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exSID USB

Assembly Guide

Disclaimer

The information and methods described herein are provided “AS-IS” WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED. Use the concepts, examples and information at your own risk. There may be errors and inaccuracies, that could be damaging to your devices. Proceed with caution, and although it is highly unlikely that accidents will happen because of following advice or procedures described in this document, the author does not take any responsibility for any damage claimed to be caused by doing so.

Introduction

This assembly guide assumes some basic soldering skills on the part of the reader. It is a step-by-step explanation of how to properly assemble the [exSID USB](#) revision C.

Note: *This kit is not suited for DIY beginners. While designed to be easy to assemble, it will require prior experience assembling DIY kits.*

The underlying idea is to start with the thinnest components first (those with the lowest “elevation” on the PCB) and move toward the thickest/tallest components.

All pictures can be clicked for larger versions.

Note: *The PCBs I provide have steps 2-3 already done: SMD parts and USB connector are already installed.*

Hacks

- Roland D-550 LCD upgrade
- dsputils_parisc.c

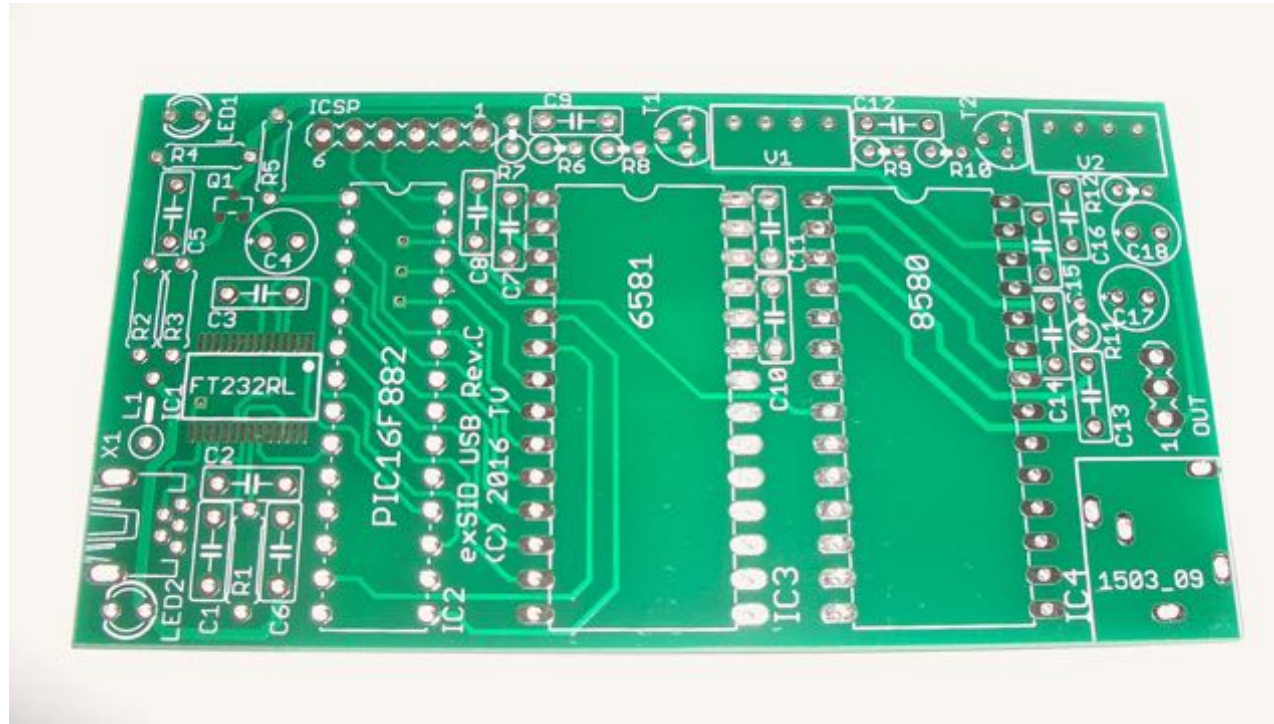
Off Topic

- Seltron Promatic D20 issues
- Roland Juno 106 to Kiwi 106
- MB-6582 Custom Build



