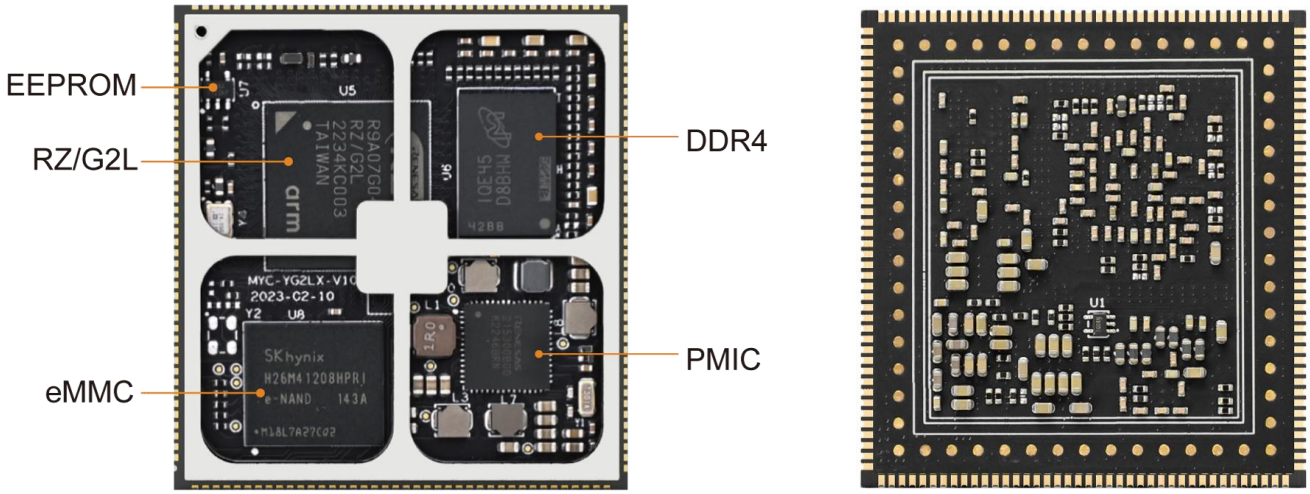
MYiR 米尔电子
Make Your Idea Real

MYC-YG2LX CPU Module

Overview

- ✓ *RENESAS RZ/G2L Processor based on 1.2GHz Dual ARM Cortex-A55 and 200MHz Cortex-M33 Cores*
- ✓ *1GB/2GB DDR4, 8GB eMMC Flash, 32KB EEPROM*
- ✓ *RAA215300 Power Management IC*
- ✓ *1.0mm pitch 222-pin Stamp Hole Expansion Interface*
- ✓ *Supports Running Linux 5.10 OS*

Measuring only 43mm by 45mm, the MYC-YG2LX CPU Module is a compact System-on Module (SoM) based on RENESAS RZ/G2L processor (R9A07G044L23GBG) which features 1.2GHz dual ARM Cortex-A55 and 200MHz Cortex-M33 cores with ARM Mali-G31 based 3D Graphics and Video CODEC Engine, as well as many interfaces such as camera input, display output, USB 2.0, and GigE-Ether, providing a cost-efficient solution for human-machine interface (HMI) applications and embedded devices with video capabilities. Additionally, the MYC-YG2LX module has integrated 1GB/2GB DDR4, 8GB eMMC, 32Kbit EEPROM and power management IC (PMIC). A variety of peripheral and IO signals are accessible via the 1.0 mm pitch 222-pin stamp-hole (Castellated-Hole) expansion interface. It is a powerful minimum system ideal for your next embedded design.

