

Accelerate your development.

A family of System-on-Modules and development boards



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Products portfolio

TOPIC Embedded Systems (TOPIC) offer a range of embedded solutions that assist developers of complex embedded systems to build their applications quickly, reliably and effectively. Built on AMD/Xilinx System-on-Chip technology, products are available in the form of:

🔺 Miami System-on-Modules (SOMs)

🔺 🛛 Florida development/carrier boards

Board support packages based on embedded Linux

FPGA and processor building blocks in the form of e.g. C/C++ and VHDL code

Supported by our development organisation

A huge benefit of working with TOPIC products is the accessible design support by the TOPIC Projects organization. Apart from in-depth background knowledge of the products, the design teams have significant application development expertise.

Our products are supported by our development organization to help with:

- Design and development services for system engineering and software-, FPGA- and hardware design
- Customization services based on Florida development/carrier boards for rapid prototyping and product development
- Full-custom product development for optimized customer-specific designs
- Application software development (embedded, PCs, cloud, mobile devices)
- Operating System porting as well as BSP/ driver development for e.g. Linux, FreeRTOS and Windows
- Certified development processes for e.g. medical (ISO13485) and safety (CENELEC SIL3/4) projects

Miami System-on-Modules

Overview

The Miami System-on-Modules (SoM) are based on the state-of-the-art silicon technologies of AMD/Xilinx. Their System-on-Chips (SoC) combine processor(s), FPGA logic and accelerators into versatile devices, meeting the latest demanding requirements of applications in medical, industrial, avionics and test and measurement domains. The Miami SOMs enable embedded cutting-edge applications in stand-alone or connected environments. The modules combine high performance and high-density programmable logic with dedicated hardened IP blocks, such as DSP cores, memory controllers, PCIe endpoints and Ethernet MACs. The unique combination of multi-core application processors, real-time processors, optional GPU and AI engines, and feature-rich FPGA fabric makes the Miami a versatile and agile platform for various different applications. The multi-gigabit high-speed transceivers enable communication links compatible with different interface standards, such as JESD204, PCIe, SGMII, DisplayPort, SATA, Aurora and SDI.

The Miami SOMs integrate all system components required to bring-up an embedded system including memory, power supplies, debugging facilities and connectivity interfaces at MAC and PHY level. The Miami family of SOMs provide best in class platforms for balancing performance and power consumption, making it a perfect solution for applications that need processing power, high-speed interfaces and have demanding reliability and quality requirements. The ability to optimize system interfaces and design footprint, as well as execute with real-time arithmetic and control, are key features of the SOM. The module comes with actively supported board support packages (BSP), including a maintained Linux distribution, supporting the AMD/Xilinx Vitis SDK. The Miami SoMs are compatible and usable with one of our Florida carrier boards, allowing for rapid prototyping and evaluation purposes.

Based on the Florida reference designs, customized carrier board variances can be realized reliably, with fast turn-around times. Typical application areas include applications requiring a fair amount of processing power combined with a small system footprint, including but not limited to (secure) communication, high-performance computing, aerospace & defense, audio/video applications, medical, and industrial imaging.

Benefits

- A family of embedded computing solutions, focused on reliability, versatility and certifiability
- Scalable in performance, power, form factor and capabilities
- Based on AMD/Xilinx Zynq 7000, Zynq Ultrascale+ and Versal ACAP System-on-Chip (SOC) technology
- Provides a rich set of state-of-the-art peripherals

Key features

- Small dimensions: <100 mm x <70 mm
- On-board high efficiency power supplies
- Configurable board I/O voltages
- Fast booting capabilities using different processor boot stages and FPGA fabric
- High performance and reliable SAMTEC board-to-board connectors
- On-board DDR3/4 memory with optional ECC support
- Advanced debug support
- Industrial temperature range (-40°C to +85°C)



Miami Zynq Plus



- Xilinx SOC technology: Zynq 7000 (7035, 7045, 7100)
- Technology node: 28 nm

Processors:

- Single/dual core ARM Cortex A9
- Logic density: 275k-444k cells
- Connectors: 2x 120 pins, 1x 180 pins
- Gigabit transceivers: 16x GTH (PL)
- DDR-SDR memory: 1GB 32b DDR3 (PS), 1GB 32b DDR3 (PL)
- Introduction date: 2016
- Product details: <u>Miami Zynq Plus</u>

