CONEXANT

HDTV MPEG-2/H.264/VC-1 Video Decoder
CX24501

Conexant's portfolio includes a comprehensive suite of semiconductor solutions for broadband communications and the digital home.

Conexant's CX24501 is a highly integrated, MPEG-2/H.264/VC-1, DIRECTV/DVB compliant, back-end decoder IC solution for high-definition digital TV which can be deployed in digital satellite, cable, Telco or terrestrial TV networks.

The CX24501 features a flexible multi format video decoder capable of decoding High Definition or Standard Definition programs in MPEG-2, H.264 and VC-1 formats. The audio decoder supports multiple audio format decoding, including MPEG-1, MPEG-2, Dolby® Digital, Dolby Digital+. MPEG-4 aac and aacPlus™, WMA and WMA Pro. An integrated ARM1176 CPU with 32K Instruction and Data cache supplies over 730 Dhrystone 1.2 MIPS at 550MHz, and a high performance 667MHz 32-bit DDR-2 SDRAM memory controller gives ample processing power for advanced applications and future expansion capability. An additional 16-bit DDR-2 SDRAM controller is also available for high performance applications.

The CX24501 also features an impressive array of I/O features, including HDMI with HDCP, dual USB 2.0 host controller with integrated PHYs, an additional USB1.1 solution, dual integrated 10/100 Ethernet MAC with MII, integrated V.92 hardware modem, PCI bus and HomePlug® connectivity via a high-speed UART. The CX24501 fully supports cable applications when used in conjunction with the CX24450-CX24453 DOCSIS 2.0+ STB Front End IC, supporting an OpenCable™ Cable CARDTM M-Card™ interface.

The CX24501 is software compatible with the other single chip MPEG decoder products from Conexant including the CX24500 and CX2427x family. A single code base allows common software development to be applied to across all platforms minimizing development time and maximizing software reuse.

Distinguishing Features

- DVB/DIRECTV® compliant back-end HDTV decoder for worldwide markets
- High-performance ARM1176 CPU with 32K I/D cache providing 730+ DMIPS
- Multiple OS support including Nucleus+, VxWorks, Linux® and Windows® CE
- MPEG-2, H.264 and VC-1 video decoder
- Advanced audio decoder with multiple audio format support
- Advanced security features including secure boot software authentication, IC personalization via OTP memory, SVP support and 3DES/AES ciphering engines
- HDMI v1.3 transmitter with HDCP content protection
- High performance de-interlacer with 480i or 1080i to480p/720p conversion
- Dual USB2.0
- OpenCable M-card support

