Leadership price/performance for digital STB applications, including MHP

STBx25xx Digital Set-Top Box Integrated Controller

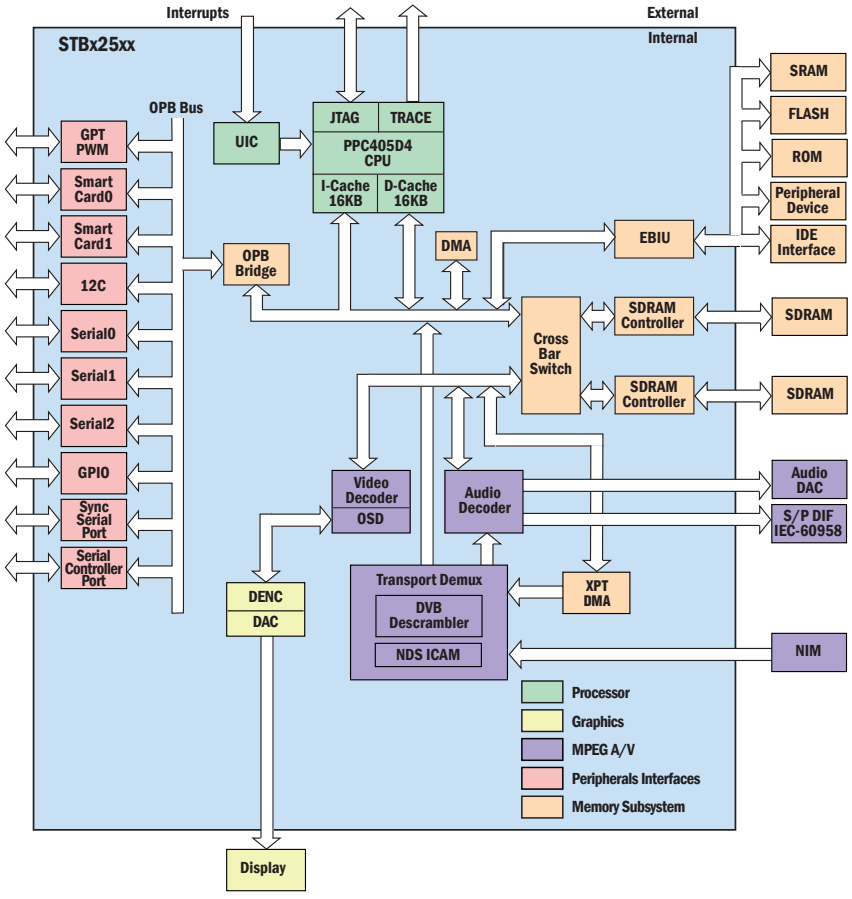
Highlights

- ***Provides high-performance, cost-effective solutions for diverse applications***
- ***Supports multimedia home platform (MHP) applications, with compute cycles to spare***
- ***Supports conditional access from NDS***

High CPU performance and a clear migration path support emerging STB services

The IBM STBx25xx Digital Set-Top Box Integrated Controller provides manufacturers and service providers with high-performance, affordable, and highly integrated semiconductors for demanding set-top box (STB) applications, including media home platform (MHP), digital terrestrial services, interactive TV, Web browsing, and data broadcasting. Building on IBM's technology for STBs, this advanced controller incorporates the powerful IBM STB architecture, advanced sub-0.15 micron process technology, and design flexibility.

Featuring a 350DMIPS PowerPC® processor, the STBx25xx controller is able to run demanding applications such as MHP and still have compute cycles available for additional functions. To



STBx25xx Digital Set-Top Box Integrated Controller block diagram

match increasing industry demands for more advanced offerings, customers can leverage software compatibility across IBM's family of STB controllers.

The STBx25xx design allows base audio and video decoding activities to execute with minimal host processing, thereby making more DMIPS available to enable high-end functions performed concurrently with audio/video programming and entertainment.

STBx25xx controllers include four powerful subsystems: processor, memory, digital audio/video, and peripheral interface. Fourth-generation single-chip devices, STBx25xx controllers demonstrate IBM's commitment to satisfying emerging STB requirements through a range of advanced features.

Design flexibility supports diverse applications

STBx25xx controllers offer the flexibility to help satisfy manufacturers' individual application requirements. Customers can select a controller with Macrovision copy protection support, NDS VideoGuard® conditional access, or both. In addition, STBx25xx incorporates a broad spectrum of peripheral interfaces and support for a range of industry-standard memory, providing extensive design flexibility.

