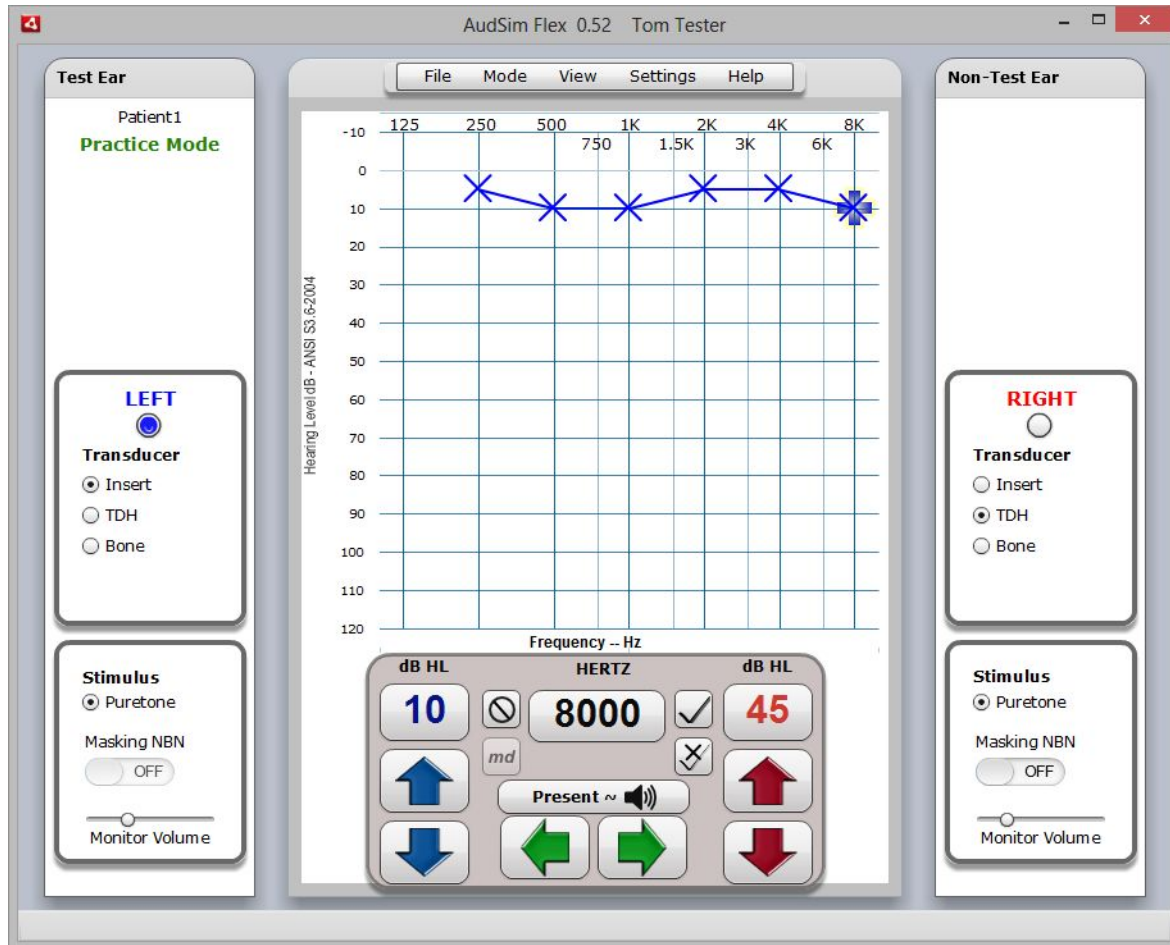# AudSim Flex

version 0.96 audsim@gmail.com

Installation and Registration

Audsim Flex is compatible with Windows (7 through Win 10) and Mac OS X systems using the Adobe Air platform.

Download and install the Adobe Air platform first, then download and install AudSim Flex. Accept the default options for both.

