



## Bringing the Smart to Smart TV: The AMD technology-based x86 Set-Top Box Solution

### SOLUTION OVERVIEW

Today's set-top box market is undergoing a change as a result of content being delivered over IP networks and the desire for a feature-rich user experience. Televisions are looking more and more like computer monitors; consequently, the "10 foot experience" is also changing, allowing more PC-like applications to look good at a distance. Therefore, a new type of set-top box is emerging that is based on PC technology and the x86 architecture. The AMD technology-based x86 Set-Top Box (xSTB) solution provides the technologies to meet the needs of today's high performance set-top box solutions. AMD is setting the standard in today's high performance, low power set-top box designs while leveraging an industry standard small form factor to help reduce time and costs in bringing the product to market. Combining AMD's wide range of powerful 64-bit x86 processors with high performance integrated graphics solutions provides the basis to create an xSTB solution to help meet the market's needs. AMD's xSTB architecture allows developers to take advantage of the extensive applications and development that already exist for the PC market and leverage them for their system development. The AMD xSTB enables x86 applications on the set-top box, including running some of the latest games, and gives the designer a number of different operating system choices from both Microsoft® and the Linux® community.

AMD's current offering is based on the AMD 780E high end graphics chipset which supports HyperTransport™ 3.0 technology, PCI Express® Generation 2, DirectX® 10 and a Unified Video Decode (UVD) engine that supports full HD decoding for H.264, VC-1 and MPEG-2 and offloads video decoding from the processor. This frees up the processor to run applications, giving the consumer a rich user experience while helping reduce the power requirements for the overall system. AMD also offers the high performance external graphics processing units designed to enable a high quality gaming experience. Additionally, solutions based on the AMD 780E chipset can support analog televisions via Composite, Component or S-Video out options. Both options allow the use of Microsoft WEB Connected Media Device (WES CMD) to enable developers to take advantage of Windows® functionality in a secure, small footprint form. WES CMD is optimal for set-top boxes with x86 processors that have a need to replicate PC-like functionality such as Internet browsing, gaming, complex video overlays and alpha blending, and specific desktop applications.

### AMD Embedded G-Series APUs

The AMD Embedded G-Series processor is the world's first integrated circuit to combine a low-power CPU and a discrete-level GPU integrated into a single embedded Accelerated Processing Unit (APU). The AMD Embedded G-Series platform is the next generation solution for xSTB applications offering scalable choices for the level of CPU performance, power efficiency, and visual experience. APU configurations are available with single or dual x86 cores, at 9W or 18W thermal design power (TDP), and two levels of graphics and video performance. Each APU supports single or dual-independent high resolution displays and exceptional multimedia capability with hardware decode support for H.264, VC-1, MPEG2, WMV, DivX and Adobe Flash. When paired with the A50M controller hub with support for advanced interfaces such as 6Gb/s SATA, Generation 2 PCI Express®, and HD Audio, the AMD Embedded G-Series platform delivers a low power, value oriented solution for applications requiring a better balance of CPU and multimedia performance.

### Help Speed Your Time to Market

AMD's x86 architecture coupled with leading-edge graphics allows customers to tap in to the large array of software and applications already available for the personal computer industry. In addition to full Linux support, AMD is also collaborating with the Microsoft Windows Embedded Group on their Connected Media Devices package to deliver a ready-made, feature-rich solution designed to help minimize the amount of development required and allow for a very quick time to market solution.

- > Minimize development time and risk
- > Benefit from complete support from industry leading technology partners
- > Enhance product success by allowing designers to focus on your unique product requirements

# Key Architecture Benefits

## AMD ASB1/780E PLATFORM CPU

- x86 64-bit processor in the ASB1 (low cost BGA) package

## 780E/SB710

- Unified Video Decoder for hardware acceleration of high definition H.264, VC-1 and MPEG-2
- Full 1080p output support for HDMI™ (1.3b), DVI and VGA
- PCI Express® graphics on one x16 or two x8 configurable ports
- Six x1 PCIe® general purpose ports for high speed I/O
- ATI Avivo™ HD graphics
  - DirectX® 10 graphics support
  - OpenGL 2.0 support
- ATI Hybrid CrossFire™ technology
- HyperTransport™ 3 technology
- Six SATA 2.5 ports (3Gbps) with RAID 0,1,10
- ATA-133 E-IDE port
- 12 USB 2.0 and 2 USB 1.1 ports
- High Definition Audio interface
- Dual Dynamic Power Management

