



Platform Vision Guide

Intel® Consumer Electronics
Platform Solutions Based on the
Intel® CE 2110 Media Processor





With their unequalled processing performance, Intel® consumer electronics platforms power advanced applications that redefine the TV experience.



Design to Redefine the Digital Home Experience

Intel® consumer electronics (CE) platforms provide unequalled processing performance to run advanced applications that support new revenue-generating IP services while enhancing user experiences. High performance enables you to design flexible devices that help service providers maximize average revenue per user (ARPU).

Intel's flexible CE platform architecture lets you base multiple device configurations on a single re-usable platform to cost-effectively support multiple product segments and a broad spectrum of applications and services. The ability to add incremental services on a single platform helps service providers improve ROI by reducing requirements for platform re-design.

Solutions from Intel's consumer electronics ecosystem provide a choice of middleware and applications that can help you accelerate time-to-market.

Performance Now and for the Future

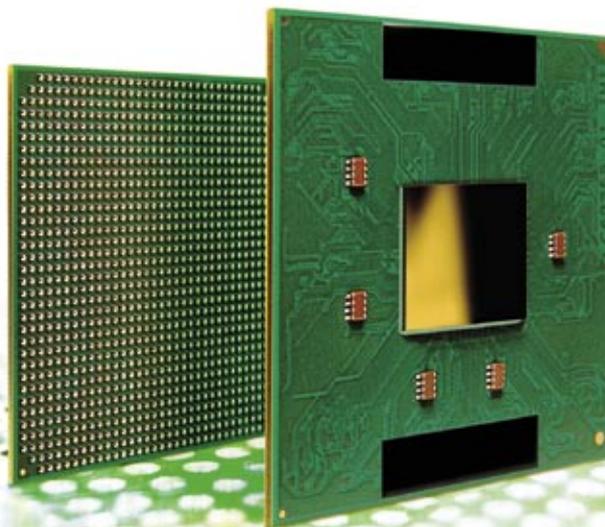
Intel provides the essential ingredients for flexible and cost-effective multifunction networked consumer electronics platforms. The highly integrated Intel® CE 2110 Media Processor is the core building block for platforms designed to support services including IPTV, voice over IP, video phone applications, casual and online games, enhanced Karaoke, and Internet browsing. Intel networked CE platforms also make it easy to share video, music and personal media with PCs based on Intel® Viiv™ technology.

Based on the Intel XScale® processor core at 1 GHz, the highly integrated CE 2110 system-on-a-chip (SoC) processor provides the processing performance needed to run computationally intensive applications in addition to integrated 3D graphics and flexible I/O capabilities.

The Intel® CE 2110 media processor development platform and reference designs from leading third-party vendors provide comprehensive development solutions for manufacturers of digital set top boxes (DSTB) and digital media recorders (DMR). These platform solutions can help device manufacturers reduce time-to-market while meeting aggressive bill of materials (BOM) targets.

Intel networked media platforms include the software building blocks you need to create devices verified with Intel® Viiv™ technology^{1 2} that are capable of playing and sharing media throughout the digital home. When used with PCs based on Intel Viiv technology, set top boxes and other networked CE devices enable consumers to access a broad range of content on the PC and then distribute and display it on the connected device of their choice.

Going forward, Intel will continue to extend and enhance its CE platform roadmap with additional performance and capabilities, enabling users to access a broad range of Web-based and IP-based services.



The highly integrated Intel® CE 2110 Media Processor helps to simplify the design of consumer electronics products. The integrated Intel XScale® processor core at 1 GHz provides processing performance and headroom to deploy new generations of revenue-generating applications.



Intel's highly integrated media processing silicon enriches TV viewing and user interaction—with headroom for value-added applications.



Save the cost of platform re-design. Intel's flexible platform architecture can help boost your return on investment.

CE to the CORE

Platforms for Multiple Usage Models

In the digital home, digital set top boxes, digital media recorders and digital media adapters enable consumers to control and enjoy their favorite digital entertainment with appliance-like ease of use. Whether they are used as stand-alone devices, connected to an Intel Viiv technology-based PC or networked with other CE devices, consumer electronics platforms based on Intel building blocks have the power to redefine the TV experience.

