface	RS232 or RS422 software selectable	
Baud Rate	2400 to 38400	bps
Input Rate	Up to 50	Hz

11.2. PHYSICAL

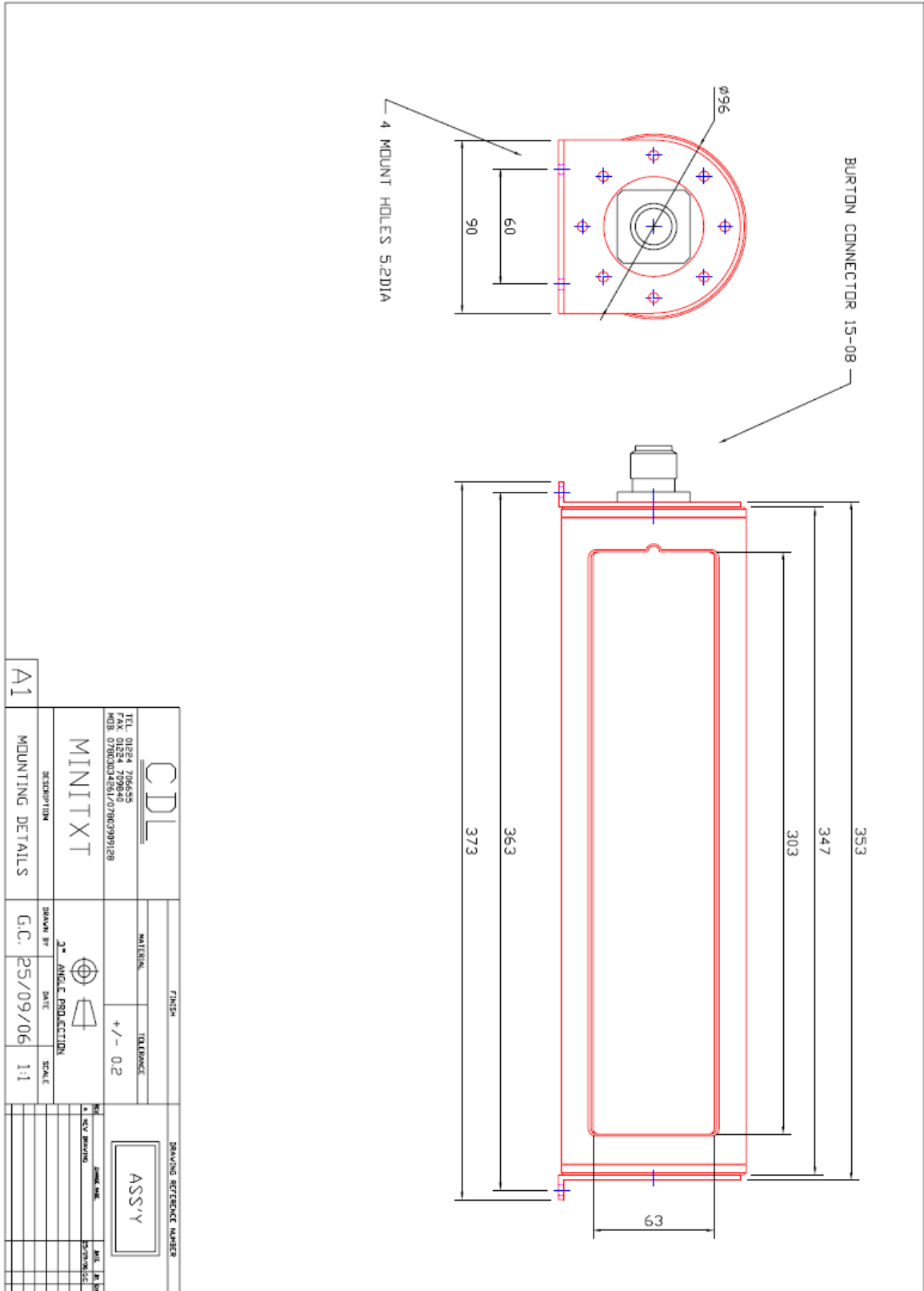
Standard depth rating	1000	m
Sub sea unit dimensions	Ø96 x 381	mm
In air weight (excluding cable)	3.1	kg
In water weight (excluding cable)	0.55	kg

