Thank you for your purchase of the Fluxus analog glitch video processor D-I-Y kit.

At your fingertips is a little analog computer capable of rich sync corruption, drop shadow and edge feedback/ringing effects. I've done my best to pack this thing with a number of useful visual degradation aesthetics. I also hope it to be the first in a series of BPMC DIY glitch video builds. You will find this to be a pretty straight forward build with a couple of interesting customization options. Some components are polarity sensitive. Be sure to orient components correctly. Always double check your work before firing the board up. I assume that with the construction of this kit you have basic soldering skills.

BPMC DIY WARNING: Build at your own risk. BPMC CANNOT & WILL NOT BE HELD RESPONSIBLE FOR BOARDS THAT DO NOT WORK. BPMC is also not responsible for damage or injury incurred as a result of the improper construction of this kit. Replacement components cannot be sourced thru BPMC. ALWAYS SOLDER IN A WELL-VENTILATED SPACE. FLUX & SOLDER FUMES ARE TOXIC. DO NOT SOLDER WHILE FLUXUS IS POWERED. IT MAY DAMAGE THE CIRCUIT. DO NOT USE WALL POWER UNTIL YOU HAVE FINALIZED YOUR FLUXUS. BE SAFE BE SAFE BE SAFE.

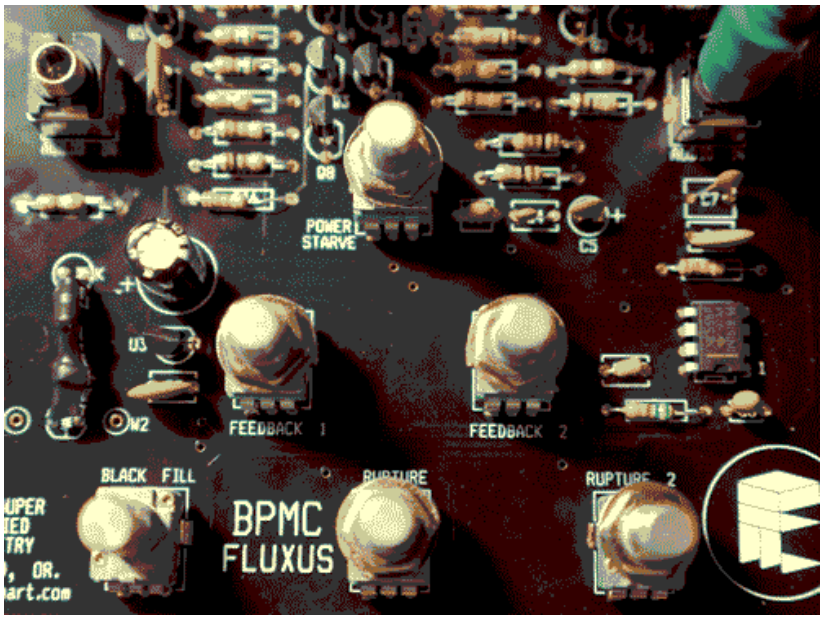
Aside from the materials included in this package you will need the following:

Soldering iron & lead-free solder.
Flux paste (optional)
Wire cutters (for trimming excess leads).
9V battery.
Test Leads (for further probing).
CRT TV (for display)
Source (the Fluxus does not generate video)
9v 300ma center positive power supply (optional)

The Build:

First, let's start by placing all the resistors. Consult the parts list and place resistors one by one. On the back of the PCB solder each component into place and trim the excess leads so that no accidental connections may occur.

2	R1, R27	75R	purple, green, black
2	R2, R26	390R	orange, white, brown
3	R3, R12, R15	10K	brown, black, orange
3	R4, R9, R10	1K	brown, black, red
1	R5	22K	red, red, orange
1	R6	47K	yellow, purple, orange
3	R7, R8, R18	5K6	green, blue, red
1	R11	820K	grey, red, yellow
1	R13	3K9	orange, white, red
3	R14, R16, R17	33K	orange, orange, orange



Second, let's place all the capacitors that are not polarity sensitive. Place, solder and trim leads. Ignore the polarity marker next to C5. It does not matter.

