

Qualcomm® SA8155P Product Brief



Qualcomm Technologies provides a wide range of integrated and scalable automotive solutions specifically targeted at the integrated cockpit/cluster and compute architectures.

With industry leading performance, graphics and DSP, our automotive compute solutions provide for unprecedented level of support for cockpit/ clusters, surround-view monitoring, advanced audio integration and additional communications such as WLAN and WWAN integration. All of these solutions are augmented by software that extend beyond a basic BSP package. The software solutions from Qualcomm Technologies support multiple operating systems including Android for Automotive, Automotive Grade Linux and other Linux for automotive distributions, and other real-time operating systems including QNX and Green Hills.

SA8155P is an integrated, next-generation automotive cockpit platform. It is a 7nm system-on-chip (SoC) designed with custom hardware blocks including:

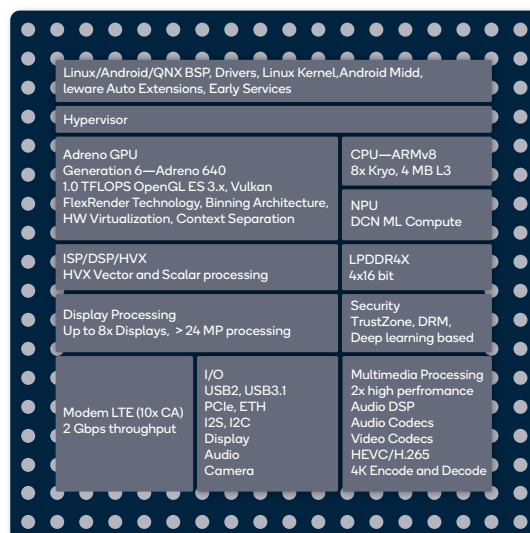
- An octa-core CPU subsystem featuring the 4th generation Qualcomm® Kryo™ CPUs based on the ARMv8 architecture
- Custom Qualcomm® Adreno™ Generation 6 GPU, with enhanced support for preemption for next-generation cluster designs, and featuring patented Qualcomm® FlexRender™ technologies
- Custom and dedicated video decode/encode hardware accelerators
- Display engine supporting up to 3x4K displays (at 60 fps), with support for instrument cluster integrity
- Audio DSP supporting Echo Cancellation/Noise Suppression (ECNS), Active Noise Cancellation (ANC), and in-car communication algorithms with multichannel-capable TDM/I2S ports
- Heterogenous compute subsystems/DSPs to support next generation machine learning and computer vision acceleration; highly efficient machine learning architecture consuming less than 7 W to deliver >10 TOPS of performance
- Optional 2 Gbps-capable modem baseband integrated with support for Gen-9
- High-speed connectivity for peripherals—USB 3.0, PCIe Gen 3.0, Ethernet (Gigabit-capable)
- Automotive Grade-3 support with PPAP and documentation

- Technology IP leadership
Leading 7nm FINFET low power
- HW thermal management
- Highest performance GPU
for infotainment, instrument cluster
- Heterogeneous compute architecture
High-performance DSP
Multi-camera input
Surround-view camera
Object recognition, Image recognition
- HW multi-display compositor
- Optional Modem:
Leading 2 Gbps LTE with 10xCA
- Optional GNSS:
Multi-constellation support
- Optional Connectivity:
Wi-Fi + Bluetooth

Optional:
External Wi-Fi
802.11ac or ax/
Bluetooth

Optional:
Qualcomm®
SIRFStar™ GNSS

PMICPM8155P

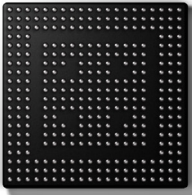


- Software integration
System-level performance optimization
Platform integration
Multimedia shared device driver
- High performance, power efficient:
Customized ARMv8 CPUs
- NPU: AI/ML compute engine
Neural Network Processing
- Multiple 4K displays, up to
8 simultaneous displays
- Latest SCSA security architecture
- Next generation audio and video codecs
in hardware including HEVC, VP9
DVR capability with H.265 encode
- Superior multimedia technologies and features

Note: Some features are optional based on the product variant.