## AMD G-SERIES PROCESSORS APU FEATURES

- High performance single or dual-core integrated x86 core(s)
- Integrated cutting edge graphics processor
- High-bandwidth, low-latency integrated memory controller
- High performance floating point
- AMD64 64-bit ISA
- SSE1,2,3, SSSE3 ISA, SSE4A
- Secure Advanced Virtualization

## LARGE HIGH-PERFORMANCE ON-CHIP CACHE

- 32KB I-Cache, 32KB D-Cache
- 512KB L2 per core

## INTEGRATED DDR3 MEMORY CONTROLLER

- Support for solder-down, SODIMM and DIMM memory, two slots, non-ECC type
- 64-bit DDR3 SDRAM controller operating at frequencies up to 1066 MT/s (533 MHz)

## GPU CORE ARCHITECTURE

- Dedicated graphics memory controller
  - High efficiency ring bus memory controller
  - Direct connection to memory
- 2D Acceleration
  - Highly-optimized 128-bit engine, capable of processing multiple pixels per clock
- 3D Acceleration
  - Full DirectX® 11 support, including full speed 32-bit floating point per component operations. Shader Model 5
  - OpenCL™ 1.0 support
  - OpenGL 3.2 and 2.1 support
- Motion Video Acceleration
  - Dedicated hardware (UVD 3) for H.264, VC-1 and MPEG2 decode
  - HD HQV and SD HQV support: noise removal, detail enchantment, color enhancement, cadence detection, sharpness, and advanced de-interlacing
  - Super up-conversion for SD to HD resolutions

## INTEGRATED DISPLAY INTERFACES

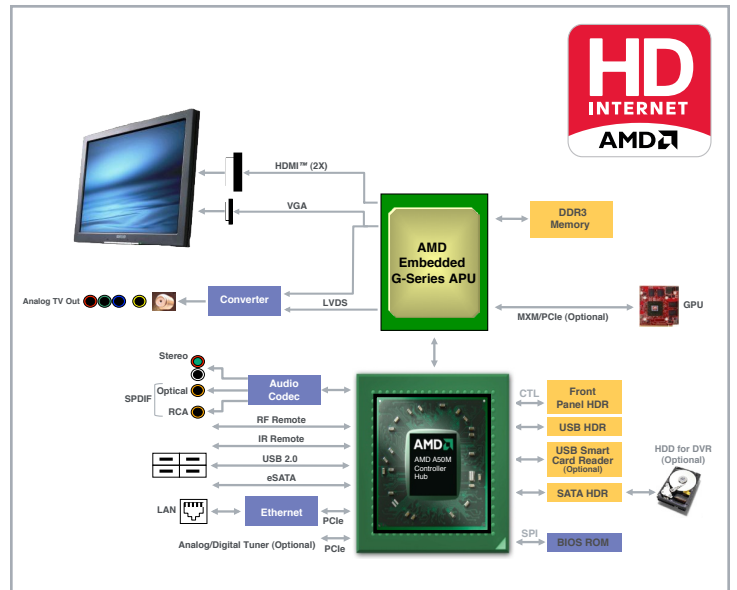
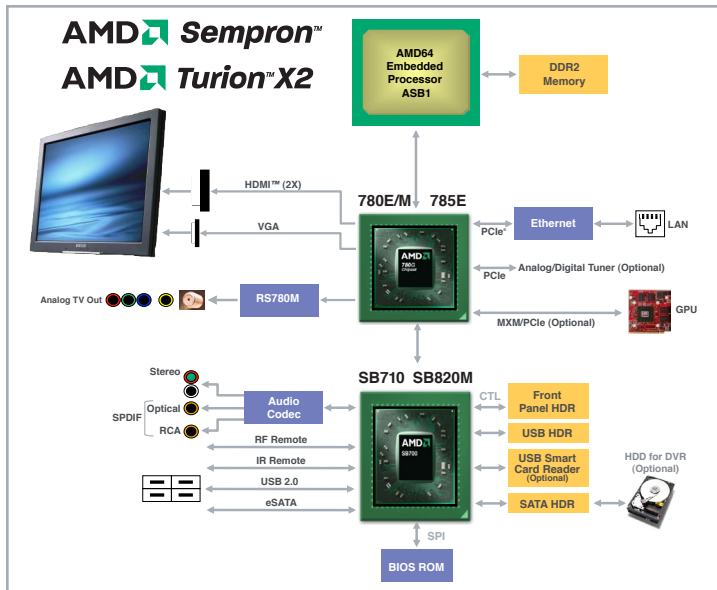
- Dual independent display support
- Dual-link or dual single-link DVI
- HDMI
- Dual DisplayPort
- Analog VGA
- LVDS

