

UM-8315

User Manual for the Type 8315 iWAND

Issue: B Rev 0

Date of issue: 21 June 2013

Head Office
Sonardyne International Limited
Blackbushe Business Park
Yateley, Hampshire
GU46 6GD United Kingdom

T. +44 (0) 1252 872288
F. +44 (0) 1252 876100
E. support@sonardyne.com
W. www.sonardyne.com

**COMPANY WITH
QUALITY SYSTEM
CERTIFIED BY DNV
= ISO 9001:2008 =**

Copyright © 2013 Sonardyne International Limited.

Sonardyne Wideband® and 6 Generation® are registered trademarks.

All rights reserved. No part of this document shall be reproduced, stored in a retrieval system or transmitted by any means, electronic, mechanical, photocopying, recording, or otherwise, or translated into any language without the written permission of Sonardyne International Limited.

CONTACTING THE SONARDYNE SUPPORT TEAM

24-hour Emergency Telephone Helpline: +44 (0) 1252 877600

The Sonardyne 24-hour helpline is answered during normal office hours (08:00 to 17:00 GMT). Outside these hours, your call is automatically transferred to an agency, which logs the details of your emergency and alerts the appropriate Sonardyne personnel.

Our aim is to make sure emergency requests are dealt with immediately during office hours, and are responded to within 30 minutes at all other times.

Please note the helpline is for emergency use only.

If you require NON-EMERGENCY product support, please contact your nearest Sonardyne office. Alternatively, contact the Sonardyne Head Office:


Blackbushe Business Park
Yateley
Hampshire
GU46 6GD
England

Telephone: +44 (0) 1252 872288

Fax: +44 (0) 1252 876100

Email: support@sonardyne.com

NOTE

 **Email and telephone support is available during normal office hours (08:00 to 17:00 GMT)**

CONTENTS

Contacting the Sonardyne Support Team	iii
Contents	iv
Figures	vi
Tables	ix
Amendment History	x
Section 1 Introduction	1
1. Introduction	1
1.1 Related Publications	1
Section 2 – Safety	2
2. Introduction	2
Section 3 – Technical description	3
3. Introduction	3
3.1 Hardware Description	3
3.1.1 Battery and Charging.....	3
3.1.2 Communications.....	4
3.1.3 User Interface.....	4
3.1.3.1 LCD Display.....	4
3.1.3.2 Keypad.....	5
3.1.3.3 Accelerometer.....	5
3.1.4 Transducer Connector.....	6
3.1.5 USB Connector.....	6
3.1.6 9-way ‘D’ connector	6
3.1.7 End-cap Connector Cover	7
3.1.8 GPS.....	7
3.1.9 Power Modes.....	7
3.1.9.1 Normal Mode	7
3.1.9.2 Idle Mode	7
3.1.9.3 Sleep Mode.....	8
3.1.9.4 Deep Sleep	8
Section 4 – Connection to the iWAND	9
4. Introduction	9
4.1 Charging the iWAND	9
4.2 Setting the iWAND Time.....	9
4.3 Connecting to the iWAND.....	10
4.4 Bluetooth	10
4.4.1 Installing the Bluetooth Dongle	11
4.4.2 Adding the iWAND to the Computer via Bluetooth.....	12
4.4.2.1 Windows 7	12
4.4.2.2 Windows XP	16
4.5 USB.....	16
4.5.1 Adding the iWAND to the Computer via USB	16
4.6 RS232/RS485 Connection.....	20
4.7 Baud Rate Settings.....	20
4.8 iWAND Setup	21
4.8.1 iWAND Information.....	21
4.8.2 Time Information	22
4.8.3 Communications.....	22

4.8.4	User Interface.....	22
4.8.4.1	Screen Rotation	22
4.8.4.2	Inertial Wakeup.....	22
4.8.4.3	Colour Scheme	23
4.8.4.4	Screen Brightness.....	23
4.8.5	Power Saving	24
4.8.5.1	Screen On Time.....	24
4.8.5.2	GPS Enable	24
4.8.5.3	Turn On Time.....	25
4.8.5.4	Turn Off Now	25
4.8.5.5	Off For Shipping.....	25
4.8.6	Discovery Options	25
4.8.6.1	Enable All Bands.....	25
4.8.6.2	LMF Band, MF Band, HMF Band	26
4.8.6.3	Acoustic Band	26
4.8.6.4	Reset Options	27
4.8.6.5	Sync Pin Options	27
4.8.7	Transponder Mode	27
4.8.8	Accessories.....	28
4.8.8.1	Serial Terminal.....	28
4.8.8.2	GPS Accessories.....	29
Section 5	– iWAND Operation	30
5.	Introduction	30
5.1	Menu System.....	30
5.2	Prerequisites for Operation.....	30
5.3	Quick Check	31
5.3.1	Acoustic Settings	33
5.3.2	Battery Status.....	33
5.3.3	Firmware Information.....	34
5.3.4	View Sensors.....	34
5.3.5	Acoustic Check.....	35
5.3.5.1	HPR Check	36
5.3.6	Test Release	37
5.3.7	Acoustic Terminal	38
5.4	Get and Set Configuration	38
5.5	Get Configuration	39
5.5.1	Release Test	42
5.5.2	Sensors Check	44
5.6	Set Configuration.....	44
5.7	Tone Testing	48
5.7.1	Sonardyne WSM6	48
5.7.1.1	Sonardyne Wideband Mode.....	48
5.7.1.2	Sonardyne Tone Mode.....	51
5.7.1.3	HPR300 / HPR400 mode	51
5.7.1.4	Legacy HPR.....	51
Section 6	– Maintenance	52
6.	Maintenance.....	52
6.1	Scheduled Maintenance and Recalibration.....	52
6.2	General Maintenance	52
Section 7	– Functional Test.....	53
7.	Functional Test.....	53
7.1	Running Self-Test.....	53
7.2	Running An External Unit Test.....	53

Section 8 – Firmware Upgrade	54
8. Introduction	54
8.1 Firmware Upgrade Procedure.....	54
Section 9 – Fault Diagnosis	62
9. Introduction	62
9.1 General Operation	62
9.1.1 Unit Does Not Power On With A Key Is Pressed On The Keypad	62
9.1.2 Unit not responsive	62
9.2 PC Communications	62
9.2.1 Bluetooth not functional on Windows XP	62
9.2.2 USB not communicating	62
9.3 Acoustic Communications	62
Section 10 – Storage.....	63
10. Storing.....	63
Section 11 – Technical Specifications	64
11. Technical Specification for the iWAND	64
11.1 External Power	64
11.2 Battery Life	64
11.3 Environmental.....	64
11.4 Firmware Requirements	65
Appendix A – Firmware History record	66
A Firmware History Record.....	66
Appendix B – Software Copyright / License / Warranty.....	67
Glossary of Terms	69

FIGURES

Figure 3-1 – 8315 iWAND.....	3
Figure 3-2 – Example LCD display screen.....	4
Figure 3-3 – Scrolling Displays	5
Figure 3-4 – Keypad	5
Figure 4-1 – Mini USB Connection Point for Charging	9
Figure 4-2 – GPS Enabled Receiving a Signal.....	9
Figure 4-3 – GPS Enabled / Disabled	10
Figure 4-4 – Enabling Bluetooth.....	11
Figure 4-5 – USB Bluetooth Dongle CDROM Installation Menu	11
Figure 4-6 – Windows 7 Control Panel	12
Figure 4-7 – ‘Add a device’	12
Figure 4-8 – Bluetooth Device Added	13
Figure 4-9 – Windows 7 Control Panel	13
Figure 4-10 – Hardware and Sound	14
Figure 4-11 – Devices and Printers.....	14
Figure 4-12 – iWAND Bluetooth Port Properties	15

Figure 4-13 – Bluetooth Services.....	15
Figure 4-14 – HyperTerminal Over Bluetooth.....	16
Figure 4-15 – Starting Device Manager	16
Figure 4-16 – iWAND Driver Installation	17
Figure 4-17 – USB Update Driver Prompt.....	17
Figure 4-18 – USB Driver Location	18
Figure 4-19 – Windows Security Warning.....	18
Figure 4-20 – USB Driver Installation Complete.....	19
Figure 4-21 – Identifying Assigned iWAND COM Port Number.....	19
Figure 4-22 – HyperTerminal Connection over USB	20
Figure 4-23 – Serial Channel Selection.....	20
Figure 4-24 – Break Key on Keyboard	21
Figure 4-25 – iWAND Serial Output After a <BREAK>	21
Figure 4-26 – iWAND Information.....	21
Figure 4-27 - Time Information View.....	22
Figure 4-28 – Colour Scheme – Standard.....	23
Figure 4-29 – Colour Scheme – Green	23
Figure 4-30 – Colour Scheme – Orange	23
Figure 4-31 – Screen Power On Time Options	24
Figure 4-32 – GPS Enable / Disable	24
Figure 4-33 – Power On Time Before Entering Sleep Mode	25
Figure 4-34 – LMF, MF and HMF Bands.....	26
Figure 4-35 – Acoustic Bands.....	26
Figure 4-36 – Sync Pin Options	27
Figure 4-37 – Transponder Mode	28
Figure 4-38 – Serial Terminal Startup View	28
Figure 4-39 – Serial Terminal Command Response View.....	29
Figure 4-40 – GPS Status View	29
Figure 4-41 – Current Position View	29
Figure 5-1 – Home Screen.....	30
Figure 5-2 – Positioning the iWAND Against the Instrument Transducer.....	31
Figure 5-3– Quick Check Screen.....	31
Figure 5-4 – Discovering process screen.....	32
Figure 5-5 – Quick Check Menu	32
Figure 5-6 – Instrument Interrogation.....	32
Figure 5-7 – Acoustic Settings View	33
Figure 5-8 – Battery Status View	33

Figure 5-9 – Firmware Information View	34
Figure 5-10 – View Sensors Menu	34
Figure 5-11 – All Sensors View	34
Figure 5-12 – Individual Sensor Channel View.....	35
Figure 5-13 – Acoustic Check View	35
Figure 5-14 – HPR Channel Configured with the iWAND 6G Configurator Software	36
Figure 5-15 – Configuring to HPR Channel.....	36
Figure 5-16 – Response Detected from the HPR Interrogation.....	36
Figure 5-17 – Select the current state of the release	37
Figure 5-18 – Select the state for the drive motor to drive to	37
Figure 5-19 – Completed Release State operation	37
Figure 5-20 – Acoustic Terminal Test Menu	38
Figure 5-21 – Acoustic Terminal Response Display.....	38
Figure 5-22 – Get Configuration	39
Figure 5-23 – Hold the iWAND Against the Instrument.....	39
Figure 5-24 – Start of the Get Configuration Process	40
Figure 5-25 – Get Configuration Sequence Discovering	40
Figure 5-26– Get Configuration Sequence Found.....	40
Figure 5-27 – Get Configuration Sequence Confirm	41
Figure 5-28 – Sensor Test Request	41
Figure 5-29 – All Sensors View.....	41
Figure 5-30 – Get Configuration Sequence Success	42
Figure 5-31 – Testing the Release – Current State.....	42
Figure 5-32 – Testing the Release – Activating	43
Figure 5-33 – Testing the Release – State following activation.....	43
Figure 5-34 – Testing the Release – Confirm release operation	43
Figure 5-35 – Option to Test Sensors	44
Figure 5-36 – Set Configuration.....	44
Figure 5-37 – Hold the iWAND Against the Instrument.....	45
Figure 5-38 – Start the Set Configuration Process.....	45
Figure 5-39 – Get Configuration Sequence Discovering	45
Figure 5-40 – Get Configuration Sequence Found.....	46
Figure 5-41 – Get Configuration Sequence Confirm	46
Figure 5-42 – Sensor Test Request	46
Figure 5-43 – All Sensors View.....	47
Figure 5-44 – Set Configuration Sequence Success.....	47
Figure 5-45 – Configuration Process Aborted	47

Figure 5-46 – Selecting correct mode for WSM6	48
Figure 5-47 – Interrogation Channel Selection.....	48
Figure 5-48 – Wideband Reply Address Selection.....	49
Figure 5-49 – Wideband Test	49
Figure 5-50 – Test Transmitting State.....	50
Figure 5-51 – Nothing Received from Transponder	50
Figure 5-52 – Response Received.....	50
Figure 5-53 – Sonardyne Tone Mode	51
Figure 5-54 – HPR400 Mode	51
Figure 8-1 – 6G Terminal Lite Software icon.....	54
Figure 8-2 – 6G Terminal Lite homepage	55
Figure 8-3 – About 6G Terminal Lite.....	55
Figure 8-4 – Click Connect	55
Figure 8-5 – Select COM Port.....	56
Figure 8-6 – Select Port Connect.....	56
Figure 8-7 – Current iWAND Configuration.....	57
Figure 8-8 – Select Bootloader	57
Figure 8-9 – Bootloader Firmware List.....	58
Figure 8-10 – Select Download Application.....	58
Figure 8-11 – Confirm Replace Firmware	59
Figure 8-12 – Select New Firmware File	59
Figure 8-13 – Downloading New Firmware	60
Figure 8-14 – Download Completed.....	60
Figure 8-15 – Close Bootloader	61
Figure 8-16 – Refresh 6G Terminal Lite Settings.....	61

TABLES

Table 1-1 – Related Publications	1
Table 3-1 – 9-way D Connector Connections.....	6
Table 3-2 – iWAND Power Modes	7
Table A-1 – Firmware History Record	66

SECTION 1 INTRODUCTION

1. Introduction

This User Manual describes the safe installation, operation and maintenance of the 8315 iWAND. The information and procedures within this manual are based on Sonardyne's experience and knowledge.

To make sure the safety of the installer and operator is maintained it is important that all Warnings, Cautions and Safety Section in this manual, and the Warnings, Cautions and Safety Section of any additional manuals are read and understood.

1.1 Related Publications

To make sure the system is operated safely, a Safety Manual is supplied with this User Manual. It is important the Safety Manual is read and understood before proceeding with any activity on the equipment.

The related publications are:

Table 1-1 – Related Publications

Publication	Title
Safety Manual	Safety Manual

SECTION 2 – SAFETY

2. Introduction

The 8315 iWAND contains no user serviceable parts. Under no circumstances should the plastic housing be opened – any repairs will be return to base.

It is recommended the operator complies with the Health and Safety Regulations applicable to the vessel and the region before operating this equipment.

Operators and service personnel must be familiar with the normal operating and safety procedures for Subsea Equipment.

Documentation must be consulted whenever a  Warning symbol is found on the equipment, in order to determine the nature of the potential hazard and any actions which must be taken.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

SECTION 3 – TECHNICAL DESCRIPTION

3. Introduction

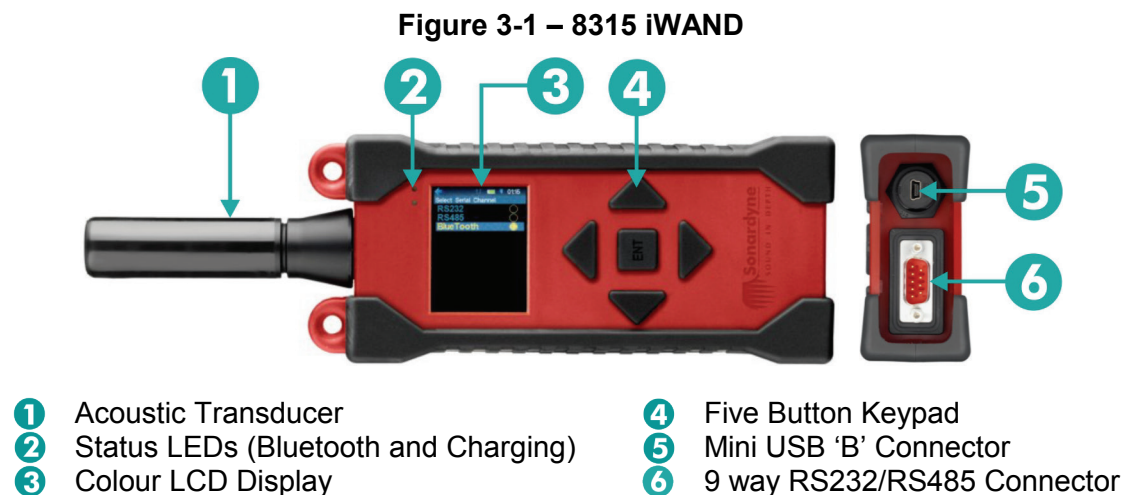
The Type 8315 iWAND (iWAND) is a handheld multiband test unit for acoustic testing and configuration of Sonardyne 6G equipment. The iWAND utilizes Sonardyne 6G Discovery to identify the unit under test (UUT) with a simple one-touch operation without knowledge of the acoustic address or frequency band. The rugged design coupled with simple interface and local colour display makes the iWAND ideal for back-deck operations.

Using the companion iWAND 6G Configurator software the iWAND simplifies configuration so the user does not require special knowledge of the Sonardyne 6G configuration language. When configured the 6G Configurator can generate a formatted report reflecting all settings configured on a unit prior to deployment. A database is held by the software so a history of all units configured can be maintained for later review.

The iWAND supports all 6G acoustic frequency bands (LMF, MF and HMF) and address ranges (Wideband® V1, Wideband® V2 and Wideband® V2 plus).

3.1 Hardware Description

The iWAND contains a low-power transceiver that communicates in the 6G command language. The rugged enclosure is rated to IP65 and can be operated over the temperature range [-10..+55]°C making it functional in most environments.



3.1.1 Battery and Charging

The iWAND contains an integrated lithium polymer battery. Charging is performed either when the unit is plugged into a computer via USB interface or via the supplied USB mains power adapter. The charge indicator LED on the front of the case above the screen indicates the 3 states of charging:

- OFF – no USB power has been detected
- Orange – the battery is being charged
- Green – the battery charge has completed

3.1.2 Communications

The iWAND can communicate serially via either RS232, half-duplex RS485, Bluetooth or USB. The iWAND 6G Configurator software will automatically identify the iWAND and establish a link to it. In addition to PC communication, the 9-way 'D' connector can be used with a standard Compatt data cable for serial testing. The RS232 connections on the connector are configured as data terminal equipment (DTE) so a **cross-over cable** is **required** to connect to a computer via this interface.

