



# Abbey Road Chambers Reverb/Delay

## User Guide



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## 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](http://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](http://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.

### About Abbey Road Chambers

Abbey Road Chambers is a delay and reverb plugin that delivers very rich, complex, and spacious reverb effects. It's been meticulously crafted to replicate the STEED tape delay and echo chamber setup (Send Tape Echo Echo Delay) that was developed at Abbey Road Studios.

This unique reverb/delay combination consists of tape recorders, a tape delay, a feedback loop, and an echo chamber with changeable and moveable speakers and mics. It produced a great-sounding reverb with the option to extend the reverb tail using repeated feedback loops. It yielded a unique sound that's heard in many classic recordings from the '60s and '70s and beyond. Once you know what to listen for, it's easy to spot the Chambers effect. Working in close collaboration with Abbey Road, Waves developed a plugin that accurately recreates this process. We modeled some of the original Abbey Road hardware that was used to create the setup, accurately captured echo chamber acoustics using impulse responses, and exactly recreated the signal path. The result is an easy-to-use plugin that delivers the sonic characteristics of this Abbey Road classic.



## A Very Brief History of the Tape Echo Process

Musicians began using loops of tape to create echo effects in the 1950s. Tape echo pioneers took advantage of the separation between a tape machine's record and repro heads to create a slapback sound. The tape speed and the distance between the heads determined the delay time. Ambitious musicians and engineers were stringing tape between two or more tape machines to create longer and more ornate loop sounds. Unavoidable inconsistencies added to the perceived magic of the procedure. With its unique tape sound and wide possibilities, tape echo was enthusiastically adopted in jazz, rock and roll, and experimental music. Engineers and producers developed ever more complex techniques to exploit this process.

## Enter the STEED Process

One of the most intricate and interesting implementations of tape delay was developed by Abbey Road Studios. The process results in a reverb effect that's longer beyond the physical limitations of the echo chamber. The effect starts with a tape delay and feedback loop. This is the STEED process. The signal then goes to an echo chamber, where the reverb sound is created. The tape feedback loop serves to prolong the tail of the chamber sound without creating a noticeable delay effect. Extending the tail with these "feedback building blocks" makes for a tail sound that's particular to STEED. The character of the reverb is influenced by the positions of speakers and mics in the chamber as well as the composition of the chamber's walls.

This effect has been used on countless recordings, but it's most famously linked with The Beatles. Listen to George Harrison's voice on "Everybody's Trying to Be My Baby," Paul McCartney's piano on "Birthday," the pauses in "Paperback Writer," or the sound collage in "Revolution 9," and you'll recognize the effect. The Waves/Abbey Road Chambers plugin lets you recreate these unique, historic sounds.



## Quick Start

This quick start teaches you how to create the basic Abbey Road Chambers effect. To learn more about controlling the plugin and to fine tune its sound, read the “Interface and Controls” section later in this user guide. To help you get to know the plugin, we suggest that you refer to the signal flow diagram on the next page.

1. Experiment with the Chamber settings:

- Mic Type and Position:

Close to wall: Produces more transients, which results in a brighter STEED effect.

Facing Room: Produces much more direct sound in the chamber reverb.

Mic Type sets the mic that is used to pick up the sound in the chamber.

- Speaker Type: B&W802 or Altec 605.

B&W: Provides a modern sound with a wide frequency range.

Altec: Emphasizes mid-to high/mid. Low frequencies are reduced.

- Chamber Types:

Chamber 2: Classic Abbey Road Studio 2 chamber; half-tiled.

Mirrored Room: A very bright, reflective room sound (Abbey Road Mirror room).

Stone Room: A dark variant of a small room.

