i.MX 8M FAMILY OF APPLICATIONS PROCESSORS

Built with **exceptional audio, voice and video processing,** the i.MX 8M applications processor family is optimized for applications scaling from consumer home audio to industrial building automation and mobile computers.

TARGET APPLICATIONS

- Streaming video devices—over-the-top (OTT) set top boxes, digital media adapters, digital signage, machine visual inspection

- Streaming audio devices—surround sound, wireless or networked speakers, sound bars, audio/video (AV) receivers, public address systems

- Voice control and voice assistants, with reference designs for homes or noisy industrial environments

- General-purpose human machine interface (HMI) solutions—touch, voice, graphics, video, image analytics, vision, sensor

ADVANCED VIDEO AND AUDIO

- **Video quality with full 4K UltraHD resolution and high dynamic range (HDR)**
  Delivers 10-bit video, HDR10, and HLG resolution. HDR can display the fine details for medical imaging, detailed inspection and magnifying the tiniest objects.
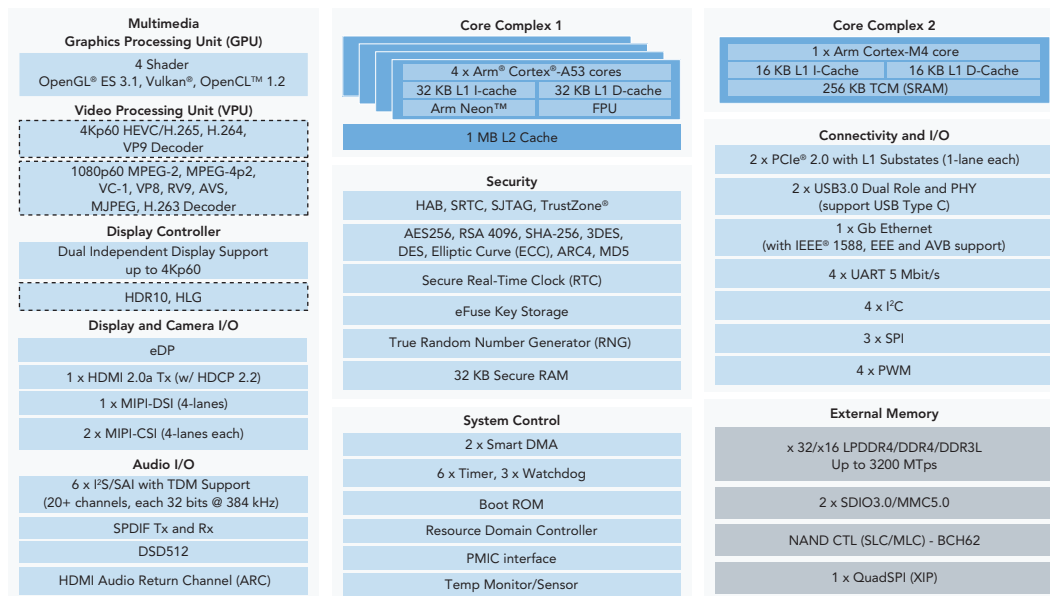
- **High levels of pro audio fidelity**
  Up to 20 audio channels enabled on a price-competitive mobile applications processor. It brings DSD512 audio and a selection of advanced audio streaming interfaces into the next generation of connected speakers, sound bars and AV receivers.

PERFORMANCE AND VERSATILITY

- **Up to four 1.5 GHz Arm® Cortex®-A53 processors**
  NXP optimized the i.MX 8M processor family for fanless operation, low thermal system cost and long battery life. The Arm Cortex-A cores can be powered off while the Cortex-M4 subsystem performs low-power, real-time system monitoring.

- **Flexible memory options**
  These processors support several external memory interfaces including LPDDR4 for high performance and low standby power, and DDR4 and DDR3L interfaces for low system cost.

i.MX 8M FAMILY BLOCK DIAGRAM

Multimedia
Graphics Processing Unit (GPU)
4 Shader
OpenGL® ES 3.1, Vulkan®, OpenCL™ 1.2

Video Processing Unit (VPU)
4Kp60 HEVC/H.265, H.264, VP9 Decoder

1080p60 MPEG-2, MPEG-4p2, VC-1, VP8, RV9, AVS, MJPEG, H.263 Decoder

Display Controller
Dual Independent Display Support up to 4Kp60

HDR10, HLG

Display and Camera I/O
eDP

1 x HDMI 2.0a Tx (w/ HDCP 2.2)

