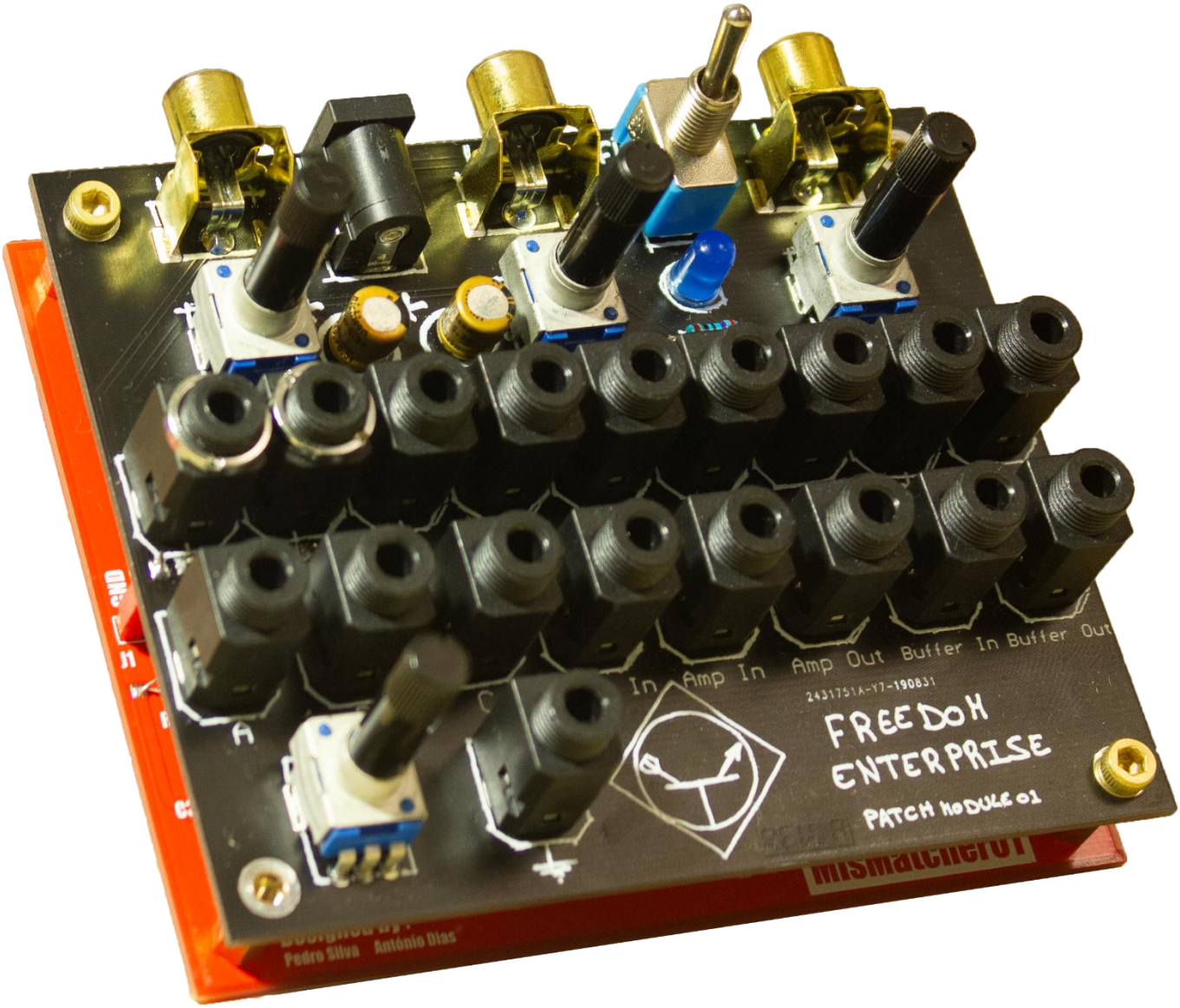
MISMATCHER01
PATCHMODULE01
OWNER'S MANUAL



FREEDOM ENTERPRISE

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Revision B
November 2019
Written by Pedro Silva

Special thanks to **Gieskes** and **LZX Industries** for inspiring me to follow this project.

