



# **IMAGENEX TECHNOLOGY CORP.**

**MODEL 852-GS**

**GYRO STABILIZED**

**ULTRA-MINIATURE IMAGING SONAR**

**(WITH OPTIONAL ECHO SOUNDER)**

**USER MANUAL**

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## Revision History

Number	430-048	
Revision	Date	Description
0A	09-Feb-21	For internal review
0B	20-Apr-22	1st Draft edits

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## Acronyms and Abbreviations

Acronym	Definition
ASCII	American Standard Code for Information Interchange
BMP	Bitmap
dB	Decibel
DC	Direct Current
GB	Gigabytes
GPS	Global Positioning System
IP	Internet Protocol
kbps	Kilobits per second
kHz	Kilohertz
m/s	Meters per second
NMEA	National Marine Electronics Association
PC	Personal Computer
RAM	Random Access Memory
ROV	Remotely Operated Vehicle
RTS	Request To Send
TB	Terabytes
UDP	User Datagram Protocol
USB	Universal Serial Bus
VDC	Volts Direct Current



## 1. INTRODUCTION

The Imagenex Model 852-GS Ultra-Miniature Imaging Sonar was designed for use with the smallest of Remotely Operated Vehicles (ROVs) and inspection vehicles. Gyro-stabilization is integrated directly into the sonar head, resulting in the sonar no longer being compromised by the blurring effects of host vehicle rotation. The optional echo sounder is connected to the sonar, which, in turn, is connected to the surface. 2-Wire serial communication is utilized (RS-485, or optionally RS-232, at 115.2 kbps). The unit will scan up to a 360° sector with a maximum range of 50 meters. The sonar is controlled by a Windows™ based program that displays and records data.

ROV information such as pitch, roll, and heading are available and the head can be operated using different ranges, gains, pulse lengths, etc.

Note that although the 852-GS sonar may be ordered as an RS-232 option, the echo sounder may not be interfaced via the 2-wire multi-drop system in this configuration.

The general features are:

Frequency	675 kHz
Transducer	Imaging type, fluid compensated
Range Resolution	10 mm (0.4") @ 500 data points or 20 mm (0.8") @ 250 data points (Polar mode)
Maximum Operating Depth	300 m
Transducer Beam Width	2.4° x 20°
Minimum Detectable Range	150 mm (6")
Communication Interface	RS-485 serial interface @ 115.2 kbps (or RS-232 option)

Table 1 General Features

## 2. GETTING STARTED

### 2.1. HARDWARE INSTALLATION

#### 2.1.1. Sonar with Echo Sounder Option

To operate the sonar head and echo sounder, ensure the cable is connected to a PC via a 2-Wire RS-485 serial port or a USB to RS-485 converter. The cable is then connected to either of the echo sounder ports, and the remaining echo sounder port is connected to the 852-GS scanning sonar by a 6-pin to 6-pin Impulse IE55 connector cable. Connections are shown below (Figure 1 Sonar Connection):

