

# Building A Modified ZIF Adapter to Upgrade Cowon A2 Hard Drive

by BaTu

When I first attempted this project I did some research on two things: 1) Is it really possible to fit in a 8mm disk in A2? 2) What is the availability of 5mm disks? My findings are:

- there is just too much work/modification involved fitting a 8mm disk in and it's practically not possible. This [blog](#) lays out the details why. But even if you do, this will be a less-than-perfect job, since you have to get rid of the rubber protective frame, which will cause any impacts (especially on the back cover) to be transmitted directly onto the drive, needless to say there will be an [ugly gap](#) on one corner when you close the back cover.

- the largest 5mm-high hard disk with a 44 pin connector is 60GB. However it wasn't available anywhere in the US (mostly discontinued).

- the largest 5mm-high hard disk is 80GB but comes with a ZIF connector so you need to connect it with an adapter. (evidently Toshiba came up with a 100GB and even a 120GB drive at 5mm but at this time it was only sold in Japan. There were even some intermediary companies that would buy it and send it to you but you can imagine the costs). So this pretty much set my limit. So I found and bought this Samsung HS082HB 80GB 5mm disk.

If you bought one of those chinese 1.8" 50-pin ATA to ZIF adapters of eBay, I suggest you check the continuity on each pin before connecting to the hard disk. When I first connected it, the drive started spinning but the computer did not detect the drive. Upon pin-by-pin continuity test I found that one of the pins on the ZIF connector had a bad solder on the board and actually was not connecting. If this is the case, just heat the terminal solders with a soldering gun. Do not use solder, as it will quickly spread across several terminals shorting them which is a real pain in the neck to clean up.

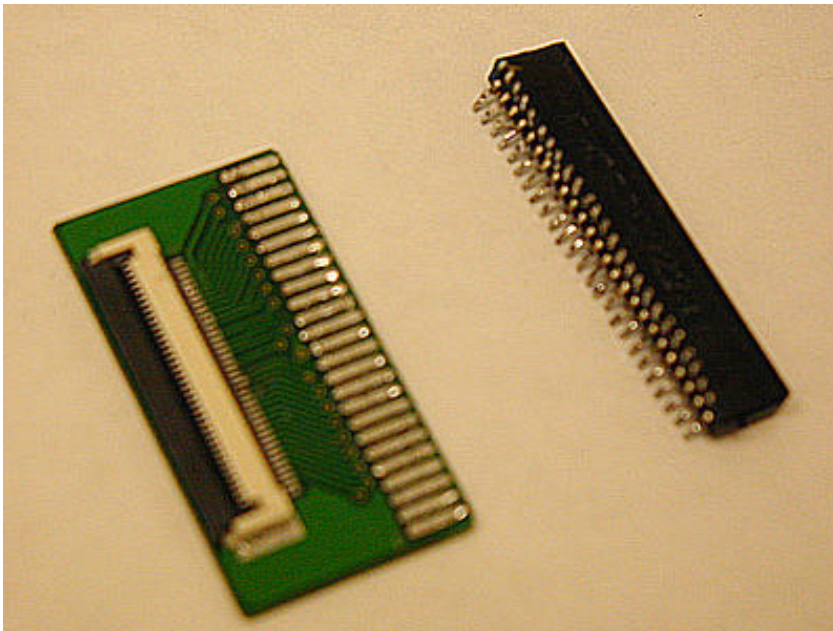
The ZIF connector on the Samsung hard drive has a thin black latch. The drive comes out of the box with this latch raised, ready to receive a ZIF cable. You insert the edge of the cable (you shouldn't have to push) and while holding the cable in, you need to press and fold the black latch backwards. This locks the cable in. It should be tight enough so you can lift the hard drive by the cable.

To connect the other end of the ZIF cable, make sure you push the cable ALL THE WAY inside the on-board connector, so that when you close down the latch it should not come off. The connector pins where the ZIF cable terminals make contact are all the way inside the connector, so if you don't push it in completely, you will not make a good connection.



Once you ensure a good connection, you will have to connect it directly on the IDE bus with an adapter, since it has no partitions and you need to boot to DOS. (Those IDE to USB converters which allow you to connect an IDE hard drive directly to a USB port, will not work.) Once you are in DOS (not from within Windows) first run fdisk to create a partition, then you can format it with the 'format c:' command. Remember, Cowon A2 uses FAT32 and Windows XP won't let you format a drive larger than 32GB in FAT32 format. I personally

use Ranish partition manager where you can easily create and format a partition in FAT32. Only then, Windows XP will recognize and access the drive. Once you access the drive, put the firmware files (the version you had on the previous drive) on it. You will need these to boot A2 for the first time on the new disk.



