Izotope RX Concise Manual

By
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Izotope RX
Stand Alone Application and Plug-in Functions

The Izotope RX stand alone application has the Spectrogram available for all Modules. The RTAS plug-in only provides the Module controls for the Declipper, Declicker, Hum Removal, and Denoiser due to the real time limitations of the RTAS format. The Spectral Repair module is only available as an Audio Suite plug-in because it must use the Spectrogram.
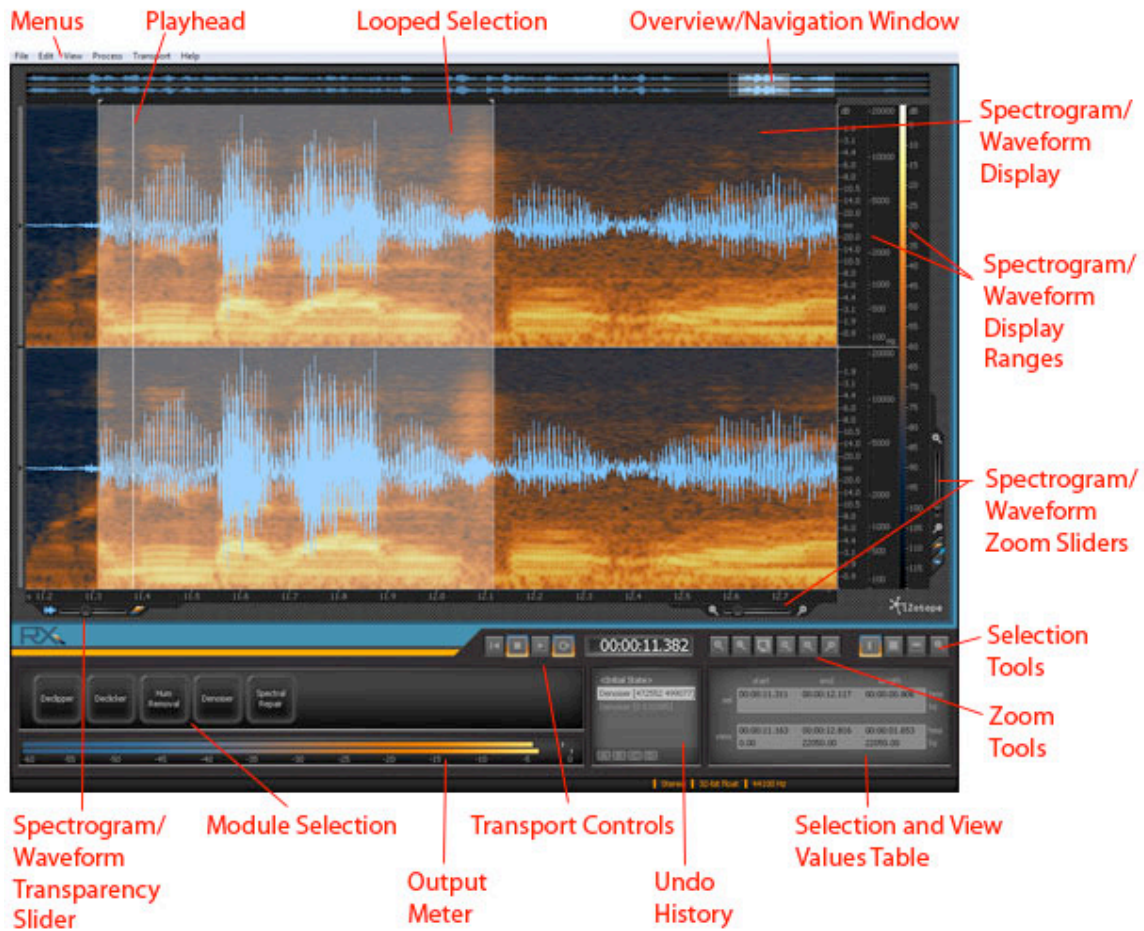
Transport Controls
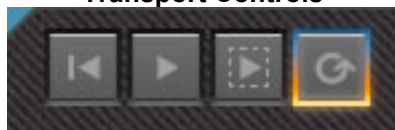
Return – Transport move to the beginning of the file
Play – Transport initiates play
Play Selected – When you make a selection of time, frequency range, or both you will only hear your selection.
Loop – initiates loop playback of selected material.