- Start AudSim and enter your First and Last name. **You cannot change your name later.** ✝
- Enter the email address for assignment submissions. Use your Instructor's address, NOT your email address.
- Purchase a registration key online. Click the 'Get a Registration Key" button on

the AudSim Registration form or http://www.audsim.com/register.htm
- The 4-digit local key needed to purchase a registration is displayed in red on the Audsim Registration Form. Your registration key is based on this unique 'local key'.
- Enter the registration key and click 'Continue'

TIP : Automatic updating is enabled; you should accept any future requests to update when prompted.

AudSim Registration

First Name   Tom

Last Name   Tester

Submission Email foo@foo.com

Exam Results will be submitted to the Email address above

Local Key 2608

Registration Key 123456

Get a Registration Key   Continue

[FERPA CONSENT] By entering your name above, you are giving consent for audstudent.com to forward your results to the email address above vai our servers. If you would prefer, you can enter a psuedonym or code numbers. Your files will be deleted from our server in 48 hours.

✝ The only way to change the user name is to deactivate AudSim and register with a new registration code.

Instructional Modes

AudSim Flex has multiple modes of instruction and assessment ranging from basic hearing loss assessment to masking dilemmas.

Mode Feature Matrix

	Threshold Assistant	Practice	Assignment	Examination
Hughson-Westlake Guidance	Yes	No	No	No
View Audiogram Overlay	Yes	Yes	No	No
Coaching Messages	Yes	Yes	No	No
View Results Table	Yes	Yes	Yes	No
Submit Results to Instructor	Automatic	No	Student's Choice	Automatic
Masking*	No	Yes	Yes	Yes
Threshold Tasks Required to Submit	Air & Bone**	N/A	Any	Any

* Masking not available in NSU-AAP version

** Bone Conduction not used in NSU-AAP version

Threshold Assistant Mode : Provides the student with step-by-step instructions on the modified Hughson-Westlake method for obtaining threshold. Once this task is completed (both ears, air and bone conduction), the results will be sent to the Instructor. Only supports Patient #1.

Practice Mode : Allows the student to explore all the simulations, and get feedback on the cochlear response to the stimuli they provide. Especially useful for mastering masking techniques. Students can compare their threshold measurements against the simulation thresholds using an audiogram overlay or the more detailed table of results.