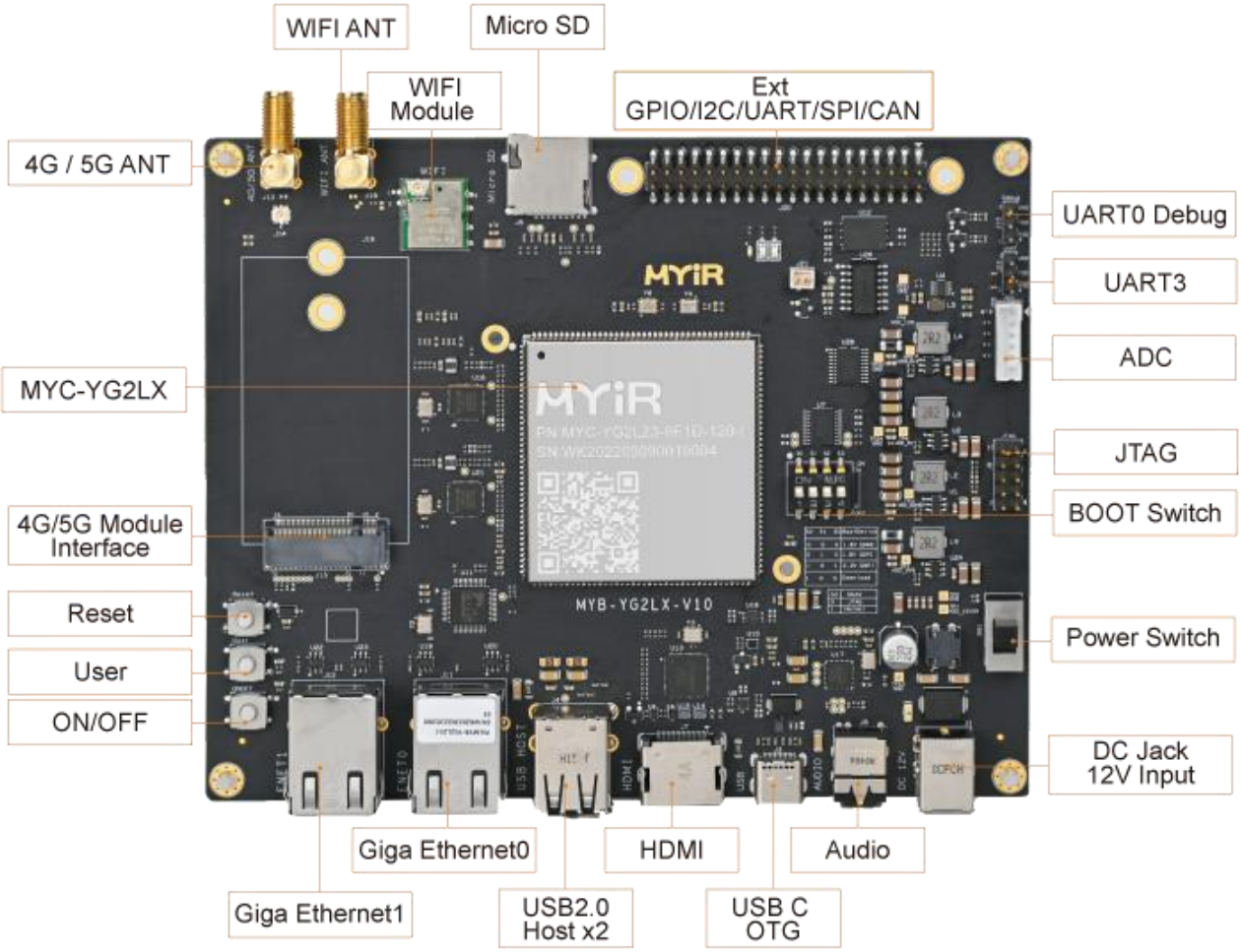


MYC-YG2LX CPU Module (Top-view and Bottom-view)