Selection Tools

Time Selector – Selection is based on start and end positions.
Time-Frequency Selector – Selection is based on start and end positions as well as a range of frequencies.
Frequency Selector – Selection is based on a range of frequencies.
Zoom Tool – When engaged with a selection tool you can select and zoom in all at once.

Zoom Tools

Zoom In – continuous clicking on this tool zooms in on the Spectrogram
Zoom Out – continuous clicking on this tool zooms out on the Spectrogram
Zoom All Out – zooms out to fill the Spectrogram with the entire audio file.
Zoom to Selection – clicking on this tool zooms in so that your time/frequency selection takes up the entire Spectrogram.
**Zoom to Left/Right Edge of Selection** – zooms to fill to the left or right side of Spectrogram.

Denoiser Module

Denoiser is designed to reduce stationary noise, including broadband noise, in audio signals. Stationary noise can include tape hiss, microphone hum, power mains buzz, camera motor noise, computer fan noise, and other types of noise that do not change in level or spectral shape throughout the recording.

Training Denoiser

Denoiser can learn the type of noise you want to remove from the recording. To train Denoiser, identify a section of the recording that contains only noise you want to remove, without any useful audio program signal. Often these places are at the beginning or end of a file, but may also be found during pauses or breaks in speech, playing, or singing. Select the longest section of noise you can find, then hit the **Train** button. This will "teach" Denoiser the noise profile of your audio. In some cases you may not have a section of just noise, or you may want RX to find a quiet section for you. If this is the case, open the options menu next to the Train button (+) and choose **Auto Train**.
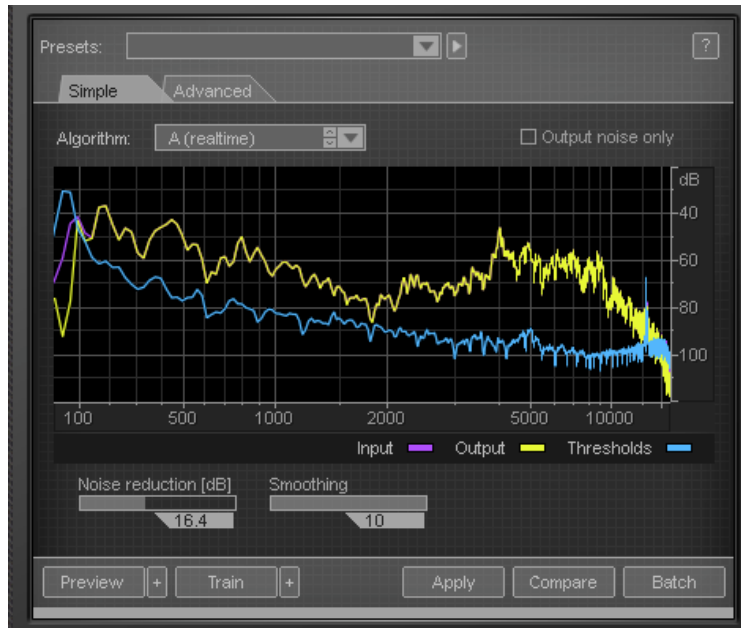
After the noise profile is captured, select the whole file that needs to be denoised. You can also make a time-frequency selection in the Spectrogram to denoise only certain frequency regions of the file. Then simply hit **Apply**.

The Controls - Simple

Preview – Allows you to hear the effect of the Denoiser without destructively applying it to the audio file

Train - This will "teach" Denoiser the noise profile of your audio (see above). Use the + control for the Auto Train function.

