



# Contents

Issue 45 May 2016

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

## TUTORIALS

- > **PI-THERMOMETER** 46  
Build your own internet-based LED thermometer
- > **PREDICTABLE NETWORKING** 48  
Give your Raspberry Pi a network address of its own
- > **MAKE ASTEROIDS IN BASIC** 50  
Build your own clone using FUZE Basic
- > **SCIENCE WITH THE SENSE HAT** 52  
Create one of the experiments being used on the ISS!
- > **SAMPLE SLICING IN SONIC PI** 54  
Join Sam Aaron for part 10 of his music-coding series
- > **RASPBERRY PI ACCESS POINT** 56  
Using the PaPiRus E-Ink display
- > **MIKE'S PI BAKERY: GET A GRIP** 58  
Make a music sequence with hairgrips!
- > **CREATE NEOPIXEL EYES** 64  
Build an impressive costume with the help of Raspberry Pi

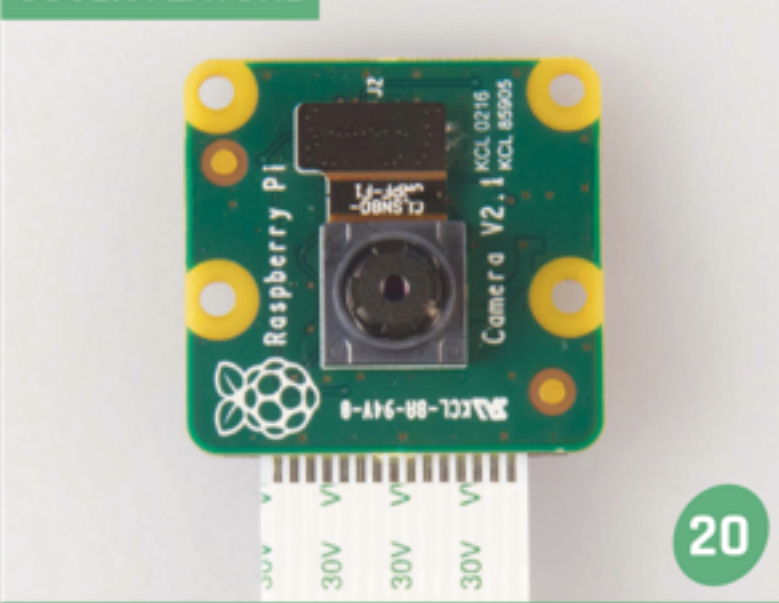
## IN THE NEWS



### Astro Pi coding challenge

The results are in and your musical masterpieces are ready for the ISS crew to listen to!

## COVER FEATURE



## THE NEW PI CAMERA

Take better pictures and video with the Raspberry Pi Camera Module V2

## CODERDOJO



The CoderDojo Foundation is benefiting from VMware Foundation support. Here's how...

## Dino Hack

Blackgang Chine has renovated some animatronic dinosaurs with the help of the Raspberry Pi



## THE BIG FEATURE



## AMAZING ARCADE PROJECTS

Follow in the footsteps of these 10 amazing projects to bring a slice of retro gaming nirvana into your own home

## YOUR PROJECTS



## PI MOON CAMERA

James Mitchell shows off his excellent Raspberry Pi camera project

### Mars Rover

This Pi enthusiast aimed for the stars when building his Raspberry Pi robot

38



### Model Railway

Dorset's model village turned to the Pi to power their awesome railway

40



### Cat Wheel

Get your moggy moving with this excellent exercise apparatus built for a feline friend

42



## 10 CAMERA MODULES MUST BE WON!

We've got 10 Raspberry Pi Camera Module V2s to give away thanks to our friends at ThePiHut.com

95

## UNDERWATER



This home-made submersible drone will take your breath away

84

## REGULARS

- > **NEWS** 06  
The biggest stories from the world of Raspberry Pi
- > **TECHNICAL FAQ** 72  
Got a problem? Maybe we can help.
- > **BOOK REVIEWS** 80  
The best reads for coders and hackers
- > **THE FINAL WORD** 96  
More musings from Raspberry Pi's own Matt Richardson

## COMMUNITY

- > **THIS MONTH IN PI** 82  
Find out what else has been happening in the community
- > **SEA OF ROBOTS** 86  
Building an AI swarm of boats using the Raspberry Pi
- > **EVENTS** 88  
Get involved in a community gathering near you!
- > **YOUR LETTERS** 92  
Talk to us about the magazine for anything you like!

## REVIEWS

- > **DRUM HAT** 74
- > **PICON ZERO** 76
- > **WYLIODRIN STUDIO** 78
- > **NUCLEUS ZERO CASE** 79