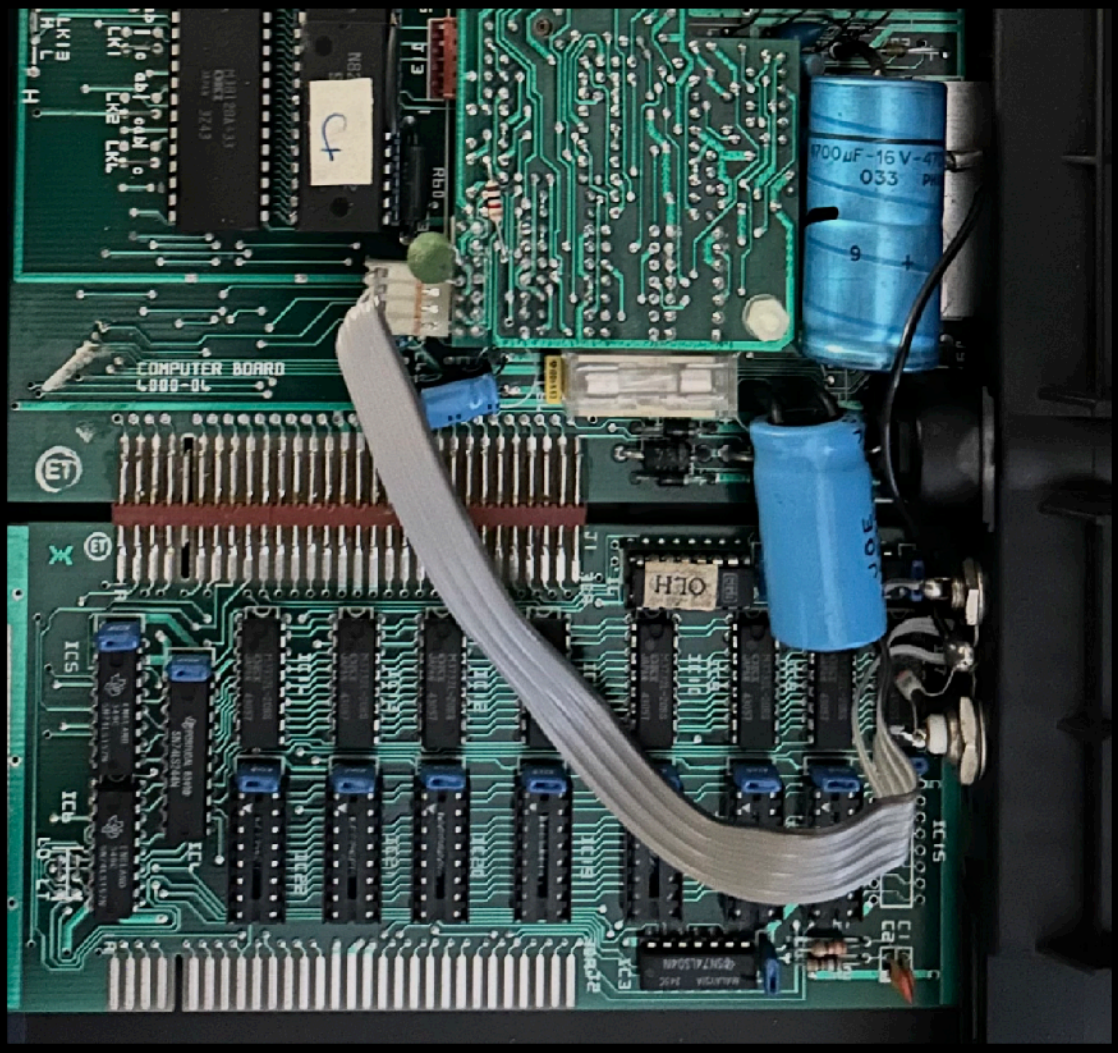
HOW TO REMOVE AN MTX 512 SOLDERED MEMORY BOARD



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PLEASE NOTE - the following before proceeding:-

1) This project is not for those unfamiliar with the use of a soldering iron

2) This project is for those wishing to upgrade their MTX 512 with other boards that will no longer require the Memory Board.

3) YOUR MEMORY EXPANSION BOARD WILL NO LONGER BE USEABLE WHEN THIS PROCESS IS COMPLETE. Although I have included a section further on, on how to make this useable again.

4) The information provided in this guide is for general informational purposes only.

5) By continuing to use this guide, you acknowledge and agree that you are doing so entirely at your own risk. You expressly agree to assume full responsibility for any outcomes, damages, or losses that may result from implementing the information provided.

INTRODUCTION

This project was documented by myself as I progressed through to the successful conclusion of the removal of the soldered Memory Extension Board from my own MTX 512.

For those wondering, the removal became essential to me when I discovered the excellent MFX board supplied by Dave Stevenson at

http://www.primrosebank.net/computers/mtx/mtx512.htm.

Which contains a 512k memory upgrade, network functionality, an SD storage facility, VGA output and so much more, I just had to have one.

Those with experience in the field of repairing, upgrading and modding retro computer systems should have no issues performing the removal of their soldered Memory Extension Board but those with substantially less experience and skills might be concerned about performing the task.

For those with justified concern :-

Although I am a highly qualified IT Professional with over 40 years experience - I have never in all that time worked on the repair of internal components of machines.

It was as my collection of retro machines began to grow that I thought I needed to be more hands on, so just over a year ago I purchased my first soldering iron and after some general practice, I began recapping my own machines (where needed), from there I moved on to installing other peoples mods and finally just over six months ago I started attempting my own repairs.