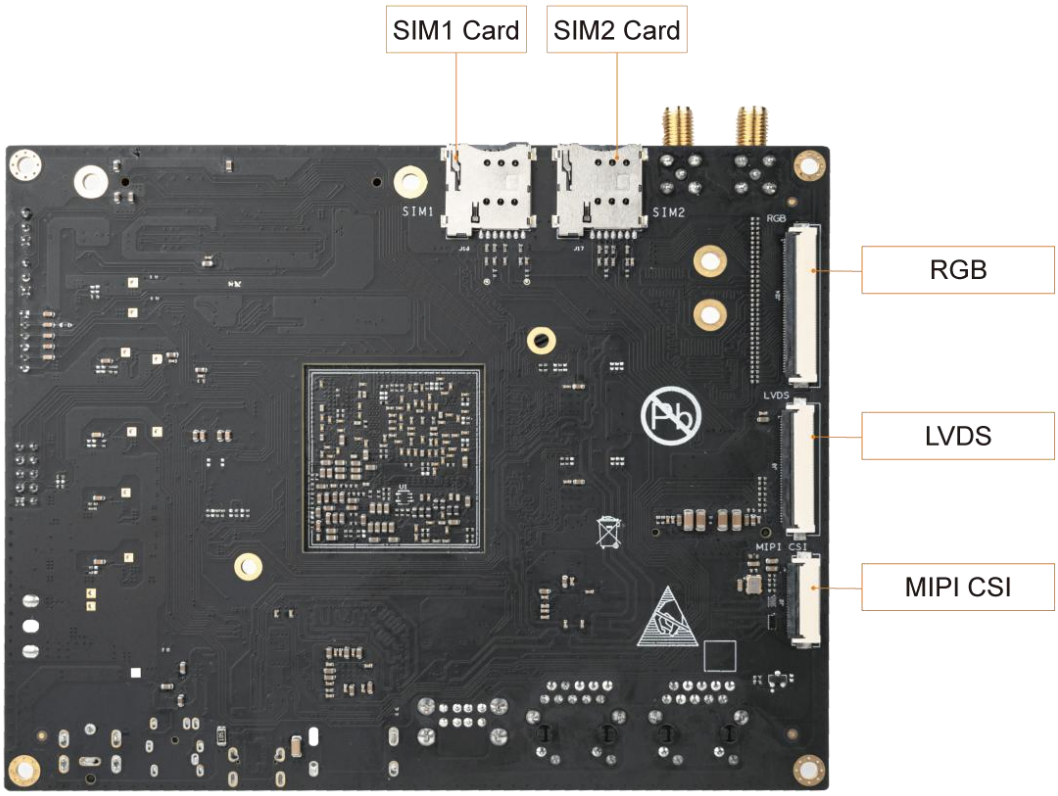
The MYC-YG2LX CPU Module is capable of running Linux 5.10. MYIR provides image files, kernel and driver source codes, application demos and compilation tools to enable users to start their development rapidly and easily.

The MYD-YG2LX Development Board is built around the MYC-YG2LX CPU Module. Its base board provides rich communication interfaces such as four Serial ports, two Gigabit Ethernet, two USB 2.0 HOST and one USB 2.0 OTG, one Micro SD card slot, one M.2 Socket for USB based 4G/5G LTE Module with two SIM card holders, one USB2.0 based WiFi module, one GPIO/I2C/UART/SPI/CAN extension header, etc. It also supports various multi-media interfaces including Audio input/output, MIPI-CSI camera interface as well as HDMI, LVDS and RGB video output interfaces.

MYIR offers MY-CAM003M MIPI Camera Module, MY-WIREDCOM RPI Module (RS232/RS485/CAN), MY-LCD70TP-C 7 inch LCD Module and MY-LVDS070C LCD Module as options for the board which have greatly enhanced the functionality of the board.



MYD-YG2LX Development Board (Top-view)



MYD-YG2LX Development Board (Bottom-view)

Hardware Specification

The MYC-YG2LX CPU Module is using the 15 x 15mm, 0.5 mm ball pitch, 456pin LFBGA package, 1.2 GHz RZ/G2L (R9A07G044L23GBG) MPU which belongs to the RENESAS RZ/G2L product group and features dual-core Arm Cortex-A55 (1.2 GHz) CPUs and Single-core Arm Cortex-M33 (200 MHz) CPU, with 3D graphics and video CODEC engine. And the microprocessor also comes with 16-bit DDR4-1600/DDR3L-1333 dynamic Random access memory, camera interface (MIPI-CSI/Parallel-IF), display interface (MIPI-DSI/Parallel-IF), and USB2.0 Interface, SDHI interface, CAN interface, Gigabit Ethernet interface, making it ideal for applications such as entry-class industrial human-machine interfaces (HMIs) and embedded devices with video capabilities.

Function		RZ/G2L	RZ/G2LC	RZ/G2UL
Cortex-A55*1	Dual	✓	✓	—
	Single	✓	✓	✓
Cortex-M33		✓	✓	✓/—*2
3D Graphics (Arm Mali-G31)		✓	✓	—
Video Codec (H.264)		✓	—	—
Display Interface		MIPI DSI or Parallel	MIPI DSI	Parallel
Camera Interface		MIPI CSI-2 or Parallel	MIPI CSI-2	MIPI CSI-2
Gigabit Ethernet		2ch	1ch	2ch
12-bit A/D Converter		8ch	—	1ch
Package (PBGA)		551pin, 21mm□ (0.8mm pitch) 456pin, 15mm□ (0.5mm pitch)	361pin, 13mm□ (0.5mm pitch)	361pin, 13mm□ (0.5mm pitch)

