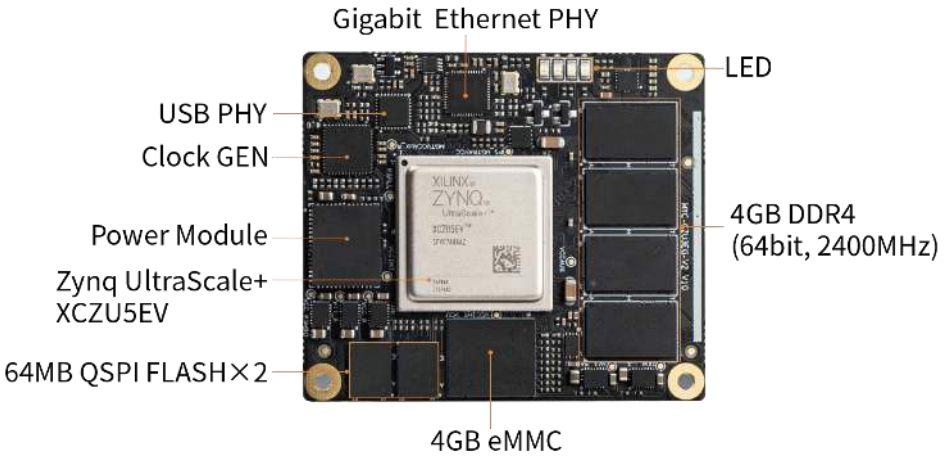
MYiR 米尔电子
Make Your Idea Real

MYC-CZU3EG/4EV/5EV-V2
CPU Module
Overview

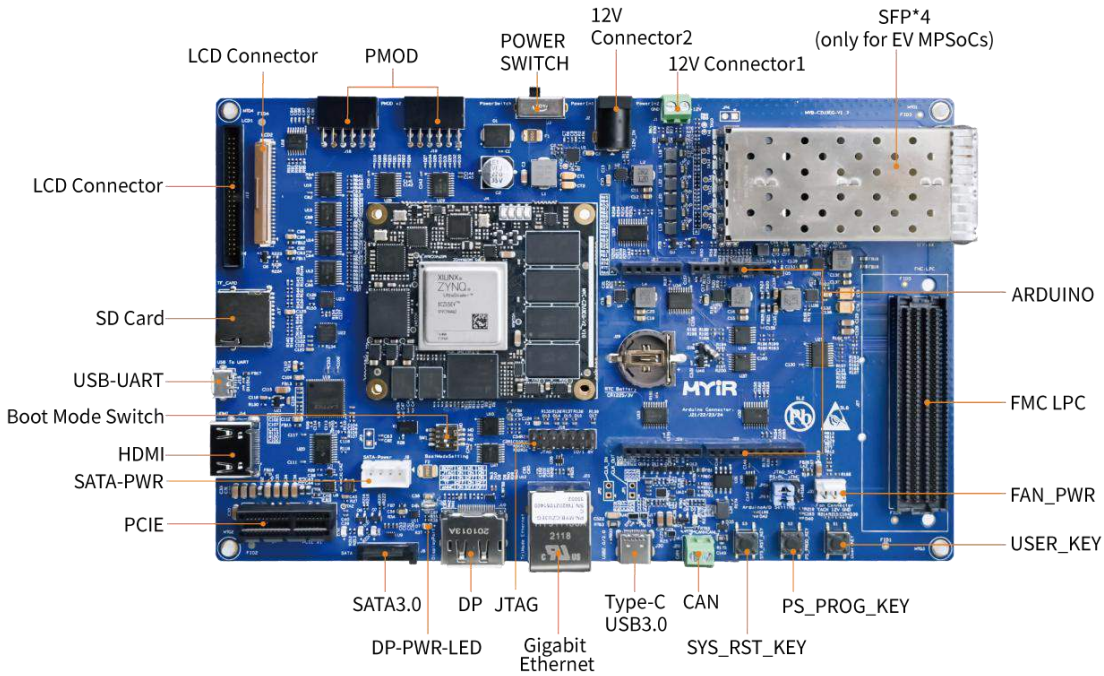
- ✓ *Xilinx Zynq UltraScale+ ZU3EG/4EV/5EV MPSoC based on 1.2GHz Quad Arm Cortex-A53 (up to 1.5GHz) and 600MHz Dual Cortex-R5 Cores*
- ✓ *4GB DDR4 SDRAM (64bit, 2400MHz)*
- ✓ *4GB eMMC Flash, 128MB QSPI Flash*
- ✓ *On-board Gigabit Ethernet PHY, USB PHY, Power Module and Clock Generator*
- ✓ *Two 0.5mm pitch 160-pin Samtec High-Speed Headers for Board-to-Board Connections*
- ✓ *Ready-to-Run PetaLinux 2020.1*
- ✓ *Supports Xilinx Vitis Software Development Platform*

