



# IAC-IMX8MP-KIT Hardware Manual

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## Version Records

Version	Hardware Version	Description	Date	Reviser
V2.00	IAC-IMX8MP-MB V2.00	Initial Version	2021-08	V2.00
V2.01	IAC-IMX8MP-MB V2.00	Change Pictures	2022-02	V2.01
V2.02	IAC-IMX8MP-MB V2.10	1. Change pictures 2. Revise UART's pin definition	2022-11	V2.02

# Catalogue

<b>I .Preface</b> .....	5
1.1 Company Profile.....	5
1.2 IAC-IMX8MP-KIT Development Board Use Suggestion: .....	6
<b>II .Production Description</b> .....	6
2.1 Chipset Outline .....	6
2.2 Development Board Resources .....	10
2.3 Core Board Resources .....	12
<b>III.Carrier Board Interface Function</b> .....	13
3.1 Interfaces' Functional Description.....	15
3.2 Jumper and DIP Switch Setting .....	17
3.3 Pin Definition.....	18
<b>IV. Structure &amp; Size</b> .....	32
4.1 Core board Dimension.....	32
4.2 Carrier Board Dimension.....	33
<b>V .Board To Board Connection Diagram</b> .....	34
<b>VI.Electrical Characteristics</b> .....	35
<b>VIII.Software Description</b> .....	36
<b>IX.Remark</b> .....	36

Notice: This manual introduces the hardware interface of the IAC-IMX8MP-KIT Development Board.

## I .Preface

### 1.1 Company Profile

Zhejiang Qiyang Intelligent Technology Co., Ltd., established in 2007, which locates in Hangzhou, Zhejiang, PRC. It is a high-end technological enterprise that specializes in exploitation, fabrication, and selling embedded computer mainboards . With 10 years of experiences, Qiyang has established the completed service chain from the design concept to mass production successfully.

The R&D team is organized by 30 more technical engineers. Qiyang focus on providing functional embedded hardware, software tool and customization solutions. It has been applied to Industrial Control, Internet of Things, New Retail, Smart Medical, Electricity Device, Environmental Surveillance, Charging Pile etc.

With the growth of the business, Qiyang has set up an SMT factory in Zhuji, Zhejiang province, which is 5000 m<sup>2</sup>, with a 2xSMT production line. The SMT factory performs the ISO9001 Quality Management System strictly. Relying on the solid production ability, the SMT factory's annual capacity is about a million sets, which totally guarantee the delivery date.

Qiyang has a thorough sales marketing network, professional sales ,and after-sales team to provide full technical support and service. The business has spread over 120 countries and areas, it helps the clients to introduce the products into the market efficiently and successfully.The combination and extension of research and development, production capacity, and market, that provide a solid foundation for Qiyang to provide specialized, globalized embedded hardware and software.

We offer:

#### 1.Software/Hardware Mainboard

Based on the CPU solution from NXP,Rockchip,MTK,Renesas,TI,Atmel,Cirrus Logic etc, Qiyang provides the ARM development kit/system on module/industrial board and periphery products, paired tools and software for the user do further exploitation.

#### 2.Customization Service

Fully taking the advantage of the technical accumulation on the ARM platform and Linux, Android, Ubuntu OS, Qiyang provides the efficient OEM/ODM service to the users.

**Sincerely thanks for using Qiyang's product, we will try our best to offer you the technical supports!**

## 1.2 IAC-IMX8MP-KIT Development Board Use Suggestion:

1. Please read the instructions firstly, before using the single board computer;
2. Before using, please check the packing list and see whether there is a missing file in the CD;
3. Please understand the basic structure and composition of development board, including the hardware resource allocation etc.;
4. If you need to develop on Linux operation system and flash program into the development board, in addition to this document, we also suggest reading another document ***IAC-IMX8MP-KIT Linux User Manual***;
5. If you need to develop on Android system and flash program into the development board, in addition to this document, we also suggest reading another document ***IAC-IMX8MP-KIT Android User Manual***;
6. ***IAC-IMX8MP-KIT*** development board supports batch order.

## II .Production Description

### 2.1 Chipset Outline

IAC-IMX8MP-KIT Development Board, it adopts NXP IMX8MPlus series processor, the i.MX 8M Plus family focuses on neural processing unit (NPU) and vision system, advance multimedia, and industrial automation with high reliability.

The i.MX 8M Plus is a powerful quad Arm® Cortex®-A53 processor with speed up to 1.8 GHz integrated with an NPU of 2.3 TOPS that greatly accelerate machine learning inference. The vision engine is composed of two camera inputs and an HDR-capable Image.Signal Processor (ISP) capable of 375 MPixels/s.

The advanced multimedia capabilities include 1080p60 video encode and decode H.265 and H.264. A 3D and 2D graphic acceleration supporting 1 GPixel/s, OpenVG 1.1, Open GL ES3.1, Vulkan, and Open CL 1.2 FP. Multiple audio and microphone interfaces for Immersive Audio and Voice systems.

For industrial applications, real time control is enabled by an integrated 800 MHz Arm® Cortex®-M7. Robust control networks are possible via CAN-FD interfaces. And a dual Gb Ethernet, one supporting Time Sensitive Networking (TSN), drive gateway applications with low latency. High industrial system reliability for safety is leveraged by DRAM Inline ECC as well as ECC support on internal software-accessible SRAMs.

