MYiR 米尔电子
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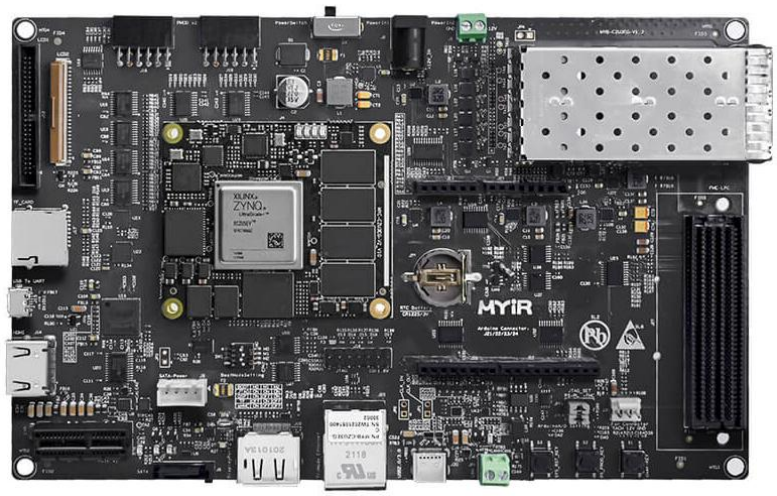
MYD-CZU3EG/4EV/5EV-V2 Development Board Overview



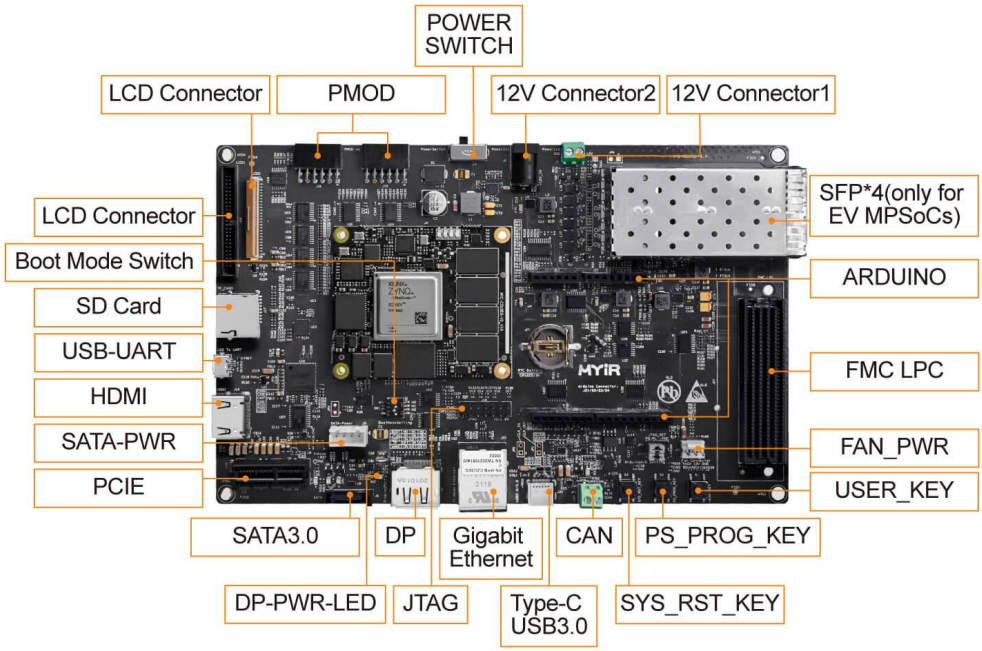
- ✓ *MYC-CZU3EG/4EV/5EV-V2 SOM as Controller Board*
- ✓ *Xilinx Zynq UltraScale+ ZU3EG/4EV/5EV MPSoC based on 1.2GHz Quad Arm Cortex-A53 and 600MHz Dual Cortex-R5 Cores*
- ✓ *4GB DDR4 SDRAM (64bit, 2400MHz), 4GB eMMC Flash, 128MB QSPI Flash*
- ✓ *USB 3.0, Gigabit Ethernet, CAN, TF, DisplayPort (DP), PCIe interface, SATA interface, JTAG...*
- ✓ *2 x PMoD, 1 x FMC, 4 x SFP+ (only for EV MPSoCs), ARDUINO User Interface, HDMI, LCD*
- ✓ *Optional 7-inch LCD Modules and USB Camera Module*
- ✓ *Ready-to-Run PetaLinux 2020.1*
- ✓ *Supports Xilinx Vitis Software Development Platform*

The **MYD-CZU3EG/4EV/5EV-V2 development board** consists of the **MYC-CZU3EG/4EV/5EV-V2 SOM** and a specially designed base board to provide a complete and versatile platform for evaluating and prototyping based on Xilinx Zynq UltraScale+ MPSoC devices.

