» Application Story «

Box PC in Infotainment

Ocean-going high-end entertainment platform

Embedded Box PCs in use as a multimedia entertainment system
for luxury yachts

ABS GmbH in Saarbrücken, Germany has developed a new IP-based multimedia entertainment system specifically for use on yachts. With the all-in-one system one can watch TV, play games, surf the internet, make telephone calls and listen to music or radio as well as handle computer work and control lighting and climate. The universal hardware basis for this multifunction device is a custom-configured "oceangoing" embedded Box PC from Kontron.

For the discriminating individual who wishes to relax and unwind aboard a luxury yacht, entertainment offerings without compromise are an absolute must. Thus, high demands are placed on entertainment systems for luxury yachts — e.g., the playing of one's favorite movie or favorite music upon request via video and audio on demand, making phone calls, surfing the Internet on a large HD flat screen and even playing multiplayer games via network. On luxury yachts, such applications are increasingly becoming the entertainment standard. A comfortable and high-quality ambiance control for, e.g., lighting and cooling as well as for steward call functions must also be included, even in the basic version. However, separate systems are still currently used for these different applications, and with limited user-friendliness in some cases. As a result, one is left with an abundance of cables and systems and ultimately double or triple the cost. Today, however, this need not be the case.

Computer systems: the born multimedia powerhouse

Ideally, all applications should be bundled into multifunctional multimedia devices that provide a uniform user interface for greater convenience and also need only a single cable infrastructure instead of a multitude of expensive data lines (such as coaxial cable for TV and radio, twisted pair cables for telephone and eight-wire Ethernet cables for the PC). For such an all-in-one system, PC technology with networking via Ethernet is ideally suited. Through custom software and flexible systems, additional functions can be integrated

at any time, and with only one cable (or wireless node) the infrastructure for all services can be expanded very easily, quickly and inexpensively. Compared to coaxial cable, this results in significantly reduced cabling costs with no loss of signal quality, even with long cable lengths. Additionally, the mishmash of different terminal types can be replaced by a single standardized client, of which almost any number can be integrated into the network, given sufficient bandwidth. Today, Gigabit Ethernet already serves as a standard for this purpose. Over this single interface, all currently available media and services can be easily accessed through the individual content servers or via communications gateways. Additionally, WLAN is now fast enough to transmit HDTV video.

Standard PC solutions are not suitable for use on yachts

For the PC clients, however, most hardware bases are unsuitable. In the same way that an ordinary package holiday cannot compare to the rest and relaxation afforded aboard a luxury yacht, a standard PC-based solution is not in any way sufficient to provide a multimedia solution for yachts. Additionally, conditions at sea are quite different than at home in the living room. Systems in a maritime climate are often exposed to high temperatures, humid and salty air as well as vibrations and shocks. Also, since the ABS entertainment system components will be concealed inside the cabin interior, they must be very compact and passively cooled. Furthermore, multiple interfaces such as digital or analog 5.1 audio for Dolby Surround are required. Given these demands, only an

The easy-to-use User-Interface of the ABS-Entertainmentsystem can be operated intuitively and offers a broad variety of functions, like music playback, ambiance control or video-on-demand service.

individually-configurable embedded computer system has the necessary robustness and flexibility for use on a yacht. Moreover, for short-cycle consumer products, embedded computer manufacturers guarantee multi-year long-term availability of the installed components. Since boats are long-term investments, this aspect is of considerable importance.

Embedded technology and multimedia - a contradiction?

For providers of multimedia entertainment systems such as ABS, the choice of an appropriate embedded computer poses a new problem — embedded products are mostly designed for durable and long-term available industrial applications. For this reason, most manufacturers have no multimedia components such as high-performance graphics chips in their portfolio; the streaming of feature films and digital multimedia connections such as TOSLINK or analog RCA jacks for 5.1 surround sound are simply not in demand in the manufacturing plant. The individual system components must be purchased separately from various manufacturers and implemented into a system. This represents an enormous logistical and system design effort. Therefore, ABS sought an embedded manufacturer that offered both entertainment-capable components as well as the complete hardware basis for an entertainment system with ready-to-install embedded Box PCs from a single source. Because of the high customization requirements of multimedia entertainment applications, the Box PC also had to be very flexibly interpretable — from the long-term available and robust graphics card to the 5.1 channel surround sound via digital optical and analog audio outputs with gold-plated RCA jacks for the best and most trouble-free (and also most corrosion-resistant) sound quality.

Embedded multimedia Box PC

With the Concept Box PC, Kontron provided the ideal hardware platform for this purpose. It offers OEMs an individually-scalable embedded multimedia Box PC solution. According to the principle of "form follows function", customers can configure the Kontron Concept Box PC as required in terms of size, feature set and system assembly. The Kontron Concept Box offers OEMs a single platform that provides the flexibility of a custom design with the time-to-market of a commercial off-the-shelf solution. Thus, with the Concept Box series, Kontron gives OEMs a huge competitive advantage in the important time-to-market factor. Within a few days after the customer has specified the desired system configuration, the first system simulation is already available. The first functional prototype then follows only a few weeks after finalizing the system simulation. Finally, serial production can begin promptly after prototype approval. Through ideal project management and consistent milestone policies, serial production can start within a single quarter, enabling the fastest innovation cycle, from initial concept, to delivery to the customer.