I have had no training for any of the above, but have watched hundreds of YouTube videos and had lots of excellent advice from those that have been doing these things for years (again a big shout out to Dave Stevenson - the guys a genius).

I hope with the above in mind you now feel confident, that if an amateur like me can do this - you can too. If not look around, there are a lot of people offering their services that would be happy to do this for you (at a price of course).

ITEMS REQUIRED IN ORDER TO PERFORM THE NECESSARY TASKS

1. A small sharp pair of wire cutters, like those shown to the right

2. A decent soldering iron

3. A large amount of narrow soldering wick, like that shown to the right

4. An anti-static soldering mat on which to work

5. As issues can occur when performing this task it is also a good idea to have some 30 Gauge PVC Hookup Wire available just incase any of the connector pads lift during the process.

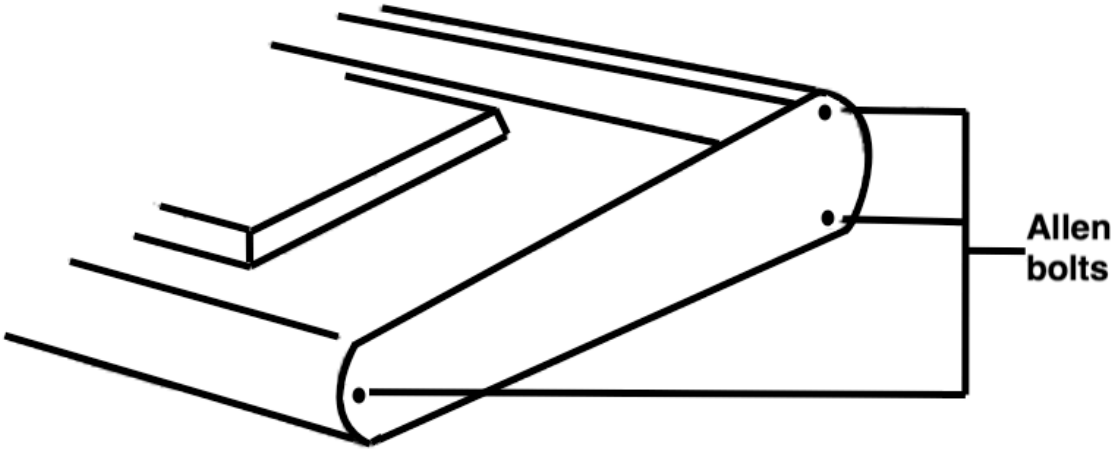
6. Some isopropyl alcohol (IPA) and Cotton buds or isopropyl alcohol (IPA) wipes

7. For testing purposes a basic cheap Multimeter is also recommended.

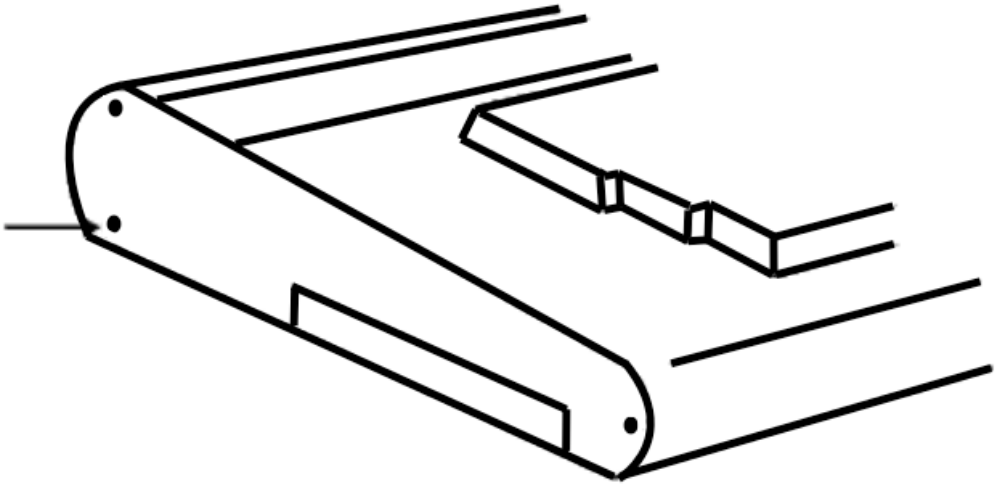
And finally of course you need your motherboard with the soldered Memory Extension Board removed from the case.

REMOVING THE MOTHERBOARD FROM THE CASE

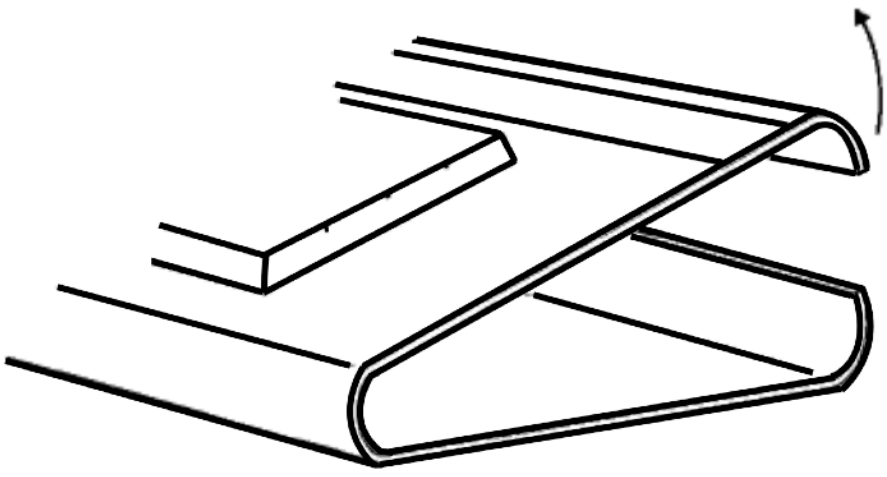
1. Turn of your machine and disconnect all cables.
2. Undo the three allen head bolts on the right side end plate of the MTX



3. Undo the rear bottom bolt on the left hand side end plate.



4. Lift the MTX keyboard at the rear just above the plastic panel. Be careful not to damage the keyboard interconnecting cable.



