

FIGnition Build Instructions (in brief).

Component	Quantity	Identification	Colour-Blind Id'ing
10K Resistor	2	Brown, Black, Black, Red	
1K5 Resistor	6	Brown, Green, Black, Brown	For resistors, the best thing to do is use a
1K Resistor	6	Brown, Black, Black, Brown	multimeter and set the range to 2K. All the
220R Resistor	2	Red, Red, Black, Black.	resistors are +/-1%.
1N4148 Diode	4	Glass+Black stripe. Tiny writing that says: 1N,41,48	Identifying the black stripe should be poss.
LED	1	Red and Translucent (or transparent)	
0.1 μ F Capacitor	1	Smooth, blobby, capacitor marked with "104"	
10nF Capacitor	3	Round ceramic disc marked with "10" or "103"	
6x6mm Switches	8	Square with protruding buttons!	

The Second bag contains:

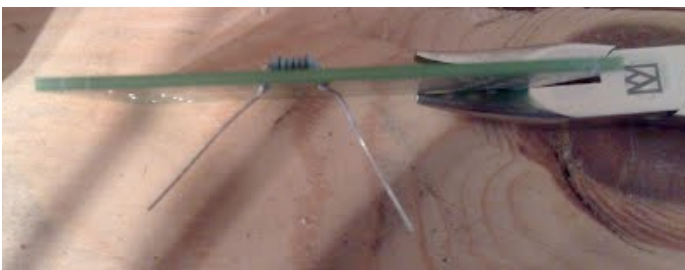
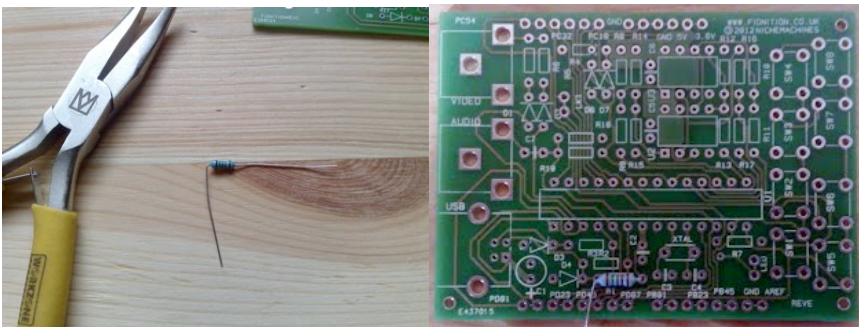
Component	Quantity	Identification
470R Resistor	1	Yellow, Purple, Black, Black.
68R Resistor	2	Blue, Silver, Black, Gold
22pF Capacitor	2	Round disc marked "22".
3v6 500mW Zener Diode	2	Glass+Black stripe. Tiny writing that says 3v6 somewhere
4.7 μ F Electrolytic Capacitor	1	Cylindrical with a white stripe.
20.0MHz Crystal	1	Metal oval-shaped can whose front is marked "20.000"
USB Connector	1	A Standard USB B-type connector.
Phono Connectors	2	Similar size to the USB connector, but with a round end. The Yellow one is for Video, the white one for Audio.
Total	12	

Setting up, make sure you have all these tools:



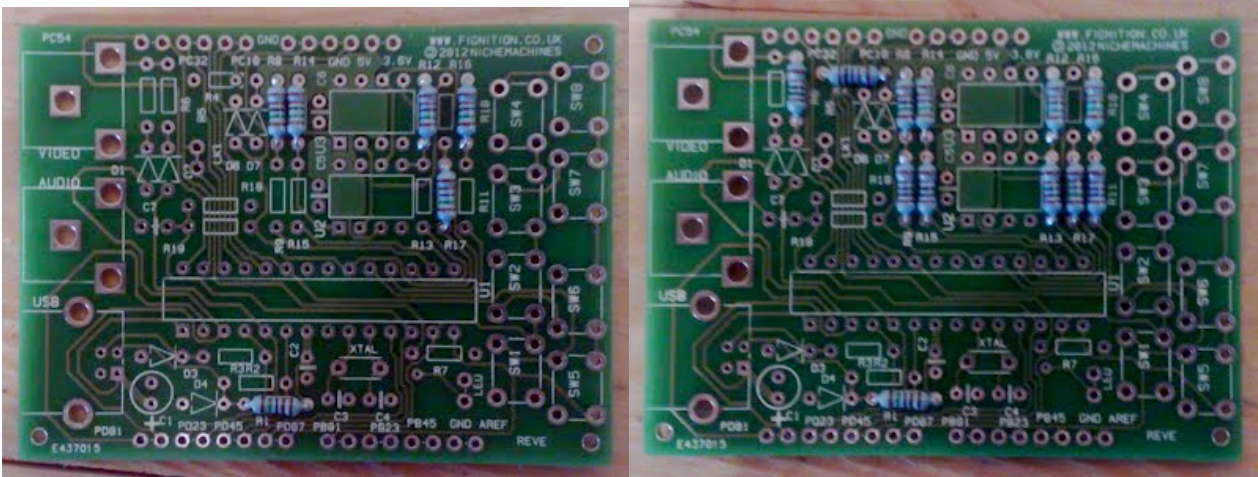
You'll also need a USB cable, a Phono lead and USB power (in my case a Kindle USB PSU).

