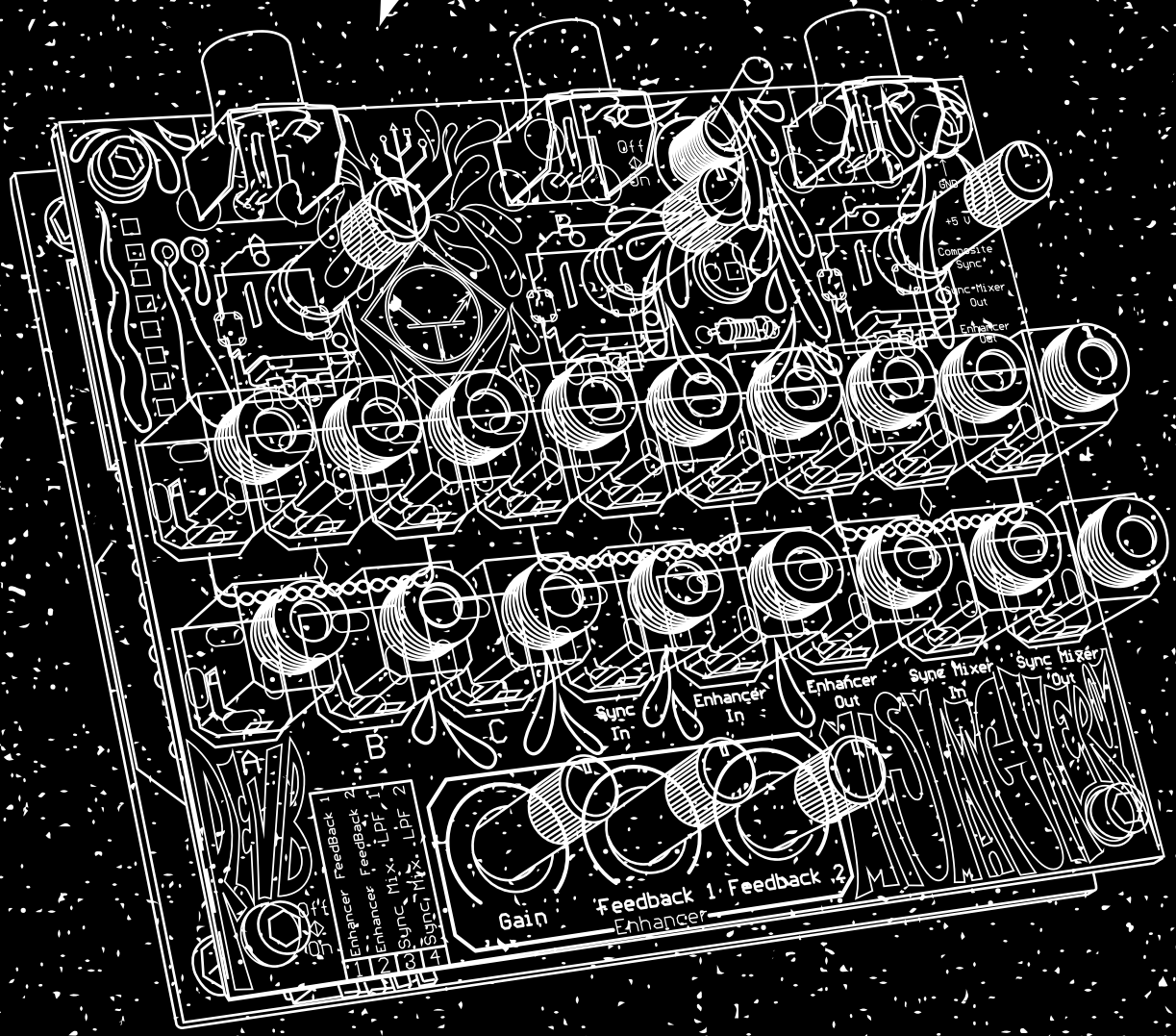
MISMATCHER 01 REVERB

FE
FREEDOM ENTERPRISE
EST. 1995



OWNER'S MANUAL

THANK YOU.

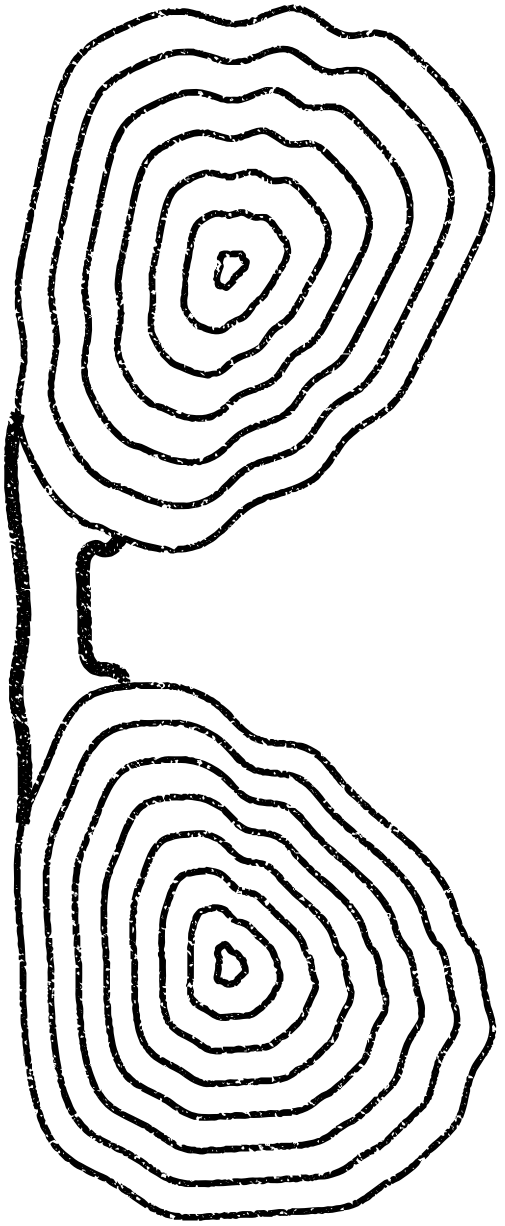
Thank you for purchasing the new MisMatcher01 from Freedom Enterprise. It has been engineered to be a powerful yet compact and handy tool to help you throughout your journey to create effects to your heart's desire. By reading this manual you'll become familiar with the MisMatcher01, how to use it and how to make the most of it.

Good luck, and have a great experience with your brand new video glitcher from Freedom Enterprise.