Apply - This function will write the processing to the audio file destructively.

Compare – If you want to work with adjusting the Noise reduction and Smoothing controls select **Compare** instead of Apply. This will open the dialog box below   Each time you change the controls and hit Compare you create a new setting that will temporarily be stored in this window. To listen and compare these settings simply select the radio button next to each setting and then hit Preview. You can also view the control settings, remove settings, rename the settings, and finally Apply the settings from this dialog box as well.
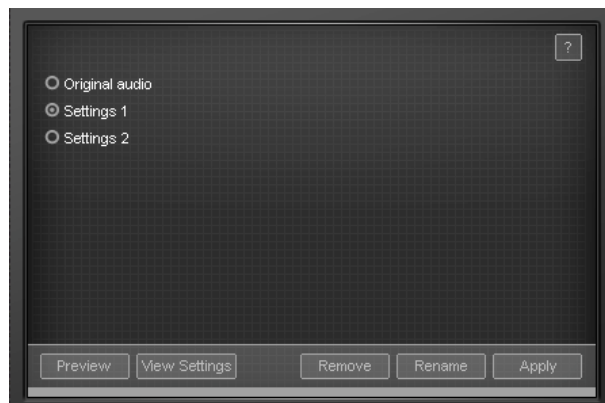
Algorithm – The fastest processing speed for noise reduction is achieved when using the **A (realtime)** algorithm. If you're not satisfied with these results after working with the Noise Reduction and Smoothing controls then try B and C. They are much slower but usually provide better results. It's a good idea to use the **Compare** Function below when using Algorithms B&C since this will speed up the comparison process. You can also use the Preview function while using Algorithm B & C.   For more CPU-intensive settings, like Denoiser's B and C algorithms and highest quality Declicker settings, RX can buffer playback to allow you to preview these slower than real time processes. To adjust how long the buffer is, the menu next to the Preview button (+) opens the Preview Buffer Size control. As audio plays back in preview mode, audio that is being processed will be tinted red, showing you how far ahead of playback processing is happening.

Noise Reduction – The amount the detected noise will be reduced in dB.

Smoothing – The side effect most commonly associated with the Denoiser module is a water-like or chirping sound that may occur occasionally. To reduce this problem increase the Smoothing number.

The Controls - Advanced

These controls will override the Simple control when you are in the Advanced pane. **Tonal noise** is hum and buzz. Broadband noise is more like hiss.

Threshold Tonal/Broadband – controls the separation between noise and the program signal. The higher the threshold is set the more noise is reduced. However, it can also reduce low level program signal. Lower threshold levels can bring out more program signal detail but it can also result in the noise being modulated by the program signal. A good starting place is zero.   You can unlink the Tonal and Broadband Thresholds if you want to deal with each part separately.

Reduction Tonal/Broadband – controls the amount of gain reduction for tonal and broadband noise. You can unlink the Tonal and Broadband Reduction controls if you want to deal with each part separately.

Musical Noise Suppression – controls the water-like or chirping sound that may occur when using the Denoiser module. Higher values help to suppress these side effects but to high a level may create a muffled sound.

