

AMC Module Xilinx Zynq UltraScale+ MPSoC

Overview

PanaTeQ's **AMC-ZU1** is a AMC module based on the Zynq UltraScale+ MultiProcessor SoC device from Xilinx.

The Zynq UltraScale+ integrates a Quad-core ARM Cortex-A53 based Application Processing Unit (**APU**), a Dual-core ARM Cortex-R5 based Real-Time Processing Unit (**RPU**), a ARM Mali-400 based Graphic Processing Unit (**GPU**) and an UltraScale+ Programmable Logic (**PL**) in a single device. It also includes on-chip memory, external memory interfaces, and a rich set of peripheral connectivity interfaces.

The board can be ordered with different versions of the Zynq UltraScale+ family of devices, coupled to 2 or 4GB 64-bit DDR4-2400 Processing Memory with 8-bit ECC.

1 or 2GB 32-bit of DDR4-2400 is also available as the Programmable Logic Memory, allowing data streaming applications such as video CODEC and signal processing. 64GB of soldered eMMC managed NAND Flash is available for local data storage.

For front-end I/O interfaces, an on-board **FMC** site with 160 SE IO (80 Diff Pairs) and 10 MGTs, allowing a wide range of applications such as Software Defined Radio, Video Camera Processing, advanced Multi-Axes Motors controller, Multi-Gig Ethernet Communications, LIDAR/RADAR/SONAR.

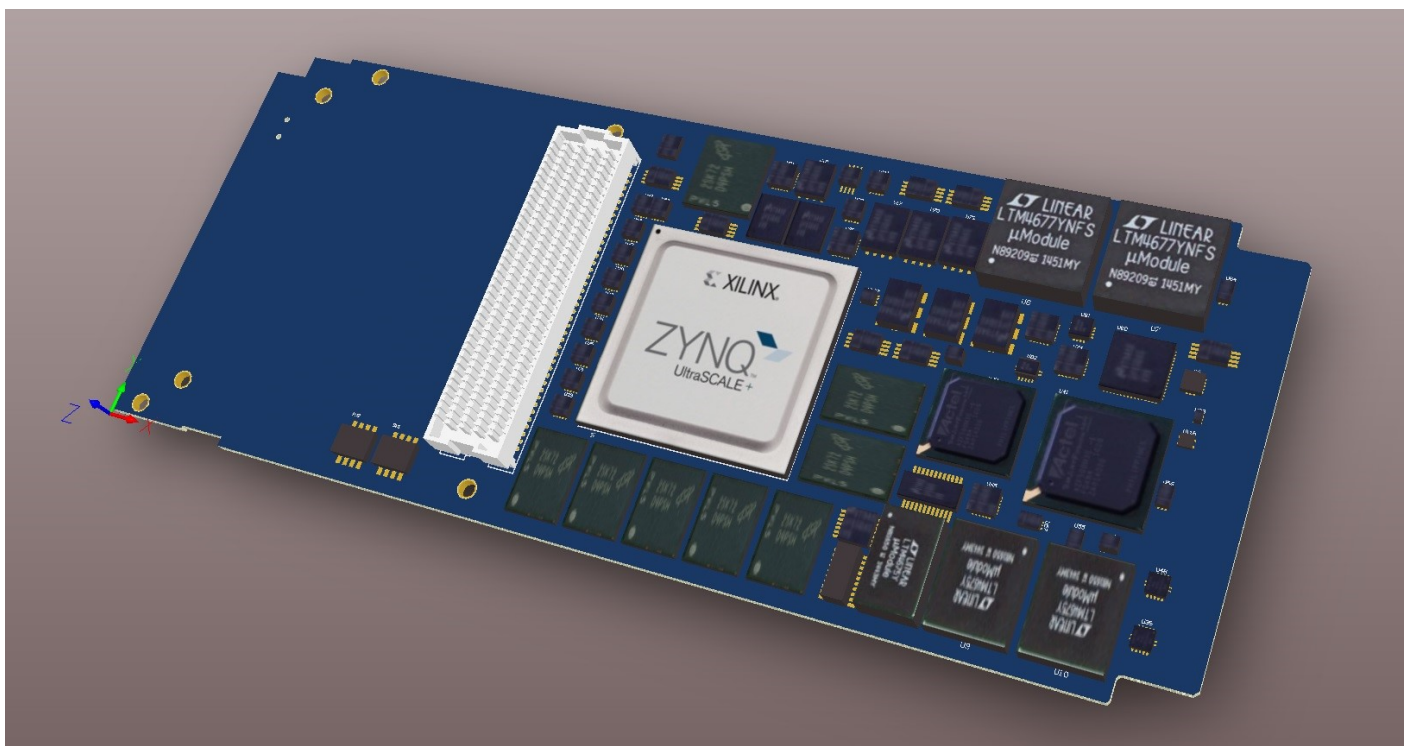
The air cooled PanaTeQ System Development Kit **AMC-ZU1-PSDK** is available for the developers and includes the AMC-ZU1-A1N, a Linux BSP, the PanaTeQ FPGA Design Kit (**PAN-FDK**) and cables.

