

VERDIN AM62P PRODUCT BRIEF



The Verdin AM62P is an extension of the existing Verdin AM62 SoM, built for high performance embedded 3D display applications, delivering up to 50 GFLOPS of graphical performance. Scalable Arm Cortex-A53 performance and embedded features, such as: multi-screen high-definition display support, 3D-graphics acceleration, 4K video acceleration, and extensive peripherals make the Verdin AM62P well-suited for a broad range of industrial applications.

Target Verticals and Highlights

The Verdin AM62P targets a wide range of verticals, including

- Industrial Automation
 - Medical
 - Transportation
 - Smart Cities
 - Test and Measurement
- and many more.

The module offers a wide range of interfaces ranging from simple GPIOs, industry-standard I2C, SPI, USB, CAN FD, and UART buses to MIPI DSI display and MIPI CSI camera interfaces. The Verdin AM62P module features a Gigabit Ethernet PHY with IEEE1588 support on the module. The SoC features a second Ethernet MAC with an RGMII interface and IEEE1588 support for adding a Gigabit Ethernet PHY on the carrier board for dual Ethernet applications. The SoM is available with optional Wi-Fi 6 and Bluetooth 5.3 interfaces.

Verdin Computer on Modules Family

The Verdin System on Module (SoM) family eliminates much of the complexity associated with modern-day electronic design. Complicated circuitry such as high-speed impedance-controlled layouts with high component density utilizing blind and buried via technology is encapsulated on the SoM.

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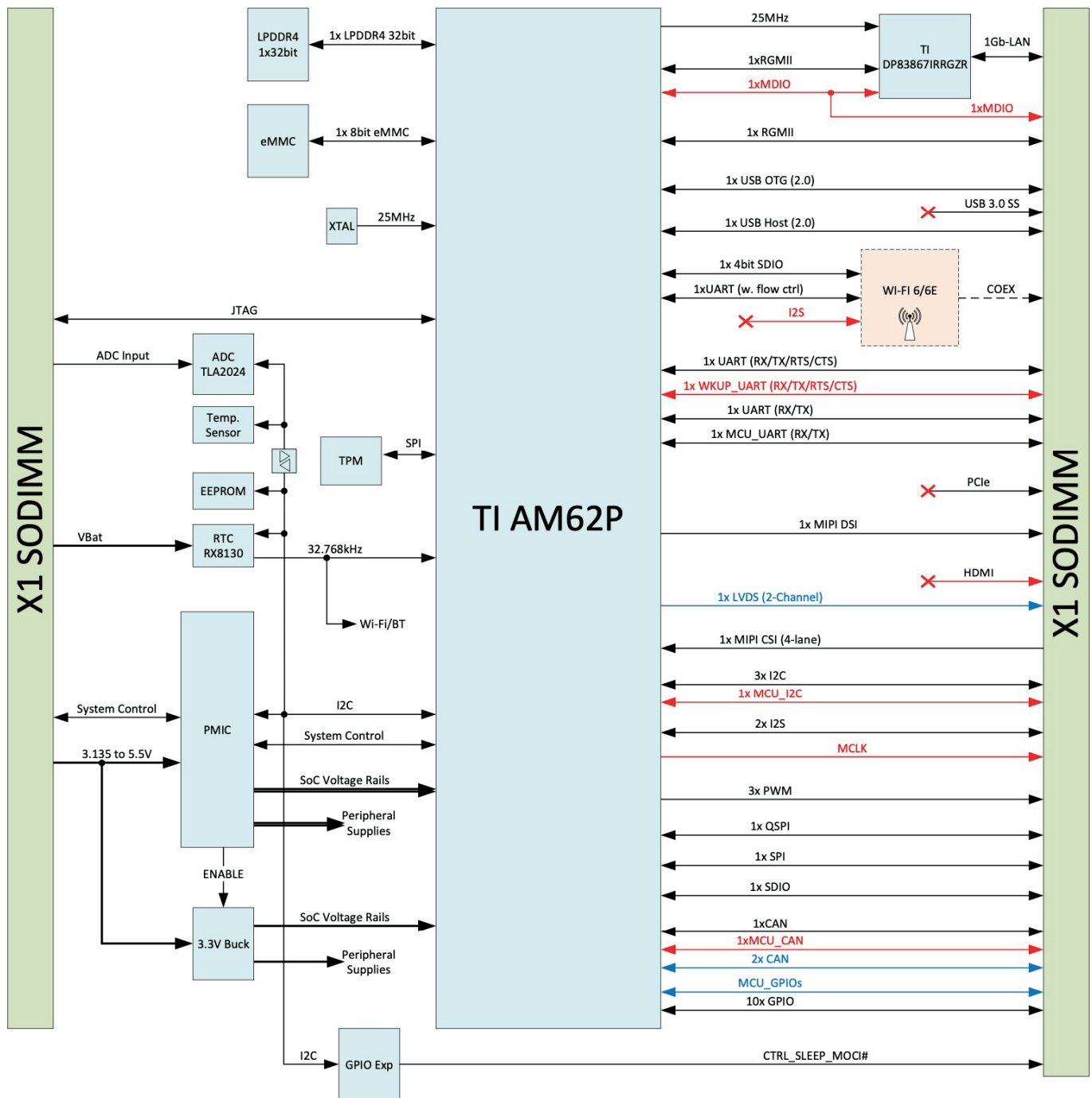
This allows the customer to create a carrier board that focuses solely on application-specific electronics, making the project substantially less complex. The Verdin module takes this one step further and implements an interface pinout that allows direct connection of real-world I/O ports without the need to cross traces or traverse layers, referred to as Direct Breakout™. This becomes increasingly important for customers as more interfaces move toward high-speed serial technologies that require impedance-controlled differential pairs. Direct Breakout™ allows them to easily route such interfaces to common connectors in a simple, robust fashion.

