



# **Uzebox Kit Assembly Guide**

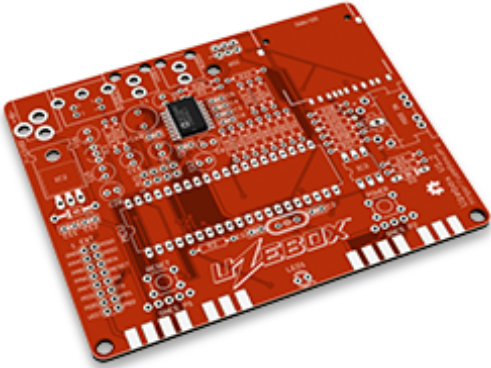

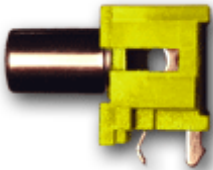
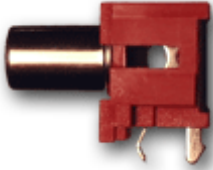

*V1.1*







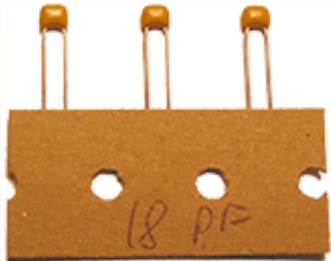
## Revision History

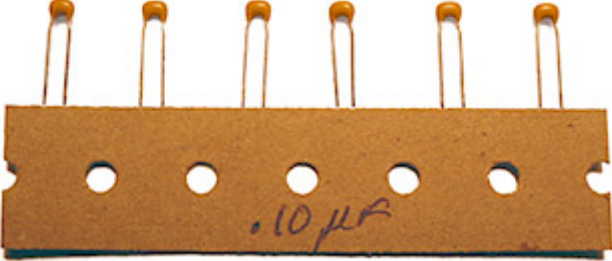










Date	Author	Description
01-Nov-2012	A.Bourque	Initial release
6-Nov-2012	A.Bourque	Minor corrections










## Parts list verification

To start, insure you have all the required parts. This list displays the exact parts included in the Uzebox kit.

Component Image	Schematic Reference	Description
	N/A	Uzebox printed circuit board with pre-soldered AD725 chip
	U5	DC power jack
	VIDEO	Composite video RCA jack (Yellow)
	AUDIO	Audio output RCA jack (Red or white)
	SVIDEO	S-VIDEO output jack


	ISP	Atmega644 programming port
	EXT	Extension port header
	N/A	DIP-40 socket for the Atmega644
	POWER RESET	Tactile switches (x2)
	SD/MMC	Secure Digital memory card socket
	SNESP1 SNESP2	SNES gamepad connectors (x2)
	C1,C2,C18	18pF ceramic capacitors

	C3,C4,C5, C6,C7,C12	.10uF (100nF) ceramic capacitors
	C11	.33uF (330nF) ceramic capacitor
	C13	10uF tantalum capacitor
	C16,C20	1uf electrolytic capacitors
	C8,C9	10uF electrolytic capacitors
	C10,C14, C15	220uF electrolytic capacitors
	R7,R11, R19,R20, R24,R25	Resistor 75Ω 1% (Violet, green, black, gold, brown)
	R2,R26, R27,R28	Resistor 301Ω 1% (Orange, black, brown, black, brown)
	R29,R30, R31	Resistor 562Ω 1% (Green, blue, red, black, brown)
	R3,R6,R10, R18	Resistor 806Ω 1% (Gray, black, blue, black, brown)
	R5,R9,R17	Resistor 1.58KΩ 1% (Brown, green, gray, brown, brown)

	R1,R8,R22	Resistor 3.16K $\Omega$ 1% (Orange, brown, blue, brown, brown)
	MCU	ATmega644 microcontroller
	XTAL	28.63636Mhz crystal
	L1	68uH inductor
	IC1	3.3V voltage regulator
	IC2	5.0V voltage regulator
	D1	Rectifier diode
	LED1	Power LED
	N/A	Bumpns

## Tools required

To assemble this kit you will need the following tools:

Tool	Description
	A basic soldering iron, 25W-40W.
	Solder, rosin core, 60/40 type.
	Long nose pliers.
	Regular cutters will do fine, but shear cutters will do a better job.



A basic multimeter is recommended but not required.