**Block Diagram:**

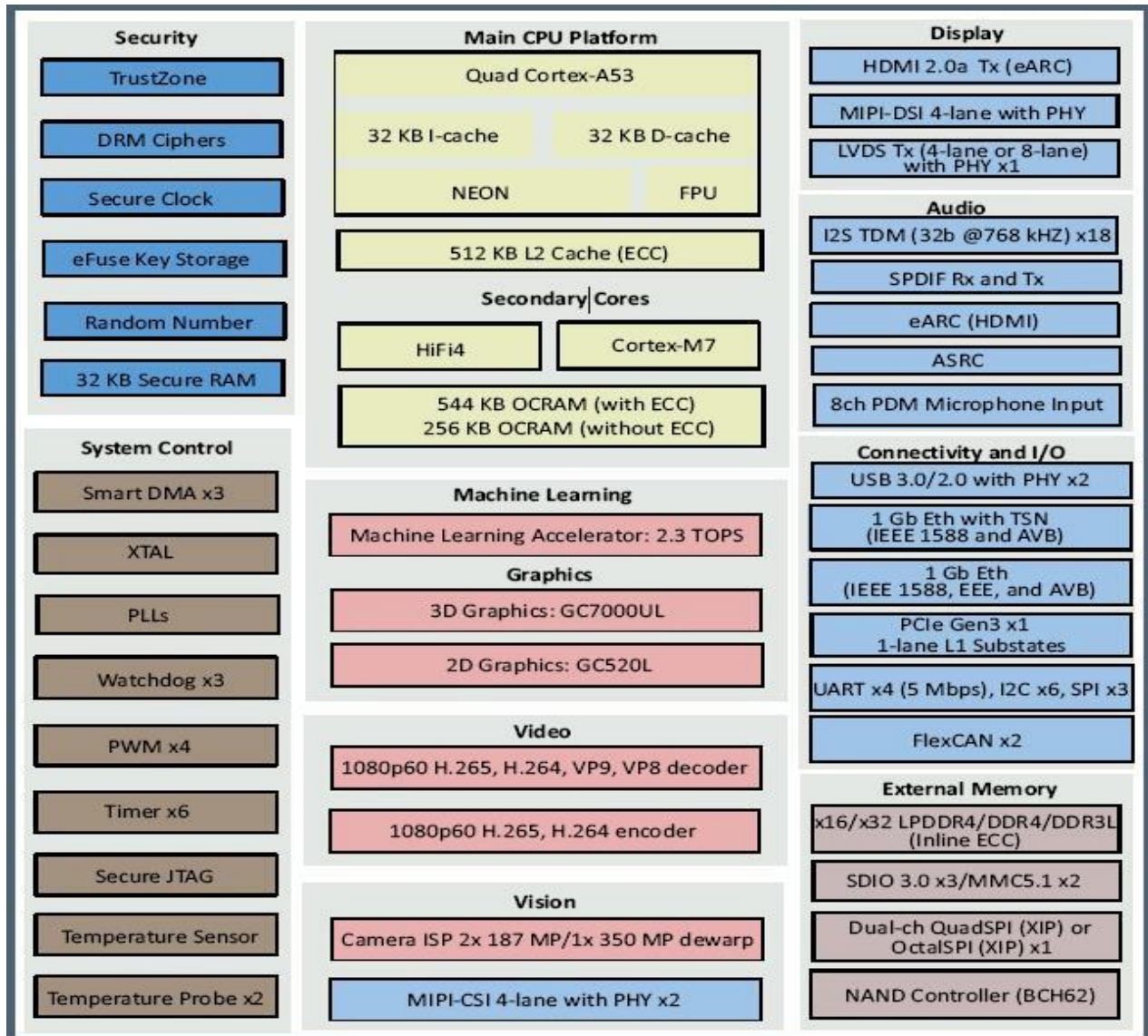


Chart 1

CORE	CPU	<ul style="list-style-type: none"> <li>● Quad Cortex®-A53 processors, frequency up to 1.8 GHz</li> <li>● 32 KB L1 Instruction Cache, 32 KB L1 Data Cache</li> <li>● 512 KB unified L2 cache</li> <li>● Support of 64-bit Armv8-A architecture</li> </ul>
	MCU	<ul style="list-style-type: none"> <li>● Arm®Cortex®-M7 800MHz</li> <li>● 32 KB L1 Instruction Cache, 32 KB L1 Data Cache</li> <li>● 256 KB TCM 包含 DTCM, ITCM (128KB+128KB) 256 KB tightly coupled memory (TCM) (128KB+128KB)</li> </ul>
Storage	On-chip Memory	<ul style="list-style-type: none"> <li>● Boot ROM (256 KB)</li> <li>● On-chip RAM (512KB + 32KB) with ECC support</li> </ul>
	External Storage	<ul style="list-style-type: none"> <li>● 16/32-bit DRAM Interface:LPDDR4-4000,DDR4-3200,DDR3L-1600</li> <li>● 8-bit NandFlash, including support for RAW MLC/SLC devices, BCH ECC up to 64bit, and ONFi3.2 compliance (clock rates up to 100MHz and data rates up to 200MB/Sec.)</li> <li>● EMMC 5.1 FLASH</li> <li>● SPI NOR FLASH</li> <li>● FlexSPI Flash with support for XIP (for Cortex®-M7 in low-power mode) and support for either one Octal SPI, or parallel read mode of two identical Quad SPI FLASH devices. It also supports both Serial NOR and Serial NAND flash using the FlexSPI.</li> </ul>
On-chip Unit	GPU	<ul style="list-style-type: none"> <li>● GC7000UL with OpenCL and Vulkan support</li> <li>● Supports OpenGL ES 1.1, 2.0, 3.0, OpenCL 1.2, Vulkan</li> <li>● GC520L for 2D acceleration</li> </ul>
	NPU	<ul style="list-style-type: none"> <li>● 2.3 TOP/s</li> </ul>
	ISP	<ul style="list-style-type: none"> <li>● It includes 2xISP, to support dual camera input</li> <li>● ISP 支持 375 Mpixel/s, 可支持配置 12MP@30fps, 4kp45, or 2x 1080p80 ISP supports 375 Mpixel/s, it could support 12MP@30fps, 4kp45, or 2x 1080p80</li> </ul>
	VPU	<p>Video Decoding</p> <ul style="list-style-type: none"> <li>● 1080p60 HEVC/H.265 Main, Main 10 (up to level 5.1)</li> <li>● 1080p60 VP9 Profile 0, 2</li> <li>● 1080p60 VP8</li> <li>● 1080p60 AVC/H.264 Baseline, Main, High decoder</li> </ul> <p>Video Encoding</p> <ul style="list-style-type: none"> <li>● 1080p60 AVC/H.264 encoder</li> <li>● 1080p60 HEVC/H.265 encoder</li> </ul>
Display Controller	LCDIF	<ul style="list-style-type: none"> <li>● Total three LCDIF controller, 1-ch HDMI, 1-ch LVDS, 1-ch MIPI DSI</li> <li>● Support 8-bit/16-bit/18-bit/32-bit color depth</li> <li>● When using 2-ch, it could support 1080p60</li> <li>● When using 3-ch display, it supports 1x1080p60 + 2x720p60</li> </ul>



