## Today's Infotainment Applications:

*Stretching the imagination to deliver advanced information and control to the home*

**INFOTAINMENT**

**ETXexpress-PM**

**ETXexpress-CD**

Computer On Modules | Blades & Mezzanines | CPU Boards | Systems | Mobile Rugged | Custom Solutions

**kontron**

# Executive Summary

What happens when you seamlessly integrate digital entertainment with home control? Imagine waking up and having the coffee brewed, the TV on and tuned to the news station of your choice and the day's traffic displayed across your bathroom mirror. Suppose your washing machine is scheduled to run later in the day, but has a malfunction and calls in for its own repair. Perhaps on your way out of the driveway you turn on your security system from your cell phone, or possibly use your cell phone to change your irrigation schedule while you are on vacation because it just rained at home.

These scenarios sound like the future, but in fact are very real possibilities today. A number of companies are already developing and delivering advanced information systems for some of the most forward thinking homeowners. In the very near future, this technology won't just be for early adopters, but will begin to appear in neighborhoods all across the country.

To propel these concepts forward, Intel and Kontron, a global leader in embedded computing technologies, have collaborated to provide the technology and building blocks to power these technological advancements. At the heart of the home "infotainment" system is a centralized flatpanel device connected to a media server or command box that must be sleek and small in order to blend in with the surroundings of a modern home. Since everything is networked together, the homeowner is able to control every function in the home at the touch of a button or based on pre-set preferences, which allows an owner to program tasks from a single location.

The brain behind the control box is Kontron's advanced ETXexpress computing modules powered by the high performance Intel® Pentium® M processors and Intel® Core™ Duo processors. Incorporating this powerful combination of technologies provides companies with increased multi-tasking computing, reduced power consumption, robust performance enhancements, quiet operation, and all while simplifying the design process. The result is an optimal platform that makes the seamless integration of digital entertainment and home control achievable and realistic for embedded systems developers to today's modern homeowner.

# Today's Infotainment Applications

By Christine Van De Graaf
*Product Marketing Manager, Kontron*

## The Challenge

In order to viably integrate digital and control technology, embedded system OEMs require a solution that gives them a simplified design cycle with technologies that allow them to focus on the end market solution. This translates into needing the latest technology with a small form factor, compatibility with application-specific software, and the ability to develop the solution quickly and shorten the time to market. In order to run the range of applications possible for home "infotainment" management, technology needs to be networked and able to perform in a multitask environment, which requires advanced processing capabilities. The challenge is not only to develop the hardware and software needed to drive multiple applications, but to do so in a way that enables OEMs to meet the needs of the homeowner.

Meeting the needs of the consumer offered other challenges. It is a necessity in an "always on" environment that systems be extremely reliable. They also must be tamper-proof providing a high level of security. In addition, quiet systems are an expectation of homeowners, which require the reducing and controlling of fan noise.

OEMs are looking to embedded computing modules for off- the-shelf customizable solutions. This enables them to concentrate on the design of carrier boards that supply interfaces, connectors, packaging and application-specific software that is their core competency and avenue for differentiation. They want to avoid expending resources for developing and designing products, but instead ask for building blocks that are comprehensive and flexible, and non-proprietary.

## The Solution

As a Premier member in the Intel Communications Alliance, Kontron and Intel have a strong working relationship that enables Kontron to implement the latest computing technologies that enhance the performance and functionality of home "infotainment" applications. By utilizing the Intel® Pentium® M 760 processor in the its ETXexpress-PM module and the Intel® Core™ Duo processor in its latest ETXexpress-CD modules, Kontron has some of the most advanced computing modules available today. Based on the COM Express Standard from the PCI Industrial Computers Manufacturing Group (PICMG), Kontron's ETXexpress modules offer 2x SerialATA for

high-speed drives, 8x USB 2.0 for fast peripherals, up to 5 PCI Express x1 lanes and PCI Express Graphic x16 lanes plus Gigabit Ethernet for high connectivity. They also feature Intel's Graphics Media Accelerator (GMA), and up to 2Gbyte DRAM / DDR2-RAM.

