

DIY Hot Air Soldering Iron

by [charper](#) on December 15, 2006

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intro: DIY Hot Air Soldering Iron

Also Available on my website

Charper's Hot Air Soldering Iron

An easy DIY project on a college student budget

This project stemmed from the desire to remove (and perhaps one day re-solder) surface mount components. In it's entirety (pictures and all), it took less that two hours and \$20. Even if you have to buy everything, I believe the cost could easily be kept under \$30. Comparatively, I could not find a hot air soldering iron retain for under \$200. Every entrepreuneuring young electrical engineer needs to work on some project to satisfy curiosities and take things apart... right? Well, at least I do!



step 1: Purchased Items

UPDATE

I can't remember where this soldering iron came from, and I've been asked questions about it - if somebody could send me a link or tell me a location where a similar iron could be purchased, I would greatly appreciate it.

Also, there has been a lot of comment on the heat exchanger. Instead of the stainless steel, you could try stripped copper wire, solder wick, or purchase actual copper mesh somewhere.

Items Purchased

Aquarium air tubing: \$1.13

Aquarium air pump: \$6.97

"Chore Boy" Stainless Steel scrubber: \$1.37

"Zebra F-301" pens: \$4.73

Total: \$14.20

Other items needed:

Super Glue

Soldering Iron, 40 watts or higher

Silicone Fuel Tubing

Tools:

Screwdriver

Scissors

Dremel (or similar drilling/grinding tool)

The silicone tubing is used as a fuel line in model airplanes, it's reasonably cheap and I'm sure you could find it easily at a local hobby shop or from Froogle, Amazon, or Ebay. Fortunately for me, Aerospace Engineering is big here at MSU, so it wasn't hard to find a friend that didn't mind giving me some. Feel free to come up with a substitute for this if you can - but this stuff seems to hold up extremely well to the heat of the soldering iron.





step 2: Take Soldering Iron Apart

This is what you get when you take a soldering iron apart: a handle, a simple resistive heater, and a sheating to protect the heater (or protect other things from it). The tip has been removed in this picture. The nut shown at the far right side of this picture holds the soldering iron tip in by a small lip.

Luckily, the entire thing is hollow! Every single part of it - including the heating element. It's almost as if this thing were made to be modified.



step 3: Add heat exchanger

In order to effectively heat the air, we have to do something to increase the surface area it passes over. I was hoping to use copper rather than stainless steel for this; but I couldn't find any copper scouring pads. The closest thing available was the "Chore Boy" stainless steel scouring pads. I feel however, that if it were available, copper would be superior. As you can see in the picture, simply stuff a few strands into the end of the heating element. Be careful not to get too much. You should test blow into the end of the heating element and make sure air still flows relatively unobstructed.

Note: Stainless Steel can catch fire... Use copper if at all possible



step 4: Pipe air into the heating element with silicone tubing

Simply push the silicone tubing into the end of the heating element. You can't see it in this picture, but I sealed the end firmly using scraps of silicone tubing and super glue. This part is relatively vital - I had to go back and make the improvements mentioned here - without them the soldering iron loses a lot of air from the back end and smokes a lot (although I could never find the source of what was burning).



step 5: Put the aquarium tubing in the handle of the soldering iron

I used a dremel tool to put a hole in the handle of the soldering iron, near the top. The hole the power cord went through was not quite large enough to accommodate both the power cord and the aquarium tubing. Your results may vary.

This shows the tubing through the hole I created in the soldering iron. The placement of this hole actually seems superior to running the line straight out the back of the iron. The air flow can be crudely regulated with a little bit of pressure, pinching the air hose against the handle.



step 6: Splice the two hoses together and re-assemble

This is how I attached the silicone tubing to the aquarium air line. I simply removed the tip from one of the pens, stretching the silicone tubing across the smaller end, and pushing the aquarium hose firmly into the wide end, securing it with a generous amount of super glue. These particular pens have a relatively wide opening at the tip - if yours aren't quite so generous, you may have to widen the opening a bit to avoid restricting the air flow.

