

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

- MYC-CZU3EG/4EV/5EV CPU Module as Controller Board
- 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
- 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

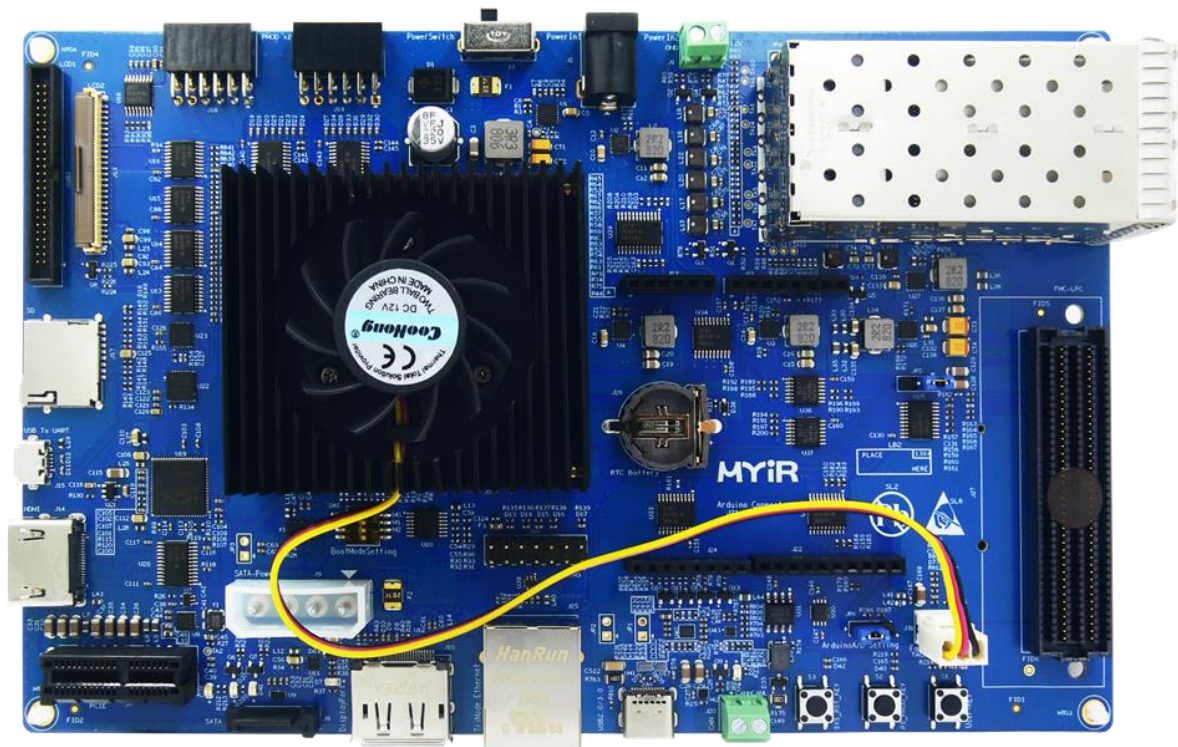


Figure 1-1 MYD-CZU3EG/4EV/5EV development board

The [MYD-CZU3EG/4EV/5EV development board](#) consists of the [MYC-CZU3EG/4EV/5EV CPU Module](#) 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 CPU Module](#) 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 Intel Power Module. It is mounted on the MYD-CZU3EG base board through two 0.5mm pitch 160-pin Razor Beam High-Speed Sockets.

The [MYD-CZU3EG/4EV/5EV](#) 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](#) 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.