		<ul style="list-style-type: none"> <li>● The highest resolution is 3840x2160p30</li> </ul>
Display Port	HDMI	<ul style="list-style-type: none"> <li>● HDMI 2.0a, HDCP 2.2 and HDCP 1.4 encryption technology</li> <li>● Pixel : 740x480p60, 720x480p60, 1280x720p60, 1920x1080p60</li> <li>● Support HDMI 2.1 eARC</li> </ul>
	LVDS	<ul style="list-style-type: none"> <li>● Dual-channel LVDS</li> <li>● Single channel supports 1366x768p60, PCLK=80MHz</li> <li>● Dual-channel supports 1366x768P60 to 1080p60,PCLK</li> </ul>
	MIPI DSI	<ul style="list-style-type: none"> <li>● Compliance with MIPI-DSI V1.2</li> <li>● Highest resolution: 1080p60,24-bit RGB</li> <li>● Support biggest channel 4LANE</li> <li>● HS:80-1.5Gbps/LANE,LP:10Mbps</li> </ul>
Video Input	MIPI CSI	<ul style="list-style-type: none"> <li>● Support 2*4-lane MIPI CSI camera input</li> <li>● When using 1*ISP, support MIPI CSI 1, PCLK=400MHz (Normal), bandwidth 80-1.5Gbps/lane.</li> <li>● When using 2*ISP, support MIPI CIS 1&amp;2: PCLK=266MHZ(normal), bandwidth 80-1.5Gbps/LANE, when only using two data LANE, the rate support 1.5Gbps/lane</li> <li>● Support formats RAW8, RAW10, RAW14, YCbCr420, YCbCR422</li> </ul>
Audio		<ul style="list-style-type: none"> <li>● Audio DSP, working frequency 800MHz</li> <li>● SPDIF IN &amp;OUT</li> <li>● 6-ch SAI, support I2S, AC97, TDM</li> <li>● BCLK=49.152MHz</li> <li>● 8 kHz to 384kHz sampling rate</li> <li>● Support audio sampling rate conversion from 1/16 to 8x</li> <li>● Support 8-ch PDM MIC input</li> </ul>
Interface	PCIE	<ul style="list-style-type: none"> <li>● PCIE3.0*1, XX1-LANE, 8GT/S encoding format 128b/130b, backward compatible with encoding format 8b/10b</li> </ul>
	USB	<ul style="list-style-type: none"> <li>● USB3.0*2, also support USB2.0, bandwidth 5Gbps</li> </ul>
	ENET	<ul style="list-style-type: none"> <li>● RGMII&amp;RMII*2, both support EEE, AVB, IEEE1588, ENET support TSN</li> </ul>
	uSDHC	<ul style="list-style-type: none"> <li>● uSDHC*3</li> <li>● uSDHC1&amp;uSDHC3 support EMMC5.1, support HS400 DDR mode, Maximum 400MB/S</li> <li>● SDIO/SD 3.01 conforms to SDR mode, 200MHZ clock rate is up to 100MB/S</li> <li>● Support SDXC</li> </ul>
	CAN/CANFD	<ul style="list-style-type: none"> <li>● CAN/CANFD*2</li> </ul>
	UART	<ul style="list-style-type: none"> <li>● UART*4</li> <li>● The baud rate of fast mode is up to 4.15 Mbit/s.</li> <li>● Low-speed mode(IR) baud rate 115.2 Kbit/s</li> <li>● UART2&amp;A53 DEBUG UART4&amp;M7 DEBUG</li> </ul>
	I2C	<ul style="list-style-type: none"> <li>● I2C*6</li> <li>● Standard mode: 100Kbit/S</li> </ul>

		<ul style="list-style-type: none"> <li>Fast mode: 400Kbit/S</li> </ul>
	SPI	<ul style="list-style-type: none"> <li>SPI*3</li> </ul>

## 2.2 Development Board Resources

Hardware Information	CPU	NXP i.MX8M Plus processor	
	Processor	Quad ARM® Cortex™-A53 core+ Cortex-M7 core, i.MX8M Plus processor's frequency @ 1.6GHz, Cortex®-M7 processor's frequency @800 MHz	
	GPU	GC7000UL with OpenCL and Vulkan support Support 16 GFLOPS(high precision) OpenGL ES 3.0/3.1, Vulkan, Open CL 1.2FP, OpenVG1.1	
	VPU	Support 1080p60, h.265/4, VP8, VP9 video decoding Support 1080p60, h.265/4 video encoding	
	NPU	Neural processor unit: 2.3 TOPS in max.	
	ISP	Dual image signal processor (ISP): resolution up to 12MP, input rate up to 375M pixels/s	
	RAM	2GB LPDDR4 (Std.)	
	Flash	8GB eMMC (16GB eMMC, 32GB eMMC Opt.) (QSPI Flash selectable)	
	PMIC	NXP PCA9450 power management unit	
	Ethernet	2-ch network chip adopts RGMII mode to perfectly support 10M/100M/1000M Ethernet	
	WiFi	Onboard WiFi module, support 2.4GHz/5GHz dual-band WiFi, 802.11a/b/g/n/ac protocol	
	Communication Interface	1-ch Cortex-A53 UART debug port, 1-ch Cortex-M7 UART debug port	
		4-ch RS232 serial ports (including 3-ch three-wire RS232 serial ports and 1-ch five-wire RS232 serial port)	
		1-ch RS485 port	
		2-ch CANFD port	
	Display interface	1-ch 4-Lane MIPI_DSI display interface, resolution up to 1920x1080@60	
		1-ch dual-channel LVDS display interface, resolution up to 1920x1080@60	
		1-ch HDMI display interface (including eARC function), resolution up to 1920x1080@60	
	Audio interface	2-ch Speaker, audio amplifier output	
		Dual channel audio output (Earphone jack)	
MIC audio input			
USB interface	3-ch USB3.0 HOST interface		
	1-ch USB Type-C interface		
Camera Interface	2-ch MIPI-CSI (4-Lane), support simultaneous input of two cameras		

	Input Interface	Standard I2C capacitive screen interface
	Extension Interface	M.2 M-KEY interface, to connect external SSD module
		M.2 B-KEY interface, to connect external 5G module, SIM card slot
		3-ch GPIO (1.8V)
	Storage Interface	1-ch TF card slot
	Other devices	Reset circuit, watchdog circuit, real-time clock
Power Input	+12V power supply	
Software resources	Development Tools	Development environment: virtual machine VM15.5.0+Ubuntu 14.04 or Ubuntu 16.04
		Application developing and debugging tools
		Cross-compiler
		Common terminal developing and debugging tools
	System Image	The matched Image file for the operating system
	Test program	Interface application demo test program and test program source code
	Source code	Bootloader, kernel, Bootloader, kernel, file system source code
	Manual	Hardware manual, test manual, device manual, etc
	Schematic	Schematic of the back board (PDF file)
Mechanical Chart	Back board mechanical drawing (DXF file)	
Electrical characteristics	Layer/ Size	Core board size: 60mm*63mm, 8-layer board high-precision immersion gold process
		Back board size: 200mm*150mm, 4-layer board high-precision immersion gold process
	Power Consumption	<b>Power consumption ≤5W (No loaded consumption).</b>
	Operation Temperature	-40℃ ~ +85℃ or 0℃ ~ +70℃
	Storage Temperature	-40℃ ~ +85℃
	Working Humidity	5% to 95%, non-condensing
	Core Board Option 1	2GB DDR/16GB eMMC (-40℃ ~ +85℃)
	Core Board Option 2	2GB DDR/8GB eMMC (0℃ ~ +70℃)

## 2.3 Core Board Resources

IAC-IMX8MP-CM core board adopts 8-layer PCB board high-precision immersion gold technology, high TG board, with reliable electrical performance and anti-interference performance. It integrated with CPU, LPDDR4, eMMC, power management chip, etc. The board-to-board connector leads to more than 200 pins, which fully expand the hardware resources of i.MX8MPlus, and can multiplex and combine different interface functions according to the pin conditions to make a bottom board that meets the needs.

