

KIT Assembly Guide

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The following guide is indicated for those who have starts from scratch, if you already have experience with the assembly of a circuit you can easily skip the reading and go directly to assembly!

Tools needed:

Stylus welder or even better a soldering station
Lead or lead-free type tin of 0.5mm or 1.0mm size
Scissors, screwdrivers
Solder paste (optional)
PCB holder (optional)

RESISTORS

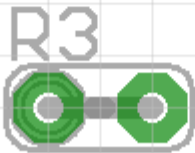
Generally you start with the lowest profile components (diodes and resistors). Resistors are indicated by the letter R followed by a number (R1, R2 etc.). Generally they are mounted horizontally but on some boards for space reasons they should be mounted vertically. The resistors are not polarized and can be mounted without following an orientation.



Horizontal mounting



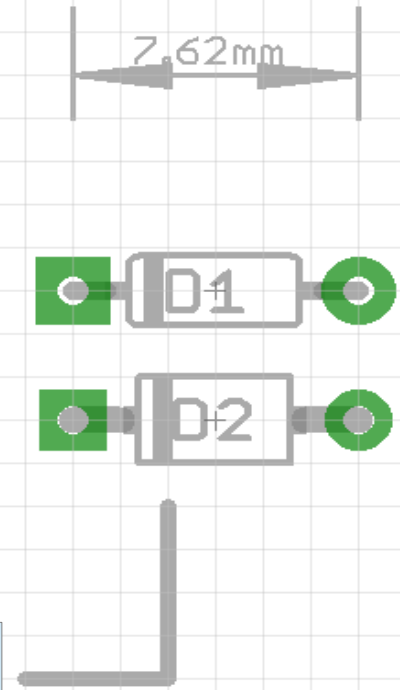
Vertical mounting



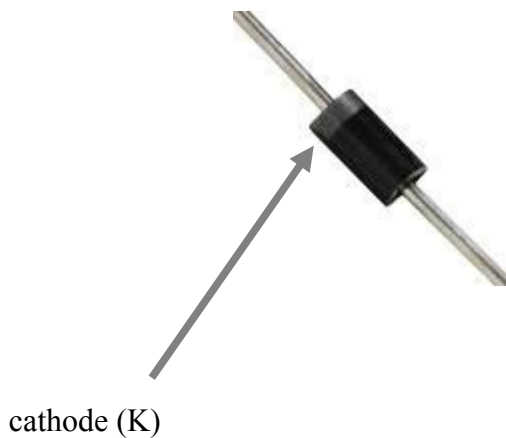
Vertical mounting

DIODES

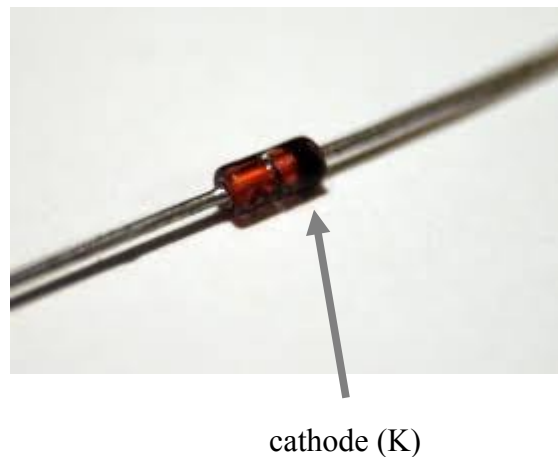
Diodes are indicated by the letter D followed by a number (D1, D2 etc.). Generally they are mounted horizontally but on some boards for space reasons they should be mounted vertically. Diodes are polarized components and it is necessary to respect the orientation indicated by a circular band on the body of the component indicating the terminal called cathode (K). Usually the component name (1N4001, 1N4148, Zener 8.2V) is indicated on the component body.



silicon diode type 1N4001



silicon diode type 1N4148 or zener diode



Germanium diode
type 1N34



CAPACITORS

Capacitors are indicated by the letter C and are distinguished according to the type of construction between ceramic, film, electrolytic and tantalum.

The ceramic and film capacitors are not polarized, so they can be mounted on the board without following an orientation.