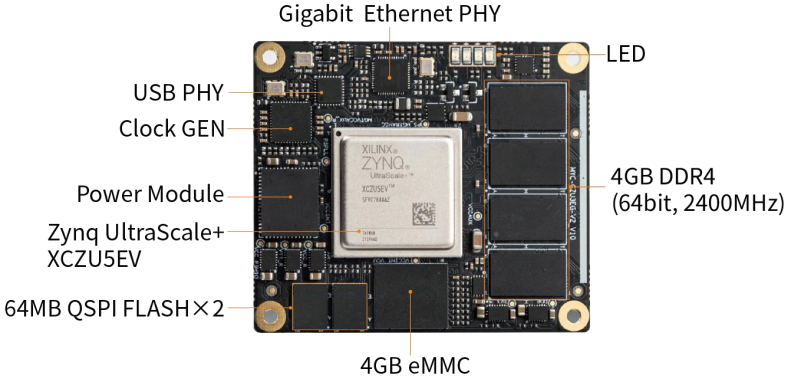
The **MYC-CZU3EG/4EV/5EV-V2 SOM** is an Arm SOM with integrated XCZU3EG-1SFVC784E / XCZU4EV-1SFVC784I / XCZU5EV-2SFVC784I MPSoC, 4GB DDR4, 4GB eMMC, and 128MB QSPI Flash, Ethernet PHY, USB PHY and Power Module. It is mounted on the MYD-CZU3EG-V2 base board through two 0.5mm pitch 160-pin Razor Beam High-Speed Sockets.

The **MYD-CZU3EG/4EV/5EV-V2** Zynq UltraScale+ ZU3EG/4EV/5EV MPSoC development board has extended a rich peripheral set and interfaces on the base board through connectors and headers including USB 3.0, Gigabit Ethernet, CAN, TF, DisplayPort (DP), PCIe interface, SATA interface, JTAG, HDMI, LCD interface, ARDUINO User Interface, PMoD, FMC, and four SFP+ interfaces (for EV MPSoCs only).

The **MYD-CZU3EG/4EV/5EV-V2** is capable of running PetaLinux2020.1 and supporting Vitis development. It comes with necessary cable accessories as well as detailed documentations and software package. Typical applications are the Internet, cloud computing, Data center, Machine Vision, Military facilities, Flight navigation and other embedded applications.



MYD-CZU3EG/4EV/5EV-V2 Development Board (delivered with heatsink by default)