11.3. ENVIRONMENTAL

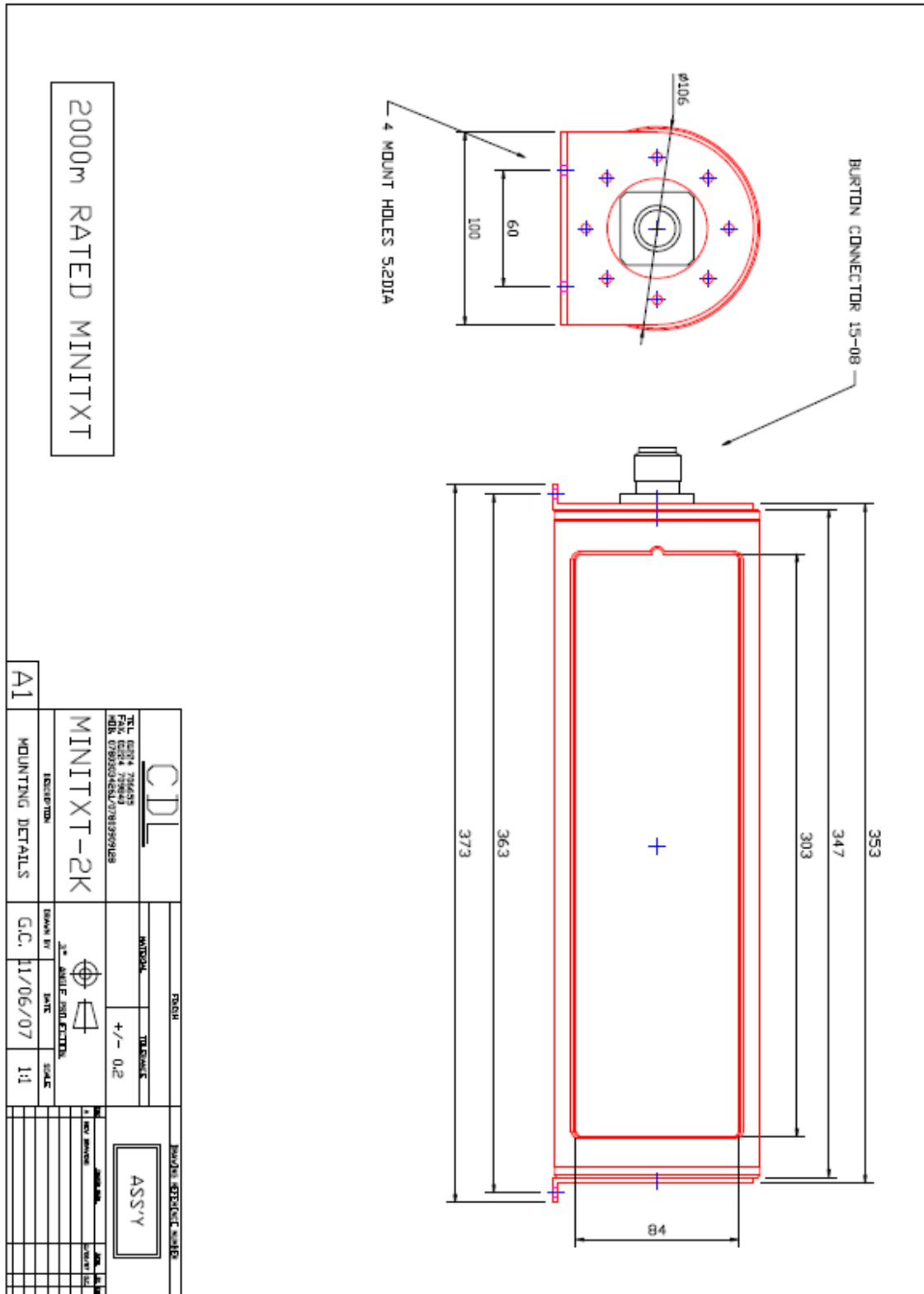
Temperature	-10 to +50	°C
-------------	------------	----