Platforms based on the Intel CE 2110 Media Processor can be used to build a broad range of devices to support new services and usage models.

IP DSTB

Digital set top boxes (DSTB) receive digital signals, process media and value-added applications, and format and enhance video for output to a display or an HD-ready digital TV. Basic IP digital set top boxes are designed to decode and display video coming over the broadband pipe from the service provider. Advanced IP digital set top boxes include the capabilities of the basic IP-DSTB with additional functionality that lets consumers enjoy an even richer variety of current and emerging usage models to enhance their entertainment experience:

- Video on demand (VoD) services
- Voice over IP (VoIP)
- Video phone capability
- Karaoke
- Casual and online games
- E-learning applications
- Home control and security applications

Hybrid IP DSTB

Hybrid IP-DSTBs add a digital broadcast tuner (terrestrial, cable or satellite) to an IP-DSTB, combining broadcast and broadband content to enable seamless video-viewing experience. The presence of two pipes (broadcast and broadband) gives OEMs and SPs much more flexibility to implement and enhance multiple IP-DSTB usage models.

Digital Media Recorder (DMR)

DMRs enable users to store and replay video and other digital content. Users can record video for later viewing and also use trick-mode functions (Pause, Rewind, Fast Forward) to watch video at their own pace and convenience. IP-DSTBs and Hybrid DSTBs can be transformed into DMRs by adding PVR capability. Platforms based on the Intel CE 2110 Media Processor include two SATA interfaces to optionally support HDDs for PVR capability and also add an optical drive (DVD reader or writer).

Network Media Devices Verified with Intel® Viiv™ Technology

Consumers can use IP-DSTBs, Hybrid IP-DSTBs and DMRs verified with Intel Viiv technology to personalize their digital entertainment and share content throughout their home with a rewarding out-of-the-box experience.

Evolving the Consumer Electronics Platform

The transition to IPTV, voice over IP, video phone and other IP-based services is driving the need for more powerful silicon and enhanced software on the networked CE platform. As these devices become more complex, they place greater demands on manufacturers to design, integrate and validate a broad set of capabilities. Intel platform solutions can help you meet the challenge.

HD Content

Growing amounts of high-definition (HD) content will continue to arrive from a range of sources including terrestrial, cable, satellite, and the “fourth pipe”—broadband IP. Other sources of content will include high-definition DVD formats and next-generation game consoles, in addition to personal content like digital photos and video. HD content requires high-performance media processing for the best user experience.

Support for Multiple-Content Formats and Sources

Consumers have growing access to a diverse mix of formats for content from multiple sources including broadcast TV, PCs, networked CE devices and the Internet.

The availability of new ways to experience digital-media content is made possible by a spectrum of new standards and technologies:

- New IPTV and digital broadcast standards
- Advanced video codecs including H.264* and VC1*
- Advanced audio codecs including HE-AAC, AC-3 Plus*, and DTS*
- Web-based content that can be accessed through Intel Viiv technology-based PCs

The growing availability of premium digital content, ranging from on-demand video and audio to increasingly sophisticated online information services and games, is driving the trend toward highly personalized services. IPTV provides direct access to a broad range of new content sources. The emergence of Internet-delivered content and services is being paralleled by the adoption of browser-based applications.

Advanced video codecs enable broadband network operators to offer bundled IPTV and video, telephony and Internet-service packages over existing DSL networks. This opens the digital home to services ranging from personalized “walled garden” Web portals to converged-voice and video-telephony services, all of which can be used to differentiate digital television products.

These trends are driving the development of innovative Web-aware applications designed to run directly on CE devices whose 10-foot viewing experience and navigation model differs from the PC paradigm.

Conditional Access, Content Protection and Digital-Rights Management

The convergence of networked media platforms, entertainment PCs, and other CE devices in the home provides consumers with new opportunities to enjoy premium services, and this makes content protection a vital necessity. The next generation of networked media platforms will require the performance to implement a broad range of content-protection solutions:

- Soft Conditional Access Schemes—provide a mechanism to enable conditional access in software without the need for proprietary hardware.
- Digital Transmission Copy Protection (DTCP)—a technology developed by Intel and other members of the CPTWG designed to protect content on a home network. DTCP is enabled by Intel Viiv technology for the protection of premium content. DTCP is licensed to the motion picture industry, consumer electronics vendors and the IT industry.
- High-bandwidth Digital Content Protection (HDCP)—developed by Intel to protect content across a DVI connection to a digital TV monitor or HDTV.