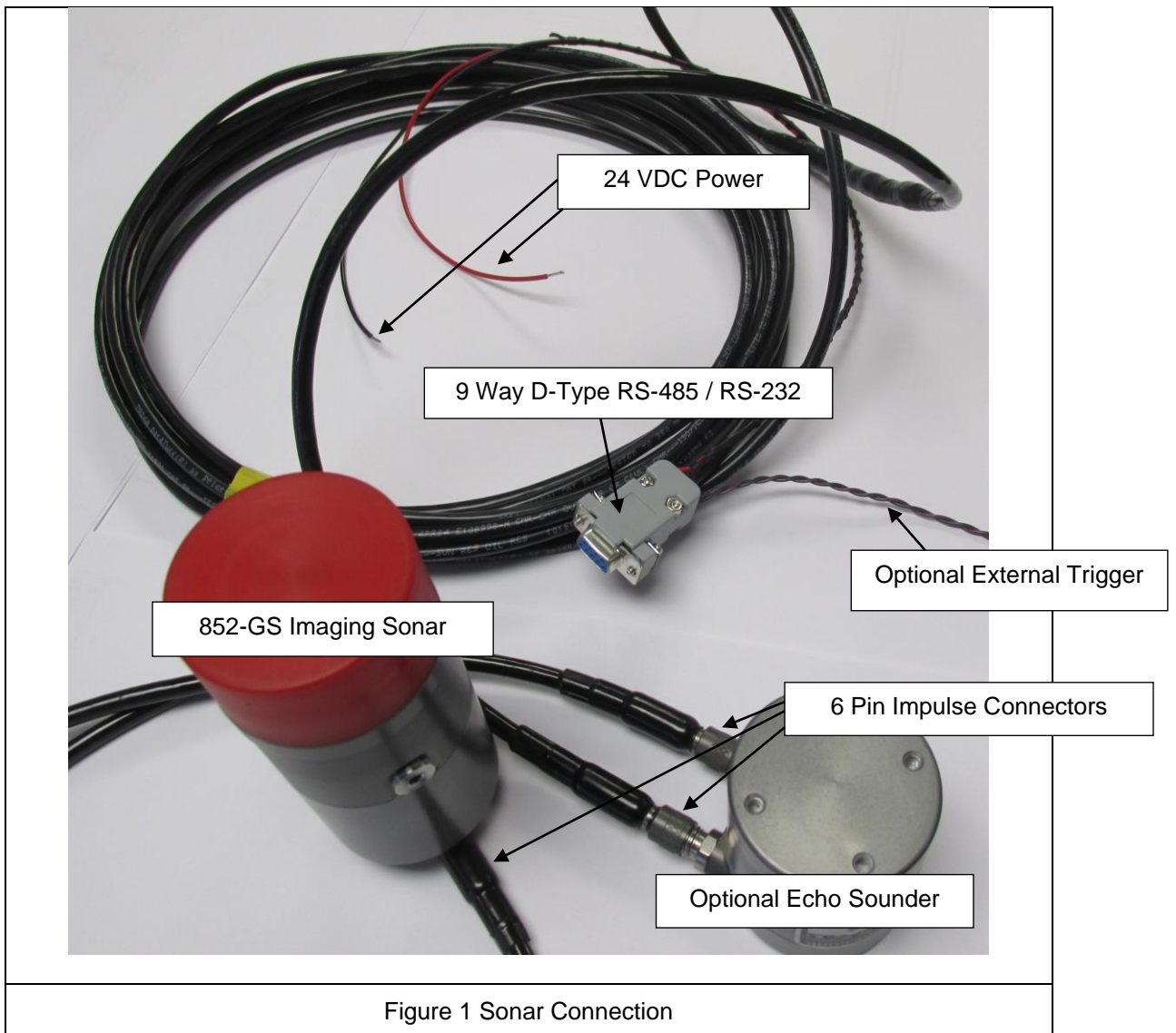



Figure 1 Sonar Connection

### 2.1.2. Sonar without Echo Sounder Option

If the sonar is ordered without the echo sounder option, a 6-pin Impulse connection cable is supplied. This is connected directly to the 852-GS sonar. RS-485 or RS-232 communication protocols may be specified at the time of ordering and appropriate PC ports must be used (see 2.1.3 RS-232 Option).

In both cases (with or without echo sounder), connect **9-50 VDC** to the power wires (**+V to RED, -V to BLACK**) using a DC power supply capable of supplying a current of **1 A**. Run the program

Win881AL\_GS\_vxxxx.exe (where xxxx is the version number). Ensure that the correct COM port is selected ("*System => COM Ports*") and depending on the RS-485 serial I/O card installed in your computer, select AUTO Enable or RTS Enable (Request To Send). As the software supports multiple sonar types, ensure that the correct sonar (852-GS/ES) is selected by "*System => Sonar Type*". Select the button  on the left-hand side of the toolbar to connect to the sonar and begin scanning.

If the external trigger option was ordered, an additional pair of wires (purple and grey) is available for triggering the sonar to fire.

### 2.1.3. RS-232 Option

While it is possible to order both the 852-GS scanning sonar and echo sounder with the RS-232 option, they cannot be used together with a multi-drop 2-wire communication system (as described above). Individual RS-232 cables will be required to communicate with each device individually and this configuration is beyond the scope of this manual.

#### 2.1.4. Personal Computer

The minimum requirements for the user supplied PC are:

- 2 GHz Pentium 4
- Windows™ XP
- 256 MB RAM
- 1 RS-485 port; or 1 USB to RS-485 converter (recommend Sealevel SeaLink 2104) if no RS-485 port is available. RS-232 protocol may also be ordered in which case a USB to RS-232 converter (recommend ATEN UC-232A) is required if no onboard RS-232 port is available.  
See 2.1.3 RS-232 Option
- 1024 x 768 Screen Resolution
- 20 GB Hard Disk

Refer to *Document Number 410-013 - 'USB Converters and the Windows OS'* for important information on USB <--> RS-232 and USB <--> RS-485 Converters running on Windows operating systems (available at <https://imagenex.com/support>).

