Peter H. Schäfer from A&D Newsletter
interviewed Hans Beckhoff on the subject of Industrial PC

Applications will define the Industrial PC of the future

The popularity of the Beckhoff EtherCAT at Hanover Fair proves there is still strong attendee presence at the show. The show attendees came to learn about new, exciting, and advanced technologies such as EtherCAT being offered by automation suppliers such as Beckhoff. EtherCAT is an open real-time Ethernet network that provides quantum leaps in high-performance machine control and simplifies the overall machine architecture.

Hans Beckhoff: "Industrial PCs have a big future. This is because these PCs can be adjusted to different applications and accurately tuned to different requirements. Also, there is further scope for down-scaling of PC technology, so that it will increasingly compete with classic embedded microprocessor technologies."

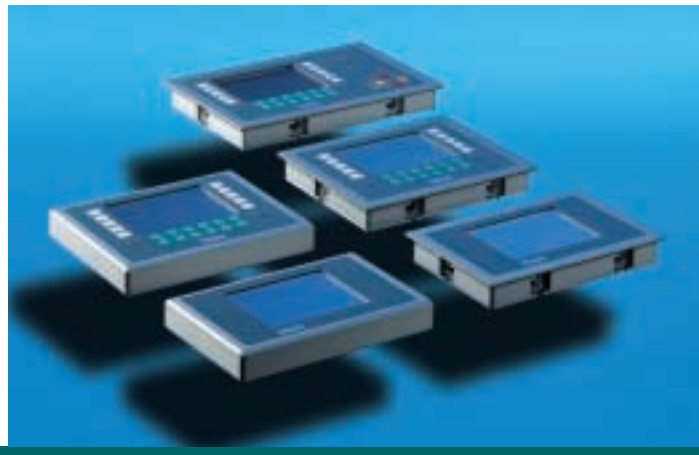
Quantum leaps are achieved thanks to the Beckhoff innovative and open approach to Ethernet. Simplicity is achieved by using the Ethernet port on a standard motherboard and nothing more. Furthermore, the standard motherboard can be smaller and low cost since no additional slots are required for expensive fieldbus cards. Smaller motherboards due to advances like EtherCAT are an example of how changing technologies are changing Industrial PCs. Peter H. Schäfer from A&D Newsletter asked Hans Beckhoff what the Industrial PC of the future will look like and what will be the important features.

Where does the Industrial PC sit within your company strategy?

Hans Beckhoff: We present ourselves on the market with a three-pronged strategy. On the one hand we are clearly positioned as an automation business and refer to Beckhoff as "The Automation Company". The Industrial PC plays an important role as part of our PC Control philosophy, because it represents the central processing unit for the control technology. The focus is clearly on automation. In the second part of our strategy, Beckhoff is "The I/O Company". We see a global independent market for I/O components, in which we act as specialists for these products. Last, but not least, this standard also applies to Beckhoff as "The IPC Company". In this segment we position ourselves as an Industrial PC company, acting as a competent contact for application-specific tasks for customers from all sectors of industry, ranging from mechanical engineering – our classic clientele – to process technology, building automation, metrology and even medical engineering – Industrial PCs are used everywhere. In view of all these options, we are establishing ourselves as a supplier both of standard solutions and of solutions that are tailored to particular industry sectors.

What is the significance of customer-specific control applications?

Beckhoff: Half of our IPCs and Control Panels are customer-specific, i. e. they are equipped with special front panels, additional keys and other customized, user-specific features.



Peter H. Schäfer, executive editor of A&D Newsletter,
publish-industry Verlag GmbH, www.aud24.net

Suppliers of special equipment want to stand out from other companies. How do you differ from other suppliers?

Beckhoff: On the one hand we have plenty of industry-specific experience, due to the fact that we have been building Industrial PCs since 1985 and have been selling them at a significant scale since 1990. This is particularly true for application-specific variants of Industrial PCs. On the other hand, we have introduced a variety of "technology first" solutions on the market, which is how we found many of our customers. In 1991, for example, we introduced the first all-in-one motherboard as a highly integrated Industrial PC with notable market success. This motherboard already had a graphics controller, a ROM disk and a fieldbus interface "on-board". In 1997, we introduced the Control Panel with CP Link philosophy, i.e. the separation of operating unit and PC via two simple coaxial cables with associated transfer electronics. This technology enables the separation of IPC and Control Panel over a distance of up to 100 m and was the next innovation leap that brought us large sales and design-ins. In 2002, we radically miniaturized the Industrial PC in the form of the CX1000. This top-hat rail PC quickly established itself on the market. We will continue along this path and present sustainable concepts that open up new markets for us. An additional advantage is our capacity: This year, we will build more than 10,000 Industrial PCs and are still able to customize even small series.

You have developed your own motherboards. Are these still being used, or do you now tend to fall back on standard components?