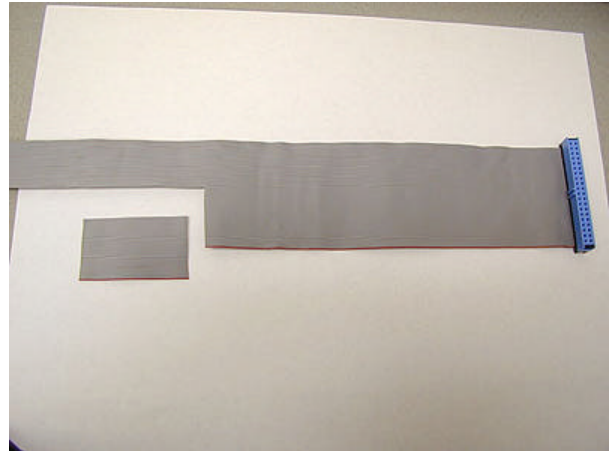
First desolder the 50-pin connector off the IDE to ZIF adapter board. Use a desoldering braid, it works best. When you're finished absorbing all the solder on the pins, you need to go over a second run to lift the pins slightly with a needle or similar, while carefully applying heat with the soldering iron to break the connection. The connector pins are extremely fragile and will break if you bend them too much so be VERY gentle and put as little pressure as possible on these. And

remember, if you overheat the solder pads on the board, they'll easily come off the PCB and the board will be ruined. When you're done, the connector should easily come off with a gentle pull. You may want to clean and smoothen all pads and pins with the soldering gun to ensure a good solder later on.

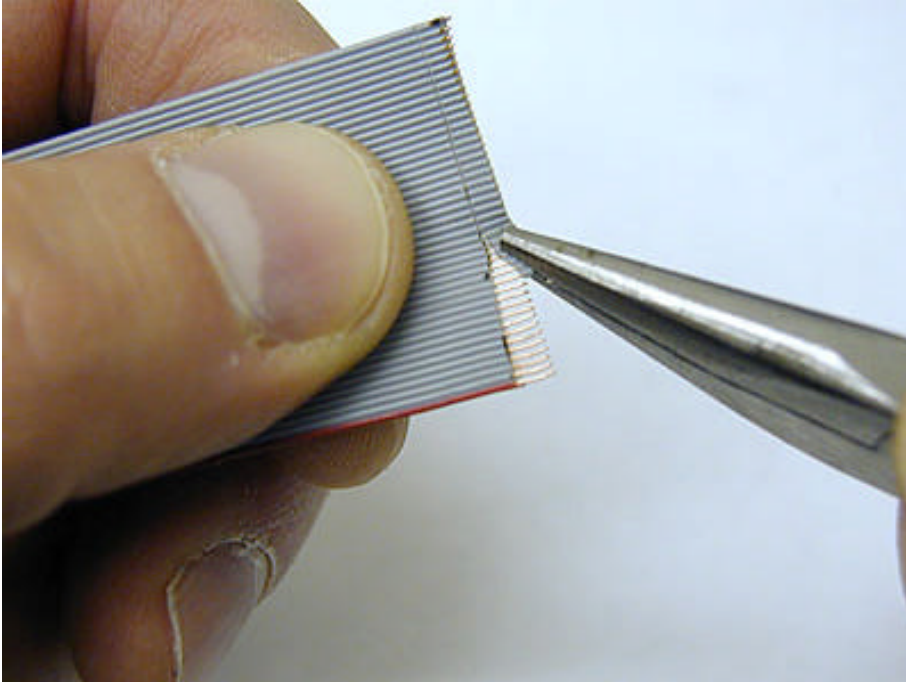
The most labor-intensive part of this project is building the hard drive connector. You will have to repeat some precision work for all 44 pins and 44 wires.

1) First find an 80-wire hard disk IDE cable. The wire pitch matches that of the mini 44-pin hard disk connector.