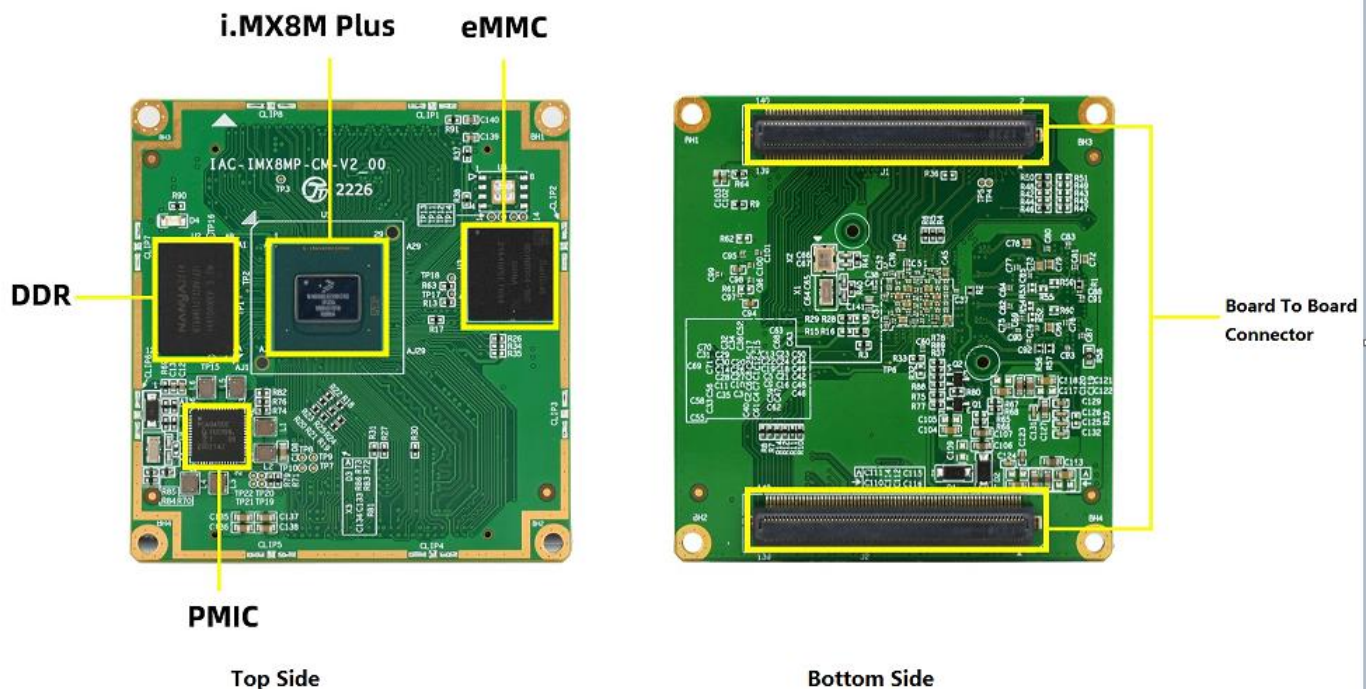


Chart 2

- ◆ Onboard NXP i.MX8M Plus processor
- ◆ Onboard 2GB LPDDR4, 16GB eMMC (default configuration, industrial grade)
- ◆ The core board adapts 8-layer PCB board high-precision immersion gold technology
- ◆ Core board size: 60mm\*63mm, it is suitable for various embedded occasions
- ◆ The core board uses 2X140Pin board to board connectors to lead out the core board resources
- ◆ Using 5V power supply, onboard power management chip
- ◆ Support Linux 5.10.35;Qt5.15.2
- ◆ Support Android 11

The pin definition of the core board, please refer to the interface function of back board.

