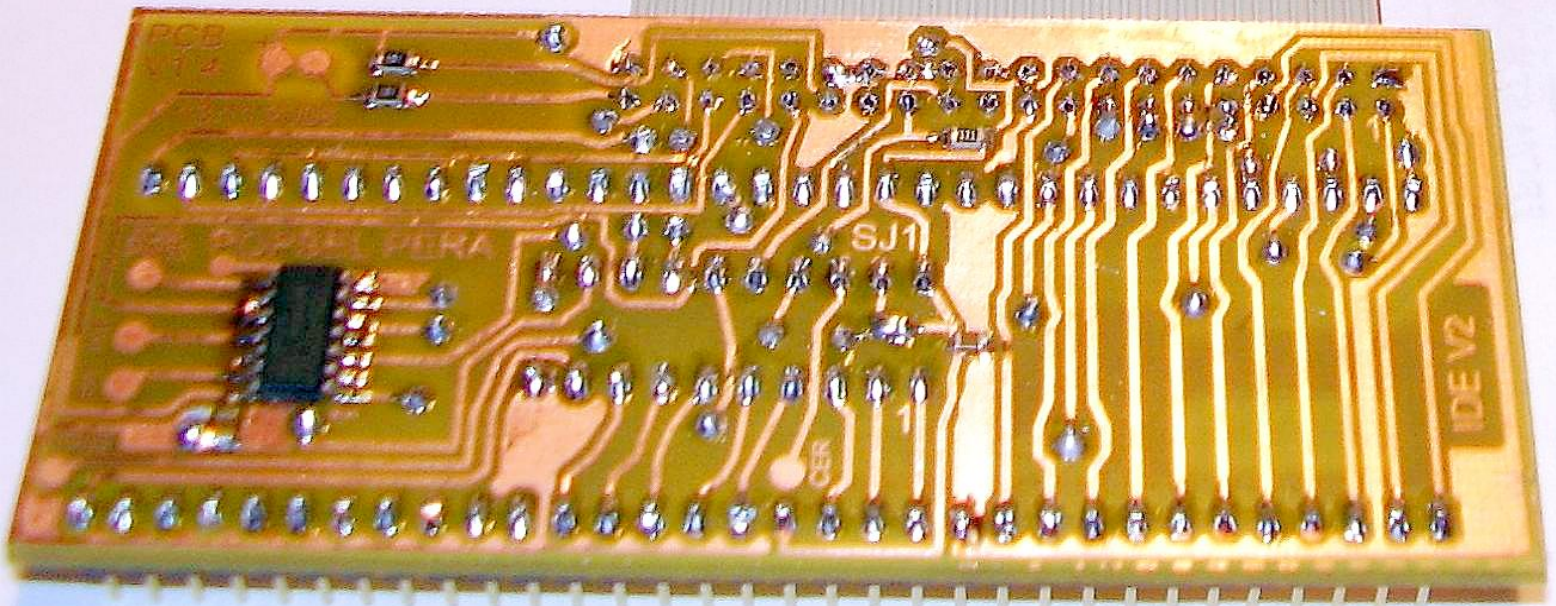


ATARI ST

IDE INTERFACE

V2.0

PPERA & POPSEL



ATARI ST

IDE - INTERFACE V2.00

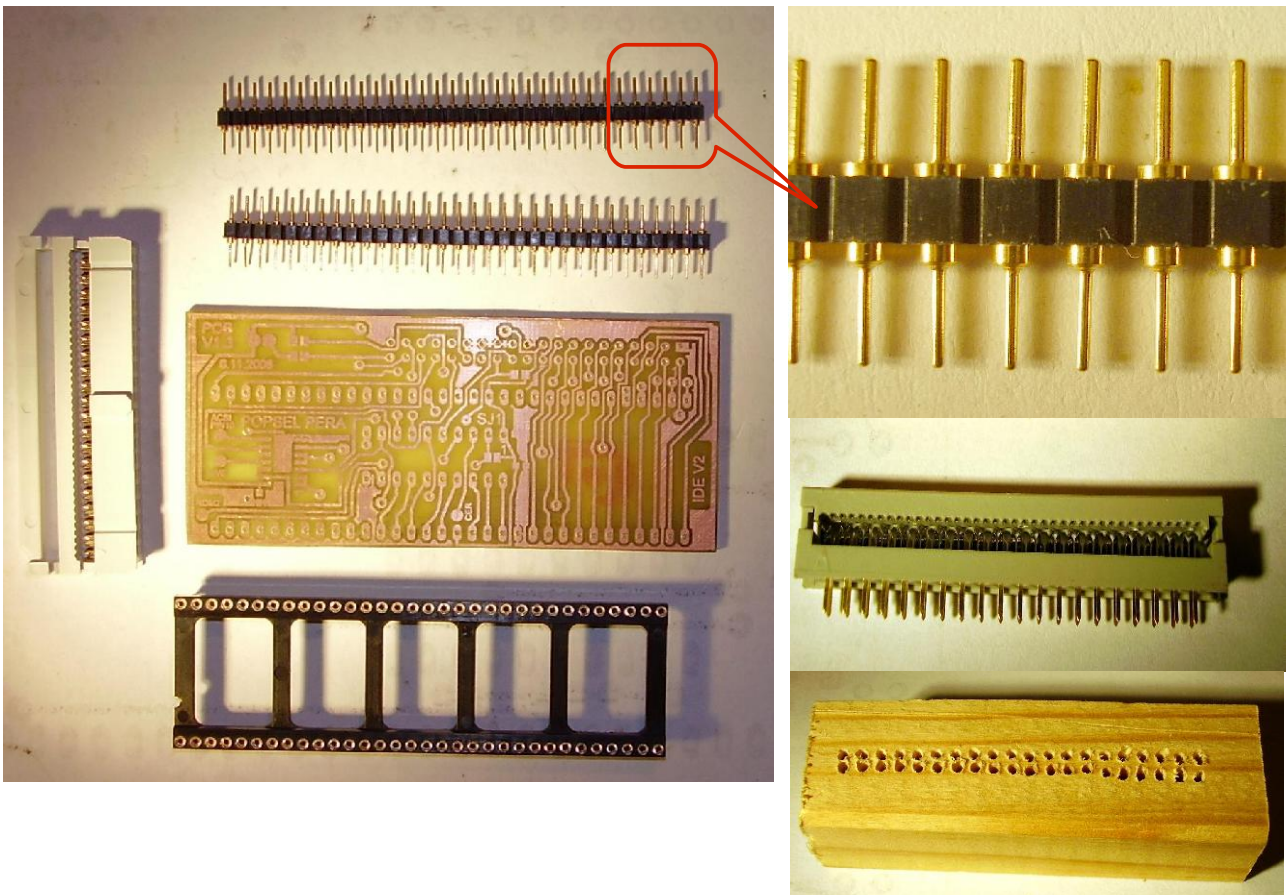
SINGLE SIDED VERSION

PCB Version 1.4

Documentation 19. November 2008

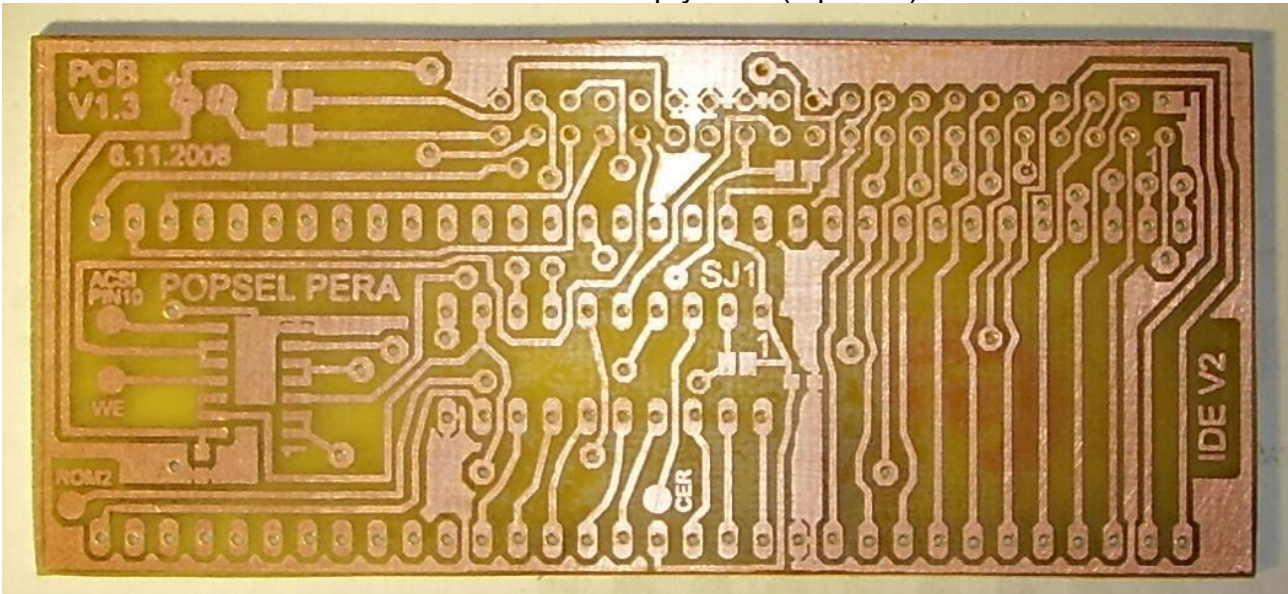
This guide shows the way how to assemble the ATARI ST IDE V2.0 interface.
The final PCB is version 1.4
These photos were taken from a previous version.
Don't use these photos as an electric reference for soldering wires.

Mechanical Parts Overview

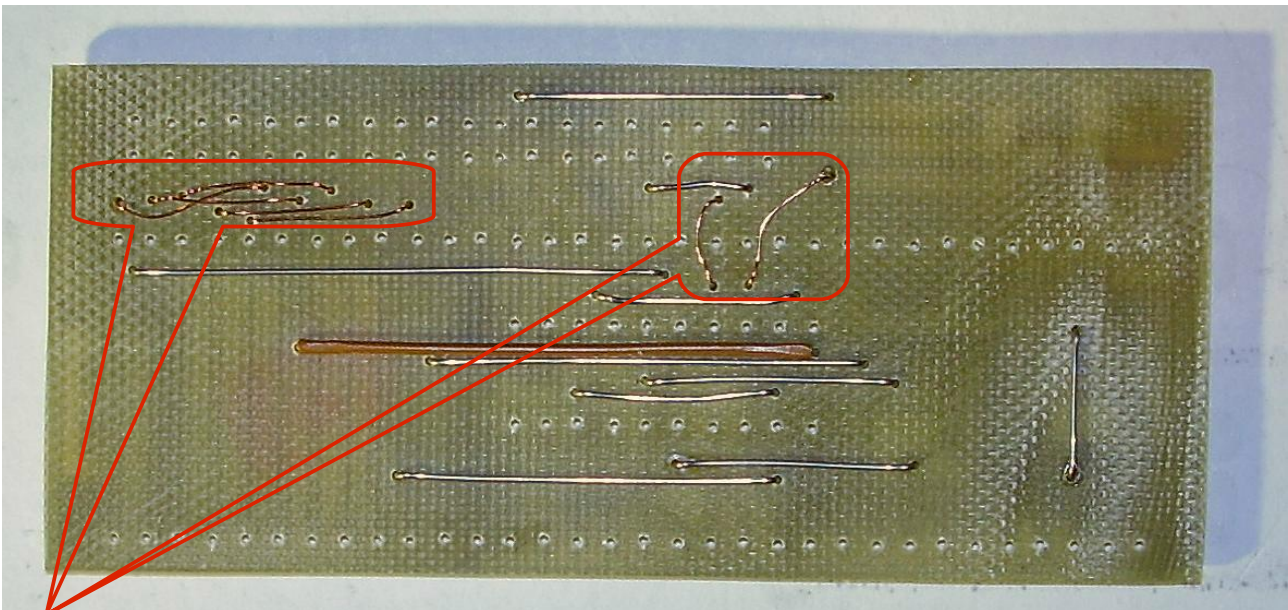


How to assemble it

We start with the empty PCB (top view):



