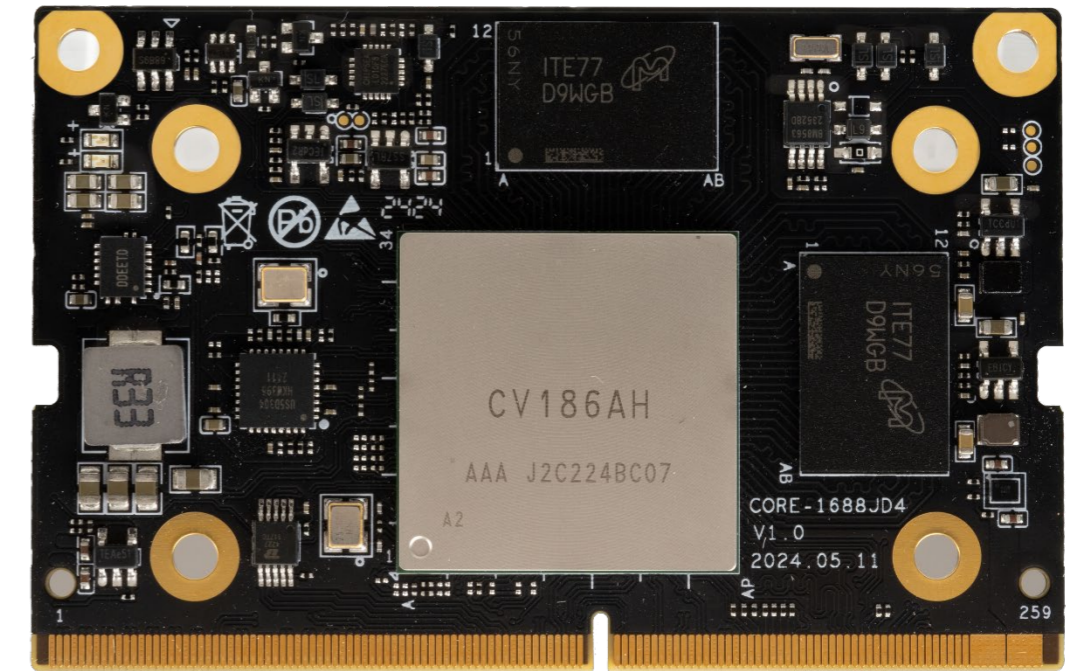




Core-186JD4

7.2TOPS Computing Power AI Core board



V1.0 2024-12-6

T-CHIP INTELLIGENCE TECHNOLOGY



Product features



7.2T INT8/12T INT4 high computing power

Equipped with SOPHON computing AI processor CV186AH, it has a hexa-core ARM Cortex-A53, with a maximum frequency of 1.6GHz. Built-in SOPHGO neural network acceleration engine TPU, with computing power up to 12T@INT4, 7.2T@INT8, 1.5T@FP16/BF16.



AI processing performance for multi-channel video

Support 16-channel H.265/H.264 1080p@30fps video decoding, 10-channel H.265/H.264 1080p@30fps video encoding, 1080P@480fps JPEG codec.



Powerful ISP image processing performance

It supports 6-channel sensor input video, and supports image processing functions such as wide dynamic range, shadow correction, lens distortion correction, purple edge correction, Bayer noise reduction, 3D noise reduction, 3A, dehaze, dynamic contrast enhancement, etc.



Strong network communication capabilities

The core board has an onboard Ethernet PHY chip, which can lead to 2 Gigabit Ethernet through the MDI interface, WiFi/Bluetooth can be expanded through the SDIO, and 5G/4G wireless network can be expanded through USB3.0/USB2.0, so that the network communication has a higher speed.



Product features



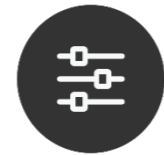
The private deployment of large language models

Support the private deployment of ultra-large-scale parameter models under the Transformer architecture, including large language models such as Gemma-2B, LLaMa2-7B, Qwen1.5-1.8B, ChatGLM3-6B. Support Docker container management technology.