The **MYC-CZU3EG/4EV/5EV-V2 CPU Module** is a powerful MPSoC System-on-Module (SoM) based on Xilinx Zynq UltraScale+ ZU3EG / ZU4EV/ZU5EV which features a 1.2 GHz quad-core ARM Cortex-A53 64-bit application processor, a 600MHz dual-core real-time ARM Cortex-R5 processor, a Mali400 MP2 embedded GPU and rich FPGA fabric. It has 4GB DDR4, 4GB eMMC and 128MB QSPI Flash default memory configuration on board as well as integrated Ethernet PHY, USB PHY and Power Module to provide control and processing capabilities as a minimum embedded system. It offers easy access to signals carried to or from the MPSoC through two 0.5mm pitch 160-pin Razor Beam High-Speed Sockets. It is ready to run **PetaLinux 2020.1** and support Xilinx **Vitis** Software development platform, which comes with detailed documentations and software package.

Developers can simply design their own base board using the **MYC-CZU3EG/4EV/5EV-V2** as the embedded controller which can help save time and reduce cost. MYIR has a reference base board design for customer evaluation and prototype. The whole development board **MYD-CZU3EG/4EV/5EV-V2** takes full features of the Zynq UltraScale+ XCZU3EG-1SFVC784E/XCZU4EV-1SFVC784I/XCZU5EV-2SFVC784I MPSoC to have explored a robust set of peripherals for a wide variety of applications including the Internet, cloud computing, Data center, Machine Vision, Military facilities, Flight navigation and other embedded applications.



MYC-CZU3EG/4EV/5EV-V2 CPU Module



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

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

Figure 1-4 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.

Pkg	mm	Zynq® UltraScale+™																		
		CG Devices							EG Devices										EV Devices		
		ZU2CG	ZU3CG	ZU4CG	ZU5CG	ZU6CG	ZU7CG	ZU9CG	ZU2EG	ZU3EG	ZU4EG	ZU5EG	ZU6EG	ZU7EG	ZU9EG	ZU11EG	ZU15EG	ZU17EG	ZU19EG	ZU4EV	ZU5EV	ZU7EV
A484	19	■	■						■	■												
A625	21	■	■						■	■												
C784	23	■	■	■	■				■	■	■	■								■	■	
B900	31			■	■		■				■	■		■						■	■	■
C900	31					■		■					■		■		■					
B1156	35					■		■					■		■		■					
C1156	35						■							■		■						■
B1517	40															■		■	■			
F1517	40						■							■		■						■
C1760	42.5															■		■	■			
D1760	42.5																	■	■			
E1924	45																	■	■			