Add wires on bottom side:

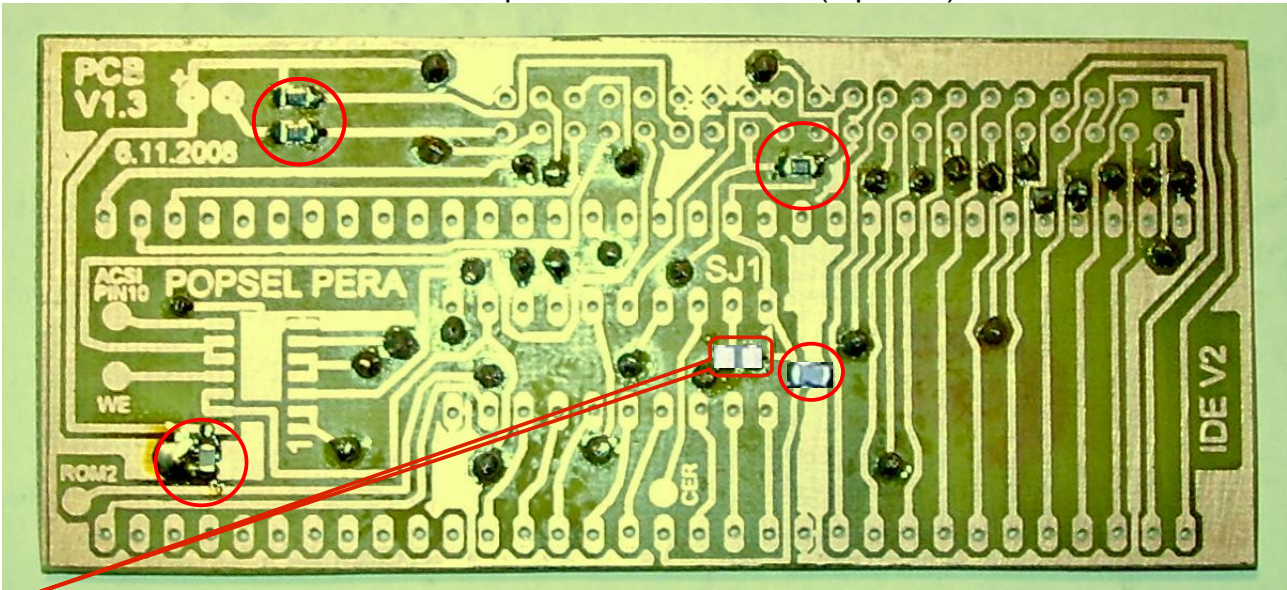


These wires are isolated by a transparent color to prevent short circuit.

Note:

Don't forget to look at separate documents to place the wires for final PCB V1.4
The not isolated wires mustn't touch each other.

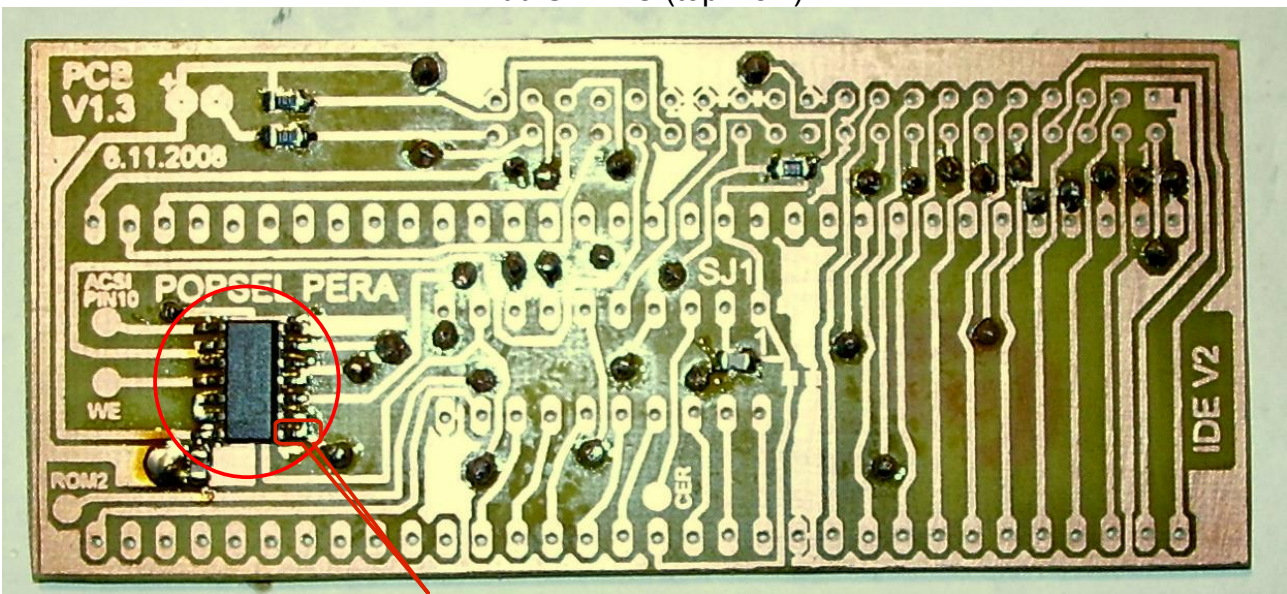
Add SMD capacitors and resistors (top view):



This is solder-jumper SJ1. Look at version 1.4 schematics for details.

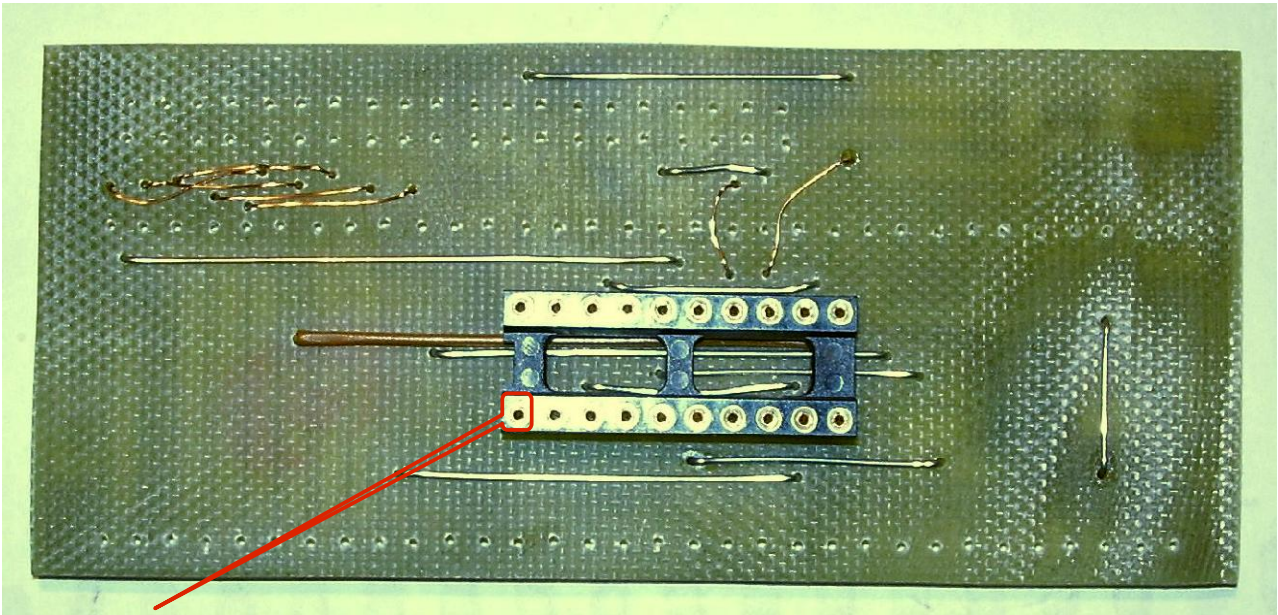
Don't forget to look at separate documents to place the parts for final PCB V1.4

Add SMD IC (top view):



Take care about mounting direction. This is PIN No. 1

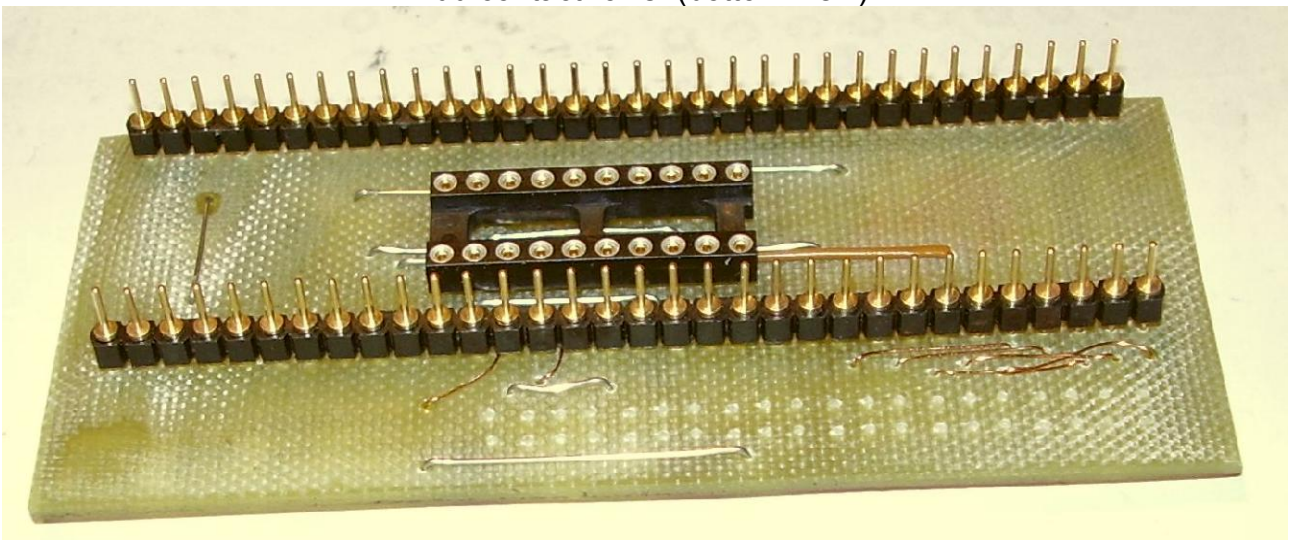
Add GAL 16V8 IC (bottom view):



GAL PIN No. 1 (check mark before soldering GAL chip)