4	C1, C6, C8, C9	47nF	473
1	C2	220pF	221
1	C3	82pF	82 (tiny disc)
1	C4	4nF7	472 (tiny disc)
1	C5	100nf	104
1	C7	2nF2	222 (little disc)
1	C10	.01uf	103

Note: In prior builds C1, C6, & C9 were 50nf (503) caps. Due to availability these have been replaced with 47nf caps creating no real visible or structural differences.

Third, let's carefully solder all the capacitors that ARE polarity sensitive. Solder and trim leads. Use the negative marker on each capacitor to match it to the guide on the PCB screen. Getting polarity incorrect will surely cause your Fluxus to sleep for all eternity so don't f it up, nyuk nyuk.

2	CZ1, CZ3	2uF2	2.2uf
2	CZ2, CZ4	470uF	470uf

Next, it's time to place all the transistors. The heart of the Fluxus. Be very careful not to mix up any of the 3904s and 3906s. Also be sure to orient the transistors correctly using the PCB screenprint as your guide. The flat side of the transistor should match the flat side indicated on the screen.

2	Q1, Q2	2N3906	3906
6	Q3, Q4, Q5, Q6, Q7, Q8	2N3904	3904

Next, voltage regulation. Place the 78L05 voltage regulator with care to match the flat side of the component with the flat side on the PCB screen.

1	U3	78L05	78L05

Now place the 555 timer with care to match up the circular divot on the chip with the orientation marker on the screenprint. It helps to place the IC and then bend the legs in slightly on the opposite side to hold it into place before flipping over and soldering.

1	U2	NE555	NE555P

Now that the basic electronic components are on your board let's add the 2 RCA jacks, the DC jack, the switches & 2 3.5mm CV/audio jacks.

Consider at this point whether you will be ultimately wiring the Fluxus into an enclosure or not. If you will be going the enclosure route please consult the second to last page real quick before continuing.

In placing the DC jack decide whether or not you want the jack on the bottom or the top of the board. I highly suggest putting it on the bottom and then putting rubber feet on the underside near the pots giving it a sloped feel. You also want to make sure that all the leads do not clear the rubber feet potentially creating a short on a conductive surface.

If wiring the fluxus into a project enclosure you may want to leave the power jack off and substitute it for a non-PCB mount DC jack. In this instance just remember center is positive and the outer points are ground.

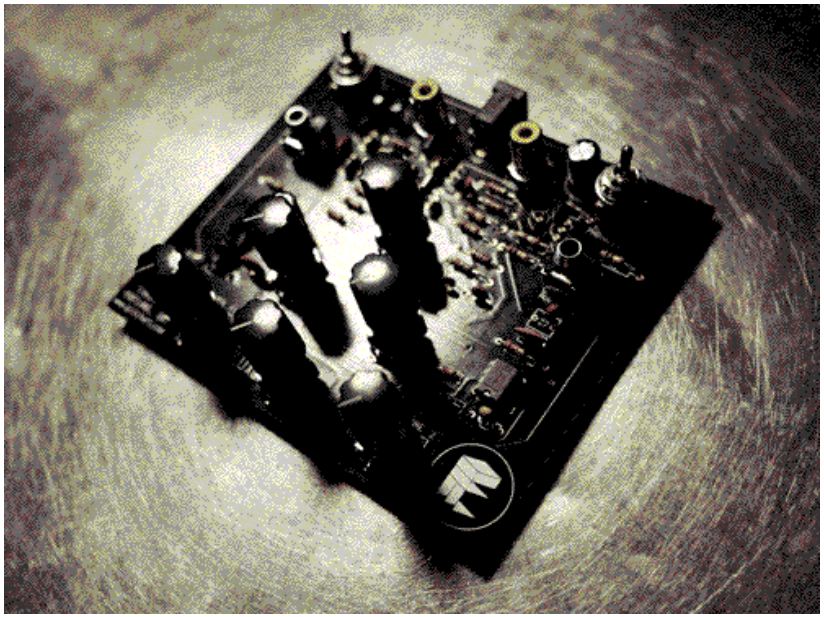
2	J1, J2	3.5mm Jack
1	J7	DC Power Jack
2	P1, P2	Composite Video Jacks
2	SW1, SW2	Switches

Time to place the potentiometers. Easy enough! The values are as follows:

R25 (Power starve) = 5k
R21 (Feedback 1) = 100k
R19 (Feedback 2) = 5k
R23 (Black Fill) = 1M
R22 (Rupture 1) = 100k
R20 (Rupture 2) = 10K

