NXP's newest applications processor for secure, affordable and intelligent edge computing

i.MX 8M Nano Applications Processors

The i.MX 8M Nano applications processor provides affordable performance for smart, connected, power-efficient devices requiring graphics, vision, voice control, intelligent sensing and general-purpose processing.

TARGET APPLICATIONS

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

▶ Smart home and building automation – HVAC climate control, home gateway, smart appliances, robotic appliances, building access control, lighting control

▶ Industrial IoT – voice-assisted products, machine learning (e.g. face recognition and anomaly detection), test and measurement equipment, human-machine interface (HMI), printers, image scanners, machine visual inspection and management, two-way radio, mobility and logistics

▶ Consumer and healthcare – mobile patient care, health care diagnostics, health care monitoring, blood pressure monitor, activity and wellness monitor, fitness equipment

SCALABLE, VERSATILE, AFFORDABLE

Design once, scale your performance

▶ Quad-, dual- or single- core Arm Cortex-A53 offerings enables scalable processing in a pin-compatible package.

▶ Optional 3D GPU for applications requiring higher levels of graphics performance (HMI).

▶ Cortex-M7 for heterogenous multicore processing to enable MCU-like functions or low-power processing.

▶ Pin-compatible package enables you to build one hardware design that supports both the i.MX 8M Nano and i.MX 8M Mini applications processors; add performance and features as your product requires.

Versatile, optimized system design

▶ NXP built and proven reference designs are available in a size-optimed form, enabled with latest software, and accessible on nxp.com to help get you started, fast.

▶ System designs offer high-speed LPDDR4 memory for optimized performance and power, or DDR4 and DDR3L memory for optimized system cost.

Power efficiency

▶ Delivered advanced 14LPC FinFET process, the device is optimized for high performance operation and low thermal system cost. The Cortex-A cores can be powered off while the Cortex-M7 subsystem performs low-power, real-time system monitoring.

Longevity of supply

▶ Backed by NXP's product longevity program to ensure a stable supply of product for your embedded design.

HIGH-PERFORMANCE COMPUTE

▶ 1x, 2x or 4x Arm Cortex-A53 cores running at speeds up to 1.5 GHz per core

▶ 1x Arm Cortex-M7 running at speeds up to 750 MHz, enables heterogenous multicore processing

▶ Resource domain controller enables secure allocation of resources to either Cortex-A53 or Cortex-M7 cores

SYSTEM CONNECTIVITY

▸ MIPI-DSI (4-lanes) for display

▸ MIPI-CSI (4-lanes) for camera input

▸ Multiple SDIO interfaces to enable flexibility in supporting boot, expansion and connectivity (Wi-Fi®)

▸ Gigabit Ethernet (with IEEE® 1588, EEE and AVB support) and USB 2.0

GRAPHICS FOR HMI

▸ 3D GPU with OpenGL® ES 3.1 and Vulkan® support enables graphical UI (e.g. Android™)

▸ MIPI-DSI enables single display output for human machine interface

ADVANCED AUDIO PROCESSING

▸ Supports at least 20 channels of high-fidelity audio playback

  – 10Tx + 10Rx external I²S lanes

  – 8-channel PDM DMIC support

 – Hardware asynchronous sample rate conversion (ASRC)

INTELLIGENCE AT THE EDGE

▸ Depending on the performance needs and complexity of your neural network, run your optimized model on either the Cortex-A53, Cortex-M7 or general purpose GPU (supports OpenCL™ 1.2)

  – Use NXP's extensive eIQ™software suite to help realize and implement your machine learning needs

▸ Leverage the latest voice control solutions that support reliable voice control in noisy environments without using a DSP

SYSTEM DESIGN OPTIMIZATION

Pin-compatible package options provide design flexibility

▸ 14 x 14 0.5 mm package designed for maximum feature enablement with 6 layer board design and no microvias

▸ Pin compatibility with the i.MX 8M Mini provides drop-in scalable product performance

