ALICIA 1200

PCB Rev 1.6

& Alicia-II Limited Edition 2.0

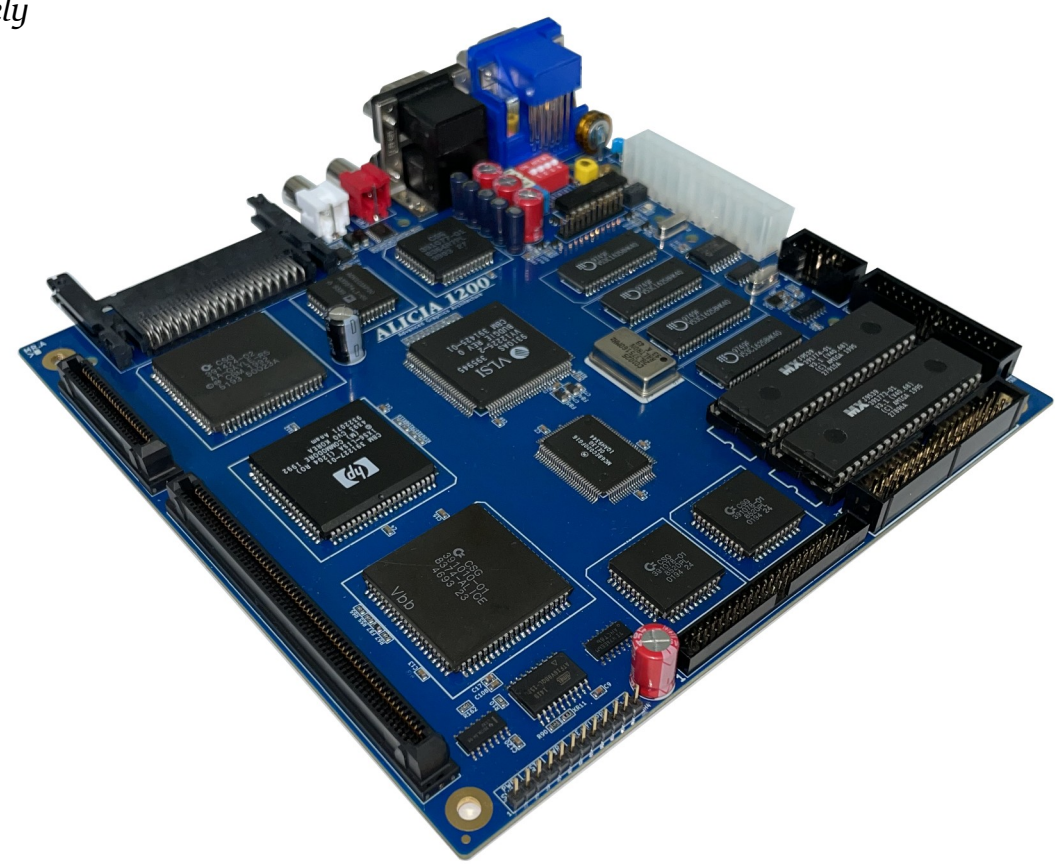
Manual

Foreword

This circuit board was developed out of a passion and love for my favorite computer that I grew up with as a teenager. I earlier had both C64, & A500+, which I still like very much too.
For me, it is a way to extend the life of the computer by being able to build a new motherboard with new and NOS components. It is also a way to relive the magic and joy it gave me during a time fraught with difficulties. Back then, I often looked longingly at the big-box computers with detachable keyboards and better expansion options. Now I had a couple of AGA chipsets lying around and an opportunity to create a machine exactly as I wanted it: small and stylish, but with good expansion options without fragile piggyback solutions and, of course, a separate keyboard.

Special thanks go to Stefan "shoe" Nordlander for all his support, help, management, and cheerful encouragement. Without him, there is a high risk that it would have remained a prototype on the shelf. A big thank you to John Hertell for help with troubleshooting & Diagrom. Also a big thank you to beta testers KarlosJackel & Vincent Price. And of course greetings to Highpuff, Skuggan, Johey, Z-Nexx, Morot, Claude, Evila, El-Nikko, Patrik, Khayoz and all other friends in the community.

Have fun building this machine, and I hope it brings you as much joy as it has brought me.
Yours sincerely
Mr. A



Features

1 x PS/2 connection for PC-keyboard or A4000-keyboard. (Selectable with just one DIL switch)

1 x PS/2 Connection for PC-Mouse with autoswitch between mouse and joystick. Multi-button and scroll wheel support.

2 x Joystick connectors.

1 x Serial port on header (DB9)

1 x Parallel port on header (DB25)

2 x RCA connectors for audio.