## FORM FACTOR

- Sub Mini-ITX

## OPTIONS

- Blu-ray playback
- Digital TV tuner
- High performance gaming
- Advanced TV
- Media-to-Go
- Place Shifting
- Full browser plus plug-Ins
- Video conferencing



# Windows® Embedded Standard 7 – Connected Media Device Solution: A Robust Platform for Smart TVs



## OVERVIEW

Windows® Embedded Standard 7 brings the technology and rich user experiences of Windows 7 to the emerging category of connected consumer media devices. As a high performance and reliable platform, Windows Embedded Standard 7 gives developers and manufacturers a wide range of options for differentiating their hardware and software that they bring to market. Its familiar, easy-to-use development tools, broad compatibility with other hardware and software, also help reduce development cost and minimize time to market. The platform provides access to embedded specific tools that operate in a familiar Microsoft® development environment for rapidly configuring, building, and deploying consumer devices that are designed to be secure, reliable, and manageable. The consumer-oriented media features of the Windows Embedded Standard 7 operating system also enable powerful, comprehensive, and scalable entertainment solutions to help meet market needs. Windows Embedded Standard 7 serves as a valuable complement to x86 processor hardware solutions – such as the AMD ASB1/780E platform – when designing next generation consumer set-top boxes and Connected Media Devices. Please visit [www.windowsembedded.com/standard](http://www.windowsembedded.com/standard) for full details.

## SMART, COMPELLING DEVICES THAT OFFER ENDLESS POSSIBILITIES

Windows Embedded Standard 7 gives embedded OEMs the ability to create exceptional user experiences based on Windows technologies, including customization of Windows Media Center.

## RICH MEDIA

The latest browsing and media experiences bring Web capabilities and multimedia experiences of the desktop to embedded devices.

## COMPELLING EXPERIENCES

Support for 64-bit hardware and high end graphics, combined with multi-touch gestures and context aware applications, make it possible for developers to create immersive user interfaces.

## INNOVATIVE FEATURES

“Green” power management, custom shell, branding support, and lock down features like AppLocker™ and BitLocker® are all built-in.

## WINDOWS® CONNECTED

The robust networking, remote management capabilities, and interoperability of Windows Embedded Standard 7 allows devices to seamlessly connect to other networked devices, Windows PCs, servers, and services.

## HIGH PERFORMANCE EMBEDDED SOLUTIONS SHARE A HIGH CONFIDENCE PLATFORM

Windows® Embedded Standard 7 provides OEMs with a powerful, security enhanced, and flexible platform on which to build innovative products. Enhanced features and tools are designed to significantly reduce costs and accelerate time-to-market.

## EMBEDDED TOOLS

Windows Embedded Standard 7 includes an easy-to-use Image Build Wizard (IBW) and other embedded tools to help speed up image development and prototyping, allowing developers to innovate on new hardware configurations.

## FLEXIBLE OPTIONS

Windows Embedded Standard 7 includes more than 150 intuitive feature packages and 500 driver sets—everything developers need to build fixed function devices.

## SIMPLE INTEGRATION

IPv6 support, including a new TCP/IP stack, and added security through Network Access Protection (NAP), enable easy integration into the enterprise network.

