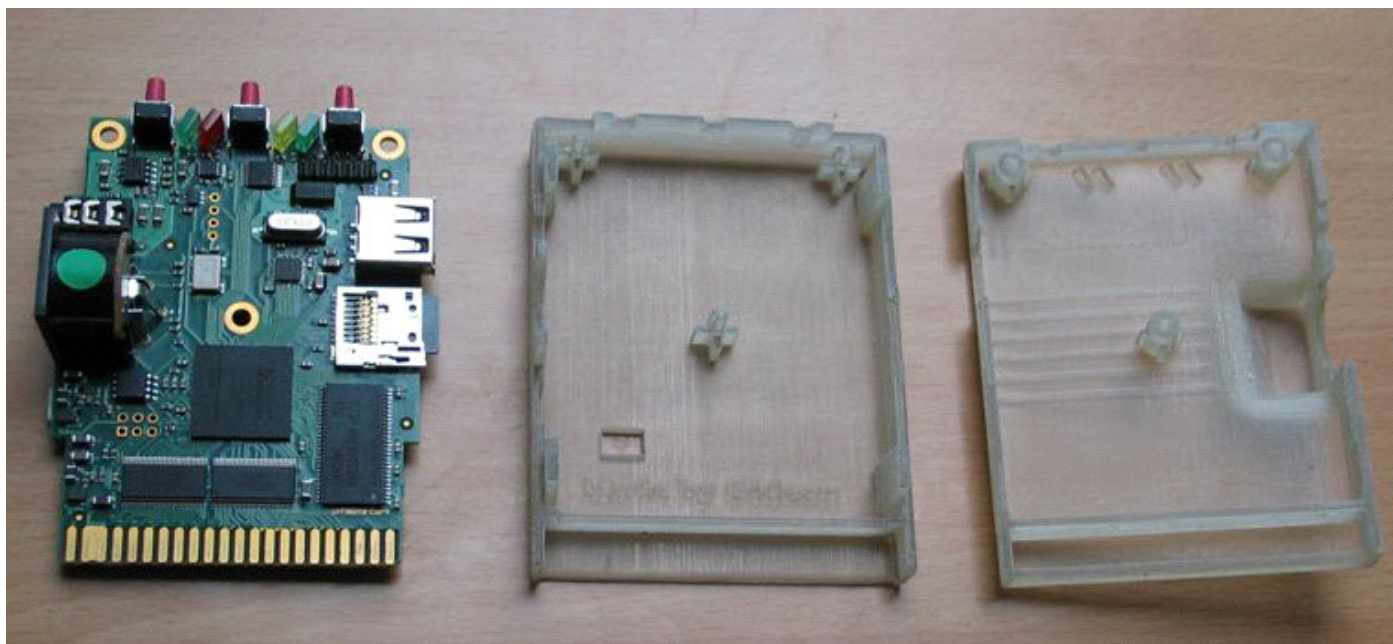


1541 MARK II PROGRESS UPDATE



<http://www.1541ultimate.net>

1541U-II Progress
Hello everyone!

It is about time to release some news about the 1541U-II. I think some of you must be really curious about the extra features and possibilities that the 1541U-II give, and about the progress on production and firmware. To start off with the 1541U-II features, I can tell you that it differs from the 'standard' 1541U Plus/Ethernet that:

- the board itself is about 30% smaller than the 1541U;
- it has a MicroSD connector, instead of a full-size SD;
- it has a real-time-clock function, for correct file time and date;
- it has a larger FPGA, which enables the implementation of more features;
- it has a USB Host port, which can be used to connect USB-sticks;
- it is targeted to have a suitable case for the device.

Some of you have written in the forums, that the MicroSD connector is not much of an improvement. But the rationale behind going to MicroSD is mainly the available space on the board is less, and that with the addition of a USB-A port, the average user will use the USB-stick rather than the SD-card. So the MicroSD-card does not need to be removed from the cartridge very often. However, because at the moment that I announced the 1541U-II, the USB port was not yet tested, I could not reveal this feature as I did not want to make promises that I can't keep. The USB turns out to be quite a bit of work to get it to work, but I can now announce that I managed to implement enough of a host-controller function to be able to talk to USB devices and send the most basic commands to access a mass-storage device. I am quite close to have implemented the 'read-block' and 'write-block' functions, which is the interface level that the file system module uses. In other words, I expect to be able to access the (FAT) file-system on the USB stick quite soon!

How will it work for the user? My objective is to have one 'directory' level above the current root of the SD-card, where you can select which partition you want to browse. There the USB flash drive becomes visible, as well as the MicroSD card, if present.