Key Features

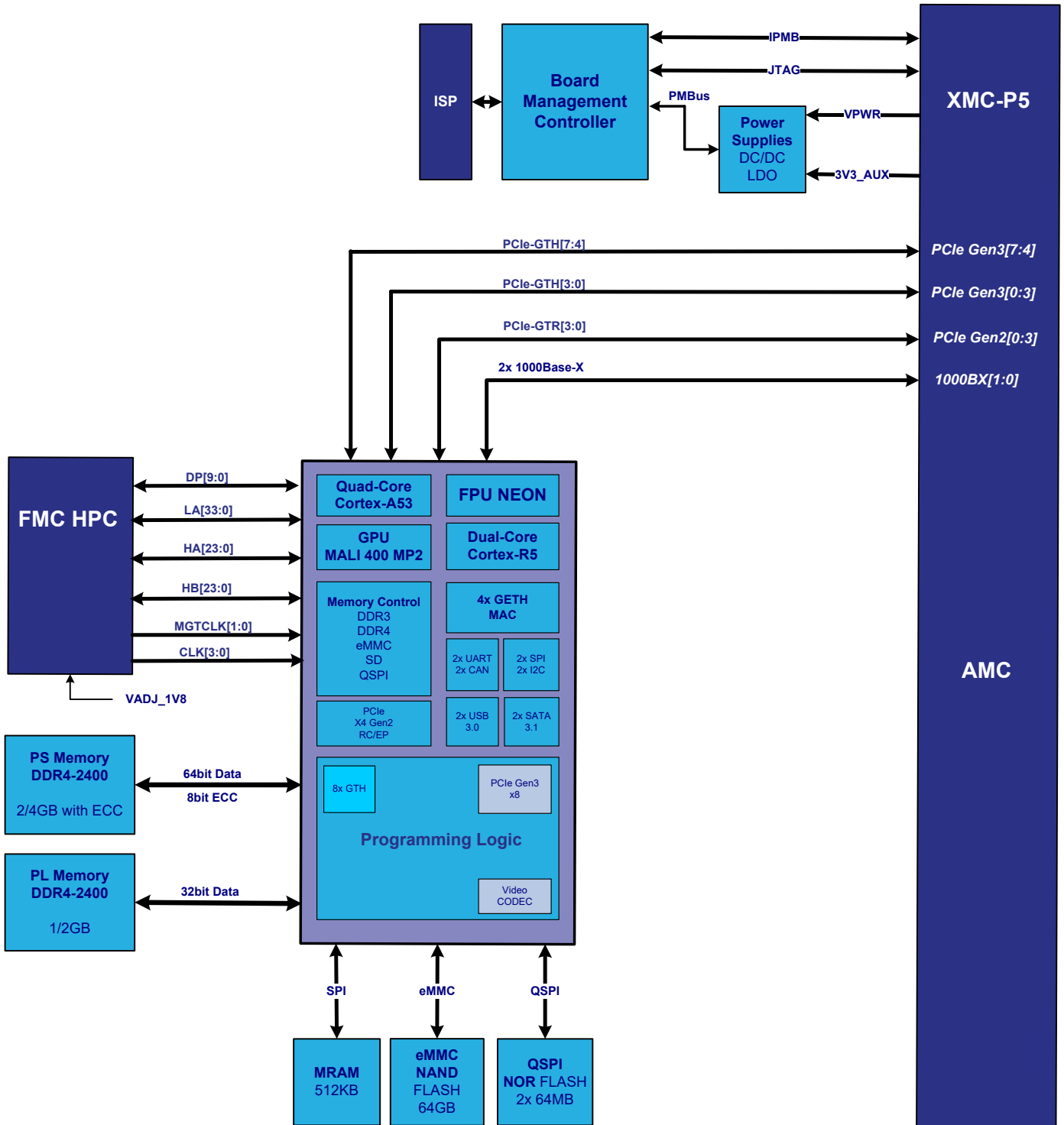
- AMC Single Width, Mid-Size compliant
- Xilinx Zynq UltraScale+ MPSoC
- FFVC-1156 Package 35x35mm
- ZU7/ZU11 CG/EG/EV devices support
- 2/4GB DDR4-2400 64-bit PS memory with 8-bit ECC
- 1/2GB DDR4-2400 32-bit PL memory
- eMMC 64GB (V4.51), MRAM 512KB
- PCIe x4 Processing System Gen1/2 on AMC
- PCIe x8 Programming Logic Gen 1/2/3 on AMC
- 2x ETH 1000Base-X on AMC
- FMC HPC site with 160x SE or 80x LVDS IOs, 10x MGTs
- MMC with IPMI 1.5
- Air Cooled

