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The MCCC News

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Living With Amiga Video Modes

Welcome to yet another month in plague world, everyone! Hopefully the lot of you are staying as healthy and safe as possible in “these trying times,” not to belittle anyone who’s been hit directly by the virus or has to risk their neck on a regular basis working in the medical or service industries. Certainly things will improve over time, or enough hardcore capitalists will decide the living population is less important than a sagging stock portfolio, and wind up killing us all. Either way, good luck to the world. At least we found out the environment can improve surprisingly quickly when fewer humans are out there mucking about.

Speaking of staying home, this month’s meeting will once again be held ‘virtually,’ using Discord (www.discordapp.com, or get the Discord app for your mobile device.) Watch your e-mail for a link sent by prez Mike Barclay which will invite you to the AmiTech Discord server, which should arrive a day or two before the meeting date. If you’re not sure about this, or just don’t want to wait around, send Mike a mail yourself, and he’ll send you an invite link. Hope you’ll be able to drop by this time.

In the world of the Amiga, a frequent issue for hardware users is finding a suitable screen, now more than ever. Originally, the Amiga came from the days when home computers were

frequently expected to be hooked up to televisions, and the dedicated monitor was more of a luxury for those with an obsession over a sharp picture with consistent color. Most Amiga screen resolutions were built around the scan rates of NTSC and PAL video signals, even when output to a monitor. Later, as hardware became less expensive and PCs with VGA video cards became more prevalent, the 31 kilohertz VGA-style scan rate became its own standard, and allowed for a nice solid 640x480 display.

Meanwhile the Amiga had a solid 200-line display (240P) or an interlaced 400-line display (480i) that would flicker as fields were alternated 30 times a second, the effect being more obvious depending on the level of brightness or contrast. Some Amiga video enhancements were ‘flicker fixers’ which buffered the display and converted it to a 31 Khz signal, for the Amiga 2000 and built in to the A3000.

Starting partially with the ECS chipset Amigas and going whole hog with the AGA models, Amiga video display modes became more malleable, and through software and tweaking an Amiga could display to NTSC, PAL, VGA, and several other possible resolutions or scan rates and switch between them at will. The Amiga, especially AGA models, were pretty unique in that regard, the downside being that you would require an equally versatile multiscan monitor if you hoped to view more than a small range of them.

The high-res, high-scan rate modes were taxing to the Amiga’s chips, and didn’t have the same performance as a pedestrian NTSC mode,

and AGA systems didn’t offer a built-in flicker fixer either, so the next step up is adding a new video card such as Cybervision, Picasso, or newer ones like the ZZ9000 or SAGA/Vampire. These allowed for high-resolution screen modes with up to 24-bit color depth with quicker performance than a similar AGA display. The downside coming from it being a separate system than the dedicated Amiga graphics, so if you want to use both, you’ll need either separate monitors depending on mode, or some kind of switch or pass-through, whether external or built into the video card. Your productivity software may work best on a 24-bit CybergrafX or Picasso96 display, but if you want to play a game, it will likely insist on a ‘classic’ NTSC/PAL (probably PAL) display.

The problem is magnified by the fact that monitors for an NTSC or PAL-compatible signal are getting older and harder to come by. The flat-screen, wide-screen, digital high-definition LCD/LED monitor or television is the standard of the day, and the newer they are, often the less tolerant they are of older signals and connections. Some still offer analog connections for RF/antenna, composite, or component video formats, which help, but are not ideal viewing quality for an Amiga display. Many monitors still take VGA video connections, and the classic Amiga RGB-to-VGA converters are still fairly common. What isn’t as common is a modern monitor which accepts a signal below 31 Khz VGA scan rates, limiting you to specific scan rates or video expansion displays. There are some monitors out there which do accept a 15 Khz signal, though maybe not in the best way. Interlaced screen modes can be less appealing than on a CRT moni-

tor, thanks to the differences in display tech.