3.1.3 User Interface

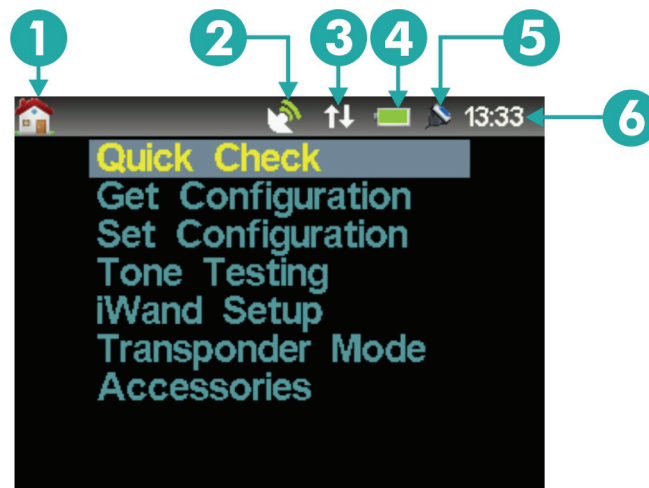
The iWAND user interface comprises 3 units:

- a 320x240 pixel sunlight readable LCD display
- a five key push-button keypad and
- a 3-axis accelerometer for orientation detection.

3.1.3.1 LCD Display

The LCD display provides local feedback of test results and progress of configuration related operations. It also provides configuration of the iWAND settings. All user interface screens have a common title bar at the top of the screen to display persistent information.

Figure 3-2 – Example LCD display screen



- | | |
|--------------------------------|---|
| ① Menu Navigation | ④ Internal Battery Level and Charging State |
| ② GPS Status | ⑤ Serial Communication Method |
| ③ Serial Communications Status | ⑥ UTC Time |

For any menus or table displays that are too long to fit on the screen a direction indicator icon will be displayed. The **UP** and **DOWN** arrow keys can be used to scroll the display.

Figure 3-3 – Scrolling Displays



3.1.3.2 Keypad

The five button keypad enables menu navigation and option selection on the iWAND User Interface. Options are selected with the four outer buttons and the central **ENT** key is used to make the selection.

Figure 3-4 – Keypad



Power to the unit can be controlled by the **ENT** button. Pressing the **ENT** button for more than 1 second and less than 5 seconds will put the iWAND into **IDLE** mode (refer to **3.1.9 – Power Modes**). When entering **IDLE** mode via this method the 'shake to wake' function **will be disabled**. Pressing the **ENT** for more than 5 seconds will put the iWAND into SLEEP mode.

NOTE

 In the event the iWAND becomes unresponsive, pressing the **UP** and **DOWN** keys together for more than 3 seconds will reset the unit.

3.1.3.3 Accelerometer

The accelerometer performs two functions:

- Wakes up the unit from sleep when shaken 'shake to wake'
- Rotates the screen dependent on the orientation of the unit to make reading easier

When the **Shake to Wake** mode is disabled a press on any key on the keypad will be required to wake the unit.

The screen rotation control allows the screen to rotate when the iWAND orientation is changed. The internal accelerometers are used to detect the orientation of the unit and rotate the screen accordingly to make the display easier to read.

3.1.4 Transducer Connector

CAUTION

 **Risk of Corrosion. When the iWAND is not in-use make sure the tethered transducer is plugged in to reduce the risk of corrosion forming on the BNC connector.**

The BNC connector in the top of the enclosure is for attachment of the tethered iWAND transducer or an external hydrophone. Care should be taken when an external hydrophone is used as the splash-proofing of the housing will be compromised.

3.1.5 USB Connector

A standard Mini-USB Type 'B' connector is mounted at the bottom of the housing. This is for data communications with a host PC and for charging the unit. The iWAND complies with the USB 2.0 specification. While the unit will charge from a PC USB port, due to the charging requirements of the iWAND (especially when connected via unpowered hubs) it is recommended to use the supplied external mains USB adapter for charging.

3.1.6 9-way 'D' connector

The 9-way 'D' connector carries the following signals:

- RS232
- RS485
- Trigger In / Out

Table 3-1 – 9-way D Connector Connections

Pin #	Signal	Notes
1	N/C	
2	RS232RX / RS485B	Receive line into iWAND in RS232 mode Data B line (Data -) in RS485 mode
3	RS232TX / RS485A	Transmit line out from iWAND in RS232 mode Data A line (Data +) in RS485 mode
4	N/C	
5	GND	Signal GND
6	N/C	
7	RS232 RTS	Request to send out from iWAND
8	RS232 CTS	Clear to send into iWAND
9	Trigger	Software configurable {IN / GPS PPS OUT}

3.1.7 End-cap Connector Cover

The rubber bung tethered to the end-cap should be fitted whenever the connectors are not in use. Any internal connector covers should also be fitted. It is **critical** the connectors are protected as much as possible for both direct splash and moist air.

3.1.8 GPS

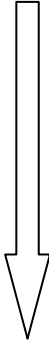
A GPS receiver is built into the iWAND for time synchronization and position recording. The primary functions of the GPS are:

- Synchronize the iWAND real-time clock with UTC time
- Provide location information when the iWAND is used to either get settings from an external unit or set its settings
- Keep time after the iWAND has powered down
- Provide a 1 PPS trigger out for external unit synchronization

3.1.9 Power Modes

As the iWAND has a limited capacity battery pack, to maximize battery life a number of power management features have been included in its design. These are outlined below.

Table 3-2 – iWAND Power Modes

Mode	Description	To wake up	Increasing Battery Life 
Normal	Active mode – all systems on	N/A	
Idle	Screen switched off – all other systems active. Fully functional as transceiver	'Shake to wake' or keypad button press	
Sleep	Keypad powered for keypress wakeup and GPS real-time clock maintained. No longer functional as a transceiver.	Keypad button press	
Deep Sleep	All systems switched off.	Connect USB power	

The battery life in each mode is shown in **Section 11.2 - Battery Life**.

3.1.9.1 Normal Mode

In this mode the screen and all systems are powered, this will result in maximum battery drain. To increase battery life it is advisable to keep the screen on time to a minimum.

3.1.9.2 Idle Mode

In this mode the screen is turned off reducing power consumption. If being used as a transceiver the unit will continue to function normally in this state. The unit can always be returned to the normal mode by pressing a button on the keypad; if inertial wakeup is enabled shaking the unit will have the same effect. The time the iWAND stays in Normal Mode before entering Idle Mode is from [1..30] minutes. The shorter the screen on time, the longer the battery will last.

Every time a button is pressed while the screen is on or the orientation of the unit is changed the screen on timer is reset so the screen will stay on for the configured time after this event. The iWAND can be manually put into Idle Mode by holding the ENT button down for more than 1 second (but LESS than 5 seconds or the unit will enter Sleep Mode).

3.1.9.3 Sleep Mode

In this mode the main processor is switched off so the unit can no longer respond to serial commands or communicate acoustically. The only systems that are maintained in this state are the keypad so a button press can wake the unit and the real-time clock in the GPS unit so the processor has an approximate time on power-up. An accurate time will be acquired as soon as the unit has a view of the sky to get an updated GPS fix.

The iWAND can manually be put into Sleep Mode by holding down the **ENT** button for more than 5 seconds.

3.1.9.4 Deep Sleep

This mode is the lowest power mode for the iWAND. In this state all systems are powered off so the GPS will lose its time and the keypad wakeup will not function. The only way to start-up from this state is by plugging in USB power.

This mode should be used when shipping the unit – it electronically disconnects the battery and the disabling of the keypad means that it won't accidentally be turned on and arrive with a flat battery. When leaving this mode the battery level indicator will not be valid until the unit has fully charged.

When leaving the unit on the shelf for extended periods it is advisable to put it in this mode.

SECTION 4 – CONNECTION TO THE iWAND

4. Introduction

The iWAND is supplied in a transit case containing all accessories including charging equipment with international plug adapters and Bluetooth dongle. Before operating the iWAND it must first be fully charged and the UTC time must be set.

4.1 Charging the iWAND

Supplied with the iWAND is a wall plug charger and international plug adapters. Before using the iWAND for the first time it must be fully charged.

To charge the iWAND connect the wall plug charger to the mini USB connection point on the bottom of the iWAND and using one of the international plug adapters connect to a mains power supply.

Figure 4-1 – Mini USB Connection Point for Charging



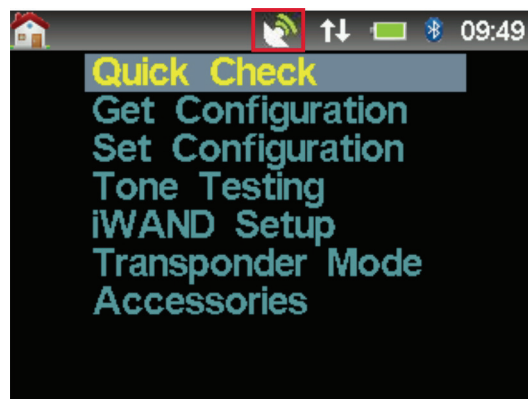
1 Mini USB 'B' Connector

The iWAND will be fully charged when the green LED light is illuminated. With the iWAND attached to the charger, switch the iWAND **ON** to configure the charge percentage value.

4.2 Setting the iWAND Time

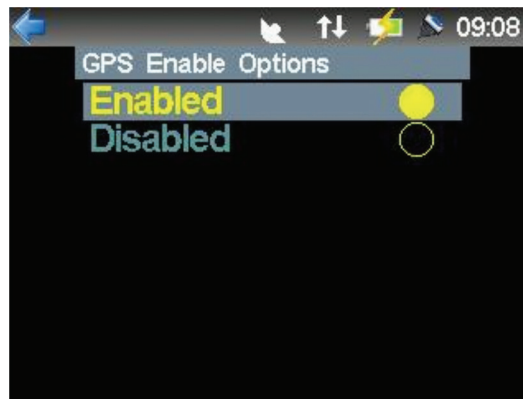
On receipt of the iWAND the UTC time on the unit will need to be set. To set the time the GPS must be enabled and receiving a signal. A satellite symbol with signal bars will be displayed on toolbar when the GPS is enabled and receiving a signal.

Figure 4-2 – GPS Enabled Receiving a Signal



If the GPS symbol is not present it can be enabled by scrolling to the **iWAND Setup** → **Power Saving** → **GPS Enable**.

Figure 4-3 – GPS Enabled / Disabled



Stand outside and make sure the iWAND has a clear view of the sky. The satellite symbol will flash to indicate the internal clock is being set. Wait for the symbol to stop flashing and the UTC time is displayed.

NOTE

 **The time shown is UTC time and not local time.**

4.3 Connecting to the iWAND

There are several ways to connect the iWAND:

- Wirelessly via Bluetooth (Windows 7 or later only recommended)
- USB
- Serially via RS232 or half duplex RS485

Any of these methods can be used to communicate with the iWAND 6G Configurator software, or if the iWAND is being used as a transceiver. All the connection methods will present themselves to the computer as a standard COM port so can be used with any terminal program (HyperTerminal, ProComm etc.).

The RS232/RS485 interface can also be used to connect directly to an instrument for serial interface testing using the iWAND Serial Terminal from the Accessories menu.

4.4 Bluetooth

It is highly recommended the Bluetooth dongle supplied with the iWAND is used to make connection. If a computer is being used with integrated Bluetooth it is recommended the internal Bluetooth is disabled and the supplied Bluetooth dongle is used. If this is not possible the computer Bluetooth interface must be capable of supporting the Bluetooth 2.1+EDR standard or later.

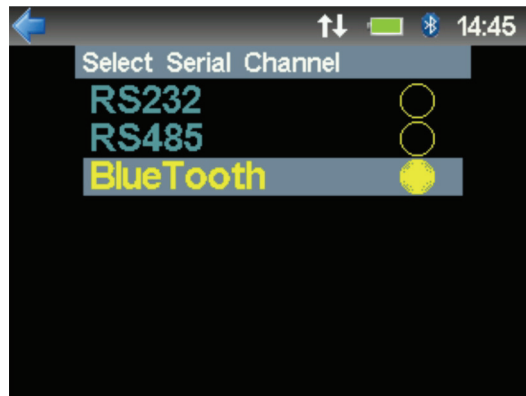
The iWAND Bluetooth interface supports the Bluetooth Serial Port Profile (SPP) so once installed it will appear as a standard COM port. The Bluetooth radio signal range is dependent on the environment but should normally operate up to 10 meters from the computer.

NOTE

 When possible the Bluetooth dongle shipped with the iWAND should be used.

To use the Bluetooth interface on the iWAND it must be turned on from the menu system **iWAND Setup** → **Communications**. If Bluetooth is already enabled it is indicated by the presence of the Bluetooth logo icon on status bar next to the battery level indicator.

Figure 4-4 – Enabling Bluetooth



When Bluetooth has been selected by pressing the **ENT** button the Bluetooth icon should appear on the status bar. As soon as the Bluetooth interface is enabled the iWAND should be discoverable by another Bluetooth device.

4.4.1 Installing the Bluetooth Dongle

The supplied Belkin USB Bluetooth dongle includes a driver CDROM.

1. Refer to **Figure 4-5**. Insert the CDROM and select **View Installation Guide** from the menu.

Figure 4-5 – USB Bluetooth Dongle CDROM Installation Menu



2. If AutoRun has been disabled on the computer find the CDROM drive in Windows Explorer and run the Belkin Bluetooth application.

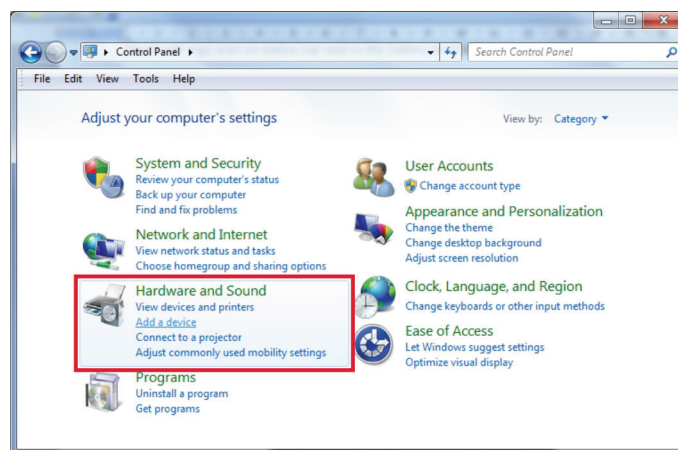
4.4.2 Adding the iWAND to the Computer via Bluetooth

4.4.2.1 Windows 7

With the Bluetooth on the iWAND enabled as outlined in **Section 4.4** and the Bluetooth dongle installed as in **Section 4.4.1** the iWAND is ready to install.

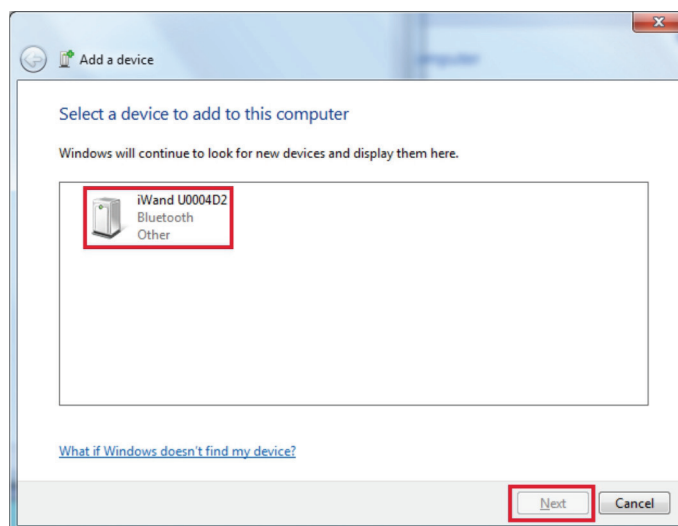
1. Open the Control Panel as shown in **Figure 4-6** (view by Category) and in the **Hardware and Sound** section select **Add a device**.

Figure 4-6 – Windows 7 Control Panel



2. Refer to **Figure 4-7**. The **Add a device** the popup window will appear.

Figure 4-7 – 'Add a device'



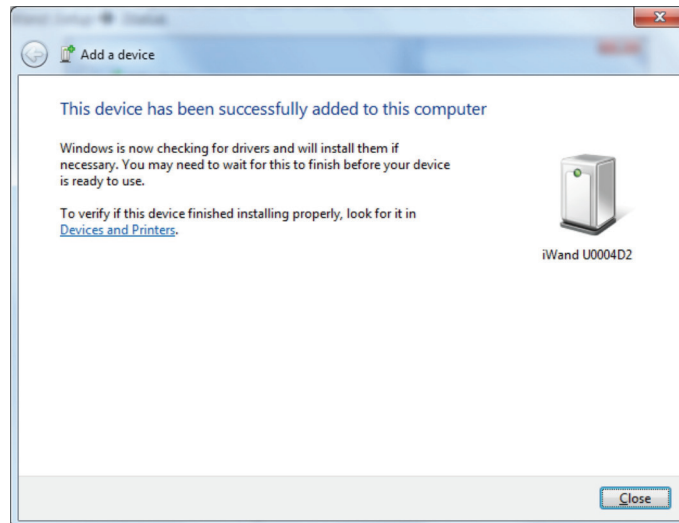
3. Refer to **Figure 4-8**. Select the iWAND required and click **Next** – this will complete the installation.

NOTE

 Any Bluetooth enabled phones or other local devices are likely to be detected – the iWAND is identified by its name 'iWand UXXXXXX' where XXXXXX are the 6 hex digits of the UID.