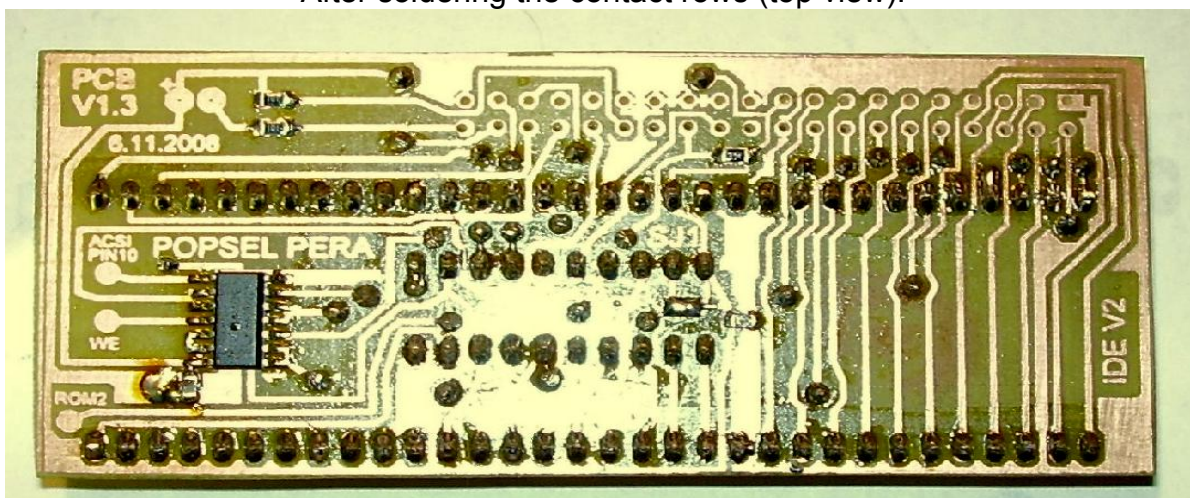
For PCB V1.4 don't use a socket to mount the GAL chip. There is very few space between CPU and interface.

Add contact rows (bottom view):

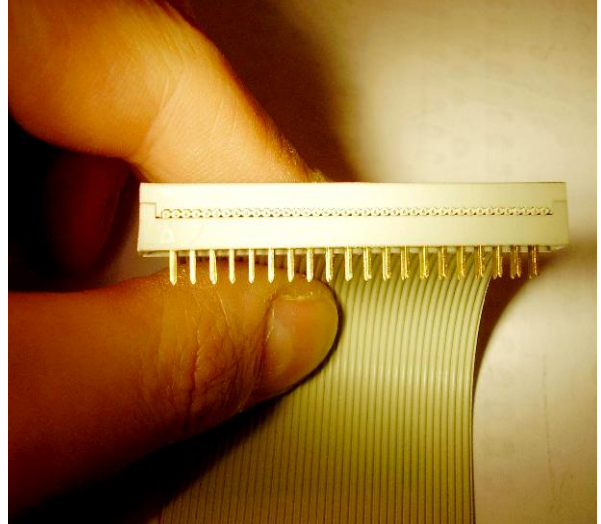
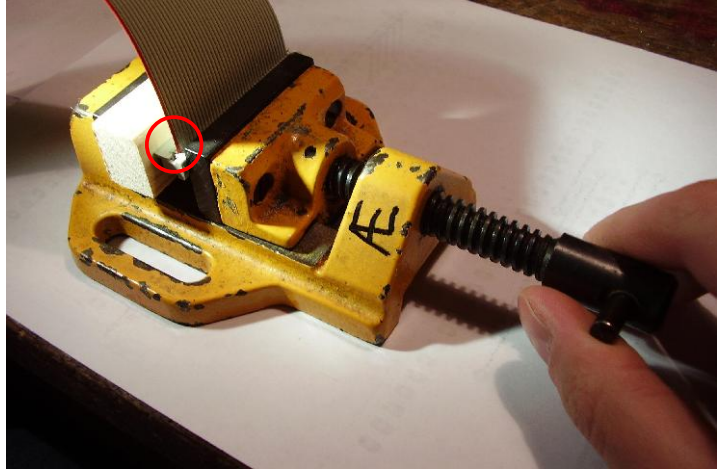
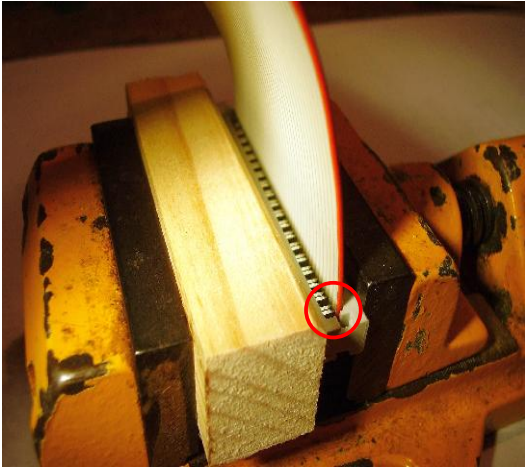
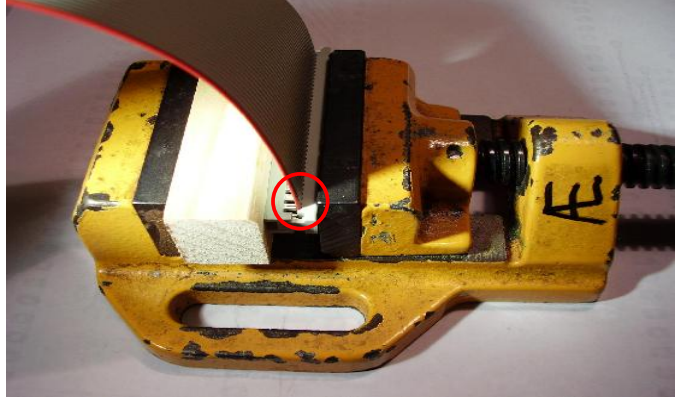
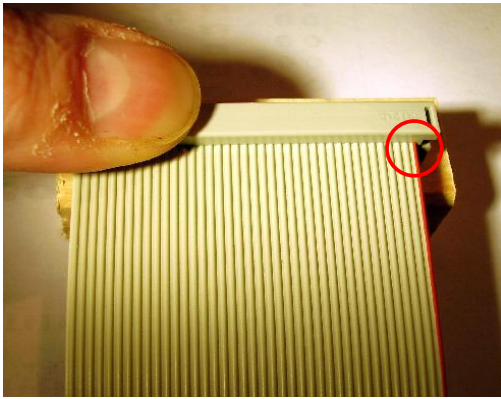
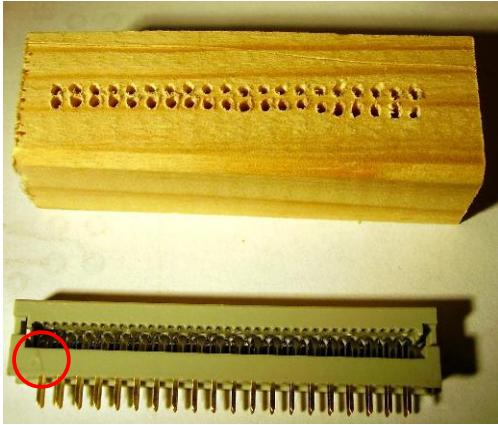


This contact rows have one thinner end. Plug the thinner end into the PCB and solder it on top side

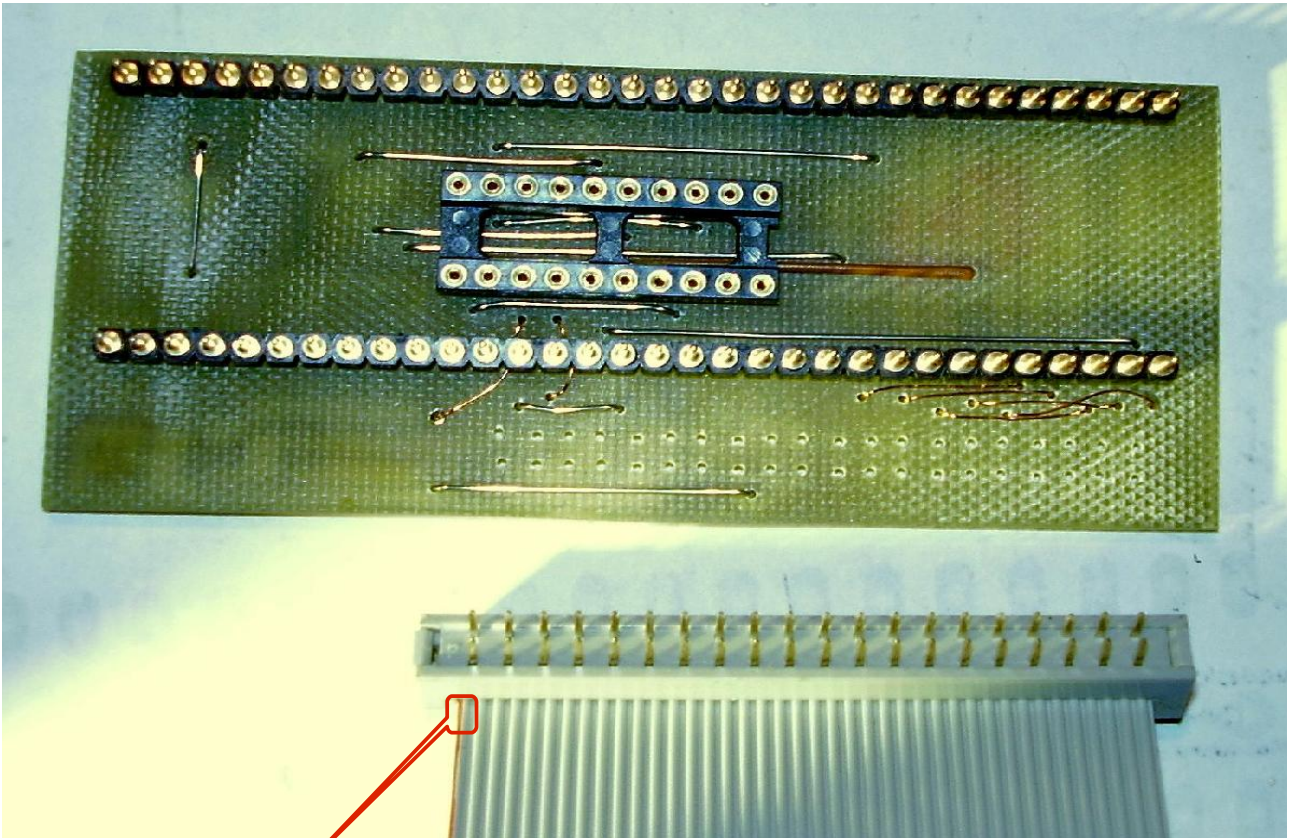
After soldering the contact rows (top view):



Prepare the PCB connector:

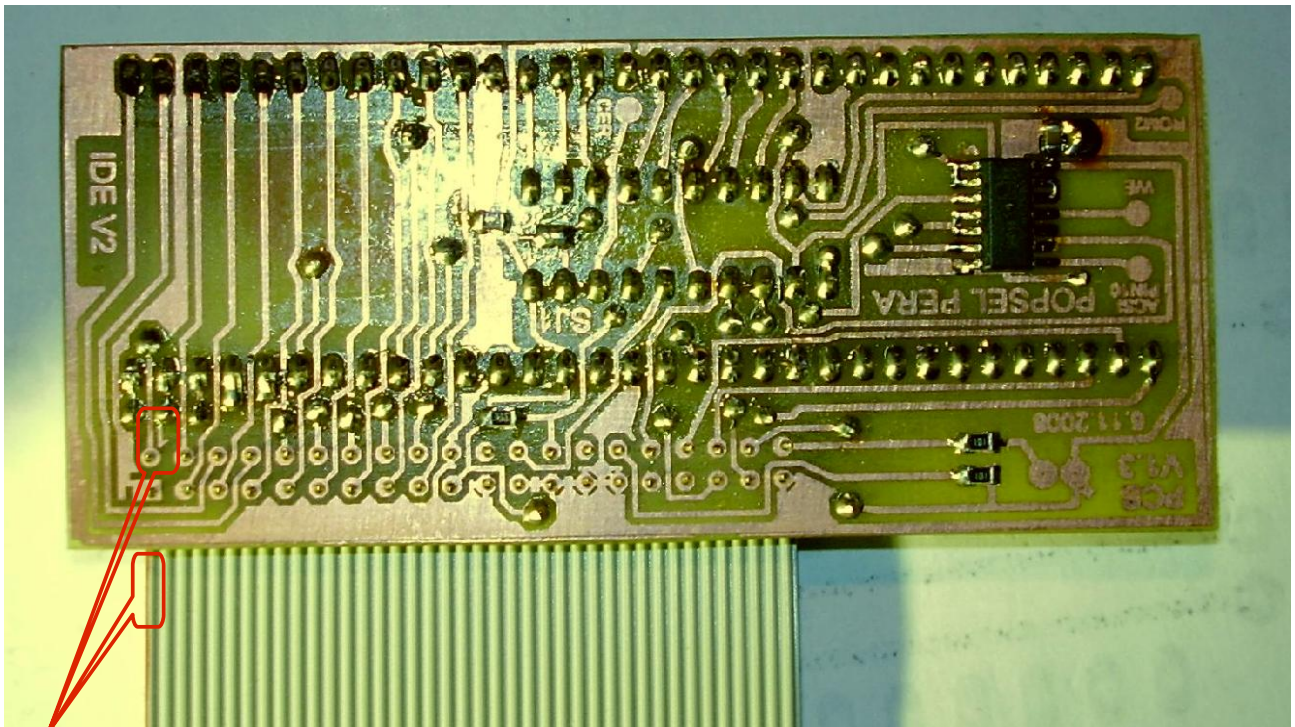


○ = PIN 1



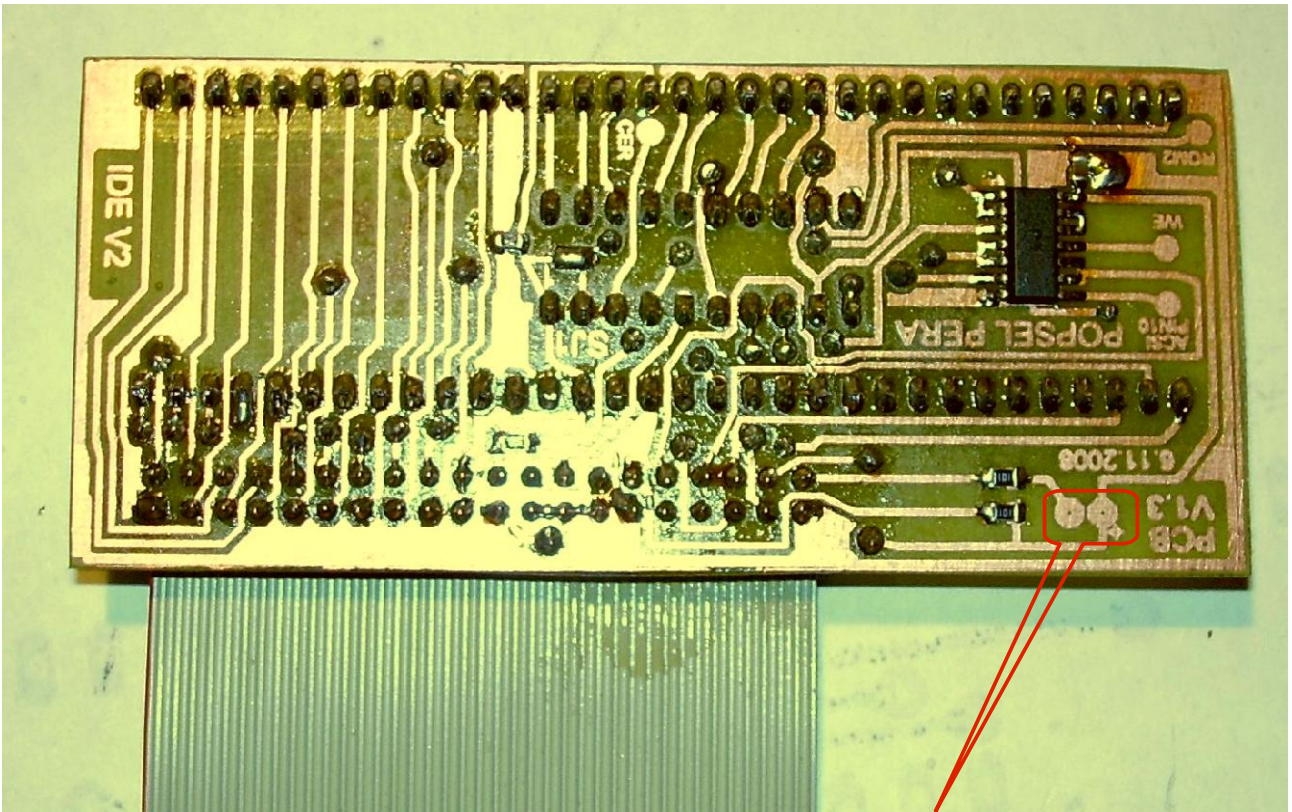
PIN 1 of cable

Prepared to solder the PCB plug (top view):



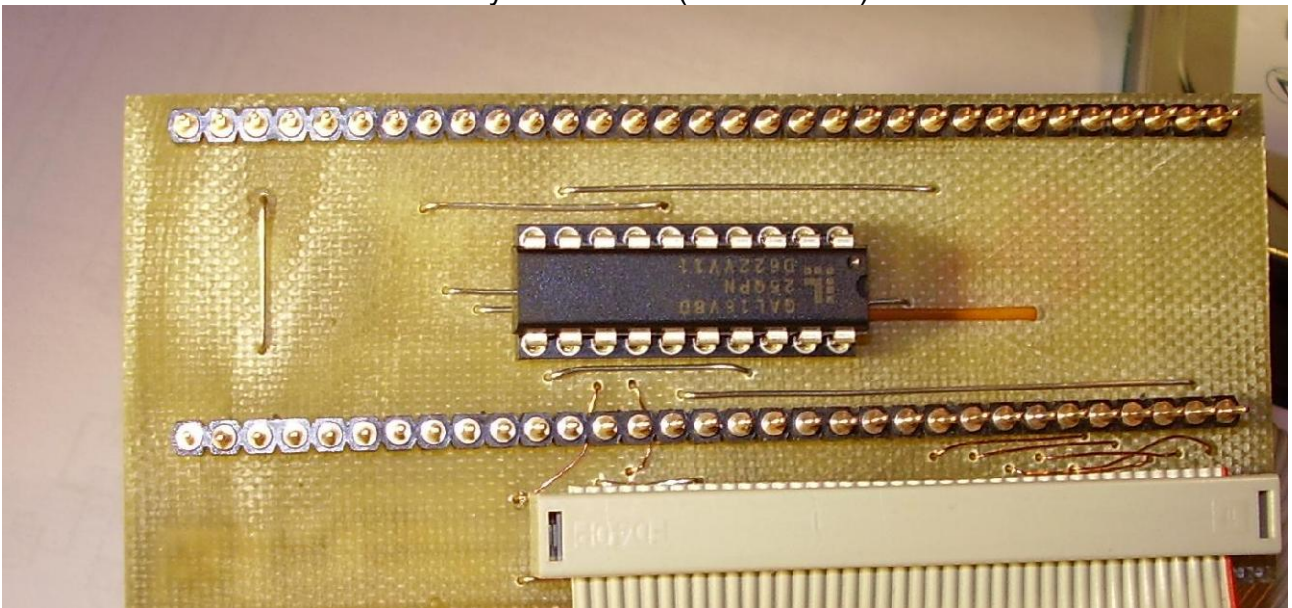
PIN 1 of cable

Ready made PCB (top view):

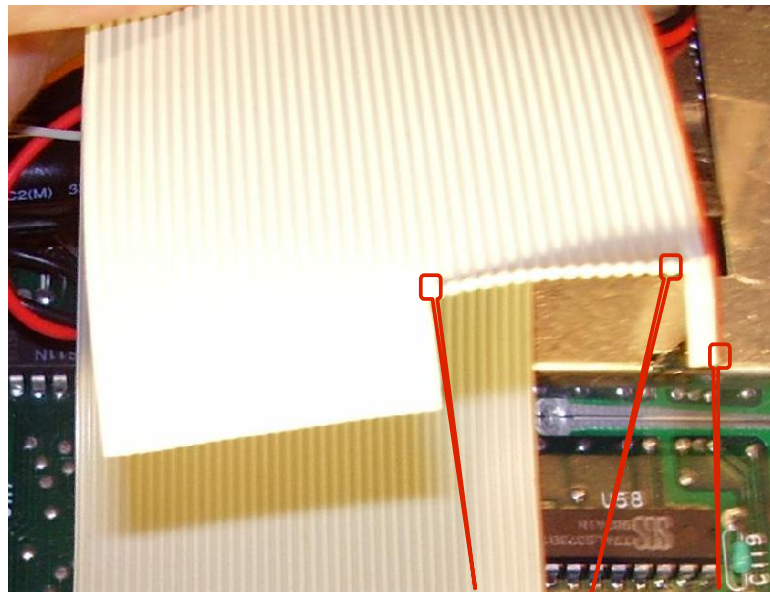


Solder pads to connect a BLUE LED

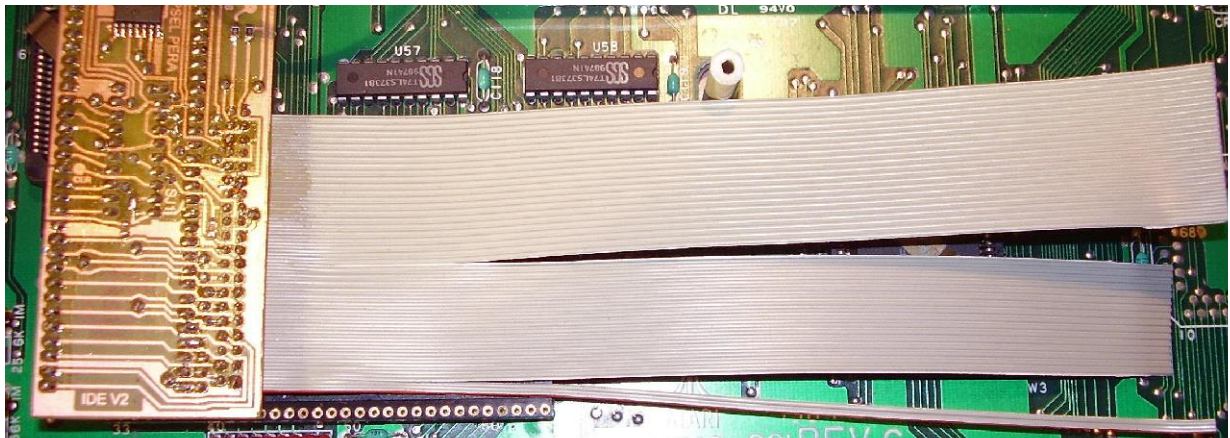
Ready made PCB (bottom view):



