

DOPPELSPUR

ARTIFICIAL DOUBLE TRACKING · TAPE ADT



User Manual

Version 1.0.0 · Audio Unit · VST3 · macOS

RUHRPOTT GUITARS

Dortmund

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At a glance

Put Doppelspur on a vocal or guitar track (ideally **mono in, stereo out**), pick the preset **Classic ADT** and set **Delay** between 12 and 25 ms. Turn the outer **Motion** ring to taste. Pan the two tapes apart for a wide double. That's it — the rest of this manual is for when you want more.

CHAPTER 1

Introduction

Doppelspur recreates Artificial Double Tracking, the tape trick invented at Abbey Road in 1966, as an Audio Unit and VST3 plugin.

Before ADT, a fuller, “doubled” lead vocal meant singing the part twice and layering both takes. Because no one sings a line exactly the same way twice, the small differences in timing and pitch make the pair sound richer than either take alone. Playing back two identical copies does not work: they simply fuse into one louder signal.

Engineer Ken Townsend solved this with a second tape machine. The vocal was sent to it from the multitrack's record head, played back a few milliseconds later and mixed with the original. An oscillator constantly nudged the second machine's speed, so the copy drifted slightly in time and pitch — enough to sound like a second performance. The technique went on to shape countless records and is also where the name “flanging” comes from.

Doppelspur (German for “double track”) gives you both machines:

- **Tape A · Signal** — the original. Left clean, it is a bit-exact copy of your input.
- **Tape B · Double** — the ADT machine: delayed, with a varispeed oscillator, wow, flutter and tape saturation.
- Both are summed, each with its own level, pan and phase switch.

Highlights

- **Two views of one machine:** Easy for fast results, Pro for every detail. Both share the same settings.
- **Motion** — a three-axis stacked knob that sets oscillator, wow and flutter in one move, with independent Depth and Rate.
- **LFO shapes** Sine, Triangle and Random.
- **Tape saturation** up to +24 dB drive, 2× oversampled, with a gentle 90 Hz head bump.
- **Through-zero tape flanging** when both decks run at the same short delay.
- **Animated reels** that show each tape's pitch deviation in cents, and a live **Tape Offset** display.
- **Your own presets**, a **Random** button for happy accidents and this manual built into the plugin (the ? button).
- Universal Binary for Apple Silicon and Intel, automatable parameters, 14 factory presets.

Credits

Doppelspur is made by Ruhrpott Guitars, Dortmund. Built with the JUCE framework. The interface font is Lato by Łukasz Dziedzic, licensed under the SIL Open Font License 1.1 (the licence text is included). ADT was invented by Ken Townsend at EMI's Abbey Road Studios in 1966. Doppelspur is an independent product and is not affiliated with Abbey Road Studios or any other plugin maker.

CHAPTER 2

Installation

Requirements

Item	Details
System	macOS 11 Big Sur or later · Apple Silicon or Intel
Formats	Audio Unit (AU), VST3
Hosts	Logic Pro, LUNA, GarageBand, Reaper, Ableton Live, Studio One and any other AU/VST3 host
Channels	mono mono, mono stereo, stereo stereo

Installing the plugin files

Doppelspur comes as a ZIP file (**Doppelspur-v1.0-macOS.zip**) with four files. Copy the plugin file(s) your DAW uses into the matching folder:

File	What it is	Copy to
Doppelspur.component	Audio Unit · Logic Pro, GarageBand, LUNA, MainStage	/Library/Audio/Plug-Ins/Components/
Doppelspur.vst3	VST3 · Ableton Live, Reaper, Studio One, Bitwig, Cubase	/Library/Audio/Plug-Ins/VST3/
Doppelspur-v1.0-Manual.pdf	This manual. It is also built into the plugin (the ? button).	anywhere you like
Lato-Font-License.txt	Licence of the interface font Lato (SIL Open Font License)	not needed for installing

The easiest way: in Finder choose **Go › Go to Folder...** (Shift-Command-G), paste the folder path, press Return and drag the file in. macOS asks for your password because these folders are shared by all users. Then restart your DAW.

If you prefer to install just for yourself, use the same folders inside your home Library instead (~/.Library/Audio/Plug-Ins/Components/ and ~/.Library/Audio/Plug-Ins/VST3/). Keep only one copy of each file — two copies in different places confuse the DAW.

