## Contents

Welcome to Issue 196

### Highlights

08 **AMD should postpone Threadripper**
AMD needs to address the holes in its Zen 2 line-up before it goes all out on Threadripper, argues Richard Swinburne.

10 **Political protests**
Tracy King analyses Blizzard’s sanctioning of a Hearthstone player for protesting against the Chinese government at a tournament.

19 **Intel Core i9-9900KS**
Intel’s new flagship LGA1151 CPU can boost to 5GHz on all cores, but is this enough to take on the latest Ryzen chips?

30 **Budget NVMe SSD**
We take a look at Kingston’s new A2000, which gives you 1TB of PCI-E 3 NVMe storage for just £108 inc VAT.

46 **Premium ATX cases**
E-ATX support, tempered glass panels and excellent water-cooling support. We test several of the latest premium PC chassis.

53 **Wi-Fi 6 gear**
We look at some of the latest Wi-Fi 6 equipment, including four brand-new routers and a PCI-E adaptor.

68 **Epic flaw**
As Epic’s Steam competitor approaches its first anniversary, Rick Lane looks back at how it’s fared.

70 **Borderlands 3**
Mini PCs no longer have to involve compromising on performance, but you do need to make sure you get the right gear. Antony Leather shows you what you need to build a powerful 12-core gaming rig, and how to put it all together.

76 **PC building masterclass**
Fancy having a go at building your own PC from scratch, but don’t know where to start. Our PC building primer takes you through all the stages from start to finish, so you can construct a smart PC just like the pros.

86 **Nvidia Turing deep dive**
Real-time ray tracing, Tensor cores and loads of stream processors. We dive deep into Nvidia’s latest GPU architecture to reveal what makes it tick.

94 **Hobby tech**
Gareth Halfacree shows you how to make a network-attached secondary display with a Pimoroni Inky wHAT, and tries out the Fuze4 Nintendo Switch kit.

104 **How to guides**
Antony Leather shows you how to make your own Velcro cable ties, and fit a water-cooling monoblock to your motherboard.

109 **Retro PC art**
We talk to Matilda (aka Bhaal Spawn) about her retro PC gaming-related art, including Lego models of the Sound Blaster Pro and 3dfx Voodoo cards.

112 **Retro tech: The PC speaker**
With its chirruping bleeps, the PC’s first sound system was highly primitive. We take a look at how it works, and how early game developers managed to make it sound half-decent.
Cover guide

Regulars

3 From the editor
8 Richard Swinburne
10 Tracy King
12 Incoming
14 Letters
34 For the win
42 Custom kit
60 How we test
62 Elite products
68 Inverse look
74 Reality check
94 Hobby tech
99 Readers’ drives
102 Customised PC
104 How to guides
109 Retro tech
114 James Gorbold

Reviewed this month

Reviews

PROCESSOR
16 AMD Ryzen 7 3800X
19 Intel Core i9-9900KS

CASES
22 Corsair iCUE 465X RGB
24 be quiet! Pure Base 500

CPU COOLER
26 ARCTIC Liquid Freezer II 240

SOLID STATE DRIVE
30 Kingston A2000 1TB

MONITOR
32 Asus ROG Strix XG438Q

LAPTOP
36 Razer Blade 15

PC SYSTEMS
38 Stormforce Crystal RTX 2080 Super
40 Wired2Fire Predator

Custom kit
42 Hamswan VR Headset
42 Klim Comfort Laptop Cooling Pad
42 Roccat Sense AIMO
43 Stageek Mouse Jiggler
43 Sound Blaster X3 USB DAC

Mini-ITX case Labs
47 Cooler Master SL600M
48 Corsair Carbide Series 678C
49 Fractal Design Vector RS
50 Lian Li PC-O11 Dynamic Razer Edition
51 NZXT H700i
52 Phanteks Enthoo Lux 2

Wi-Fi 6 Labs
54 Asus AiMesh AX6100
55 Asus RT-AX88U
56 Netgear Nighthawk AX8
57 TP-Link Archer AX6000
58 TP-Link Archer TX3000E

Games
69 Greedfall
70 Borderlands 3
72 Blasphemous
73 Untitled Goose Game
74 Star Wars: Vader Immortal Episode II

Hobby Tech
96 Fuze4 Nintendo Switch
98 The Secret History of Mac Gaming