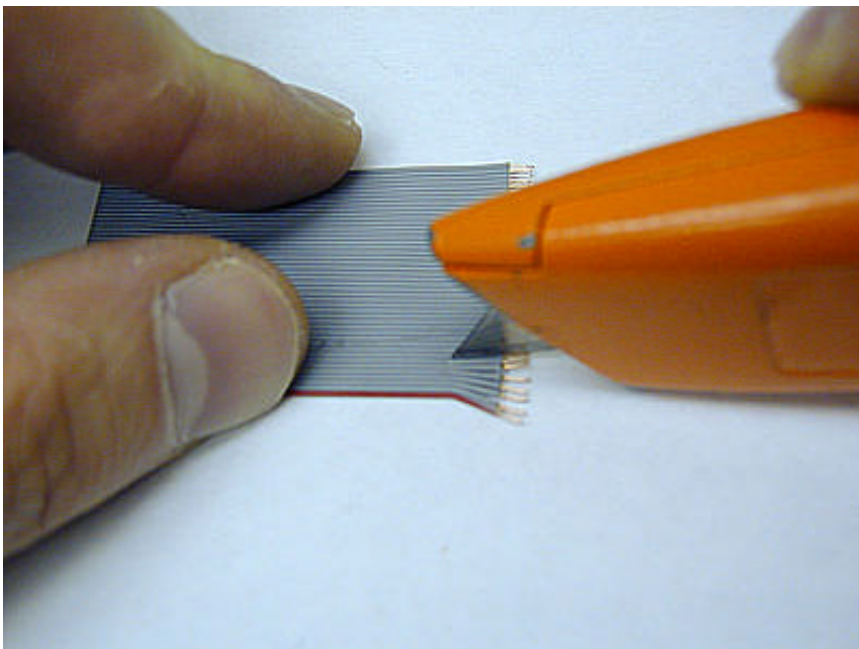
2) Cut out a 44-wire piece about 2 inches long (which we'll use a lot less of, but just in case you break a wire tip).



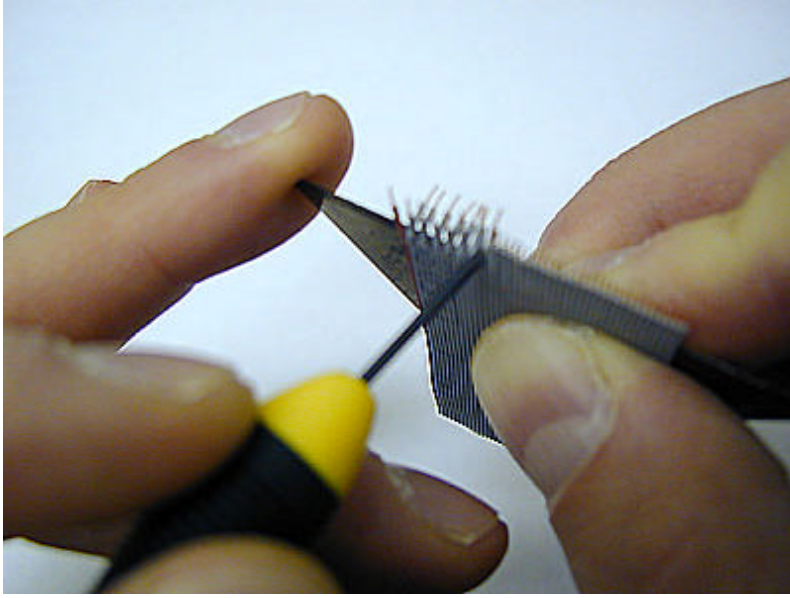
3) For stripping the ends of cable off, I used an old dull cutting blade. Place the blade edge about 1/8" from the end of the cable on one side and while gently pressing it down with pliers, heat it with a butane torch. The heat will melt the wire insulation along the edge of the blade. Repeat the same on the other side of the cable.



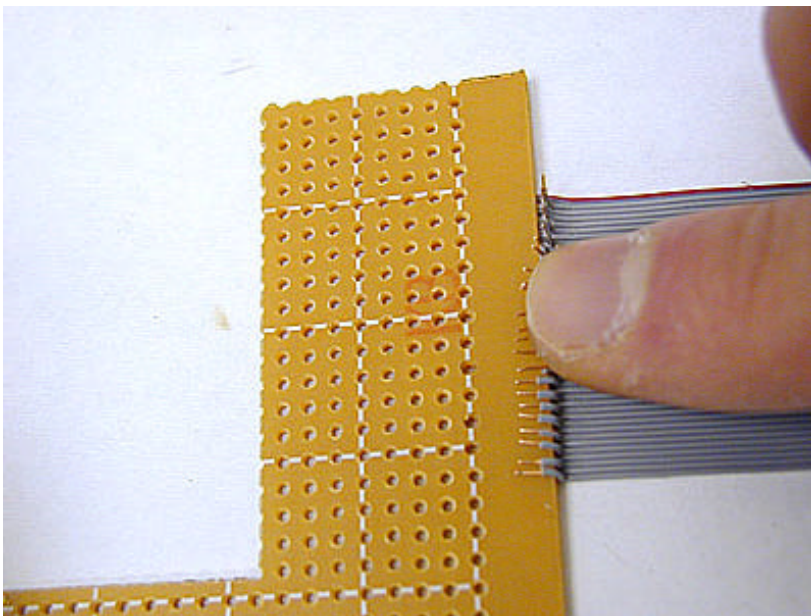
Finally pull the tip insulator with a small pliers. At this point be very careful not to squeeze the pliers too much, or you'll pull the conductor inside along with the insulator. If you do, you'll have to start over with a new piece of cable.



