

There's a global shortage of computer chips – what's causing it?

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Silicon wafers being transported in clean rooms at the GlobalFoundries semiconductor plant in Germany

Liesa Johannssen-Koppitz/Bloomberg via Getty Images

The world is experiencing a computer chip shortage due to a perfect storm of problems including a global pandemic, a trade war, fires, drought and snowstorms. It has coincided with a period of soaring, unprecedented demand – in January alone, chip sales reached a record \$40 billion. Chips are now in everything from watches to fridges and your car probably has several dozen. Manufacturers simply can't produce them fast enough.

What is causing the shortages?

The covid-19 pandemic caused an [initial slump in car sales of up to 50 per cent](#), because few people were travelling anywhere and confidence in the economy was low. Car companies reacted by slimming down manufacturing and reducing orders for parts.

This included huge numbers of computer chips, because modern cars contain dozens of them to control everything from braking to steering and engine management. According to [research firm IHS Markit](#), 672,000 fewer vehicles than usual will have been made in the first quarter of 2021 as a result.

At the same time, there was a rush for home office items like laptops and smartphones, vital because many people transitioned to working from home. There was a similar rush for games consoles, so that people had something to do to keep their minds off the global pandemic.

The big factories supplying manufacturers switched from making car components to smartphone, [laptop and tablet chips](#) instead. In fact, production is going stronger than ever in terms of total sales, and the problem is as much about demand as supply. The Semiconductor Industry Association (SIA) says that [chip sales in January 2021 hit \\$40 billion](#), which is up 13.2 per cent on the same month last year.

Now car sales have picked up again and the result is that companies across several industries are fighting to get priority in factory order books.

Was there any backup stock of computer chips?

Many companies operate with low stock levels to keep costs down and are now rushing to replenish supplies. Supply chains are stressed or broken and nobody knows what to expect. One chip-maker [told *The Washington Post*](#) that car company executives were telling him: "You're killing me. You need to make more."

But semiconductor factories have limited capacity, and building new factories takes massive investment and often several years. Chip-makers also have incentive to focus their efforts on smartphone and tablet chips rather than on the older technology used in cars which has lower profit margins.

Read more: [Virtual computer chip tests expose flaws and protect against hackers](#)

Why can't chip manufacturers just increase output to meet demand?

In short, a perfect storm of problems has hit the semiconductor industry. Much of the world's supply of computer chips comes from Taiwan, and most are made by the Taiwan Semiconductor Manufacturing Company (TSMC), which has been dealt a double whammy.

Compounding the pandemic trouble is the trade war between the US and China. US chip firm [Xilinx has had to suspend some sales to Chinese consumer electronics company Huawei](#) after then-President Donald Trump put Huawei on a trade blacklist over national security fears. China is now working on building up its own production of chips. The US is doing the same, and getting TSMC to build a \$12 billion chip factory on its own shores. Everyone wants to be able to guarantee their own supply of chips, and the current shortage has made it an even higher priority.

As if that wasn't enough, the weather is also against many chip-makers. The manufacturing process requires lots of water. TSMC makes chips for dozens of companies and churns through 156,000 tonnes of water a day normally. But there are serious droughts in Taiwan at the moment, reservoirs are drying up and the firm is now [bringing water to the factory in trucks](#).

And there's still more. A [fire struck a chip factory](#) in Japan in October, while an unseasonably [cold snap in Texas also temporarily shut down plants there](#).

How will this affect me?

This is only an issue if you need to buy something that includes a computer chip. Sadly, these days that means most things with electrical components from cars to household appliances.

Those who own shares in chip-makers will see a positive effect, as the global shortages have seen many raise their prices for chips and [share prices have subsequently hit record highs](#).

Read more: [The superconductor breakthrough that could mean an energy revolution](#)

Which manufacturers are affected?

Car-makers like [Ford](#), [Toyota](#) and [Volkswagen](#) have all partially mothballed factories over recent months because they can't source the chips needed to produce their cars.

Sony hasn't been able to put together as many PS5 games consoles as it hoped, and Microsoft is cutting back production of its Xbox Series X and Samsung is considering [delaying its Galaxy Note phone](#).

How long will it last?

Some analysts believe it will take up to a year for manufacturing to get back on track, and then a further six months for stock levels at various companies to reach normal levels. US chip-maker [Broadcom says 90 per cent of its 2021 output is already spoken for](#).

Other data shows that the chip industry has been edging closer to its full manufacturing capacity for some years now, so in a way this could have been expected and there wasn't enough of a buffer in place to handle fluctuations in demand. "Chip famines" have happened several times before, often due to disasters, but also sometimes when new technology requires updated factories.

In any case, factories are ramping up capacity now but this will take time to have much of an effect. It can take 26 weeks to create a chip and there are more than 1000 steps in making some products.

In February, US president Joe Biden signed [an executive order](#) that will see \$37 billion spent on bringing manufacturing capacity to the US. Again, this will take time.