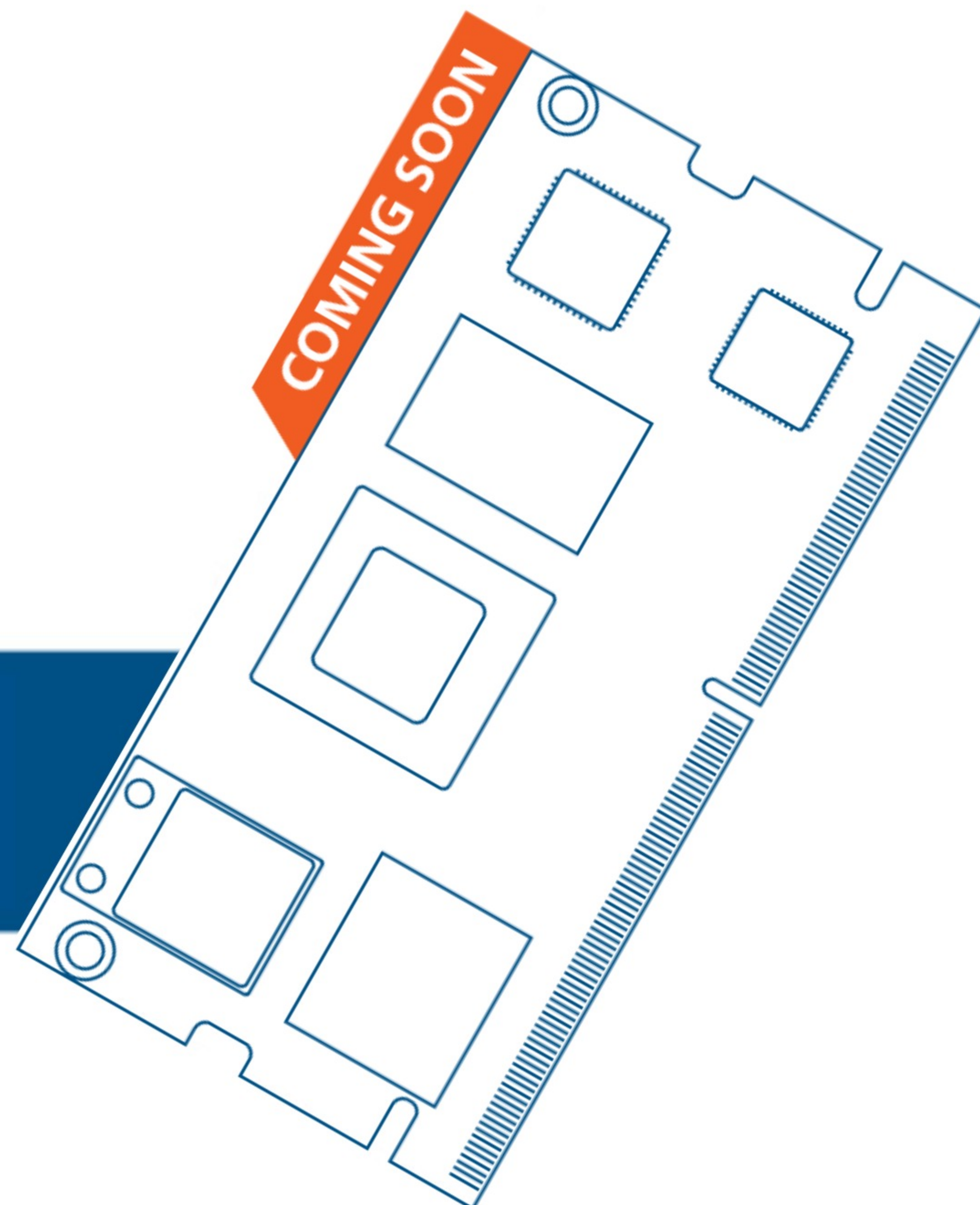


Verdin iMX952

PRODUCT BRIEF



Verdin iMX952 Product Brief

iMX952 SoC overview

The NXP i.MX 952 is an applications processor designed for AI-powered sensor fusion and vision sensing, supported by an integrated NXP eIQ® Neutron Neural Processing Unit (NPU). It combines up to four Arm® Cortex®-A55 application cores with Arm Cortex-M7 and Cortex-M33 real-time cores, advanced 3D/2D graphics, a 4K-capable video engine, and a vision pipeline with integrated ISP. Part of NXP's EdgeVerse™ portfolio, it integrates the EdgeLock® secure enclave for energy-efficient, secure edge computing and supports functional safety (IEC 61508 SIL 2 for industrial, ISO 26262 ASIL B for automotive). It targets medical, industrial and commercial IoT applications.