CONTENTS

II. BASIC MISMATCHER 01 REV.B FEATURES

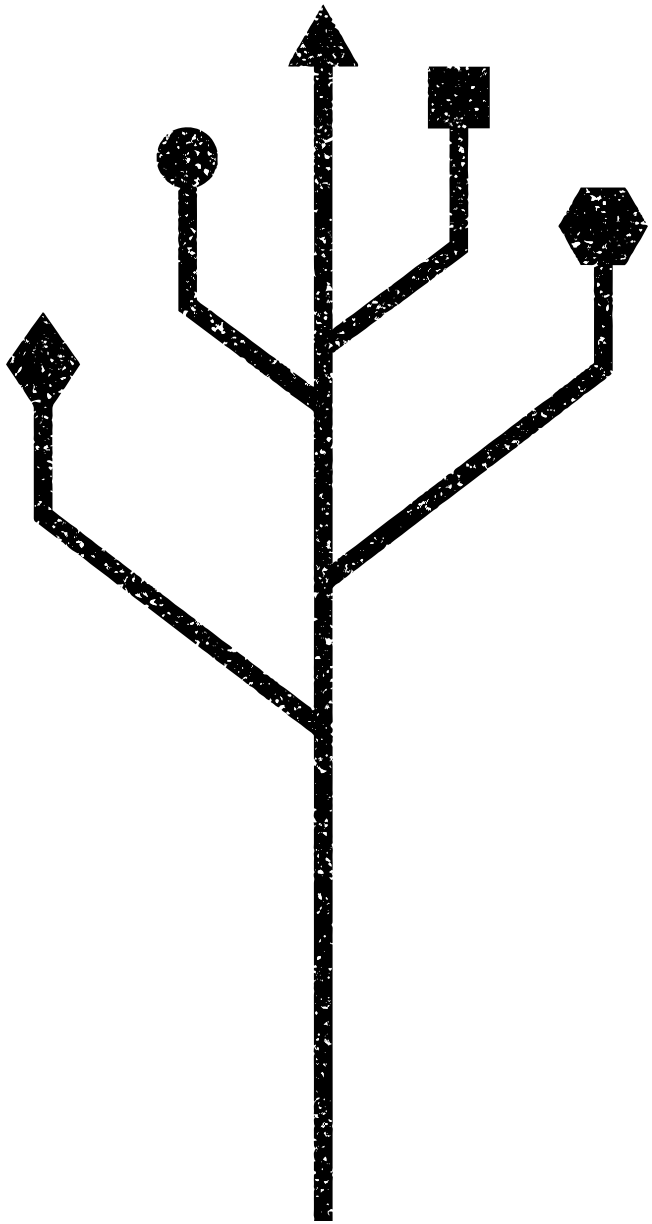
An electronic analog video glitcher is a device designed to distort analog video signals using analog circuitry. The MisMatcher01 contains 3 different analog circuits, Sync Separator, Sync Mixer and Enhancer. Feedback and gain controls are available for the Enhancer, as well as a low pass filter for the Sync Mixer. To mix or attenuate different video signals, three 5 kΩ potentiometers are provided. Video inputs, such as cameras or VCRs, and outputs, such as monitor or ADCs, can be connected to the MisMatcher01 trough three RCA jacks. The user interface provides users with various patch point, enabling them to interconnect different parts of the circuit together for a vast array of effects. To easily visualize the video signal wave, oscilloscope probe points are provided on the main PCB.



III. ASSEMBLY

A. BUILD OF MATERIALS

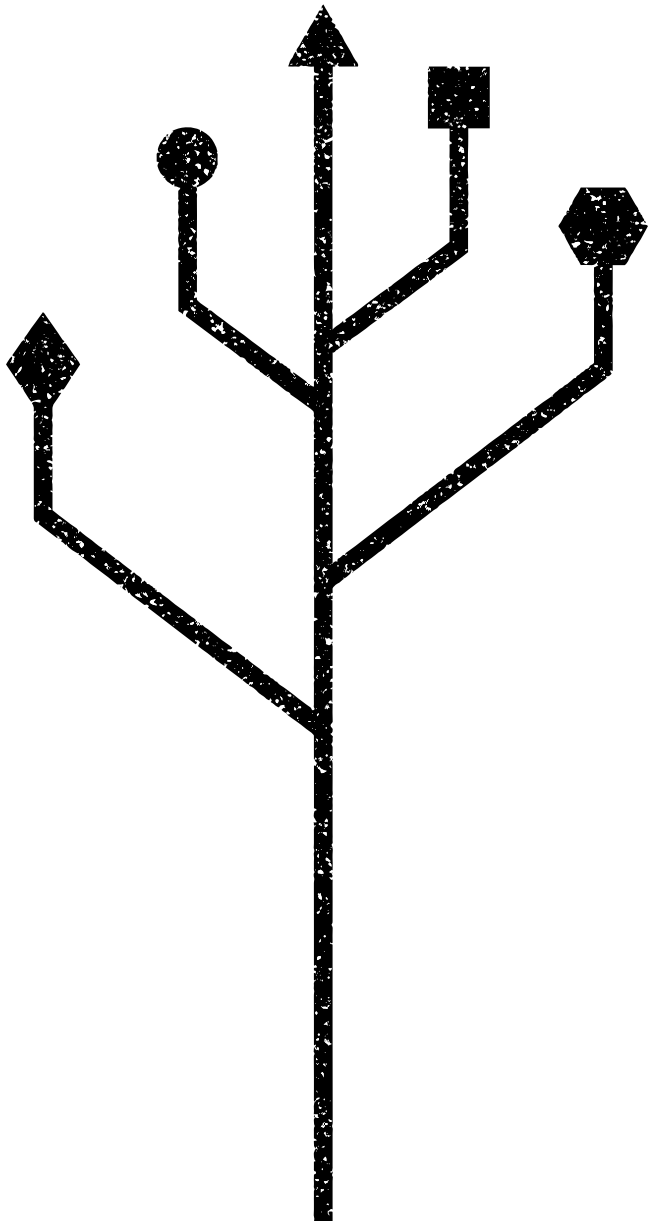
Value	Description	Designator	Quantity
1 nF	Ceramic Capacitor	C1, C5, C22	3
0.1 µF	Ceramic Capacitor	C2, C6, C7, C10, C11, C12, C14, C16	8
220 µF	Electrolytic Capacitor	C3, C4, C8, C9, C13, C15	6
10 nF	Ceramic Capacitor	C21	1
-	Header 1X8 M	CN1	1
-	Micro USB Board	CN2	1
-	Header 1X2 M	CN3, CN4, CN5, CN6	4
-	1N4148	D1, D2	2
-	Ferrite Bead	FB1	1
-	LM1881	IC1	1
-	2N3904	Q1, Q5, Q6	3
-	2N3906	Q2, Q4	2
470 Ω	Resistor 1/4 W	R1, R5, R8, R11, R20	5
75 Ω	Resistor 1/4 W	R2, R4, R9, R10, R12, R21, R24	7
820 Ω	Resistor 1/4 W	R3, R14	2
1 kΩ	Resistor 1/4 W	R6, R7, R22	3
20 kΩ	Resistor 1/4 W	R13	1
2.2 kΩ	Resistor 1/4 W	R15	1
680 kΩ	Resistor 1/4 W	R16	1
7.5 Ω	Resistor 1/4 W	R17	1
100 Ω	Resistor 1/4 W	R18, R23	2
10 kΩ	Resistor 1/4 W	R19	1
5 kΩ	R09 Potentiometer	RV1, RV2, RV3	3
-	SPDT Switch	SW1	1
-	Piano DIP Switch	SW2	1



B. USER INTERFACE

Start by placing the PJ-341 jacks and solder them. Snap the gold RCA jacks and potentiometers in place. Place the LED in the right orientation as well as the 270 Ω current limiting resistor. Solder these remaining components. The male header will be soldered later on.