Soldering: Bend one end, place in PCB, bend other end where it needs to fit its PCB hole.

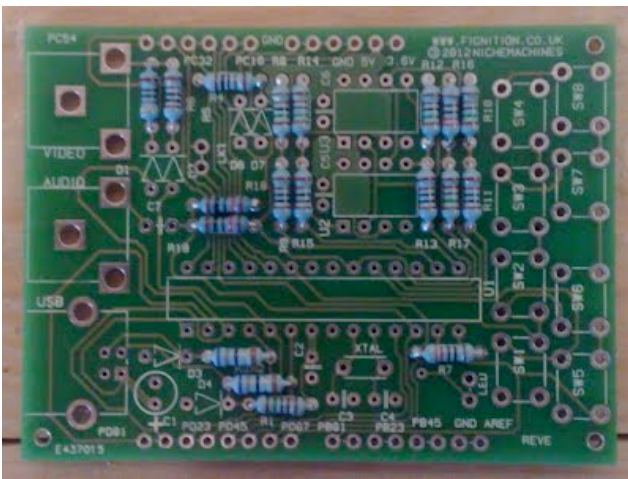


Splay legs and solder from rear-side.

1K5's should go in: R1, R8, R10, R12, R14, R17. 1Ks should go in R4, R5, R9, R11, R13, R15



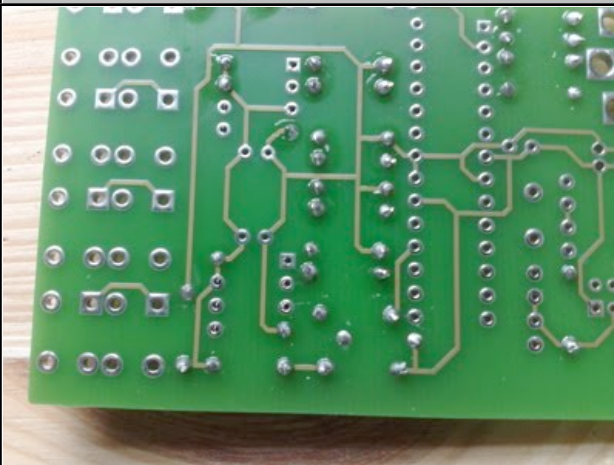
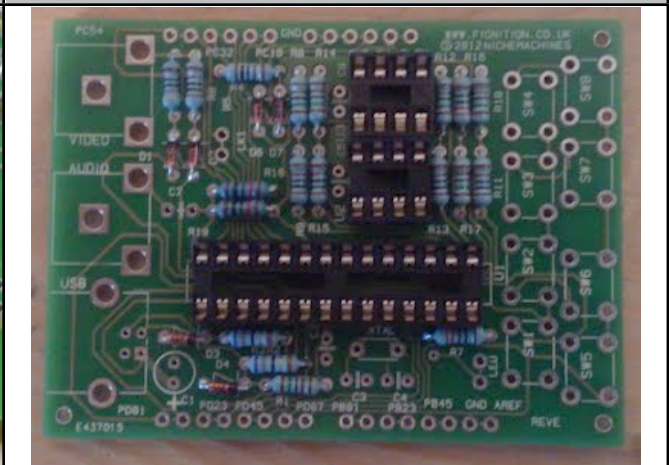
220Rs in R7 and R16, 470R in R6, 68R in R2 and R3, 10Ks in R18 and R19



