

# Electro-Resales

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## CW Filter – Kit build guide

### Read me first!

The following steps are designed to get your kit built and operational. This is a good beginner's kit; however, you do need to know the basics of soldering and electronic construction, if you are unsure of your skills, seek the help of a more knowledgeable person who can assist.

### Gotcha Alert

The kit while easy to construct has one 'gotcha', which can trip up even the most experienced builder. IC 2 is oriented in the opposite direction ( $180^\circ$ ) to IC 1 & IC 3, make sure to note this and follow the IC outline pattern, when inserting IC 2

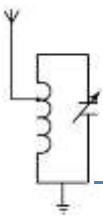
Before starting work, carefully unpack the component pack, and check the components supplied against the component checklist. If any parts are missing please contact us immediately at: [resalese@gmail.com](mailto:resalese@gmail.com) and we will assist.

Preparation is 99% of success, and building this kit is no exception. Make sure to have a clean well-lit work area, some containers to hold the parts are a good idea, and familiarize yourself with this guide.

Be methodical in your construction and by following our stage construction process your kit will be built quickly and work first time.

### Parts Checklist

Part Name	Part number	Part Value	Identification
Resistor	R1, R4, R7	680 K $\Omega$	Blue, Grey, Yellow
	R2, R5, R8	24k $\Omega$	Red, Yellow, Orange
	R3, R6, R9	1.8 M $\Omega$	Brown, Grey, Blue
	R10, R13	1K $\Omega$	Brown, Black, Black, Brown
	R11, R12	33k $\Omega$	Orange, Orange, Orange
Capacitor	C1	0..1uF	Marked 104
	C2, C3, C4, C5, C6, C7	1000pF	Marked 102
	C8, C9, C10, C11	10uF	Marked 10uF (Electrolytic)
	C12	470uF	Marked 470uF (Electrolytic)