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MISMATCHER01

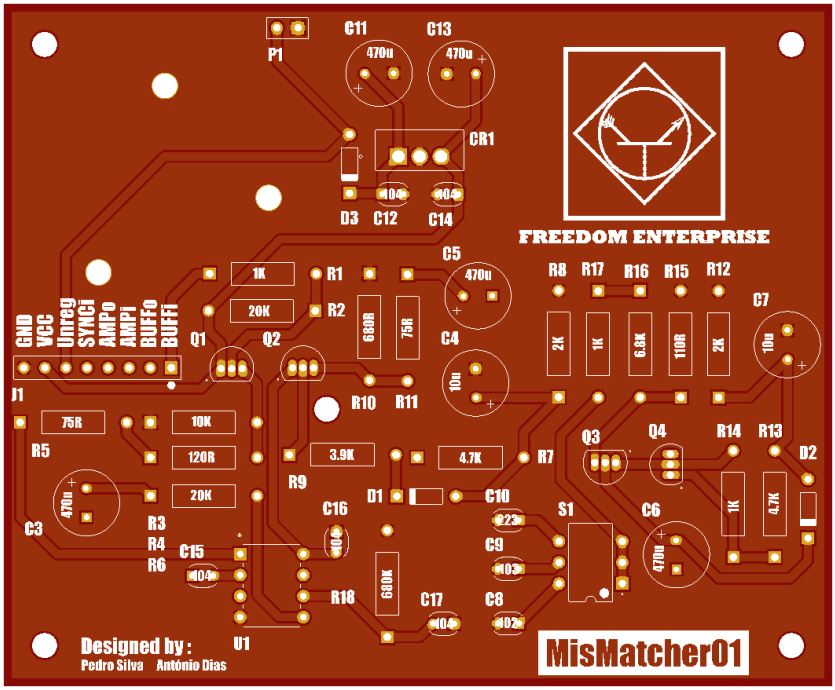


Figure 1 MisMatcher01 PCB

ABOUT

The MisMatcher01 is an analog video effects unit comprised of a sync mixer and an amplifier. It's intended to work in tandem with another control board trough a connection header. The sync mixer extracts the sync pulses from a video signal and mixes them with another video signal. It's used to restore the sync timing after modifying a video signal or to re-sync a video signal with another video. The amplifier is based on the modified Archer Video Enhancer with variable gain.

SPECIFICATIONS

DC Input	7-20 V Negative Tip
Power Consumption	33 mA @ 9 V
Video Format	NTSC/480i & PAL/576i
Voltage Level	2 V_{pk-pk}
Size	100x83 mm

