

Introduction

The Stimulus Conversion Utility included with your system can be used to convert a prerecorded WAV files to the system's native stimulus format, STM. The StimConv.EXE utility can be run from the Launch Pad Utility Menu, the IVRA Add/Remove Stimulus window or the Auditory Stimulus Generation window of SmartEP and SmartTrOAE.

Generating a WAV file

There are many programs that can be used to generate or record a WAV sound file. Some of the most popular ones are Cool Edit and Adobe Audition, which allow you to generate customized tones silence and noise combinations. You must refer to the respective user manual to learn how to use those programs and produce the required output. When generating your sound file, have the following considerations in mind:

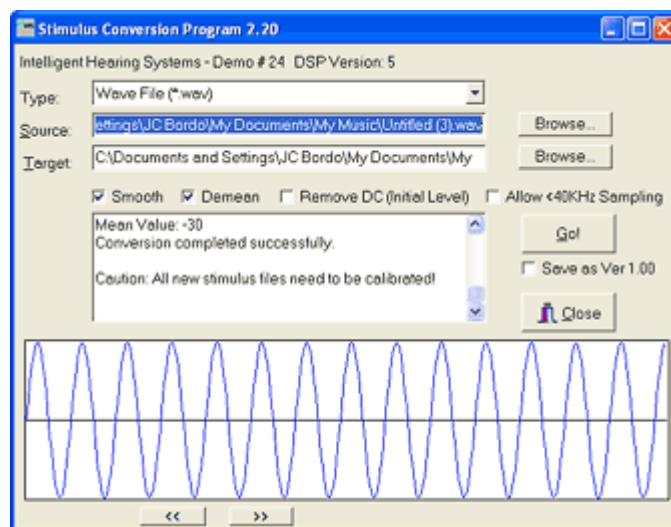
- When saving your sound files, you must define the sample rate to be 22050 or 44100 Hz, so that the stimulus conversion utility can read it.
- The file must be in Mono format, Stereo files will not be processed by the utility since these files will be output by a single speaker.
- The file must have a resolution of 8 or 16 bits, other resolutions are not allowed.
- Signals over 500ms will be clipped; unless less than 40k sampling is selected, then different rules apply (applicable to the IVRA program only, refer to the next section).
- The recommended save format is Windows PMC WAV. Other formats may be "lossy" and may not operate as expected.

Converting to STM

Once the Stimulus has been generated and saved to file, you may convert it following these steps:

1. Open the Stimulus conversion utility and click on the browse button to select the WAV file from your files.

2. Change the Target name and destination folder if necessary. It is recommended to choose a descriptive name. The default program directories for the stimulus files are the ones containing *Stim* in the folder name, located in your program installation directory.
3. Click on Smooth if you wish to have the output be a smoother wave. This option is especially helpful when the recording is noisy.
4. Click on Demean if the wave is clipping when you convert it to STM format. This option will reduce the amplitude of the stimulus to avoid clipping throughout the entire wave, preventing saturation of the stimulator.
5. Click on Remove DC to remove any offset that the wave may have (which may cause it to clip as well), bringing the mean value of the wave to zero.
6. Click on Allow < 40 KHz Sampling when using stimulus files for IVRA ONLY and a duration of more than 0.5 seconds is necessary. At 20 kHz the maximum duration is 1 second, at 10 KHz the maximum duration is 2 seconds. The program will determine automatically the best sampling rate to use. Longer files will be clipped to fit the 20000 data point maximum.
7. Click on GO to convert the file.



Using the Stimulus Conversion Utility

Once the procedure has been completed, the STM file can be found in the directory that was specified. It may be necessary to calibrate the file to achieve the desired output. NOTE: If the generated file does not load into the software, you may need to check the box that says "Save as Version 1.0" to ensure compatibility with older software versions.

Calibrating the Files

Before using the stimulus files it is recommended that you calibrate them. Calibration will ensure reliable stimulation. Calibration can be achieved by performing the following steps.

1. Start the Stimulus File Calibration Utility from the Launch pad. It can be accessed from the *System* menu.
2. From the Top right hand corner select the directory where the file is located; then click the File button to select the file to calibrate.
3. Choose the stimulator from the list.
4. Couple the stimulator to a SPL meter. If performing sound field calibration, place the SPL meter in the spot where the subject will be normally positioned.
5. With the output intensity at 70 dB SPL, press the output button to stimulate constantly.
6. Read the SPL meter reading and press the correction buttons up or down accordingly until the SPL meter reads 70 dB.
7. Click on the Ear button to change from right to left and perform step 6 for the other transducer if available.
8. Enter a maximum intensity value and a minimum intensity value. Keep in mind the physical limitations of the transducers when entering these values.
9. Enter a SPL to HL level if known.
10. Click on save calibration.

Using the STM files in SmartEP

Keep in mind that stimulus files for SmartEP cannot exceed 500 ms in duration and must have a sampling rate of 40 kHz. To load and use the stimulus file in SmartEP:

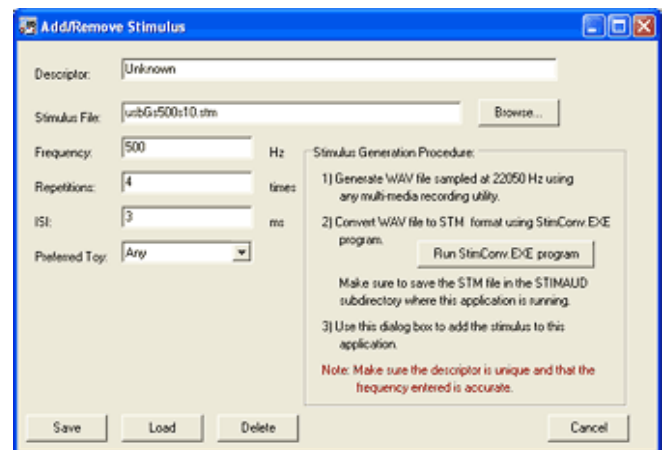
1. Click on the Stim button from the control panel to open the auditory stimulus window.

2. From the Stimulus Type options, select File and choose the file to be used from the open file dialog box.
3. Edit the other available options as when using SmartEP normally.

Using the STM files in IVRA

IVRA STM files may have duration of up to 2 seconds and may use all the different sampling rates that the stimulus generation utility allows. To load the stimulus into IVRA:

1. Select Stimulus > Add/Remove Stimulus from the IVRA main menu.
2. Enter a descriptive name for your stimulus. This name will be shown in the stimulus list.
3. Click on the browse button, locate the converted STM file in your computer and select it.
4. Enter the necessary parameters: frequency at which the stimulus is to be plotted in the audiogram (for speech sets, or other odd stimuli, select the frequency that is most convenient for plotting). Repetition is the number of times the stimulus will occur during a single presentation. ISI is the Inter Stimulus Interval, amount of time to delay between repetitions. Select a preferred toy if desired, otherwise choose *Any*.
5. Save the file.



Notice that the stimulus file you have just added will appear at the bottom of the list. You will need to create a stimulus set using the converted files to use them in one of the standard automated routines. Consult the IVRA manual to learn how to create a stimulus Set.