Miami MPSoC Plus



- Xilinx SOC technology: Zynq Ultrascale+ (ZU6, ZU9, ZU15)
 - Technology node: 16 nm
- Processors:
- Logic density:
- Connectors:
- Gigabit transceivers: 3x GTP (PS), 16x GTH (PL)
- DDR-SDR memory:
- Introduction date:
- Product details:
- 2020

2GB 72b DDR4 (PS)

469k-747k cells

Cortex R7, ARM Mali-400 GPU

2x 120 pins, 1x 180 pins

Dual/quad core ARM, Cortex A53, Dual core ARM,

Dual core ARM Cortex A72, Dual core ARM Cortex R5F,

tails: <u>Miami MPSoC Plus</u>

7 nm

Miami Versal



• Xilinx SOC technology: Versal ACAP (VE2602, VE2802, VM2302, VM2902)

AI Engine-ML Tiles

820k - 2233k cells

8GB 72b DDR4 (PS)

Miami Versal

Highspeed Samtec Mezzanine

- Technology node:
- Processors:
- Logic density:
- Connectors:
- Gigabit transceivers: 24x GTYP (PL)
- DDR-SDR memory:
 - Introduction date: Under development
 - Product details:



Florida carrier boards

Benefits

- Evaluation boards for the Miami System-on-Modules
- Development platform for kick-starting a design
- Reference designs, schematics and printed circuit board layouts available
- Customize the board to your own needs or make use of our fast-turn-around board customization services

Key features

- Gigabit transceiver support for PCI Express, SATA, Aurora
- Ethernet LAN interface
- Display interfaces
- Digilent compliant PMOD interfaces
- FMC compliant interfaces
- Bluetooth, WiFi, mass-storage
- USB-C, 3.0 and 2.0 OTG
- UART via USB



Evaluation and prototyping

The Florida carrier boards are designed to evaluate the capabilities of the AMD/Xilinx Zynq[®] or Zynq Ultrascale+[®] based Miami System-on-Modules (SoM) and provide a means for rapid prototyping. The boards offer a rich pool of peripherals. Together with an accessories bag, a Florida carrier board and Miami SoM of choice form a complete development platform. The kit configuration helps kick-starting your application development in an early stage, giving access to the complete feature set of the processing system using the provided reference design and Linux board support package (BSP).

The interfaces on the carrier boards provide functionality to support data acquisition, visualization, human-machine interfaces, and communication. With a Florida platform, an application can be prototyped and validated. Software and FPGA reference designs, schematics and printed circuit board layout are available as a starting point for a dedicated carrier board design. The functions on the carrier boards are validated in different applications, guaranteeing high quality circuitry. TOPIC also offers driver development support as a service. The same is applicable for the carrier board customization: TOPIC offers board design and production services to facilitate quick and reliable hardware realization.

Florida carrier boards are off-the-shelf available in a number of configurations. Each Florida supports a specific Miami SoM. The carrier boards differ in supported peripherals and evaluation context. The peripherals supported meet the capabilities of the processing system as well as the intended use cases of the FPGA fabric and other SoC features. The Florida Plus supports the latest generation peripherals and communication interfaces, for the Miami MPSOC Plus capabilities.

Peripheral diversity

Given the flexibility of the connectors and interfaces on the carrier boards, a variety of functionality is made available: SATA, M.2 based PCIe, Gigabit Ethernet, SDIO/SDcard interface, FMC and PMOD Generic I/O expansion ports, DisplayPort/HDMI/DVI/MIPI video capture and generation, virtual COM ports, JTAG debug ports, LEDs and switches. This makes it possible to prototype a complete instrument containing visualization, communication, control, and data storage/offloading.

Customization services

Customized application

TOPIC offers Florida carrier board customization services to rapidly create a custom carrierboard according to specific requirements with short times and optionally succeeded by the production and assembly of the boards. Peripherals used on the evaluation boards are applied in various applications, resulting in robust circuit design, thorough testing, extensive software support and compliant (EMC) qualification. Customization can be supported by our board- and reference designs. The carrier board schematics and board layout files are available as inspiration and under certain conditions as Mentor Graphics or Altium design files.