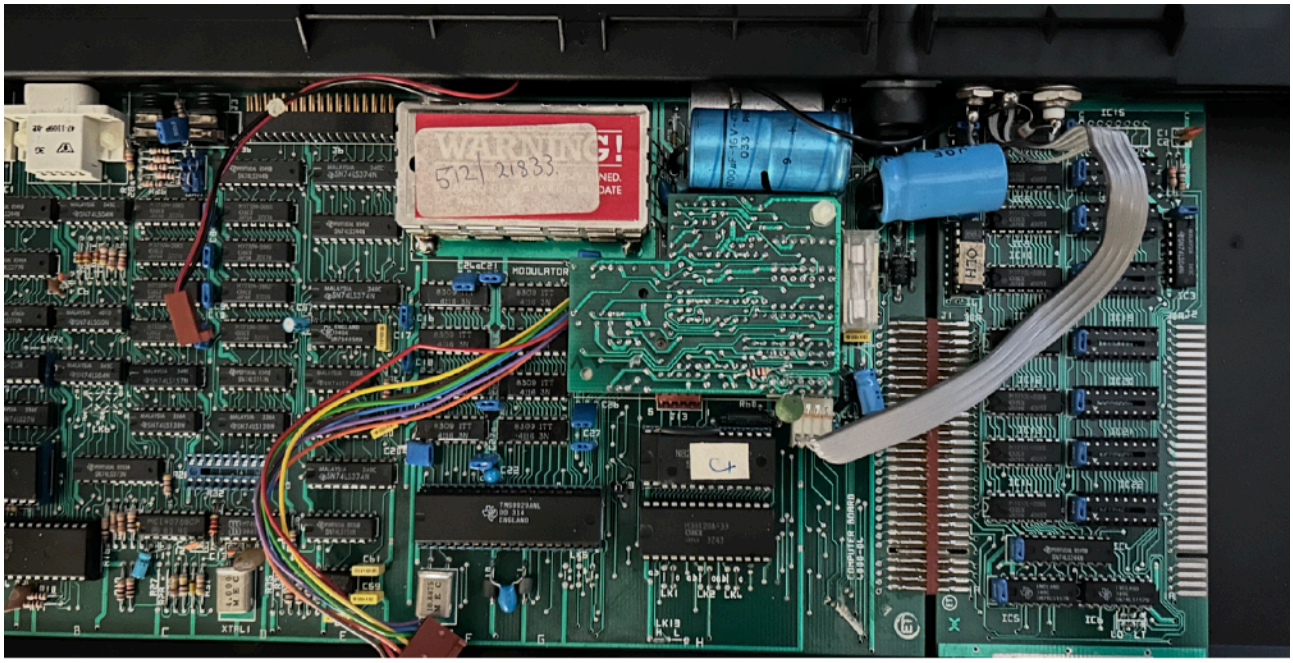
5. Gently ease the KBD (keyboard) interconnecting cable from the mother board and slide the top KBD to the left or right until detached.

6. Remove the video monitor cable (the grey cable shown connected to the video card daughterboard below) and tape it to the plastic panel to prevent any unnecessary damage.

7. The under side of the MTX reveals a single screw which secures the MTX mother board to the bottom chassis. By removing the main screw and earth strap the MTX Mother Board and Rear Plug panel will slide from the case bottom just like the keyboard.

NOTE: MAKE SURE TO LOCATE AND SAFELY KEEP THE NUT FROM THE SCREW YOU REMOVED AS THIS IS REQUIRED WHEN REASSEMBLING.

You should now be able to place your motherboard (my MTX 512 before I began the work is pictured below) on your anti-static soldering mat.



REMINDER:-

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THE APPROACH AND WHY

There are going to be those reading this, that will wonder to themselves “why has he taken this approach”, so in order to enlighten those that wish to know, here are the methods I considered and rejected and the reason why.

METHOD 1 - Use a hot air gun to warm all the soldered connectors at once and gently prise the Memory Expansion Board off.

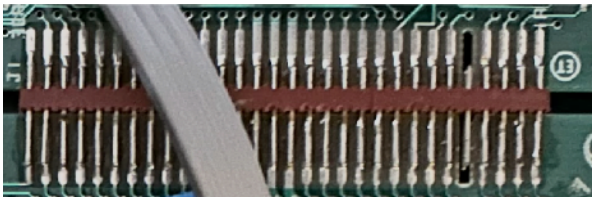
REJECTED - The memory board is soldered on both sides of the board, it would be impossible to warm both sides at once. Secondly this option risks damaging components near the area to be warmed.

METHOD 2 - Heat each soldered connection one at a time and prize the soldered connection off.

REJECTED - The prizing of anything off of the edge connector, will almost inevitably result in the rising of the trace itself, I cant imagine anyone would want a huge amount of damaged traces.

