

What is noise?

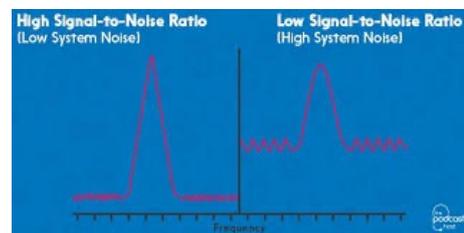
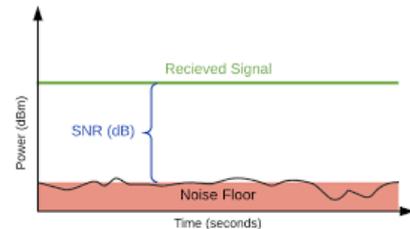
- An unwanted disturbance in an electrical signal
- All audio equipment will carry some kind of noise as well as the audio signal
- We can quantify the noise level of a system using its **signal-to-noise ratio (SNR)**

Cables, Microphones, Audio Interfaces

Noise is present in all electronic systems

Signal-To-Noise Ratio

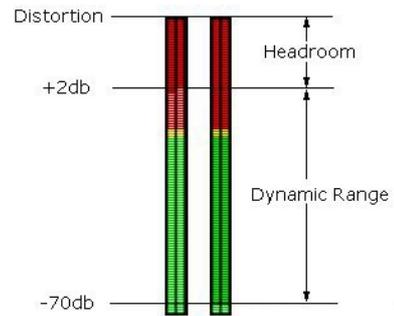
- The difference in volume between the **desired signal** and the **unwanted noise** (measured in dB)
- **High SNR** = **Low system noise** and clearer signal
- **Low SNR** = **High system noise** and less clear signal



A poor signal-to-noise ratio means that the desired signal is quiet and close in level to the undesired noise which forces you to boost the volume of the signal and as a result, also boost the volume of the noise

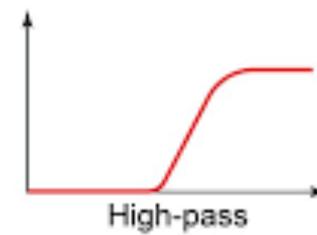
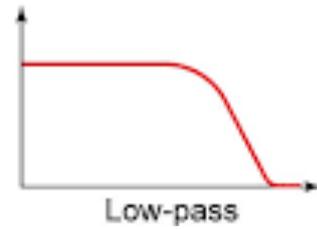
Headroom

- The difference in level between the **loudest peaks** in a signal and the point at which **digital clipping** starts to occur
- **Analogue soft clipping** is used creatively to add warmth to a recording, but digital clipping sounds harsh and unmusical



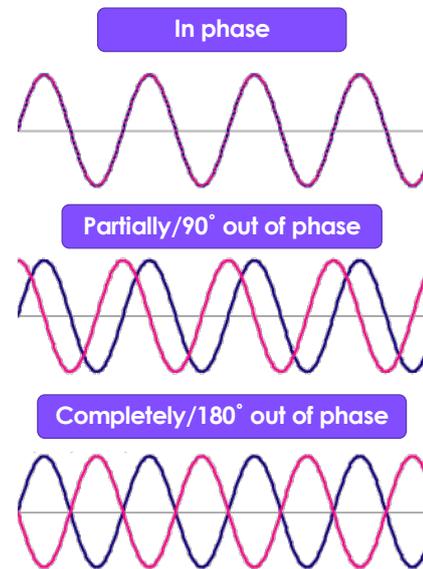
Hiss and Hum

- Different filters can be used to remove different frequencies of noise
 - **Low pass filters (LPF)** are used to remove **hiss**
 - **High pass filters (HPF)** are used to remove **hum**
- Parametric EQ with a narrow Q factor can be used to remove specific problematic frequencies



Phase

- If two waves are in phase, their peaks and troughs will line up
- If two waves are out of phase, their peaks and troughs won't line up
 - This causes **destructive interference**
- It is important to consider phase in any situation where you are using **more than one microphone** to record a **single sound source**



- Phase describes the 'sync' of two waves
- If a wave is completely out of phase, then the destructive interference will completely cancel out the sound of the wave
- Can be particularly problematic when recording on opposite sides of a sound source (e.g. top and bottom mics on a snare drum)

Polarity and Phase

- Switches with an 'Ø' symbol on them are commonly found on analogue mixing consoles
 - Usually called **phase switches** but they actually invert the **polarity** of a signal
- Phase refers to a **shift in time** relative to an initial wave
- Polarity refers to the **reversal** of two connections on a cable



- Polarity and phase refer to slightly different things

Avoiding Noise in Capture

- Mount microphones in shock mounts/cradles
- Get performers to wear headphones
- Keep the monitor mix in the headphones low
- Use acoustic screens and isolation booths



- Cradles help to isolate against vibrations travelling up the microphone stand and therefore avoid capturing low frequency rumble
- Closed back headphones specifically