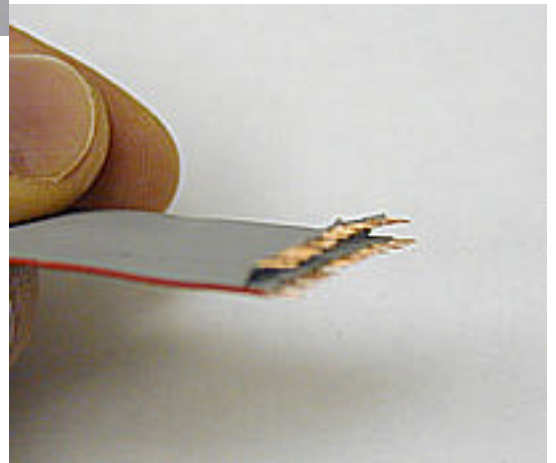
4) Cut about 1/4" into between the individual wires, so you can move the wire tips individually. Don't do this step until step 3 is complete, or you'll increase your chances of pulling the conductor off. Also while cutting, place the blade between wires and once you make sure it's correctly aligned press it down. Do not cut by sliding the blade because it's very likely that you'll cut into the adjacent wires.

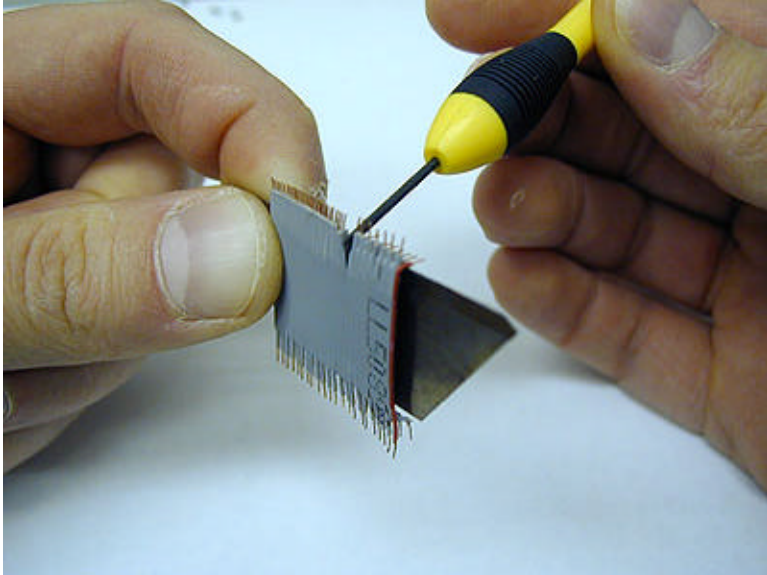


5) While the exposed wire tips are pointing up, leave the leftmost wire straight and fold the next one 90 deg down. Back up the cable with a blade so your bends are sharp enough. Continue the process folding every alternate wire 90 deg down. The straight wires will go on the side of the adapter PCB where the ZIF connector is. The folded wires will be for the bottom side of the PCB.