Assignment Mode : Student must obtain thresholds on their own. The student can review the results and decide whether to submit them to the Instructor, or do the assignment over.
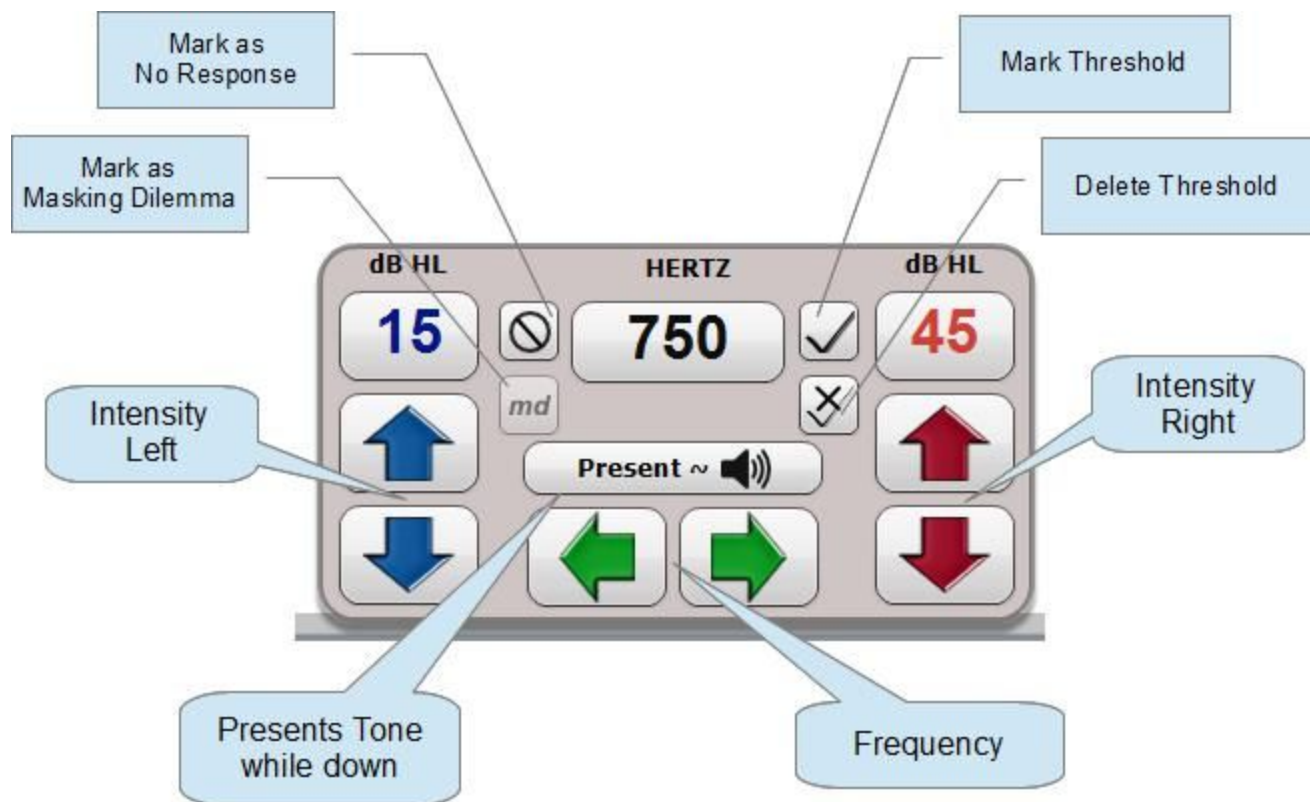
Exam Mode : Student must obtain thresholds on their own. After the results are submitted to

the Instructor, the Student can review the results.

Note : Multiple submissions are allowed, but they will be time stamped and have incremental version numbers appended to the file name (_1,2,3...).

Audiometer Controls

Control Panel

Audiometer Control Panel

**TIP :** You can use the Right mouse button to present the tone

Keyboard Controls

- **Left** and **Right** arrow keys control frequency
- **Up** and **Down** arrow keys control intensity. (5 dB step)
- **Spacebar** presents the stimulus. Down = ON Up = OFF
- **End** key marks threshold

- **Delete** key removes threshold marker
- **Page Up** key increases masking intensity (5 dB)
- **Page Down** decreases masking intensity (5 dB)

