Uzebox Kit Assembly Guide

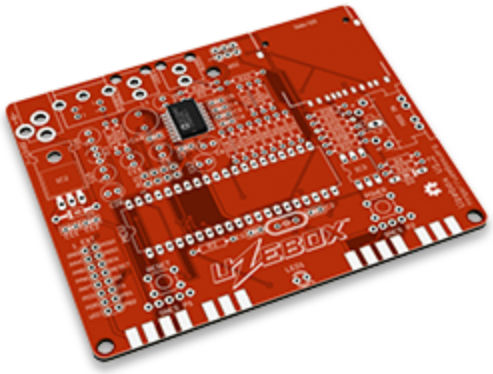
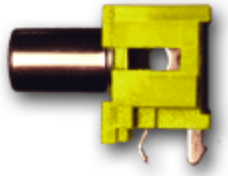
V1.7

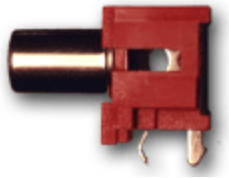
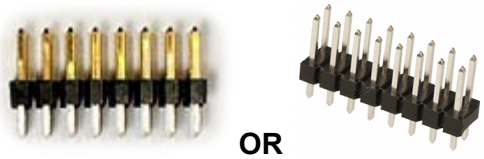
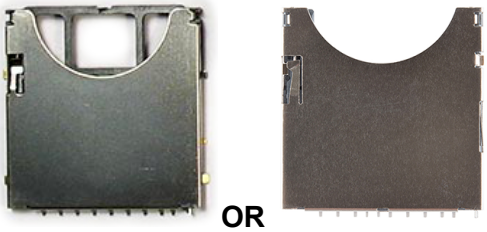
Revision History

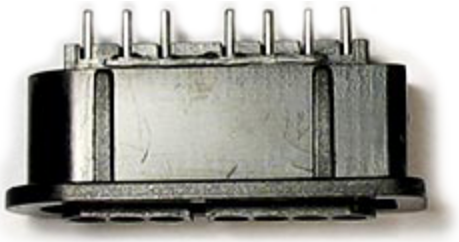
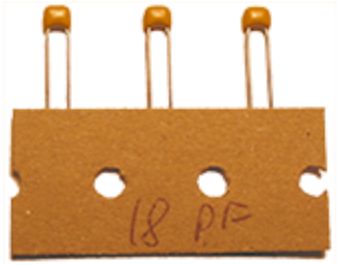
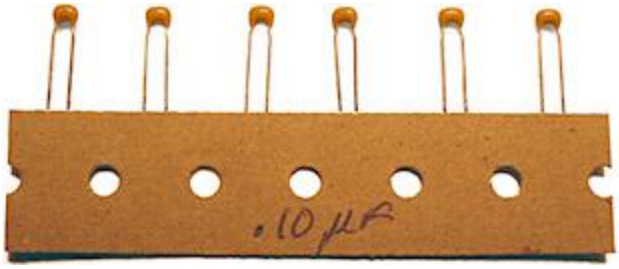
Version	Date	Author	Description
1.0	01-Nov-2012	A.Bourque	Initial release
1.1	6-Nov-2012	A.Bourque	Minor corrections
1.2	28-Jan-2014	A.Bourque	Minor changes
1.3	27-Jan-2015	A.Bourque	Added replacement parts for EXT header and SD card socket
1.4	21-feb-2015	A.Bourque	Added preliminary troubleshooting section
1.5	26-nov-2015	A.Bourque	Minor improvements
1.6	1-feb-2016	A.Bourque	Added note regarding power button
1.7	15-nov-2016	A.Bourque	Added notes for PCB rev 1.3.1 and references to the Uzenet interface.

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 (PCB) with pre-soldered AD725 chip **NOTE:** This tutorial was made using PCB rev 1.0. Later revisions may have a slightly different arrangement, but part references will stay the same. For example PCB v1.3.1 reorganized the SD card voltage divider resistors in order to accommodate the "Uzenet" interface. Relevant differences will be described in the assembly steps.
	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
 **OR**	EXT	Extension port header
	N/A	DIP-40 socket for the Atmega644
	POWER RESET	Tactile switches (x2)
 **OR**	SD/MMC	Secure Digital memory card socket. One of the two possible models has a soldering wing on the right side only.

	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 3.16KΩ 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	Bumpons

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.