Typical Applications

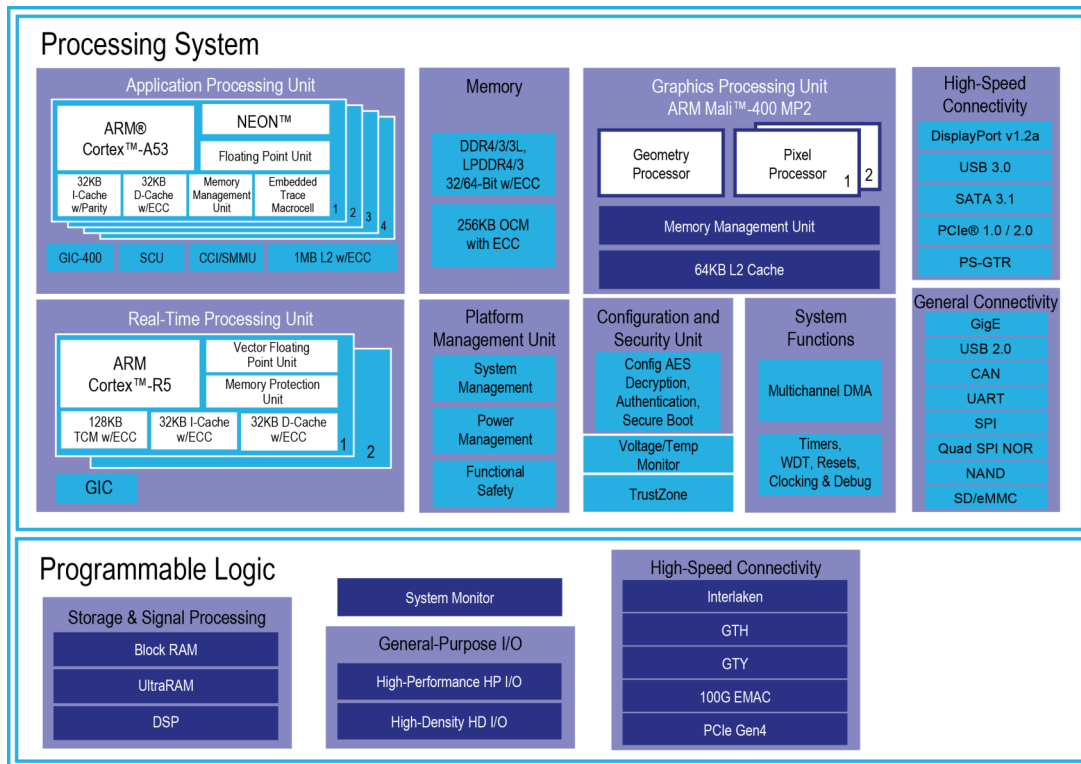
- Video CODEC and Signal Processing
- MILCOM, Software Defined Radio, MIMO
- Situational Awareness Systems
- Electronic Warfare, Signal Intelligence
- LIDAR/RADAR/SONAR Systems
- Advanced Multi-Axes Motors Control



Bloc Diagram



Xilinx Zynq Ultrascale+ MPSoC Processing System Highlights



Applications processing unit (APU) with quad-core ARM® Cortex™-A53 processors up to 1.5GHz:

- Next-generation ARMv8 architecture supporting 32- or 64-bit data widths
- Ideal for Linux and bare-metal SMP/AMP application systems

Real-time processing unit (RPU) with dual-core ARM Cortex-R5 processors up to 600MHz:

- Low-latency, highly deterministic performance APU offloading

New integrated hardened multimedia blocks up to 667MHz:

- Graphics processing unit (GPU) [ARM Mali™-400MP2]
- 4Kx2K 60fps video encoder/decoder (VCU) [in select devices]
- 4Kx2K 30fps DisplayPort interface

New integrated high-speed peripherals:

- PCIe® Gen1 or Gen2 root complex and integrated Endpoint block in x1, x2, and x4 lanes
- USB 3.0/2.0 with host, device, and OTG modes
- Gigabit Ethernet with jumbo frames and precision time protocol
- SATA 3.1 host
- Dedicated quad transceivers up to 6Gb/s

