



2.3 Assembly of the PCB

We're now about to start the assembly of the Enigma-E PCB. Please read the instructions below carefully to ensure a working machine. You should have the following tools at hand:

- Soldering iron and a wet sponge, to clean the tip of the soldering iron
- Multicore solder
- Pliers
- Side cutter
- Small screwdriver
- A piece of foam or a dry soft sponge (if available)

Before we take off, a few important points to note:

1. When unpacking the kit, you should have found a double-sided not-bound A3 drawing. Both sides show the position of each component on the PCB. The first one shows the reference code for each component. This is the same code as is used in the circuit diagram. The second one shows the value of each component. Use the table on the previous pages to cross-check each component prior to mounting it.
2. Most pads on the PCB have circular shapes. Some pads however, have square shapes. The square shapes are used to identify:
 - The positive wire (+) of an Electrolytic Capacitor
 - The Cathode of a diode (this is the side with the band)
 - Pin 1 of an IC (marked on the IC with a notch)
 - The Anode of a LED (this is the longest wire of the two)
3. When soldering a component, ALWAYS hold the multicore solder between the leg of the component and the soldering iron. This way the flux inside the multicore solder can do its job: to help the solder to flow properly. Ensure that you have a good connection between the leg of the component and the PCB, but be careful not to keep the soldering iron on too long, as too much heat will cause damage to the component and the PCB.
4. Don't cut the legs of the components -after soldering- too short. Not only does it look bad, it may also damage the contacts or ultimately the PCB!
5. If you make a mistake, e.g. soldering an IC the wrong way around, please consider whether you want to repair this yourself or not. If you're uncertain **DO NOT TRY TO RESOLVE IT YOURSELF**, but find professional help. The PCB is rather complex and consists of many thin tracks that are easily damaged when too much heat is applied. Removing a component in an unprofessional manner may cause permanent damage to the PCB.
6. We haven't tried to cut costs on the quality of the PCB. The top layer of the PCB contains a silk screen (the white print) that clearly shows the orientation of each component.
7. The PCB consists of two parts: the main Enigma PCB and the Steckerbrett. If you look closely, you'll see a V-cut that will help you to break the Steckerboard from the main PCB. **Don't do this yet!** Mounting the components on a large PCB is much easier than on two smaller boards.
8. Don't use excessive force when inserting a component into the holes in the PCB. Some components are very vulnerable and are easily damaged. The PCB is designed in such a way that all components will fit without modification. You may however need to straighten a few legs prior to inserting them.
9. Once all components have been soldered, some flux residue may be left behind on the soldering side of the PCB. Although this should not cause any problems, you may want to clean the PCB. If you decide to do so, you should ONLY use pure alcohol rather than anything else. Don't use any solvents as they are likely to cause serious damage to the PCB.