The Model B+ uses the same BCM2835 application processor as the Model B. It runs the same software, and still has 512MB RAM; but James and the team have made the following key improvements:

- **More GPIO**. The GPIO header has grown to 40 pins, while retaining the same pinout for the first 26 pins as the Model B.
- **More USB**. We now have 4 USB 2.0 ports, compared to 2 on the Model B, and better hotplug and overcurrent behaviour.
- **Micro SD**. The old friction-fit SD card socket has been replaced with a much nicer push-push micro SD version.
- **Lower power consumption**. By replacing linear regulators with switching ones we've reduced power consumption by between 0.5W and 1W.
- **Better audio**. The audio circuit incorporates a dedicated low-noise power supply.
- **Neater form factor**. We've aligned the USB connectors with the board edge, moved composite video onto the 3.5mm jack, and added four squarely-placed mounting holes.

The Raspberry Pi Foundation unveiled the latest incarnation of its affordable single-board computer recently, sporting a redesign that adds more USB ports and access to more I/O pins from the processor, but keeping software compatibility with the current Pi.

Although many of these changes are largely cosmetic, we took the opportunity to take a closer look at the new Raspberry Pi Model B+ and see what has changed since we reviewed the original Raspberry Pi back in 2012.

What has not changed is the price, which is still around the £22-£24 mark before VAT and delivery, although the price varies depending upon which retailer you buy the miniature marvel from, so it is worth shopping around.

Design

The new Raspberry Pi has the same footprint as the original device, but has been given a redesign that doubles the number of available USB ports to four, while adding a larger I/O connector block to bring out more of the general-purpose I/O pins from the Broadcom system on a chip (SoC) so that hobbyists can use these in hardware projects.

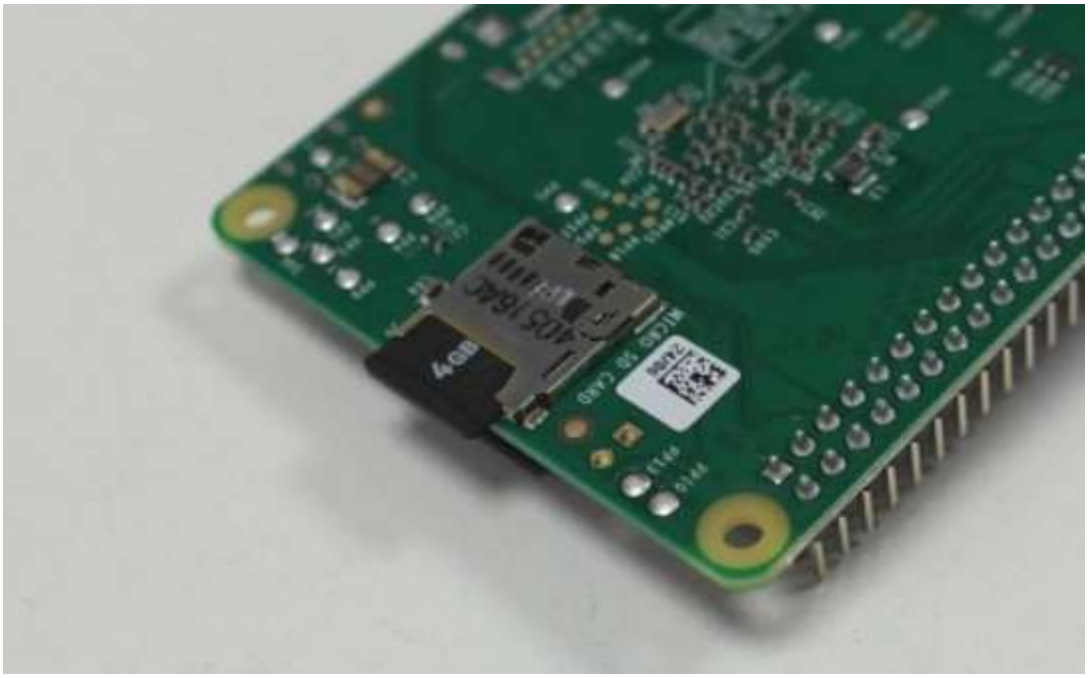
While the SoC is still the same ARM-based Broadcom BCM2835 of the original, the chip has been upgraded since our original review and now has 512MB of memory mounted with the CPU inside the chip package, rather than 256MB.

The GPIO header is basically an extension of that in the original Raspberry Pi, which had 26 pins. The new one has 40, but retains the same pinout for the first 26 pins, which should mean that 26-pin ribbon cables for the older model should still fit.