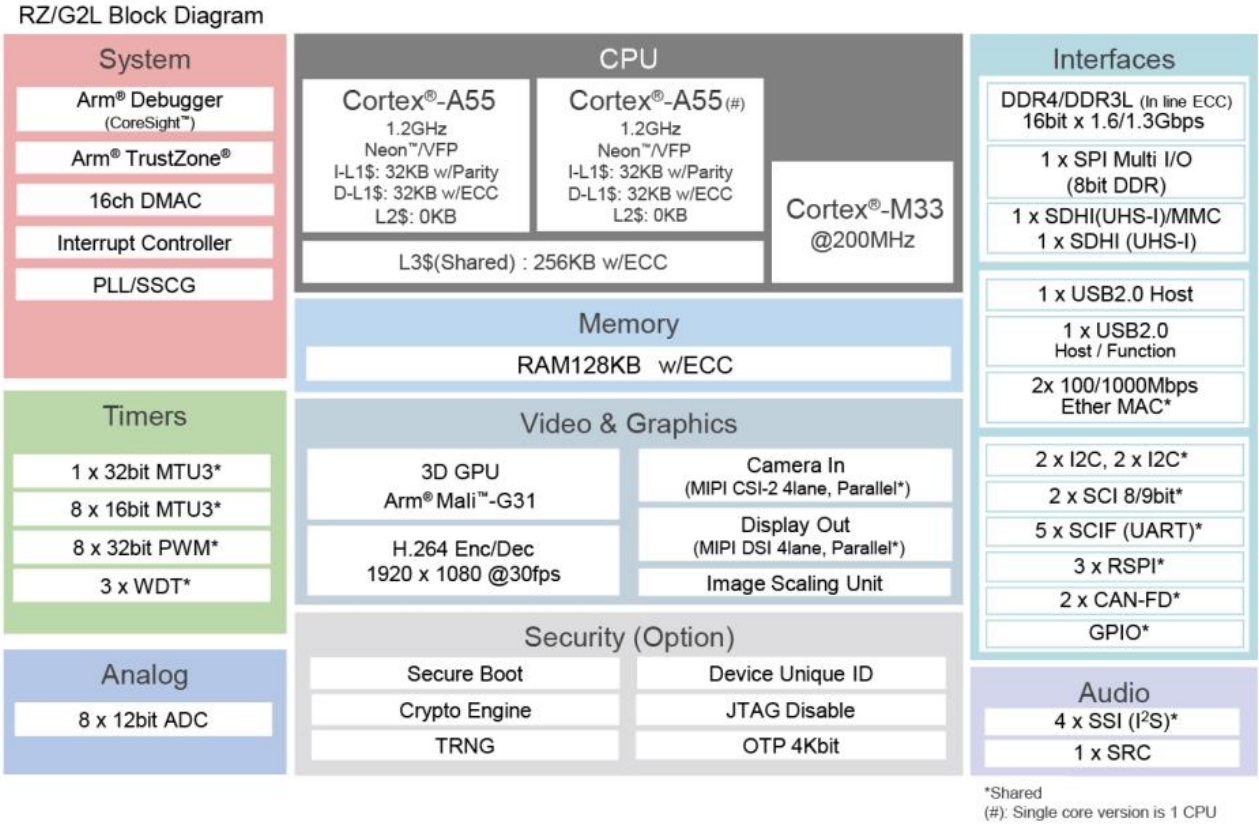
***1: The maximum operating frequency of Cortex-A55 is 1.2GHz for RZ/G2L, RZ/G2LC, and 1.0GHz for RZ/G2UL.**