After putting the soldering iron back together - this is what we are left with. What would be a fully-functioning hot air soldering iron, missing only one small piece: the nozzle. Another pen tip is unscrewed and cut using the dremel cutting accessory shown in this picture.



step 7: Make a tip

This shows the pen tip after being cut in two. The idea is to get a tip with a wide end barely larger than the hole in the soldering iron's nut. This way the tip can rest on the outside of the soldering iron's male end, and fit securely when the nut is tightened on the modified pen tip.



step 8: Final assembly

This is the result after securing everything together. The tip from this pen seems to fit perfectly. I would recommend actually using a pen tip - as the mechanical pencils I found all seemed to have too small of an opening. Of course, it could easily be filed down to something wider.



step 9: Final Results

Here are some initial results - these tiny devices are surface mount diodes from a damaged network card. The soldering iron seems to work absolutely flawlessly. After waiting a few minutes to heat up, just turn the air pump on and bring it close to the device you want to remove. Using tweezers to apply gentle pressure against the device, it quickly loosens up and falls off.

So, how well does a hot air soldering iron really work?

Light on both time and money, I found this project a worthwhile investment, especially for a college student on a budget. Not only can it remove surface mount components, but I found it works really well as a general use soldering iron because of its less-intense heat. For example, a transistor can be soldered in only a few seconds, without the need for the usual soldering heatsinks. For anything but heavy wires, this is a vast improvement over the soldering iron I started out with. In fact, if it weren't for the heating time typical of soldering irons, I would greatly prefer this for general use even to my Cold-Heat device.



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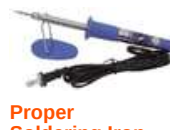
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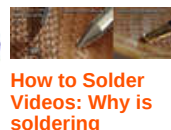
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Comments

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Darmani says:

Wow, i just made this thing, and its just so awesome, i can desolder smd components without a sweat. Thanks a lot man for the idea. I used a 45W Truper soldering iron, and for the heat exchange element i used the copper wire from a 16 gauge woofer cable, i just twisted it a little and into the iron it goes. works excellent. (sorry for the bad english)

Jan 4, 2009. 5:19 PM [REPLY](#)



knak123 says:
great!

Sep 15, 2008. 11:39 AM [REPLY](#)



Coffee bean says:

now what can you do with those lol

Dec 16, 2008. 12:29 PM [REPLY](#)



burrhead76 says:

Where do you find the heat exchanger at?

Oct 21, 2008. 8:52 AM [REPLY](#)



carlitoscr says:

Well, I think you can use a piece of copper solder wick as your heat exchange element. you can either place the piece of solder wick as it is (being careful it doesn't offer too much resistance to the air flow) or you can take your time to separate all the copper threads and then make a small ball with them (be careful not to compress that ball, it has to be porous). Use the porous copper thread ball as your heat exchange element. Good luck!

Aug 6, 2008. 8:12 AM [REPLY](#)



Ian01 says:

These wicks usually contain rosin flux, which could be detrimental. On the other hand, you might get vaporized flux that could help with the desoldering.

Aug 21, 2008. 6:46 PM [REPLY](#)



PetervG says:

I got a ColdHeat yesterday! XD

Dec 15, 2006. 7:49 PM [REPLY](#)



Shark500 says:

i pray for your soul. the cold heat soldering iron is probably the worst soldering tool ever created. tips break too easy and are far too expensive. the entire concept of how the cold heat soldering iron works is completely retarded. go to radio shack

Dec 15, 2006. 11:31 PM [REPLY](#)

and get yourself a butane soldering iron.



YummyPancakes says:

Yeah. I remember my first soldering iron was a ColdHeat... *shivers* Won't use THAT one ever again.