Verdin iMX952 SoM

The Verdin iMX952 is a versatile System-on-Module (SoM) built around NXP's i.MX 952 applications processor, designed to cater to a diverse array of applications, including but not limited to AI vision, in-cabin sensing, Industrial Automation, Medical, Transportation, Smart Cities, Test and Measurement, and more.

Equipped with an optional Wi-Fi 6 and Bluetooth interface (u-blox MAYA-W2), this SoM ensures cutting-edge connectivity. Its extensive range of interfaces spans from fundamental GPIOs to industry-standard I2C, I3C, SPI, CAN FD, and UART buses, dual USB 2.0 ports, as well as a high-speed PCIe Gen3 x1 port.

The Verdin iMX952 comes equipped with advanced safety and security features. The EdgeLock® secure enclave (Advanced Profile) of the i.MX 952 SoC, with EdgeLock Prime accelerator and post-quantum cryptography (PQC), allows cryptographic operations as well as secure boot, while the functional-safety support of the i.MX 952 processor allows users to run safety-critical software.



Verdin iMX952 Product Brief

Verdin iMX952 SoM

A MIPI CSI-2 camera interface (one 4-lane or two 2-lane) coupled with the i.MX 952's integrated ISP and eIQ® Neutron NPU will allow users to fully take advantage of the vision and AI pipeline on offer in the SoC.

The Verdin iMX952 has two display interfaces, MIPI DSI (up to 4Kp30) and LVDS (up to 1080p60), and features a modern 3D GPU with OpenGL® ES 3.2, Vulkan® 1.2, and OpenCL™ 3.0 support, together with a video engine providing 4K30 decode (H.265/HEVC and H.264/AVC) and 4K30 H.264 encode for rich multimedia experiences.

Notably, the Verdin iMX952 module incorporates a Gigabit Ethernet PHY with IEEE 1588 support directly on the module. For enhanced versatility, the SoC includes a second Ethernet MAC with an RGMII interface, enabling the addition of a Gigabit Ethernet PHY on the carrier board for dual Ethernet, TSN-capable applications.

Note: Unlike the Verdin iMX95, the i.MX 952 SoC provides USB 2.0 only (no SuperSpeed). Both module USB ports are USB 2.0 (one Host, one OTG). Carrier-board designs requiring a USB 3.x SuperSpeed link should remain on the Verdin iMX95.

In essence, the Verdin iMX952 stands as a comprehensive, cost-optimized solution that is pin-compatible with the Verdin iMX95, seamlessly blending robust connectivity, advanced interfaces, and adaptability for diverse applications.

Verdin iMX952 SoM Highlights

The diagram illustrates the Toradex Verdin family of computer modules and their key features. At the top, a central image shows a green Verdin module with various ports. Below it, seven feature icons are arranged in two rows, each with a corresponding text label:

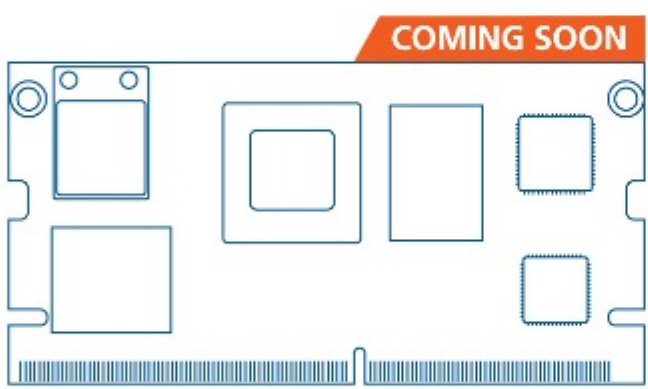
- Multicore Processing:** Features A55 (x4), M7 (x1), and M33 (x1) processors, along with NPU and 3D GPU capabilities.
- 2 eTOPS (High Performance Machine Learning):** Represented by a brain icon connected to circuit lines.
- Future-proof Security:** Represented by a shield icon with a checkmark.
- Industrial Reliability:** Represented by a sun icon with temperature ranges from -40° to +85°.
- The Toradex Verdin Family of Computer Modules:** Represented by an image of the Verdin module.
- High-Resolution Graphics and Multi-Display Support:** Represented by an icon showing HD and 4K resolution.
- Torizon for Updates, Remote Access and Monitoring:** Represented by an icon showing a stack of blocks and a penguin.