To passively mix two video signals with one potentiometer, solder a 500 Ω resistor from one fixed end of potentiometer A to the wiper, and another 500 Ω resistor from the other fixed end of potentiometer A to the wiper.



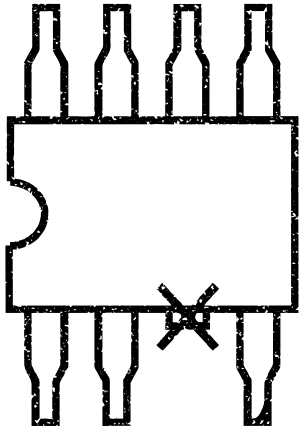
C. MAIN PCB

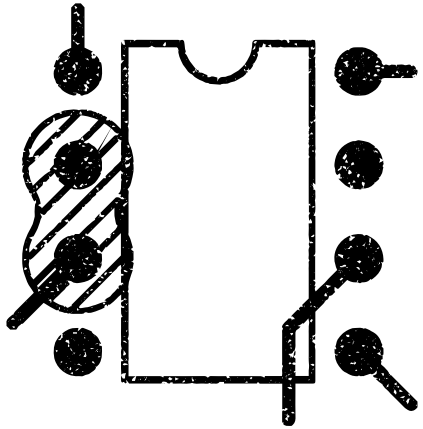
Start with the smaller components, such as resistors, diodes, ceramic capacitors and the ferrite bead. Note that the diodes have polarity and must be installed in the correct orientation. Follow this by installing the electrolytic capacitors and transistors. These also have their own orientation, printed on the PCB. Trim the excess leads.

Use four of these trimmed leads and solder them on the Micro USB connection, in the main PCB. Place the Micro USB connector flush with the main PCB and solder it to the previously soldered leads. Trim the excess.

Snap the three potentiometers in place along with the DIP switch and jumpers. Solder them.

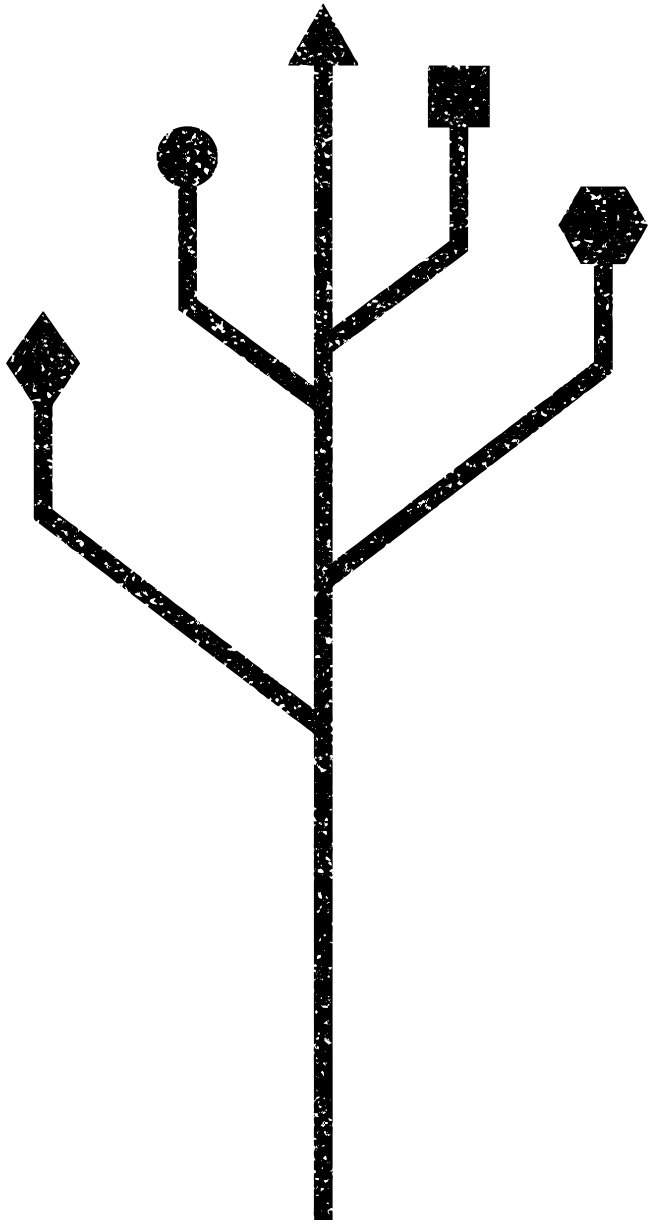
Place the LM1881's socket in place. When soldering, jump pin 2 and 3 together with solder. Trim pin 3 off the LM1881. Install the LM1881 only after soldering the socket.





Place the power switch, as well at the female header on the main PCB and the male header on the user interface. Secure the two PCBs with the provided brass screws and standoffs. With these components secured in place, solder them.

To finish off, remove flux residue left behind and perform a visual inspection.



IV. BOOTING UP

With the 2 PCBs mounted together, connect a Micro USB charger to the Micro USB port and turn the switch on. The LED should light up.

Connect a video source to jack A and a monitor do jack C. Patch these 2 points together and you should see the source on the monitor. Connect A to Sync Mixer Input and C to Sync Mixer Output. A clear image should appear.

Connect A to Enhancer Input and C to Enhancer Output. A clear yet sharper image than before should appear on the monitor. Enable the Enhancer Feedback 1 e 2 on the DIP switch. Rotate the Gain, Feedback 1 and 2 potentiometers and confirm that the image changes on the monitor.

V. PASSIVE MIXERS / ATTENUATORS

The three potentiometers in the user interface can be used to either attenuate the intensity of a video signal, or to fade between two different video signals.

VI. SYNC SEPARATOR AND SYNC MIXER

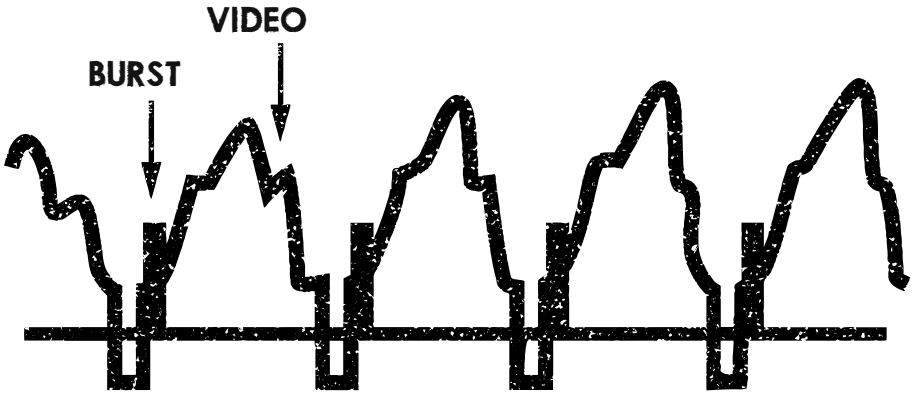
The key to a stable picture is a good sync signal. The mixing, attenuation and distortion of video signals can deteriorate sync, leading to horizontal or vertical scrolling of video on screen. When the lost of sync is undesired by the user, the sync separator and sync mixer can come into play.