However, these are just the most obvious changes. The Model B+ circuit board also now has four mounting holes to enable it to be fixed securely into an enclosure or something else. The Pi actually gained a pair of mounting holes in a minor revision, but now the designers have done a better job and delivered four regularly spaced holes.

Most of the connectors now fit pretty much flush with the edge of the board rather than sticking out, as with earlier Raspberry Pi boards, which makes for a neater appearance if the board is fitted into a case.

The redesign also swaps the SD card slot of the original for a smaller smartphone-style micro SD slot on the underside of the board. As with a typical smartphone, you insert the card by pushing it in until it clicks into place, and remove it by pushing again to eject it. The SD card slot of the original Pi simply held the card in place using friction.



In order to make room for the larger I/O header connector, the Raspberry Pi Foundation has had to remove the RCA-style phono connector that provided the composite video output. This signal is still available, but is now output on a new four-pole 3.5mm jack socket that also

carries the audio. This has been designed in such a way that a standard audio cable will work as normal, but if you want the composite video you will need to purchase an adapter cable that breaks out the audio and video signals.

The on-board power regulator has also been redesigned in order to make the Model B+ more power efficient, while also supplying enough current to power peripherals such as external hard drives via the USB ports. However, this is still restricted to a maximum of 1.2A across all four of the USB ports on the Model B+, and requires a power supply capable of delivering 2A to the Raspberry Pi itself.

Next: Setup, in use

Setup

Like the original Raspberry Pi, the Model B+ still exhibits a bit of a ‘do it yourself' approach, as you literally get just the bare board itself, often with minimal packaging. This was a deliberate Raspberry Pi Foundation policy, in order to keep the price down.

This means that the buyer has to separately source their own power supply, flash storage card, keyboard and mouse, not to mention operating system, in order to get up and running with the Raspberry Pi.

Fortunately, most of these items are not difficult to come by, and the same online retailers that offer the Raspberry Pi – such as Farnell Element14, RS Components and Maplin Electronics – typically offer flash cards pre-loaded with an operating system, as well as all kinds of extras including cases, the Raspberry Pi camera module and LCD display modules.

As with our review of the original Raspberry Pi, we downloaded the default ‘Raspbian' software image from the Raspberry Pi website. This is based on the Debian Linux distribution, with numerous customisations including developer tools.

However, anyone following this route also need to download and use a tool like Win32DiskImager to actually write the operating system image to their micro SD card and make it bootable.

Once this is accomplished, it is simply a question of clicking the micro SD card into its housing on the Model B+, plugging in mouse, keyboard, display and network connection, and connecting the power.

In use

We were delighted to find that the Raspberry Pi Model B+ booted up the first time, as was the case with our original review. But after throwing up a stream of messages onto the screen as Raspbian boots up and runs through its hardware detection and configuration, users are now met with a configuration menu.

This menu allows you to set the keyboard layout and timezone, and expand the root partition to fill up all available space on the flash storage card (the image is sized for a 4GB card), and differs from the original Raspberry Pi software, which simply dumped the user at the Bash command line prompt and left you to figure everything out for yourself.

Exiting the configuration tool reboots the Raspberry Pi, and if you have chosen to boot straight to the graphical desktop environment, the Lightweight X11 Desktop Environment (LXDE) will be the next thing you see.

The dekstop environment has not noticeably changed since the last time we looked at it, and includes various system tools and developer software. The latter comprises the Idle environment for Python, the Squeak programming language, and the Scratch environment, but also now comes with the Wolfram Mathematica language and Sonic Pi, an environment designed to teach programming through the process of creating new sounds.

Also new is a tool for configuring the Raspberry Pi for WiFi, if you have a WiFi USB adapter fitted, and the Xpdf viewer for reading PDF document files.

The Raspberry Pi Foundation also now offers a NOOBS, or New Out Of the Box Software, download from its website, along with a setup guide, both designed to help absolute beginners get started.

Summary

The Raspberry Pi Model B+ may be "the final evolution of the original Raspberry Pi", according to its creators, and it shows a whole slew of improvements in the two years since the original launched, including twice the built-in memory, and now more available USB ports and I/O connections.

At the same time, a whole industry has built up around the Raspberry Pi, offering add-ons and projects based around the miniature computer. There are also a number of software environments available, including builds of Fedora and even a version of Red Hat Linux called Red Sleeve.

While the Raspberry Pi is not the fastest computer around, it is most definitely a capable device for its size and price, making it very difficult to beat on value for money.

For hobbyists, the expanded I/O ports available will open up more opportunities, making the Model B+ even more attractive as the centerpiece of a project.

The Raspberry Pi Model B+ is available from various outlets, including Farnell Element 14, and RS Components.