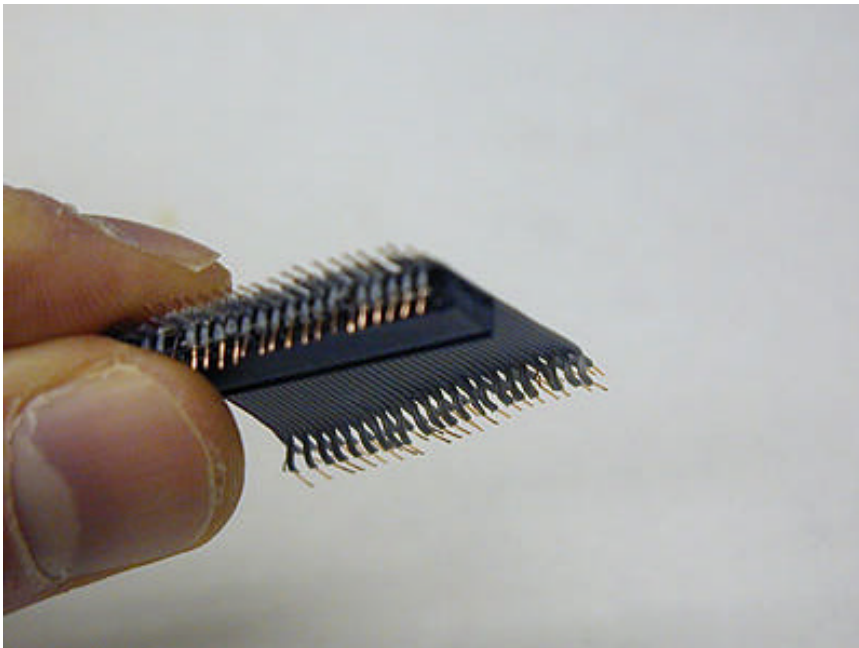


6) When step 5 is complete flawlessly, you need to fold the 90 deg folded wires again so they form a gap with the straight wires where the PCB goes in. Use another PCB or some object of similar thickness. Lay it on the straight wires and fold the vertical ones back on the board so the board is sandwiched in between. You can now cut the cable at about 1 inch length, since that's all we'll need.





7) Now work on the other end of the cable. First repeat steps 3, 4 and 5, this time making sure the wire that's straight on the opposite end is folded 90 degrees down, and a wire that's folded on the opposite end is left straight. This end will receive the connector.

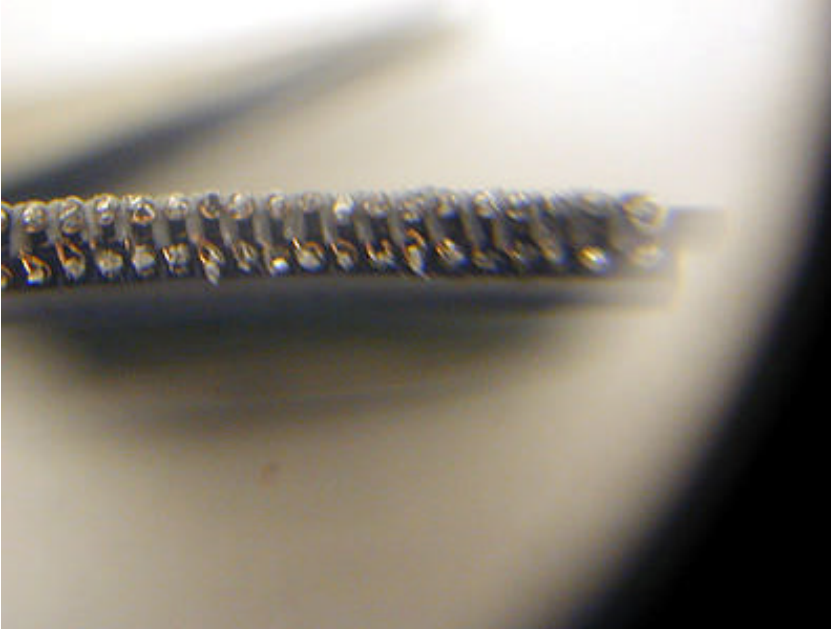


8) Turn the connector around and skipping the first set of 3 pins (6 pins in total) from the left (not used), run the connector pins through the gaps between folded wires.

9) Trim the conductors if necessary so they're just about 1/16" and the tips are even. Leaving them too long will increase your chances of shorting.

10) Using a tweezer or a needle-nose pliers, carefully give each wire a half turn around the corresponding pin. Pay extra attention not to short the wires or the pins. Use a nail trimmer to trim the ends of wires. When you place the HDD later, these will press against the ZIF cable so make sure the solder is smooth and there are no pointy tips sticking out or they may puncture the ZIF cable.