The value of the capacitor expressed in submultiples of Farad (F) can be read on the value of the component. Generally a 2 or 3-digit encoding is used to extrapolate the value expressed in pico farad (pF). The third digit indicates how many zeros should be added to the first two digits.

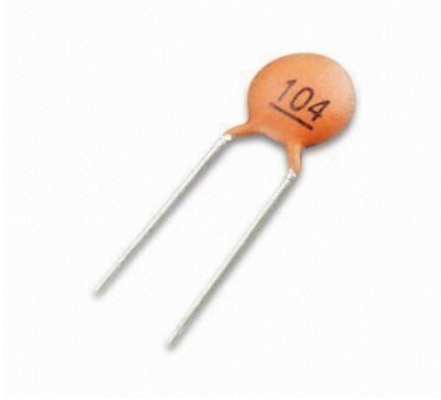
Example:

100 = 10pF
 101 =100pF
 104= 100000pF

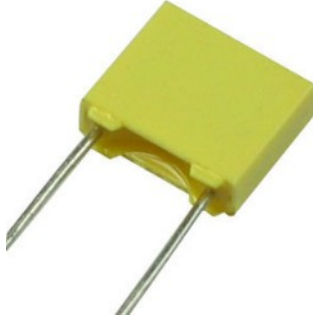
The following table can be used to identify most type of caps:

Value	3 digit code	2 digit code
4.7p		4R7
10p	100	10
15p	150	15
22p	220	22
33p	330	33
47p	470	47
100p	101	
150p	151	
220p	221	
330p	331	
470p	471	
560p	561	
680p	681	
1n	102	1n
2.2n	222	2n2
3.3n	332	3n3
4.7n	472	4n7
6.8n	682	6n8
10n	103	10n
15n	153	15n
22n	223	22n
33n	333	33n
47n	473	47n
68n	683	68n
82n	823	82n
100n	104	.1 / u1
150n	154	.15
220n	224	.22
330n	334	.33
470n	474	.47
1u	105	1

Ceramic cap



Film cap boxed

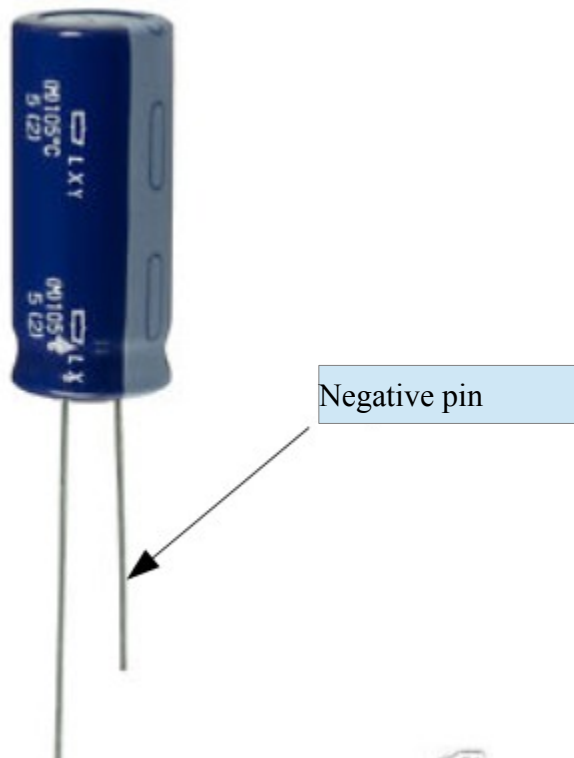


Ceramic cap



Electrolytic capacitors and the tantalum capacitors are polarized and it is mandatory to respect the **orientation** in the mounting boxes. On the board the positive terminal is indicated by the symbol "+".

In electrolytic capacitors the negative terminal is indicated by a vertical band on the component body. The pins can also be used to identify the positive terminal from the negative one. The negative terminal corresponds to the shorter pin and the positive to the longer pin.



The value of the electrolytic capacitors expressed in micro farads (μF) can be read directly on the component body.