TIP : You can use keyboard and mouse controls at the same time

Side Panel Controls
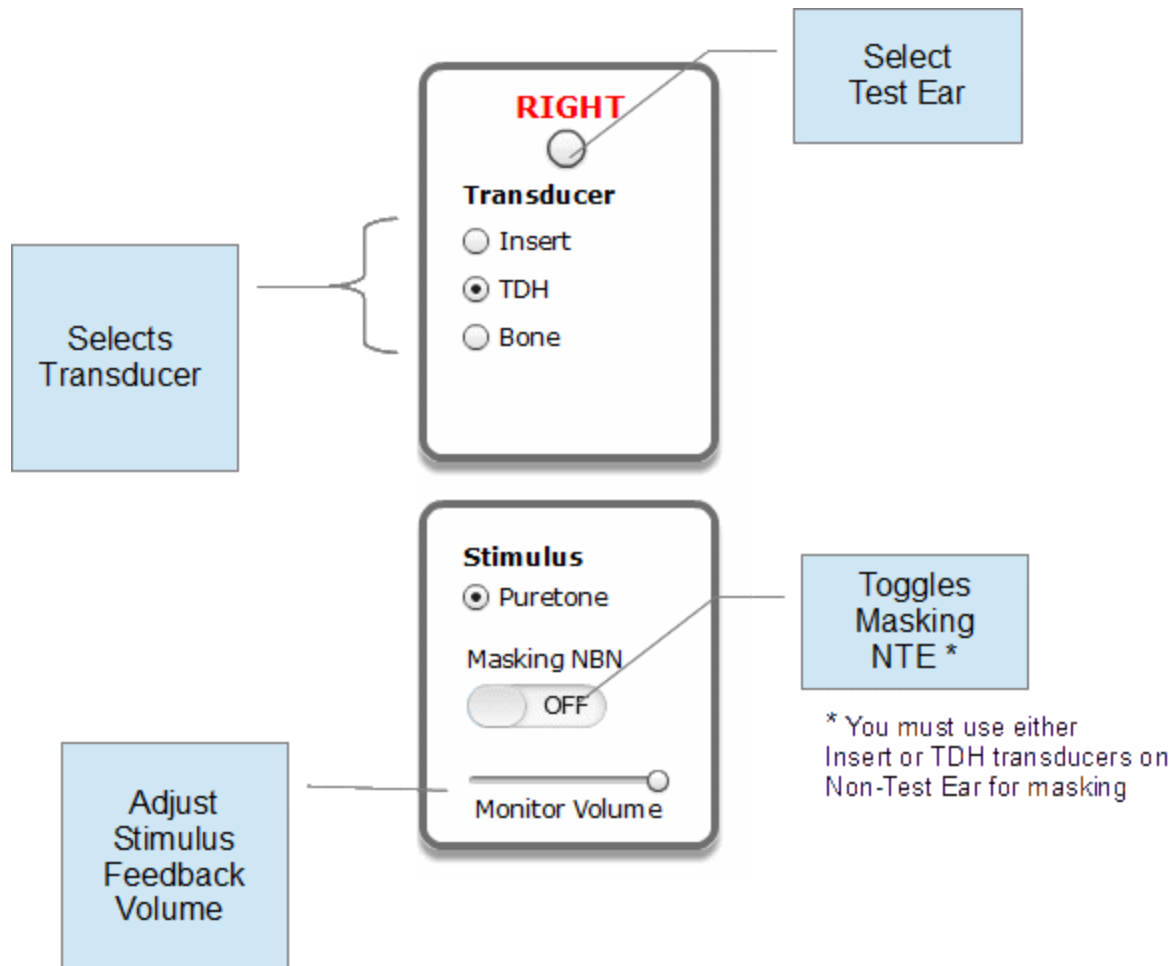
Patient Simulation

Variability

Just like real patients, patients in AudSim don't always respond to stimuli near threshold. The attention of real patients may wander or become distracted, so a real patient won't always hear/respond to sound presented at threshold. AudSim simulates this real-world behavior.

Depending upon how a given patient is programmed, the simulated patient might be completely reliable (always respond at and above threshold) or much harder to test.

Real threshold is defined as the lowest intensity level that can be heard 50% of the time. Just as a real patient may occasionally hear a sound below real threshold level, the audiometer simulator may do this as well.

As the simulated patients become more realistic or simulates a difficult to test patient, it becomes increasingly important to follow the *exact* Hughson-Westlake technique when finding threshold. If the patient is particularly challenging, you might find that even if you follow proper technique, you might be slightly off in finding your thresholds. Welcome to the real/simulated world!

The patient may be programmed to have a "real" threshold that is not on a 5 dB step, which will create a difference between your measured threshold and the real threshold.

Timing

Patients don't always hit the response button at the same time post-stimulus. Real patients take a little longer to respond to a near threshold signal, and less time as the signal gets to be above threshold. This is simulated in AudSim. Also, some patients are faster responders than others. For example, younger people are usually fairly quick to respond, while seniors may take a little longer to press the response button. You will find this is simulated.

