



TRAINING

MANUAL



*Revolutionary Tinnitus
Assessment*

MedRx TINNOMETER



www.medrx-int.com

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Introduction

The MedRx Tinnometer represents a new era of ultra-compact screening audiometry for your office. Compact yet rugged, this PC-Based system is USB powered and supports current ANSI and IEC audiometric tests. ***This manual assumes that the system hardware, software and drivers are installed and working properly.*** Please refer to the MedRx Tinnometer Installation Manual for assistance. The Installation Manual is included in the original Tinnometer packaging in PDF format on the USB Flash Drive.

The scope of this manual is to get you “up and running” with your MedRx Tinnometer. Please consult the interactive Help System within the software for more detailed information of features and functionality. To access this tool, press the F1 key at any time, or click the Help icon or text menu with your mouse. Access these by clicking on the “Help” tab at the top of the screen, and select “Help Topics”. Select an item from the list in the Index tab and click “Display”.



The AVANT Audiometer Software Overview

The AVANT Audiometer software can run stand-alone or from NOAH™ System or the TIMS® NOAH-Compatible Office System.

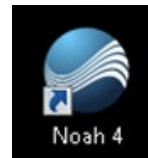
Launching the AVANT Audiometer Software

Stand Alone



- Double Click the **AVANT Audiometer** shortcut on your Windows Desktop.

NOAH

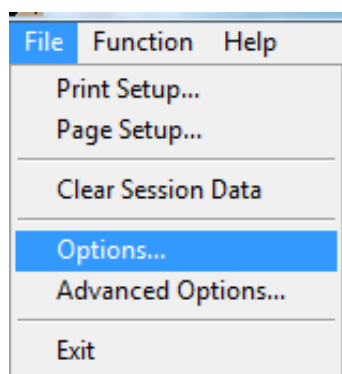


- Launch **NOAH**.
- Launch **Avant Audiometer module** following **NOAH** procedures.

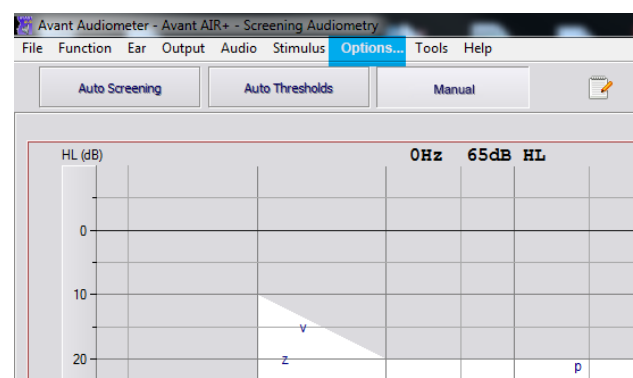
Basic Software Options

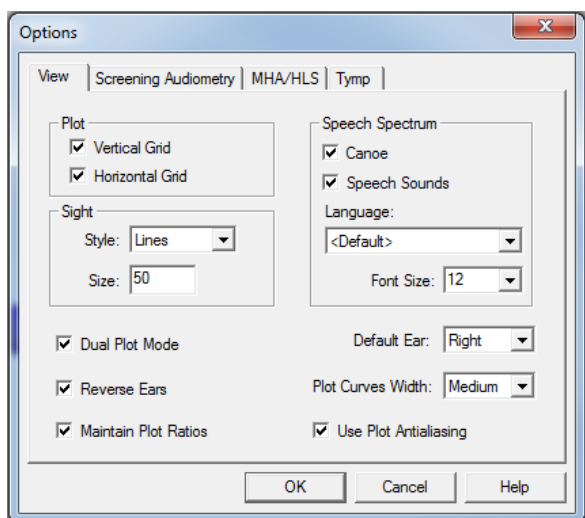
Several options are available which allow the user to customize the AVANT Audiometer Software to meet their needs.

Access these options from the File Menu on the AVANT Audiometer **Main Screen** as shown below.

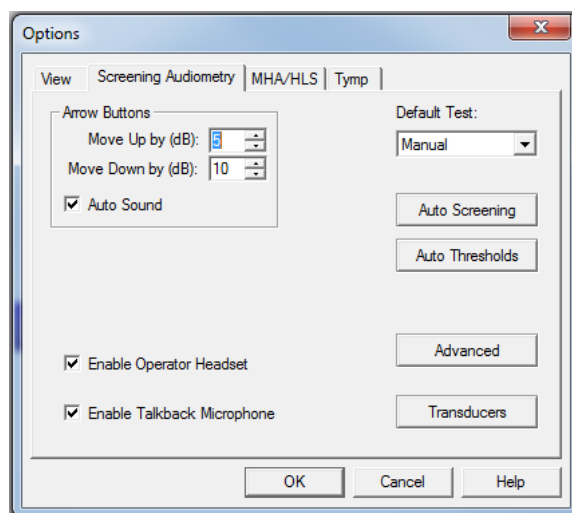


The Options may also be accessed from the **Audiometry screen** by clicking on the *Options* text menu as shown below.

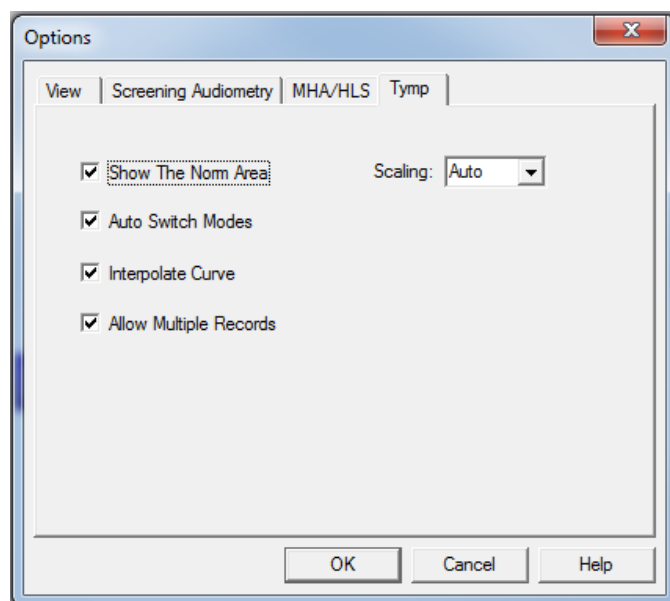




The **View** tab allows you to set the default appearance of the test environment.



The **Screening Audiometry** tab sets the look and behavior of the Tinnometer.

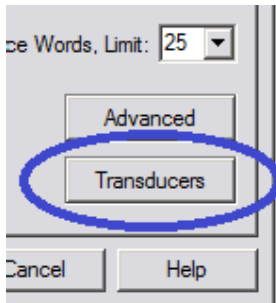


If your system has a **Tympanometer** connected, this tab will assist in configuring the look of the display.

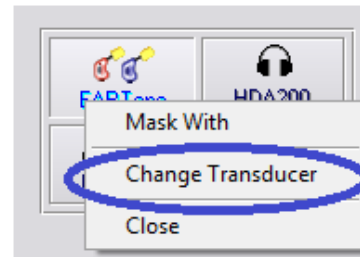
NOTE: Remember, more information is always available in the Interactive Help System by clicking the Help Icon or pressing the F1 key.

Assign Transducers

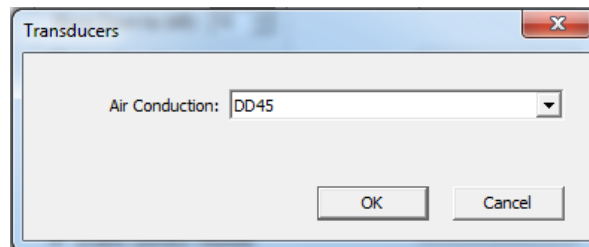
Option 1: On the Audiometry Options screen click **Transducers** to assign specific transducers to the audiometer outputs.