Prepare the other end of cable:

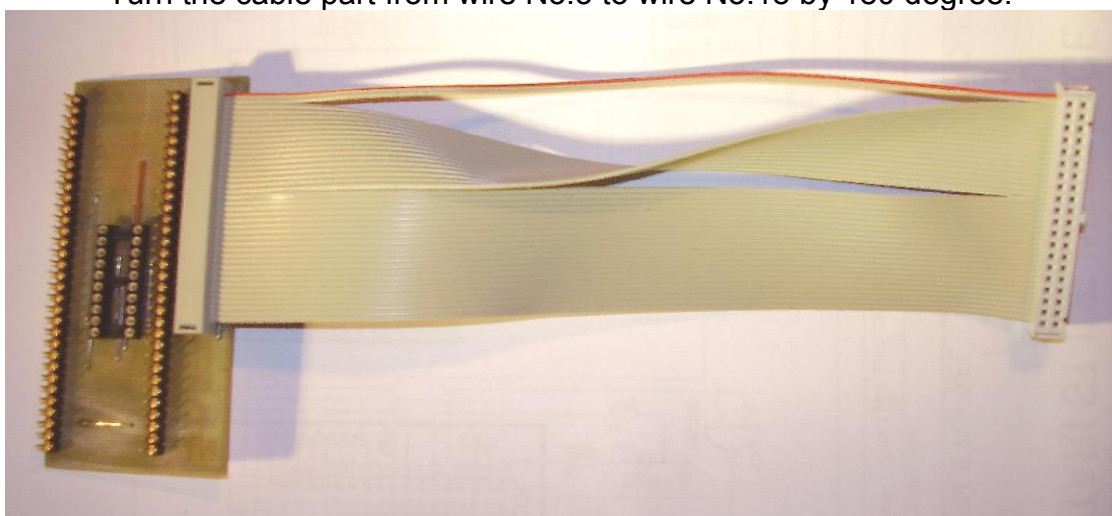


Wire 18 3 1
Cut after wire No. 2 and wire No. 18



Mounting the IDE plug:

Turn the cable part from wire No.3 to wire No.18 by 180 degree.

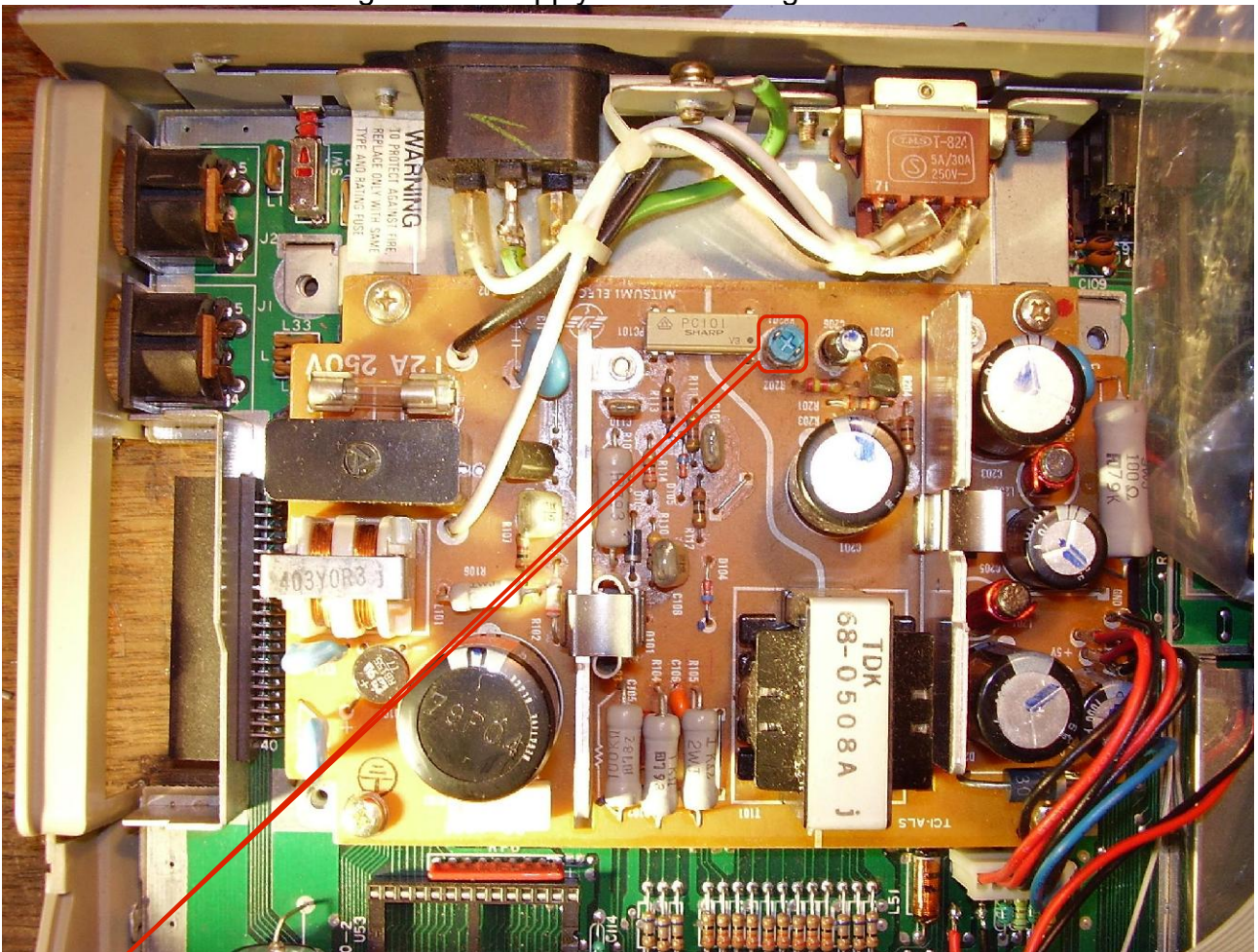


Pin 1 of the IDE connector is marked with a little triangle.
The wires 1...2 and 19...40 must be connected without turning.

Prepare ATARI ST (overview):



Setting the +5V supply to 5.15V using a Volt-meter



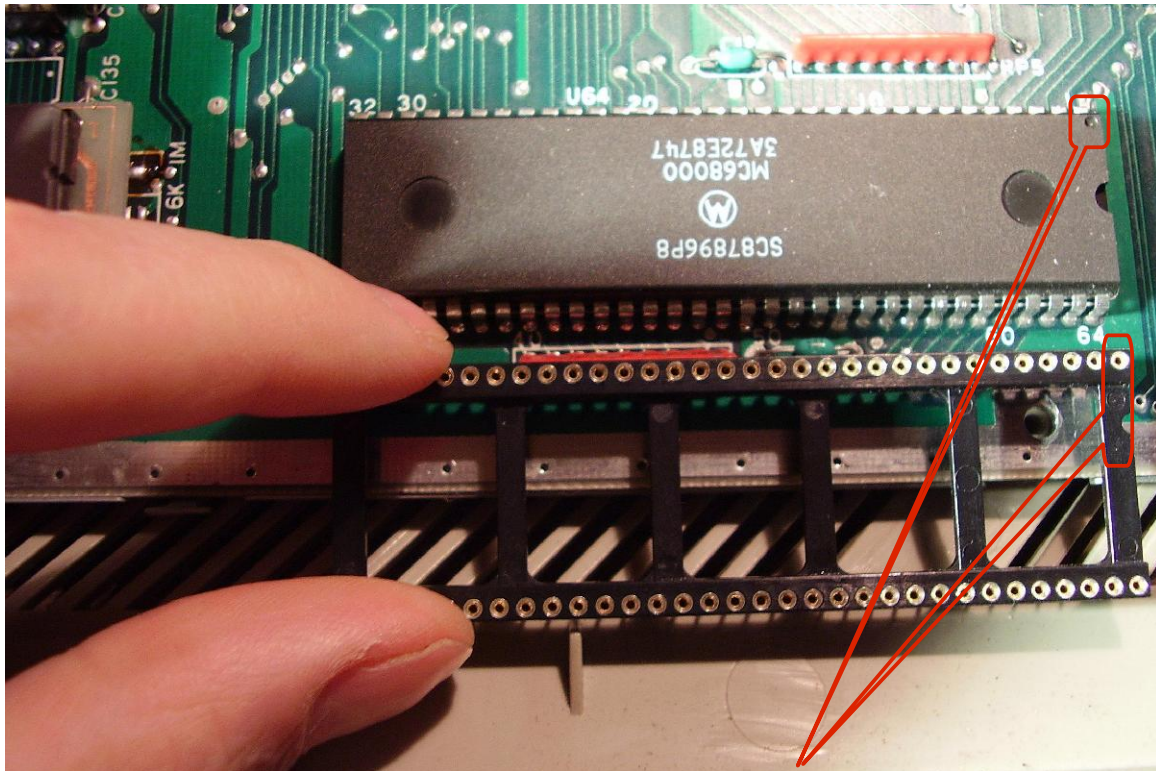
Turn the variable resistor very slow while measuring voltage in the same time.

Red wires are +, black wires are -

Don't make this modification if you have not enough knowledge.

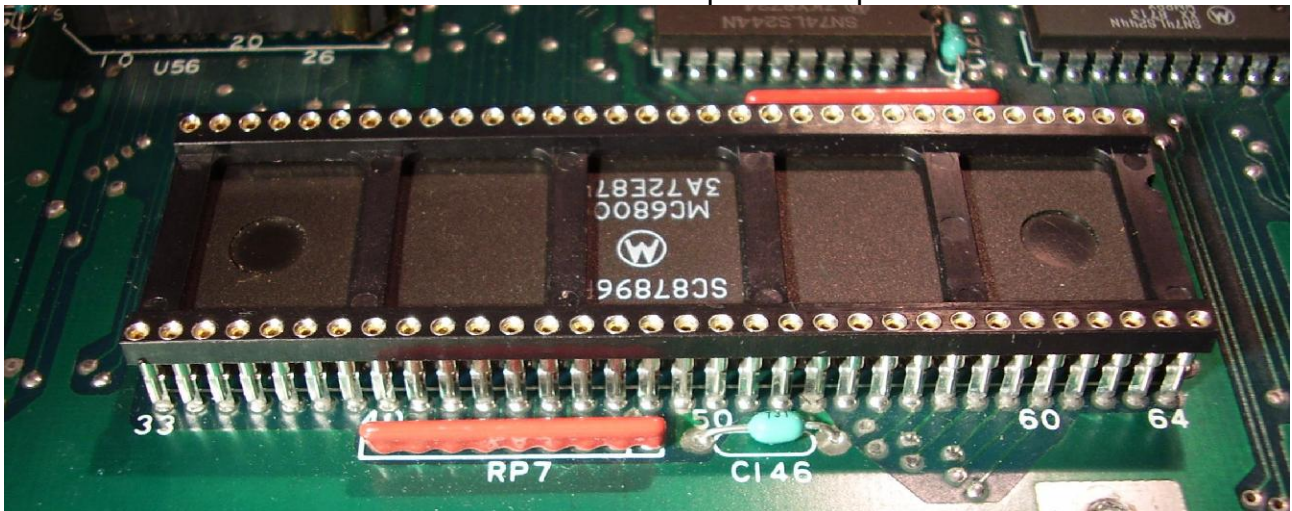
Be very careful with PSU. There are high and dangerous voltages. You can get an electric shock if you touch wrong parts.

