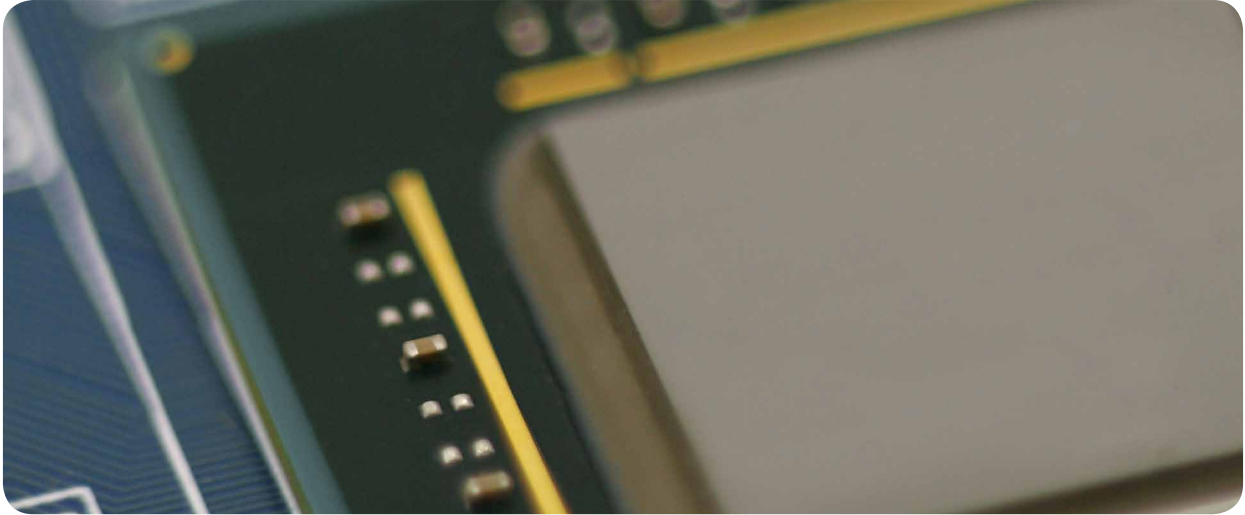


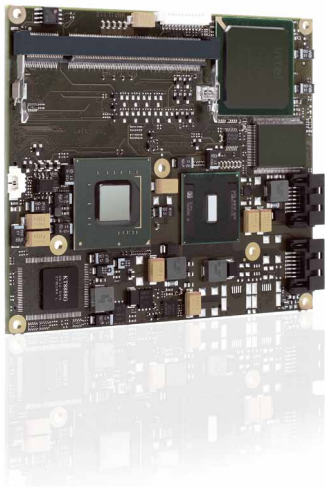
# » Application Story «

ETX® in Industrial Automation



**With the borrowed eye, distance from your customer is no longer a problem**

**Wearable PC with Kontron ETX COM used around the world in mobile service**



The size of a first generation Walkman, the i-boro PC, which can be worn on a belt, is integrated into a novel communications system for service and maintenance work on devices, machines, and facilities. The system is based on ETX Computer-On-Modules (COM) from Kontron and was developed by ies Industrie-Elektronik Schmitz in cooperation with SN Technics. It delivers Intel® Pentium® M performance for bi-directional audio and video communication between central service technicians and on-site maintenance personnel.

The i-boro (pronounced „eye borrow“) PC can be worn on a belt, but it can also be described as a „borrowed eye on site“: with a unique VCD headset (Voice Camera Display) for bi-directional IP communication, distance is no longer a factor. Time and costs in on-site after-sales service and maintenance are significantly reduced. OEMs provide



these WLAN, UMTS, and satellite-capable systems with the documentation for the device, machine, or facility. Employees of the end user or local machine service staff can carry out the first diagnostic steps in repair work and regular maintenance. With support from an OEM central service center employee, even difficult tasks can be solved with remote support. Depending on the OEM's service concept, maintenance documents, animated quick reference guides for standard maintenance, or even avatars can be used off-line on the wearable PC in order to reduce costs for the end user and time for the central OEM service employee to a minimum. Maintenance and repair tasks are delegated as far "down" as possible. The vision even goes beyond today's technology: in the long term, virtual reality image recognition-based UIs will perfect solutions like the i-boro. The appropriate software is being developed by many suppliers. RFID tags will support this path with decentralized intelligence. But right now, the extremely small autofocus zoom camera and the powerful and – thanks to smart battery support – battery-saving wearable PC represents a crucial milestone for this technology, which will lead to market penetration. Up to now, problems such as manual focusing of the lens, relatively limited resolution rates in image transmission, and a lack of zoom function were as much of a stumbling block to extensive market penetration as processor performance with appropriately low energy use at attractive prices. With the new i-boro system from SN Technics, this obstacle has now been overcome. The camera focuses automatically and provides brilliant image data, zoomed as needed, in VGA or SVGA resolutions. Camera zoom functions are controlled via a keypad integrated into the i-boro. Interfaces for WLAN, UMTS, or satellite are available as communication interfaces for the IP-based communication of images, video, and audio data.