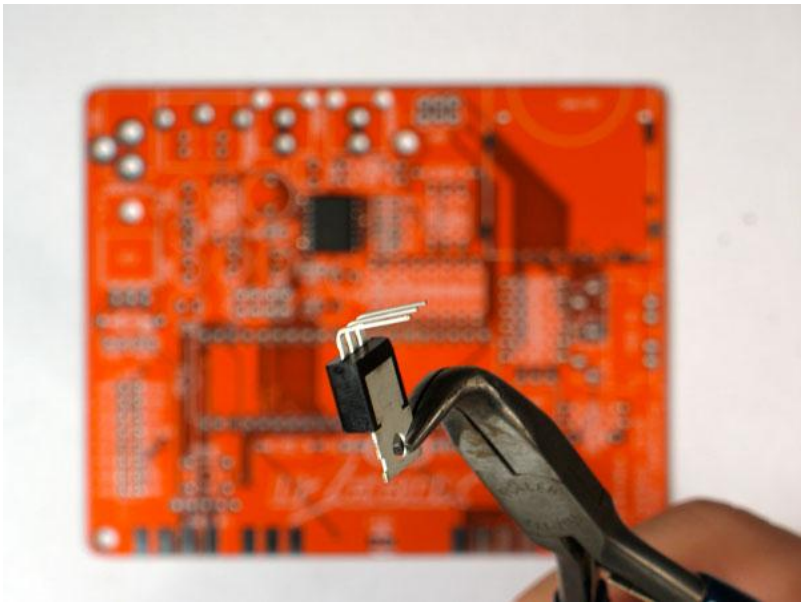
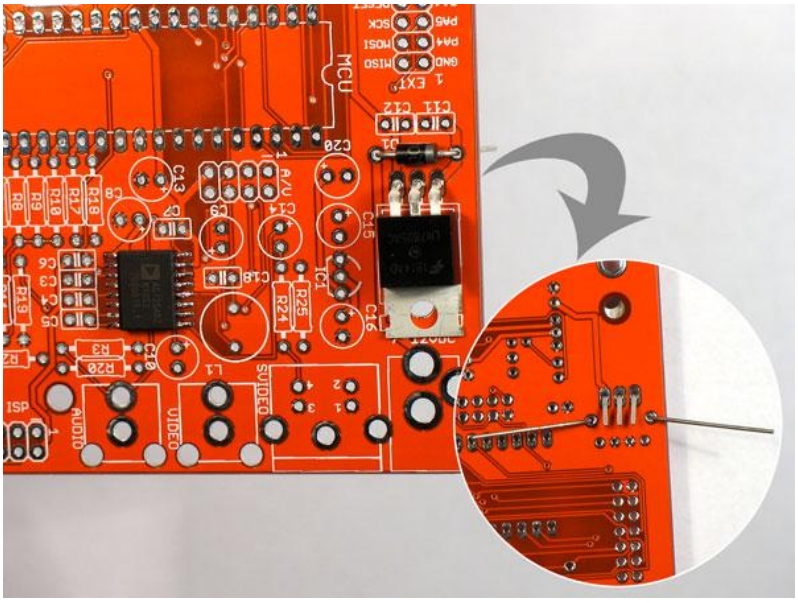
	Long nose pliers.
	Regular cutters will do fine, but shear cutters will do a better job.
	A basic multimeter is recommended but not required.

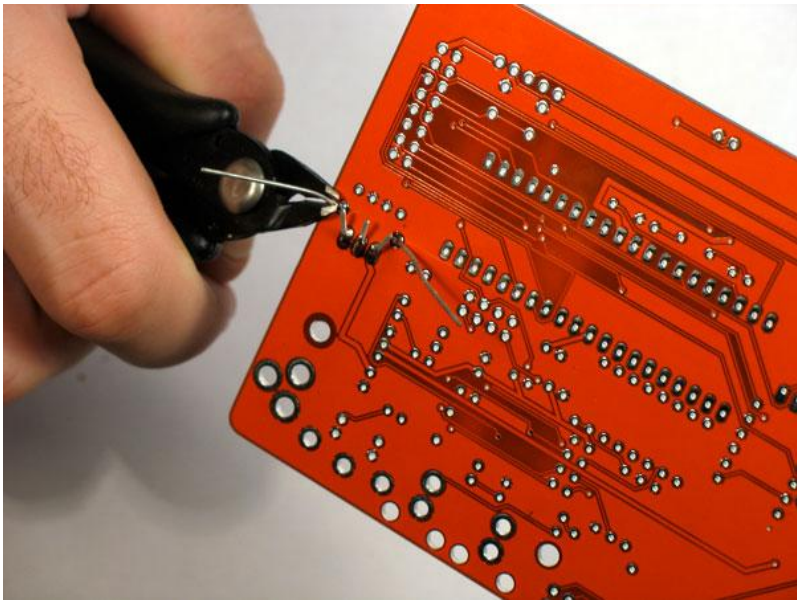
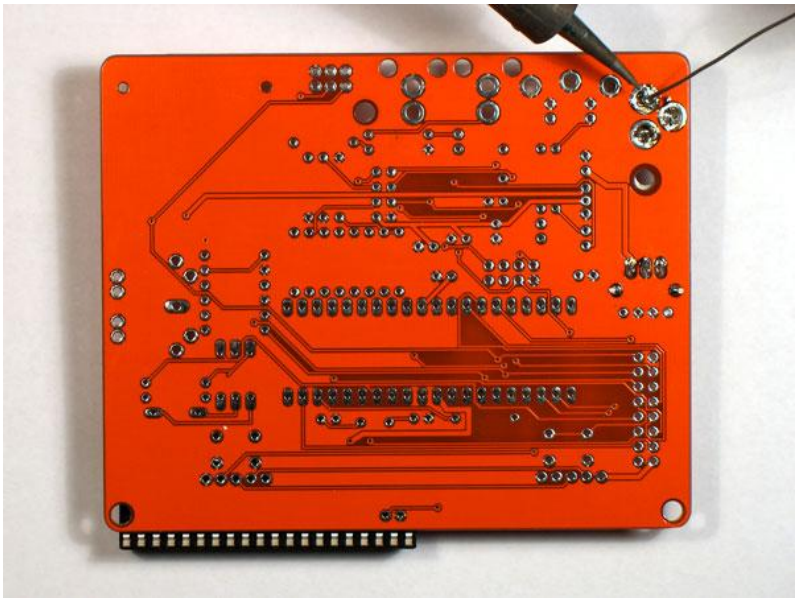
Other parts required

