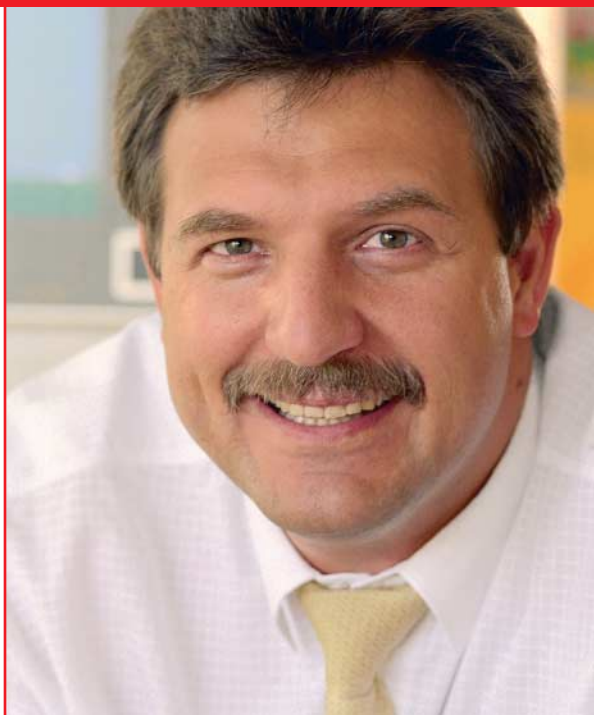


In an interview with Stefan Ziegler, Chief Editor of elektro Automation, Andreas Thome explains the Beckhoff control philosophy

“Bottleneck” interplay

→ The focus of the Beckhoff control philosophy continues to be on PC-based, centralized automation. For Andreas Thome, PC Control Product Manager, the emphasis has always been on customer benefit. With regard to the interplay in the discussion about data processing “bottlenecks,” Thome sees no system limitations or other problems with his automation solutions.



Andreas Thome, PC Control Product Manager at Beckhoff: “The trend in Industrial PCs is to use DVI for image transmission and USB for touch applications. The new single-cable solution for DVI/USB that we will present at the Hanover Fair 2006 even includes the power supply. The user therefore only needs one cable for connecting the display.”

What exactly is behind the Beckhoff control philosophy, and what technological changes have taken place recently, e.g. through EtherCAT?

| **Andreas Thome:** Our basic philosophy is PC-based control with focus on a central control system and non-intelligent field devices. In this context, we benefit from new chip generations and the developments regarding operating systems in our efforts to develop ever higher performance controllers, complemented by fieldbus technology such as EtherCAT.

EtherCAT represents another major advance in technology, not least because, from Beckhoff’s perspective, the “bottleneck” discussion – the question of whether the “bottleneck” in data processing is caused by fieldbus technology or PC-based control technology – has shifted towards the fieldbus over recent years. Our customers increasingly find that the bandwidths offered by conventional bus systems are inadequate. The fact is that more and more machines or processes require very fast, μ s-based control technology. While PCs can meet this requirement, conventional fieldbus technology cannot. In addition, we have always placed great emphasis on ensuring that all individual

components can optimally communicate with each other. The Beckhoff system offers capable decentralized solutions for modular customer applications. However, our philosophy continues to be based on the central concept, since we always strive to offer customer the most cost-effective solutions, which in most cases is a central solution.

Has EtherCAT moved the “bottleneck” back to PC?

| **Andreas Thome:** Yes, the focus of the “bottleneck” discussion is now moving back towards the central PC unit. It has to adapt, since a fieldbus that meets μ s requirements is now available. We have to try and deal with the associated data volume and speed on the PC and controller side. In practice, this means that future Beckhoff controllers should be equipped with two Ethernet interfaces by default, as demonstrated in the new “Economy” panels, for example. Each central unit will offer at least two Ethernet interfaces, of which one will be GBit-capable. While this is currently not required for EtherCAT operation, it will be necessary for future EtherCAT modes. The two interfaces also enable a clean separation between the EtherCAT world and IT applications. Ultimately, this also means that we will equip all our boards and our whole control technology such that it can work in conjunction both with the K-Bus world (original Beckhoff Bus Terminal I/O) and with the EtherCAT world – and in all shapes and sizes, ranging from small and medium controllers to large Industrial PCs.

That sounds like plenty of development effort.