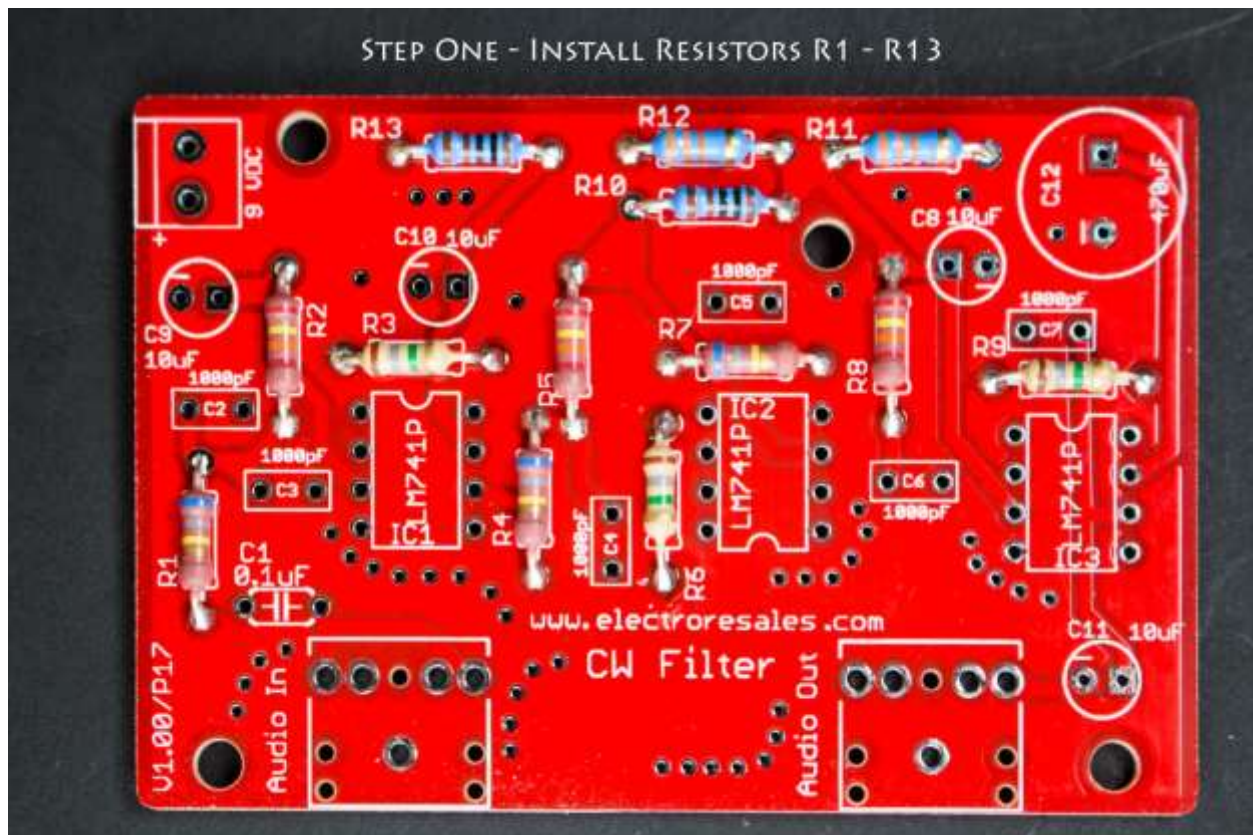


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OP-Amp IC	IC 1, IC 2, IC 3	LM741 or TL071	8 Pin plastic package Dip
Hardware	J1	3.5 mm block	Green body
	Audio in/out	3.5mm Connector	Black flat body jack sockets

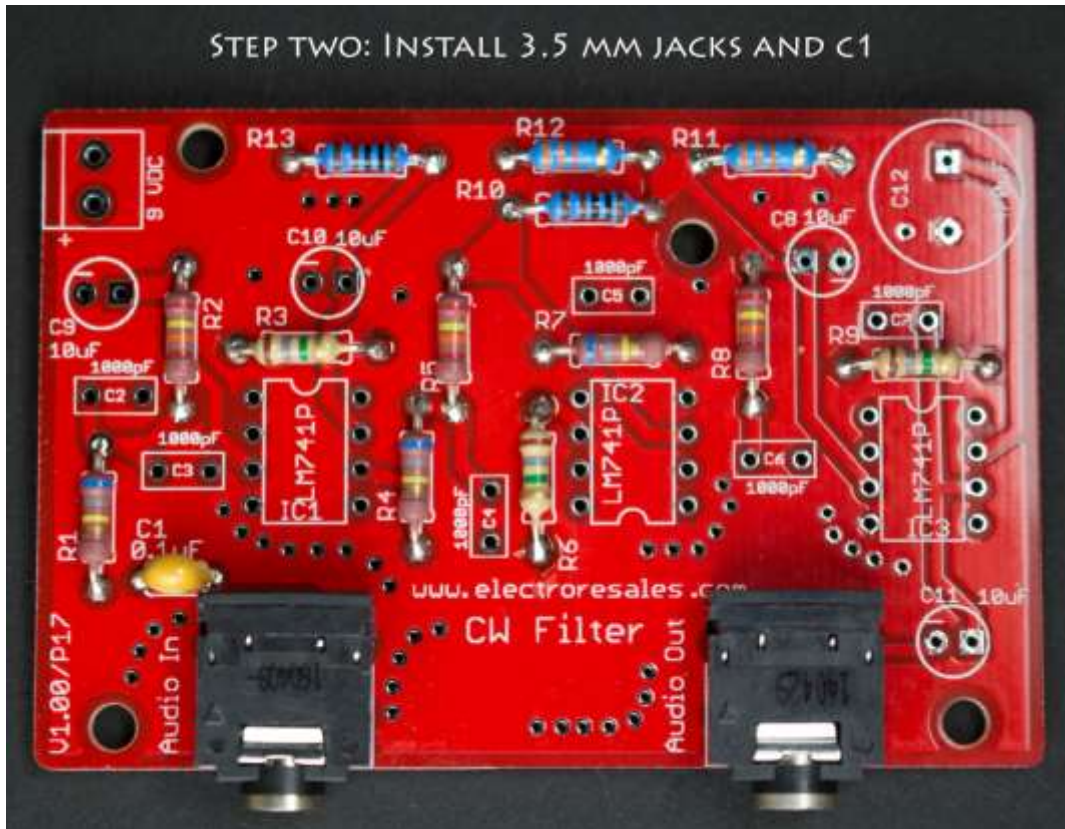
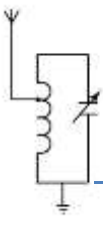
## Stage one

Start construction by inserting and soldering resistors R 1 – R13, these parts are not polarized so they can be inserted without worrying about orientation. The photo below shows how your board should look after inserting and soldering in the resistors:



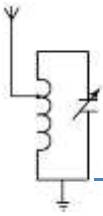
## Stage Two

With the resistors installed the next step is to install the 3.5mm audio jacks for the in and out audio and capacitor C1. Refer to the photo below to see how your board should look at this stage:



## Stage Three

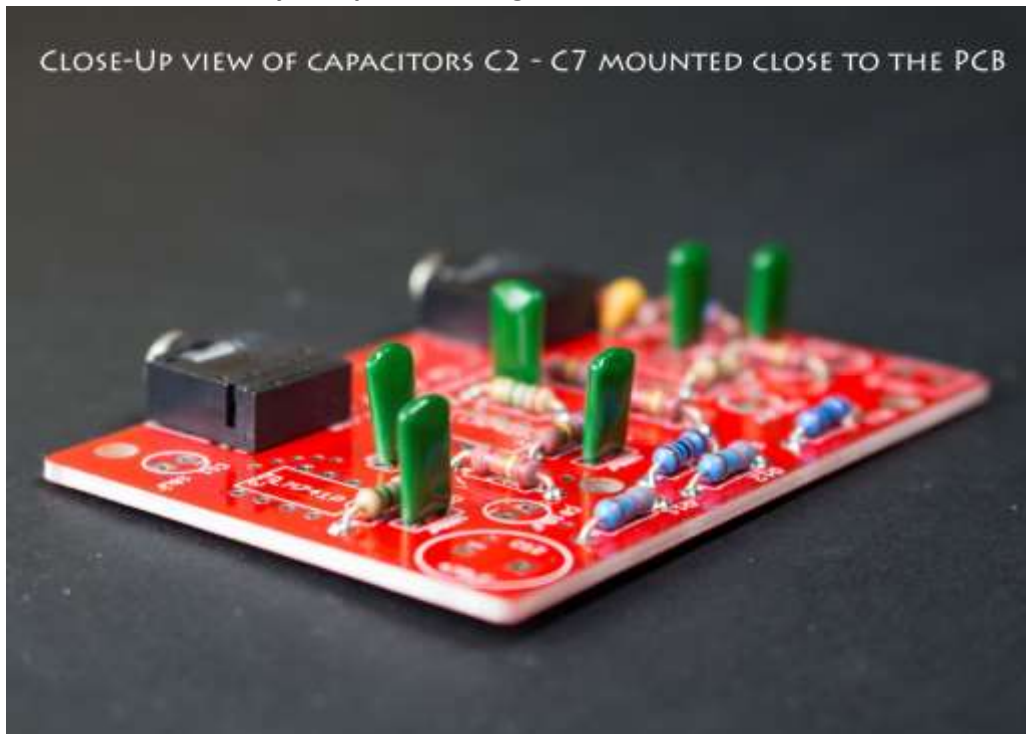
The next step is to install the Mylar capacitors C2 – C7, these are not polarized so again orientation is not important. Try to get the capacitors seated as close to the PCB surface as possible. These capacitors have been matched to be within 1-3% of each other as they form an important part of the filter circuit. See the phot below for how the board should look after this stage.

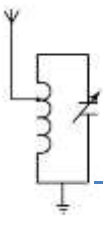


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This photo illustrates the Mylar capacitors being close mounted to the PCB