Before firing it up:

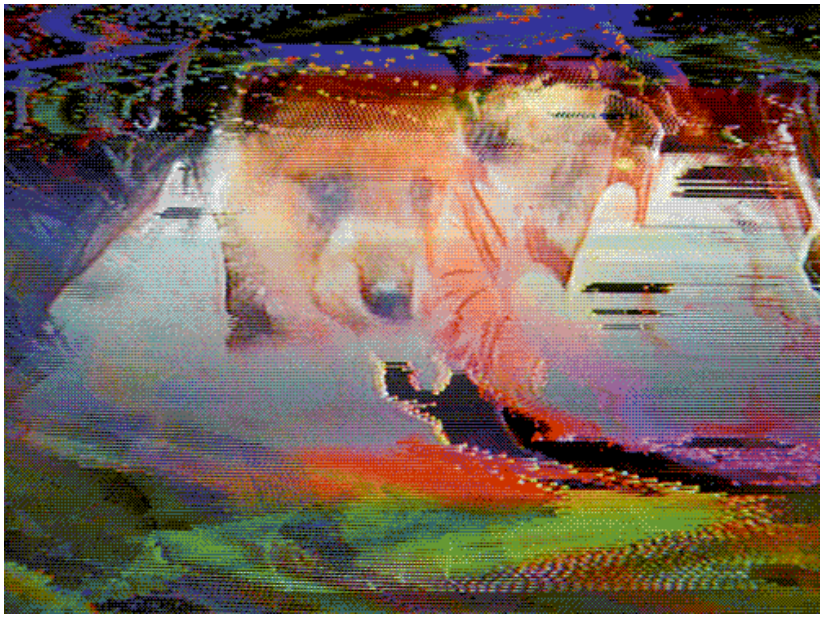
At this point double check your work. Make sure all your component leads are trimmed, no connections are accidentally being made on the back of the PCB, the correct polarity is present on the capacitors, the correct transistors have been placed properly and the 555 IC is oriented correctly. Now would be a good time to make sure the power starve knob is all the way clockwise and the other five knobs are all the way counter clockwise. The power starve knob always needs to be completely up in order



for the Fluxus to function “properly,” haha. The idea was that when you hone in on a good look try starving the power a little bit and see if you get anything interesting.

AS I MENTIONED BEFORE, IT IS VERY IMPORTANT THAT WHEN YOU FIRE YOUR FLUXUS UP THAT YOU ARE ON A NON-CONDUCTIVE SURFACE AND THAT ALL OF THE LEADS ARE TRIMMED.

Plug a composite video source into the Video IN and output the Fluxus to a CRT TV. Initially, do not use an LCD TV as you will get dropout. (I say initially because the Fluxus does look good on an LCD in powered bypass mode but you will indeed get dropout if you venture into powered mode sync corruption land). Flip the mode switch down (bypass mode) to verify that you indeed have a signal sans power. If you flip the switch up into powered mode you should see nothing without power. Flip the mode switch up into powered mode. Now plug a 9v battery into the DC to 9v adaptor or plug the PCB into a 9v 300ma-1000ma center positive power supply. At this point the Fluxus should fire up. Your signal should be slightly dim with the 5 knobs clockwise. Turn the Feedback 2 knob all the way up for a clean, brighter signal. Light dropshadow feedback may occur.



Notes about powered bypass mode:

You have two modes. The top left switch, when toggled down, is in powered bypass mode. Without power it should be a completely clean pass-thru. With power there are a number of effects that can be achieved in this mode however mild in comparison to what can be achieved in powered mode. Knobs 2 & 3 when combined full on give you a really nice edge feedback look. Mix in 3 & 4 at full and you've got some interesting ringing artifacts that begin to crop up. Starve 5 a bit for variations. Want them to pop a little more? Starve 3 a bit, to the point of breaking into guard stabilization mode.

