Banana Pi

Have a look at the image below. At first glance you probably think that it is a Raspberry Pi… but look again. Most people first spot the new connector beside the HDMI socket followed by the adjacent connectors. It may look like a Raspberry Pi but what you are looking at is the Banana Pi. With over 3 million units sold, the incredible popularity of the Raspberry Pi has not gone unnoticed in other parts of the world. The Banana Pi is one of several Raspberry Pi-esque boards to come out of Asia.

<INSERT REGULAR IMAGE OF B-PI>

Let’s be very clear from the outset… the Banana Pi is not a clone of the Raspberry Pi, nor is it a new version of the Raspberry Pi. It does claim to be “Raspberry Pi compatible” and contains some additional hardware which may appeal to some.

Hardware specification

The Banana Pi is 92mm x 60mm which means it is 7mm longer and 4mm wider than the Raspberry Pi. That fact, plus the additionally sockets, means that existing Raspberry Pi cases will not fit. For now you will have to do without or make a case out of LEGO or card or 3D print your own.

The processor is a 1GHz Allwinner A20 dual core ARM Cortex A7. Raspbian reports that this actually runs at 912MHz and when compared to a Raspberry Pi running in “High” overclock mode at 950MHz the real world speed difference between the two is not particularly noticeable. However, the Banana Pi comes with 1GB DDR3 RAM and it is this which contributes towards perceived performance improvements. The dual cores of the A20 processor also do not result in any significant performance boost for individual programs, but the real benefit appears when you start more the one program.

I use my Raspberry Pi daily in the production of The MagPi. I can happily have Scribus, GIMP and LibreOffice all loaded and running, but I can only use one at a time and need to minimise those programs not being used. The extra 512MB RAM and dual core processor of the Banana Pi make a difference in this scenario. I can now simultaneously edit graphics in GIMP while Scribus is generating PDFs.

<INSERT LARGER IMAGE WITH CONNECTOR LABELS>

Like the Raspberry Pi, the Banana Pi has HDMI (digital) and composite (analogue) video outputs plus HDMI (digital) and 3.5mm jack (analogue) audio outputs. It uses a micro USB socket for power in, an SD card slot for the operating system and 2 USB 2.0 ports. It also has the same 26-pin GPIO header. From this point onwards, everything else is different to the Raspberry Pi.

The Ethernet port supports gigabit networks while the new SATA connector allows hard drives up to 2TB in size to be connected. There are two micro USB connectors on the Banana Pi but surprisingly the one located in the same position as the micro USB on the Raspberry Pi is not used to supply power. Instead it is a USB OTG (on the go) connector. This means that the Banana Pi can either be a USB host or a USB slave when connected to another USB device. There is also a CSI camera connector and a LVDS connector for external displays. Unfortunately neither of these are the same as the equivalent connectors on the Raspberry Pi so you cannot use the Raspberry Pi camera board with the Banana Pi.

The Banana Pi has three buttons; a uboot button, a reset button and a power button. The latter is particularly useful because it removes the need to plug/unplug the micro USB power connector. Simply press the power button to turn on the Banana Pi, and press and hold for four seconds to turn it off. There are also three LEDs; a blue LED to indicate Ethernet activity, a red LED for power and a green LED which is user defined and is connected to GPIO 24. Interestingly there is also an onboard microphone, sandwiched between the composite video and 3.5mm jack sockets, and finally an IR receiver. This, plus the SATA connector, make the Banana Pi a very good media player.

In summary, the Banana Pi has a similar hardware form factor and connectivity as the Raspberry Pi, but with Cubieboard specific hardware such as the microphone, power buttons, IR receiver and SATA also squeezed onto the board.

Software

The Banana Pi has only be available for a few months but already has surprisingly good software support. Four images are currently available for the Banana Pi - Lubuntu, Open SuSE, Android and Raspbian. Another image is available for kids, based on Raspbian, which boots into Scratch and only runs Scratch.

With the exception of the wallpaper, the Raspbian image is everything you would expect. Interestingly the Raspbian image for Banana Pi also works perfectly on the Raspberry Pi too, thus reinforcing the compatibility claims.

<INSERT RASPBIAN SCREEN SHOT>

There are a couple of small differences. Raspbian for Banana Pi installs the Arduino IDE and ???. Additionally you cannot run Mathematica, unless you have a licence key. But run the Raspbian Banana Pi image on a Raspberry Pi and Mathematica works perfectly… thanks to the Raspberry Pi Foundation and the generosity of Wolfram Research. That’s a US$140 saving!

As mentioned previously, when running single applications there was not really any noticeable speed improvement. It was interesting to note that while the Raspberry Pi would often be pegged at 100% CPU for periods of time, the Banana Pi rarely reached 100% CPU usage.

But when two or more programs are running, that’s really when the benefits of the extra RAM and Allwinner dual-core processor come to the fore. Tasks are possible which would have laboured the Raspberry Pi.

The Open SuSE and Lubuntu images are exactly what you would expect and those of you who use these images on other computers will feel right at home.

GPIO

One of the most important aspects of the Raspberry Pi is the GPIO. The Banana Pi has an identical GPIO pin out and claims to be 100% compatible with the Raspberry Pi GPIO. I put that claim to the test with various add-ons such as the Pi Matrix, Adafruit LCD 16x2 display and the Adafruit TFT display.

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One thing worth noting is that that distance between the composite video connector and the GPIO pins is less on the Banana Pi than it is on the Raspberry Pi. That’s a result of squeezing a microphone between the 3.5mm audio socket and composite video connector. That means that there are some Raspberry Pi add-on board that will simply not fit without the use of a stacking header.

<INSERT IMAGE OF DIFFERENCE>

Android

For me, the Android image was the biggest surprise. The image runs Android 4.2.2 and it’s very good… and fast. Compared to Midori in the Raspbian image, running the ??? browser in the Android image is almost a pleasure!

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Conclusion

The price of the Banana Pi is ~US$50 which, given the additional hardware, is good value. But at the time of writing it is only available direct from sources in Asia so you need to factor in an additional US$20-US$30 for shipping. It should be available from other sources in the coming months.

I deliberately did not perform any formal benchmarking because the results are moot. Of course the Banana Pi will record better results than the Raspberry Pi in most tests, but that would be missing the point. The USD$35 price of the Raspberry Pi is everything. It is deliberately low cost, yet powerful enough to encourage tinkering without fear of breaking it, whether you are 8 years old or 80 years old.

If you are a beginner, or want to be part of the incredible Raspberry Pi community and have confidence that all third party add-ons will work, then the Raspberry Pi remains the best and only choice.

However if you want a cheap Linux or Android computer then the Banana Pi is worth serious consideration.