



OPTIMIZING EMERGENCY PATIENT CARE

SUDDEN RESPIRATORY ARREST OR ACUTE RESPIRATORY
DISTRESS - A PATIENT'S LIFE CAN BE AT STAKE WITHIN A MATTER
OF SECONDS IN SUCH CRITICAL SITUATIONS

▶ KONTRON'S COM EXPRESS MODULE HAS PROVEN ITSELF IN HARD EMERGENCY USE



INTENSIVE CARE VENTILATORS ARE INDISPENSIBLE IN THESE CASES IN ORDER TO SUPPLY THESE PEOPLE WITH OXYGEN FOR A CERTAIN PERIOD OF TIME UNTIL THEY START BREATHING ON THEIR OWN AGAIN. WITH THIS IN MIND, IMTMEDICAL DEVELOPED ITS BELLAVISTA PRODUCT LINE, WHICH WORKS WITH COM EXPRESS MODULES FROM KONTRON.



// IMAGE: THE INTEGRATED KONTRON MODULE TAKES OVER THE DISPLAY AND VISUALIZATION OF THE CURRENT VENTILATION PARAMETERS

„Making ideas work“ is the motto of the Swiss company IMT AG, which has been manufacturing innovative products and software solutions for more than 20 years. The technology experts help customers from all over the world on their way to success on the market in their specific fields. The company employs more than 60 engineers in the fields of medical technology, quality services, embedded systems, IT applications and industrial automation. The project leaders' many years of experience and work in interdisciplinary projects ensure revolutionary and innovative solutions that are also profitable. IMT AG focuses on the development of complete solutions that integrate software, electronics and mechanical systems. Compliance with regulatory requirements such as those for the CE mark and FDA approval are obligatory.

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In order to optimize emergency patient care, the Swiss IT company imtmedical, an internationally operating manufacturer of solutions in medical ventilation technology, put the development of a new, innovative intensive care ventilator on its agenda in 2008. The vision was to develop a device that featured an innovative operating principle and that integrated maximum ventilation performance and reliable diagnostic options. Imtmedical wanted to set new standards in the medical ventilation environment. The company brought the experienced technology manufacturer IMT AG on board for the project. The result of the technology partnership: the team was able to present the bellavista 950 and 1000 in 2013. „The system's core element is a COM Express module from Kontron,“ explains Daniel Müller, Development Team Manager and Project Leader at IMT AG. „This product already showed its performance and range of functionalities during the evaluation phase and clearly distinguished itself from the competition. This allowed us to achieve a distinct market advantage for our new developments right from the start.“

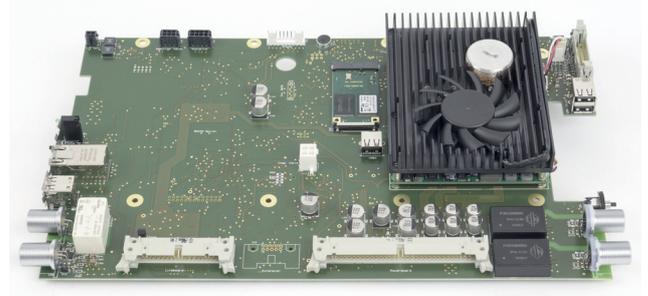
INNOVATION MEETS REVOLUTION

For the new product line, imtmedical specified the shortest possible time-to-market for an intensive care ventilator with well-engineered components. Also on the wish list were modern touch control and clear presentation of the patient data. It also had to be possible to pass the data output and any critical alarms on to the medical staff in real time in order to guarantee optimal patient care.

DEPENDABLE AND STABLE PROCESSOR MODULE SOUGHT

The system is used in critical situations and consequently dependable, stable, high-performance components were indispensable for IMT AG. The product was ultimately intended to take over the vital ventilation of people in emergency situations in various environments. „Intensive care ventilators draw air from the environment by means of a turbine. This air is filtered and supplied to the patient under increased pressure,“ is how Müller explains the function. In the bellavista, the control of the pressure and the volume to be administered was to be handled by various

processors working in accordance with the latest technological standards. „In-house developments would have been inconceivable for such a specific system,“ says the project leader. „We were therefore looking for a partner with the necessary expertise who could supply us with a powerful computer-on-module that satisfied our technical requirements. Reliability, quality, and cost efficiency in the framework of completion were likewise crucial for us.“



// IMAGE: THE COM EXPRESS MODULE IS USED IN THE BELLAVISTA 950 AND 1000 VENTILATORS AND HAS PROVEN ITSELF IN HARD EMERGENCY USE.

EMBEDDED SPECIALIST OFFERS IMPRESSIVE DECADES OF EXPERTISE

After intensive platform evaluation, a COM Express module from Kontron, a leading supplier of embedded systems, was finally chosen. The company stood out with its 14 years of expertise in implementing reliable solutions based on computer-on-module technology. Kontron is also one of the driving forces behind the COM Express standard. The embedded specialist's engineers' daily work includes intensive participation in further developing the standard. The Kontron modules feature robustness, quick performance and the obligatory safety features. „We chose the COMe-bSC2 COM Express module in the basic form factor. In addition to sufficient processor performance, it also offers additional, flexibly configurable digital display interfaces (DDI) for SDVO, DisplayPort and HDMI/DVI,“ Müller relates. Up to two gigabytes of error-proof ECC DDR3 RAM were integrated for safety-critical applications. The Celeron B810E was used as the CPU.