The sync separator, based on the LM1881, extracts the sync portion of the video signal. The sync mixer then takes a distorted video signal and remixes it with the sync provided by the sync separator, resulting in a stable image.

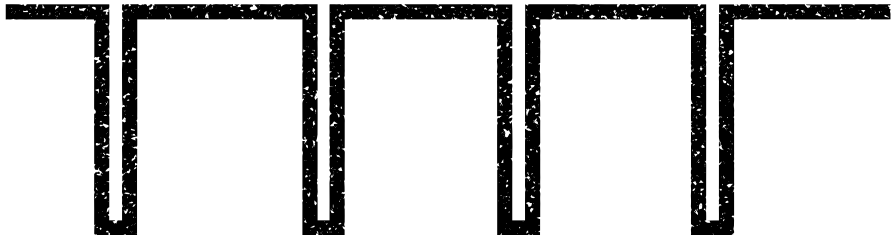
Instead of restoring the sync of a video signal, the user can also sync, for example, video source A with video source B's sync, resulting in a slow horizontal and vertical scrolling of video source A.

A two-stage low pass filter, switchable through the DIP switch, is also built into the Sync Mixer, enabling user to create a ghostly effect.

To improve stability and compatibility with cameras and monitors, a switchable input and output impedance of 75 Ω is available on the main PCB.



Composite Video



Composite Sync

VII. ENHANCER

This video enhancer can be used to either boost saturation and sharpness of the video or, using the provided Gain and Feedback 1 and 2 controls, to distort the video and create interesting effects. The gain controls how much the signal is amplified. Feedback 1 and 2, switchable through the DIP switch, take video from different stages of the circuit and feeds it back into the Enhancer's input. These, along with the gain control, can be used to create an edge detector and repeater on the video.

To improve stability and compatibility with cameras and monitors, a switchable input and output impedance of 75 Ω is available on the main PCB.

VIII. TROUBLESHOOTING

- The LED doesn't turn on.

1. Using a multi-meter, check for 5V on the oscilloscope probing points. If 5V are present, confirm the LED is in the correct orientation.

2. If 5V are not present, use a different Micro USB cable and charger and check the polarity of the diode in the PSU section.

- No video output from one of the stages.

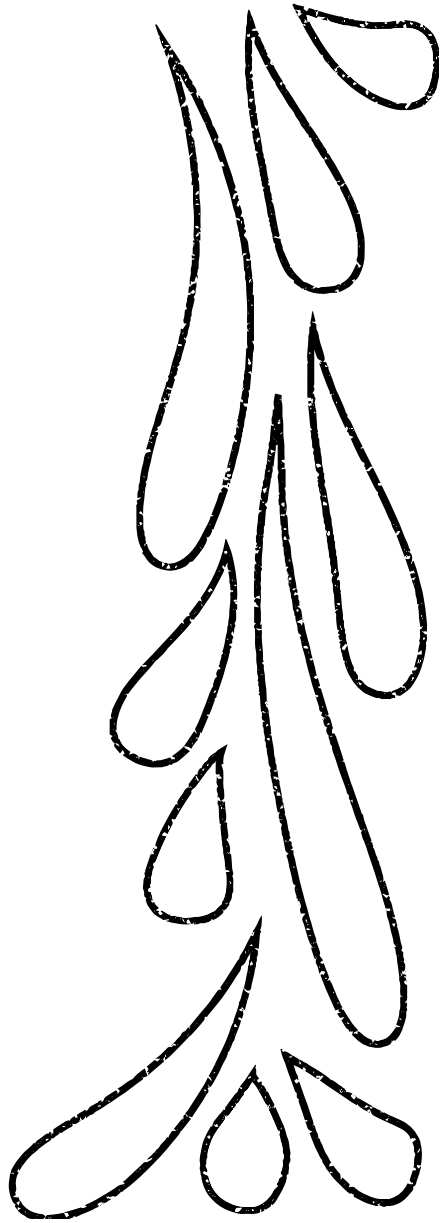
1. Ensure the capacitors and transistors are in the right orientation.

2. Check the voltages in these locations.

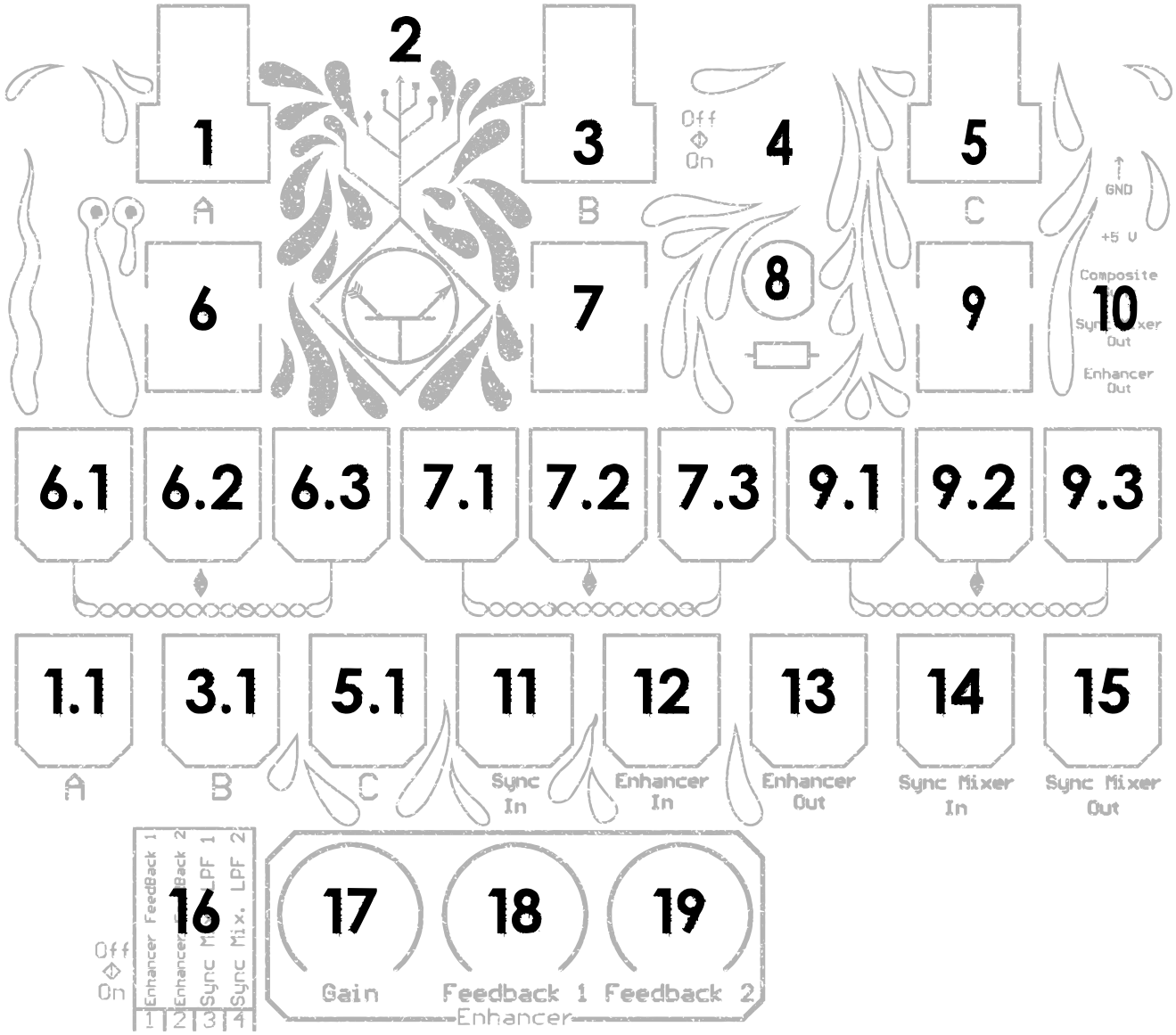
Test condition: power on, all DIP switch positions off, gain at full CCW position, all 75 Ω jumpers on, no inputs connected.