TOPIC can customize a carrier board according to specific needs. As an experienced product development organization, we design and manufacture customized boards according to the requirements we agreed upon, as well as test and qualification criteria that are applicable. As the Miami SoMs are qualified according to industrial design constraints, TOPIC customized carrier boards can comply to these same constraints when required.

Prototype production of the carrier boards is always carried-out under the responsibility of TOPIC as this is part of the qualification process. Thereafter, the choice of production partner is open. Feel free to contact TOPIC to discuss the possibilities.

Benefits

- The development services provided by TOPIC are flexible and customer specific
- Customization services are available for board design, software development and FPGA design
- Application software development based on e.g. Qt, OpenCV, Python, Docker, ROS, .NET
- Operating System porting as well as (Linux) BSP/ driver development and support
- RAMS (Reliability, Availability, Maintainability, Safety) aware development
- Development processes executed according to e.g. IEC60601, ISO13485 and ISO14971 standards.



About TOPIC Embedded Systems

"We make the world a little better, healthier and smarter every day". Our mission statement reflects exactly what we do: developing innovative systems for our customers. The way we do that, is by combining our customers domain specific know-how with our expertise in hardware and software development. This results in the most optimal product for our customers. TOPIC has a strong background of more than 26 years in developing systems, which can contain embedded-, application- and cloud software, FPGA code and PCB designs. We help customers in different domains such as medical, imaging, machine control & safety. With over 150 employees, we are a strong and established company with our headquarters in Best, the Netherlands. TOPIC has an ISO13485 (medical) certified Quality Management System and adopted the Agile way-of-working for optimal interaction with the customer.

Premier Partnership with AMD Xilinx | TOPIC is one of the few AMD Xilinx Premier Design Services Partners in the world and the only one in the Benelux. Our partnership with Xilinx started in 2009 and since than we have been working closely together over the last years.







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linkedin.com/company/topic-embedded-systems



