



MCCC News



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Raspberry Pi and the Amiga

Since its debut in February 2012 the Raspberry Pi has become the very symbol of a little machine that can do anything. So far it has proven to be capable of doing just about anything, one can dream up for this little computer. My attraction to the Raspberry Pi would be in its ability to emulate the Amiga computer as well as many classic game consoles. Watch this video <https://www.youtube.com/watch?v=6HZXM6cLVUg> as I did, and I'm sure you will see its potential as an Amiga.

For about \$60 the preferable Raspberry Pi 3 can be purchased giving you the main components to get started. I already had a USB mouse and keyboard and an HDMI cable needed to connect to my monitor. I also owned Amiga Forever, the emulator package needed mainly for the Kickstart ROMs to get the Amiga part started. Getting the Raspberry Pi started involved putting it together, a tool-free job as the case simply snaps together around the motherboard.

Now to get the Raspberry Pi running. I checked out several setups for getting the it running, but one stood out. Amibian is a very lightweight Linux setup that makes the Amiga setup quick and easy. Go to this site: <https://gunkrist79.wixsite.com/amibian>

It has everything on this one page website to get you going, including the software needed to write the image-file to the microSD card. That brought up another thing needed: a card adapter that plugs into the USB

of my PC to write the image-file on the microSD. The image-file contains the LinuxOS and the Amiga Emulator software that make the magic take place.

The first boot-up of the Amibian definitely shows how fast things are going to be. It is up and ready very quickly. Follow the instructions on the Amibian website, for getting the microSD final prep completed.

Some years ago I had decided to give Amiga Forever a try on a PC and I was blown away as to how fast it was. As a result I already had all of my Amiga files setup and ready to use, which saved time for this adventure. Setting up the files involved not much more than creating directories for the content of a drive or partition. I could then copy the directory into a directory on the microSD set up by Amibian. A directory is also set up for ADF files which are for Amiga floppy disks turned into files that can be read like a floppy in a disk drive. I put files on a thumb drive and plugged it into one of the four USB connectors on the Raspberry Pi. Now the tough part.

Amibian has a rather simplified interface called Midnight Commander that allows you to copy the files needed to the correct places on the microSD card. The hard part is that it uses the keyboard for everything. I reached for the mouse so many times while trying to copy files over, that it became annoying. Once you get the hang of it, it isn't bad. The second hard part of this is finding the proper directory to copy to. You will be copying Kickstart ROM files, the hard disk files, and/or floppy disk files. If you wish to start from scratch you can put the five floppy disk files—matching the five disk of Workbench 3.1 for instance—then cre-

ate an empty directory in the hard-file directory named whatever you want it to be. If your goal is to setup 3.9, then you will need the 3.9 CD to update the setup. When using the floppy drive emulation, they have even duplicated the speed of the floppy drives, or at least it seemed. With the adjustment of a slider you can increase the speed to eight times faster. That really helped. Using modern replacements for the floppy, has spoiled me.

Setting up the emulator will be made easier if you ave knowledge of the Amiga and how it works. Example: do you want to create an Amiga 500 in its basic form or a 4000 in full-blown setup? You get to make the choices. You may want to play some Amiga game from the early days of the Amiga. Keeping the setup simple for that definitely has advantages. The great thing about the emulator is that you can setup all kinds of Amigas and have them ready to run in a moment's notice. In the setup page, which is where you end up when you boot the Raspberry Pi , you choose the ROM file, what to boot from, what chipset to use, what CPU, how many floppy drives, and so many more things to choose. Only a few need to be chosen. I set up a duplicate of my last Amiga—it worked!

My last Amiga ran a 60MHz 68060. This emulation doesn't offer a 68060, but does offer a 68040 running at very fast speed. Roughly six times faster than my 68060 could do! Everything I tried was incredibly fast, and looked much better due to the HDMI hookup to a much better monitor than I ever had on my Amiga. You save the settings and they are there ready for the next time, instantly. You can even set it up to start up as an

Amiga, and not go through the emulation setup interface.