The remaining option is to invest in a video scan rate converter of some type. These range from low-quality Chinese-made devices for as low as \$20, to internal boards which do the ‘flicker-fixing’ before sending the signal out, up to the larger external converters with more bells and whistles for possibly hundreds of dollars. Each has their own advantages and drawbacks, and your own mileage may vary depending on what screen mode from what system you try to output to what monitor or TV. You’ll probably have to appraise and limit the screen modes you use on your Amiga. Your LCD monitor or your scan converter may be versatile, but few handle all Amiga modes, from NTSC 240P to PAL 576i to Productivity mode to video card modes to those strange 24 Khz modes some used to get higher resolutions.

Especially if they have a compatible monitor or converter, few Amiga users probably need more than a VGA-style screen resolutions for productivity, and NTSC/PAL modes for games and other software that doesn’t accept other modes. Since I got my scan-doubler device from RetroTINK.com. I can use my Samsung LCD TV to display NTSC and PAL displays very well (albeit up-converted), and video card displays, such as from the Amiga 600’s Vampire card, can go in via a different HDMI input. Maybe some day it will all come through one wire without any issues, but that’s a problem for future me. I can see why some would rather do their Amiga work exclusively thru emulation, as they wouldn’t have to put up with these video issues. Well, they do, but not necessarily in the same way.

...Eric Schwartz
From The AmiTech Gazette,
Dayton, Ohio, May 2020

8GB Raspberry Pi 4

Raspberry Pi 4 is almost a year old, and it’s been a busy year. We’ve sold nearly 3 million units, shipped a couple of minor board revisions, and reduced the price of the 2GB variant from \$45 to \$35. On the software side, we’ve done enormous amounts of work to reduce the idle and loaded power consumption of the device, passed OpenGL ES 3.1 conformance, started work on a Vulkan driver, and shipped PXE network boot mode and a prototype of USB mass storage boot mode – all this alongside the usual round of bug fixes, feature additions, and kernel version bumps.

While we launched with 1GB, 2GB and 4GB variants, even at that point we had our eye on the possibility of an 8GB Raspberry Pi 4. We were so enthusiastic about the idea that the non-existent product made its way into both the Beginner’s Guide and the compliance leaflet.

The BCM2711 chip that we use on Raspberry Pi 4 can address up to 16GB of LPDDR4 SDRAM, so the real barrier to our offering a larger-memory variant was the lack of an 8GB LPDDR4 package. These didn’t exist (at least in a form that we could address) in 2019, but happily our partners at Micron stepped up earlier this year with a suitable part. And so, today, we’re delighted to announce the immediate availability of the 8GB Raspberry Pi 4, priced at just \$75.

It’s worth reflecting for a moment on what a vast quantity of memory 8GB really is. To put it in retro-perspective (retrospective?), this is a BBC Micro’s worth of memory for every bit in the memory of the BBC Micro; it’s a little over 13,000 times the 640KB that Bill Gates supposedly thought should be enough for anyone (sadly, it looks as though this quote is apocryphal).

If you’re a power user, intending to compile and link large pieces of software or run heavy server workloads, or you simply want to be able to have even more browser tabs open at once, this is definitely the Raspberry Pi for you.

What else has changed?

To supply the slightly higher peak currents required by the new memory package, James has shuffled the power supply components on the board, removing a switch-mode power supply from the right-hand side of the board next to the USB 2.0 sockets and adding a new switcher next to the USB-C power connector. While this was a necessary change, it ended up costing us a three-month slip, as COVID-19 disrupted the supply of inductors from the Far East.

Other than that, this is the same Raspberry Pi 4 you’ve come to know and love.

What about 64-bit?

Our default operating system image uses a 32-bit LPAE kernel and a 32-bit userland. This allows multiple processes to share all 8GB of memory, subject to the restriction that no single process can use more than 3GB. For most users this isn’t a serious restriction, particularly since every tab in Chromium gets its own process. Sticking with a 32-bit userland has the benefit that the same image will run on every board from a 2011-era alpha board to today’s shiny new 8GB product.

