



## Miami MPSoC Plus System on Module

- Xilinx Zynq Ultrascale+® System-on-Chip based System on Module
- System on Module provides state-of-the-art high bandwidth connectivity and system integration capabilities
- High-performance processing with superior performance/watt ratios
- Quad core 64-bit application processor + dual core real-time/safety processor + GPU + FPGA fabric for agile system development
- Dyplo ready on all processing units, enabling heterogeneous distributed processing on all processors including the FPGA
- Linux distribution support with high-quality BSP via Github (Topic Products)



### Overview

The Miami MPSoC Plus System on Module (SoM) is based on the latest Xilinx 16 nm Ultrascale+ FPGA technology. It is a highly integrated and compact off-the-shelf solution for today's high performance embedded systems. The module combines high performance and high-density programmable logic with dedicated hardened IP blocks, such as DSP cores, memory controllers and PCIe endpoints. The unique combination of a quad-core application processor, a dual core real-time processor, an embedded GPU and feature-rich FPGA fabric makes this platform a versatile and agile platform for many different application domains. The high speed transceivers enable communication links using many different interface standards.

The Miami MPSoC Plus SOM integrates all system components required to bring an embedded system alive including memory, power supply, debugging and connectivity. The Miami family of SOMs provides best in class platforms for balancing both 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 an actively supported HDL board support package, including a maintained main-line Linux distribution. The Miami MPSoC Plus SoM is compatible and functionally combinable with one of our Florida carrier boards, allowing for rapid prototyping.

Based on the Florida reference designs, customized variances can be realized reliably with fast turn-around times. Typical application areas are any existing applications that require 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.

### Key Features

- Dimensions: 95 mm x 68.5 mm
- On-board high efficiency power supplies
- Configurable board I/O voltages
- Fast booting of different processor boot stages and FPGA fabric
- High performance and reliable SAMTEC board-to-board connectors
- Support for USB3.0, HDMI, PCIe, Gigabit Ethernet, DisplayPort, MIPI, Aurora, SFP+
- IEEE1588v2 support
- On-board high-performance ECC DDR4 memory
- On-board Ethernet and USB PHY
- Advanced debug support
- Industrial temperature range (-40°C to +85°C)

### Development support

- Topic provides a wide variety of development services for system, software, FPGA and board design
- Customization services based on reference carrier boards
- Development of customer specific designs
- Application Software Development
- Operating System Porting as well as BSP/driver development for e.g. Linux, FreeRTOS, Windows
- Development processes qualified for e.g. medical (ISO13485) and safety (CENELEC SIL3/4) projects.

Order number	miap-zu6-1-6-4-2	miap-zu9-1-6-4-2	miap-zu15-1-6-4-2
<b>PROCESSOR SYSTEM</b>			
Application Processor <sup>1)</sup>	XCZU6-EG-1FFVB1156E	XCZU9-EG-1FFVB1156E	XCZU15-EG-1FFVB1156E
CPU Architecture	ARM Cortex-A53 (quad core)		
CPU Performance <sup>2)</sup>	Up to 1.2 GHz		
Real Time Processor	ARM Cortex R5 (dual core)		
Graphics Processor	ARM Mali™-400 MP2		
<b>MEMORY</b>			
Application processor cache	L1: 32KB I / D per core, L2: 1MB, on chip memory 256 KByte		
Real-time processor cache	L1: 32KB I / D per core, tightly coupled memory 128 KByte per core		
GPU cache	64 Kbyte		
SDRAM <sup>1)</sup>	2,4 or 8 GByte DDR4 with/without ECC (assembly option 32, 64 or 72 bits wide)		
NOR <sup>1)</sup>	Quad-speed SPI, (64 MByte, 128 MByte, 256 MByte)		
eMMC <sup>1)</sup>	0, 8, 16, 32 or 64 GByte pseudo-SLC or MLC		
EEPROM	32 Kbit I2C EEPROM storage		
<b>FPGA</b>			
Technology	Ultrascale+®		
Logic cells	469K	600K	747K
LUTs	215K	274K	341K
Flip Flops	429K	548K	682K
BRAM	25.1Mbit	32.1Mbit	26.2Mbit
UltraRAM	-	-	31.5Mbit
DSP slices	1973	2520	3528
PS transceivers	3x (6 Gbit/s each)		
GTH transceivers <sup>2)</sup>	16x (12.5 Gbit/s each)		
<b>Connectivity</b>			
LAN	10/100/1000Mbps Ethernet, (PHY included), IEEE 1588 and SyncE support 10G/40G/50 G support (external PHY needed)		
Serial	UART, I2C, SPI, I2S, CAN (user configurable/selectable)		
Video	e.g. FPD link, SDI, TFT, HDMI (PL), DisplayPort (PS)		
USB	2x USB 3.0, including on-board ULPI media		
Debug	Debug UART, console, PS JTAG, PL JTAG, 4 pins		
PS connected I/O	PS connected 1.8V GPIO, multiplexed peripherals (MIO)		
PL connected I/O	HP and HD GPIO, 100 Ohm impedance controlled and length matched within quads		
PS connected transceivers	3x, Display port, SATA, PCIe, USB 3.0 with integrated MAC support, Ethernet		
PL connected transceivers	16 lanes, 4 banks, 1 programmable clock per bank, 1 clock externally available		
<b>Power supply</b>			
Input	9.0– 16.0 Vdc via carrier board connector, 50[W] absolute maximum power rating On-board voltage regulation and power distribution		
Output	Selectable I/O standards and voltages for		
<b>Software</b>			
Bootloader / BSP	U-Boot / Linux		
Boot options	JTAG, QSPI-NOR, eMMC, SD-Card, USB		
Operating System	Topic Linux distribution on GitHub		
Dypllo® compatible platform	Yes		
<b>Mechanical and environmental</b>			
Dimensions	95mm x 68.5mm		
Connectors	2x 120 + 1x 180 pin Samtec high performance mezzanine carrier board connectors		
Temperature	Industrial grade		
<b>Qualification tests</b>			
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 213B)		

<sup>1)</sup> Configuration options possible at higher volumes

<sup>2)</sup> Higher speed grade as configuration option: CPU performance up to 1.5GHz, 16Gbps transceivers

## Florida carrier boards

Miami System-on-Modules are supported by evaluation and reference boards and designs to accelerate your overall design cycle with commonly used peripheral functions. Visit [www.topic.nl](http://www.topic.nl) for an overview of applicable boards and board support packages for your Miami SoM.