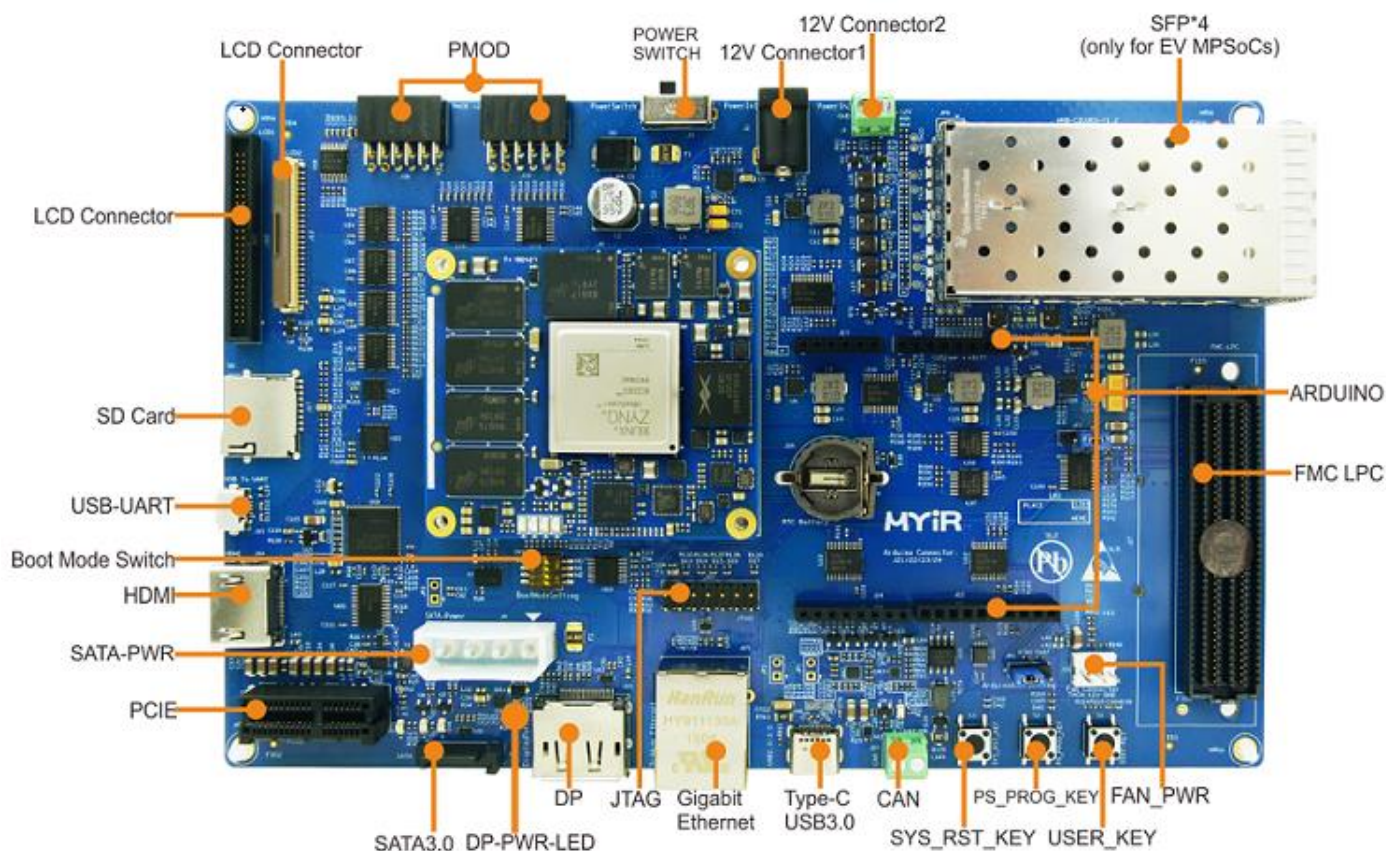


Figure 1-2 MYD-CZU3EG/4EV/5EV Development Board

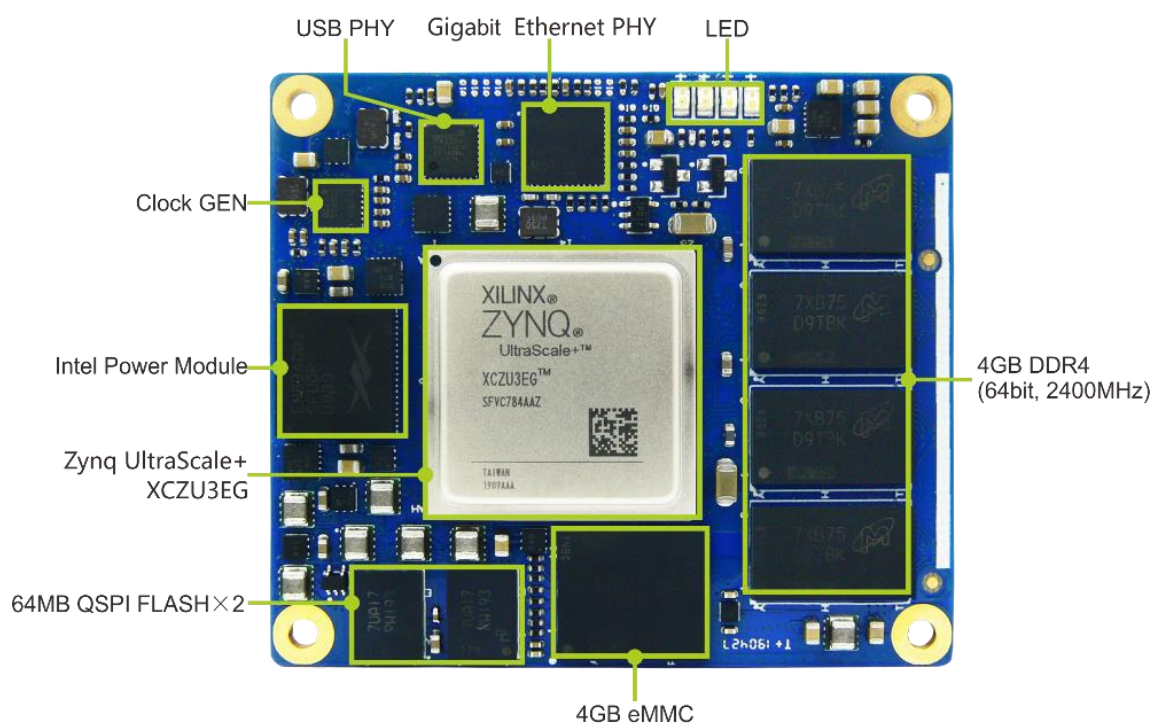


Figure 1-3 MYC-CZU3EG/4EV/5EV CPU Module



## 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          | <ul style="list-style-type: none"> <li>• Sensor Processing &amp; Fusion</li> <li>• Motor Control</li> <li>• Low-cost Ultrasound</li> <li>• Traffic Engineering</li> </ul> | <ul style="list-style-type: none"> <li>• Flight Navigation</li> <li>• Missile &amp; Munitions</li> <li>• Military Construction</li> <li>• Secure Solutions</li> <li>• Networking</li> <li>• Cloud Computing Security</li> <li>• Data Center</li> <li>• Machine Vision</li> <li>• Medical Endoscopy</li> </ul> | <ul style="list-style-type: none"> <li>• Situational Awareness</li> <li>• Surveillance/Reconnaissance</li> <li>• Smart Vision</li> <li>• Image Manipulation</li> <li>• Graphic Overlay</li> <li>• Human Machine Interface</li> <li>• Automotive ADAS</li> <li>• Video Processing</li> <li>• Interactive Display</li> </ul> |

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   |                    |       |       |       |       |       |       |            |       |       |       |       |       |       |        |        | ■      | ■          |       |       |       |

Figure 1-5 Zynq® UltraScale+™ MPSoC Device Migration Table

MYIR supply the [MYD-CZU3EG/4EV/5EV 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<br>(6Gb/s)  | PS-GTR4x<br>(6Gb/s) | PS-GTR4x<br>(6Gb/s)                             | PS-GTR4x (6Gb/s),<br>GTH4x (16.3Gb/s) | PS-GTR4x (6Gb/s),<br>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                                  |                     |   |                                       |                                       |