Product details Miami Zynq Plus

Order number miap-7235-2-2-3 miap-7245-2-3 miap-7210-2-2-3 Perice XC72035-FFG90-2 XC72045-FFG90-2 XC72104-FFG90-2 Technology Kinter*-7 Kinter*-7 Kinter*-7 Device XC72035-FFG90-2 XC72045-FFG90-2 XC72104-FFG90-2 Device Kinter*-7 Kinter*-7 Kinter*-7 Device 275K 350K 444k Education 10x10 125, 5 10x10 UtraRAM - - - Application Processor focres) ARM Cortex-A9 (dual) ARM Cortex-A9 (dual) ARM Cortex-A9 (dual) ZARM NEON ^{IIIII} CP Processor System - <th>Miami type</th> <th>Miami Zynq Plus</th> <th>Miami Zynq Plus</th> <th>Miami Zynq Plus</th>	Miami type	Miami Zynq Plus	Miami Zynq Plus	Miami Zynq Plus				
EPGA CZ2130-FFG900-2 XCZ210-FFG900-2 Device XCZ203-FFG902 XCZ210-FFG900-2 Technology Kintex*-7 Kintex*-7 Logic cells 275K 350K 444K Device 275K 350K 444K Lip Flogs 343.8 437.2 554.8 Block RAM 17,6 19,1 26,5 UtrakAM - - - OPO 900 16x (10.3125 Gb/s each) 16x (10.3125 Gb/s each) Processor System ARM Cortex-A9 (dual) ARM Cortex-A9 (dual) 2x 800MHz 2x 800MS 300 830 85 <td>Order number</td> <td>miap-7z35-2-2-3</td> <td>miap-7z45-2-2-3</td> <td>miap-7z100-2-2-3</td>	Order number	miap-7z35-2-2-3	miap-7z45-2-2-3	miap-7z100-2-2-3				
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Software support Bootloader / BSP U-Boot Boot resources JTAG, NOR, SD-Card Operating System TOPIC managed/maintained PetaLinux distribution FPGA reference design Vivado BSP and module configuration Carrier board (order number) Florida Test (flo-test) Mechanical and environmental Dimensions Dimensions 2x 120 pins + 1x 180 pins Samtec high performance mezzanine carrier board connectors + 1x 3 pin fan connector Temperature Industrial grade Temperature and humidity IEC 60068-2-1 (Cold), IEC 60068-2-2 (Dry heat), IEC 60068-2-78 (Damp heat) EMC/EMI EN 55032, IEC 61132, EN 61326, IEC 55024	Logic I/O supply output	Configu	urable I/O standards and vol	tages				
Bootloader / BSP U-Boot Boot resources JTAG, NOR, SD-Card Operating System TOPIC managed/maintained PetaLinux distribution FPGA reference design Vivado BSP and module configuration Carrier board (order number) Florida Test (flo-test) Mechanical and environmental Dimensions Dimensions 85mm x 68.5mm Connectors 2x 120 pins + 1x 180 pins Samtec high performance Temperature Industrial grade Temperature and humidity IEC 60068-2-1 (Cold), IEC 60068-2-2 (Dry heat), IEC 60068-2-78 (Damp heat) EMC/EMI EN 55032, IEC 61132, EN 61326, IEC 55024	Software support							
Boot resources JTAG, NOR, SD-Card Operating System TOPIC managed/maintained PetaLinux distribution FPGA reference design Vivado BSP and module configuration Carrier board (order number) Florida Test (flo-test) Mechanical and environmental Dimensions Dimensions 85mm x 68.5mm Connectors 2x 120 pins + 1x 180 pins Samtec high performance mezzanine carrier board connectors + 1x 3 pin fan connector Temperature Industrial grade Temperature and humidity IEC 60068-2-1 (Cold), IEC 60068-2-2 (Dry heat), IEC 60068-2-78 (Damp heat) EMC/EMI EN 55032, IEC 61132, EN 61326, IEC 55024	Bootloader / BSP	U-Boot						
Operating System TOPIC managed/maintained PetaLinux distribution FPGA reference design Vivado BSP and module configuration Carrier board (order number) Florida Test (flo-test) Mechanical and environmental Start (flo-test) Dimensions 85mm x 68.5mm Connectors 2x 120 pins + 1x 180 pins Samtec high performance Temperature Industrial grade Temperature and humidity IEC 60068-2-1 (Cold), IEC 60068-2-2 (Dry heat), IEC 60068-2-78 (Damp heat) EMC/EMI EN 55032, IEC 61132, EN 61326, IEC 55024	Boot resources	JTAG, NOR, SD-Card						