MYC-CZU3EG/4EV/5EV-V2 System On Module

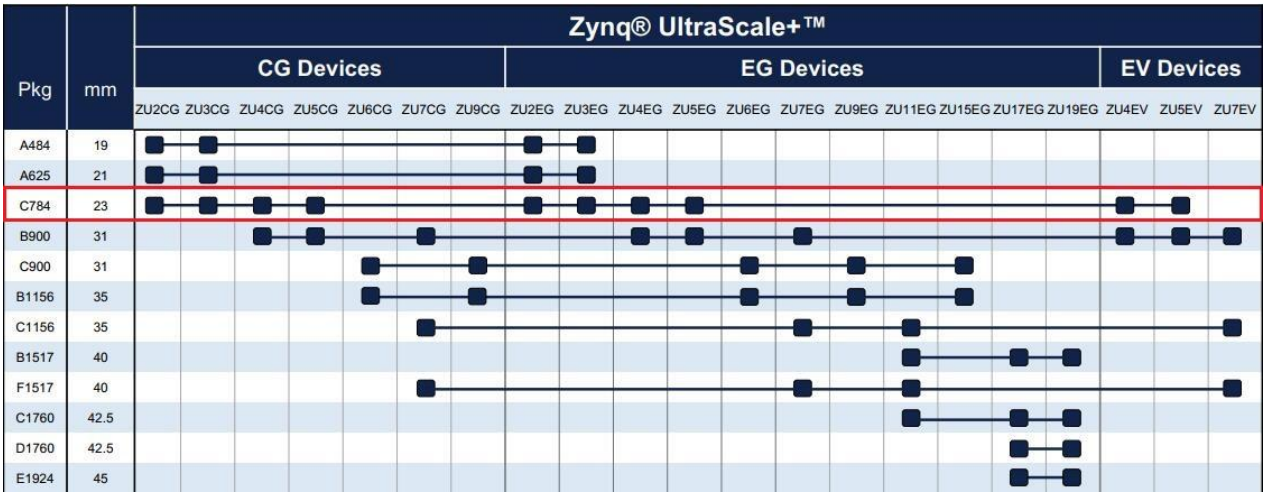
Hardware Specification

Zynq® UltraScale+™ MPSoC devices provide 64-bit processor scalability while combining real-time control with soft and hard engines for graphics, video, waveform, and packet processing. Built on a common real-time processor and programmable logic equipped platform, three distinct variants include dual application processor (CG) devices, quad application processor and GPU (EG) devices, and video codec (EV) devices.

	CG Devices	EG Devices	EV Devices
Application Processor	**Dual**-core ARM® Cortex™-A53 MPCore™ up to **1.3GHz**	**Quad**-core ARM Cortex-A53 MPCore up to **1.5GHz**	**Quad**-core ARM Cortex-A53 MPCore up to **1.5GHz**
Real-Time Processor	Dual-core ARM Cortex-R5 MPCore up to **533MHz**	Dual-core ARM Cortex-R5 MPCore up to **600MHz**	Dual-core ARM Cortex-R5 MPCore up to **600MHz**
Graphics Processor		Mali™-400 MP2	Mali™-400 MP2
Video Codec			H.264 / H.265
Programmable Logic	103K–600K System Logic Cells	103K–1143K System Logic Cells	192K–504K System Logic Cells
Applications	• Sensor Processing & Fusion • Motor Control • Low-cost Ultrasound • Traffic Engineering	• Flight Navigation • Missile & Munitions • Military Construction • Secure Solutions • Networking • Cloud Computing Security • Data Center • Machine Vision • Medical Endoscopy	• Situational Awareness • Surveillance/Reconnaissance • Smart Vision • Image Manipulation • Graphic Overlay • Human Machine Interface • Automotive ADAS • Video Processing • Interactive Display

Zynq UltraScale+ MPSoCs

The Zynq UltraScale+ family provides footprint compatibility to enable users to migrate designs from one device to another. Any two packages with the same footprint identifier code (last letter and number sequence) are footprint compatible. MYIR is using the **XCZU3EG-1SFVC784E / XCZU4EV-1SFVC784I / XCZU5EV-2SFVC784I** MPSoC by default, the C784 package covers the widest footprint compatibilities that enable users to select devices among CG, EG and EV.



Zynq® UltraScale+™ MPSoC Device Migration Table

MYIR supplies the MYD-CZU3EG/4EV/5EV-V2 development boards with XCZU3EG, XCZU4EV or XCZU5EV MPSoC as options. The main features for the MPSoC devices are summarized as below.

Device	**XCZU2CG**	**XCZU3CG**	**XCZU3EG**	**XCZU4EV**	**XCZU5EV**
Logic cells (k)	103	154	154	192	256
CLB Flip-Flops (K)	94	141	141	176	234
CLB LUTs (K)	47	71	71	88	117
Block RAM (Mb)	5.3	7.6	7.6	4.5	5.1
UltraRAM (Mb)	-	-	-	13.5	18.0
DSP Slices	240	360	360	728	1,248
GTX transceivers	PS-GTR4x (6Gb/s)	PS-GTR4x (6Gb/s)	PS-GTR4x (6Gb/s)	PS-GTR4x (6Gb/s), GTH4x (16.3Gb/s)	PS-GTR4x (6Gb/s), GTH4x (16.3Gb/s)
Processor Units					
Application Processor Unit	Dual-core ARM® Cortex™-A53 MPCore™ up to 1.3GHz		Quad-core ARM® Cortex™-A53 MPCore™ up to 1.5GHz		
Memory w/ECC	L1 Cache 32KB I / D per core, L2 Cache 1MB, on-chip Memory 256KB				
Real-Time Processor Unit	Dual-core ARM Cortex-R5 MPCore™ up to 600MHz				
Memory w/ECC	L1 Cache 32KB I / D per core, Tightly Coupled Memory 128KB per core				
Graphics Processing Unit	-	-	Mali™-400 MP2 up to 667MHz		
Video Codec	-	-	-	H.264 / H.265	
Memory L2 Cache	64KB				
External Memory, Connectivity, Integrated Block Functionality					
Dynamic Memory Interface	x32/x64: DDR4, LPDDR4, DDR3, DDR3L, LPDDR3 with ECC				
Static Memory Interfaces	NAND, 2x Quad-SPI				
High-Speed Connectivity	PCIe® Gen2 x4, 2x USB3.0, SATA 3.1, DisplayPort, 4x Tri-mode Gigabit Ethernet				
General Connectivity	2 x USB 2.0, 2 x SD/SDIO, 2 x UART, 2 x CAN 2.0B, 2 x I2C, 2 x SPI, 4 x 32b GPIO				
Power Management	Full / Low / PL / Battery Power Domains				
Security	RSA, AES, and SHA				
AMS - System Monitor	10-bit, 1MSPS – Temperature and Voltage Monitor				