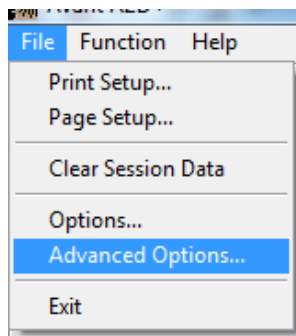
Option 2: You can change transducers by **Right-Clicking** on any transducer icon on the Screening screen.



The Transducers dialog box will then appear. Select the appropriate transducer for each output.

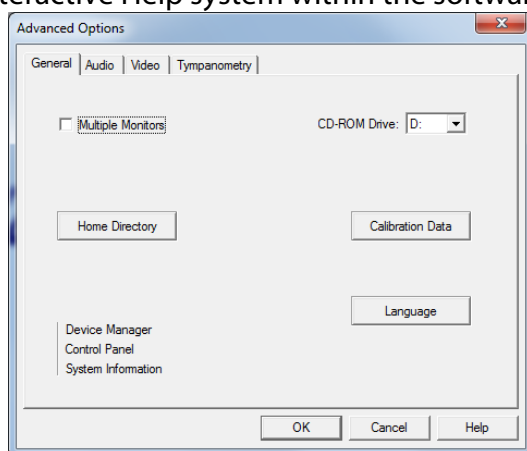


Advanced Options

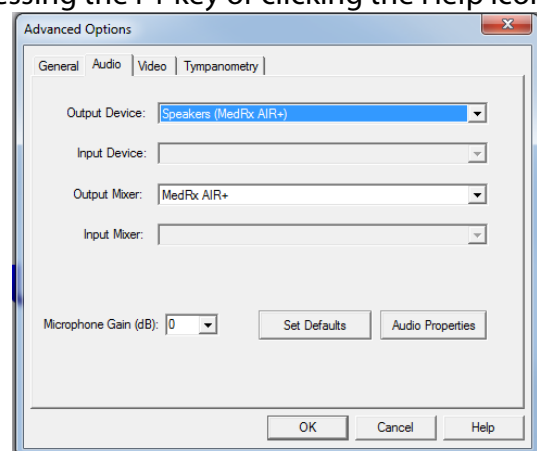


The Advanced Options screen allows you to configure your system to meet your individual clinical needs. It also provides MedRx Technical Support with tools for helping you troubleshoot technical issues. Access this screen from the File Menu on the Avant Main Screen as shown to the left.

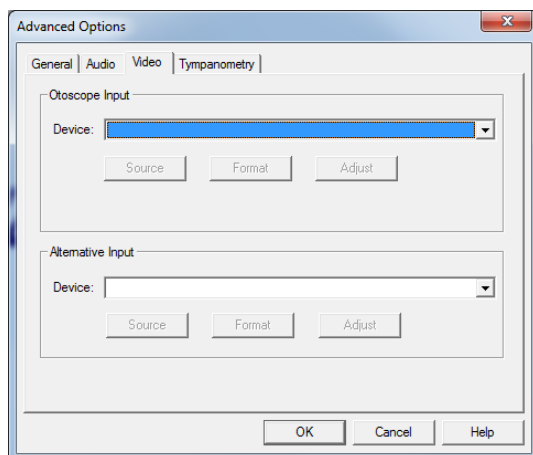
The key features of each tab are described below. For more in-depth information, consult the interactive Help system within the software by pressing the F1 key or clicking the Help icon.



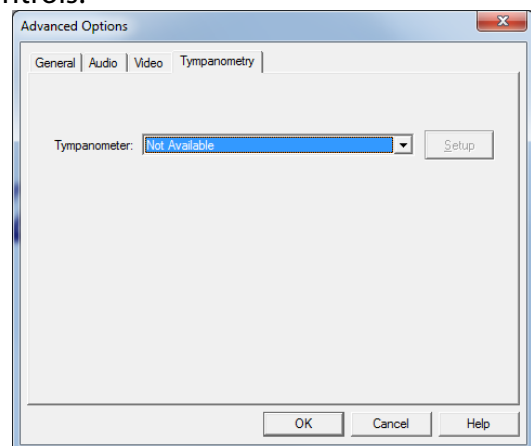
The **General** Tab configures the overall Tinnometer behavior with respect to other Windows programs, specifically NOAH.



Use the **Audio** Tab to select the proper audio device for your Audiometer. This tab also provides access to the Windows Audio controls.




If your system has a Video Otoscope, the **Video** tab allows you to select the appropriate device driver.



If your system has a **Tympanometer** connected, use this tab to identify it and ensure the driver and software that control it are correctly installed.

Preparing for Testing

Use the accessories provided with your MedRx Tinnometer. Typical acceptable transducers are shown on the “Transducer & Accessories” page in the Installation manual. Operator headsets for use with the MedRx Tinnometer should have 32 ohms impedance and the speaker power should be at least 50 watts. Air conduction transducers for use with this device should have an impedance of 10 ohms. The speaker voltage should match the local mains voltage where the device is used.

The Operator Headset with microphone is used by the device operator to communicate with the patient. The patient talks to the operator using the Talk-Back microphone. 

Placing the Earphones on the Patient

High Frequency Earphones (DD450)



1. Place the earphones on the patient's head so the center of the earphone is directly over the opening of the ear canal.

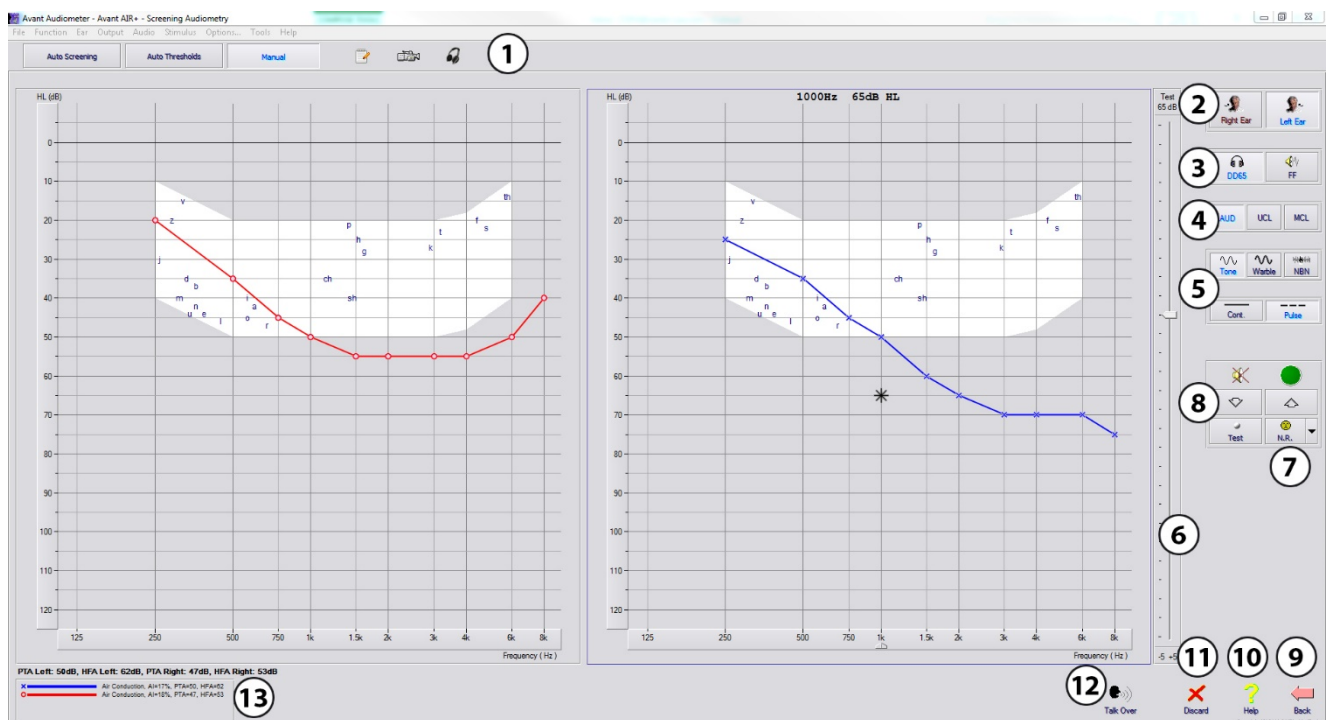
Adjust the headband so the earphones remain in place, but be careful not to make it so tight as to cause patient discomfort.