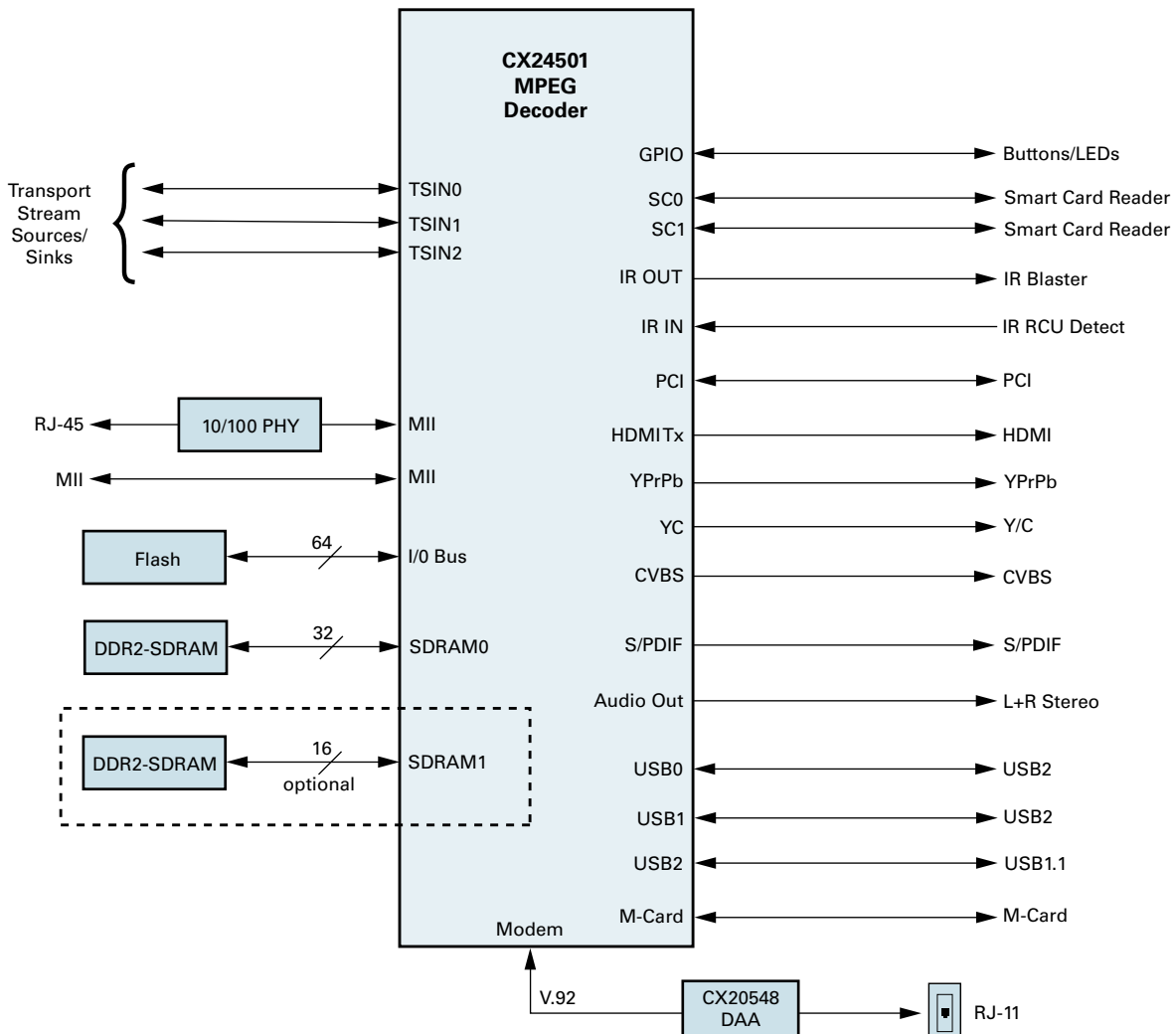|	
Part Number	CX24501
Description	HDTV MPEG-2/H.264/VC-1 Video Decoder

For a complete HDTV hardware design, the only additional components required are a tuner, demodulator, double data rate (DDR-2) synchronous dynamic random access memory (SDRAM), and flash memory ICs. This level of integration enables a low-cost system bill of materials and allows the flexibility of supporting different modulation and compression technologies with a low cost, highly featured MPEG solution for dual TV set-top box (STB) applications.

The CX24501 IC is integrated into a fully engineered interactive TV STB reference development system that implements third-party interactive middleware/real-time operating system (RTOS) platforms and provides a complete set of STB low-level drivers. The STB development platform hardware is designed with a flexible architecture that supports multiple front end tuner/demodulator daughter boards. A mature and robust hardware abstraction layer is assured by re-use of core driver libraries developed over multiple generations of production MPEG ICs. Support for Nucleus+ and Linux OS is included, with the software architected to allow easy porting to other real-time OS.