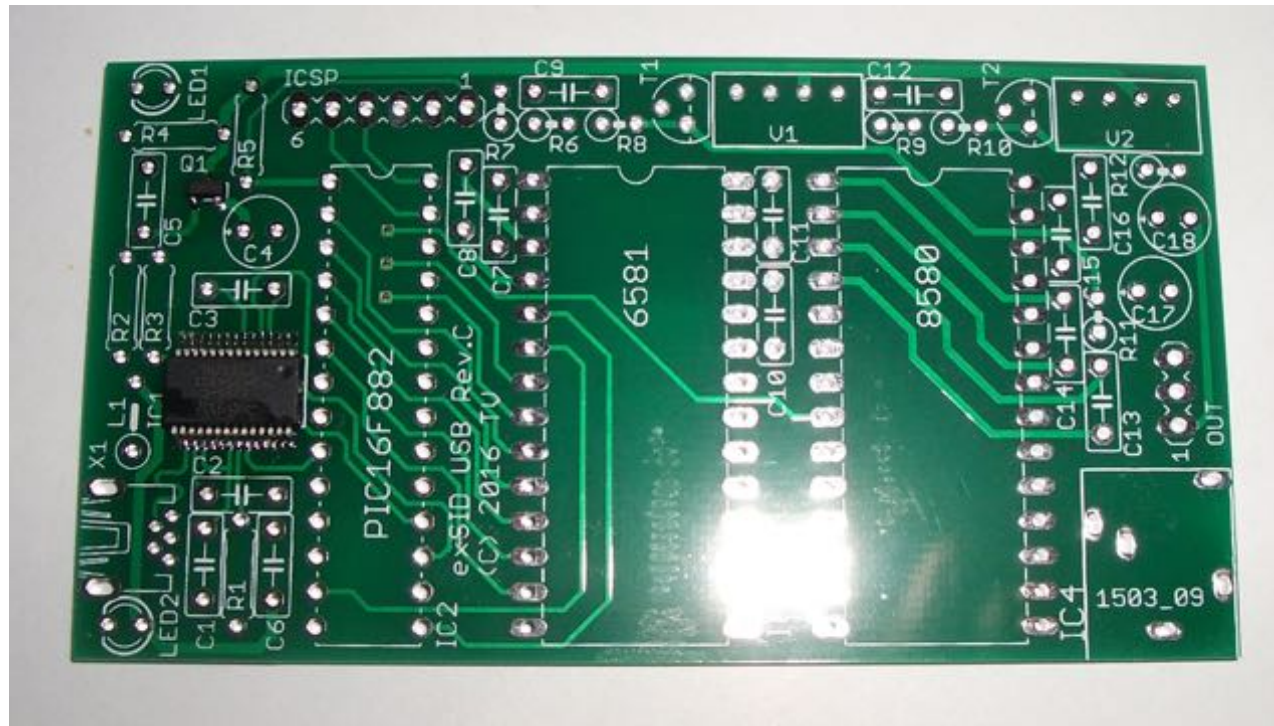
unless otherwise noted

Step 1



The first step is familiarizing yourself with the PCB, show here in [HASL](#) finish.

Step 2

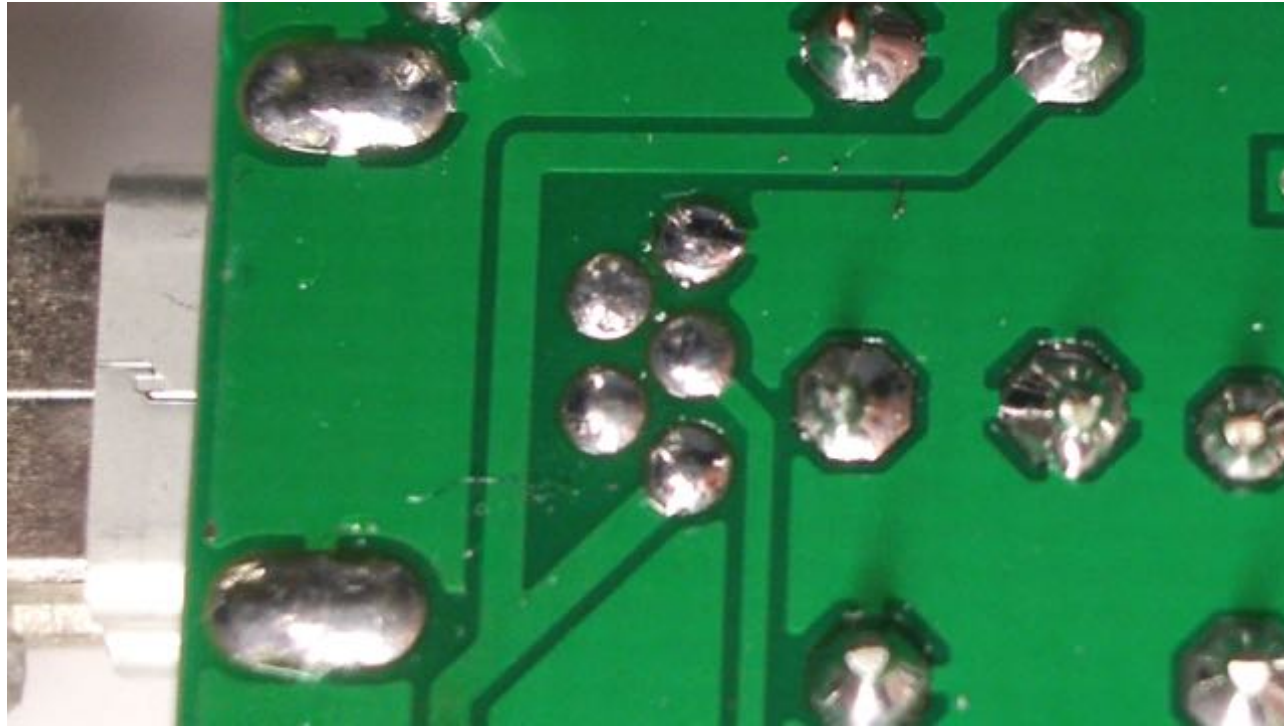


If you start from a bare PCB, the SMDs are the first devices that must be soldered: **IC1** and **Q1**.