Zynq® UltraScale+™ MPSoC Device Migration Table

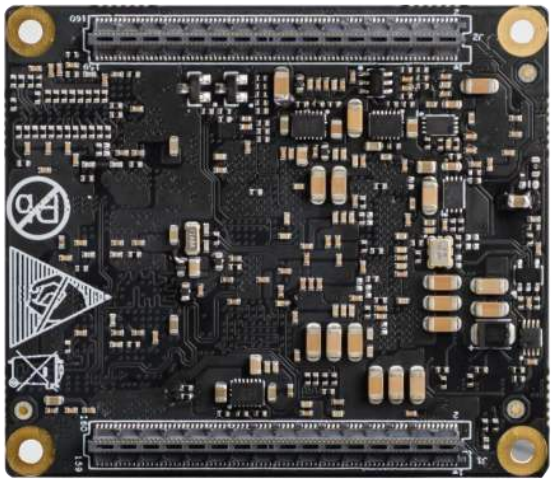
MYIR supplies the MYC-CZU3EG/4EV/5EV-V2 CPU Modules with XCZU3EG, XCZU4EV or XCZU5EV MPSoC as options. The main features for the MPSoC devices are summarized as below.

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

The MYC-CZU3EG/4EV/5EV-V2 CPU Module takes full features of the Xilinx Zynq UltraScale+ ZU3EG/4EV/5EV MPSoC to bring out most of the processor signals through two 0.5mm pitch 160-pin Razor Beam High-Speed headers. The main features are characterized as below:

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



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

Mechanical Parameters

- Dimensions: 60.00 mm x 52.00 mm
- PCB Layers: 12-layer design
- Power supply: 3.3V
- Working temp.: 0~70 Celsius (commercial grade, MYC-CZU3EG-V2),
  -40~85 Celsius (industrial grade, MYC-CZU4EV/5EV-V2)

MPSoC

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

Memory

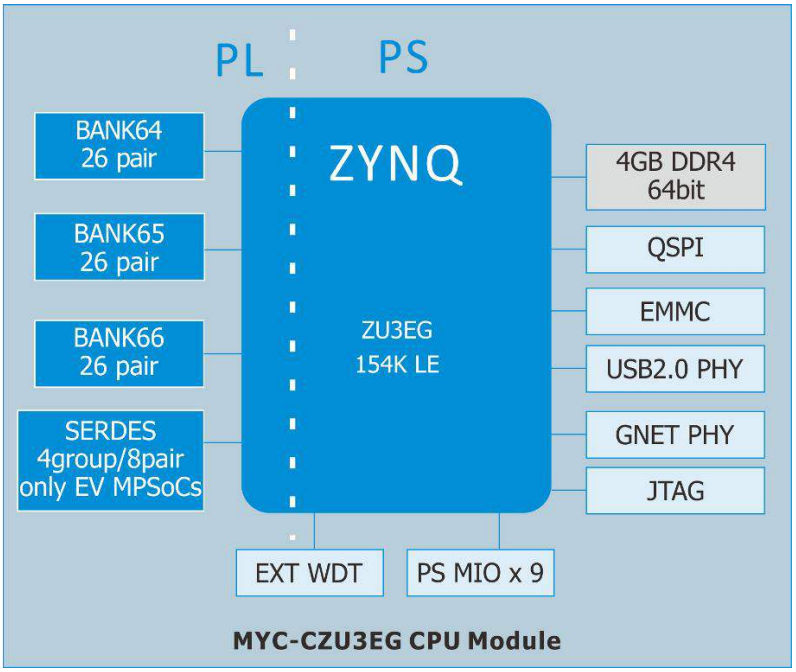
- 4GB DDR4 SDRAM (64bit, 2400MHz)
- 4GB eMMC Flash
- 128MB QSPI Flash

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)