Accelerate time-to-market
with a comprehensive portfolio
of ecosystem solutions, including
applications and middleware.

Intel® Networked CE Platform Advantages

Broadband Internet content and IP-based services impose unique application processing demands on the platform. In this demanding environment, it is important to work with an experienced technology supplier who can assemble the right combination of proven, cost-effective solutions. Intel has the proven resources you need.

Reducing Platform BOM

System-on-a-chip (SoC) architecture offers important benefits to manufacturers of set top boxes and other networked CE platforms. The integration of functional units, such as an application processor, hardware codecs, graphics accelerators, audio codecs, encryption/decryption accelerators and peripheral interfaces on a single chip can reduce chip count, save board real estate and help minimize BOM cost. An SoC can also help to reduce development cost by simplifying the hardware design of consumer electronics devices.

Processing Power Advantage

Intel set top box platforms are based on an SoC that includes an integrated Intel XScale® processor core at 1 GHz which provides the processing performance and headroom required to run new revenue generating services, such as enhanced video phone applications, games and Karaoke. Hardware-based decode of widely used video codecs (MPEG-2, H.264) maximizes system-level performance by enabling the Intel XScale processor core to be used exclusively for applications.

Production-Ready Hardware

The Intel consumer electronics ecosystem has developed production-ready IP digital set top box reference designs that accelerate development of differentiated client solutions by OEMs and service providers. The designs enable vendors to quickly develop differentiated solutions for digital media sharing, IPTV, VoIP, video phone, Internet browsing, on-demand applications and triple-play combinations of these services.

Software Ecosystem

Intel's ecosystem of networked CE platform vendors is making a transition from software stacks provided by the silicon vendor to multi-vendor ecosystems. The software stack can be built from modular software components, from applications through middleware, media building blocks, conditional access and digital rights management solutions to the underlying operating system. This enables manufacturers and their customers to configure optimized software stacks supported by solutions from multiple vendors. Intel is positioned to help bring together complete solutions, including software components from leading third-party developers.

Time-to-market is important in today's fast-changing consumer electronics market segment. Available software from leading third-party vendors enables manufacturers to port multiple applications and middleware and conditional access solutions to the baseline platform.

Intel® CE 2110 Media Processor

The Intel CE 2110 Media Processor is Intel's first system-on-a-chip (SoC) designed for digital set top boxes and other networked CE devices. The highly integrated processor enables aggressive BOM cost reduction while helping to simplify consumer electronics designs.

The integrated Intel XScale processor core at 1GHz provides processing performance and headroom for IP-based applications. Support for DDR2 memory hardware-based decode of popular video codecs can further improve system-level performance.

In addition to the Intel XScale processor core, this highly integrated building block includes an Intel® Micro Signal Architecture (MSA) DSP core for audio codecs, a 2D/3D graphics accelerator for high-impact user interfaces, hardware accelerators for encryption and decryption in security applications, comprehensive peripheral interfaces, analog and digital input/output, and a transport interface for digital tuner input.

Intel® CE 2110 Media Processor Development Platform

The Intel® CE 2110 Media Processor development platform is designed to reduce time-to-market and support the transition to the Media Processor's SoC architecture. The platform provides a comprehensive hardware and software solution.

Software Development Kit (SDK)

Intel supports rapid software development on the Intel® CE 2110 Media Processor development platform with comprehensive software building blocks. Software deliverables include a platform support package for the Linux* operating system, media drivers, platform drivers, display drivers and the Intel CE 2110 Media Processor SDK.

The Intel® CE 2110 Media Processor is designed to meet the need for a flexible and cost-effective multifunction media platform. Functional blocks include a 1 GHz Intel XScale® processor core, 2D/3D graphics accelerator, MPEG-2 and H.264 decoders, DSP audio codec, hardware encryption/decryption unit, and a variety of interfaces.

