

# ECS614U/ECS749P: The Recording Chain

This reference sheet details the procedure for setting up an audio interface and recording with Logic.

## Audio interface drivers

Some types of audio interface are known as ‘plug and play’ because you don’t need specific drivers to use them. You simply connect the interface and it will be detected by your operating system. If your interface isn’t plug and play, e.g. the Tascam US-112L that we use in class, then you need to install specific drivers (the most up to date versions can be found on the manufactures website). Once the drivers have been installed the interface will be detected by your operating system.

## Connecting and selecting your interface

Most audio interfaces connect either via USB or firewire, and should be automatically detected once connected. Be careful when using firewire interfaces, because connecting or disconnecting the firewire cable while the unit is on can cause damage. When using either type of interface with a laptop it may be necessary to have a mains power lead connected. If you are having problems when recording on location check this first (or if you know you won’t have access to mains power check before you leave home!).

If the correct drivers are installed your interface should be detected automatically by your operating system. It may also be automatically selected by Logic, but if not it can be selected as follows.

- Click on the *Preferences* button on the top left of the screen.
- Select *Audio*.
- Select your interface from the input and output device drop down menu.
- Press *Apply Changes* to confirm your selection.

## Setting the sample rate

The sample rate is the rate at which the analogue audio signal entering your interface is converted into a digital samples. To change the sample rate:

- Click on the *Settings* button on the top left of the screen.
- Select *Audio*.
- Select the sample rate you want from the drop down menu. Note that the minimum sample rate is CD quality - 44.1 kHz.

## Setting the bit depth

By default Logic records 16 bit audio (CD quality). There is the option to switch to 24 bit if it is required, e.g. if you are recording sounds with a very large dynamic range. To enable 24 bit recording:

- Click on the *Preferences* button on the top left of the screen.
- Select *Audio*.
- Tick the *24-Bit Recording* checkbox.

## Setting the buffer size

The size of the buffer is also set in the audio preferences window, using the *I/O Buffer Size* drop down menu. Larger buffer sizes place less demands on the processor but introduce latency. Conversely small buffer sizes are more computationally expensive but introduce less latency.

Latency is an issue if you are recording musicians who need to monitor themselves. It manifests itself as a delay on the input signal and if beyond a relatively low threshold it makes performance impossible. The simplest solution is the using direct monitoring of the input signal (sending the analogue input signal straight out of the monitoring system before it has passed through the computer), but in some instances this may not suit the performers, e.g. bad singers often want to hear their voice with reverb on to hide mistakes! In these situations you have to make the performer comfortable so try a combination of direct monitoring and small buffer sizes, possibly with other processor hungry effects turned off to save resources. Note that when you are mixing there is no monitoring of the input signals so you can use a larger buffer size without detrimental side-effects.

## Connecting the microphone

The Tascam interface is shown in Figure 1. Connect microphones using XLR cables to either the **MIC IN L** or **MIC IN R** sockets. Remember to switch the phantom power off before connecting or disconnecting the microphone, and that it must be on if using a condenser microphone. The left socket is input channel 1, and the right is input channel 2. If you are recording line level signals, e.g. plugging an electric guitar directly into the interface, you plug into the **LINE IN** sockets, and must switch the **MIC/GUITAR** switch to the right hand side.

## Selecting inputs in Logic

When creating a new audio track in Logic you are prompted to select the input track to which it is assigned. If you are using the Tascam then you can select from inputs 1 and 2. You can view and edit the assigned input per track in the Inspector (left hand strip on the screen) or Mixer windows of Logic. Figure 2 shows the Inspector window for track ‘Audio 6’ (the currently selected track), and the Mixer window for all tracks. You can see that the first two Audio Tracks are assigned to Input 1 and the others are assigned to Input



Figure 1: Tascam US-122L audio interface

2. To edit the assignment click and hold. It is worth noting that whilst you are able to assign more than one Audio Track to an Input channel, you cannot record onto similarly assigned Audio Tracks simultaneously.

### Arming tracks and setting gain

Prior to recording you must ‘arm’ the tracks in Logic. This is done by clicking on the small ‘R’ on the track which turn red once armed as shown in Figure 2. Logic is now ready to record.

Before you start recording you must set the input gain on the interface. This scales the analogue input signal prior to it’s digital conversion. The objective is to have as strong a signal as possible (to reduce the effect of quantisation noise) whilst ensuring that it doesn’t go above the maximum allowable limit (known as digital clipping). Once the tracks have been armed in Logic you will see the strength of the input signal on the respective tracks (see the orange bars in the armed tracks in the Mixer window in Figure 2). Adjust the two input gain dials to set the input level. It is better to be cautious and have a slightly lower input signal than risk digital clipping.

### Monitoring

The recording can be monitored using either headphones, or by plugging the line out phone connectors to a loudspeaker system. If you are in the space where the recording is taking place then clearly monitoring must be done using headphones! If using loudspeakers



Figure 2: Arming and selecting a track in logic

ers and the microphone is in the same room you must be careful not to cause acoustic feedback.

There are two main controls. The **PHONES/LINE OUT** control sets the output gain. The **MON MIX** control is a cross-fader that combines the direct analogue input signal with the signals coming from the computer. If set to hard left (Input), the interface will output the analogue input signal directly, and will attenuate any sounds coming from the computer, including previously recorded parts of your project. If set to hard right (Computer) the analogue input is fully attenuated and you only hear the signal coming from the computer. A combination of Input and Computer monitoring will be needed when recording musicians. When all recording is done and you are mixing it's best to switch this dial to Computer.

The **MONO** switch beneath the **MON MIX** dial controls the format that the direct input monitoring is played back. If off, the input is monitored as a stereo, i.e. L input is reproduced in the left ear (assuming headphone monitoring), and the R input is reproduced in the right. When on, the signals are monitored as mono, so both are playing in each ear.

## **Recording**

Set the position in the project and press record!