



InNovaSound USB Ultrasound Probe/ System Specifications

System Description

- Direct USB interface between probe and computer or laptop
- Power provided from laptop or computer
- Portable operating time based on laptop battery capacity and condition
(Currently available laptops provide three (3) to four (4) hours of continuous scan time)
- Probe cables lengths two (2) meters standard – Five (5) meter cables available on request
- Each probe is its own ultrasound system once plugged into a laptop or desktop computer
- Every probe is water resistance
- Integrated training videos available
- Complete Post Processing (TGC Controls, GAIN and Contrast) of saved still images and cine loops
- Cine Loops selectable from 32 frames to 512 frames
- Automatic patient data base for images (stills and cine loops) and reports
The software creates a patient file and existing patients have their current images stored in their file
- Each probe has a least two frequencies
- Printing and archiving can be done on standard Windows™ supported products

5.0 MHz USB Probe Descriptions

- 5.0 MHz dual frequency – 3.5MHz selectable under software control.
- B-Scan mode – mechanical sector, single element crystal utilizing composite materials.
- Fixed focal point located at 6.0cm
- 90 degree sector size
- 256 scan vectors per scan, 512 samples per vector
- 2048 acquisitions per vector (4 times over sampled)
- 256 shades of gray
- Supported Depths: 10cm, 15cm, 20cm
- Image resolution of 1mm
- Digital USB 2.0 interface
- Detachable 2 meter USB cable, (5 meter available on request)
- All electronics for the ultrasound scanner is contained within the probe housing. Only digital data is sent to the connected computer with acts as a controller and performs image processing, storage and retrieval
- A Programmable USER button is located on the probe, which can be programmed for various functions such as Scan and Freeze or save image on Freeze



- Water Proof (resistant) to: 50 m
- Shock resistant to: 10 G
- Operational Temperature Range: 0°C - 50°C
- Storage Temperature Range: -20°C - 65°C

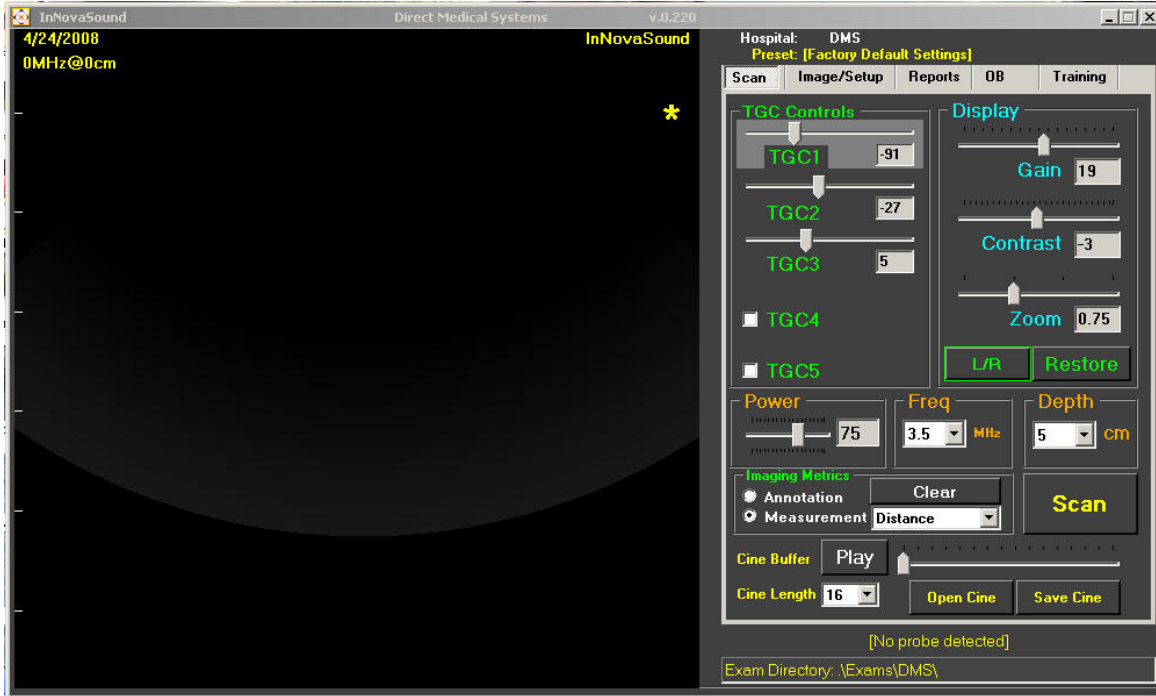


- Compact
- Light Weight
- Portable
- Ruggedized
- Weatherproof
- Real-time Images
- Freeze Button
- Cine Loop with Pre & Post
- Trigger Save Modes