Updating: replace the old file with the new one. Your settings in existing projects and your own presets are kept.

If macOS blocks the plugin

Files received by AirDrop, Mail, Messages or download are marked as “from the internet”. If your DAW refuses Doppelspur or macOS says it cannot be opened, remove that mark once. Open Terminal, paste these lines one at a time and press Return after each (you will be asked for your Mac password):

```
sudo xattr -dr com.apple.quarantine /Library/Audio/Plug-Ins/Components/Doppelspur.component
sudo xattr -dr com.apple.quarantine /Library/Audio/Plug-Ins/VST3/Doppelspur.vst3
killall -9 AudioComponentRegistrar
```

Then restart your DAW and let it rescan its plugins.

Finding it in Logic Pro

Audio Units › Ruhrpott Guitars › Doppelspur. For the classic effect on a mono track, choose the **Mono Stereo** version. If it does not show up: Logic Pro › Settings › Plug-in Manager, select Doppelspur and choose *Reset & Rescan Selection*.

CHAPTER 3

Quick Start

- 1 Insert**
Insert Doppelspur on a vocal or guitar track as **Mono Stereo**. It opens in Easy mode with the preset **Classic ADT**.
- 2 Set the gap**
Turn **Delay**: around 10–25 ms sounds like a second take. Below 5 ms the two tapes start to phase; above 30 ms they separate into a slapback.
- 3 Bring it to life**
Turn the outer **Motion** ring. 0 % is a static copy, 30–50 % a natural double, the top third gets seasick.
- 4 Spread it**
Pan **Signal** left and **Double** right (or use the preset **Wide Double**). Check in mono now and then.
- 5 Colour it**
Add some **Drive** to the Double tape and pull its **Level** down a few dB until it sits behind the original.

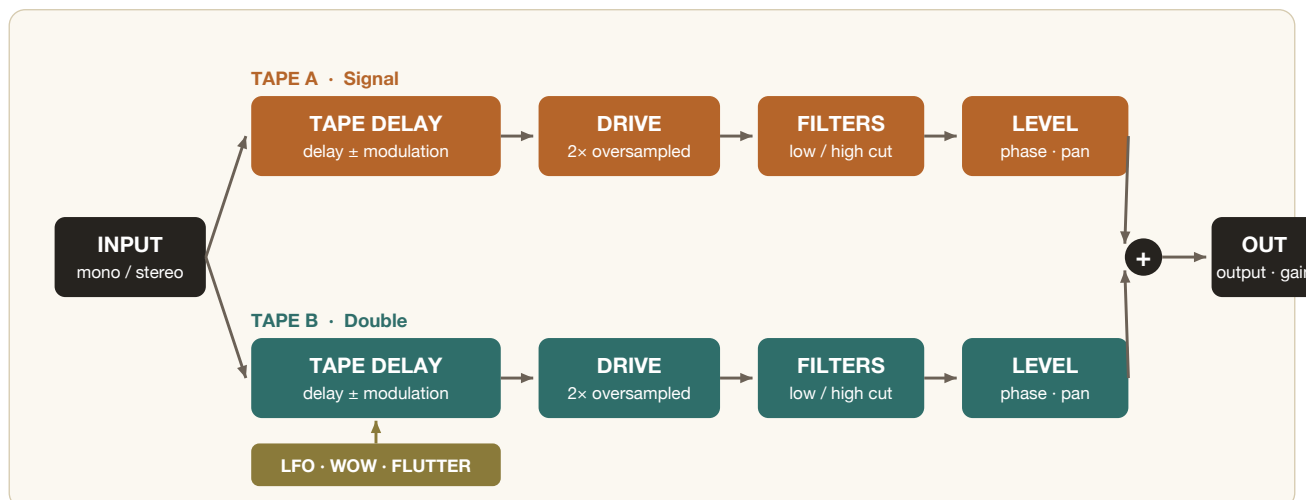
Tip

For a send effect, use the preset **Pro: Double Only (Send)** on an aux bus. Tape A is muted, so only the double returns.

CHAPTER 4

Signal Flow

Both tapes receive the same input. Each runs through its own chain; the results are summed and pass the master output gain.



Signal path of Doppelspur. The modulation (LFO, wow, flutter) moves the playback point of a tape and therefore its timing and pitch.