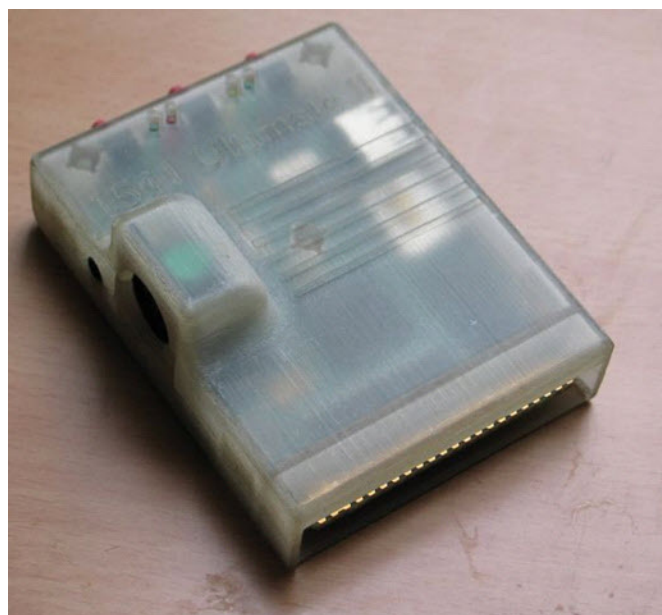
Why has the Ethernet function disappeared? The rationale behind this, is also space. However, another consideration is the shitty interface of the CS8900A chip. This chip is slow and creates quite a challenge to get the timing right on the C64 slot. It works now, but there are quite some tricks to make it work, and it will probably only work in 95% of the cases. Because I want the 1541U to be a quality product, I decided that it would be better to emulate the CS8900A chip in the future inside the FPGA, and transfer the data over USB, by means of an external USB-to-Ethernet converter. This will not only be cheaper, but also more reliable. However, everyone knows that implementation of these things take time, so I am not offering this functionality from the start.

Production status: All components are on stock at the assembly company for 100 boards. Once the PCB is ready, the assembly company will build the boards for me. Hopefully, the case will be done by the time that the boards come, too. The design of the case has been finalized, but to find a company that can make

a mould for this, is quite another issue. I have offers from different companies that differ in price by a factor of 5! It will be a huge investment for me, and therefore I need time to select the right company for making this special case. Therefore, I don't expect the cases before Christmas. :- (For this very reason, I have not yet opened "payment season", because I do not feel good when people pay and have to wait long before I can ship. It gives me a lot of stress.

Some time ago, I already had a prototype made by a company that uses a 3D printer, based on some kind of ink-jet system. Below you can see the result, including the new 1541U-II board on the left. Note, that the final case will *not* be transparent. It will be either black or cream
I hope you will be enthusiastic about the new developments. I would love to hear about your thoughts and ideas, but beware that I can't answer all E-mails. At this moment, I only have 3 days every 2 weeks that I can use to spend time on the 1541U project.

Regards,
Gideon
<http://www.1541ultimate.net/content/index.php>



Commodore Free Talk to Gideon Zweijtzter



Gideon Zweijtzter took time to speak to Commodore Free about his love of Commodore, and the future for his excellent 1541 Ultimate Plus upgrade.

Many of today's Commodore 64 users, enthusiasts, fans and so-called experts will be in their late 20s through to their mid-30s, and remember Commodore's mighty 8-bit from their childhood, especially in parts of mainland Europe where the 64K 'Bread-bid' did particularly well. Gideon is no exception to this rule, introducing himself as "35 and living in the Netherlands" and revealing a typical story by recalling "as a child I was really hooked to the C64 for many years, starting at the age of 9. At the age of 11 I got my first C64 of my own. For some time, I used it for everything, including writing fully laid out documents, using PrintFox, then the Amiga came, and I switched over", and regardless of upgrading to the 16-bit Miggy, it was the 64 that started his love affair with computing, and with the Commodore brand.

