Toradex
Swiss. Embedded. Computing.

Lino iMX91
PRODUCT BRIEF

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Lino Family SoMs

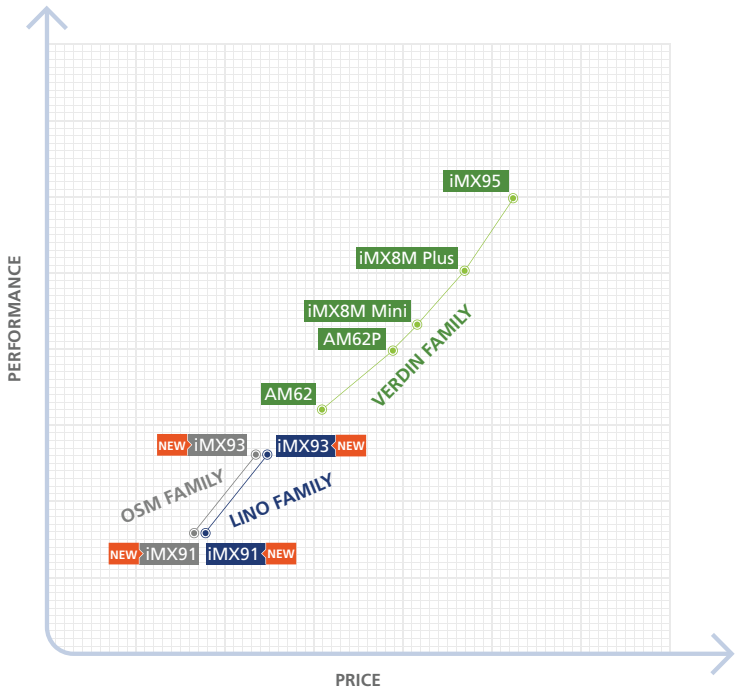
The **Lino family** brings modern processing, connectivity, and security to space- and power-constrained designs. Built on NXP's i.MX 9 applications processors, it provides a consistent and scalable foundation for industrial and IoT devices requiring long-term reliability and efficient performance in compact designs.

Within the family, two modules address different application needs while sharing the same mechanical design, connector, and software ecosystem; enabling effortless scalability from simple control units to intelligent connected devices.

Features / SoMs	Lino iMX91	Lino iMX93
Form Factor	Lino	
SoM Physical Size	30x30mm	
Connector	2x100-pin board-to-board connectors down to 1.5mm stacking height	
CPU	1× Arm Cortex-A55 (up to 1.4 GHz)	Up to 2× Arm Cortex-A55 (up to 1.7 GHz)
MCU	-	1× Cortex-M33 (250 MHz)
RAM Technology	LPDDR4 (up to 2.4 GT/s)	LPDDR4 (up to 3.7 GT/s)
Storage Technology	On-module eMMC	
Connectivity	Dual Ethernet (with TSN), 2× CAN FD, USB 2.0 (OTG + Host), I²C, I³C, SPI, UART, PWM, GPIO, ADC, SDIO/SD/MMC, I²S	
NPU	-	0.5 TOPS
Multimedia	Headless design for compact controllers and gateways	MIPI DSI display, LVDS, MIPI CSI-2 camera and 2D graphics acceleration
Typical use cases	Industrial controllers, PLCs, IoT gateways, smart sensors	HMIs, smart vision nodes, AI-enabled controllers, connected IPCs

Each **Lino SoM** is strategically positioned within the family to deliver a clear path for scalability. The **Lino iMX91** serves as the entry point, offering essential performance and robust connectivity for control-oriented systems. The **Lino iMX93** builds on the same foundation with added multimedia and AI capabilities, enabling more advanced and interactive applications.

Together, they form a consistent, cost-optimized platform that enables easy scalability and long-term design compatibility across product lines.



Lino Family SoMs

The **Lino connector solution** uses a pair of **2×100-pin board-to-board connectors**, supporting a stacking height as low as **1.5 mm** to enable ultra-compact designs. This robust connector system ensures **ruggedness and reliability** in demanding industrial environments, providing strong resistance to shock and vibration.

It also offers clear advantages for **field upgrades and serviceability**, allowing modules to be replaced or updated without complex rework. **During development**, the same connector approach simplifies hardware integration, enabling **fast prototyping** and easy access to key signals on carrier and development boards.

Front

Back

Lino-Verdin Adapter

The **Lino family pinout** is designed as a carefully selected **subset of the Verdin family pinout**, enabling **high-level compatibility for evaluation and early development**. This approach allows developers to explore Lino modules quickly without redesigning hardware during the initial stages of a project, while keeping the Lino family clearly positioned for **direct integration in volume products**.

To support this workflow, Toradex will offer a **Verdin–Lino Adapter** as part of its official **accessories portfolio**, enabling seamless evaluation of Lino modules using the well-established Verdin ecosystem. Developers can take advantage of the broad selection of **Verdin carrier and development boards, peripherals and documentation** to accelerate bring-up, testing, and validation, while also having access to the **complete hardware design files** for review or adaptation as needed.