Device Maintenance

Annual re-calibration of the transducers used with the Avant Audiometer is recommended. There are no user repairable components of this device. Refer to the **Installation Manual** for care and cleaning instructions.

Performing Audiometric Testing

The screen shot below shows the all feature controls which are available on the Audiometer main window. Depending on the features that have been enabled, on your device, some icon may not be available. The sections of the manual that follow explain how to use these tools to perform hearing evaluations using your MedRx Tinnometer.



Pure Tone Audiometry

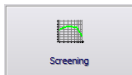

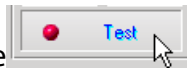
Pure Tone Audiometry measures the patient's peripheral hearing sensitivity, or the softest levels they can hear pure tones at a variety of frequencies. These thresholds are plotted on a standard graph called an audiogram. The AVANT Audiometer software controls the hardware, stores the data (if running within NOAH or TIMS) and prints a standard audiogram report. Pure tone Audiometry can be performed via earphones or a Bone Conductor (Bone Conduction).

Prerequisites:

- Before performing audiometry, careful inspection of the ear canal should be performed. This is best done with Video Otoscopy. After ensuring the ear canal is clear, place the appropriate transducer on the patient.

Pure Tone Audiometry via DD450

(High Frequency Supra-Aural Headphones)

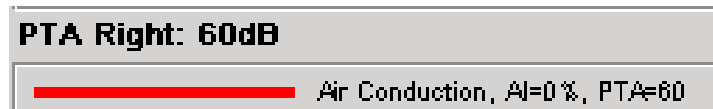
1. From the main Audiometer Window, Click the  button on the right side menu bar.
2. By default, the  button will be selected once you enter the main Audiometry Screen. Other default settings (based on typical clinical practice and procedures) are:
 - a. Right Ear
 - b. AC (Air Conduction)
 - c. Tone Stimulus
 - d. Continuous Tone
3. Instruct the patient that they will hear several very quiet (soft) tones (beeps) and that they should signal (raise their hand, press the patient response button, etc.) as soon as they hear it. It is helpful to also say "even if it seems very far away".
4. Begin at 1000 Hz in the Right ear (unless the patient reports better hearing in the left ear).
5. Present a tone at 60 dB by pressing the space bar or clicking the  button.
6. If the patient does not hear the tone (does not signal), raise the level 5 dB using the up arrow on your keyboard and present again.
7. Repeat step 6 until the patient signals that they hear the tone.
8. When the patient signals they hear the tone, decrease the level by 10 dB and present the tone again.
9. Repeat steps 6 through 8 until the patient responds to a tone at the same level 2 times with the level ascending.
10. Using the right arrow key, change the test frequency to 2000 Hz and repeat steps 5 through 8 to establish the threshold at 2000 Hz.

NOTE: If the threshold at 2000 Hz is more than 20 dB different (less than or greater than) the threshold at 1000 Hz, repeat steps 5 through 8 at 1500 Hz (the “half octave” between 1000 Hz and 2000 Hz).

11. Repeat steps 5 through 8 for 4000 Hz, 8000 Hz, 500 Hz and 250 Hz.

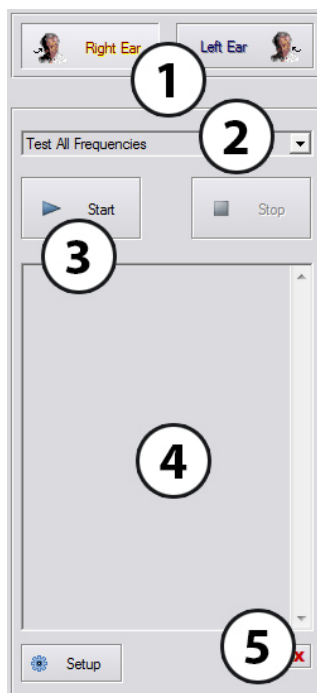
12. Repeat steps 5 through 11 in the opposite ear.

NOTE: The software automatically calculates the 3-frequency Pure Tone Average (PTA) which is displayed above and inside the legend as follows:



Auto Screening

In **Automatic** mode the operator has to define the test parameters and start the test. The test will follow the automatic screening protocol. It will perform a single intensity hearing screening.



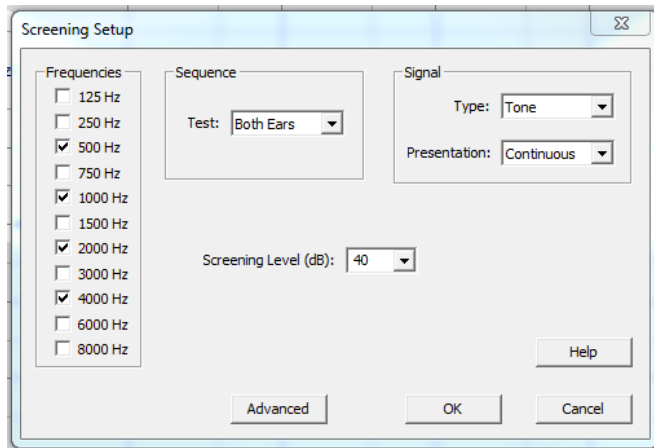
To begin the Automatic Screening:

1. Select the ear you want to start
2. Choose the test style from the drop down
3. Click Start to begin
4. Watch the log of the patient responses
5. Clear Log as needed

The person being tested will have to use the Patient Handswitch to make responses. The person should be instructed prior to performing the test to respond as soon as possible whenever the tone is heard in either ear, no matter how faint it may be.

The test will keep a log of every frequency tested. If the test shows some inconsistent or dubious results, it may need to be repeated manually or automatically for a particular frequency.

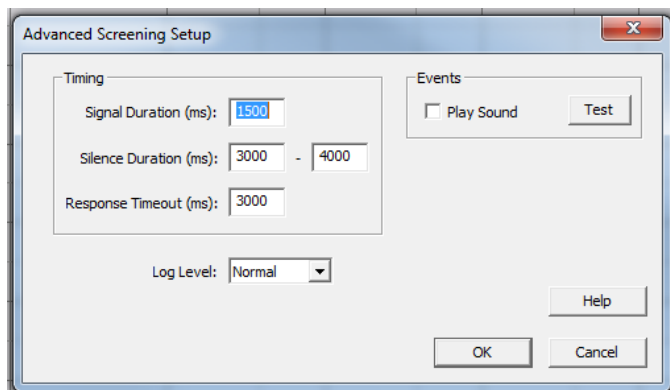
The automatic screening test parameters are available on the Setup screen.