As you can tell it is very fast, but the numbers will show you that emulation does lose some of the potential of the Raspberry Pi. It has a 1.2 GHz 4 Core processor, but until a change is made somehow, the emulated Amiga is only using one core, and because of all of the work the CPU is doing to make the emulation work it is only showing six times the speed, instead of twenty times the speed difference might get, dividing 60MHz into 1200MHz. It has been suggested that a smart move for the AmigaOS would be to recompile it to work in the Raspberry Pi. There were 4.5 million Raspberry Pis sold before version 3 came out, and it appears to now be selling even faster. Using more than one core is a problem that is affecting the AmigaONE owners as well. The AmigaONE X1000 and X5000/20 have dual core processors, and the X5000/40 has a quad core. With AmigaOS 4.1 they are only able to use one of the cores. AmigaOS 4.2 is supposed to offer limited multiple core usage. Limited means what? I do not know. Still it is a tribute to the AmigaOS watching the Raspberry Pi run AmigaOS, and the AmigaONE running 4.1, and doing everything very fast!

The Amiga emulation on the Raspberry Pi has become so popular that cases that look like little Amiga computers have sprung up all over the Internet. My favorite was a full sized 3000 case for Raspberry Pi.

There are also some add-ons for the computer, to add functions to the emulation. One recent is a FPGA chip card. The FPGA has been making news in the Amiga world by being the driving force on the Vampire accelerator card. It offers Amiga users a new level of performance never dreamed of for original Amigas. They have even begun calling it the 68080. Which is faster has come up. At the moment the Raspberry Pi seems to hold a speed advantage, but just a little. Every time the Vampire dips into the older hardware it loses speed,

but it is getting to the point where it does it so less and less. But the Raspberry Pi truly wins on price. The Vampire is just an Amiga accelerator for \$300. The Raspberry Pi is a complete computer for around \$60.

There is now a FPGA card announced for the Raspberry Pi, if it offers anything for the Amiga emulation, it has yet to be seen. The AmigaONE X1000 and X5000 have FPGA chips on the motherboard, but those have yet to be put to use as well.

A recent announcement for the Raspberry Pi is a full blown laptop case and parts, that could give the world a low priced Amiga laptop. It is very compact. The Raspberry Pi dimensions keep the laptop from being as thin as some very popular laptops, but it is portable.

As I was in the process of putting this article together, the Raspberry Pi 3 B+ made it's debut. Offering greater CPU speed will give a boost to the Amiga emulation, as well as faster networking with the 1 gigabit, and improved bluetooth speed, with version 4.2. The amazing part: it is only a few dollars more than the previous version.

Well, in closing, if I can say anything, the Raspberry Pi is quite an achievement and can provide many avenues to help take advantage of its abilities. It would take a big list to show even half of the things it can do. It can emulate fifty different game consoles. If you want a pocket sized Amiga, it can do it, as well as many other computers. The Raspberry Pi can and is putting the fun back in computers.

If you want to see a motherboard that is rumored to useable in the future with the AmigaOS, take a look here.

<https://www.raptorcs.com/content/TL2MB1/intro.html>

...by Johnny C. Kitchens

Speed Comparisons and Amiga Nostalgia

March has arrived, and I'm not sure whether we've gotten the lion or the lamb at this point. There are a few notable developments, one of which ties in to my continuing adventures of the Vampire A600. The Apollo Accelerators team recently put out the public release of the "Gold 2.7" core for the Vampire 500 and 600 cards. This adds several enhancements over the previous public release, but the headliner is the addition of the FPU (the Floating Point Unit for the uninitiated— for complex math stuff such as 3D work).

I downloaded the new core for my Vampire 600, followed the installation instructions to the letter, and turned my Amiga 600 into a brick. Apparently the update did not go through properly, and I was unable to try a second time now that the system refused to do anything. My next step was to order a "USB Blaster" device, which allows you to program the FPGA core on the Vampire board from an external computer. Eight dollars and four days later, I had the device and the software I needed, but my attempts to program it from my Linux laptop were unsuccessful. I took the next option available—bringing the Amiga and "blaster" to VP Mike Barclay's home, and trying to program the core from his Windows machine. Thankfully, the operation was mostly a success, and the A600 is back up and running with the new core. I'm not completely out of the woods yet, as the SAGA graphics from the Vampire's HDMI port are not coming through in full color, but everything else is apparently working fine, and I want to be sure to exhaust all other troubleshooting possibilities before I dare try re-flashing the core again.

