MYiR 米尔电子
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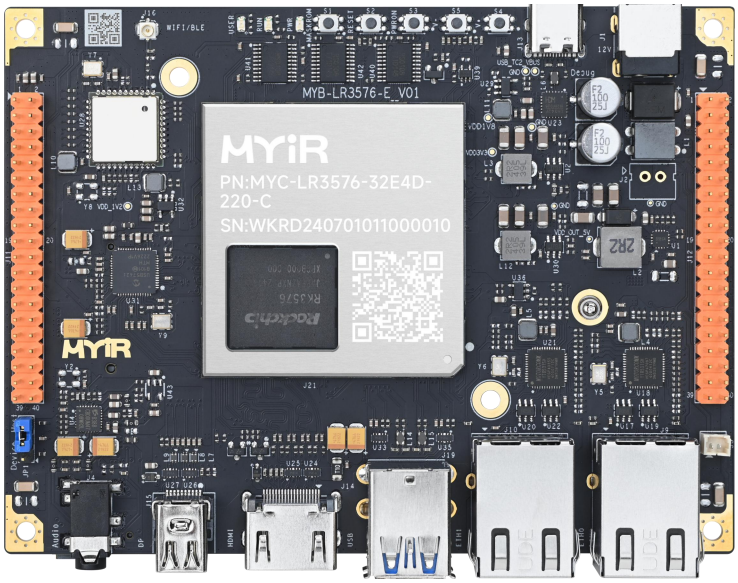
MYD-LR3576 Development Board Overview

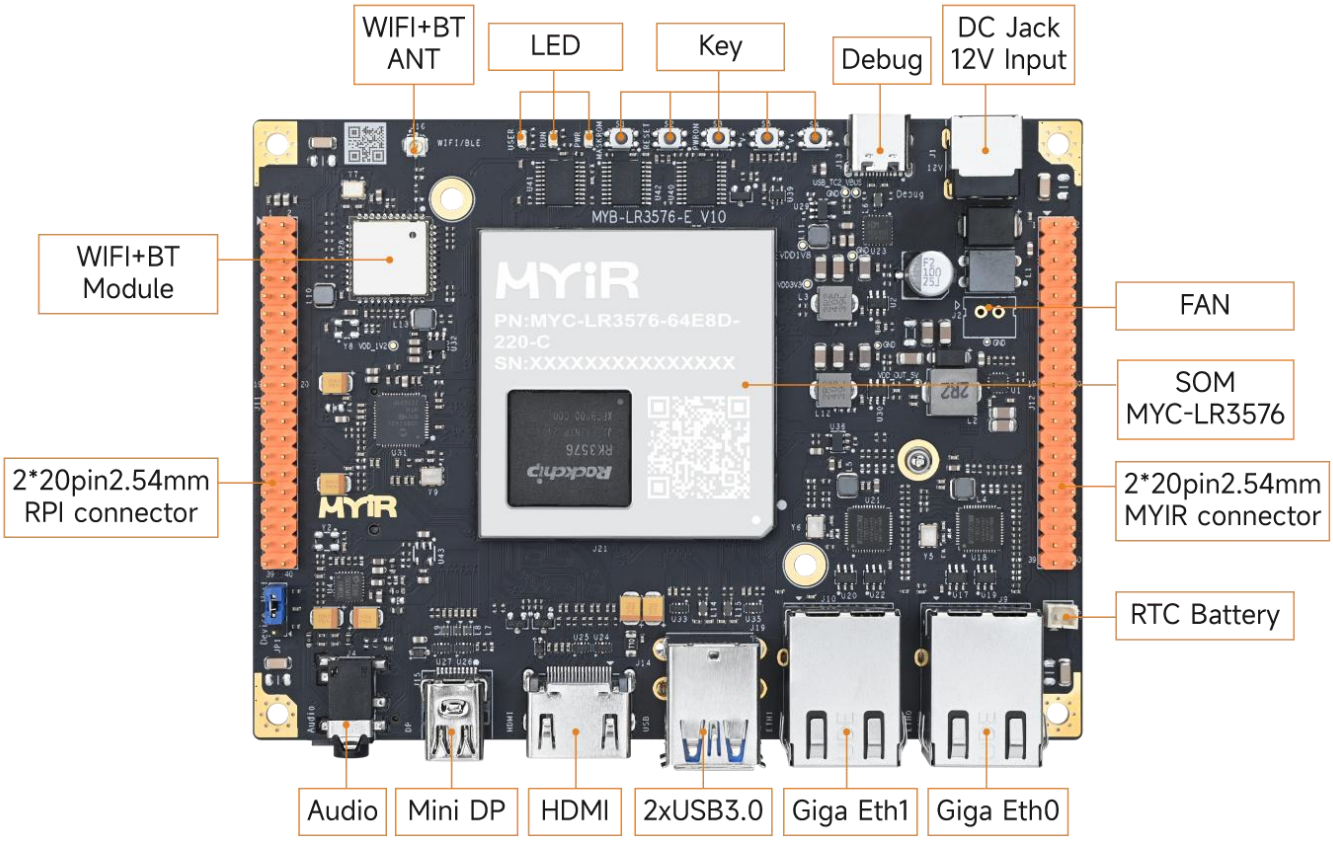


- ✓ *MYC-LR3576 SOM as Controller Board*
- ✓ *Rockchip RK3576 (J) Octa-core Arm Processor with Quad Cortex-A72 Cores at 2.2 GHz and Quad Cortex-A53 Cores at 1.8 GHz, Up to 6 TOPs NPU, 3D GPU, 4K Video Codec*
- ✓ *4GB/8GB LPDDR4X, 32GB/64GB eMMC, 32Kbit EEPROM*
- ✓ *2x USB 3.0, 1x USB2.0 Host, 2x CAN, 2 x Gigabit Ethernet, WIFI/Bluetooth, 1 x Micro SD Card Slot*
- ✓ *HDMI/Mini DP/MIPI-DSI, 3x MIPI-CSI, Audio*
- ✓ *Supports Linux 6.1, Debian 12, Ubuntu 22.04 and Android 15 OS*
- ✓ *Optional 10.1-inch LCD Module and Camera Modules*