These unprecedented performance capabilities have maintained reasonable power consumption on state-of-the-art small form factors from generation to generation while continuing to maximize the processing performance. Furthermore, it is easy to migrate to the next generation as the modules are scalable solutions that are drop-in replacements. The modular design of Kontron's ETXexpress modules protects customer's R&D investments, allowing a lower total cost of ownership.
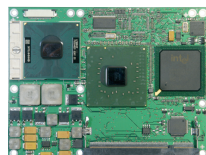
Overcoming the challenge to provide a quiet system, the pre-loaded BIOS on the ETXexpress modules includes heat and fan control monitors. That way, the fan is only engaged when the system reaches a predetermined temperature and turns off automatically when the temperature is lowered providing minimal noise disruption. In an always-on environment, this is a key element for product marketability and takes the design burden away from the systems provider.

The modules, too, provide advanced security. Encryption algorithms are loaded onto the module BIOS to protect the application-specific software so the system cannot be tampered with. Plus, the ETXexpress controls all the components of the home infotainment system making it the networking hub for the entire system.

## Benefits

Providing the computing might to tackle the intensive multi-tasking demands that marry digital entertainment with home control in one small system, Intel and Kontron continue to be leaders in offering reliable technology platforms. This includes the processing capability of managing advanced software programs that go beyond the basic Microsoft® Windows® XP environment.

Infotainment applications receive notable benefits from the capabilities realized with an off-the-shelf custom
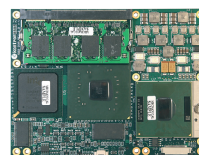
➤ **ETXexpress**

| Features | ETXexpress-CD | ETXexpress-PM |
|---|---|---|
| **CPU** | Intel® Core™ Duo and Intel® Core™ Solo | Intel® Pentium® M, Intel® Celeron® M |
| **CPU Clock** | 1.06 GHz up to 2.0 GHz | Up to 2 GHz |
| **Cache** | 1 MByte L2 up to 2 MByte L2 | 512 kByte up to 2 MByte L2 |
| **Chipset** | Intel® 945GM, ICH7M (opt. ICH7M-DH) | Intel® 915GM, ICH6-M |
| **Bus Speed** | 667/533 MHz FSB | 400/533 MHz FSB |
| **DRAM** | Up to 2 GByte (DDR2-RAM) | |
| **DRAM socket** | 1x DDR2-SODIMM socket | |
| **SM Bus Support** | yes | |
| **Flash Disk** | - | - |
| **Hard Disk** | 2x Serial ATA, 1x Parallel ATA | |
| **USB** | 8x USB 2.0 | |
| **USB Boot/Legacy Support** | yes/yes | |
| **Ethernet** | Gigabit Ethernet | Gigabit Ethernet or 10/100Base-Tx |
| **Ethernet Controller** | Intel® 82562 | Intel® 82573 or Intel® 82562 |
| **Audio Controller** | Intel® High Definition Audio - onboard | |
| **Graphics Controller** | Intel® Graphics Media Accelerator (GMA) 900 with a powerful 333 MHz core and new DirectX 9 hardware acceleration or expand via 16x PCIexpress card | |
| **Graphics Memory** | Dynamic Video Memory Technology (DVT) 3.0Supports up to 224 MByte VRAM UMA | |
| **Flat Panel Interface** | JILI Interface (24/18bpp LVDS) up to UXGA (1600x1200) resolution Dual SDVO (shared PCI Express Graphics port) CRT, DVI-A | JILI Interface (18bpp LVDS) up to QSXGA (2560x2048) resolution Dual SDVO (shared PCI Express Graphics port) CRT, DVI-A |
| **Power Management** | ACPI 2.0, APM 1.2 | |
| **Power Consumption (typ.)** | 30 W @ 12 V | 26 W @ 1.8 GHz, 12 V |
| **Dimensions H x W x D** | 95 x 125 mm | |
| **PCI** | 3 PCI Express x1 lanes (opt. 5 PCI x1 lanes) PCI 2.1, 32 bit | 4 PCI Express x1 lanes, PCI 2.1, 32 bit / 66 MHz |
| **RoHS compliant** | yes | yes |

module solution. Benefits such as the Intel processor architecture and Kontron computing modules have been designed for maximum compatibility with application-specific software. Adding system features can be seamless for a broad range of functions, from remote monitoring, to appliance management to home security alarms. This is critically important for an emerging industry where the features and applications have yet to become standardized through market maturity.