*Table 1-1 MPSoC device selection guide*

## Mechanical Parameters

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

## The MYD-CZU3EG/4EV/5EV Controller Board ([MYC-CZU3EG/4EV/5EV CPU Module](#))

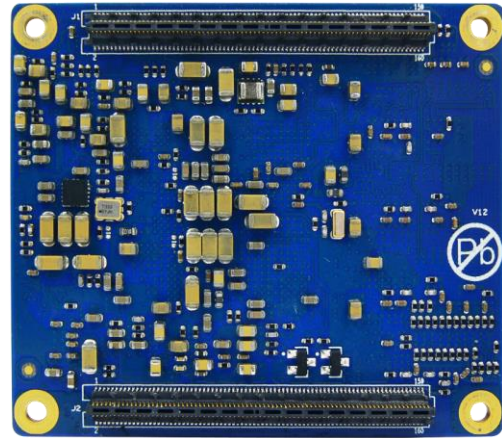


Figure 1-6 [MYC-CZU3EG/4EV/5EV CPU Module](#) Top-view Figure 1-7 [MYC-CZU3EG/4EV/5EV CPU Module](#) Bottom-view

## 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
  - 667MHz ARM Mali™-400MP2 Graphics Processor
  - 16nm FinFET+ FPGA fabric

## Memory

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

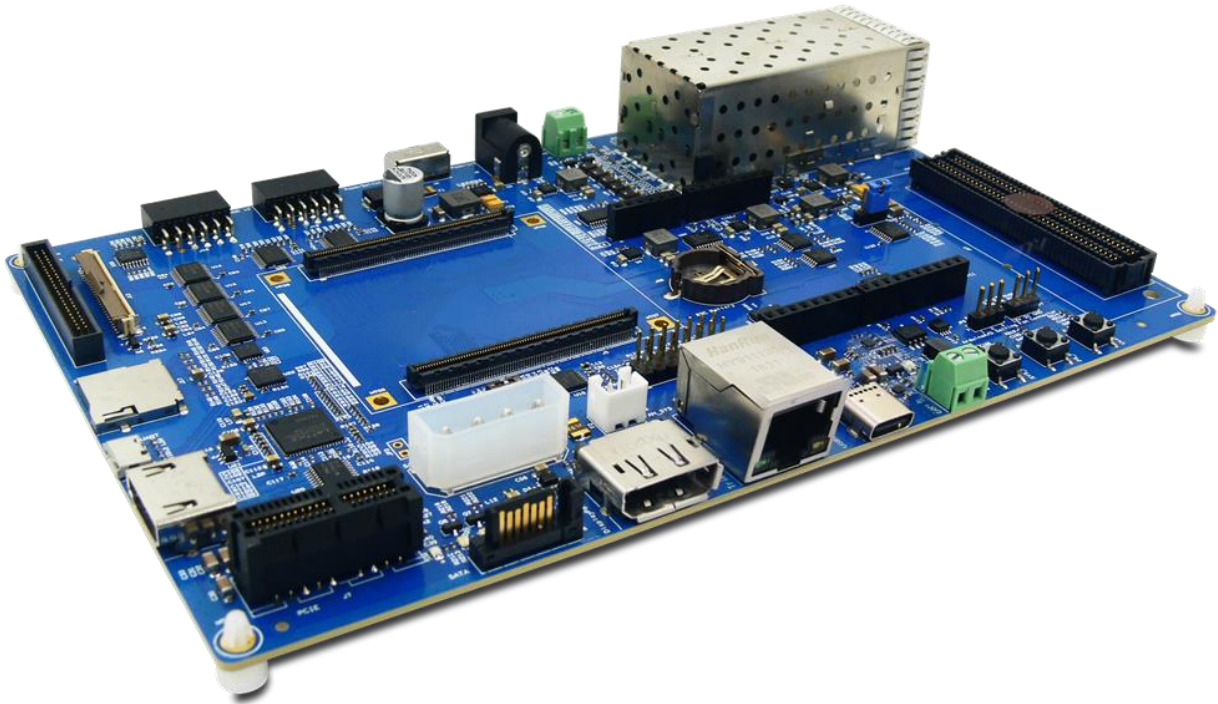
## Peripherals and Signals Routed to Pins

 [MYC-CZU3EG/4EV /5EV Pinouts Description](#)

- ✓ Gigabit Ethernet PHY
- ✓ USB PHY
- ✓ Intel 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 Development Board Base Board (MYB-CZU3EG/4EV/5EV)**



*Figure 1-8 MYD-CZU3EG/4EV/5EV 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