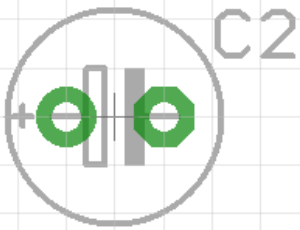
Tantalum capacitors such as electrolytic capacitors are polarized and the positive terminal is indicated by the "+" symbol on the component body. The value can be read on the component body and is expressed in μF as for electrolytic or indicated by the 3-digit coding system as for ceramic and film capacitors.



C1



Non-polarized capacitor



Polarized capacitor

Some electrolytic capacitors are of the non-polarized type (also called bipolarized). They are usually indicated by the abbreviation NP or BP in the parts list. They have the same shape as the polarized electrolytic capacitors but it is not necessary to respect the orientation.

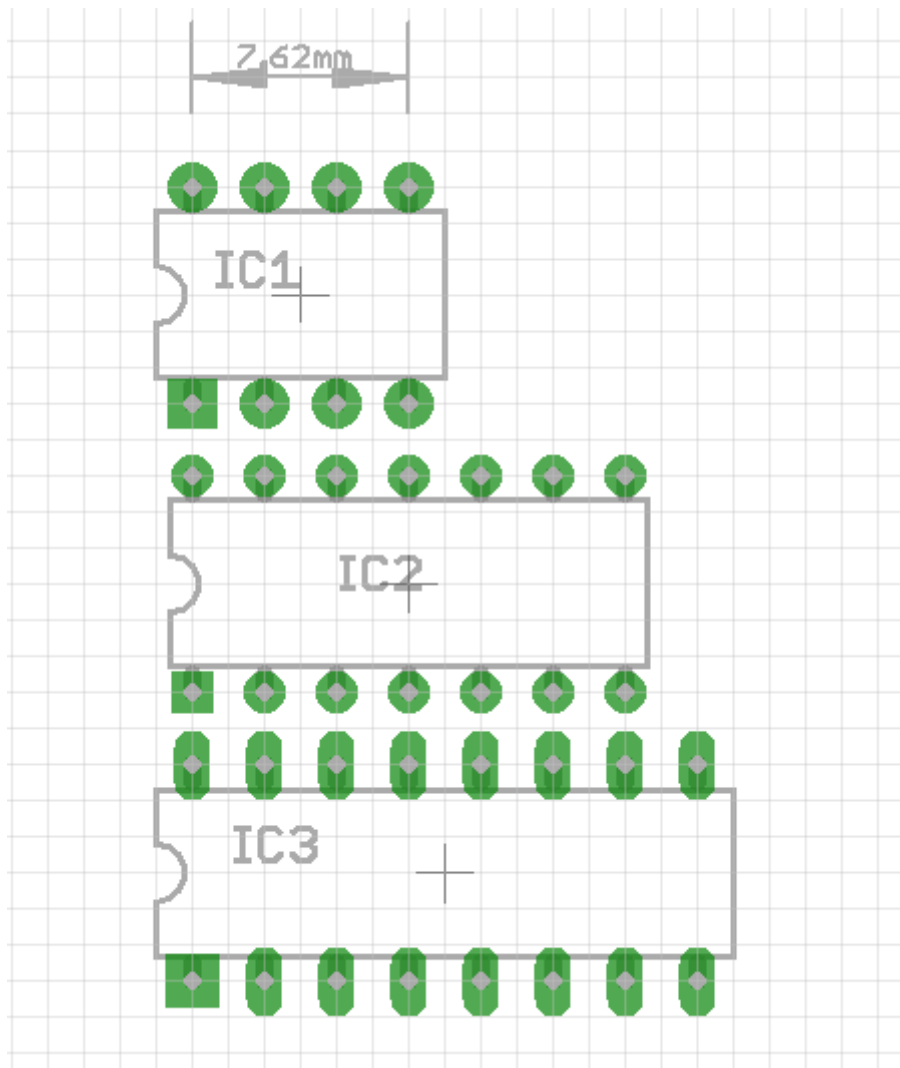
TRANSISTOR

Usually transistors have 3 terminals, they are distinguished according to the shape of the casing (called package). They are indicated with the letter T or Q followed by a number and must be oriented according to the screen printing on the PCB. The name of the transistor is indicated on the body of the component. The most common shape is the one related to the TO-92 package, the side with the flat surface on the component must be placed in correspondence with the flat part of the silkscreen on the board:



INTEGRATED CIRCUITS

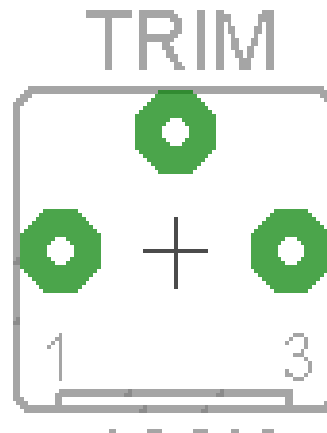
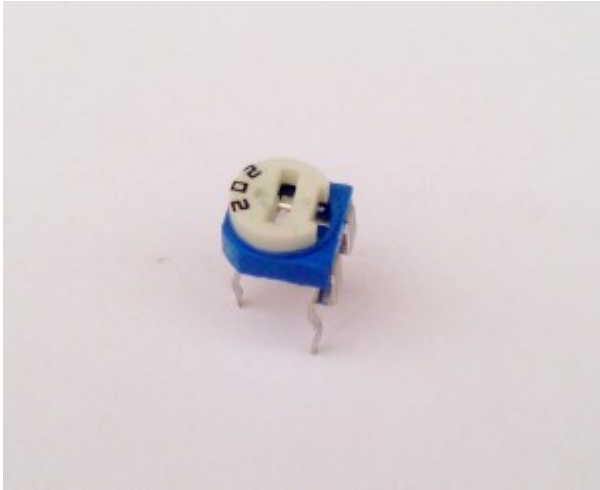
The **orientation** during assembly must be respected. A bezel or a lateral circle on the body of the component indicates pin number 1. The component must be mounted following the silk-screen printing on the board (which also indicates the orientation direction with a crescent or circle at pin 1):



ICs can be soldered directly to the board but a socket is often used for convenience. In this case, the socket is soldered to the board while the integrated circuit is simply plugged onto the socket. A crescent moon is also indicated on the socket to indicate the mounting side and facilitate the orientation of the IC.

TRIMMER

Trimmers usually have three terminals, once soldered on the board they must be adjusted with a screwdriver following the instructions on the kit datasheet. Most of the adjustments can be made by ear. The trimmer value is indicated on the component body and uses the 3-digit coding of the capacitors. Eg. 202 = 2000 ohm = 2K ohm 103 = 10000 ohm = 10K ohm etc.



POTENZIOMETRI

Potentiometers usually have 3 terminals but in some cases they can also have 6 terminals (dual gang pot).

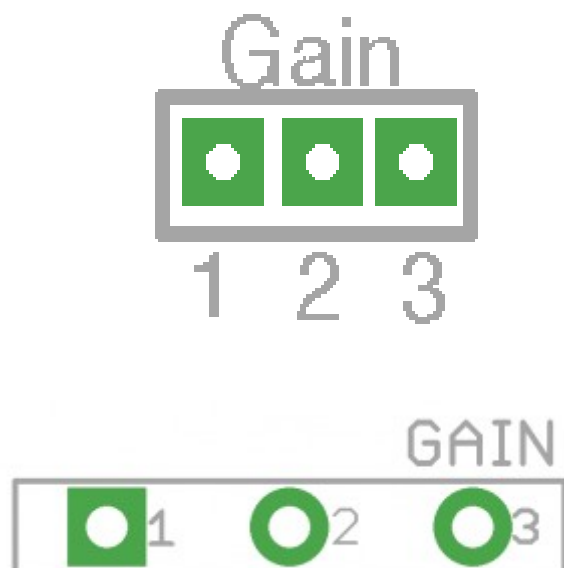
The value is expressed on the component body (e.g. 1K, 10K, 500K etc.). In addition to the value, a letter is indicated that identifies the type of curve of the potentiometer:

B = Linear

A = Logarithmic

C = Anti-logarithmic (or reverse log)

The left pin corresponds to pin 1, the middle pin to pin 2 and the side pin to pin3.