Tape delay

Each tape is a delay line read at a moving position. When the oscillator pushes the delay longer, the tape effectively slows down and the pitch drops; when it pulls the delay shorter, the pitch rises. This is exactly what the varying motor speed did on the original second machine. Delay values are always *behind* the input: a tape can reach 0 ms but never run ahead of it.

Drive

Soft tape saturation with an emphasis on even harmonics. Quiet passages keep their level, peaks are rounded. The added harmonics are gently low-passed so heavy drive stays warm instead of fizzy, and a small head bump around 90 Hz adds weight. Drive runs at twice the sample rate to avoid aliasing.

Filters, level, phase, pan

Low cut and high cut set the bandwidth of each machine; at their end stops (20 Hz / 20 kHz) they are fully out of the circuit. Level, phase (polarity) and pan come last.

Latency

Doppelspur reports a fixed latency of 23 samples (about 0.5 ms at 48 kHz) for the oversampling. Your DAW compensates automatically, so a clean Tape A stays sample-aligned with the rest of your mix.

CHAPTER 5

Easy Mode

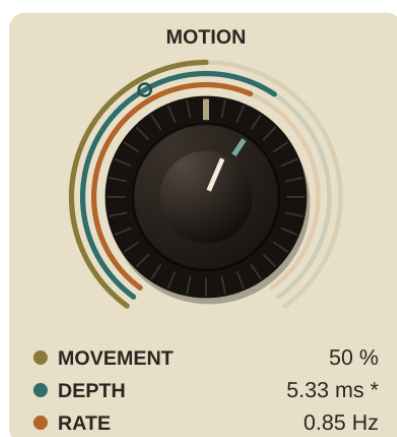
Easy mode shows what you need for classic double tracking. Switch views with the **EASY | PRO** selector at the top.



Easy mode with the preset Wide Double and a Depth offset on the Motion knob.

- 1 **Easy | Pro** — switches the view. Both views control the same machine.
- 2 **Preset** — factory presets (Easy and Pro), your own presets and the save/delete functions (chapter 8). The arrows on either side step to the previous or next preset.
- 3 **Random** — sets the sound to new, random values within musical limits (chapter 8).
- 4 **? · Manual** — opens this manual.
- 5 **Tape speed display** — the reels turn with the tape speed (deviation strongly exaggerated); the figure shows the pitch deviation in cents. Tape A stays at +0.0 ¢.
- 6 **Drive · Level · Pan** — saturation, volume and stereo position of the Signal tape.
- 7 **Ø Phase · Mute** — flips polarity / silences the tape (the reels stop).
- 8 **Delay** — the gap between the tapes, 0–40 ms: how far Tape B runs behind Tape A.
- 9 **Motion** — three-axis knob for Movement, Depth and Rate (see below).
- 10 **Tape Offset** — live position of Tape B relative to Tape A, including the movement; the shaded trail shows the recent range.
- 11 **LFO Shape** — oscillator waveform of Tape B: Sine, Triangle or Random.
- 12 **Output** — master output level, –24 to +12 dB.
- 13 **Spread** — stereo only: the right channel is modulated with an offset for extra width.
- 14 **Double · Tape B** — the same Drive, Level, Pan, Phase and Mute controls for the ADT tape.

The Motion knob



Motion works like a stacked potentiometer with three axes. Where you grab it decides what you move; the outline of the active part lights up.

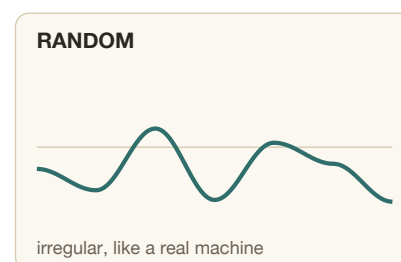
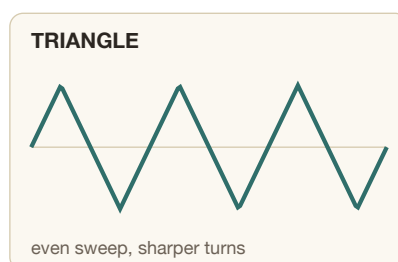
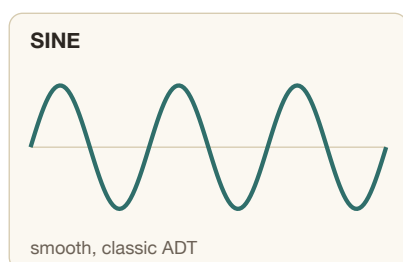
- **Outer ring · Movement** sets oscillator rate, depth, wow and flutter together. 0 % is a static delay, 30–50 % a natural double, the top third reaches the extremes (up to 20 ms depth).
- **Middle disc · Depth** — how far the oscillator moves the tape (± 0 –20 ms).
- **Inner cap · Rate** — oscillator speed (0–3 Hz).