1 x PCMCIA-port (16-bit)

1 x Video port 15-kHz VGA HD15. Video filter to eliminate vertical lines and other interference. It provides stunning picture quality on both CRT monitor and 15kHz TFT. C-SYNC & SCART signals are selectable with DIL switches.

1 x Internal connector for Floppy diskdrive with some extra features. Contains signals to break out more disk drives. Autosense if drive is not connected to save boot time.

1 x 120-pos Local Bus (Tornado II) Pretty much signal-compatible with the Ami1200 CPU slot. Also has important signals to make a simple (non-DMA) ZII slot. The pin placement is similar to the Ami1200, so a card-edge adapter is easy to implement.

1 x Video Slot with important signals for scandoubler etc. Contains all signals to recreate a simpler version of the A4k video slot. Contains a built-in video switch, allowing a scandoubler or RTG-card to automatically switch its signal to the motherboard's VGA connector and also through the video filter. No external cables or connectors required.

1 x IDE 2.5” connector (non buffered)

1 x Clock Port connector Ami1200-compatible and strategically placed.

Pin header for connection of power button, reset button and LED:s for power, floppy, IDE & PCMCIA

24-pin standard ATX-power supply connector

Realtime Clock backed up by ATX-standby power-rail and supercap.

68EC020 CPU Onboard and 2Mb Fastpage CHIP-MEM

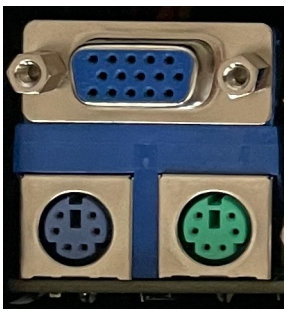
ESD protection on IO-ports like Joy/Mouse, Parallel port etc. Protects them rare precious custom chips.

Many minor fixes have been made, such as a pure pcmcia reset fix, timing fixes, improved vbb caps, better decoupling & power rails to custom chips, etc. Great care has been taken in the planning and routing of clock signals, control signals, and buses, and resistors have been tweaked on transmission lines.

The entire audio-signal chain from Paula is built with high quality film capacitors and audio grade electrolytic capacitors. The filter has the same characteristics as an Ami500 Rev8. But less distortion.

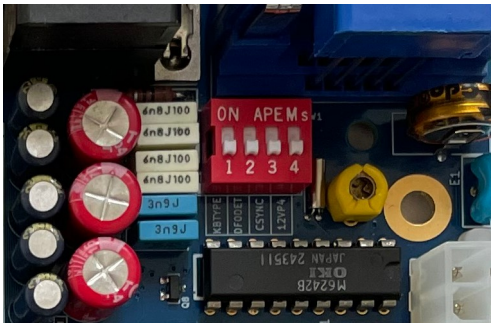
Manually routed multi-layer PCB ensures good signal integrity and makes it less susceptible to electromagnetic interference. Sturdy power-rails with plenty bulk-capacitance to support power demanding accelerator cards such as 060-cards.

Video-port



You can connect a VGA monitor directly to the motherboard if it supports 15 kHz.
If you want to connect a video monitor or SCART TV, you must build your own cable and activate the respective signal on the DIL switch.
There is both a built-in video filter and monitor switch on the motherboard. So with a future Scandoubler/Flickerfixer or RTG card, it can automatically switch to the motherboard's VGA connector and also utilize the filter that removes vertical stripes and other interference.
The SYNC signals are already buffered, so no external adapters are needed.

Below is a table showing how the DIL switches should be set.



VGA-Monitor:
DIL-Switch 3:Down
DIL-Switch 4:Down
Important! Ensure that both are down (off) when using a VGA monitor.

Video-Monitor (C1084/8833-II):
DIL-Switch 3:UP
DIL-Switch 4:Down
This puts C-SYNC on pin 12. Most video monitors need that instead of hsync & vsync.

VGA-Pin	Connect to	DB9-Pin
1 (RED)	--->	3 (RED)
2 (GREEN)	--->	4 (GREEN)
3 (BLUE)	--->	5 (BLUE)
5 (GND)	--->	1 (GND)
6 (GND)	--->	2 (GND)
7 (GND)	--->	1 (GND)
8 (GND)	--->	2 (GND)
12 (C-SYNC)	--->	7 (C-CYNC)

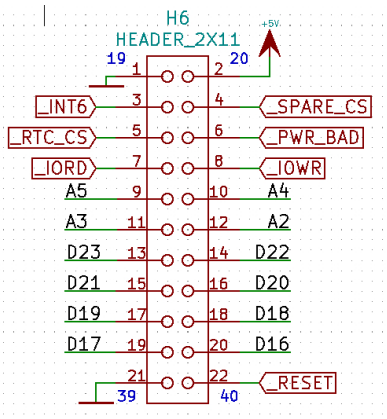
SCART-TV (RGB-Video)
DIL-Switch 3:UP
DIL-Switch 4:UP
This puts C-SYNC on pin 12.
And 12V through a 4k resistor to pin 4. Needed for Status & Aspect Ratio (+9.5–12 V → on/4:3)
(To clarify, the resistors are already on the board; the cable does not require any additional components.)