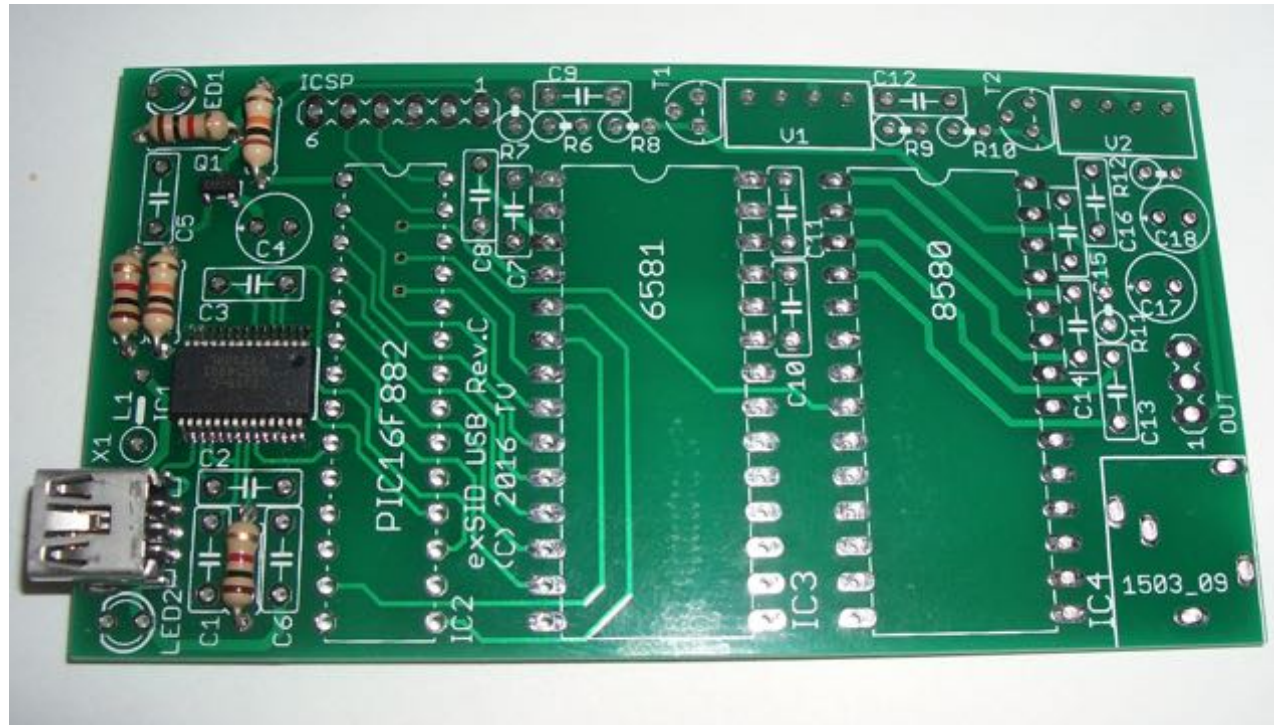
These parts have polarity: the silkscreen for **IC1** has a dot that must be aligned with the beveled dot on the chip. **Q1** has an odd number of pins, making mis-orientation impossible.

As mentioned in the [layout comments section](#), they will require solid soldering skills. HASL-finish PCBs certainly help there.