Depth and Rate follow Movement. Turn one of them yourself and Motion remembers the offset: it keeps following Movement, just shifted. An asterisk (*) after the value and a small ring on the scale (where Movement alone would put it) show the offset.

Gesture	Result
Drag up / down	change the part you clicked (dragging sideways works too)
Shift + drag	fine adjustment
Mouse wheel	change the part under the pointer
Double-click outer ring	Movement back to 40 % (also clears wow/flutter offsets taken over from Pro)
Double-click Depth or Rate	remove the offset — it follows Movement exactly again

LFO shapes

The oscillator that moves Tape B can have three shapes. The curves show the delay of Tape B over three periods:



Random glides to a new random target twice per period, so the movement never repeats. Switching shapes is crossfaded and does not click.

CHAPTER 6

Pro Mode

Pro mode opens up both machines completely. Deck A and Deck B have identical controls; the master section in the middle holds Spread and Output.



Pro mode with the preset Pro: Classic Double.

- A** **Tape speed display** — reels and pitch deviation in cents, as in Easy mode.
- B** **Transport row** — Delay, Osc Rate, Osc Depth, Wow, Flutter — everything that moves the tape in time.
- C** **Character row** — Drive, Low Cut, High Cut, Level, Pan — the sound of the machine.
- D** **Ø Phase · Mute** — polarity and mute for the deck.
- E** **LFO shape** — Sine, Triangle, Random for this deck's oscillator.
- F** **Master** — Spread and Output, shared with Easy mode.
- G** **Deck B** — identical controls for the Double tape.

Deck controls

Control	Range	What it does
Delay	0–120 ms	Base delay of the tape. 10–30 ms classic ADT, 40–60 ms wide and psychedelic, 80–120 ms slapback.
Osc Rate	0–3 Hz	Speed of the varispeed oscillator. 0 Hz freezes it.
Osc Depth	±0–20 ms	How far the oscillator moves the delay. This creates the pitch drift. If depth exceeds the delay, the tape touches 0 ms and stays there for that part of the cycle.
Wow	0–100 %	Slow, irregular speed variation like a worn capstan or reel (up to ±1.5 ms).
Flutter	0–100 %	Fast, fine speed variation from rollers and capstan (up to ±0.12 ms).

Control	Range	What it does
Drive	0–100 %	Tape saturation up to +24 dB into the curve, 2× oversampled, with head bump.
Low Cut	20–600 Hz	High-pass filter. At 20 Hz it is switched out completely.
High Cut	2–20 kHz	Low-pass filter. At 20 kHz it is switched out completely.
Level	–inf to +6 dB	Output level of the deck.
Pan	L100–R100	Constant-power panning; with stereo input it works as a balance control.
Ø Phase	on / off	Inverts polarity — the key to hollow phasing and flanging sounds.
Mute	on / off	Silences the deck; the reels come to a stop.
LFO shape	Sine · Triangle · Random	Waveform of the deck's oscillator.

Master

Control	Range	What it does
Spread	0–100 %	Stereo only. Offsets the oscillator of the right channel by up to half a period and makes wow, flutter and random modulation increasingly independent between left and right.
Output	–24 to +12 dB	Master level after the sum of both decks.

A clean Tape A

With Delay 0 ms, Depth, Wow, Flutter and Drive at 0, filters at their end stops, Level 0 dB and Pan centre, Deck A passes your signal bit-exactly (shifted only by the reported latency).

CHAPTER 7

Easy and Pro Together

Easy and Pro are two views of the same machine. Easy simply shows less.

Controlled by	Parameters
Easy only (Delay, Motion)	Delay, Osc Rate, Osc Depth, Wow and Flutter of Tape B
Shared, identical in both views	Drive, Level, Pan, Phase, Mute, LFO shape, Spread, Output, the filters and all of Deck A

- **Easy Pro:** the values produced by Delay and Motion are written into Deck B's controls. You can refine from there.
- **Pro Easy:** Deck B's delay becomes the Easy Delay; any difference in rate, depth, wow and flutter is kept as an offset in the Motion knob. Movement stays where it was.
- The sound does not change when you switch, in either direction.