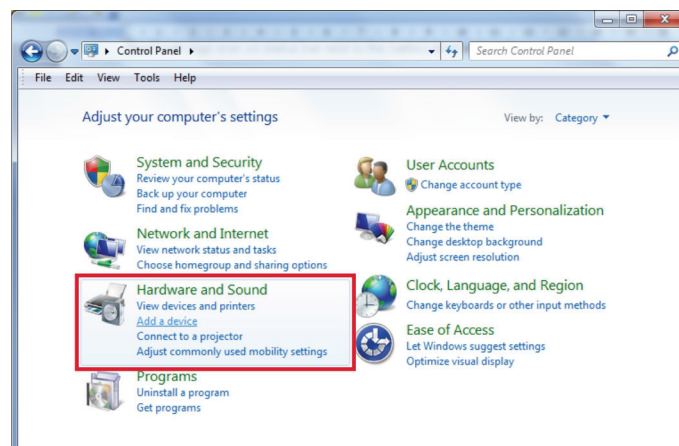
4. If multiple iWANDs are detected the UID is printed on the label on the back of the unit or can be seen from the menu item **iWAND Setup** → **iWAND Information**.
5. Refer to **Figure 4-8**. Once the iWAND has been successfully connected the **Add a device** window can be closed

Figure 4-8 – Bluetooth Device Added



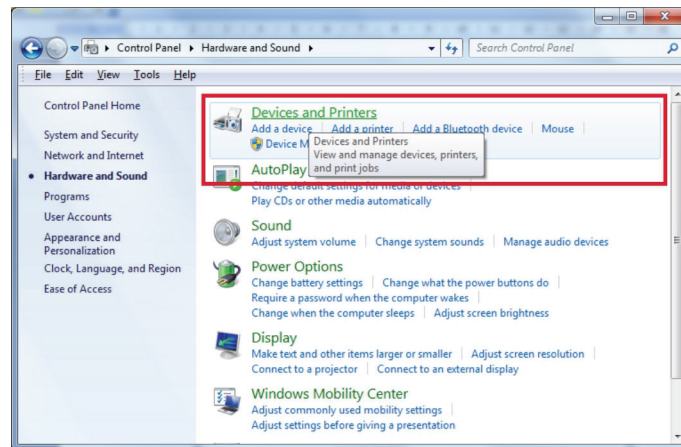
6. Now the iWAND has been installed it can be connected to the iWAND 6G Configurator software via any serial terminal program for use as a transceiver.
7. To identify the COM port Windows has assigned to the iWAND, return to the Control Panel.
8. Refer to **Figure 4-9**. Click on the **Hardware and Sound** link.

Figure 4-9 – Windows 7 Control Panel



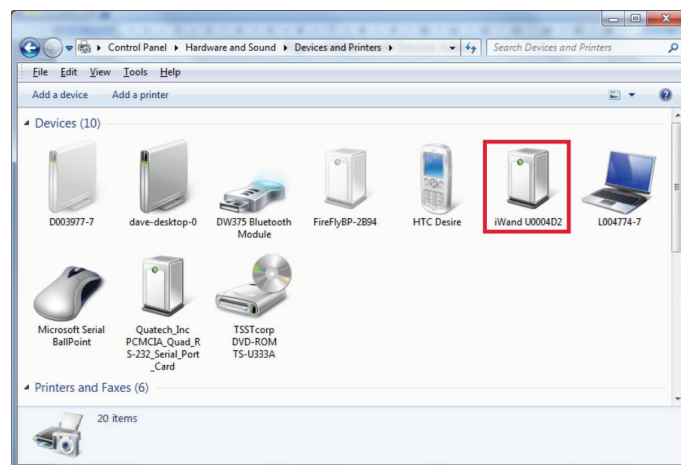
9. Refer to **Figure 4-10**. Click on the **Devices and Printers** link.

Figure 4-10 – Hardware and Sound



10. Refer to **Figure 4-11**. Select the **iWAND** from the **Devices and Printers** window.

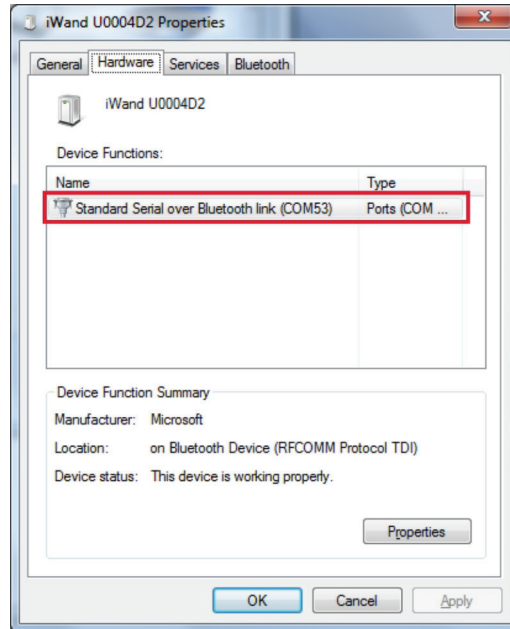
Figure 4-11 – Devices and Printers



11. Right-click on the **iWAND** and select **Properties**.

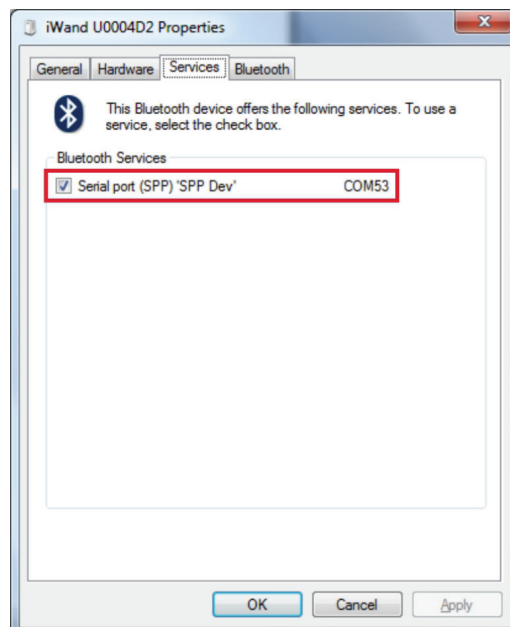
12. Refer to **Figure 4-12**. The COM port assigned to the iWAND will be shown in the **Hardware** tab.

Figure 4-12 – iWAND Bluetooth Port Properties



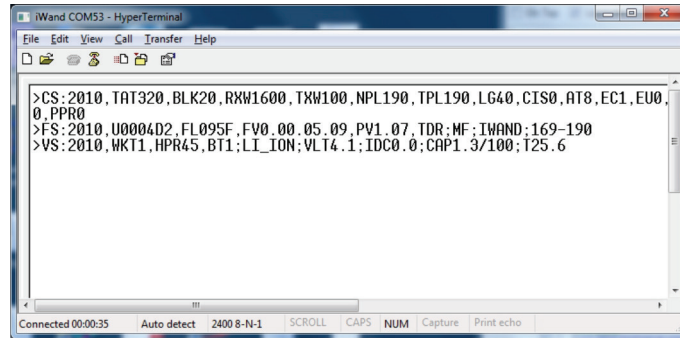
13. Refer to **Figure 4-13**. If no COM port is assigned make sure the **Serial Port (SPP)** option is selected in the Services tab.

Figure 4-13 – Bluetooth Services



14. Refer to **Figure 4-14**. Once the assigned COM port is known the iWAND can be communicated with using a terminal program such as HyperTerminal. A baud rate setting is not relevant so does not require configuring.

Figure 4-14 – HyperTerminal Over Bluetooth



4.4.2.2 Windows XP

Windows XP is not currently supported for Bluetooth connection.

4.5 USB

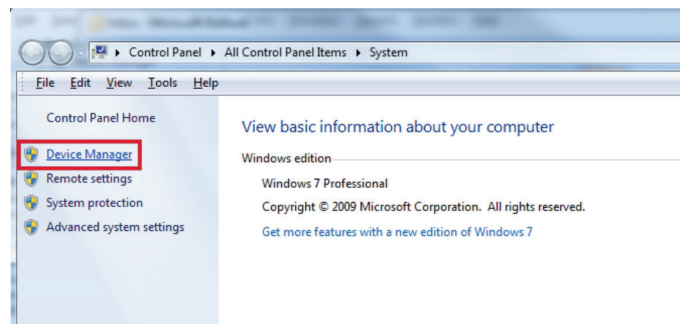
When installed, the USB interface on the iWAND will appear as a virtual COM port. The driver is supplied on the Sonardyne CDROM (920-2004) in the \Drivers directory.

4.5.1 Adding the iWAND to the Computer via USB

The screen shots below show the installation sequence for Windows 7. The sequence is the same for Windows XP.

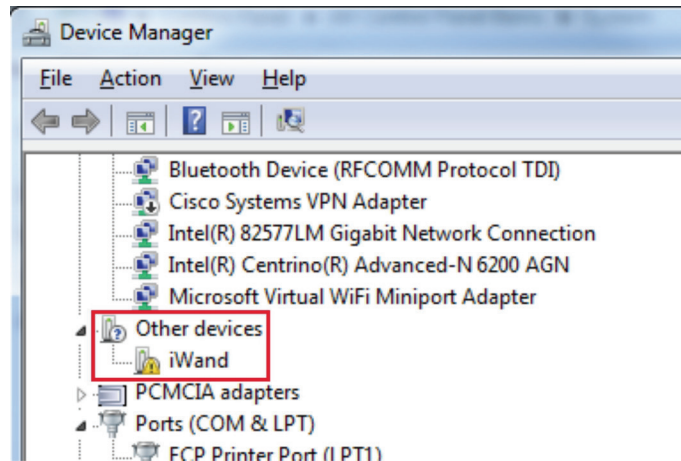
1. On plugging the iWAND USB cable into the computer Windows will attempt to load the driver and fail.
2. Refer to **Figure 4-15**. From the Windows Start menu, right-click on Computer, select Properties and then Device Manager.

Figure 4-15 – Starting Device Manager



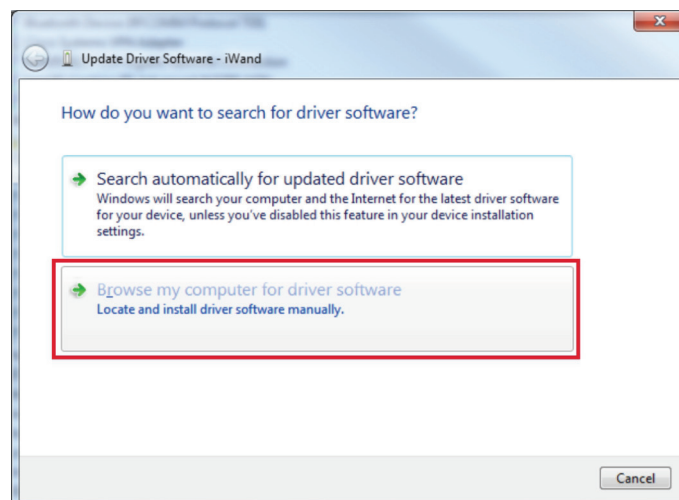
3. Refer to **Figure 4-16**. In **Device Manager**, from the **Other devices** drop-down menu select the iWAND.

Figure 4-16 – iWAND Driver Installation



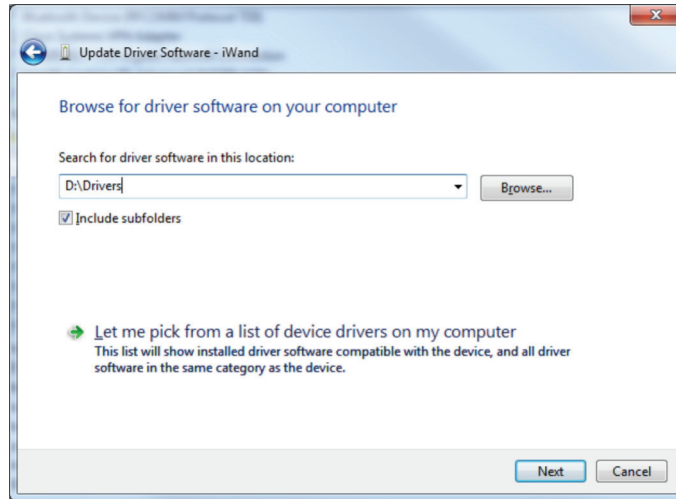
4. Right-click on the iWAND device and select **Update Driver Software....**
5. Refer to **Figure 4-17**. Select the **Browse my computer for driver software**.

Figure 4-17 – USB Update Driver Prompt



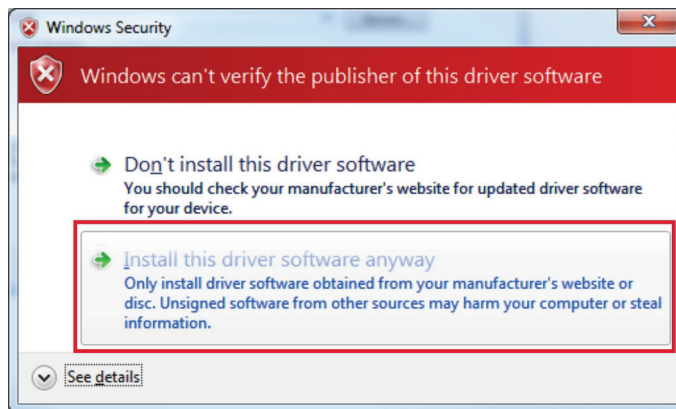
6. Refer to **Figure 4-18**. Click the **Browse** button and locate the **Drivers** directory on the supplied Sonardyne CDROM 920-2004.

Figure 4-18 – USB Driver Location



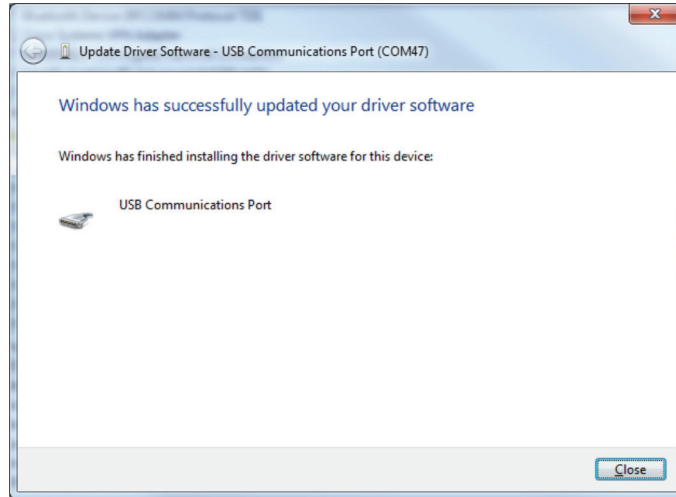
7. Refer to **Figure 4-19**. Windows will locate the correct drivers and prompt for confirmation. Select **Install this driver software anyway**.

Figure 4-19 – Windows Security Warning



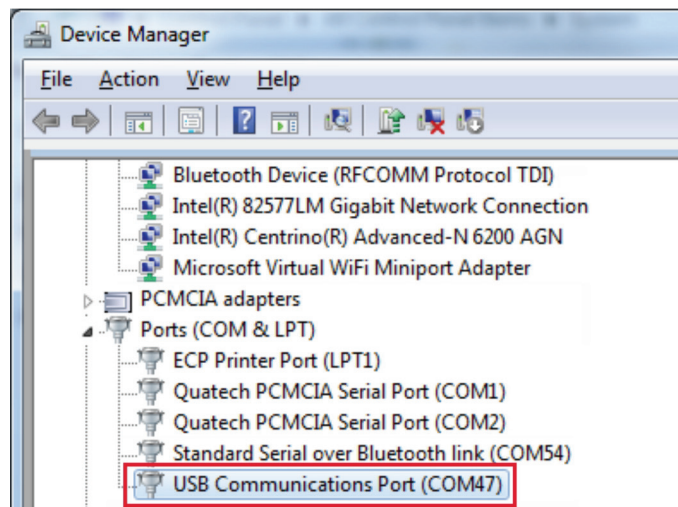
8. Refer to **Figure 4-20**. On successful completion of the driver installation an **Update Driver Software** window will appear.

Figure 4-20 – USB Driver Installation Complete



9. Refer to **Figure 4-21**. Once installed the iWAND will appear as a new COM port on the computer. The COM port number can always be identified in the **Device Manager**.

Figure 4-21 – Identifying Assigned iWAND COM Port Number



10. The iWAND should be able to communicate with most terminal programs (e.g. HyperTerminal).

NOTE


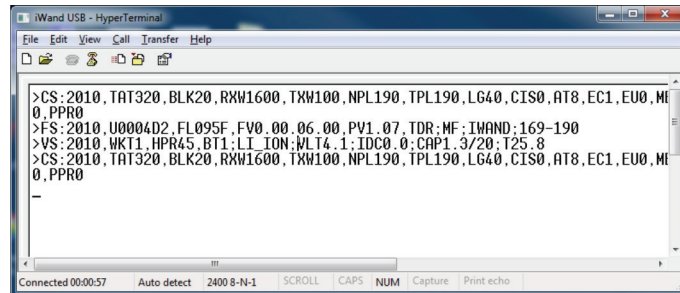
 When connected, the serial settings (baud rate, stop bits etc.) are not important so the default settings can be used.

Figure 4-22 – HyperTerminal Connection over USB

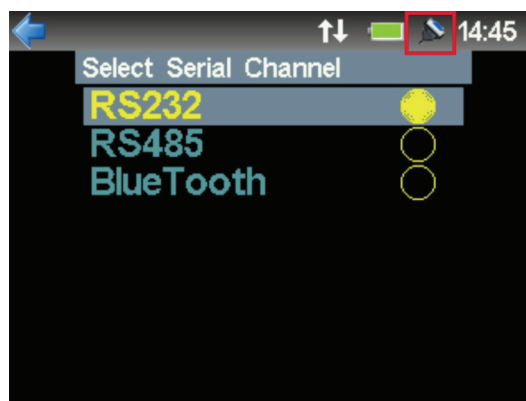


4.6 RS232/RS485 Connection

To communicate with the iWAND via an RS232 or RS485 connection, make sure the correct setting is selected from the Select Serial Channel menu (**iWAND Setup** → **Communications**).

When either RS232 or RS485 is selected a small serial connector icon will appear on the user interface next to the time.

Figure 4-23 – Serial Channel Selection



4.7 Baud Rate Settings

The default baud rate setting is 9600, however this may have been modified by the PORT command.

The baud rate can be identified by setting the terminal program (e.g. HyperTerminal) to 9600 baud and issuing a <**BREAK**> to the iWAND. The <**BREAK**> will reset the unit and on a restart it will output its current PORT settings at 9600 before switching to the configured baud rate.