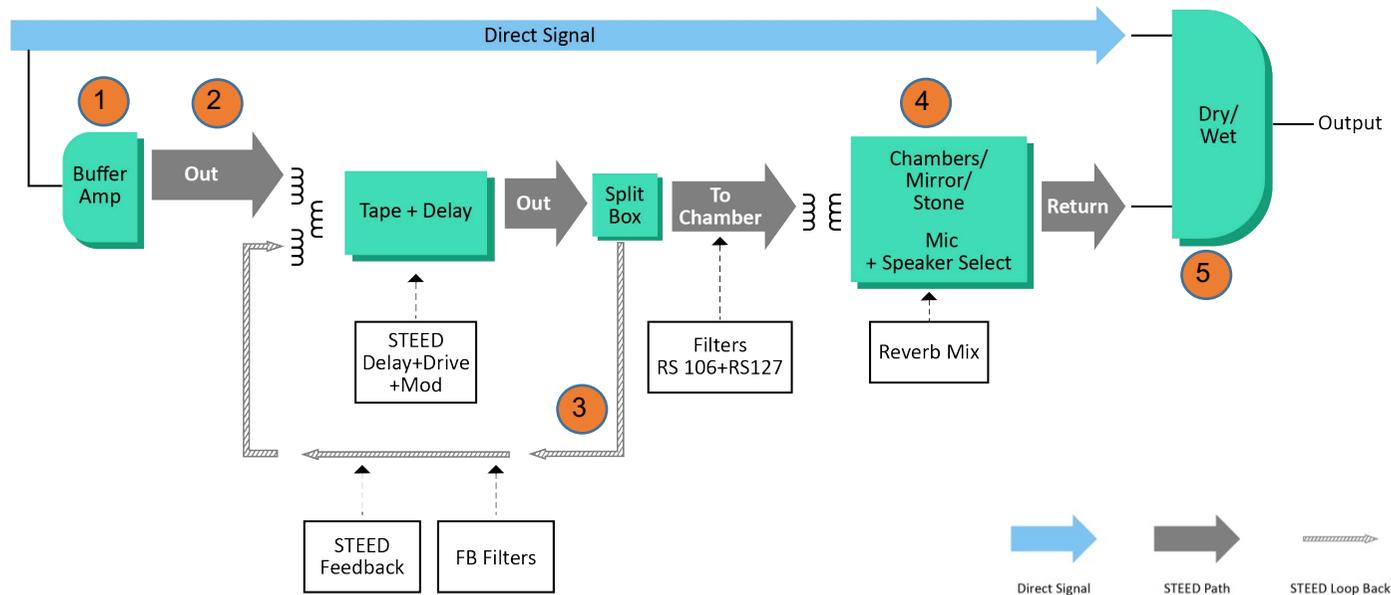
2. Set the input level. Use the Input meter to leave some headroom for processing and make sure that there are no clip indications.
3. In the STEED section, set the Delay time. This is the tape machine delay time between the record and playback heads when the tape is running at 30 ips. There are separate left and right settings on the stereo component.
4. Increase the Feedback amount until you hear the signal oscillating. Slightly decrease the feedback control to a point where you don't hear the delay taps, but rather a lengthening of the chamber reverb tail.
5. Filter the feedback signal using the three controls on the left side of the panel. Top Cut and Bass Cut have fixed gain with adjustable frequency. Mid has a fixed frequency of 3.5 kHz with variable gain.
6. Use the “Filters to Chamber” section to adjust the signal entering the echo chamber.
7. Use the Mix section to adjust the balance between the chamber reverb and the STEED tape delay section.
8. Finally, adjust the output level of the plugin in the Output section.



# Signal Flow

Waves/Abbey Road Chambers combines several processes to create its unique sound:

- Input filtering that optimizes the signal for processing.
- An adjustable delay with analogue tape emulation.
- A feedback path that creates complex delays and effectively lengthens the reverb tail.
- Impulse responses of physical echo chambers provide accurate emulation.



- 1 Input Sets the plugin's input level. The input signal is split into two paths: A direct signal is sent to output mixer. The Chambers processing signal is sent through a buffer amplifier and then into the system.
- 2 Main path The signal goes to the delay and tape effect processor and is then split: one signal goes straight to the echo chamber through a set of filters. This is the Main path.