Mar 2, 2008. 5:51 AM [REPLY](#)



disturbedreaper says:

i have the cold heat my god its a complete mockery. it makes a complete disaster you cant solder anything smaller than an inch in diameter.

Mar 2, 2008. 6:30 AM [REPLY](#)



PetervG says:

Yea, its hard to get it to work, i'm a beginner so I like having a wireless one and you dont have to wait. Anyways, good for fast jobs, sorta. I have to get the hang of it.

Dec 16, 2006. 3:17 PM [REPLY](#)



static says:

Personally I wouldn't recommend the Cold Heat tool to a beginner, because the way you you have to futz with it to get it just so to heat the connection. I have to consider the Cold Heat a tool for those who have already mastered soldering and, instinctively know when the job should be good. 30 years ago I had a Wahl rechargeable <http://www.starkelectronic.com/wahl.htm> and just loved it. Anyway if you already have it, no need to toss it in favor of another style of cordless iron.

Sep 11, 2007. 9:31 PM [REPLY](#)



PetervG says:

Yeah, that comment is old. The tip broke.

Sep 12, 2007. 3:55 AM [REPLY](#)



charper says:

Oh come on... if you use it for what it's really good for, it's great. Quick, short jobs where a low-power resistance soldering iron really shines. You're right about the tips, but I found that a nail file (black emory board?) works realllly well for re-sharpening and cleaning the melted plastic out of it. I've had moderate use out of my cold heat for about 2 years now and have never replaced the tip.

Dec 16, 2006. 1:20 AM [REPLY](#)



Sync says:

omg yes. cold heat ISNT that bad. ive been using mine for a while and nothings broken...

Aug 15, 2007. 3:07 AM [REPLY](#)



Crash2108 says:

If you use it you know what it's good for. Nothing. The stripper it comes with is worth more.

Dec 16, 2006. 3:40 AM [REPLY](#)



Shark500 says:

my stripper broke after 3 uses :/

Dec 16, 2006. 9:54 AM [REPLY](#)



Crash2108 says:

You should put more money in her panties.

Dec 17, 2006. 3:38 PM [REPLY](#)



soapy says:

lol. I didn't even get a stripper with my ColdHeat, which was the worst £20 I ever spent. It takes longer to get the darned thing to solder than it does to get my great butane one, and fire that up, unless it is a *single* joint. It doesn't even heat the solder hot enough half the time, even with Duracells. I'd say it was just Cold.

Dec 18, 2006. 2:30 PM [REPLY](#)



rbhays says:

or you could buy one of their 8 dollar pencil type irons too lol

Dec 15, 2006. 11:51 PM [REPLY](#)



inertia18 says:

You can buy a good quality hot air solder for the amount you spent making this. but very good indeed!!!!!!!!!!!!

May 15, 2007. 12:16 AM [REPLY](#)



charper says:

This is not a flame - but a serious request for information. Could you possibly post a link to where you could buy one. - For the benefit of not only me, but everybody else reading this post.

Jun 1, 2007. 11:16 AM [REPLY](#)



ryzellon says:

Just to affirm:

You can buy good quality *solder* for less than 20\$.

You can buy a low end *heat gun* for 20\$ + shipping/handling.

You can buy a glorified butane *lighter* pretending to be a soldering iron for less than 20\$.

But unless Inertia18 thought you spent 200\$, you're absolutely right: I can't find anything remotely resembling a good quality hot air soldering iron for that price. (If you have been enlightened otherwise, though, please do pass along the info!)

Sep 19, 2007. 1:55 AM [REPLY](#)



Ghostpilot says:

As you said copper is much better heat conductor than the "Chore Boy" stainless steel scouring pad. I found some leaf thinn copper in an old broken harddrive and occasionally in some brand of older CD-ROM units.

In the old harddrive the small slab of copper was used to cover some ICs. I just took a pair of needlenose plyers and ripped it from the PCB. Then I could easily cut small enough peices with a normal scissor.

Great instructable.
Thank you for sharing, Charper.