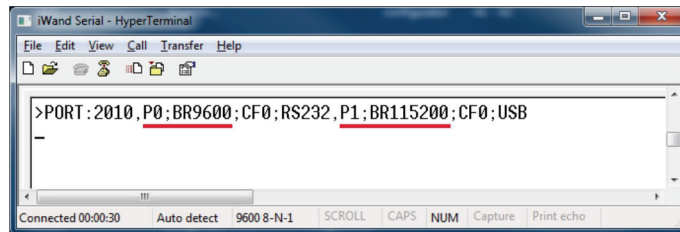
In HyperTerminal a <BREAK> can be sent by holding **CTRL** and pressing the **Break** key.

Figure 4-24 – Break Key on Keyboard



The baud rate is configured for P0 (port 0) is set at the default 9600 baud BR9600. P1 (port 1) is assigned to the USB interface – this is always available regardless of the settings assigned to port 0

Figure 4-25 – iWAND Serial Output After a <BREAK>



4.8 iWAND Setup

4.8.1 iWAND Information

The iWAND information screen shows the status of the iWAND and includes firmware version information.

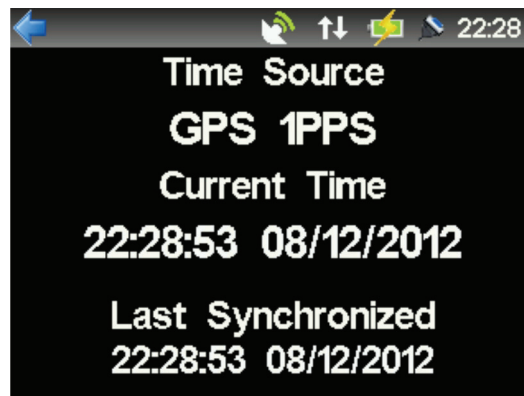
Figure 4-26 – iWAND Information



4.8.2 Time Information

The time information screen shows the time source used by the iWAND. In the best case the unit will be in view of satellites and updating – this will be indicated by a time source of **GPS 1PPS** and the **Last Synchronized** time will match the current time. If the unit has been powered on without view of the sky it will take it's time from the GPS internal RTC. If the GPS has not seen the sky since power was last removed it will not be set – it must be set with the iWAND 6G Configurator software or taken out to get a clear view of the sky.

Figure 4-27 - Time Information View



4.8.3 Communications

Clicking on Communications allows selection of the communications channel to serial communicate with the iWAND. When either RS232 or RS485 are selected the baud rate will default to 9600. Regardless of this setting the USB interface is always available to use. For information on setting the baud rate refer to section 4.7 - **Baud Rate Settings**.

Configuration of the serial communication mode is performed via the iWAND user interface:

iWAND Setup → Communications

The Bluetooth connection LED will light solid blue when a connection has been established.

4.8.4 User Interface

4.8.4.1 Screen Rotation

The screen rotation screen allows control of how the screen will rotate when the iWAND orientation is changed. Once the orientation has changed (if rotation is enabled) the unit must return to the horizontal plane before being rotated to the new orientation. The '90 Degree' option allows rotation in 90 degree steps; the '180 Degree' option restricts rotation to 'normal' and 'upside down'; 'Disabled' prevents the screen from rotating.

The screen rotation options can be selected from **iWAND Setup → User Interface → Screen Rotation** where it can be disabled or restricted to 90 or 180 degree steps.

4.8.4.2 Inertial Wakeup

Allows the operation of the inertial **Shake to Wake** feature to be enabled or disabled. Once the screen has turned off and the iWAND has entered Idle Mode (see section 3.1.9 for description of power modes) if inertial wakeup is enabled shaking the unit will return it to Normal Mode and the screen will be turned on.

To configure the inertial wakeup: **iWAND Setup → User Interface → Inertial Wakeup**.

4.8.4.3 Colour Scheme

The iWAND display colour scheme can be changed. To improve visibility in certain lighting conditions it may be beneficial to switch to a high-contrast colour mode. The **Standard** scheme is recommended for most situations.

Figure 4-28 – Colour Scheme – Standard



Figure 4-29 – Colour Scheme – Green

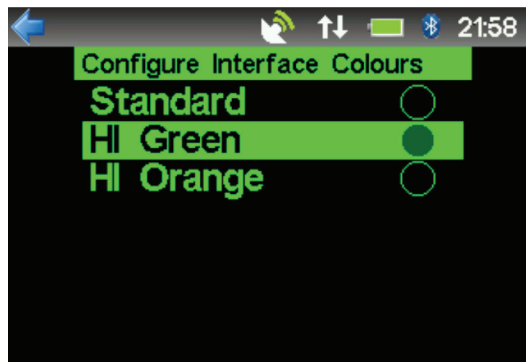
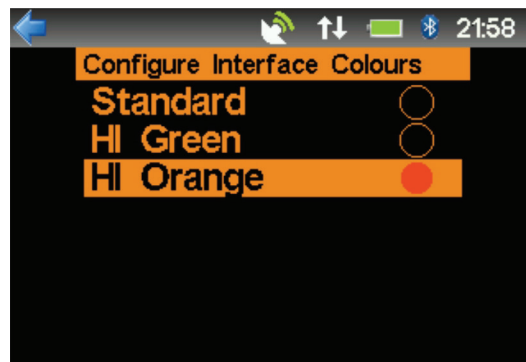


Figure 4-30 – Colour Scheme – Orange



4.8.4.4 Screen Brightness

This allows control of the display backlight brightness. It is recommended to leave it at 'Maximum' – however reducing the brightness will extend battery life if required.

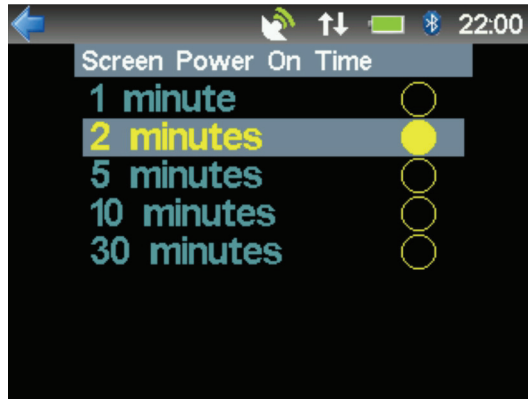
4.8.5 Power Saving

4.8.5.1 Screen On Time

The **Screen on Time** control determines how long the iWAND will spend in Normal Mode before switching the display off and entering Idle Mode. The shorter the duration the longer the battery will last for.

To configure the screen on time: **iWAND Setup** → **Power Saving** → **Screen On Time**

Figure 4-31 – Screen Power On Time Options



4.8.5.2 GPS Enable

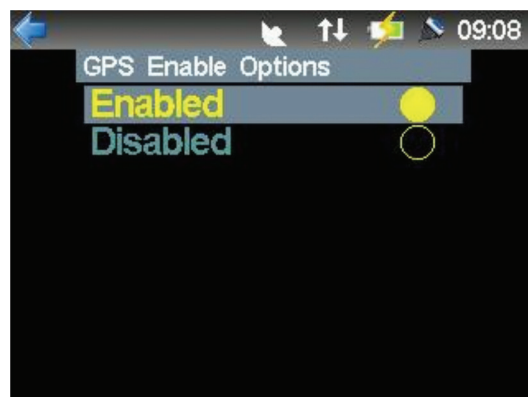
This allows the internal GPS to be turned on or off to extend battery life if required.

NOTE

 When the GPS is disabled it should be noted the iWAND time will no longer be able to synchronize to GPS time.

To configure the GPS Enable: **iWAND Setup** → **Power Saving** → **GPS Enable**

Figure 4-32 – GPS Enable / Disable



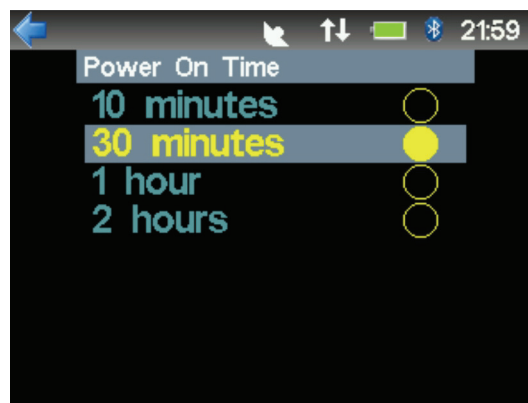
4.8.5.3 Turn On Time

The length of time the iWAND spends on before entering the Sleep Mode is configured from this menu.

To configure the Turn on Time: **iWAND Setup** → **Power Saving** → **Turn On Time** – the shorter this period the longer the battery life.

The turn on time timer is reset whenever a button is pressed or a serial command comes in – therefore this time is a period of inactivity before entering Sleep Mode. The shorter the configured time the longer the battery life will be. If the iWAND is being powered by USB it will remain powered on indefinitely – once the external power is removed the power on time will start to count down.

Figure 4-33 – Power On Time Before Entering Sleep Mode



4.8.5.4 Turn Off Now

This option will immediately put the iWAND into Sleep Mode – the same can be achieved by holding the **ENT** key down for more than 5 seconds (see section 3.1.9.3 for details).

To turn off the iWAND now: **iWAND Setup** → **Power Saving** → **Turn Off Now**

4.8.5.5 Off For Shipping

This option will electronically disconnect the internal battery and prevent it from an accidental wakeup on a keypad press that maybe experienced during shipping. USB power must be provided to wake the iWAND from this state (see section 3.1.9.4 for details)

To turn off the iWAND for shipping: **iWAND Setup** → **Power Saving** → **Off for Shipping**

4.8.6 Discovery Options

4.8.6.1 Enable All Bands

As a factory default the 6G Discovery operation at the beginning of the 'Quick Check', 'Get Configuration' and 'Set Configuration' sequences will search for an instrument in any of the 6G acoustic frequency bands (LMF, MF and HMF). If any of these bands have been disabled (see 4.8.6.2) this option will re-enable them all.

To enable all bands: **iWAND Setup** → **Discovery Options** → **Enable All Bands**

4.8.6.2 LMF Band, MF Band, HMF Band

These options allow the individual frequency bands used in the 6G Discovery process at the beginning of the 'Quick Check', 'Get Configuration' and 'Set Configuration' sequences to be enabled or disabled. If the user only has certain types of unit (e.g. all LMF) it will speed up the 6G Discovery process by skipping over the disabled bands.

NOTE

 **If in doubt Enable All Bands as described in section 4.8.6.1.**

To enable the different bands: **iWAND Setup** ➔ **Discovery Options**

Figure 4-34 – LMF, MF and HMF Bands

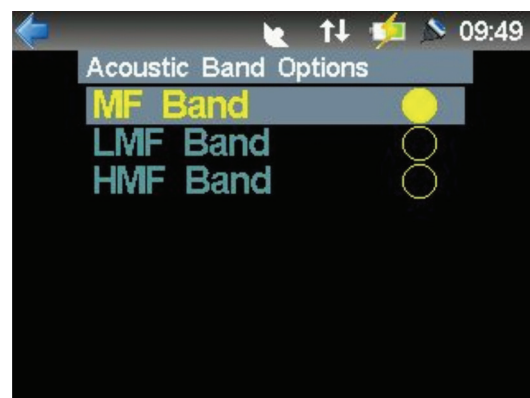


4.8.6.3 Acoustic Band

When being used as a transceiver or in transponder mode (see 4.8.7) the iWAND must be set to the same band as the unit being communicated with. This menu allows selection of the correct MF, LMF or HMF bands.

To configure the acoustic band: **iWAND Setup** ➔ **Acoustic Band**

Figure 4-35 – Acoustic Bands



4.8.6.4 Reset Options

4.8.6.4.1 Reset All Settings

This will reset all configurable options relating to the iWAND to their factory default values. The database of any instruments configured by the iWAND will not be affected.

To reset all settings: **iWAND Setup** → **Reset Options** → **Reset All Settings**

4.8.6.4.2 Clear Database

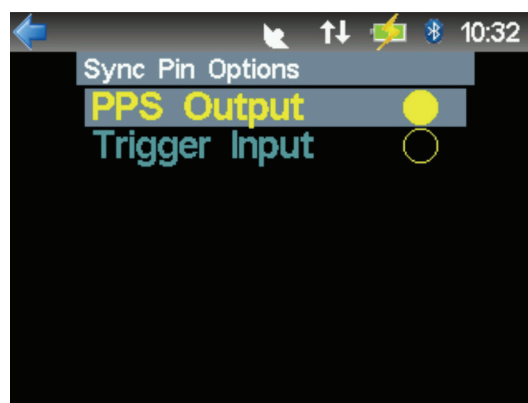
This option will wipe the internal storage of any instruments the iWAND has been used to configure. The database held by the 6G Configurator software will not be cleared by this operation.

To clear the database: **iWAND Setup** → **Reset Options** → **Clear Database**

4.8.6.5 Sync Pin Options

When PPS Output is selected, if the GPS receiver is enabled and the iWAND has a good view of the sky, the 1PPS output from the GPS receiver will be output on the 'Trigger' pin on the 9 way connector. When configured as Trigger Input the iWAND will trigger a BR cycle on every rising edge of the 'Trigger' pin.

Figure 4-36 – Sync Pin Options



4.8.7 Transponder Mode


Transponder Mode allows the iWAND to behave as a transponder. It can therefore be used to test an external Sonardyne 6G transceiver. The current acoustic settings of the iWAND are shown on the display. These values can be used in conjunction with the acoustic test mode in the 6G Configurator software or directly with direct 6G commands to the transceiver.

Figure 4-37 – Transponder Mode



The Common Interrogate channel (CIS in Figure 4-37) will indicate the current assigned CIS channel or 'Disabled' if the CIS channel is not enabled.

NOTE

 The transmit power for the iWAND is **SIGNIFICANTLY** lower than a standard Sonardyne Transponder. It will only operate at short range in a quiet environment for tank testing applications, or with direct transducer contact when used in air.

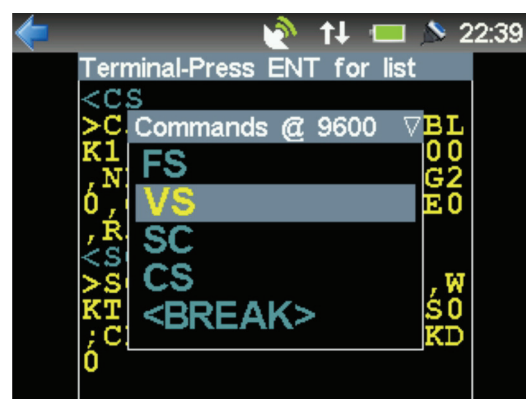
4.8.8 Accessories

The Accessories menu contains miscellaneous functions for non-acoustic testing.

4.8.8.1 Serial Terminal

The Serial Terminal function is provided to aide diagnostics of a 6G instrument when the acoustics are not functioning correctly. A standard Compatt serial cable can be plugged into the 9-way connector on the iWAND and connect directly to the 6G instrument.

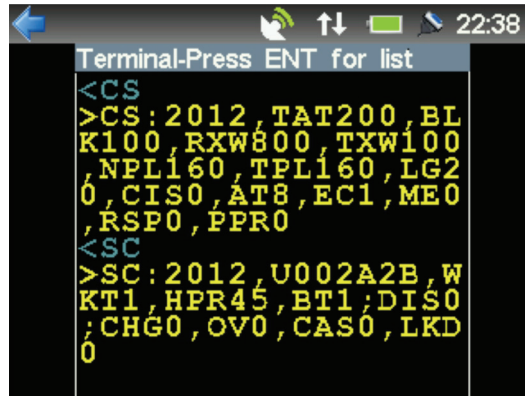
Figure 4-38 – Serial Terminal Startup View



On starting, the Serial Terminal will present a menu as shown in **Figure 4-38**. The menu title bar shows the baud rate the terminal is currently set to – this will be the default speed the iWAND serial port is configured to. If the baud rate of the instrument connected to does not match the baud rate shown, or the baud rate is not known selecting the **<BREAK>** option will issue a serial break to the instrument to reset it and configure the Serial Terminal baud rate to match the instrument.

Once the baud rate is configured correctly any of the predefined 6G commands can be issued and their raw text responses will be displayed.

Figure 4-39 – Serial Terminal Command Response View



4.8.8.2 GPS Accessories

The GPS Status view provides a simple diagnostic view of how well the iWAND GPS receiver is receiving satellite signals. The display shows elevation and azimuth with the received signal strength of each satellite being tracked. Orange or green satellites are good. When the Fixes field shows '3D Fixes' the GPS receiver has a good view of the sky.

Figure 4-40 – GPS Status View



The Current Position view displays the current latitude and longitude along with the time the fix was made. If the GPS signal drops out the display will stop updating until the GPS signal is re-acquired.

Figure 4-41 – Current Position View



SECTION 5 – IWAND OPERATION

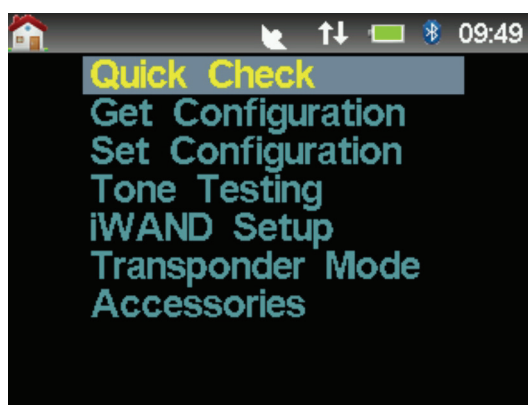
5. Introduction

This section describes the operation of the iWAND. All functions of the iWAND are available via the menu system. As a standalone instrument the iWAND can provide testing and status reporting of Sonardyne 6G instruments. When used in conjunction with the Sonardyne iWAND 6G Configurator software the iWAND can perform fully acoustic instrument configuration with a single button press.

5.1 Menu System

The home screen with main system menu is shown in **Figure 5-1**.

Figure 5-1 – Home Screen



The operation of the keypad keys is as follows:

- The UP and DOWN arrow keys change the selected menu item
- The ENT key selects the high-lighted menu item
- The BACK arrow key will return to the previous menu until the home screen is reached

5.2 Prerequisites for Operation

The first three menu options **Quick Check**, **Get Configuration** and **Set Configuration** all begin with a Sonardyne 6G Discovery operation to identify the instrument being communicated with.