1 x MIPI-DSI (4-lanes)

2 x MIPI-CSI (4-lanes each)

Audio I/O
6 x I²S/SAI with TDM Support
(20+ channels, each 32 bits @ 384 kHz)

SPDIF Tx and Rx

DSD512

HDMI Audio Return Channel (ARC)

Core Complex 1
4 x Arm® Cortex®-A53 cores
32 KB L1 I-cache | 32 KB L1 D-cache
Arm Neon™ | FPU
1 MB L2 Cache

Security
HAB, SRTC, SJTAG, TrustZone®

AES256, RSA 4096, SHA-256, 3DES, DES, Elliptic Curve (ECC), ARC4, MD5

Secure Real-Time Clock (RTC)

eFuse Key Storage

True Random Number Generator (RNG)

32 KB Secure RAM

System Control
2 x Smart DMA

6 x Timer, 3 x Watchdog

Boot ROM

Resource Domain Controller

PMIC interface

Temp Monitor/Sensor

Core Complex 2
1 x Arm Cortex-M4 core
16 KB L1 I-Cache | 16 KB L1 D-Cache
256 KB TCM (SRAM)

Connectivity and I/O
2 x PCIe® 2.0 with L1 Substates (1-lane each)

2 x USB3.0 Dual Role and PHY
(support USB Type C)

1 x Gb Ethernet
(with IEEE® 1588, EEE and AVB support)

4 x UART 5 Mbit/s

4 x I²C

3 x SPI

4 x PWM

External Memory
x 32/x16 LPDDR4/DDR4/DDR3L
Up to 3200 MTps

2 x SDIO3.0/MMC5.0

NAND CTL (SLC/MLC) - BCH62

1 x QuadSPI (XIP)

⌐⌐ Optional Capability

- **High-speed interfaces connectivity**
  - Two USB 3.0 interfaces with PHY and Type-C support
  - Two PCIe® interfaces (1-lane each) with L1 substates for fast wakeup and low power
  - HDMI 2.0a, MIPI-DSI (4-lane) and eDP display interfaces
  - Up to two MIPI-CSI2 (4-lane) camera interfaces
  - Gigabit Ethernet MAC with audio-video bridging (AVB) and EEE capability

ADVANCED HMI SOLUTIONS

- **Industrial and consumer HMI**
  Designs can leverage the latest audio, video and voice control capabilities. Software solutions support reliable voice control in noisy environment without a DSP.

- **Dual displays**
  Up to 4Kp60 resolution on the HDMI 2.0a output and 1080p60 resolution on the MIPI-DSI (4-lanes) interface.

- **Enriched user experience**
  Provides a 4-shader graphics core supporting the latest OpenGL® ES3.1, OpenCL™ 1.2, OpenGL® 3.0, OpenVG™ and Vulkan® standards.

- **Video processing unit**
  Playback video standards up to 4K resolution using h.264, h.265 and VP9 (for YouTube 4K) codecs with HDR.

PIN AND POWER COMPATIBLE

Highly scalable design options allow a single platform to cover multiple products. Pin- and power-compatible packages (all 0.65 pitch) allow a single PCB platform and utilize different i.MX 8M processors as product needs dictate.

EARLY DEVELOPMENT ACCESS

The i.MX 8M evaluation kit (EVK) is available now to prototype i.MX 8M systems. Contact your NXP sales representative for details.

THE SCALABLE PLATFORM OF CHOICE

- **Comprehensive software support**
  Android™, Linux®, FreeRTOS and partner commercial operating systems

- **Industrial and consumer qualified**
  Industrial (-40 °C to 105 °C Tj), consumer (0 °C to 95 °C Tj)

i.MX 8M FAMILY—DIFFERENTIATED FEATURES

FEATURE	i.MX 8M DUAL/I.MX 8M QUAD	i.MX 8M QUADLITE
Arm® Core	2 or 4 x Cortex®-A53	4 x Cortex-A53
Arm Core	1 x Cortex-M4F	1 x Cortex-M4F
Audio	20 channels in/out; 32-bit up to 384 kHz, with DSD512 support	
GPU	GC7000Lite	GC7000Lite
Video Acceleration	4Kp60, h.265 and VP9	
Camera	2 x MIPI-CSI	2 x MIPI-CSI

*2-lane PCIe can act as 2 x 1-lane PCIe