The first users and interested parties in the fields of

- » Machine and facilities construction
- » Auto manufacture and supply
- » Pharmaceutical and chemical manufacture
- » Printing industry and publishing
- » Energy
- » Shipbuilding and ship owners
- » Household appliance manufacture
- » Aircraft maintenance
- » Defense, etc.

can expect savings of several million dollars thanks to the i-boro, because current practice requires service technicians to be called to the site to determine in the shortest possible time what replacement parts are needed. Depending on the location, it may be necessary to wait one or two days for the replacement before it can be installed to bring the machine back into operation. This quickly leads to avoidable costs of a few thousand dollars per service technician-year. However, these costs alone are not crucial: much more important for end-users is reducing downtime to a minimum, since production grinds to a halt when the machines are not working. Depending on the product, immense margins can be lost.





### Technical highlight: thermal design, the smallest box and smart battery support

The developers have come up with something special in the housing design for cooling the powerful Intel Pentium M processor. While in principle, cooling a 1.1 GHz Pentium M is no problem, at the system dimensions of a mere 230x140x44 mm, this is usually done through passive thermal coupling to the housing. However, this method is undesirable in a wearable system, because the housing would reach 50 degrees Celsius, which would be uncomfortably warm on the body. For this reason, a solution had to be developed that did not couple the thermal design to the housing, yet is robust enough to withstand long-term mobile use. The solution is based on an integrated passive heatpipe that is insulated from the housing; at the internal end, the turbulence of the waste heat is ensured via a microfan, meeting the highest MTBF requirements. More details are proprietary, because the unique design promises SN Technics a competitive advantage and is even more design wins in the field of mobile computing. Furthermore, smart battery support is an important criterion for mobile applications, because ideally the operating period of the battery should cover a full working day. This is



possible, but is currently impractical because the batteries needed to run the application continuously for eight hours are still too heavy. For this reason, the system has a buffer battery so the batteries can be exchanged while in operation. The system runs for 10 minutes without a battery and then shuts down automatically and error-free if there is no power supply. Depending on the operating mode, the system automatically switches its resources on and off in order to save energy, which is always in short supply in mobile applications. In day-to-day operation, one battery is currently sufficient for 4 hours. The second battery can be carried in a belt pouch with a Velcro fastener, but does not need to be worn the whole time. The energy management functions were developed together by SN Technics, ies, and Kontron and will soon be available through the three companies, so that developers of these functions will hardly have to put in any effort on them, because they will be part of the board support package.





## COMs reduce the pressure for electronics developers

The PC system design with Intel Pentium M 1.1 GHz processor (optionally 1.8 GHz) and up to 1024 MB RAM is based on Computer-On-Modules (COM). The form factor of a COM determines the format for the fully-fledged PC. In practice, the dimensions are 95 mm x 114 mm. Depending on the interfaces and expansion cards needed, the developer can design the baseboard to be larger or smaller or highly integrated. This also means form fits function 100 % and no one is tied to the standard Single-Board Computer form factor. The layout of the basic circuit board can therefore be round or even triangular. However, COMs are not used just because of this high degree of freedom in developing OEM solutions. They are also particularly sought after because otherwise more and more complex processor technologies would consume tremendous resources in the development and maintenance of hardware and software. More time and manpower would also be needed for in-house development in order to bring products onto the market in good time. Often, a significant investment in suitable measuring equipment can drive development costs to unexpected heights. The use of COMs allows users to employ proven systems with higher functionality as building blocks, and concentrate fully on their core competence. COMs simplify product maintenance by reducing the parts list from several hundred individual components to just one element. Cancellations of nonessential components do not require additional redesigns on the computer module, because Kontron guarantees a minimum five years form-fit function on its COMs. With a shorter time-to-market, a lower design risk, always the most up-to-date computer technology and no additional expenses for hardware and software maintenance, more and more manufacturers of devices and systems are using these advantages for a wide variety of applications and industries, because the outsourcing advantage is unmistakable with COMs.