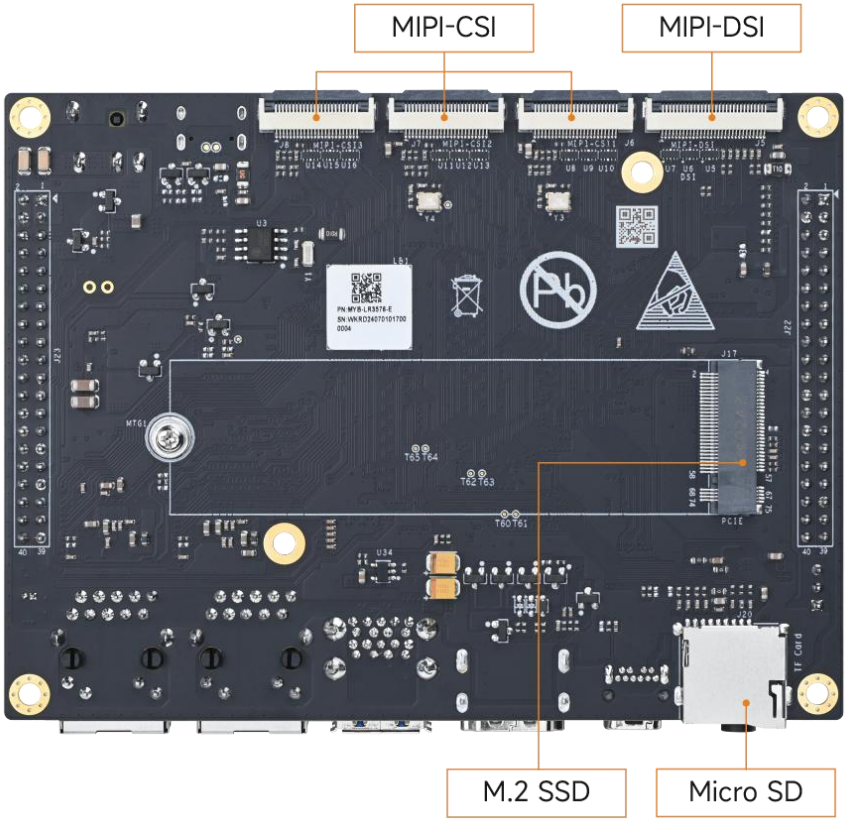
The MYD-LR3576 Development Board is an advanced evaluation platform designed for the low-power and high-performance Rockchip RK3576 (J) AIoT processors. This processor features an Octa-core Arm MPU with four Cortex-A72 cores clocked at 2.2 GHz and four Cortex-A53 cores at 1.8 GHz, coupled with a 6 TOPs NPU, a 3D GPU, and 4K video codecs. The board is specifically tailored for various sectors, including industrial automation, AIoT, edge computing, smart mobile terminals, and other digital multimedia applications.

The MYD-LR3576 Development Board is built around the MYC-LR3576 System-On-Module (SOM) and effectively utilizes the advanced capabilities of the Rockchip RK3576 processor through its 381-pin LGA expansion interface. The expansion base board is equipped with two USB 3.0 interfaces, one USB 2.0 interface, dual Gigabit Ethernet interfaces, two CAN interfaces, and an integrated WiFi/Bluetooth module. Furthermore, it incorporates a Micro SD card slot and an M.2 NVMe SSD-compatible PCIe slot. In terms of multimedia capabilities, the board offers multiple display interfaces, including HDMI, Mini DP, and MIPI-DSI, as well as three MIPI-CSI video input interfaces and one 3.5mm Audio interface, facilitating comprehensive audio-visual support. Furthermore, the board provides an extensive array of peripheral signals expansion options accessible via the RPI Interface (including GPIO/I2C/UART/SPI/CAN-FD) and the MiFAN Interface (supports GPIO/I2C/UART/SPI/USB). This design empowers users to tailor their projects, enhancing the overall development experience.

The MYD-LR3576 Development Board is fully compatible with Linux 6.1, Debian 12, Ubuntu 22.04 and Android 15 operating systems, ensuring stable and efficient performance for a wide range of applications. MYIR offers a comprehensive suite of software resources, including the source code for the kernel and drivers, along with detailed documentation and development tools. This extensive support enables developers to leverage the full capabilities of the MYD-LR3576, ultimately enhancing their innovation and productivity.

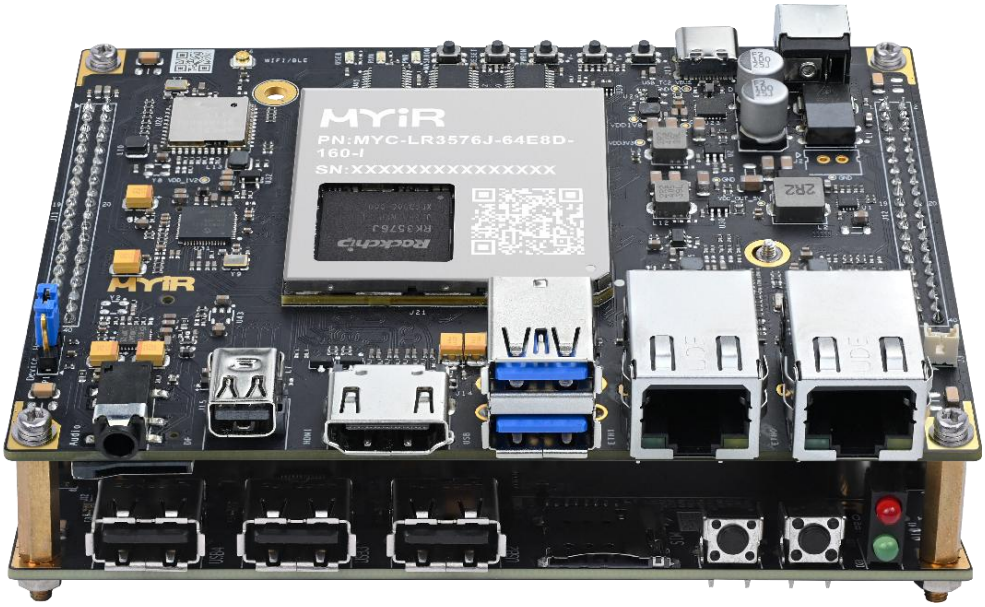


MYD-LR3576 Development Board (Top- view)