NOTE

 **As the WSM6 is a tone interrogation transponder it DOES NOT support 6G Discovery – acoustic testing of WSM6 is handled in the Tone Testing menu described in section 5.7**

Once the instrument is identified, a series of commands are sent to get the status of the instrument. For this process to succeed the following conditions must be met:

- a. The firmware on the 6G Instrument must be at least the version number outlined in section **11.4**
- b. The battery level on the instrument being interrogated **MUST** be greater than 5% capacity remaining. Below this level the 6G Instrument will only respond to a very limited command set. If the battery is too depleted the iWAND will display a 'Battery Too Low' message and will not continue.
- c. The battery on the 6G Instrument must be a genuine Sonardyne 6G battery back. If this is not the case the 6G Instrument will only respond to a very limited command set. The iWAND will display a 'Battery Authentication Error' message and will not continue.
- d. There must be good acoustic coupling between the iWAND transducer and the transducer of the instrument being interrogated. The iWAND transducer should be firmly pressed against the transducer of the instrument being interrogated.

Figure 5-2 – Positioning the iWAND Against the Instrument Transducer



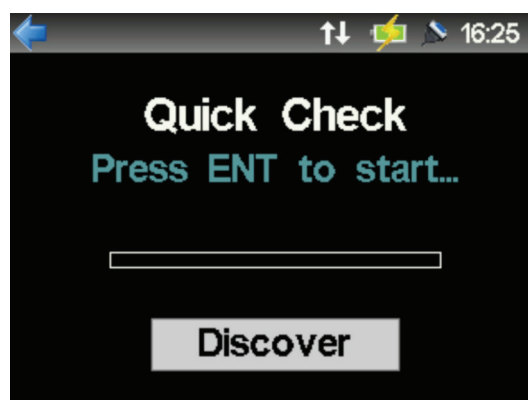
5.3 Quick Check

This menu leads to all of the standalone test options. It includes functions to view acoustic settings, battery status, sensor measurements and a number of other operations to view configuration and status of the instrument. It also provides operational testing of the mechanical release (if present) and acoustics of the instrument.

The details of all the options within the Quick Check menu are outlined below.

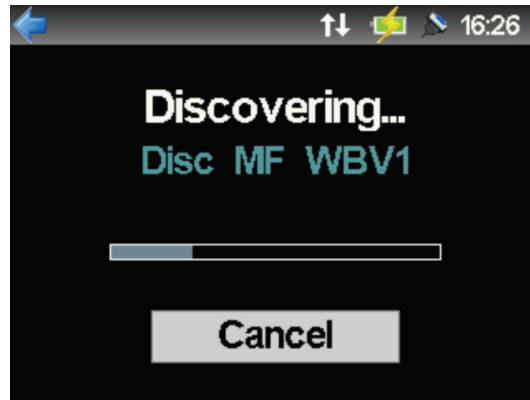
1. Refer to **Figure 5-3**. From the main menu click on **Quick Check**. To begin the sequence press **ENT**. This will begin with a **Discovery** process.

Figure 5-3– Quick Check Screen



2. Refer to **Figure 5-4**. The Discovering process will gather all information from the instrument.

Figure 5-4 – Discovering process screen



3. Refer to **Figure 5-5**. On completion of the Discovery process the **Quick Check** menu will appear. Depending on the configuration of the instrument, various options within the Quick Check menu (e.g. sensors, acoustic release, HPR check etc.) may not be displayed if they are not relevant.

Figure 5-5 – Quick Check Menu

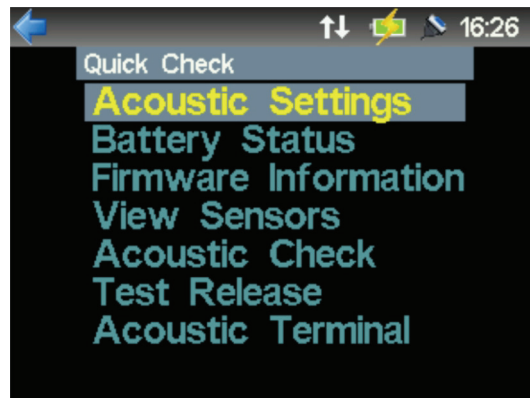
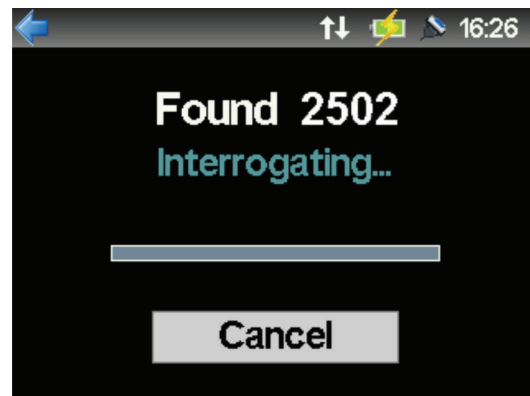


Figure 5-6 – Instrument Interrogation



5.3.1 Acoustic Settings

The Acoustic Settings screen shows the acoustic configuration of the instrument. The UID, Functionality level, Band and Transducer are fixed for the instrument – the remaining parameters can be configured with the iWAND 6G Configurator software.

Figure 5-7 – Acoustic Settings View



5.3.2 Battery Status

The Battery Status screen shows information about the battery within the instrument. If the **Remaining** % field falls below the 5% threshold the instrument will stop functioning normally (unless the battery override flag is set) and will only respond to certain acoustic commands.

Figure 5-8 – Battery Status View



5.3.3 Firmware Information

The Firmware Information screen shows the firmware version of the software inside the instrument. This may be required when contacting Sonardyne customer support.

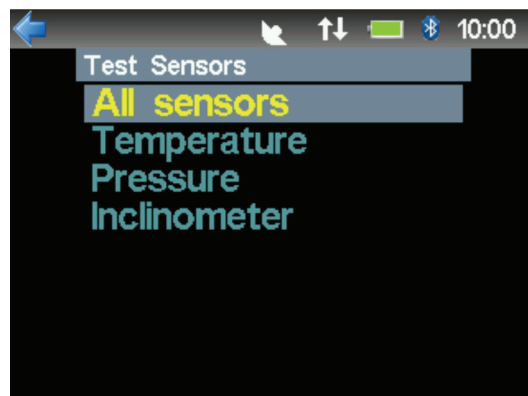
Figure 5-9 – Firmware Information View



5.3.4 View Sensors

The View Sensors screen lists all sensors fitted and available on the instrument.

Figure 5-10 – View Sensors Menu



Selecting the All Sensors option shows the current measurement of each of the sensors available in the instrument.

Figure 5-11 – All Sensors View



The colour of the sensor value indicates the error status of the measurement:

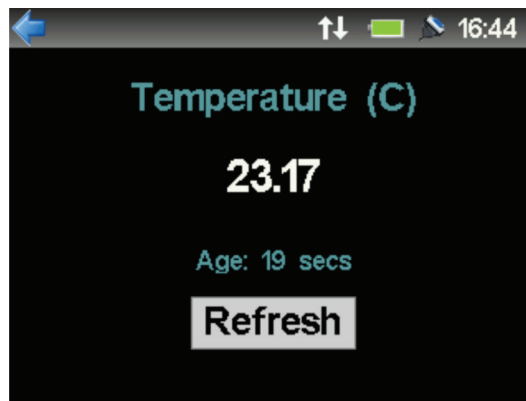
- GREEN – measurement is valid and less than 10 seconds old
- ORANGE – the measurement is > 10 seconds old
- RED - the measurement is reported in error (out of range)

Pressing the **Refresh** button will request another reading – some sensor types have a long warm up time, so may take several refresh operations.

For more information (including error information and measurement age) each individual sensor can be selected and viewed (refer to **Figure 5-12**). As various sensors have variable warm up times they can take several seconds to start up and begin giving good values.

Pressing the **ENT** key to perform a refresh will re-read the sensor.

Figure 5-12 – Individual Sensor Channel View



5.3.5 Acoustic Check

In the **Acoustic Check** a transfer in both directions (from iWAND to the instrument and a return from the instrument to the iWAND) will occur, with the acoustic quality parameters being displayed. This may be requested when dealing with Sonardyne customer support.

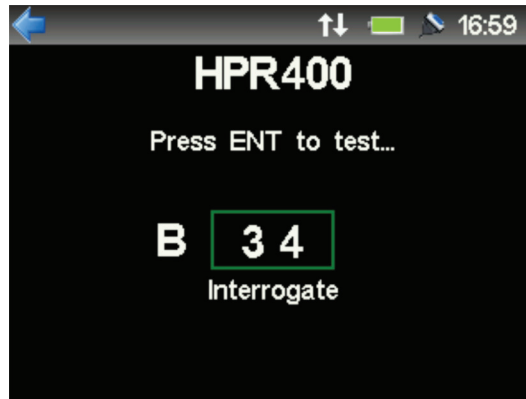
Figure 5-13 – Acoustic Check View



5.3.5.1 HPR Check

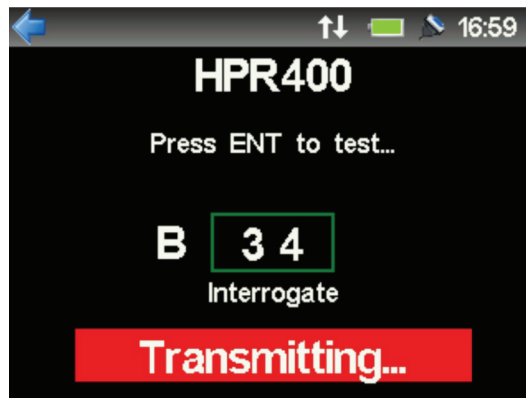
If HPR is enabled on the instrument and the iWAND has been purchased with the required functionality level, an option will be available to test the HPR.

Figure 5-14 – HPR Channel Configured with the iWAND 6G Configurator Software



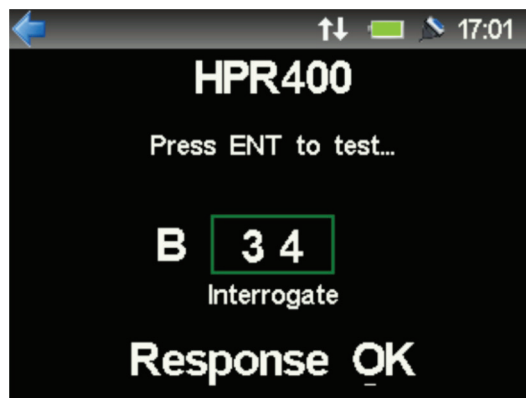
The HPR channel will have been configured with the iWAND 6G Configurator software – the test will configure itself to the HPR channel that has been selected.

Figure 5-15 – Configuring to HPR Channel



A simple **Response OK** will be displayed if a response is detected from the HPR interrogation.

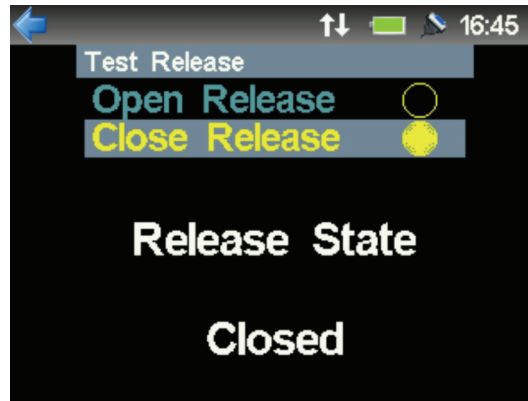
Figure 5-16 – Response Detected from the HPR Interrogation



5.3.6 Test Release

If a release mechanism is fitted to the instrument, the menu will allow a functional test to be carried out. The test will start with the menu selecting the current state the release mechanism is in (open or closed).

Figure 5-17 – Select the current state of the release



From the menu, select the required position for the release mechanism. The release motor will drive the mechanism to the requested position. While the release is moving the instrument will 'ping' to indicate it is active. The transducer of the iWAND should be held against the instrument transducer until the operation is complete.

Figure 5-18 – Select the state for the drive motor to drive to

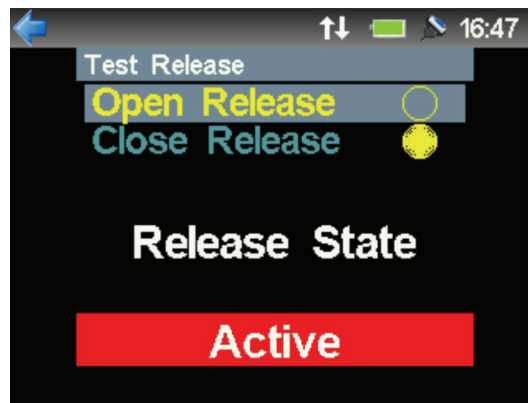
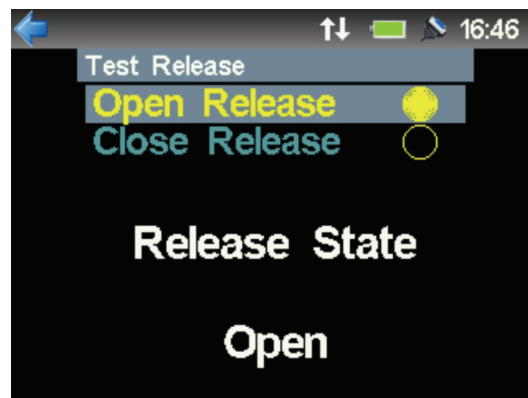


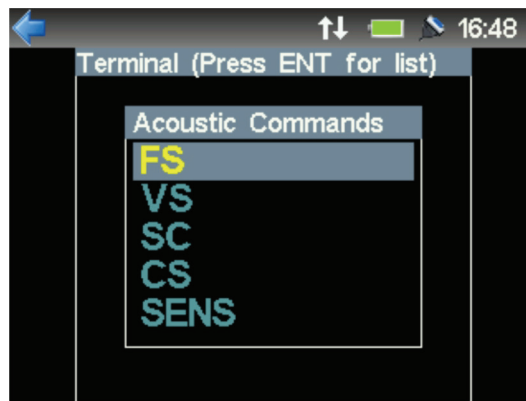
Figure 5-19 – Completed Release State operation



5.3.7 Acoustic Terminal

For advanced users the **Acoustic Terminal** allows a raw view the internal 6G command that communicates between the iWAND and the instrument.

Figure 5-20 – Acoustic Terminal Test Menu



The predefined commands are selected from the menu and will be issued to the instrument and the replies shown.

Figure 5-21 – Acoustic Terminal Response Display



The direction of the data is indicated by the colour of the text.

- Blue is the command from the iWAND to the instrument.
- Yellow is the reply from the instrument to the iWAND

A short history of the communications is maintained – the UP and DOWN arrow keys can be used to scroll backwards and forwards through the data.

5.4 Get and Set Configuration

Both **Get and Set** operations timestamp the responses collected from the instrument. The iWAND time **must** be set for these operations to proceed. This can be done by enabling the GPS and leaving the iWAND outside for a few minutes (with a clear view of the sky) or by using the iWAND 6G Configurator software.

5.5 Get Configuration

This menu initiates a sequence to collect all the status and settings from the 6G instrument for later upload to the iWAND 6G Configurator software. All data is stored in non-volatile memory inside the iWAND. When connected to a computer running the iWAND 6G Configurator software the data will automatically be downloaded from the iWAND to update the database held by the software.

The **Get Configuration** sequence starts with a Sonardyne 6G Discovery operation to identify the instrument. If the prerequisites for operation have (refer to section 5.2) been met the sequence will proceed to automatically collect all information required.

1. Refer to **Figure 5-22**. Select **Get Configuration** from the main menu.

Figure 5-22 – Get Configuration



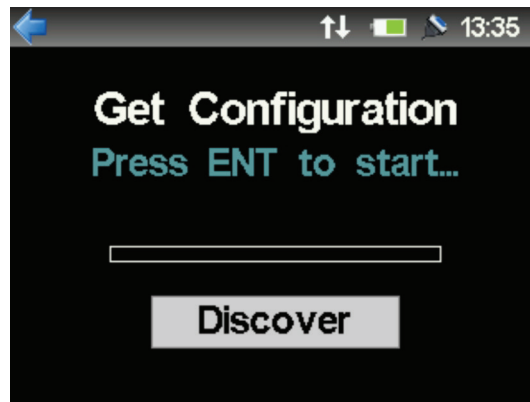
2. Refer to **Figure 5-23**. Make sure the iWAND transducer is held firmly against the transducer of the unit.

Figure 5-23 – Hold the iWAND Against the Instrument



3. Refer to **Figure 5-24**. To begin the sequence press **ENT**.

Figure 5-24 – Start of the Get Configuration Process



4. Refer to **Figure 5-25**. The Discovering sequence will begin.

Figure 5-25 – Get Configuration Sequence Discovering

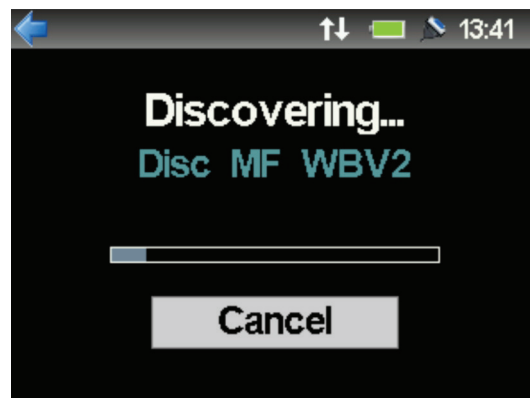
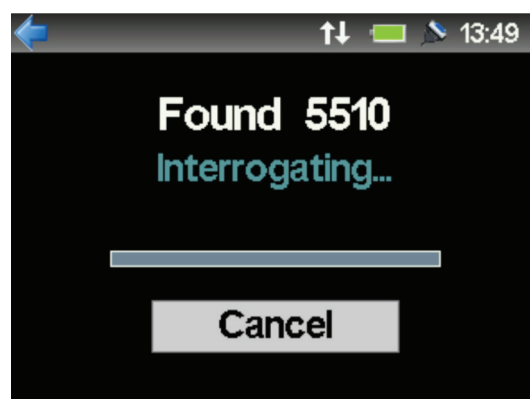
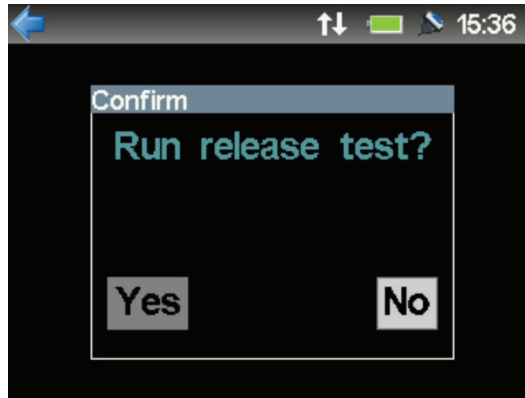


Figure 5-26– Get Configuration Sequence Found



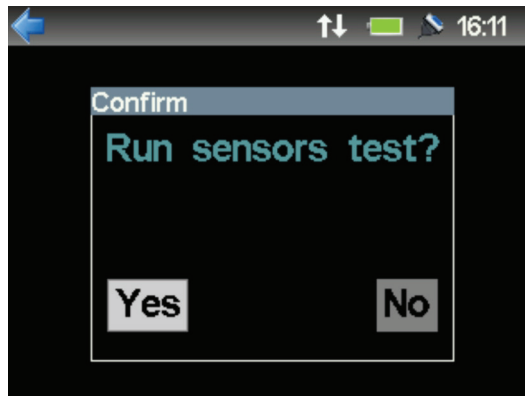
5. Refer to **Figure 5-27**. The Get Configuration sequence will confirm if a release mechanism is fitted and if a test is required.