IBM STBx25xx Digital Set-Top Box Integrated Controller

Processor Subsystem	PowerPC 405 @252MHz/350DMIPS 16KB I-Cache, 16KB D-Cache	
Memory Subsystem	DMA controller External bus interface unit IDE Interface (ATA-3)	2 SDRAM controllers Processor local buses Intelligent crossbar switch
Audio/Video Subsystem	MPEG-2 MP @ ML video decoder MPEG-2 transport demultiplexers/DVB descramblers Digital encoders with NTSC/PAL/SECAM analog conversion MPEG-2 Layer I and Layer II audio decoder Dolby® Digital decoding (license required)* Macrovision copy protection (license required) VideoGuard from NDS Group plc (license required)	
Peripheral Interface Subsystem	General-purpose timers IR receiver 2 smart cards Three UART serial ports GPIO controllers Real-time clock/front panel controller	Pulse width modulation I/F – sleep/wake functions One I^2C interface Serial controller port Synchronous serial interface
Physical Specifications	Sub-0.15-micron CMOS technology 3.3V/2.5V/1.8V operating voltage 1.4W (max.) power dissipation 0°C - 70°C ambient temperature range 304-pin EPBGA package	

The STBx25xx controller integrates several features that can help STB manufacturers minimize additional component cost:

- DENC outputs designed for multiple configurations, including SECAM
- DENC outputs capable of output to a VCR and television simultaneously
- IDE interface = direct connection
- DVB CI = direct connect
- Smart Card interface = direct connection
- Front Panel Control and Real Time Clock

PowerPC 405 delivers high performance

The PowerPC 405 processor, the heart of the *processor subsystem,* features high-speed operation at 252MHz, 16KB instruction cache, and 16KB data cache to maximize application performance. With this exceptional processing capability, STB manufacturers can design products to support:

- Media home platform
- Digital terrestrial services
- Internet gaming
- Interactive TV
- Web browsing
- e-commerce applications

Advanced digital audio and video features support next-generation applications

The *digital audio and video subsystem* delivers high-quality video and sound, enabling advanced features for consumer applications. The digital audio and video subsystem operates with minimal processor intervention, making more DMIPS available for custom application functions.

The STBx25xx digital audio and video subsystem incorporates:

- MPEG-2 video decoder; decodes MPEG-2 Main Profile at Main Level (MP @ ML) video
- MPEG-2 transport demultiplexer/ DVB descrambler
- Digital encoders, including NTSC, PAL, and SECAM analog conversion, and six concurrent analog video outputs
- MPEG-2 audio decoder; decodes MPEG-2 Layer I & Layer II
- MPEG-2 Layer III (MP3) audio decoder
- Macrovision copy protection support (STBx25x1 controllers only; a Macrovision license is required)
- NDS Video Guard support (STB125xx controllers only; an NDS license is required)
- Anti-flicker filter

A wide range of peripheral and memory interfaces

The *peripheral interface subsystem* provides the variety of interfaces needed to satisfy customer requirements:

- General-purpose timers, pulse width modulation (GPT, PWM)
- Two smart card interfaces (EMV2000)
- One inter-integrated circuit (I2C) interface
- Three UART750 serial communications ports
- Serial control port
- General-purpose input/output (GPIO) controllers
- Synchronous serial port
- Real-time clock/front panel controller
- Infrared receiver

The *memory subsystem* incorporates a DMA controller that provides 4 channels, supporting up to 128MB of SDRAM; two SDRAM controllers; an external bus interface unit (EBIU) supporting up to 256MB of SRAM/ROM or Flash memory; a crossbar switch; and two processor local buses (PLBs) that interface to the PowerPC processor and other major subsystems. The PLBs provide high bandwidth between the function masters and the external memory interfaces for ROM, Flash, SDRAM, and others. The subsystem's DMA controller increases application performance by allowing more concurrent data transfer between memory and peripherals.

Highly productive development tools help reduce time-to-market

Evaluation kits, including device drivers, a circuit board, VxWorks® and Linux® development tools are available. The IBM RISCWatch™ debugger for non-invasive RTOS-aware debug is also available to help manufacturers improve their time-to-market. In addition, the PowerPC 405 processor's widely adopted architecture is supported by the IBM PowerPC Embedded Tools Program, giving designers access to third-party tools to meet a range of development needs.

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