For more information, visit our website product page: [Verdin iMX952 Product Page](#)

Verdin iMX952 Product Brief

Verdin Family

The Verdin family offers a range of SoMs to match different performance and cost, all within a pin-compatible design. This means you can start development with one module and scale to another as your application's needs evolve, without redesigning your carrier board. The chart shows the full Verdin family lineup and how each module is positioned.



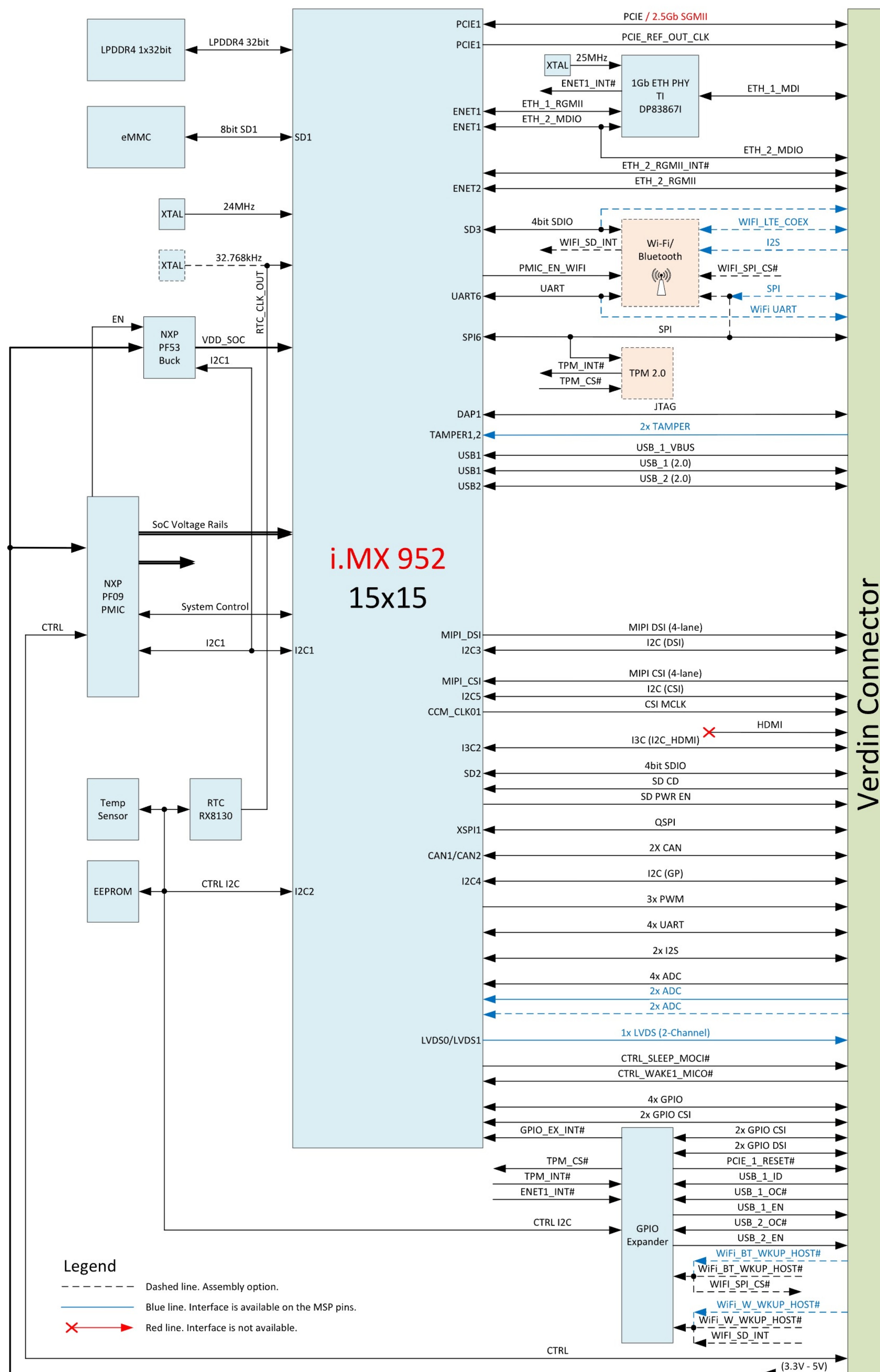
Verdin iMX952 x Verdin iMX95 What's the difference?

