



ENCLUSTRA
FPGA SOLUTIONS

Product Portfolio

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Product Manager

Enclustra Product Portfolio

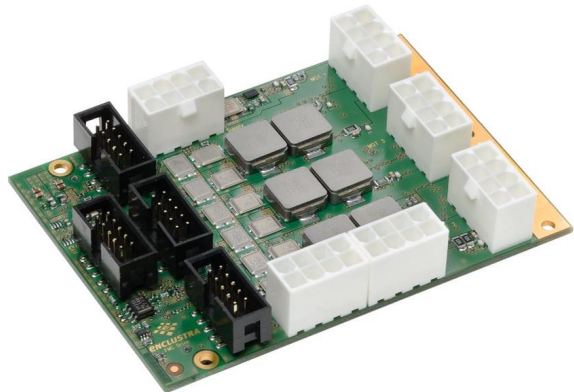
Modules (SoM)



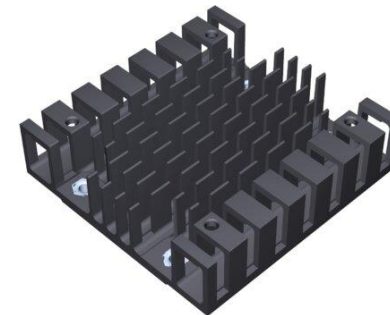
Base Boards



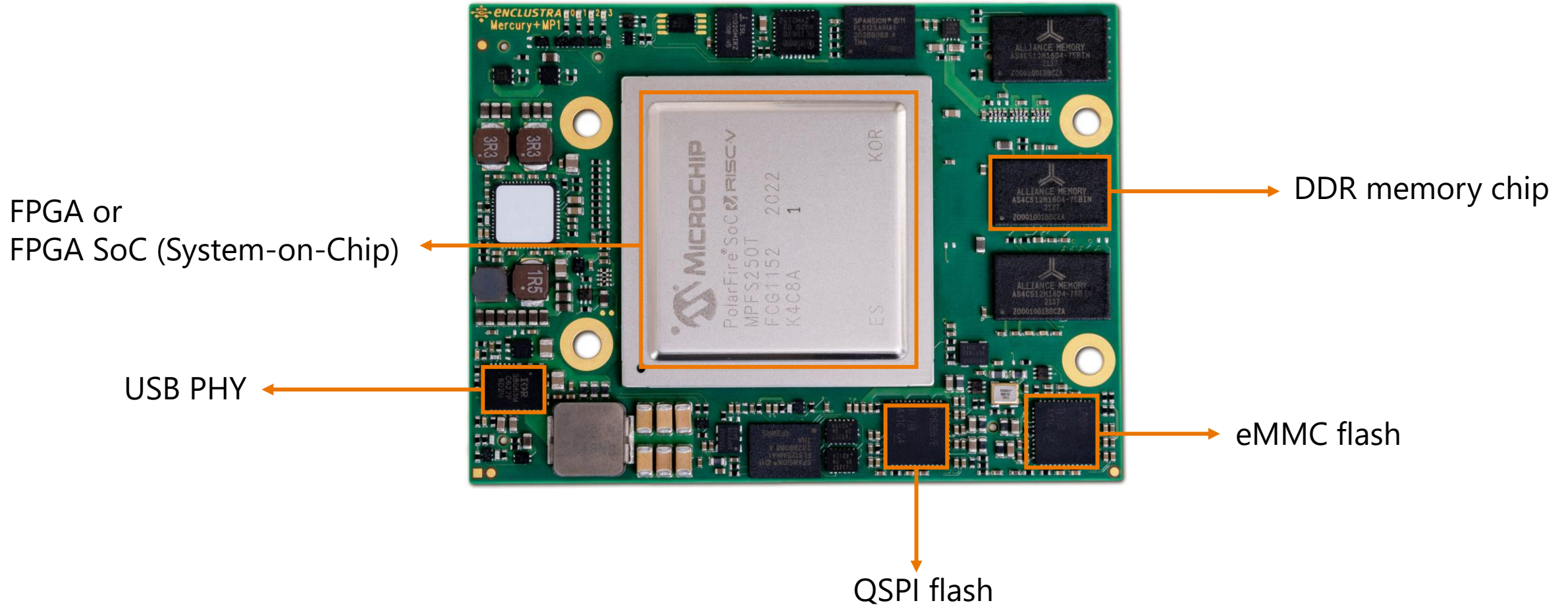
Peripherals



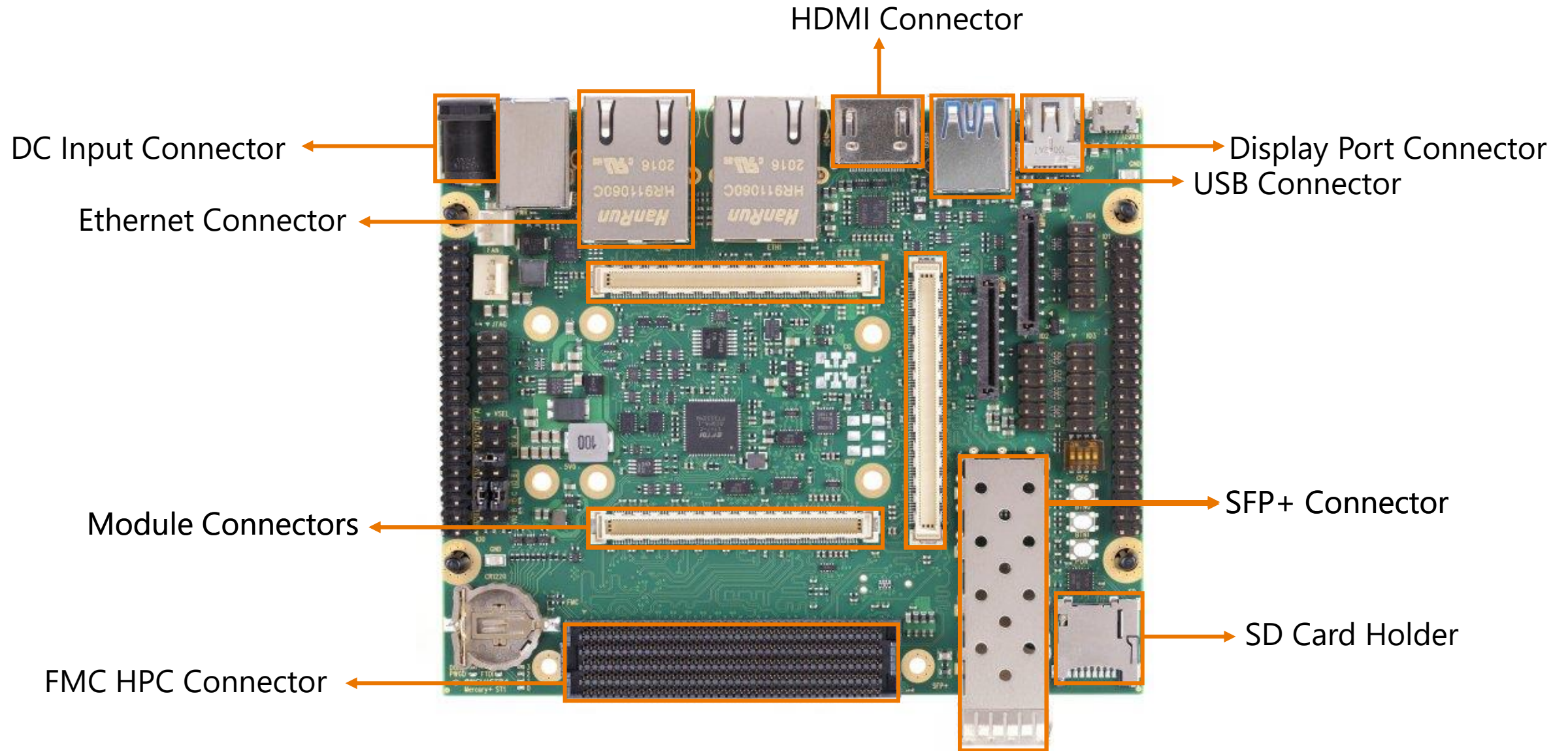
Accessories



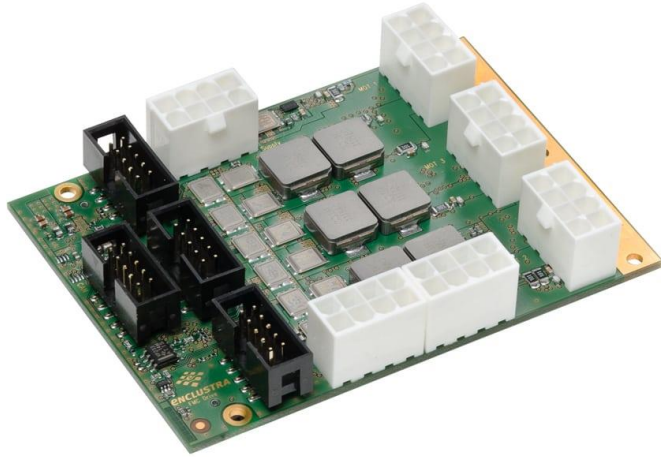
System-on-Module (SOM)