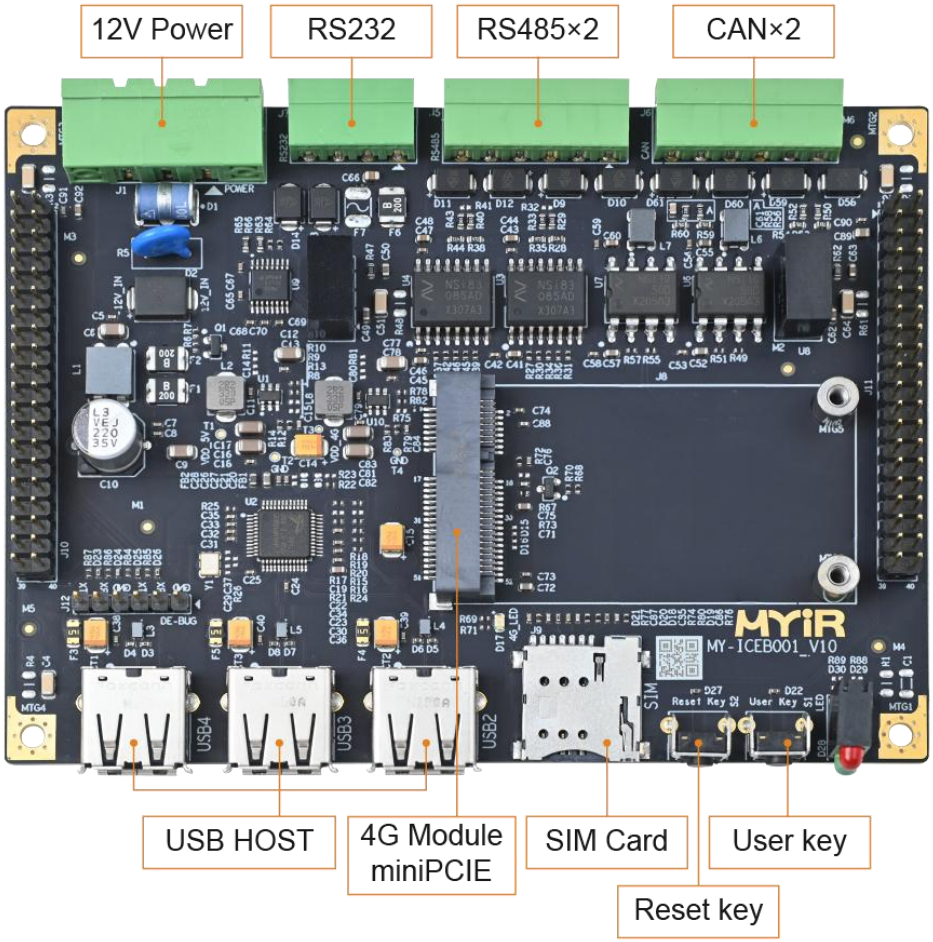


MYD-LR3576 Development Board (Bottom-view)