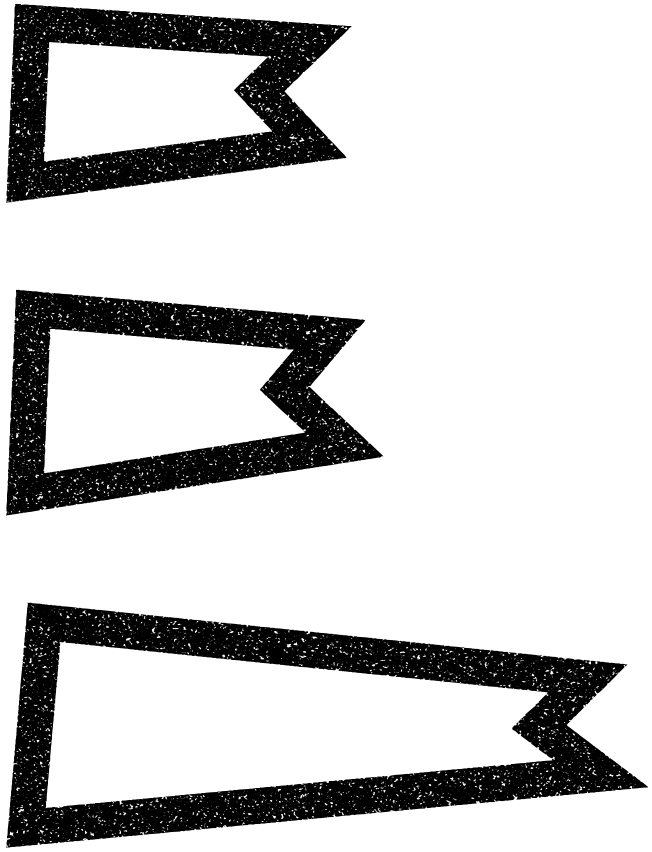
All measures in V
Q1:
C:4.220 B:2.786 E:2.136
Q2:
C:3.374 B:4.220 E:4.880
Q4:
C:1.576 B:4.570 E:5.000
Q5:
C:5.090 B:5.060 E:4.390
Q6:
C:4.580 B:1.579 E:1.037

If your measured values are more than 10% off, ensure you have installed the correct resistor values in each section.



