Waves X-Click
Software Audio Processor
Users Guide



In this manual –

1. Introduction……2
2. Using X-Click……3
3. Controls and Displays……..5
4. Important information and useful tips…….7

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1. Introduction

Thank you for choosing Waves! In order to get the most out of your new Waves plugin, please take a moment to read this user guide.

To install software and manage your licenses, you need to have a free Waves account. Sign up at www.waves.com. With a Waves account you can keep track of your products, renew your Waves Update Plan, participate in bonus programs, and keep up to date with important information.

We suggest that you become familiar with the Waves Support pages: www.waves.com/support. There are technical articles about installation, troubleshooting, specifications, and more. Plus, you'll find company contact information and Waves Support news.

Waves X-Click reduces strong, impulsive, transient noise while preserving excellent audio quality. **X-Click** is part of the Waves **Restoration** bundle, which restores vinyl records and damaged recordings. We recommend using **X-Click** first to remove large clicks and **X-Crackle** to take care of more delicate scratches. The plug-ins can also be chained together (**X-Click->X-Crackle**). X-Click and the other Restoration plug-ins have a friendly interface that is easy to learn and use. **X-Click** uses just two parameters to configure the click-removal process.

This user guide describes:

- the problems **X-Click** solves;
- how to use the software;
- the software user interface.

Click the **?** on the toolbar for online help. Thanks for using **X-Click** and enjoy!

WHAT PROBLEMS DOES X-CLICK FIX?

Clicks are caused by two types of events: digital errors that create a large, rapid transition in the waveform; physical obstacles and/or damage in the record's needle groove. Physical damage often corrupts more samples than digital errors.

X-Click effectively removes clicks from old vinyl and shellac records, and recordings tainted by switching noise, digital cross-talk, or thyristor buzz. Unlike other click-removal systems, **X-Click** leaves virtually no audible artifacts if its parameters are set correctly.

X-Click employs the most recent psychoacoustic research and multilevel decision algorithms to remove clicks while preserving the sonic clarity of the source. It performs better than comparable DAW tools and as well or better than more expensive, dedicated-hardware solutions.

2. Using X-Click

GENERAL USE

X-Click has two parameters to select clicks for removal:

- ***Threshold:*** Sets the amplitude of the targeted clicks. Higher values remove more clicks; a 0 setting leaves all clicks. For a typically polluted vinyl recording transferred to a digital medium, we recommend starting with a Threshold in the range 30–50.
- ***Shape:*** Corresponds to the width, or time window, of the clicks to be removed. Lower values remove smaller clicks usually from digital origin. Scratched vinyl record clicks are usually wider and call for a higher shape value. We recommend 70 as a starting value for typical vinyl restoration.

Artifacts increase with higher values of both parameters so a compromise may be necessary between click-removal performance and the sound quality of the processed signal. The number of clicks removed for a given Threshold value is displayed in the **Click Scope** (see Displays section) by the red lines; this visually represents the click's detection level. We recommend experimenting with different settings while monitoring with headphones to hear the details of the processing.

For additional help, use the ***Difference*** feature in **X-Click's** monitor section (see Controls section). You can switch between monitoring the processed audio path (Audio) and the signal removed by **X-Click** (Difference). This differential signal should contain only clicks, not desirable parts of the audio signal. If it does contain audio, try lowering the Threshold and/or Shape parameters to minimize the removal of audio transients.

X-Click's factory presets are optimized for the most common click-removal situations (i.e., digital clicks, 78 RPM shellac, vinyl). If a preset does not perform adequately, find the best preset and begin experimenting with its parameters until a good balance is achieved.

AUTOMATIC CLICK REMOVAL

X-Click can usually be set once for an entire recording. It can be applied as a track insert by itself or as part of a process chain with **X-Crackle** inserted after it. Similar to processing an entire file in an audio editor, this is the fastest and easiest method.

When the material has intentionally transient sounds (i.e., drums and percussion instruments), this automatic process may inadvertently remove some of them. If an acceptable balance between click removal and preservation of desirable

audio transients cannot be found for the entire recording, the Manual Click Removal technique described next may offer a better solution.