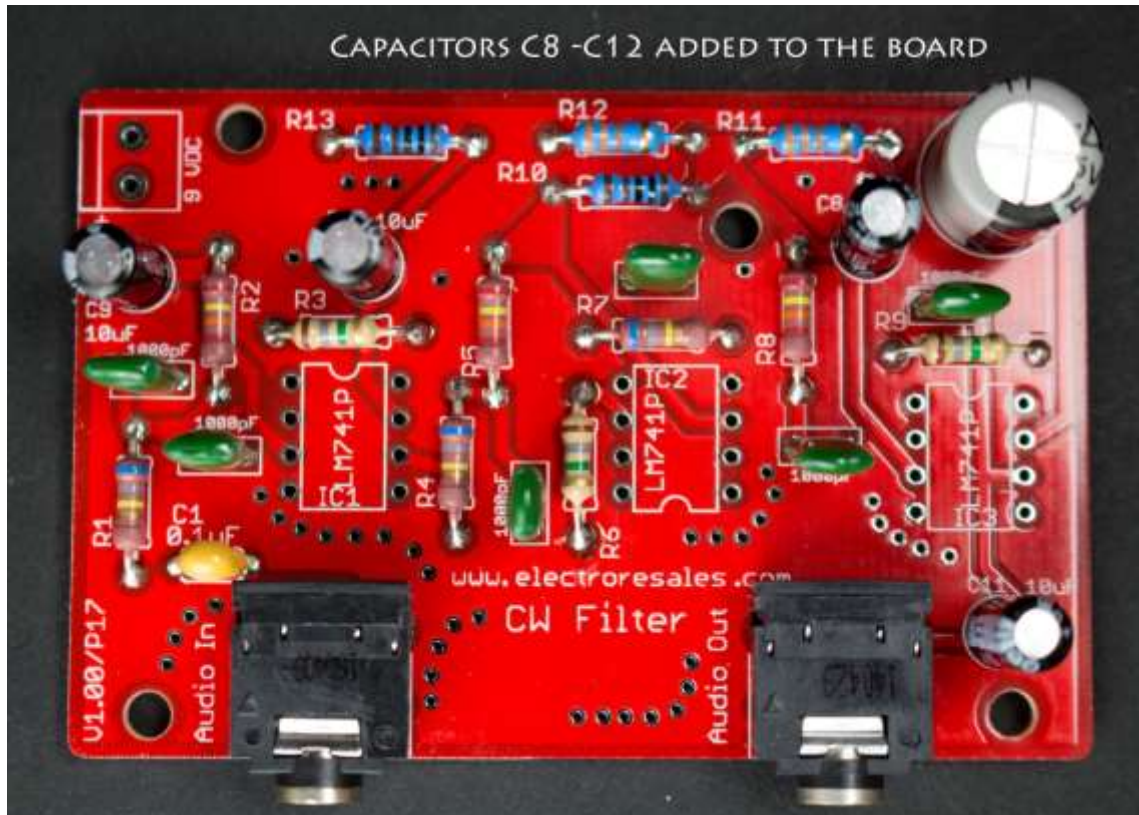




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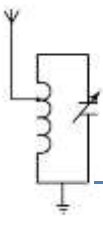
## Stage Four

Its now time to add the polarized capacitors C8 – C12, the PCB legend shows the negative lead position, make sure to orient the negative lead on the capacitor with this negative solder pad. After adding these capacitors the board should look like this:



## Stage Five

We now need to add the Op-Amps to the board – the kit may be supplied with either 741 type Op-Amps or TL071 type Op-Amps. They are interchangeable. The only note of caution is to repeat that IC 2 is oriented 180° to IC 1 & IC 3. The next photo shows these items and the screw terminal block added to the board.



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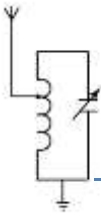
Congratulations your board is now completed.

## Inspection & Test

At this point it is very tempting to apply power and get going, however, it is better to closely inspect the PCB, mistakes are easier to correct now – start by comparing the board you built to the picture above, make sure your components match our images and are correctly orientated, correct any mistakes now.

Flip the board over and inspect your soldering – reflow any suspect joints, make sure all joints are soldered; it's easy to miss one joint.

If it all looks good, now is the time to apply power and test the finished filter. To power your filter unit a 9 VDC battery can be used or a 12 VDC power supply. Whichever method is chosen the positive lead is



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attached to the terminal block connection marked with a '+’.

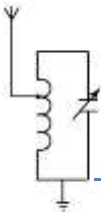
With the power applied an audio jack lead from the headphone jack of the radio can be connected to the Audio In jack on the board, while headphones can be used at the Audio out Jack. Powered computer style speakers can also be connected here, however, the output power is not sufficient to drive a standalone speaker.

You should hear audio in the headset/speakers, which may sound a little different to what you are used to. Extraneous, noise and signals will be suppressed considerably, and the sound heard will be more like that heard via a long tube. While learning how to use the filter it may be easier to tune in a station sending CW without the filter attached, and then introduce the filter into the audio stream. Careful retune the receiver and also use the AF & RF controls to minimize overloading.

## Troubleshooting

If there is no audio or you cannot hear any ‘rushing’ type noise. Unplug the power source and check the following first:

1. Power connections are correct, if using a battery is it ok, can you try another fresh battery
2. Check your board for suspect solders joints, also check to make sure all joints are soldered and no whiskers of solder are bridging components or pads.
3. Check that all components are in the right place, and importantly that polarized capacitors are oriented correctly.
4. If still no luck please contact us at : [resalese@gmail.com](mailto:resalese@gmail.com) for assistance



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## The small Print

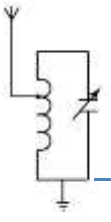
### DISCLAIMER

**Any person who constructs or works on electronic equipment may be exposed to hazards, including physical injury, the risk of electric shock or electrocution.. These hazards can result in health problems, injury, or death. Only qualified persons who understand and are willing to bear these risks themselves should attempt the construction of electronic equipment. By purchasing this item, the buyer acknowledges these risks.**

**There is a risk of electric shock, electrocution, burns, or fires that is inherent in the construction and use of electronic equipment. By purchasing this item, the buyer acknowledges these risks.**