FPGA reference design Vivado BSP and module configuration Carrier board (order number) Florida Test (flo-test) Mechanical and environmental Dimensions Dimensions 85mm x 68.5mm Connectors 2x 120 pins + 1x 180 pins Samtec high performance mezzanine carrier board connectors + 1x 3 pin fan connector Temperature Industrial grade Temperature and humidity IEC 60068-2-1 (Cold), IEC 60068-2-2 (Dry heat), IEC 60068-2-78 (Damp heat) EMC/EMI EN 55032, IEC 61132, EN 61326, IEC 55024 Shock and vibration MIL STD 202G (method 204D). MIL STD 202G (method 212D)	Operating System	I OPIC managed/maintained PetaLinux distribution						
Carrier board (order number) Florida Test (flo-test) Mechanical and environmental State Dimensions 85mm x 68.5mm Connectors 2x 120 pins + 1x 180 pins Samtec high performance mezzanine carrier board connectors + 1x 3 pin fan connector Temperature Industrial grade Temperature and humidity IEC 60068-2-1 (Cold), IEC 60068-2-2 (Dry heat), IEC 60068-2-78 (Damp heat) EMC/EMI EN 55032, IEC 61132, EN 61326, IEC 55024 Shock and vibration MIL STD 202G (method 204D), MIL STD 202G (method 212D)	FPGA reference design	Vivado BSP and module configuration						
Mechanical and environmental Dimensions 85mm x 68.5mm Connectors 2x 120 pins + 1x 180 pins Samtec high performance mezzanine carrier board connectors + 1x 3 pin fan connector Temperature Industrial grade Temperature and humidity IEC 60068-2-1 (Cold), IEC 60068-2-2 (Dry heat), IEC 60068-2-78 (Damp heat) EMC/EMI EN 55032, IEC 61132, EN 61326, IEC 55024 Shock and vibration MIL STD 202G (method 204D), MIL STD 202G (method 212D)	Carrier board (order number)	Florida Test (flo-test)						
Dimensions 85mm x 68.5mm Connectors 2x 120 pins + 1x 180 pins Samtec high performance mezzanine carrier board connectors + 1x 3 pin fan connector Temperature Industrial grade Temperature and humidity IEC 60068-2-1 (Cold), IEC 60068-2-2 (Dry heat), IEC 60068-2-78 (Damp heat) EMC/EMI EN 55032, IEC 61132, EN 61326, IEC 55024 Shock and vibration MIL STD 202G (method 204D), MIL STD 202G (method 212D)	Mechanical and environmental		05 (0.5					
Connectors mezzanine carrier board connectors + 1x 3 pin fan connector Temperature Industrial grade Temperature and humidity IEC 60068-2-1 (Cold), IEC 60068-2-2 (Dry heat), IEC 60068-2-78 (Damp heat) EMC/EMI EN 55032, IEC 61132, EN 61326, IEC 55024 Shock and vibration MIL STD 2026 (method 204D), MIL STD 2026 (method 212D)	Dimensions	85mm x 68.5mm						
Temperature Industrial grade Temperature and humidity IEC 60068-2-1 (Cold), IEC 60068-2-2 (Dry heat), IEC 60068-2-78 (Damp heat) EMC/EMI EN 55032, IEC 61132, EN 61326, IEC 55024 Shock and vibration MIL STD 202G (method 204D), MIL STD 202G (method 212D)	Connectors	2x 120 pins + 1x 100 pins Samtec nigh performance						
Temperature and humidity IEC 60068-2-1 (Cold), IEC 60068-2-2 (Dry heat), IEC 60068-2-78 (Damp heat) EMC/EMI EN 55032, IEC 61132, EN 61326, IEC 55024 Shock and vibration MIL STD 202G (method 204D), MIL STD 202G (method 212D)	Temperature	mezzanine carrier board connectors + 1x 3 pin fan connector						
EMC/EMI EN 55032, IEC 61132, EN 61326, IEC 55024	Temperature and humidity	IEC 60068-2-1 (Cold), IEC 60068-2-2 (Drv heat), IEC 60068-2-78 (Damp heat)						
Shock and vibration MIL STD 2026 (method 204D) MIL STD 2026 (method 212B)	EMC/EMI	EN 55032, IEC 61132, EN 61326. IEC 55024						
MIL-51D-2020 (method 204D), MIL-51D-2020 (method 213B)	Shock and vibration	MIL-STD-202G (method 204D), MIL-STD-202G (method 213B)						