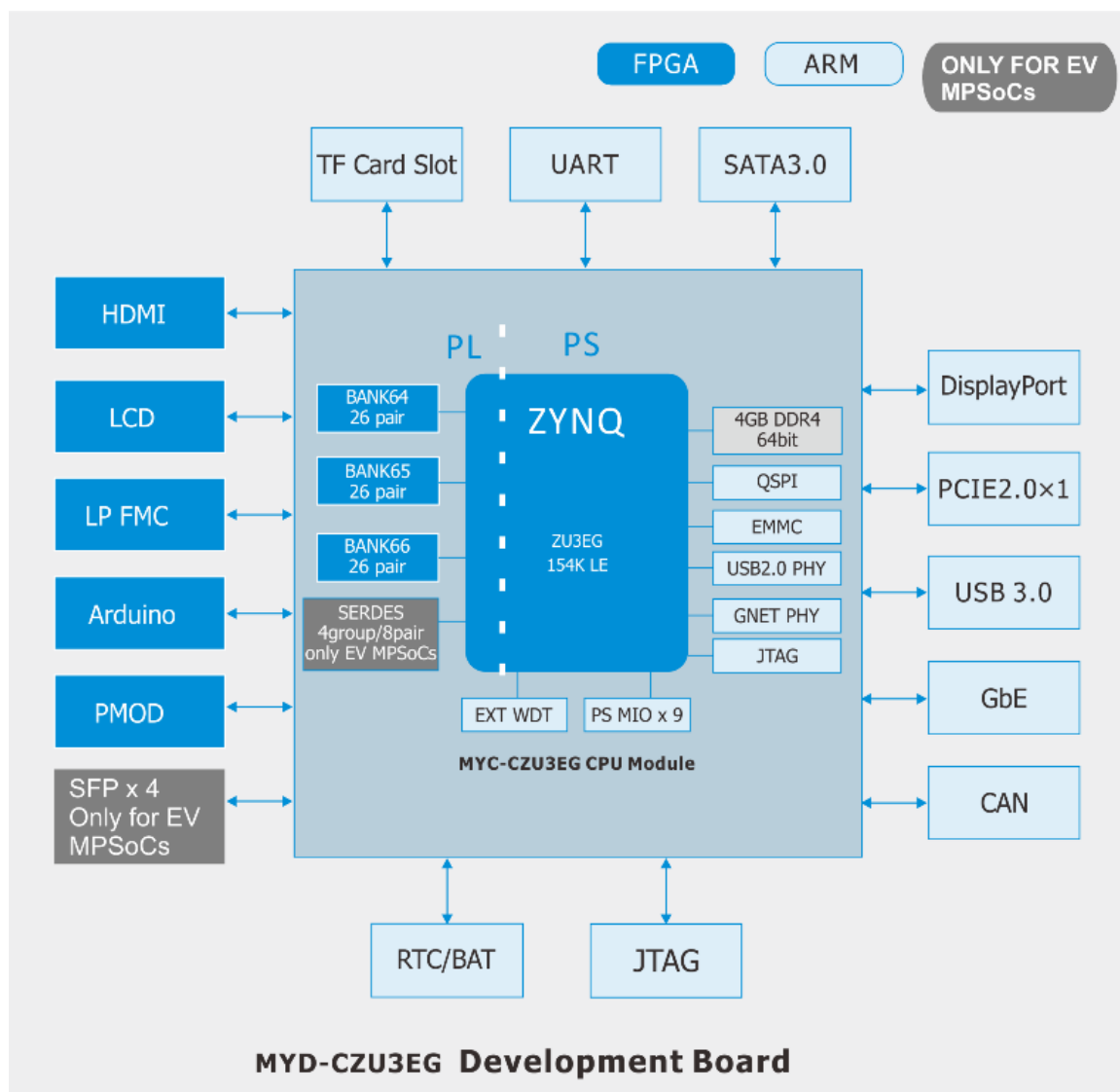
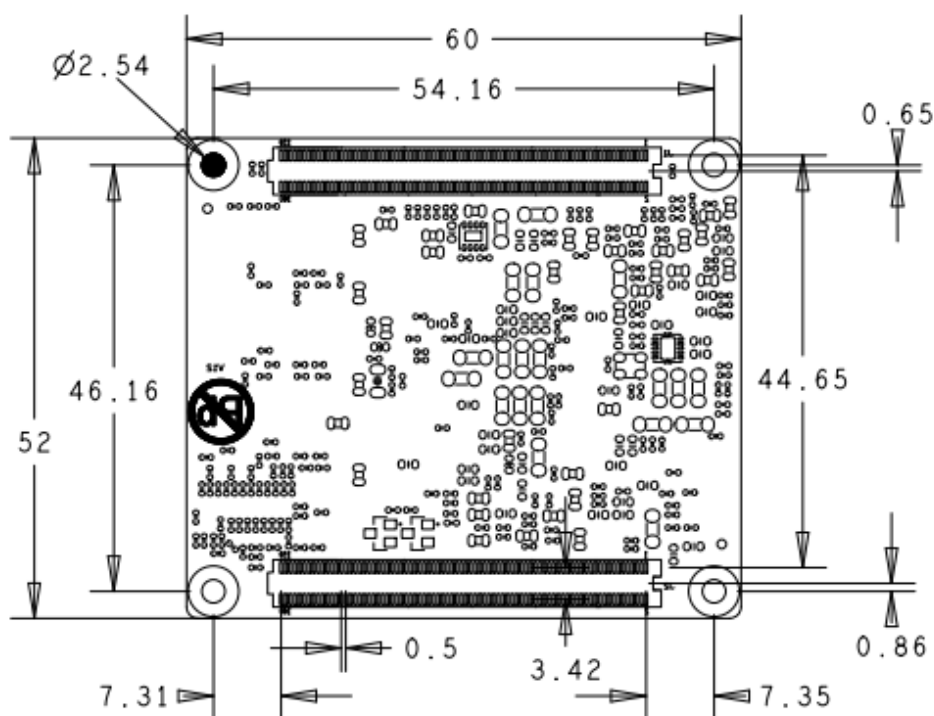