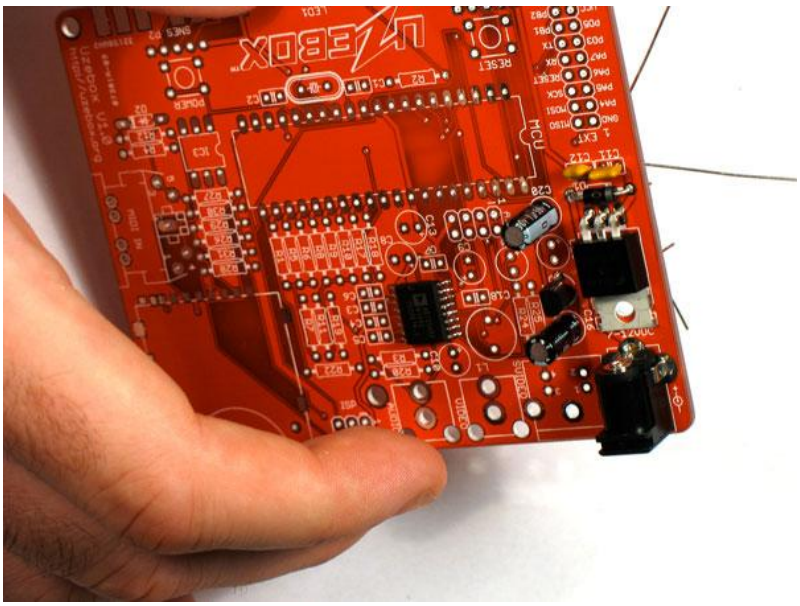
	A standard 7-12VDC power supply with a center-positive, 5.5x2.1mm tip.

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.

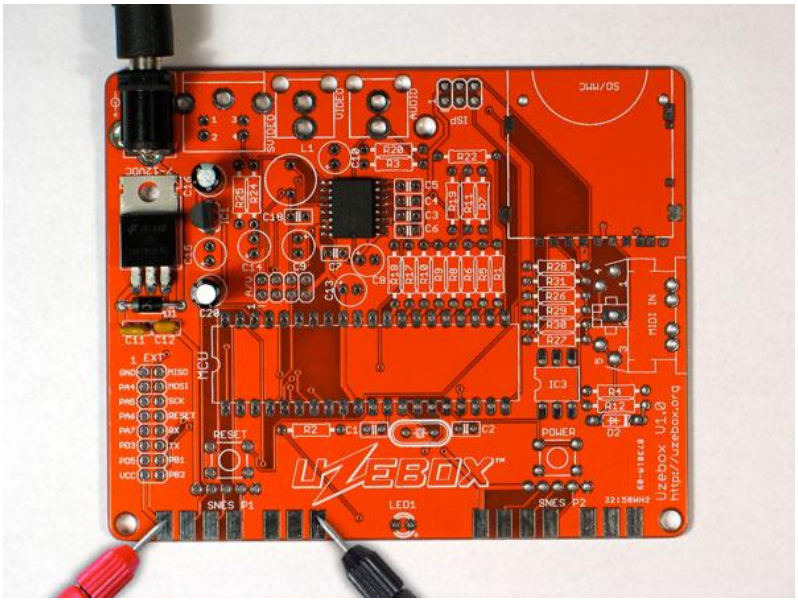
	Using the cutters, cut the pins excess wire. Watch out that those flying wire bits don't end up in your eyes!
	Insert ***U5***, the DC barrel jack. To insure it hold firmly, bend the pins on the soldering side. To insure it's soldered flat, you can also put the 40 pins DIP socket underneath the PCB to 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.

