## Contents



#### **SPARK**

**Top Projects** Brilliant things made by brilliant people

Objet 3d'art Shake it (automatically) like a Polaroid picture

Meet the Maker: UNIQ Furniture Upcycling done right, by Andrew Smith

Columns A remedy for anti-social media

28 Letters Music! Robots! Requests!

30 **Kickstarting** Where cake meets 3D printing





Motors, sensors, actuator

**LENS** 

How I Made: A scrolling face mask Combine Covid hygiene with reactive blinkenlights

Interview: Rob Ives On the limitations and possibilities of paper

Improviser's Toolbox Cardboard The best bit of any new toy is the box

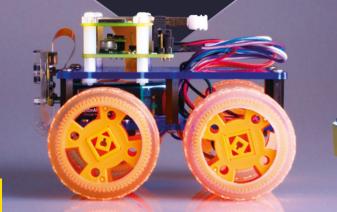
Making a maker business

**Tutorial** 

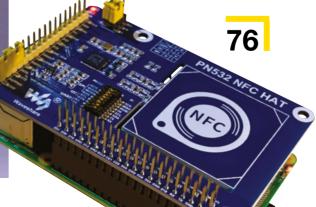
Today: an idea. Tomorrow: Omni Consumer Products

# **Cover Feature BUILD A ROBOT**

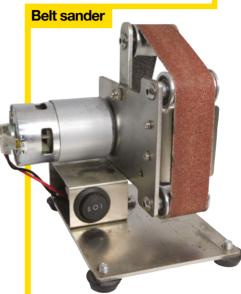
Take control of every single component and build the perfect mechanical companion











Can you get cheap, reliable machine tools from China?



### **FORGE**

**SoM** Restoration Give new life to old tools

**SoM** Copolyester Tough and good-looking printing filament

Tutorial Raspberry Pi Read RFID and NFC tokens with a HAT

**Tutorial** Home Automation Let the machines control your house

Tutorial Laser etching Adapt a laser cutter to etch into glassware

**Tutorial FreeCAD** Customise your wheels

**Tutorial** Found sound Find unexpected musical treats everywhere

06 Interview **Rob Ives** 

Teaching the world engineering..



### **FIELD TEST**

106 Direct from Shenzhen Belt sander An essential tool for making knives

A Raspberry Pi for embedded applications

Our favourite new desktop Linux machine

A cheap and accessible platform for AI

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



86

YEAR PM HOUR MIN

H 105 2028 1888

DESTINATION TIME

110

20

**Best of Breed Tindie** Our picks of the maker marketplace

108 Review Raspberry Pi Compute Module 4

110 Review Raspberry Pi 400

112 Review NVIDIA Jetson Nano 2GB