IX. USER INTERFACE





1 RCA Connector A

1.1 RCA Access Point A

2 Micro USB

3 RCA Connector B

3.1 RCA Access Point B

4 On/Off Switch

5 RCA Connector C

5.1 RCA Access Point

6 Potentiometer A

6.1 Potentiometer A Fixed Access Point

6.2 Potentiometer A Wiper Access Point

6.3 Potentiometer A Fixed Access Point

7 Potentiometer B

7.1 Potentiometer B Fixed Access Point

7.2 Potentiometer B Wiper Access Point

7.3 Potentiometer B Fixed Access Point

8 Power LED

9 Potentiometer C

9.1 Potentiometer C Fixed Access Point

9.2 Potentiometer C Wiper Access Point

9.3 Potentiometer C Fixed Access Point

10 Oscilloscope probing points

11 Sync Separator Input

12 Enhancer Input

13 Enhancer Output

14 Sync Mixer Input

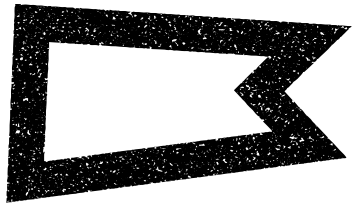
15 Sync Mixer Output

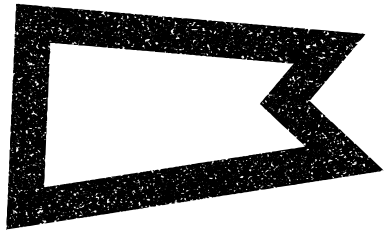
16 DIP switch

17 Enhancer Gain

18 Enhancer Feedback 1

19 Enhancer Feedback 2

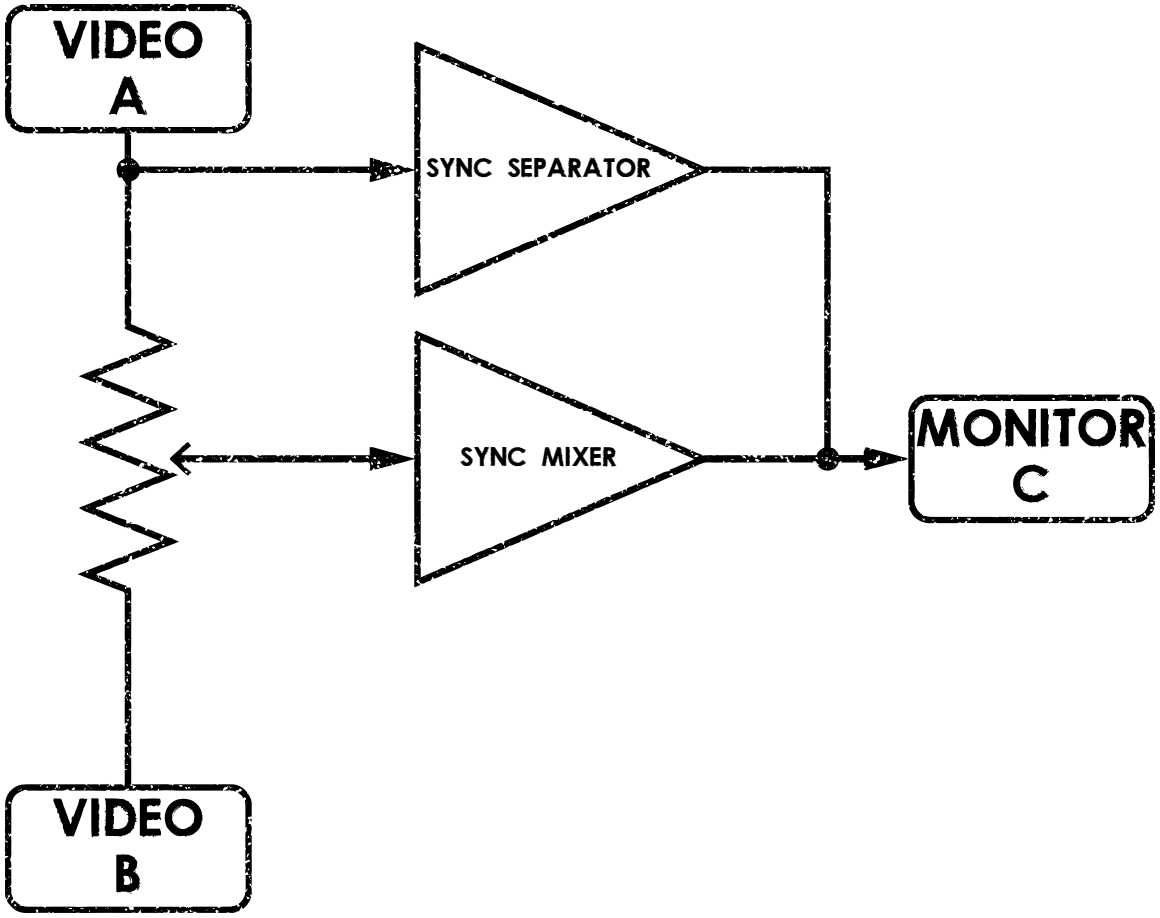


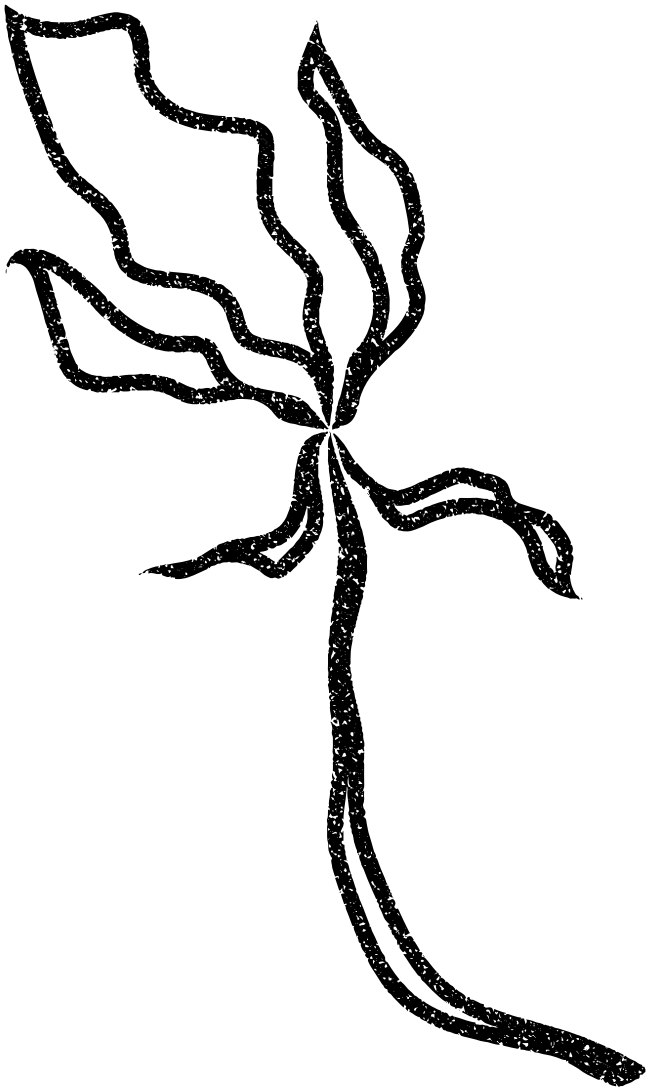


X. PATCHING EXAMPLES

- **Dirty Mixer with Sync**

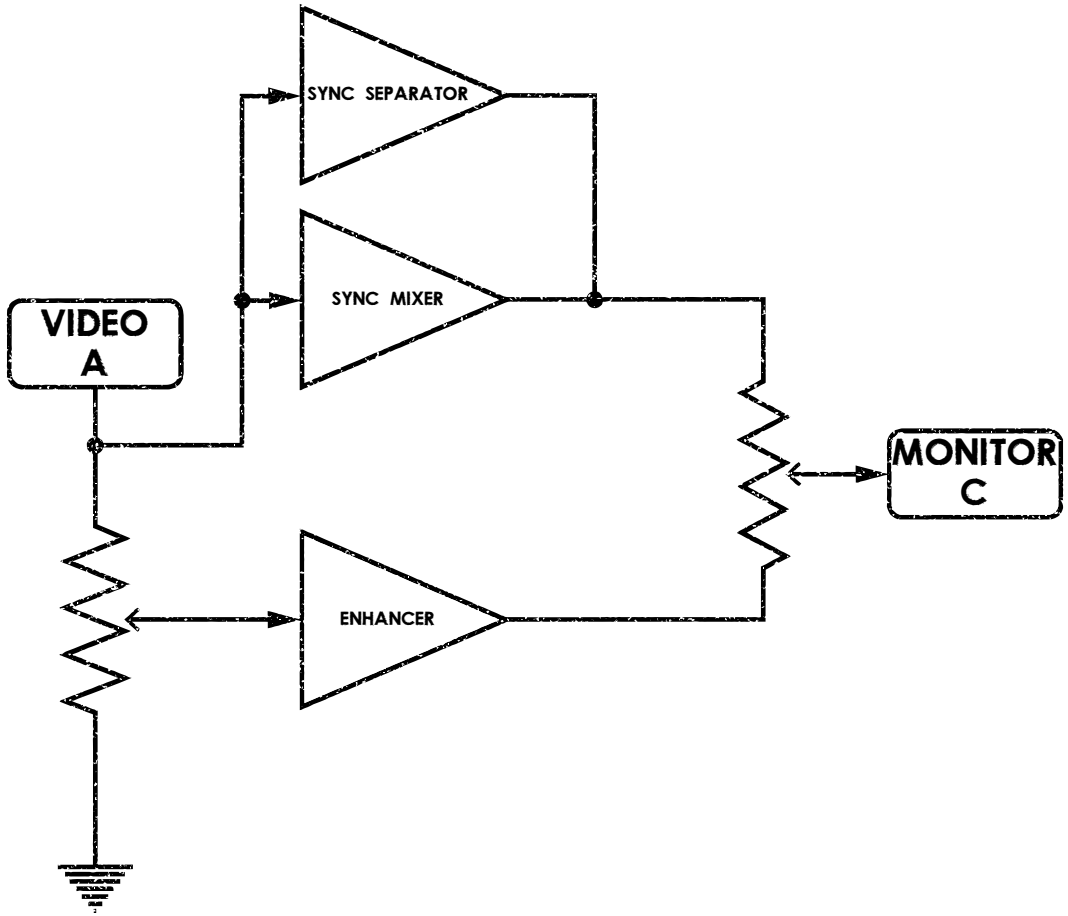
Fade between two different video signals but preserve the sync of one of them.