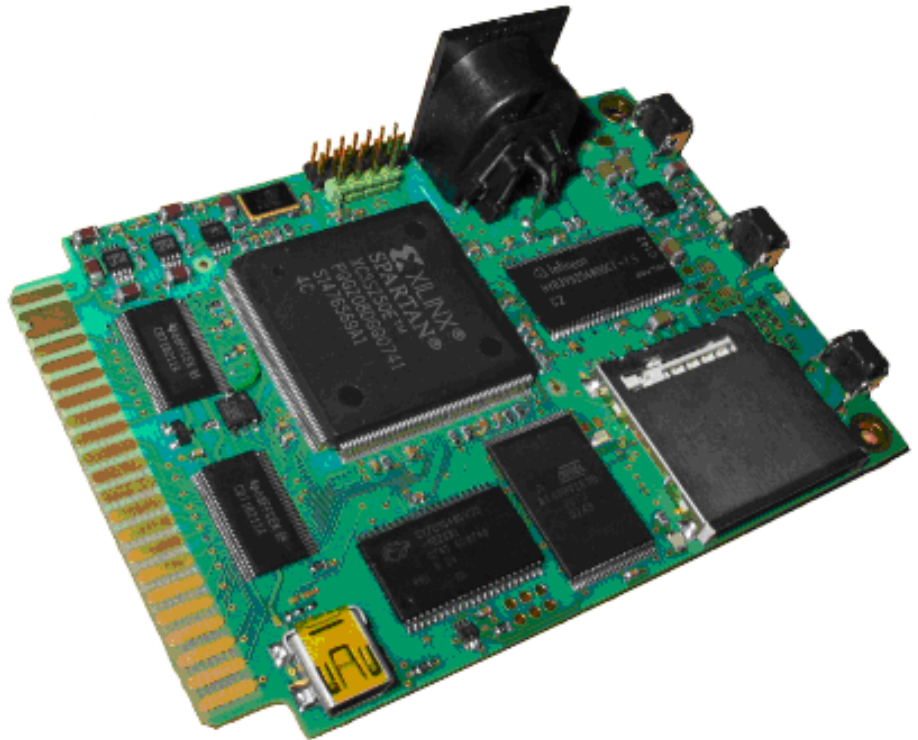
Behind all of this is a dark secret, "the C64 was the first... although I also secretly played with my brother's [Sinclair] ZX-81 before the C64 came." Whilst you recover from the shock of that revelation, it will be less surprising to hear what drew Gideon into using computers in the first place; "I was often programming, and I spent hours and hours copying games, but I never actually played any of them. Only Giana Sisters. I was hooked to that!"



So, it was the all-round usability of the C64, especially as he "used PrintFox for editing and writing reports for school. And I enjoyed the C64 a lot, really. I believed it was a very good machine for its time." Now, if only I'd had Commodore's set up 'for educational purposes' in my school. Sadly, like most people in the UK, if I wanted to do school work on a computer, it'd have to be on a BBC Micro, something that most people didn't have at home.

As we talked, Gideon admitted that his obsession with the Rainbow Arts game The Great Giana Sisters, revealing "I was so hooked on [The Great] Giana Sisters, that I reverse engineered the code to some extent and wrote a level editor and created Giana Sisters II, together with two friends of mine", although his version including the level editor was never made available to anyone else, his edited game found its way out: "Giana Sisters II is available. I was very surprised when I found it on a 15000-games DVD."

Like many of us, his C64 was dormant for many years, waiting to be rediscovered. "My Commodore had been pretty much 'dead' for me for many years." It was never forgotten though - "Professionally I got into programmable logic, the generic term for FPGA technology. Then, when I wanted to do some experiments with FPGAs for a hobby, I chose the C64 as a platform. The first thing I did back in 2000 was write a 6502 in VHDL, and replaced the 6510 on a real Commodore with mine, and debugged it until it booted the kernel. "Then I wanted to write a 32-bit 6502 replacement, but that project never got finished, mostly due to the fact no one would ever write a compiler for it." A 32-bit 6502 replacement? I pressed him to tell me more, and whether or not it was inline with the 65832 I had heard about earlier in the decade. "My project was the 65GZ032; a CPU that could execute both 8-bit instructions as well as 32 bit



instructions without switching between modes.", so it was something different, though would be compatible with "the 6502" which he "used it in a project at the university." After abandoning his 32-bit dream, he concentrated on a VHDL replacement for the C64 chipset, as he explained. "For some years, nothing happened... at some free evenings I wrote VHDL to replace the other C64 chips, and demonstrated a working C64 in one FPGA chip at my work place, using an (expensive) FPGA development board. I did this just for fun, actually. And the Commodore One from Jeri Elsworth already existed at that time."