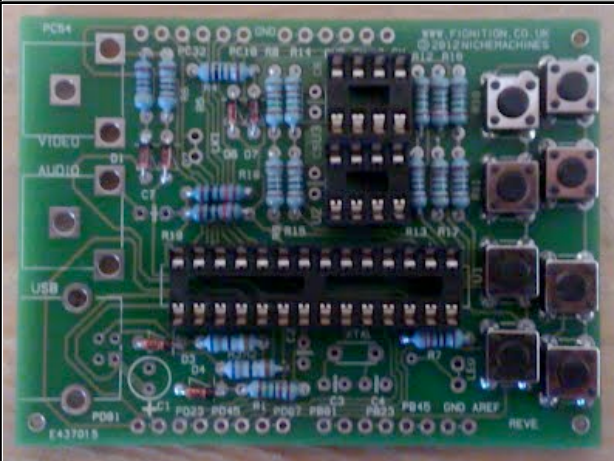
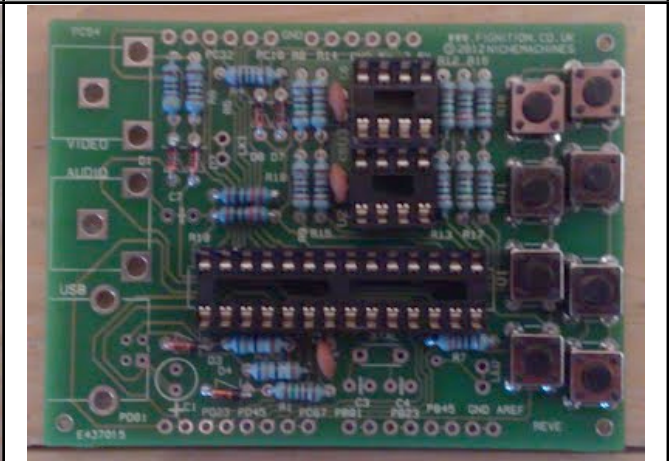
Diodes

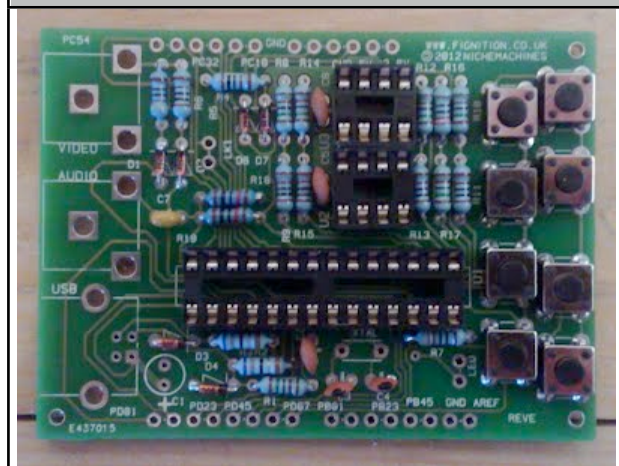
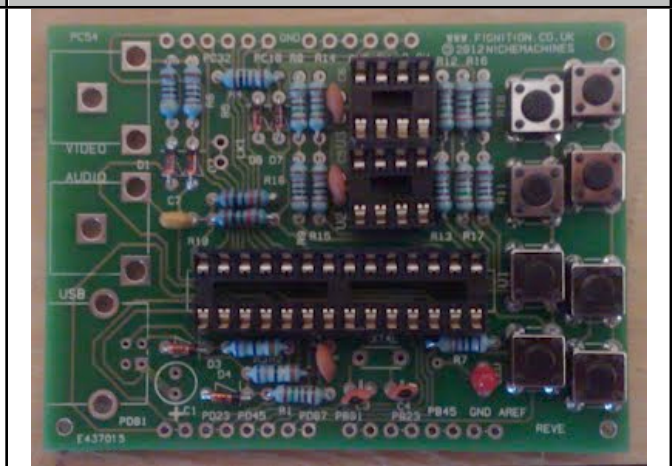
Zeners from second bag in D3 and D4	Signal diodes (first bag) in D1, D2, D6 and D7

IC Sockets next, but DON'T add the chips yet!!! Place notch at Right hand side; take care not to bend pins when fitting them into the PCB (especially with U1).

<p>Solder in a corner pin and then the opposite corner pin</p>	<p>Solder in the other pins.</p>
	

Switches. They look square, but the pins make them rectangular.