***2: RZ/G2UL Cortex-M33 is optional.**

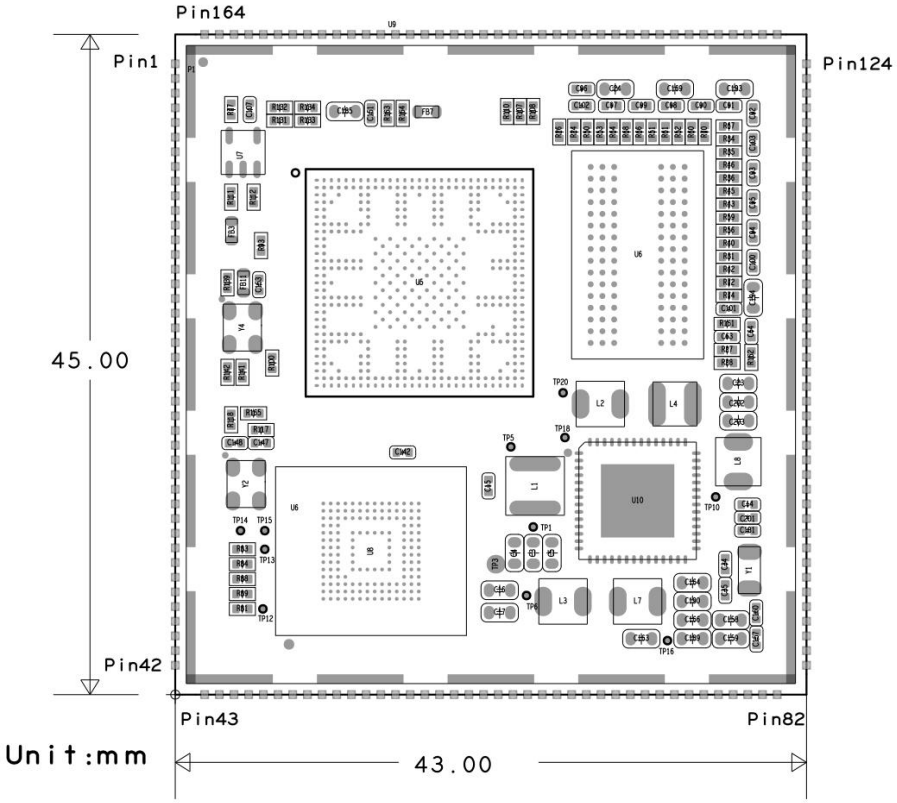
RZ/G2L Group Function Differences

Product Group	RZ/G2L			
Part No.	R9A07G044L24GBG	R9A07G044L14GBG	R9A07G044L23GBG	R9A07G044L13GBG
Arm Cortex-A55	2	1	2	1
Arm Cortex-M33	1	1	1	1
3D Graphics (Arm Mali-G31)	✓	✓	✓	✓
Video Codec (H.264)	✓	✓	✓	✓
Display Interface	1x MIPI DSI or 1x Digital Parallel output	1x MIPI DSI or 1x Digital Parallel output	1x MIPI DSI or 1x Digital Parallel output	1x MIPI DSI or 1x Digital Parallel output
Camera Interface	1x MIPI CSI-2 or 1x Digital Parallel input	1x MIPI CSI-2 or 1x Digital Parallel input	1x MIPI CSI-2 or 1x Digital Parallel input	1x MIPI CSI-2 or 1x Digital Parallel input
Gigabit Ethernet	2ch	2ch	2ch	2ch
12-bit A/D Converter	8ch	8ch	8ch	8ch
Package	LFBGA	LFBGA	LFBGA	LFBGA
Pin Count	551pin	551pin	456pin	456pin
Package Information	21mm x 21mm 0.8mm pitch	21mm x 21mm 0.8mm pitch	15mm x 15mm 0.5mm pitch	15mm x 15mm 0.5mm pitch

RZ/G2L Product Group



RZ/G2L Processor Block Diagram



MYC-YG2LX Dimensions Chart

The MYC-YG2LX CPU Module takes full features of RZ/G2L processor and the main features are characterized as below:

Mechanical Parameters

- Dimensions: 43mm x 45mm
- PCB Layers: 10-layer design
- Power supply: +5V/1A
- Working temperature: -40~85 Celsius (industrial grade)

Processor

- RENESAS RZ/G2L processor (R9A07G044L23GBG)
  - 1.2 GHz Dual-core ARM Cortex-A55
  - 200 MHz ARM Cortex-M33
  - 3D graphics functions (Arm Mali-G31)
  - Video codec (H.264)