MANUAL CLICK REMOVAL

Although **X-Click** is designed primarily as a real-time, automatic process, some recordings may require several settings for different sections. This *Manual Click Removal* technique (MCR) is possible in all multitrack audio editors with some variation in their specific implementation. MCR assumes that you can perform the following steps with your multitrack recorder:

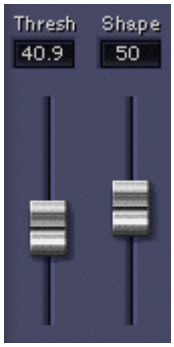
1. Insert **X-Click** on the desired track and set the parameters for fairly aggressive click detection (Threshold = 50, Shape = 70).
2. Set the **X-Click** Monitor section to *Difference* and record the entire track to a neighboring track (or to a file that you will record there). This track serves as the Click Log.
3. Locate clicks in the Click Scope and listen to the audio and Click Log to decide if that section requires X-Click processing. If it does, find the optimal settings for the clicks and transients present in that section. When finished setting the parameters, process that section and move on to the next click (or section with similar clicks) in the Click Log.

MCR works well for precise, surgical click removal of clicks in critical material. It does not necessarily require destructive processing and you can easily undo and redo as you work.

NOTE: The Click Log is useful only if it is accurately aligned with the original track. **X-Click's** natural latency is 2624 samples. Some host applications compensate for the delay automatically but some do not, which may result in a 2624-sample offset between the original and click log tracks. For hosts that do not compensate automatically, you must move the Click Log track back by 2624 samples to align it.

3. X-Click Controls and Displays

CONTROLS



THRESHOLD:
Sets the amplitude of the clicks to be removed. Higher values remove larger clicks.

Settings: 0–100; Default = 0

SHAPE:
Specifies the duration, or width, of clicks to be removed. Lower values remove shorter clicks. Lower values are better for digital clicks, while higher settings are better for vinyl scratches.

Settings: 0–100; Default = 50

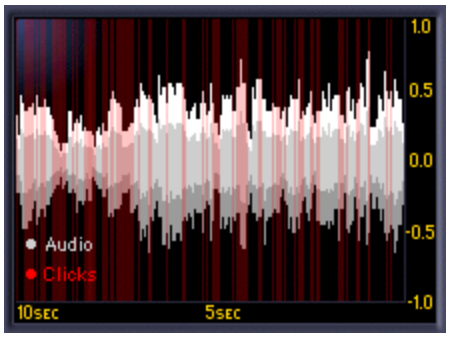
OUTPUT MONITOR



The Output Monitor switches between **Audio** (the audio processed by X-Click) and **Difference** (the clicks currently removed with selected settings). **Audio** is the default setting and is used to evaluate the final settings. Use the **Difference** setting to evaluate whether the current parameters removed audio transients.

DISPLAYS

X-CLICK SCOPE



The X-Click Scope provides visual feedback for the last 10 seconds of processing history. Red denotes detected clicks; the intensity of the color corresponds to the degree of damage in the sample. The audio samples unaffected by X-Click are colored gray. Higher threshold values yield more red clicks displayed in the scope.

CLICK ATTENUATION METER



Displays the amount of click removal. This display correlates with the level when monitoring the Difference.

OUTPUT METERS

The output meters display the output corresponding to the selected Output Monitor mode. They are logarithmically scaled, dBFS peak meters. The numeric fields under the meters show a peak hold value until being reset by clicking anywhere in the meters area.

WaveSystem Toolbar

Use the bar at the top of the plugin to save and load presets, compare settings, undo and redo steps, and resize the plugin. To learn more, click the icon at the upper-right corner of the window and open the WaveSystem Guide.

4. Important Information and Useful Tips

LATENCY

To properly perform its task, **X-Click** must look ahead into the future. It manages this by delaying the source signal 2624 samples (about 60 ms in CD-quality audio). This is particularly significant when the target track must play in sync with other tracks. To maintain sync with other tracks, they must be delayed by the same 2624 samples. Since there is no way to solve this in live recording situations, **X-Click** is not recommended for real-time, live applications. Fortunately, it is not often required for live sound!

To use **X-Click** in a sound file editor, it is important that the editor compensate for the plug-in's delay. If this feature is not available in your host, cn add at least 2624 samples of silence at the end of the file and trim the start after the process is done.

SIDE EFFECTS

X-Click is virtually free of audible artifacts. If the material has high-amplitude drumbeats and other transient sound effects, X-Click may inadvertently classify them as Clicks. Manual Click Removal may be the best solution if the recording does not contain these sounds throughout.

To minimize side artifacts, use the lowest threshold settings possible to remove clicks.