### Other parts required

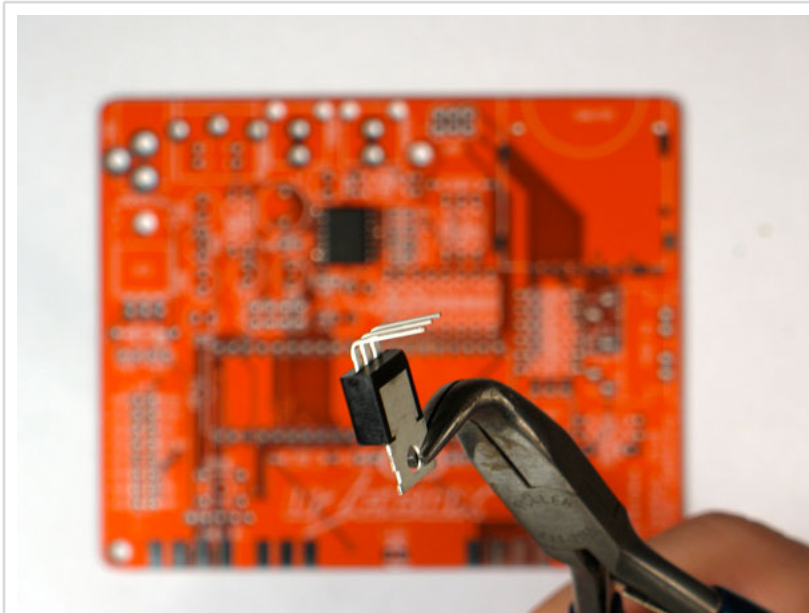


A standard 7-12VDC power supply with a center-positive, 5.5x2.1mm tip.

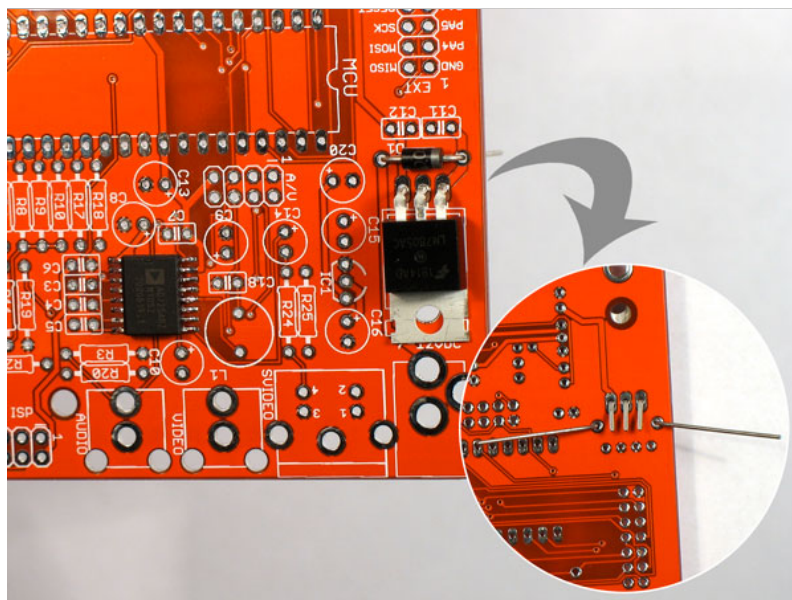


## Build the kit!

### Assembling the power supply section



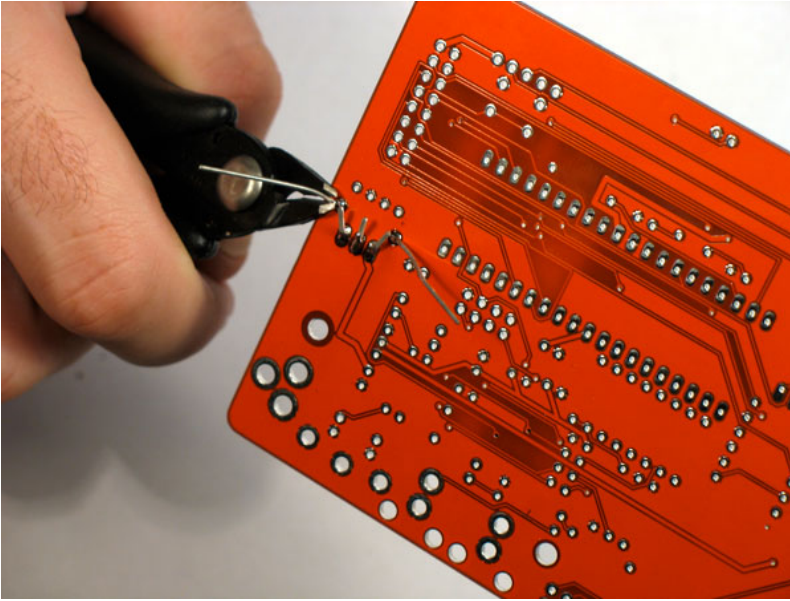
Using pliers, bend the pins of **IC2**, the 5V voltage regulator, at a 90 degrees angle as pictured.