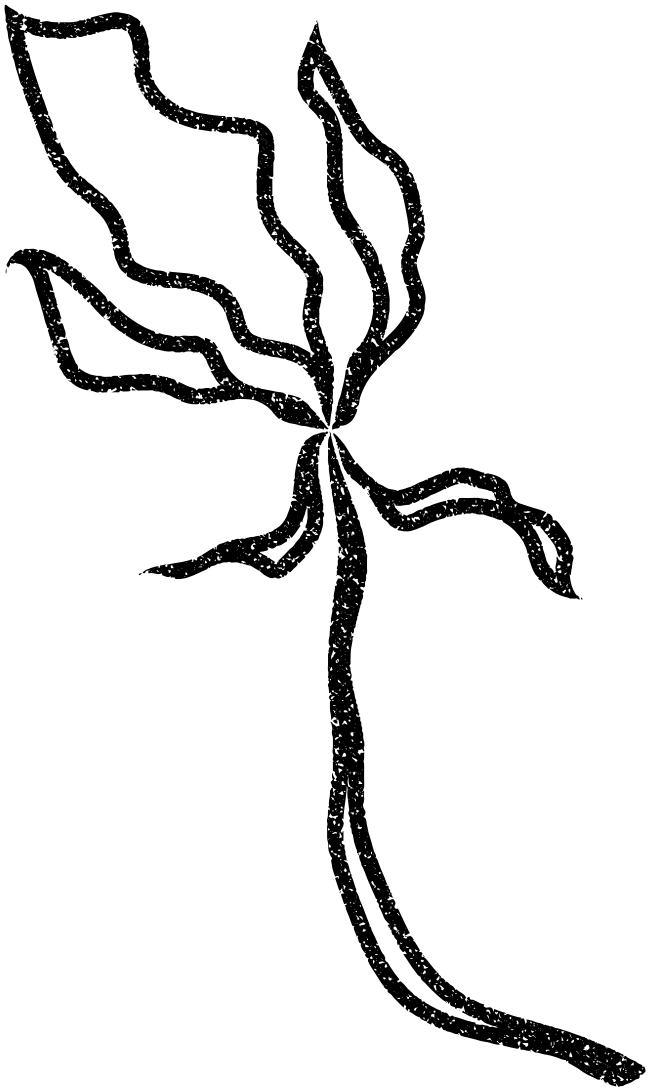




- **Edge Detection**

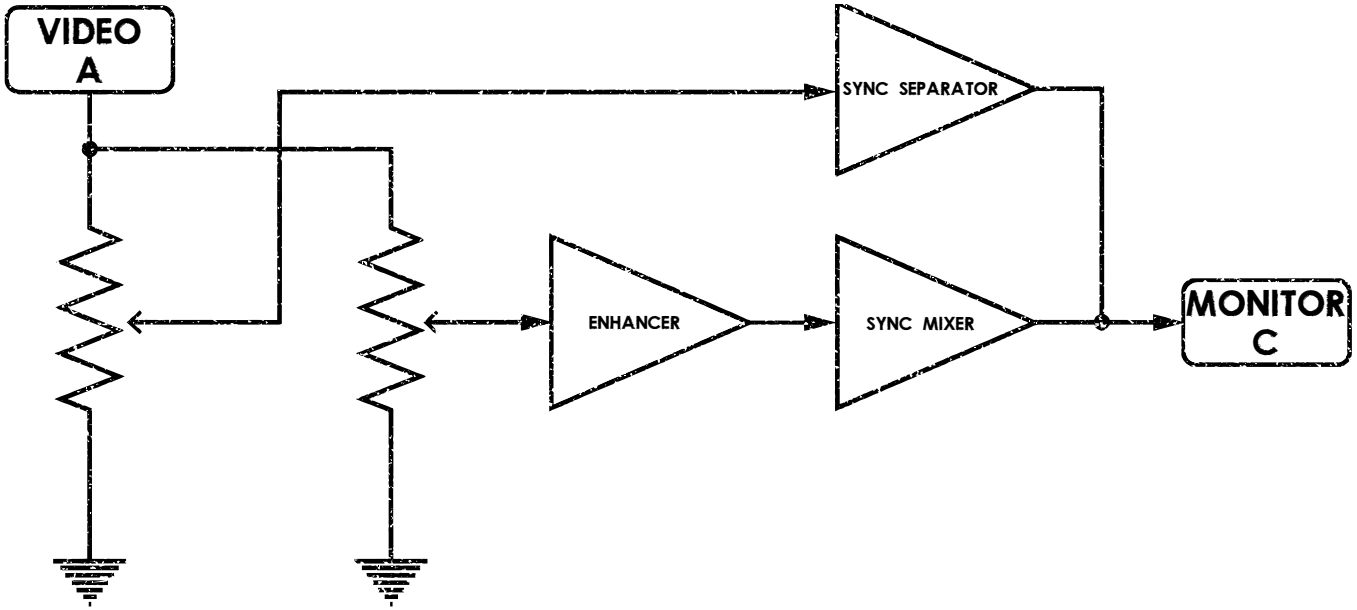
Use the Gain and Feedback controls of the Enhancer to achieve the desired result. Use a potentiometer to attenuate the signal coming into the Enhancer and use another one to fade between the clean and glitched signal.