Notes about powered mode:

When the top left toggle switch is positioned up you are in normal PCB operation mode. There are a number of rad striking looks in this realm. 2 & 3 together get you a stable signal with light dropshadow edge feedback. Starve 3 within this combo and you've got a nice dropshadow range to play with (does well with the incoming audio/cv feature as well… more on that shortly). 4 & 5 full on together kick off something real tasty. Now throw in 3 and you've got a party. Once again starving three brings about some serious rewards and instances of ever-so-slightly starving 5 in this configuration should be lovely. 6 stands alone on it's own as an extra de-stabilized drop-shadow look. Remember different color information from your content brings about different results within your set Fluxus parameters so be sure to experiment with all sorts of content.

Notes about audio:

With an audio signal coming into J2 some looks are audio reactive. Sometimes it just looks like a mess, but take for instance dialing in a nice of instance of either black dropshadow. Hit that shit with an incoming audio signal and you've got db induced throbs n' bobs for daze. You should be able to plug an audio source into J2 with minimal amplification however additional amplification may be necessary depending on your source. I am able to ⅛ to ⅛ into the Fluxus via my Sony Walkman and provide enough signal to drive this effect however so it should not need to much. Careful not to overdrive this input.

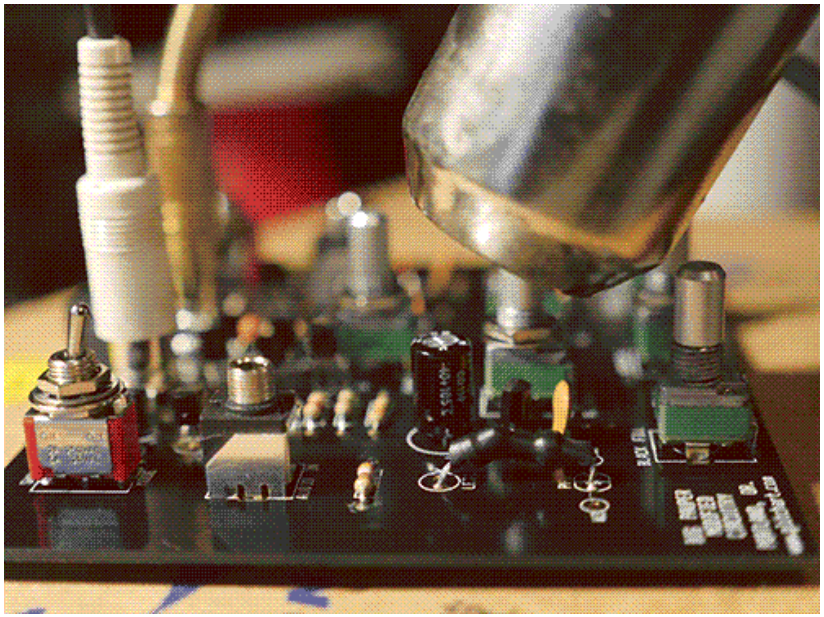
Notes about CV:

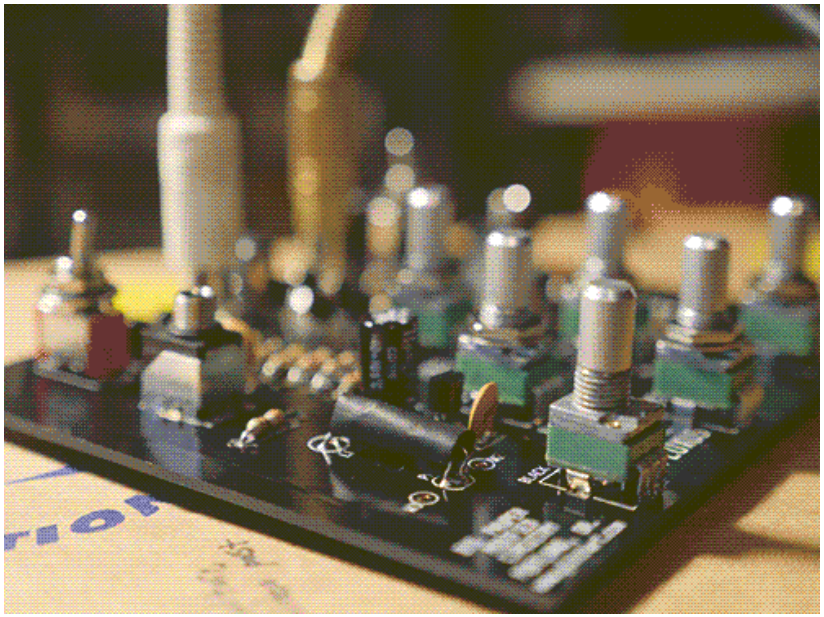
The Fluxus accepts CV via both the vactrol assigned to J1 & the audio input assigned to J2. The Fluxus is not designed to accept voltages above +5v. I find that the unit responds best to function generators, LFOs and sequencers.