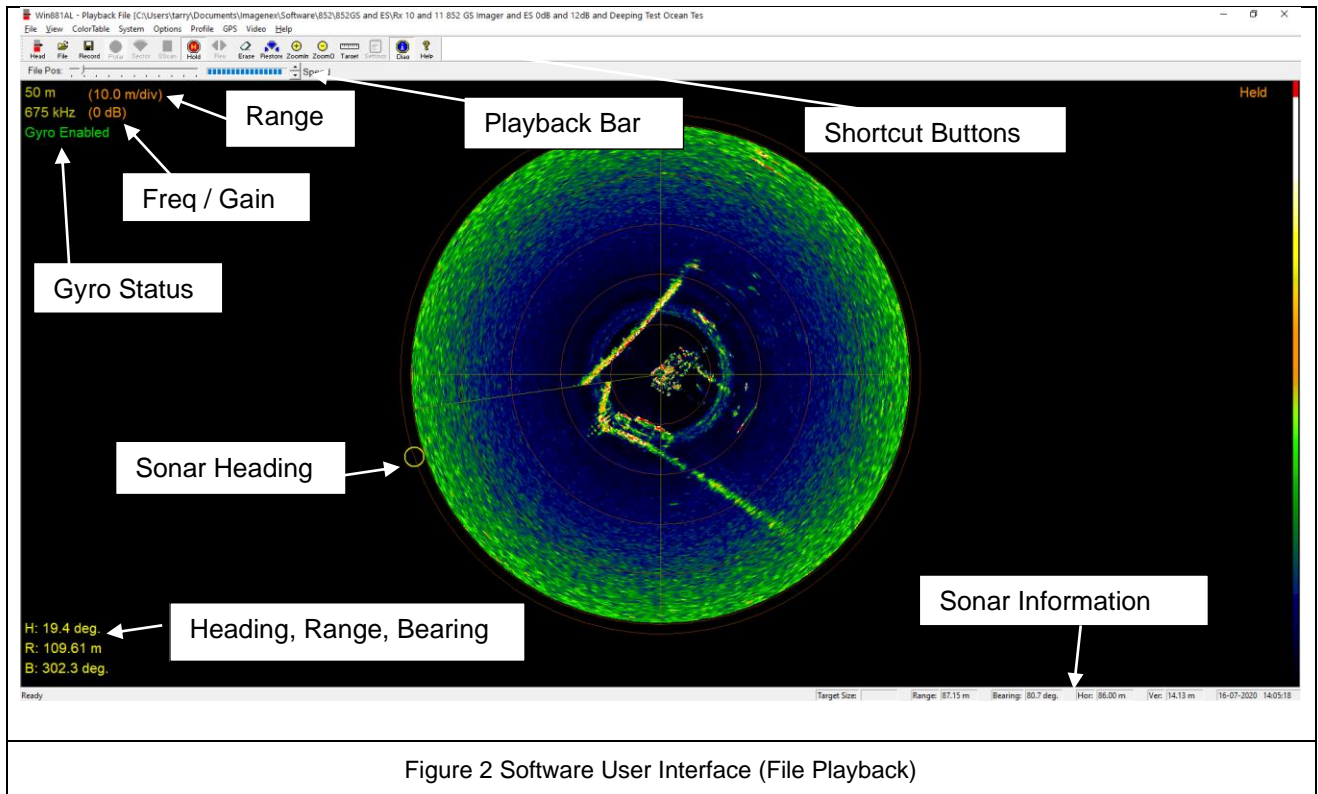
#### 2.2. SOFTWARE SETUP

The latest version of the *Win881AL\_GS\_vxxxx.exe* program is available from the Imagenex website (<https://imagenex.com/interior-page/software-download>). The installation of the software on the PC is straightforward. It can be placed in its own directory and run by double clicking the file by creating a shortcut for it on the desktop. It is not recommended that the “New Program Wizard” nor any other installation program be used as the file is a self contained executable.

If present in the program’s root folder, a *Win881AL.INI* file will be read and the settings from the previous time the application was run will be used.

**Note:** The *Win881AL\_GS\_vxxxx* software is used for multiple types of Imagenex sonar systems, including the 852-GS. Ensure the correct sonar is selected by going to “*System => Sonar Type*” and selecting “852-GS/ES”.

















### 2.3. INTERFACE



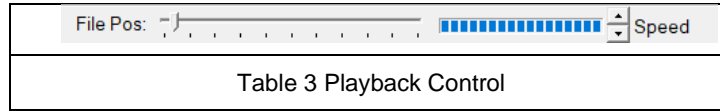
This Section will describe the various functions of the *Win881AL\_GS\_vxxxx* software.

**Note:** The *Win881AL\_GS\_vxxxx* software is used for multiple types of Imagenex sonar systems, including the 852-GS. Ensure the correct sonar is selected by going to "System => Sonar Type" and selecting "852-GS/ES".

### 2.3.1. Shortcut Buttons

 Head	Connect to a physical sonar head
 Open	Open a file for playback session
 Record	Start / Stop recording a .81R data file
 Polar	Places the sonar in to “polar mode” which causes the sonar to do continuous 360° rotations. The scan direction (clockwise / counter-clockwise) is toggled by clicking the “Rev” button or pressing the spacebar
 Sector	Places the sonar into” scan mode” which causes the sonar to scan in a specified sector defined by the sector setting on the settings toolbar
 SScan	Places the sonar into a sidescan view mode which disables sonar rotation and displays a Side Scan type image showing intensity of return
 Hold	Pauses real-time or playback (the letter ‘H’ on the keyboard issues this command as well)
 Rev	Changes the sweep direction. Toggles clockwise / counter-clockwise (the space-bar on the keyboard issues this command as well)
 Erase	Refreshes (clears) the sonar display
 Restore	Restores the default zoom and pan settings
 ZoomIn	Zoom in display
 ZoomOut	Zoom out display
 Ruler	Ruler. Measures distance in meters or feet (depending on “Options => Units” selection) on the display
 Settings	Display the “Settings” Dialogue box
 Ddiag	Opens a diagnostics window
 Help	Opens a window with speed keys and other settings (See APPENDIX A)
Table 2 Shortcut Buttons	

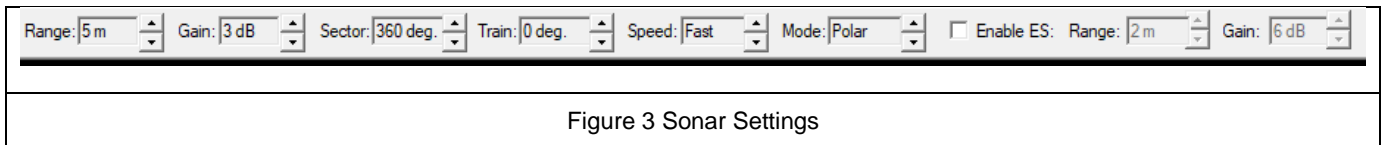
### 2.3.2. File Playback



The file playback bar is used during playback and allows the user to adjust the playback speed and file position.