Feb 9, 2007. 2:58 AM [REPLY](#)



charper says:

Lol. I probably have enough wire to wrap around the world; I don't know why using thin copper wire didn't hit me. Great addition!

Jun 1, 2007. 11:18 AM [REPLY](#)



sysadmn says:

You might want to use epoxy or other glue, rather than super glue. Epoxy, white glue (Elmer's, in the US), and Gorilla Glue will fill in tiny gaps and give a good seal. Gorilla Glue expands slightly as it sets; that can be a good thing, but make sure you don't block the internal channel. If you think heat will be an issue, there are high temperature epoxies. Super glue seems to work best for me when attaching two flat surfaces, or two jagged surfaces that fit exactly, like the arm on that ceramic statue that you never liked, but your wife bought anyway.

Jan 22, 2007. 1:07 PM [REPLY](#)



theprofessor says:

your telecom arent you? too bad your not EE, we just got a nice rework staion for such things.

Jan 21, 2007. 9:04 PM [REPLY](#)



erfonz says:

So you can just attach the silicone tubing to the part that heats up?

Dec 15, 2006. 8:37 PM [REPLY](#)



physzome says:

You bet! 100% pure silicone is pretty damn sturdy stuff. There's a reason they use it for those new-fangled oven mitts.

It's also used for super-hygienic umm... "adult novelty toys", because it can be sterilized by being boiled on the stove.

Jan 14, 2007. 12:00 AM [REPLY](#)



charper says:

Yep.... it's really high-temp stuff, designed to carry fuel right next to a hot air-cooled engine.

Dec 16, 2006. 1:18 AM [REPLY](#)



Jack Daniels says:

i was thinking of buying one of those butaine irons are they really that great?

Dec 16, 2006. 1:40 AM [REPLY](#)



soapy says:

Argh! java.sql.SQLException: Deadlock found when trying to get lock; try restarting transaction ate my post! Again!

If you are in the UK, Maplin do a great one. I just searched for it, they still do it. <http://www.maplin.co.uk/module.aspx?ModuleNo=3887&doy=18m12>

I've had mine for at least ten years now, brilliant bit of kit. The case means everything stays together. I never wet the sponge because it's a pain inside the kit, but hey. And I own a second one, just in case they pull these off the market for some spurious health & safety reason.

If you want the heat right now, keep the lighter under the tip for 20 seconds to get it started fast. If you are in a hurry to be off, turn it off and take the tip off with pliers, it will be stone cold in about 2 minutes. If you want to change the tip, simply take it off with pliers and swap it, then wait a minute or two for it to be hot again (or boost it again with your lighter)

Great for working outdoors, comes with a flame spreader thing, various tips, a hot knife thing, a sponge and even some solder in a holder. Best thing? They left a space so you could add your own lighter to the kit. There is even a hot air tip, but I've not had much success with it, except for on heatshrink.

Dec 18, 2006. 2:44 PM [REPLY](#)



Shark500 says:

Dec 16, 2006. 9:56 AM [REPLY](#)

yes. i suggest the radio shack one.

<http://www.radioshack.com/product/index.jsp?productId=2062753&cp=2032058.2032236.2032313&parentPage=family>
it is really easy to hold and i love it. i don't suggest the gun type butane soldering irons because i find them harder to hold.



indestructable says:

Dec 18, 2006. 8:12 AM [REPLY](#)

Original idea from:

www.usbmicro.com

which uses a desoldering-bulb type of iron. Tube already built-in.



cirano says:

Dec 18, 2006. 6:32 AM [REPLY](#)

One catch for those who want to drop in on their local radioshack for a soldering iron for this project. it appears that the radioshack brand soldering iron has holes in the metal barrel that doubles as a heat transfer chamber.

So look for one that doesn't have holes in the barrel. (I have one with holes, but I really want a hot air pencil, so I'll have to get another one).

Great Instructable. Thanks Charper.