Verdin iMX952 helps teams building safety-critical vision and sensor-fusion products deliver AI vision performance without compromising on functional safety or security.

With the i.MX 95 already covering high-performance edge AI and enhanced security for advanced HMI and vision systems, the question becomes: **what's the difference between the two?**

	Verdin iMX952	Verdin iMX95
SoC	NXP i.MX 952	NXP i.MX 95
Arm Cortex-A55 cores	4x	6x
Real-time cores	1x Cortex-M7 + 1x Cortex-M33	
AI / NPU	eIQ Neutron NPU (2 eTOPS)	eIQ Neutron NPU (8 eTOPS)
RAM	LPDDR4X (32-bit)	
USB	2x USB 2.0 (Host + OTG) – no SuperSpeed	1x USB 3.2 Gen1 (OTG) + 1x USB 2.0 (Host)
Gigabit Ethernet	1x PHY on module + RGMII for 2nd	
PCIe	1x Gen3 x1 (muxable to 2.5GbE SGMII)	1x Gen3 x1
CAN FD	Up to 3x	Up to 5x
Analog Input (ADC)	up to 8x	
Display	MIPI DSI (up to 4Kp30) + LVDS (1080p60)	
Camera	1x 4-lane or 2x 2-lane MIPI CSI-2 + ISP	2x 4-lane MIPI CSI-2 + ISP
Functional safety	Safety island / NXP SafeAssure, IEC 61508 SIL 2, ISO 26262 ASIL B	
Form factor & pinout	Verdin standard – pin-to-pin compatible; same SoC placement	
Positioning	Cost-optimized AI vision & in-cabin sensing	High-performance, safety-enabled platform

Block Diagram



Legend

- - - - - Dashed line. Assembly option.
 — Blue line. Interface is available on the MSP pins.
 — Red line. Interface is not available.

Verdin iMX952 Product Brief

Interfaces Overview

The Verdin module interfaces are organized into three categories: Always Compatible, Reserved, and Module-specific. Always Compatible interfaces are present on every Verdin SoM, ensuring scalability and easy upgrades. Reserved interfaces are defined and electrically compatible but may be absent on some models depending on SoC features or cost-optimized configurations. Module-specific interfaces can vary between modules and may limit upgradeability if used in a carrier design.

Additionally to this definition, the i.MX 952 SoC allows for alternate functions. As an example, many pins can, apart from their primary function, also work as GPIOs. These functions can only be used if the primary function of the pin is not used.

For detailed definitions, see the [Verdin Family Specification](#).

Features	Total (up to)	Always compatible	Reserved	Module specific or Alternate Function
Analog				
Analog Input (ADC)	8		4	4
Audio				
I2S	2		2	
PDM Mic Input	4			4 (alternate)
Camera				
MIPI CSI-2	2 ¹		1	1 (alternate)
Display				
MIPI DSI	1		1	
LVDS (dual channel)	1			1
Low speed				
I2C	7	1	3	3 (alternate)
I3C	1			1 (alternate)
SPI	6	1		5 (alternate)
UART	8	3	1	4 (alternate)
PWM	21	1	2	18 (alternate)
CAN FD	3		2	1 (alternate)
JTAG	1	1		
QSPI	1		1	
GPIO	82	4	6	~72 (alternate)
Network				
Gigabit Ethernet	1	1		
RGMII (for 2nd Gigabit Ethernet)	1		1	
Other				
PCIe Gen3	1		1	
Storage				
SD/SDIO/MMC	2	1		1 ³
USB				
USB 2.0 OTG	1	1		
USB 2.0 Host	1	1		

1 The i.MX 952 supports one 4-lane or two 2-lane MIPI CSI-2 inputs; the second instance is subject to pin-muxing and the optional second CSI clock.