METHOD 3 - Use solder wick/flux to remove each of the soldered connections one at a time, gently prizing the metal connector up when free.

REJECTED - As the pins for each pad run straight through a plastic block (see below) bending the pins involves adding some level of force, which could lead to damaging the edge connector trace pads.



THE SOLUTION

First a final reminder :-

The following process will render your memory expansion board unusable (albeit I will cover a fix for that board later on - just in case anyone wants to make use of it).

and

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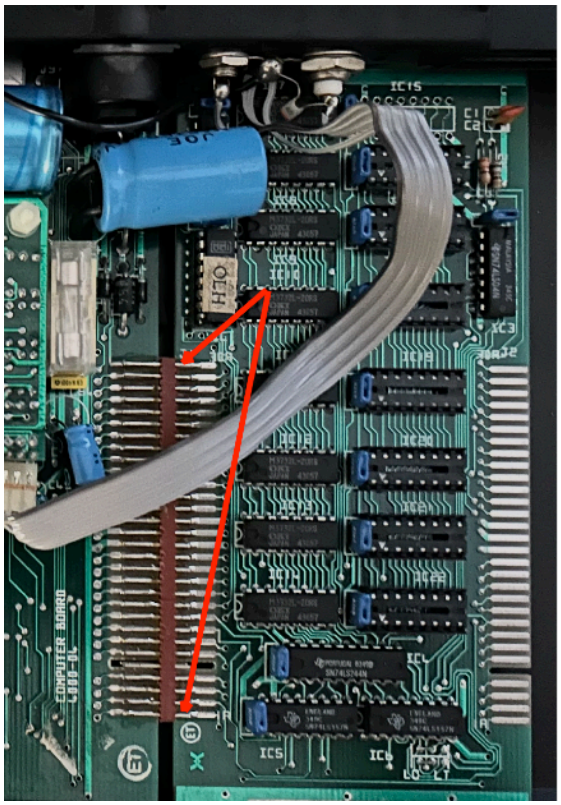


1. Using a small sharp pair of wire cutters, gently cut every pin along the Memory board side of the brown connector (see picture right)
2. Now repeat the process for the reverse side of the board.
3. Gently remove the Memory expansion board.

NOTE:- If you find the board is still hanging on in there - place the wire cutters along the pin on The Memory Extension board side and cut along the pin these should now come off easily - when complete the board should be easy to remove.

You now have easy access to the moulded brown connector and most importantly at no point in this process have you risked damage to the motherboard itself.

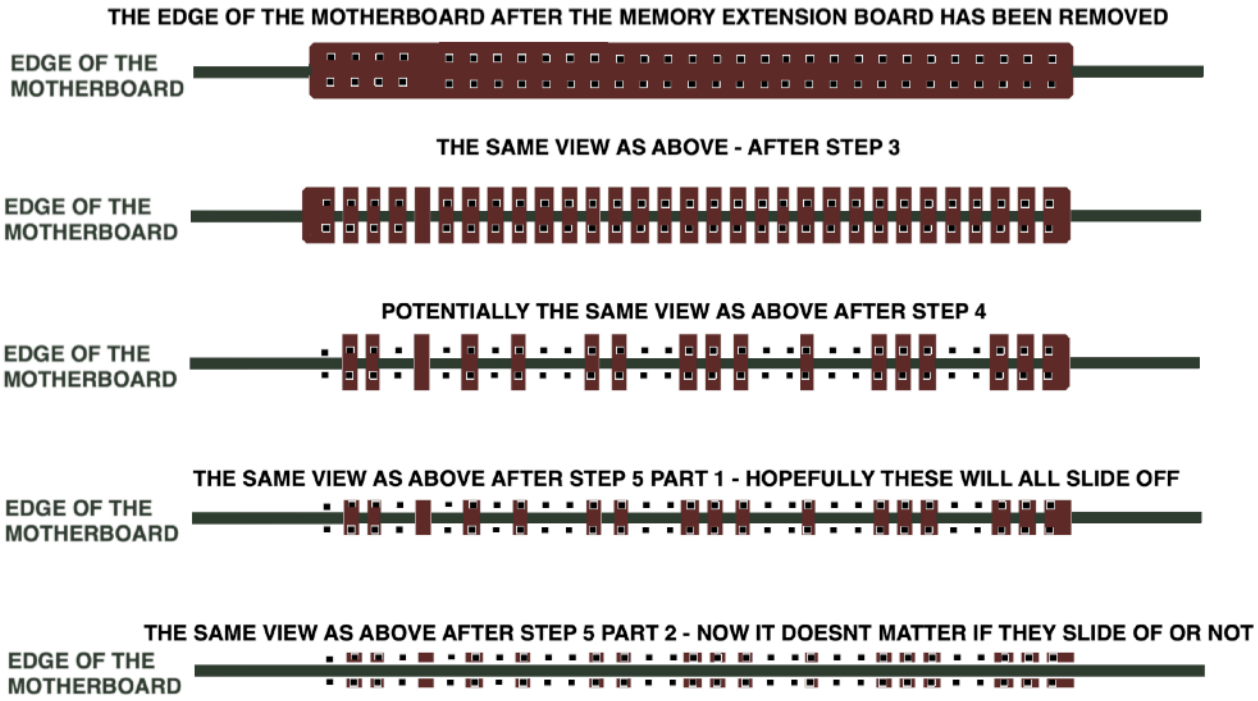
4. Now using the wire cutters systematically work your way along the brown connector cutting it between each pin (see picture at the top of next page) - Make sure you do this carefully, you do not want to accidentally catch the motherboard, that would be a very bad thing.