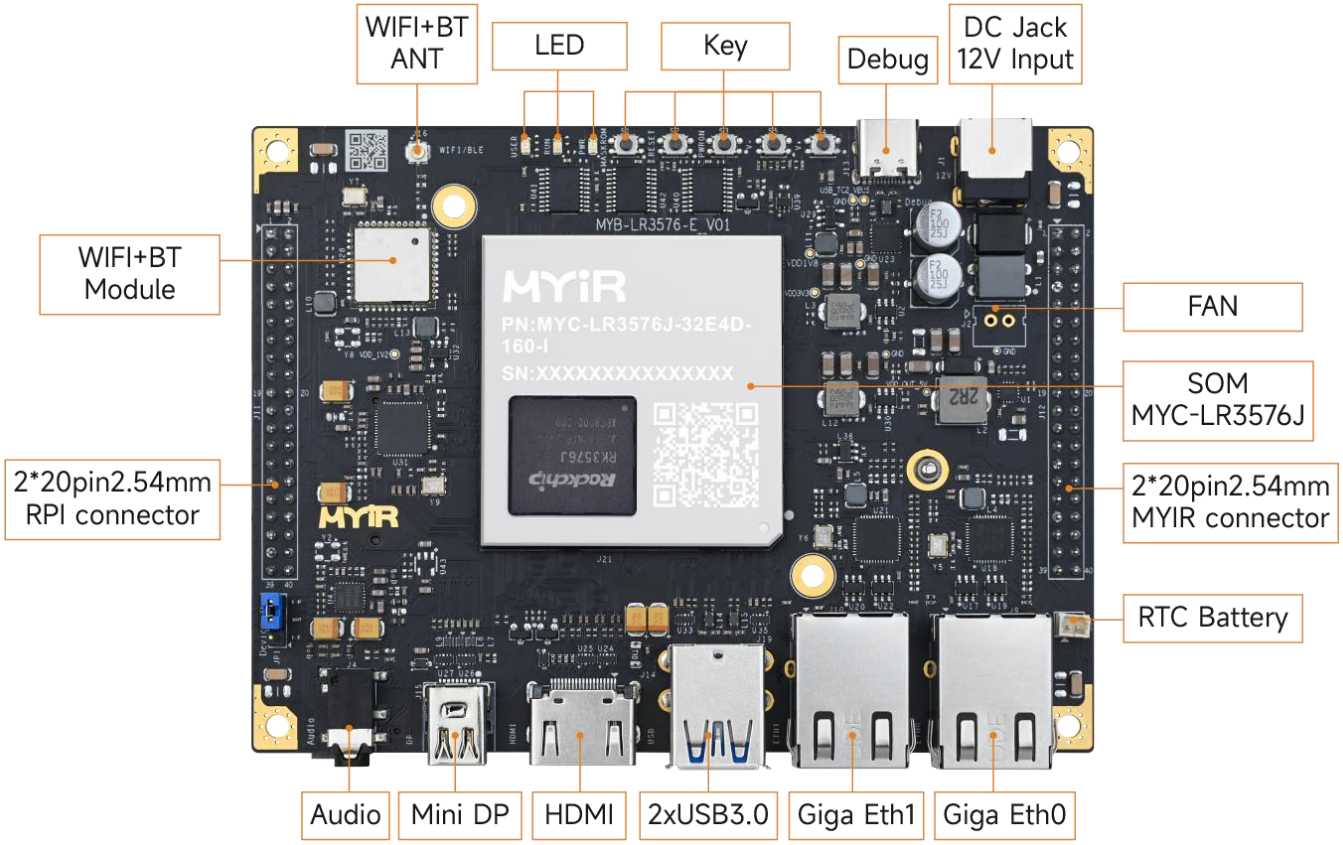
The MYD-LR3576 Development Board comes with a Quick Start Guide, one USB Type-C cable, one WiFi/BT PCB antenna (with an ipex connector), and a 12V/3A Power Adapter. MYIR also provides several add-on options for the board, including the MY-MIPI101C 10.1-inch LCD Module, MY-CAM003M Camera Module, MY-CAM004M Camera Module, and MY-CAM005M Camera Module. The MYD-LR3576 offers a kit MYD-LR3576J-GK with the RK3576J CPU version includes an expansion board MY-ICEB001 that extends three USB2.0 ports, one RS232 port, two RS485 port, two CAN interfaces and one M.2 Socket for a USB-based 4G/5G LTE Module with a SIM card holder. These additions significantly expand the board's functionality, providing users with versatile capabilities to cater to their unique project needs.



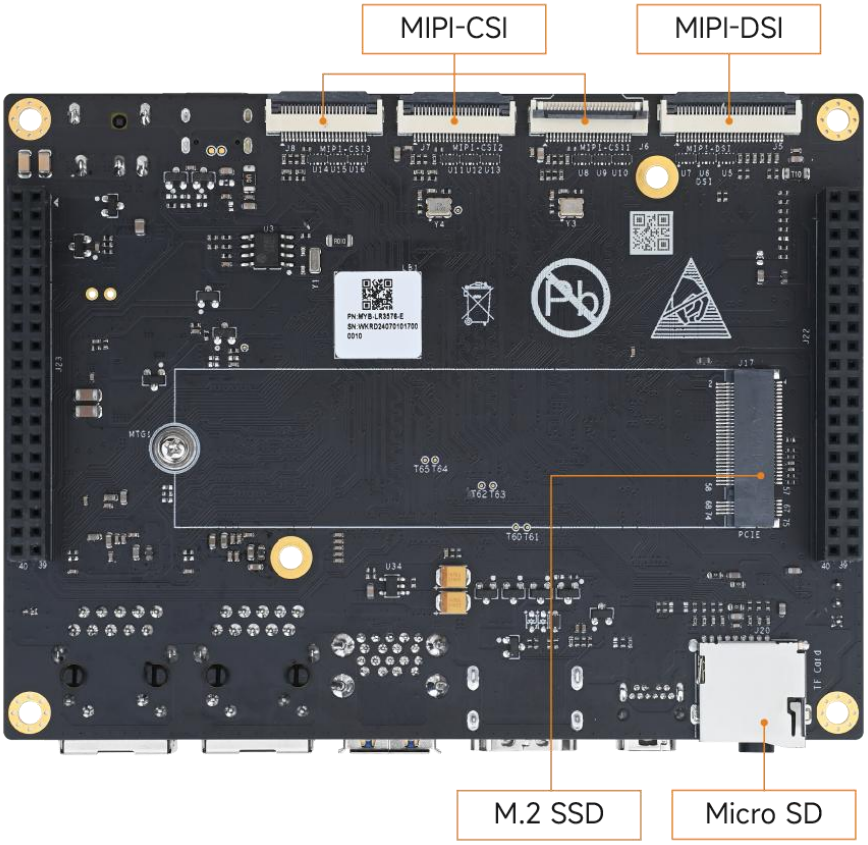
MYD-LR3576 Development Board (RK3576J version) Integrates with the MY-ICEB001 Expansion Board