3 Loopback

The other path loops back through the tape and delay processor. It can be equalized again on its way. As before, the tape and delay processing section output splits: One path goes to the echo chamber, the other to the feedback path.

4 Chamber

The reverb itself is created in the chamber, where the combined outputs of the tape and delay processor are played through loudspeakers and captured on microphones. You can select the speakers and microphones, and where they are positioned in the chamber. Other characteristics of the chamber can be modified. All aspects of the chamber are applied with impulse responses.

5 Output

After the chamber, the signal is summed in the output mixer. It can be mixed with the direct signal using the wet/dry control.

To quickly view the Abbey Road Chambers signal flow, click the Signal Flow button on the Top Bar.



# Components

## Mono-to-mono



Only the center mic is used to capture the chamber reverb.



## Mono-to-stereo



The input signal is mono. Left, center, and right mics are used to capture the chamber reverb. The mix of the reverb can be controlled. This is the setup most commonly used at Abbey Road.

## Stereo



The signal is split into two channels. Each side is processed as a separate mono-to-stereo signal. These are summed to stereo at the output.



# Interface

## Echo Chamber

Illustrates the chamber surface, mic type and position, and speakers type and orientation.

The screenshot shows the Abbey Road Chambers plugin interface. At the top, there are navigation buttons for 'Signal Flow', 'Setup A', and 'A+B', along with 'Load' and 'Save' buttons. The interface is divided into several sections:

- INPUT:** Located on the left, it contains two vertical gain sliders. A bracket on the left side of the interface points to this section with the label 'Input Controls plugin input gain.'
- OUTPUT:** Located on the right, it contains two vertical gain sliders. A bracket on the right side of the interface points to this section with the label 'Output Controls plugin output gain.'
- Chamber:** The central part of the interface shows a 3D rendering of a chamber with microphones and speakers. Below this, there are controls for 'MICS' (TYPE: KM53s, POSITION: CLASSIC), 'REVERB TYPE' (CHAMBER2, MIRROR, STONE), 'TIME X' (0-5), and 'SPEAKER' (TYPE: B&W, FACING: WALL). A bracket on the right side of the interface points to this section with the label 'Chamber Controls the characteristics of the echo chamber.'
- S.T.E.E.D:** Located at the bottom left, it includes 'FB FILTERS' (TOP CUT, MID, BASS CUT), 'FEEDBACK' (0-100), 'DRIVE' (0-100), 'MOD' (0-100), and 'DELAY' (111.0, 111.0) with a 'SYNC' button.
- FILTERS TO CHAMBER:** Located at the bottom middle, it includes 'TOP CUT' (6k, 8k, 10k, 12k), 'BASS CUT' (75, 150, 300, 600, 800, 1.6k, 3.2k, 6.4k), and 'GAIN' (-10 to +10).
- MIX:** Located at the bottom right, it includes 'REVERB' and 'DRY/WET' sliders.

**STEED**  
Applies tape delay and feedback to the signal before echo chamber.

**Filters to Chambers**  
Adjusts filters to the signal before it is sent to the chamber.

**Mix**  
Controls balance of chamber in/out; controls overall plugin wet/dry balance.



## Controls



Any control section can be bypassed by deselecting its ON button.

### Input Section

The Input section controls the signal being fed to the plugin.

#### **Input Fader**

Sets the plugin input level.

Range: -48 dB to +18 dB

#### **Input Meter**

Shows the level of the plugin's input signal, post-input fader. A red LED at the top of the meter indicates input clipping (infinite hold). Click on the LED to clear meter indicators.

Range: -48 dBFS to 0 dBFS

### STEED Section

The STEED section applies tape delay to the signal before it is sent to the chamber. It is also used to create tape saturation, which warms up the signal that's going directly to the chamber and to the feedback loop.

#### **Tape Delay Feedback**

Controls the amount of feedback signal returning to the Tape Machine processor. Values above 85 can result in excessive feedback. This can create interesting results but be careful with very high settings.