2 The PCIe interface can be muxed to a 2.5GbE SGMII alternate function on the i.MX 952.

3 Second SD/SDIO/MMC available only on SoMs without the Wi-Fi/Bluetooth module.

Verdin iMX952 Product Brief

Configuration Overview

The Verdin iMX952 SoM is designed to deliver scalable performance, advanced multimedia, AI capabilities and versatile connectivity. It combines multiple display support, an integrated vision and NPU pipeline, plus flexible expansion options such as PCIe, Ethernet, Wi-Fi and Bluetooth to provide an efficient yet powerful foundation for a wide range of industrial and connected edge applications.

The first configuration to be released is shown in the table below: Verdin iMX952 Quad 4GB WB IT.

Family	iMX95 Segment	A-Core Qty	RAM	eMCC	ETH PHY	Wi-Fi	TPM	Temperature
VRIMX952	9	4	-4G	-64G	-E1	-W6	-T	-IT

Additional configurations will be developed over time. In the meanwhile, the tables below summarizes the available configuration elements and how they can be combined. Use the "Configuration Inputs" tables to fill in the open fields from "NPI part number table" in order to build the desired configuration.

For additional specific requirements or tailored options, please, get in touch with us.

Note: The New Product Introduction (NPI) part number nomenclature shown below does not reflect volume or sellable part numbers from Toradex. They should only be used to communicate your desired configuration.

NPI part number table

Family	iMX952 Segment	A-Core Qty	RAM	eMCC	ETH PHY	Wi-Fi	TPM	Temperature
VRIMX952								

Configuration Inputs

iMX952 Segment	Description	A-Cores Qty	2.5GbE	NPU	GPU	VPU	Display
9	Full Featured	2 / 4	Yes	Yes	Yes	Yes	Yes
5	Display (HMI)	2 / 4			Yes	Yes	Yes
3	Network AI	4	Yes	Yes			
1. The MIPI-DSI and LVDS interfaces are disabled. The display controller is enabled.							

RAM Density	
-1G	1 GB
-2G	2 GB
-4G	4 GB
-8G	8 GB
-16G	16 GB

eMMC Capacity	
-4G	4 GB
-8G	8 GB
-16G	16 GB
-32G	32 GB
-64G	64 GB
-128G	128 GB
-256G	256 GB

ETH PHY	
-E1	1GbE PHY assembled
-E0	1GbE PHY not assembled

TPM	
-T	TPM 2.0 assembled
-N	TPM 2.0 not assembled

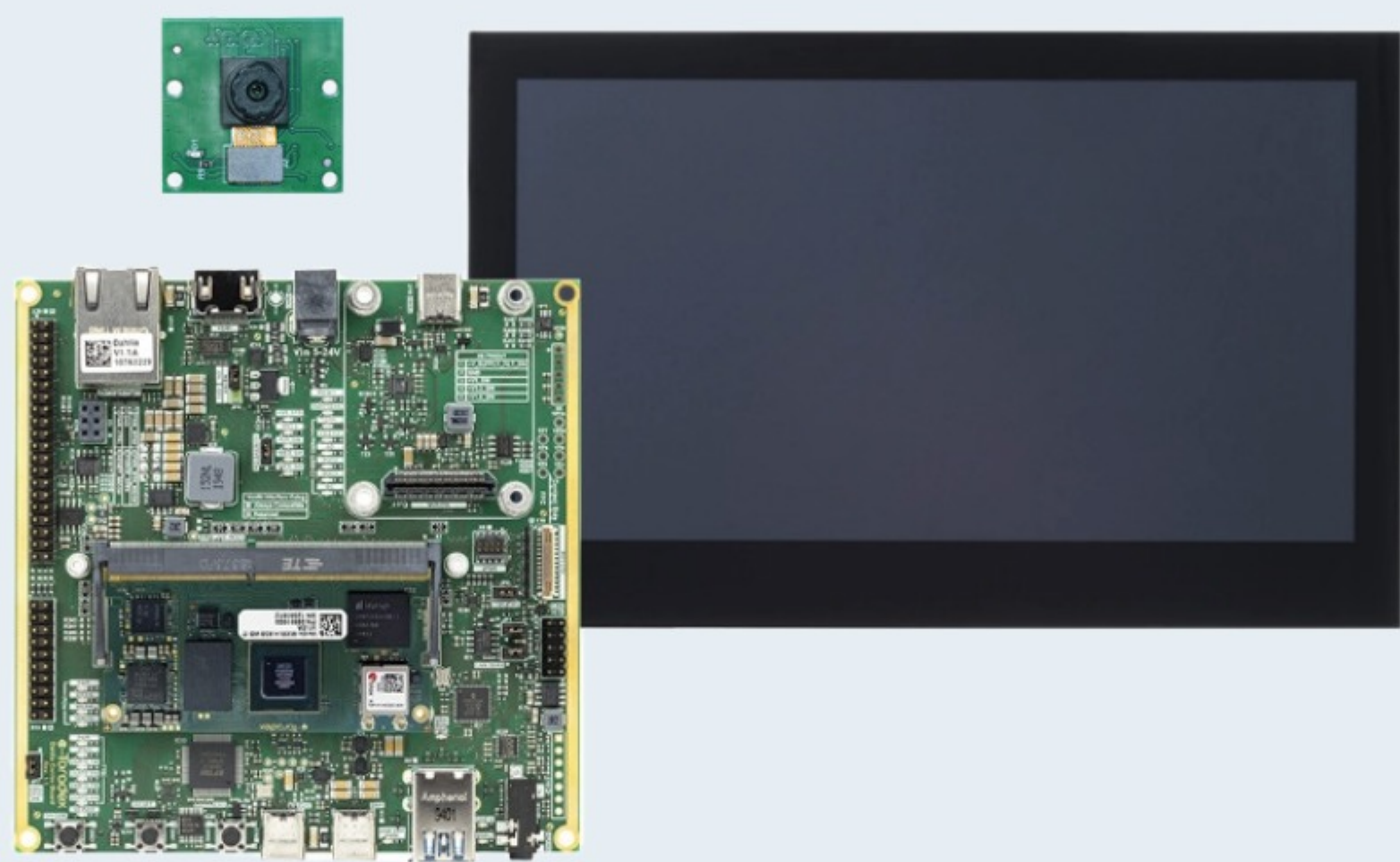
Wi-Fi	
-W6	Wi-Fi 6 and BT 5.2 module
-W0	No WiFi-BT module