Step 3



Step 4

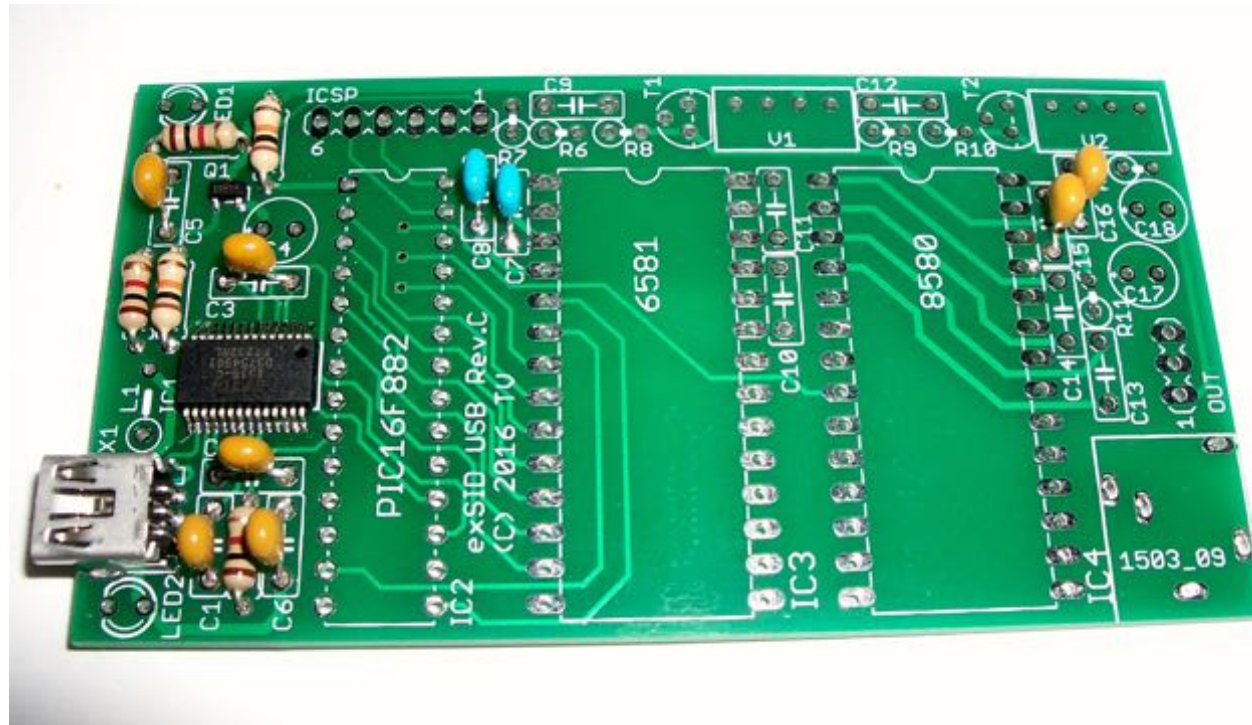


Next, solder the horizontal resistors: **R1, R2, R3, R4, R5** These components do not have polarity (they can be soldered in any orientation), however the **designated values** must be respected:

- 1k Ω is color-coded as *Brown, Black, Red, Gold*
- 10k Ω is color-coded as *Brown, Black, Orange, Gold*

This [online calculator](#) can help in case of doubt.

Step 5



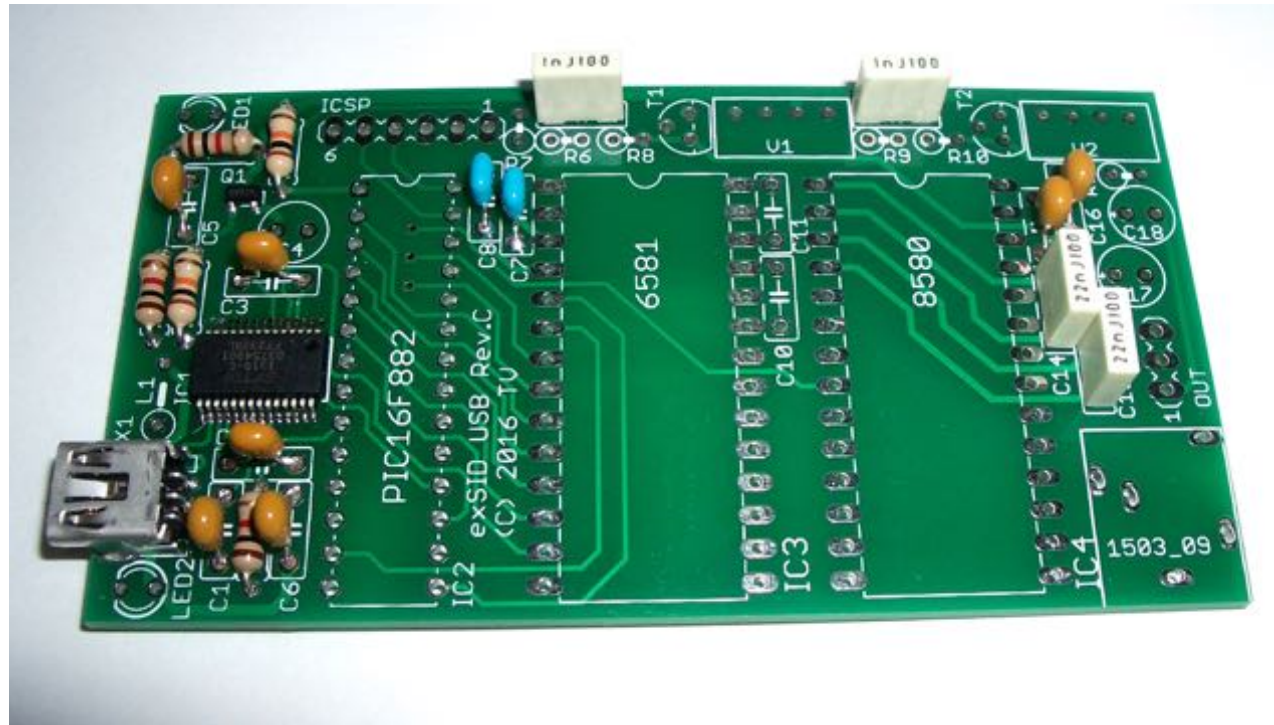
Moving on, it's time to solder the capacitors.