BLOCK DIAGRAM

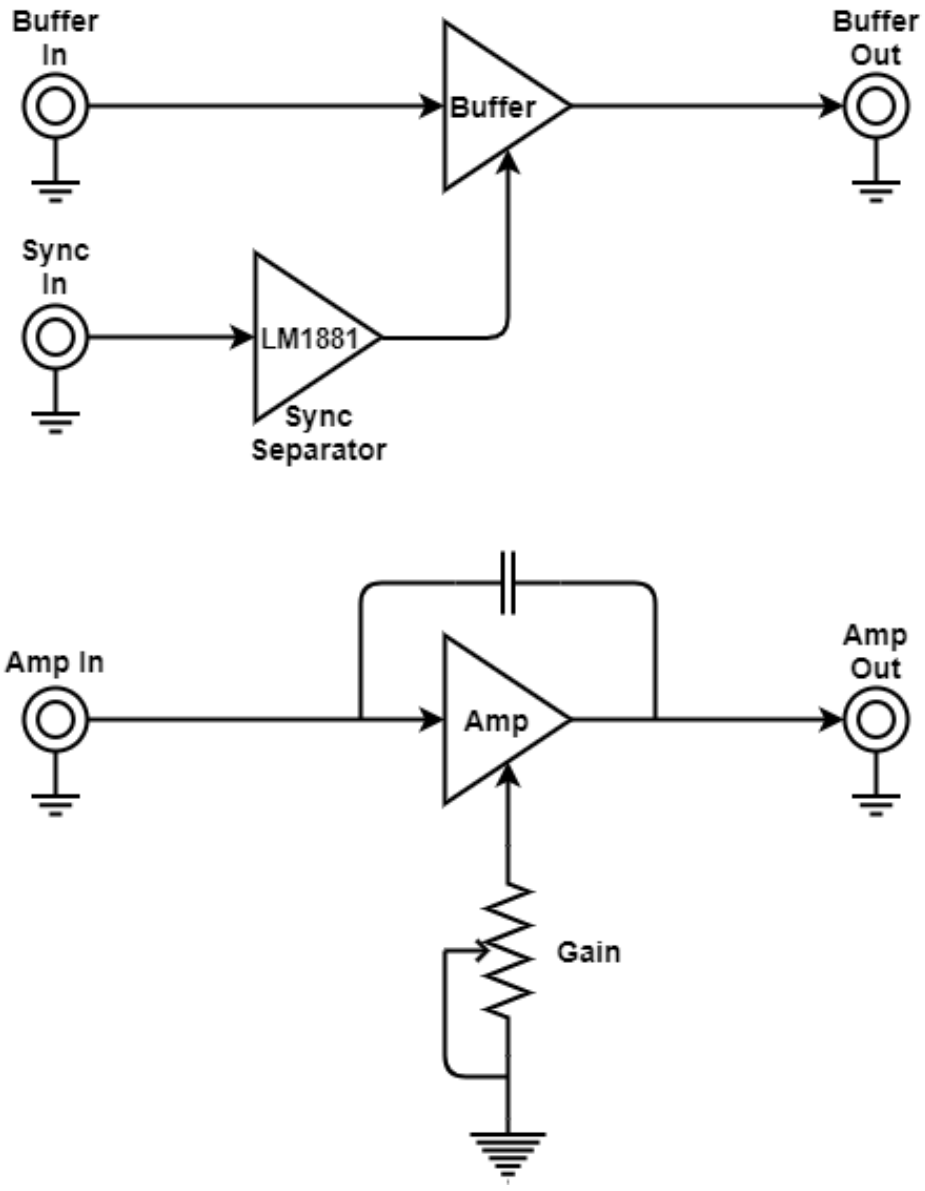


Figure 2 MisMatcher01 Block Diagram

BILL OF MATERIALS

Qty	Description	Value	Reference
6	Nichicon Electrolytic Capacitor	220 μF 6.3 V	C3, C4, C5, C6, C7, C13
4	Ceramic Capacitor	0.1 μF	C12, C14, C15, C16, C17
3	Diode	1N914	D1, D2, D3
1	Jumper	-	R17
2	¼ W Resistors	75 Ω	R5, R11
2	¼ W Resistors	120 Ω	R4, R15
1	¼ W Resistors	470 Ω	R16
1	¼ W Resistors	680 Ω	R10
2	¼ W Resistors	1 $K\Omega$	R1, R14
2	¼ W Resistors	2 $K\Omega$	R8, R12
1	¼ W Resistors	3.9 $K\Omega$	R9
1	¼ W Resistors	4.7 $K\Omega$	R13
1	¼ W Resistors	10 $K\Omega$	R3
2	¼ W Resistors	20 $K\Omega$	R2, R6
3	Transistor	BC237	Q1, Q2, Q3
1	Transistor	2N3906	Q4
1	8 Pin Male Header	-	J1
1	5V Linear Voltage Regulator	78L05	CR1
1	Sync Separator IC	LM1881	U1
-	Leave Empty	-	C8, C9, C10, C11, S1

ASSEMBLY

Figure 3 2.2 nF capacitor

Assembly the board with the provided components **following the bill of materials.**

Install CR1 with the flat face facing C11 and C13.

Install the 2.2 nF capacitor as shown on Figure 3, near S1.

Leave C8, C9, C10 and S1 empty.

Clean the flux residue left behind.