Multiple deep learning frameworks

Support traditional network architectures such as CNN, RNN, and LSTM; a variety of deep learning frameworks, including TensorFlow, Pytorch, PaddlePaddle, Caffe and ONNX, as well as custom operator development.



Abundant expansion interfaces

It has MIPI-CSI, MIPI-DSI, HDMI2.0, PCIe3.0, SATA3.0, USB3.0, USB2.0, SDIO, I2C, I2S, SPI, UART, CAN, PWM, ADC, GPIO and other expansion interfaces.



Wide range of application scenarios

It is widely used in intelligent computing servers, edge intelligent computing boxes, industrial computers, intelligent network cameras, AIOT, intelligent security and other types of products and fields.

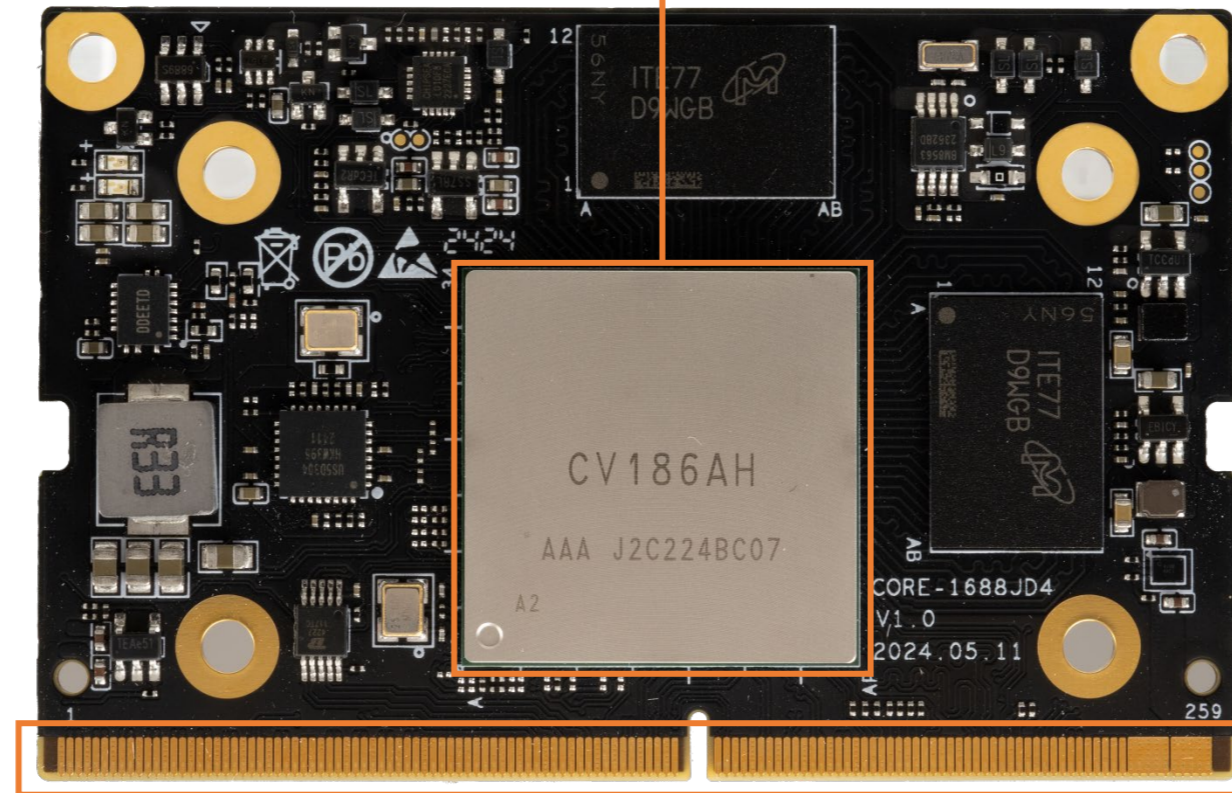
Specifications



Specification		
Basic Specifications	SOC	SOPHON CV186AH
	CPU	Hexa-core 64-bit ARM Cortex-A53 @ 1.6GHz
	TPU	Built-in SOPHGO neural network acceleration engine TPU, computing power up to 7.2T@INT8, 12T@INT4, 1.5T@FP16/BF16
	ISP	Time-sharing multiplexing for up to 6 sensor input videos, with maximum widths of 4608 (non-tile mode) and 8192 (tile mode) Supports Sensor self-band dynamic and 2-frame wide dynamic range, and the maximum performance supports: 12M@30 HDR or 8K@15 SDR or 16M@30 SDR Support RGB-IR, AI ISP interface, 3A (AE/AWB/AF, 3A control user adjustable) Support fixed mode noise removal, dead pixel correction, shadow correction, lens distortion correction, purple edge correction, Bayer noise reduction, 3D denoising, image edge enhancement, dehazing, dynamic contrast enhancement, image video Mirror, Flip and other functions
	VPU	Video decoding: H.265/H.264 decoding (maximum performance: 1920×1080@480fps or 8192×4320@30fps) Video encoding: H.265/H.264 encoding (maximum performance: 1920×1080@300fps or 8192×4320@15fps) Image codec: JPEG/MJPEG Baseline codec (JPEG codec: 1080P@480fps, maximum resolution 32768×32768)
	RAM	4GB LPDDR4 (4GB/8GB optional)
	Storage	32GB eMMC(32GB/64GB/128GB/256GB optional)
	OS	Linux OS (Ubuntu)
	Software Support	<ul style="list-style-type: none"> The private deployment of ultra-large-scale parameter models under the Transformer architecture, including large language models such as Gemma-2B, LLaMa2-7B, ChatGLM3-6B, Qwen1.5-1.8B Traditional network architectures such as CNN, RNN, and LSTM; a variety of deep learning frameworks, including TensorFlow, Pytorch, PaddlePaddle, Caffe and ONNX, as well as custom operator development Docker container management technology
