Hauptwerk Hardware

Solder Practice Kit

Safely practice soldering to solder pads

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Important Health Warning:

Please be aware that the solder wire included in this kit contains lead, a substance proven to be injurious to health. Please follow the accepted guidelines when working with leaded solder wire. The flux contained in the cores of the solder wire is also injurious to health and care should be taken not to breathe the fumes given off when the solder melts. I would suggest that you check Google for the latest advice and guidance for using flux cored leaded solder in your location.

Introduction.

Many of the Hauptwerk Hardware products have solder pads for the user to connect their various console controls to. These solder pads offer a very quick and easy way to make the physical connections required during the assembly of your organ project.

These pads are completely reliable and do not suffer the 'loose connection' issues often encountered with the push-on crimp type connectors and screw type connectors. They are infinitely easier to solder to than the solder pins which were used on our earlier products. In addition they do not require any heat-shrink sleeving as the pads are fixed and there is little likelihood of adjacent connections making contact.

Whilst these solder pads boast all of the advantages just mentioned, they do have one limitation. Because they are bonded to the board it is possible for them to become detached if they are overheated with the soldering iron or if the wire(s) soldered to them are subjected to excessive physical stress.

A number of new customers have asked exactly how robust these connections are, and said that they are worried that they may be likely to damage them when they first use these products, until they have had a chance to try out the soldering process.

Additionally I have had many emails from customers asking what is the best type of hook-up wire to use as well as what type of solder is recommended.

In order to help everyone understand the benefits and limitations of soldering to the solder pads used on our products we have developed the Solder Practice Kit.

What is the 'Solder Practice' Kit?

The solder practice kit is a kit comprising of a printed circuit board which contains many of the solder pads as used in our products. Electrically the board does nothing but it offers the user a chance to try out the soldering operation and see for themselves just how easy it is, as well as test their resulting solder joints to destruction, thus building a picture of exactly how much force is required to break one of these joints.

The kit includes a short length (~2000mm) of the recommended hook-up wire as well as a similar length of flux cored solder wire with 3.3% flux content. I use leaded solder and find this to be easier to use than the lead free solder. The choice is a personal one, but if you prefer to be lead free I urge you to at least try some of the included solder and see how it compares to your unleaded solder.

I have received many enquiries from people asking about the best hook-up wire and solder to use and it seems that the type we use is hard to get in some countries. For that reason we include the samples for you to try so you can compare using this to using the type you may have available locally.

Using different types of wire and solder really does make a HUGE difference to how hard it is to solder, so please try this out and compare the results with your own stuff.

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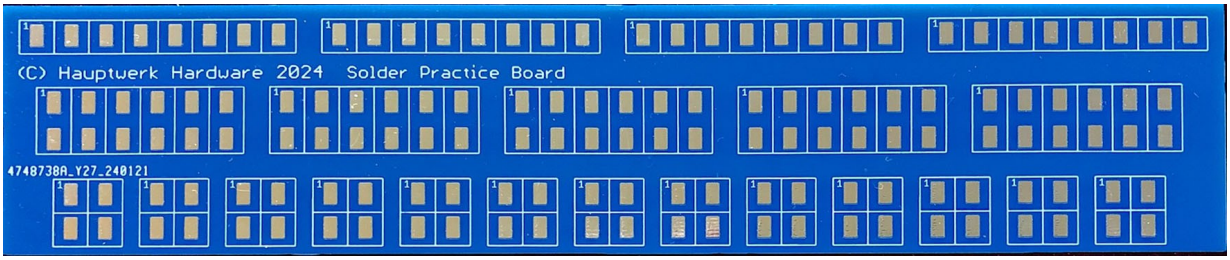
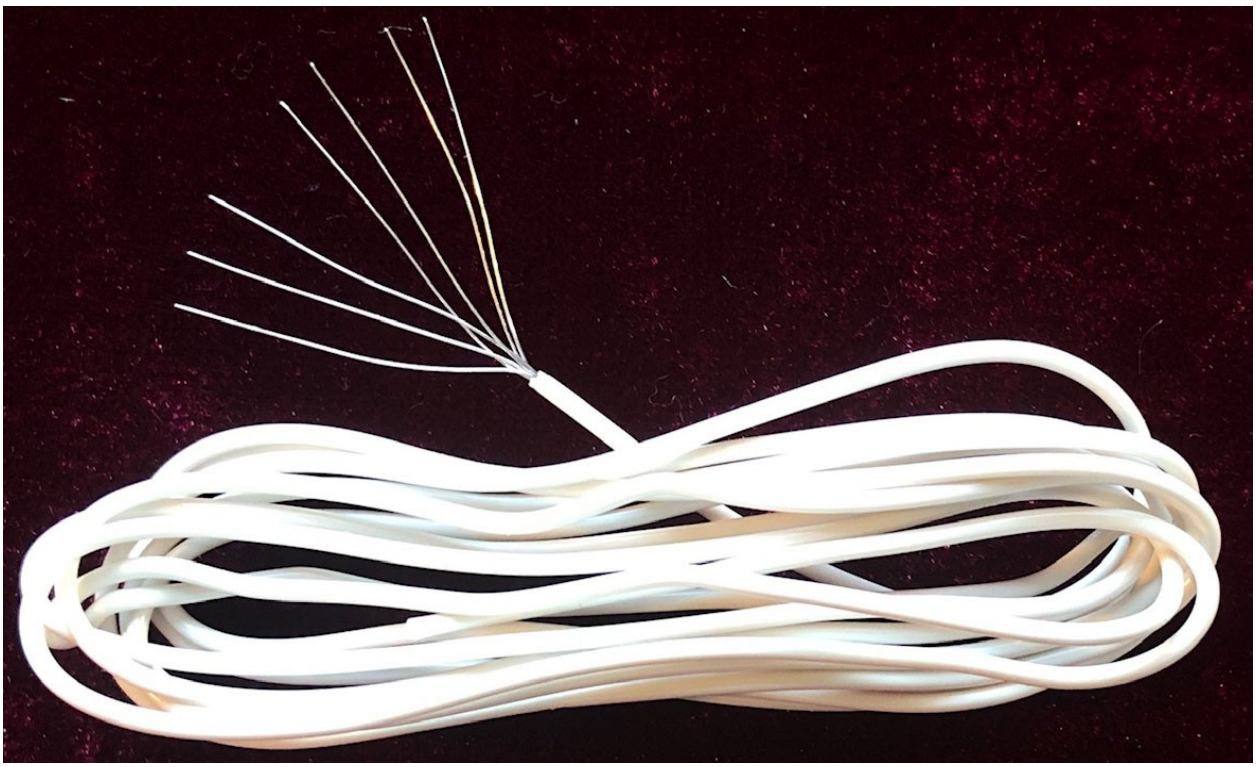
The Printed Circuit Board.