Figure 5-27 – Get Configuration Sequence Confirm



6. If a release mechanism test is to be carried out refer to section **5.5.1 - Release Test**.
7. Refer to **Figure 5-28**. The Get Configuration sequence will then ask if a **Sensor Test** is required.

Figure 5-28 – Sensor Test Request



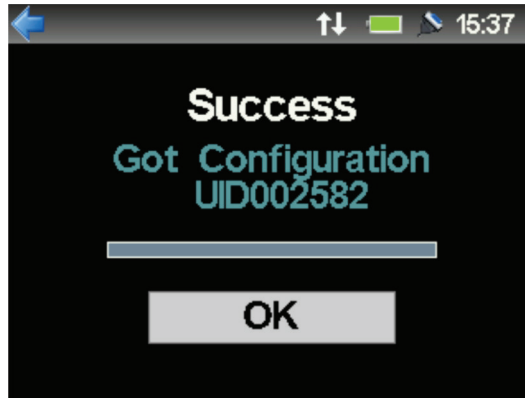
8. Refer to **Figure 5-29**. If a Sensor Test is required all fitted senses will be tested and the current measurements of each sensor will be displayed.

Figure 5-29 – All Sensors View



9. Refer to **Figure 5-30**. On completion of the Get Configuration sequence the iWAND will display the address of the unit and the configuration was successful.

Figure 5-30 – Get Configuration Sequence Success



10. At the end of the sequence the user will be prompted to run a release mechanism test (to test the release mechanism if one is present) and a sensor test (if the unit has any sensors).

5.5.1 Release Test

1. Refer to **Figure 5-31**. If a release mechanism is fitted to the unit a prompt will be displayed to allow it to be tested. If **Yes** is selected, the dialogue box will appear.

Figure 5-31 – Testing the Release – Current State

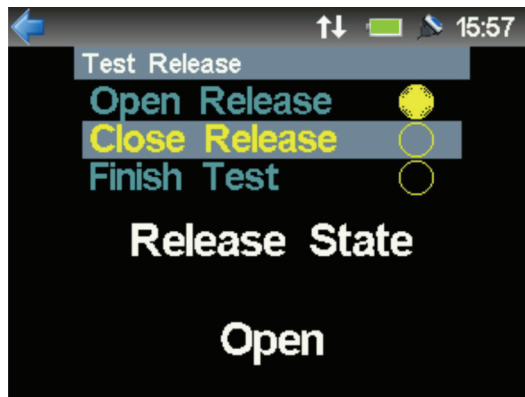


Figure 5-32 – Testing the Release – Activating

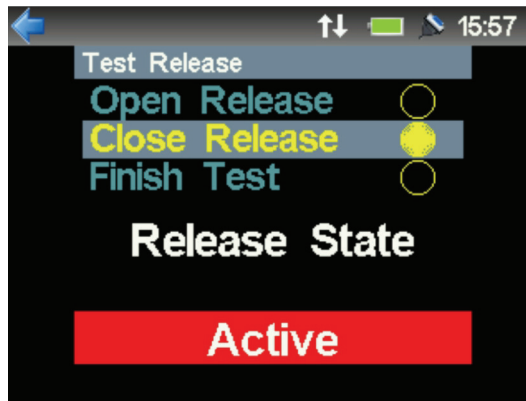


Figure 5-33 – Testing the Release – State following activation

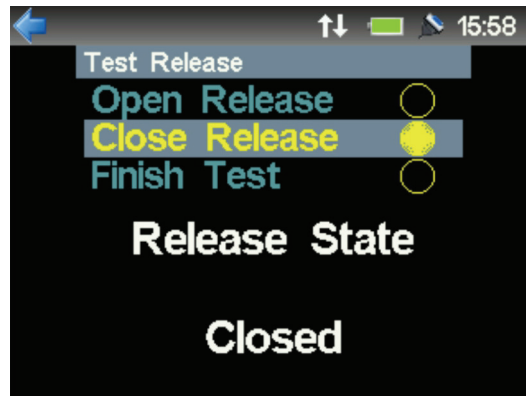
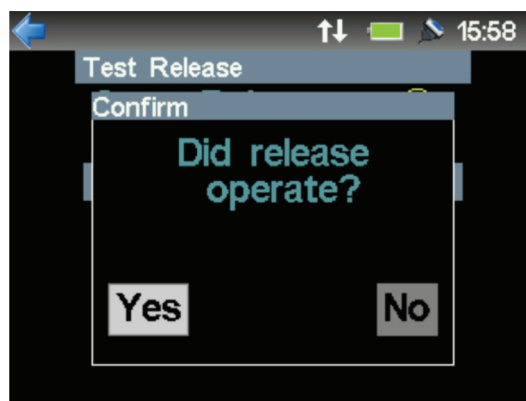


Figure 5-34 – Testing the Release – Confirm release operation



2. It is the user's decision as to what state the release is left in and how it is exercised. After opening / closing the release and selecting the **Finish Test** option the dialogue box will request confirmation the release has operated. This response will be stored with the collected settings and presented to the iWAND 6G Configurator software

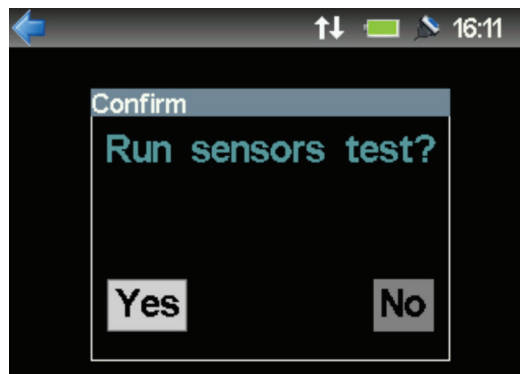
NOTE

While the mechanical release is operating the unit will transmit periodic pings to indicate it is active. The iWAND transducer must stay in contact with the transducer of the instrument under test until the process is completed, indicated by the *Release State Open* or *Release State Closed*.

5.5.2 Sensors Check

Sensors fitted to the instrument can now be tested.

Figure 5-35 – Option to Test Sensors



5.6 Set Configuration

Once an instrument has been configured by the iWAND 6G Configurator software the settings will be automatically downloaded to the iWAND for delivery when a synchronization process is performed.

When synchronized the iWAND can be unplugged from the computer and moved to the location of the 6G instrument to be configured. Configurations for multiple 6G instruments can be held by the iWAND at the same time.

As outlined in 5.2 a Sonardyne 6G Discovery operation is performed at the start of the **Set Configuration** sequence. As this operation automatically identifies the 6G instrument, the **Set Configuration** process will automatically download the correct settings for the instrument without user intervention.

1. Refer to **Figure 5-36**. Select **Set Configuration** from the main menu.

Figure 5-36 – Set Configuration



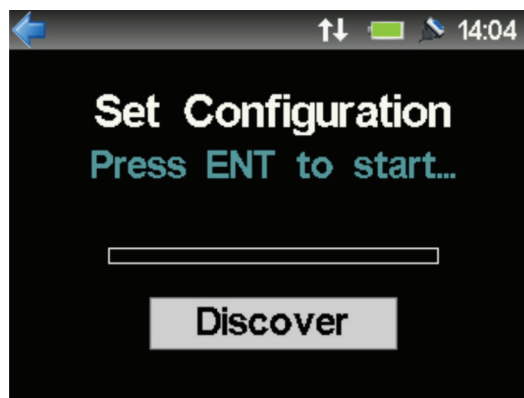
2. Refer to **Figure 5-37**. Make sure the iWAND aerial is held firmly against the transducer of the unit.

Figure 5-37 – Hold the iWAND Against the Instrument



3. Refer to **Figure 5-38**. To begin the configuration sequence press **ENT**.

Figure 5-38 – Start the Set Configuration Process



4. Refer to **Figure 5-39**. The **Discovering** sequence will begin.

Figure 5-39 – Get Configuration Sequence Discovering

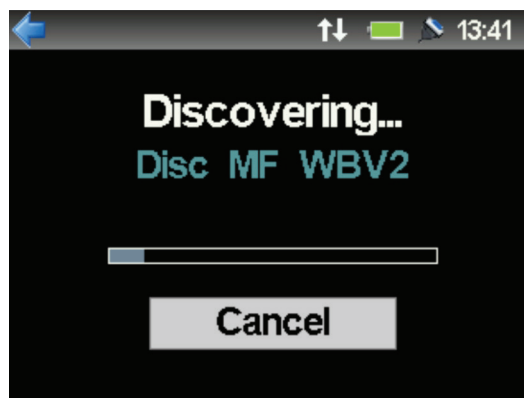
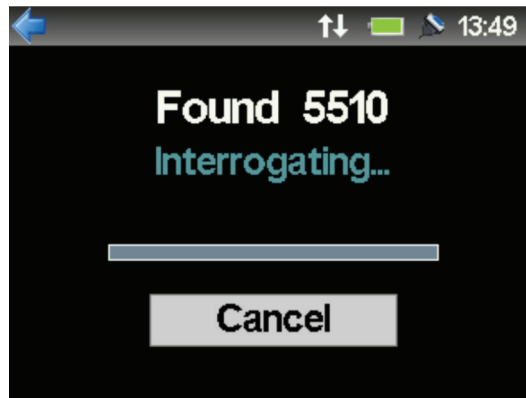
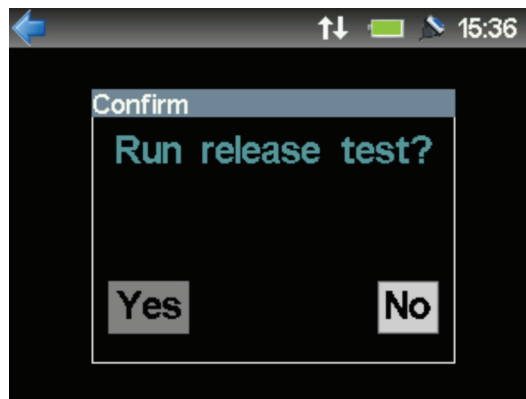


Figure 5-40 – Get Configuration Sequence Found



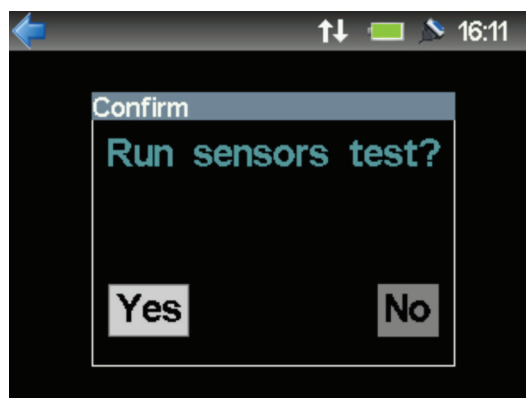
5. Refer to **Figure 5-41**. The Set Configuration sequence will confirm if a release mechanism is fitted and if a test is required.

Figure 5-41 – Get Configuration Sequence Confirm



6. If a release mechanism test is to be carried out refer to section **5.5.1 - Release Test**.
7. Refer to **Figure 5-42**. The Set Configuration sequence will then ask if a **Sensor Test** is required.

Figure 5-42 – Sensor Test Request



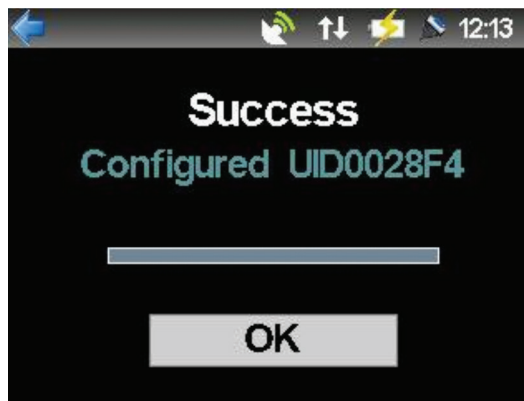
8. Refer to **Figure 5-43**. If a Sensor Test is required all fitted senses will be tested and the current measurements of each sensor will be displayed.

Figure 5-43 – All Sensors View



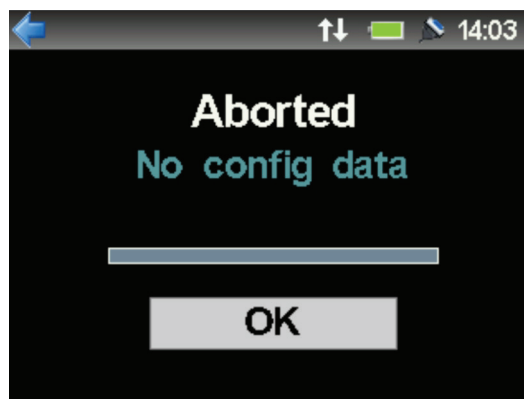
9. Refer to **Figure 5-44**. On completion of the Set Configuration sequence the iWAND will display the address of the unit and the configuration was successful.

Figure 5-44 – Set Configuration Sequence Success



10. Refer to **Figure 5-45**. If the Set Configuration process detects that no configuration changes are necessary on the instrument it will abort the Set Configuration.

Figure 5-45 – Configuration Process Aborted



5.7 Tone Testing

These options are to support tone interrogate transponders.

5.7.1 Sonardyne WSM6

NOTE

 As WSM6 does not support the 6G Discovery mode, it can only be tested in the Tone Testing mode.

The channel the WSM6 has been configured to must be known. As standard the iWAND allows acoustic testing of WSM6 in Sonardyne Wideband V1, Wideband V2 or Sonardyne tone modes. If the iWAND has been purchased with HPR functionality it can be used to test the WSM6 in HPR300 and HPR400 modes.

1. Refer to **Figure 5-46**. Select the appropriate mode based on the WSM6 configuration as setup in the WSM Terminal.

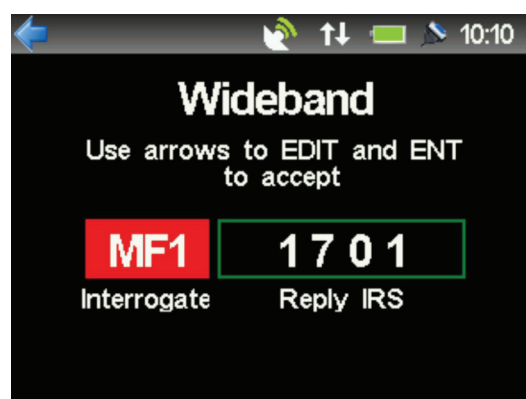
Figure 5-46 – Selecting correct mode for WSM6



5.7.1.1 Sonardyne Wideband Mode

Refer to **Figure 5-47**. When the WSM6 has been configured in Sonardyne Wideband V1 or Sonardyne Wideband V2 mode the Sonardyne Wideband option should be selected. This allows the tone interrogate channel and Sonardyne Wideband reply address to be configured.

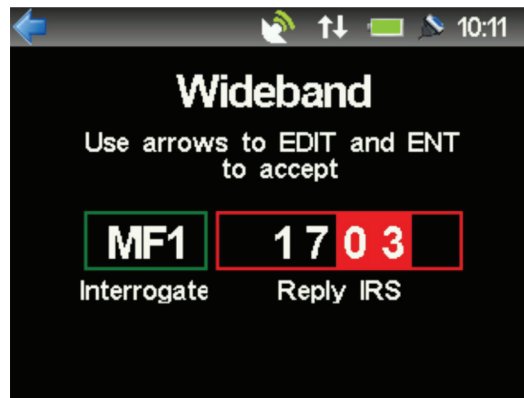
Figure 5-47 – Interrogation Channel Selection



Refer to **Figure 5-48**. On entry the interrogation channel selector will be selected. The **UP** and **DOWN** keypad keys allow the channel to be changed.

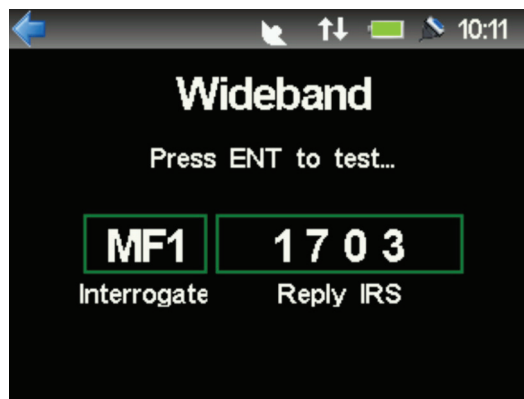
1. Refer to **Figure 5-48**. Select the appropriate interrogate channel and press **ENT** to move onto the reply address selector.

Figure 5-48 – Wideband Reply Address Selection



2. Refer to **Figure 5-49**. Once the reply IRS channel is correct press **ENT** to accept. Further **ENT** presses will trigger an interrogation cycle. UP, DOWN or RIGHT button presses will re-enter the edit cycle.