	Power	5V (voltage tolerance ± 5%)
	Power consumption	Normal: 5.5W (5V/1100mA), Max: 7.5W (5V/1500mA)
	Interface	Goldfinger (260 PIN, SODIMM, 0.5mm pitch)
	Size	69.6mm × 45.0mm
	Weight	≈20g
	Environment	Operating Temperature: -20°C ~ 60°C, Storage Temperature: -20°C ~ 70°C, Storage Humidity: 10% ~ 90%RH(non-condensing)
	Interface Specifications	Internet
Video input		It supports up to 6 video inputs, including 1 channel 8L, two channels 8L+4L, three channels 4L, six channels 2L, and other combinations, and maximum resolution is 8192×3840 Supports MIPI-CSI/subLVDS Support Bayer RGB (RAW8/RAW10/RAW12/RAW16) parallel interface, maximum resolution of 1920×1080 Support BT (BT.601/ BT.656/ BT.1120), maximum resolution of 1920×1080 Support high-definition CMOS sensors such as SONY, OnSemi, OmniVision, etc Supports high dynamic range (up to 2 frame HDR) inputs, mainstream CMOS-level thermal imaging sensors
Video output		1 × HDMI 2.0: Maximum output capacity 4 (4096×2160)@60fps 1 × MIPI DSI: 2.5G bps/lane, up to 4 lanes, maximum output capacity 1440P(2560 ×1440)@60fps 1 × LVDS: Bit Rate: 1.6G bps/lane, maximum 1 link, maximum output capacity 720P(1280×720)@60fps
Audio		Integrated Audio CODEC supports 16-bit source/voice input and output Support two dual-channel microphone inputs, support two-channel two-channel microphone output (external amplifier is required to push the speaker) It supports connecting to an external Audio CODEC via I2S/PCM/TDM interface, I2S mode supports up to 4-channel stereo input, and the built-in Audio PLL supports MCLK output
SATA/PCIe		2 × PCIe 3.0/SATA Gen3 high-speed interface: 1) Configurable as 2-Lane PCIe3.0 RC/EP + 2-Lane PCIe3.0 RC/EP 2) Configurable as 2-Lane PCIe3.0 RC/EP + 2 × SATA Gen3
USB		2 × USB3.1/USB2.0 Host/Device
SDIO		2 × SD3.0/SDIO3.0 (support 1-bit/4-bit mode)
I2C		11 × I2C (1 no die domain)
UART		9 × UART (1 no die domain)
CAN		2 × CAN 2.0 (Support CAN2.0 A/B ISO11898 and CAN FD 1.1)
PWM		20 × PWM (support up to 50MHz (100MHz/2) output, down to about 0.093Hz (100MHz/(2^30-1)))
ADC		5 × single-ended ADC (2 no die domain)
Other interfaces		4 × SPI, 3 × I2S, 209 × GPIO (17 no die domain), IR

