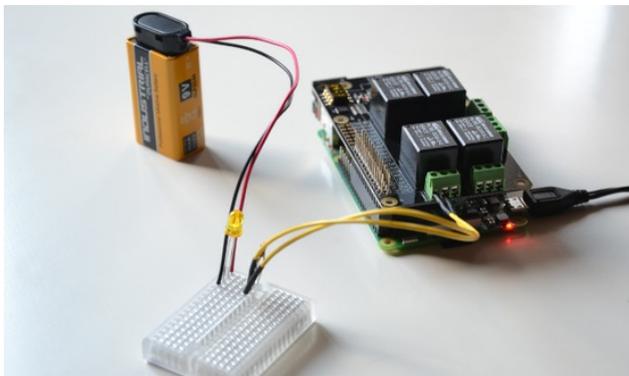


The low-cost hardware revolution

This article focuses on opportunities and challenges of low-cost developer boards in the industry.



A connected Raspberry Pi board (Source: Reichelt Elektronik)

This article originally appeared in the [June issue](#) of the CAN Newsletter magazine 2019. This is just an excerpt.

The inventiveness of the maker generation is finding its way into industry with cost-effective hardware, open source platforms, and fresh ideas. The wave of low-cost hardware success is unstoppable. Anyone thinking of low-cost hardware has developer boards front of mind: Raspberry Pi, Arduino, or Beagle Bone. Since its launch in 2012, the Raspberry Pi has an amazing success story. With over 17 million devices sold worldwide, Raspberry Pi is the most popular single-board computer of all time. This mini-PC is the initiator of the low-cost trend.

But the Raspberry Pi has now found itself in a competitive market place as more developer boards try to emulate its success. From new one-board controls to accessories and extensions, the market

is constantly seeing innovation. Shields, hats, power supplies, sensors, and the ability to enable CAN support through converters has created a whole hardware ecosystem that is available with these mini-computers. Developments in performance and computing power have opened up a host of new possibilities for mini-PCs. The Raspberry Pi initially had limited computing capacity and was primarily used by students for study or hobby projects. But it quickly became apparent that more was needed from the small format. The latest model, the Raspberry Pi 3B+, now offers a 1,4-GHz quad-core processor with 1024 MiB of memory and gigabit Ethernet.

The active developer community provides guidance for fellow users to make it easier for people to get started in electronics. The Raspberry Pi is being used in an industrial environment more often than before, either as a controller in prototype development or as a fully-fledged industrial control system. Raspberry Pis can also be of use for industrial purposes such as automotive as well, thanks to its ability to be connected to CAN through USB or SPI (serial peripheral interface) converters. For example, users can enhance a Raspberry Pi using the PiCAN2 board or a CAN network for the Revolution Pi. Micro-controllers and devices can communicate without a host computer in a low-cost, robust, and efficient way without complex wiring. It can be modified, too – great for problem solving engineers.

Speed, flexibility, cost reduction

The big advantage of a Raspberry Pi is, without question, the low-price, which keeps the barriers to entry particularly low. For around 29 euros, you can get a standard board and a wealth of possibilities. Any missing interfaces can now be added by a range of shields or hats. In addition, developers are finding they can work much more independently with mini-PCs. Solutions like open source developer portals are available for reference. Most of the time, the systems are based on Linux but there are also freely available software libraries with helpful developer forums. Working with low-cost hardware offers unimagined flexibility. Developers are able to find their own solutions to specific problems. When a new interface is needed, it is usually easier and faster to integrate it via an open source environment.

Paradigm shift in development

By contrast, a developer who relies on a proprietary control system will have to wait until the right extension has been developed and launched by the appropriate company. Here we see a clear paradigm shift: With low-cost hardware, developers can take their projects into their own hands, contribute ideas, and find solutions. This saves valuable development time and money. In a market environment that is becoming more dynamic and relying on rapid innovation, this is a key advantage. Electronics have developed rapidly in recent years. It is becoming increasingly clear that speed has become a decisive factor to be successful in this market.

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