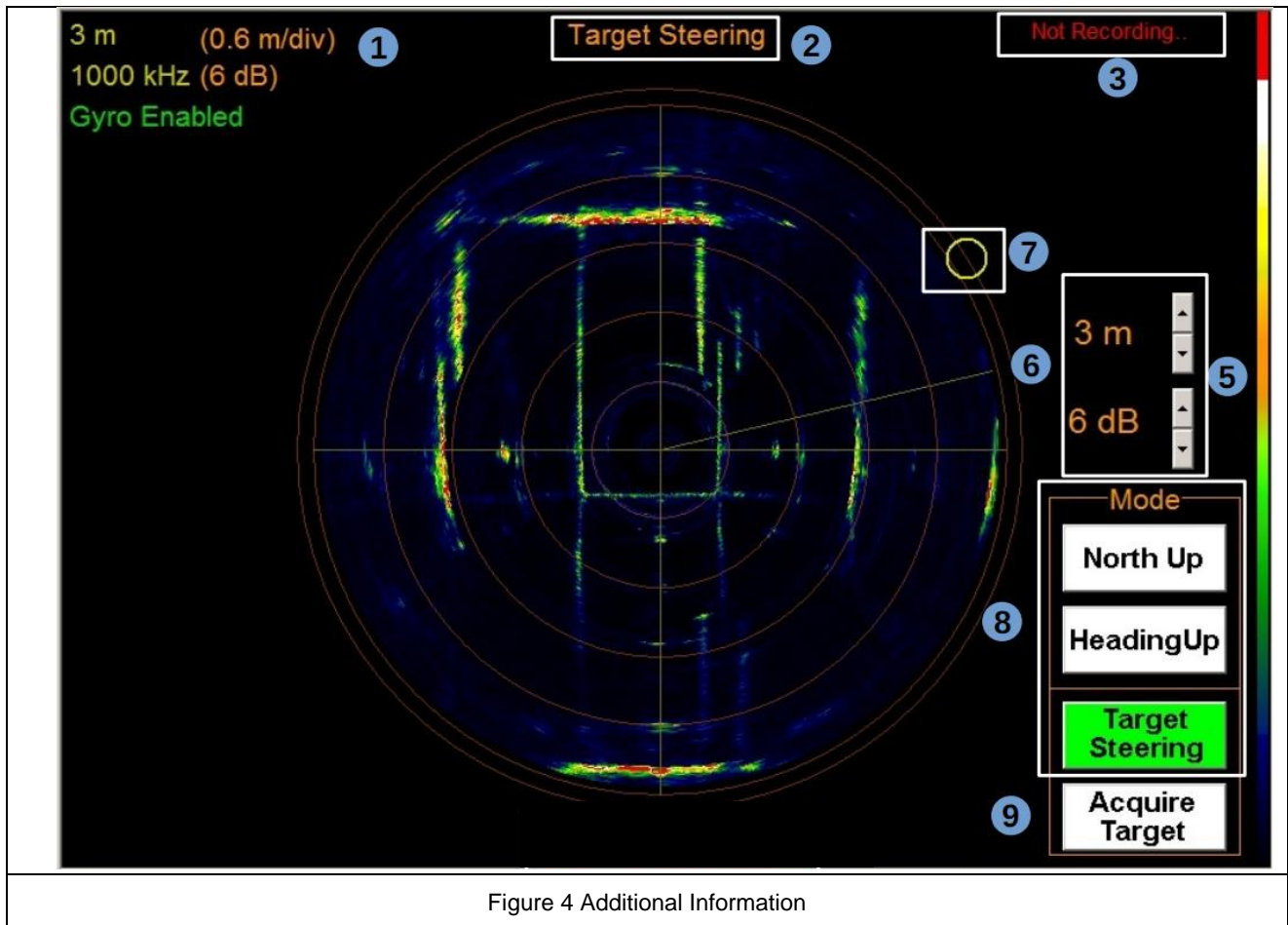
### 2.3.3. Sonar Settings

The sonar settings toolbar is used to control various sonar attributes. It is only available in RealTime mode:



- **Range:** Sets the maximum range of target detection. 5 - 50 m
- **Gain:** Sets the sonar gain. 0 - 40 dB. Adjust until the display is optimized for the target environment
- **Sector:** Defines the scan sector (0° – 360° in 3° increments)
- **Train:** Allows for the rotation of the sector (set above) around the centre (0° – 360° in 3° increments)
- **Speed:** Defines the scan speed of the sonar. (Slow – Fastest)
- **Mode:** Sets Polar, Sector, or Side Scan mode, as described in 3.2.7. View => Grid
- **Enable ES:** Click if echo sounder available. Displays echo sounder window
- **Range:** Sets the echo sounder range. Ranges from 5 m to 50 m are available
- **Gain:** Sets the echo sounder gain. Max 40 dB. Adjust until the display is optimized for the target environment