At the last meeting, I started to explore some "practical" speed trials and comparisons of the Vampire system. I got my copy of Lightwave 3D (V5) running, with an identical scene of a spaceship rendering an 800x600

pixel image on my different systems. My venerable A4000T/68060 rendered the scene in 8 minutes, 59 seconds. My MorphOS G5 Mac rendered the same scene with all the same settings in just 32 seconds. (Doing it a second time clocked in at a quicker 30 seconds, thanks to the nature of JIT processor emulation.) The Morph G5 has an extra speed advantage in that it does not perform some of the display updates that require an Amiga chipset, but I doubt that would be that big a drag if it did. Finally, I set up the render on the Vampire A600 at last month's meeting. Unfortunately, this was under the previous "GOLD 2" core with no FPU, which Lightwave 5 requires to run. I was able to run it thanks to "Femu"—software that emulates an FPU—but like many forms of emulation, it was slow and quite a drag to the system. The render was only about halfway finished by the time we had to cancel and finish the meeting. Once I had more available time at home, I set up the render again, which took a glacial four hours, 55 minutes, and 49 seconds to complete. Obviously rendering under an emulated FPU is not recommended.

After all the mess updating the Vampire's core to version 2.7, (now with FPU), I ran the test again, and got a far more respectable render time of 6 minutes even. I also did a few other time trials using some of my commonly-used graphics software (as opposed to benchmarks or SysInfo like everyone tries at least once). Bear in mind these times are far from exact, as my reaction time and fumbly fingers on a stopwatch app are factors, but you should get an idea.

Lightwave 3d V5 spaceship render: (800x600, raytraced shadows, glow effects)

- Amiga 4000T/060 - 8 min 59 sec
- MorphOS Mac G5 - 32 sec
- V600 2.5 (emulated FPU) - 4 hr 55 min 49 sec
- V600 2.7 w/FPU - 6 min 0 sec

Personal Paint 7.1 load/convert JPEG (800x600 24 bit to 256 color)

- Amiga 4000T/060 - 8.2 sec.
- A600/V600 2.7 - 6.1 sec.
- MorphOS Mac G5 - 2.7 sec.

Image FX 4.5 Gaussian Blur (640x844 24 bit, blur over entire image)

- Amiga 4000T/060 - 15.7 sec.
- A600/V600 2.7 - 12.9 sec.
- MorphOS Mac G5 - 1.35 sec. (Note: The G5 was using PowerPC native code here, and thus had a huge advantage)

As you can see from these admittedly imprecise tests, the Vampire A600, while not touching the speeds of the G5 even when it runs 68K-based software, it offers a significant all-around speed boost over the previous "fastest ever" 68060/50 Mhz, knocking down all times by about a fourth or more, which is quite good for something which is still ostensibly a 68000-series CPU.

One of the things I enjoy about our modern world is that, surprising as it may seem, nostalgic Amiga material both new and old is easier to find than ever. For example, there's a wealth of Amiga stuff to be found on YouTube, with new things popping up fairly regularly, from old game coverage to talk of the new Vampire-accelerated systems and more. Here are a few videos I have found which you might enjoy, if you haven't already seen them all.

81 year-old artist Samia Halaby, who creates works with her slightly younger Amiga 1000, from The Guru Meditation:
<https://youtu.be/sDflkXf3uzA>

New games for the Amiga CD-32, from The New Retro Show:
<https://youtu.be/arzRzyUa7CE>

An overview of Amiga Ireland 2018, from MsMadLemon:
<https://youtu.be/r6TUTzniA2k>

Seeing the Commodore CD1200 prototype, from Dan Wood:
https://youtu.be/qYq_F5-fAaw

Plenty more can be found on YouTube, either linked with these videos, or by doing a search of your own.

...by Eric Schwartz
 From the AmiTech Gazette, March 2018

April Calendar

April 8 — MCCC Meeting
 2:30 PM — Grand Prairie Airport
 3116 S. Great Southwest Parkway, Grand Prairie

April 8 — Board of Director's Meeting
 Approximately 4:30 PM — Location TBD

May 1 — Newsletter Deadline — 8:00 AM

MCCC 2507 Tamaron Cove Cedar Hill, Texas 75104
<http://www.amigamccc.org>