PROBE SPECIFICATION	SYSTEM REQUIREMENTS
Frequency: 3.5MHz - 5.0 MHz ($f_c = 5\text{MHz}$)	Processor Speed $\geq 1\text{GHz}$
Scan Angle: 90°	DDR SDRAM $\geq 512\text{ MB}$
Focal Point: 6.0 cm	Windows XP
Scan Depth (max): 20 cm	USB 2.0



Control Software (Rev 2.20)



TGC Controls: Working with the TGC's (Time Gain Controls)

While scanning, the operator can adjust the **TGC's** on the right of the screen to optimize the image (changing contrast, brightness and gain). The raw data is being acquired and saved by the transducer. The image is then enhanced to the user's diagnostic requirement based on the Image Control settings. The USB probe system provides 256 shades of gray and an imaging resolution of 0.1 to 2.0 mm depending upon the probe that is connected. The TGC's also allows for image Post Processing.

Power

The power setting increases and decreases the amount of power applied to the ultrasound transducer. The default setting can be changed by the operator by selecting a different setting from the pull down menu.

Frequency and Depth

Frequency (MHz)

This displays the frequency of the probe connected to the PC. When the probe is plugged in, the default frequency is displayed. Most probes have more than one frequency that you can set it manually. Example; a 3.5MHz probe also can run at 5.0MHz. Frequency selections range from 3.5MHZ to 24MHZ depending upon the probe.

Depth (CM)

When connecting the probe to the PC, the in the depth display seen is the default depth of the probe. The depth can be changed by selecting the pull down menu. Depth ranges from 3CM to 20CM depending upon the probe type.



Display

Gain

The gain controls is used to adjust the overall gain of the 3, 4 or 5 TGC controls. The Gain control also allows image Post Processing. TGCs 4 and 5 are selectable.

Contrast

The contrast control adjusts the overall contrast of the image. Slide this control left to decrease and to the right to increase the contrast between light and dark areas of the image. As with the Gain controls, adjusting contrast while scanning, frozen or on a previously saved image is allowed. The Contrast control also allows for image Post Processing.

Zoom

With the zoom control you can decrease the image size to .5 of the scan by moving the control to the extreme left or you can magnify up to x2 by moving the control to the extreme right. Zoom is enhanced with 4 times over sampling to preserve the data. This control also works for post processing.

Image Control

Restore Image

Returns the Image position to the factory imaging setting (scan from top to bottom). Restores the probe back to the normal scan angle of 60, 90, 180 or 360 degrees depending upon probe.

Rotate Image 0-90 degrees

This will cause the image to rotate Counter Clock Wise (**CCW**) by 90 degrees. If you press this button a second time the image returns to the normal image format.

Flip Image Vertical

This will cause the image to flip scanning direction to allow for imaging from the bottom of the screen towards the top of the screen. If you press this button a second time the image returns to the normal image format.

Invert Image L/R

This causes the image to flip the right and left the image to match the scan orientation of the probe.

Image Metrics

In this control box there are several imaging processes controls; **Annotation and Measurements**.

Annotation

When selecting the Radio button, located next to Annotation, allows placing your annotation on the imaging screen. There is no limit on how many annotations you can place on the screen. To use this feature place the mouse cursor on the desired location in the image area. Then RIGHT click the mouse. This action will open a dialog box that allows to entering text. The text is placed at the tip of the mouse cursor when clicked on the image. After entering the annotation, then press either Accept or press the enter key.

Measurements

When selecting the radio button located next to Measurement, start making the measurement on the imaging screen. There is no limit on how many measurements that can be placed on the screen. To use this feature, place the cursor on the desired location in the image area where starting to make a measurement. Then using the mouse RIGHT click and hold the RIGHT mouse button down (click and drag). The measurement function will begin. Once the measurement is completed then release the mouse button. Additional measurements can now be made.



Available Measurements:

Distance, Area Square, Area Circle, Area Freehand and Pointer

Distance

Caliper measurement, displayed in mm (millimeters)

Area Square

Allows making rectangular or square box area measurements and is displayed in mm (millimeters) squared

Area Circle

Allows making circular area measurements and is displayed in mm (millimeters) squared. The center of the circle is at the cursors tip when starting the function.

Area Freehand

Allows drawing freely on the image or square box measurements and is displayed in mm (millimeters) squared. Complete the freehand drawing to end the measurement.

Pointer

The pointer allows drawing to a specific location to another. This is useful if placing an annotation on the screen and facilitates pointing out an area of interest.

Cine Control

Cine Buffers

The Cine Buffer is a continuously recording loop of the scan from **16 to 512** frames. The length of the loop is determined by selecting the number of frames to capture. The larger the number of frames, the more system memory required. The default is 16 frames. Each frame is 512 KB in size.