Base board



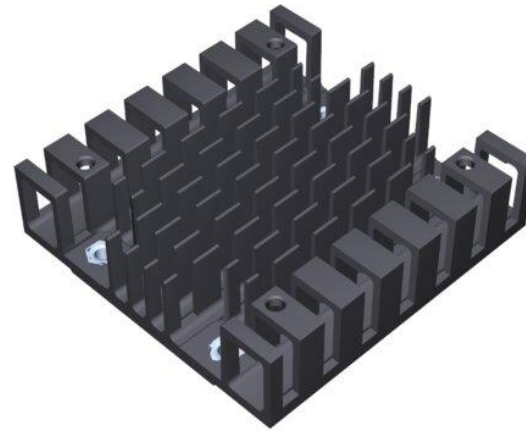
Peripherals and Accessories



FPGA Mezzanine Card (FMC)

Peripherals are modular extensions to our Base boards.

The FMC card enables the development of high-performance drive control systems on our Base boards.



Heatsink

Accessories consist of cooling solutions but also various cables or other items required for setup or operation.



Venting Fan

Design-In KIT

SoM

Base board

Heatsink

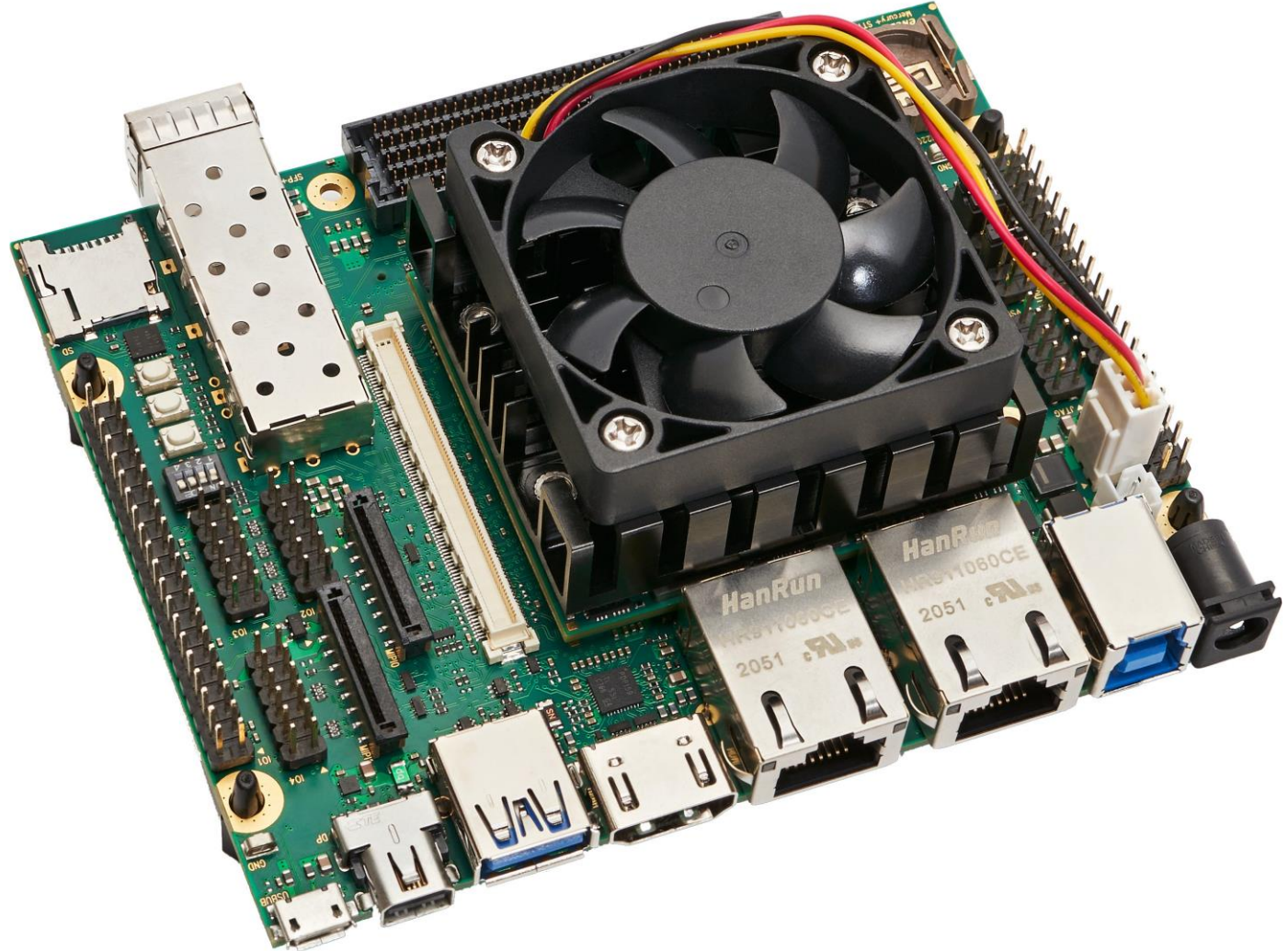
Fan

Power supply

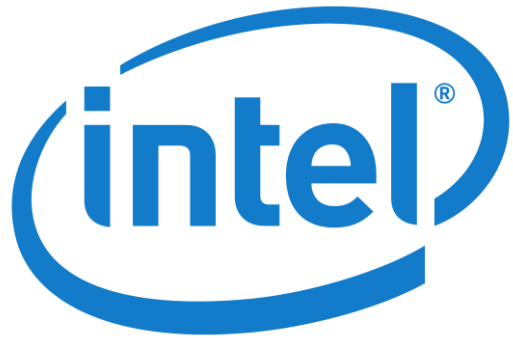
USB cable

SD Card

Application specific accessories,
for example a camera and DP
cables



The Core of Enclustra SoM



Product Families and Form Factors

Mars



Andromeda



Mercury

Mars

Front view



Back view



FPGA Modules