### III. Carrier Board Interface Function

#### Carrier Board's Block Diagram-Top Side

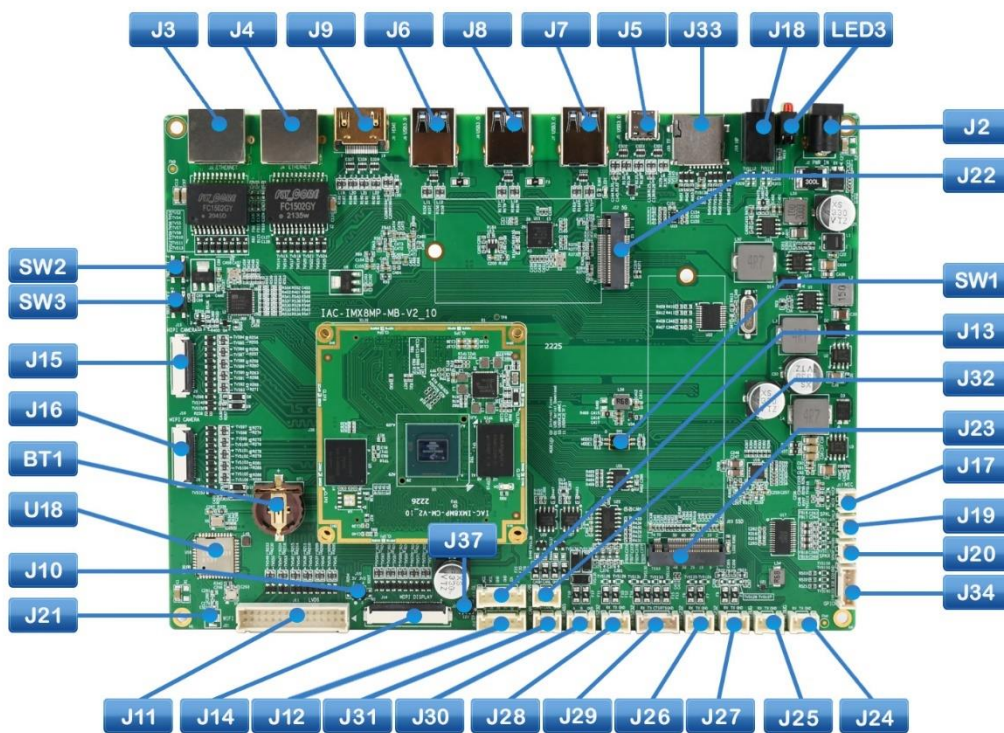


Chart 3

## Carrier Board's Block Diagram-Bottom Side

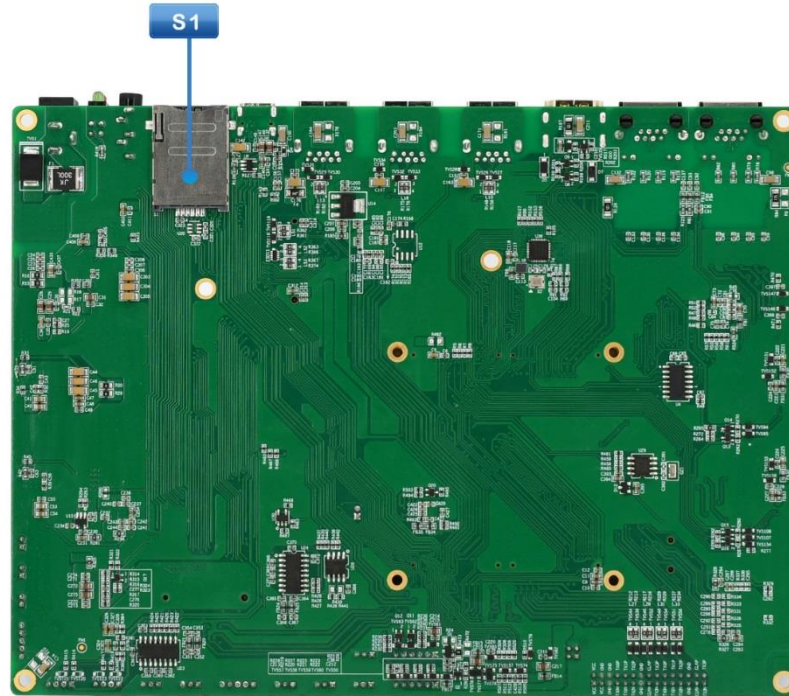


Chart 4

### 3.1 Interfaces' Functional Description

Label	Function
J2	DC12V power input interface
J22	M.2 B-KEY socket (connect to 4G/5G module)
SW1	DIP switch for BOOT Method
J13	LCD screen backlight interface
J37	5V/12V Jumper (LCD backlight)
J32	CAN interface
J23	M.2 M-KEY socket (To connect SSD module)
J17	MIC input
J19	Speaker output
J20	Speaker output
J34	GPIO Interface
J24	Cortex-A53 debug port (With RS232 level)
J25	Cortex-M7 debug port (With RS232 level)
J27	RS232 port
J26	RS232 port
J29	RS232 port (5-wire)
J28	RS232 port
J30	RS485 port
J31	CAN interface
J12	I2C interface (capacitive touch screen interface)
J14	MIPI-DSI display interface
J11	LVDS display interface

J21	WiFi-IPEX antenna interface
J10	3.3V/5V jumper
U18	WiFi module
BT1	RTC battery
J16	MIPI-CSI interface
J15	MIPI-CSI interface
SW3	ON/OFF switch
SW2	Reset Switch
J3	Gigabit Ethernet interface
J4	Gigabit Ethernet interface
J9	HDMI display interface
J6	USB3.0 HOST port
J8	USB3.0 HOST port
J7	USB3.0 HOST port
J5	Type-C port
J33	TF card slot
J18	Earphone jack
S1	SIM card slot (At bottom side)



## 3.2 Jumper and DIP Switch Setting

Back board DIP switch setting: SW1: BOOT MODE

SW1	SW2	BOOT MODE
0	0	Boot From Internal Fuses
1	0	USB Serial Download
0	1	USDHC3 (eMMC boot only)
1	1	USDHC2 (TF boot only)

### 3.3 Pin Definition

J1A: (Core Board's Board To Board Connector Pin Definition)

Multiplexing GPIO	Signal Name	PIN #	PIN#	Signal Name	Multiplexing GPIO
	BOOT_MODE0	1	2	BOOT_MODE1	
	GPIO_USB1_PWREN	3	4	GPIO_SSD_nPERST	
	GPIO_DSI_nRST	5	6	GPIO_SSD_nPEWA KE	
	GPIO_DSI_TP_nRST	7	8	GPIO_SSD_nCLKR EQ	
	GPIO_DSI_TP_nINT	9	10	GPIO_CC_nINT	
	PWM1_OUT	11	12	GPIO_TYPEC_XSD	
	PWM2_OUT	13	14	GPIO_TYPEC_SEL	
	GPIO_DSI_BL_EN	15	16	GND	
	GND	17	18	USB1_RX_N	
	USB1_D_N	19	20	USB1_RX_P	
	USB1_D_P	21	22	GND	
	USB1_ID	23	24	USB1_TX_N	
	USB1_VBUS	25	26	USB1_TX_P	
	USB2_ID	27	28	GND	
	USB2_VBUS	29	30	USB2_RX_N	
	USB2_D_N	31	32	USB2_RX_P	
	USB2_D_P	33	34	GND	
	GND	35	36	USB2_TX_N	
	JTAG_TDO	37	38	USB2_TX_P	
	JTAG_TMS	39	40	GND	

	JTAG_TDI	41	42	PCIE_RX_N	
	JTAG_TCK	43	44	PCIE_RX_P	
	GND	45	46	GND	
	PCIE_REF_CLK_N	47	48	PCIE_TX_N	
	PCIE_REF_CLK_P	49	50	PCIE_TX_P	
	GND	51	52	GND	
	MIPI_CSI1_D0_N	53	54	MIPI_DSI_D0_N	
	MIPI_CSI1_D0_P	55	56	MIPI_DSI_D0_P	
	MIPI_CSI1_D1_N	57	58	MIPI_DSI_D1_N	
	MIPI_CSI1_D1_P	59	60	MIPI_DSI_D1_P	
	MIPI_CSI1_CLK_N	61	62	MIPI_DSI_CLK_N	
	MIPI_CSI1_CLK_P	63	64	MIPI_DSI_CLK_P	
	MIPI_CSI1_D2_N	65	66	MIPI_DSI_D2_N	
	MIPI_CSI1_D2_P	67	68	MIPI_DSI_D2_P	
	MIPI_CSI1_D3_N	69	70	MIPI_DSI_D3_N	
	MIPI_CSI1_D3_P	71	72	MIPI_DSI_D3_P	
	GND	73	74	GND	
	MIPI_CSI2_D3_N	75	76	LVDS1_D0_P	
	MIPI_CSI2_D3_P	77	78	LVDS1_D0_N	
	MIPI_CSI2_D2_N	79	80	LVDS1_D1_P	
	MIPI_CSI2_D2_P	81	82	LVDS1_D1_N	
	MIPI_CSI2_CLK_N	83	84	LVDS1_CLK_P	
	MIPI_CSI2_CLK_P	85	86	LVDS1_CLK_N	
	MIPI_CSI2_D1_N	87	88	LVDS1_D2_P	
	MIPI_CSI2_D1_P	89	90	LVDS1_D2_N	
	MIPI_CSI2_D0_N	91	92	LVDS1_D3_P	