Figure 5-49 – Wideband Test



3. Refer to **Figure 5-50**. On every **ENT** button press the transmitting state will be shown. This will stay active while the interrogate transmission is transmitted and either a reply is received or the request times out (refer to **Figure 5-51** and **Figure 5-52**).

Figure 5-50 – Test Transmitting State

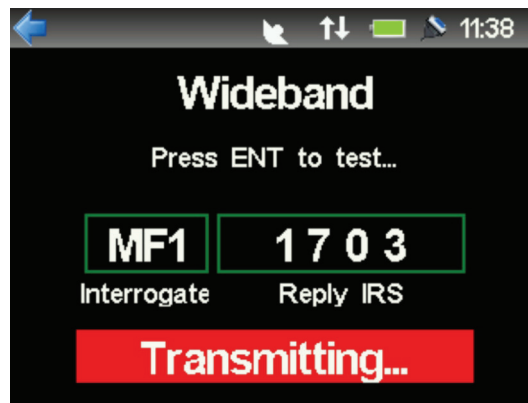
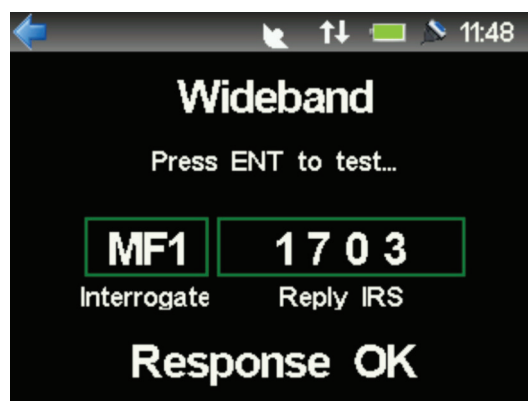


Figure 5-51 – Nothing Received from Transponder



Figure 5-52 – Response Received



5.7.1.2 Sonardyne Tone Mode

The operation of Sonardyne Tone mode is identical to Sonardyne Wideband mode except the selection of the reply channel is a Sonardyne Tone rather than a Sonardyne Wideband address.

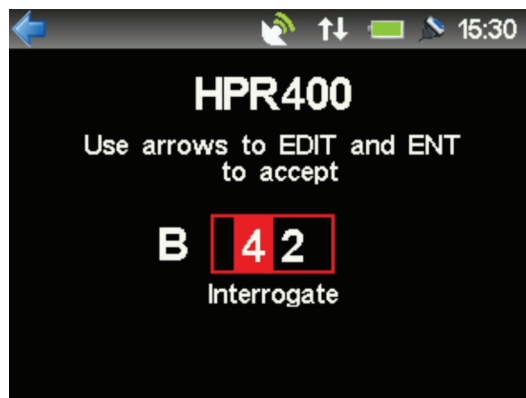
Figure 5-53 – Sonardyne Tone Mode



5.7.1.3 HPR300 / HPR400 mode

In HPR300 or HPR400 mode only the interrogate channel is configured – the reply channel is defined by the interrogate channel. Operation is identical to Wideband mode described in **Section 5.7.1.1**


Figure 5-54 – HPR400 Mode



5.7.1.4 Legacy HPR

This mode is included to support other types of transponder compatible with HPR300 / HPR400. This option is only available if the iWAND has been purchased with HPR functionality enabled. It is functionally identical to the HPR300 / HPR400 tests in the Sonardyne WSM6 tests described in **Section 5.7.1.3**


NOTE

 When using the iWAND with legacy or 3rd party transponders Sonardyne cannot guaranty compatibility even if there are configured for HPR300 / HPR400 due to the low transmit power of the iWAND.

SECTION 6 – MAINTENANCE

6. Maintenance

CAUTION

 **Equipment Damage.** There are **NO** user serviceable parts inside the iWAND. The plastic housing should not be opened under any circumstances as this will damage the integrity of the housing seal.

Before any maintenance activity is carried out make sure all warnings and cautions in **Section 2 – Safety** are read.

Documentation must be consulted whenever the warning symbol is found on the equipment, in order to determine the nature of the potential hazard and any actions which should be taken.

6.1 Scheduled Maintenance and Recalibration

There is no calibration associated with the iWAND.

6.2 General Maintenance

Make sure the iWAND is kept clean and dry whenever possible. The screen area has an anti-glare coating – avoid scratching this area or using any abrasive cleaning materials.

Make sure the rubber bung over the communications connectors is in good repair and maintains a good fit to protect the end cap connectors from direct water ingress and moisture.

SECTION 7 – FUNCTIONAL TEST

7. Functional Test

7.1 Running Self-Test

Running a self-test on the iWAND hardware can be performed from the menu system from **iWAND Setup** → **Test iWAND** at the bottom of the menu. This will perform a series of functional tests on the internal electronics including:

- User interface buttons
- Display
- Display backlight
- GPS (if enabled)
- Internal accelerometer
- Internal electronics

7.2 Running An External Unit Test

To verify the iWAND is operational a simple quick check to a known working 6G transponder meeting the requirements outlined in Section 5.2 will exercise all acoustic functions of the unit along with the iWAND transducer.

SECTION 8 – FIRMWARE UPGRADE

8. Introduction

This chapter describes the process for upgrading the firmware in the iWAND. The firmware update requires the Sonardyne 6G Terminal Lite software to be installed (this can be found on the Sonardyne 6G Utilities CD 8300-102).

8.1 Firmware Upgrade Procedure

Upgrading the firmware in the iWAND can only be carried out by means of the USB or the RS232 connection. To connect to the iWAND USB refer to **Section 4.5 - USB**; to connect to the RS232 refer to **Section 4.6 - RS232/RS485 Connection**.

NOTE

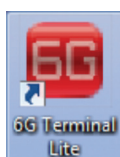
 Firmware upgrade using the RS485 or BlueTooth is NOT supported.

 If upgrading through the RS232 connection make sure the USB cable is NOT connected to the iWAND at the same time.

To upgrade the firmware in the 8315 iWAND proceed as follows:

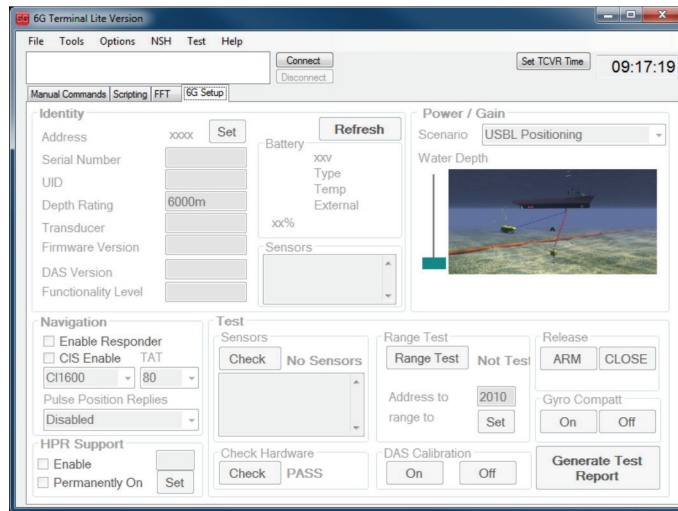
1. Make sure the iWAND is switched **ON**.
2. Connect either the USB or the RS232 serial cable to the iWAND. **Do not connect both**.
3. Connect the USB or the RS232 serial cable to the PC.
4. Refer to **Figure 8-1**. Start the **6G Terminal Lite** software by clicking on the icon on the desktop.

Figure 8-1 – 6G Terminal Lite Software icon



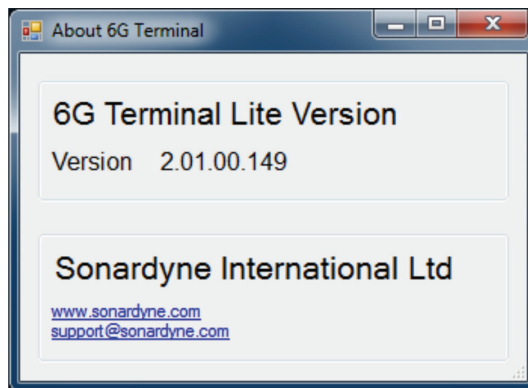
5. Refer to **Figure 8-2**. The 6G Terminal Lite software will open with a blank page.

Figure 8-2 – 6G Terminal Lite homepage



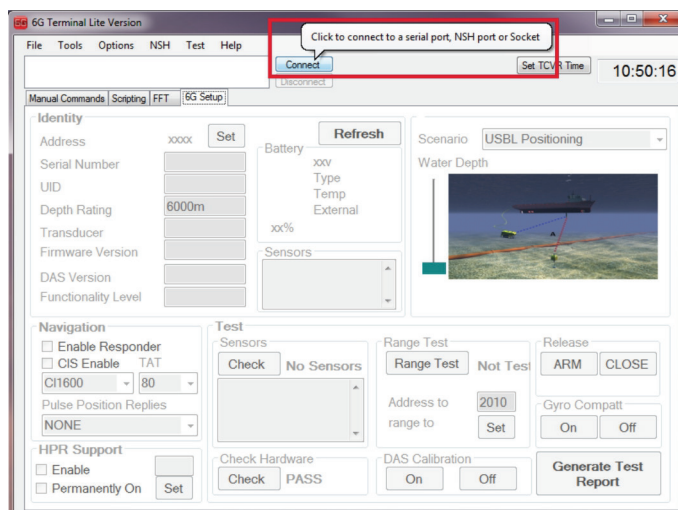
6. Refer to **Figure 8-3**. Make sure the 6G Terminal Lite version is 2.01.00.149 or later. To locate the version of the software click **Help > About 6G Terminal**.

Figure 8-3 – About 6G Terminal Lite



7. Refer to **Figure 8-4**. Click the **Connect** button to connect to the computer.

Figure 8-4 – Click Connect



8. Refer to **Figure 8-5**. In the **Select Port** window, from the drop down menu select the COM Port the iWAND is connected to.

NOTE


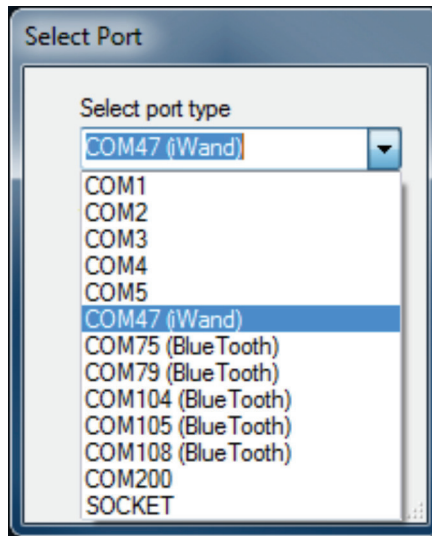
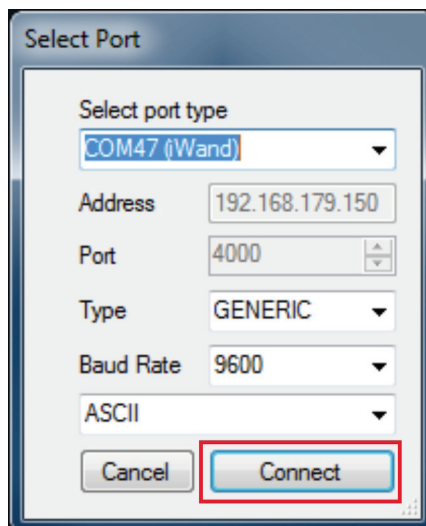
 For standard RS232 ports select the port the iWAND is connected to. If the iWAND is connected via the USB the COM port will have (iWand) next to the port name.

Figure 8-5 – Select COM Port



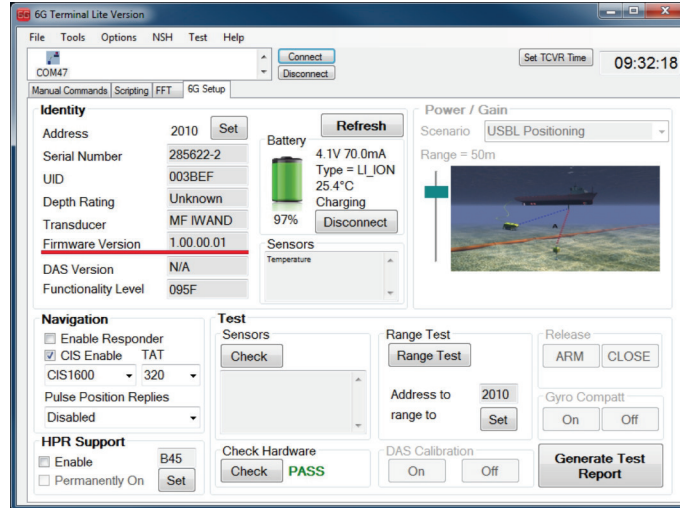
9. Refer to **Figure 8-6**. Click **Connect**.

Figure 8-6 – Select Port Connect



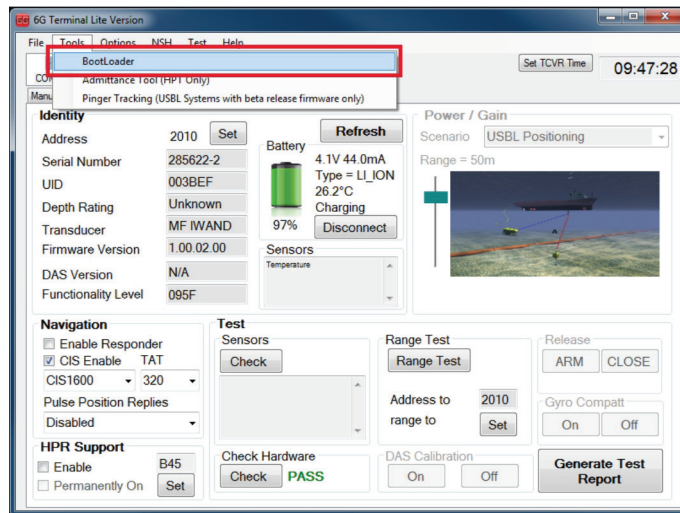
10. Refer to **Figure 8-7**. The 6G Terminal Lite window will populate with the current configuration of the iWAND, including the current firmware version.

Figure 8-7 – Current iWAND Configuration



11. Refer to **Figure 8-8**. To upgrade the firmware the bootloader must be opened. To open bootloader select **Tools > Bootloader**.

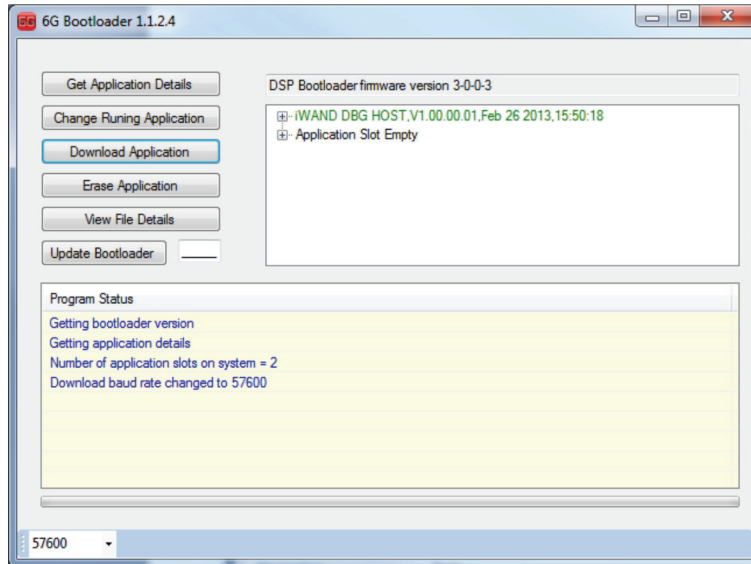
Figure 8-8 – Select Bootloader



12. The iWAND will reset followed by the 6G Bootloader window will open.

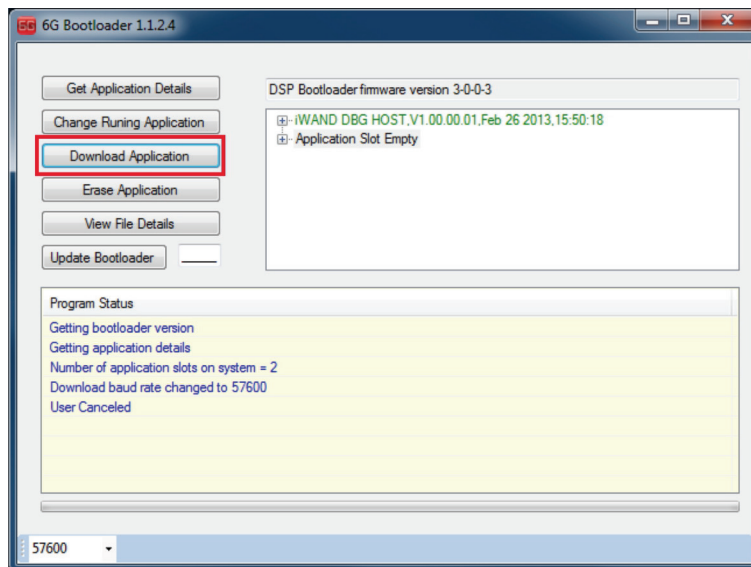
13. Refer to **Figure 8-9**. In the list, the currently running firmware is in green. The black firmware line is old or unused firmware.

Figure 8-9 – Bootloader Firmware List



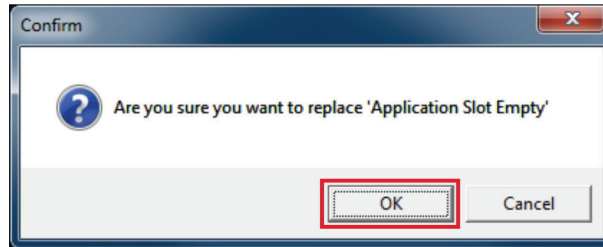
14. Refer to **Figure 8-10**. Click on the black firmware to select it, then click on **Download Application**.

Figure 8-10 – Select Download Application



15. Refer to **Figure 8-11**. A window will appear asking for confirmation the firmware selected is to be replaced.

Figure 8-11 – Confirm Replace Firmware



16. Click **OK** to confirm the firmware is to be replaced.

NOTE

 The new firmware will be provided by Customer Support and should be saved on the PC.