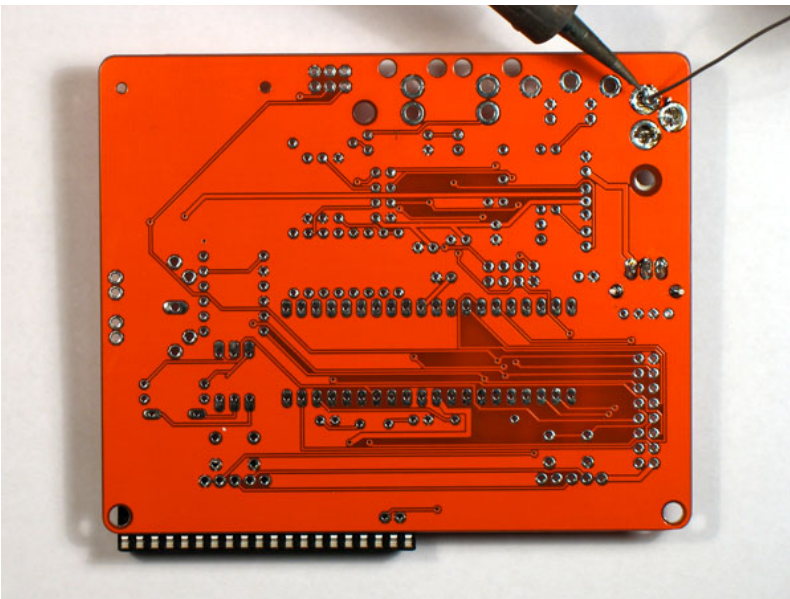
Mount **IC2** on the PCB along diode **D1**. Notice the diode has a white stripe on one end to indicate the direction of current. Insure the band matches with the component's drawing on the PCB.

As with all future components you will solder, when inserting a component, bend it's pins on the other side of the PCB so it holds in place.

Flip the PCB and solder all pins.



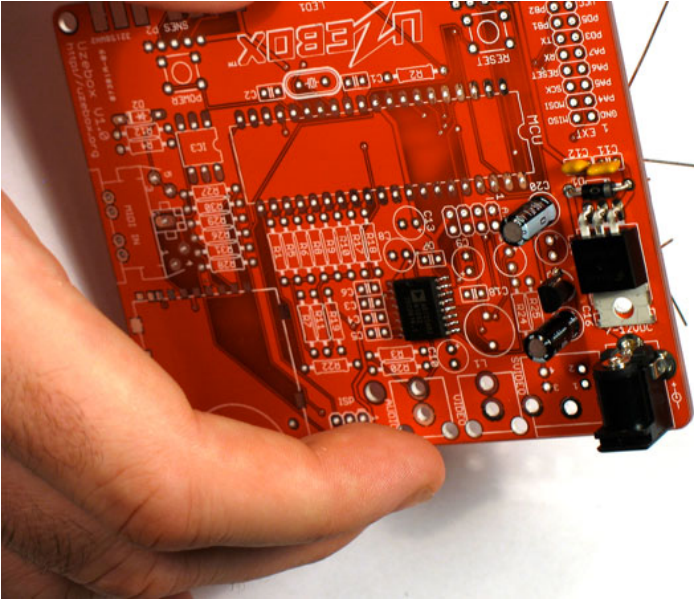
Using the cutters, cut the pins excess wire. Watch out that those flying wire bits don't end up in your eyes!



Insert **U5**, the DC barrel jack. To insure it hold firmly, bend the pins on the soldering side.

To insure it's soldered flat, you can also put the 40 pins DIP socket underneath the PCB to level it up.

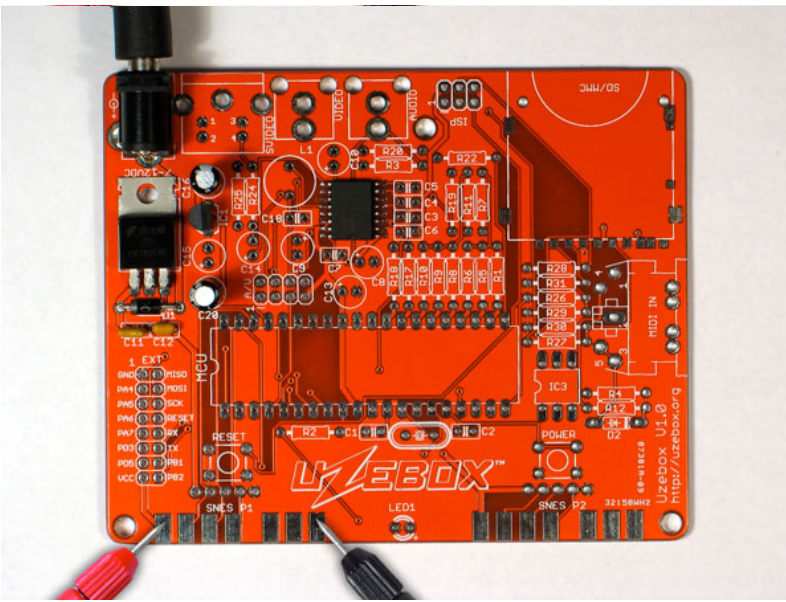
Be sure to put plenty of solder on the three pins so the jack will hold firmly.



