**Lesson 14 – RWC**

**WHAT IS REVERB**

* The way sound waves reflect off various surfaces before reaching listener`s ear
* Sound waves can bounce backwards and forwards many times before they die out
* When sound waves reflect off walls – 2 things happen
	+ They take longer to reach the listener
	+ They get quieter with every bounce
* Listener hears initial sound directly from source followed by reflected waves
* Reflections are a series of very fast echo
* Echoes in reverb are merges together so that listener interprets reverb as one effect
* Major sources of reverb are…
	+ Acoustic (natural)
	+ Chamber
	+ Plate
	+ Spring
	+ Reverberator
	+ Digital reverberator
* Digital reverb adds mix to natural sound

**COMMON CONTROLS ON DIGITAL REVERB UNITS**

* REVERB TIME
	+ Designates length of time that reverberation ill remain
* PRE-DELAY
	+ Determines length of time it will take after sources reach unit until it starts the reverb process
* SIZE
	+ Select cubic space digital circuitry will emulate
	+ Not on all units
* TYPE
	+ Usually many environments to choose from
	+ They might include…
		- Small
		- Medium
		- Large rooms or halls
		- Plates
		- Chambers
		- Reverse reverb
* REFLECTION
	+ Allows control over number of early reflections and volume of these reflections
	+ Not on all units
* EQUALIZATION
	+ Adjustments to frequency response to signal going into reverb unit
* INPUT
	+ Controls volume of input signal
* METER
	+ Shows signal level amounts
* OUTPUT
	+ Control volume of output signal
	+ Not on all units

**DELAY / ECHO**

* Delay – original audio signal is followed closely by a delayed repeat, like an echo
	+ Delay time can be as short as a few milliseconds or as long as several seconds
	+ Can include a single echo or multiple echoes
	+ Usually reducing quickly in relative level
* Examples of digital delay lines (DDL)
	+ Chorusing
	+ Automatic panning
	+ Phase
	+ Flanging
	+ Pitch Shift
* Programming material with delays of 30-40 ms or greater
	+ Used to cause listener to perceive discrete delays
* Delays of 15-35 ms are perceived as doubling or thickening
	+ Fools listener into thinking that more voices or instruments are being played
	+ Allows for panning the two signals – creating a wider imagery
* Delay forms the basis of other effects like…
	+ Reverb
	+ Chorus
	+ Phasing
	+ flanging

**FLANGING**

* type of phase-shifting
* mixes original signal with a varying slightly delayed version of signal
* original and delayed signals mixed equally
* MIXING ORGINAL SIGNALS WITH VARIABLE SHORT-TERM DELAY CREATES SERIES OF SHARP DIPS AND NOTCHES IN FREQUENCY RESPONSE
* Term comes from days of reel-to-reel tape recording
	+ Original signal was recorded on a second reel and delay was achieved by holding finger or thumb on edge to physically slow reel down
* Made popular during psychedelic music era in the 1960s and 1970s

**CHORUS**

* Originally designed to make a single persons voice sound like multiple voices
* It has become popular with instruments
* Type of delay
* Original signal is duplicated and played at varying lengths and pitches
* Creates effects of multiple sources
* Similar to flanger
* Combines 2 identical signals slightly de-tuned in relation to each other and one slightly delayed
* Common parameters include…
	+ NUMBER OF VOICES
		- Number of times the source is multiplied
	+ DELAY
		- Minimum delay length is 20-30 milliseconds
	+ SWEEP DEPTH / WIDTH
		- Maximum delay length

**PHASE SHIFTING (PHASING)**

* Audio effect that takes advantage of way sound waves interact with each other when they are out of phase
* By splitting audio into 2 signals and changing relative phasing between them – a variety of sweeping effects can be created
* First made popular by musicians in the 1960s
	+ And has remained important
* Similar to flanging except instead of using a simple delay
	+ It uses notch and boost filters to phase-shift frequencies over-time