PATCHMODULE01

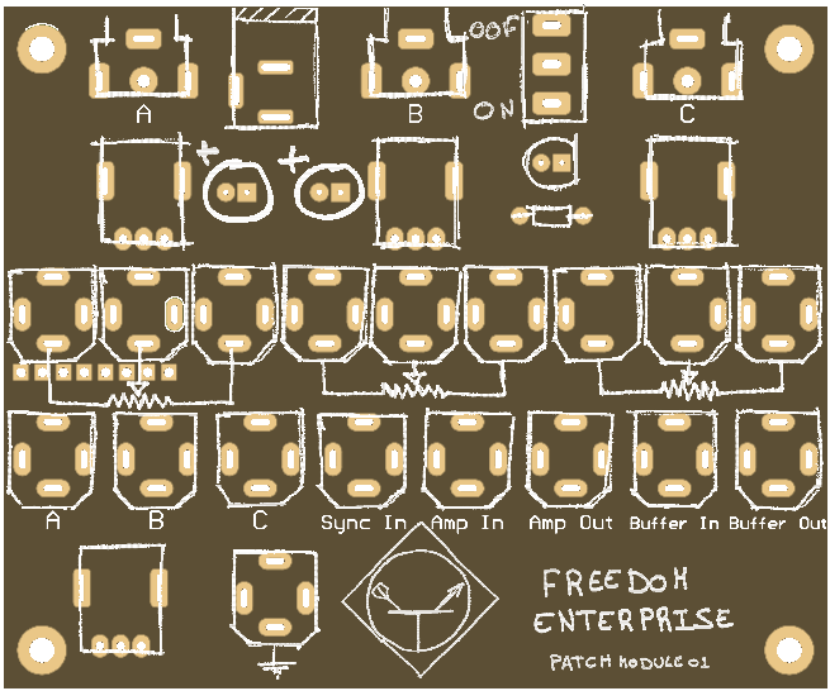


Figure 4 PatchModule01 PCB

ABOUT

The PatchModule01 is a 3.5 mm patch cable control module for the MisMatcher01. It works as the user interface, providing input and output RCA jacks, 3 mixers and an easy way to combine different video signals with the different functions of the MisMatcher01. **The 3.5 mm stackable patch cables are needed but not included.**

BILL OF MATERIALS

Qty	Description	Value
2	Nichicon Electrolytic Capacitor	220 μF 6.3 V
1	LED	-
1	8 Pin Female Header	-
3	¼ W Resistors	1 $K\Omega$
18	Vertical 3.5 mm Jack	-
1	SPDT Switch	-
4	Potentiometer	20 $K\Omega$
3	Gold RCA Jacks	-
2	12 mm Spring Pin	-

ASSEMBLY

Figure 5 Potentiometer A Resistors

Start by soldering the red 8-pin female header.

Solder the two 220 μF electrolytic capacitors, the 1 $K\Omega$ resistor and LED. Solder the remaining components. If you have any trouble fitting the RCA jacks and potentiometers to the PCB, please use a plier to straighten out the component's leads. Beware that two of the 3.5 mm jacks have had a specific pin removed in order to fit in the PCB.

Solder the two 1 $K\Omega$ resistors on potentiometer A as shown on Figure 5.

Clean the flux residue left behind. Finish off by soldering the two 12 mm spring loaded SMD pin on the back. Make sure they are centred on the pad and that they make contact with the resistor underneath on the MisMatcher01 board when assembled.

