

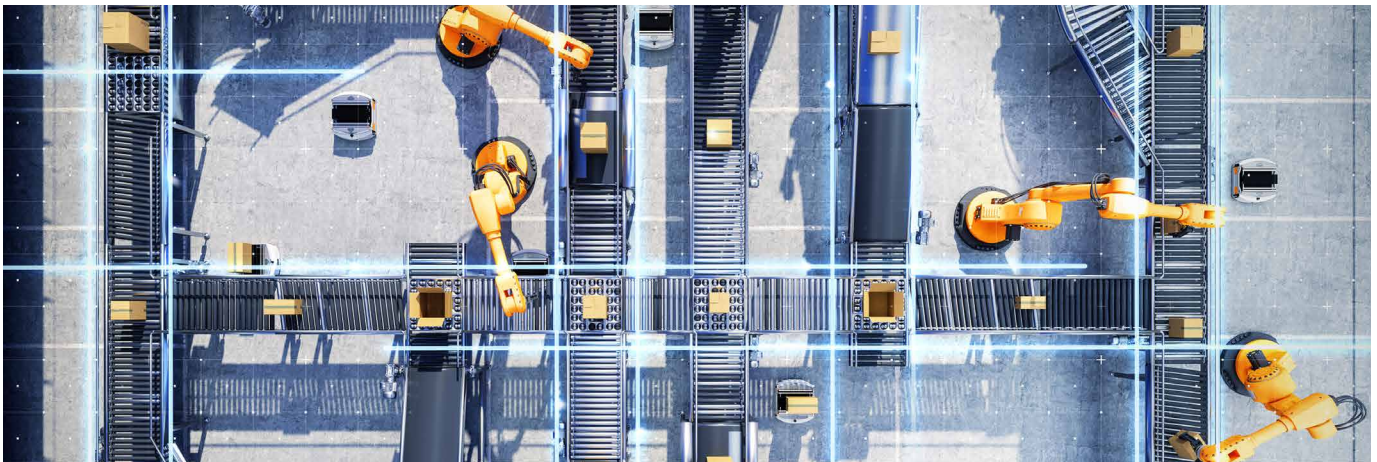


SECURE CONNECTIONS
FOR A SMARTER WORLD

FACT SHEET

i.MX 95 Applications Processor Family

NXP i.MX 95 APPLICATIONS PROCESSOR FAMILY FOR SECURE CONNECTED EDGE



The i.MX 95 applications processor family enables a broad range of edge applications in automotive, industrial, networking, connectivity, advanced human machine interface applications, and more.

The i.MX 95 family combines high-performance compute, immersive Arm® Mali™-powered 3D graphics, innovative NXP NPU accelerator for machine learning, and high-speed data processing with safety and security features alongside integrated EdgeLock® secure enclave and developed in compliance with automotive ASIL-B and industrial SIL-2 functional safety standards, through NXP SafeAssure®.

A critical requirement for the next wave of edge applications is advanced processing and machine learning capabilities, combined with high-speed connectivity, in order to better analyze the environment and make intelligent decisions locally. The i.MX 95 family is the first i.MX applications processor family to integrate NXP's eIQ® Neutron neural processing unit (NPU) and a new image signal processor (ISP) developed by NXP, helping developers to build these powerful, next-generation edge platforms.

TARGET APPLICATIONS

- **Automotive** — Connectivity Domain Controller, In-Vehicle Infotainment, eCockpit, Software Defined Radio, Occupant Monitoring System, Blindspot Monitoring System, Multi-camera Monitoring
- **Aviation** — Communication and Navigation Systems, Real-time Network Airborne systems, Passenger Seatback Entertainment
- **Industrial** — Gateway, Scanner, Printer, Ruggedized HMI, Factory Automation, Robotic Controller, Machine Visual Inspection, Digital Kiosk, Digital Signage, Vision Payment Systems, Industrial PCs
- **Medical** — Pumps/Respirator/Clinical Monitoring
- **IoT** — Smart Appliances, Video/Audio Conferencing, IP Phones, Smart Shopping Carts, Home Automation Control Gateway