Core Board Interface description

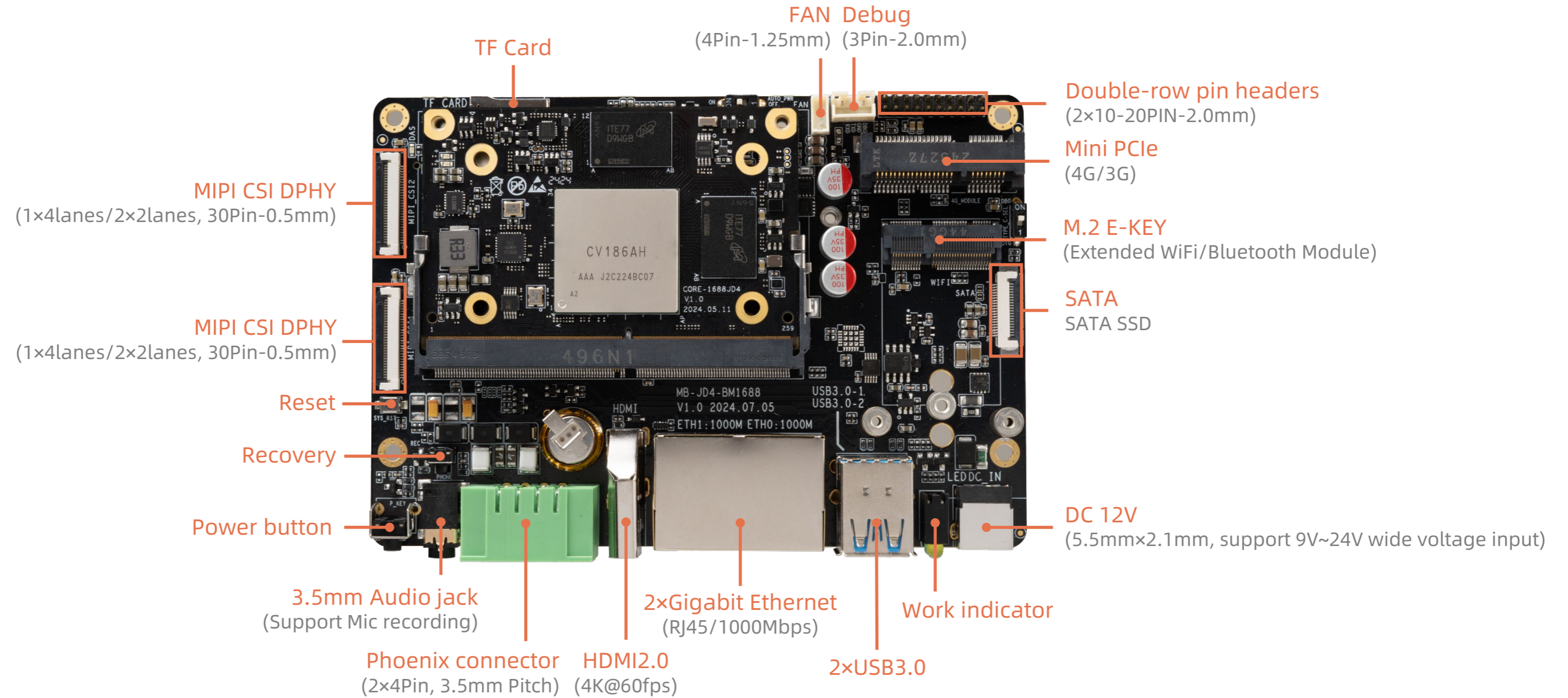
SOPHON CV186AH
(Main Frequency up to 1.6GHz)