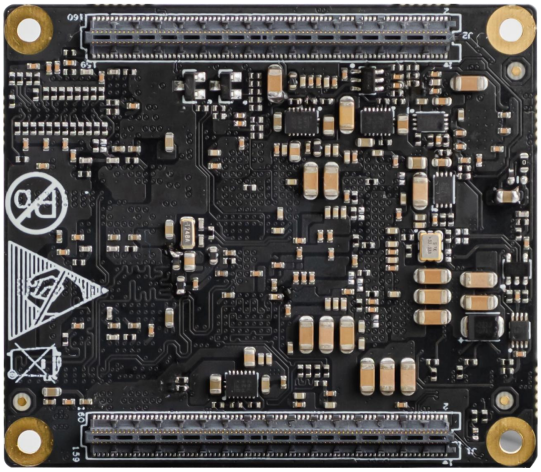
MPSoC device selection guide

Mechanical Parameters

- Dimensions: 60.00mm x 52.00mm (SOM), 195.33mm x 123.95mm (base board)
- PCB Layers: 12-layer design (SOM), 6-layer design (base board)
- Power supply: 3.3V (SOM), 12V (base board)
- Working temp.: 0~70 Celsius (commercial grade)

The MYD-CZU3EG/4EV/5EV-V2 Controller Board (MYC-CZU3EG/4EV/5EV-V2 SOM)

MYC-CZU3EG/4EV/5EV-V2 Top-view



MYC-CZU3EG/4EV/5EV-V2 Bottom-view

MPSoC

- Xilinx Zynq UltraScale+ XCZU3EG-1SFVC784E / XCZU4EV-1SFVC784I / XCZU5EV-2SFVC784I MPSoC
  - 1.2 GHz 64 bit Quad-core ARM® Cortex™-A53 (up to 1.5GHz)
  - 600MHz Dual-core ARM® Cortex™-R5 processor
  - ARM Mali™-400MP2 Graphics Processor
  - 16nm FinFET+ FPGA fabric

Memory

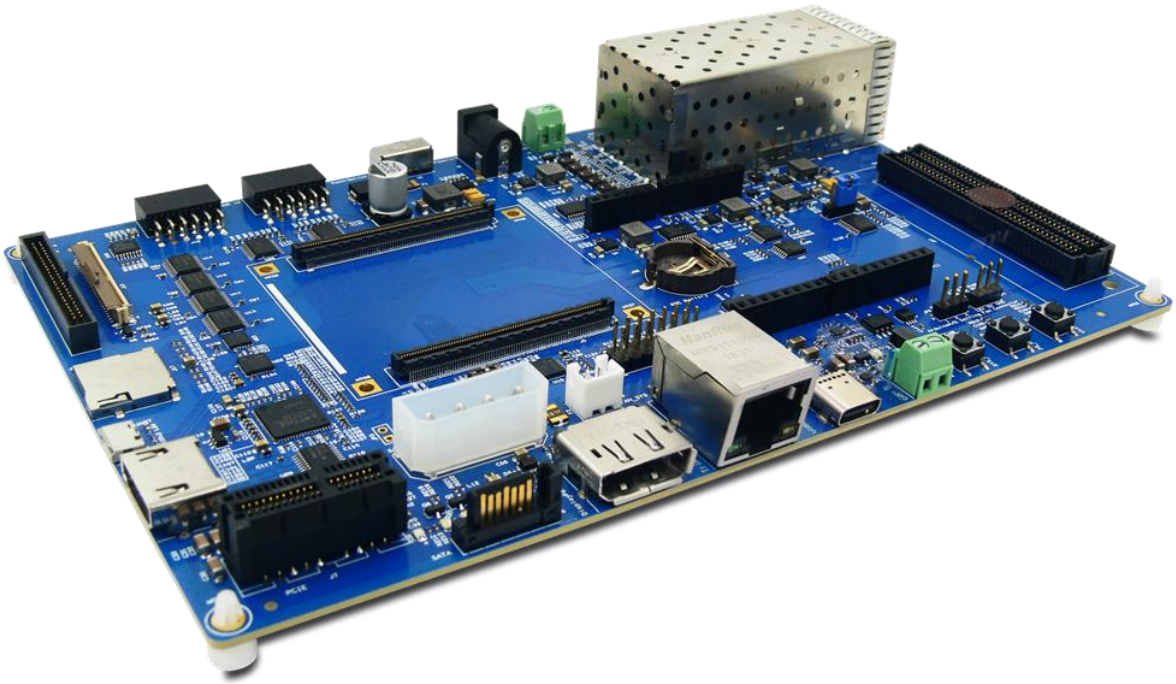
- 4GB DDR4 SDRAM (64-bit, 2400MHz)
- 4GB eMMC Flash
- 128MB QSPI Flash