The Verdin SoM features a wide input voltage range that allows it to be powered from a broad range of power sources (e.g., directly from a USB power supply or a single lithium cell). Due to increasing transistor density and the need for more power-efficient devices, the I/O voltage level is trending to decrease from 3.3V to 1.8V. For this reason, the Verdin family of SoMs supports a 1.8V I/O voltage level only. Both the wide input voltage range and the 1.8V I/O voltage make the power supply designs for a Verdin carrier board simple, easy, and cost-efficient. These features altogether make the Verdin family of SoMs perfectly suited for battery-powered applications as well.

More information, visit the Verdin Family Specification at: <https://docs.toradex.com/109262-verdin-familyspecification.pdf>



Verdin AM62P Block Diagram



- ◀────────▶ Always compatible and reserved interfaces without an issue
- ◀────────▶ Always compatible and reserved interfaces with restrictions
- ◀────────▶ Noteworthy extra interfaces on module-specific pins
- ✗────────▶ Noteworthy missing interfaces
- ✗────────▶ Obviously missing interfaces (interfaces also not available on Verdin iMX8M Mini)

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Interfaces Overview

Features of the Verdin module are split into three distinct categories: “Always Compatible”, “Reserved”, and “Module-specific”. The “Always Compatible” and “Reserved” pins are also referred to as the “Verdin Standard” pins.

Additionally to this definition, the AM62P SoC allows for alternate functions. As an example, many pins can, apart from their primary function, also work as GPIOs.

“Always Compatible” interfaces are features that shall be present on each SoM in the Verdin Family. Customers can count on upgradeability and maximum scalability regarding these interfaces.

“Reserved” interfaces are features that are defined and reserved but

possibly missing on some SoM models due to lack of availability. It could be that a particular SoC does not provide a specific interface or that there is an assembly option that omits certain interfaces for cost optimization. Replacement pins must be electrically compatible with the specified functionality. This means any Verdin SoM can be reliably inserted into any Verdin carrier board without causing damage due to incompatible “Reserved” pins.

