There are **10 components of the ultrasound set-up**. They are:

1. MacBook Pro laptop
2. StarTech.com USB hub
3. AAA dongle
4. Focusrite Scarlett 2i2 soundcard
5. mic
6. Telemed Echoblaster 128 ultrasound machine
7. XP transformer (240V~1.1A : 12V=4.0A)
8. Telemed ultrasound transducer
9. Articulate Instruments synch box
10. AAA stabilisation helmet

Their set-up is detailed here in a schematic, and below in words.



**How to set up the ultrasound equipment**

1. Check all sockets with plugs in are switched on.
2. Ensure that the MacBook Pro is plugged in at the wall (if necessary).
3. Ensure that the Telemed Echoblaster 128 is plugged in at the wall via the XP transformer. Make sure that kettle lead connection is secure.
4. Ensure that the Telemed ultrasound transducer is plugged into the Telemed Echoblaster.
5. Ensure that the blue AAA dongle, the synch line USB, and the Telemed ultrasound USB output are all plugged into the StarTech USB hub.
6. Ensure that the StarTech USB hub is plugged into the USB hub on the left side of the MacBook pro.
7. Ensure that the USB output from the Focusrite Scarlett 2i2 soundcard is plugged into the USB hub on the right side of the MacBook pro.
8. Ensure that there is a line running from the “frame synch” output on the Telemed Echoblaster into the IN port on the Articulate Instruments synch box.
9. Ensure that the mic is switched on and plugged into “Gain 1” on the Focusrite Scarlett 2i2 soundcard.
10. Ensure that there is a line running from the OUT port of the Articulate Instruments synch box into the “Gain 2” port on the Focusrite Scarlett 2i2 soundcard.
11. Bear in mind; if you are using the PC to present acoustic experimental stimuli, you need to switch on the speakers. If you are using DMDX to present stimuli via the PC, you need to plug a (spare) mic into the PC even if you are not collecting data on this machine.
12. If you are using an external recorder to make a back-up recording, ensure that is powered up and switched on too.

**How to start-up the recording equipment**

(NB To right click on the Mac mousepad, tap the mouse pad with two adjacent fingers simultaneously)

1. Check that all connections detailed above are physically secure (i.e., check for loose connections)
2. Turn on the MacBook Pro by pressing the on switch in the top right corner of the keyboard.
3. Enter the bitlocker encryption key Ultra5ound. All passwords referred to in this document are produced in blue text in consolas font.
4. Use the keyboard mouse pad to select the user EDGuser via a single finger tap. Enter the password goultrasound.
5. Use the keyboard mouse to select the AAA icon (little green octopus on desktop). Select “open”.
6. Do not worry about the “Error: division by zero message that appears”.
7. Check that the light on the Telemed Echoblaster ultrasound machine has turned green.
8. From the top ribbon in AAA, select File->Create/Copy Project…

**How to set up a new project in AAA**

1. Complete step 8 above; a communication window will pop-up
2. In the Projects root field enter the desired file path to your new project.
3. In the Project name field enter the desired name for your project
4. In the Author field enter your name. Click the OK button.
5. You will get a message No clients in database. Creating new client. A new box will pop-up, requiring client details to be entered. Enter any name you like (e.g., trial) in the Family name field and click OK.
6. You will get a message Prompt list does not exist. Loading default prompt list. Click OK (if necessary).

**How to set up a prompt list in AAA**

1. Open your (new) project from the top ribbon in AAA by selecting File->Open Project/Client… and browsing to the correct project.
2. From the top ribbon in AAA, select Edit->Prompt List…
3. A communication window will pop up. From the top ribbon within the pop up communication window, select List -> New…
4. A further communication window will pop up. In the List Name field enter your desired list name and click OK.
5. You will be returned to the Prompt List Editor window. You can click in the central panel of this window to enter prompts. Each line represents a new prompt. Typically we paste in a long list of consecutive integers (i.e., 1,2,3,….100), so that each trial is associated with an individual number. However, specific prompts can be uploaded directly using the Text, Image, Audio, and Video tabs from the top ribbon of the Prompt List Editor window, in conjunction with the Load function accessed by these tabs. This approach should be used if you wish to present stimuli directly within AAA.
6. When you close the Prompt List Editor window you will get a message asking if you wish to save the changes made to the prompt list. Usually you would want to do this, and should click OK.

**How to set up a new client (i.e., participant) in AAA**

1. Open the appropriate project (see above).
2. File -> New Client…
3. Enter appropriate (anonymised) reference in Family Name field and click OK.
4. You may get Prompt list does not exist. Loading default prompt list. This is no cause for concern.
5. From the ribbon at the top of the main AAA window, select Options -> Prompt List -> Select.
6. The Prompt List Editor window will pop up.
7. Check the prompt list that you wish to use, and then close the window.

**A couple of other points**

1. At the very bottom of the screen in the main AAA window, there are radio buttons labelled 1 and 2, adjacent to the word Chan. You should ensure that the 1 button is selected, to indicate that audio input is recorded on channel 1.
2. Adjacent to the radio buttons is a check box alongside the word AutoAdvance. If you check this box then the software will automatically move on from one trial to the next throughout the experiment.

**How to record in AAA**

1. Run through the instructions in “How to start up the recording equipment”
2. Open the appropriate project and client
3. Select the appropriate prompt list (via Edit->Prompt List…)
4. Fit the ultrasound probe (using stabilisation helmet; see “using the helmet”)
5. Ensure that the mic is registering input at an appropriate level: You should be able to observe a sound image travelling across the screen in the long grey horizontal box that is directly underneath the white (or green) prompt box. When the participant speaks you should see amplitude variations. Note that on the Scarlett sound card gain 1, you should see a green ring light up. If the ring is red or amber, turn the gain down on the sound card.
6. Ensure that the transducer is registering input at an appropriate level: You should be able to observe the tongue image in the bottom central panel of the main AAA window. You should be able to see the tongue moving as the participant speaks.
7. Adjust the probe location if necessary (see “Using the helmet”)
8. The prompt (trial) list is in the bottom left panel of the main AAA window. To select a prompt, click in the furthest-left small square box of the appropriate row. To start recording, click Record (located in the ribbon below the prompt list box). To stop recording a specific trial, press Stop (same location).
9. DO NOT use any of the small square “trial” boxes other than the one on the furthest left. Using other boxes can cause recording issues (this is an unresolved and not yet understood issue).