THE COMe-bSC2 COM EXPRESS MODULE WAS CHOSEN IN THE BASIC FORM FACTOR. IN ADDITION TO SUFFICIENT PROCESSOR PERFORMANCE, IT ALSO OFFERS ADDITIONAL, FLEXIBLY CONFIGURABLE DIGITAL DISPLAY INTERFACES (DDI) FOR SDVO, DISPLAY-PORT AND HDMI/DVI

COMPREHENSIVE SUPPORT INCLUDED

The software has been continually updated since the intensive care ventilators in the bellavista family were first completed. "New developments are always subjected to enormous economic and technical pressure," Müller knows from experience. "As with most complex systems, we also had to clear a few stumbling blocks from our path during the development phase. For me as the project and team leader, it was therefore enormously important that our team could count on support from Kontron during all project phases. Particularly the direct contact with the responsible engineers sped up the problem-solving process."

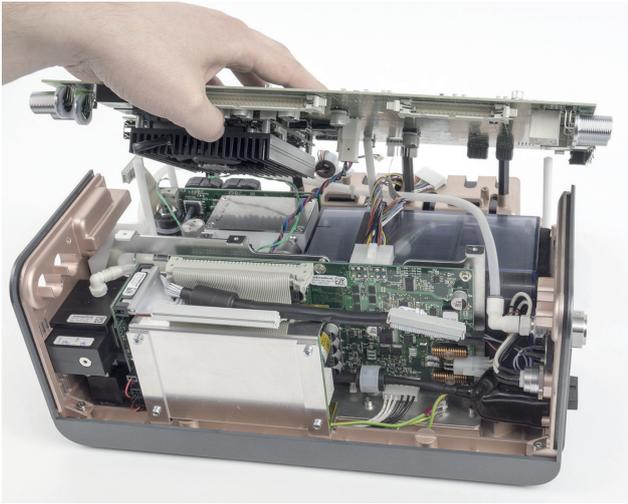
Because medical systems are subject to strict standards, the precise definition of which parts of the device would have to be tested according to which criteria was already settled in advance. "Each discipline is fundamentally scrutinized at every development stage," Müller explains. "This includes module, integration and system tests in the disciplines: software, electronics and hardware." For the first version of the ventilator, the development team meticulously conducted all the tests, while for successor versions they only monitored the particular changes that were made and conducted additional continuous operation tests. The project leader and his team were fully satisfied with the Kontron processor module's performance in all the jobs it carried out in the clinical process during a period of around 2,000 hours.

INTELLIGENT VISUALIZATION AND ALARM FUNCTIONS

Today the Kontron module is used in the bellavista 950 and 1000 ventilators and has proven itself in hard emergency use. The intuitive Touch Control allows the medical specialists to make new ventilation settings easily and to adapt them individually to the situation and the patient's condition. The integrated Kontron module handles the display and visualization of the current ventilation parameters, which are shown in real-time curves and numerical measured values. This allows a differentiated statement to be made on the current state of the patient's health. The patient data are additionally evaluated and monitored at runtime. The system automatically recognizes unsuitable settings and potentially dangerous situations for the patient and sets off corresponding visual and acoustic alarms to which the medical team can appropriately respond.

LONG-TERM AND REAL-TIME TRENDING

The COM Express module ensures continual recording and storage of the patient data retroactively for up to one year. Corresponding interfaces allow the data to be exported to a multitude of prevalent storage media, such as USB sticks. This allows medical specialists to conduct a quick and reliable analysis at any time. The continual recording of the real-time data for each breath - going back for up to two weeks - simplifies the analysis of the therapeutic process.



// IMAGE: USING THE KONTRON MODULE SIGNIFICANTLY CONTRIBUTED TO THE ABILITY TO BRING THE INTENSIVE CARE VENTILATOR ONTO THE MARKET AFTER A COMPARABLY SHORT DEVELOPMENT TIME."

PERFECT CONNECTIVITY AND SOFTWARE MAINTENANCE

"We see the Kontron module's flexibility as a major advantage for us. Communication with external sensors and patient data monitoring systems from other manufacturers runs without any problems," Müller points out. The device also automatically detects all available software updates and automatically installs them on its various processors.

"In complex systems, it is crucial to select the right components in order to get the product onto the market as quickly as possible," Müller knows from experience. "Using the Kontron module significantly contributed to our ability to bring the intensive care ventilator onto the market after a comparably short development time."



Thousands of uses and future projects ahead

Since its market launch in 2013, the intensive care ventilator has been used thousands of times in hospitals in various countries in Africa, Asia, Europe and South America. The device has also proven its value in harsher environments, not least due to the robust Kontron module. „The COM Express module is compact and works efficiently and reliably even under difficult circumstances,“ project leader Müller praises. „The cooperation with Kontron was exemplary and has created the basis for further product developments.“

About Kontron

Kontron, a global leader in embedded computing technology and trusted advisor in IoT, works closely with its customers, allowing them to focus on their core competencies by offering a complete and integrated portfolio of hardware, software and services designed to help them make the most of their applications.

With a significant percentage of employees in research and development, Kontron creates many of the standards that drive the world's embedded computing platforms; bringing to life numerous technologies and applications that touch millions of lives. The result is an accelerated time-to-market, reduced total-cost-of-ownership, product longevity and the best possible overall application with leading-edge, highest reliability embedded technology.

Kontron is a listed company. Its shares are traded in the Prime Standard segment of the Frankfurt Stock Exchange and on other exchanges under the symbol "KBC". For more information, please visit: www.kontron.com



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