A **“Module-specific”** feature is a feature that is not guaranteed to be functionally or electrically compatible between modules. Suppose a carrier board design uses such features. In that case, it is possible that other modules in the Verdin module family do not provide these features and instead provide other features on the associated pins. In this case, Verdin modules that are suitable for use in

the carrier board design may be restricted. An incompatible SoM/carrier board combination may disable all functionality or even damage the SoM or the carrier board. The use of these pins could make upgrades impossible.

The alternate functions group means that an interface is provided as an additional function on an “Always Compatible”, “Reserved”, or “Module-specific” pin. These functions can only be used if the primary function of the pin is not used.

The table below shows the interfaces that are supported on the Verdin AM62P module along with the group in which that feature is provided: “Always Compatible”, “Reserved”, “Module-specific”, or alternate function.

Feature	Total	Always Compatible	Reserved	Module-specific	Alternate Function
USB 2.0 OTG	1x	1x			
USB 2.0 Host	1x	1x			
Gigabit Ethernet (with TSN)	1x	1x			
RGMII (for 2 nd Gigabit Ethernet; with TSN)	1x	1x			
Wi-Fi 4 and Bluetooth 5	1x ¹		1x		
I2C	5x	1x	3x		1x
SPI	5x	1x			4x
QSPI	1x		1x		
GPMC	1x			1x	
UART	8x	3x	1x		4x
UART (with flow control)	2x ²		2x		
PWM	3x	1x	2x		
SD/SDIO/MMC	2x	1x		1x ³	
GPIO	90x	4x	6x		80x
MIPI DSI (Quad Lane)	1x		1x		
CAN FD	4x		2x	2x	
MIPI CSI-2 (Quad Lane)	1x		1x		
I2S	2x		2x		
ADC	4x		4x		
LVDS (Dual-Channel)	1x ⁴			1x	
JTAG	1x		1x		

¹ Depending on the configuration (see the “Configuration Overview” section); with assembly option for Wi-Fi 6 and Bluetooth 5

² Complementing 2x UART interfaces in the Always Compatible class

³ For configurations not featuring Wi-Fi and Bluetooth

⁴ Configurable as 1x dual channel or 2x single channel

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Configurations Overview

The Verdin AM62P system on module can be ordered to fit your specific needs. There are different configurations available, with a wide range of RAM and Flash sizes, Wi-Fi and Bluetooth connectivity options as well as different temperature ranges, for specific automotive or industrial usage. In case you need a specific set of configuration options, we offer customization services.