### 2.3.4. Main Sonar Display






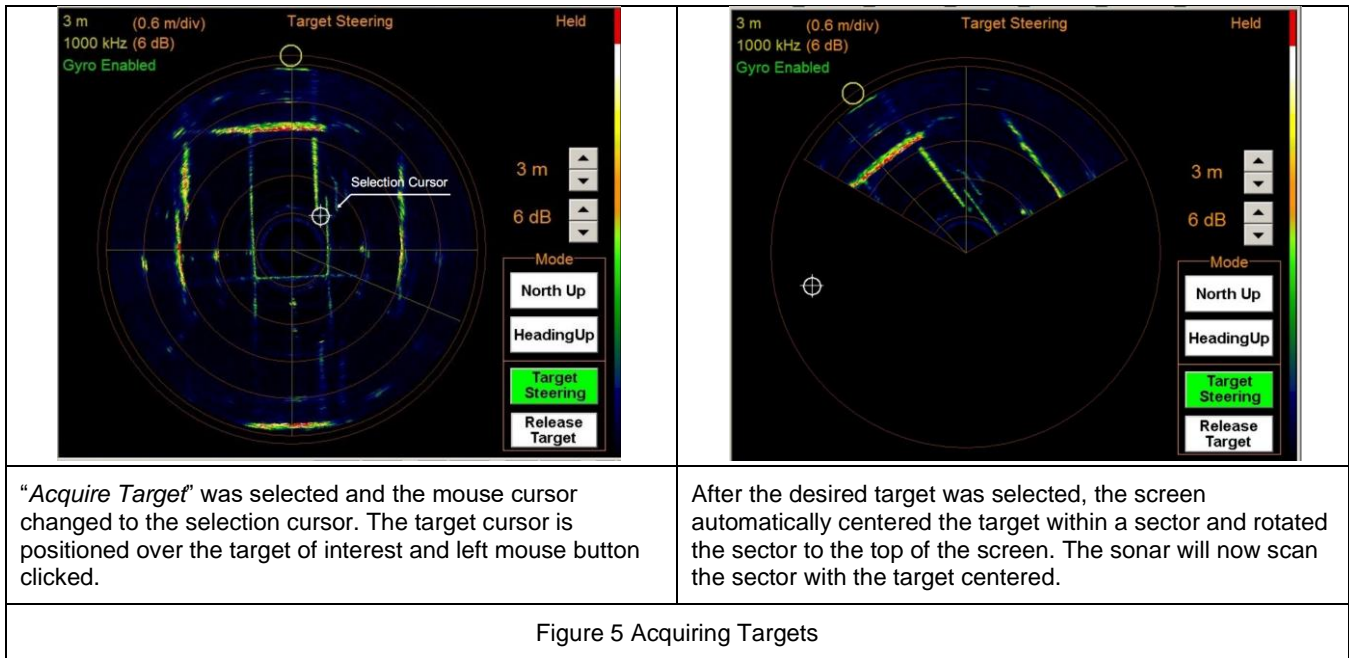
Ref	Description
1	Indicates the current acoustic operating range and frequency of the sonar in yellow. It also indicates the grid scale and current gain in orange. The Gyro status (enabled / disabled) is shown in green
2	The gyro mode is displayed only when a gyro stabilized image is enabled. The modes are: North Up, Heading Up, or Target Steering as described below
3	Displays “ <i>Not Recording</i> ” or “ <i>Recording...</i> ” RealTime file record status
5	Provides quick settings for sonar range and gain (if Gyro Enabled selected)
6	Current transducer position for the “ping”. This wiper will track where in the scan the transducer is currently facing
7 and 8 Gyro Enabled Only	<p>Sonar position indicator:</p> <p>The yellow circle indicates the current sonar unit heading independent of the transducer position.</p> <p>In <b>North Up</b> mode, the circle will remain at the heading of the sonar unit. It will rotate around the perimeter of the sonar image which remains stationary in a North Up orientation.</p> <p>In <b>Heading Up</b> mode, the circle will remain stationary at the top of the screen, while the sonar image rotates.</p> <p>In <b>Target Steering</b> mode, the circle will transverse around the perimeter of the sonar image which remains stationary.</p>
9	<p>Gyro Stabilized target acquisition selection.</p> <p>If <b>Target Steering Mode</b> is selected, the user can acquire a target manually by selecting its location on the main screen. The scanning sector will then be centered on the selected target and rotated to place the target at the top of the display. (See 2.3.5 Acquiring Targets below for details)</p>
Table 4 Reference Table	

### 2.3.5. Acquiring Targets

This function is only available during RealTime operation only.

The 852-GS allows the operator to select a target of interest and automatically center the sector on and scan about that target on screen. The procedure is as follows:

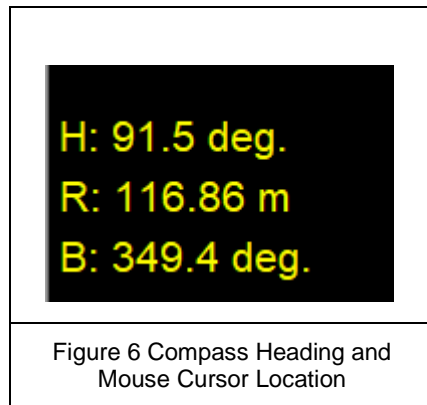
1. Ensure the gyro is enabled and in “Target Steering” mode. The sonar will automatically perform a motor calibration upon entering this mode in order to re-align the sonar and transducer to a known point (zeroing the system). Note that target acquisition may be instigated at any time while “*Target Steering*” mode is active
2. Select the button “*Acquire Target*”. The mouse cursor will change to 
3. Select the desired target on screen. The screen will automatically change to a top sector view, defaulted to a 120° sector, and the target will be centered within the sector:



To return, select “*Release Target*” to remove the sector restrictions and train angle.

### 2.3.6. Mouse Cursor Heading, Range, Bearing

The following data appears at the bottom left of the main display:



H: Sonar heading.

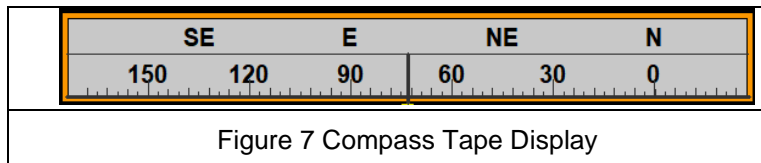
R: Range of the mouse cursor from center.

B: Bearing of the mouse cursor.

(Note Shown) Latitude and Longitude data (if a GPS is interfaced) is displayed below this Heading, Range and Bearing data.

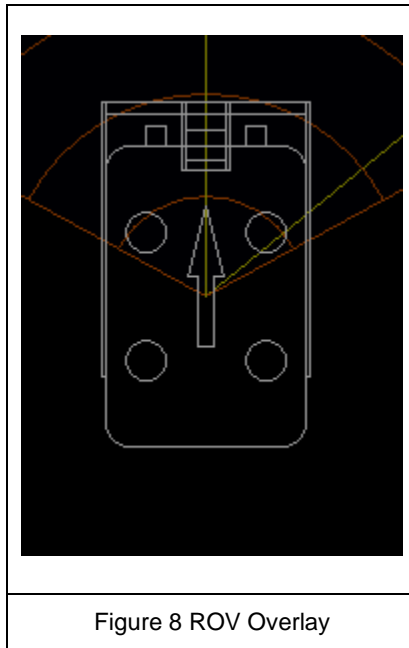
### 2.3.7. Compass Display

Enable "View => Compass Display" displays the current heading as a moving display:



### 2.3.8. ROV Overlay

Displays the ROV overlay if “View => ROV Overlay” is selected.



### 3. SOFTWARE MENUS

#### 3.1. FILE

##### 3.1.1. File => Connect to Sonar Head

Selects the data source to be from the sonar head and viewed in real-time.