Start with the ceramic ones (the yellow ones on the picture): **C1, C2, C3, C5, C6, C7, C8, C10, C11, C15, C16**. These parts aren't polarized either. Ceramic capacitor values are specified using a **3-digit code**. Fortunately, the design uses only 3 different values:

- **471**, for 470pF caps **C7, C8**
- **103**, for 10nF caps **C1, C6**
- **104**, for 100nF caps (remaining ones)

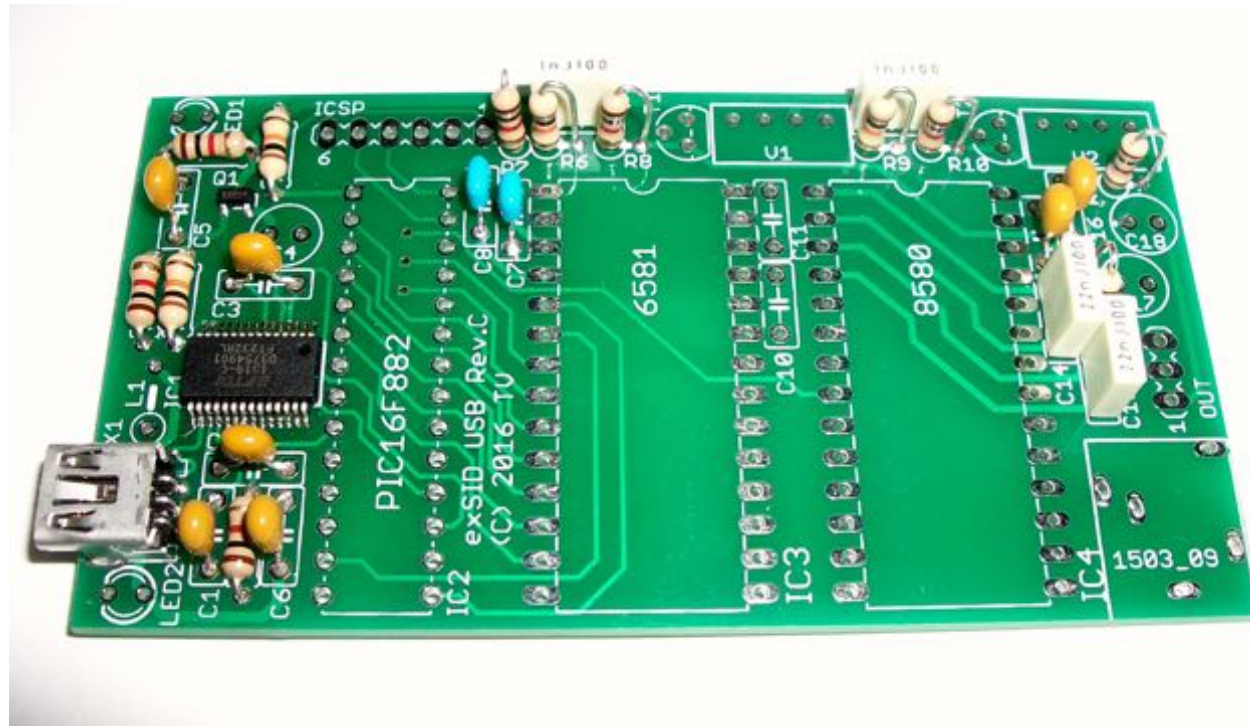
Note: C10 and C11 (located between the two SIDs) only appear later in the pictures but they really need to be soldered now.

Step 6



Continue with the film capacitors (the rectangular ones), **C9**, **C12**, **C13**, **C14**. Their value will be specified plainly on the casing (e.g. **1nJ100** means **1nF**, 100V, 5%). They are not polarized.