CX24501 MPEG Decoder

Left side		Right side
Transport Stream Sources/Sinks	TSIN0	GPIO — Buttons/LEDs
	TSIN1	SC0 — Smart Card Reader
	TSIN2	SC1 — Smart Card Reader
		IR OUT — IR Blaster
		IR IN — IR RCU Detect
RJ-45 — 10/100 PHY	MII	PCI — PCI
MII	MII	HDMITx — HDMI
Flash — 64	I/0 Bus	YPrPb — YPrPb
DDR2-SDRAM — 32	SDRAM0	YC — Y/C
DDR2-SDRAM — 16 optional	SDRAM1	CVBS — CVBS
		S/PDIF — S/PDIF
		Audio Out — L+R Stereo
		USB0 — USB2
		USB1 — USB2
		USB2 — USB1.1
	Modem	M-Card — M-Card

V.92 — CX20548 DAA — RJ-11

CX24501 System Block Diagram

Common Platform for Satellite, Cable, IP and Terrestrial STB manufacturers increasingly look to leverage a common hardware platform that can be reused over various broadband networks, including satellite, cable, terrestrial, DSL, and Telco networks. Conexant's CX24501 IC can serve as a common back-end platform that easily interfaces to a variety of broadband front ends, including QPSK, 8-PSK, DVB-S2, QAM, OFDM, 8-VSB, ADSL/VDSL, 802.3, 802.11a/b/g, Homeplug, MoCA® or IEEE 1394 through either transport stream, MII or PCI interfaces. This provides a flexible STB solution that can be targeted to a variety of broadband operators while minimizing hardware/software development costs.

CX24501 Product Features

- High-performance ARM1176 CPU with 32K I/D cache supplying 730+ Dhrystone 1.2 MIPS at 550MHz

- 667 MHz 32-bit DDR-2 memory interface with optional additional 16-bit DDR-2 interface for high performance applications

- DIRECTV/DVB transport stream demultiplexing

- Multi-standard transport processor with 3DES, AES and Multi-II descrambling

- Supports MPEG-2 MP@HL, MP@ML. MP@LL, SP@ML

- Supports H.264 MP@L4.1 and HP@L4.1

- Supports VC-1 AP@L3 and MP@HL

- Multi-plane video/graphics display controller

- HD displays supports HD 1080p, 1080i and 720p picture output with six-plane compositing

- Supports constrained HDTV image output on YPrPb

- Supports video plane re-sizing for format conversion, picture-in-picture, or picture-in-graphics

- High-performance de-interlacing supports 480i to 480p/720p and 1080i to 480p/720p conversions

- Multi-format audio decoder supporting decoding of MPEG-1, MPEG-2, Dolby Digital, Dolby Digital Plus, MPEG-2 AAC, MPEG-4 AAC, aacPlus, WMA and WMA Pro encoded bitstreams

- Advanced 2D graphics rendering engine for alphablt, bitblt, textblt, line draw, and color expansion acceleration

- Six 10-bit video DACs

- Macrovision® 7.x copy protection with 525p/625p optional support

- Advanced security features including secure boot SW authentication, IC personalization via OTP memory

- Secure video processor (SVP) support

- Integrated DIRECTV security

- HDMI v1.3 transmitter with HDCP

- Dual USB2.0 host controllers with integrated PHYs

- Dual channel 10/100 Ethernet MAC with overclocked MIIs

- Two Smart Card ports

- 32-bit 33 MHz PCI controller

- Multiple I2S, 12C, SPI, GPIO, UARTs

- OpenCable™ CableCARD™ M-Card interface

- Infrared (IR) input/output

Conexant Product Portfolio

The company's broad portfolio of semiconductor products also includes client-side DSL and cable modem solutions, home network processors, broadcast video encoders and decoders, digital set-top box components and systems solutions, and dial-up modems. In addition to its IEEE 802.11a/b/g-compliant WLAN chipsets, software, and reference designs, Conexant offers a suite of networking components that includes solutions for applications based on HomePlug® and HomePNA™. Additional products include a complete line of asymmetric and symmetric DSL central office solutions, which are used by service providers worldwide to deliver broadband data, voice, and video over copper telephone lines.

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