This is the CPU (MC68000):

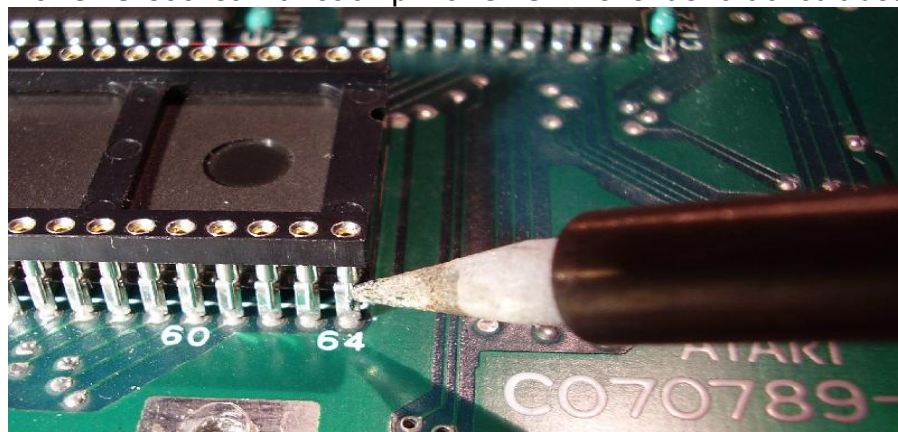


PIN 1

Put the CPU-socket without space on top of CPU:

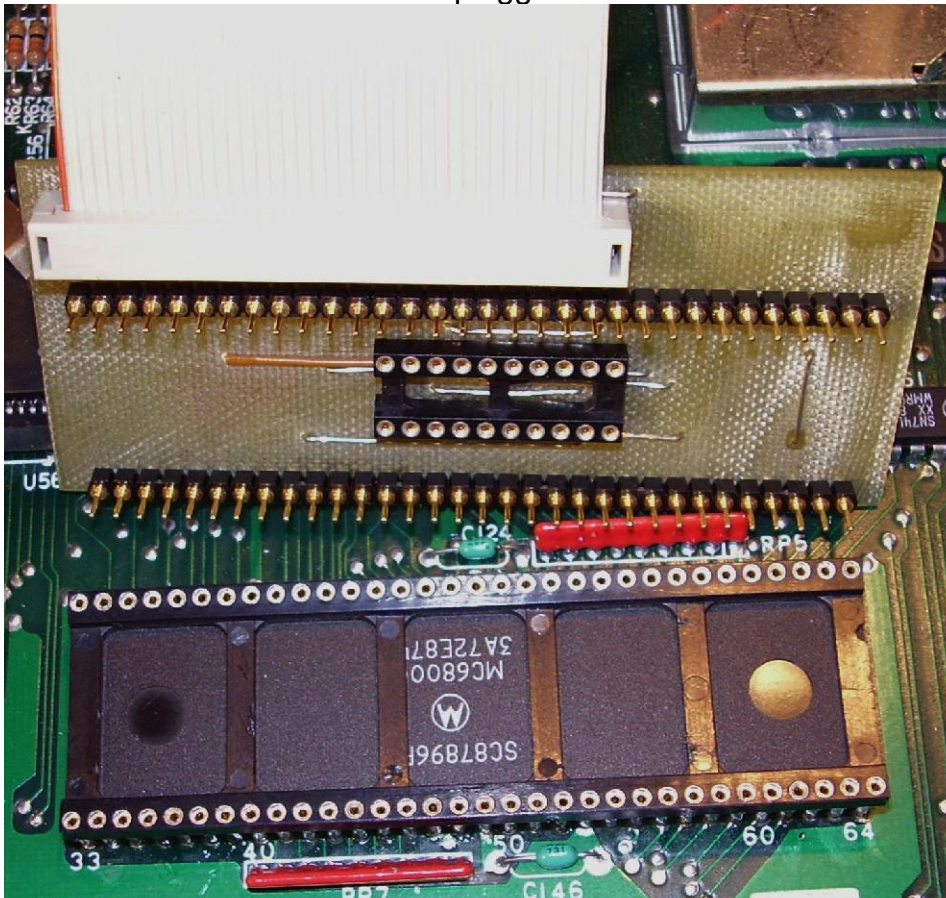


Solder each pin of CPU-socket with each pin of CPU. Prevent short circuit between pins:



After soldering the CPU-socket check again for short circuit. If you are sure that everything is OK switch your ATARI ST on (without the IDE interface) and check function. Everything should work as usual.

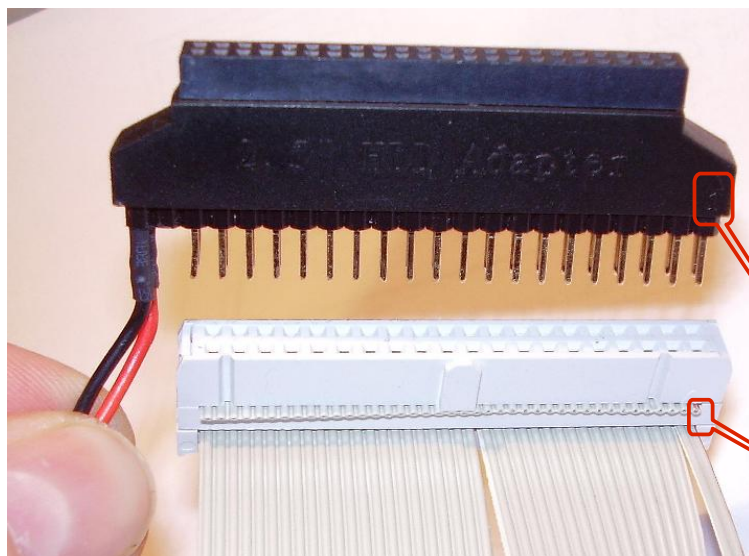
The IDE-Interface can be plugged into the CPU-socket:



Yes, without GAL it can not work ;-)

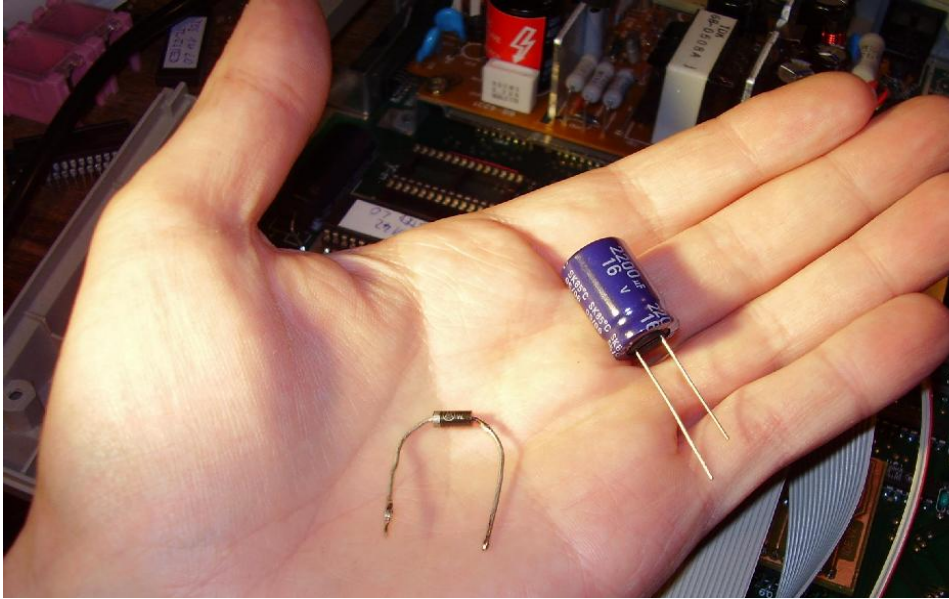
In V1.4 the programmed GAL should be already soldered into the IDE-interface PCB. Take care about right direction (see plans) and that all pins have contact with their corresponding pins of CPU-socket. Check both ends that there are no pins going into air after you have plugged the IDE-interface into the CPU-socket.

If you want to connect a 2.5" notebook HDD then you need this adapter:

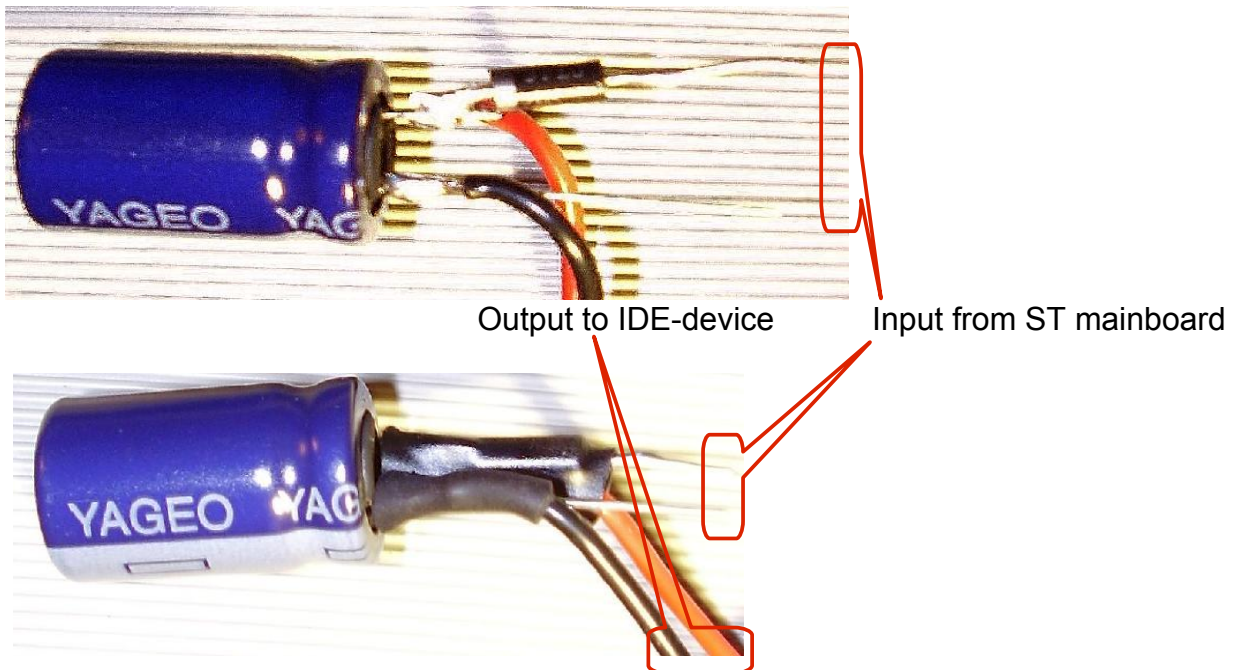


PIN 1

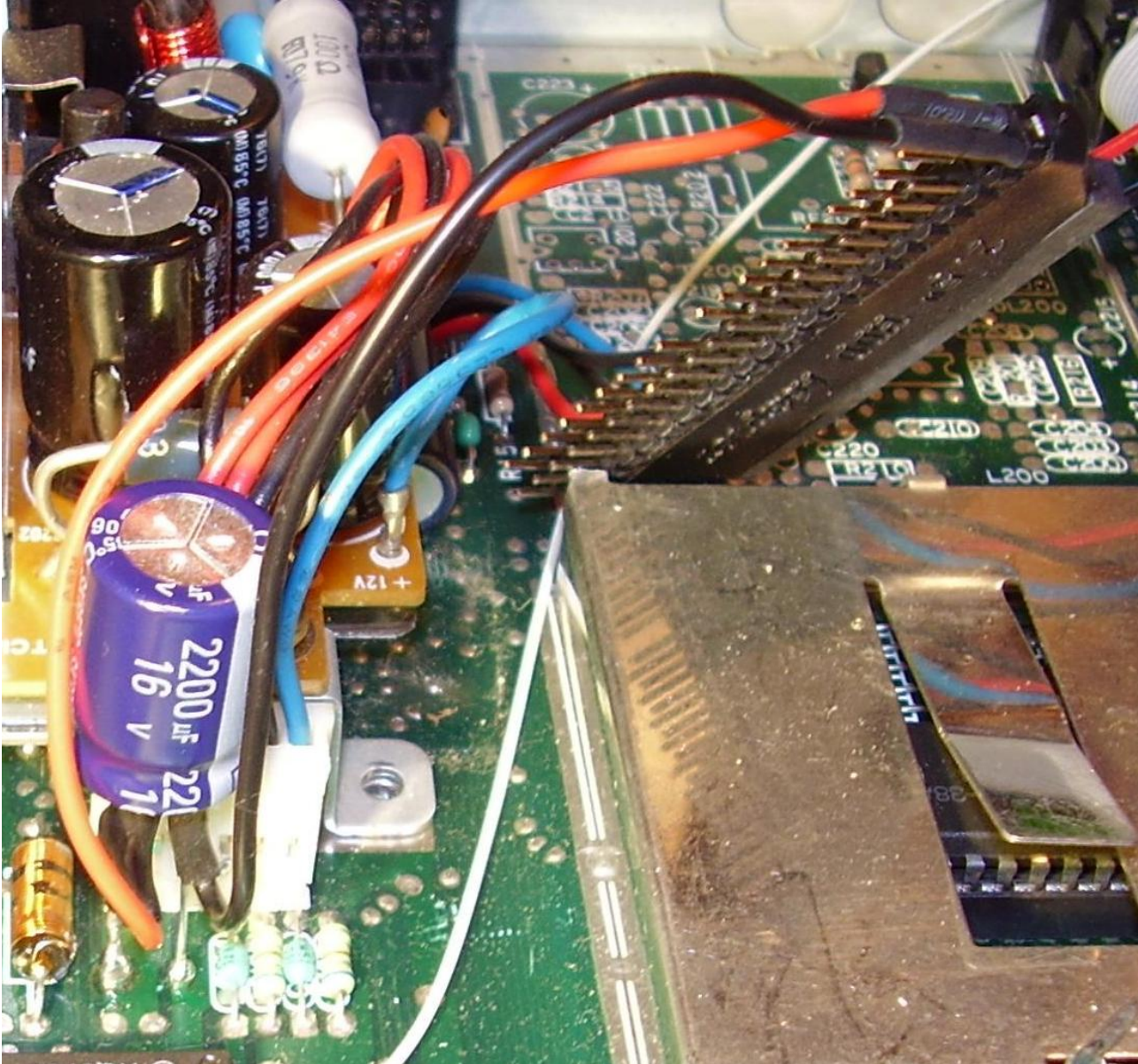
Building a power-filter for the IDE-device:



While intensive tests with this IDE-interface I discovered that it can appear read & write errors after copying about 4000 files. The IDE device (HDD or CARD) can disturb the stable function of the ATARI ST computer. I recommend to add this simple power-filter to get a stable function. This filter has some advantages: It decouples IDE-device power from ATARI ST mainboard and prevent negative influence of IDE power peaks to the ST. The capacitor buffers the IDE-device power. After adding this filter I never got faulty files again (tested by copying and verifying 16000 files!)

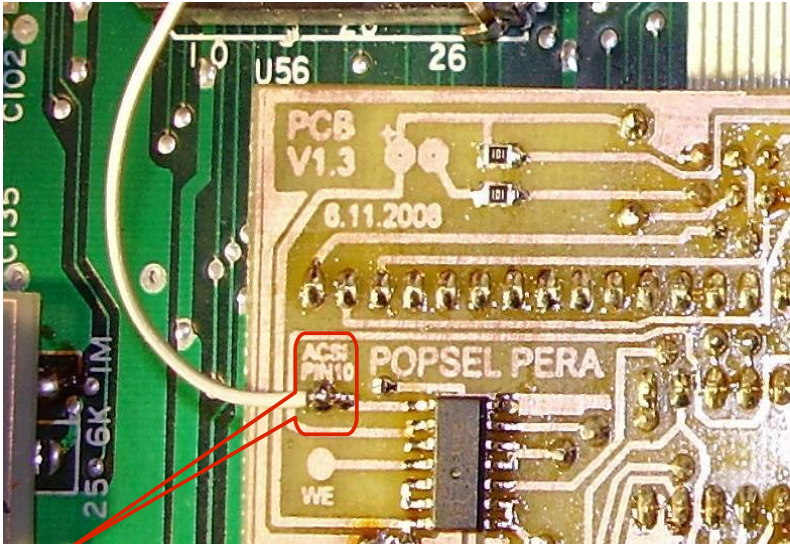


Built in power filter:



Measure the +5.15V before soldering the filter and take care about polarity: red is + and black is - (GND)

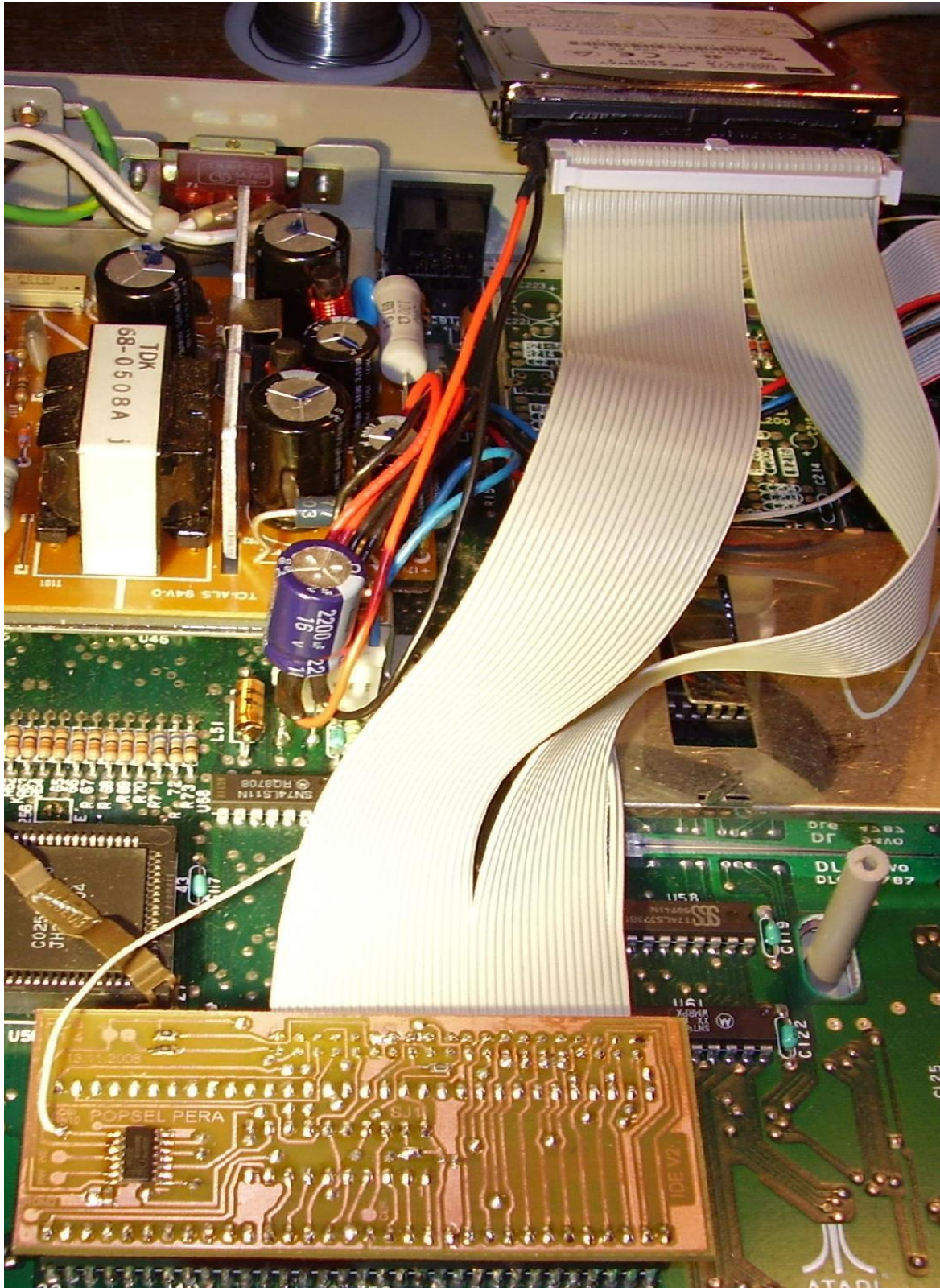
Connect the ACSI wire:



This wire must be soldered to ACSI-port, pin No.10

Ready made IDE-interface:

There is an option to use a Compact Flash card with adapter, instead using a HDD.



PPERA offers a software guide, how to setup and use this IDE interface.