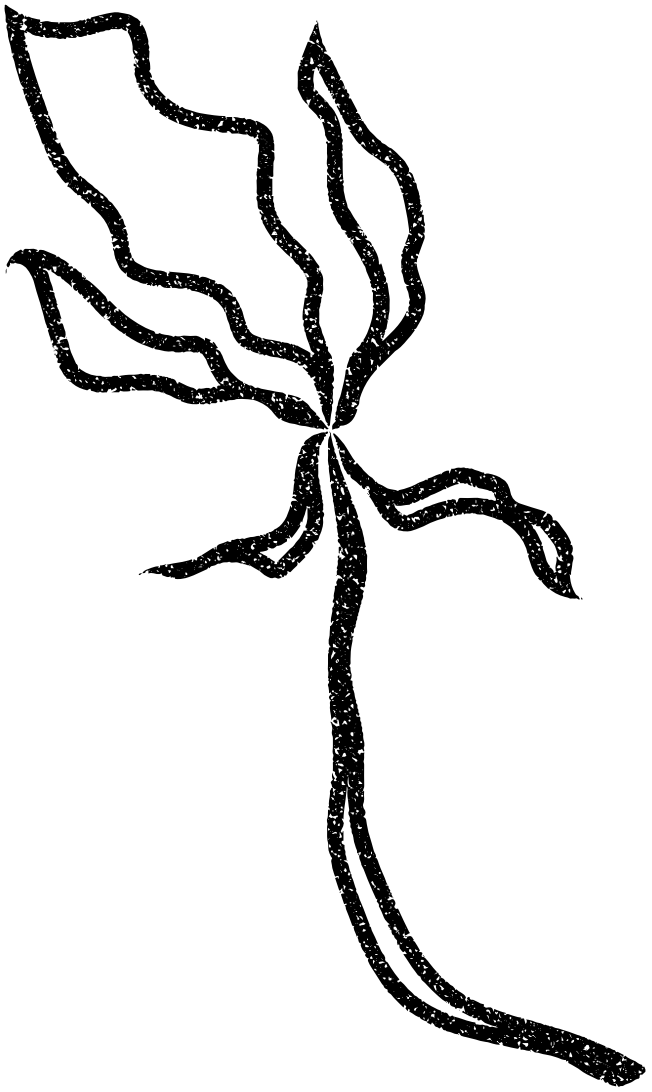




- **Total Signal Annihilation**

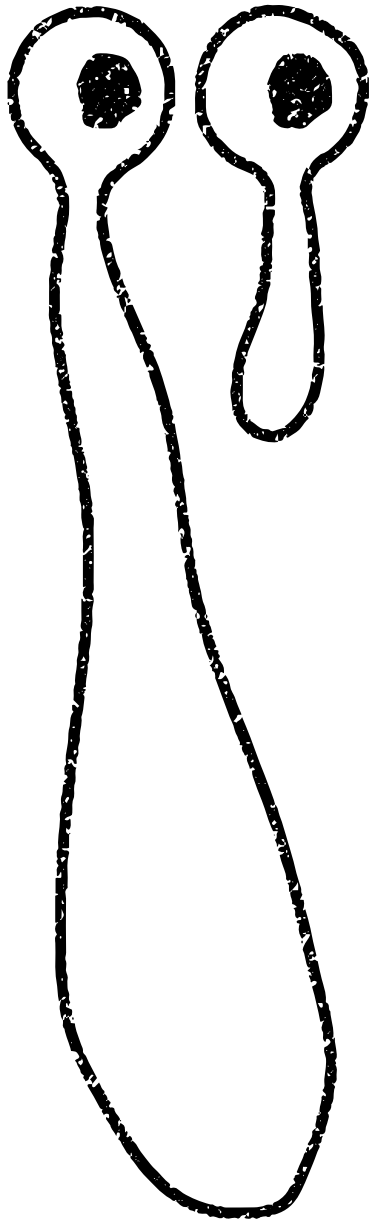
Completely destroy your video signal with the Enhancer and then restore some of it's former glory with the Sync Mixer. Attenuate the signal coming into the Sync Separator and use the Low Pass Filters for an extra layer of effects.



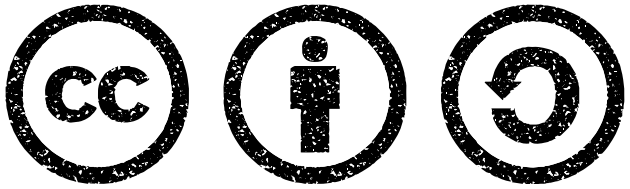


XI. SPECIFICATIONS

Size	100x83 mm
DC Input	5 V
Power Consumption	35 mA @ 5 V
Video Format	NTSC/480i & PAL/576i
Voltage Level	2 V_{pk-pk}

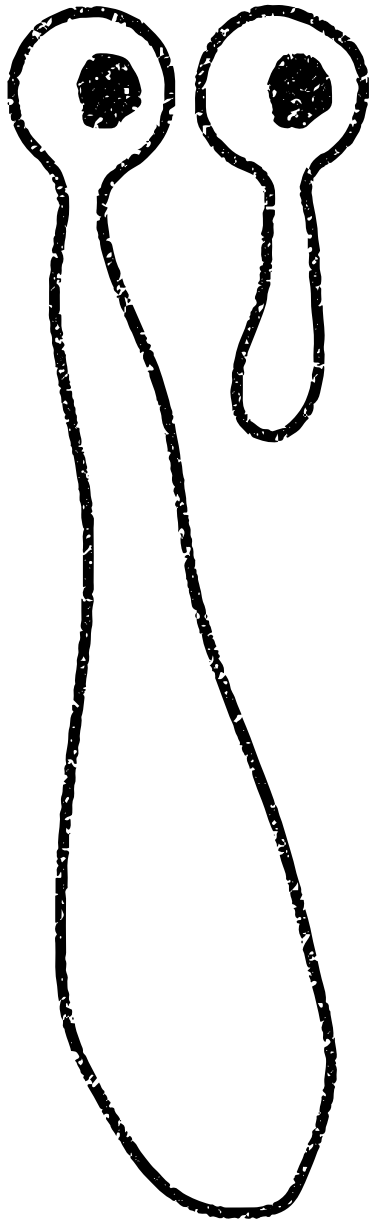


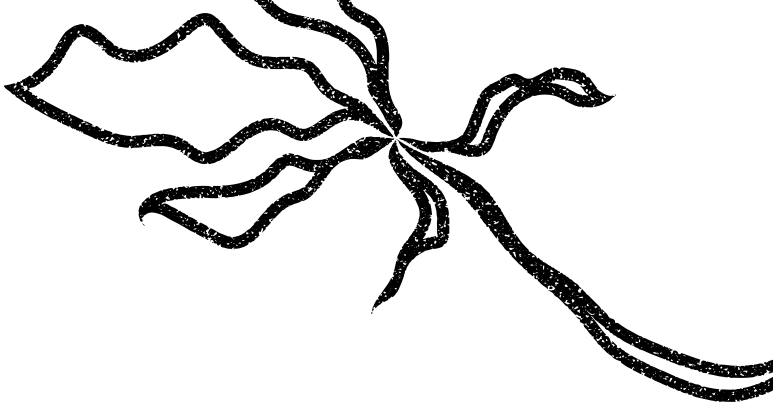
XII. CREATIVE COMMONS LICENSE



XIII. WARRANTY

Fully assembled versions of this product are covered by warranty for one year following the date of purchase. This warranty covers any defect in the manufacturing of this product, such as assembly errors or faulty components. This warranty does not cover any damage or malfunction caused by incorrect use, such as, but not limited to, power cables connected backwards, excessive voltage levels, or exposure to extreme temperature or moisture levels. The cost of returning a product for repair or replacement is paid for by the customer. DIY kits and bare printed circuit boards are not covered under any warranty and come with no guarantee of assembly troubleshooting or customer support (although I'll try help you out).





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Revision A August 2020
Written by Pedro Silva
Art by Seni

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