- **Product Series AX3**
AMD Artix-7

SoC Modules

- **Product Series ZX2**
AMD Zynq-7000
- **Product Series ZX3**
AMD Zynq-7000
- **Product Series XU3**
AMD Zynq Ultrascale+

Technology | CPU | Logic Cells | MGTs | I/Os

28nm | - | 101k | - | 108

28nm | 766MHz | 85k | - | 108

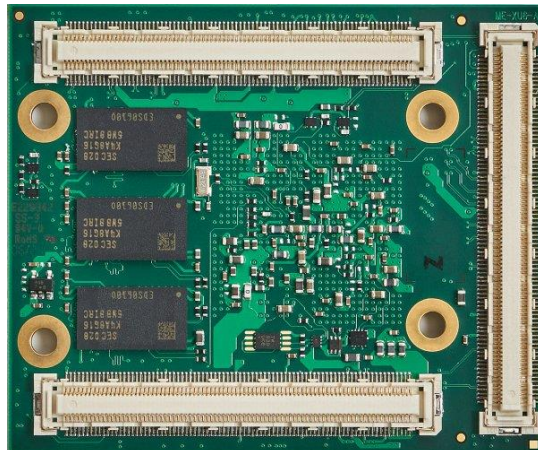
16nm | 1'333MHz | 154k | 4 | 108

Mercury

Front view



Back view



65 mm

FPGA Modules

- **Product Series KX2**
AMD Kintex-7

SoC Modules

- **Product Series AA1**
Intel Arria 10
- **Product Series SA1**
Intel Cyclone V
- **Product Series SA2**
Intel Cyclone V
- **Product Series ZX1**
AMD Zynq-7000
- **Product Series ZX5**
AMD Zynq-7000
- **Product Series XU7**
AMD Zynq Ultrascale+
- **Product Series XU8**
AMD Zynq Ultrascale+
- **Product Series MP1**
Microchip PolarFire