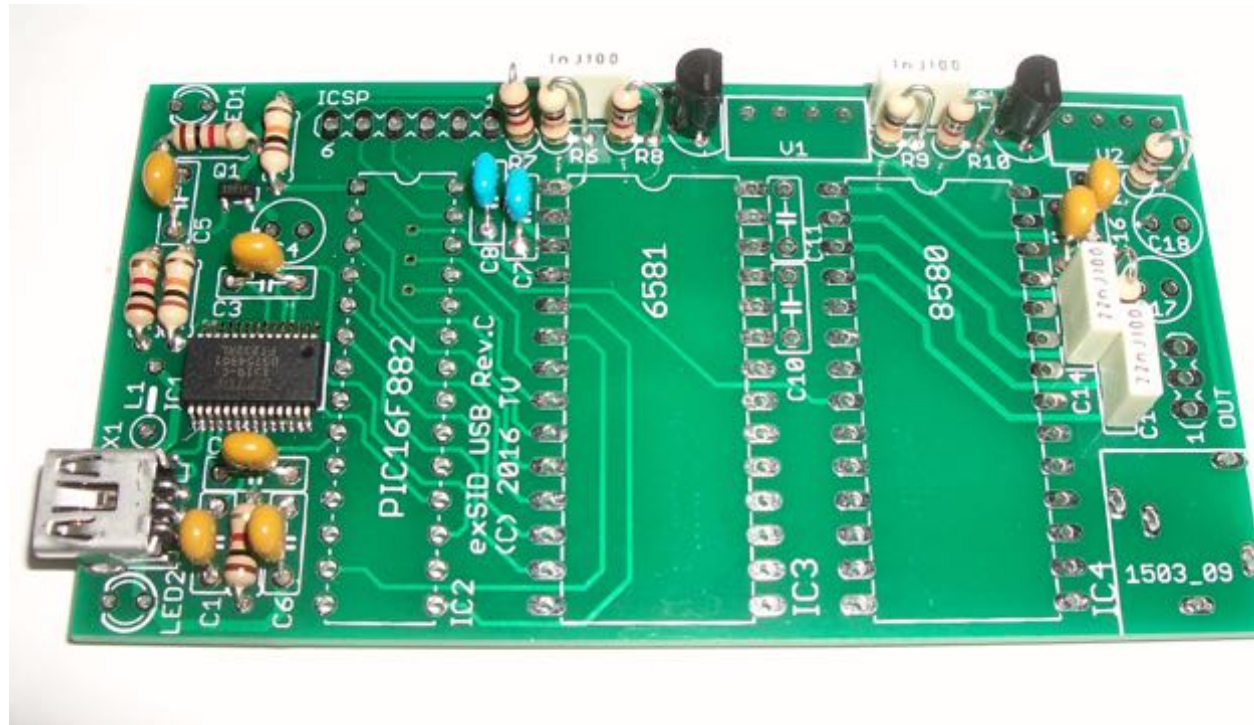
Step 7



Now is a good time to solder the vertically-mounted resistors, **R6, R7, R8, R9, R10, R11, R12**. They can be soldered in any orientation, but it's best to place the component on the designated spot (the circle on the silkscreen) as this is the only placement that has been validated for physical clearance with other components.

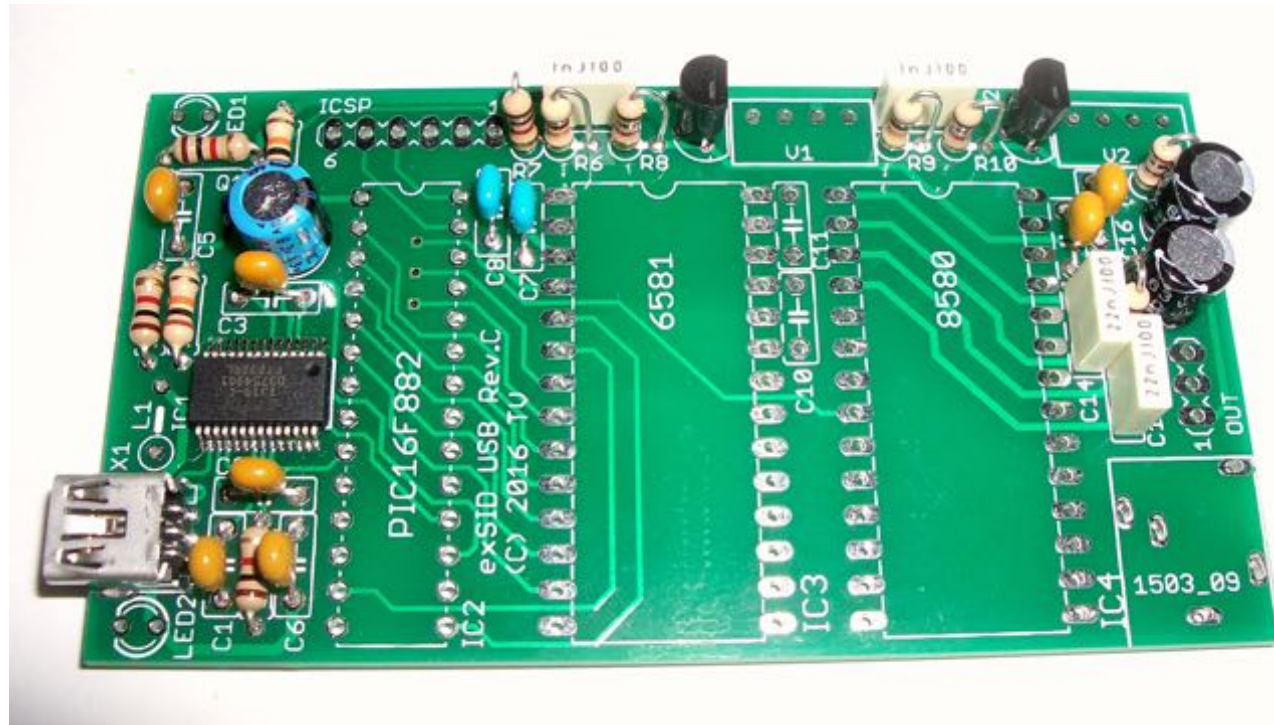
- 100 Ω is color-coded as *Brown, Black, Brown, Gold*
- 1k Ω is color-coded as *Brown, Black, Red, Gold*
- 10k Ω is color-coded as *Brown, Black, Orange, Gold*

