What is a hardware hacker without a soldering iron? Probably a softie. Because of this importance of the tool and because here and there, viewers asked me about my soldering iron, I decided to do this episode. I will compare 5 soldering irons in typical situations and at the end, give my personal view about all of them.

Let’ start: The five soldering irons are:

1. A very, 35 years old Weller Magnastat as a reference and to show the capabilities of our fathers (or, depending your age, grandfathers)
2. My main soldering station: The Aoyue 968A+. I always have to look at the product to get the spelling right
3. A cheap 907 Constant Temperature Electric Soldering Iron, also from Banggood. Also 60 Watt rated.
4. A small and cheap 60W Mustool MT223 from Banggood
5. An innovative TS100 Digital Soldering Iron with a STM32 microprocessor, an accelerometer, and a display. This device is rated from 17 – 65 Watt, depending on the supply voltage

I will test several aspects: The first is the real electrical power at the beginning of the heating process. Next I will check, if the chosen temperature is the real temperature. And then, I will measure, how long it takes till the irons are heated up. This shows us, if the power comes fast to the tip. Everybody knows, how annoying it is to wait for a heated soldering iron. And if it is slow, you tend to leave it on for the whole day and waste energy.

The next test is how good the heat is transferred from the tip to the solder. This is important, if you have to solder goods with high thermal conductivity.

And at the end, I will show additional features like Smoke Absorber or automatic switch-off. I will also give you an indication on the price of the stations.

But first, I will show you the different candidates:

I purchased the Weller Magnastat in 1982 when I got my degree in electronics engineering. It consists of a transformer, a heating element, and a magnet which interrupts the current if it reaches a certain temperature. This temperature is fixed, because it is the magnet’s curie temperature. Back then, this was already a big advantage, because the temperature of the tip was constant, even if the iron had a decent power of 50 Watts.

We do not need to talk about its quality. It speaks for itself. The only maintenance was to exchange the tip once. The price then was, similar to the Weller products now, very high.

When I re-started with my lab, I tough, that I have to have a modern soldering Iron, but did not want to spend the money for a Weller. Partly, because I was not sure if I would go on, partly, because I thought, that these Chinese Irons have a great bang for the buck. So, I bought the Aoyue 968A+. It is a combined station with soldering iron, heat gun, and fumes extractor. This vacuum pump could even be used as a holder for small SMD parts. But I never use this feature, probably because I do not want to change the plumbing jus for the few parts of a small PCB.

The heat gun, however, is used regularly. Mostly to shrink heat shrink tubes, but once in a while also, to solder an SMD. Especially ICs can easily be soldered or de-soldered using this heat gun. Usually, I use the normal soldering iron also for SMD resistors or transistors.

The fume extractor is very important for me. I discovered this in the last weeks, when I did use the other soldering irons for this test. Without this feature, I got all the smoke into my nose. Maybe it will not kill me in these small quantities, but still, it does not smell good. So, I really like this feature, even if I know, that the smoke is only removed and distributed into the lab through the heat gun. But still, it is not directly into my nose.

The quality of this station is not very good. I already had to exchange the soldering Iron once because it did not work anymore. Fortunately, the replacement was dirt cheap. I also had to replace the fume filter and clean the piping, because it had no vacuum anymore.

I purchased the 907 Soldering Iron, because, from time to time, I have to do work in another room or at another place. In the past, I took the Weller with me, but found it clumsy. So, I wanted a cheap and mobile alternative. This iron is not used very often, but then, it is highly valued, because it is very portable.

The smaller Mustool MT223 is just part of this test because I wanted to give some choice for my young viewers, or viewers with a low budget. This is, together with the next iron, my newest tool.

Last but not least, the TS100. This is a remarkable tool, because it uses newest technology to improve the comfort. I intend to replace the 907 with this tool, because it is not powered by 220 volt. You can power it also with 12 volts of your car. For this test, I use an old laptop power supply at 19 volts Fortunately, its cable had the right plug. This is not easy. The normal 5.5mm plugs out of my drawer do not fit. This is also, why I cannot test it with 12 Volts. So, keep in mind to purchase the right plug together with the iron.

If you do not use it, it switches automatically off, and, if you remove it from the stand, it heats automatically up. Interestingly, this iron is open source. So, if you want, you can write your own code. And even without writing your own code, you can influence the parameters by connecting it to your computer’s USB port and changing a text file with the parameters.

So, you know all the different irons and we can go-on to the first test: I plug each iron into the power meter and check the power it consumes. By the way, only the Weller and the Aoyue came with a stand. For the others, you have to find a solution or order one together with the tool. A stand is indispensable.

Here are the results of our three tests plus the bells & whistles, and the prices. If we start with the old Weller: It was a very good product and met its specifications and was worth the money. The next is the Aoyue. It has two red flags because of its weak iron. Its advantage is the compact design and the combination of soldering iron, fume extraction, and heat gun. This is a good concept for a guy like me, because I need all of them. The price is good compared to the features.

The 907 is definitively a good choice for a cheap soldering iron. It does its job for 12 $. The red flag for the temperature is relative, if you use a trick: You find the minimum reading where you solder starts to melt. From there, you can add more or less based on the delicateness of your components. The melting point of your solder always stays the same. That is does not reach a high maximum temperature is not critical for lab work.

The Mustool is a failure. I do not know, if my device is defective or if it generally does not meet the specs. Maybe Banggood will send me a replacement. Then I will add an overlay with the result.

The TS100 was a surprise for me and I used it in the last weeks for my normal lab tasks. It worked very well. Because I mad big pauses between soldering, it switched off quite often and I had to restart it before soldering. But its extreme fast heat-up time made this no problem. Maybe I will tweak the parameters a little.

Its lightweight and its small tip made it a good choice for delicate work. And the test shows, that a good temperature control together with a fast heat-up time can replace thermal capacity of the tip to a certain degree. For sure a surprise for me. For a primary soldering iron, this would be a good choice if you do not need the features of a combined station. Then, the price is ok. For a mobile iron, it is probably a little bit too expensive, unless you do not have 220v at all places.

It will definitively replace my 907.

I hope, this 100st episode was useful or at least interesting for you. Bye