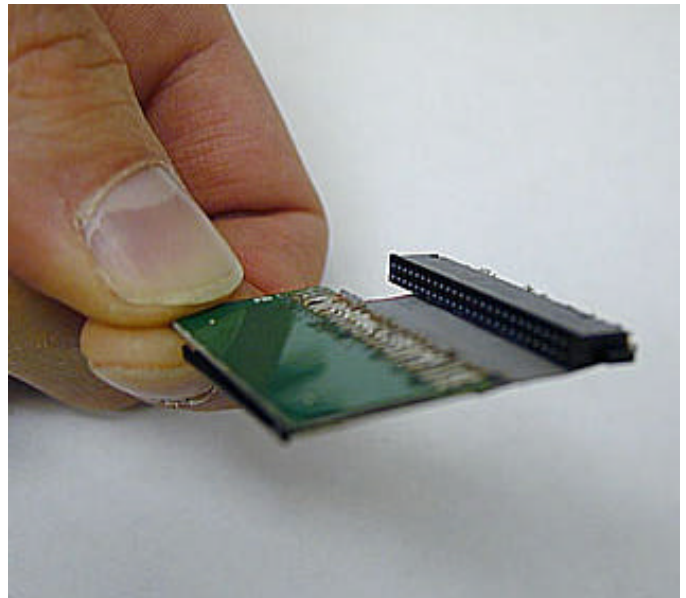
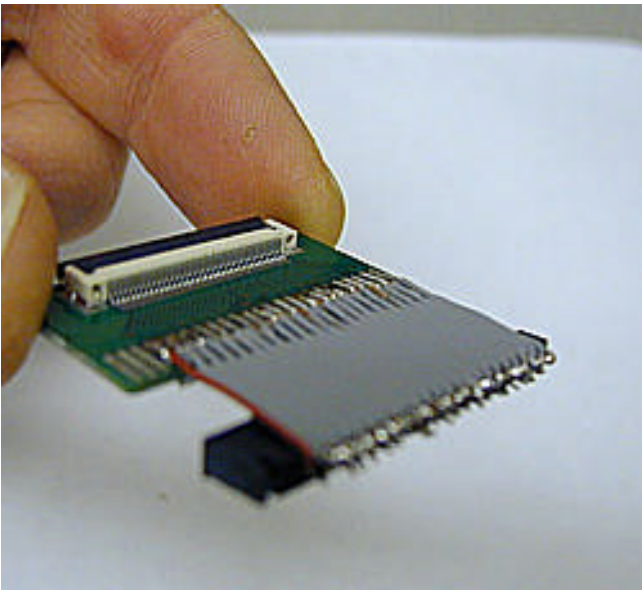
11) When done with the first row, commence with soldering. Apply a VERY small amount of solder (the residual solder on the tip of the soldering iron should be enough to solder 4-5 pins). This is the part where your soldering skills, dexterity and precision are really put to test. Once soldered, trim the excess part of the connector pin so it's smooth.



12) After soldering the first row, repeat steps 10 and 11 on the second row. The picture shows a magnified view of how connections should look.

13) Now we're ready to solder the PCB on the other end of the cable. But before that, turn your multimeter on for a continuity test. Make sure no pins or wires touch each other. Don't proceed with soldering the PCB before this step is complete, because some pins on the PCB are shorted on-board, which may

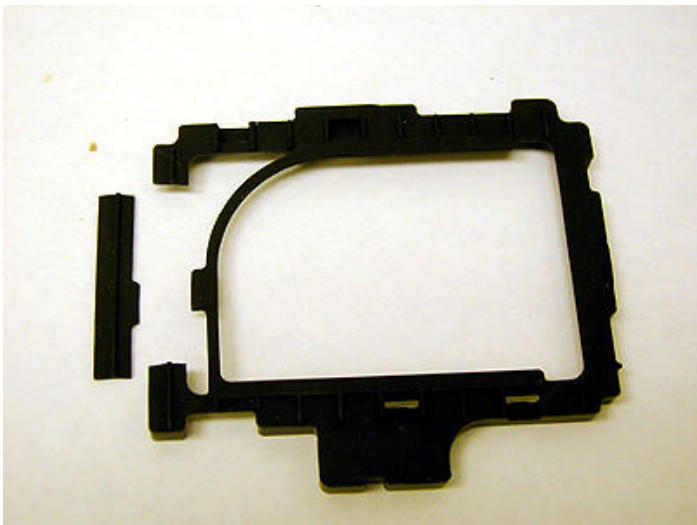
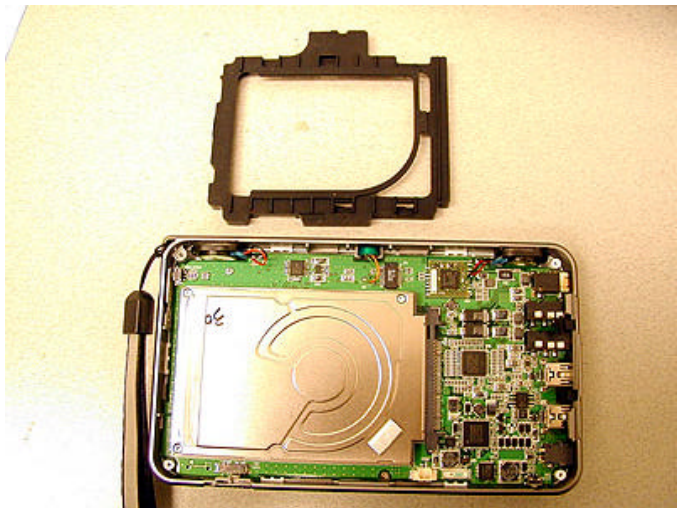
fool you into thinking that the wires are shorted on the connector you soldered. And by then, you won't know whether they should be normally shorted or not.



