

MUS:4250:0001 COMPOSITION: ELECTRONIC MEDIA I

Fall 2015

Recording in Studio I

1. Signal Flow
 - a. This handout will cover basic recording techniques for Studio I.
 - b. All hardware will be presented in the order in which the incoming signal from a microphone will pass through.
 - c. N.B. All necessary hardware will turn on when the grey button is pressed on the Furman.

2. Selecting a microphone
 - a. Microphones come in two basic types:
 - i. Dynamic
 - A. These require no power to operate. They are activated by the incoming signal.
 - B. Most dynamic microphones are *moving coil* microphones. These work well for performances that involve some mic handling, like passing a microphone around on stage, or moving it from one location to another. When you touch these microphones, they do not pick up the handling noise as much as more sensitive microphones. They are more rugged and can survive rough handling, thus serve well in live performance situations. They can handle a high sound-pressure levels (SPLs), such as drums or loud guitar amplifiers.
 - C. Other dynamic microphones are *ribbon* microphones. These are much more sensitive than moving coil and they can be damaged by rough handling. They also cannot handle as many high SPLs as moving coil.
 - ii. Condenser
 - A. These require power for operation. Some have their own power supplies, but others take their power from the microphone preamp or mixer (discussed below).
 - B. These work best for subtle and nuanced performances. Handling these microphones will result in noise, so you do not want to touch them while you are recording. Often these microphones come with a shock mount, a small cage with wiring to help prevent the microphone from picking up any vibrations traveling from the floor through the mic stand. They can handle high SPLs, and are regarded as the most “true” representation of an original acoustical source.
 - b. Microphones come in a variety of polar patterns.
 - i. Cardioid: good for recording a sound directly in front of the microphone.
 - ii. Omni directional: good for recording sounds coming from any direction, nearby instruments, and sympathetic sounds.
 - iii. Bidirectional: good for recording a sound directly in front of the microphone plus reverberating sound of the space in which the sound is being recorded.
 - iv. There are other types of cardioid which extend the range toward the back of the microphone, but not as far as a bidirectional or omni directional.

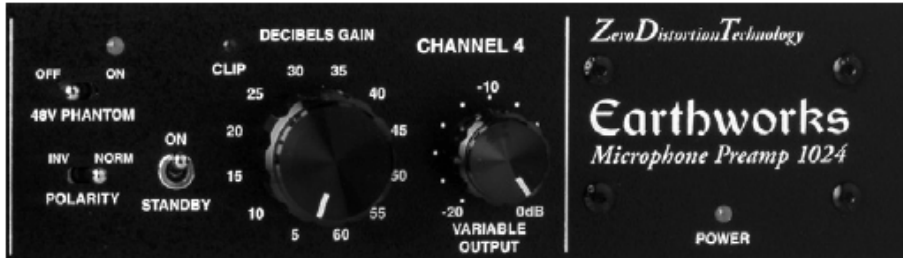
3. XLR patch bay
 - a. After selecting a microphone, use an XLR cable and plug the microphone into the XLR patch bay.
 - b. The XLR patch bay is located directly below the MOTU.
 - c. There are 8 XLR inputs. From left to right they correspond in Pro Tools with input channels 1-8.
 - d. It is possible to record up to 8 channels simultaneously. Most recording sessions require one microphone. In this case, using channel 1 is the easiest option.

4. Earthworks Microphone Preamp
 - a. All XLR inputs pass through to the Earthworks Microphone Preamps. We have two preamps stacked on top of one another in the rack.
 - b. Starting with the top preamp, from left to right they correspond in Pro Tools with input channels 1-8. In other words, channels 1-4 are passing through the top preamp, while channels 5-8 are passing through the bottom.

Front Panel (one channel)

48V phantom switch
(yellow LED)

Clip indicator
(red LED)



polarity reversal switch

output standby

stepped gain switch
5 to 60dB to XLR output

variable gain
0 to -20dB from the step (1/4" output)

power indicator
(green LED)

- c. The image above shows the preamp controls for channel 4.
 - i. Notice the 48V PHANTOM power is switched to “off”. This is the necessary setting for a Dynamic microphone. If you are using a Condenser microphone, and you need to provide power, flip this switch to on. When 48V power is being used, a yellow LED light will turn on.
 - ii. The POLARITY should be set to “norm”.
 - iii. Notice the STANDBY switch is set to “on”. This allows the signal to pass into and through the channel. Putting a channel on STANDBY will stop the signal flow. This can be useful in situations, such as avoiding loud clicks when unplugging a microphone.
 - iv. The DECIBELS GAIN knob is a stepped gain switch in 5 db increments. Adjust this knob to increase the gain of the signal.
 - v. The VARIABLE OUTPUT knob allows one to make smaller adjustments to the gain of the signal.

5. Zener Limiter

- a. Channels 1 and 2 pass through the Zener Limiter. Channels 3-8 bypass the limiter and go straight to the Metric Halo, discussed below.
- b. Channel 1 is passing through the left side of the limiter, while channel 2 is passing through the right.
- c. You can use either channel individually or simultaneously by pressing the square buttons in the center of the unit. When the buttons are blue, the limiter is engaged. When the buttons are white, the limiter is being bypassed and the signal passes through. This is for direct comparisons of dry verses compressed/limited sounds.