TECHNICAL DRAWINGS

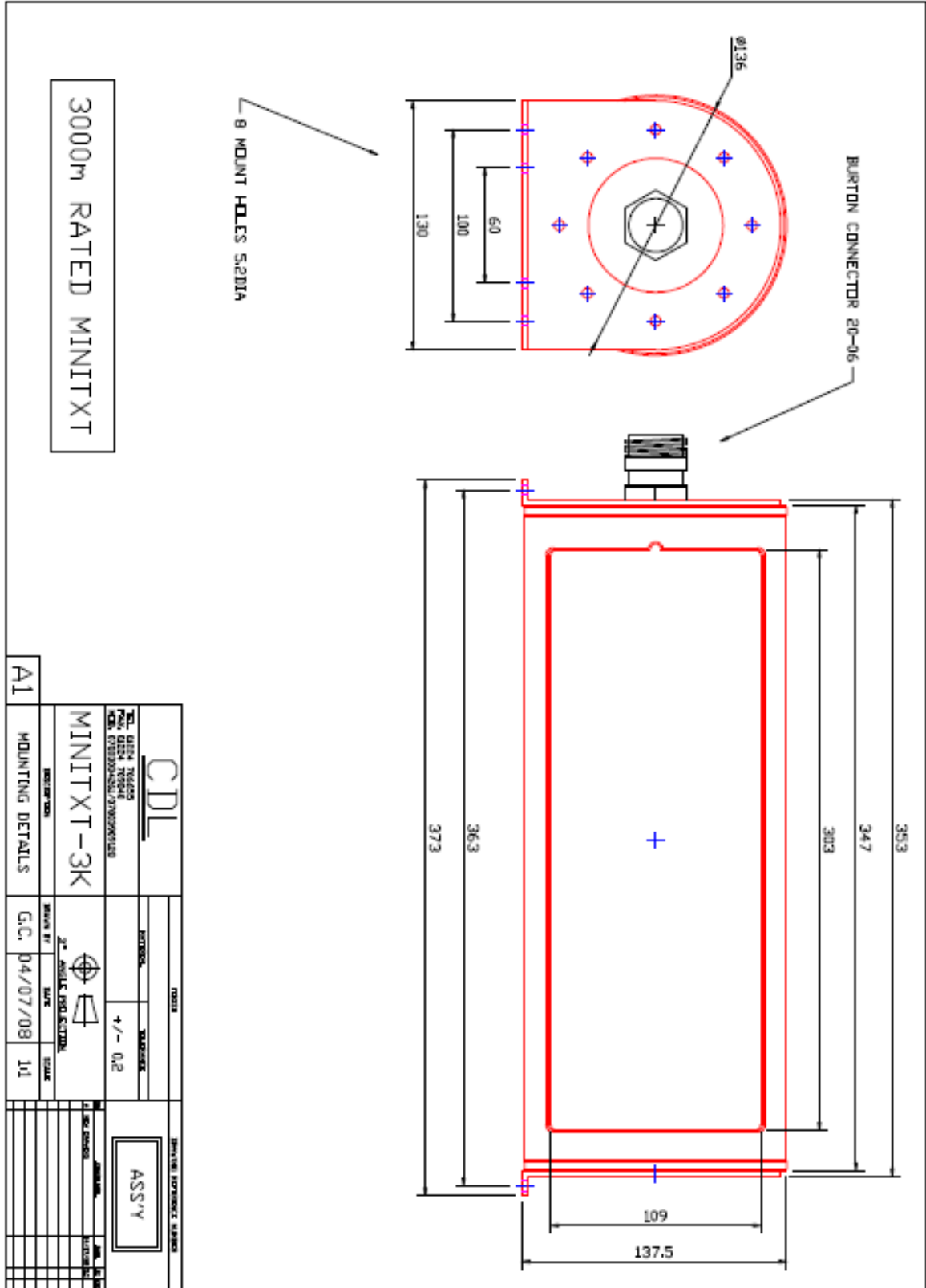
12.0. 1000M VERSION



12.1. 2000M VERSION



12.2. 3000M VERSION



CONTACTING CDL

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Craig Spy (Development Engineer)	(mobile)	-	+44 (0) 7590 643243

In case of faults or queries please contact the Development personnel in the first instance.