MY-ICEB001 Expansion Board



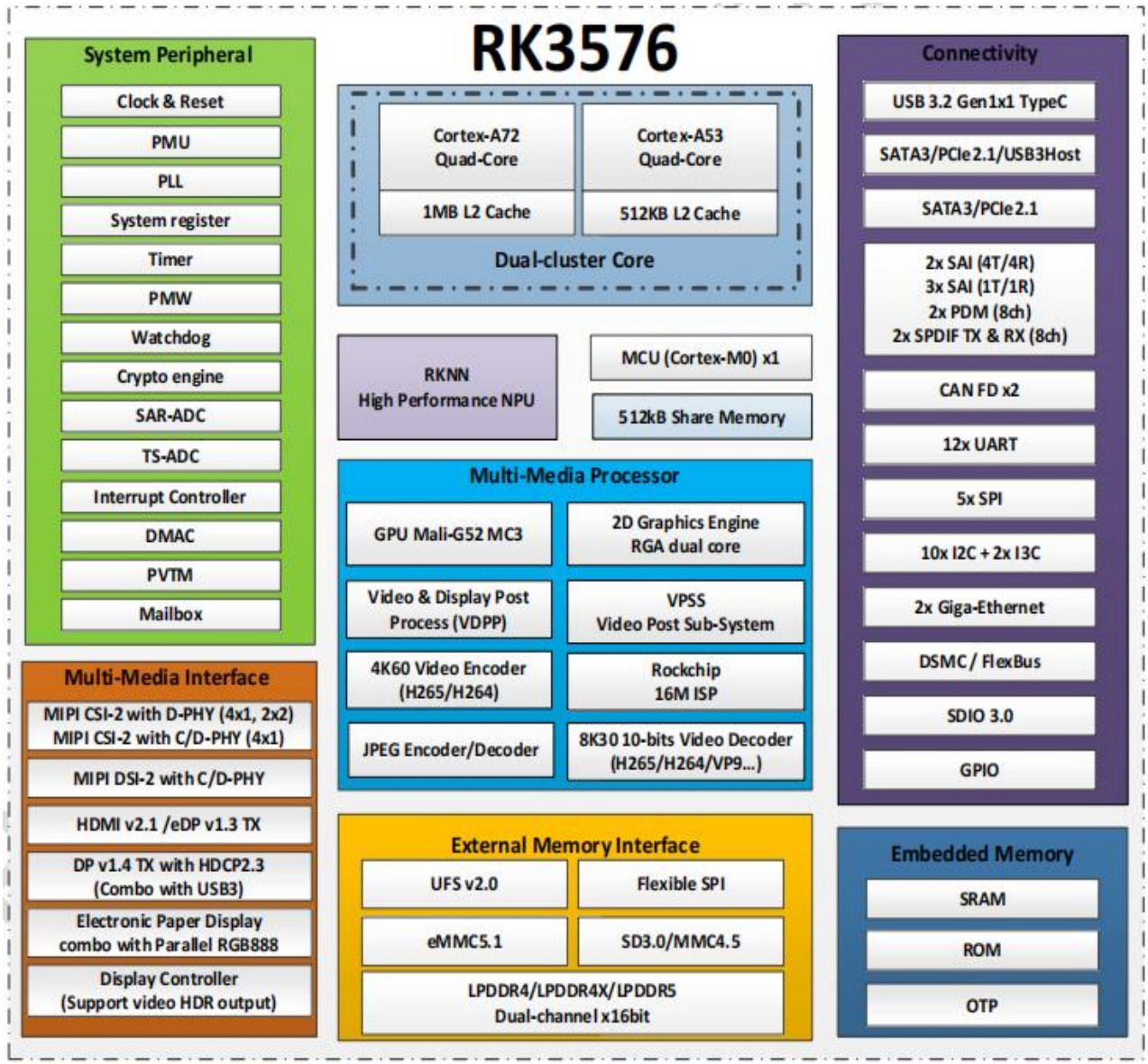
MYD-LR3576 Development Board (RK3576J version) Top-view



MYD-LR3576 Development Board (RK3576J version) Bottom-view

Hardware Specification

The RK3576 (J) is designed as a low-power, high-performance processor for ARM-based PCs and edge computing devices, personal mobile Internet devices, and a range of digital multimedia applications. It features an integrated quad-core Cortex-A72 and quad-core Cortex-A53 architecture. The RK3576's video decoder is capable of supporting H.264, H.265, VP9, AV1, and AVS2 at up to 8K@30fps or 4K@120fps, while its video encoder can handle H.264 and H.265 formats at up to 4K@60fps. The embedded 3D GPU ensures compatibility with a range of graphics standards, including OpenGL ES 1.1, 2.0, and 3.2, OpenCL 2.0, and Vulkan 1.1. A dedicated 2D hardware engine, equipped with an MMU, optimizes display performance and ensures exceptionally smooth operation. In addition, this processor offers extensive peripheral extension support, such as dual Gigabit Ethernet interfaces, PCIE2.1, USB3.2, SATA3, DSMC/Flexbus, CANFD, UART, and more.



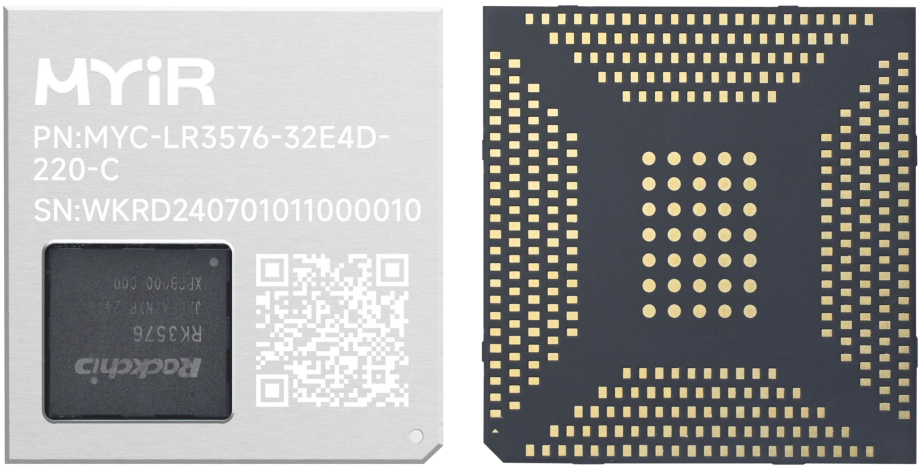
RK3576 Processor Block Diagram

The MYD-LR3576 Development Board utilizes the MYC-LR3576 as its core controller board, featuring the Rockchip RK3576 processor. The primary characteristics are as follows:

Mechanical Parameters

- Dimensions: 120mm x 90mm (base board), 43mm x 45mm (SOM)
- PCB Layers: 6-layer design (base board), 12-layer design (SOM)
- Power supply: +12V/3A (base board), +5V/3A (SOM)
- Working temperature: 0~70 Celsius (commercial grade, with RK3576 CPU)
  or -40~85 Celsius (industrial grade, with RK3576J CPU)