Further customization:

Assignable CV knob control.

Located on the bottom left hand side of the Fluxus is an assignable vactrol. A vactrol consists of an LED that converts incoming voltage into light and a photocell that varies resistance based on light. The combo will need to be shielded from excess light utilizing either the supplied heatshrink or a strong piece of black tape. This is a cheap and easy way to use control voltage to hijack control over a knob. This vactrol turns on and off via the top right switch named "photocell." When not using this feature turn the switch off to prevent potential light influence. With a vactrol you do not have the full range of resistance you would have with a knob (typically 0-100ohm is missing) but depending on a knob's functionality that can be a-okay.





First, place the photocell, solder it and bend it down to the PCB.

1	LED1	T1	3mm LED
1	PH1	GL5537	Photocell

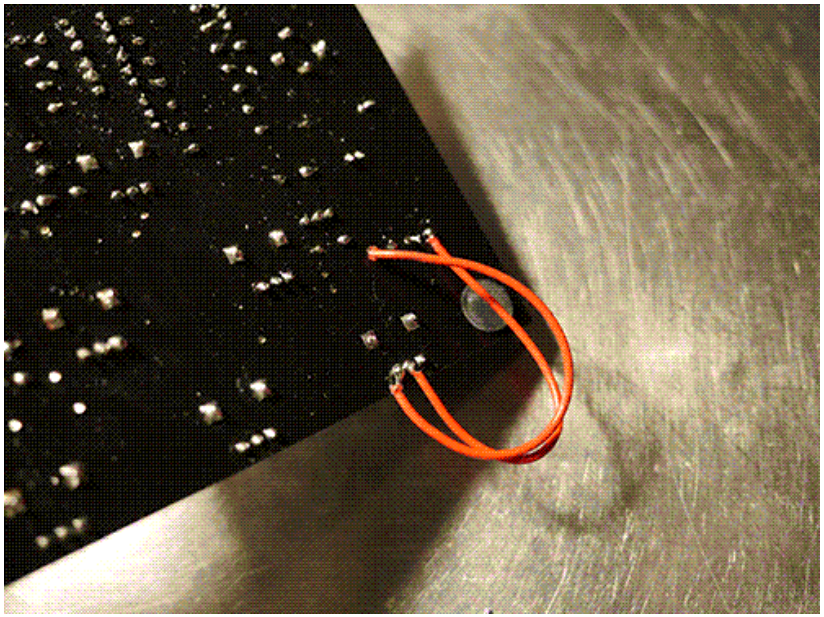
Second, LED's are polarity sensitive. Place the LED so that the short eg sits alongside the "K" indicated on the screenprint. You can test this by plugging a CV source into the LEFT AUDIO IN 3.5mm jack sans Fluxus power. Depending on what you are sending it the LED should light up. While the jack we are using states AUDIO, it should say CV (although with a loud enough signal the LED can light via an audio source). I buffered this jack with a 390ohm resistor, if primarily using this jack for audio purposes remove R26 and use an extra bit of wire or component lead and jumper this connection to omit the resistor.