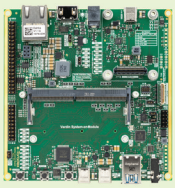
Lino-Verdin Adapter

Verdin Ecosystem

Development and Evaluation

Verdin Development Board

Fully featured carrier board providing easy access to all features of the Verdin family. Several display adapter boards will be available to support HDMI, LVDS, DSI and Parallel RGB display interfaces.



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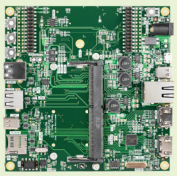


Yavia

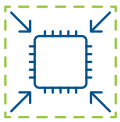
Compact carrier boards providing easy access to the most common features of the Verdin Family. It is an ideal platform for software development and demonstration purposes.

Lino iMX91 Product Brief

Interfaces Overview

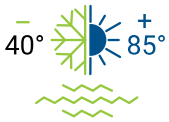
The **Lino iMX91 System on Module (SoM)** combines efficiency, scalability and industrial reliability in a compact form factor. Based on the **NXP i.MX 91** processor, it integrates a single Arm® Cortex®- A55 core and EdgeLock® Secure Enclave, delivering the right balance of performance, connectivity, and security for control-oriented systems.

Designed for **industrial controllers, PLCs, smart sensors, and IoT gateways**, the Lino iMX91 simplifies development with on-module LPDDR4 memory, eMMC storage, and a broad range of industrial interfaces, all supported by Toradex's long-term software ecosystem.



Ultra-compact Small Form Factor

Optimized for Edge & Industrial IoT



Industrial Reliability

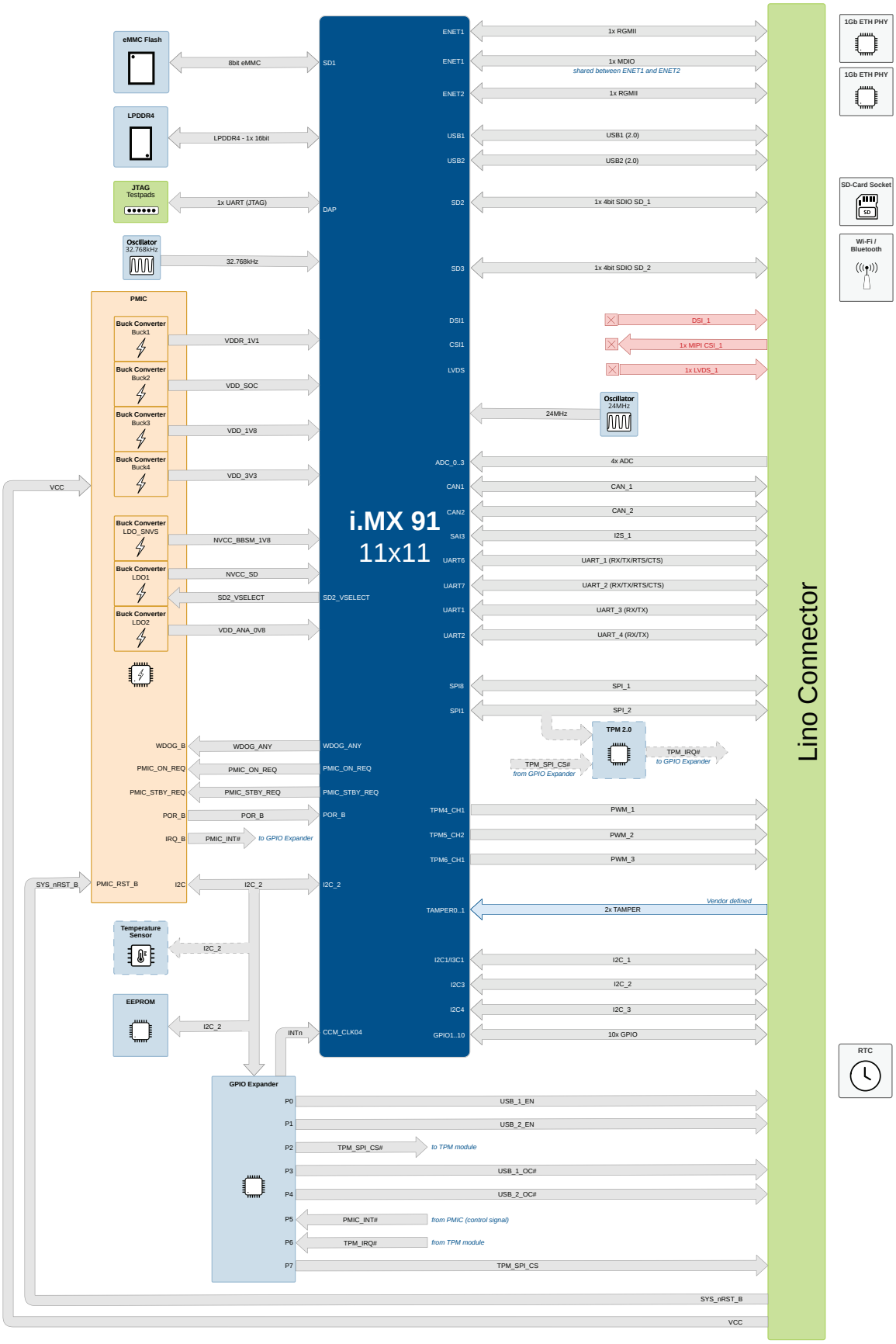
Power Optimized

The table below summarizes the main interfaces and configuration options of the Lino iMX91.