Peripherals and Signals Routed to Pins

- Gigabit Ethernet PHY
- USB PHY
- Power Module
- Clock Generator
- Watchdog
- Four LEDs
  - One yellow LED for ERROR_STATUS indicator (indicate a secure lockdown state)
  - One yellow LED for ERROR_OUT indicator (Asserted for accidental power loss, hardware error)
  - One green LED for PS_Done indicator (indicate the pl configuration is done)
  - One green LED for PS_INIT indicator (indicate the ps is initialized after a power-on reset)

- Two 0.5mm pitch 160-pin Razor Beam High-Speed headers bring out
  - 4 PS GTR transceivers along with 2 GTR reference clock inputs
  - PS JTAG interface, USB 2.0 interface, Gigabit Ethernet interface and etc.
  - 4 PL GTH transceivers along with 1 GTH reference clock inputs (only for Zynq UltraScale+ EV Devices)
  - 156 user PL I/O pins

The MYD-CZU3EG/4EV/5EV-V2 Development Board Base Board (MYB-CZU3EG/4EV/5EV)



MYD-CZU3EG/4EV/5EV-V2 Development Board Base Board

PS Unit

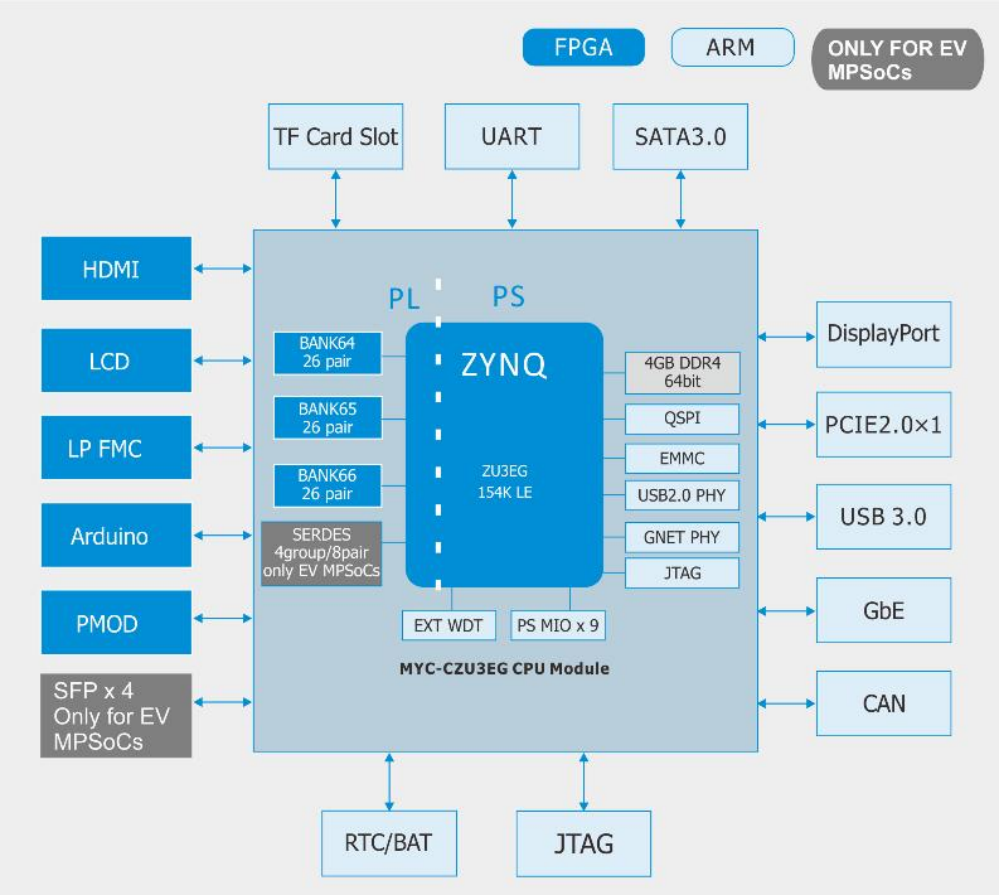
- One USB 3.0 (Type-C interface)
- One USB to UART port
- One TF card slot
- One CAN interface
- One 10/100/1000Mbps Ethernet interface
- One PCIe interface
- One SATA interface
- One 2.54mm pitch 14-pin JTAG interface (PS, PL reused)
- Buttons (one user button, one system reset button and one ps-programming button)
- One DisplayPort (DP)
- Battery backed RTC