Add **C11** (.33uF), **C12** (100nF), **C16** (1uF), **C20** (1uF) and **IC1** (3.3v regulator).

The electrolytic capacitors (the black cans) have a polarity. The negative pin in marked with a white stripe and little minus signs on the side. Insure the opposite pin (the longest one) inserts in the hole which has a little "+" next to it.

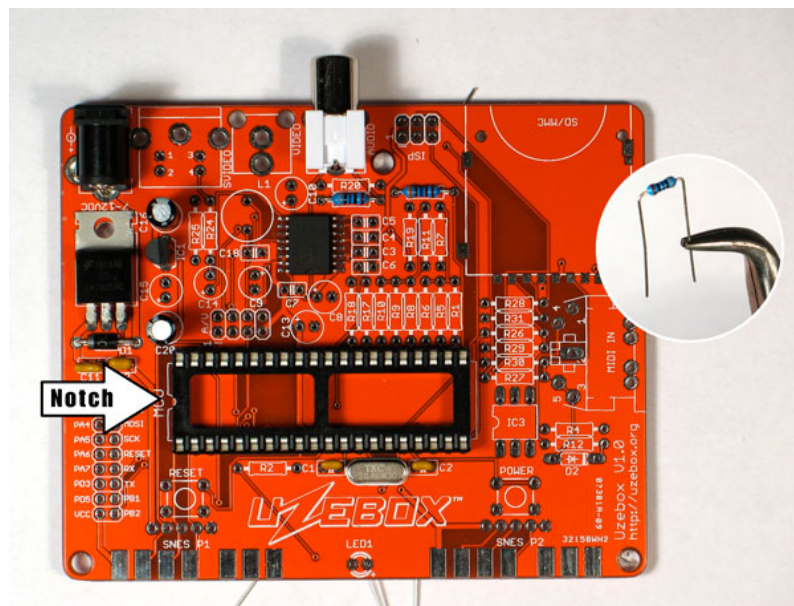
Solder all pins and remove excess wire. That completes the power supply section.



If you have a multimeter, let's test what we have so far.

Plug in the power supply and probe pin 1 and 7 on the P1 SNES connector footprint. If all goes well, you should measure around 5V. Unplug the power.

## Assembling the microcontroller and sound section



Add the DIP-40 socket and insure the DIP socket notch is located to the left.

Add **XTAL** (crystal), **C1** and **C2** (18pF), **R3** (806Ω), **R22** (3.16KΩ) and **AUDIO** jack (white or red).

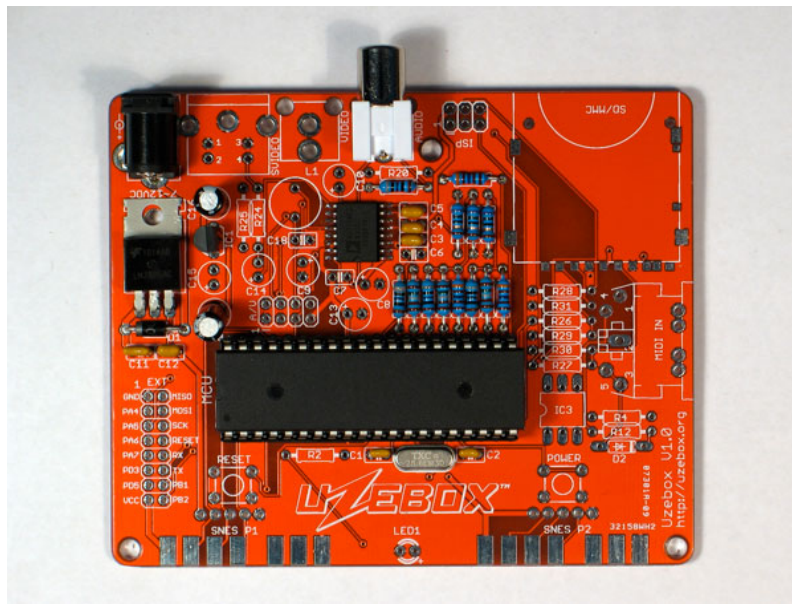
Pre-bend the resistors using the pliers to insure they will all look nicely aligned on the PCB.