Beckhoff: This is where a mixed strategy comes in. If special motherboards are required due to a particular design, we develop them ourselves. Our top-hat rail PC CX1000 or our Control Panel PCs are typical examples. Here, the complete PC is integrated in a display with a thickness of only 30 mm – that design is best realized with our own motherboard development. For standard formats, i. e. where ATX formats are used, we have been cooperating with the same motherboard manufacturers for several years. We specify our motherboards, but have them developed and produced externally. For motherboard development we focus on industrial features, i. e. the suitable number or the right type of on-board interfaces and the suitable selection of components. An important point for our customers is long-standing availability of the motherboards, which is based on the embedded roadmap from Intel and other chip manufacturers.

How many years of availability does the embedded roadmap ensure?

Beckhoff: The crucial factor is the company Intel, whose embedded roadmap comes with a five-year availability promise, but not a guarantee. We build on this promise, which enables us to think in five-year cycles. However, this standard is only just beginning to establish itself within the industry. Nevertheless, we are still able to supply our customers with IPCs that we built back in 1992. Notwithstanding rapid technological development, customers are still requesting these PCs for their applications.

But not all customers? What procurement cycles are customary?

Beckhoff: Some customers will use a new 3.2 GHz processor as soon as it is on the market. For applications requiring intense computing power, motherboards

are replaced even if there is nothing wrong with them. However, this policy does not apply to the majority of customers. Most customers are interested in a continuous product policy, i. e. they accept two-year cycles for the Industrial PC. At the other end of the spectrum there are customers who will order the same Industrial PC for five or ten years.

How quickly does an Industrial PC become outdated?

Beckhoff: Since our IPCs are normally installed for a particular machine or a particular company, they will usually provide good service over many years, i.e. much longer than in home applications, since the tasks required from Industrial PCs are not changing immediately. In the Embedded-PC variant, the IPC is closely linked to a particular application. A universal computer on which a new operating system can be installed every year to cater for changing applications would therefore be oversized.

Many PC manufacturers today advertise with Industrial PCs. How can the customer be sure that "suitability for industry" is more than just a slogan?

Beckhoff: As an automation technology company that develops Industrial PCs we have several advantages. We know about clear quality requirements and approval standards from our experience in the automation industry. Examples are standards for harsh industrial applications, which PLC control also has to essentially comply with. We also use these strict standards for judging our Industrial PCs.

This has resulted in a comprehensive list of requirements for our Industrial PCs. Furthermore, for individual approvals such as UL, CSA of FCC we cooperate with accredited test laboratories.

The IPC market strives on OEMs. Who are the OEMs you cooperate with, and are there certain sectors in which you have a particular interest?

Beckhoff: We serve a broad market and have no industry-specific orientation. From its origins, our company has grown through orders for timber processing and window construction machines. However, we are now represented in all areas of mechanical engineering and building & process automation. Our largest customer makes up no more than three percent of our total turnover, so that we do not depend on a few large customers. Typical IPC customers will buy 30–50 IPCs per year from us, although of course we also have customers who order 500 or 1,000.

Many companies like to change from component suppliers to system specialists. What exactly do you mean when you refer to a Beckhoff system development?

Beckhoff: Many companies who previously used to offer a graphics card plus a few RAMs, for example, today enclose their RAMs with metal and call them IPCs. As an automation manufacturer, we have chosen a different path and are able to convince our customers with our automation know-how as an "IPC Company" or "I/O Company". The second issue when it comes to systems is the fact that we have developed a so-called system kit for our Industrial PCs, consisting of approximately 150 different elements. They are used both for our standard series and for our customer-specific variants. The skill consists in careful planning of the kit, and in complementing it with parts from the world market or through own developments. The kit has to be constructed systematically, so that it can be used to easily assemble the associated devices for different applications.

What does the PC of the future look like from your point of view? What developments are to be expected?

Beckhoff: Industrial PCs have a big future. This is because these PCs can be adjusted to different applications and accurately tuned to different requirements. PC technology enables the costs for Industrial PCs to be reduced further. Also, there is no doubt further scope for down-scaling of PC technology, so that it will increasingly compete with classic embedded microprocessor technologies.

The second development trend depends on your definition of an Industrial PC, i. e. whether the significant component of the Industrial PC is the Intel platform or the Microsoft operating system. Despite all differences in taste, for each application the user will decide whether the Intel platform or the Microsoft operating system is the crucial factor. In the latter case, X-Scale or Strongarm platforms are available in addition to Intel, offering further opportunity for down-scaling under Windows CE. For high-performance applications, the features of the Industrial PCs are also likely to shrink to what is actually required. To exaggerate a little, one might say that the Industrial PC of the future will have a cooling fin, an Ethernet/DVI/USB connection, and a power supply plug – that's all.

Will the Industrial PC learn from the embedded control solutions?

Beckhoff: The weak points of the Industrial PC compared with an embedded control will no doubt be tackled. Operation without fan and without drive will become standard. Many different types will meet this trend. The Industrial PCs will become even more compact and migrate into the actual operating panel. Depending on the application, the opposite may also occur, i. e. the IPC will be installed in the control cabinet as a box PC, and the control panel will then no longer be connected via DVI and USB, but via Ethernet using the associated software packages from Microsoft. However, there won't be a single design or a single mainstream development. The diversity of the Industrial PCs is determined by the different applications.