	Verdin AM62P Quad 4GB WB IT	Verdin AM62P Quad 4GB ET	Verdin AM62P Quad 2GB WB IT	Verdin AM62P Quad 2GB ET	Verdin AM62P Dual 1GB WB IT	Verdin AM62P Dual 1GB ET	Custom Verdin AM62P
CPU and MCU Details							
CPU Name	TI AM62P54	TI AM62P54	TI AM62P54	TI AM62P54	TI AM62P32	TI AM62P32	Customizable
CPU Type	4x Arm® Cortex®-A53	4x Arm® Cortex®-A53	4x Arm® Cortex®-A53	4x Arm® Cortex®-A53	2x Arm® Cortex®-A53	2x Arm® Cortex®-A53	
MCU Name	1x Arm® Cortex®-R5F	1x Arm® Cortex®-R5F	1x Arm® Cortex®-R5F	1x Arm® Cortex®-R5F	1x Arm® Cortex®-R5F	1x Arm® Cortex®-R5F	
CPU Clock	1.4GHz (A53) 800MHz (R5F)	1.4GHz (A53) 800MHz (R5F)	1.4GHz (A53) 800MHz (R5F)	1.4GHz (A53) 800MHz (R5F)	1.4GHz (A53) 800MHz (R5F)	1.4GHz (A53) 800MHz (R5F)	
Other SoC Details							
Video Decoder	Yes (up to 4K UHD resolution)						Customizable
Video Encoder							
2D Graphics Acceleration	Yes	Yes	Yes	Yes	Yes	Yes	
3D Acceleration	Yes (up to 50 GFLOPS)	Yes (up to 50 GFLOPS)	Yes (up to 50 GFLOPS)	Yes (up to 50 GFLOPS)	No	No	
Display Controller	Triple	Triple	Triple	Triple	Triple	Triple	
Hardware Security Module	Yes	Yes	Yes	Yes	Yes	Yes	
Memory							
RAM (with inline ECC)	4GB LPDDR4 (32 Bit)	4GB LPDDR4 (32 Bit)	2GB LPDDR4 (32 Bit)	2GB LPDDR4 (32 Bit)	1GB LPDDR4 (32 Bit)	1GB LPDDR4 (32 Bit)	Customizable
Flash	32GB eMMC	32GB eMMC	16GB eMMC	16GB eMMC	8GB eMMC	8GB eMMC	
Connectivity							
Wi-Fi	2.4/5 GHz Dual-band 1x1 Wi-Fi 6 (802.11ax)	-	2.4/5 GHz Dual-band 1x1 Wi-Fi 6 (802.11ax)	-	2.4/5 GHz Dual-band 1x1 Wi-Fi 6 (802.11ax)	-	Customizable
Bluetooth	Bluetooth 5.2	-	Bluetooth 5.2	-	Bluetooth 5.2	-	
Operating System							
Torizon	Coming Soon	Coming Soon	Coming Soon	Coming Soon	Coming Soon	Coming Soon	Customizable
Embedded Linux	Coming Soon	Coming Soon	Coming Soon	Coming Soon	Coming Soon	Coming Soon	
Preinstalled OS	Toradex Easy Installer (Coming Soon)	Toradex Easy Installer (Coming Soon)	Toradex Easy Installer (Coming Soon)	Toradex Easy Installer (Coming Soon)	Toradex Easy Installer (Coming Soon)	Toradex Easy Installer (Coming Soon)	
Android	Contact Us	Contact Us	Contact Us	Contact Us	Contact Us	Contact Us	
QNX	Coming Soon	Coming Soon	Coming Soon	Coming Soon	Coming Soon	Coming Soon	
FreeRTOS	Contact Us	Contact Us	Contact Us	Contact Us	Contact Us	Contact Us	
Physical							
Size	69.6 x 35.0 x 6.0 mm	69.6 x 35.0 x 6.0 mm	69.6 x 35.0 x 6.0 mm	69.6 x 35.0 x 6.0 mm	69.6 x 35.0 x 6.0 mm	69.6 x 35.0 x 6.0 mm	Customizable
Temperature	−40°C to 85°C	−25°C to 85°C	−40°C to 85°C	−25°C to 85°C	−40°C to 85°C	−25°C to 85°C	
Shock / Vibration	EN 60068-2-6/50g 20ms	EN 60068-2-6/50g 20ms	EN 60068-2-6/50g 20ms	EN 60068-2-6/50g 20ms	EN 60068-2-6/50g 20ms	EN 60068-2-6/50g 20ms	
Power Dissipation	TBD	TBD	TBD	TBD	TBD	TBD	
Intended Use, Pricing, Availability							
Intended Use	For End Products	For End Products	For End Products	For End Products	For End Products	For End Products	For End Products

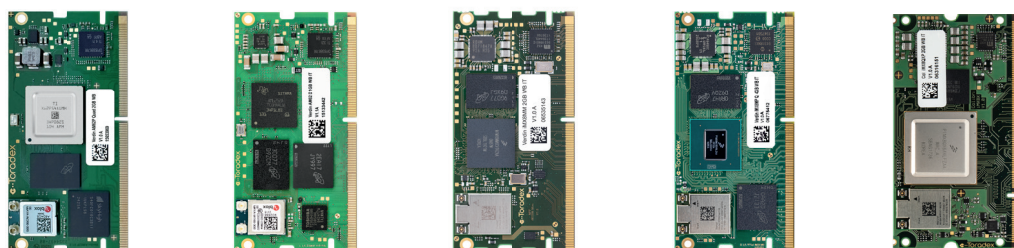
Contact us for more information: <https://www.toradex.com/computer-on-modules/verdin-arm-family/ti-am62p>

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Comparison with Other Similar Toradex SoMs

The Verdin AM62P extends Toradex's portfolio of SoMs to a new area that overlaps high graphical performance, industrial readiness and low cost. Compared to other

lower-cost Verdin SoMs, the Verdin AM62P offers the highest GPU performance, the most performant VPU, a Cortex-R5 realtime core (instead of Cortex-Ms) and additional display interfaces (with 1x Dual-Channel LVDS interface, and 1x Quad-Lane MIPI DSI interface).