The 'Screening Setup' dialog box is shown. It has three main sections: 'Frequencies', 'Sequence', and 'Signal'. The 'Frequencies' section on the left lists frequencies from 125 Hz to 8000 Hz with checkboxes; 500 Hz, 1000 Hz, 2000 Hz, and 4000 Hz are checked. The 'Sequence' section in the middle has a 'Test' dropdown set to 'Both Ears'. The 'Signal' section on the right has a 'Type' dropdown set to 'Tone' and a 'Presentation' dropdown set to 'Continuous'. Below these sections is a 'Screening Level (dB)' dropdown set to '40'. At the bottom are buttons for 'Advanced', 'OK', 'Cancel', and 'Help'.

You may customize the screening setup to specific:

- Frequencies
- Test ears
- Signal type
- Level

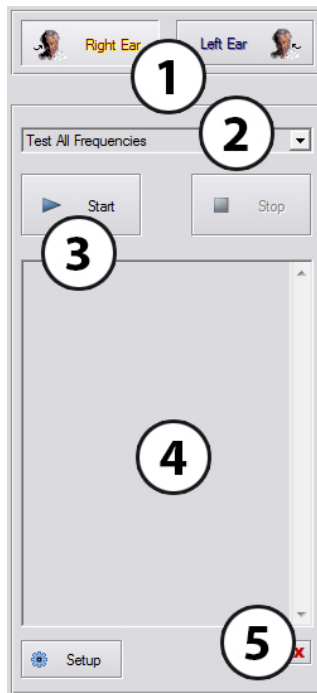
The Auto Screening will perform a single intensity hearing screening.

The 'Advanced Screening Setup' dialog box is shown. It has two main sections: 'Timing' and 'Events'. The 'Timing' section on the left has three input fields: 'Signal Duration (ms)' set to 1500, 'Silence Duration (ms)' with a range from 3000 to 4000, and 'Response Timeout (ms)' set to 3000. Below these is a 'Log Level' dropdown set to 'Normal'. The 'Events' section on the right has a checkbox for 'Play Sound' which is unchecked, and a 'Test' button. At the bottom are buttons for 'OK', 'Cancel', and 'Help'.

Advanced Screening Setup will allow you to customize the signal duration, silence duration and response timeout.

Auto Threshold

In **Automatic** mode the operator has to define the test parameters and start the test. The test will follow the automatic screening protocol as defined in ISO: 8253-1.



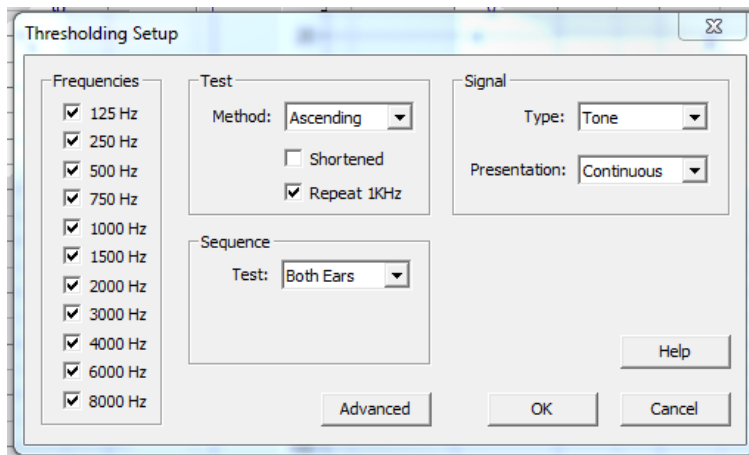
To begin the Automatic Screening:

1. Select the ear you want to start
2. Choose the test style from the drop down
3. Click Start to begin
4. Watch the log of the patient responses
5. Clear Log as needed

The person being tested will have to use the Patient Handswitch to make responses. The person should be instructed prior to performing the test to respond as soon as possible whenever the tone is heard in either ear, no matter how faint it may be.

The test will keep a log of every frequency tested. If the test shows some inconsistent or dubious results, it may need to be repeated manually or automatically for a particular frequency.

The automatic threshold test parameters are available on the Setup screen.

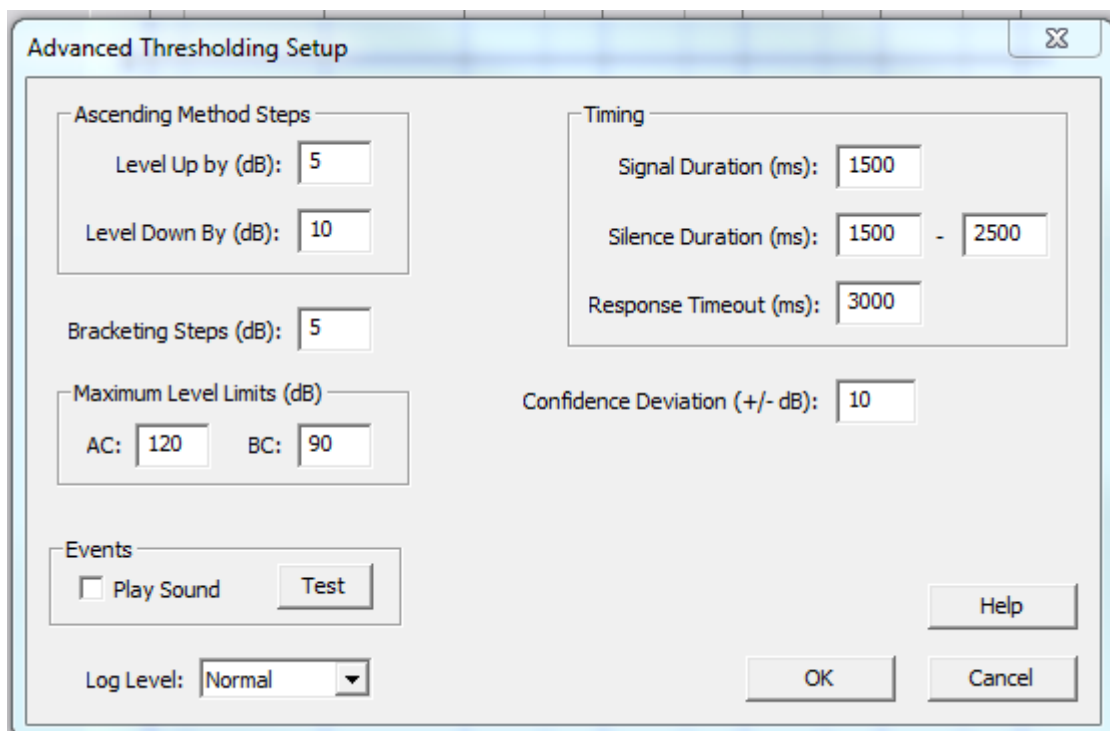


You may customize the screening setup to specific:

- Test Method
- Frequencies
- Test ears
- Signal type

The Auto Thresholds will perform a threshold seeking formula and complete after 3 successful response button pushes at one level.

Advanced Threshold Setup allows for customization of various parts of the test. These options will allow the clinician to adjust how the thresholds are determined, the maximum presentation level, stimulus timing, bracketing steps, logging activity and confidence deviation. Information on each of these items are found by clicking the Help button.