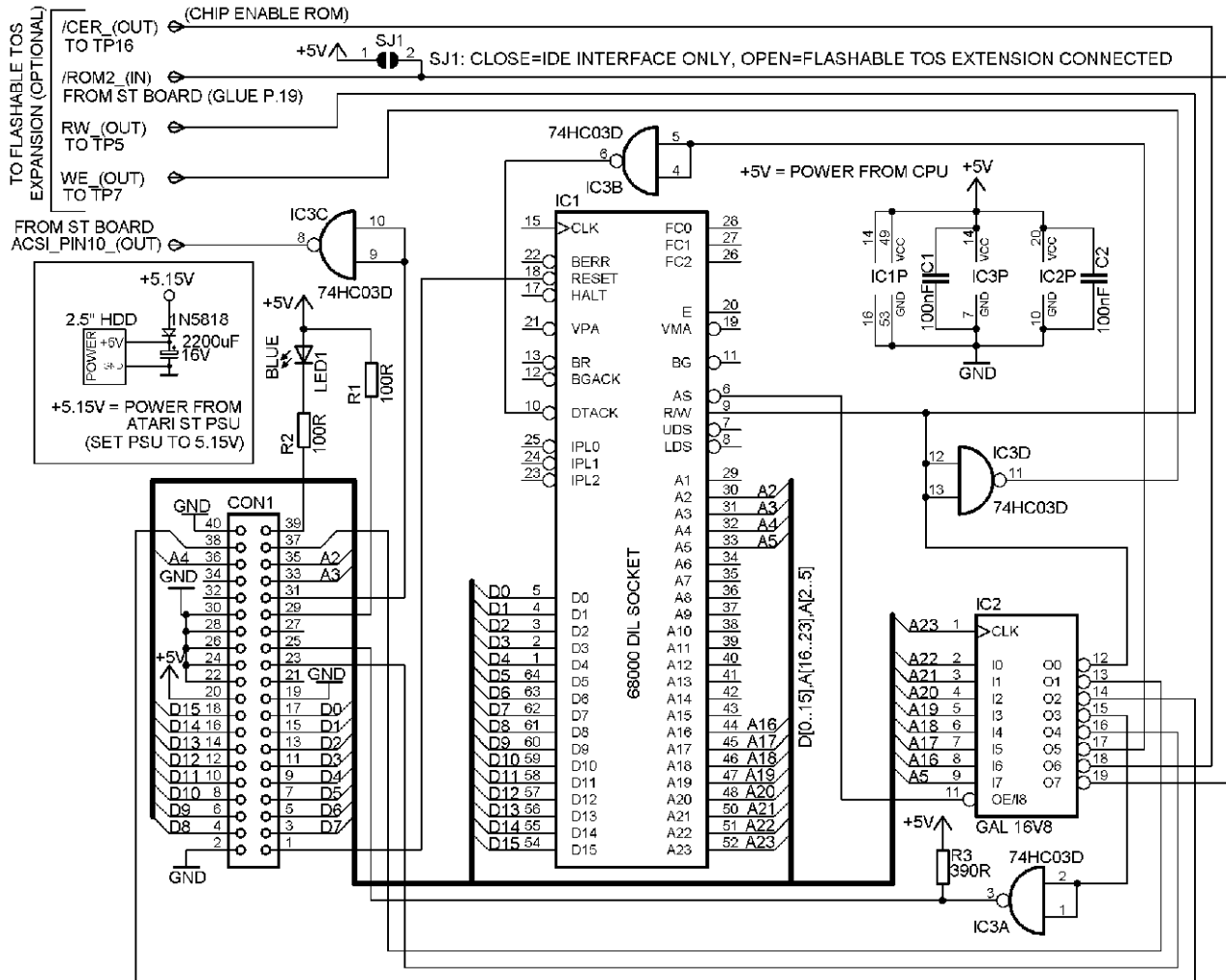
ATARI ST IDE INTERFACE V2.00

FOR 68000 DIL CPU

PCB REVISION 1.4

PPERA & POPSEL

13. NOVEMBER 2008



PARTSLIST

Menge	Wert	Device	Bauteile
1		CON40L	CON1
1		LED5MM5MM	LED1 BLUE
1	74HC03D	74ALS03D	IC3 SMD
2	100R	R-EU_R0805	R1, R2
2	100nF	C-EUC0603	C1, C2
1	390R	R-EU_R0805	R3
1	68000 DIL SOCKET	MC68000P	IC1
	1	GAL 16V8	16V8 IC2

Some isolated thin wire

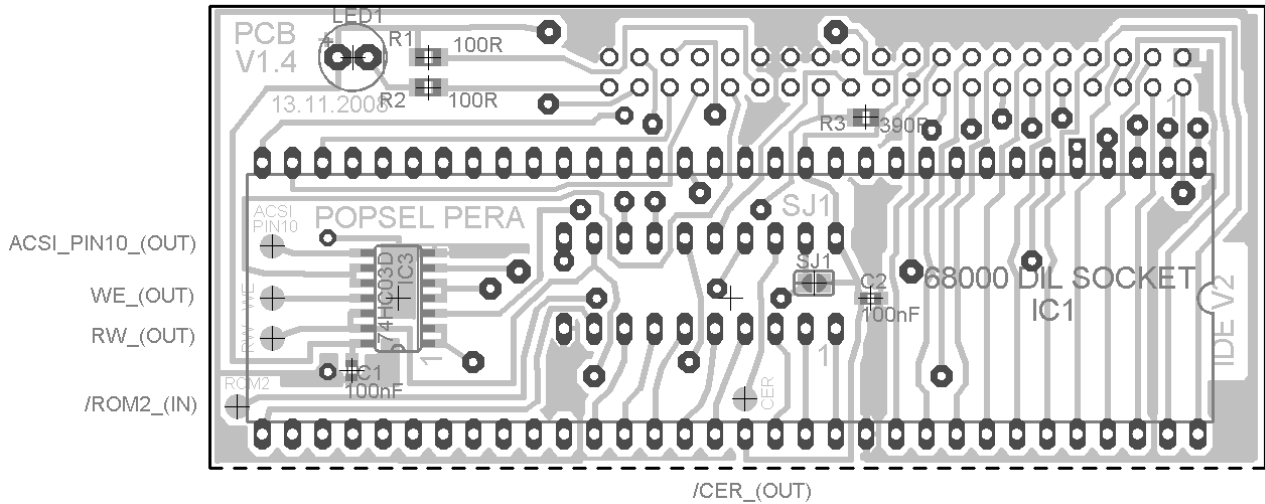
ATARI ST IDE INTERFACE V2.00

FOR 68000 DIL CPU 13.NOVEMBER 2008

SINGLE SIDED PCB REVISION 1.4

POPSEL & PPERA

TOP VIEW



ATARI ST IDE INTERFACE V2.00

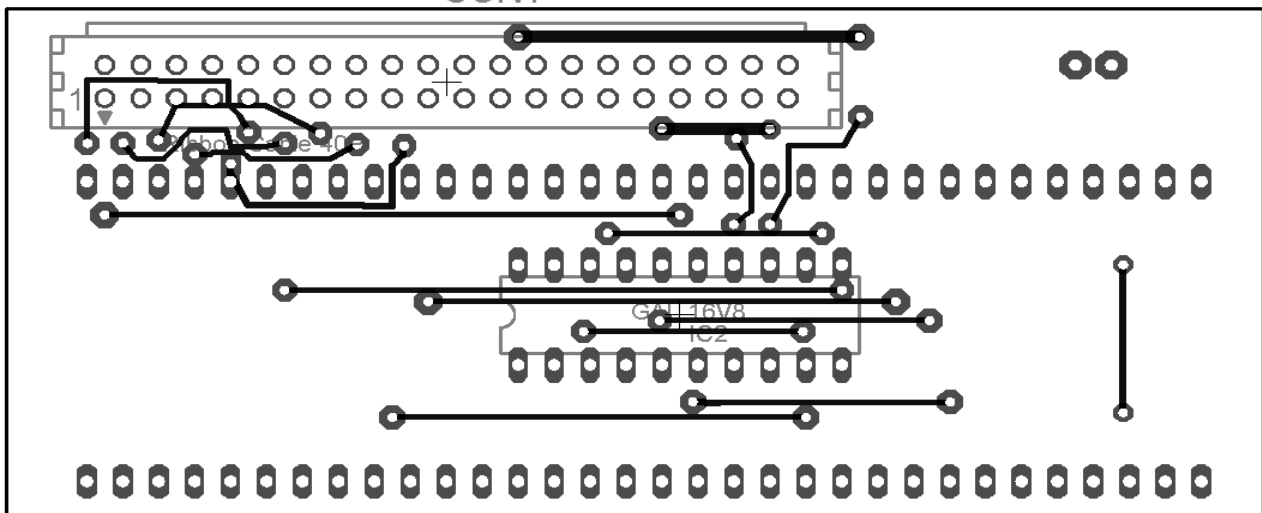
FOR 68000 DIL CPU 13.NOVEMBER 2008

SINGLE SIDED PCB REVISION 1.4

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BOTTOM VIEW

CON1



Why building this project ?

Nowadays SCSI harddisks suitable for ATARI ST are hard to find (here in Germany) and very old. The needed SCSI controllers for Atari ST are even harder to find and expensive. There are no SCSI-cards and no small 2.5" SCSI harddisks available. You can get only expensive SCSI-IDE adapters or SCSI card readers. Data exchange with PC is not so simple as by CF or SD cards.

Our solution (PPERA and me, POPSEL) is:

- * Cheaper
- * Can be build at home
- * Needs less components
- * Is smaller (fits all into a 1040 ST case)
- * Offers better flexibility
- * Gives a higher speed than ACSI
- * Offers more than one TOS (optional)
- * Adds TOS 2.06 support (optional)
- * Comfortable to use
- * Silent operation if using a CF card

Information for building the IDE INTERFACE V2.0

This is again a common project of PPERA & POPSEL.

Using this interface one can connect IDE harddisks or most

Compact Flash cards (in)to ATARI ST computers.

It is possible to build a 2.5" notebook harddisk into a 1040ST case.

With some modifications maximum speed of ATARI ST hardware is available.

Normally only TOS 2.06 is able to boot from IDE.

PPERA found even solutions to boot from IDE with a patched TOS 1.4 or KAOS 1.4.2

An other big advantage is the ability to use up to 14 DOS (FAT16) compatible partitions for easy file transfer with PC at maximum speed.

So one can copy data with PC onto harddisk / CF-card which can be used by ATARI and vice versa.

This offers a maximum of 14 partitions with 2GB each = 28 GB total harddisk space, even with TOS 1.4 or KAOS 1.4.2

To get the highest maximum speed we need some special tricks:

- * Partitioning of harddisk or CF-card on PC as type FAT16
- * A special IDE-cable

- * A patched TOS
- * A special harddisk driver (PPERA's)
- * Freeware program BIGDOS in AUTO folder

To learn the details about setting up the software and usage

Ppera offers a separate software guide for this project.

Due to many ATARI mainboard versions I wanted to create an

IDE Interface as small as possible.

Now you can choose between two IDE Interface PCB versions:

There is one single sided PCB (some wires are required on bottom side).

Beside there is a double sided PCB version (no wires, not so easy to build).

Both versions have the same function. They are optimized to build at home.

The double sided version uses vias to make contact between layers.

The vias are big enough to solder at home.

There is no need to solder under components.

Minimum hardware on ATARI ST side is a patched

TOS (1.4 or KAOS 1.4.2) and the IDE Interface V2.00.

This function is expandable with a special version of FLASHABLE TOS.

IDE-INTERFACE V2.00 FLASHABLE TOS

This is an expansion for the IDE V2.00 Interface. So the IDE V2.00 Interface

can be used single or in combination with FLASHABLE TOS. If you want a

single Flashable TOS there is already a solution for this available.

What can you do with a Flashable TOS ?

A TOS can be changed without opening the machine by programming

with PPERA's special software by using re-programmable EEPROM chips

for TOS instead of ROMS or EPROMS.

There is enough space to keep up to 4 TOS versions in two EEPROM chips.

Further there is build in support for TOS 2.06.

With this IDE-INTERFACE V2.00 there are several, bootable, TOS versions available.

TOS versions below TOS 1.4 can only be used with Flashable TOS and floppys, because

they have too many errors to use it with a harddisk / CF-card.

To keep switching between TOS versions simple this task is managed by a very small

AVR-controller. This offers several functions with only one momentary switch.

- * Switching between TOS versions
- * Activating and deactivating of hardware write-lock for TOS EEPROMS
- * TOS-locking to prevent unwanted switching of TOS while computer is in use
- * Optical feedback with a DUO-LED to show the state & function

Get more information by looking at the FLASHABLE TOS EXPANSION folder.

How to build this hardware ?

To build this project there is a separate guide with a lot of photos available.

Nearly every step to build it is shown on a photo with comment.

In some cases the sequence of soldering is important.

THIS IS A CLOSED PROJECT.

No more extensions will be made (expect bug fixes, if there are any).

For further information please take a look at Ppera's site:

<http://ppera.07x.net/atari/>

If you have questions you can contact me:

www.atari-forum.com

or

popsel @ yahoo.de

or

ICQ #195520754

Thank you, Ppera, for support & software.

Regards

Popsel