So, how did the idea for the 1541 Ultimate come along then? "Later on, I talked to a colleague of mine about what I could do, since others already developed the C64, so then the idea came up to implement a 1541 instead. At first, I demonstrated this using a development board. I could load a disk image through Ethernet from a laptop and demonstrate the operation. And later, the idea came to implement this on a cartridge, and use the C64's VIC chip to display a menu to select disks. This is how the 1541 Ultimate came into existence." But, it didn't stop at just implementing a 1541, as this piece of kit can mimic many cartridges, including the 17xx Ram Expansion Units from Commodore. "Actually, it was more of a fun thing again. I equipped the 1541U with 32MB of RAM, and

One thing on the mind of many GEOS enthusiasts is, will he ever get around to implementing such devices as the RAMLink, so I pressed him on this. "Not yet, but ever since the sales of the 1541U took off, I am so swamped with other things than programming, that it is just a limitation of my time." There is quite a wish-list for the hardware, as he stated, "many people have asked me to implement many extensions, but my time is limited." Of course, he is only one man, and not an entire industry, or a production line, as we must remember! He also had his priorities sorted when I spoke to him, "at this moment, having a holiday is the top of my list!! Haha!"

As we will all appreciate, he has needed a holiday, "honestly, since I am still working full time, the 1541U project has been wearing me out a lot", but you can never stop a workaholic, "technically, when it comes to the 1541U, I am working on a new version of the firmware, that will remove some of the current limitations in the software design", although many people have said that the device is hardly 'limited'. Gideon seems to have something of a perfectionist in him, as he sees a lot of room for improvement "the current firmware is based on a 6502 CPU. This CPU has many limitations. It can only access 64K at a time, and as you understand, the 1541U needs to address more data in its memory. So there is an extensive memory mapping scheme in effect that enables the 1541U to do the things it can do now. But it is a dead end, since the whole firmware is full of memory mapping code. In this way, it is the address bus that has the limitations. The idea is to use a small 32-bit CPU in the new firmware. But this transition involves rewriting a lot of the code!"

So, will we have a 32-bit future then? Surely, if this can be done, the 1541U really will be the 'Ultimate' cartridge, but he continued, "I have put some efforts in creating a new version of the hardware, which is now announced on my website. I am trying to make the new 1541U even more versatile, and make it more 'ultimate' than the current one is. But I think that after this one, I will have to start looking for other things to do in my life." I'm sure you will agree that, when this time comes, we'll be left with one superb piece of hardware that will even appeal to the more casual users.

What of the future for this project though? I told him about a friend of mine who said that he fully expected there to still be Commodore users beyond the year 2000, though he wondered what people would be doing with the old 8-bit other than playing classic games. Many of you will know the answer to this, as support came along for PostScript Laser Printers, and connectivity to modern networks. Where did he see the Commodore 64 platform in a decades time?

Teasingly, he said "I think the new 1541U will once again add something to the C64." So, what exactly? "The major new addition to the 1541U-II is a USB-host port. With the right software support, this port can be used to attach memory sticks, other storage devices like hard disks, as well as printers and other stuff. And yes, connect a PC to share files should be possible as well." After salivating at these thoughts, I came to my senses again and continue to press him for more information.

"Well, the power usage of the [new] cartridge itself will be somewhat lower [than the 1541U]. But you have to keep in mind that without the use of a powered USB hub, the C64 will power your external USB device, so this is not recommended. Though I expect it to be no problem to use a USB memory stick. Initially, the only USB support in the firmware will be for mass storage devices, so that it can be used for the fundamental 1541U function. No HUB support at first." "Will we need a separate Ethernet adapter then? Gideon thinks not, at least in the medium term. "I think, that in time, it would be possible to emulate the CS8900A chip in the FPGA, and use a USB to Ethernet adapter to provide Ethernet functionality to the 1541U-II again. That is why the Ethernet port has disappeared." And what about using USB joysticks? "Yes, indeed. Although joysticks need to be supported [in the hardware] as well in the software running on the C64. This is because the 1541U cannot replace the 6526 CIA chip inside the C64; otherwise it would be possible."

It may seem an obvious question to ask, but stating the bloomin' obvious is something that I'm very good at. 1541U-II will keep the Commodore platform interesting for the next few years at least? "I hope it will!" Gideon replied, further explaining that "the 1541U-II will bridge the Commodore platform to modern hardware, which gives a lot of new possibilities. And since the Commodore platform is such an open platform, people might want to create new, fun applications. I wished I could have come up with the 1541U ten years ago" indeed, as do we all. And so the interview came to a close with Gideon, humble as ever, leaving Commodore Free's readers with a message: "The most important thing I would like to say to the CF readers is 'Thank you!' Thank you for so many of you having interest in the 1541U project, and for the trust many of you have shown by paying in advance and sometimes having to wait for a long time before I can deliver the hardware." The future is looking bright again, and it seems that through Gideon we have a new CMD; giving us what we are missing, functionality, compatibility and performance, and at a cheaper price than those coveted 90s upgrades.