In addition, the module is designed specifically for multi-tasking. This requires enhanced computational, performance and memory technologies. Next generation infotainment applications require that multiple applications run simultaneously and for always-on or extended periods. Thus, the module must be a workhorse that never fails. The Intel® Core™ Duo processor is one of the most advanced and reliable to date an

Kontron's advanced ETXexpress modules ensure that it will perform and function for an extended lifetime.

Encryption was added to the module BIOS to protect application-specific software so the system is tamper resistant. This offers an added layer of security for a range of computing technologies in home systems, including the actual home security system. The module was also developed to keep pace with the quickly emerging technologies and enhancements that continue to take place by providing a next-generation drop-in solution that offers easy migration with minimal hardware or software modification.

The ultimate result of these benefits is that OEMs can shorten the time to market for their products because the foundation and framework from an embedded perspective is rock solid.

# Conclusion

With the assistance of Intel processor and Kontron embedded computing technologies, home infotainment system providers can now offer a control center to manage all digital entertainment systems in all mediums and distribute them anywhere in the home at any time. With just a touch of a flatpanel screen, system providers can give every member of the household access to important information to live their lives more richly or complete control of any home system from security systems including cameras, automatic climate control for different rooms throughout the home and control of a home's lighting and window coverings. All of this is can be managed-wirelessly and remotely from any location and anywhere. In short, Kontron and Intel offer the enabling technologies and time-to-market advantages that are ideal building blocks for OEMs looking to capitalize on the infinite opportunities in the very exciting and dynamic home infotainment market.

## About the Intel® Communications Alliance

The Intel Communications Alliance is a community of communications and embedded developers and solutions providers who share a common vision on the convergence of computing technologies. The member companies within the Alliance are committed to the development of modular, standards based building blocks, platforms, and solutions based on Intel technologies, processors, products, and services. The availability of these standards-based modular building blocks and solutions offer the market greater choice, faster time to profit, and the opportunity to innovate using modular building blocks from multiple levels of integration - silicon, software, boards and complete systems. For additional information on the Intel Communications Alliance, visit : www.intel.com/go/ica

## About Kontron

A global leader in embedded computer technology and mobile rugged solutions, Kontron supplies a diversified customer base of OEMs, system integrators, and application providers in the: automation, test and measurement, communications, medical, gaming and entertainment, military, aerospace, transportation, and energy markets. The company helps its customers considerably reduce their time-to-market and gain a competitive advantage with products including: high-performance open computer platforms and systems, single board computers, human-machine interfaces, and mobile rugged computers and displays. Kontron employs more than 2,300 people worldwide and has manufacturing facilities in Europe, North America, and Asia-Pacific. The company is listed on the German TecDAX 30 stock exchange under the symbol "KBC". Kontron is a Premier member in the Intel® Communications Alliance and has a rich portfolio of the latest Intel products and technologies. For additional information on Kontron, please visit www.kontron.com.

## AUTHOR'S BIO

Christine Van De Graaf is the Product Marketing Manager of Kontron America's Embedded Modules Division that is located in Northern California's Silicon Valley. She has more than five years experience working in the embedded computing technology industry and holds a Masters of Business Administration, Marketing Management degree from California State University, East Bay (Hayward, CA). Van De Graaf has authored a number of technical articles published in various embedded computing technology trade publications and recently presented at the WindRiver Worldwide Users' Conference on the topic of COM Express and Linux based embedded solutions.

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