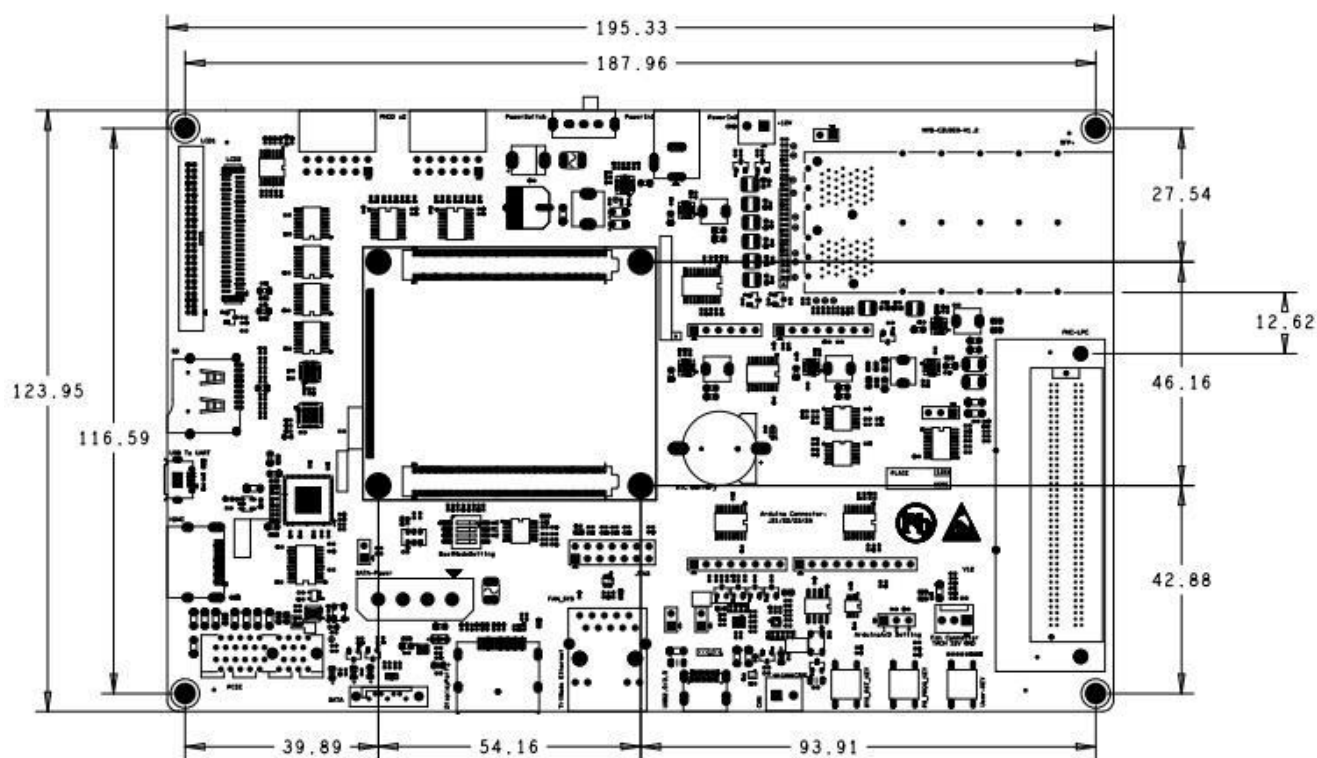
Figure 1-9 Function Block Diagram of MYD-CZU3EG/4EV/5EV