But power users, who want to be able to map all 8GB into the address space of a single process, need a 64-bit userland. There are plenty of options already out there, including Ubuntu and Gentoo.

Not to be left out, today we’ve released an early beta of our own 64-bit operating system image. This contains the same set of applications and the same desktop environment that you’ll find in our regular 32-bit image, but built against the Debian arm64 port.

Both our 32-bit and 64-bit operating system images have a new name: Raspberry Pi OS. As our community grows, we want to make sure it's as easy as possible for new users to find our recommended operating system for Raspberry Pi. We think the new name will help more people feel confident in using our computers and our software. An update to the Raspberry Pi Desktop for all our operating system images is also out today, and we'll have more on that in tomorrow's blog post.

...<https://www.raspberrypi.org/blog/8gb-raspberry-pi-4-on-sale-now-at-75/>

New Raspberry Pi OS Released

Along with yesterday's launch of the new 8GB Raspberry Pi 4, we launched a beta 64-bit ARM version of Debian with the Raspberry Pi Desktop, so you could use all those extra gigabytes. We also updated the 32-bit version of Raspberry Pi OS (the new name for Raspbian), so here's a quick run-through of what has changed.

Bookshelf

As many of you know, we have our own publishing company, Raspberry Pi Press, who publish a variety of magazines each month, including The MagPi, HackSpace magazine, and Wireframe. They also publish a wide range of other books and magazines, which are released either to purchase as a physical product (from their website) or as free PDF downloads.

To make all this content more visible and easy to access, we've added a new Bookshelf application – you'll find it in the Help section of the main menu.

Bookshelf shows the entire current catalogue of free magazines – The MagPi, HackSpace magazine and Wireframe, all with a complete set

of back issues – and also all the free books from Raspberry Pi Press. When you run the application, it automatically updates the catalogue and shows any new titles which have been released since you last ran it with a little “new” flash in the corner of the cover.

To read any title, just double-click on it – if it is already on your Raspberry Pi, it will open in Chromium (which, it turns out, is quite a good PDF viewer); if it isn't, it will download and then open automatically when the download completes. You can see at a glance which titles are downloaded and which are not by the “cloud” icon on the cover of any file which has not been downloaded.

All the PDF files you download are saved in the “Bookshelf” directory in your home directory, so you can also access the files directly from there.

There's a lot of excellent content produced by Raspberry Pi Press – we hope this makes it easier to find and read.

Edit – some people have reported that Bookshelf incorrectly gives a “disk full” error when running on a system in which the language is not English; a fix for that is being uploaded to apt at the moment, so updating from apt (“sudo apt update” followed by “sudo apt upgrade”) should get the fixed version.

Magnifier

As mentioned in my last blog post (here), one of the areas we are currently trying to improve is accessibility to the Desktop for people with visual impairments. We've already added the Orca screen reader (which has had a few bug fixes since the last release which should make it work more reliably in this image), and the second recommendation we had from AbilityNet was to add a screen magnifier.

This proved to be harder than it should have been! I tried a lot of the existing screen magnifier programs

that were available for Debian desktops, but none of them really worked that well; I couldn't find one that worked the way the magnifiers in the likes of MacOS and Ubuntu did, so I ended up writing one (almost) from scratch.

To install it, launch Recommended Applications in the new image and select Magnifier under Universal Access. Once it has installed, reboot.

You'll see a magnifying glass icon at the right-hand end of the taskbar – to enable the magnifier, click this icon, or use the keyboard shortcut Ctrl-Alt-M. (To turn the magnifier off, just click the icon again or use the same keyboard shortcut.)

Right-clicking the magnifier icon brings up the magnifier options. You can choose a circular or rectangular window of whatever size you want, and choose by how much you want to zoom the image. The magnifier window can either follow the mouse pointer, or be a static window on the screen. (To move the static window, just drag it with the mouse.)