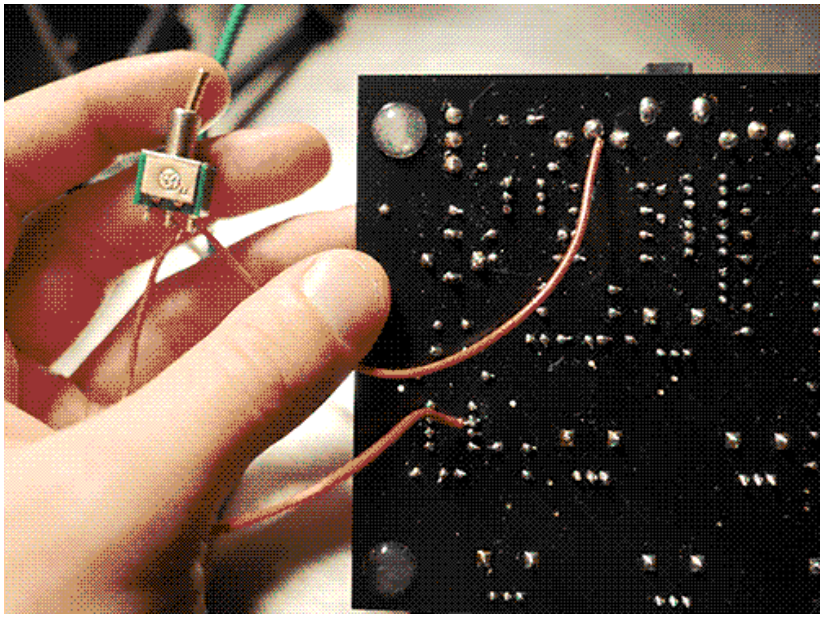
You will want to prevent the influence of outside light so utilizing the black heatshrink included in the kit stretch it over the LED and photocell. You will want to bend them forward so that the LED tip is positioned directly over the flat surface of the photoresistor. See illustration.
Once you have the heat shrink on hit it with just a dab of low heat from either a heatgun or a hairdryer. Be careful in this process not to overheat the surrounding components.

Now cut yourself off enough wire to create wire jumpers from W3 & W2 to the 2 & 3 pin of whatever knob you'd like to experiment with. Flip the board over and thread each wire into W2 & W3 respectively. I suggest doing this on the PCB's underside because it looks cleaner, however, if you would like a more messy sci-fi look, by all means, do it on the topside.

If in your experiments you burn out an LED, simply use one of the supplied replacements and consider switching R26 to a higher level of resistance.

Remember the top right switch turns the photocell on and off.





Note: Do not assign the vactrol to the power knob.

CV customization offers you more of a soft takeover than full-on control of the knob. Think of it as a way to get a CV signal into the mix so that you can further concoct looks. I like wiring into the BLACK FILL knob, hitting it with CV and then feeding in the FEEDBACK 2 knob and the RUPTURE 2 knob to aid in seeing a strong instance of CV-aided design.

Rupture 2 Capacitor Swap-out:

Rupture 2's effect is dictated by C10. Feel free to unsolder it and try some other capacitors in there. Try values under 1uf and see if it varies the effect at all.

Battery Power:

The Fluxus draws an average .03ma off of a 9v battery giving it good couple of hours before the battery weakens. I do not recommend running it off of a wall adaptor sans enclosure but should you have an enclosure in mind the adaptor to seek out would be a 9v 300ma center positive DC wall adaptor.

Blur effect:

There is a light blur effect made possible by routing the Video Out (careful not to accidentally use the ground on the video out) to pin 7 on the 555 timer IC. See photo for illustration. Using alligator test leads check this effect out. This effect also may be further amplified by throwing a >1uf capacitor in the mix. If this effect is desirable consider wiring a 1k pot or a SPST switch to it.

Enclosure Options:

I do recognize that a fair amount of you are going to want to house the Fluxus in an enclosure. If this is the case (no pun intended nyuk nyuk) consider wiring the pots, switches and 3.5mm jacks out to whatever length of wire you may desire. Pots will need wiring from pins 2 & 3. The mode switch will need all three leads wired out. The potentiometer on/off switch will need only the bottom and middle lead wired out. The top lead on the 3.5mm (the only side that lacks shielding) is the input, the sides are the ground and the bottom is unused. You will need to wire out one ground point and the input. The only components that will need replacing are the DC jack and the RCAs.

You can replace these with the following components:

RCA jacks:

http://www.ebay.com/itm/Gold-RCA-Jack-Solder-Type-Yellow-Each-Hex-Type-/231507082870?hash=item35e6e5be76:g:kEEAAOSwstxVBv8L

2.1mm DC power jack:

http://www.ebay.com/itm/New-5-5-mm-x-2-1mm-DC-Power-Jack-Socket-Female-Panel-Mount-Connector-/301022196001?hash=item4616523121:g:ftUAAOxy3zNSjFrp

TROUBLESHOOTING/COMMON MISTAKES:

Before contacting BPMC please consider these common mistakes:

Your video jacks need to be grounded in order for video to pass thru them. A common mistake I have seen is people only soldering one of the two outer PCB mounts on the RCA jacks. Both metal mounts need to be firmly soldered for ground to be present.

