

Fact sheet TwinCAT Core Boost

CPU cores deliver peak performance

Increasingly sophisticated processes and rising levels of automation require more and more powerful industrial PCs. Beckhoff supports advanced multi-core technologies to ensure that increased performance does not automatically mean higher energy and resource consumption due to high-frequency clocked processor cores.

With TwinCAT's long-established multi-thread capability, you can distribute applications across several cores. This leads to more efficient use of resources, but also – as a side-effect – promotes the trend towards producing CPUs with more and more cores while single-core performance increases at a slower rate.

Specific applications such as machine learning or computationally intensive vision applications now require significantly higher performance in some areas than they previously did. That is why we offer TwinCAT Core Boost, a software solution that lets you selectively boost individual cores and increase their computing power as a result.

Deeply integrated free clocking

With TwinCAT Core Boost, you parameterize the clock frequency of individual cores for specific applications and draw on the maximum performance as required – with software control, precision, and with automatic balancing of the overall system. The turbo option is deeply integrated into TwinCAT and runs constantly, so that you can permanently overlock individual cores in real time if required.

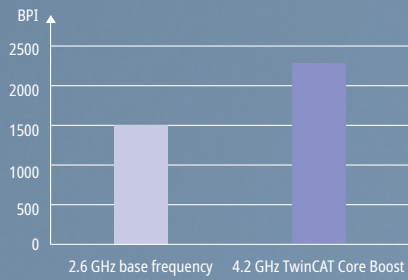
“PC-based control underpins our control philosophy. With TwinCAT Core Boost, we are expanding this philosophy by increasing hardware performance through software and making it parameterizable.”

Felix Wildemann

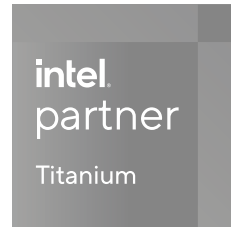
Industrial PC Product Management,
Beckhoff Automation



Single-core benchmark | Intel® Core™ i7-11850HE, 8 cores



Comparison of the single-core performance of an Intel® Core™ i7-11850HE at base frequency vs. TwinCAT Core Boost on a single core with identical CPUs.



Beckhoff is a Titanium partner of Intel® and has been developing PC-based control technology for automation processes for over 30 years. Beckhoff works in close cooperation with Intel® and Microsoft and employs their comprehensive specialist expertise to offer their customers innovative, cutting-edge industrial PCs.

Up to 50% more computing power per core

Whether you are using it for real-time transfers or user-mode applications, TwinCAT Core Boost allows you to configure the clock rate of each CPU core individually and fully exploit its performance potential. Up to 50% more computing power can be drawn upon per core. This is shown by current benchmarks.

Our tests show that the single-core performance of an Intel® Core™ i7-11850HE reaches the manufacturer's defined base frequency of 2.6 GHz. With TwinCAT Core Boost, it can be increased to up to 4.2 GHz. This means an increase in computing power and efficiency of up to 50% per core (see figure).

The advantages are numerous and immense: the software-initiated performance boost allows you to operate systems and machines even more

efficiently and shorten project cycle times – without having to invest in higher-performance processors. The bottom line is that this reduces both your hardware costs and hardware-dependent software costs. In short, TwinCAT Core Boost enables you to free up valuable performance reserves and master increasing requirements.

Intelligence and security included

Process reliability and stability are our priority. This is why we have integrated the turbo option into our automation platform so that TwinCAT continuously monitors important CPU values such as energy consumption or the temperature of the cores. What's the intelligent element here? If the defined standard values are exceeded, TwinCAT responds automatically and adjusts the performance and utilization of the individual cores while allowing real-time applications to keep running reliably.

Technical requirements

TwinCAT Core Boost is a fixed component of TwinCAT 3.1 Build 4026 – the current version of our Beckhoff automation platform. You can use TwinCAT Core Boost as a turbo option for individual cores with all industrial PCs equipped with Intel® Core™ i processors from the 11th generation.

How you benefit from TwinCAT Core Boost

- + up to 50% more computing power for one or more CPU cores
- + enables targeted, application-specific overlocking of individual cores
- + reliable and constant turbo operation for real-time applications, with permanent maximum clock speed if required
- + Smaller processors can be upgraded to a higher performance level for high-performance applications, saving on expensive CPU investments.
- + This leads to lower costs for software licenses; software license costs increase with processor performance.

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