Temperature	
-IT	Industrial (-40°C to 85°C)
-ET	Extended (-25°C to 85°C)
-CT	Commercial (0°C to 70°C)

Verdin iMX952 Product Brief

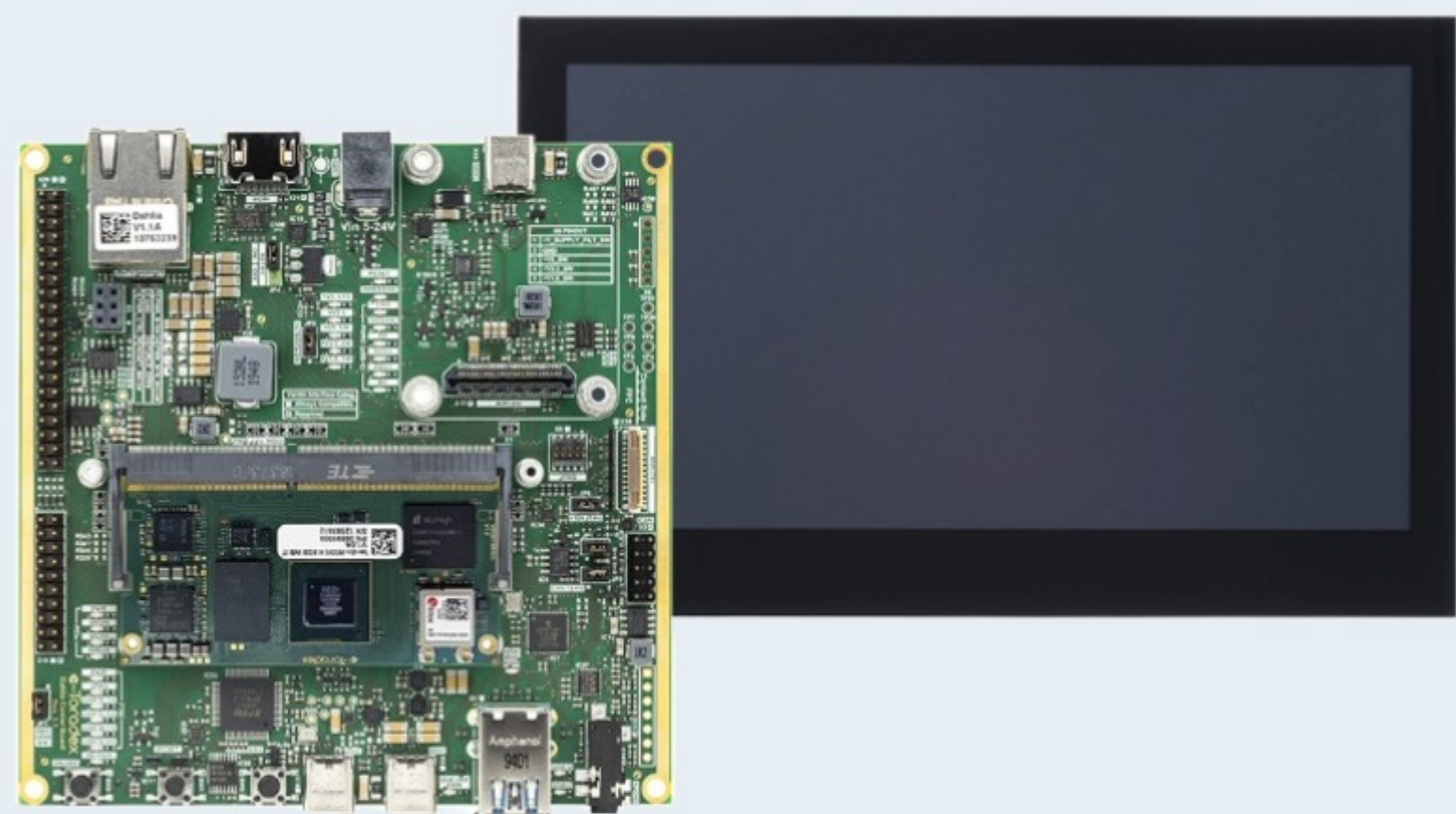
Develop today on Verdin iMX95, migrate to iMX952 later

