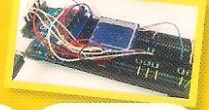
HOW TO: Build your own handheld games console



CUSTOM PC

THE BEST-SELLING MAG FOR PC HARDWARE, OVERCLOCKING, GAMING & MODDING / ISSUE 134

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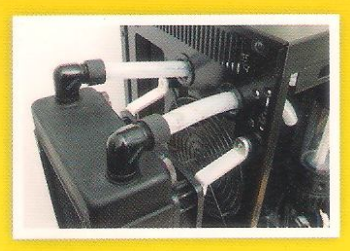

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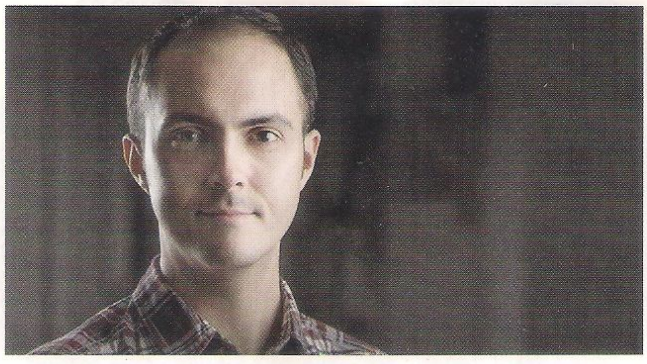


ANTONY LEATHER'S

Customised PC

Case mods, tools, techniques, water-cooling gear and everything to do with PC modding

Improving smaller cases

In this month's How to section (see p110), I've looked at two ways to provide more room for PSUs in smaller cases. Specifically, it's the cables that are often the main issue, especially with modular PSUs. In the case of the latter, the cables stick out of the end and can be quite inflexible. The end result is that many small cases, such as BitFenix's Prodigy, often require the use of small captive-cabled models.

However, this isn't the only area that appears to have been overlooked by many case manufacturers when it comes to shrinking their cases. Water cooling is another area that suffers, often unnecessarily. The Prodigy actually does rather well in this respect. In my own system, I have a 180mm radiator in the front with a large 180mm SilverStone Air Penetrator fan, plus a single 120mm radiator in the roof.

There's room for a double 120mm-fan radiator here, but I need the 5.25in bay free. This represents enough cooling to deal with an overclocked CPU and high-end graphics card, but lots of smaller cases could benefit hugely from small design changes and a little less focus on aesthetics.

The two cases that immediately spring to mind in this respect are Cooler Master's Elite 130 and Antec's ISK600.

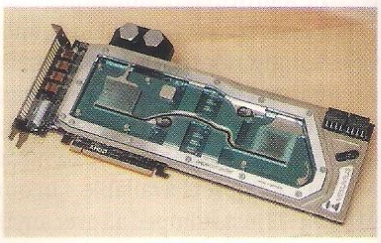
Despite its size, the BitFenix Prodigy can handle a decent amount of water-cooling gear

Both are small, cube-style cases, and have quite good water-cooling potential, but only if you're prepared to get out the Dremel and modify them. The Elite 130 has plenty of room in the front of the case for pumps and radiators, and the addition of side 120mm fan mounts could improve its potential, allowing for two deep single 120mm-fan radiators to be mounted.

Meanwhile, the Antec ISK600 has a design that's fine for air cooling, and it's largely built around aesthetics. However, the rear of the case – particularly the roof – is just begging to be fitted with a 120mm fan. This would mean removing one of the drive mounts, but it would have been good to at least have the option.

Water-cooling AMD's R9 295X2

This month, I was lucky enough to have an AMD R9 295X2 card, and an Aqua Computer Kryographics Vesuvius waterblock, for a few days. This time period was just long enough to see how the stock all-in-one liquid cooler fared compared to custom liquid cooling. Having eventually built up the confidence to strip this £1,000 graphics card to pieces, and fit one of the largest waterblocks I've ever seen to it, I then strapped the card to a water-cooling loop consisting of an XSPC RX240 radiator and Laing D5 pump.



The custom water-cooling loop knocked 16°C off the overclocked load temperature

The custom water-cooling loop knocked 16°C off the overclocked load temperature – a decent amount, but considerably less than I saw when I water-cooled an R9 290X, although this isn't particularly surprising when you consider that the stock R9 290X has an air cooler, compared with the Asetek-designed liquid-cooling system on the stock R9 295X2.

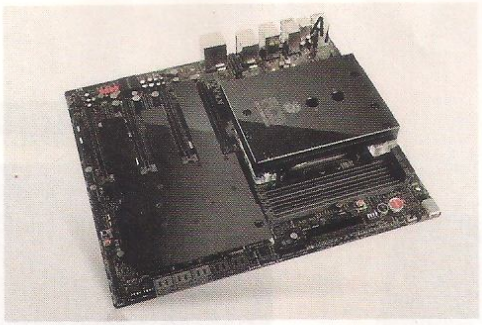
There was also limited performance gains from water cooling, due to thermal throttling. All of these results go to show that, while a single 120mm radiator is overloaded by this monster graphics card, it's probably doing a better job than an air cooler could ever manage – AMD definitely made the right decision to liquid-cool it as standard.

