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 heterogeneous 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-optimized 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 heterogeneous 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**

<table>
<thead>
<tr>
<th>Feature</th>
<th>i.MX 8M Mini</th>
<th>i.MX 8M Nano</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Arm® Core</td>
<td>1 x Cortex-M4F up to 1.5 GHz</td>
<td>1 x Cortex-M7 up to 1.5 GHz</td>
</tr>
<tr>
<td>Secondary Arm® Core</td>
<td>1 x Cortex-M4F up to 400 MHz</td>
<td>x16 LPDDR4/DDR4/DDR3L</td>
</tr>
<tr>
<td>DDR Interface</td>
<td>16/32/64 MB</td>
<td>x16 LPDDR4/DDR4/DDR3L</td>
</tr>
<tr>
<td>Audio</td>
<td>5 x SAI (12Tx + 16Rx external I²S lanes) up to 49.152 MHz</td>
<td>5 x SAI (10Tx + 10Rx external I²S lanes) up to 49.152 MHz</td>
</tr>
<tr>
<td>GPU</td>
<td>2D GPU, 3D GPU (1x shader, OpenGL® ES 2.0)</td>
<td>3D GPU (2x shader, OpenGL® ES 3.1, OpenCL 1.2, Vulkan)</td>
</tr>
<tr>
<td>Video Decode</td>
<td>1080p60 Hz26.5, Hz26.4, VP8, VP9</td>
<td>None</td>
</tr>
<tr>
<td>Acceleration</td>
<td>1080p60 Hz26.4, VP8</td>
<td>None</td>
</tr>
<tr>
<td>Display</td>
<td>1 x MIPI-DSI</td>
<td>1 x MIPI-DSI</td>
</tr>
<tr>
<td>Camera</td>
<td>1 x MIPI-CSI</td>
<td>1 x MIPI-CSI</td>
</tr>
<tr>
<td>Connectivity</td>
<td>1 x PCIe 2.0, 3 x SDIO/eMMC, 2 x USB 2.0, 1 x GbE</td>
<td>3 x SDIO/eMMC, 1 x USB 2.0, 1 x GbE</td>
</tr>
</tbody>
</table>

**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

**www.nxp.com and imxcommunity.org**

P and the NXP logo are trademarks of NXP B.V. All other product or service names are the property of their respective owners. Arm, Cortex, Neon and TrustZone are trademarks or registered trademarks of Arm Limited (or its subsidiaries) in the US and/or elsewhere. The related technology may be protected by any or all of patents, copyrights, designs and trade secrets. All rights reserved. © 2019 NXP B.V.