Tinnometer

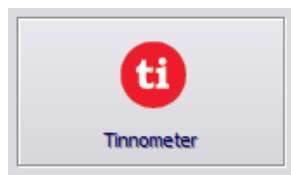
Purpose of the Tinnometer

Tinnitus is experienced by millions of people worldwide. The Tinnometer is designed to mimic the sounds of tinnitus in order to provide an accurate and flexible tinnitus assessment. Tinnitus Assessment increases patient rapport with the clinician when an equivalent tinnitus sound can be created. The Tinnometer can accurately create tinnitus sounds for fast and reliable tinnitus assessment. All test results should be used to help counsel the patient on their specific tinnitus and what the assessment has found.

The Tinnometer test was developed to:

1. Break away from the traditional limitation of tinnitus assessment with an audiometer
2. Produce accurate and flexible sounds that mimic patient tinnitus
3. Provide extended frequency ranges to more accurately match tinnitus sounds
4. Decrease the time needed to complete a tinnitus assessment
5. Standardize reporting needed when completing tinnitus assessment
6. Allow clinicians to save and recall prior tinnitus assessments
7. Provide general guidelines for implementing results into tinnitus sound therapies provided by leading hearing aid manufacturers

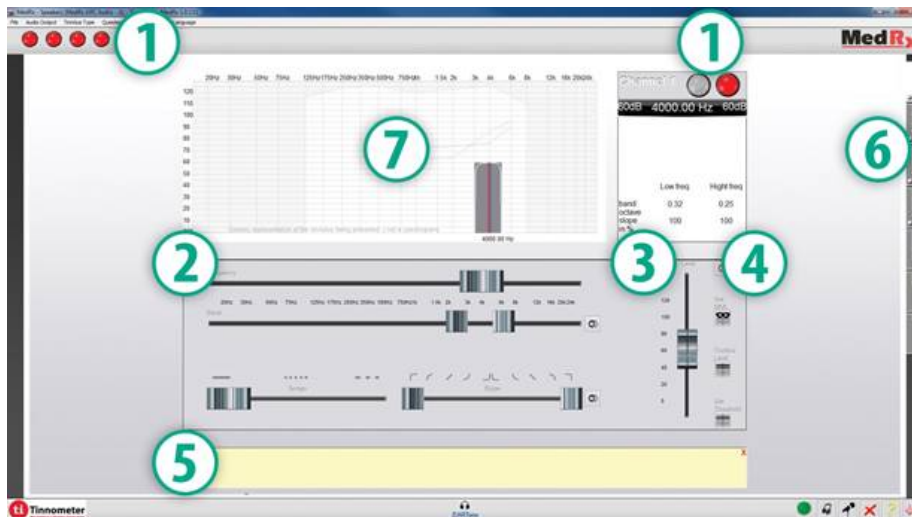
Performing the Tinnometer Testing:



- Click the ***Tinnometer*** button from the main Avant Audiometer main screen.

The following screenshot shows the key features of the Tinnometer:

1. Toggle Switch to Start/Stop stimulus
2. Sliders to control frequency, bandwidth, slope and tempo of the stimulus
3. Slider to control the intensity of the stimulus
4. Buttons used in determining tinnitus match, threshold and minimum masking level
5. Area where description of items will be displayed
6. Channels designed to present multiple types of tinnitus sounds
7. A graphical display of the sounds being played for the patient. Stimulus and Audiogram (if done within Avant or Noah) are display in dB SPL



Interactions with the patient are controlled as follows:

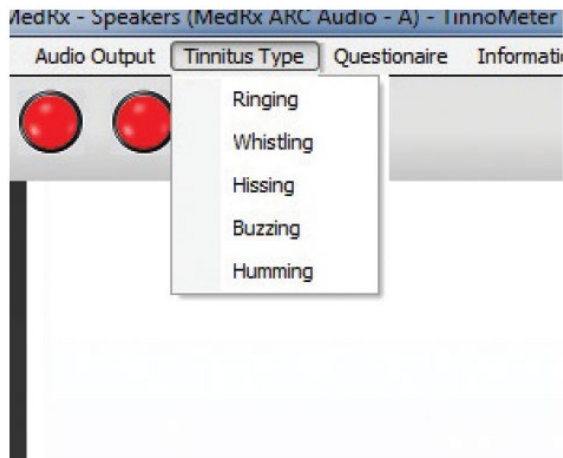


- | | |
|--------------------------------------|------------------------|
| 1. Patient response switch indicator | 4. Undo |
| 2. Patient monitor microphone | 5. Toggle help section |
| 3. Talk forward | 6. Return to Avant |

There are 3 Steps needed for Tinnitus Assessment with the Tinnometer

1. Identify patient's tinnitus by frequency, bandwidth, slope and tempo
2. Lower the identified tinnitus until patient threshold is reached
3. Raise the tinnitus level above the identified tinnitus intensity (widen bandwidth if needed) until the patient states they no longer hear the tinnitus. Play stimulus for 60 seconds to ensure masking is achieved.

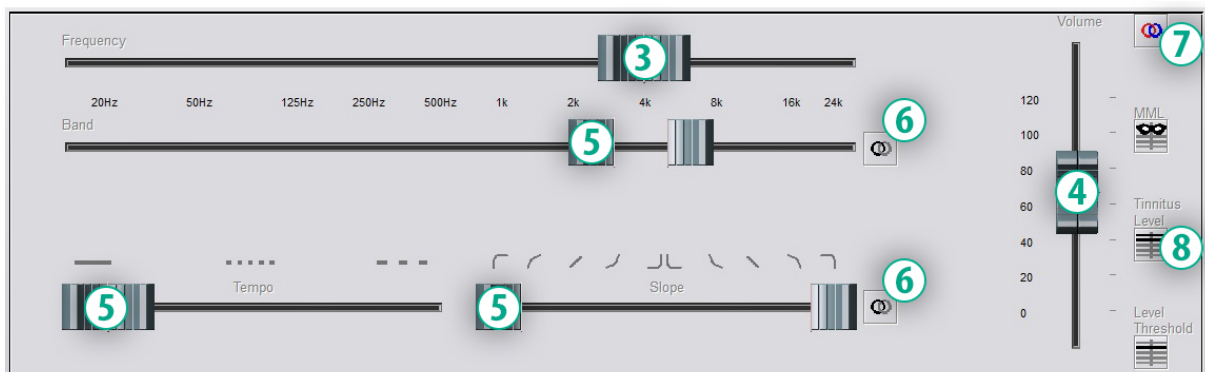
Step 1: Identify Patient's Tinnitus



1. Start by selecting the **tinnitus type** that has been described by the patient. This is an approximation of the tinnitus sound your patient hears. Tinnitus type will provide a starting frequency, bandwidth and slope to help speed up testing time.



2. Use the stimulus **start/stop toggle** to present the selected signal to the patient.



3. Use frequency slider to match the pitch of the patient's perceived tinnitus
4. Use volume slider to match patient's perceived intensity of tinnitus
5. Adjust bandwidth, slope and tempo (for pulsating tinnitus or prevention of adaptation) as needed
6. Buttons to allow greater flexibility in bandwidth and slope of tinnitus. Allows the addition of high/low frequency sounds independently
7. Allows for independent right/left volume control
8. Press Tinnitus Level button once the patient's tinnitus is matched

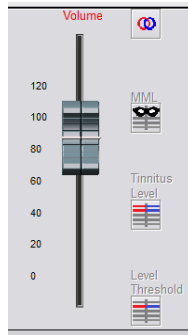
Step 2: Find Identified Tinnitus Threshold



1. Use **down** arrow on your keyboard to lower stimulus until patient states they are no longer able to hear the tinnitus.

2. Click **Threshold Level** button.

Step 3: Masking Tinnitus for 60 Seconds



1. Use **volume slider** to increase intensity of the stimulus until the patient states they are no longer able to hear their tinnitus.