##### 3.1.2. File => Open File to Playback

Data can be replayed from a previously recorded file from the “*Open File*” dialog box.

##### 3.1.3. File => Plot data from UDP

Specify a data source as an .81R data file that is received through a UDP port.

##### 3.1.4. File => Record Start (Stop)... / Copy Start (Stop)...

*Record Start (Stop)* - **RealTime only**.

*Copy Start (Stop)* - Playback only.

Toggles the record state on and off. Recording is done as per file the settings below. The file format for an 852-GS is “.81R”.

##### 3.1.5. File => Set Record Directory...

**RealTime only**

Specify the directory in which you wish to save files. If nothing is specified, the program saves the copied / recorded files to the directory from which the software was run. It is recommended to set this to a convenient directory with sufficient permissions, such as a sub folder under “My Documents”.

##### 3.1.6. File => Auto Save File Names

**RealTime only**

Select the file name set automatically as Win881AL DD-MMM-YYYY HHMMSS.81R.

Automatically sets the filename in the format of “*Win881AL DD-MMM-YYYY HHMMSS.81R*”.

### **3.1.7. File => Auto File Size**

#### ***RealTime only***

Select the file size to be limited to 1 – 4 GB. If enabled, the data file will be logged to the maximum file size and a new file will be created to continue logging.

### **3.1.8. File => Convert 81R File to .xyz**

Converts an.81R data file to an ASCII text XYZ file. X and Y are the output from a polar to rectangular conversion, and z is calculated from the Auto Profile settings (see 3.6.9 Profile => Auto Profile). X,Y and Z values are corrected for pitch and roll. An Open File dialog box is shown and a file is selected, which is replayed while the XYZ file is generated in the background. RealTime operational mode will stop during this process.

The XYZ is formatted as **dd-mm-yyyy<tab>hh:mm:ss<tab>X<tab>Y<tab>Z<cr><lf>**

### **3.1.9. File => Save Screen**

Opens a dialog that allows for the saving of a .BMP file of the current screen.

### **3.1.10. File => Exit**

Writes all settings to the Win881AL.INI file that is kept in the same location as the executable file, and closes the program. The next time the program is started, the system will load these settings from the .INI file.

## **3.2. VIEW**

### **3.2.1. View => Hold**

Pauses the display of sonar data and all sonar communication. (*Shortcut key 'H'*)

### **3.2.2. View => Reverse**

#### ***RealTime only***

Changes the sweep direction. Toggles clockwise / counter-clockwise. (*Shortcut key 'spacebar'*)

### **3.2.3. View => Clear Screen**

Clears the screen of historical data. (*Shortcut key 'C'*)

### 3.2.4. View => Zoom Factor

Changes the factor by which the display is zoomed in or out (50, 75, 100, 125, 150, 175, 200%).

### 3.2.5. View => Zoom In



Shortcut button:

Zooms in on the sonar display.

### 3.2.6. View => Zoom Out



Shortcut button:

Zooms out of the sonar display.

### 3.2.7. View => Grid

Choose between None, Rectangular and Polar.

### 3.2.8. View => Range Marker

Displays / hides the range, frequency and gain information on the top left of the display.

### 3.2.9. View => Colour Indicator

Toggles the colour bar on or off.

### 3.2.10. View => Compass Display

#### ***RealTime only***

Toggles the Compass display on or off (see Figure 7 Compass Tape Display).

### 3.2.11. View => ROV Overlay

#### ***RealTime only***

Toggles the ROV Overlay on or off (see Figure 8 ROV Overlay).

**3.2.12. View => Main Toolbar**

Toggles the Main Toolbar on or off.

**3.2.13. View => Mini Settings Bar**

***RealTime only***

Toggles the Mini Settings Bar (top of display) on or off (see Figure 3 Sonar Settings).

**3.2.14. View => Show Sonar Settings**

***RealTime only***

Toggles a display window on or off that shows various sonar settings and allows the enabling of the sonar and echo sounder, as well as setting of the head ID. The head IDs have been programmed by the factory into both sonar and echo sounder at default 16 (sonar) and 17 (echo sounder). Care should be taken when changing these values as it may lead to loss of communication.

Contact Imagenex if reprogramming of head id's is required.



### 3.3. COLOUR TABLE

Allows various colour combinations (background and scan) to be selected.

Used to change the sonar data colour palettes for the sonar images. The 852-GS uses a colour table to represent echo data strength (amplitude). For example, the “Normal High” intensity colour table maps the echo data amplitude to 256 colours ranging from black (low strength level) through blue, green, orange, yellow, white, and red (highest strength level).

The Colour Table menu offers the following options:

Normal High	Standard colour table used for mapping the echo data amplitude to 256 colours ranging from black (low level), through blue, green, orange, yellow, white, and red (highest level)
Normal Low	Same colours as Norm Hi, but uses a lower colour intensity
Green	256 shades of green
Grey	256 shades of grey (white on black)
Reverse Grey	256 shades of grey (black on white)
Brown/Yellow	256 mixed shades of brown and yellow
Green/Blue	256 mixed shades of green and blue
Green/Yellow	256 mixed shades of green and yellow
Blue	256 shades of blue
Table 5 Colour Table	

### **3.4. SYSTEM**

#### **3.4.1. System => Choose COM Ports**

##### ***RealTime only***

Allows for the configuration of communication ports. Note that Win881AL software will automatically configure the correct baud rate, parity, and stop bits. This does **NOT** need to be done in the Windows system.

The communication port parameters are set in the Sonar Head section and the RTS / Auto enabled should be selected as per the serial card used.

A serial heading output can be set here which will output the heading sensors information on a serial port.