The Verdin iMX952 is still in development, and dedicated evaluation kits aren't available yet. That doesn't have to put your project on hold: the Verdin iMX95 Evaluation Kit lets you start development today. Verdin's pin-compatible design lets you move to the iMX952 later without carrier board redesign. Explore the Verdin iMX95 Evaluation Kits.



Verdin iMX95 Evaluation Kit 1

- 5MP Camera Set, Dual-Lane MIPI CSI output
- 10.1 inch Capacitive Touch Display, 1280x800, 8-bit DSI output
- Up to six Cortex-A55 1.8 GHz processors
- Cortex-M7 processor with speeds up to 800 MHz
- Neural Processing Unit (NPU)
- Image Signal Processor (ISP)
- NXP i.MX 95 applications processor
- Dual Band 2.4/5 GHz Dual band 1x1 Wi-Fi 6 (802.11ax) + Bluetooth 5.2



Verdin iMX95 Evaluation Kit 2

- 10.1 inch Capacitive Touch Display, 1280x800, 8-bit DSI output
- Up to six Cortex-A55 1.8 GHz processors
- Cortex-M7 processor with speeds up to 800 MHz
- Neural Processing Unit (NPU)
- Image Signal Processor (ISP)
- NXP i.MX 95 applications processor
- Dual Band 2.4/5 GHz Dual band 1x1 Wi-Fi 6 (802.11ax) + Bluetooth 5.2

Verdin ecosystem advantage: Scale Performance Without Redesign

-  Match compute performance to different application requirements
-  Preserve interfaces, enclosure strategy, and system architecture
-  Use pin-compatible Verdin modules across performance levels
-  Reduce redesign and requalification effort across product variants

Join the Sample Waitlist

Visit our website product page: [Verdin iMX952 Product Page](#)

Verdin iMX952 Product Brief



Torizon is a ready-to-use Linux-based ecosystem that simplifies the development, management, and security of embedded devices. Built on a robust Linux foundation, it accelerates time-to-market with a production-grade software stack and no vendor lock-in.

Designed for reliability at scale, Torizon offers secure over-the-air updates, real-time capabilities, and streamlined device management throughout the product lifecycle. It empowers you to build, deploy, and maintain Linux devices with confidence.

Fast time-to-market
Ready-to-use Linux distribution

Open Source
Based on open software, no lock-in

Simple updates
Built-in, automotive-grade, over-the-air update capabilities

Real-time
Optimized real-time option

Secure
Frequent updates, accessible security features

Device Monitoring

Subsystem Updates

Remote Access

Remote Updates

Secure by Default



To explore the full potential of the Torizon ecosystem, visit [Torizon.io](https://torizon.io)



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