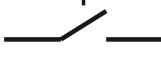


FIG. 0 – COMPONENT LEGEND

			
Potentiometer 1k · 10k · 100kΩ	Resistor 470 · 1k · 47kΩ	Capacitor 0.1 · 4.7μF	Pushbutton (NO) Momentary

		
Switch Fixed ON/OFF	RCA Composite video	3.5mm jack Audio input

ANALOG VIDEO MODULE – ASSEMBLY MANUAL

DIRTY VIDEO MIXER

Build diagrams for a hand-made composite video mixer, documented step by step.
Mixing · Pushbuttons · Sound · Feedback



MOD-DVM-05

TITLE Dirty Video Mixer		
SHEET 1/1	REV 05	SCALE NTS
REVISION HISTORY 01 Mixing device 02 Normally-open pushbuttons 03 Sound – audio injection 04 Feedback (direct and crossed)		
LINK wiki.terata.org/index.php? title=Dirty_Video_Mixer		

DIRTY VIDEO MIXER

A *Dirty Video Mixer* is a simple analog device that mixes, crosses and distorts composite video signals using potentiometers, with no digital circuitry involved. It's a common tool in experimental video, circuit bending and visual performance, valued precisely for the “dirtiness” and unpredictability of the results it produces.

This document covers the construction of our own Dirty Video Mixer and the improvements we keep adding to it over time, step by step.

01 Mixing device · 02 Normally-open pushbuttons · 03 Sound — audio injection · 04.1 Direct feedback · 04.2 Crossed feedback · + Using it

FIG. 0 — COMPONENTS

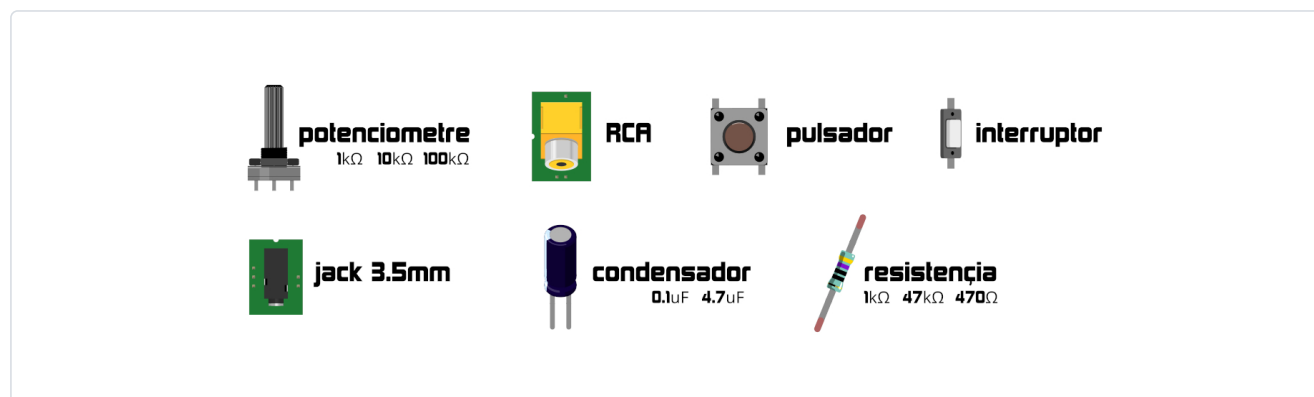


FIG. 0 — Before getting into the circuit, this image gathers the symbols of the components we'll use at each step: from here on, in the following diagrams you only need to check the values (Ω , μ F) of each part.

01

MIXING DEVICE

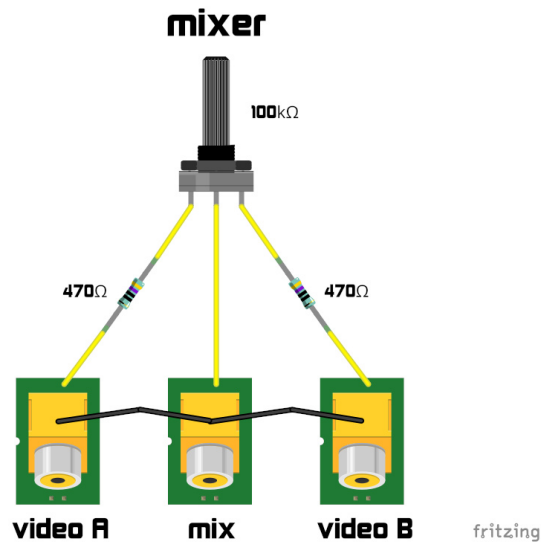


FIG. 1 — 100kΩ potentiometer with 470Ω protection resistors on the Video A and Video B inputs.