## ETX, the market-leading computer-on-module standard

The i-boro system uses ETX modules from Kontron. ETX modules – which are classified by the independent analysts VDC as the market leader by far in the COM field – have a standardized, extremely compact form factor (95 cm x 114 cm) that offers the user identical mechanical dimensions, the same placement of mounting holes, and a uniform thermal interface to the system housing; also, most importantly, all electrical signals are guided to the carrier board using the same pin compatibility and voltage level. The decision to comply with the ETX COM standard, published in 2000, made it possible to equip the i-boro solutions from SN Technics with suitable performance without appreciable expenses. Currently, solutions are primarily based on the Intel Pentium M with 1.1 GHz. Additional performance upgrades are possible. Interestingly, the Pentium M processor's performance is comparable to that of a 2.3 GHz Pentium 4 processor, but generates significantly less heat and can therefore be operated without a fan.

Another advantage of using COMs for SN Technics is the ability to adapt the base circuit board easily to any new requirements without having to commission a completely new board design. Thus, necessary new developments can be adapted to the latest requirements with the least expense. "Thanks to ETX, smart battery support, and the powerful, energy-saving Intel Pentium M processor, it was possible to adapt the PC technologies of the new i-boro to all important market requirements. Coupled with the new camera technology we were able to take from medical technology, for the first time a solution is available that is interesting not just to early adaptors, but which will provide wide circulation," says development manager Jörg Seitz from the manufacturer SN Technics. The first pilot projects with Bosch, Daimler-Chrysler, DMG, and Miele confirm this prognosis.



### ETX 3.0 offers SATA

In order to realize the current module scalability requirements beyond pure performance classes for newer interfaces on ETX as well, Kontron, together with Adlink and MSC, published the 3.0 specification for ETX in March, 2006. It will soon be available for download at [www.etx-ig.org](http://www.etx-ig.org). 2 x SATA was implemented as a significant expansion, while ETX 3.0 computer-on-modules are 100 % backwards compatible to previous ETX specifications. The integration of 2 x SATA is

implemented on the ETX module itself, so that existing baseboard designs do not have to be altered in order to be able to use SATA hard drives. With the new ETX 3.0 specification, the ETX consortium emphasizes that they will continue to provide long-term support for ETX for many years to come. Kontron will support the first ETX 3.0-compliant products with VIA C7, as well as Intel® and AMD processors.

### i-boro soon from SN Technics

- » The industrial-grade i-boro is based on an ETX-PM module with 1.1 GHz Intel Pentium M processor and features all the standard interfaces necessary in industry (USB2.0, Firewire, PCMCIA).
- » The headset for sound, zoom camera, and eye monitor weighs a mere 770 grams.
- » The controls for the screen menu and camera are integrated into the i-boro via a 2-button mouse and 4 button keypad.
- » WLAN, UMTS, and satellite are supported as interfaces to the central technician.

### About ies

The mid-sized company ies Industrie-Elektronik Schmitz GmbH & Co. KG, based in Kierspe, North Rhine-Westphalia, Germany, is a system partner and distributor of Kontron, with over 35 years of experience in measurement, process control, and automation technology. The company has been involved in the field of embedded computer technology for about 10 years. The abbreviation ies also stands for "intelligent embedded systems". In 2005, ies achieved sales of 2 million Euro just with embedded computer modules and customer-specific developments based on COM standards from Kontron. ies is a refiner of Kontron products and, thanks to many years of close cooperation with its partner Kontron, facilitates the usability of industrial computer systems, even in the most difficult areas of application.

### About SN Technics

Since its foundation in 1996, SN Technics GmbH has established itself as a recognized and powerful partner for electronic solutions and information technologies for after-sales service. The company primarily serves customers in the processing industries, especially machine and facility construction. SN Technics bundles years of know-how into a long-sought product solution: the mobile service and communications tool i-boro. The first of its kind, i-boro is the highlight of the SN Technics range of products. This completely novel service tool offers users innovative, never before seen advantages in on-site service. For more information, visit [www.sntechnics.de](http://www.sntechnics.de)

## About Kontron

Kontron designs and manufactures standards-based and custom embedded and communications solutions for OEMs, systems integrators, and application providers in a variety of markets. Kontron engineering and manufacturing facilities, located throughout Europe, Americas, and Asia-Pacific, work together with streamlined global sales and support services to help customers reduce their time-to-market and gain a competitive advantage. Kontron's diverse product portfolio includes: boards and mezzanines, Computer-on-Modules, HMIs and displays, systems, and custom capabilities.

Kontron is a Premier member of the Intel® Embedded and Communications Alliance.

For half-a-decade now, Kontron has been named a VDC *Platinum Embedded Board Vendor*. Based entirely on user feedback, industry professionals evaluate vendors on over 45 non-product related criteria. Kontron is only one of two companies to receive the Platinum award 5-years running.

Kontron is listed on the German TecDAX stock exchange under the symbol „KBC“.

For more information, please visit: [www.kontron.com](http://www.kontron.com)

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