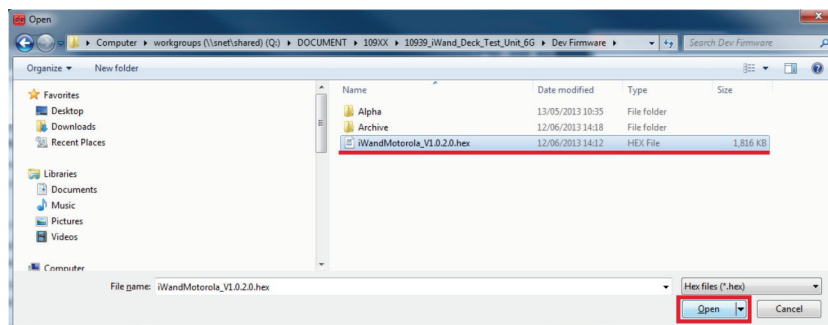
17. A window will appear to select the firmware file (.HEX) to download.

CAUTION

 **Equipment Inoperable. Incorrect Firmware will render the iWAND inoperable. Make sure the correct firmware is selected.**

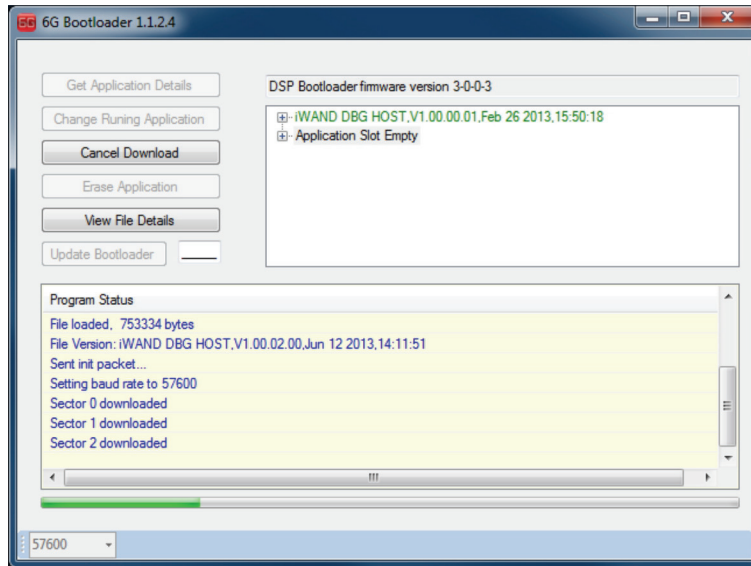
18. Refer to **Figure 8-12**. Navigate to the location of the new firmware. Make sure the .HEX file is the correct file for the iWAND.
19. Select the file and click **Open**.

Figure 8-12 – Select New Firmware File



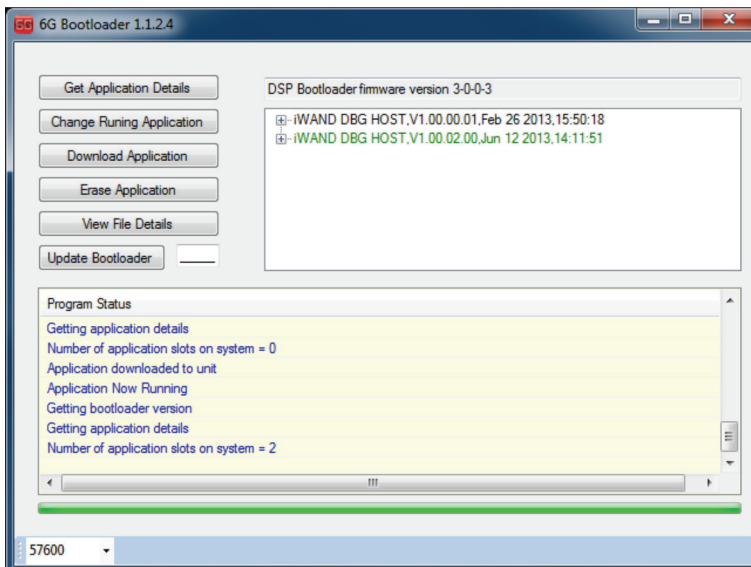
20. Refer to **Figure 8-13**. The file will automatically start to download the new firmware version.

Figure 8-13 – Downloading New Firmware



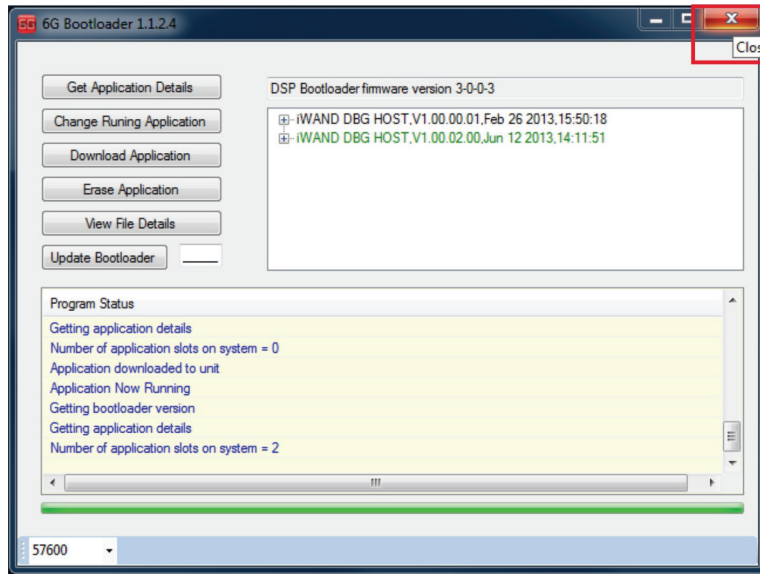
21. Refer to **Figure 8-14**. The new firmware will appear in green.

Figure 8-14 – Download Completed



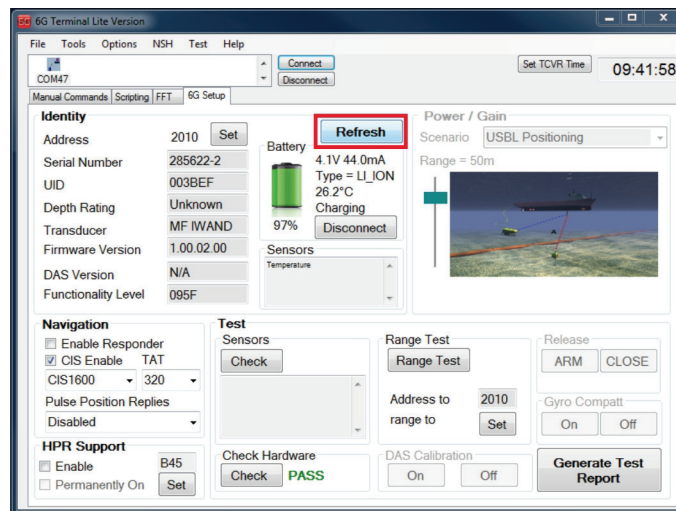
22. Refer to **Figure 8-15**. On completion of the download the bootloader programme can be closed. The iWAND will reset with the new firmware.

Figure 8-15 – Close Bootloader



23. Refer to **Figure 8-16**. After the reboot of the iWAND the 6G Terminal Lite settings should refresh and the new firmware will be displayed. If the software does not update automatically click **Refresh**.

Figure 8-16 – Refresh 6G Terminal Lite Settings



SECTION 9 – FAULT DIAGNOSIS

9. Introduction

The following section assists in diagnosis of problems that occur when running the iWAND.

9.1 General Operation

9.1.1 Unit Does Not Power On With A Key Is Pressed On The Keypad

If the iWAND has been turned off for shipping or reset with the reset magnet for more than a few seconds it will require insertion of the USB cable (connected to either the charger or a computer) to restore power. With the cable plugged in, press a button on the keypad to switch on.

If the iWAND still fails to turn on the battery maybe flat – leave the iWAND plugged into the supplied charger for approximately four hours and retry.

9.1.2 Unit not responsive

If the iWAND becomes unresponsive it can be reset by holding down the UP and DOWN arrow keys together on the keypad for more than 3 seconds. If it is serially connected it can be reset by sending a serial BREAK of > 30 ms.

9.2 PC Communications

9.2.1 Bluetooth not functional on Windows XP

Windows XP is currently not supported via a Bluetooth connection with 6G Configurator.

9.2.2 USB not communicating

Make sure the USB driver has been installed correctly as per **Section 4.5.1**. If the USB Communications Port is present and the iWAND is failing to talk to the 6G Configurator software, unplug the USB lead from the unit and plug it in again. If that fails, power cycle the unit (hold down the ENT button for > 5 seconds).

USB can be sensitive to electrical disturbances from close proximity power systems and motor drives. If problems persist consider moving the iWAND and PC to an electrically quieter environment.

9.3 Acoustic Communications

For successful communications the iWAND transducer should be firmly held against the transducer of the Sonardyne 6G instrument being interrogated. Make sure the criteria outlined in **5.2 - Prerequisites for Operation** have been met for the instrument being interrogated.

If problems persist ensure the frequency band is correct for the instrument being interrogated. If in doubt use the **iWAND Setup → Discovery Options → Enable All Bands** to make sure the discovery band required has not been disabled. If using the iWAND as a transceiver make sure the FS response has the correct band configured - use **iWAND Setup → Acoustic Band** to select the correct frequency band.

SECTION 10 – STORAGE

10. Storing

The iWAND when not in use should be stored in the protective transit case shipped with the product. Make sure the housing is clean and dry before returning to the case.

Make sure the conditions for storage comply with the Environmental requirements outlined in **Section 11**.

Avoid leaving the iWAND in a deeply discharged state for extended periods. To turn off the iWAND for storage and shipping: **iWAND Setup → Power Saving → Off for Shipping**

SECTION 11 – TECHNICAL SPECIFICATIONS

11. Technical Specification for the iWAND

11.1 External Power

External Supply Voltage	Nominal 5V DC (USB)
Operating Range	5V USB
Maximum Current	500mA USB powered / 800mA USB charger powered

11.2 Battery Life

Battery Type	Capacity (Ah)	Voltage range
Lithium polymer	1.3	[4.2..3.0]V
Mode	Typical Battery Life	
SLEEP	2 months	
IDLE	12 hours	
ACTIVE	6 hours	

11.3 Environmental

Parameter	Specification
Temperature Operation	[-10..+55]°C
Temperature Storage	[-10..+55]°C*
Rated for Outdoor use	Relative humidity 100%
	IP65

* To maximize battery life the iWAND should be stored in the range [+15..+35]°C

11.4 Firmware Requirements

For correct operation the iWAND requires the following firmware versions (or later) in the unit being interrogated:

Sonardyne 6G Product	Minimum Firmware Version
Compatt 6 / AMT	V3.00.06.10*
WMT / AvTrak 6	V3.02.02.09
ROVNav	V3.03.04.09
WSM 6	All firmware versions (tone testing ONLY)

*V3.00.06.10 does not support 6G Discovery in WBV1 addresses of the LMF frequency band – this will be fixed in a future firmware release.

APPENDIX B – SOFTWARE COPYRIGHT / LICENSE / WARRANTY

SOFTWARE COPYRIGHT / LICENSE / WARRANTY

All rights reserved.

This license applies to the registered version of 6G UTILITIES TEST PROGRAMS, known below as the SOFTWARE PRODUCT.

LICENSE AGREEMENT

You should carefully read the following terms and conditions before using this software. Unless you have a different license agreement signed by Sonardyne International Limited your use of this software indicates your acceptance of this license agreement and warranty disclaimer.

REGISTERED VERSION

One registered copy of the SOFTWARE PRODUCT may either be used by a single person who uses the software personally on one or more computers, or installed on a single workstation used non simultaneously by multiple people, but not both.

COPYRIGHT

All rights, title, and copyrights in and to the SOFTWARE PRODUCT and any copies of the SOFTWARE PRODUCT are owned by Sonardyne International Limited. The SOFTWARE PRODUCT is protected by copyright laws and international treaty provisions. Therefore, you must treat the SOFTWARE PRODUCT like any other copyrighted material, except that you may either make one copy of the SOFTWARE PRODUCT solely for backup or archival purposes, or install the SOFTWARE PRODUCT on a single computer, provided you keep the original solely for backup or archival purposes. You may not copy the printed materials accompanying the SOFTWARE PRODUCT.

DESCRIPTION OF OTHER RIGHTS AND LIMITATIONS

You may not reverse-engineer, decompile, or disassemble the SOFTWARE PRODUCT, except and only to the extent that such activity is expressly permitted by applicable law notwithstanding this limitation.

No registered user may alter or modify the Software except as detailed in the Special Conditions below. You cannot give anyone else permission to modify the Software.

You may not rent, lease or lend the SOFTWARE PRODUCT unless specifically authorised in advance by Sonardyne International. Where onward rental, lease or loan is sanctioned by Sonardyne International, the end user must be made aware of the details of this agreement and it is the responsibility of the rentee to ensure that the end user complies with the agreement and deletes and returns any copies at the end of the rental period..

You may not transfer any of your rights under this agreement

Without prejudice to any other rights, Sonardyne International Ltd. may terminate this agreement if you fail to comply with the terms and its conditions. In such event, you must destroy all copies of the SOFTWARE PRODUCT and all of its component parts.

GOVERNING LAW

This agreement shall be governed by English law.

DISCLAIMER OF WARRANTY

THIS SOFTWARE PRODUCT AND THE ACCOMPANYING FILES ARE RECEIVED "AS IS" AND WITHOUT WARRANTIES AS TO PERFORMANCE OR MERCHANTABILITY OR ANY OTHER WARRANTIES WHETHER EXPRESSED OR IMPLIED. Because of the various hardware and software environments into which the SOFTWARE PRODUCT may be put, NO WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE IS OFFERED.

Good data processing procedure dictates that any program be thoroughly tested with non-critical data before relying on it. The user must assume the entire risk of using the program. ANY LIABILITY OF SONARDYNE INTERNATIONAL LIMITED WILL BE LIMITED EXCLUSIVELY TO PRODUCT REPLACEMENT OR REFUND OF PURCHASE PRICE.

SPECIAL CONDITIONS

The user is allowed to modify data files, as described in the operating instructions, to suit his own custom test routines.

Copyright © Sonardyne International Limited 2013

GLOSSARY OF TERMS

Term	Definition
Acoustic Responder	An instrument that emits an acoustic signal in response to an electrical signal carried to it by cable.
Acoustic Signal	Information carried by sound pressure waves through water. The Sonardyne acoustic signal has a finite length.
Acoustic Synchronous / Precision Pinger	An instrument that emits signals regularly without an interrogating signal. A SYNCHRONOUS Pinger can be synchronised to an external master signal. A PRECISION Pinger has an accurate internal time standard.
Acoustic Transceiver	An instrument that emits and receives acoustic signals, and extracts information from them. Transceivers can measure the time it takes a signal to travel from its transducer to a transponder and return. Some can encode and send data in a message and extract digital data from a message (Acoustic Telemetry). Used on a surface vessel or to mark a point on the seabed, or fixed to a mobile for tracking or positioning.
Acoustic Transducer	A device that converts electrical signals into acoustic signals and vice versa.
Acoustic Transponder	An instrument that emits an acoustic signal when it detects an interrogating acoustic signal.
Acoustic Transponder (Intelligent Transponder)	A type of transponder that is managed by a micro-controller. Examples include the COMPATT (COMPUTing And Telemetry Transponder) and the WMT (Wideband Mini Transponder). Depending on supported functionality it can: Decode acoustic telemetered commands from a transceiver and can send telemetered data to the transceiver. It can measure the distance between itself and other transponders and then telemeter the data to a transceiver. It can be capable of measuring its depth and the temperature of the water. It can be used to measure a variety of underwater parameters and telemeter these back to the surface. It can be used, as an intelligent angle-measuring device, in a Riser Angle Monitoring System. It can be fitted with a release mechanism so it can return, on command, back to the surface e.g. if battery power is low.
Attitude and Heading Reference System (AHRS)	An inertial sensor that provides outputs of heading, pitch and roll.

Term	Definition
COMPATT	COMPUTing and Telemetry Transponder (see Acoustic Intelligent Transponder)
Common Reply Signal (CRS)	A reply signal common to a complete family of addressed transponders.
Global Positioning System (GPS)	A multi-user, 24-hour, worldwide radio navigation system using the NAVSTAR constellation of satellites. GPS receivers are capable of tracking and decoding data from the satellites and using it to compute the position and velocity of a vehicle.
ROV	Remotely Operated Vehicle
Ultra Short Base Line Positioning System (USBL)	A system similar to an SBL system except the system uses three or more elements in a single transducer array. The measurements it makes are the differences in "time-phase" of the signals from each element. The co-ordinate frame is fixed to the transducer array which must be oriented in the vessel frame to be equivalent to the SBL.
Serial Communications Wait	The maximum time allowed for the Transponder to reply to an RS232 command.
Delay between commands	Provides a delay between adjacent commands.
Firmware	The firmware installed on the transponder. Firmware upgrades can be installed via WSM Terminal. The Tx firmware refers to the transmission signal synthesiser.

Global Headquarters, UK

Blackbushe Business Park
Yateley
Hampshire
GU46 6GD, UK
T. +44 (0) 1252 872288
F. +44 (0) 1252 876100
sales@sonardyne.com

Rio das Ostras, Brasil

Av. Zen lotes 05 e 06
Quadra D
Zen, Rio das Ostras – RJ
CEP 28.890-000, Brasil
T. +55 22 2123 4950
F. +55 22 2123 4951
brasil.sales@sonardyne.com

Singapore, Asia

34 Loyang Crescent
Block B
Singapore
508993
T. +65 6542 1911
F. +65 6542 6937
asia.sales@sonardyne.com

Houston, USA

8280 Willow Place Drive North
Suite 130
Houston, Texas
77070 USA
T. +1 281 890 2120
F. +1 281 890 7047
usa.sales@sonardyne.com

Aberdeen, UK

Units 12–14,
The Technology Centre
Claymore Drive
Bridge of Don, Aberdeen
AB23 8GD UK
T. +44 (0) 1224 707875
F. +44 (0) 1224 707876
sales@sonardyne.com

24/7 Emergency Helpline

T. +44 (0) 01252 877600

Email Support

support@sonardyne.com

Website

www.sonardyne.com