NOTE: Lower levels of masking may be achieved by increasing bandwidth of the masking stimulus. Pulsating the masking noise can prevent tinnitus adaptation.

2. Press the **MML button** and continue presenting stimulus until 60 second countdown ends.
3. If patient begins to hear their tinnitus within the 60 seconds, raise intensity until masking is achieved and repeat number 2.

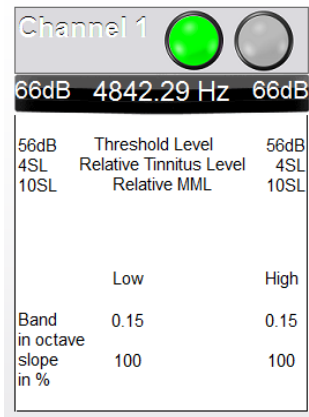
Tinnometer Modulation Tab

The Tinnometer modulation tab is designed to simulate sound generators when hearing aid demonstrations cannot be performed. The following are controls used in Modulation.

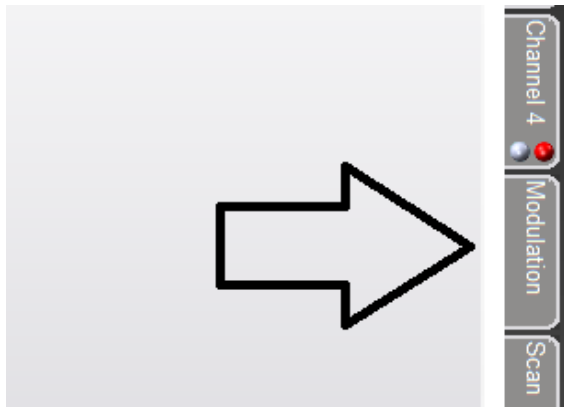


1. Type of modulation Sound
2. Speed of modulation
3. Frequency of modulation
4. Modulation volume range

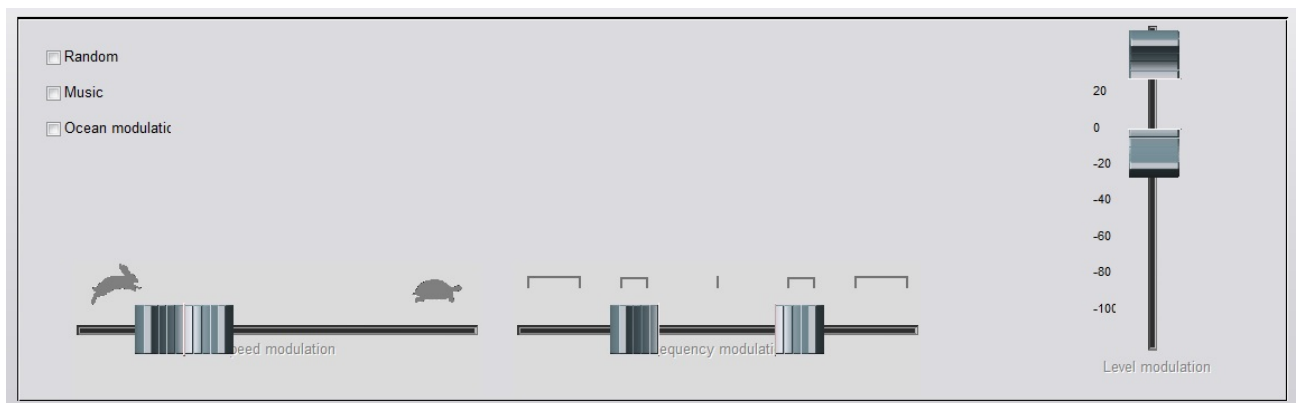
To use the Modulation features within Tinnometer, you must first complete the three steps involved with tinnitus assessment. Once tinnitus assessment is complete, you can use modulation by:



1. Activating the channel in which the tinnitus assessment was performed.



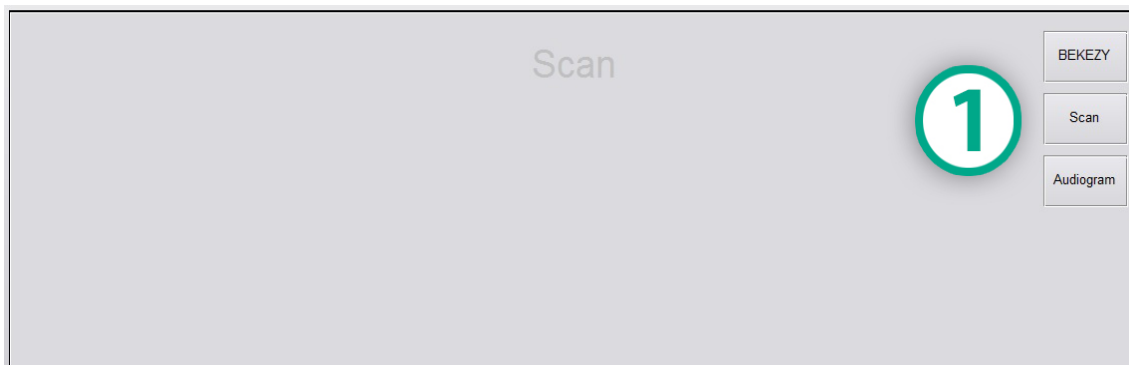
2. Enter the modulation tab on the right side of Tinnometer software.



3. Adjust the modulation stimulus with sliders as a counseling tool for the patient.

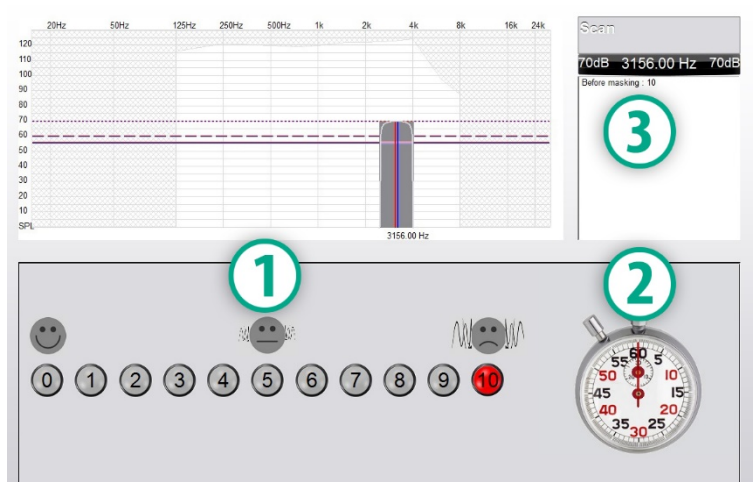
Tinnometer Audiometry Scan

The Tinnometer Scan tab is designed for various forms of air conduction audiometry. There are three types of audiometry that can be performed with Tinnometer. You can access the forms of audiometry with the buttons located by the number 1 in the image below.