AudSim provides many patient files with various hearing loss scenarios for testing. You can test the same patient different times. Unlike with a real human patient, the simulation thresholds will vary somewhat each time you test the patient.

Main Menu Functions

File ~ Open Patient

Displays a dialog box with list of simulated patient files. AudSim patient files all have the file suffix '.simd'. Select the file name to load.

The patient history/background information will be displayed automatically.

File ~ Regenerate Simulation

Forces a regeneration of the simulation thresholds for the current patient. The basic hearing loss scenario is preserved, but the individual thresholds are changed slightly.

Simulations are automatically regenerated when a patient file is opened.

File ~ Save Audiogram Image

Creates a PNG image file of the audiogram as currently displayed. Useful if you want to create example audiograms.

Mode ~ Threshold Assistant

Threshold Assistant (TA) mode steps you through the basic pure tone testing procedures using the Modified Hughson-Westlake Method, and basic use of the simulator.

You will be guided in obtaining basic audiometrics at 8 frequencies for both ears using air and bone conduction (32 thresholds). Patient #1 is the default, and is loaded automatically. If you wish, you can open a different patient *before* starting to obtain threshold.

Follow the instructions that appear in the TA window. Errors will be highlighted in red.

When TA is completed:

- The results table is displayed for your review.
- Results are automatically submitted to the instructor at the email address provided when you logged-in.
- The results table is saved to a PDF file in your 'Documents' folder.

The PDF file name format is "first last patientfilename_#.pdf (where # is incremented

1,2,3 as you make multiple submissions) For example "Tom Tester Patient1_2.pdf" for the second testing of Patient1 by user 'Tom Tester'.

Mode ~ Practice

Practice mode allows you experiment with all the patient files. While practicing you will see a 'Coaching Window" that provides feedback on the simulation's cochlear response to the simuli you present.

You can view the Result Table at any time to compare your threshold measurements with the actual threshold. (see View ~ Test Results)

You can also pop-up an overlay window of the actual audiogram (View ~ Simulation Audiogram Overlay).

There is no submissions available in Practice Mode.

Mode ~ Assignment

Assignment mode works with all the patient files. You will obtain thresholds without any assistance.

You may view the Result Table one time only. You can decide to submit the results or start-over from the beginning.

 Click the 'Submit Results' button at the top of the form.

- Results are automatically submitted to the instructor.
- The results table is saved to a PDF file in your 'Documents' folder.

 The filename is same as in Threshold Assistant with the addition of 'asg' suffix.

Mode ~ Exam Mode

Assignment mode works with all the patient files. You will obtain thresholds without any assistance.

You may view the Result Table only after you have completed testing. When you view the Result Table

- Results are automatically submitted to the instructor.
- The results table is saved to a PDF file in your 'Documents' folder.

View ~ Patient History

Displays the patient case history/background information window. Be sure to scroll down to see all the information.

View ~ Simulation Audiogram Overlay

Displays the simulated patient audiogram in a window that can be viewed side by side or overlayed with the measured audiogram.

NOTE: This is a static representation of the simulation design; thresholds shown do not reflect any Central Masking Effects that would occur due to Contra Level Masking. Dynamic thresholds are computed during testing and are only revealed n Practice Mode.