Step 8



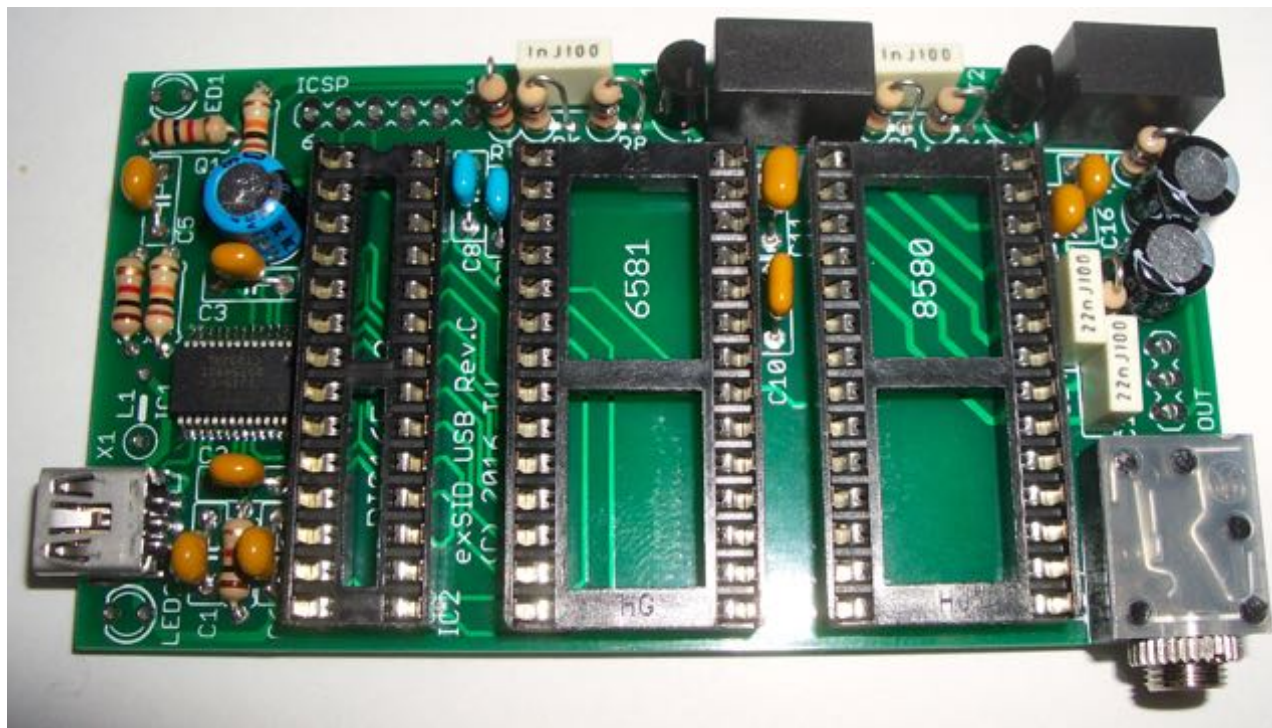
Next up are the 2N3904 transistors **T1**, **T2**. These components are **polarized** and must be mounted in the proper orientation. The flat side of the transistor is reflected on the PCB silkscreen: they must be aligned. The middle pin will typically have to be slightly bent backwards before insertion to fit the PCB footprint.