One limit

The Easy Delay reaches 40 ms. A Pro delay above 40 ms is limited to 40 ms when you switch to Easy. Deck A settings made in Pro stay active in Easy, even though Easy does not show them.

CHAPTER 8

Presets and Random

All presets live in the menu at the top of the plugin. Loading a preset resets every parameter first, then applies the preset's settings. The arrows left and right of the menu step through the presets one by one: first the factory presets, then your own, and from the last one back to the first.

Factory presets

Preset	Mode	Character
Classic ADT	Easy	The standard: 18 ms gap, natural movement, a touch of drive. Default when the plugin is inserted.
Wide Double	Easy	Tapes panned hard left and right, a little more gap and movement.
Subtle Double	Easy	Short gap, gentle movement, double 6 dB down — thickens without being noticed.
Tape Phasing	Easy	1 ms gap with inverted polarity: hollow, sweeping phase effect.
Driven Slap	Easy	40 ms slapback with heavily saturated double, slightly split.
Random Wobble	Easy	Random LFO with stereo spread for an irregular, living double.
Classic Double	Pro	Classic ADT built in Pro with a 12 kHz high cut and 60 Hz low cut on Tape B.
Split Left/Right	Pro	Two tapes at L80 / R80.
Subtle Thickener	Pro	Short, quiet, bandwidth-limited double.
Psychedelic Split	Pro	55 ms, hard-panned, heavy wow — the late-60s “two singers” effect.
Tape Flange (Through Zero)	Pro	Both tapes at 1.6 ms, Tape B sweeps through Tape A.
Slapback Double	Pro	95 ms, saturated, dark.
Double Only (Send)	Pro	Tape A muted — for use on an aux bus.
Init (A clean, B off)	Pro	Neutral starting point: clean pass-through.

My presets

Save your own sounds and recall them in any project. The **My Presets** section of the preset menu lists them; the actions are at the bottom of the menu:

Menu item	What it does
Save preset...	Asks for a name and saves the current settings. Using an existing name replaces that preset (the dialog warns you).
Delete “name”	Deletes the active preset of your own after asking. The current sound stays as it is.
Show preset folder	Opens the folder with your preset files in Finder.

SAVE PRESET

Name for your preset:

Cancel

Save

Each preset is a small file ending in **.dspreset**, stored in:

```
~/Library/Audio/Presets/Ruhrpott Guitars/Doppelspur/
```

To share a preset, send the file; the other person puts it into the same folder. A preset stores the complete sound including the view (Easy or Pro) and the output level. The name of the active preset is saved with your project.

Random

The dice button next to the preset menu rolls a completely new sound — every click a different one, always within musical limits. The preset menu then shows **Random**; if you like the result, save it as your own preset.

What Random sets	
Both views	Drive, Level and Pan of both tapes (sometimes close together, sometimes split wide), phase of Tape B, LFO shape and Spread. Mostly a classic ADT gap of 8–30 ms, sometimes short (phasing) or long (slapback).
Easy	Delay (up to 40 ms), Movement and small Depth/Rate offsets on the Motion knob.
Pro	Everything on Deck B including Rate, Depth, Wow, Flutter and the filters, Delay up to 120 ms. Deck A only gets tone changes (Drive, High Cut, Level, Pan).
Never changed	Output level, the view (Easy/Pro), Mute. Tape A always stays the original in time.

CHAPTER 9

Techniques

Classic vocal double

Mono Stereo, Delay 12–20 ms, Movement 30–45 %, double 2–4 dB below the original. Keep both centred for thickness, or pan them apart for width.

Wide stereo double

Pan Signal and Double hard left and right, Delay 18–30 ms. Larger gaps sound more like two separate singers. Check mono compatibility — short gaps can comb-filter when summed.

Phasing and tape flanging

Delay below 5 ms, switch on Ø Phase for the hollow sound. For true through-zero flanging go to Pro, set both decks to the same delay (e.g. 1.6 ms) and let Deck B's oscillator sweep around it slowly (0.1–0.3 Hz, depth slightly above the delay).