TIP : When aligned with the main audiogram, fade the overlay in and out to aid comparison.
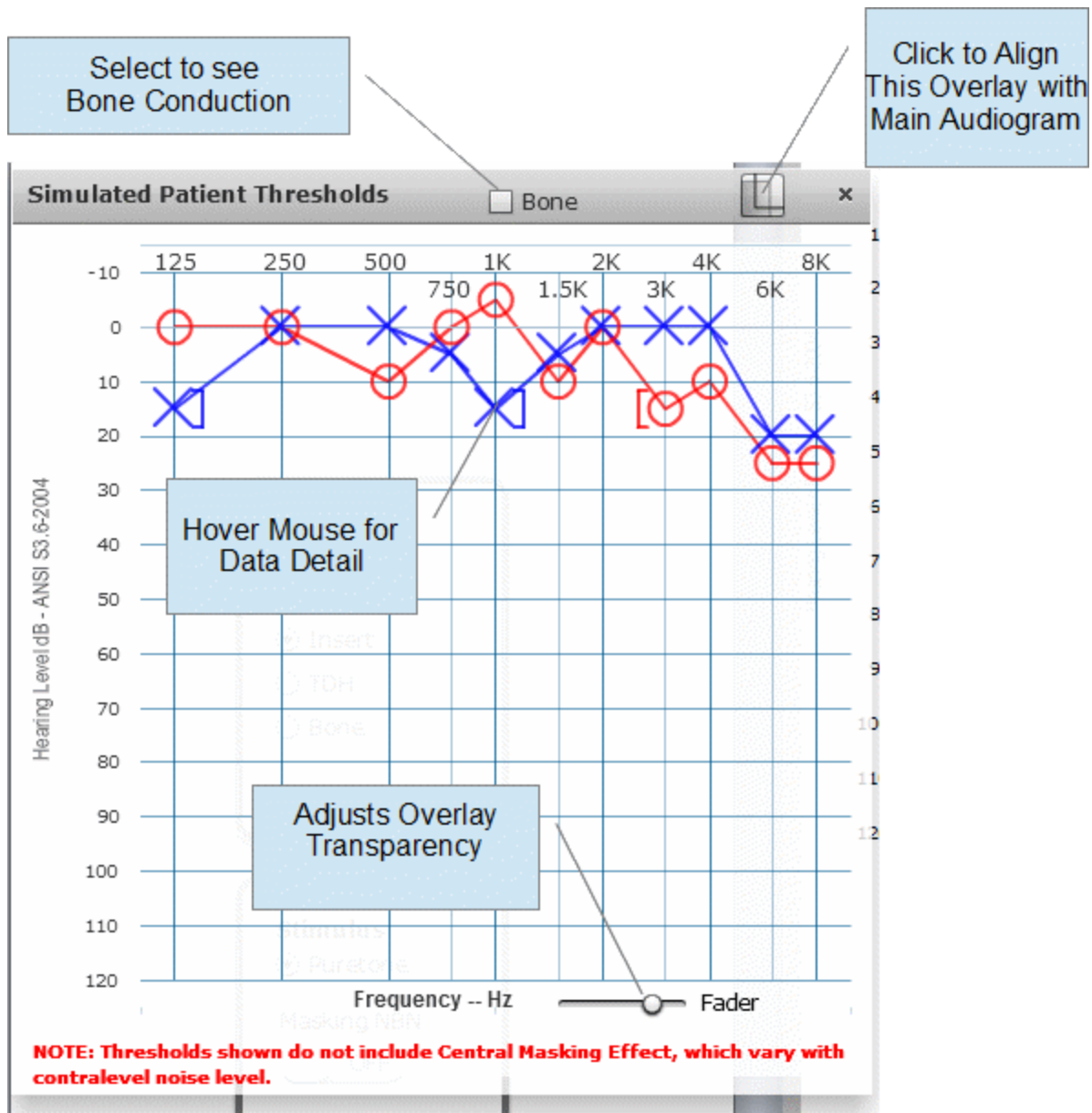
View ~ Coaching Messages

Displays coaching window in Practice mode.
Not available in Exam or Assignment modes.

The dynamic simulation parameters and cochlear response to the stimulus are revealed; including:

- Test Ear responses
- Non-Test Ear responses
- Cross-over levels
- Cross-back levels
- Central Masking Effect
- Over-Masking

- Under-Masking
- Inter-Aural Attenuation
- Masking Dilemma

View ~ Test Results

Displays table of results, in four tabs, comparing the student's assessment of thresholds vs. the actual thresholds of the simulation, with the difference calculation. The state of the audiometer controls at the time the student marked the thresholds are recorded.