Range: Off to 100:

Off = -144 dBFS (no signal returned to the filter/delay processor)

100 = unity gain (100% of signal returned to processor)

Default: 37.5



## Delay Filters

There are three filters in Feedback Loop. They help reduce buildup of low- and high-frequency sounds in the loop and color the feedback signal. Since the signal can enter the loop several times on its way to the chamber, these filters can have an accumulative effect.

- **Top Cut Filter**

The Top Cut filter is used to reduce excessive high frequencies in the feedback loop, which can diminish the clarity of the effect.

Range: flat to 3.5 kHz

Default: flat (24 dB per octave)

- **Bass Cut Filter**

The Bass Cut filter is used to reduce the buildup of low frequencies in the feedback loop. Unfiltered, low frequencies can accumulate in the feedback loop, resulting a tubby or boomy reverb effect.

Range: flat to 6400 Hz

Default: flat (12 dB per octave)

- **Mid Filter**

The Mid filter is a fixed-frequency bell that controls midrange frequencies in the feedback loop.

Frequency (fixed): 3.5 kHz

Gain range: -6 dB to +6 dB

## Drive

Drive increases the input level to the tape STEED section, which affects the tape saturation effect. The STEED section output level is adjusted to maintain unity gain, as best as possible, when the Drive value changes. Drive is created in the tape section, so each time the feedback loop passes through the tape machine it undergoes drive processing, as does the signal passing directly to the chamber.

Range: 0–100 (Drive is Off when set to 0).

## Modulation

This adds AM and FM modulation to the feedback signal.

Range: 0–100

Default: Off



## Delay

Adjusts the delay value in much the same manner as changing the tape speed as it moves between the record and repro heads. The delay occurs each time the signal passes through the feedback loop, which creates Chamber's unique reverb tail.

Click on the box and slide vertically to adjust the delay or double-click and enter a numerical value.

Delay range depend on the **Sync** control setting. Range: (see Sync below)

## Sync

There are two modes for setting and displaying delay time:

- When the Sync button is **On**, the delay calculation is based on the host BPM setting and is displayed in divisions.

Range with Sync on: off, 1/64t, 1/64, 1/32t, 1/64d, 1/32, 1/16t, 1/32d, 1/16, 1/8t, 1/16d, 1/8, 1/4t, 1/8d

- When the Sync button is **Off** delay is displayed in milliseconds. Switch between Sync On or Off and the delay value is maintained until the setting is changed. You can switch between the two modes without affecting the delay duration.

Range with Sync off: 0 ms to 500 ms

Default with Sync off: 111 ms

Default: Sync On

Default Delay setting: 1/16 (111 ms when Sync is off). This corresponds to the delay introduced by the 3.3 inch gap between the record and repro heads in a BTR tape machine playing at 30 ips.

## Link

When Link is engaged, the delay values of the left and right channels of a stereo channel move together. If left and right have different delay values, their offset will be maintained when they are linked.

Default: Link On

## Filters to Chamber Section

This section falls after the Feedback section in the signal flow and is used to control the frequency range of the signal as it enters the chamber.

### Top Cut (RS 106)

Reduces the high frequencies of the signal entering the chamber. Excessive high frequencies in the chamber can result in a reverb tail that is very bright and brittle.

Range: flat to 3.5 kHz

Default: flat (24 dB per octave)



### **Bass Cut (RS 106)**

Reduces the low frequencies of the signal entering the chamber. Excessive low frequencies in the chamber can result in a reverb tail that is dull or boomy.

Range: flat to 6400 Hz

Default: flat (24 dB per octave)

### **RS-127 Equalizer**

This is a gentle bell for overall coloring of the signal entering the chamber.

Range: 2.7 Hz, 3.5 Hz, or 10 kHz

Gain: -10 dB to +10 dB;

## **Chamber Controls**

In the original analog Abbey Road Delay/Reverb, the output of the STEED tape delay and feedback is sent to an echo chamber. In this acoustically-treated room, a loudspeaker plays the signal, which is captured by one or more microphones. There is a choice of loudspeakers and microphones, as well as control over the placement and orientation of the mic. There's also a choice of chambers, each with its own type of surface. The Waves Abbey Road Chamber plugin provides control over all of these variables.

