SOLUTION BRIEF
Intel® Architecture Processors
Healthcare Industry

Advantages of Scalable Architectures for Medical Devices

With the Intel® Medical Evaluation Kit with IEEE 11073 Continua Certified* Software Stack for Medical Applications, see how to dramatically reduce the evaluation and development time by using POSIX compliant software validated across many platforms and operating systems.

Quickly Support Medical Software Standards

Medical equipment manufacturers are scrambling to meet the growing demand for reliable, clinically-relevant devices, while facing increased regulatory challenges throughout the U.S., Asia Pacific and European markets. At the same time, hospital medical processes and procedures are becoming more centralized – driving to the "Connected Health" - which requires a higher level of standardization and coordination between devices.

With the goal of making portable health devices (PHDs) more interoperable, the healthcare industry is adopting recommendations from groups such as Continua* Health Alliance and IEEE. Using the Intel® Medical Evaluation Kit with IEEE 11073 Continua Certified Software Stack for Medical Applications, developers of medical devices can quickly modify their applications to support these standards. The kit implements the guidelines for an Application Host Device (AHD) as defined by the Continua design guidelines. It supports all USB device specializations defined by Continua v1.0 specification for an AHD. This kit was designed using many of the requirements of the ISO 13485-2003 quality standards. Save time and effort by evaluating software from Intel that supports these emerging interoperation standards validated on a wide range of Intel® processor-based platforms.

After registering, developers can download the software binaries and documentation for free at http://edc.intel.com/Applications/Medical/Evaluation-Kit/. The source code is also available and is distributed through your Intel field sales representative. The software has been certified on a powerful Intel® Atom™ processor N450 development kit using Microsoft* Windows* Embedded Standard 7 Embedded. This Intel platform can be purchased online at http://edc.intel.com/Platforms/Atom-N450-D410-D510/Development-Board. Although this software meets the requirement of Continua Compliance with Windows Embedded Standard 7, it has been built and validated with QNX*, Wind River* VxWorks*, Ubuntu* Linix*, Ubuntu Real Time Kernel and LinuxWorks* LynxOS*. This versatility and choice of environment underscores the ecosystem flexibility and support choices users have to optimize their application while knowing their binary investment will remain compatible with an Intel® architecture choice.

Benefits from a Single Code Base

To a large extent, satisfying new market demands begins with software developers, who must develop innovative medical applications, adhere to industry software standards and ensure connected devices are secure and interoperable. This is even more complex when developers have to support code over various CPU architectures, which increases development, validation and certification time. Alternatively, it is possible to use the same code base across different devices when they are based on the large family of Intel® Architecture Processors. This also allows consolidation of modalities using Intel® Virtualization Technology (Intel® VT)[1] – further protecting software development investment. One example of code compatibility and the ecosystem that products enjoy with Intel is the new Intel® Atom™ E6xx Series platform. It is the first single chip bootable product that Intel has developed in many years.

Intel® Atom™ E6xx Series

Intel has unveiled a system-on-chip (SoC), that is ideal for small, portable medical devices. The highly integrated SoC combines an Intel® Atom™ processor core, memory controller, graphics engine and PCI Express* into one chip, as shown in Figure 1. The product also has very fast boot times and exceptional performance density, partly due to its very small footprint.

Offering new flexibility for medical applications, the SoC is designed to allow other companies to create PCI Express*-compliant devices that directly connect to the chip. Depending on the application I/O requirements, developers use the PCI Express links to connect to up to four supporting chips, like Ethernet and SATA controllers, ASICS, FPGAs, CMOS sensors and Intel® I/O Controllers. With this solution, equipment manufacturers can develop compact, energy-efficient devices with a reduced BOM cost.