Insert **MCU** (ATmega644) into the DIP-40 socket. Notice one end of the chip has a notch, it goes the same way as the socket.

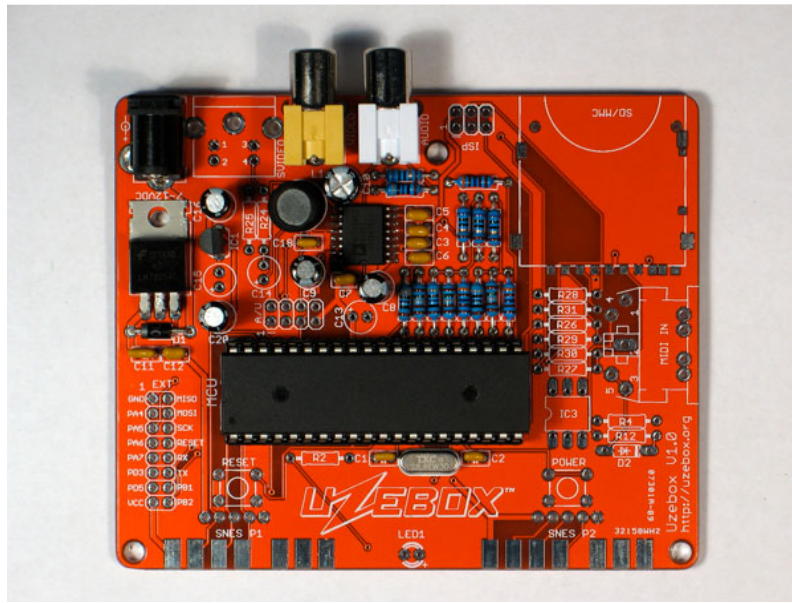
Plug in a RCA cable to your TV's audio input and plug the power supply. If all goes well, you should hear the Uzebox logo bell sound! Give yourself a pat on the back!

## Assembling the video section



Assemble the video DAC by soldering **R1**(3.16K $\Omega$ ), **R5**(1.58K $\Omega$ ), **R6**(806 $\Omega$ ), **R8**(3.16K $\Omega$ ), **R9**(1.58K $\Omega$ ), **R10**(806 $\Omega$ ), **R17**(1.58K $\Omega$ ), **R18**(806 $\Omega$ ) and **C3**(100nF), **C4**(100nF), **C5**(100nF).

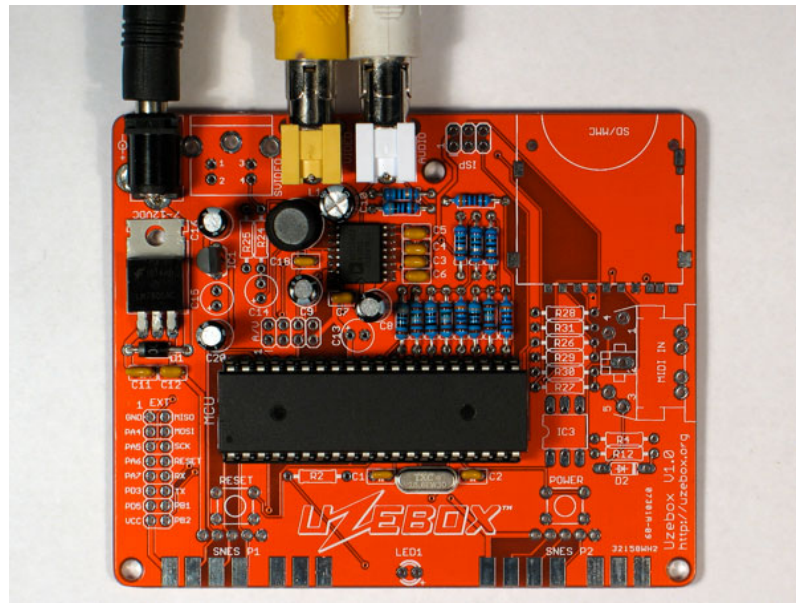
Cut all remaining pins. Then solder **R7**(75 $\Omega$ ), **R11**(75 $\Omega$ ) and **R19**(75 $\Omega$ ).