LEDs

LEDs usually have two pins and like diodes (they are part of the same family) they have a positive terminal called the anode and a negative terminal called a cathode. The cathode terminal is easily distinguished because, as with electrolytic capacitors, it is the shortest pin. To mount the LED it is first necessary to solder the two cables to the pins of the LED (it is good to use two different colors e.g. black cable for the cathode and red for the anode in order to easily distinguish them when the LED cables will have to be mounted on the board).

To solder the cables on the LED it is necessary:

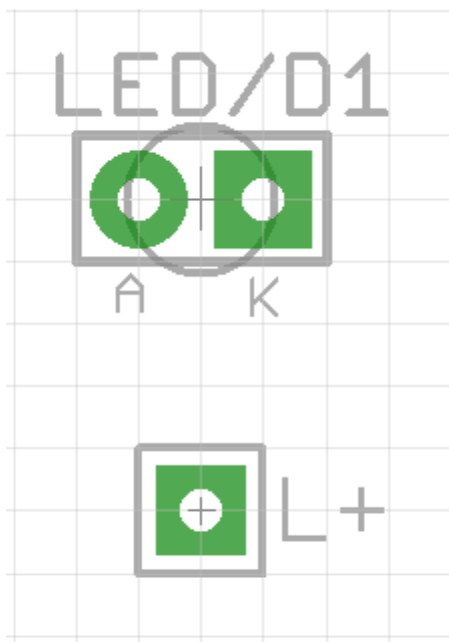
- strip the cables from both sides, intertwine the conductors, apply a little solder paste on the braided conductors and tin them.
- Hook one end of the cable and wrap it around the LED pin, apply some solder paste on the LED pin and proceed to solder the cable and pin as close as possible to the LED head (5-10 mm) to avoid the LED taking up too much vertical space.
- Cut off the excess wire and pin.
- Repeat for the second pin of the LED.

After soldering the cables to the pins, it is good practice to insulate the two pins to avoid this, the ideal is a heat-shrink sheath or, alternatively, insulating tape.

On some boards the LED pin is indicated as L + and represents the pad to which the LED anode must be connected, the cathode will instead go towards the footswitch.

On other boards the both LED conductors must be connected to the pins indicated with A (for the anode) and K (for the cathode).

On the board the name of the LED can be indicated by the LED writing and by the letter D followed by a number.



JACK, FOOTSWITCH, SWITCH, POTs ETC.

See the WIRING GUIDE file and datasheet for wiring. It is usually useful to first mount all the components on the box, cut the cables according to the length they have to travel (leaving a little margin to avoid them being too tight) and solder them first on the component and then on the PCB or vice versa.

JACK DI ALIMENTAZIONE

Usually, if the "internal" type, which is also the most common, is the last component to be soldered. It is necessary to insert the jack on the box, fix it with the nut supplied and proceed with the soldering as indicated in the CONNECTION GUIDE.

SOME NOTIONS ON SOLDERING

There are a thousand tutorials on YouTube made by experts in the field on how to solder properly and if you are just starting out I strongly recommend that you check them out, however some of this information may be useful:

- When you strip a cable it is best to twist the copper wires. In addition to braiding the cable, applying some tin (pre-soldering it) makes the bare end more solid. It is possible to use some solder paste on the cable before proceeding to soldering. The paste will make it easier to deposit the tin on the conductor.

- When soldering to potentiometers, jacks, footswitches, switches, etc. Solder paste is very useful for facilitating soldering, it takes very little to deposit on the component pin to facilitate soldering.

- Do not use solder paste on the PCB, some types are conductive and can create short circuits on the board.

- The ideal soldering temperature depends on several factors, mainly the type of solder used and the size of the surface to be soldered. The larger the soldering surface, the higher the temperature should be. However, a reference range is 370 ° - 390 °

- Once you have soldered a component on the board, cut the terminal in excess of the top of the solder.

To facilitate the soldering of cables on potentiometers / jacks / switches we recommend:

- strip the cable on one side for about 2 mm (the one that will go to the PCB) and on the other for about 4 mm (the one that will go to the component pin).
- wrap the conductors and apply a thin layer of solder paste
- tin the conductors
- hook the 4 mm long part of the tinned cable and insert it into the eyelet of the potentiometer / jack / switch pin
- apply a light layer of solder paste and finally proceed with soldering.
- the 2 mm tinned cable part is finally soldered on the board.