

Keep Pace with Embedded Computing Innovations to Meet Medical Systems Trends

The use of standard embedded form factors and new Intel technologies ensure smooth migration and help overcome barriers.

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Computing technology innovation gives manufacturers of medical technology distinct advantages for next-generation applications, but also presents challenges for them to keep pace with the speed of advancements. Adding to this challenge is the need for standards-based EN60601-compliant solutions that reduce risk and enable streamlined manufacturing of individual embedded computer designs for medical. Suppliers have the objective to optimize computer technology so that medical devices and networks improve and offer constant access to important patient information, resulting in upgraded patient care. These objectives have led to rapidly expanding design requirements with medical device developers seeking computing technology capabilities that include:

- Real-time remote monitoring of vital data to facilitate superior patient care
- More precise graphics to support minimally-invasive surgery and improved diagnostic findings
- Open source software for long-term availability and enhanced security
- Multi-touch control for a more intuitive system and ease of operation
- High level security of networks to enable on-demand access to patient data at any time from any location
- While developers of medical systems need these new innovations, they have to balance those needs with long-life availability.

Processors and Platforms that Meet Medical Device Trends

Providing enhanced patient care using real-time monitoring has become essential to the healthcare industry. Medical equipment is being integrated with low-power computing and wireless connectivity that allow caregivers to keep track of patient data. Medical device manufacturers are now

looking to leverage the flexibility and mobile advancements of consumer electronics devices such as workstations and tablet PCs. According to research firm MarketsandMarkets, the portable medical devices market is projected to generate revenue in excess of \$14 billion in 2013 and revenues are expected to reach \$20 billion by the end of 2018 (<http://www.marketsandmarkets.com/Market-Reports/semiconductor-opportunities-mobile-healthcare-market-1204.html>). To adequately support this growing market of mobile systems, processors and operating systems supporting low-power platforms need to be developed.

In addition, virtually all healthcare environments are migrating to graphics and compute-intensive applications such as diagnostic work stations, computers in operating rooms and bedside monitors and nursing stations. These applications are often connected to a picture archiving and communication system (PACS) or other hospital information systems (HIS), and embedded platforms are needed to do back-end processing and act as a graphical user interface (GUI) for a variety of medical devices including stationary and semi-mobile ultrasound scanners, MRIs and CTs.

Crucial Long-term Availability

Medical systems typically have long development and certification cycles until final approval has been obtained and market launch has taken place, which causes manufacturers to demand longer product lifecycles. Medical device designers can count on long-term availability of computing platforms based on the new Intel® Atom™ processors. Availability of these platforms can exceed seven years or more.

Standardized embedded form factors such as the latest COM Express® modules are key components in extended system lifecycles. COM Express® modules not only help to simplify the electrical design and system development in general, but they are also scalable building blocks that ensure complete solution functionality over the course of an application's life. This makes OEMs more independent

of processor or component suppliers should a component be discontinued or the application need to be upgraded. It is particularly important, as service lives in medical technology and subsequently the lifecycle of a medical device often goes beyond the lifecycle of embedded computer technology.

Sourcing Complete Systems

For many device designs, medical OEMs would rather source complete systems that can be deployed in their equipment as ready-made components. To ensure quality, identical configuration and to optimize the supply chain, it is preferred for embedded medical computers to be single sourced. Therefore, medical computer suppliers need to be able to develop and produce complete customized systems and master the whole process from board development to design of customized systems. An example of this is customized HMIs with high processing power and an intuitive, multi-touch user interface used for back-end processing and visualization simultaneously.



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Companies such as Kontron that have a history of trusted ODM capabilities that include installed and established processes and quality management systems, allow device manufacturers to concentrate on core competences and make just-in-time purchases of finished components and EN60601-compliant complete systems. Additionally, it is important for medical OEMs to look for an embedded computer supplier that can provide extensive migration services and be a consolidated resource.

Kontron ODM Medical Collage

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The latest motherboards are not only perfectly tailored to medical OEMs but also for the huge market of medical PCs that are deployed directly by IT specialists in hospitals, rehab and medical centers. Medical OEMs, value added resellers (VARs) and medical end users will all benefit from the broader customer base, improved support and increased production.

Overcoming Technology Barriers

The use of standard embedded form factors ensure smooth technology migration and help overcome technological barriers. Motherboards and modules in standardized form factors can be implemented into either established or new solutions, and also allow simplified integration of later processor architectures.

A welcome resource for medical device developers is to collaborate with a computing solutions supplier that can offer a wide range of original design and manufacturing (ODM) services that help unburden OEMs so that they may significantly reduce time-to-market in the development of new solutions. While cutting-edge technology plays a huge role in development, technology attributes such as reliability, quality and long-term availability are still crucial demands.

In addition, finding an experienced computing technology supplier that offers ODM services gives medical OEMs a closer and more sustainable interaction between design and manufacturing. Ultimately this will further increase the quality of computing solutions for medical device developers, and help them keep pace with leading technologies.

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