**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