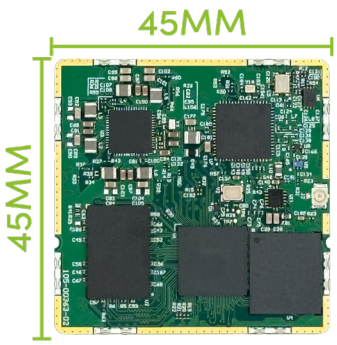
DEC i.MX 91 / 93-OSM EMBEDDED COMPUTING MODULES

Scalable performance from connected control to intelligent edge computing

Built on NXP's latest generation of energy-efficient, secure processors, DEC i.MX 91-OSM and DEC i.MX 93-OSM embedded computing modules deliver scalable performance for a broad range of embedded applications. Both computing modules provide industrial-grade reliability, long-term availability, and advanced security through NXP's EdgeLock® Secure Enclave.

By combining common core architecture with tiered processing capabilities, the DEC i.MX 91/93-OSM embedded computing modules give engineers the freedom to match performance, power, and cost to their specific embedded application needs.



DEC i.MX 91-OSM Computing Module

The DEC i.MX 91-OSM computing module is designed for cost-sensitive, connected applications that require secure, reliable performance in a compact form factor. Powered by a single Arm® Cortex®-A55 processor with an integrated Arm® Cortex®-M33 core, it supports efficient control and communication across industrial and IoT devices.

Key Features

- Single Arm® Cortex® -A55 core for efficient application performance
- Integrated Arm® Cortex® -M33 for secure real-time control
- EdgeLock® Secure Enclave for device and data protection
- Broad I/O support including Ethernet, USB, UART, SPI, and I^2C
- Compact, low-power design ideal for fanless and space-limited systems
- Industry standard OSM form factor

DEC i.MX 93-OSM Computing Module

The DEC i.MX 93-OSM embedded computing module brings greater processing capability and AI acceleration to the edge. Built using the NXP i.MX 93 processor with dual Arm® Cortex®-A55 cores and an Ethos™-U65 Neural Processing Unit (NPU), it delivers higher performance for advanced control, machine learning, and intelligent vision applications.

Key Features

- Dual Arm® Cortex® -A55 cores plus Arm® Cortex® -M33 for combined application and real-time processing
- Integrated Ethos™ -U65 NPU for AI and ML acceleration
- Dual Gigabit Ethernet, PCIe Gen 2, and MIPI-CSI camera interface
- MIPI-DSI and LVDS display support for HMI and vision systems
- Industry standard OSM form factor
- Secure Enclave for device and data protection

IDEAL APPLICATIONS

The DEC i.MX 91/93-OSM computing modules are well suited for use in products such as:

- Smart energy meters and grid monitoring systems
- Industrial HMIs (human–machine interfaces) and control panels
- Building automation controllers (HVAC, lighting, and access control)
- Predictive maintenance sensors and edge analytics gateways
- Medical monitoring and diagnostic devices
- Transportation tracking and telematics units
- Robotics controllers and autonomous guided vehicles
- Smart security systems with AI-based image or motion detection
- EV charging stations and energy management equipment
- Retail kiosks and interactive point-of-sale terminals

KEY FEATURE DIFFERENCES BETWEEN THE I.MX 91-OSM AND THE I.MX 93-OSM

FEATURE	DEC I.MX 91-OSM	DEC I.MX 93-OSM
Processor	1 Arm® Cortex®-A55 running up to 1.4 GHz	1 or 2 Arm® Cortex®-A55 running up to 1.7 GHz
Display	24-bit parallel RGB	24-bit parallel RGB MIPI-DSI LVDS
NPU	N/A	Arm Ethos™ -U65
GPU	N/A	PXP - Hardware Compositor
Camera	8-bit parallel YUV/RGB	8-bit parallel YUV/RGB MIPI-CSI
Power Profile	Ultra-low power	Low to moderate power
Target Tier	Entry-level, cost-optimized	Performance and AI-enabled
Target Applications	Devices requiring reliable general-purpose processing: • Industrial control panels • Basic data capture • Connected monitoring • Energy and Access management • POS, kiosks, ticketing	AI/ML devices requiring more processing power: • Industrial vision systems • Advanced vision and AI inference • Intelligent diagnostics • Adaptive systems, environmental analytics • Smart signage, inventory tracking

DEVELOPMENT KITS AVAILABLE:

To facilitate seamless integration and development, Diamond Technologies, Inc. offers a full-featured, high-performance solution for evaluating and developing with the Diamond Embedded Computing i.MX 91/93-OSM computing modules. The development kit includes everything you need to jumpstart your product development.

PRODUCT FEATURES

Processor Options
- **i.MX 91:** 1 Arm® Cortex®-A55 running up to 1.4 GHz
- **i.MX 93:** NXP i.MX 93 processor with one or two Arm® Cortex®-A55 cores running up to 1.7 GHz
- Arm® Cortex®-M33 core running up to 250 MHz
- **i.MX 93:** Arm® Ethos™ U-65 microNPU
- **i.MX 93:** PXP - Hardware Compositor 2D GPU

Embedded Memory
- Up to 2GB of 16-bit wide LPDDR4X memory
- eMMC 5.1, configurable

Network Connectivity
- Wi-Fi (802.11ax) 1x1 Dual-Band
- Bluetooth/BLE 5.4
- 802.15.4 Tri-radio for Thread & Matter
- Dual Gigabit Ethernet RGMII Interfaces: AVB & IEEE 1588, 1 with TSN

USB
- 2x USB 2.0 OTG

Display
- 24-bit parallel RGB
- **i.MX 93:** MIPI DSI (4 lanes, 1.5Gbs) 1080p @60fps
- **i.MX 93:** LVDS (4-lane) 720p @60fps

Camera
- 8-bit parallel YUV/RGB
- **i.MX 93:** MIPI CSI-2 (2-lane, 1.5Gbs/lane) w/PHY, 1080p @ 60fps

Audio
- Up to (7) I2S TDM (32-bit @ 768KHz)
- 3 synchronous audio interfaces (SAI)
- S/PDIF input and output
- Up to 8 Channel PDM input

Serial I/O
- Up to 8 UART interfaces up to 5Mbps
- Up to 6 I2C interfaces
- Up to 5 SPI interfaces operating as either master or slave
- Up to 2 I3C interfaces
- Up to 2 CAN FD interfaces

GPIO
- Up to 64 multiplexed GPIOs supporting various peripherals such as PWMs, SDIO, UART, SPI, and I2C

RTC
- On-board ultra-low power real-time clock (RTC)

Debug
- JTAG support

Mechanical
- OSM-L form factor
- Dimensions: 45mm x 45mm
- Weight: 11.0 g

Compliance
- RoHS Compliant
- Reach Compliant

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