## **Contents**



**Cover Feature** 

## **SPARK**

**Top Projects** Beautiful builds to fire the imagination

Objet 3d'art Cut glass bottles with 20% PLA

Meet the Maker: Anne Barela Making CircuitPython accessible for all

Letters You lot are never satisfied

28 **Kickstarting** Why have one radio when you can have five?





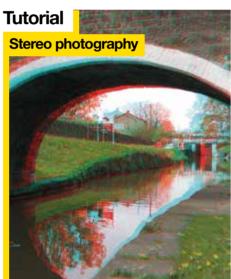
**LENS** 

Build brains into your bricks with these smart projects

How I Made: DIY film scanner Digitise family memories with a Raspberry Pi

Interview: Sam Topley Electronics, soft crafts, and weird synth sounds

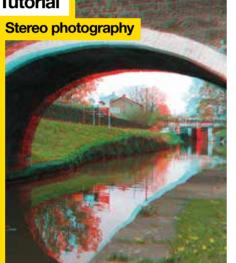
Improviser's Toolbox Glass bottles Turn empty drinks containers into... anything really



Combine multiple images for a 3D photographic feel







Add intelligence to your builds with LEGO® Technic Hub™ and Raspberry Pi Build HAT





## **FORGE**

Raspberry Pi's even more budget option gets a refresh

**SoM** Compressors Add compressed air power to your workshop

Tutorial Lock picking Make your own set of lock picking tools

Tutorial Make a tablet Combine a Raspberry Pi with a touchscreen

**Tutorial FreeCAD** Model 3D objects from real life

Tutorial Stereo photography Make flat images to fool the tiny human mind

Tutorial MIDI and Pico Combine Pico with Pure Data to make music

and making with yarn

Embroidered circuits, sound,

## **FIELD TEST**

102

102 Best of Breed Arduino shields for be olde wired communications

**108** Review Radio control unit Add remote control over the air waves

110 Review Raspberry Pi Zero 2 W The next generation of the budget Linux machine

**112 Review** Thermal printer A cutesy CircuitPython-powered image maker

Some of the tools and techniques shown in HackSpace Magazine are dangerous unless used with skill, experience and appropriate personal protection equipment. While we attempt to guide the reader, ultimately you are responsible for your own safety and understanding the limits of yourself and your equipment. HackSpace Magazine is intended for an adult audience and some projects may be dangerous for children. Raspberry Pi (Trading) Ltd does not accept responsibility for any injuries, damage to equipment, or costs incurred from projects, tutorials or suggestions in HackSpace Magazine. Laws and regulations covering many of the topics in HackSpace Magazine are different between countries, and are always subject to change, You are responsible for understanding the requirements in your jurisdiction and ensuring that you comply with them. Some manufacturers place limits on the use of their hardware which some projects or suggestions in HackSpace Magazine may go beyond. It is your responsibility to understand the manufacturer's limits.

**Hack**Space **Hack**Space