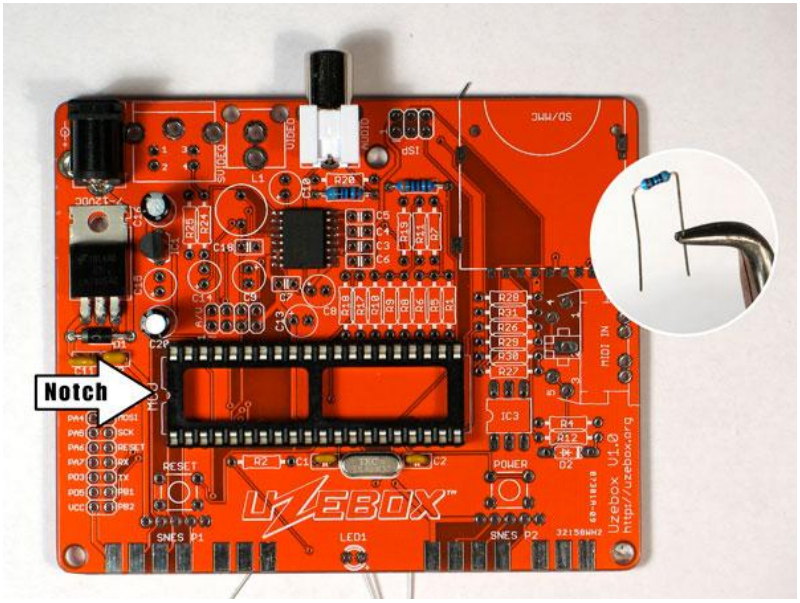
Solder all pins and remove excess wire. That completes the power supply section.



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

Switch your multimeter to DC voltage measurement mode. 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.

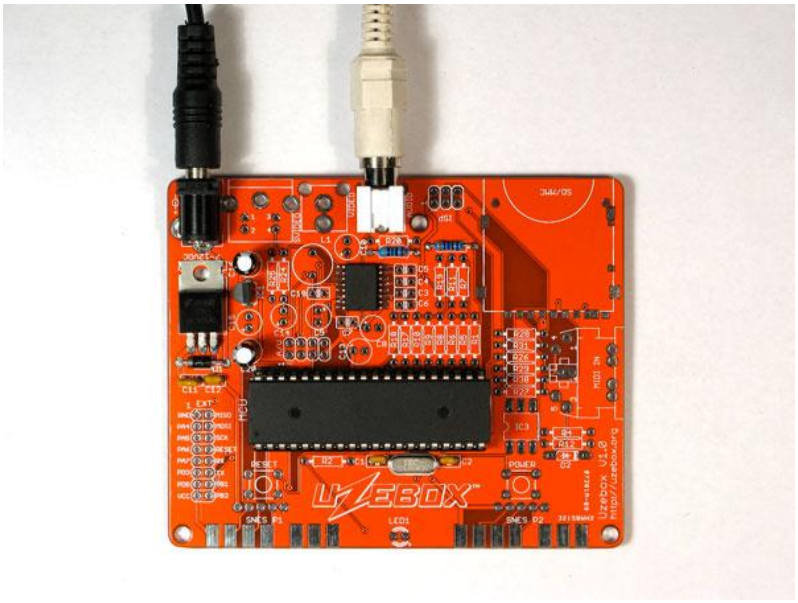
Assembling the microcontroller and sound section



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).

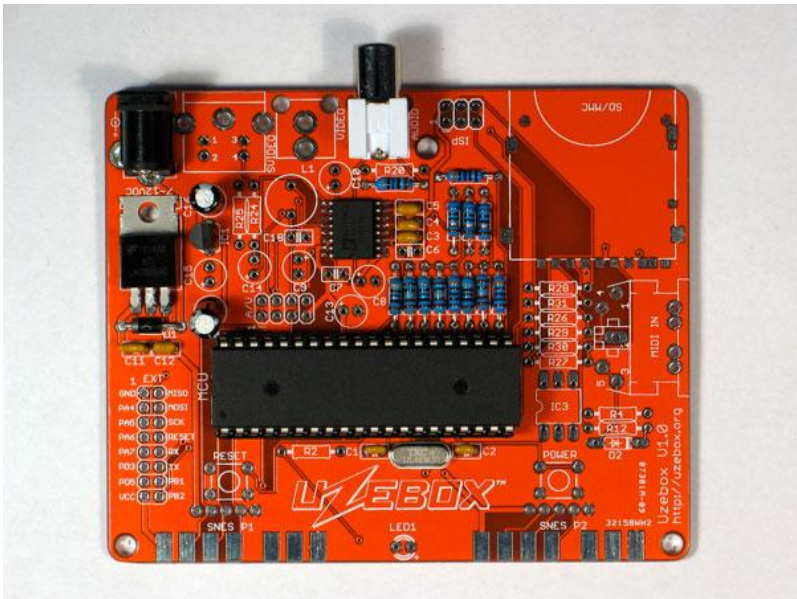
Pre-bend the resistors using the pliers to insure they will all look nicely aligned on the PCB.