Product details Miami MPSoC Plus

Miami type	Miami MPSOC Plus	Miami MPSOC Plus	Miami MPSOC Plus				
Order number	miap-zu6-1-7-4-2	miap-zu9-1-7-4-2	miap-zu15-1-7-4-2				
FPGA							
Device	XCZU6-EG-1FFVB1156E	XCZU9-EG-1FFVB1156E	XCZU15-EG-1FFVB1156E				
Technology	Ultrascale+®	Ultrascale+®	Ultrascale+®				
Logic cells	469K	600K	747K				
Flip Flops	429K	548K	682K				
Block RAM	25.1Mbit	32.1Mbit	26.2Mbit				
UltraRAM	-	-	31.5Mbit				
DSP slices	1973	2520	3528				
GTx (PL controlled)	16x (12.5 Gbit/s each)	16x (12.5 Gbit/s each)	16x (12.5 Gbit/s each)				
Processor System							
Application Processor (cores)	ARM Cortex-A53 (quad)	ARM Cortex-A53 (quad)	ARM Cortex-A53 (quad)				
CPU Performance	4x 1.2GHz	4x 1.2GHz	4x 1.2GHz				
Co-Processor	4x ARM NEON™	4x ARM NEON™	4x ARM NEON™				
Real-Time Processor (cores)	ARM Cortex R5 (dual)	ARM Cortex R5 (dual)	ARM Cortex R5 (dual)				
AI Engine-ML Tiles	-	-	-				
Network-on-Chip M/S ports	-	-	-				
Graphics Processor	ARM Mali™-400 MP2	ARM Mali™-400 MP2	ARM Mali™-400 MP2				
GTx (PS controlled)	3x (6 Gbit/s each)	3x (6 Gbit/s each)	3x (6 Gbit/s each)				
Memory							
Cache (application processor)	L1: 32KB I / D p	per core, L2: 1MB, on chip me	emory 256 KByte				
Cache (real-time processor)	L1: 32KB I / D per (core, tightly coupled memory	128 KByte per core				
Cache (GPU)	64 Kbyte						
SDRAM (PS/PL controlled)	2,4 or 8 GByte DDR4 with/without ECC (assembly option 32, 64 or 72 bits wide)						
SDRAM (PL only controlled)		-					
NOR	Quad-speed SPI, (64 MByte, 128 MByte, 256 MByte)						
NAND	0, 8, 16	6, 32 or 64 GByte pseudo-SLC	C or MLC				
EEPROM		32 Kbit I2C EEPROM storage	2				
User programmable/configurable inte	erfaces on SoM connector						
PS connected I/O	PS connected	d 1.8V GPIO, multiplexed per	ipherals (MIO)				
PL connected HR I/O	•						
PL connected HP I/O	HP and HD GPIO, 100 Ohr	n impedance controlled and l	ength matched within quads				
Dedicated interfaces on SoM connect	or						
Network	10/100/1000Mbps Ethernet, (PHY included), IEEE 1588 and SyncE support						
USB	2x USB 3.0, including on-board ULPI media						
CAN	UART, I2C, SPI, I2S, CAN (user configurable/selectable)						
Gigabit transceivers	e.g. FPD link, SDI, TFT, HDMI (PL), DisplayPort (PS)						
PCI-Express (end-point/root-complex)	no						
GTx (PS controlled)	3x (6 Gbit/s each, DisplayPort, PCIe, USB 3.0)						
GTx (PL controlled)	16x (PCIe GEN3/4, 40Gb Ethernet, USB 3.0, CoaXPress, HDMI, DisplayPort)						
Miscellaneous	GPIOs, SD/SDIO 2.0/MMC 3.31 compliant controllers						
JTAG	PL and PS JTAG chain for shared debugging						
Debug	Debug UA	ART, console, PS JTAG, PL JT	AG, 4 pins				
Supply							
Power supply input	9.0- 16.0 Vdc via carrier boar	d connector, 50[W] maximum	n. On-board voltage regulation.				
Logic I/O supply output	Selectable	I/O standards and voltages fo	or I/O banks				
Software support							
Bootloader / BSP	U-Boot / Linux						
Boot resources	JTAG, QSPI-NOR, eMMC, SD-Card, USB						
Operating System	TOPIC managed/maintained PetaLinux distribution						
FPGA reference design	Vivado BSP and module configuration						
Carrier board (order number)	Florida Plus (flo-plus)						
Mechanical and environmental							
Dimensions	95mm x 68.5mm						
Connectors	2x 120 + 1x 180 pin Samtec high performance						
Tomporatura	mezzanine carrier board connectors + 1x 3 pin fan connector						
Temperature and humidity	Industrial grade						
	EN 55032 IFC 61132 EN 61326 IFC 55024						
Shock and vibration	MIL_STD_202G (method 204D) MIL_STD_202G (method 213B)						
	WIIL-31D-2020	(inetilou 2040), WIL-310-202					

