Marvell ARMADA 610 Application Processor

1GHz, 1080p encode/decode, 45 MTPS 3D, Security enabled

PRODUCT OVERVIEW

The ARMADA™ 610 processor is Marvell®'s next generation application processor. Designed for mobility, the ARMADA 610 features a gigahertz-class CPU, integrated 1080p full HD encode and decode, and 3D graphics to offer high performance and visual and entertaining experiences for Mobile Internet Devices (MIDs), connected portable media players, eReaders, smartphones, and new personal information appliances. Apart from its family members, the ARMADA 610 is designed to use extremely low power while maintaining high processing performance and attractive price points for manufacturers — all in the lightweight form factors with extended battery life consumers are looking for.

The ARMADA 610 is based on a Marvell-designed ARM v7 compatible CPU offering best-in-class performance. The ARMADA 610 features bleeding-edge graphics with a powerful 3D engine that renders full 2D/3D graphics with a complete floating point pipeline and unified vertex and fragment/pixel shading to generates contrast-rich scenes with high-definition resolution and color. The ARMADA 610 supports OpenGL ES 2.0 and 1.1 and Open VG – ensuring complete compatibility with the most hotly anticipated game titles and is able to render 45M triangles per second for an immersive gameplay experience.

The ARMADA 610 features Marvell's award winning Qdeo technology and can seamlessly both encode and decode 1080p video, enabling applications such as HD IP cameras, full HD camcorders and HD video playback that were previously impossible for this class of device. Finally, the ARMADA 610 offers the flexibility to use any standard memory (LPDDR and standard DDR), a highly flexible display controller capable of four simultaneous displays at 2K x 2K resolution (greater than WUXGA) and a highly robust security subsystem that includes a secure execution processor. The ARMADA 610 also features support for superior advanced peripherals such as MIPI, which includes support for MIPI DSI display, MIPI CSI camera, MIPI HSI and MIPI SLIMbus. Additional IOs include: USB 2.0 HSIC, SD/SDIO/MMC, eMMC, HDMI w/PHY and a standard set of lower bandwidth peripherals. Finally, the ARMADA 610 maintains support for legacy peripherals such as Parallel LCD and Parallel Camera interfaces with integrated laser scanner support. And with optimized support for Linux, Android™, Maemo, Windows® Mobile 6.5, Windows CE 6, Windows CE 7, Flash® 10, industry standard APIs such as OpenMAX and OpenGL, ARMADA 610 customers will have one of the broadest choices of platform support in the industry.