HIGH-PERFORMANCE COMPUTE

The i.MX 95 family capabilities include a multi-core application domain with up to six Arm Cortex®-A55 cores, as well as two independent real-time domains for safety/low-power, and high-performance real-time use, consisting of high-performance Arm Cortex-M7 and Arm Cortex-M33 CPUs, combining low-power, real-time, and high-performance processing. The i.MX 95 family is designed to enable ISO 26262 ASIL-B and SIL-2 IEC 61508 compliant platforms, with the safety domain serving as a critical capability for many automotive and industrial applications. Platforms based on i.MX 95 serve to ensure safety essential actions in a vehicle, like voice warnings, instrumentation, and cameras meet high reliability standards set by automotive OEMs. Similarly, in industrial factory automation platforms, the functional safety domain ensures that an industrial control system always returns to a pre-determined state, even when the rest of the system fails.

MACHINE VISION CAPABILITIES

The i.MX 95 family enables machine vision through its integrated eIQ Neutron NPU as part of a vision processing pipeline for use with multiple camera sensors or network-attached smart cameras. The i.MX 95 SoC integrates an NXP ISP supporting a wide array of imaging sensors to enable vision-capable industrial, robotics, medical and automotive applications, all backed by comprehensive NXP developer support. A rich, vibrant graphics experience for the user is enabled by Arm Mali GPU capabilities, scaling from multi-display automotive infotainment centers to industrial and IoT HMI based applications. The i.MX 95 applications processors contain a 4-lane MIPI-DSI capable of supporting 4kp30 or 3840x1440p60 resolution, a 2x 4-lane or 1x 8-lane LVDS display interface capable of 1080p60 resolution.

HIGH SPEED CONNECTIVITY

The next generation of edge platforms for Industry 4.0, automotive connectivity domain controllers, and IoT smart home gateways will benefit from the integrated 10-gigabit Ethernet plus two 1-gigabit Ethernet ports, with TSN capabilities. Adding wireless connectivity such as Wi-Fi, Bluetooth LE, satellite radio, or 5G, is simple thanks to two independent PCIe ports, USB 3 port and integrated BSP-level drivers for NXP's wide array of wireless connectivity solutions. With expansive capabilities and robust processing, next-generation platforms based on i.MX 95 family application processors will be capable of securely processing local and network data.

ENERGY FLEX ARCHITECTURE

The i.MX 95 family is designed to be configurable and scalable, with multiple heterogenous processing domains. This includes an application domain with up to 6 Arm Cortex A55 cores, a high-performance real-time domain with Arm Cortex M7, and low-power/safety domain with Arm Cortex M33, each able to access interfaces including CAN-FD, 10GbE networking, PCIe Gen 3 x1 interfaces, and accelerators such as V2X, ISP, and VPU.

ADVANCED SECURITY, SIMPLIFIED

Security is an essential foundation for edge applications. The i.MX 95 family integrates a secure enclave to simplify implementation of security critical functions like secure boot, cryptography, trust provisioning, and run-time attestation. Combined with NXP's [EdgeLock® 2GO](#) key management services, manufacturers can securely provision i.MX 95 SoC-based products for secure remote management of devices deployed in the field, including secure over-the-air updates (OTA). The i.MX 95 platform features a dedicated cryptographic engine with support for a wide range of standards to enable next-generation automotive V2X applications, and more.

DISPLAY AND MULTIMEDIA

The [Arm Mali GPU](#) supports OpenGL® ES 3.2, Vulkan® 1.2, and OpenCL 3.0 to enable rich graphical experiences or compute acceleration. The independent 2D GPU is part of the real-time domain and can blend graphics overlays for conveying critical information in safety or real-time applications. Additionally, the display controller enables two independent display output streams. It is capable of image rotation (90°, 180°, 270°), image resize, color space conversion, copy, blend, ROP, scale, rotate, warp/de-warp, affine transformations, linear light, and offers multiple pixel format support (GPU-Tile, Super-Tile, VPU-tile, RGB, YUV, RGBA), plus standard 2D-DMA operations.

ENHANCED RELIABILITY

The i.MX 95 platform contains error correcting codes (ECC) in most of the internal memories such as L1, L2, L3 caches of the Arm Cortex-A55, the TCM of the Cortex-M33, Cortex-M7, and internal on-chip memory as well as in-line memory correction on the LPDDR interface for enhanced reliability of key application memory regions. On-the-fly memory encryption enables secure data processing to ensure privacy and security in a wide range of applications.