Assemble the composite video circuitry by soldering **C6**(100nF), **C7**(100nF), **C8**(10 $\mu$ F), **C9**(10 $\mu$ F), **C10**(220 $\mu$ F) and **R20**(75 $\Omega$ ).

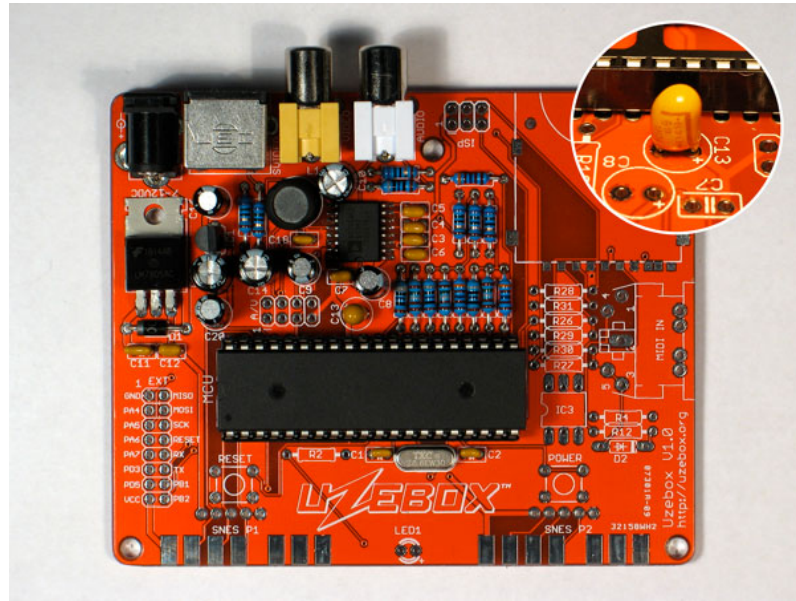
Add the luma trap components **C18**(18pF) and **L1**(68 $\mu$ H inductor). Note that L1 does not have a polarity so it can be mounted in any direction.

Finish by soldering the composite video jack **VIDEO** (yellow).



Connect the audio and video outputs to your TV, then plug in power.

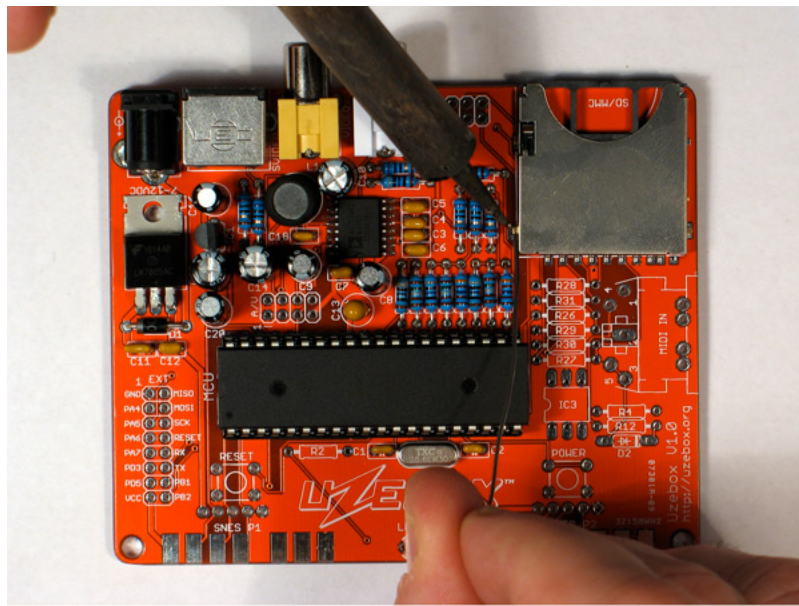
If all goes well, you should be greeted with the Megatris menu screen! Give yourself a double pat on the back!



Finish up the video section by adding the **S-VIDEO** connector, **R24**(75Ω), **R25**(75Ω) and then **C13**(10uF tantalum), **C14**(220uF) and **C15**(220uF).

Note that C13 is a tantalum capacitor and has polarity. If you look closely, one pin has a little + sign next to it. Be sure to insert this pin in the matching hole on the PCB.