	MIPI_CSI2_D0_P	93	94	LVDS1_D3_N	
	GND	95	96	GND	
GPIO2_IO2	SD1_DATA0	97	98	LVDS0_D0_P	
GPIO2_IO3	SD1_DATA1	99	100	LVDS0_D0_N	
GPIO2_IO4	SD1_DATA2	101	102	LVDS0_D1_P	
GPIO2_IO5	SD1_DATA3	103	104	LVDS0_D1_N	
GPIO2_IO6	GPIO_WIFI_REG_ON	105	106	LVDS0_CLK_P	
GPIO2_IO7	GPIO_WIFI_WAKE_H OS	107	108	LVDS0_CLK_N	
GPIO2_IO8	GPIO_RUN_LED	109	110	LVDS0_D2_P	
GPIO2_IO9	GPIO_USB3HUB_nRS T	111	112	LVDS0_D2_N	
GPIO2_IO1	SD1_CMD	113	114	LVDS0_D3_P	
GPIO2_IO0	SD1_CLK	115	116	LVDS0_D3_N	
GPIO2_IO10	GPIO_WDT_EN	117	118	GND	
GPIO2_IO11	GPIO_WDT_FEED	119	120	NAND_nREADY	GPIO3_IO16
	GND	121	122	NAND_DQS	GPIO3_IO14
GPIO2_IO15	SD2_DATA0	123	124	CPU_ONOFF	
GPIO2_IO16	SD2_DATA1	125	126	GPIO_LVDS_TP_nI NT	GPIO5_IO3
GPIO2_IO17	SD2_DATA2	127	128	GPIO_LVDS_TP_nR ST	GPIO5_IO4
GPIO2_IO18	SD2_DATA3	129	130	GPIO_LED_EN	GPIO5_IO5
GPIO2_IO14	SD2_CMD	131	132	GND	
GPIO2_IO13	SD2_CLK	133	134	VCC_SD1	
GPIO2_IO20	GPIO_BL_PWR_EN	135	136	VCC_SD_3V3	

GPIO2_IO12	SD2_nCD	137	138	VCC_SD_3V3	
	GND	139	140	GND	

J1B: (Core Board 's Board To Board Connector Pin Definition)

Multiplexing GPIO	Signal Name	PIN#	PIN#	Signal Name	Multiplexing GPIO
	VCC_SYS_5V0	1	2	VCC_SYS_5V0	
	VCC_SYS_5V0	3	4	VCC_SYS_5V0	
	VCC_SYS_5V0	5	6	VCC_SYS_5V0	
	VCC_SYS_5V0	7	8	VCC_SYS_5V0	
	VCC_SYS_5V0	9	10	VCC_SYS_5V0	
	GND	11	12	GND	
	GND	13	14	GND	
	GND	15	16	GND	
	GND	17	18	GND	
	GND	19	20	GND	
	GND	21	22	GND	
	VDD_3V3	23	24	VDD_1V8	
	VDD_3V3	25	26	VDD_1V8	
	VDD_3V3	27	28	GND	
	GND	29	30	WDT_nRST	
	CLK_OUT_32K	31	32	PMIC_nRST	
	GND	33	34	GND	
GPIO5_IO23	UART1_TXD	35	36	UART2_TXD	GPIO5_IO25
GPIO5_IO22	UART1_RXD	37	38	UART2_RXD	GPIO5_IO24
GPIO5_IO27	GPIO_RS485_DIR	39	40	UART4_TXD	GPIO5_IO29
GPIO5_IO26	GPIO_CS11_PWR_EN	41	42	UART4_RXD	GPIO5_IO28

GPIO5_IO17	I2C2_SDA	43	44	GND	
GPIO5_IO16	I2C2_SCL	45	46	GPIO_CSI1_PWDN	GPIO4_IO0
GPIO5_IO19	I2C3_SDA	47	48	GPIO_CSI1_nRST	GPIO4_IO1
GPIO5_IO18	I2C3_SCL	49	50	GPIO_CSI2_PWDN	GPIO4_IO2
GPIO5_IO21	I2C4_SDA	51	52	GPIO_CSI2_nRST	GPIO4_IO3
GPIO5_IO20	I2C4_SCL	53	54	GND	
	GND	55	56	GPIO_CSI2_PWR_E N	GPIO4_IO20
GPIO4_IO15	ENET1_TD3	57	58	ENET1_RD3	GPIO4_IO9
GPIO4_IO14	ENET1_TD2	59	60	ENET1_RD2	GPIO4_IO8
GPIO4_IO13	ENET1_TD1	61	62	ENET1_RD1	GPIO4_IO7
GPIO4_IO12	ENET1_TD0	63	64	ENET1_RD0	GPIO4_IO6
GPIO4_IO16	ENET1_TX_CTL	65	66	ENET1_RX_CTL	GPIO4_IO10
GPIO4_IO19	GPIO_ENET1_nINT	67	68	GPIO_ENET1_nRST	GPIO4_IO18
GPIO4_IO17	ENET1_TXC	69	70	ENET1_RXC	GPIO4_IO11
GPIO4_IO4	ENET1_MDC	71	72	ENET1_MDIO	GPIO4_IO5
	GND	73	74	GND	
GPIO3_IO25	SAI5_MCLK	75	76	CAN2_RXD	GPIO4_IO27
GPIO3_IO19	GPIO_SSD_PWR_EN	77	78	CAN1_RXD	GPIO4_IO25
GPIO3_IO20	GPIO_5G_PWR_EN	79	80	CAN1_TXD	GPIO4_IO22
GPIO3_IO24	GPIO_ENET_nRST	81	82	GPIO_5G_ON_OFF	GPIO4_IO24
GPIO3_IO21	GPIO_ENET_nINT	83	84	GPIO_5G_W_DIS	GPIO4_IO21
GPIO3_IO23	GPIO_AUD_PWR_EN	85	86	GPIO_5G_nRST	GPIO4_IO23
GPIO3_IO22	GPIO_AUD_AMP_nS D	87	88	CAN2_TXD	GPIO4_IO26
	GND	89	90	GND	