### **Reverb Types**

There are three echo chambers to choose from. The acoustics of each echo chamber is described with several impulse responses (IR). These files accurately capture the size, dimensions, surface, and other attributes of the space, including the pillars used to increase diffusion. The types, orientation, and position of speakers and mics are part of each IR.

When the signal from the STEED feedback processor and Filters-to-Chambers section enters the chamber, it passes through the appropriate IR and takes on the characteristics of the original space.

- **Chamber 2**

This IR describes the famous Chamber 2 at Abbey Road Studios. The room is half tiled and it accents low-mid frequencies.



- **Mirror Room**

This room is mirrored on all sides, so the reverb is very bright and reflective. Two mic placements are available: near and far. When this IR is selected, the Speaker and Mic types controls are disabled.

- **Stone**

The chamber is small and dark. When this IR is selected, the Speaker and Mic types controls are disabled.

### **Speaker**

Use this drop-down menu to set the type of speaker used for playback in the chamber:

**Altec 605** This was a standard monitor loudspeaker used in the 1950s and '60s. It has very little low end lots of high-mid frequencies.

**B&W 800D** This speaker has a modern, flat sound, with a very wide range.

Default: Altec

### **Speaker Orientation (“Facing”)**

This controls which direction speakers are facing with respect to the room.

**Room** The loudspeaker faces the center of the chamber. This results in more direct sound reaching the microphone.

**Wall** The loudspeaker faces in the opposite direction, toward the front wall. This yields a more diffused sound reaching the microphone.

Default: Wall

The current speaker orientation is shown in the illustration.

### **Microphones**

There are three microphones in the chamber. All three microphones will be the same type, as defined by “Mic Type.”

#### **Mic Type**

Choose between two microphone types for capturing the sound in the chamber:

**Neumann KM-53s** A slightly bright sound

**Schoeps MKH-2s** A modern-sounding mic with a very flat response

These mics are quite similar, but each has its subtle personality.

Default: KM-53s



## Mic Position

The position of the mic plays a critical role in establishing the sound and texture of the effect. There are five mic positions.

Positions used only with the **Chamber 2 IR**:

- **Room** The microphones are positioned in front of the pillars, facing the loudspeaker. This results in relatively more direct sound reaching the mic.
- **Wall** The mics are close to the rear wall, so they pick up lots of reflections. This tends to emphasize transients.
- **Classic** The mics are behind the pillar. There is a natural-feeling balance between reflections and decay.

Positions used only with the **Mirror Room** and **Stone Room IRs**:

- **Near** and **Far**: These positions refer to the distance between the speakers and the microphones. The Near mic position is usually more focused, while the Far position is more diffuse.

## Time X

Controls the apparent duration of the reverb tail with respect to the natural reverb from the echo chamber.

Range: 0.5 (50% of the original size) to 1.5 (150% of the original size)

Default: 1.0

## Mix Section

### Reverb

Controls the balance of the signal from the Tape Machine processor (before echo chamber) with the reverb effect in the echo chamber. Higher settings result in more a pronounced chamber effect. This is not the same as the Wet/Dry control.

Range: 0% to 100%

Default: 100%

### Wet/Dry Mix

Controls the balance of the effect and the direct signal. The direct signal is split from the input before filtering and is sent directly to the output mixer, where it is mixed with the output of the chamber.

Please note: If you apply filters during this process, changing the Wet/Dry setting may result in phasing in certain frequencies. This a result of tape modulation and is the nature of a parallel process.

Range: 0% (Dry) to 100% (Wet)

Default: 100%



## Output Section

The Output section controls the signal being sent from the plugin.

### **Output Fader**

Sets the plugin output level.

Range: -48 dB to +18 dB

### **Output Meter**

Shows the level of the plugin's output signal, post-output fader. A red LED at the top of the meter indicates output clipping (infinite hold). Click on the LED to clear meter indicators.

Range: -48 dBFS to 0 dBFS

## 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.