VGA-Pin	Connect to	SCART-Pin
1 (RED)	--->	15 (RED)
2 (GREEN)	--->	11 (GREEN)
3 (BLUE)	--->	7 (BLUE)
4 (+12V 4k Ohm)	--->	8 (Aspect)
5 (GND)	--->	18 (GND)
10 (GND)	--->	17 (Composite GND)
6 (GND)	--->	5 (GND)
7 (GND)	--->	9 (GND)
8 (GND)	--->	13 (GND)
9 (+5V 75 Ohm)	--->	16 (RGB Sel)
12 (C-SYNC)	--->	20 (C-SYNC)

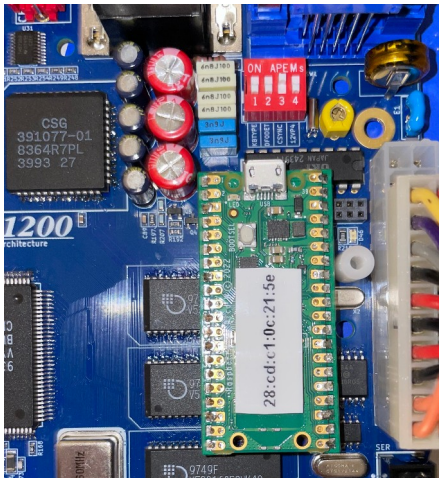
Pinouts

Clockport

Ami1200 compatible and with the same pinout. Note the orientation and pin 1, which is actually pin 19.

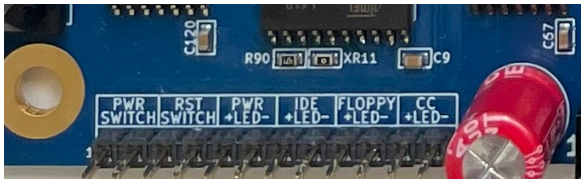


Shown here is a PicoWyfy that fits perfectly without an extension cable or other accessories.



H4 Pinheader

This is where chassis buttons and LEDs are connected. From left to right, they have the following functions:
Power on/off button: after switching off, it can only be switched on again after one second has passed.
Reset button: resets the motherboard.
Power LED
IDE Activity LED
Floppy Drive Activity LED
PCMCIA Activity LED
(No resistors are needed for LEDs as they are built into the motherboard.)



Keyboard Select

The DIL switch on the left-most side selects keyboard type.
Up = A4000-keyboard
Down = PC-keyboard

Floppy-Connector

XR2: Mount 0R to put _MTRX on NC-pin 6 of the floppy-connector.
XR3: Mount 0R to put _IORESET on NC pin 14 of the floppy connector.
These signals are required if you want to break out more disk drives on one cable or build an adapter for an external floppy drive. If you plan to have only one internal drive, you don't need to mount XR2 and XR3. All drives I have tested don't have anything connected on these NC pins so most of the time they can sit there anyway.
The ATtiny MCU can detect if there is a drive connected. It does this by checking Pin 5 which should be GND. In the drives I tested it has been GND. But it is possible that there are drives where not all GND pins have been connected. Then the MCU thinks that there is no drive connected and signals incorrectly to the system software. The purpose of this feature is to avoid waiting for the computer to boot without a floppy drive connected. And you also avoid the annoying icon with lots of ???.
If you happen to have a problem drive, you can turn on (up-position) the second DIL switch from the left. This overrides the detect function. KS3.2 has its own way of disabling DF0: if you use that, the switch should also be on.