USER INTERFACE

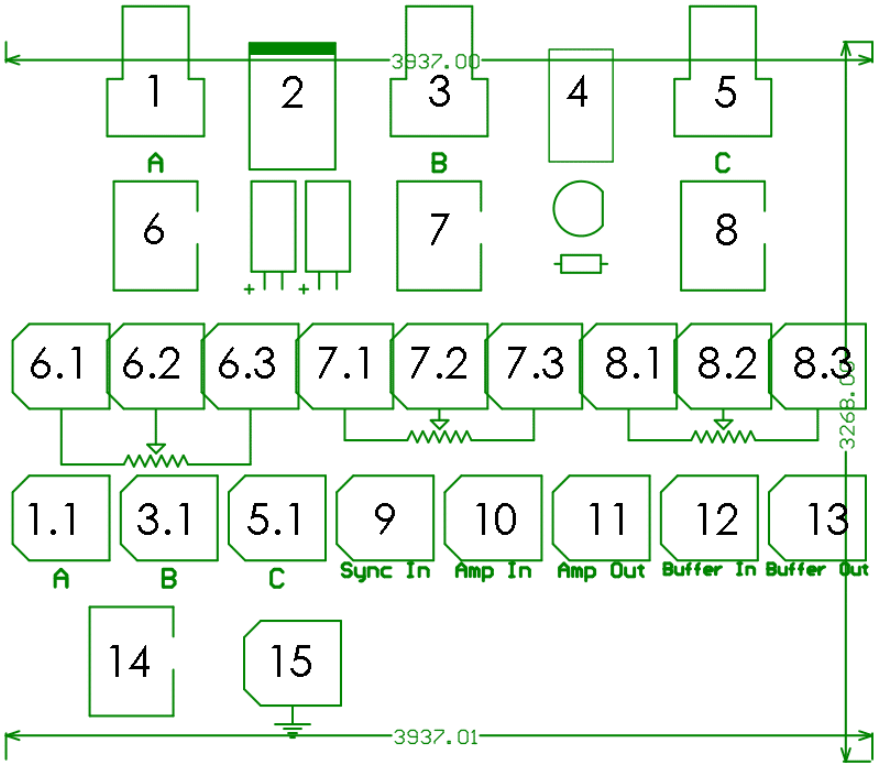


Figure 6 PatchModule01 Layout

1 RCA Connector A
- **1.1** RCA Access Point A

2 2.1 mm X 5.5 mm DC Jack

3 RCA Connector B
- **3.1** RCA Access Point B

4 On/Off Switch

5 RCA Connector C
- **5.1** RCA Access Point C

6 1.5 $K\Omega$ Potentiometer A
- **6.1** Potentiometer Fixed Access Point
- **6.2** Potentiometer Wiper Access Point
- **6.3** Potentiometer Fixed Access Point

7 20 $K\Omega$ Potentiometer B
- **7.1** Potentiometer Fixed Access Point
- **7.2** Potentiometer Wiper Access Point
- **7.3** Potentiometer Fixed Access Point

8 20 $K\Omega$ Potentiometer C
- **8.1** Potentiometer Fixed Access Point
- **8.2** Potentiometer Wiper Access Point
- **8.3** Potentiometer Fixed Access Point

9 Sync Separator Input

10 Amplifier In

11 Amplifier Out

12 Buffer In

13 Buffer Out

14 Amplifier Gain (Full CW position is the standard setting)

15 Ground Access Point

PATCHING EXAMPLES
CROSS DISSOLVE
Video Input: A and B
Video Output: C
Connect source A to the fixed end of potentiometer A. Connect source B to the other fixed end of the same potentiometer. Connect the potentiometer wiper to the output C. Rotate the potentiometer and the video output will cross fade between A and B, loosing sync in between.

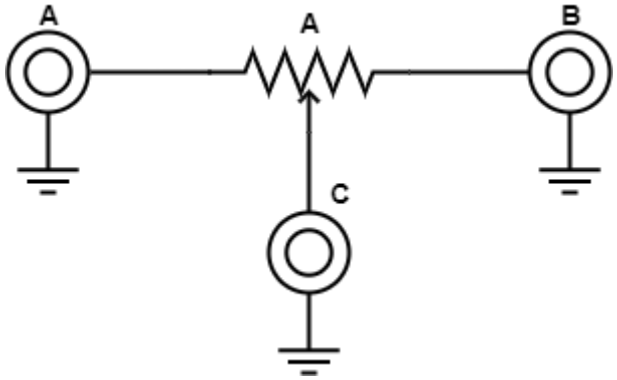


Figure 7 Cross Dissolve

ATTENUATOR

Video Input: A
Video Output: C
Connect the source A to the fixed end of potentiometer A. Connect the other fixed end to the ground jack. Connect the potentiometer wiper to C. This will create a voltage divider, reducing the signal intensity, loosing detail, colour and sync in the process.