## Dimension Chart



UNIT : mm

Figure 1-10 Dimension Chart of MYC-CZU3EG/4EV/5EV (Top-view)



UNIT : MM

Figure 1-11 Dimension Chart of MYD-CZU3EG/4EV/5EV



## Software Features

The [MYD-CZU3EG/4EV/5EV 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 Board  | Source code provided |
| Drivers        | SFP & SFP+   | SFP driver and SFP+ driver (only for CZU4EV/5EV)  | Source code provided |
|                | VCU  | VCU driver (only for CZU4EV/5EV)  | 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, Rs232, 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. |                      |

Table 1-2 Software Features of MYD-CZU3EG/4EV/5EV

## Order Information

| Item   | Packing List   |
|--|--|
| MYD-CZU3EG Development Board<br>(Part No.: MYD-CZU3EG-4E4D-1200-C) | <ul style="list-style-type: none"> <li>➤ One MYD-CZU3EG/4EV/5EV Development Board (including the base board and CPU Module with installed active heatsink)</li> <li>➤ One HDMI cable</li> <li>➤ One 12V/5A Power adapter</li> <li>➤ One 1.2m Micro USB2.0 cable</li> <li>➤ One USB A 3.0 to Type-C cable Adapter</li> <li>➤ One 16GB TF card</li> <li>➤ One Product disk (including user manual, datasheet, base board schematic in PDF format and software packages)</li> </ul> |
| MYD-CZU4EV Development Board<br>(Part No.: MYD-CZU4EV-4E4D-1200-C) |  |
| MYD-CZU5EV Development Board<br>(Part No.: MYD-CZU5EV-4E4D-1200-C) |  |
| MYC-CZU3EG CPU Module<br>(Part No.: MYC-CZU3EG-4E4D-1200-C)        | <ul style="list-style-type: none"> <li>➤ MYC-CZU3EG/4EV/5EV CPU Module</li> <li>➤ One Product disk</li> </ul>  |
| MYC-CZU4EV CPU Module<br>(Part No.: MYC-CZU4EV-4E4D-1200-C)        |  |
| MYC-CZU5EV CPU Module<br>(Part No.: MYC-CZU5EV-4E4D-1200-I)        |  |
| MY-LCD70TP LCD Module<br>(Part No.: MY-TFT070RV2)                  | 7-inch LCD Module with resistive touch screen  |
| MY-LCD70TP-C LCD Module<br>(Part No.: MY-TFT070CV2)                | 7-inch LCD Module with capacitive touch screen   |
| MY-CAM002U Camera Module<br>(Part No.: MY-CAM002U)                 | USB Camera Module  |



### MYIR Tech Limited

Room 04, 6th Floor, Building No.2, Fada Road, Yunli Smart Park, Bantian,  
Longgang District, Shenzhen, Guangdong, China 518129

E-mail: [sales@myirtech.com](mailto:sales@myirtech.com)

Phone: +86-755-22984836

Fax: +86-755-25532724

Website: <http://www.myirtech.com>

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