14) When everything checks out, carefully slide the PCB in and begin soldering. Solder the leftmost and rightmost wires first, so the PCB is aligned and will not slide out of alignment as you continue. Next solder the pins in between. Then flip the board and solder the bottom wires.

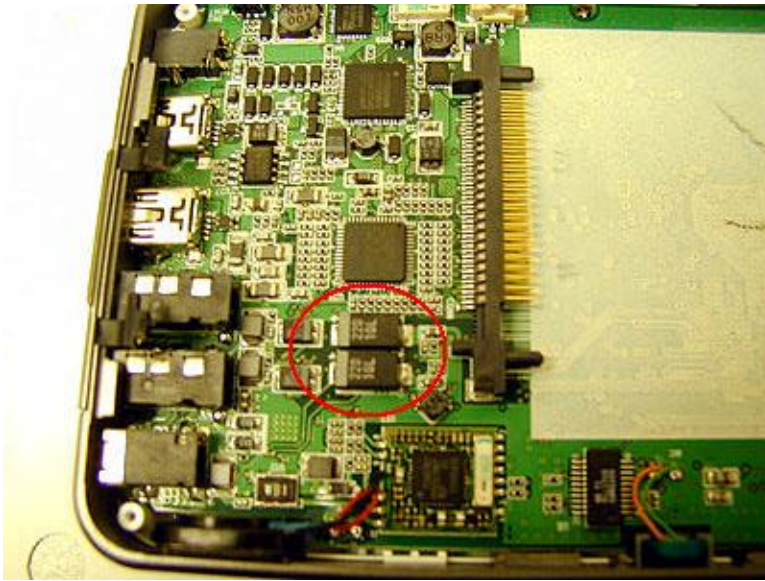
15) Breathe and wipe your sweat off! The adapter board is now complete.

16) Now open up your A2, disconnect the battery, remove the black rubber protector and remove the hard disk. First cut the left piece out that covers the HDD connector.

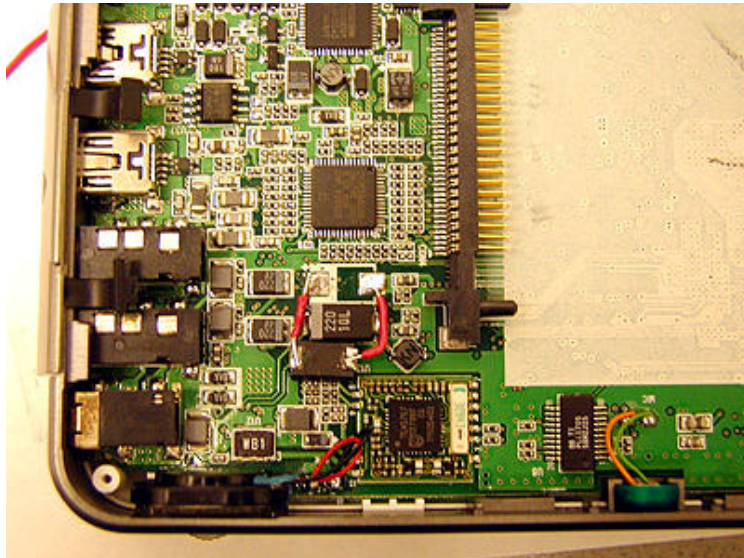


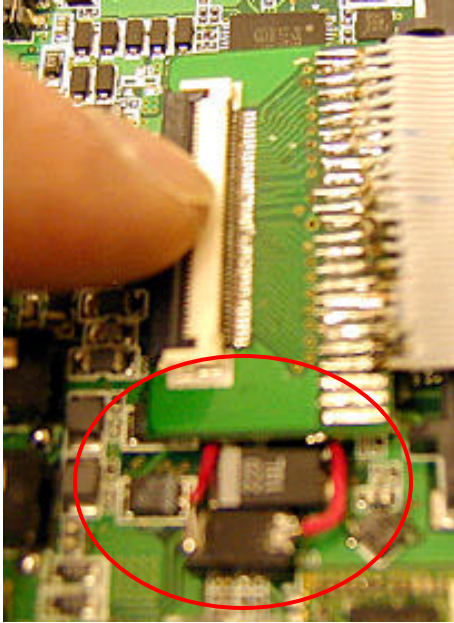
17) Then flip it over and carve about 1/16" of rubber from the opposite edge. We'll need this gap to nudge the HDD slightly so we have enough room for the soldered connector pins.