PL Unit

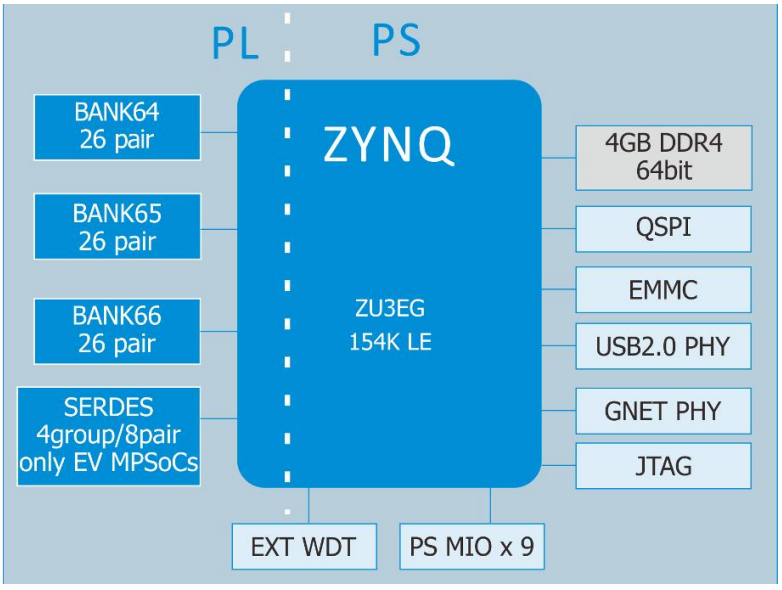
- One Xilinx standard LPFMC interface
- One HDMI interface (signals reused with LCD/TSP interface)
- Four SFP+ transceiver interfaces (up to 10Gpbs, only for Zynq UltraScale+ EV Devices)
- Two-channel Pmod
- ARDUINO user interface
- LCD/TSP interface (24-bit RGB, supports resistive and capacitive touch screen panels)

- Three LEDs
  - One blue LED for power indicator
  - One red LED for FPGA programming indicator
  - One green LED for user defined