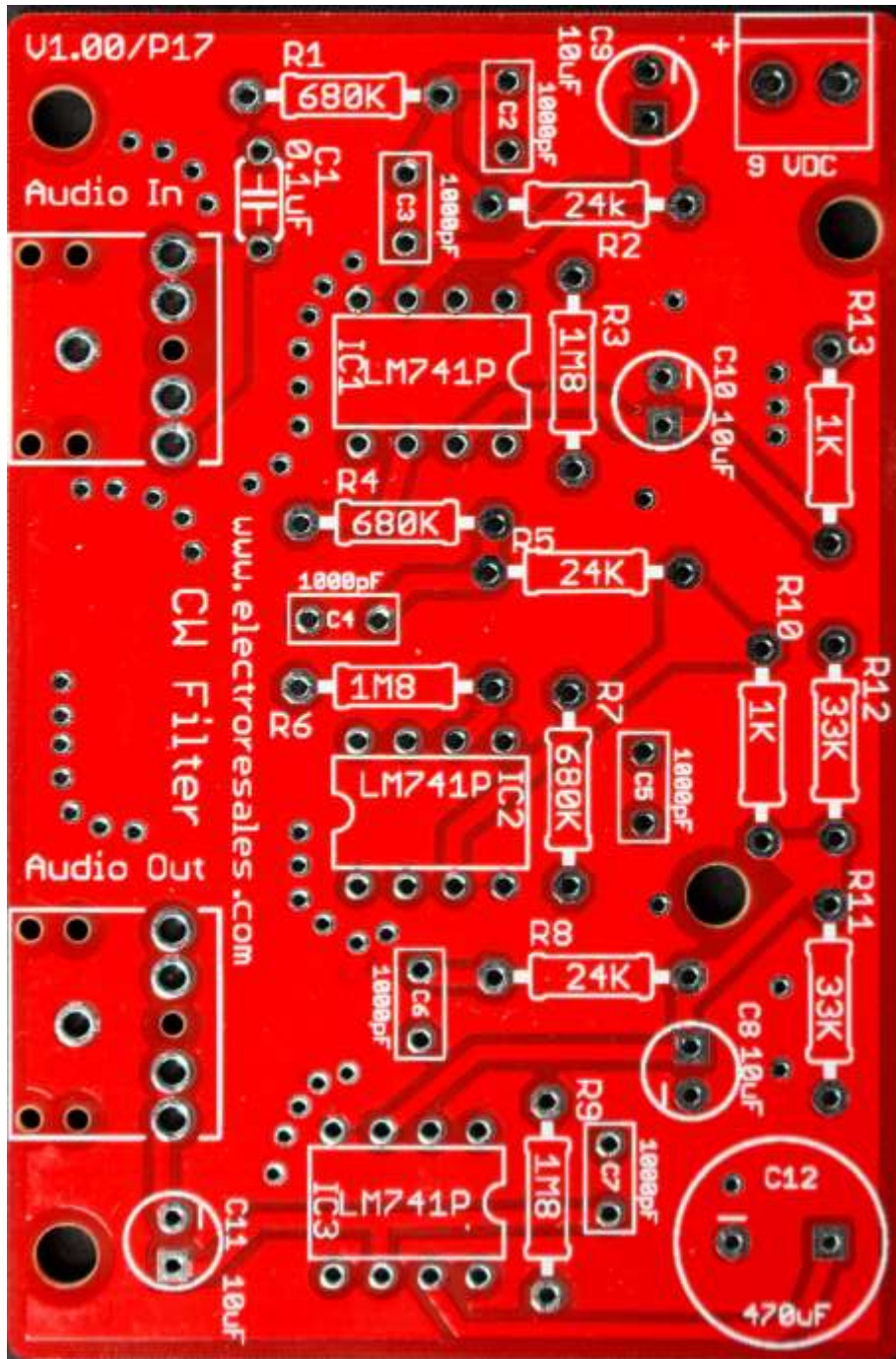
**IN NO EVENT SHALL THE SELLER BE LIABLE FOR ANY SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY NATURE including, but not limited to, property damage, personal injury, death or legal expenses. Buyer's recovery from Seller for any claim shall not exceed the purchase price paid by Buyer for the goods, irrespective of the nature of the claim, whether in warrant, contract or otherwise. By purchasing this item, BUYER AGREES TO INDEMNIFY, DEFEND AND HOLD SELLER HARMLESS FROM ANY CLAIMS BROUGHT BY ANY PARTY REGARDING ITEMS SUPPLIED BY SELLER AND INCORPORATED INTO THE BUYER'S PRODUCT.**

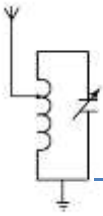




## Appendix

The Bare PCB for reference





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## The schematic