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.

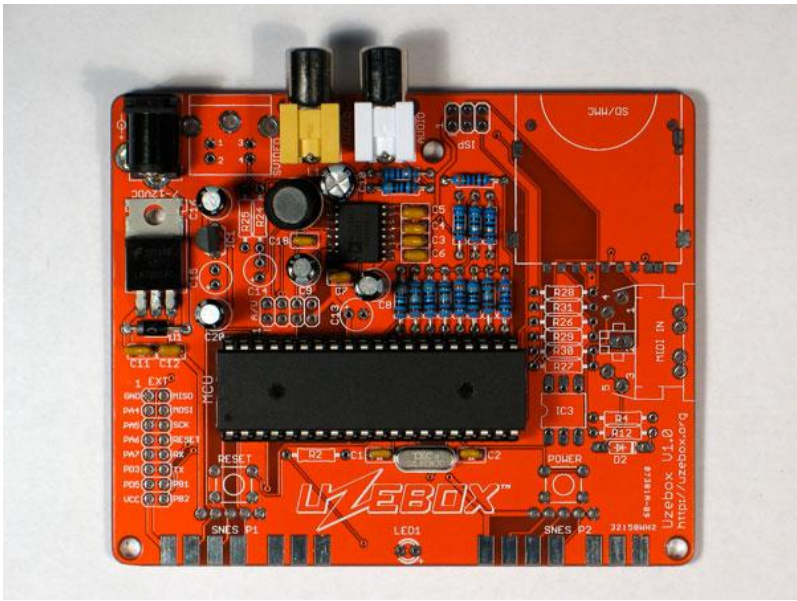
Plug in a RCA cable to your TV's audio input and plug the power supply. If all goes well, you should hear the Uzebox logo bell sound! Give yourself a pat on the back!

Assembling the video section



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

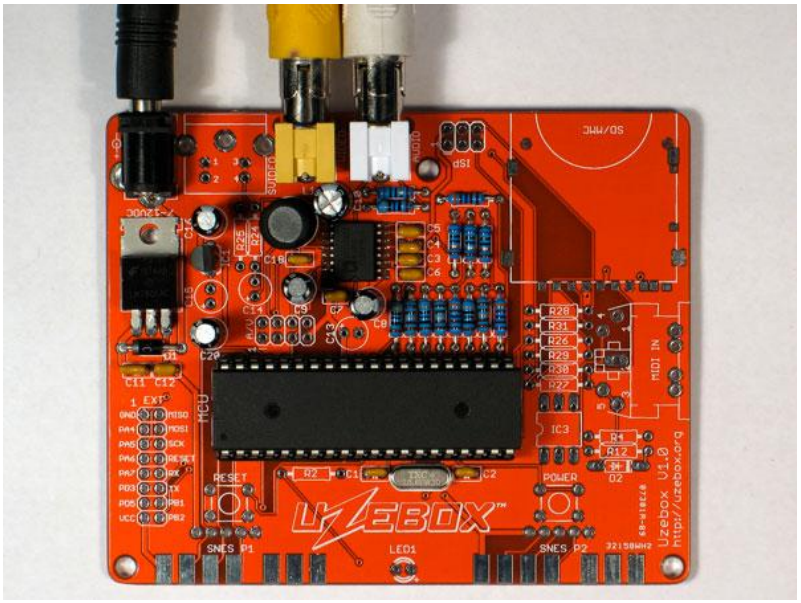
Cut all remaining pins. Then solder ***R7***(75Ω), ***R11***(75Ω) and ***R19***(75Ω).



Assemble the composite video circuitry by soldering ***C6***(100nF), ***C7***(100nF), ***C8***(10uF), ***C9***(10uF), ***C10***(220uF) and ***R20***(75Ω).