BLOCK DIAGRAM

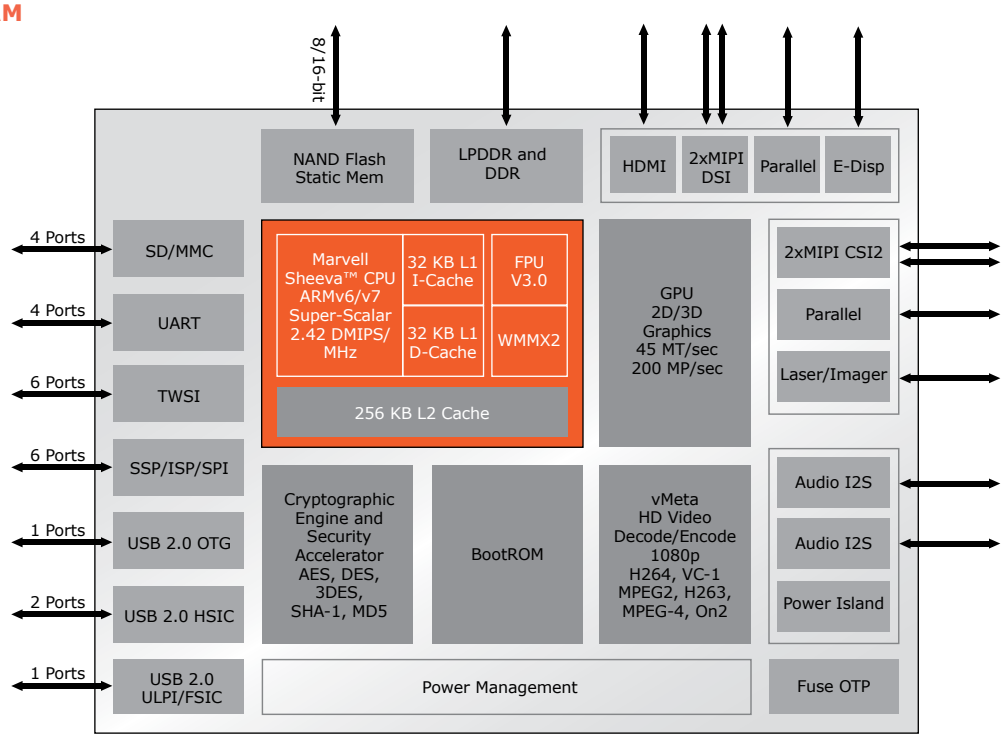

Fig 1. Marvell ARMADA 610 Application Processor

Marvell ARMADA 610 Application Processor

MOVING FORWARD FASTER®

FEATURES	BENEFITS
• Marvell PJ4 Core – Marvell Sheeva CPU Technology – Up to 1 GHz operation (2.41 DMIPS/MHz) – ARMv7 and ARMv6 compliant – Wireless MMX2, VFPv3D16, Thumb-2, Jazelle* RCT – Trustzone technology for secure – 32 KB I-Cache, 32 KB D-Cache, 256 KB L2 Cache	• Hardware Video Acceleration – Integrated video accelerator supporting 30 fps 1080p decode and encode – 1080p decode support for H.264 high profile, VC-1/WMV, MPEG-4, MPEG-2, H.263, On-2. – 1080p encode support for h.264 high profile, MPEG-4, MPEG-2, H.263 and On-2
• Hardware 3D/2D acceleration – Integrated 3D accelerator w/ full 2D acceleration – 45M triangle strips per second, 250 Mpixel/s fill rate – Supports OpenGL* ES 2.0/1.1 and OpenVG 1.1	• Audio Accelerator System – Low power audio island with streaming support when processing is in standby – Supports up to 100 hrs of audio playback
• Image Signal Capture – Integrated ISP up to 16MP – Dual MIPI CSI-2 controllers – Primary sensor resolution up to 14MP – Secondary sensor resolution up to 4MP – Parallel image capture interface – Laser/optical bar code reader interface	• LCD Controller – Dual LCD panels (smart or active), up to 2k x 2k – Supports two symmetric LCD panels as a single virtual LCD – 2x MIPI DSI controllers; One parallel 24-bit LCD; 1x ePaper – HDMI v1.3a w/ integrated PHY (1080p resolution) – Supports four independent content streams on four displays (2x LCD + 1x ePaper + 1x HDMI)
• Static Memory Controller – 4 chip selects, up to 256 MB each – Asynch/Sync operation up to 78 MHz – A/D and AA/D Mode, x8 & x16 NOR Flash interface – Support for VLIO or companion chips	• MMC, SD and SDIO Controller – 4x MMC/SD/SDIO/CE-ATA Controllers – Supports MMC/eMMC v4.2, 4.3 and 4.4 – SDIO v 2.0, SDcard v2.1 and v3.0 (UHS-I) – CE-ATA 1/4/8-Bit, SPI mode and boot support
• NAND Flash Controller – ONFI compliant controller supporting SLC and MLC NAND, x8 & x16, small block and large block – 2 Chip Selects with up to 64GB of address space – Support for 2 KB and 4 KB page sizes – 2-bit detect/1-bit correct ECC & 16-bit correct BCH	• DDR Memory Controller – LPDDR2 32-bit 400MHz (800MTPS) – LPDDR1 32-bit 200MHz (400MTPS) – DDR2 400MHz (800MTPS) – DDR3 533MHz (1066 MTPS) – RBC and BRC bank addressing modes
• Marvell Wireless Trusted Module v3 – Secure Execution Processor with secure Boot from multiple sources (e.g. NAND, eMMC) with multiple life cycle states to protect processor – Multi level key & Trustzone extensions for entire SOC – Secure storage via RKEK-based secure data wrapping – Hashing units: MD5, SHA-1, HMAC-SHA-1; SHA-224/SHA256 and HMAC, SHA-512 and HMAC, MD5 and HMAC-MD5 – Symmetric crypto: AES (128 to 256 & ECB, CBC, CTR/XTS modes), DES/3DES (ECB & CBC), RC4 – Asymmetric crypto: ECC (Prime field ECC, FIPS std curve EC-224/256, EC-DSA) & RSA (RSA key gen, PKCS#1 v1.5/v2.1 Digital Signatures, x.509 Digital Certificate), & DiffieHellman Key exchange. True HW RNG, FIPS 140-2 certification	• Peripherals – One MIPI HSI physical layer interface (protocol v1.0 and v1.1 up to 225 Mbps) – One MIPI SLIMbus interface (v1.00.00 compliant) – Three high-speed USB 2.0 Host controllers (two configured as HSIC, one as FSIC or 12 pin ULPI) – One high-speed USB 2.0 OTG w/ transceiver – One Memory Stick PRO controller – Six SSPs (including 2 dedicated for audio), 6x TWSI controllers, 4x UARTs, One-Wire interface, 4x PWM – One USIM Controller supporting 1.8V and 3.0V USIMs – Keypad controller (up to 8x8 matrix, up to 8 direct keys, up to 2x rotary encoders and one trackball) – IEEE 1149 JTAG support – Trace Port Interface Unit (TPIU)

THE MARVELL ADVANTAGE: Marvell chipsets come with complete reference designs which include board layout designs, software, manufacturing diagnostic tools, documentation, and other items to assist customers with product evaluation and production. Marvell's worldwide field application engineers collaborate closely with end customers to develop and deliver new leading-edge products for quick time-to-market. Marvell utilizes world-leading semiconductor foundry and packaging services to reliably deliver high-volume and low-cost total solutions.

ABOUT MARVELL: Marvell is a leader in storage, communications, and consumer silicon solutions. Marvell's diverse product portfolio includes switching, transceiver, communications controller, processor, wireless, power management, and storage solutions that power the entire communications infrastructure, including enterprise, metro, home, storage, and digital entertainment solutions. For more information, visit our Web site at www.marvell.com.

MARVELL®

Marvell Semiconductor, Inc.
5488 Marvell Lane
Santa Clara, CA 95054
Phone 408.222.2500
www.marvell.com

Armada_610_SoC-01 1/10