General and boot peripherals:

- CAN, I2C, QSPI, SD, eMMC, and NAND flash interfaces
- GPIO, UART, and trace ports
- 6-port DDR controller with ECC, supporting x32 and x64 DDR3, DDR3L, LPDDR3, LPDDR4, DDR4
- Integrated platform management unit (PMU) supporting multiple power domains
- Integrated configuration security unit (CSU)
- TrustZone support
- Peripheral and memory protection

Board Specifications

AMC Interfaces

- AMC Single Width / Mid-Size Specifications compliant
- PCIe Gen1/2 x4 connected to Zynq Ultrascale+ Processing System
- 8x MGT GTH @ up to 16.3 Gb/s connected to Zynq Ultrascale+ Programming Logic
- 2x ETH 1000BASE-X
- Module Management Control (MMC) Interface implementing IPMI 1.5 for temperature monitoring and hot-wap support
- JTAG

Xilinx Zynq Ultrascale+ MPSoC

- Supported Devices: **XCZU7 CG/EG/EV**-FFVC1156 / **XCZU11 EG**-FFVC1156
- (Speed Grade –1/2/3)
- Processing System : Quad-Core ARM A53, Dual-Core ARM R5, GPU Mali-400, 2x SATA, 2x USB, 4x GETH MACs
- Programmable Logic: 504K Logic Cells (ZU7) / 653K Logic Cells (ZU11)
- On-Chip Memories: 38.0Mb (ZU7) / 43.6Mb (ZU11)
- DSP Slices: 1728 (ZU7) / 2928 (ZU11)
- High Speed Serial Links: 20 full duplex, high performance, GTH Multi-Gigabit Transceivers (MGT) @ up to 16.3 Gb/s
- PCIe Hard IP Gen3 x8
- Video CODEC H.264/H.265 (only ZU7EV devices)
- 2x 10-bit, 1MSPS ADCs for System Monitoring
- Supported by PanaTeQ's FPGA Development Kit (**PAN-FDK**)

External Memories

- 2 or 4GB of DDR4-2400 Processor System (PS) memory, 64-bit data, 8-bit ECC
- 1 or 2GB of DDR4-2400 Programmable Logic (PL) memory, 32-bit data, no ECC
- 64GB eMMC v4.51 of managed NAND Flash memory. HS200 support @ up to 100MB/s
- 512KB of SPI MRAM (NVRAM)
- 2x 512Mb of QSPI NOR Flash memory for booting Zynq Ultrascale+ Programmable Logic and Firmware Processing System

FMC Site

- VITA 57.1 HPC Compliant
- 10x high-performance MGT @ up to 16.3 Gb/s to/from Zynq Programmable Logic
- 160 LVCMOS_18 or 80 LVDS_18 to/from FPGA Zynq Ultrascale+ Programmable Logic
- 4x clocks FMC to Zynq Ultrascale+ Programmable Logic
- 2x clocks FMC to Zynq Ultrascale+ GTH Transceivers
- VADJ = 1V8 (default). 2V5 not supported by Zynq Ultrascale+ HP Banks

Environnemental Specifications

- Commercial 0-50C

Product Codification

The AMC-ZU1 can be assembled with different versions of the Zynq Ultrascale+ devices and various amounts of memory storage. The cooling technique et ruggedization level are also available options. The following table shows the product coding for all these options.

AMC-ZU1-B 1 N

	Device	APU	GPU	PCIe Gen3	VCU	Logic Cells	DSP Slices	Memory
A	XCZU7CG	2x A53	No	2	0	504K	1728	38.0 Mb
B	XCZU7EG	4x A53	Yes	2	0	504K	1728	38.0 Mb
C	XCZU11EG	4x A53	Yes	2	0	653K	2928	43.6 Mb
D	XCZU7EV	4x A53	Yes	2	1	504K	1728	38.0 Mb

	Device Speed Grade
1	Slowest
2	Mid
3	Fastest

	PS / PL Memory Size
N	2GB/1GB
M	4GB/2GB

Ordering Information

The following product references are offered by PanaTeQ as standard products. Other combinations of devices, speed grade, memory and cooling can be specially ordered. Please contact us for details

Reference	Device	Speed	Memory PS/PL
AMC-ZU1-A1N	ZU7CG	-1	2GB/1GB
AMC-ZU1-B1N	ZU7EG	-1	2GB/1GB
AMC-ZU1-D1N	ZU7EV	-1	2GB/1GB

Reference	Description
AMC-ZU1-PSDK-A	AMC-ZU1 Development System Kit