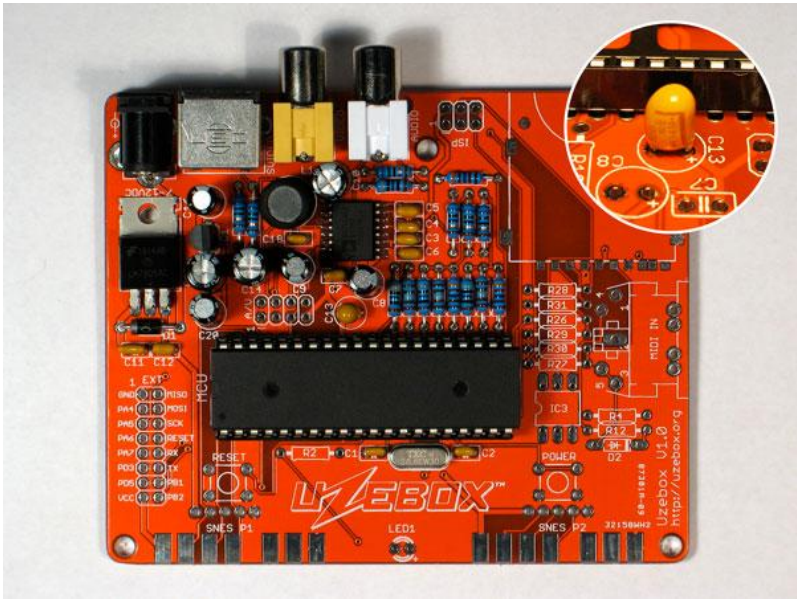
Add the luma trap components ***C18***(18pF) and ***L1***(68uH inductor). Note that L1 does not have a polarity so it can be mounted in any direction.

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

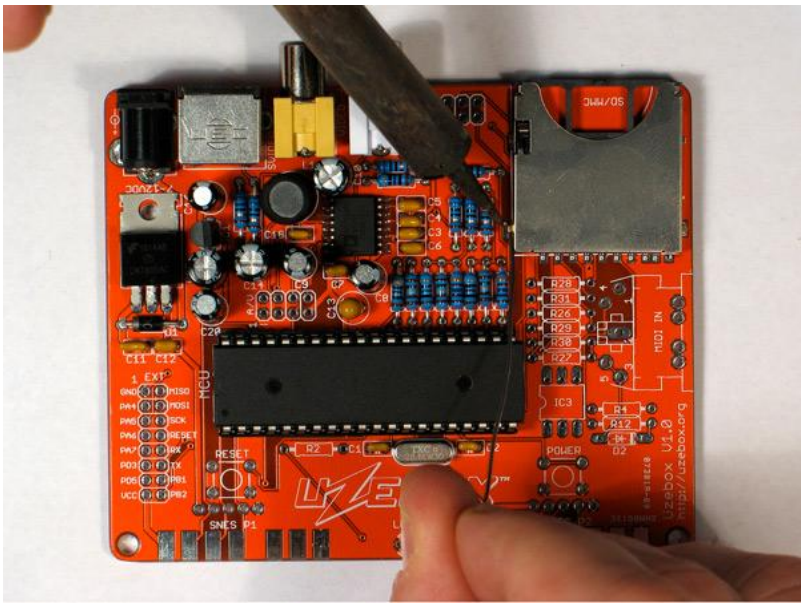


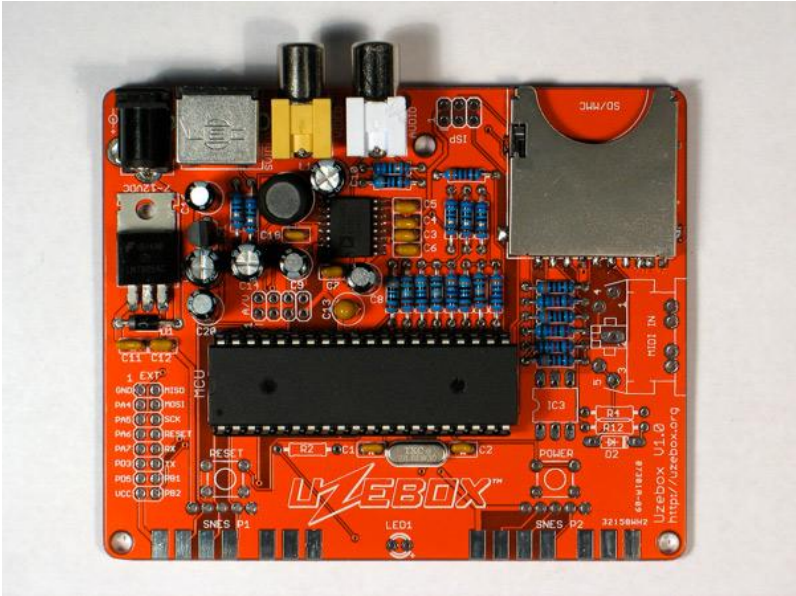
Connect the audio and video outputs to your TV, then plug in power.