Residual Whitening – Helps to shape the spectrum of the noise being reduced. When the control is at zero the noise reduction is uniform at all frequencies. This means that the gain reduction has the same shape as the original noise. As you increase this value you start to flatten out the gain reduction to make it more neutral or white.
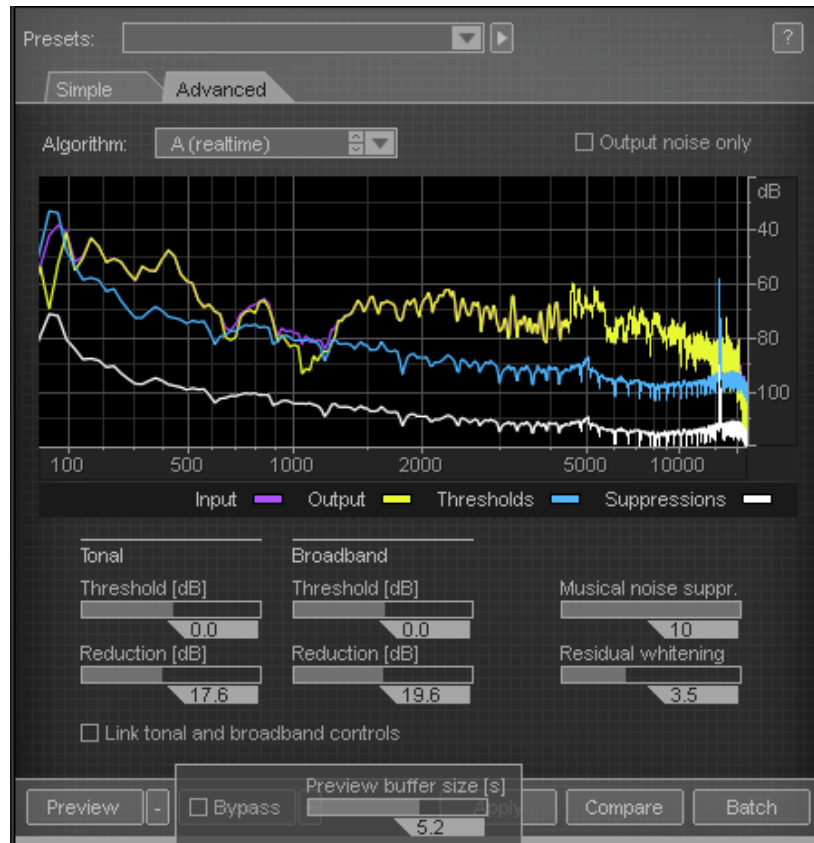
Spectral Repair Module

Spectral Repair is designed to remove unwanted sounds from a recording that are not steady state such as squeaks, sirens, coughs, dropped objects, etc. In addition, it can replace sounds through the interpolation of surrounding data or it can replace sound with the most similar portion of the surrounding audio. For most Spectral Repair work drag the waveform/spectrogram opacity slider to the right so you're only viewing the spectrogram.

The Modes

Attenuate – used to drop the level of unwanted sounds.

Replace – used to replace badly damaged areas using interpolations of surrounding data. Can also be used to fill in short gaps in recordings.

Pattern – used replace excessive background noise or unwanted audio with repeating patterns.

Partials + Noise – advanced version of replace mode. It restores harmonics in a more accurate fashion.

The Controls

Number of bands – selects the number of frequency bands used to interpolate a sound. Higher number of bands give better frequency resolution.

Direction – in Attenuate mode this determines if the material to the left/right (horizontal) above and below (vertical) or both horizontal and vertical (2D) is used in the repair.

Strength – used to determine the amount of attenuation in Attenuate mode.

Surrounding region length – defines how much of the surrounding region will be used in the repair. Values are in seconds.

Before/after weighting – determines the weight of the surrounding area to be used in the repair. Moving the slider to the left gives more weight to events left of the repair while moving the slider to the right has the opposite effect. When the slider is hard left or right only the left or right side of the repair is considered.

Harmonic sensitivity – used in Partials + Noise mode adjusts the amount are harmonics detected. Lower values will detect fewer harmonics while higher values detect more harmonics. High values may introduce unnatural side effects.

Declipper Module

Repairs digital and analog clipping artifacts from recordings. Analog clipping is usually more difficult to deal with.

1. Select a section of the recording where clipping is prominent.

2. Select the **Single-band mode**. For most declipping this mode works the best.

3. Select the **Quality** level. This sets the overall quality of the repair.

4. Click on the **Compute** button under the histogram meter. The histogram will now display the detected audio in the file (in light blue) from -8 dBFS up to 0 dBFS. Light blue lines that extend fully across the histogram generally indicate a point of clipping.