## A WORLD OF SUPPORT

OEMs can benefit from the vibrant development and partner technology ecosystem of Microsoft® and Windows Embedded. These industry-leading IHVs, ISVs, and distributors can help to ensure the timely delivery and marketability of embedded devices.

Windows Embedded products are covered by an industry leading 10-year support program plus a product availability of 15 years.

Download a free 180-day trial of Windows Embedded Standard today at: [www.windowsembedded.com/downloads](http://www.windowsembedded.com/downloads)

# Windows® Embedded Standard 7 – Features at a Glance

## ENDLESS POSSIBILITIES

### PROVIDE RICH IMMERSIVE USER EXPERIENCES ON EMBEDDED DEVICES

- Benefit from the award winning, and widely deployed Windows Media Center user experience
- Ability to develop a custom entertainment user experience using Silverlight or Windows Presentation Foundation technologies

### BUILD PREMIUM DEVICES THAT UTILIZE HIGH END HARDWARE CAPABILITIES

- Support for 64-bit (x64) CPUs in addition to the 32-bit (x86) to build a wide range of embedded systems

### CUSTOMIZE TO SUPPORT CUSTOMER REQUIREMENTS

- Custom shell support to include customer branding and unique user experiences
- Easily use a broad range of applications and connect to specific sets of peripherals

### TARGET NEW MARKETS WITH INNOVATIVE SOLUTIONS

- Support for global broadcast TV standards and Internet media enable creation of powerful consumer 'hybrid' devices
- Access to Internet-delivered electronic program guide (EPG) TV listings for 29 countries
- Full TV digital video recorder (DVR) capabilities as part of Windows Media Center

### DEVELOP ENERGY SAVING SOLUTIONS THROUGH SMART POWER MANAGEMENT

- Offers smart power management APIs for developers to build applications that can improve the idle time on the CPU

## WINDOWS® CONNECTED

### ACCESS THE LATEST WINDOWS DESKTOP TECHNOLOGY INNOVATIONS

- Access the latest browsing and media experiences available on Windows
- Includes support for the latest .NET Framework
- Central access to personal media content (pictures, movies, videos) thru the Windows Media Center user experience
- Embedded support for PlayReady media DRM technologies

### SEAMLESS ACCESS TO PERSONAL MEDIA AND DEVICES IN THE HOME

- Stream personal media content from other connected Windows PCs or devices using Homegroup or DLNA 1.5

## HIGH CONFIDENCE PLATFORM

### HAVE ACCESS TO THE LATEST WINDOWS DESKTOP TECHNOLOGY INNOVATIONS

- Differentiate product offerings based on hardware/software/ applications and user experience instead of platform development

### REDUCED DEVELOPMENT COSTS USING EMBEDDED FEATURES

- VHD boot, custom shell support, OEM branding experience, notification, and popup suppression
- SD Boot with Windows Embedded Standard SP1, allows OEMs to deploy images to an SD Card, minimizing hardware costs

### INCREASED FLEXIBILITY TO BUILD SPECIAL PURPOSE DEVICES

- Flexibility to configure and assemble the image on the device
- Add features, drivers, and language packs either directly to the device or to the image on the developer machine
- The new SKU Compliance Package in Windows Embedded Standard SP1 ensures OEMs include the right features for their devices
- Latest wireless networking and added security features through Network Access Protection (NAP)

### TAKE ADVANTAGE OF EMBEDDED TECHNICAL RESOURCES DURING DEVELOPMENT

- Large, active developer and technology partner community with deep expertise on Windows Embedded Standard technology

### USE INDUSTRY STANDARD TOOLS FOR EMBEDDED APPLICATION DEVELOPMENT

- Compatibility with Windows tools and resources gives OEMs access to the skills of the Windows developer community

### MINIMIZE OR REDUCED COMPLEXITY AND COSTS FROM DEPLOYMENT AND SERVICING

- Choose from any of the Windows deployment tools like Windows Deployment Services, Sysprep, ImageX or boot from USB
- Choose from direct OEM servicing or take advantage of automatic servicing options like Windows Update or Windows Server® Update Services.

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