



Digital Audio Corporation
a DRI company

Noise-to-Filter Selection Guide (QE/AS)

Noise Type	Filter
Low Level	Auto-Normalize
Hum	Hum Filter, Predictable Noise Reduction, Random Noise Reduction
Buzz	Hum Filter, Predictable Noise Reduction, Random Noise Reduction
Tones	Predictable Noise Reduction, Random Noise Reduction
Engine, Fan, Machinery Noise	Predictable Noise Reduction, Random Noise Reduction
Rumble	200 Hz HPF, Random Noise Reduction, reduce lower sliders of Graphic EQ
Hiss	Random Noise Reduction, reduce upper sliders of Graphic EQ
Crackling/Popping	Random Noise Reduction, reduce upper sliders of Graphic EQ
Wind Noise	Random Noise Reduction, Graphic EQ
Music	Predictable Noise Reduction (set to COMPLEX)
Reverberation/Echo	Predictable Noise Reduction
Muffled Audio	Graphic EQ
Near-Party/Far-Party	Auto Gain

Important Concepts To Remember for Voice Enhancement

How was the recording made?

The recording device will influence the bandwidth (e.g., a microcassette has a low bandwidth while a DAT has a high bandwidth) as well as the signal to noise ratio. If wow and flutter (caused by bad cassette playback motors or inconsistent motor speed) is involved, noise cancellation ability will be impaired. Use a top-quality machine for playback.

What type of environment was the recording made in?

If the recording was made in a big room then there may be echoes (i.e., use a Complex Deconvolver filter). If the recording was made outdoors, there will likely be wind noises, car noises, etc. Consider what type of noises and effects the environment may produce, and use the appropriate filter(s) to reduce.

Forensic Audio Speech Enhancement Guideline:

Only use enough filtering to extract intelligible speech. Remember, your job is to find out what was said, not to make the recording sound "better". Focus on intelligibility.

Voice Enhancement Filter Selection Guide

Filter Name	Description and Uses:
Auto-Normalize	Increases the volume of low-level input to a more audible level.
200 Hz HPF	200 Hertz High-Pass Filter. Reduces all frequencies below 200 Hz. Useful for minimizing low-frequency noises (like traffic rumble) that lie below the primary frequency range for speech intelligibility but may still interfere with comprehension.
Hum Filter	Reduces 50 or 60 Hz power line hum. This type of hum often generates harmonics (such as 120 Hz, 180 Hz, etc.) The Hum Filter (also known as a comb filter) acts like a multiple notch filter, reducing the energy at the base frequency and at the appropriate harmonics.
Random Noise Reduction	Attenuates constant noises that may span the whole frequency bandwidth. Helpful for reducing air conditioning and other engine noise, buzzing, and tones. The Random Noise Reduction analyzes the average background noise in the audio and removes it.
Predictable Noise Reduction	Cancels predictable (time-correlated) noises and effects. Predictable noises include tones, hum, buzz, engine/motor noise, and to some degree, music. Predictable effects include echoes, reverberations, and room acoustics. This filter is also known as a deconvolver.
Graphic Equalizer	Consists of 10 notch filters, each with a notch width of 1/10 of the bandwidth. This filter is most often used to reshape the voice spectrum to improve voice quality (used as an equalizer). This filter is the same type as on many home stereos (except this one has 10 “sliders” instead of just a few.)
Auto Gain	Automatically amplifies the output volume. This tool is useful in amplifying audio whose volume has been reduced by filtering, and for near party/far party scenarios.

Follow The Steps Below For Easy Audio Enhancement:

1. Pull audio into timeline (via Avid or Pro Tools application).
2. Find QE/AS in Tools or AudioSuite menu, and open application.
3. Set all the filters, so that indicator light is off.
4. Click Preview button to begin playback of track.
5. For all following steps, if no improvement is noted by filter, deactivate filter by clicking on highlighted button. You most likely will not need all filters active to achieve desired results.
6. If low level audio exists, go to INPUT and click on Auto-Normalize (button becomes highlighted).
7. If low frequency rumbling exists, go to INPUT and click on 200 Hz HPF.
8. To view SPECTRUM, click Input button. Optionally, click Output to get processed audio view. If needed, click Max Peak to find the maximum peak of the audio. Use Freeze to hold filters at their current settings.
9. Highlight the HUM FILTER. If in North America, set the HUM FILTER switch to 60 Hz. Elsewhere, set it to 50 Hz. Choose Auto-Tracking to let QE/AS find the frequency. Once attenuation occurs, turn auto-tracking feature off.
10. Click on PREDICTABLE in the NOISE REDUCTION section, and use the slider to reach 100% (allow filter time to work on the noise problems). If there is no audio improvement, try Complex setting.
11. Click the RANDOM NOISE REDUCTION so that the filter light is on. Adjust the ATTENUATION slider for best noise reduction and speech intelligibility. Choose Aggressive setting if necessary.
12. Click the GRAPHIC EQUALIZER so that button is highlighted. Adjust the 10 sliders for best sound quality. Use preset curves or customize as needed.
13. Click AUTO GAIN switch to on position. Select 0dB to 60dB as needed to increase volume and correct near/far party conversation.
14. Readjust the filters as needed.
15. Compare “before” and “after” by toggling the Bypass button.
16. Choose “Render” in Avid (or “Process” in Pro Tools) to apply filter settings and record processed audio.
17. Call DAC with additional questions at 919.572.6767 or visit us at www.dacaudio.com