<u>The MYD-LR3576 Controller Board (MYC-LR3576)</u>



MYC-LR3576 System On Module (Top-view and Bottom-view)

Processor

- Rockchip RK3576 (J) processor
  - Octa-core Arm processor with 4x Cortex-A72 cores at 2.2 GHz, 4x Cortex-A53 cores at 1.8 GHz
  - Arm Cortex-M0 MCU at 400MHz for user application
  - Arm Mali-G52 MC3 GPU
  - 6 TOPS NPU supports INT4/8/16/FP16/BF16/TF32
  - Supports up to 8K@30fps or 4K@120fps video decoding (H.265/HEVC, VP9, AVS2, and AV1) and video encoder up to 4K@60fps video encoding (H.265 and H.264)

Memory

- 4GB/8GB LPDDR4X
- 32GB/64GB eMMC
- 32Kbit EEPROM

Peripherals and Signals Routed to Pins

- 381-pin LGA Expansion Interface
  - 2x RGMII/RMII
  - 1x USB/DP combo, USB3.2 OTG
  - Multi-PHY (1-lane PCIe2.1 or SATA3.1, 1-lane PCIe2.1/SATA3.1/USB3.2)
  - SD v3.0/MMC v4.5.1, 4-bit
  - SDIO v3.0, 4-bit
  - 1x FSPI, 1/2/4-bit data width

- DSMC/FlexBus, 8/16-bit data width
- 12x UART, up to 8Mbps, auto flow control (except UART0)
- 2x CAN/CANFD
- 10x I2C
- 2x I3C
- 16x PWM
- 5x SPI
- 6x SARADC, 12-bit
- 1x MIPI-CSI D-PHY v2.0, 4-lane, 4.5Gbps/ C-PHY v1.1, 3 trios, 2.5Gbps
- 1x MIPI-CSI D-PHY v1.2, 2*4-lane/4*2-lane/4+2*2, 2.5Gbps
- 1x DVP, 8/10/12/16-bit, BT.601/BT.656 and BT.1120
- 1x ISP, 16M pixels
- 1x HDMI/eDP Combo interface (supports 4K@120fps/4K@60fps)
- 1x USB/DP Combo interface (supports 4K@120fps)
- 1x MIPI-DSI, up to 2560x1600@60Hz
- 1x Parallel output interface, supports RGB/BT.656/BT.1120, 1080p@60fps
- 2x I2S/TDM/PCM, 4-channel
- 3x I2S/TDM/PCM, 1-channel
- 2x SPDIF TX, 2x SPDIF RX
- 2x PDM, 8-channel

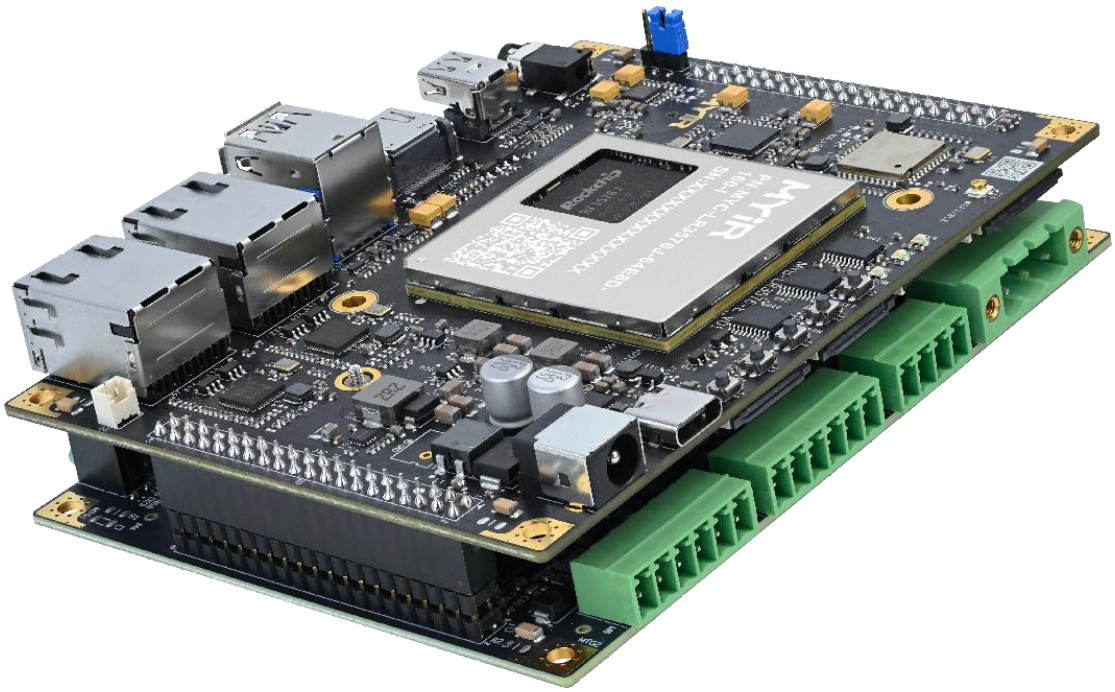
Note: the peripheral signals brought out to the expansion interface are listed in maximum number. Some signals are reused. Please refer to the processor datasheet and the SOM pinout description file.