Function Block Diagram

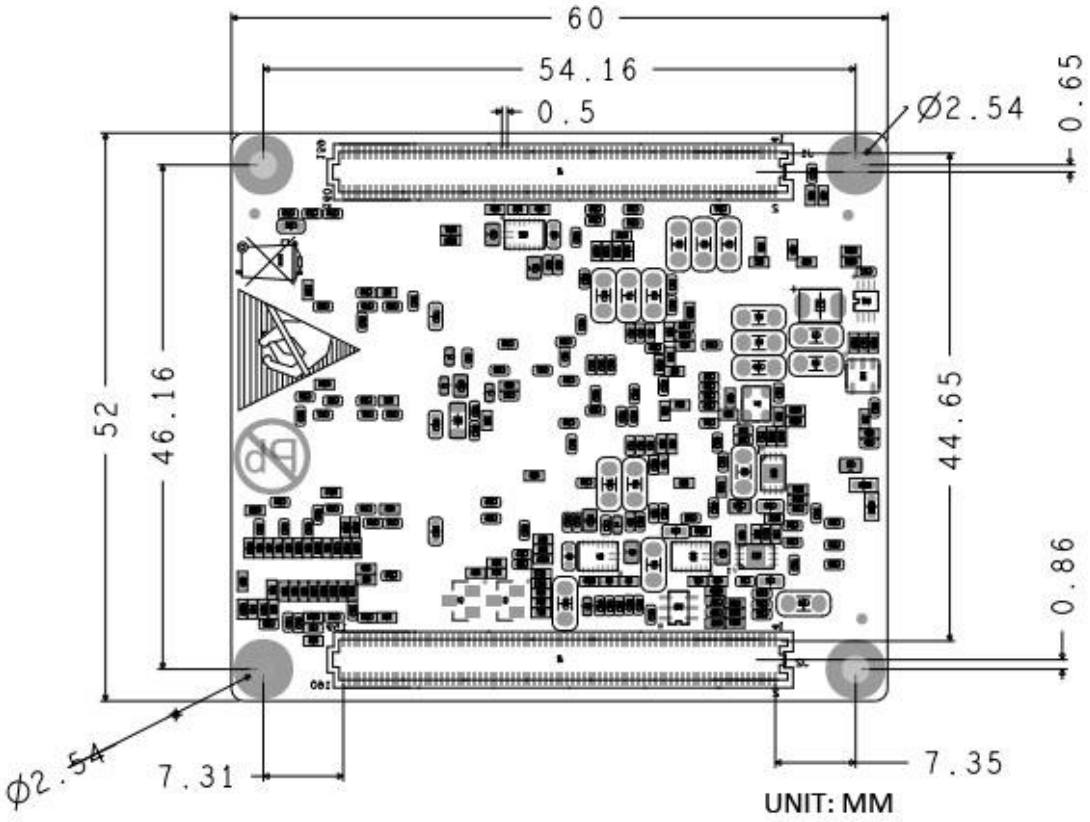


Function Block Diagram of MYD-CZU3EG/4EV/5EV-V2 Development Board

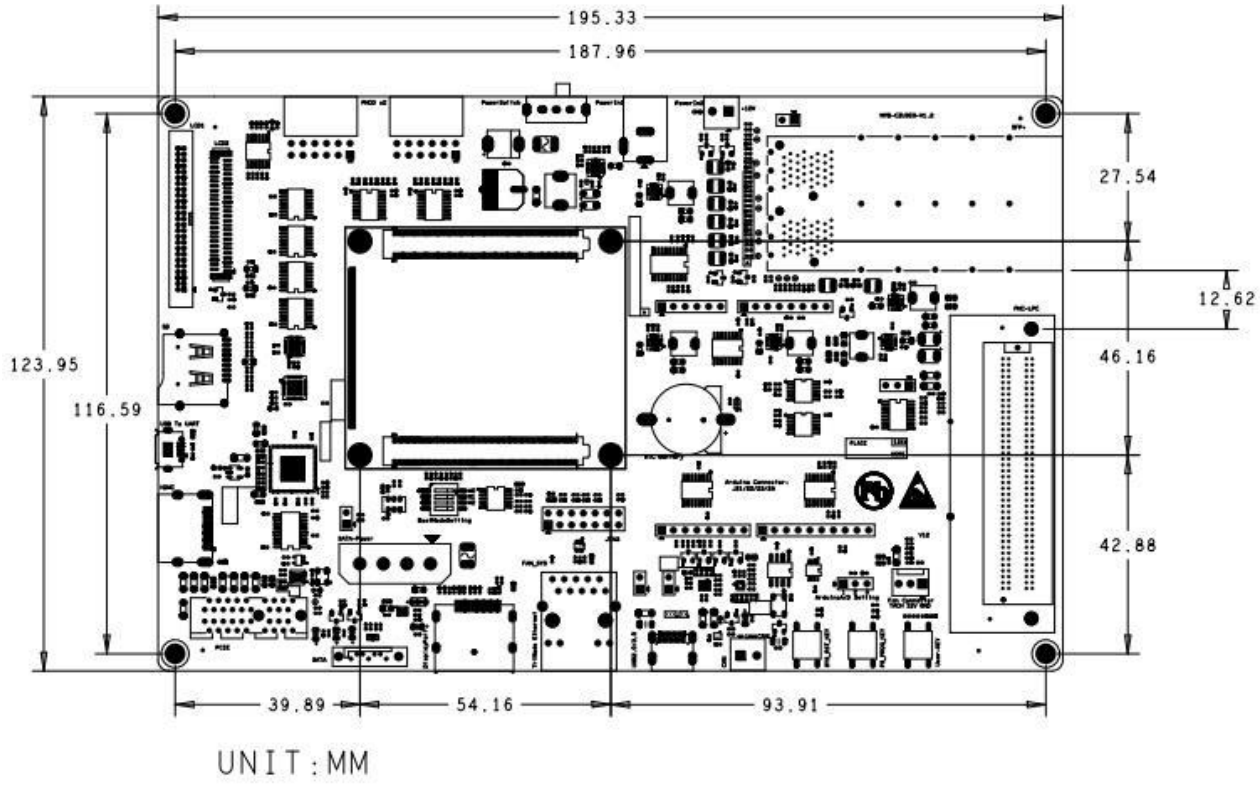


Function Block Diagram of MYC-CZU3EG/4EV/5EV-V2 System On Module

Dimension Chart



Dimension Chart of MYC-CZU3EG/4EV/5EV-V2 (Top-view)