Open Cine

Opens a previously saved cine loop. If the Exam Data has been entered for the current patient, the "Open Cine" selection will open that patient's ultrasound image folder containing the cine loops that have been saved. If the Exam Data is empty, "Open Cine" will open the folder titled "Exam". This folder contains the folders for each patient that has an ultrasound history. "Click" on the folder of the patient to review and each Cine loop will be listed. Once the selected Cine Loop is loaded, the Cine Loop can be re-played an unlimited number of times. As a method of review, the left and right arrow keys on the keyboard will advance or reverse the Cine loop, frame by frame. All of the image controls for gain and intensity may be used to adjust the image as well as zoom.

Save Cine

Saves the current cine buffer to a file. All data, along with the acquisition frame rate, is saved for future retrieval. If a patient's name was entered in the Exam Data dialogue box, that patient's Cine loop folder will be opened. Enter the filename and press Save.

Probe Information

Displays the probe information and probe serial number

Image Directory

Directory location of Cine files and image files

Scan

By selecting the SCAN button (Freeze) on the screen, tapping the space bar or using the probe button, do the following. Start or stop (Freeze) the scan. Stopping the scan saves that image in the directory selected in the



preference tab. After the scan is stopped (frozen) the cine in the buffer that can be played by tapping the play button.

Image/Setup

Open

Opens USB Images files that were previously saved.

Save As

Saves the USB Images data for later viewing.

Open Cine

Allows loading a previously saved cine file for playback and analysis.

Save Cine

Allows saving the current cine file to disk.

Restore Image

Returns the Image position to the factory imaging setting (scan from top to bottom). Restores the probe back to the normal scan angel of 60, 90, 180 or 360 degrees depending upon probe.

Rotate Image 0-90 degrees

This will cause the image to rotate Counter Clock Wise (CCW) by 90 degrees. If this button is pressed a second time the image returns to the normal image format.

Flip Image Vertical

This will cause the image to flip scanning direction to allow for imaging from the bottom of the screen towards the top of the screen. If this button is pressed time, the image returns to the normal image format.

Invert Image L/R

This causes the image to flip the right and left the image to match the scan orientation of the probe.

Save Image

This will save the present frozen image displayed on the screen. It saves the image to the patient directory as defined in the setup in Preferences and in the New Patient dialog boxes.

Open Image

Will recall the current frozen image and display it on the imaging screen. It recalls the image from the patient directory as defined in the setup in Preferences and in the New Patient dialog boxes.

New Exam

The **New Exam** Button starts a new patient exam and will open the above dialog box. All fields need to be filled out before you start the exam. This follows the DICOM standard for patient demographics. The patient's exam folder and images are stored and created base upon the Patients ID.

If a mistake or error is made after you press Accept, then you can edit this form by pressing:

Edit Exam

Allows editing the demographics for the patient.



Presets

The preset dialog allows saving a favorite imaging setting for recall. There is a Factory Default Setting if desiring to return to the preset factory setting.

The presets that are stored are the: **TGC's, Gain, Contrast, Zoom, and Power settings.**

The presets stored reflect the setting on the Scan Page. In normal operations, scanning and adjustments are made to optimize the image. These same values are the ones that will be stored in the presets.

Usage: Select any of the available radio buttons. This will allow giving the selected preset a new name. Once the preset is named, Click SAVE. This action saves the preset. To use this preset, press Load and it will load the selected preset in to the imaging system. You can now scan using the saved imaging parameters.

Preferences

By clicking the **preferences** box allows setting up the way the system behaves. Return to the factory setting by clicking **Restore Defaults**.

In **Local data**, by selecting the Edit box, enter your facilities name and data. By de-selecting the Edit box, the newly entered information is displayed on the Main Screen and report.

In the **Image and Cine Saving Setting**, select the desired root directory for storing images. The default image storage area is called Exam. There are two other choices that can be selected. Automatically generate save filename (default) or select the program to prompt for the filename and path.

In **Exam Setting** there have several selections; automatically saves image on freeze, which when selected the image is saved every time freeze is pressed.

Beep on Image save will make the PC make a "BEEP" each time an image is saved.

Show grid will display grid tick marks on the left and bottom sides of the displayed imaging window and on the printed report. There are several different grid sizes to choose from. 1mm, 2mm, 5mm, and 10mm

Show Frames per Second this option will display the probes frame rate.

Show Report in display window by selecting this option, the on-screen report generator will be displayed in the lower left portion of the screen. This consists of 4 lines that can be chosen from a wide selection of pre-defined names or enter your own text to be displayed.

Spacebar start/stops Scan (Freeze/ unfreeze) When selected, this allows starting and stopping the scan by pressing the spacebar on the keyboard.

