

# Marvell ARMADA 1500 Ultra

Ultra High-definition Media Processor System-on-chip with Quad-core CPU

**ARMADA**  
smart tv

## PRODUCT OVERVIEW

The Marvell® ARMADA® 1500 Ultra (88DE3218) ultra high-definition secure media processor is a system-on-chip (SoC) delivering multi-core CPU/GPU performance, Ultra HD video, and carrier-grade security to PayTV set-top box (STB), and retail over-the-top (OTT) box markets. State-of-the art power management techniques and an enhanced Qdeo® Video (2160p60 HEVC/VP9) processor enable a highly immersive 4K TV entertainment experience to be delivered in a cost effective, small form factor CE device. In addition, Marvell's latest video SoC integrates 14K (1.5GHz) DMIPs Quad Core A53 ARM CPU for supporting the wide range of Smart TV services. The ARMADA 1500 Ultra includes a powerful 8 core 51 GFLOP Graphics Processing Unit (GPU) (Vivante GC7000XS) further underscoring Marvell's value proposition of enabling operators to deliver gaming services. The GPU integrates hardware tessellation and geometry shaders that support new gaming features in Android L AEP (Android Extension Pack). This innovative architecture brings impressive processing power to the digital entertainment market, unifying the user experience between the small screens in our homes (mobile, tablet) and the large ones (TV, cable boxes). The video/audio codec subsystem supports decode of up to 2160p60 H.265, H.264, VC-1, MPEG2, AVS, VP9 and several other formats, and supports audio formats such as Dolby MS11, HE-AACv2, DTS-HD®, SRS®, ARMADA 1500 Ultra security architecture includes secure boot, Trusted Rendering Path, video watermarking and full TrustZone® enabling operators to bring together the best OTT + PayTV experience with the highest level of content protection. The device integrates both HDMI v2.0 output as well as multiple transport stream inputs, analog video (composite, component) output to minimize the video/audio components required in the system and save on bill-of-materials (BOM). Peripheral connectivity includes Gigabit Ethernet (RGMII), Fast Ethernet with integrated PHY, 1 x SATA 3.0 host port, USB 3.0 and USB 2.0 host ports, 2 x SDIO 3.0 controllers, smart card, and PCIe. System performance is enhanced with 64-bit unified asymmetric DDR3/4 100 Gbps memory controller and still maintains very small footprint with 15mm x 15mm FCBGA packing. The ARMADA 1500 Ultra is the ideal SoC platform solution for the next generation of STBs that service operators (Telco, Cable, Satellite) are deploying enabling new Ultra HD, Smart TV, and IoT services.