RICH SET OF HIGH-SPEED AND MEMORY INTERFACES

The i.MX 95 processors offer high-speed interfaces for connectivity and fast data transfer with USB 3.0, USB 2.0, 3x SD/SDIO 3.01, 1x 10Gigabit Ethernet and 2x Gigabit Ethernet, each with EEE, AVB, IEEE 1588 and TSN for precise, low latency control loops, in addition to 5x CAN-FD interfaces. The memory interfaces supported are 32-bit LPDDR5/LPDDR4X and eMMC 5.1.

AUTOMOTIVE EDGE

An automotive ECU that consolidates all external wireless interfaces in one domain managed by single high-performance processor, providing vehicle network interfaces, is known as a connectivity domain controller. The security features of the i.MX 95 processors combined with high-speed connectivity, application processing performance, plus safety and real-time domains, enable the i.MX 95 SoC to be an essential module in the modern software-defined vehicle. With premium graphics capabilities from the Arm® Mali™ GPU combined with 2D graphics and safety capabilities, the i.MX 95 is a capable eCockpit or In-Vehicle Infotainment module, offering features such as surround-view parking assistance, in-car navigation, rear-view cameras, and essential dials and tell-tale lights.

INDUSTRY 4.0

The i.MX 95 family of applications processors are optimized for machine vision with high-performance graphics and scalable connectivity with support for pre-emption and TSN. Featuring a flexible architecture with safety domain and real-time domain, command and control of automated production lines is enabled with ruggedized HMI featuring multiple displays, touch-screen control, and real-time critical alerts.

INTERNET OF THINGS

Vision-enabled devices are appearing in our lives as we leverage the power of AI to identify, classify and make decisions about the world around us. The i.MX 95 can enable vision-enabled shopping carts that can help you price and pay for groceries as you go, to home gateways that provide control and managed of discrete functions such as lighting, security, entertainment, and climate control.

COMPREHENSIVE SOFTWARE SUPPORT

NXP's software enablement package includes Linux® and Android™ support to provide flexibility for our customers to customize the BSPs to their specific needs. NXP provides quarterly releases with the latest kernel patches and bug fixes to support customers in their designs. NXP also provides precompiled packages for all advanced IPs to

enable a seamless experience for customers while porting and integrating their applications and offloading their workloads to these IPs. Additionally, NXP also supports FreeRTOS and a plethora of commercial RTOS from partners to address real-time customer applications enabling developers a quick and easy migration path.

Join fellow i.MX developers online at NXP [i.MX community](#).

NXP eIQ Neutron NPU and machine learning application development are supported by the award-winning [eIQ® ML Software Development Environment](#), a collection of libraries and development tools for building machine learning applications targeting i.MX applications processors and MCUs. The eIQ Toolkit leverages open-source technologies and is fully integrated into NXP's Yocto development environments, allowing the development of complete system level applications with ease.

HARDWARE TOOLS

The i.MX 95 evaluation kit (EVK) will enable SoC evaluation and system prototyping. Multiple accessory boards are planned to facilitate i.MX 95 processors evaluation for applications such as camera modules and display panels. NXP wireless connectivity solutions enable seamless Wi-Fi and Bluetooth capabilities for easy development and integrated platform design.

EXPERT PACKAGE DESIGN FOR SIMPLIFIED SYSTEM DESIGN

The i.MX 95 family will have two package offerings: 19x19mm, 0.7mm pitch; and 15x15mm, 0.5mm pitch

EXTENDED INDUSTRIAL, CONSUMER AND AUTOMOTIVE QUALIFIED

i.MX 95 applications processors supports the following qualifications

- automotive temperature range (-40 °C to 125 °C Tj)
- consumer application temperature range (0 °C to 95 °C Tj)
- extended industrial temperature range (-40 °C to 125 °C Tj)
- standard industrial temperature range (-40 °C to 105 °C Tj)

SUPPLY LONGEVITY

i.MX 95 processors will be part of the [NXP Product Longevity](#) program ensuring supply continuity and preserves your engineering investment for embedded designs for 15 years.

i.MX 95 APPLICATIONS PROCESSOR BLOCK DIAGRAM