	Verdin AM62P	Verdin AM62	Verdin iMX8M Mini	Verdin iMX8M Plus	Colibri iMX8X
GPU	50 GFLOPs	8 GFLOPs	8 GFLOPs	16 GFLOPs	28 GFLOPs
VPU	H.264, H.265 (4K @ 30fps)	N/A	H.264, H.265 (FHD @ 60fps)	H.264, H.265 (FHD @ 60fps)	H.264, H.265 (4K @ 30fps)
Real-Time ARM Cortex	1x Cortex-R5F @ 800 MHz	1x Cortex-M4F @ 400 MHz	1x Cortex-M4F @ 400 MHz	1x Cortex-M7 @ 800 MHz	1x Cortex-M4F @ 264 MHz
Memory Bandwidth	LPDDR4 (32 Bit)	LPDDR4 (16 Bit)	LPDDR4 (32 bit)	LPDDR4 (32 bit)	LPDDR4 (32 bit)
Display Interfaces	3x (up to 3840x1080 @60fps)	2x (up to 1080p @60fps)	1x (up to 1080p @60fps)	3x (up to 4K @30fps)	3x (up to 1080p @60fps)
Price	Contact Us	Contact Us	Contact Us	Contact Us	Contact Us
CPU	4x Cortex-A53 (1.4 GHz)	4x Cortex-A53 (1.4 GHz)	4x Cortex-A53 (1.6 GHz)	4x Cortex-A53 (1.6 GHz)	4x Cortex-A35 (1.2 GHz)
NPU	N/A	N/A	N/A	Yes	N/A

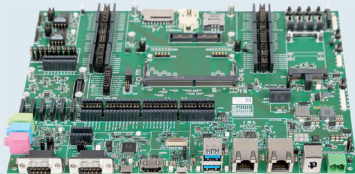
Carrier Boards and Ecosystem

The Verdin family offers a broad range of off-the-shelf carrier boards, both at low volume for development and evaluation, as well as in higher volumes for scaling to production. Besides our off-the-shelf offerings, we can work with you to design, manufacture and maintain a carrier board specific for your needs.

Additionally, our vast accessories ecosystem, including Displays, Cameras and Enclosures, will get you up and running with integrating your product in no time. Learn more about our [carrier board ecosystem](#) and [accessories ecosystem](#).

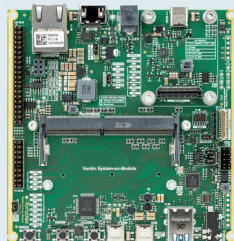
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Development and Evaluation



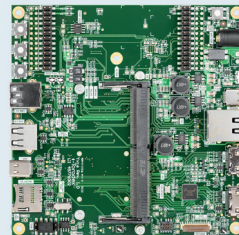
Verdin Development Board

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



Dahlia

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



Yavia

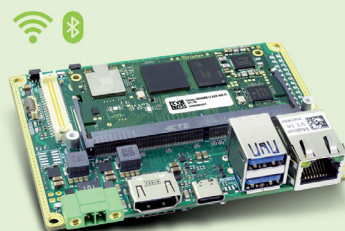
Compact carrier board providing easy access to the most common features of the Verdin family. It is an ideal platform for software development and demonstration purposes

Volume Production



Ivy

- Optimized for industrial and harsh environments
- Small 125 x 90 mm form factor
- Dual Gigabit Ethernet
- Isolated I/O



Mallow

- Small 100 x 72 mm Pico-ITX form factor
- Simple extension header
- M.2 PCIe slot for modems and accelerators
- MIPI-CSI camera interfaces



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