



# Contents

Issue 42 February 2016

[raspberrypi.org/magpi](http://raspberrypi.org/magpi)

## TUTORIALS

- > BUILD A BINARY CLOCK 44  
Dr Simon Monk helps you build a very digital clock
- > SURFING RANDOM STREAMS 48  
Put some randomisation into your Sonic Pi creation
- > NODE-RED MINECRAFT PART 2 50  
Control Steve without using Python code
- > PI BAKERY: HUNT THE SNARK 52  
Create a fun, distracting game for the kids
- > USE SENSE HAT WITH FUZE 58  
Even BASIC works with the sensor board now
- > TWEET WITH WOLFRAM 62  
Access Twitter very simply via Wolfram Language
- > BUILD YOUR OWN HAT 64  
Your custom HAT, with the components you need

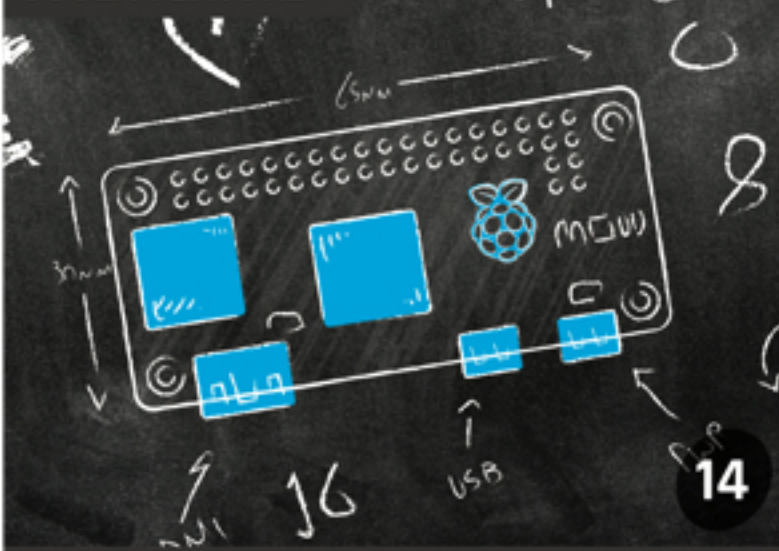
## IN THE NEWS



Come and celebrate Raspberry Pi's 4th birthday

The Big Birthday Weekend in March is open to everyone – find out why you should come along

## COVER FEATURE



## MORE PI ZERO PROJECTS!

Five more really cool things to do with your Raspberry Pi Zero, from a simple switch to a full-on games console in a controller

## ASTRO PI



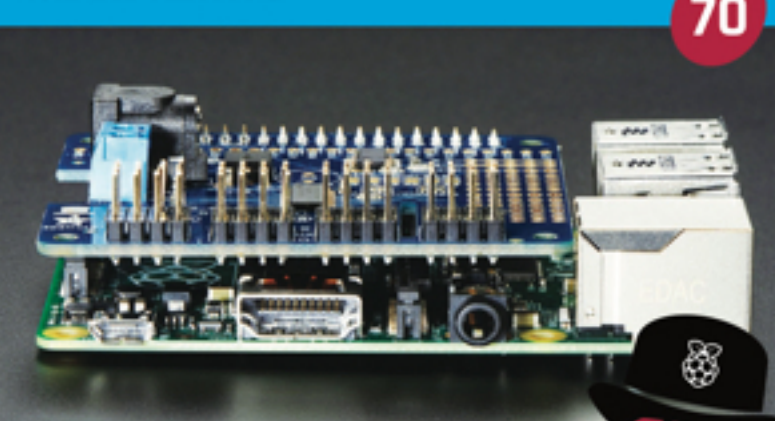
Tim Peake has successfully made it to the ISS – here's how life aboard has been for him so far



Ian Murdock

The creator of Debian, a giant in the Linux and open source community, passes on

## THE BIG FEATURE



## TOP 10 HATS

Not stylish headwear, but excellent hardware you can add to the Raspberry Pi. Ten of them, in fact!

## YOUR PROJECTS



## CLIMBING KILIMANJARO WITH PI

How Kurt Hunter let people follow his climb progress using a 3D printed model

### Zoe the Zero

A custom-made quadcopter is rebooted with the help of a Raspberry Pi Zero

### Sniffur

Dog-tracking software helps this owner know where his dog is at all times

### Balance Bot

This sociable two-wheeled robot can recognise faces and react to them

## 5 OF EACH Pimoroni pHAT MUST BE WON!

Don't miss your chance to win big with The MagPi this issue!

## 4BORG ROBOT REVIEW

Check out the affordable and super-cool kit from the robot masters over at PiBorg. Maybe a late Christmas present to yourself?

## REGULARS

- > NEWS 6  
The biggest stories from the wide world of Raspberry Pi
- > TECHNICAL FAQs 68  
Got a problem? Our experts answer all your questions
- > BOOK REVIEWS 84  
The latest computer books reviewed and rated
- > THE FINAL WORD 96  
Matt Richardson tells us how important it is to have fun

## COMMUNITY

- > THIS MONTH IN PI 86  
The Pi community continues to make excellent things
- > EVENTS 88  
Find a community gathering near you in the coming weeks
- > LETTERS 92  
Have your say on the magazine and the community

## REVIEWS

- > LCD CONTROL CASE 76
- > 4BORG 78
- > UBUNTU PI FLAVOUR MAKER 80
- > MEARM 82