The MYD-LR3576 Development Board Base Board

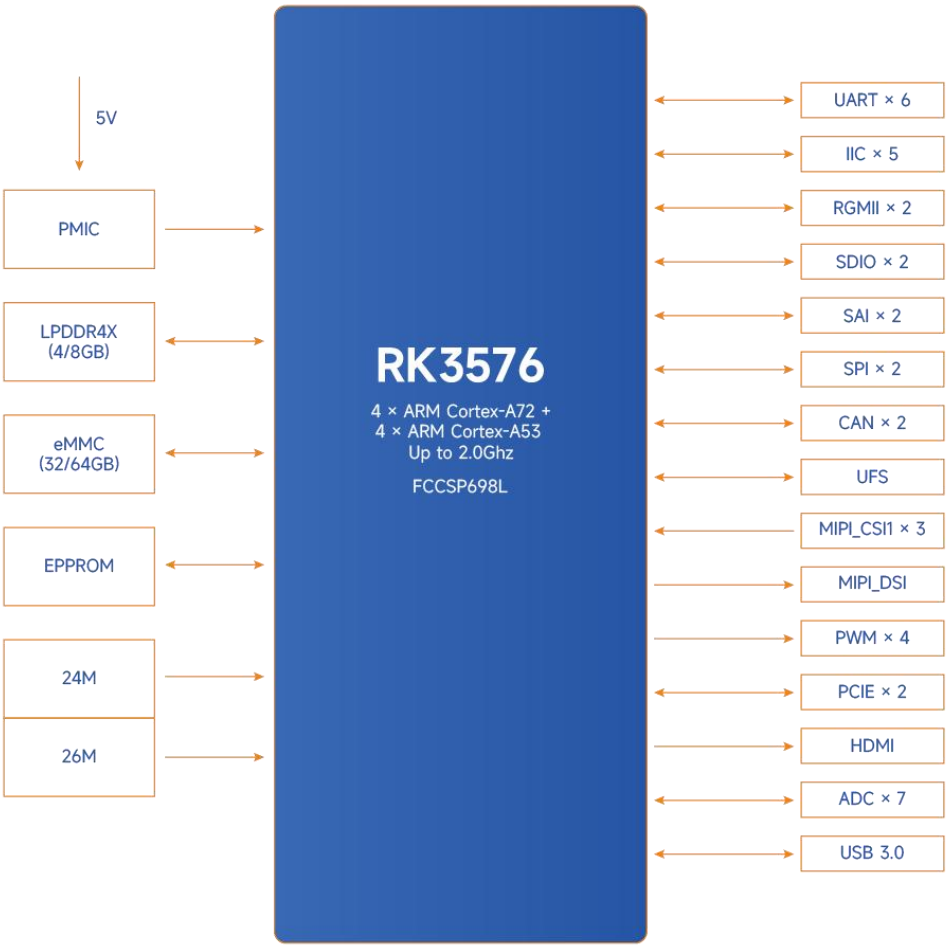
- 1x Power Jack
- 4x Buttons (MaskRom, RST, PWR, V+, V-)
- 3x LEDs (1x PWR LED, 1x RUN LED, 1x USR LED)
- 1x Micro SD card slot
- 1x NVMe PCIe M.2 2280 SSD socket
- 1x Debug UART (USB Type-C connector)
- 1x FAN socket
- 2x 10/100/1000Mbps Ethernet (RJ45)
- 1x WiFi/Bluetooth Module (complies with IEEE 802.11a/b/g/n/ac standard and supports BT 5.2)
- 2x USB3.0 ports (Type-A)
- 1x USB2.0 Host port (via MiFAN interface)
- 2x CAN interfaces (via RPI expansion interface)
- 1x HDMI Interface
- 1x Mini DP interface
- 1x MIPI-DSI interface (0.5mm pitch 30-pin FPC connector)
  *Support MYIR's MY-MIPI101C 10.1-inch MIPI Module 1920*1200 resolution*
- 3x MIPI-CSI interfaces (0.5mm pitch 30-pin FPC connector)
  Support MYIR's MY-CAM003M, MY-CAM004M and MY-CAM005M MIPI Camera Modules
- 1x 3.5mm Audio/ Headset interface
- 2x Extension interfaces (2.54mm pitch 2x 20-pin expansion connector)
  - RPI interface (GPIO/I2C/UART/SPI/CAN-FD, compatible with Raspberry PI standard 40-pin extension interface)
  - MiFAN interface (GPIO/I2C/UART/SPI/USB)

The MY-ICEB001 Expansion Board (for MYD-LR3576J-GK)