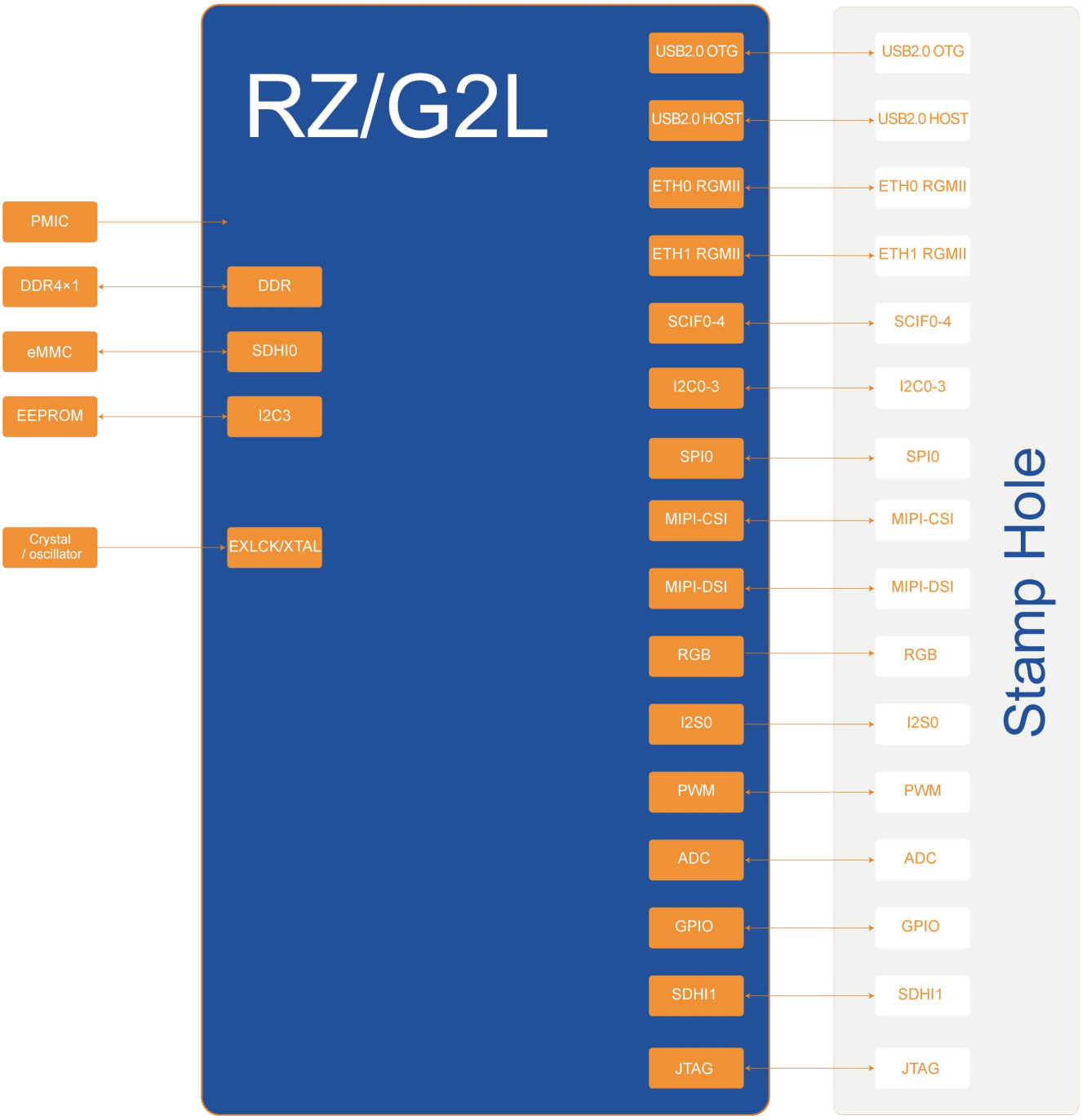
Memory

- 1GB/2GB DDR4 (supports optional 4GB)
- 8GB eMMC (supports optional 4GB/16GB/32GB)
- 32KB EEPROM

Peripherals and Signals Routed to Pins

- Power Management IC (RAA215300)
- 1.0mm pitch 222-pin Stamp Hole Expansion Interface
  - 2 x RGMII
  - 2 x USB2.0
  - 5 x SCIF
  - 2 x SCI
  - 2 x CAN
  - 4 x I2C
  - 3 x SPI
  - 8 x ADC
  - 1 x MIPI-DSI
  - 1 x RGB
  - 1x MIPI-CSI
  - 1 x Parallel CSI
  - 4x SSI
  - 1x SRC
  - Up to 118 GPIOs

  Note: the peripheral signals brought out to the expansion interface are listed in maximum number. Some signals are reused. Please refer to the processor datasheet and the CPU Module pinout description file.