Okay so now we have the brown connector still in place but cut into many pieces, each with a pin through it on the top and bottom of the board.

5. Carefully test each piece of the brown connector, some will now just slide off the pins soldered to the edge connector, so remove them, the others we will deal with next .
6. The remaining section of the brown connector can now be removed by either snipping the top and bottom of the brown connector above the pins (see picture at the top of the next page) still soldered to the mother board edge connector and then sliding out the remains

   or

   snipping the brown connector between the top and bottom pins (see picture at the top of the next page)

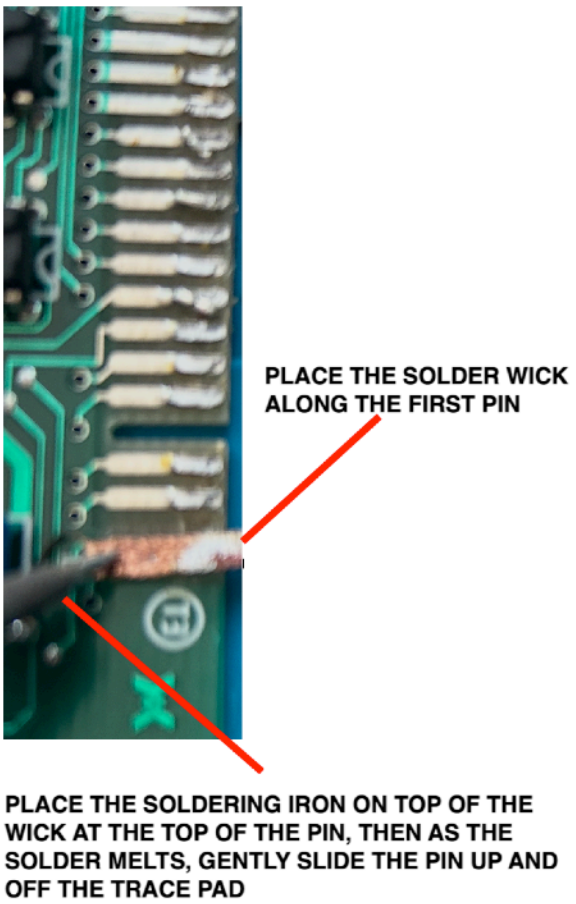


6. Now its time to break out the soldering iron and solder wick.

7. Place the soldering wick along the first pin soldered to the motherboard edge connector and place the soldering iron on the top of the wick at the top of the pin, then as the solder melts, (using the soldering iron) gently slide the pin up and off the trace pad.

   Do not force it - take your time. If done carefully the trace pad should be intact.

   Dont worry about the remaining solder we will deal with that later.



8. Now repeat the process for all of the remaining pins - take your time, dont rush, if done carefully all your trace pads should be intact - but If one does come loose dont worry - im going to show you what to do later on in this document.

9. With all the pins removed, we now need to clean the trace pads on the edge connector. So I used the same trick as above - place some solder wick at the top of the trace pad and then apply the soldering iron, let the wick suck up all the remaining solder as you gently slide it towards the edge of the board.

10 . Repeat the above process for every trace pad, making sure that all of the solder is removed.

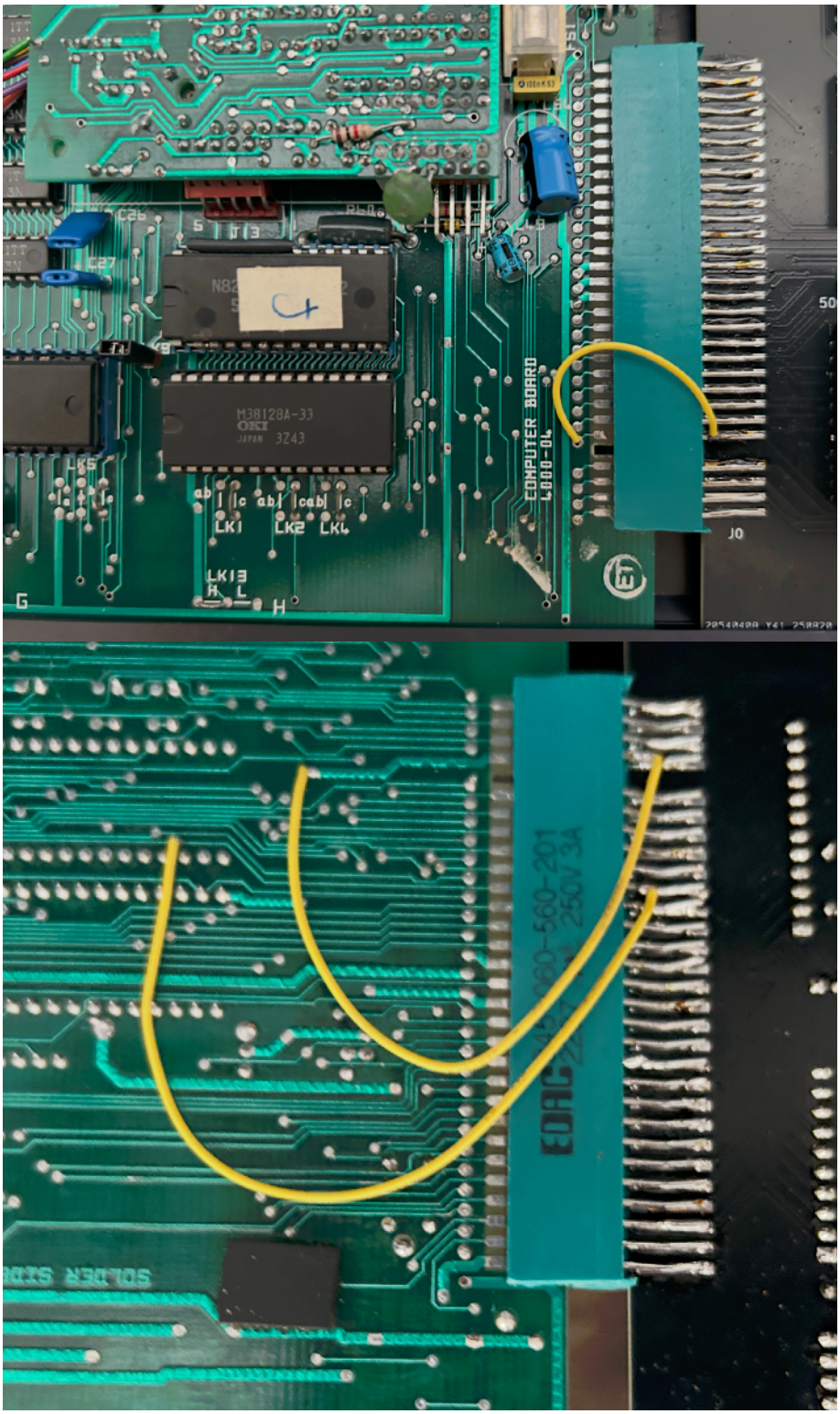
11. Finally using some cotton buds and some isopropyl alcohol (IPA) or isopropyl wipes clean all the trace pads in order to remove any flux residue, grit or grime and you have finished.