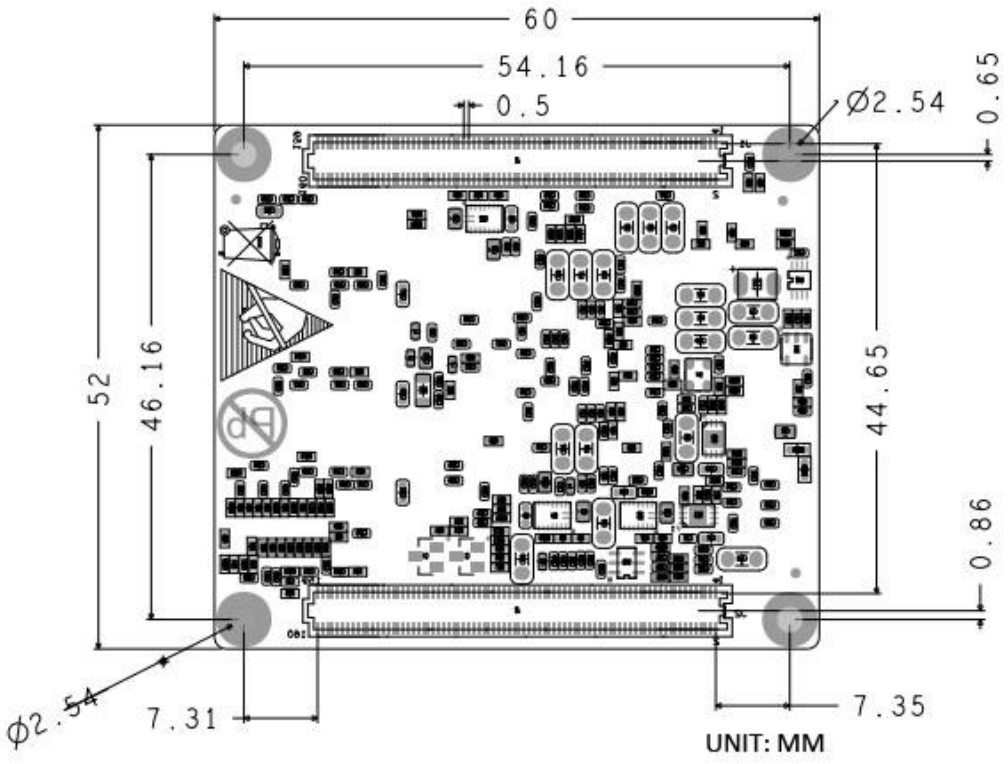
- Two 0.5mm pitch 160-pin Razor Beam High-Speed headers bring out
  - 4 PS GTR transceivers along with 2 GTR reference clock inputs
  - PS JTAG interface, USB 2.0 interface, Gigabit Ethernet interface and etc.
  - 4 PL GTH transceivers along with 1 GTH reference clock input (only for Zynq UltraScale+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

Function Block Diagram



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

Dimension Chart



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

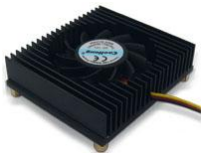
Software Features

The MYC-CZU3EG/4EV/5EV-V2 CPU Module 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 Board	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 MYC-CZU3EG/4EV/5EV-V2

Order Information

Item	Packing List
MYC-CZU3EG-V2 CPU Module (Part No.: MYC-CZU3EG-V2-4E4D-1200-C)	✓ MYC-CZU3EG-V2 CPU Module
MYC-CZU4EV-V2 CPU Module (Part No.: MYC-CZU4EV-V2-4E4D-1200-I-FAN)	✓ MYC-CZU4EV-V2 CPU Module (installed with heatsink)
MYC-CZU5EV-V2 CPU Module (Part No.: MYC-CZU5EV-V2-4E4D-1200-I-FAN)	✓ MYC-CZU5EV-V2 CPU Module (installed with heatsink)
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 CPU module with installed active heatsink) ✓ One HDMI cable ✓ One 12V/5A Power adapter ✓ One 1.2m Mini USB2.0 cable ✓ One USB A3.0 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)	
MY-LCD70TP LCD Module (Part No.: MY-TFT070RV2)	7-inch LCD Module with resistive touch screen
MY-LCD70TP-C LCD Module (Part No.: MY-TFT070CV2)	7-inch LCD Module with capacitive touch screen
MY-CAM002U Camera Module (Part No.: MY-CAM002U)	USB Camera Module
MYC-CZU3EG-V2-Radiator Active heatsink (Part No.: 60101.00005) - 60mm * 52mm * 14.5mm - aluminum heatsink with fan - silicon pad	
Samtec 0.5mm pitch 160-pin Razor Beam High-Speed Socket (Part No.: SS5-80-3.50-L-D-K-TR) Matching with the headers on MYIR's MYC-CZU3EG/4EV/5EV-V2 CPU Module	

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