The core of the device is a 100kΩ potentiometer. Its two outer terminals are each connected, through a 470Ω protection resistor, to the Video A and Video B composite video inputs via RCA connectors; the potentiometer's center wiper connects directly to the Mix output, where the mixed signal comes out. The grounds of all three connectors are tied together with a jumper wire.

Turning the potentiometer moves from one source to the other, blending the two signals at intermediate positions and producing the characteristic “dirty” video cross-fade. The 470Ω resistors on the inputs minimally isolate the two sources from each other, prevent them from mixing directly with no protection at all, and reduce the risk of a short circuit between the cameras or video sources connected — good practice worth following in any dirty mixer.

EFFECT

At both ends of the potentiometer's travel you see only one source or the other; at the in-between points, the two images overlap, creating a double-exposure or “dissolve” effect, with transparencies and ghosts of one image over the other depending on the exact position of the potentiometer.

02

NORMALLY-OPEN PUSHBUTTONS

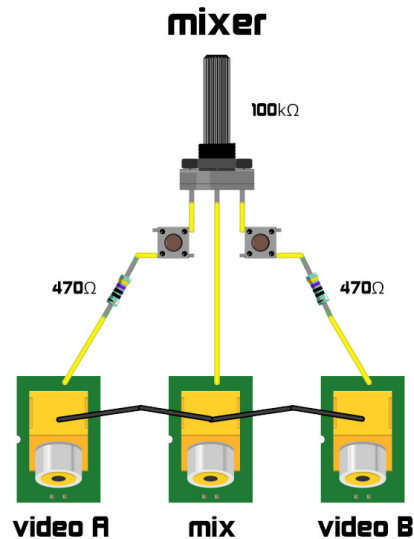


FIG. 2 — Normally-open (NO) pushbutton added to each video line, between the mixer and the protection resistor.

From this step on, each video line includes a normally-open (NO) momentary pushbutton, placed between the mixer's potentiometer and each input's protection resistor. At rest the pushbutton does nothing, since the circuit stays open; pressing it completes the signal path to that input, allowing Video A and Video B to be cut or “chopped” independently and instantly — a glitch/stutter effect that can be played by hand, for example to the rhythm of the music.

EFFECT

Each pushbutton momentarily interrupts the path of a video source, producing a sharp, repetitive cut (stutter) that chops the image of Video A or Video B while held down. It's a percussive effect, meant to mark the beat by pressing the button in time with the music, instead of relying only on turning the potentiometer to switch sources.

03

SOUND — AUDIO INJECTION INTO VIDEO

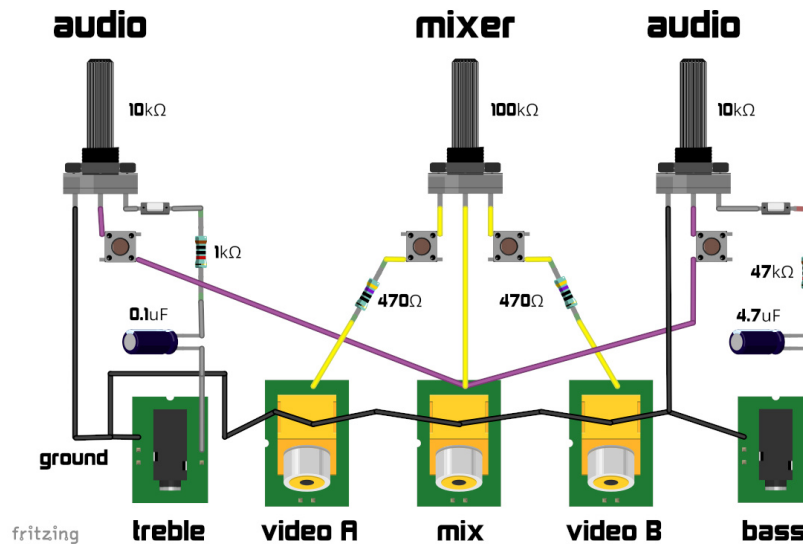


FIG. 3 — Two audio input channels, treble and bass, injecting signal into the Mix node through their own filter.