<p>Switches. They look square, but the pins make them rectangular. Pop them in so they fit nicely, they'll hold themselves in place when you turn the PCB</p>	<p>Disc capacitors. Solder the 10nF capacitors C2, C5 and C6</p>
	

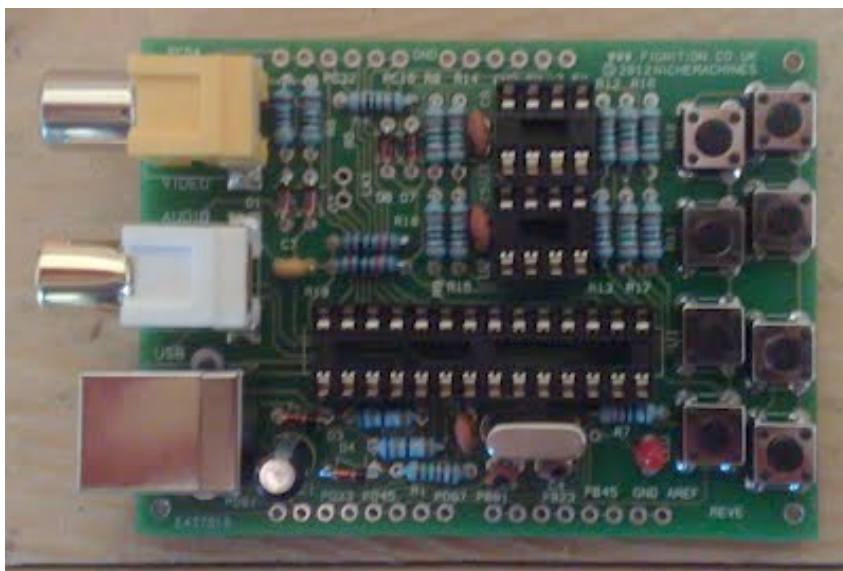
<p>Solder the 22pF capacitors next in the locations for C3 and C4 (they have a black mark on the top of them).</p>	<p>The LED should go next. It has 2 legs. The shorter one is towards the bottom on this diagram (towards ground).</p>
	

Then, there's the Electrolytic capacitor: The stripe with '-' on it should go on the *opposite* side to the '+' marking on the PCB.

Then the USB connector is next, be careful with the small USB pins, but put plenty of solder on the big anchoring solder pads!

Then the phono connectors, the pins will go through despite the plastic lugs. Again you'll need quite a lot of solder for these pins, mostly for anchoring!

the Crystal is the last component - it's last because it's the tallest.



Wow - you've actually **BUILT** the computer now. And now, instead of caving into temptation and switching it on, here comes the boring tricky bit, you need to meticulously check what you've done.

First you need to check all the joints... No, first you need to go away and have a tea-break. If you don't have any tea, find a shop or store which sells it; buy some and have some tea... and if you don't like tea hunt round for some water or a nice fruit squash! You need to take a break at this point!!! **Take a break!!!**

Twenty Minutes Later: ... Testing

Turn the PCB upside down and carefully check all the joints. Make sure all your connections look good. Good connections tend to look nicely cone shaped. Although my soldering isn't perfect, I never accept a connection that has gaping crevasses in the pin/pad connection or doesn't appear to smoothly connect to the pin. I'm also not happy if it looks like there's only a thin layer of solder connecting them both, it works for machine soldering, but hand-soldering doesn't have that level of accuracy.

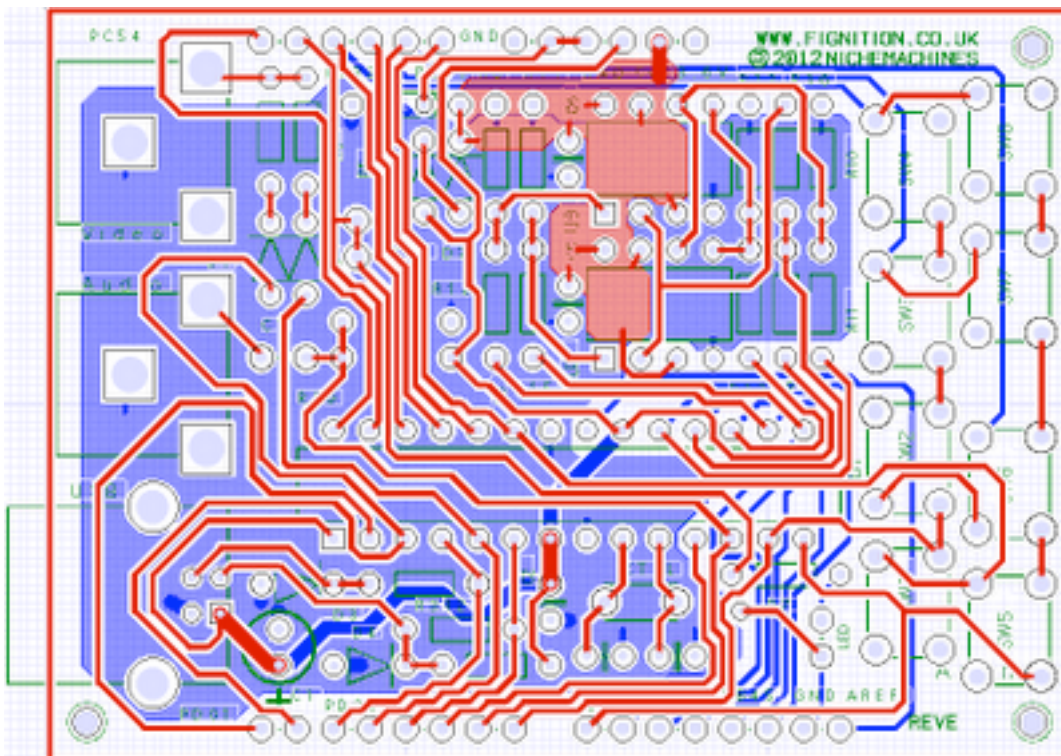
If you see a potential problem, remember it's easy to retouch the solder joint and add a tiny amount of solder if there isn't enough.