Flexibility in form and function

The base configuration of the individual Kontron Concept Box is defined by the choice of the appropriate Kontron embedded motherboards, of which Kontron already offers countless variants in serial production. Customers can choose from the Intel® Atom™ Processor® N270 up to the latest multi-core processors. The outer shape of the system also meets the requirements of the OEM or installation situation, such as, in the case of ABS, the cabin wall mounting conditions aboard yachts. This high flexibility of the Kontron Concept Box series is made possible by a modular housing concept based on standardized housing profiles, which can be customized as needed in regards to length and width. The front of the system, which features individual recesses for the dedicated I/O, as well as the rear will also be manufactured from standard profiles. This free interpretation provides a decisive advantage for precisely-tailored assembly and for interface design needs.

Durable and long-term available

All currently available versions of the Kontron Concept Box are fanlessly designed and, in comparison to the typical office PC, offer more reliable operation in the extended temperature range from 0 to 50°C. Since the customer obtains all relevant system components from a single system supplier, the overall responsibility for the platform lies in one hand, which is very beneficial when service is required. Long-term availability is ensured for many years because lifecycle management of the boards is also in the hands of the system supplier. Thus, the user can relax on the open sea and enjoy rich multimedia entertainment for years and the OEM can be sure that they have a reliable platform, which, due to the highest MTBF values, is highly unlikely to have a system failure while out at sea. In addition, the same hardware platform will always be used in the years ahead, greatly facilitating and expediting any future service.

Quality "Made in Germany"

This alone was not decisive for ABS. "The high quality of standard products together with the short development times for individual solutions and guaranteed compliance with current industry standards. For us, all of these things combined equal the value added by Kontron," says Christopher Koch, CEO of ABS Ltd., "because time is money. But without proper care, a fast time-to-market doesn't help matters. Rather, it hinders them, because in the luxury yacht sector everything must be of the highest quality."

The system configuration of the Multimedia-Box

The Kontron Concept Box PC functions in the entertainment systems from ABS as multimedia clients. For the clients, ABS opted for soldered 986-LCD BGA Embedded Mini-ITX motherboards, with either 1.06 GHz Intel® Celeron® CPU or 1.66 GHz Intel® Core™ Duo. For data storage, 2 GB of CF storage media are available, they operate absolutely silently and thereby do not emit any disruptive background noise into the yacht cabin. For the best graphic resolution, the dedicated embeddedgraphics board provides a dFlat-PEG-M72 with 256 MB of graphics memory for demanding multimedia applications up to QXGA resolution (2048x1536), including HDTV and all other wide-screen resolutions. Support for DirectX10, OpenGL2.0 and Shader Model 4.0, amongst others, ensure the latest 3D acceleration. The Box PCs developed for ABS boast 4x RS232, 8x USB and 2 Firewire ports. For sound output, there are 6 gold plated RCA jacks for analog 5.1 audio and a digital sound input available. For digital sound output, the box also offers a gold connector jack, and an optical TOSLINK connector. For optimal crosstalk attenuation, the bushings are spaced at least 1.5 cm apart from each other. This specific configuration of the Kontron Concept Box is recommended not only for yachts but also for many other multimedia applications in the infotainment and digital signage sector. The expansion slots can also be suitably equipped for a variety of other vertical markets. The scalable embedded Box PC solution, for example, is already in operation in the industrial, medical technology, and transportation vertical markets, further ensuring system availability.

The Kontron Concept Box is the ideal hardware basis for ABS Entertainmentsystems. The Box-PC has the necessary robustness for use on yachts and, thanks to component´s long-term availability, guarantees the joy of great multimedia services for several years.

About abs

abs is the leading provider for multimedia entertainments system completely based on IP technology. Our expertise is to deliver and to distribute the contents in an IP network with focus on quality, high availability and performance. This ability we have shown in many projects for professional users and large entertainment systems.

About Kontron

Kontron is a global leader in embedded computing technology. With more than 40 % of its employees in research and development, Kontron creates many of the standards that drive the world's embedded computing platforms. Kontron's product longevity, local engineering and support, and value-added services, helps create a sustainable and viable embedded solution for OEMs and system integrators.

Kontron works closely with its customers on their embedded application-ready platforms and custom solutions, enabling them to focus on their core competencies. The result is an accelerated time-to-market, reduced total-cost-of-ownership and an improved overall application with leading-edge, highly-reliable embedded technology.

Kontron is listed on the German TecDAX stock exchanges under the symbol "KBC". For more information, please visit: **www.kontron.com**

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