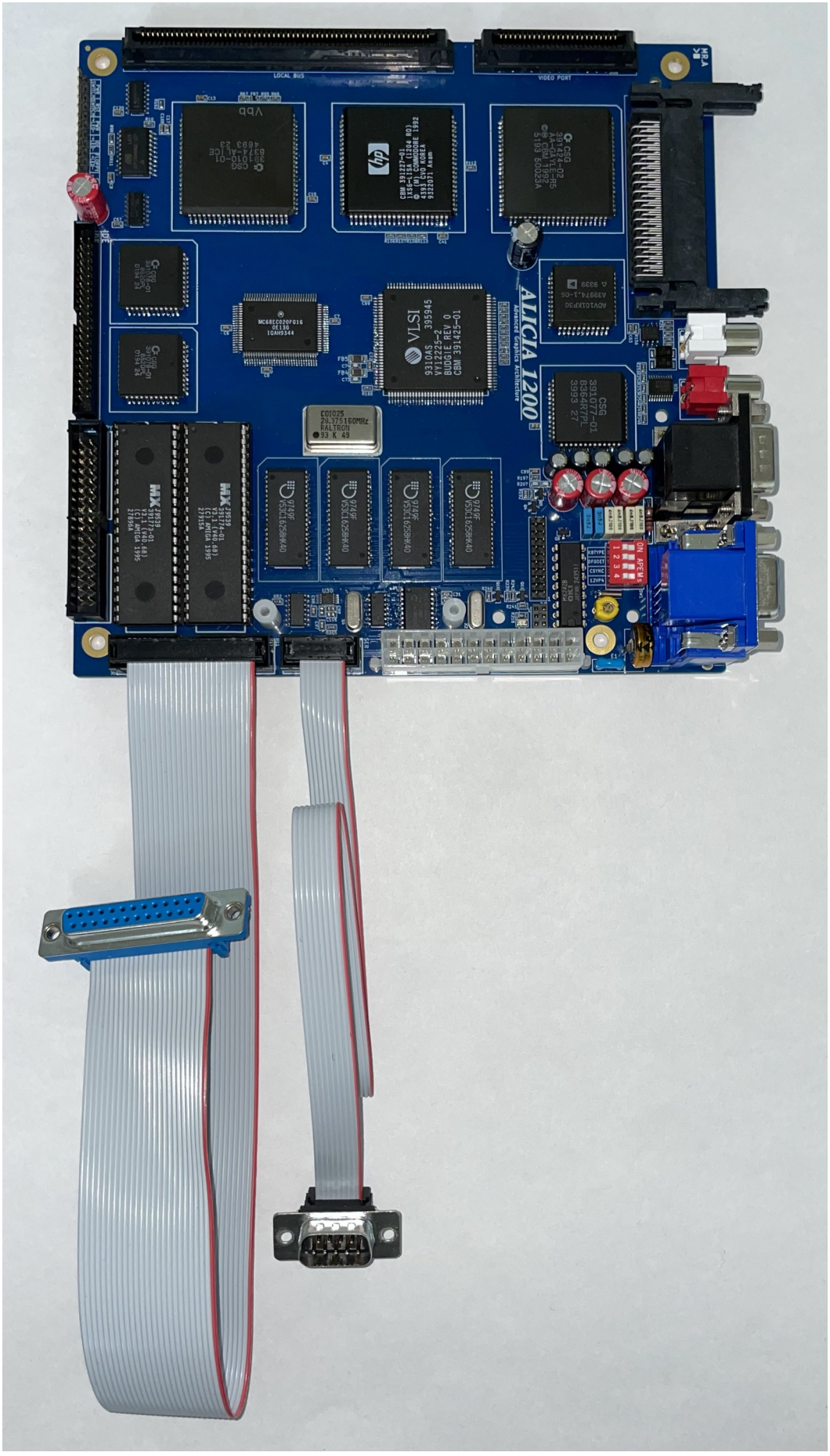
Serial and Parallel Ports

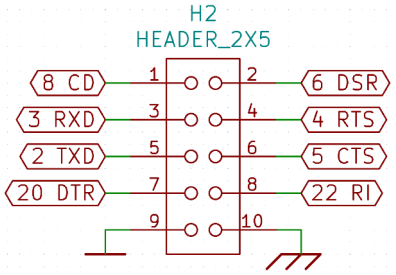
Based on headers, it provides a 25-pin parallel port and a 9-pin serial port.

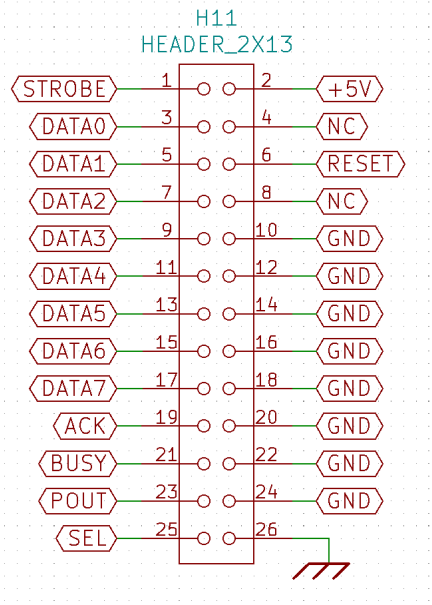
The connector is IDC-style, so be careful when buying a ready-made cable, as there are at least two standards.