18) Now we'll need to relocate a capacitor inside A2 so the ZIF PCB fits better. Right under the square HDD interface chip (right behind the HDD socket) you'll see two black rectangular capacitors. We need to move the one on top under the lower one. Just use the solder braid to suck up the solder on each side of the capacitor and while gently pushing up with a small flat screwdriver, apply soldering iron on one side and it should pop up. Don't put too much force, you don't want to ruin the copper track. Then do the same to the other side and remove the capacitor completely. Put it under the other capacitor with the terminals pointing towards you. Use two short wires to connect it back on the mainboard. This capacitor is polarized, so watch the polarity.

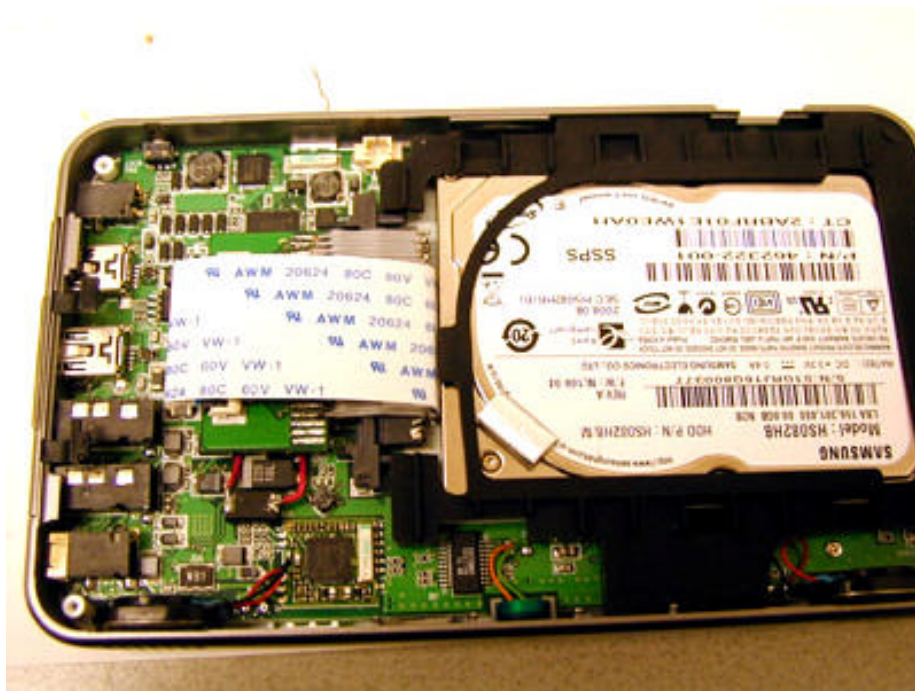




19) Snap in the new ZIF PCB. The lower edge of the board should line up with the capacitor that remained on the mainboard.

20) Connect the HDD cable to the ZIF connector on the little PCB. Flip up the connector latch and make sure the cable pins are turned downwards. (Looking from above the connector, you should NOT see the cable terminals). Push it all the way in and flip down the latch.

21) Place the HDD in the bay. Make sharp folds on the cable right by the ZIF connector and by the HDD connector so it's routed smoothly without bulges or curves.



22) Place the rubber protector. Depending on your situation, you may have to carve inside the rubber cover a bit more as mentioned in step 17 so the HDD fits in nicely. Never force or cram the rubber protector in, or the HDD will press too much against the soldered pins and cause the ZIF cable to get damaged. Just keep carving to the point where the rubber will snap on the HDD properly without too much force. Don't worry about the soldered connector pins getting shorted, the ZIF cable will keep them insulated from the body of HDD.



23) Connect the battery, cross your fingers and holding down the joystick boot A2!

24) At this point, you may either get the regular firmware loading screen, a bizarre screen with black and white horizontal bars, just a black screen or a black screen with colorful pixels. Don't worry as long as you see the yellow progress circles showing that the firmware is being loaded.

25) When you see your booting Cowon screen with the "system initialize" bar running, you'll know you've done it! However at this point if you get that notorious Red X icon, it means hard disk is not being read properly, probably due to shorted or broken pins. Just remove the HDD and the ZIF PCB to check for shorts or broken wires.

26) Go to System\Information to (proudly) verify the new HDD size.