GPIO5_IO2	SAI3_MCLK	91	92	EARC_N_HPD	
GPIO4_IO29	GPIO_EXP_UART_RS T	93	94	EARC_P_UTIL	
GPIO4_IO30	SAI3_RXD	95	96	GND	
GPIO4_IO28	GPIO_EXP_UART_IR Q1	97	98	HDMI_DDC_SCL	
GPIO5_IO0	SAI3_TXC	99	100	HDMI_DDC_SDA	
GPIO5_IO1	SAI3_TXD	101	102	HDMI_CEC	
GPIO4_IO31	SAI3_TXFS	103	104	HDMI_HPD	
	GND	105	106	GND	
GPIO5_IO8	UART3_CTS	107	108	HDMI_TXC_N	
GPIO5_IO7	UART3_TXD	109	110	HDMI_TXC_P	
GPIO5_IO9	UART3_RTS	111	112	HDMI_TX0_N	
GPIO5_IO6	UART3_RXD	113	114	HDMI_TX0_P	
GPIO5_IO12	ECSPI2_MISO	115	116	HDMI_TX1_N	
GPIO5_IO11	ECSPI2_MOSI	117	118	HDMI_TX1_P	
GPIO5_IO13	ECSPI2_SS0	119	120	HDMI_TX2_N	
GPIO5_IO10	ECSPI2_SCLK	121	122	HDMI_TX2_P	
	GND	123	124	GND	
GPIO1_IO26	ENET_RD0	125	126	ENET_TD0	GPIO1_IO21
GPIO1_IO27	ENET_RD1	127	128	ENET_TD1	GPIO1_IO20
GPIO1_IO28	ENET_RD2	129	130	ENET_TD2	GPIO1_IO19
GPIO1_IO29	ENET_RD3	131	132	ENET_TD3	GPIO1_IO18
GPIO1_IO24	ENET_RX_CTL	133	134	ENET_TX_CTL	GPIO1_IO22
GPIO1_IO25	ENET_RXC	135	136	ENET_TXC	GPIO1_IO23
GPIO1_IO16	ENET_MDC	137	138	ENET_MDIO	GPIO1_IO17

	GND	139	140	GND	
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#### J17: MIC input interface

Pin No.	Signal Name
1	AUD_MIC-
2	AUD_MIC+

#### J19: Speaker output interface (Amplifier output)

Pin No.	Signal Name
1	OUTNL
2	OUTPL

#### J20: Speaker output interface (Amplifier output)

Pin No.	Signal Name
1	OUTPR
2	OUTNR

#### J34: GPIO Interface

Pin No.	Signal Name
1	VCC_EXT_1V8 (VCC-1.8V)
2	IO1 (GPIO3_IO14)
3	IO2 (GPIO3_IO16)
4	IO3 (GPIO3_IO25)
5	GND



## J24: Cortex-A53 Debug UART (RS232 level)

Pin No.	Signal Name
1	TXD
2	RXD
3	GND

## J25: Cortex-M7 Debug UART (RS232 Level)

Pin No.	Signal Name
1	VCC_SYS_3V3 (VCC-3.3V)
2	UART4_RXD
3	UART4_TXD
4	GND

## J26/J27/J28: RS232

Pin No.	Signal Name
1	RXD
2	TXD
3	GND

## J29: RS232

Pin No.	Signal Name
1	RXD
2	TXD
3	CTS
4	RTS
5	GND

## J30: RS485

Pin No.	Signal Name
1	RS485_A
2	RS485_B
3	GND

## J31/J32: CAN

Pin No.	Signal Name
1	CANH
2	CANL
3	GND

## J12: I2C Interface (Capacitive Touch Screen)

Pin No.	Signal Name
1	VCC_EXT_3V3
2	TP_I2C_SCL
3	TP_I2C_SDA
4	TP_nINT
5	TP_nRST
6	GND

## J13: BL Interface (LCD Screen Backlight Interface)

Pin No.	Signal Name
1	VCC_BL (5.0V/12.0V)
2	VCC_BL (5.0V/12.0V)

3	GND
4	GND
5	LED_EN (3.3V/5.0V)
6	LED_PWM (PWM)

**J37: 5.0V/12.0V Jumper**

Signal Name	PIN#	PIN#	Signal Name
VCC_EXT_12V0	1	2	VCC_BL
VCC_EXT_5V0	3	4	VCC_BL

**J14: MIPI-DSI Interface**

Pin No.	Signal Name
1	DSI_TP_I2C_SDA
2	DSI_TP_I2C_SCL
3	DSI_TP_nRST
4	DSI_TP_nINT
5	DSI_BL_EN
6	VCC_EXT_5V0 (VCC-5.0V)
7	VCC_EXT_5V0 (VCC-5.0V)
8	VCC_EXT_5V0 (VCC-5.0V)
9	VCC_EXT_5V0 (VCC-5.0V)
10	GND
11	GND
12	GND
13	NC

14	DSI_nRST
15	NC
16	GND
17	DSI_D3_N
18	DSI_D3_P
19	GND
20	DSI_D0_N
21	DSI_D0_P
22	GND
23	DSI_CLK_N
24	DSI_CLK_P
25	GND
26	DSI_D1_N
27	DSI_D1_P
28	GND
29	DSI_D2_N
30	DSI_D2_P
31	GND
32	DSI_PWM
33	GND
34	GND
35	GND
36	GND
37	VCC_EXT_12V0 (VCC-12.0V)
38	VCC_EXT_12V0 (VCC-12.0V)
39	VCC_EXT_12V0 (VCC-12.0V)

40

VCC\_EXT\_12V0 (VCC-12.0V)

J10: 3.3V/5V jumper

Signal Name	Pin No.	Pin No.	Signal Name
VCC_LVDS_LCD	1	2	VCC_EXT_5V0
VCC_LVDS_LCD	3	4	VCC_EXT_3V3

J11: LVDS Interface

Signal Name	Pin No.	Pin No.	Signal Name
VCC_LVDS_LCD	1	2	VCC_LVDS_LCD
VCC_LVDS_LCD	3	4	GND
GND	5	6	GND
LVDS0_TX0_N	7	8	LVDS0_TX0_P
LVDS0_TX1_N	9	10	LVDS0_TX1_P
LVDS0_TX2_N	11	12	LVDS0_TX2_P
GND	13	14	GND
LVDS0_CLK0_N	15	16	LVDS0_CLK0_P
LVDS0_TX3_N	17	18	LVDS0_TX3_P
LVDS1_TX0_N	19	20	LVDS1_TX0_P
LVDS1_TX1_N	21	22	LVDS1_TX1_P
LVDS1_TX2_N	23	24	LVDS1_TX2_P
GND	25	26	GND
LVDS1_CLK1_N	27	28	LVDS1_CLK1_P
LVDS1_TX3_N	29	30	LVDS1_TX3_P

J14: MIPI-CSI Interface

Pin No.	Signal Name
1	VCC_EXT_5V0 (VCC-5.0V)
2	GND
3	VCC_EXT_3V3 (VCC-3.3V)
4	VCC_EXT_3V3 (VCC-3.3V)
5	GND
6	CSI1_CK_N
7	CSI1_CK_P
8	GND
9	CSI1_D0_N
10	CSI1_D0_P
11	GND
12	CSI1_D1_N
13	CSI1_D1_P
14	GND
15	CSI1_D2_N
16	CSI1_D2_P
17	GND
18	CSI1_D3_N
19	CSI1_D3_P
20	GND
21	CSI1_I2C_SDA
22	CSI1_I2C_SCL
23	CSI1_PWDN
24	CSI1_nRST