This step adds the possibility of injecting audio signal directly into the video, to generate visual interference synchronized with the sound. Two independent audio input jacks are added, “treble” and “bass”, each with its own filter, both of which end up converging at the same point: the Mix node (the already-mixed output of Video A and Video B).

jack → capacitor → resistor → 10kΩ potentiometer → pushbutton → Mix node

- **Treble:** 0.1μF capacitor and 1kΩ resistor — lets through mainly the high frequencies of the audio signal.
- **Bass:** 4.7μF capacitor and 47kΩ resistor — lets through mainly the low frequencies.

Each channel's capacitor filters the part of the spectrum to be used, the resistor attenuates the signal so it doesn't saturate the video, the potentiometer sets how much is injected, and the pushbutton lets you turn the audio injection on or off at any moment.

EFFECT

Since the capacitor and resistor of each channel define a different filter, the visual effect each one causes is quite different:

- **Treble** (small capacitor, low resistance) lets through mainly the fast variations of the audio signal. Injected into the video, this translates into fine noise, thin lines and rapid flicker in the image — a “snow” or grain texture that reacts to high-pitched sounds, whistles or metallic tones.
- **Bass** (large capacitor, high resistance) lets through the slow variations of the audio. In the video, this causes wider, slower deformations: waves, image “breathing”, warping or brightness pulses that follow the rhythm of the kick drum or bass.

FEEDBACK

Video feedback consists of re-injecting part of the output signal back into the inputs themselves, creating feedback loops. Depending on where this return signal is taken from, two variants with quite different behaviors can be told apart:

- **Direct feedback:** each video input feeds back only with its own signal (Video A returns to Video A, Video B returns to Video B). The loop never brings in the other source, so each channel degrades independently — an effect close to pointing a camera at its own screen.
- **Crossed feedback:** the re-injected signal is taken from the Mix node, i.e. from the already-combined blend of Video A and Video B. Since this node always contains part of the other source, each channel ends up contaminating itself and the other one at the same time, generating the cross-interference, moiré and oscillations characteristic of “dirty” video feedback.

Both variants can be built independently, and can even be combined at the same time for more complex results.

