Astro Pi Component Kit

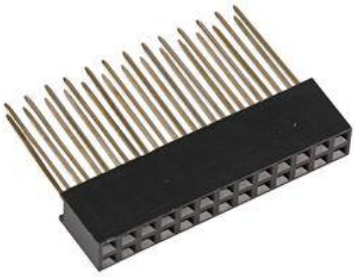
Introduction

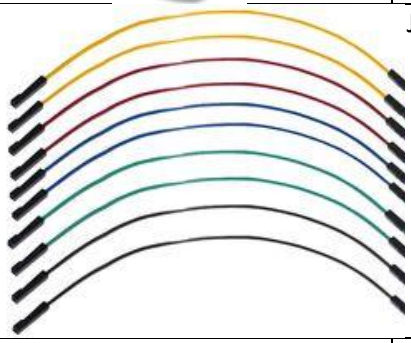
If you're reading this, it probably means that you've got a box of various bits of hardware for constructing a fully functional Astro Pi in a flight case.

The purpose of this guide is to provide easy access to all the information that you will need in order to get you up and running with your Astro Pi with hopefully as little effort as possible on your part.

Kit Contents

Before getting started, let's just take a quick look at the components that you have in your kit, and understand what they are for.

Component	Description	Quantity	What it's for
	Push switch	6	The push switches are mounted in the lid of the Astro Pi case, and can be used to control the Astro Pi. The function of these switches will depend on what you program your Astro Pi to do.
	26 pin extended header	1	The extended header provides the connection between your Raspberry Pi and the Sense HAT. The extended pins allow a gap between the Pi and Sense HAT, allowing access to some of the Raspberry Pi GPIO pins that are required to connect the push switches.
	M2 machine screw	4	The M2 machine screws are for holding the camera board in place on the camera mounting pillars in the Astro Pi case.
	11mm M2.5 Spacer	4	The 11mm spacers hold the Raspberry Pi in place inside the Astro Pi case.
	8mm M2.5 Spacer	4	The 8mm spacers are used in combination with the M2.5 nuts and/or washers to allow the Sense HAT to sit at the correct height on the 26 pin extended header.

	M2.5 stainless steel nut	4	These may be required to provide an additional space between the 8mm and 11mm spacers so that the Sense HAT will sit at the correct height on the 26 pin extended header.
	M2.5 stainless steel washer	4	Similarly to the M2.5 nuts, these may be required to provide an additional space between the 8mm and 11mm spacers so that the Sense HAT will sit at the correct height on the 26 pin extended header.
	M2.5 stainless steel machine screw	4	The M2.5 machine screws screw in to the 8mm spacers to hold the Sense HAT in place.
	M4 50mm machine screw	4	The 50mm M4 machine screws are used to hold the 4 separate parts of the Astro Pi case together.
	M4 nut	4	The M4 nuts screw on to the 50mm M4 machine screws, to hold the Astro Pi case together.
	Jumper wires	1 pack of 10	These jumper wires are used to connect the push switches to the GPIO pins of the Raspberry Pi. They will need to be adapted by connecting crimp terminals to one end of the jumper wire. You shouldn't need all of these wires, so you'll have some spare to use for other projects.
	Crimp terminals	15	These crimp terminals attach to one end of the jumper wires so they can be connected to the push switches. We've also included a few spare ones.
	PVC crimp terminal covers	15	These covers slide onto the crimp terminals to provide electrical insulation.
	Black wire	About 50cm	The black wire is required to connect the ground terminals of the push switches to a ground GPIO pin of the Pi. You'll need to cut this wire into a number of shorter lengths, and attach crimp terminals. The instructions will show you how to do this.

You will also need

In addition to the component kit and a 3D printed Astro Pi flight case (see below for details), you will also need the following items in order to construct your Astro Pi. We have included handy links to enable you to get everything you need from CPC, one of our resellers.