Dimension Chart of MYD-CZU3EG/4EV/5EV-V2

Software Features

The MYD-CZU3EG/4EV/5EV-V2 Development Board is preloaded with PetaLinux 2020.1. MYIR provides software package in product disk along with the goods delivery. The software package features as below:

Item	Features	Description	Remark
Cross compiler	gcc9.2.0	gcc version 9.2.0	
	gcc 5.2.1	gcc version 5.2.1 (Linaro GCC5.2)	
Boot program	BOOT.BIN	First boot program including FSBL, u-boot2020.01	Source code provided
Linux Kernel	Linux 5.4.0	Customized kernel for MYD-CZU3EG/4EV/5EV-V2	Source code provided
Drivers	SFP & SFP+	SFP driver and SFP+ driver (only for CZU4EV/5EV-V2)	Source code provided
	USB Host	USB2.0/USB3.0 Host driver	Source code provided
	Ethernet	Gigabit Ethernet driver	Source code provided
	MMC/SD/TF	MMC/SD/TF card driver	Source code provided
	QSPI Flash	QSPI Flash driver	Source code provided
	PCI-E	PCI-E driver	Source code provided
	CAN	CAN driver	Source code provided
	DP	DP display driver	Source code provided
	HDMI	HDMI display driver	Source code provided
	LCD	LCD display driver	Source code provided
	Button	Button driver	Source code provided
	UART	Uart rs232 driver	Source code provided
	I2C	I2C driver	Source code provided
	LED	LED driver	Source code provided
	GPIO	GPIO driver	Source code provided
	QSPI	QSPI Flash MT25QU512ABB driver	Source code provided
	Touch Screen	TSC2007 resistive touch screen driver	Source code provided
		FT5X0X capacitive touch screen driver	Source code provided
	SATA	SATA HD driver	Source code provided
	Watch dog	Watch dog driver	Source code provided
Example	Including Button, LED, CAN, Socket examples		
File System	Ramdisk	Ramdisk system image	File System
	Rootfs.tar	Buildroot, including QT	Source code provided
Petalinux	Petalinux2020.1	Supports Xilinx development tools for PetaLinux 2020.1 and provides complete customized Linux BSP in source code including kernel, uboot, filesystem, etc. Supports Xilinx Vitis development.	

Software Features of MYD-CZU3EG/4EV/5EV-V2

Order Information

Item	Packing List
MYD-CZU3EG-V2 Development Board (Part No.: MYD-CZU3EG-V2-4E4D-1200-C)	✓ One MYD-CZU3EG/4EV/5EV-V2 Development Board (including the base board and SOM with installed active heatsink) ✓ One HDMI cable ✓ One 12V/5A Power adapter ✓ One 1.2m Micro USB2.0 cable ✓ One USB A 3.0 to Type-C cable Adapter ✓ One 16GB TF card
MYD-CZU4EV-V2 Development Board (Part No.: MYD-CZU4EV-V2-4E4D-1200-C)	
MYD-CZU5EV-V2 Development Board (Part No.: MYD-CZU5EV-V2-4E4D-1200-C)	
MYC-CZU3EG-V2 System On Module (Part No.: MYC-CZU3EG-V2-4E4D-1200-C)	MYC-CZU3EG-V2 SOM
MYC-CZU4EV-V2 System On Module (Part No.: MYC-CZU4EV-V2-4E4D-1200-I-FAN)	MYC-CZU4EV-V2 SOM (installed with heatsink)
MYC-CZU5EV-V2 System On Module (Part No.: MYC-CZU5EV-V2-4E4D-1200-I-FAN)	MYC-CZU5EV-V2 SOM (installed with heatsink)
MY-TFT070RV2 LCD Module (Part No.: MY-TFT070RV2)	7-inch LCD Module with resistive touch screen
MY-TFT070CV2 LCD Module (Part No.: MY-TFT070CV2)	7-inch LCD Module with capacitive touch screen
MY-CAM002U Camera Module (Part No.: MY-CAM002U)	MY-CAM002U USB Camera Module
MY-WF003U WiFi Module (Part No.: MY-WF003U)	MY-WF003U USB WiFi Module

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