AudSim Results ✕

| Air LEFT | Bone LEFT | Air RIGHT | Bone RIGHT |

Description	125	250	500	750	1000	1500	2000	3000	4000	6000	8000
Threshold	*	10	10	*	0	*	0	*	5	*	25
Unmasked Measured Threshold	*	5	10	*	10	*	5	*	5	*	10
Difference	*	-5	0	*	10	*	5	*	0	*	-15
Masking Issue	*	*	*	*	*	*	*	*	*	*	*
-											
Threshold w/ CME	*	*	*	*	*	*	*	*	*	*	*
Masked Measured Threshold	*	*	*	*	*	*	*	*	*	*	*
Masking Level	*	*	*	*	*	*	*	*	*	*	*
Difference	*	*	*	*	*	*	*	*	*	*	*
Masking Issue	*	*	*	*	*	*	*	*	*	*	*
-											
Transducer (LEFT)	*	Insert	Insert	*	Insert	*	Insert	*	Insert	*	Insert
Transducer (RIGHT)	*	TDH	TDH	*	TDH	*	TDH	*	TDH	*	TDH
Air IA (LEFT)	*	85	90	*	80	*	60	*	65	*	65
Air IA (RIGHT)	*	45	45	*	50	*	50	*	50	*	50
Bone IA	*	0	0	*	0	*	0	*	0	*	0

NOTES: UM = Under Masked, OM = Over Masked, TI = Tone Inaudible, MI = Mask Inaudible, MD = Masking Dilemma, AT = Above Threshold, OK = masking intensity appropriate for signal level

Unmeasured thresholds are maked with ✻.

For masking scenarios, thresholds include the 'Central masking Effect'. Any masking issues are noted :

UM = Under-masked condition. The masking noise is not loud enough to mask the signal that crossed over from the non-test ear to the test ear. The non-test ear is still responding ('hearing') the test signal.

OM = Over-masked. The masking noise crossed back to the

non-test ear cochlea and prevented the non-test ear from hearing the test signal.

TI = Tone was inaudible. The pure tone intensity level marked as threshold is below the threshold of the test ear.

MI = Masking was inaudible. The masking level that was presented to the non-test ear is below the non-test ear's air-conduction threshold.

MD = Masking dilemma. Masking noise that is loud enough to mask the crossed-over signal is so loud that it crosses back to the non-test ear by bone conduction and elevates the test ear bone (and air) conduction threshold. There is no way to find the true masked threshold.

AT = Above threshold. The test ear responded, but the signal level was above the threshold of the test ear.

OK = Masking intensity level prevented the non-test ear from responding to the tone (if any crossed over) and the masking noise wasn't so loud that it crossed-back to the non-test ear cochlea.

Settings ~ Language
Select the default language to use with AudSim.

Help ~ Deactivate AudSim
Deletes the registration on this computer. You will need a new registration key if you wish to re-register.

Does not uninstall AudSim. Use the operating system to uninstall AudSim.

Family Educational Rights and Privacy Act (FERPA) Policy Notice

Submission of Student results may be subject to the Family Educational Rights and Privacy Act of 1974, (FERPA). This is our Student Records submission policy:

1. Identifying information in the submission is provided by the Student.
2. Real names are not required
3. Results are submitted to a Recipient email address provided by the Student.
4. Result files are temporarily uploaded to the audsim.com web server(s) to transmit these results.
5. Result files are automatically deleted after 48 hours.
6. No humans other than the Student and Recipent are involved in this process.
7. The Student designates audsim.com as a legitimate educational interest as defined by FERPA

Known Issues
version 0.801

1. If you click on the present button, drag away, and then release the mouse: the tone will stick in the ON position.   Workaround: Click on the present button again.
2. You cannot simultaneously be viewing the results PDF file and make a new submission with that same patient.   Workaround: Make sure to close the PDF viewer before retesting the patient.