As you can see from the picture above the printed circuit board (PCB) is covered with groups of pads which resemble the way the pads are laid out on some of our products. You can solder to any and all of these pads, so go right ahead and try it out. Try to purposely overheat a pad and see how much you have to heat it before it fails. Likewise try soldering a wire to a pad and then try to pull that pad off the board. You will seen see how hard it is to make these pads actually fail :-) The PCB is double sided so you can try many times and really build up your skill level.

The Hook-up Wire.



As you can see from the picture, the hook-up wire we recommend is stranded. That is to say that it does not have a single core but has a number of thinner cores within it's plastic covering. There are seven strands of wire, each one being 0.2mm diameter. This makes the wire much more flexible and reliable, since it easily withstands being moved and bent in different directions many times over. This physical resilience also helps to reduce mechanical stress at the solder joint. A bunch of stranded wires all soldered to adjacent solder pads will allow the PCB to be moved with far less stress than a similar number of solid single cored wires. Try it out by soldering some single core wire (not included) to some pads and compare it to some of the included stranded wire soldered to

the same number of pads.

The Solder wire.

The actual solder wire is probably the most important part of the soldering jigsaw. Using the wrong type of solder wire will make it almost impossible to get a good soldered joint on a solder pad. Try out the solder wire included in the kit and see just how easily it works. You get around 2000mm of solder wire in the kit so feel free to have a go!

The critical factors are:-

1. The solder wire must be flux cored – meaning it has a number of cores throughout its length which contain flux.
2. The percentage of flux in the cores of the solder wire. The higher this number the easier it is to use.
3. The thickness of the solder wire. 0.7mm seems to be ideal and is what we use. If it is too thick only a tiny bit will be used to make a joint, this means only a tiny amount of flux will be used, making it hard to 'wet'. Too thin and you will need to feed inches into the joint to get it 'wet' enough.

The solder wire shown above is what we use, and this is available from RS Components in the UK. Their website it https://rswww.com Search for the part number 170-6678

I do not know if they ship worldwide, but if you have trouble obtaining either the stranded wire or the solder let us know and we will see if we can help you.

How to solder.

So – how exactly do we go about making a connection to a solder pad. Firstly use a good quality soldering iron specifically made for electronic work. Nothing else will do.....

Give the iron time to heat up to it's operating temperature. You know when it's ready because touching a piece of solder to the iron tip will cause it to melt instantly and emit a small puff of smoke as the flux in the solder melts.

Strip around 5mm of insulation from the wire and twist the strands together between thumb and forefinger, then hold the iron against the bare wire and AT THE SAME TIME touch the solder to the wire. This will cause the solder to melt into the wire. This process is called 'tinning' and it is what gets the wire ready for soldering to the solder pad.

Next heat a solder pad with the tip of the iron and AT THE SAME TIME touch the solder to the pad and iron. This will cause the solder to run all over the pad. You want to add enough solder to make a small hill of solder on the pad.

Now holding the tinned end of the wire onto the tinned pad simply touch the tip of the iron to both and watch as the solder melts and the wire becomes engulfed in the pool of solder on the pad. Remove the iron as soon as the solder on both the wire and pad has melted. If both were tinned properly this will only take around a second.

That's all there is too it. :-)

BIG TIP #1.

The important part is to take note of the words in capitals above. You must heat the wire at the same time as adding solder to it. Likewise the pad. Many people try to do it by adding solder to the iron tip and then using the iron to transport the solder to the joint – this will not work! Honestly, believe me, it does not work. It might seem to work, but you will get an inferior joint, both electrically and mechanically, and it will look bad. Each solder joint should look shiny, like a mirror when newly made. If it doesn't have another go!

BIG TIP #2.

If you need to solder two wires to a pad, strip around 10mm of insulation from each wire and then, holding the two side by side, twist the bare ends together so they hold together. Then tin them as explained above. Finally cut the tinned length to the desired length (around 5mm for most solder pads) and solder as before.

Like most things, soldering is easily learnt and your skill improves rapidly with practice. That is why the Solder Practice Kit is so useful as you can get your skill level up to scratch before you start on the 'real thing', mistakes on the practice board are way cheaper that mistakes on the actual device.

I thank you for your interest in our products and wish you all the very best with your musical project.

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