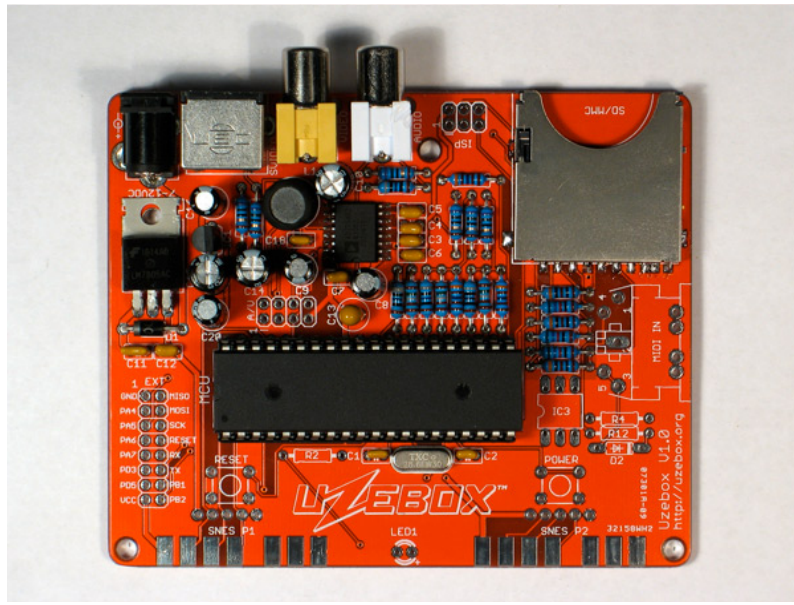
## Assembling the SD card section



Place the SD/MMC socket on the PCB (keep the plastic retainer when soldering).

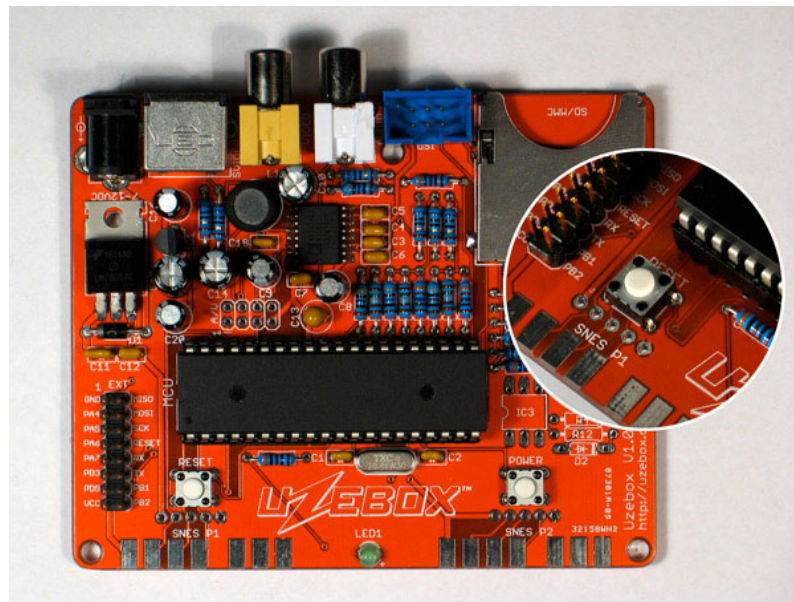
Align and hold the socket while soldering the anchor points. Their location vary depending on the kit version. For the Uzebox starter pack, they are located at the top on each side of the socket .

Solder the remaining pins.



Complete the SD interface by soldering the voltage dividers **R26**(301 $\Omega$ ), **R27**(301 $\Omega$ ), **R28**(301 $\Omega$ ), **R29**(562 $\Omega$ ), **R30**(562 $\Omega$ ) and **R31**(562 $\Omega$ ).

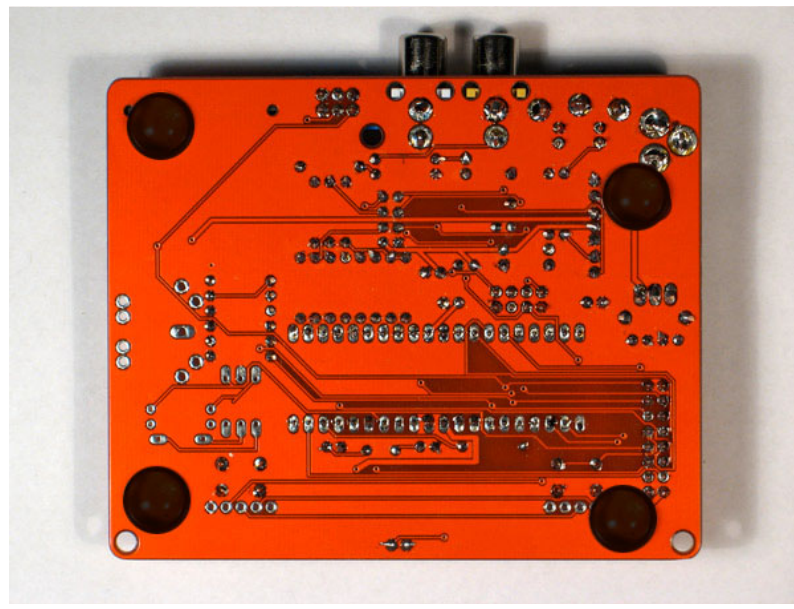
## Assembling the remaining parts



Add the **ISP** connector (notch goes inside) and the extension header (the grey side of the header is to be soldered).