▸ 8-channel DMIC support for direct connection of PDM microphones (no CODEC) enables system cost savings

i.MX 8M NANO BLOCK DIAGRAM
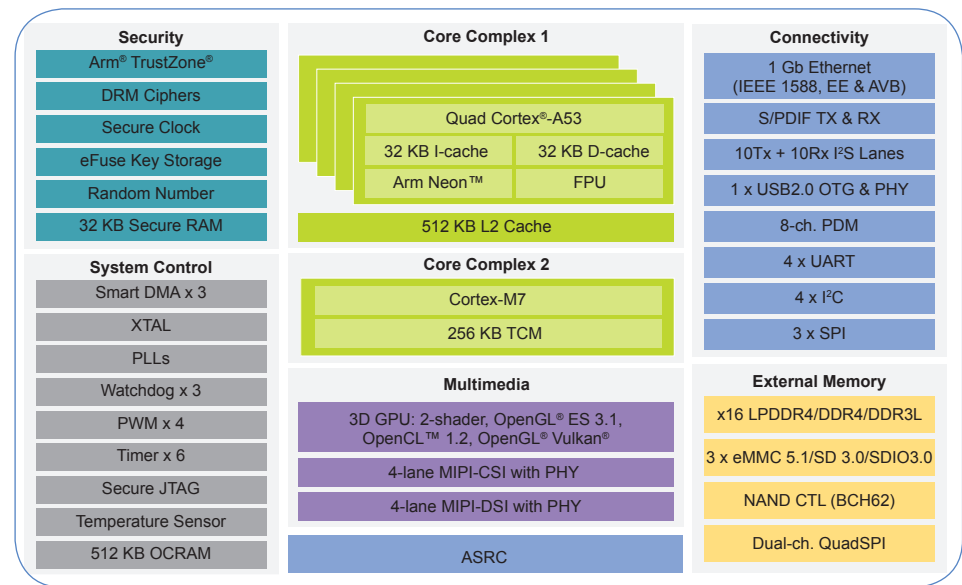
PIN COMPATIBLE i.MX 8M MINI AND NANO - DIFFERENTIATED FEATURES

	i.MX 8M Mini	i.MX 8M Nano
Primary Arm® Core	1 x or 2 x or 4 x Cortex®-A53 up to 1.8 GHz	1 x or 2 x or 4 x Cortex-A53 up to 1.5 GHz
Secondary Arm Core	1 x Cortex-M4F up to 400 MHz	1 x Cortex-M7 up to 750 MHz
DDR Interface	x16/x32 LPDDR4/DDR4/DDR3L	x16 LPDDR4/DDR4/DDR3L
Audio	5 x SAI (12Tx + 16Rx external I²S lanes) up to 49.152 MHz BCLK; DSD512	5 x SAI (10Tx + 10Rx external I²S lanes) up to 49.152 MHz BCLK; DSD512; ASRC
GPU	2D GPU, 3D GPU (1x shader, OpenGL® ES 2.0)	3D GPU (2x shader, OpenGL®ES 3.1, OpenCL 1.2, Vulkan)
Video Decode Acceleration	1080p60 H.265, H.264, VP8, VP9	None
Video Encode Acceleration	1080p60 H.264, VP8	None
Display	1 x MIPI-DSI	1 x MIPI-DSI
Camera	1 x MIPI-CSI	1 x MIPI-CSI
Connectivity	1 x PCIe 2.0, 3 x SDIO/eMMC, 2 x USB 2.0, 1 x GbE	3 x SDIO/EMMC, 1 x USB 2.0, 1 x GbE

Leverage NXP's system design expertise

▸ Our expert engineers have defined package options that simplify your hardware design and provide overall system cost benefit depending on the application

▸ Reference hardware designs using different memory types are available to help get you started fast

Comprehensive software support

▸ Android, Linux and FreeRTOS® developed, tested and supported by NXP and partner commercial operating systems (Voice, ML, audio framework). Benefit from extensive years of BSP development on i.MX applications processors from NXP and its partners.

  – eIQ™ software suite

  – Windows 10 IoT Core

  – Third party voice and UI solutions

  – Pins tool for i.MX application processors

  – Benefit from the extensive i.MX software ecosystem

Industrial and consumer qualified

▸ Industrial (-40 °C to 105 °C Tj) device options support always-on applications operating in harsh environments

▸ For more cost-sensitive, higher-performing applications, consumer device options (0 °C to 95 °C Tj) and faster core speeds are available