Step 9



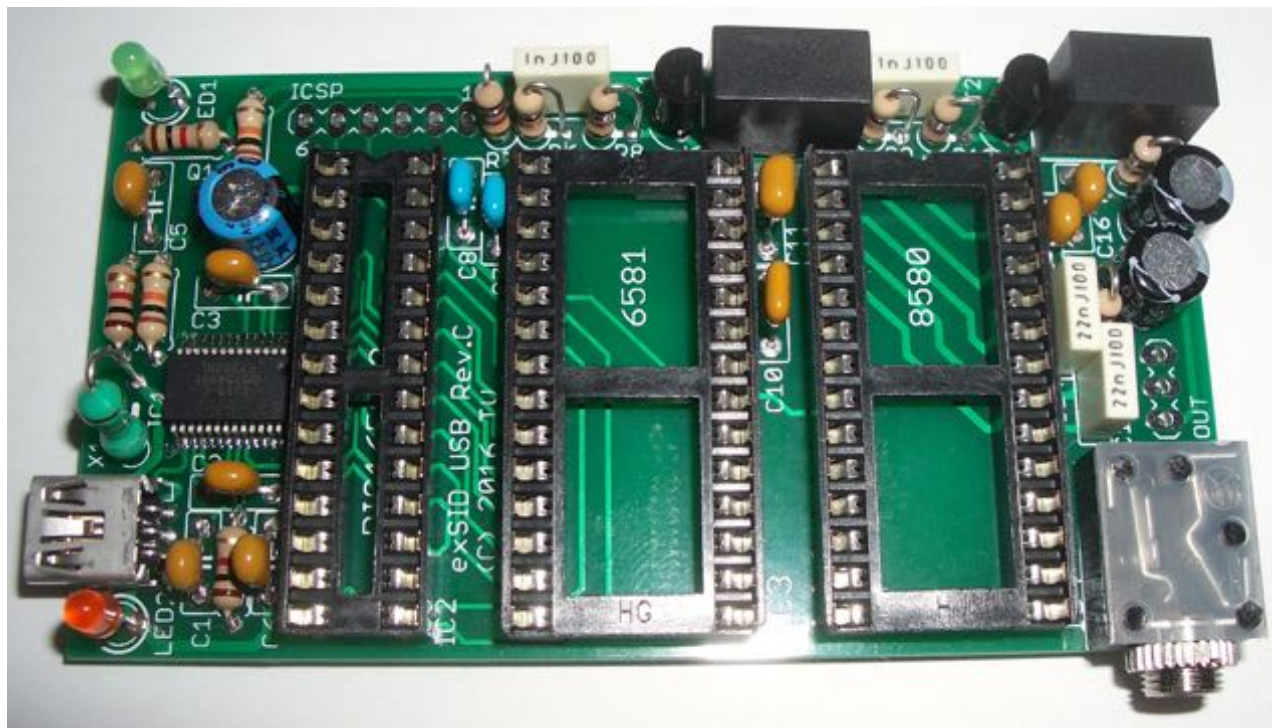
Up next are the electrolytic capacitors **C4**, **C17**, **C18**. These devices are also **polarized**. The devices have their negative pin marked on the package, usually by a distinctive band, as can be seen on [this picture](#). That pin must be inserted on the opposite side of the solder pad marked with a tiny **+** on the PCB, which obviously denotes the positive pin place. All 3 capacitors have the same orientation on the PCB. Their value is printed on the package.

Step 10



The device is now almost ready. This step shows the addition of the IC sockets, as well as the output jack.

Step 12



In this step we add the vertically-mounted choke **L1**, right next to the mini-USB connector. This device is not polarized. Finally we add the two LEDs, **LED1**, **LED2**. These devices are **polarized**. They normally have a flat side and/or a shorter leg that must be aligned with the flat side drawn on the PCB silkscreen, toward the edge of the PCB.

Step 13

It is now time to insert the ICs **IC2**, **IC3**, **IC4** **in the correct orientation** (mind the notch on the IC that must be matched with the notch on the PCB silkscreen: all 3 ICs have the same orientation), and this completes the assembly of **exSID USB**!

Note: *If you plan to do some voltage measurements before inserting the SIDs in their sockets, please note that the regulators cannot regulate properly without a load. Thus it is normal to read a higher voltage than expected for the +9V and +12V rails. As soon as any load is connected (the SID chips or a simple 1k to 10k resistor to ground) the voltage will settle to the correct value.*

Case assembly

If you use the laser-cut acrylic case I designed, the case elements come with a white plastic protection layer that must be peeled off before assembly. The faces covered with that protection layer are the **inside** of the box. Assemble all but the two sides which have a hole for the USB and jack connectors: insert the exSID inside the case and then close the remaining two sides.

The case is a lego-style system where each side snaps together with the adjacent one. Be gentle during assembly as acrylic is **brittle** and does not tolerate well excessive force. The snug fit of the jagged edges provides enough strength to not require glue.

An extra pair of grooves has been added to the bottom side of the case (see below) to facilitate re-opening if that ever proves necessary (insert a flat screw driver in the grooves and exert a very gentle outward pressure on the adjacent side).

Note: The case “reopening” feature is really there “just in case”. It is highly preferable to confirm the device is operating correctly before closing the case!