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

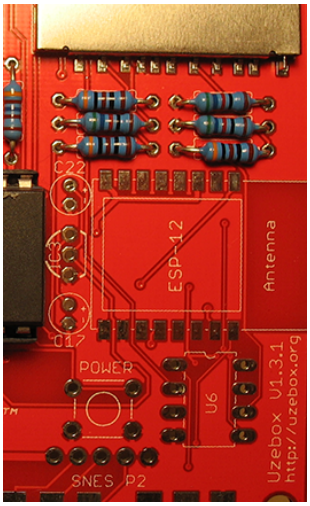
	Finish up the video section by adding the ***S-VIDEO*** connector, ***R24***(75Ω), ***R25***(75Ω) and then ***C13***(10uF tantalum), ***C14***(220uF) and ***C15***(220uF). Note that C13 is a tantalum capacitor and has polarity. If you look closely, one pin has a little + sign next to it. Be sure to insert 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 if available). Align and hold the socket fitting the the underlying plastic pins in the matching PCB holes. Then solder the anchor points (small wings protruding). Their location and count vary depending on the socket version included in the kit. For the Uzebox starter pack, they are located at the top. Solder the remaining pins.
	Complete the SD interface by soldering the voltage dividers ***R26***(301Ω), ***R27***(301Ω), ***R28***(301Ω), ***R29***(562Ω), ***R30***(562Ω) and ***R31***(562Ω). **NOTE:** The layout for PCB revision V1.3.1 is slightly



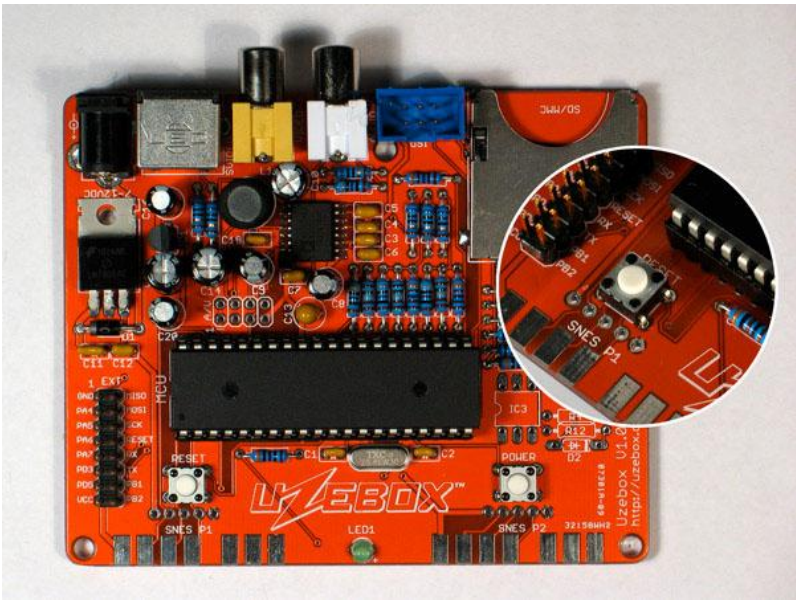
PCB V1.0-V2.0



PCB V1.3.1+

different but uses the same parts.