Use lots of solder. Don't skimp. People have sent me photos of Fluxus boards with questionable connections being made. Give the solder adequate time to form a solid bond between the part and the board. Don't just quickly blob it on. Please use flux paste.

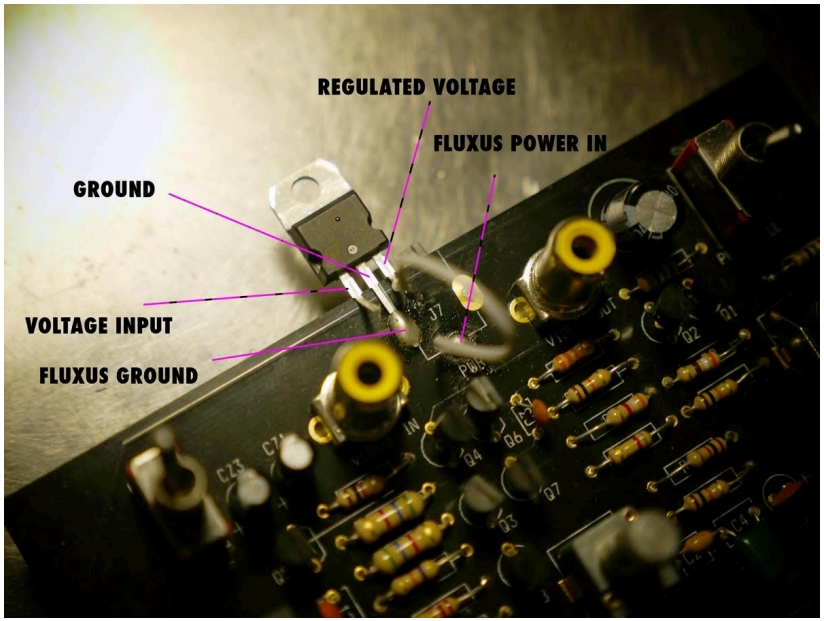
Please make sure you have placed the correct component. Having tiny 103 and 102 caps may cause some confusion. Placing the correct transistor (as well as not mixing up the voltage regulator and the 78L05) is integral to optimal Fluxus health.

Publication History:
Update: 05/01/17 Second Revision.
Update: 11/03/16 First Revision.
Initial Publication: 10/22/16

ADDITIONAL VOLTAGE REGULATION:

One thing that did not make the final circuit revision in time was the addition of a secondary 9v voltage regulator. By placing a L7809CV 9v voltage regulator in between the positive in and the DC jack you effectively add a layer of protection should you accidentally plug the wrong power supply in or plug a power supply in with the polarity reversed. As it stands in both those instances the Fluxus will most likely die. Below I have illustrated the proper wiring on the regulator and provided a link to the datasheet associated with said part. It is a common part and is available from ebay, mouser, digikey or any other electronic parts supplier.

http://www.st.com/content/ccc/resource/technical/document/datasheet/41/4f/b3/b0/12/d4/47/88/CD00000444.pdf/files/CD00000444.pdf/jcr:content/translations/en.CD00000444.pdf



COMPLETE PARTS LIST:

(6) Knobs
CV Assignment Wire
Fluxus Board
9v to DC adaptor
(2) Switches
(2) RCA Jacks
DC Jack
(2) 5k pots, (2) 100k pots, (1) 50k pot, (1) 1M pot
Heat shrink tubing
(2) 3.5mm CV jacks
Handful of LEDs
Photoresistor

1 555 Timer IC
2 470uf capacitors
(2) 2.2uf capacitors
78L05 Voltage Regulator
(6) 3904 Transistors
(2) 3906 Transistors

Resistors:

2	R1, R27	75R
2	R2, R26	390R
3	R3, R12, R15	10K
3	R4, R9, R10	1K
1	R5	22K
1	R6	47K
3	R7, R8, R18	5K6
1	R11	820K
1	R13	3K9
3	R14, R16, R17	33K

Capacitors:

4	C1, C6, C8, C9	47nF
1	C2xx	220pF
1	C3xx	82pF
1	C4xx	4nF7
1	C5xx	100nf
1	C7xx	2nF2
1	C10xx	.01uf