Qualcomm SA8155P, Qualcomm Adreno, Qualcomm FlexRender, Qualcomm Kryo and Qualcomm SirfStar are products of Qualcomm Technologies, Inc. and/or its subsidiaries.



Feature Details

• CPU

- Custom 64-bit Kryo octa-core CPU
- 7nm FINFET with advanced power savings
- SOC virtualization support
- 384 KB L1 I/D + 1.875 MB L2 + 2 MB L3 + 3 MB system cache

• GPU

- Adreno 640 GPU: OpenGL ES 3.x OpenCL 2.0 Full, Vulkan, RenderScript, 64-bit virtual addressing, plus hardware tessellation, geometry shaders, programmable blending, and decreased power consumption
- High granularity for preemption with HW queues and doorbell features

• DSP + NPU

- Qualcomm® Hexagon™ 6 DSP with Hexagon Vector eXtensions (HVX)—Four instances
- Neural Processing Engine (NPU) for machine learning acceleration

• Audio DSP and Audio Interfaces

- Dedicated Audio Low Power Audio Subsystem (LPASS) with Hexagon 6 DSP
- Support for ECNS, ANC, and in-car communication using Qualcomm® Noise and Echo Cancellation
- 5 interfaces supporting I2S and PCM/TDM
- Up to 512* 48 kHz (24.576 MHz)
- 3x high-speed I2S (70 MHz) to support Software Defined Radio (SDR)

• Display and Video Processing

- Up to 3x 4kp60 support—Total of 24 Mpix supported in HW display compositor
- Support for 2x DSI V1.0 and DisplayPort V1.4 with Multi-Stream Transport (MST) support (up to 2x 4k60)
- Multiple surface processing pipes
- Support for instrument cluster integrity
- Hardware video decode/encode support—Up to 4k120 decode, 4k60 encode support
- Support for major video codecs (HEVC, H.264/H.265, etc.)

• Memory and Storage

- 4x16 LPDDR4X support—Up to 68 GBps with compression (Gen 3 of UBWC)
- Error Correction Code (ECC) support on external memory
- 1x UFS 3.0 support
- QSPI for boot

• Camera and ISP Support

- Support for automotive ISP
- 4x4 CSI 2.0 lane for camera support
- Support for Around View Monitoring (AVM) and Rear-View Camera (RVC) with automotive enhancements

• Interfaces and I/O

- 1x 2-lane PCIe Gen3 + 1x 1-lane PCIe Gen3
- 2x USB3.0 support—Host and endpoint
- 1x GigE with RGMII support
- Up to 16 programmable serial interfaces
- 150 general purpose I/Os

• Integrated Communication Support (optional)

- Integrated 4G LTE modem
- 10xCA, 4x4 over 4xCA, UL 4xCA—Up to 2 Gbps of bandwidth
- Multi-constellation and multi-level (L1/L5) support
- IPA for Ethernet and modem built in

• Security

- Secure boot using RSA2048/SHA256, boot image encryption
- HW and SW encryption including inline crypto, RNG and general-purpose crypto engine
- Qualcomm® Trusted Execution Environment (TEE) support
- Dedicated security HW SPU for auto applications

• OS Supported

- Android Automotive
- Linux—AGL, GENIVI
- Hypervisor including QNX and Green Hills

• Power Management

- Power Management IC—PMM8155AU providing power management for SA8155P
- RTC, power-down and wake-up support
- PWM support
- AEC-Q100 Grade-3

• Power and Thermal

- -40° to 105°C junction temperature support
- Estimated TDP of 7 W (at 65°C ambient)
- Support for always-on/suspend to RAM

• Automotive Spec and Package

- AEC-Q100 Grade-3
- 0.7 mm ball pitch package—23 mm x 23 mm 989 ball FCBGA package
- In production, PPAP and documentation available

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