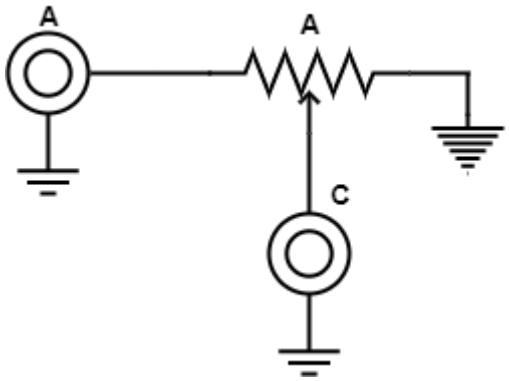


Figure 8 Attenuator

CROSS DISSOLVE WITH SYNC LOCK

Video Input: A and B
Video Output: C
Connect source A to the fixed end of potentiometer B. Connect source B to the other fixed end of the same potentiometer. Connect the potentiometer wiper to Buffer In. Connect the video source whose sync you want to restore (A or B) to Sync In. Connect Buffer Out to the Output C. Rotating the potentiometer will output a cross dissolve of the two sources, but the sync of one of them is maintained.

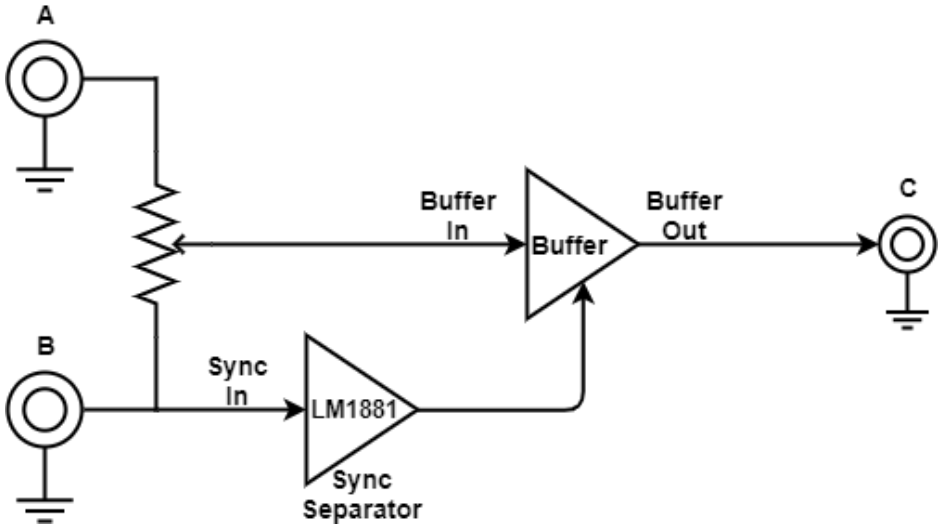


Figure 9 Sync Lock

VIDEO ENHANCER WITH SYNC RESTORATION

Video Input: A
Video Output: C
Connect source A to Amp In. Connect Amp Out to Buffer In. Connect Buffer Out to C. Connect A to Sync In. Turn the Gain potentiometer to control the picture contrast. Pass any of the previous connection trough a potentiometer to create different effects. You can also combine the final result with the original input trough a potentiometer.