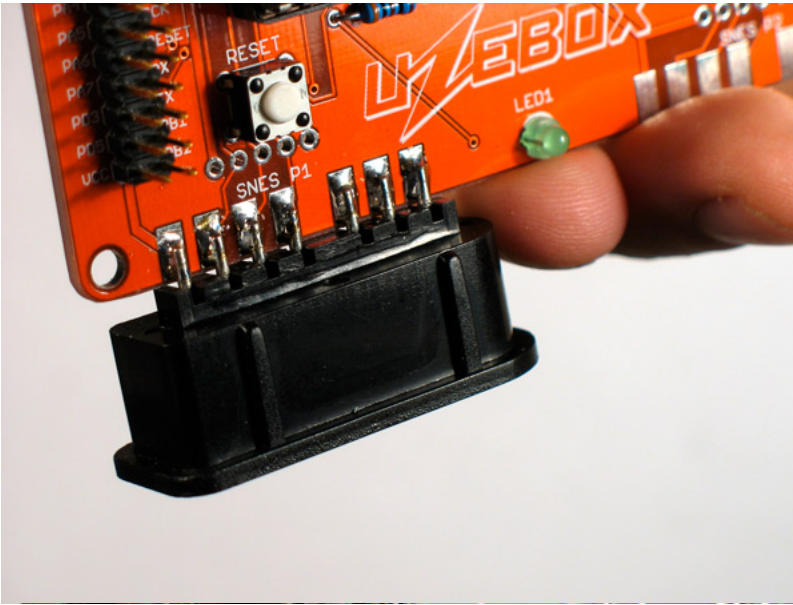
Add the **RESET** and **POWER** switches, **R2**(301Ω) and **LED1**. The longest pin on the LED is the anode and must be inserted in the hole with a little "+" next to it.

Insure the tactile switches are mounted horizontally as pictured.

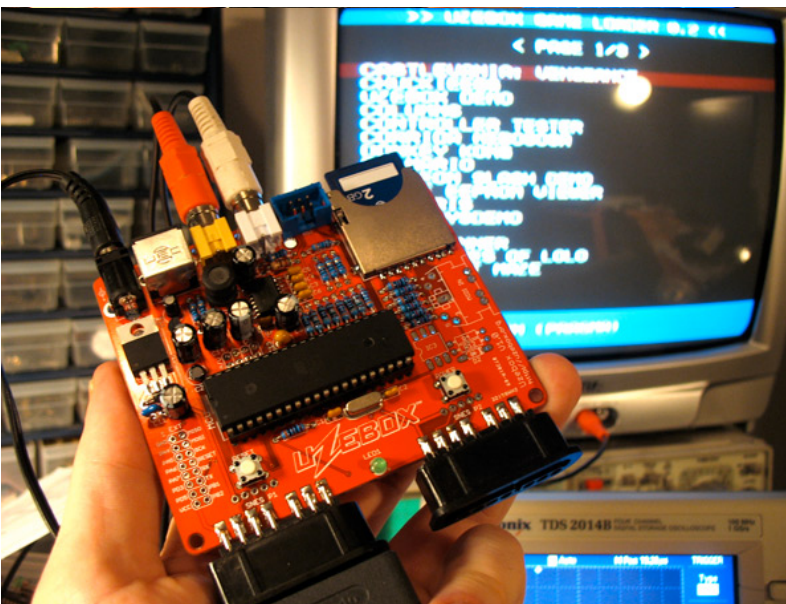


Place the 4 rubber bumpers as pictured. It's important to have them in place to help soldering the SNES connectors.





Solder the SNES connectors. The SNES connector plastic won't withstand a ton of heat before becoming loose, so solder them quickly. Hold the connector firmly and center the pins in the middle of the pads. Begin by heating just the pad for a second or two then both the pin and the pad then add solder, a lot of solder! It's easier to solder pins at both extremities of the connector first. Again, be sure to add enough solder (like pictured) to be sure it will have a good mechanical resistance.



Plug in a controller in P1 port, the audio, video and power cables and insert the SD card to test everything. You should be greeted by Megatrix title screen... you're done, Congrats!

To enter the bootloader menu, hold any button on P1 controller while pressing the reset button. From there push select on P1 controller to change the bootloader's start mode: game first or bootloader menu first.

Have fun!