Features	Total (up to)	Always compatible	Reserved	Module specific or Alternate Function
		Analog		
Analog Input (ADC)	4		4	
		Audio		
I2S	1		1	
		Camera		
MIPI CSI-2	N/A			
		Display		
MIPI DSI	N/A			
LVDS (dual channel)	N/A			
		Low speed		
I2C	3	3		
I3C	2			2 - alt
SPI	2	1	1	
UART (2-wire)	4	3	1	
UART (RTS/CTS signals)	2		2	
PWM	3	3		
CAN FD	2		2	
GPIO	10	10		~TBD - alt
		Network		
RGMII (Gigabit Ethernet)	2	1	1	
		Storage		
SD/SDIO/MMC	2	1	1	
		USB		
USB 2.0 OTG	1	1		
USB 2.0 Host	1	1		

Contact us for more information, or visit our website product page: Lino iMX91 product page.

Block Diagram



Legend

- Solid gray line arrow: always available
- Solid blue line arrow: available on MSP pins
- Dashed gray line arrow: assembly option
- Blue arrow: vendor defined
- Red arrow: Interface not available

- Connector — System-on-Module connector
- PMIC — Power Management IC (PMIC)
- Component — Built-in component
- Component — Built-in component - assembly option
- Component — Not on module
- SoC — System-on-Chip

Configuration Overview

The Lino iMX91 SoM delivers reliable performance for industrial and IoT applications that demand efficiency, scalability, and long-term availability, all within a compact 30×30mm PCB footprint that perfectly fits space-constrained designs. It offers flexibility through multiple configuration options for memory and storage, allowing developers to tailor the module to their specific system requirements.

The first configuration to be released is shown in the table below: Lino iMX91 Solo 2GB IT.

Family	iMX91 Segment	A-Core Qty	RAM	eMCC	TPM	Temperature
LIMX91	3	1	-2G	-16G	-N	-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	iMX91 Segment	A-Core Qty	RAM	eMCC	TPM	Temperature
LIMX91						

Configuration Inputs

iMX91 Segment	Description	A-Cores Qty	Max Frequency	DRR Speed
3	Full Featured	1	1.4 GHz	2.4 GT/s
2	Reduced	1	800 MHz	1.6 GT/s

RAM Density	
-256M	256 MB
-512M	512 MB
-1G	1 GB
-2G	2 GB

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

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

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

Contact us for more information, or visit our website product page: Lino iMX91 product page.

Lino iMX91 Product Brief

Torizon™ | Easily Develop, Manage and Secure Your Linux Devices

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

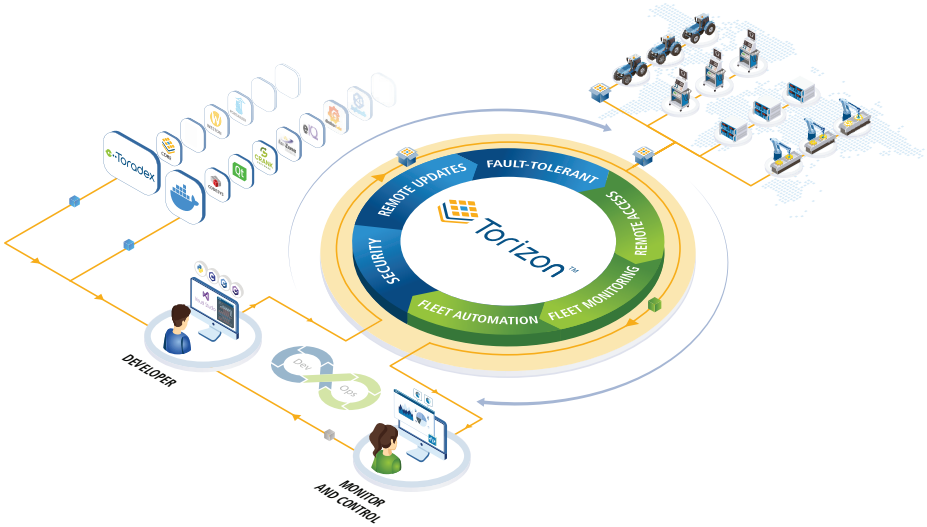
Device Monitoring

Subsystem Updates

Remote Access

Remote Updates

Secure by Default



To explore the full potential of the Torizon ecosystem, visit Torizon.io

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