(String format: \$HEHDT)

A GPS serial input port can also be configured here to read NMEA GPS information. The expected string format is \$GPGGA.

#### **3.4.2. System => IP Address**

Not used for the 852-GS sonar.

#### **3.4.3. System => Diagnostics**

Displays a window showing various diagnostic information relating to the sonar.

#### **3.4.4. System => Sound Velocity**

Opens a window that allows for the manual input of sound velocity between 1400 m/s and 16000 m/s. Default is 1500 m/s.

#### **3.4.5. System => Sonar Orientation**

##### ***RealTime only***

Select “*Up*” if the sonar is orientated with the transducer towards the top and “*Down*” if inverted (see Figure 9 and Figure 10).

### 3.4.6. System => Sonar Type

#### *RealTime only*

Selects one of various models of sonar supported by Win881AL. Select **852-GS/ES**.

## 3.5. OPTIONS

### 3.5.1. Options => Units

Meters (default) or feet can be selected as the units used.

### 3.5.2. Options => Measure Target

Measures distance in meters or feet (depending on “Options => Units” selection) on the display.

### 3.5.3. Options => RealTime Play Speed

Playback only.

Limits the playback speed to the same speed as what was used when data was acquired.

### 3.5.4. Options => Enable Gyro

#### *RealTime only*

Enables the internal gyro to be used in North Up, Heading Up, Target Steering and Acquire Target mode.

### 3.5.5. Options => Calibrate Gyro

#### *RealTime only*

All gyros are sensitive to the environment (i.e. temperature, motion, earth's rotation, etc.) and will naturally drift with time. Therefore, from time to time it is recommended to complete a gyro calibration (in manual mode) or re-calibrate the motor (in gyro auto mode) to remove the accumulated drift.

#### **Automatic Gyro Calibration**

Imagenex gyro enabled scanning sonars now incorporate an automatic gyro biasing feature. This mode continuously re-biases the gyro in real time accommodating for temperature fluctuations and internal drift. See Section 3.5.6 Options => Enable Gyro Auto Bias for enabling / disabling this mode. When first starting the sonar, the bias adjustment will be very rapid as the temperature stabilizes. While the gyro will still internally

drift, the sonar image will be coherent, allowing the operator to continue to work. Note that the absolute heading will not be exact during this time as the sonar does not differentiate between induced drift and real movement. After a few minutes, re-calibrate the motor to re-align the sonar and the transducer. This will reset the accumulated drift that occurred during the warm-up period. It is recommended to periodically re-calibrate the motor to re-align the sonar and transducer to remove offset that have occurred via induced drift.

### **Manual Gyro Calibration**

The information below describes the manual biasing mode which may be necessary in **strong magnetic field** environments.

Do not calibrate the gyro until the internal temperature of the sonar has stabilized which will be approximately 30-60 minutes underwater.

The procedure below is followed:

- Suspend sonar operations and mount the sonar on a level stable surface or settle the ROV on a flat bottom.
- Select “*Options => Calibrate Gyro*”.
- The message “*Calibrating Gyro*” will appear. Calibration takes approximately 30 seconds. The calibration time can be set in the .ini file.
- Once the message disappears, commence standard operation.

**Note:** When using manual biasing, it is **ESSENTIAL** that the sonar is completely stationary and at constant temperature. Any movement will cause undesirable drift in the gyro.

### **3.5.6. Options => Enable Gyro Auto Bias**

#### ***RealTime only***

Puts the sonar into auto bias mode where the sonar will continuously re-bias the gyro in real time. Disabling this mode necessitates periodic manual calibration. See Section 3.5.5 Options => Calibrate Gyro.

### **3.5.7. Options => Calibrate Compass**

#### ***RealTime only***

Field calibrates the internal compass. To calibrate the compass, the sonar head must be rotated by 360° (direction is irrelevant). Check “*Calibrate Compass*”, rotate 360° slowly, then uncheck “*Calibrate Compass*” to store the settings.

### **3.5.8. Options => Calibrate Motor**

#### ***RealTime only***

Calibrates the motor and re-aligns the sonar head position relative to the transducer position.

This can be done periodically to remove unwanted drift.

### **3.5.9. Options => Local Lat / Compass Declination**

#### ***RealTime only***

The geographical local latitude compensates for drift caused by the Earth's rotation. Use the Local Lat / Compass Declination window to set the Latitude (0 to 90 for northern latitudes, 0 to -90 for southern latitudes) and Compass Declination (offset to magnetic north. West is negative, east is positive).

The following website reports declination <https://www.geomag.nrcan.gc.ca/calc/mdcal-en.php> for a given position.

## **3.6. PROFILE**

Regardless of the Profile settings below, all data is logged during data recording.

### **3.6.1. Profile => Off**

Only image data is displayed (i.e. no profile points).

### **3.6.2. Profile => Points Only**

Only generated profile points are displayed and no image data is visible.

### **3.6.3. Profile => Low Mix**

Image data is displayed at quarter intensity along with the generated profile points.

**3.6.4. Profile => Medium Mix**

Image data is displayed at half intensity along with the generated profile points.

**3.6.5. Profile => High Mix**

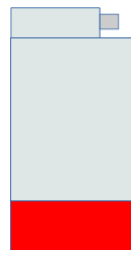


Image data is displayed at the normal intensity along with the generated profile points.

**3.6.6. Profile => Point Size**

Choose small, medium, or large profile points for ease of visual acuity.