04.1 DIRECT FEEDBACK

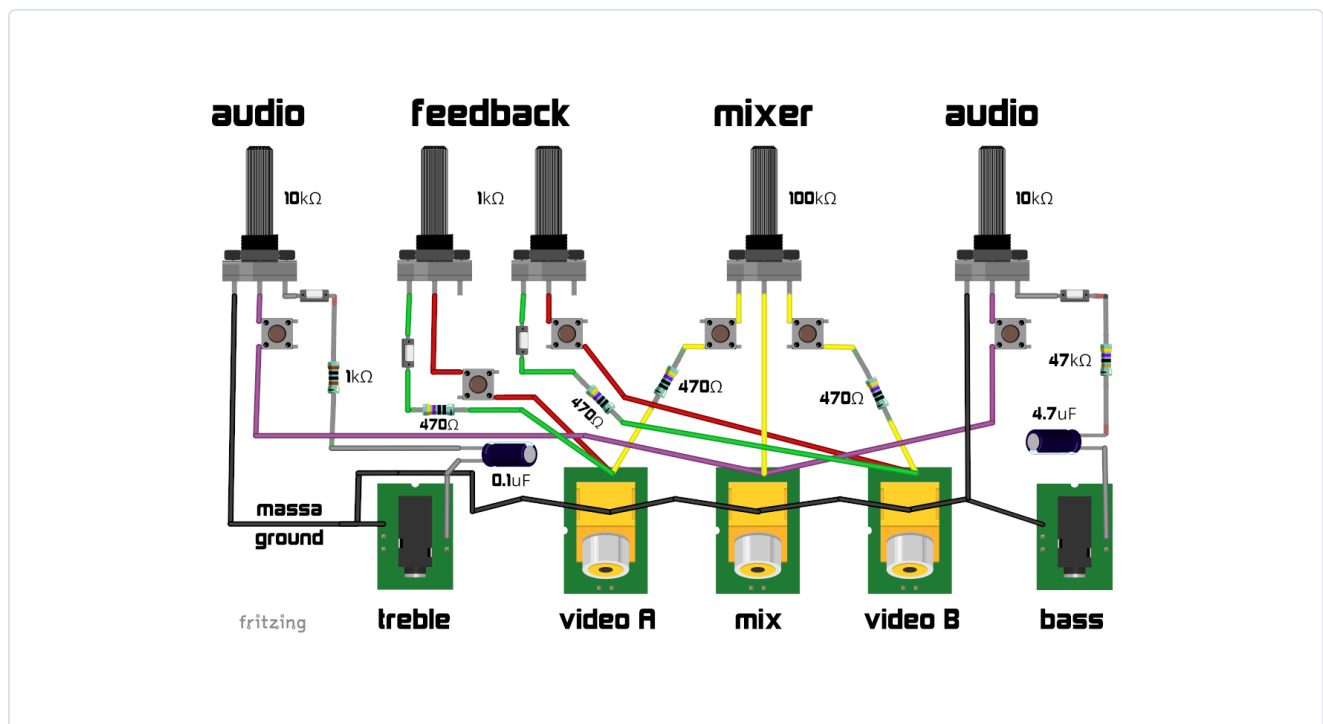


FIG. 5.1 – Direct feedback loop: each video input feeds back only with its own signal, with a 1kΩ potentiometer, a fixed switch and a pushbutton per branch.

RCA → 470Ω resistor → fixed switch → 1kΩ potentiometer → NO pushbutton → back to the same RCA

In this variant, each video input has its own complete, independent feedback loop, with the signal never passing through the Mix node or the other source at any point.

The signal leaves the RCA connector, passes through the 470Ω protection resistor and that branch's own fixed switch, and reaches one of the outer legs of the 1kΩ potentiometer. The potentiometer's wiper picks up the already-attenuated signal and carries it to the normally-open pushbutton, which, when closed, injects it back into the same source RCA connector.

Each branch has its own fixed switch and its own pushbutton, so Video A and Video B can be turned on, turned off and chopped completely independently of each other.

EFFECT

Since each channel feeds back only with itself, the effect is an echo or progressive degradation of the same image: multiplying edges, repetitions, and a visual "trail" that intensifies as more signal is re-injected with the potentiometer. Unlike crossed feedback, Video A and Video B can become unstable completely independently of one another, and the pushbutton lets you chop this echo to whatever rhythm you like.

04.2 CROSSED FEEDBACK

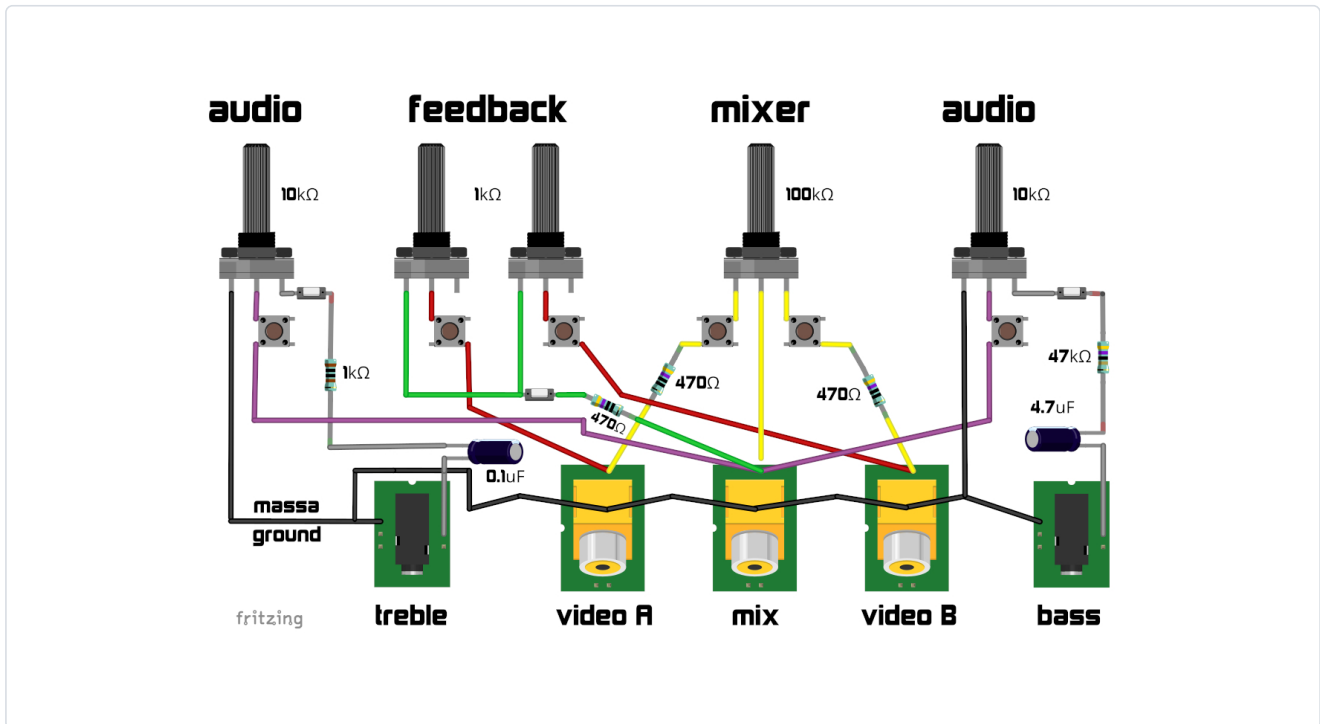


FIG. 5.2 – Crossed feedback loop between Video A and Video B, with two 1kΩ potentiometers, one global switch and one pushbutton per branch.