WHAT TO DO IF A TRACE PAD IS DAMAGED.

Firstly do not worry, its most probably not your fault, these boards are very old and just the heat from the soldering iron could have caused the problem.

Secondly I myself had three of my trace pads lift , so if you have done better then that your doing well.

And now, before we begin and just to prove that if you follow the below instructions you to can have a working solution, here are photos of my fully finished, tested and working trace pad repairs.



AN EXPLANATION

Ok lets first of all explain what effect the lifting or removal of a pad has and why its such a problem.

From the picture shown on the right we can see that one pad has lifted and one has completely broken off (note this is a generic picture from the web). If you look closely you can see the lifted pad has twisted exposing the copper trace underneath and that the missing one has snapped off at the tip of the pad.

So now you know what the issue is you need to realise that without these pads anything you planned to connect to the motherboard's edge connector will not work because two of its required connections are now missing.

The bottom line is you now have no alternative, you have to fix this before any extension board can be installed.

THE REPAIR

Firstly and this sounds insane, cut the lifted pad off with a pair of wire cutters, leaving a lifted pad, like that shown, risks the pad moving when a device is connected and that could cause all sorts of very serious damage. Trust me your safer with the loose pad gone.

If any of you pads have partially lifted - simply cut the lifted part off, leaving the still properly connected part is not a problem. Obviously you cannot and should not rely on that connector to work and you should perform the following actions on that connection.

Now we have to undertake the repair and I have found the easiest way is to make connections directly between the motherboard (using the Via's) and the device you wish to install (in my case an MFX board).

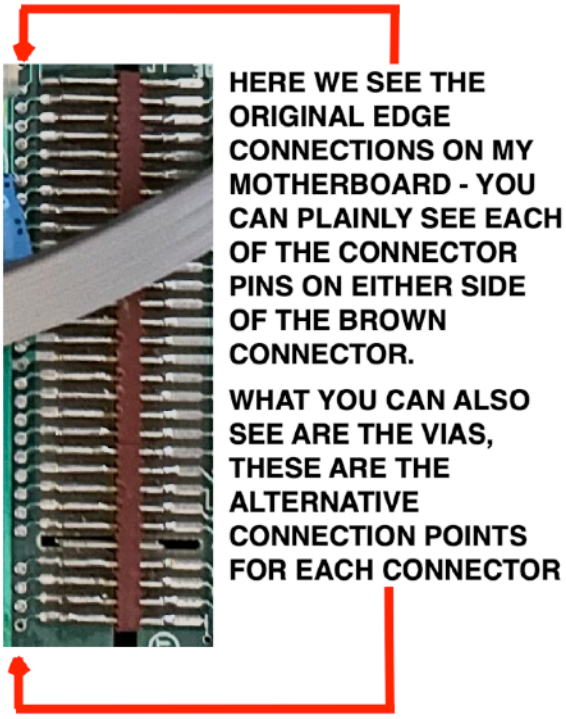
BEFORE WE PROCEED AN INTRODUCTION TO VIA's

On pretty much every motherboard ever made, there are things called VIA's, consisting of a small drilled hole in a printed circuit board that connect electrical signals between the different layers of a circuit board. Basically the Via acts as a vertical bridge allowing traces to pass power and signals across the board.

For our purposes the Via's provide excellent connection points, which we are going to use to solve our damaged pads problem.

It should be noted that the Via's on top of the board are very easy to identify as they are presented in a row with clearly visible connection to the trace pad they are for - the same is not so true for the reverse of the board.