In Probe Settings many systems related functions may be selected:

In normal operations do not change the following: Interpolation, Average, and Bidirectional Sweep. These controls are provided, if needed, for specific imaging requirement(s), however, if these settings have changed and are not known, the response may cause the system to have poor performance.

By selecting **Start/Freeze scan on button press** the system allows starting and stopping the imaging by pressing the button on the probe.

By selecting **save image on button press** the system allows saving the image by pressing the button on the probe.



Calibrate Probe is to be performed only with assistance during a service call. DMS factory trained personal will walk you through this procedure.

Help

By clicking the button you will be taken directly to the DMS web site if connected to the internet. If not connected to the internet then please refer to the users manual(s) for HELP documentation. (WWW.DMSWW.COM)

Enable Bluetooth Receiver

By selecting this box enables using the optional external Bluetooth TCG keyboard module.

Reports

The report generator allows displaying on the main imaging page and on the printed report, the viewed **Anatomy, Organ, Finding, and Direction**. When selecting the down arrow, located at the far right of the box, a selection of preset choices will be displayed to choose from. If the preset choices are not suitable you can type you own results in the box. All of this data is shown on the main imaging screen and in the final report.

The section called **Notes** is an area allows typing in personal observations of the study. These notes are printed on the final report. There is a limit of 256 characters that can be entered in this box.

The Print Image and Report button opens the computers printer selections and destination (default printer) for hardcopy reports.

Print the present image that is displayed on the screen

OB

The OB calculation page allows making the following standard calculations.

- CRL** (crown rump length) in mm [less than 12 weeks]
- FL** (femur length) in mm [12 to 24 weeks]
- BPD** (Biparietal diameter) in mm [greater than 24 weeks]
- AD** (abdominal diameter) in mm
- ADP** (abdominal diameter posterior) in mm

To use these features; first select the type of measurement by clicking the corresponding radio button located next to the Measurement.

By using the RIGHT mouse button, click on the starting point and while holding down the RIGHT mouse button you can drag (click and drag) the cursor to the new location. The measurement data is displayed on the main screen while making the measurement. Once the RIGHT mouse button is released, the total measurement is then transferred to the selected measurement box.

If repeating the measurement press Clear:

This clears the on-screen measurements and clears any old calculated data.

To get the calculated results press the calculate button



The results are displayed. Note: depending upon the selected measurement that was taken, not all boxes will have results.

GA Weeks displays the age in Weeks
HC is the Head Circumference (calculated from BPD)
AC is the abdominal circumference (calculated from AD and ADP)
EFW is the effective fetal weight and can be displayed either in grams or pounds
Due Date is the approximant due date

Print adds the results of the calculations to the Final Report Page.

Cardiac

This page allows making measurements of the ejection fraction (**EF**) function of the heart.

By using the mouse, move to the first location on the frozen image. Click and Hold the RIGHT mouse button and drag the measurement to the ending point. Release the RIGHT mouse button. This measurement is transferred in to the selected **EDV** (End Diastolic Volume) box. Now select **ESV** (End Systolic Volume) and repeat the measurement on the location of the ESV. This measurement is transferred in to the selected ESV box.

Once the 2 caliper measurements have been made, manually enter the patient Heart Rate into the **HR** box.

To get the calculated results press the calculate button.

The following results are displayed. (Note: depending upon the selected measurements that were taken, not all boxes will have results.)

SV = Stroke Volume
EF = Ejection Fraction
Q = Cardiac output (Q)

To repeat the measurement press clear:

This clears the on-screen measurements and clears any old calculated data.



Option Monitor Specifications

NEW LifeBook® P1620 Notebook



- Genuine Windows Vista® Business, or Genuine Windows® XP Professional, or Genuine Windows® XP Tablet PC Edition 2005
- Incredibly versatile convertible form factor
- Lightweight with a touch-sensitive widescreen display
- Optional Port Replicator

[Intel® Core™ 2 Duo Processor](#) Ultra Low Voltage U7600 (1.20 GHz, 2 MB L2 cache, 533 MHz FSB)

- Genuine Windows® Vista Business
- Microsoft® Office OneNote® 2007
- 8.9" WXGA touch screen display
- 1 GB DDR2 533 SDRAM memory
- 60 GB P-ATA 100, 4200 rpm hard drive¹
- Integrated multinational² 56K³ V.90 modem and Gigabit Ethernet LAN
- Integrated Atheros Super AG® Wireless LAN (802.11a/b/g)
- Embedded TPM and integrated Fingerprint Sensor
- Built-in digital microphone
- High-Capacity Main battery: Lithium ion (6-cell, 10.8V, 5200 mAh, 56 WHr)
- One-year International Limited Warranty