## BLOCK DIAGRAM

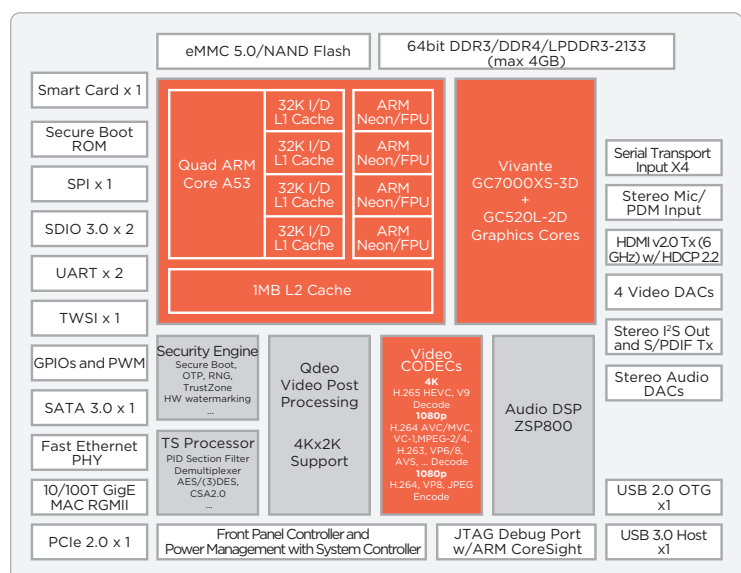


Fig 1. Marvell ARMADA 1500 Ultra Block Diagram

## FEATURES AND BENEFITS

SPECIAL FEATURES	BENEFITS
<ul style="list-style-type: none"> <li>Up to 14000 DMIPs Quad Core ARM CA53 CPU with 1MB L2 Cache</li> </ul>	<ul style="list-style-type: none"> <li>Enabling rich media/web-based TV applications and Android TV services in single SoC, 64-bit CPU enables unification of application development with mobile ecosystem. Power efficient: 0.05 mW/DMIPS</li> </ul>
<ul style="list-style-type: none"> <li>3840x2160 (UHD) at 60 frames per second 10-bit HEVC Decode + PiP +1080p60 Transcode concurrent operation</li> </ul>	<ul style="list-style-type: none"> <li>Decodes highest resolution video, a critical feature that consumers will demand with the mass installation of 4K TVs over the next several years</li> <li>Encode/Decode for multi-screen and video calling applications</li> <li>Includes patented noise reduction, scaling, format conversion and enhancement</li> </ul>
<ul style="list-style-type: none"> <li>8-core, 51 GFLOP GPU (Vivante GC7000XS) w/ HW tessellation and geometry shaders</li> </ul>	<ul style="list-style-type: none"> <li>OpenGL ES 1.1/2.0/3.0/3.1, OpenCL 1.2 and DirectFB</li> <li>HW Tessellation and Geometry Shaders, optimized for Android L (AEP) gaming applications</li> </ul>
<ul style="list-style-type: none"> <li>Dedicated Robust Security Engine including secure boot, Trusted Rendering Path, full TrustZone®, video watermarking</li> </ul>	<ul style="list-style-type: none"> <li>Offers premium content support with multiple DRM/CAS options: Verimatrix® Ultra, Widevine®, Playready®, DTCP-IP</li> <li>Trusted Path certified by Service Operators and Content Owners Worldwide</li> </ul>
<ul style="list-style-type: none"> <li>Hybrid Architecture</li> </ul>	<ul style="list-style-type: none"> <li>Quad TS inputs supports PayTV Operator STB requiring both broadcast (DVB-T,C,S) and IP content for deployment of a compelling unified OTT and PayTV entertainment experience</li> </ul>
<ul style="list-style-type: none"> <li>Full suite of peripherals</li> </ul>	<ul style="list-style-type: none"> <li>SATA, SDIO, USB 3.0 for operator/consumer apps such as DVR</li> <li>10/100/1000 Ethernet MAC with RGMII interface for robust IP connectivity</li> <li>PCIe for additional connectivity options for 4x4 Wi-Fi, cable modem</li> <li>Smartcard interfaces</li> </ul>
<ul style="list-style-type: none"> <li>Android TV and RDK SDK support</li> </ul>	<ul style="list-style-type: none"> <li>Full Integration and complete SDK for Fast time to deployment of Unified PayTV and OTT services</li> <li>Complete platforms with multiple connectivity options including Marvell Wi-Fi (2x2 or 4x411ac), LTE, ZigBee® and Powerline (G.hn) technologies</li> </ul>
<ul style="list-style-type: none"> <li>Advanced power management architecture</li> </ul>	<ul style="list-style-type: none"> <li>Eliminates need for expensive thermal management hardware</li> <li>Enables Small form factors down to 75mm x 75mm</li> </ul>

## APPLICATIONS

The ARMADA 1500 Ultra delivers the ideal SoC solution for Ultra HD set top boxes with Smart TV services. Marvell is delivering a strong portfolio of SDKs in the ARMADA 1500 Ultra platform including both Android TV and RDK. Service Operators are depending on new open standards SW platforms with proven ecosystems to enable this content and application convergence across all the screens. To shorten system manufacturers' design cycles and accelerate time to market, Marvell provides complete ARMADA 1500 Ultra development platforms and reference designs with device drivers, schematics, layout files and other documentation.



**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 (NASDAQ: MRVL) is a global leader in providing complete silicon solutions enabling the digital connected lifestyle. From mobile communications to storage, cloud infrastructure, Internet of Things (IoT), digital entertainment and in-home content delivery, Marvell's diverse product portfolio aligns complete platform designs with industry-leading performance, security, reliability and efficiency. At the core of the world's most powerful consumer, network and enterprise systems, Marvell empowers partners and their customers to always stand at the forefront of innovation, performance and mass appeal. By providing people around the world with mobility and ease of access to services adding value to their social, private and work lives, Marvell is committed to enhancing the human experience. As used herein, the term "Marvell" refers to Marvell Technology Group Ltd. and its subsidiaries.

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