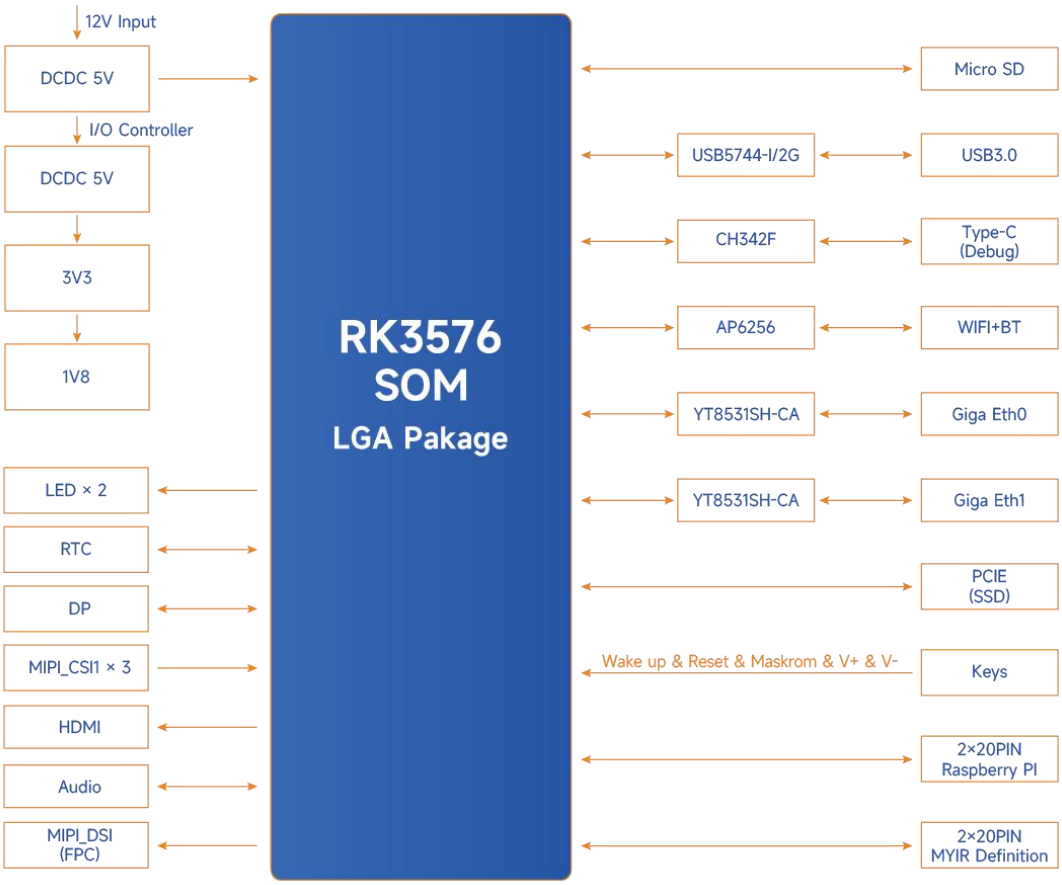
- 1x Power Input (Phoenix connector)
- 2x Buttons (RESET, USER)
- 2x LEDs (1x RUN LED, 1x USR LED)
- 1x RS232 Serial Port
- 2x RS485 Serial Ports
- 2x CAN Interfaces
- 3x USB2.0 ports (Type-A)
- 1x M.2 Socket for a USB-based 4G LTE Module
- 1x SIM Card Slot
- 2x Extension interfaces (2.54mm pitch 2x 20-pin connector)
  - RPI interface (GPIO/I2C/UART/SPI/CAN)
  - MiFAN interface (GPIO/I2C/UART/SPI/USB/PWM)



MYD-LR3576 Development Board (RK3576J version) Integrates with the MY-ICEB001 Expansion Board



MYC-LR3576 Function Block Diagram



MYD-LR3576 Function Block Diagram

Software Features

The MYD-LR3576 development board supports Linux, Debian and Android operating systems with comprehensive software packages. To help clients in accelerate their projects, the kernel and various peripheral drivers are provided in source code format. Here is a brief overview of the key software features:

Item	Features	Description	Source Code
Bootloader	TFA	First bootloader 2.8.15	YES
	U-boot	Second bootloader uboot_2017.09	YES
Kernel	Linux kernel	Base on official kernel_6.1.118/6.1.141 version	YES
Drivers	EEPROM	BL24C32F driver	YES
	USB OTG	USB OTG driver	YES
	I2C	I2C bus driver	YES
	SPI	SPI bus driver	YES
	Ethernet	YT8531SH-CA driver	YES
	HDMI	HD119F driver	YES
	DP	A512001 driver	YES
	MIPI DSI	MIPI DSI driver	YES
	Audio	ES8388 driver	YES
	MIPI CSI	MIPI CSI driver	YES
	RTC	LK8563T driver	YES
	GPIO	Generic GPIO driver	YES
	CAN	CAN driver	YES
	WiFi	AP6256 driver	YES
	BT	AP6256 driver	YES
File system	myir-image-lr3576-buildroot	Full-featured image built as Buildroot, weston desktop environment	YES
	myir-image-lr3576-debian	Images built on Debian 12 system	YES
	myir-image-lr3576-android	Images built on Android 15 system	YES
	myir-image-lr3576-ubuntu	Image with built with Ubuntu 22.04 system	YES
	myir-image-lr3576-yocto	Full-featured image built as Yocto	YES
	myir-image-lr3576-robot	Images built on Debian 11 system, integrating the ROS2 framework with various SLAM algorithms	YES

MYD-LR3576 Software Features

Order Information

Product Item	Part No.	Packing List
MYD-LR3576 Development Board	MYD-LR3576-32E4D-220-C	✓ One MYD-LR3576 Board ✓ One USB TYPE-C cable ✓ One WiFi/BT PCB Antenna (with ipex connector) ✓ One 12V/3A Power adapter ✓ One Quick Start Guide
	MYD-LR3576-64E8D-220-C	
MYD-LR3576J-GK Development Kit	MYD-LR3576J-32E4D-160-I-GK	✓ One MYD-LR3576 Board ✓ One MY-ICEB001 Expansion Board ✓ One USB Type-C cable ✓ One WiFi/BT PCB antenna (with ipex connector) ✓ One 12V/3A Power adapter ✓ One Quick Start Guide
	MYD-LR3576J-64E8D-160-I-GK	
MYC-LR3576 System-On-Module	MYC-LR3576-32E4D-220-C	**Add-on Options** ✓ One MYC-LR3576 SOM ✓ MY-MIPI101C LCD Module ✓ MY-CAM003M Camera Module ✓ MY-CAM005M Camera Module
	MYC-LR3576-64E8D-220-C	
	MYC-LR3576J-32E4D-160-I	
	MYC-LR3576J-64E8D-160-I	
MY-MIPI101C 10.1-inch LCD Module	MY-MIPI101C	
MY-CAM003M Camera Module	MY-CAM003M	
MY-CAM005M Camera Module	MY-CAM005M	

Note:

1. One MYD-LR3576 Development Board comprises one MYC-LR3576 SOM mounted onto the base board. If you require additional SOMs, you may place order for extras.

2. Bulk discounts are available. Please contact MYIR for inquiries.

3. We accept custom design based on the MYD-LR3576, whether reducing, adding or modifying the existing hardware according to customer's requirement.

MYIR Electronics Limited

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

Factory Address: Room 201, Block C, Shengjianli Industrial Park, Dafu Industrial Zone, Guanlan, Longhua District, Shenzhen, 518110, China

Website: en.myir.cn

Email: sales@myir.cn

Tel: +86-755-22984836