- Raspberry Pi - This will need to be a B+, Pi 2 or Pi 3. We suggest using a Pi 3, as this has built in WiFi. Note that there are 2 different versions of the Astro Pi case, as the LEDs on the Raspberry Pi are in different places depending on whether you have a B+/Pi 2 or Pi 3.
    - http://cpc.farnell.com/raspberry-pi/raspberrypi3-modb-1gb/sbc-raspberry-pi-3-model-b-1gb/dp/SC14012
- Raspberry Pi camera module (either a standard one or the NoIR version).
    - http://cpc.farnell.com/raspberry-pi/rpi-8mp-camera-board/raspberry-pi-camera-board-8mp/dp/SC14028
    - http://cpc.farnell.com/raspberry-pi/rpi-8mp-noir-camera-board/raspberry-pi-noir-camera-board/dp/SC14029
- Raspberry Pi Sense HAT.
    - http://cpc.farnell.com/raspberry-pi/raspberrypi-sensehat/add-on-board-sense-hat-for-raspberry/dp/SC13930?MER=e-bb45-00001003
- Micro SD card for the operating system.
    - http://cpc.farnell.com/transcend/tsraspi10-16g/memory-microsd-16gb-noobs/dp/SC14027
- Raspberry Pi power supply.
    - http://cpc.farnell.com/stontronics/t5989dv/psu-raspberry-pi-3-4-head-black/dp/SC14154
- HDMI cable.
    - http://cpc.farnell.com/pro-signal/psg03534/hdmi-lead-high-speed-2m/dp/AV20601
- Ethernet cable (optional).
    - http://cpc.farnell.com/pro-signal/ps11076/lead-patch-cat-5e-3-00m-black/dp/CS17457

You will also require the following tools:-

- Small cross-head screwdriver.
    - http://cpc.farnell.com/silverline/243080/screwdriver-pozidrive-pz1x75mm/dp/TL18417
- Large cross-head screwdriver.
    - http://cpc.farnell.com/silverline/243764/screwdriver-pozidrive-pz2x38mm/dp/TL18418
- Small pair of long nose pliers.
    - http://cpc.farnell.com/duratool/d00119/pliers-mini-long-nose/dp/TL10328
- Wire cutters.
    - http://cpc.farnell.com/duratool/d03006/precision-side-cutters-snips-5/dp/TL08617
- Wire strippers.
    - http://cpc.farnell.com/kew/ws250/wire-strippers/dp/TL18769

Astro Pi Flight Case

In order to put your Astro Pi flight case together, the first thing you will need is the flight case itself. Details of how to 3D print your very own Astro Pi flight case are available at the Raspberry Pi Foundation's web site at the following link:-

https://www.raspberrypi.org/learning/astro-pi-flight-case/worksheet/

Note, that 3D printing your Astro Pi flight case will take quite some time, so the sooner you get this started the sooner you'll be able to start putting things together. It's also worth noting that some parts of the case will take longer to print than other parts; for example, the heat sink (part 1 of the case) will probably take the longest of the 4 parts to print (5 parts if you include the joystick cap).

We recommend to start printing the base of the Astro Pi case (part 2) first, as once this is printed you can start fitting the Raspberry Pi and camera into the base.

Installing the Hardware

Once you've got the base of your Astro Pi flight case printed, you can start fitting the Raspberry Pi and camera into it. As with the printing of the flight case, there are detailed instructions for installing the hardware at the Raspberry Pi Foundation's web site at the following link:-

https://www.raspberrypi.org/learning/astro-pi-flight-case/worksheet2/

We've got a couple of top tips for attaching your Raspberry Pi and camera to the base of the Astro Pi case:-

Firstly, if you have access to a M2 and M2.5 tap, it is worth tapping a short thread into each of the holes (just enough to make it easier to start screwing the screw or standoff into the hole) in the base of the Astro Pi case before trying to screw the screws or standoffs into the holes.

Secondly, when screwing the screws or standoffs into the base, be really careful not to over-tighten them, as this may cause the support pillar to split or break away from the base of the case, or could strip the thread from the inside of the plastic pillar.

Further Reading

http://www.makerspace-uk.co.uk/getting-ready-for-take-off-with-astro-pi/

http://www.makerspace-uk.co.uk/astro-pi/

https://astro-pi.org/