Tinnometer Residual Inhibition (RI)

The Tinnometer RI tab is designed for Residual Inhibition (RI) testing for a patient's tinnitus. The controls in the RI tab are as follows:

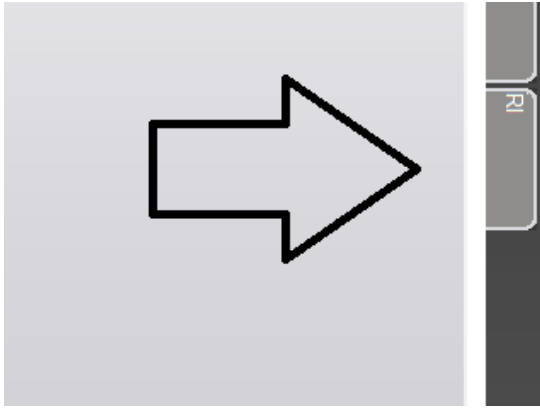


1. Scale from 0-10 of tinnitus bothersome level
2. Timer to begin stimulus
3. Tracking of patient's tinnitus bothersome level as a function of time

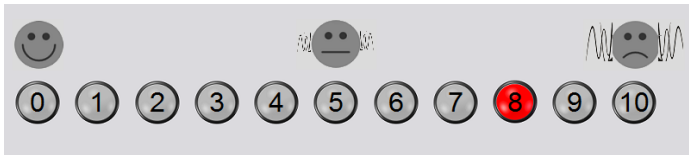
A complete tinnitus assessment must be performed prior to performing testing in the RI tab. Once tinnitus assessment testing is completed, optional residual inhibition testing can be performed with the following steps:

Channel 1		
66dB	4842.29 Hz	66dB
56dB	Threshold Level	56dB
4SL	Relative Tinnitus Level	4SL
10SL	Relative MML	10SL
	Low	High
Band in octave	0.15	0.15
slope in %	100	100

1. Activating the channel in which the tinnitus assessment was performed.



2. Select the RI tab on the right side of the Tinnometer software.



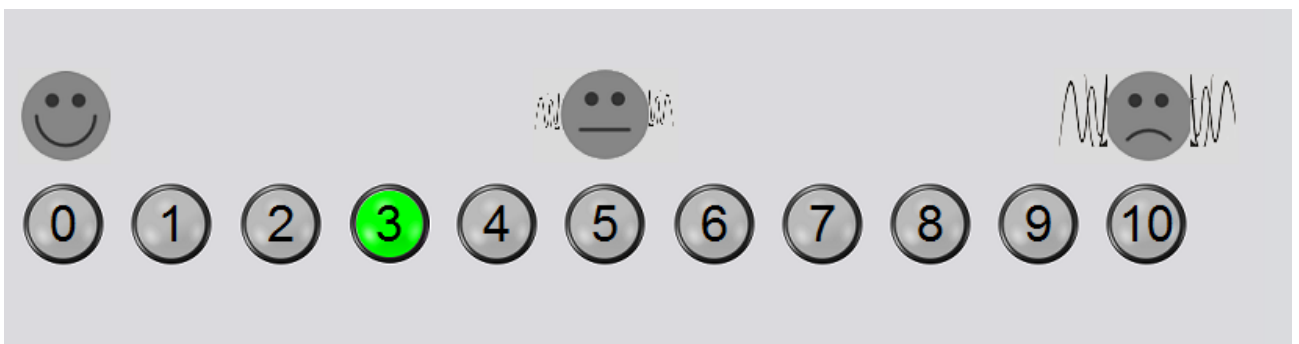
3. Ask the patient the bothersome level of their tinnitus from 1 to 10 and mark their response.



4. Click the stop watch to begin the masking stimulus (stimulus to play for 60 seconds).

You will hear a masking noise for 1 minute
Then the noise will suddenly stop
The patient will have to redefine his discomfort about every 30 seconds.

5. Stimulus will play for 60 seconds and automatically stop at the 60 second point.

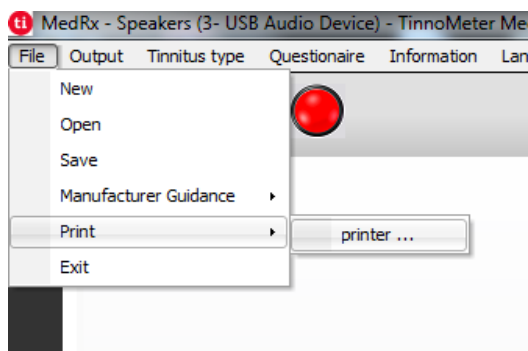


6. When the stimulus stops the patient must redefine their tinnitus bothersome level every 30 seconds. The bothersome level should decrease upon the stimulus stopping and will increase with time.
7. The test continues until the bothersome level returns to pre-test level.

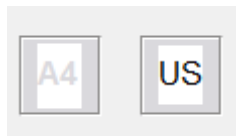
Tinnometer Report Printing

The Tinnometer has four reports available for printing: tinnitus assessment report, manufacturer guidance report, questionnaire report and a channel report.

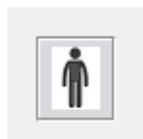
The following are common features found across reports:



1. To generate your report, select "printer ..." from the File menu.



2. Select the paper style you are printing.



3. Confirm all patient information is correct.



4. Choose your print preferences.



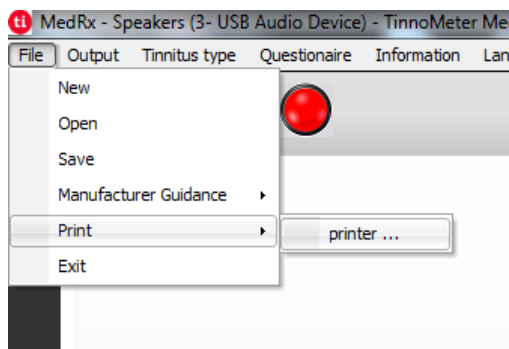
5. Change the zoom of your print preview.



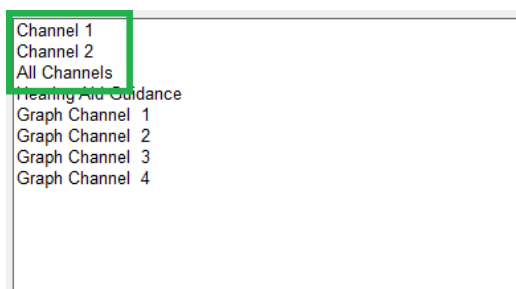
6. Print your Report.

Tinnitus Assessment Report

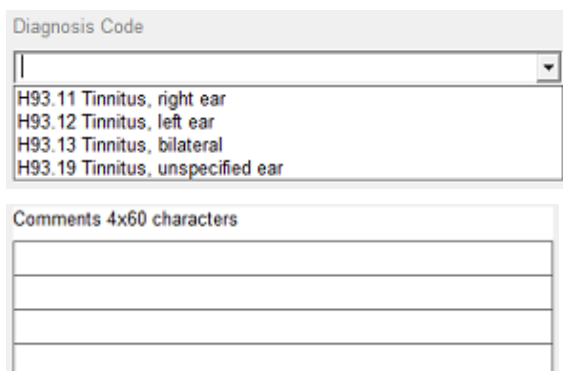
Tinnitus assessment reports are able to be generated after completing the three steps to tinnitus assessment. Once all steps are complete you are able to print a report



1. To generate your tinnitus assessment report, select "printer ..." from the File menu.



2. The "Channel" reports are the tinnitus assessment reports. Select the channel used for testing or All Channels when multi-channel testing is completed.



3. Use the drop down box to select a diagnosis for the patient.
4. Comments can be entered in 4 separate lines with a maximum of 60 characters.

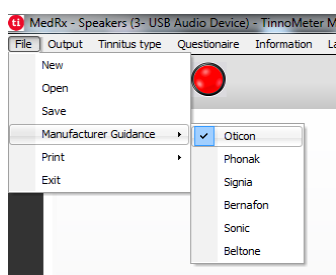


5. Print the Report.

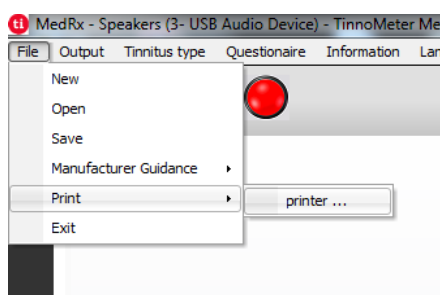
Manufacturer Guidance Report

Manufacturer guidance reports are designed to provide hearing aid sound therapy guidance to a clinician based on tinnitus assessment results. Sound therapy is an option to tinnitus treatment. We encourage all clinics to develop a tinnitus treatment protocol that is in line with their tinnitus treatment goals. Manufacturer guidance generated by the Tinnometer is designed to be a starting point in sound therapy and each patient may differ in preferred sound.