The SDK includes:

Integrated Device Library (IDL)

Low-level API for controlling devices that are integrated into the Media Processor

External Device Library (EDL)

Low-level API for controlling devices that are part of the platform, but external to the Media Processor

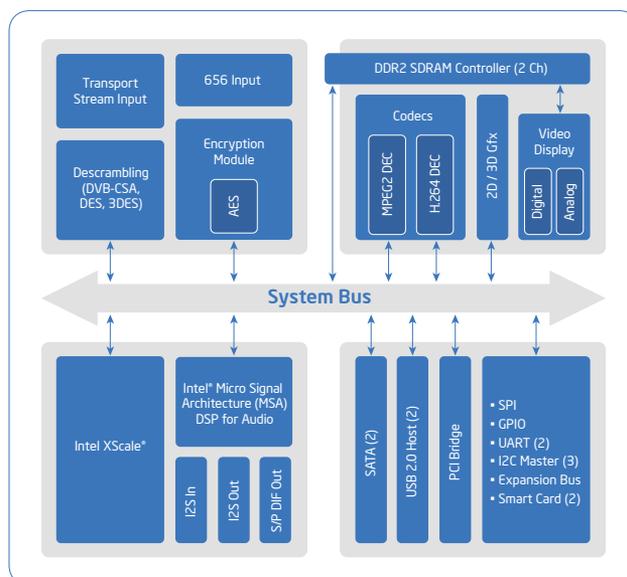
Graphics Device Library (GDL)

API for applications to control the graphics subsystem

Streaming Media Driver (SMD)

External software interface and high-level API for media-processing tasks that can be done on the platform

Applications and middleware for EPG, VoD and other capabilities are available from Intel's ecosystem of third-party vendors.



A close-up photograph of a woman with dark hair and glasses, smiling broadly. She is wearing a light blue button-down shirt and a blue lanyard. In the background, there is a server rack with many cables. She is holding a document in the foreground, which appears to be a technical drawing or blueprint with some text and diagrams. The lighting is warm and focused on her face.

New usage models are coming.
Intel's flexible platform architecture
can help you prepare for them today.

A photograph of three men sitting on a boat, looking out at the water with expressions of joy and excitement. The man in the foreground is wearing a maroon jacket with yellow accents and has his hands clasped. The man in the middle is wearing a light blue jacket with dark blue stripes on the sleeves. The man in the background is wearing a white jacket with dark blue stripes on the sleeves and is laughing heartily. The background shows the white structure of the boat and a bright, sunny sky.

Experience the difference. Intel
CE platform solutions can help you
achieve design wins by powering new
generations of digital home services.

A vertical photograph on the left side of the page shows a person's hand holding a soccer ball. The background is a window with a white frame, and the lighting is bright, suggesting an indoor setting.

Design to Redefine the TV Experience

The rapid growth in digital content, delivery and display technologies is creating a spectrum of new opportunities to share and enjoy enhanced TV experiences throughout the digital home.

Intel's networked CE platforms provide a flexible, platform-based approach to product development that can help you benefit from these growing opportunities. By building digital capabilities into the platform, you can meet the growing consumer demand for display quality and innovative services.

Intel's vision of networked CE platforms does not stop with quality and innovation, because we realize that keeping costs down is the only way to ensure competitive price points. Intel platform solutions can help here too, with comprehensive reference designs, board-support packages, development boards, software and development tools that can help you reduce time-to-market.

Intel's strengths in architecture and integrated device manufacturing, coupled with a growing ecosystem of consumer-electronics solution providers, can help you design products that deliver the experiences that today's consumers want.

If you are ready to redefine new opportunities in the digital home, put Intel's digital leadership to work for you.

Your Intel representative has the details you need.



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² Home networking capability and many Intel® Viiv™ technology-based usage models will require additional hardware devices, software or services. Functionality of Intel® Viiv™ technology verified devices will vary; check product details for desired features. System and component performance and functionality will vary depending on your specific hardware and software configurations. See www.intel.com/go/viiv_info for more information.

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