25	GND
26	CSI1_PWR_EN

**J15: MIPI-CSI**

Pin No.	Signal Name
1	VCC_EXT_5V0 (VCC-5.0V)
2	GND
3	VCC_EXT_3V3 (VCC-3.3V)
4	VCC_EXT_3V3 (VCC-3.3V)
5	GND
6	CSI2_CK_N
7	CSI2_CK_P
8	GND
9	CSI2_D0_N
10	CSI2_D0_P
11	GND
12	CSI2_D1_N
13	CSI2_D1_P
14	GND
15	CSI2_D2_N
16	CSI2_D2_P
17	GND
18	CSI2_D3_N
19	CSI2_D3_P
20	GND
21	CSI2_I2C_SDA

22	CSI2_I2C_SCL
23	CSI2_PWDN
24	CSI2_nRST
25	GND
26	CSI2_PWR_EN

## IV. Structure & Size

Unit: mm, if you need the size of the connector, please email: [supports@qiyangtech.com](mailto:supports@qiyangtech.com)

### 4.1 Core board Dimension

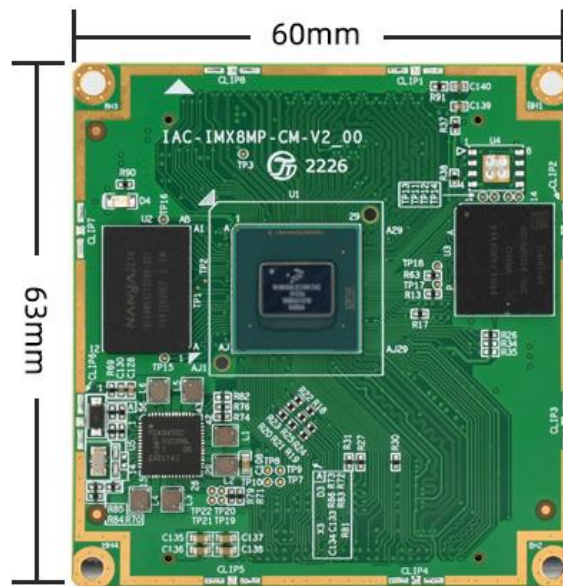


Chart 5



## 4.2 Carrier Board Dimension

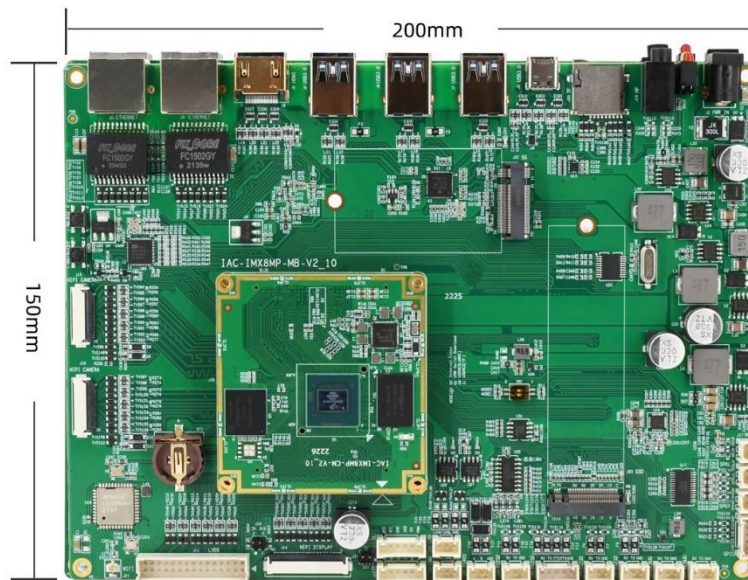


Chart 6

## V. Board To Board Connection Diagram

Pay attention to the direction of the core board: (refer to the figure below)

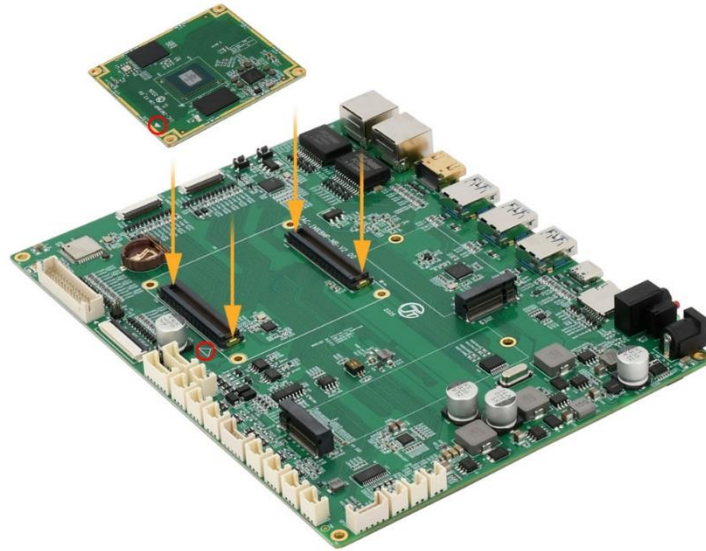


Chart 7

## VI. Electrical Characteristics

Item	Parameter
Operation Temperature	-40℃ ~ +85℃
Storage Temperature	-40℃ ~ +85℃
Working Humidity	5% to 95%, non-condensing
Core Board Dimension	63mm*60mm, 8-layer board high precision immersion gold process
Back Board Dimension	200mm*150mm, 4-layer board high precision immersion gold process
Development Board power consumption	About 5W (No loaded consumption)
Power Supply	DC12V/2.5A

## VIII. Software Description

IAC-IMX8MP-KIT provides software support, mainly including Linux/Android.

IAC-IMX8MP-KIT Linux User Manual introduces how to establish and use the development environment in Linux OS specifically. If you need details, please reference that manual.

IAC-IMX8MP-KIT Android User Manual introduces how to establish and use the development environment in Android OS particularly. If you need details, please reference that manual.

## IX. Remark

1. Before connecting to LCD, please confirm LCD power specification.
2. Please use the original connecting accessories to avoid damaging the main board.
3. We ensure offering communication technology support through E-mail, telephone for lifelong technical support service.
4. We ensure offering 6-months repair service for free, if malfunction occurs in warranty because of quality problem. Under that circumstance, please contact our retailer or our company with purchase receipt within warranty period, we are willing to repair or replace.
5. Under these circumstances, we do not offer repair for free:
  - Over warranty time;
  - Do not attach purchase receipt;
  - Liquid inlet, damp or mold;
  - Malfunction and damage is not due to product quality but drops, intense sharking, arbitrarily modify, disoperation after purchase;
  - Damage of force majeure.
6. We reserve intellectual property for the software and hardware technical data of IAC-IMX8MP-KIT; users can only use them for teaching, testing, researching. Shall not be engaged in any commercial purpose. Shall not distribute them on the Internet. Shall not intercept, modify them to tamper copyright.
7. We accept batch order. We can offer technical support and service.

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