MYC-YG2LX CPU Module Function Block Diagram

Software Features

The MYC-YG2LX CPU Module supports Linux OS and comes with complete software package. The kernel and many peripheral drivers are available in source code to assist clients to expedite their development. The following are a summary of the software features:

Item	Feature	Description	Source Code
Bootloader	trusted-firmware-a	fsbl boot	YES
	U-boot	second boot program based on uboot_2021.10	YES
Linux kernel	Linux kernel	Customized base on official kernel_5.10.83 version	YES
Device driver	PMIC	RAA215300A2GNP driver	YES
	QSPI	W25Q128JVEIQ driver	YES
	USB Host	USB Host driver	YES
	USB OTG	USB OTG driver	YES
	I2C	I2C bus driver	YES
	SPI	SPI bus driver	YES
	Ethernet	YT8531SH driver	YES
	SDHI	eMMC/SD card storage driver	YES
	HDMI	LT8912 driver	YES
	LVDS	LT8912 driver	YES
	RGB	RGB driver	YES
	Audio	SGTL5000 audio driver	YES
	4G/5G	4G/5G driver	YES
	PWM	PWM control	YES
	ADC	ADC driver	YES
	RTC	RTC driver	YES
	GPIO	Generic GPIO driver	YES
	UART	RS232/RS485/TTL driver	YES
	CAN	CAN driver	YES
	Camera(MIPI)	OV5640 camera driver	YES
	WiFi	FG6188EUFX-05 driver	YES
File system	myir-image-core	image without GUI interface built with Yocto	YES
	myir-image-full	full-featured image built with Yocto	YES
	myir-image-ubuntu-xfce	image with xfce desktop system built with Ubuntu 20.04 (available later)	YES
Application DEMO	Charging pile application	Refer to State Grid charging pile program to implement Modbus protocol, IEC104 platform communication protocol and charging demonstration interface. Integrating the features into MEasyHMI V2.0 for demonstration through full image.	YES

	PLC controller	Porting open source Ethercat host IGH; Use Linux real-time patch PREEMPT-RT or XENOMAI (real-time response speed and real-time jitter time measured data), to write a console application and control the EtherCAT slave station and servo motor by command.	YES
	Engineering machinery scene	Four AHD cameras capture four channels of videos to display on screen. The analog instrument information is displayed on screen. The videos and instrument information are displayed with split-screen presentation. Integrating the features into MEasyHMI V2.0 for demonstration through full image.	YES

MYC-YG2LX Software Features

Order Information

<table>
<tr><th>Product Item</th><th>Part No.</th><th>Packing List</th></tr>
<tr><td rowspan="2">MYC-YG2LX
CPU Module</td><td>MYC-YG2L23-8E1D-120-I</td><td rowspan="2">✓ One MYC-YG2LX CPU Module</td></tr>
<tr><td>MYC-YG2L23-8E2D-120-I</td></tr>
<tr><td rowspan="2">MYD-YG2LX
Development Board</td><td>MYD-YG2L23-8E1D-120-I</td><td rowspan="2">✓ One MYD-YG2LX Development Board
✓ One USB to TTL cable
✓ One 12V/2A Power adapter
✓ One DC Power jack adapter
✓ One Quick Start Guide</td></tr>
<tr><td>MYD-YG2L23-8E2D-120-I</td></tr>
<tr><td>MY-CAM003M
MIPI Camera Module</td><td>MY-CAM003M</td><td rowspan="4">Add-on Options
✓ MY-LVDS070C 7-inch LCD Module
✓ MY-LCD70TP-C 7-inch LCD Module
✓ MY-CAM003M Module
✓ MY-WIREDCOM Module</td></tr>
<tr><td>MY-LVDS070C
7-inch LCD Module</td><td>MY-LVDS070C</td></tr>
<tr><td>MY-LCD70TP-C
7 inch LCD Module</td><td>MY-TFT070CV2</td></tr>
<tr><td>MY-WIREDCOM RPI Module</td><td>MY-WIREDCOM</td></tr>
<tr><td colspan="3">Note:

1. One MYD-YG2LX Development Board includes one CPU module MYC-YG2LX mounted on the base board. If you need more CPU module, you can order extra ones.

2. Discounts are available for bulk orders.

3. We provide OEM/ODM services to reduce time and save cost for customers.</td></tr>
</table>

MYIR Tech Limited

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