Technology | CPU | Logic Cells | MGTs | I/Os

28nm | - | 406k | 8@10Gbps | 256

20nm | 1'200MHz | 480k | 12@12.5Gbps | 286

28nm | 800MHz | 110k | 9@6Gbps | 294

28nm | 1'000MHz | 350k | 8@10Gbps | 178

16nm | 1'333MHz | 746k | 16@12.5Gbps | 294

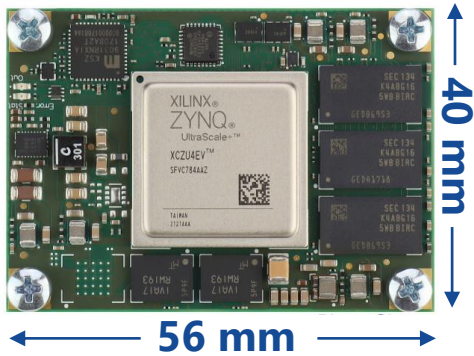
28nm | 625MHz | 461k | 20@12.5Gbps | 295

Mercury Comparison – AMD SoC

Module	<u>XU1</u>	<u>XU5</u>	<u>XU6</u>	<u>XU7</u>	<u>XU8</u>	<u>XU9</u>
ZU+ Devices	6/9/15	2/3/4/5	2/3/4/5	6/9/15	4/5/7	4/5/7
Sys. logic cells (k)	469-747	103-256	103-256	469-747	192-504	192-504
Main DDR4 PS/PL Bus Width (Bits) w/ECC(ECC)	2-8 GB 64(ECC)	1-8 GB 32/64(ECC)	1-8 GB 32/64(ECC)	2-8 GB 64(ECC)	2-8 GB 64(ECC)	2-8 GB 64(ECC)
Secondary DDR4 PL Bus Width (bits), w/out ECC	-	0.5-2 GB 16	-	1-4 GB 32	1-4 GB 32	2-8 GB 64
PS MGT (GTR)	4	0/4 ²⁾	4	4	4	4
PL MGT (GTH)	12/16 ¹⁾	0/4 ²⁾	0/4	16	16	16
H.264/265 Codec (VCU)	-	-/yes	-/yes	-	yes	yes
PCIe Gen3 Hard-IP	-	-/yes	-/yes	-	yes	yes
PL I/O (+PS I/O)	200 ¹⁾ (+14)	144 ²⁾ (+14)	240 (+14)	122 (+14)	122 (+14)	78 (+14)

Andromeda: The Most Scalable SoM Platform

S Size



M Size



L Size

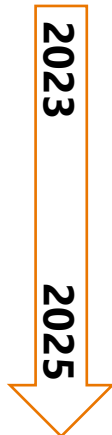


Technologies

- 16nm AMD Ultrascale+
- 16nm AMD Ultrascale+ RFSoc
- 10nm Intel Agilex 5
- 7nm AMD Versal AI Edge
- And more to come...

Top specifications:

- 1.65 GHz CPU cores
- 1'143k Logic Cells
- 28 GTY Transceivers (32Gbps)
- 44 GTH Transceivers (16.3Gbps)

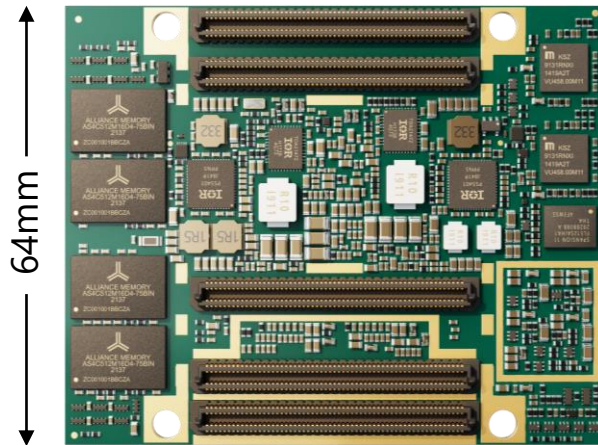


AM-XRU50-48DR-2I-D4E

Andromeda RF, L size

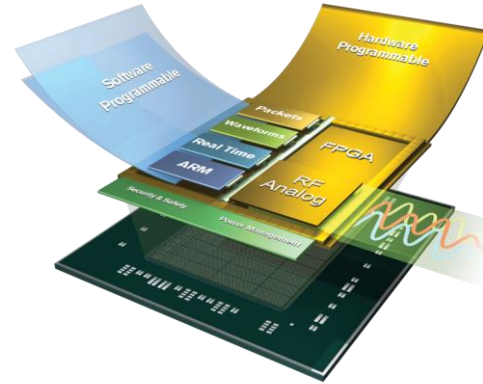


80mm



64mm

AMD Zynq UltraScale+ RFSoc



XCZU48DR-2FFVG15171

- Package G1517 40mm x 40 mm

930k System Logic Cells

Processing System

- 4x Cortex-A53 @1.3GHz
- 2x Cortex-R5F @533MHz

RF

- 8x ADC @ 5Gsps
- 8x DAC @ 9.85 Gsps

RFSoc Module Specifications

I/Os

- 156 HP (1-1.8V)
- 24 HD (1.2-3.3V)
- 22 MIO (1.8-3.3V)