Product details Miami Versal PRELIMINARY

Miami type	Miami Versal	Miami Versal	Miami Versal	Miami Versal		
Order number	miav-ve26-1-7-4-2	miav-ve28-1-7-4-2	miav-vm23-1-7-4-2	miav-ve29-1-7-4-2		
FPGA						
Device	XCVE2602-2MSIVFVH1760	XCVE2802-2MSIVFVH1760	XCVM2302-2MSIVFVF1760	XCVM2902-2MSIVFVF1760		
Technology	Versal®	Versal®	Versal®	Versal®		
Logic cells	820K	1139K	1575K	2233K		
Flip Flops						
Block RAM	16.7Mbit	21.1Mbit	49Mbit	70Mbit		
UltraRAM	63.0Mbit	74.3Mbit	127Mbit	181Mbit		
DSP slices	984	1312	1904	2672		
GTx (PL controlled)	24x (32 Gbit/s each)	24x (32 Gbit/s each)	24x (56 Gbit/s each)	24x (56 Gbit/s each)		
Processor System						
Application Processor (cores)	ARM Cortex-A72 (dual)	ARM Cortex-A72 (dual)	ARM Cortex-A72 (dual)	ARM Cortex-A72 (dual)		
CPU Performance	2x 1.5GHz	2x 1.5GHz	2x 1.5GHz	2x 1.5GHz		
Co-Processor	2x ARM NEON™	2x ARM NEON™	2x ARM NEON™	2x ARM NEON™		
Real-Time Processor (cores)	ARM Cortex R5F (dual)	ARM Cortex R5F (dual)	ARM Cortex R5F (dual)	ARM Cortex R5F (dual)		
Al Engine-ML Tiles	152	304	0	0		
Network-on-Chip M/S ports	21	21	30	42		
Graphics Processor	-	-	-	-		
GTx (PS controlled)	-	-	-	-		
Memory						
Cache (application processor)	L	1: 32KB I / D per core, L2: 11	MB, on chip memory 256 KBy	rte		
Cache (real-time processor)	L1: 3	2KBI/D per core, tightly co	upled memory 128 KByte pe	r core		
Cache (GPU)						
SDRAM (PS/PL controlled)	2,4 or 8 GByte DDR4 with/without ECC (assembly option 32, 64 or 72 bits wide)					
SDRAM (PL only controlled)						
NOR	Quad-speed SPI, (128 MByte, 256 MByte)					
NAND		0, 8, 16, 32 or 64 GBy	rte pseudo-SLC or MLC			
EEPROM		32 Kbit I2C EE	PROM storage			
User programmable/configurable int	erfaces on SoM connector					
PS connected I/O		PS connected 1.8V GPIO, multiplexed peripherals (MIO)				
PL connected HR I/O						
PL connected HP I/O	HP and HD G	PIO, 100 Ohm impedance o	ontrolled and length matched	d within quads		
Dedicated interfaces on SoM connect	tor					
Network	10/100/1000Mbps Ethernet, (PHY included), IEEE 1588 and SyncE support					
USB	2x USB 3.0, including on-board ULPI media					
CAN	UART, I2C, SPI, I2S, CAN (user configurable/selectable)					
Gigabit transceivers	e.g. FPD link, SDI, TFT, HDMI (PL), DisplayPort (PS)					
PCI-Express (end-point/root-complex)	yes, 0	GEN4	yes, (GEN5		
GTx (PS controlled)			•			
GTx (PL controlled)	16x (PCIe, 100Gb/40Gb Ethernet, USB 3.0, CoaXPress, HDMI, DisplayPort)					
Miscellaneous	GPIOs, SD/SDIO 2.0/MMC 3.31 compliant controllers					
JIAG	PL and PS JTAG chain for shared debugging					
Debug		Debug UART, console, P	'S JTAG, PL JTAG, 4 pins			
Supply		sector based as a sector F		la se se la fac		
Power supply input	9.0- 16.0 Vdc via carrier board connector, 50[W] maximum. On-board voltage regulation.					
Logic I/O supply output		Selectable I/O standards	and voltages for I/O banks			
Software support			Poot			
Bootrosources						
Doot resources	JIAG, QSFI-NOK, EMIMO, SD-Card, USB					
EPGA reference decign	Vivado BSD and medule configuration					
Carrier board (order number)	Elorida Vorcal (fla vorcal)					
Anner board (order humber) Fronda versal (no_versal)						
Connectors	Samtec high performance mezzanine carrier board connectors					
Temperature	Industrial grade					
Temperature and humidity	IEC 6006	IEC 60068-2-1 (Cold), IEC 60068-2-2 (Dry heat), IEC 60068-2-78 (Damp heat)				
EMC/EMI		EN 55032, IEC 61132, EN 61326, IEC 55024				
Shock and vibration	M	IL-STD-202G (method 204D)	, MIL-STD-202G (method 213	3B)		

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