    NOTE: If analog clipping is occurring below -8 dBFS you will need to destructively increase the gain of your file by using the **Gain** tool in the bottom of the **Process** menu. However, the clipping may be in a place where you won't be able to bring it up to a level above -8 before you clip the file (over 0 dBFS). In these cases use the Declicker tool.

5. Click and hold on the Red clipping threshold in the histogram and drag it just below the first light blue line that extends fully across the histogram.
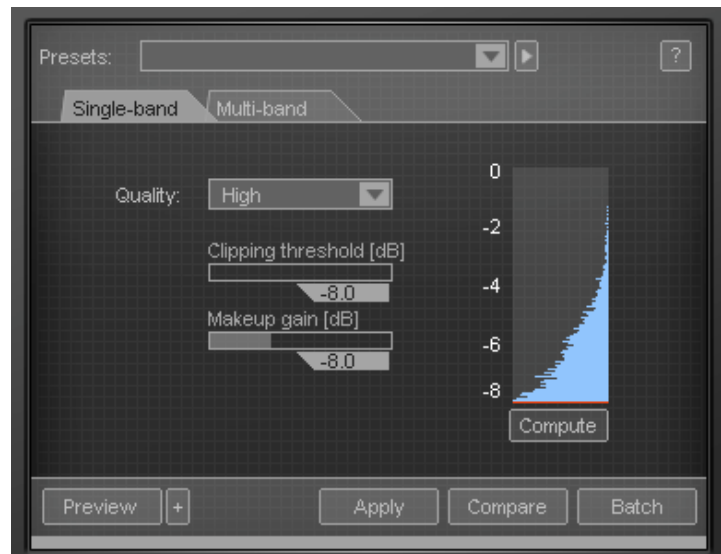
6. Use the Preview or Compare function to listen to the repair. Many times the repair (if spread over a large section) will create an overall gain drop in the audio file. Use the **Makeup gain** control to counterbalance this gain drop.

7. If you are using the **Multi-band** mode the **Number of Bands** adjust the number of frequency bands employed in the declipping repair.

Declicker Module

Repairs short impulse noises like pops and clicks from old records, crackle from old recordings and analog clipping if it's intermittent.

The Modes

Automatic – used to repair large files with short impulse noise.

Maual – used to repair specific instances of short impulse noise. Only available on RX Advanced.

Using the Declicker

1.   Select a section of the recording where impulse noises are prominent.

2.   Select the **Automatic mode**.

3.   Select the **Quality** level. This sets the overall quality of the repair.

4.   There are many presets that you may want to choose as a starting point for your repair.

5.   As you listen to a loop of a section in **Preview** mode manipulate the **Sensitivity** and the **Maximum click width** controls to fine tune your setting. Maximum click width determines the maximum expected length of a click. The Sensitivity control determines the number of clicks that are detected and repaired. Lower values repair fewer clicks while higher values have the opposite effect.

6.   Many times this tool is best used in multiple passes. Each pass deals with a specific maximum length and sensitivity.

