

Industrial PC – extreme space-savings and flexibility

The new ultra compact Industrial PC from Beckhoff is designed for universal application in automation, visualization and communication tasks. As Roland van Mark, Product & Marketing Management Industrial PC explains in this interview, the new model is inexpensive, compact and flexible, opening doors to application areas that were previously closed to IPC technology.

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Where is the C6015 ultra compact IPC positioned in the Beckhoff portfolio with regard to potential application areas?

With dimensions of only 82 x 82 x 40 mm, the C6015 is one-third the size of the C6905, previously the most compact cabinet-mounted IPC in our portfolio. With cost savings of roughly 25 %, it ranks far below the former lowest-cost x86 PCs from Beckhoff. This means that engineers can now implement automation, visualization and communication tasks for small to medium-sized applications very cost-effectively, with a minimal footprint. Furthermore, it opens doors to applications where PC-based control technology was not being used until now, or where motherboards had to be customized at great expense.

What are the most important features of the IPC?

The most important feature is its extremely compact size without compromising suitability for industrial applications. This is dem-

About Beckhoff

The product range of Beckhoff covers Industrial PCs, I/O and Fieldbus Components, Drive Technology and automation software, which are used worldwide in a wide variety of different applications, ranging from CNC-controlled machine tools to building automation. Headquarters is in Verl, Germany, turnover amounts to EUR 620 million (2015) and staff amounts 3,350 (January 2017).

Roland van Mark, Product & Marketing Management Industrial PC: "Despite its compact size and economical price, the ultra compact C6015 IPC from Beckhoff does not compromise its suitability for industrial applications."



onstrated by the high performance of the integrated Intel Atom CPU with up to four cores, and by the design as a passively cooled, long-term available device in a robust aluminum-zinc die-cast housing. It also meets other industrial requirements, such as an extended operating temperature range of up to +55 °C (131 °F) and exceptional vibration and shock resistance. I don't believe that this level of CPU power paired with all necessary PC interfaces has ever been available for industrial applications in such a small device.

How did you manage to develop such a compact design?

Our extensive motherboard development expertise was a critical factor in designing this exceptionally compact single-board computer. We also paid close attention to user requirements and preferences. Even if it is ultra compact, an IPC must still provide all the necessary interfaces for typical automation tasks. In addition to the power supply, these devices include two independent Ethernet ports, one USB 2.0 and one USB 3.0 port, as well as a DisplayPort. These interfaces are what ultimately determined the size of the IPC, because to keep the cabling simple, they had to be located on the same side, necessitating the 82 mm housing edge length.

How does this design affect the IPC installation in extremely confined spaces?

With the minimal size of the C6015, the six interfaces with their connectors and cables almost take up more space than the IPC itself. Therefore, it is critical that the connection level of the ultra compact IPC be precisely matched to the orientation of the cable inlet, usually predetermined by the machine layout. This is particularly true in space-constrained applications. We accommodate this with a highly flexible installation concept. Using two different installation frame types, the IPC can be vertically or horizontally mounted on a back wall or snapped onto a DIN rail. Moreover, the C6015 can be positioned anywhere within an appropriate mounting frame because of its symmetrical cooling fins. Rotating the IPC will not affect its heat management, because the cooling fins dissipate the heat equally in all directions. As a result, the installer can align the connector face perfectly with the incoming cables. In the past, this was often not possible and ultimately may have prevented the use of Industrial PCs in especially small installation spaces.

What are the advantages of the single-board design?

Designing the IPC as a single-board unit means that we can build a compact device in our own factory according to highest standards of efficiency and reliability. The user receives a high-quality, yet affordable industrial-grade product. Another important aspect is our quality control, which is performed entirely at the Beckhoff



The ultra compact IPC is just one third the size of the C6905, previously the smallest cabinet IPC available from Beckhoff

factory in Verl. We perform thorough tests of the boards after the assembly process, before and after installation in the housing and final tests of the finished IPC.

The C6015 was especially designed for cost-sensitive applications where space is at a premium. Can you give us some examples?

With its powerful Intel Atom CPU, the ultra compact IPC is especially well-suited for small and medium-sized applications in the areas of automation, visualization and communication. It works particularly well where machine designers otherwise need to integrate highly individualized electronics, usually because of lack of space or for historical design reasons. If you want to stay up-to-date in technological terms, such customized designs can become very expensive very quickly. In addition, most machine designers' strength lies in the end process and mechanical engineering, which is often much easier to implement if they just buy the latest control electronics from a third party. The same applies to many research institutions, test-bed builders and process technology companies.

To what extent does this advantage apply to Industrie 4.0 and the Internet of Things?

Decentralizing the intelligence is critical for Industrie 4.0 and IoT concepts. I foresee numerous potential applications for the C6015 where users want to collect machine and process data for transmission to cloud-based systems in very confined installation spaces. In such cases, the ultra compact IPC can function as an intelligent IoT gateway, which is also able to buffer large data volumes or to run remote diagnostics.

Photographs: Beckhoff Automation

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