So lets take a look at how to trace the correct via on the reverse of the board :-



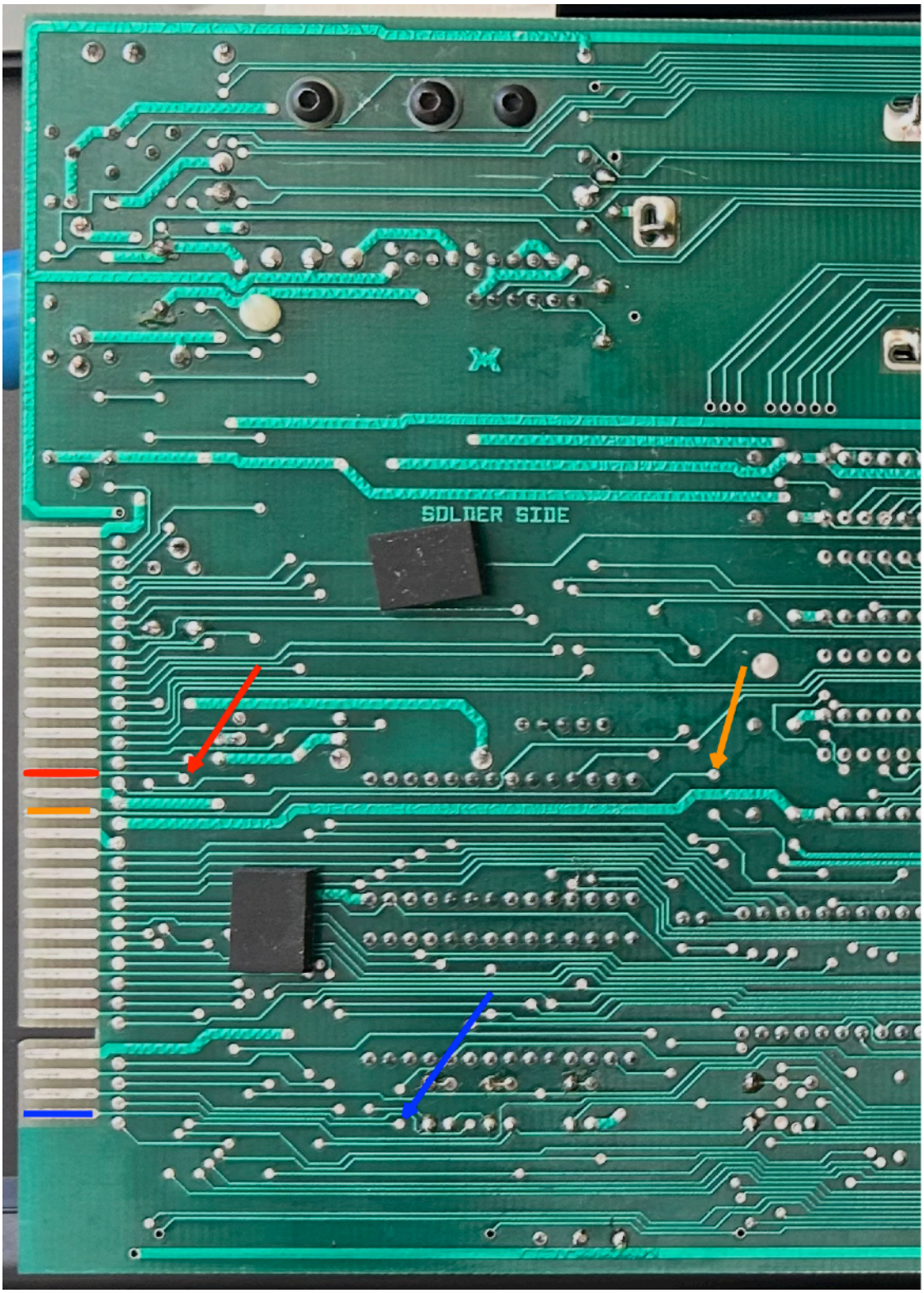
HERE WE SEE THE ORIGINAL EDGE CONNECTIONS ON MY MOTHERBOARD - YOU CAN PLAINLY SEE EACH OF THE CONNECTOR PINS ON EITHER SIDE OF THE BROWN CONNECTOR.

WHAT YOU CAN ALSO SEE ARE THE VIAS, THESE ARE THE ALTERNATIVE CONNECTION POINTS FOR EACH CONNECTOR

In these three examples, its clear to see the method used to find the Via, simply start at the damaged pad and follow the trace until you reach the Via.

The red example is extremely easy to follow, the orange and blue slightly less so and some Via's could be almost at the extreme right of the board - but every pad on the edge connector has one via somewhere, you just need to find it.

Remember the pictures of my fixed board - well why not take another look at them you will see a good example of what you're about to do.



HOW TO CONFIRM YOU HAVE THE CORRECT VIA

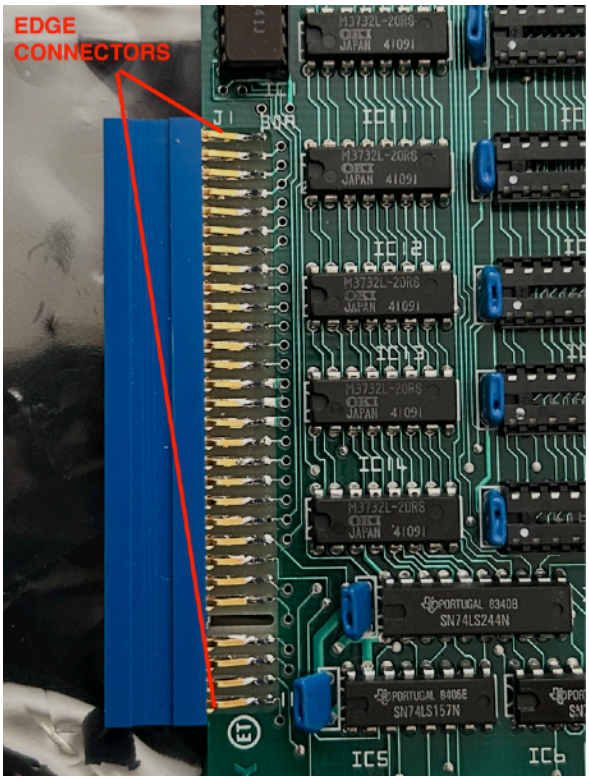
This one is easy, you need a multimeter to do it, but it's extremely easy to do.