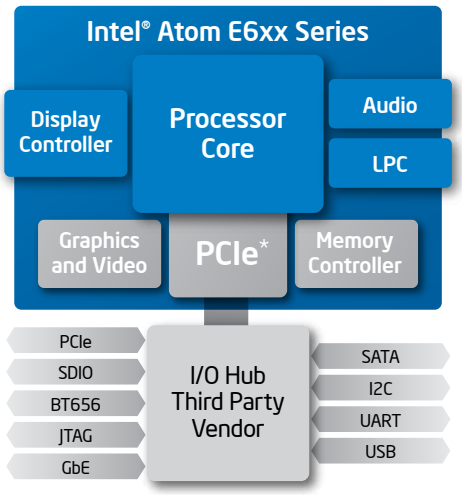

Figure 1: Intel Atom E6xx Series Block Diagram

Backwards-Compatible Intel® Processors

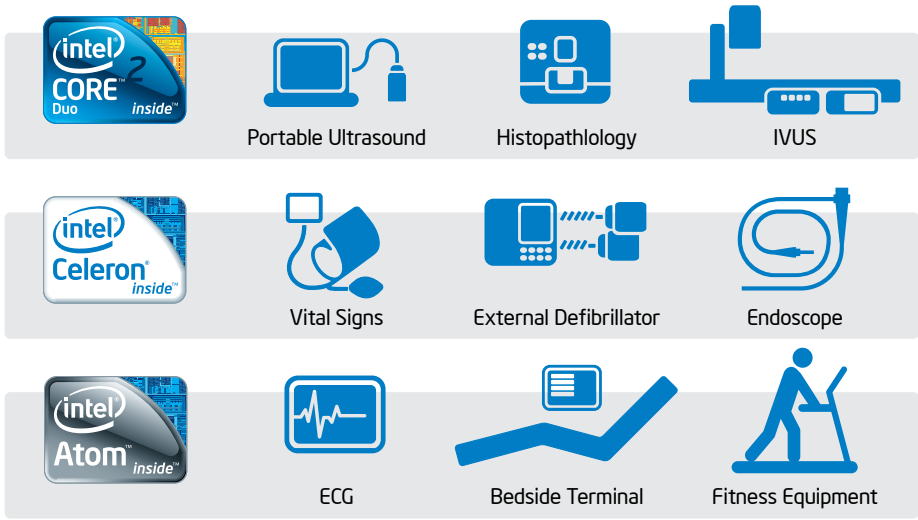

Figure 2. Processors Mapped to Medical Devices

Intel® Processor-based Platforms Mapped to Medical Devices

Code-compatible Intel Architecture Processors enable equipment manufacturers to cost-effectively develop a family of devices (Figure 2), selecting the right processor to reach specific price performance targets. Intel processor-based platforms are also standards-based, which greatly simplifies the task of integrating the latest networking, communications, wireless and security technologies. Whether developing high-end portable ultrasound devices or a low cost bedside terminal, there is an Intel processor ideal for the job.

High-end <-> Midrange: Intel® Core™ processor family

Advanced features:

- Intel® Multi-core Technology – run multiple applications simultaneously
- Intel® Active Management Technology (Intel® AMT)[2] – remotely diagnose and repair devices
- Intel® Virtualization Technology (Intel® VT)[1] – consolidate medical modalities onto a single platform, reducing cost

Midrange <-> Low-end: Intel® Atom™ processor family, Intel® Celeron® Processor

Product highlights

- Low power consumption, high performance
- Small footprint
- Highly integrated platform

Lowering Cost with Intel® Architecture Processors

Much of the complexity in developing medical devices falls into the laps of software developers. Likewise, a large portion of cost is tied to software releases with respect to development, validation and certification. One way to minimize these costs is to maximize software reuse, and this is where Intel processor-based medical devices excel. Software developed today can scale across a family of devices, from top to bottom, for many years to come – especially with seven year long life support for embedded Intel® products. If you're not already using Intel Architecture Processors, then try out the Intel® Evaluation Kit for Medical Applications and see how the Intel® embedded roadmap helps lower product development costs.

To learn more about Intel's solutions for Embedded Computing, please visit www.intel.com/go/medical

[1] Intel® Virtualization Technology requires a computer system with an enabled Intel® processor, BIOS, virtual machine monitor (VMM) and, for some uses, certain platform software enabled for it. Functionality, performance or other benefits will vary depending on hardware and software configurations and may require a BIOS update. Software applications may not be compatible with all operating systems. Please check with your application vendor.

[2] Intel® Active Management Technology (Intel® AMT) requires the computer system to have an Intel AMT-enabled chipset, network hardware and software, as well as connection with a power source and a corporate network connection. Setup requires configuration by the purchaser and may require scripting with the management console or further integration into existing security frameworks to enable certain functionality. It may also require modifications of implementation of new business processes. With regard to notebooks, Intel AMT may not be available or certain capabilities may be limited over a host OS-based VPN or when connecting wirelessly, on battery power, sleeping, hibernating or powered off. For more information, see www.intel.com/technology/platform-technology/intel-amt/.

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