- d. A limiter is used to prevent signal peaks from exceeding a specified level in order to prevent overs.
- e. Generally, limiting during a recording or mastering phase of a project should only be used to remove occasional high-level peaks. Excessive use of the limiter reducing multiple peaks will become audible as the signal is continually “pumped” down to a specified level.
- f. The red dials control the input and output gain of the signal respectively.
- g. “Comp1” and “Limit” are meant to duplicate vintage equipment from the AbbeyRoad Studios. “Comp2” is an approximation between them.
- h. The “Side Chain” dial acts as a filter allowing more of the low end of the frequency spectrum to pass through.

- i. The blue dials on the far right control the attack threshold and the release, the nature of the “pump” in the audio signal.
- j. THD is used to bypass the limiter but still allowing the signal to pass through the circuit of the unit. This results in a potentially more distorted sound.
- k. The Input gain can be set to “High” or “Low” depending on the general intensity of the incoming signal.

6. Metric Halo



- a. All channels must pass through the Metric Halo before going into Pro Tools.
- b. The eight level meters on the left side measure the input signals for up to 8 channels, while the meters on the right side indicate the output levels, traveling to the mixer and ultimately the speakers.

7. Recording in Pro Tools

- a. Open Pro Tools and create a new session. Name your session whatever you’d like and save it to an appropriate location.
- b. Go to the Track menu, click on “New”, and select 1 mono audio track.



- c. The above image shows the newly created track header. Notice the I/O setting “In 1”, which means that this track is channel 1 of our signal chain. If you plugged your microphone into an XLR channel other than channel 1, you must change this setting by clicking on the grey “In 1” box and selecting the appropriate channel.

8. Testing and setting levels

- a. It is a good idea to test the strength of your incoming signal before recording it. Generally, when recording a sound, you want the strongest level you can get without any overs.
- b. Make sure you have left STANDBY in the “on” position on the Earthworks to allow the signal to flow.
- c. Click on the reddish circle below the name of the track. The circle should begin flashing red. This means that the track is “armed” and the level meter will indicate the strength of the incoming signal without recording the sound. The level meter is a vertical green bar that lights up when signal is passing through the channel.



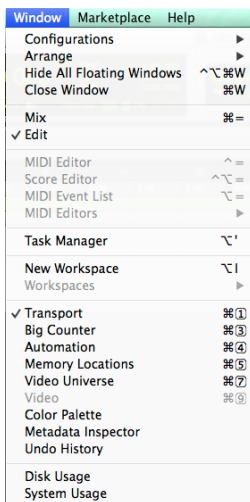
- d. Watch the level meter in Pro Tools while aiming the microphone at your sound source. The image above shows the level meter being activated by incoming audio signal. Ideally you want the level to be mostly green with some orange at the loudest moments of the recording. Adjust the DECIBELS GAIN knob and the VARIABLE OUTPUT knob on the Earthworks to obtain a signal strength that is ideal.



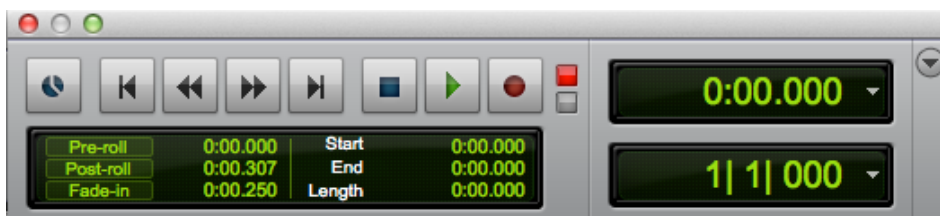
- e. The level meter will turn red at the top if an over has occurred, like in the image above. Generally you want to avoid any overs in your recording. It is better to have a quieter recording and then normalize it later, than to have a recording with an over in it.
- f. Remember, channels 1 and 2 pass through the limiter as well as the Earthworks, and the red knobs control input and output of the signal. Make adjustments to these as well when you are setting your levels. If you are not using the limiter, it is best to push the center buttons so that they turn white, thus bypassing the limiter.

9. Recording

- a. Once you have set good levels, you are ready to make a recording.
- b. Go to the Window menu and select the “Transport”. This is where you control when to start and stop recording.



- c. In the image above, there is a check mark next to “Transport”. That means a new window should appear in the upper right side of the screen that looks like the image below. This new window is the Transport.



- d. In the middle of the transport there are three buttons: stop (square), start (triangle), and record (circle). Click on the record button, and it will begin to flash red. This arms Pro Tools for recording.

- e. To begin recording, press the space bar, or click on the play button. The space bar can also be used to stop recording.
- f. The recording can be monitored in the edit window. As the wavelength is recorded, it is drawn into a red region.
- g. Once you stop recording, the region turns a different color.



- h. To record a new region, click on a new area of the edit window with the Selector tool, so that the flashing cursor is at a new location. Once you begin recording, the new region will be drawn starting at the flashing cursor.
 - i. Be sure to save your session often, so you don't lose any recordings.
10. Once you have finished your recording session, disarm your track in Pro Tools, and put the Earthworks channel into STANDBY mode before unplugging your microphone. If you are using a condenser microphone, turn off the 48V power before unplugging the microphone.