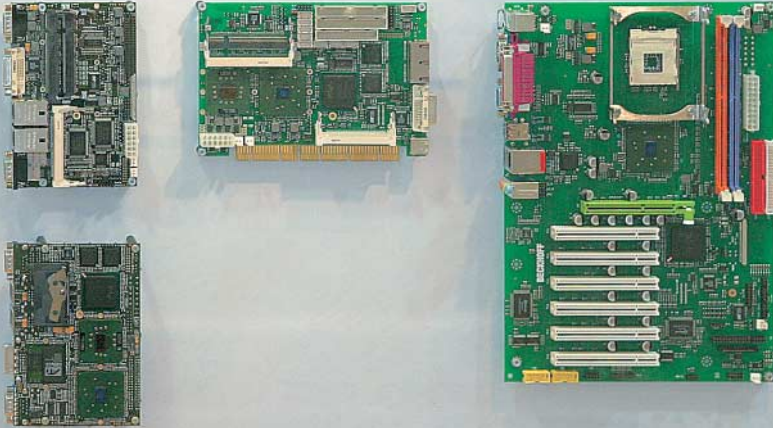
What effect has this had to date?

| **Andreas Thome:** Consistent adherence to this philosophy made Beckhoff decide to start developing and producing PC motherboards in-house again. This enables us to optimally apply PC-based, Ethernet-capable control technology in all our product families. Through precise selection of CPU, chipset, graphics capability and sub-I/O components, we are able to optimally configure systems in which jitter is largely avoided. Moreover, this step enables us to further improve long-term availability of motherboards.

B401:
- 3½-inch motherboard
- Intel® Celeron® M
- Intel® Pentium® M

B402:
- Slot CPU motherboard
- Intel® Celeron® M
- Intel® Pentium® M

B403:
- ATX motherboard
- Intel® Celeron® M
- Intel® Pentium® M



Beckhoff motherboards were presented at SPS/IPC/DRIVES 2005 in Germany.



Stefan Ziegler, Chief Editor
of elektro Automation,
www.konradin.de

Does this route not involve significant expenses for Beckhoff?

Andreas Thome: Price levels have largely become standardized worldwide. From our point of view, it therefore makes no difference whether the components are bought here or in Taiwan. The only remaining question is that of added value, where Asia no doubt offers more effective options. On the other hand, in-house development and production offers know-how gains and greater flexibility, which may well compensate the higher costs to Beckhoff. This flexibility gain also provides us with the freedom of deciding (independent of the market) what CPU or design to use. Naturally, establishing development know-how required significant effort, both financially and in terms of staff resources. The fact that Beckhoff has been developing and is still producing 486 and 586 systems has been very helpful.

Are your own motherboards also used in the new "Economy" panels that will be introduced at the Hanover Fair?

Andreas Thome: Yes, the "Economy" panels are one of the first product lines to benefit from this new development. The boards for medium and small control applications, e.g. for the CX family, and for the PC sector, e.g. the C69xx series, were also developed in-house. This technology will eventually be integrated into all product ranges, with the aim of optimum cooperation with TwinCAT as software and EtherCAT as fieldbus. Naturally, all these controllers also support conventional fieldbus systems.

What role do the new "Economy" panels play in the Beckhoff control strategy?

Andreas Thome: The new panels are around 20 to 40% more cost-effective than our existing devices, i.e. we are able to open up new markets, particularly for price-sensitive applications. The performance range includes ARM-based CPUs, Celeron® and Pentium® M processors, and therefore covers a very wide spectrum. Another application option is passive display elements, connected to the controller via CP-Link or DVI/USB. There is a clear trend towards the use of DVI for image transmission and USB for touch applications. At

Hanover Fair we will present a genuine innovation, i.e. a single-cable solution for DVI/USB and even for the power supply. The user now only needs one cable for connecting the display. In addition, we offer a solution for the DVI/USB extension up to a distance of 50 m. Standard DVI can only be used up to a distance of 5 m and would represent a step back, compared with Beckhoff CP-Link technology. However, we will continue to support CP-Link, since it opens up its own area of applications, with distances of up to 100 m. On the other hand, unlike CP-Link, the DVI/USB solution is not limited to a 15"-display size, but is suitable for 19" and beyond.

What other trends do you see in control engineering?

Andreas Thome: The trend is towards integration of PC and display. In the future, displays will become even more intelligent, offering central operating stations with an integrated PC. This trend is supported by increasingly powerful and energy-efficient computers. I do not foresee a general trend towards decentralized intelligence. From my point of view, this only makes sense for safety technology, where multi-intelligence is required for monitoring purposes. For example, Beckhoff is no supporter of PLCs running in drives, despite the fact that local computing capacity could be made available. We feel that it makes more sense to eliminate all cost factors from the drive and dedicate it to its actual tasks, such as current control or safety functions, as mentioned above.

And finally, back to the "bottleneck": With an optimum fieldbus system such as EtherCAT, central systems that simplify commissioning, monitoring and maintenance can be configured without problem.

→ EtherCAT www.beckhoff.com/ethercat/

→ "Economy" Control Panel www.beckhoff.com/cp69xx/