This last modification adds a feedback loop between the two video inputs. The line coming out of the Mix node first passes through a fixed switch, placed right before the signal splits toward the two 1kΩ potentiometers: this switch turns the entire feedback loop on or off. From there, each potentiometer takes part of the signal and re-injects it crossed into Video A and Video B, generating the interference patterns, noise and distortion typical of analog video feedback.

In addition, each of the two potentiometers has its own normally-open pushbutton, which lets you momentarily cut that channel's feedback. This way, the switch controls the feedback loop globally (fixed on/off), while the pushbuttons let you chop each feedback branch separately and live.

EFFECT

The feedback loop feeds its own video signal back into itself, which produces repetitive, unstable patterns: visual echo, multiplying streaks, moiré, and oscillations that feed on themselves until the image saturates or unexpected color bands appear. Depending on the position of the 1kΩ potentiometers, the effect can range from a slightly emphasized edge to a fully oscillating visual chaos, similar to what you get by pointing a camera at its own screen, but generated here entirely within the electrical circuit.

USING IT

WHAT VIDEO SOURCES CAN YOU USE?

The Dirty Video Mixer accepts any source with a composite video output (yellow RCA), which opens up plenty of possibilities:

- **MiniDV cameras:** many older MiniDV-format camcorders have a composite video output, ideal for using them as a live source.
- **CCTV cameras:** surveillance cameras usually carry an RCA or "coaxial" output that, with a simple adapter, converts to standard composite video; they're cheap and easy to find secondhand.
- **VHS or DVD players:** any domestic player with an RCA video output is a perfect source, whether with tapes or discs.
- **A computer (the most common option):** with an HDMI-to-AV (composite) converter you can use any digital content — videos, generative imagery, even the desktop itself — as a source for the Dirty. It's by far the most versatile option, since it lets you choose exactly what gets injected into the mixer.

WHY THE IMAGE “CUTS OUT” AND HOW TO FIX IT

Since the Dirty Video Mixer blends two composite video sources with no synchronization between them at all (there's no genlock), the resulting signal is quite unstable, especially at the mid-range points of the mixer's potentiometer — right where the actual blend between Video A and Video B happens. At those points, the sync pulses of the two sources collide with each other and the output stops being “clean”.

A modern (digital) TV or projector constantly analyzes this signal to decide whether it's valid; when it detects that the sync is unstable, it often interprets this as “no signal” and shows a blue or black screen, cutting the image out right as the Mix potentiometer reaches its midpoint — the moment when the effect tends to be most interesting.

RECOMMENDATIONS

QUICK AND CHEAP OPTION – CRT (TUBE) TV

These TVs don't do any digital validation of the signal — they simply draw, line by line, whatever they receive, so they tolerate the Dirty's instability perfectly. The Mix output can be connected directly via composite video, or through a composite-to-SCART converter if the TV only has a SCART input. To feed digital sources into the Dirty Video Mixer (for example, from a computer), you can use an HDMI-to-AV (composite) converter, which turns the digital output into a composite video signal that the mixer processes normally. If you want to project the tube TV's picture, you'll need to point a video camera at the TV screen. In that case there won't be any cuts, since the camera sends a stable, synchronized signal to the projector.

A MORE ADVANCED OPTION – TIME BASE CORRECTOR (TBC)

A TBC is a device that rebuilds and stabilizes the sync of an unstable composite video signal, which lets you view the Dirty Video Mixer's output without cuts even on digital screens. Many older composite video mixing desks, such as Roland's or Videonics', have a TBC built in, and can be found relatively cheap secondhand precisely because they're considered obsolete technology today.

In other words, if you don't have any analog gear, the simplest way to start experimenting with the Dirty Video Mixer is with a secondhand CRT TV; when you want to go further and integrate the output with digital equipment, it's worth looking for an old mixing desk with a built-in TBC.

We'll keep updating this document with every new modification to the Dirty Video Mixer – wiki.terata.org/index.php?title=Dirty_Video_Mixer