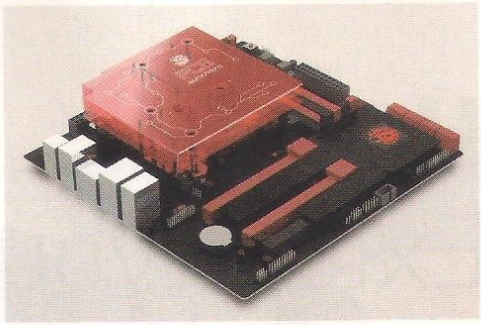
That said, noise-wise, the custom loop was still leagues ahead, even with its fans reduced to 7V, where it was whisper-quiet, but still fine in terms of temperatures. Is it worth water-cooling the R9 295X2? I think so. It might not result in the same radical drop in temperature as water-cooling an R9 290X, but you still get a decent drop in temperature and, more importantly, you get the most powerful desktop graphics card, but it barely makes a sound.

Bitspower shows off full-cover motherboard blocks

I reported last year about Bitspower's swoon-worthy mini-ITX full cover motherboard waterblocks, for boards such as Asus' Maximus VI Impact and P8Z77-I Deluxe. However, the company has recently shown off some slightly more ambitious plans. It released photos of combined CPU, VRM and chipset waterblocks for numerous Asus ROG motherboards.

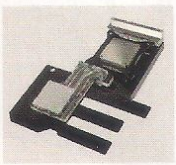
The supported boards include the Maximus VII Ranger, Hero, Gene, Formula and Rampage IV Black Edition (the Maximus VII Impact is apparently compatible with its predecessor's waterblock). With what appear to be single inlets and outlets dealing with an entire motherboard, the new waterblocks could make it much easier to water-cool your hardware, plus they look pretty good too.



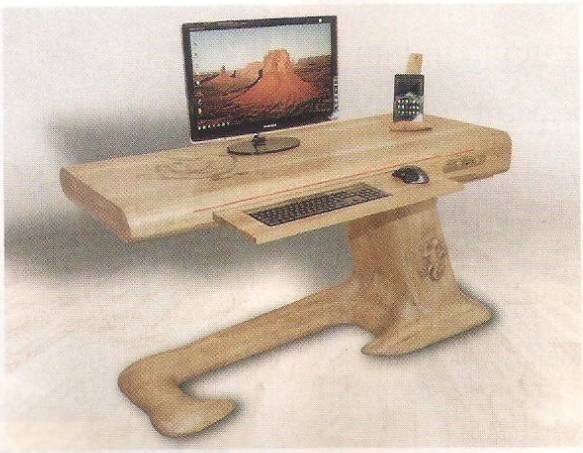


There's a full-sized waterblock mounted underneath the board for cooling the CPU, which is possibly a better-performing option than Bitspower's previous system of milling fins above the CPU into a large copper plate that cools the entire board. This older system led to comparatively poor performance from the original full-cover waterblock for the Asus P8Z77-I Deluxe. This new CPU waterblock is plumbed into the rest of the full-cover motherboard waterblock, which sports a two-layer design, so the coolant can rise over the CPU and other components to reach the VRMs and chipset.

There's also a large cover that hides the PCB around the expansion slots for a very clean look. Sadly, no other motherboard manufacturers have been given support yet, but as Bitspower offered full-cover waterblocks for mini-ITX motherboards from manufacturers other than Asus, there may still be hope for owners of boards made by MSI, Gigabyte or ASRock.



Above: Bitspower's new full-cover motherboard blocks (photo and concept) Below: A full-sized waterblock sits underneath the board for cooling the CPU



Lizard Desk was hand-crafted from solid blocks of oak

Lizard Desk by awadon

Desk PCs are making big waves at the moment, with many fantastic projects from the modding community, and even off-the-shelf models coming from Lian Li and Red Harbinger.

You might think they'd all look pretty similar, but bit-tech forum member awadon has shown that there's still room for originality in this space.

His desk PC is made from wood, but he has used this common material it in a completely different way to any other desk PC I've seen. The whole desk has been largely hand-crafted from solid blocks of oak, merged together and then chiselled and sanded to create this wonderful streamlined masterpiece.

My favourite parts are the inset keyboard, which sits in a pull-out tray, and the front panel, which is finished in brass and offers all the usual creature comforts. Awadon even created a stand for his tablet, while the PC itself resides in a pull-out drawer in the side.

A quick flick through his work log is thoroughly recommended to appreciate the mammoth task of shaping and sanding this desk, which stands complete with a raised lizard logo. You can see the full project log at **http://tinyurl.com/lizarddesk** CPC

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