MGT

- 4 PS GTR @ 6Gbps
- 16 PL GTY @ 28.2 Gbps

On-module Memory

- 8 GB DDR4-2400 x72 ECC memory (PS)
- 8 GB DDR4-2666 x64 memory (PL)
- 16 GB eMMC flash (PS)
- 64 MB QSPI flash (PS)

Interfaces

- 2 x Gigabit Ethernet PHY (PS + PL)
- USB 2.0 PHY (USB 3.0 using PS GTR)
- 2x PCIe Gen3 x16 endpoint/root

Power

- 12V power input
- 30A core power supply

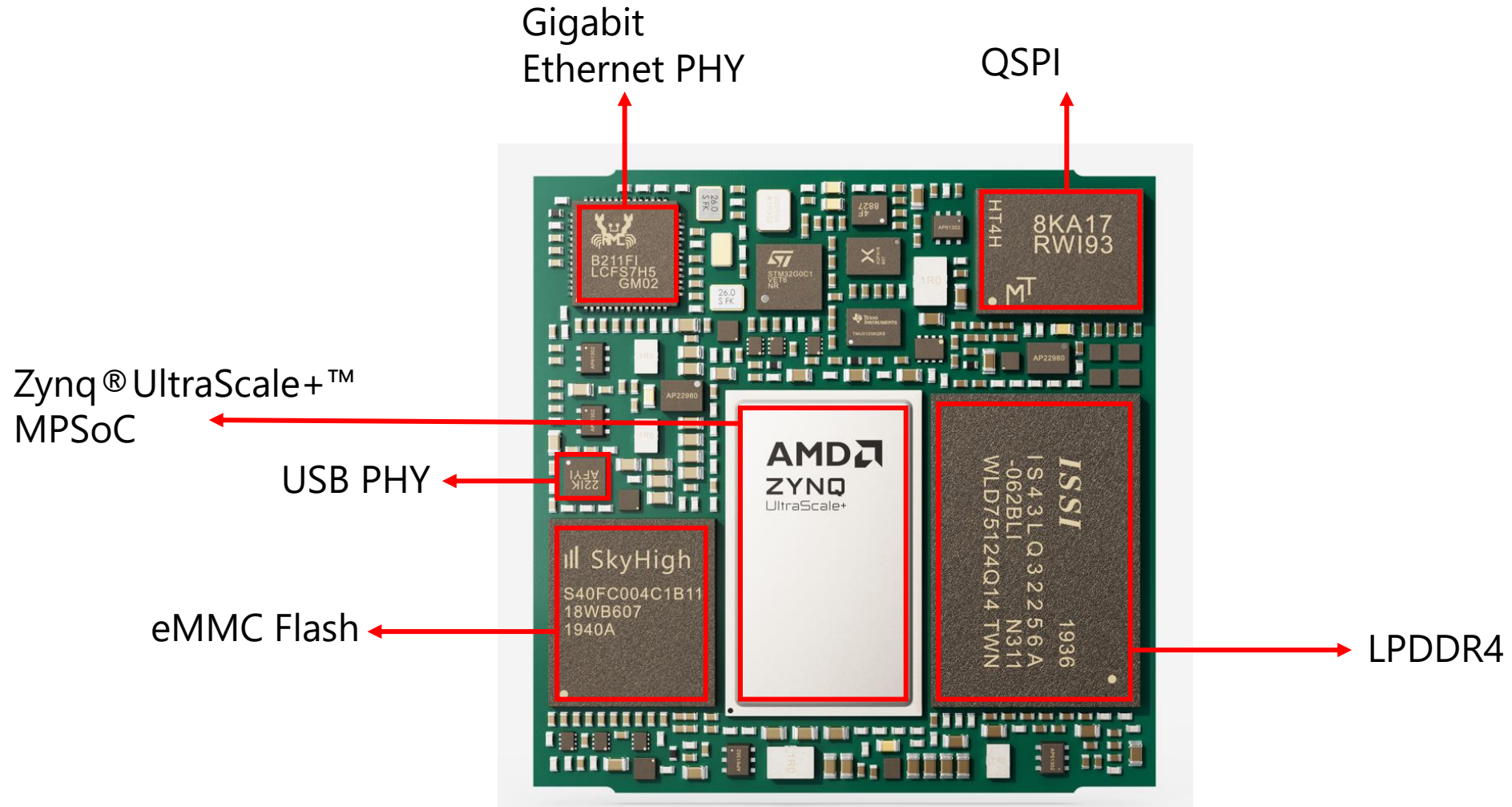
Temperature range

- -40..+85 °C



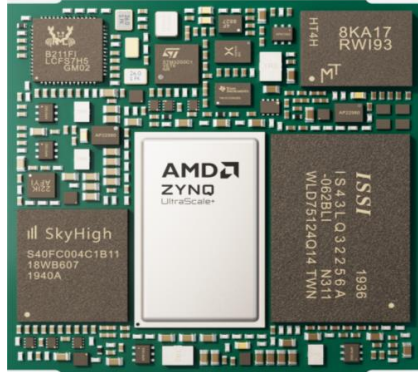
Pluto

Key Features

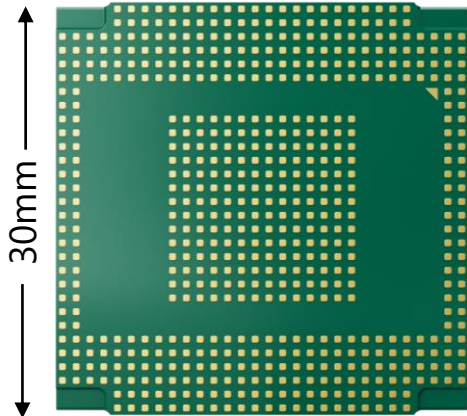


PL-XZU20-3EG-2W-M-D4

Pluto

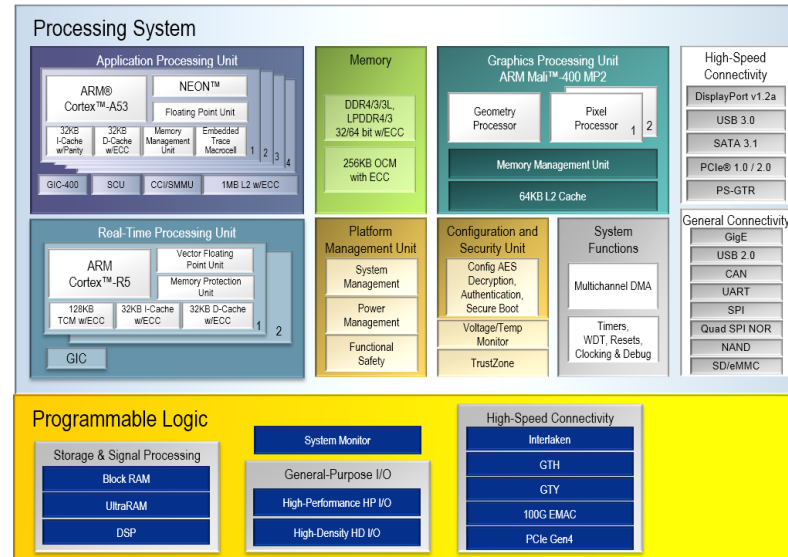


30mm



628 pin LGA, 1 mm pad pitch

AMD Zynq UltraScale+



XCZU3EG-2UBVA530I

- InFO Package A530 9.5mm x 16 mm

154k System Logic Cells

Processing System

- 4x Cortex-A53 @1.3GHz
- 2x Cortex-R5F @533MHz

Module Specifications

I/Os

- 54 HP (1-1.8V)
- 24 HD (1.2-3.3V)
- 22 MIO (1.8-3.3V)

MGT

- 4 PS GTR @ 6Gbps

On-module Memory

- 2 GB LPDDR4-1066 x32 memory (PS)
- 4 GB eMMC flash (PS)
- 64 MB QSPI flash (PS)

Interfaces

- Gigabit Ethernet PHY
- USB 2.0 PHY (USB 3.0 using PS GTR)

Power

- 3.3V power input
- 3A core power supply

Temperature range

- -40..+85 °C

Why Enclustra?