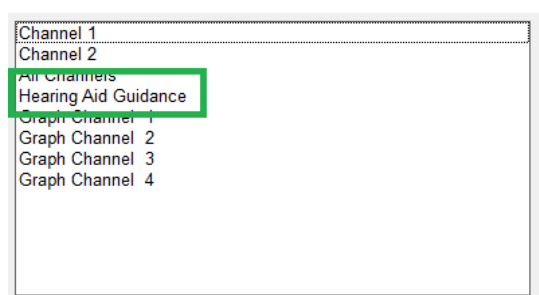
Manufacturer guidance reports are able to be generated after completing the three steps to tinnitus assessment. Once all three tinnitus assessment steps are complete you are able to print a report.



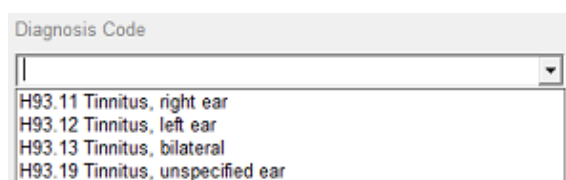
1. Select the manufacturer that you would like to have printed in your report.



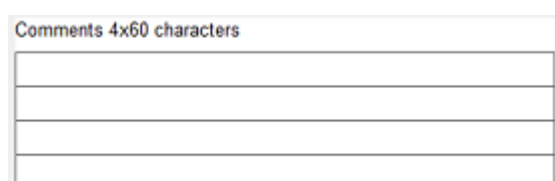
2. To generate your tinnitus assessment report, select "printer ..." from the File menu.



3. Select "Hearing Aid Guidance" from the list of reports.



4. Use the drop down box to select a diagnosis for the patient.



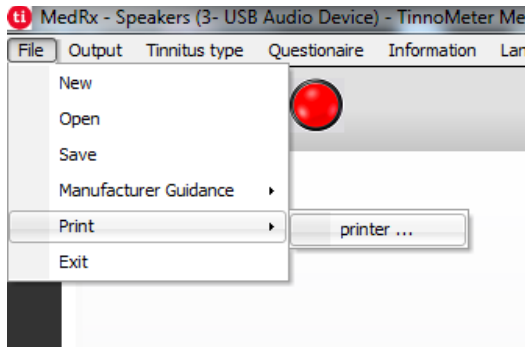
5. Comments can be entered in 4 separate lines with a maximum of 60 characters.



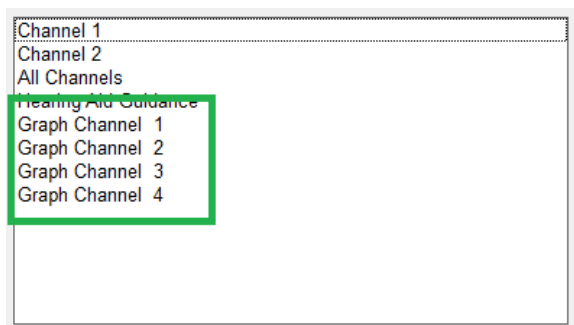
6. Print the report.

Graph Channel Report

Graph channel reports will print a patient report which displays an image of the patient's tinnitus with QR codes for YouTube videos that play a wind modulation noise nearest to their tinnitus. To generate the report you must:



1. To generate your tinnitus assessment report, select "printer ..." from the File menu.



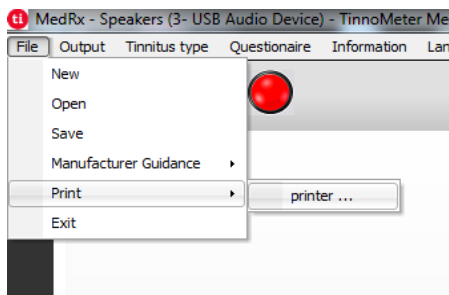
2. Select "Graph Channel" from the list of reports. Select the channel number which you used to match your patient's tinnitus sound.



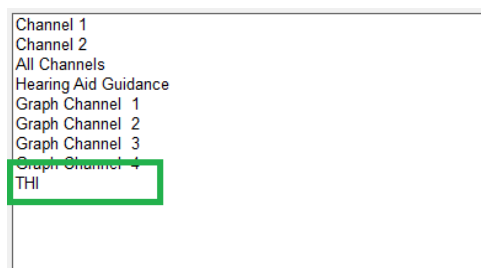
3. Print the report.

Questionnaire Report

Questionnaire reports will only show as an option once the questionnaire has been completed. Once a questionnaire has been completed and you are ready to print a report you must:



1. To generate your tinnitus assessment report, select "printer ..." from the File menu.



2. Select the name of the questionnaire you want to print from the list of reports.

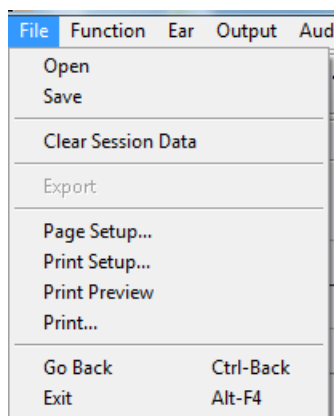


3. Print the report.

Printing

Printing within the Avant Audiometer software is very simple.

From the File menu, click one of the following options:



Page Setup – Allows you to set margin sizes and the default text header for your reports.

Print Setup – selects the printer you want the report to be sent to.

Print Preview – Shows you what your report will look like before you print it.

Print – Sends the report to the printer. This option opens the Windows Print dialog which allows the user to select any installed printer and modify the properties (quality, number of copies, etc.) for the print job.

Limited Warranty

MedRx warrants this product to be free from defects in material and workmanship for two years from the time of purchase. If this system fails to perform as specified during this period, the purchaser is responsible for calling MedRx at +49 30 70 71 46 43. The company's representative will advise the owner to either return specific components or the entire system to:

MAICO Diagnostics GmbH
MedRx International TCS
Sickingenstr. 70-71
10553 Berlin
Germany

MAICO will repair or replace any defective devices, fully test the system and/or components and ship the system promptly back to the owner. There is no cost for the repair or return shipping, provided the system is two years old or less and has not been misused, abused or damaged. Such damage includes, but is not limited to, dropping, exposure to excessive heat greater than 37,78° C and water/liquid damage.

Repair or replacement of the system as provided under this warranty is the sole and exclusive remedy of the purchaser. MedRx shall not be liable for any consequential or incidental damages or for breach of any express or implied warranty. Except to the extent of applicable law, any implied warranty, merchantability or fitness of this product is limited to the duration of this warranty.

MAICO will, at its discretion, service and repair out of warranty products at the purchaser's request, charging for parts and labor as necessary. The limited warranty is deemed void if software or hardware is installed on this product which is not pre-approved by MedRx, Inc. Approved software includes NOAH™ and HIMSA approved hearing aid manufacturer programming modules for fitting hearing aids.

MAICO is not responsible for problems resulting from installation of unapproved software or hardware. In the event of unapproved software or hardware installed on the system causing a conflict, MedRx will service the product for a fee to be determined at the time of service.