Also check that there doesn't appear to be any connections where there shouldn't be.

Look for what's called 'solder splashes', random bits of solder splashed across the circuit, they will cause inexplicable problems when checking the PCB... or smoke when you turn it on.

Also, make sure you've snipped all the legs from your components to no more than 1 or 2 mm (mine are generally 2mm) from the bottom of the PCB.

Finally, check to see that all the components are in the right places and right orientations (compare with the photo). If You've **Made a Terrible Mistake** and you find some components will have to be removed, you'll need the solder sucker.



Connection List RevE

IC:Pin\Connection

U1

1	(VCC)USB:1		
2	PD01.1		
3	D1:2 PD01.2		
4	R3:2 PD23.1		
5	D2:2 PD23.2		
6	R2:2 PD45.1		
7	VCC C2.1 U1.20		
8	(GND)USB:4		
9	XTAL:1		
10	XTAL:2		
11	PD45.2		
12	PD67.1	R19.1	
13	SW1.4	PD67.2	
14	SW5:3	PB01.1	
15	R15.2	PB01.2	
16	R9.2	PB23.1	
17	R13.2	PB23.2	
18	R17.1	PB45.1	
19	R11.2	PB45.2	
20	(VCC)R17.2, R19.2	H2.4 D6.2 U1.7	
21	AVREF		
22	(GND)		
23	SW5.1	PC10.2	
24	SW6.1	PC10.1	
25	SW3.1	PC32.2	
26	SW4.1	PC32.1	
27	LK1.1	PC54.2	
28	PC54.1		

U2

1	R15.1		
2	U3.2	R16.1	
3	VCC3_6		
4	GND		
5	R13.1		
6	U3:6		
7	VCC3_6		
8	VCC3_6		

IC:Pin\Connection

U3

1	R8.2		
2	U2:2	R16.1	
3	VCC3_6		
4	(GND)		
5	U2.5	R12.2	
6	U2:6	R10:2	
7	VCC3_6		
8	VCC3_6		

SW1

1	SW5.1	U1.23	
2			
3			
4	SW2.3	U1.13	

SW2

1			
2	SW6.2		

3 SW1:4
4 SW3.3
SW3
1 SW7.1 PC23.2
2
3 SW2.4
4 SW4.3
SW4
1 SW8.1 PC23.1
2
3 SW3.4
4
SW5
1 U1.23 SW1.1
2
3 PB01.1 U1.14
4 SW6.3
SW6
1 PC10.1
2 SW2.2
3 SW5.4
4 SW7.3
SW7
1 SW3.1
2
3 SW6.3
4 SW8.3

IC:Pin\Connection

SW8
1 SW4.1
2
3 SW7.4
4
R1
1 R2:1 USB.2 (Via D4.2 and R2.1)
2 (VCC)
R2
1 D4.2 R1.1 USB.2
2 U1:6 PD45.1
R3
1 D3.2 USB.3 (Via D3.2)
2 U1:4 PD23.1
R4 (3v6 Reg)
1 (GND)
2 D7.1
R5
1 R6:1
2 D2.1
R6
1 R5.1 PHONO1.1
2 D1.1
R7
1 LK1.1
2 LED.1
R8
1 (GND)
2 U3.1 R9.1
R9