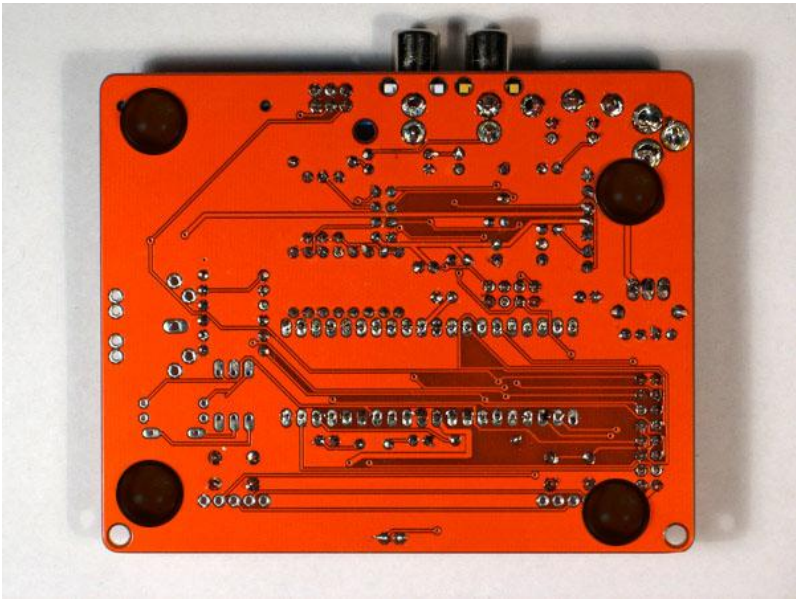
Assembling the remaining parts



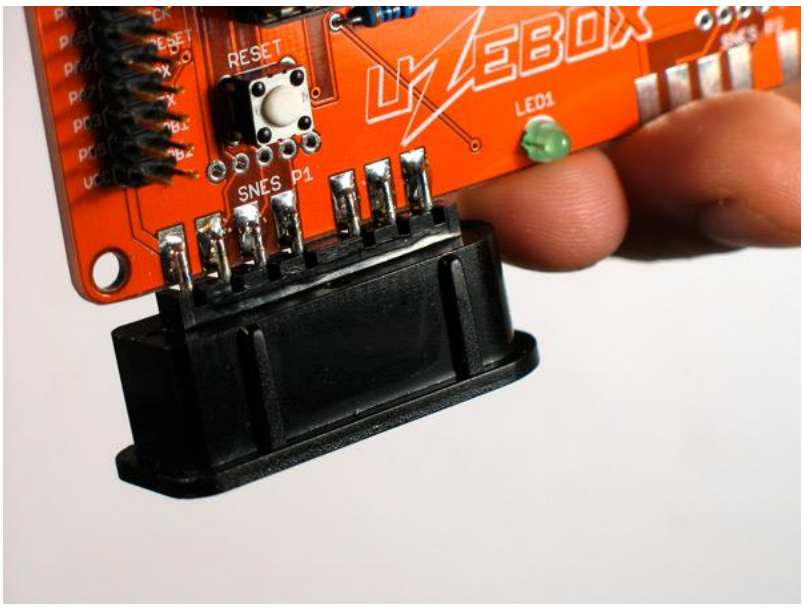
Add the ***ISP*** connector (notch goes inside) and the extension header (the grey side of the header is to be soldered).

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.

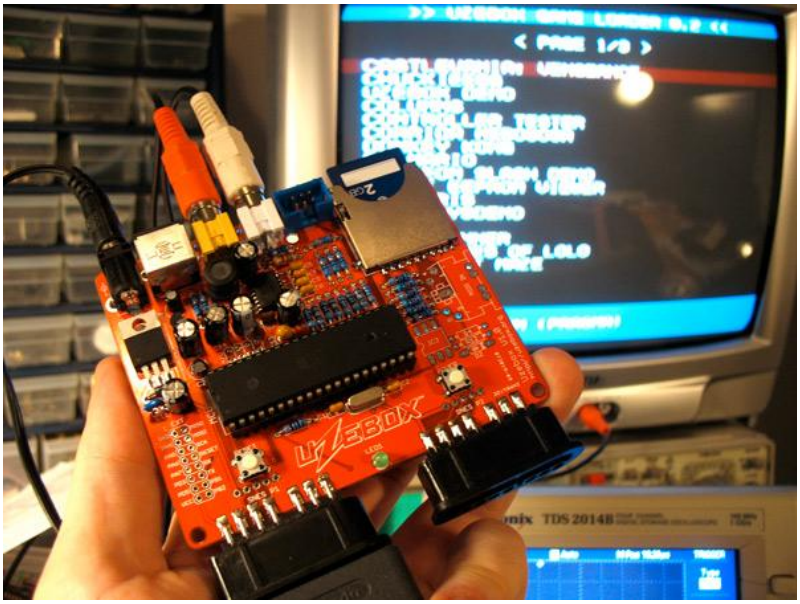
Insure the tactile switches are mounted horizontally as pictured.



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 Megatris title screen... you’re done, Congrats!

<u>IMPORTANT</u>

In addition to Megatris, the ATmega644 also comes pre-programmed with a 4K bootloader (aka the *Gameloader*) that allows you to load games stored on the SD card.

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

While in a game, you can push, Select+Start+Y+B to

	reset the game and get back to the gameloader. Have fun!

PCB revision 1.3.1

In this revision the MIDI interface was replaced by the Uzenet interface. Uzenet allows your Uzebox to play games with others via the internet! It uses the popular ESP-12 wireless module. Consult the Uzebox wiki (http://uzebox.org/wiki/index.php?title=Uzenet) for the Uzenet interface bill of material and assembly guide.

Troubleshooting

If you encounter a case not covered in this section, you can head to the Uzebox forum for support.

The Gameloader menu displays the message “SD Init fail: No card?”

- The SD card is faulty. Cards that comes with the kits are programmed and tested individually so they should work. Verify the card by plugging it into your computer. Alternatively, if you have another SD card less than 2G formatted in FAT16, test it out.
- Soldering problems with the SD card socket or the voltage divider resistors. You'll have to get your multimeter and the schematic (rev F2) and check the continuity from the ATMEGA pins to the SD card socket pins. Check the 3.3v voltage section too.
- A problem with the PCB. These should be extremely rare as the fab that manufactures them performs electrical tests. A broad section of the PCB is also tested after the AD725 is soldered.

The power button does seem to do anything

This is normal. This button is directly connected to an I/O pin of the ATmega644 and was initially targeted as a “soft power” button. The feature was never implemented but the button was left for backward compatibility with all other Uzebox clones. People use it as a general purpose button for debugging and such.

Support

If any parts are missing or broken, please email us at: uzeboxsupport@belogic.com for replacements.