Also, in some applications, you can have the magnifier automatically follow the text cursor, or the button focus. Unfortunately, this depends on the application supporting the required accessibility toolkit, which not all applications do, but it works reasonably well in most included applications. One notable exception is Chromium, which is adding accessibility toolkit support in a future release; for now, if you want a web browser which supports the accessibility features, we recommend Firefox, which can be installed by entering the following into a terminal window:

```
sudo apt install firefox-esr
```

(Please note that we do not recommend using Firefox on Raspberry Pi OS unless you need accessibility features, as, unlike Chromium, it is not able to use the Raspberry Pi's hardware to accelerate video playback.)

I don't have a visual impairment, but I find the magnifier pretty useful in general for looking at the finer details of icons and the like, so I recommend installing it and having a go yourself.

User research

We already know a lot of the things that people are using Raspberry Pi for, but we've recently been wondering if we're missing anything... So we're now including a short optional questionnaire to ask you, the users, for feedback on what you are doing with your Raspberry Pi in order to make sure we are providing the right support for what people are actually doing.

This questionnaire will automatically be shown the first time you launch the Chromium browser on a new image. There are only four questions, so it won't take long to complete, and the results are sent to a Google Form which collates the results.

You'll notice at the bottom of the questionnaire there is a field which is automatically filled in with a long string of letters and numbers. This is a serial number which is generated from the hardware in your particular Raspberry Pi which means we can filter out multiple responses from the same device (if you install a new image at some point in future, for example). It does not allow us to identify anything about you or your Raspberry Pi, but if you are concerned, you can delete the string before submitting the form.

As above, this questionnaire is entirely optional – if you don't want to fill it in, just close Chromium and re-open it and you won't see it again – but it would be very helpful for

future product development if we can get this information, so we'd really appreciate it if as many people as possible would fill it in.

Other changes

There is also the usual set of bug fixes and small tweaks included in the image, full details of which can be found in the release notes on the download page.

One particular change which it is worth pointing out is that we have made a small change to audio. Raspberry Pi OS uses what is known as ALSA (Advanced Linux Sound Architecture) to control audio devices. Up until now, both the internal audio outputs on Raspberry Pi – the HDMI socket and the headphone jack – have been treated as a single ALSA device, with a Raspberry Pi-specific command used to choose which is active. Going forward, we are treating each output as a separate ALSA device; this makes managing audio from the two HDMI sockets on Raspberry Pi 4 easier and should be more compatible with third-party software. What this means is that after installing the updated image, you may need to use the audio output selector (right-click the volume icon on the taskbar) to re-select your audio output. (There is a known issue with Sonic Pi, which will only use the HDMI output however the selector is set – we're looking at getting this fixed in a future release.)

Some people have asked how they can switch the audio output from the command line without using the desktop. To do this, you will need to create a file called `.asoundrc` in your home directory; ALSA looks for this file to determine which audio device it should use by default. If

the file does not exist, ALSA uses “card 0” – which is HDMI – as the output device. If you want to set the headphone jack as the default output, create the `.asoundrc` file with the following contents:

```
defaults.pcm.card 1
```

```
defaults.ctl.card 1
```

This tells ALSA that “card 1” – the headphone jack – is the default device. To switch back to the HDMI output, either change the ‘1’s in the file to ‘0’s, or just delete the file.

How do I get it?

The new image is available for download from the usual place: our Downloads page.

To update an existing image, use the usual terminal command:

```
sudo apt update
```

```
sudo apt full-upgrade
```

To just install the bookshelf app:

```
sudo apt update
```

```
sudo apt install rp-bookshelf
```

To just install the magnifier, either find it under Universal Access in Recommended Software, or:

```
sudo apt update
```

```
sudo apt install mage
```

You'll need to add the magnifier plugin to the taskbar after installing the program itself. Once you've installed the program and rebooted, right-click the taskbar and choose Add/Remove Panel Items; click Add, and select the Magnifier option.

We hope you like the changes — as ever, all feedback is welcome.

...<https://www.raspberrypi.org/blog/latest-raspberry-pi-os-update-may-2020/>

June Meeting — Canceled

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