# Description

The augmented stethoscope can play an audio file stored within the on-board memory of the Teensy Audio Board.

# Methodology

The following steps will guide the user in the process of storing a short audio clip into the on-board memory of the Teensy Audio Board;

1. Download [Audacity](http://www.audacityteam.org/download/)®

Note: Audacity® is a free, open-source, cross-platform audio software for multi-track recording and editing. Audacity® can be used for audio file conversion, editing and analysis.

1. **if audio file is in .RAW format**, open Audacity® and import sound file;
   1. Import sound file
      1. *File > Import > Raw Data…*
   2. Enter the Raw Data Import parameter on the pop-up window

Note: Parameters such as **encoding**, **byte order**, **channels**, and **sample rate** of the file must be known

1. **if audio file needs editing,** select and trim the audio clip/region of interest by;
   1. Press the “Selection Tool” button
   2. Select audio clip/region of interest
   3. Press the “Trim Audio” button

Note: The “Trim Audio” function will eliminate everything by the selected audio clip/region of interest

* 1. Press the “Time Shift” button and slide the clip to time 0.0

Note: This step is not necessary, but may reduce concerns of storing null data

* 1. Export audio clip/region of interest as an audio file
     1. *File > Export Audio…*
     2. Save as a .WAV file with the same **encoding** used for importing the raw signal

1. [wav2sketch](https://www.pjrc.com/teensy/td_libs_AudioPlayMemory.html)

Note: wav2sketch is a script developed by the PJRC team (builders of the Teensy and Teensy Audio Board)

2) The utility to convert the .wav file to a .h/.cpp file pair is called 'wav2sketch.exe', and it is in the '...\Arduino\libraries\Audio-master\extras\wav2sketch' subdirectory.

<https://www.pjrc.com/teensy/td_libs_AudioPlayMemory.html>

3) Copy the .h/.cpp files to the same arduino program directory as the .ino; restart the IDE to load them.

4) For example:

     \*  I generated the pair, 'KorotkoffSound.h'/'KorotkoffSound.cpp' from a single beat captured

          with Audacity, using the 'wav2sketch.exe' utility program.

     \*  Put them in the '...\thebeat\Software\Arduino\Stethoscope' subdirectory (& restarted the IDE).

     \*  Added the following--

               #include "KorotkoffSound.h"

               void PlayHB()  
               {  
                   playMem\_heartSoundSamp.play( KorotkoffSound );  
               }

               ....and in the '// GUItool: begin automatically generated code':

                    AudioPlayMemory          playMem\_heartSoundSamp;                                //xy=154,398