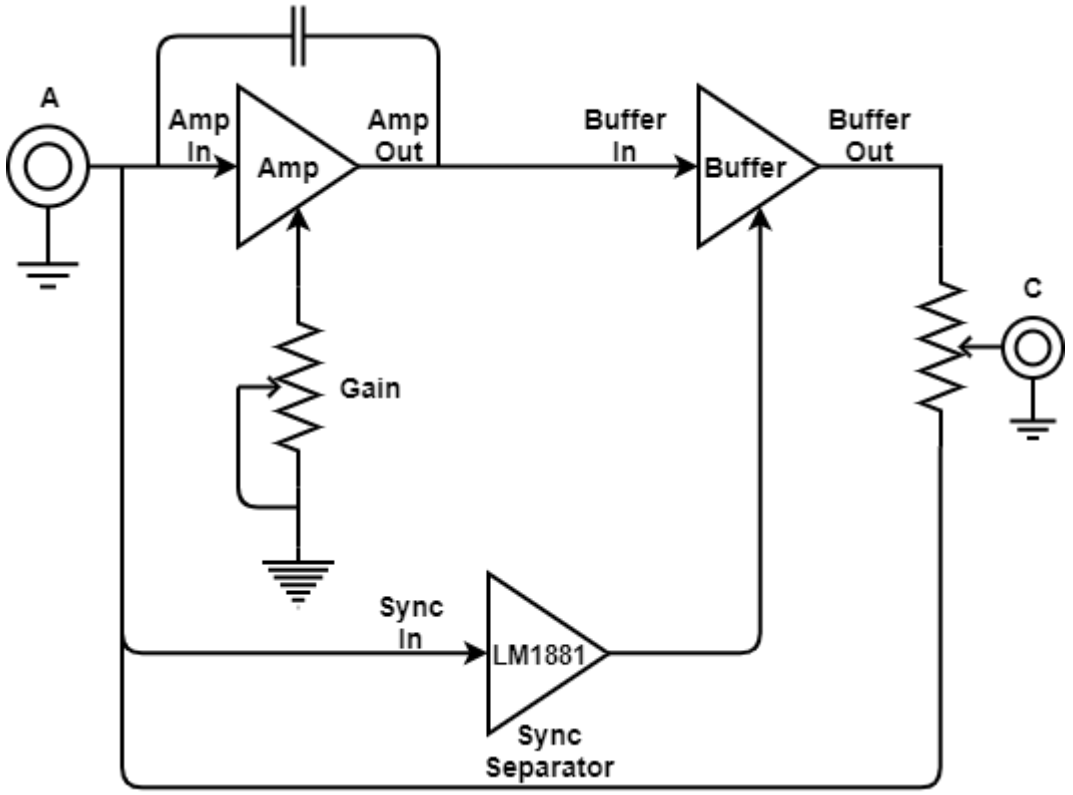


Figure 10 Video Enhancer with Sync Restoration

VIDEO ENHANCER

Video Input: A
Video Output: C
Connect source A to the fixed end of potentiometer B. Connect the other end to ground. Connect potentiometer's B wiper to Amp In. Connect Amp Out to the fixed end of potentiometer C. Connect the other fixed end to ground. Connect the wiper to output C. Control the gain potentiometer to vary the contrast and other effects.

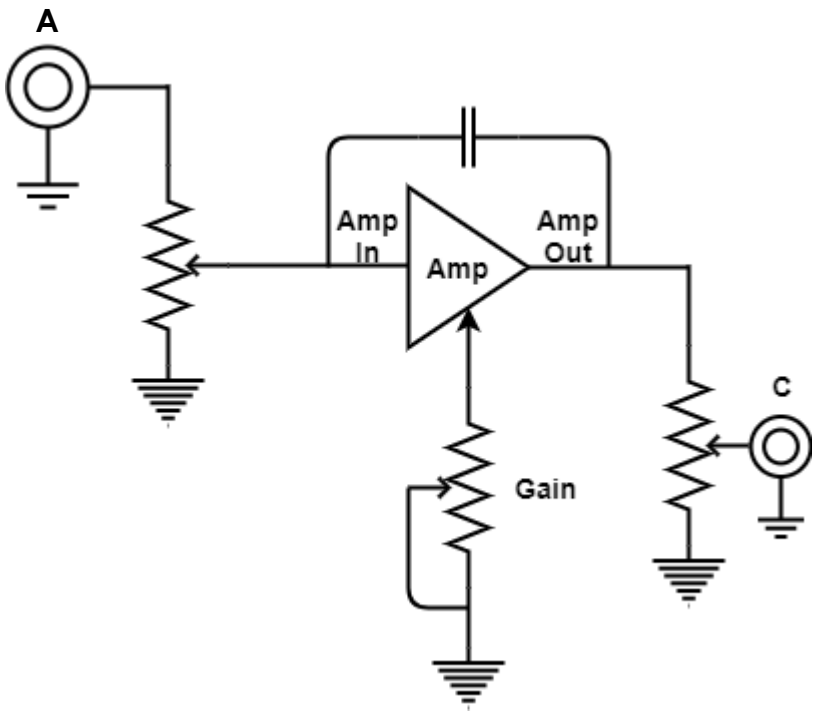
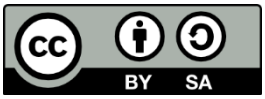


Figure 11 Video Enhancer

CREATIVE COMMONS LICENSE



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).