It's for the best

World Record

ETH zürich

Medienmitteilung

Schweizer E-Rennwagen bricht Weltrekord

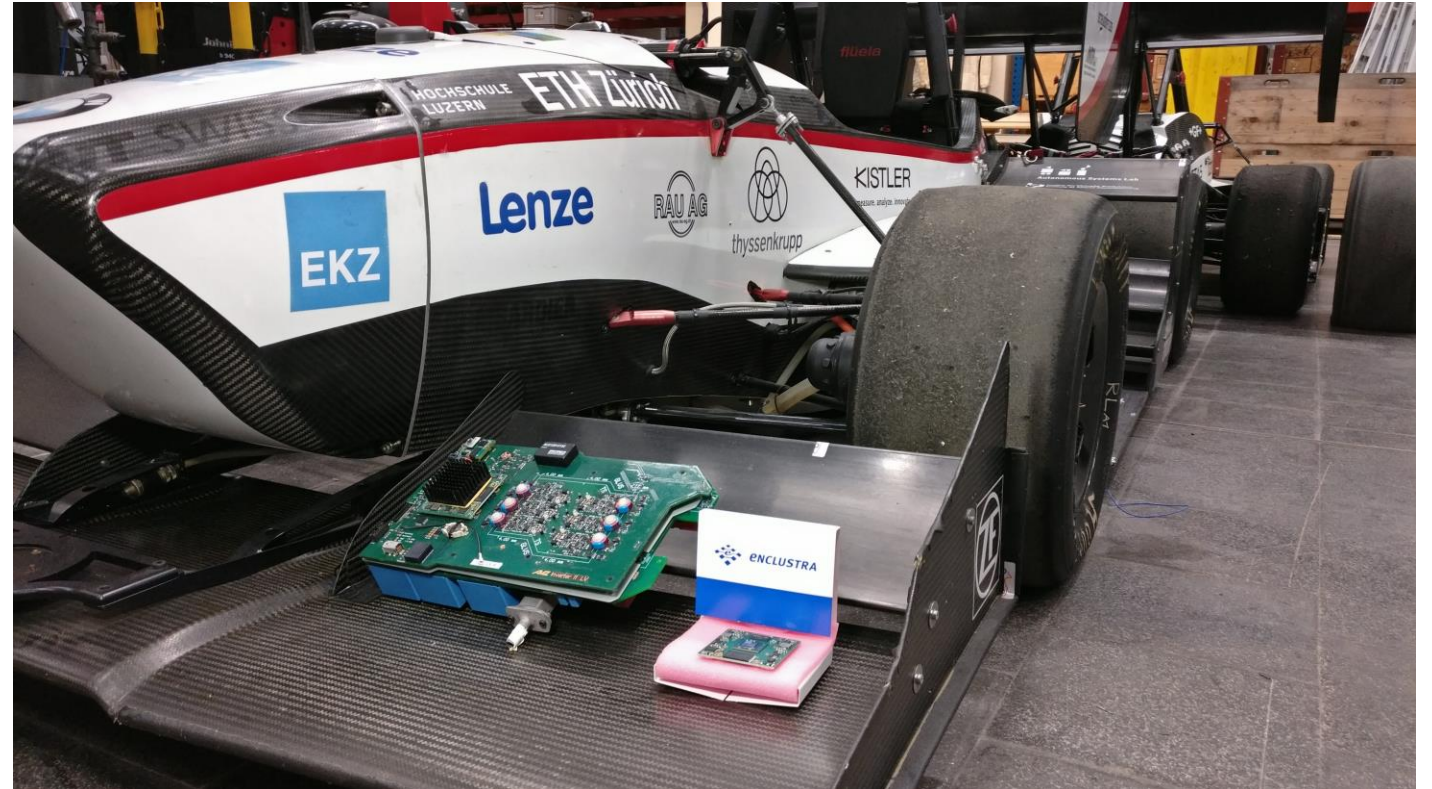
In 0,956 Sekunden von Null auf Hundert

Zürich, 12. September 2023

Mit ihrem selbstgebauten Elektro-Rennwagen «mythen» haben Studierende der ETH Zürich und der Hochschule Luzern den bisherigen Beschleunigungsweltrekord gebrochen. Innerhalb von nur 0,956 Sekunden und 12,3 Metern beschleunigte der Bolid von 0 auf 100Km/h.



Ein Jahr harte Arbeit trägt Früchte: «mythen» bricht den Weltrekord. (Bild: Alessandro Della Bella / ETH Zürich)



Innovative, FPGA SoM-based approach for the electric drivetrain. 4 custom inverters are built around the Enclustra SoM Mercury ZX5.



Everything FPGA.



Thank You!