You should get a cable that is IDC standard or you can easily press your own cables with a bench vise.

This is what it may look like.



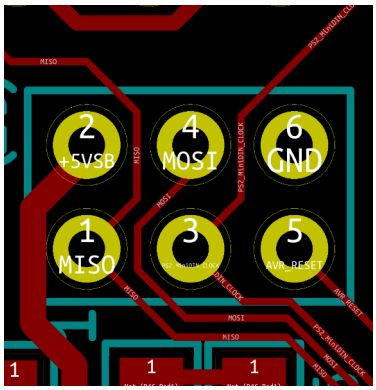




Build

The circuit board is fairly easy to build if you have previous experience with surface-mounted components and PLCC capsules.
But it's not for beginners, as it can be difficult to troubleshoot if something goes wrong.
Don't use sockets! They usually don't work well and will cause issues.
Don't forget to break off the PCB panel edges before installing connectors, etc., as they can be difficult to remove later.
Assemble all surface mount components first.
Wait to mount connectors. They are not needed for test run.
For test running you only need the video connector.
Don't swap 74HC for HCT etc. It won't work. Different logic families for certain functions are chosen for good reasons. Do not change the electrolytes to something else. There is a reason they are low profile.
In short, don't swap components in the parts list unless it's necessary or you're sure what you're doing.

Choose a good quality power supply; more watts does not necessarily mean better. Search the web for recommended power supplies for retro computers.
A poor power supply can cause computer instability or image interference. Or problems with accessories.
Some Pico PSUs can be noisy on the chassis ground. In this case, it may be necessary to isolate its connector.
Use a good quality VGA cable and avoid KVM switches.



All programmable circuits (there are four) come pre-programmed and are carefully verified one by one. So if you have a problem, it is wise to check everything else before even suspecting a problem with these.
If you need to update the firmware in ATTiny (U12), there is an ISP header with standard pinout for AVR-ISP-MKII but smaller.
The DIL switch on the left-most side must be up, and no keyboard or floppy drive may be connected while programming.

Some hard drives require a warm reset to start up.
There is a experimental firmware that performs a double reset during a cold start, which fixed the problem on my hard drive, at least.
The pre-programmed firmware mimics the startup in an Ami1200 very closely and does not have this function as default, as we do not yet know if it affects anything else. (See the additional documentation for the firmware that came with your card. Since the firmware has been thoroughly tested at the time of updating this document)

Miscellaneous
The D46 LED lights up when the computer is turned on via the power switch. It draws power from the 3.3V rail and is the only component on the board that runs on 3.3V. In rare cases, the power supply will not start with too weak a load.
CD32-Joypads work, but it's one thing to keep in mind. In joystick port 2, CD32-Joypads works together with a PS2-mouse, but if a pad is also connected in port 1, a PS2-mouse cannot be connected at all.

Several builds, including myself, have successfully mixed different revisions of custom ic:s. The most noticeable is Budgie rev.1. All combos have worked flawlessly so far and without any patches.

Chip-RAM
There are many different DRAMs that are compatible. It should be a Fast page mode (FPM) DRAM in a standard SOJ40 capsule. Many EDO DRAMs are compatible.
These have been tested and work:
V53C16258HK40
IC41C16257-35K
NEC42460-80
TC514265DJ-60
KM416C256BJ-7
VG264265BJ

Testing with Diagrom
Key presses can be slow, especially if you are using a PC keyboard.
This is normal and you can also use the mouse.
Some graphics tests may freeze occasionally. They do this on all C= A1200s we have tested under exactly the same circumstances. So this is to be expected.
With the reservation that these things are updated in newer versions of diagrom.
In all other respects, there should be no irregularities, and all tests should function normally.

Expansion cards that have been tested either by ourselves or by beta testers
(With Tornado-II to A1200 Card Edge Adapter)
ACT/Apollo 1230 Turbo Mk3 (Winner 1230)
Blizzard 1260
Blizzard PPC
Terrible Fire 1230
Terrible Fire 1260

(With Video-Slot to A4000 Video-Slot Adapter)
CompServ / Arxon AGA ScanDoubler

For more in-depth troubleshooting and electrical diagrams, please refer to the relevant documents.
If anything is ambiguous or unclear, the latest BOM for your PCB rev. always applies.