7.   The **Output click only function** works in Preview mode and allows you to listen only to the clicks that are detected and will be repaired.
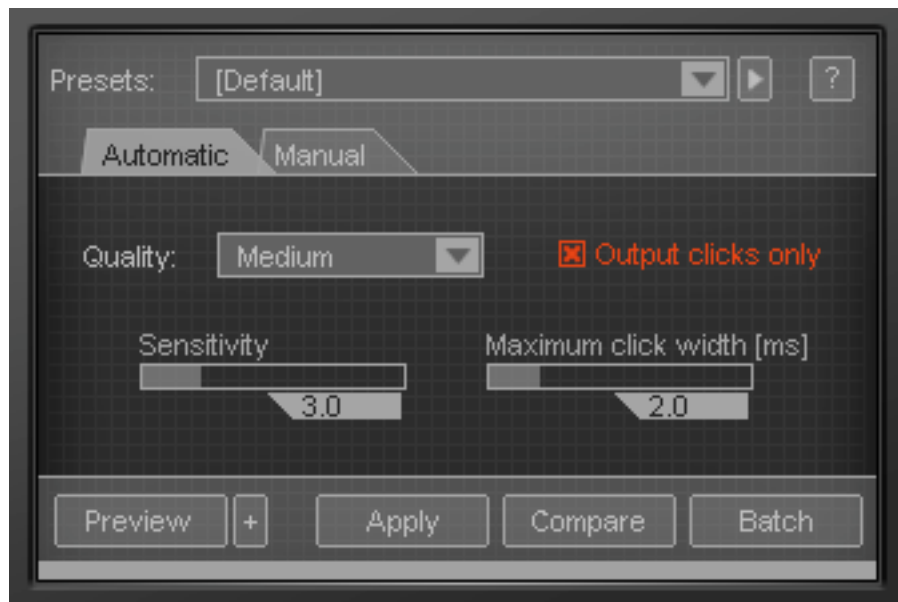
8.   Manual mode adds a control for **Interpolation order** which works in conjunction with the automatic mode. This control determines the number of surrounding samples that are used to created the repaired samples. The complete Manual mode is found on the Izotope RX Advanced.

Hum Removal Module

The Hum Removal Module is designed to remove low frequency hum and buzz as caused by faulty electrical grounds.   This tool is comprised of a series of notch filters that work on the AC fundamental frequency and up to seven related partials. If the hum has more than seven partials or is harmonically complex use the Denoiser Module.

Getting Started

Hum removal starts with identifying the appropriate "fundamental" frequency. Generally recordings done in North America will have 60 cycle hum while recordings from Europe will have 50 cycle hum.

1.   For most Hum Removal work drag the waveform/spectrogram opacity slider to the right so you're only viewing the spectrogram

2.   To identify the appropriate frequency, find a place in the recording where the hum is audible and by itself.

3.   If you want to visually see the hum frequency use the **Time-Frequency selection tool** along with **the Zoom tool** and select an appropriate section at the bottom of the Spectrogram. Click on the selection (zoom tool icon) to zoom further in. You may need to adjust the **Frequency scale zoom** control to see your selection clearly. Now select the **Play frequency selection** control to play the frequency and time range you've selected.

4.   Once you've made your selection in a place where the hum is alone select the **60 or 50 Hz Wide Reduce** preset. This preset will set a single notch filter for just the fundamental frequency (one harmonic) with a fairly wide Q.

5.   Depress the **Preview** button and listen. You can adjust the **Filter Q** and **Harmonic gain** as you listen in Preview by using the dialog boxes and sliders or by the controls on the graphic display.

6.   If neither the 50 or 60 Hz presets removes the fundamental frequency you can choose **Free** under **Frequency type** and move the base/fundamental frequency around with the dialog boxes and sliders or with the controls on the graphic display.

Additional Controls

Num harmonics – you can place notch filters on the fundamental frequency and seven of it's overtones. This control selects the number of harmonics/partials you are using.

Linking type – You can link all of the harmonics so that their filter Qs and gain are adjusted together. You can also turn linking off with this control and have independent control of each harmonic's parameters (**Harmonic gain**) or link the odd numbered harmonics together and the even numbered harmonics together.

Filter DC offset – removes any direct current (usually created at the A/D convertor) when present.

Harmonic slope/Harmonic odd/even slope – global control for the amount of gain reduction at all the overtones, or the odd and even overtones.

High and Low Pass filters – controls for engaging a high and low pass filter as well as controls for knee frequency and the amount of overshoot and slight Q adjustments.

Output hum only – when this is checked Preview will only play the frequencies it's removing.