Contents



SPARK

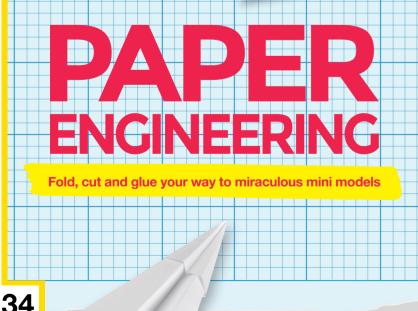
- 06 **Top Projects** The Uffizi of DIY projects
- **Objet 3d'art** 16 Summer is on its way. Celebrate with hot PLA
- 18 **Cool Build: The Man Engine** A huge mechanical puppet stalks the land!
- 22 Meet the Maker: Ken Olsen The joy of masochistic soldering challenges
- 24 Columns Much egg-related silliness
- 26 Letters There's a fight brewing about computer history!
- 28 Hackspace The Making Rooms Building in Blackburn, Lancashire

Cover Feature



- 34 Paper engineering Because we can all do better than paper aeroplanes
- How I Made: Reading glasses 46 Like Google Glass, but homemade, better, and not creepy
- **Global Village** 50 How to rebuild society after machines become self-aware
- 56 Radio radio Explore the humble transistor radio
- 72 Improviser's Toolbox Matchsticks Don't play with matches (unless you're building things)







Put your Adafruit CPX to good use





116

3D pen



77 FORGE	
•	

meet the man of Steele

62

78	SoM Arduino Multiplexing, operators, and digital display	
82	SoM Capacitive switches Sew a reactive circuit onto a fabric bag	
88	SoM Découpage Put your unique style on project enclosures	1
92	Tutorial Smart lights Control IKEA lights with Google Home Assistant	1
96	Tutorial LED panel Program a wall of light for maximum colour	12
100	Tutorial Make gin DIY booze for the refined, discerning palate	
102	Tutorial Robot sumo Build a program for your own fighting robot	12
106	Tutorial 3D-printed car Add micro:bit controls to a toy car	12
110	Tutorial Echo Control a Raspberry Pi with voice commands	12

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.

HackSpace

CONTENTS

Direct from Shenzhen

3D print freehand with a molten plastic pen





FIELD TEST

- 16 Direct from Shenzhen 3D pen Repair 3D prints (or unleash your artistic side) with a 3D pen
- 18 Best of Breed Camera modules: give your build eyes!
- 24 Can I Hack It? Look flash, with LED trainers
- 26 Review Bare Conductive Touch Board Starter Kit Join your circuits up with conductive paint
- 28 Review Arduino Cloud Networked programming for this little development board
- 29 Book Review The Maker Revolution Building a future of creativity and innovation