**3.6.7. Profile => Zero Down**

To enable plotting of profile data with the zero reference of the sonar transducer pointing vertically down (see Figure 11 below) rather than pointing horizontally (Figure 9 and Figure 10 below). This allows plotting targets in their correct orientation. Note that the GS component will not work if the sonar is mounted horizontally (as shown in Figure 11, below):

		
<p>Figure 9 Sonar Mounted Vertically, Transducer Down</p>	<p>Figure 10 Sonar Mounted Vertically, Transducer Up</p>	<p>Figure 11 Sonar Mounted Horizontally, Zero Down Note: GS will not work in this orientation</p>

**3.6.8. Profile => Profile Min Range**

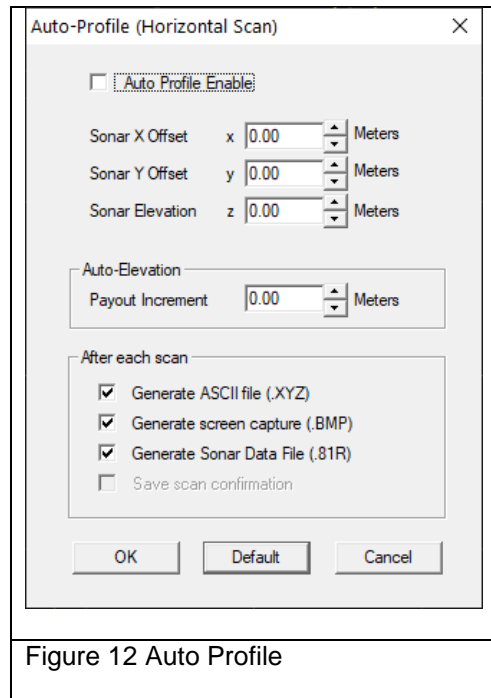
***RealTime only***

Set the minimum range (0 - 25 m) here. Useful to eliminate detecting profile points from spurious returns that occur close to the transducer.

### 3.6.9. Profile => Auto Profile

#### *RealTime only*

Used to generate the Z (depth) component of the XYZ files via an auto increment function. This allows the user to set the expected depth increment for successive scans and if the sonar is paid out at this rate, a realistic profile will be generated of the internal surface of the structure / bore.



See Figure 12 Auto Profile. The X, Y, and Z offsets from the reference point, as well as the payout increment are set. If for example 0.1 m is set, the Z value logged in the XYZ file will increment by 0.1 m with every scan. To ensure a realistic XYZ point cloud, the sonar should be lowered at a 0.1 m per scan rate during auto profiling.

### 3.6.10. Profile => ES Profile

Select *Off*, *Points Only*, *Low Mix*, *Medium Mix* or *High Mix* as appropriate. The range scale is set in the “*Sonar Settings*” dialog box (see 2.3.3. Sonar Settings).

### **3.7. GPS**

#### **3.7.1. GPS => Enabled**

##### ***RealTime only***

If a GPS receiver is connected via a comm port, it may be enabled and disabled here.

#### **3.7.2. GPS => Track Plotter**

##### ***RealTime only***

Displays a window showing the historical track of the sonar.

#### **3.7.3. GPS => Erase GPS Tracks**

##### ***RealTime only***

Clears the historical track of the sonar.

#### **3.7.4. GPS => Zoom In**

##### ***RealTime only***

Zooms in on the track plot. Meters / feet per division is shown in the track-plot window.

#### **3.7.5. GPS => Zoom Out**

##### ***RealTime only***

Zooms out on the track plot. Meters / feet per division is shown in the track-plot window.

### **3.8. VIDEO**

It is possible to connect a video source to the sonar via a connected USB video frame grabber. This video is viewed in the interface window in real time using the following commands.

#### **3.8.1. Video => Open Video Window**

##### ***RealTime only***

Allows an interfaced video camera to display in the video window.



### **3.8.2. Video => Record Video Frames to File**

#### ***RealTime only***

Enable / disable the recording of video to the data files. Once "*File => Copy Start...*" (Stop...) (see Section 3.1.4) is clicked, the video data will be included in the data file recording.

Note that storing video can generate very large files. The software is able to automatically split the recorded file in predefined file sizes as defined in Section 3.1.7 File => Auto File Size.

### **3.9. HELP**

#### **3.9.1. Help => Help...**

Displays a pane with hot keys. (see APPENDIX A)

#### **3.9.2. Help => About...**

Reports the software version which should be quoted during any support queries.

APPENDIX A **HOT KEYS**

Command	Hot Key	Discription
Default 881L IP:		192.168.0.5
Default 881A COM Port:		COM1
-----		
Help	F1	Show Hot Keys Help Window
Settings	F2	Show/Hide Settings Dialog.
Diagnostics	F3	Show/Hide Diagnostics Dialog.
-----		
Hold	h, H	Operation Held.
Reverse	Space	Reverse Scan Direction.
Clear the screen	c, C	Clear Sonar Image.
-----		
Key In Range	r, R	Keyboard entry for Range Entries: 1,2,3,4,5,10,20,30,40,50,60,80,100,150,200 in meters Entries: 3,6,9,12,15,30,60,90,120,150,180,240,300,450,600 in feet
Key In Gain	g, G	Keyboard entry for Gain Entries: 1 - 40 with increment of 1
Key In Sector width	s, S	Keyboard entry for Sector width Entries: 0 - 180 with increment of 3 (sector mode) Entries: 0 - 360 with increment of 3 (polar mode)
Key In Train Angle	t, T	Keyboard entry for Train Angle Entries: 0 - 360 with increment of 3
Hot Key	Shift + '+'	Zoom In Sonar Image
Hot Key	Shift + '-'	Zoom Out Sonar Image
Hot Key	z, Z	Zoom In and Out around Cursor Position
-----		
Sector Width Increase	Up	Increase Sector Width 3 degrees
Sector Width Decrease	Down	Decrease Sector Width 3 degrees
Train Angle Increase	Right	Increase Train Angle 3 degrees
Train Angle Decrease	Left	Decrease Train Angle 3 degrees
-----		
Mouse LButton Drag		Move Sonar Image