Slapback

Delay 40 ms in Easy, or 80–120 ms in Pro, with little movement and some drive. Pull the High Cut down to 6–8 kHz for a vintage echo.

Guitars and keys

ADT works well on acoustic guitar, organ and lead guitar. Try Triangle for an even, chorus-like sweep or Random for a looser feel.

Stereo sources

On stereo tracks each tape processes both channels. Raise Spread to let the right channel move differently from the left for more width.

As a send effect

Use Pro: Double Only (Send) on an aux. Your dry track stays untouched, the aux fader controls the amount of double.

CHAPTER 10

Technical Specifications

Item	Value
Formats	Audio Unit (type aufx, subtype Dspr, manufacturer Rpgt), VST3 (Fx · Delay · Modulation)
Platform	macOS 11 or later, Universal Binary (arm64 + x86_64)
Channel layouts	mono mono, mono stereo, stereo stereo
Sample rates	all rates offered by the host
Latency	23 samples, fixed and reported to the host
Delay range	0–120 ms per tape, plus up to ± 20 ms oscillator depth, wow and flutter
Interpolation	4-point cubic Hermite (smooth pitch modulation)
Saturation	asymmetric tanh, 2× oversampling with 47-tap linear-phase half-band filters (approx. 70 dB stopband)
Parameters	35, all automatable; parameter smoothing against zipper noise and clicks
Presets	14 factory presets plus your own (.dspreset files); plugin state and preset name are saved with your project

CHAPTER 11

Parameter Reference

Names as they appear in your DAW's automation lists. Every parameter exists for Deck A (prefix “A”) and Deck B (prefix “B”) unless noted.

Parameter	Range	Default A / B
Delay	0–120 ms	0 ms / 18 ms
Osc Rate	0–3 Hz	0.5 Hz / 0.8 Hz
Osc Depth	0–20 ms	0 ms
Osc Shape	Sine, Triangle, Random	Sine
Wow	0–100 %	0 %
Flutter	0–100 %	0 %
Drive	0–100 %	0 %
Low Cut	20–600 Hz (20 = off)	20 Hz
High Cut	2–20 kHz (20 kHz = off)	20 kHz
Level	–inf to +6 dB	0 dB
Pan	L100–R100	C
Phase Invert	off / on	off
Mute	off / on	off

Global parameter	Range	Default
Mode	Easy, Pro	Easy
Delay (Easy)	0–40 ms	18 ms
Movement	0–100 %	40 %
Movement Rate Trim	–1 to +1 (share of knob travel)	0
Movement Depth Trim	–1 to +1 (share of knob travel)	0
Movement Wow Trim	–100 to +100 %	0
Movement Flutter Trim	–100 to +100 %	0
Stereo Spread	0–100 %	0 %
Output	–24 to +12 dB	0 dB

Defaults are the values each parameter returns to on reset. When the plugin is inserted, the preset Classic ADT is loaded on top of them. The four trim parameters are the offsets of the Motion knob; they are set by the knob and when switching from Pro to Easy.

CHAPTER 12

Troubleshooting

Doppelspur does not appear in Logic

Check that Doppelspur.component is in /Library/Audio/Plug-Ins/Components. Rescan in Logic Pro › Settings › Plug-in Manager and restart Logic. In Terminal, `auval -v aufox Dspr Rpgt` shows whether macOS finds the plugin.

Doppelspur does not appear in a VST3 host

Check that Doppelspur.vst3 is in /Library/Audio/Plug-Ins/VST3 and let the host rescan its plugin folders.

“Cannot be opened” or validation fails

The file is quarantined. Remove the mark as described in chapter 2.

Two Doppelspurs in the plugin list

There is a copy in /Library and another one in your home Library. Delete one of them.

The double sounds thin or hollow in mono

Short gaps comb-filter when summed. Increase the Delay, lower the double's level or reduce the pan width.

The ? button does not open the manual

Some DAWs do not let plugins open other apps. Doppelspur then offers to save the manual (for example into Documents) and opens it from there. The PDF is also included in the ZIP file.

My presets are missing

They are files in ~/Library/Audio/Presets/Ruhrpott Guitars/Doppelspur. Use “Show preset folder” in the preset menu to check. Files must end in .dspreset.

Tape B seems to stick at one point

Osc Depth is larger than the delay, so the tape touches 0 ms. Increase the delay or reduce depth.