First set the multimeter to continuity mode and then place the red lead of the multimeter on an exposed part of the damaged pad (if there is no pad left, lightly scratch the top off the beginning of the trace to expose the silver trace beneath) and the black lead on the suspected Via. If its correct the multimeter will beep to confirm there is a connection between the two points, if not you have made a mistake so follow the trace again until you find the correct Via and of course test it again to make sure your correct.

THE FINAL PART OF THE REPAIR

Right by now you should have traced the appropriate Via for every damaged pad you have, looked at the photos of my board at the beginning of the chapter and are now ready to put that 30 Gauge PVC Hookup Wire we specified in the Requirements section to work.

1. Strip one end of the cable and using your soldering iron connect it to the Via. Leave the lead length as long as possible at this point we will trim it down in size later. That said, you need to make sure its long enough to reach not only across to the faulty pad, but also much further. All will become clear later.
2. Repeat this exercise for each damaged pad (I suggest using a different colour wire for each via you need to connect - or if not label the wire to indicate which pad its connected to).
3. Now you need to install the expansion board you want to use - but and this is important do not slide the board all the way on - you will need to be able to see the damaged pads on the motherboard. If this is not possible then you must clearly document which cable needs to go to which pad.
4. Now take the first cable you need to connect and run it across to the newly installed expansion board, measure it to the rear of the edge connectors (see picture right) - add a considerable length of slack. Then cut the wire and strip the end ready for soldering.



5. On the newly inserted expansion board the edge connector will have easily accessed connector pins - it is these pins we will be using for the other end of our cable.
6. Now with the new board in place and the cables ready to go, all you need to do, is place a small amount of solder on the correct edge connector pin of the new board and then solder the cable you prepared to it.
7. Repeat the process for all damaged pads, each time making sure you are connecting your cables to the correct edge connector pin.

8. Now before you dive straight in and turn the machine on, lets test it has all been done correctly. Break the multimeter again and this time place the red lead on the exposed part of the damaged pad on the motherboard (as we did in the HOW TO CONFIRM YOU HAVE THE CORRECT VIA section), then place the black lead on the edge connector pin of the expansion board you soldered the lead to. If you have done it correct you will be presented with a very pleasing Beep. If not you must go back check and correct any errors made.
9. If you are happy that everything is correct, have used the multimeter to test everything and are sure no mistakes have been made - then now's the time to turn on the machine, like me you should find everything works perfectly. If not turn the machine off immediately recheck all your work, there's something wrong somewhere.

WHAT IF AFTER ALL THIS I WANT TO REMOVE THE NEWLY INSTALLED EXPANSION BOARD AND INSTALL SOMETHING ELSE

No problem at all - simply unsolder the wires on the currently installed Expansion board, insert the new board and then re-connect the wires to the same pins on the new board.

Off course if this is going to be something you want to do quite often this process will be very annoying so you could cut the wires and install some connectors which would allow the wires to be plugged/unplugged as necessary - you could then solder the appropriate wires to each of the boards you want to use, place the appropriate connector on the end of the wire and now you can install the board - connect the wires - disconnect the wires - uninstall the different boards - as much as you like.

HOW CAN I REUSE THE MEMORY BOARD I REMOVED

This is fairly straight forward compared to everything you have just done.

1. Purchase the appropriate edge connector (a 30+30 Way Connector (60 pin)) from a reputable supplier. (Mouser usually stock them but there can be delays)

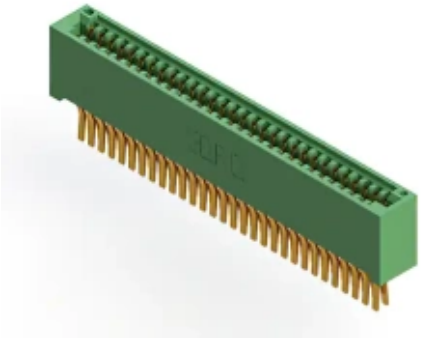
   https://eu.mouser.com/ProductDetail/EDAC/345-060-560-201?qs=X9HCC1dc6JtEudKIL0Qupw==&countryCode=GB&currencyCode=GBP

   Please note:- these connectors come with end stops, you will need to trim the end stops off to allow the connector to fit over the internal connector (see photos below).

   Original MTX Connector with no end caps

   EDAC Connector With end caps removed

2. Remove the pins and solder from the edge connector pads on the Memory Board
3. Making sure you have the edge connector placed correctly on the board and then solder each of the pins.
4. Test the connections using a multimeter - place the red connector on the pad you soldered to and then place the black lead on the appropriate part of the new edge connector - you should get a reassuring beep - if not check your soldering.
5. If you are happy that everything is correct, have used the multimeter to test everything and are sure no mistakes have been made - then now's the time to turn on the machine, like me you should find everything works perfectly. If not turn the machine off immediately recheck all your work, theres something wrong somewhere.