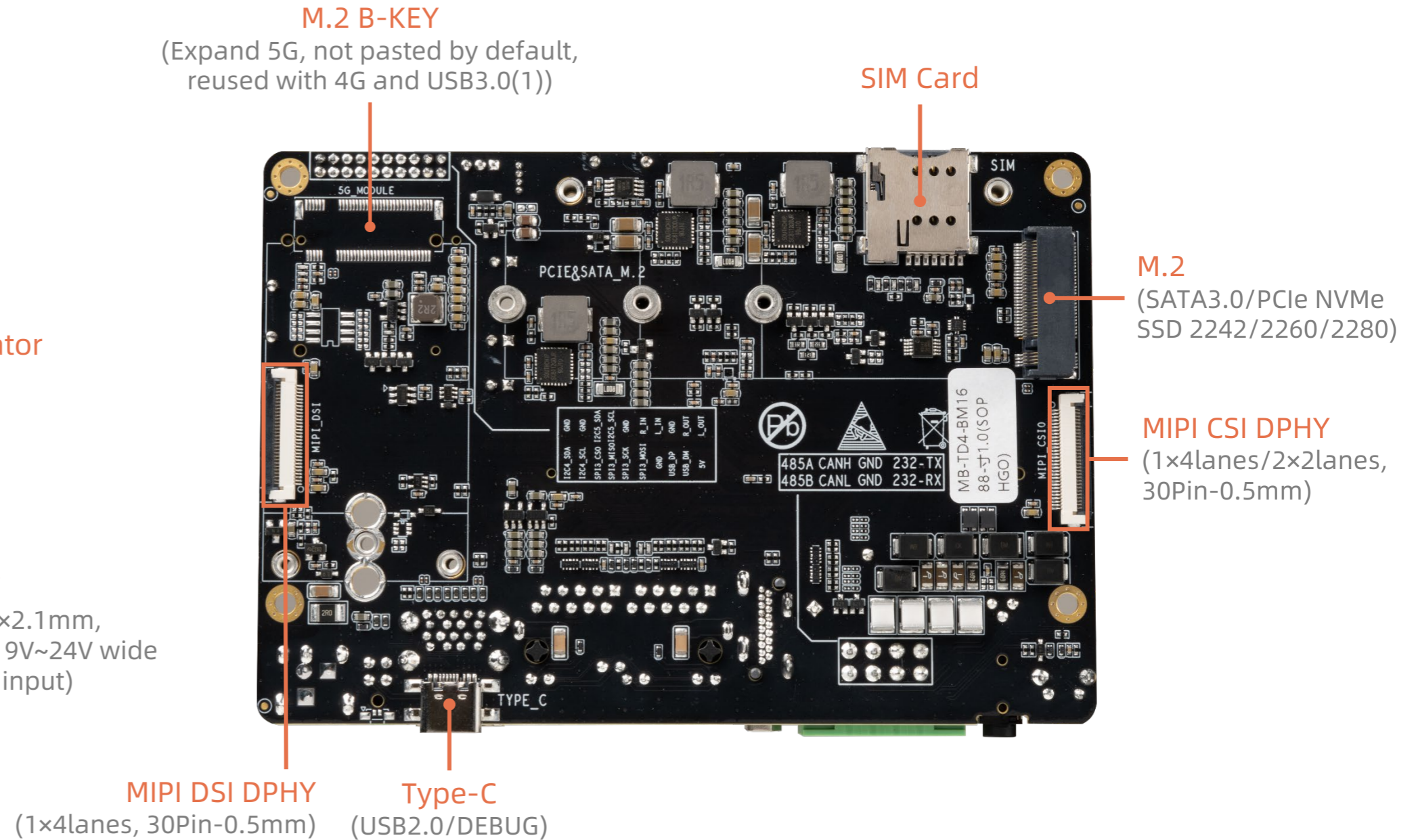
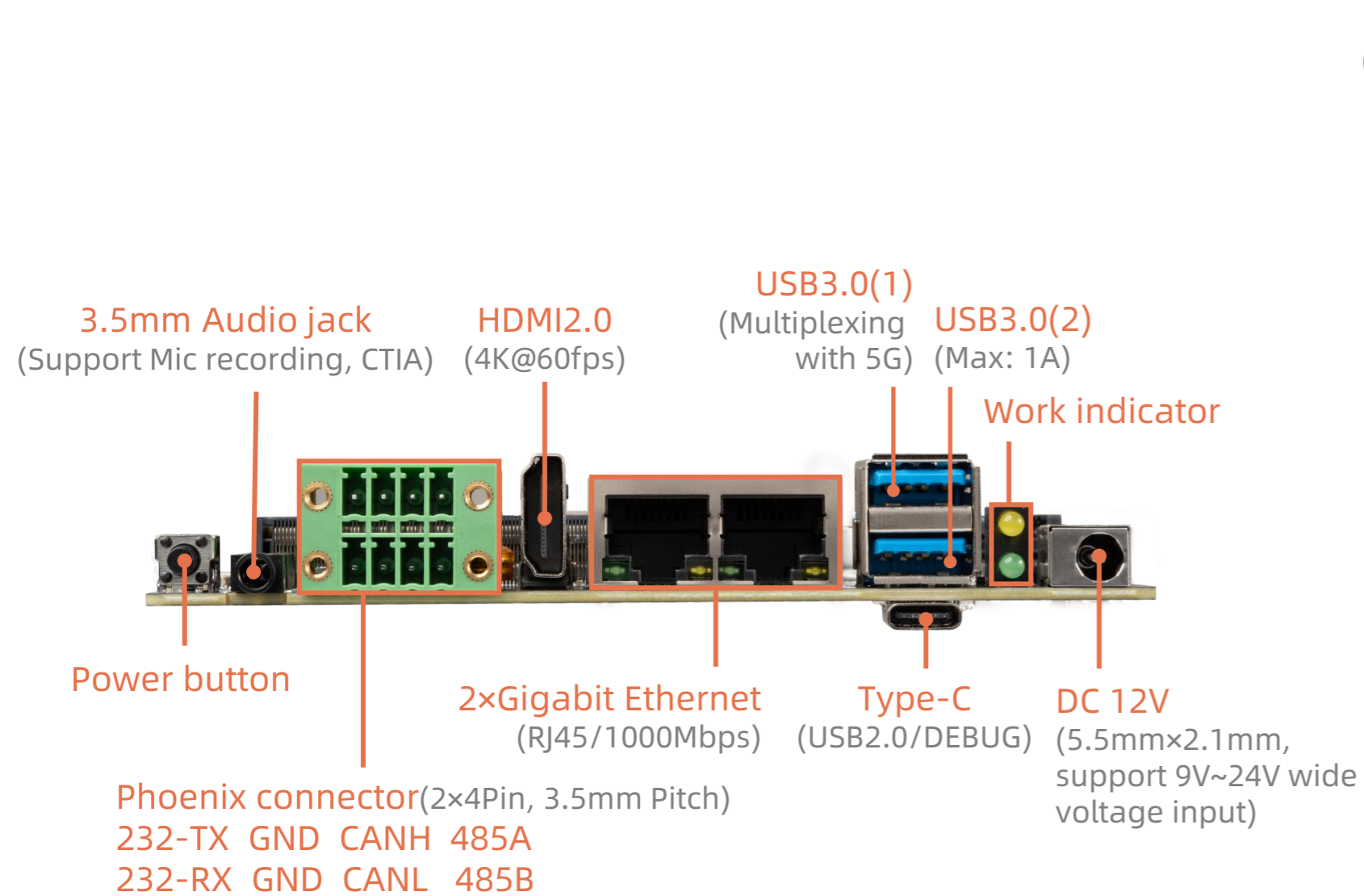
Goldfinger
(260 PIN, SODIMM, 0.5mm pitch)



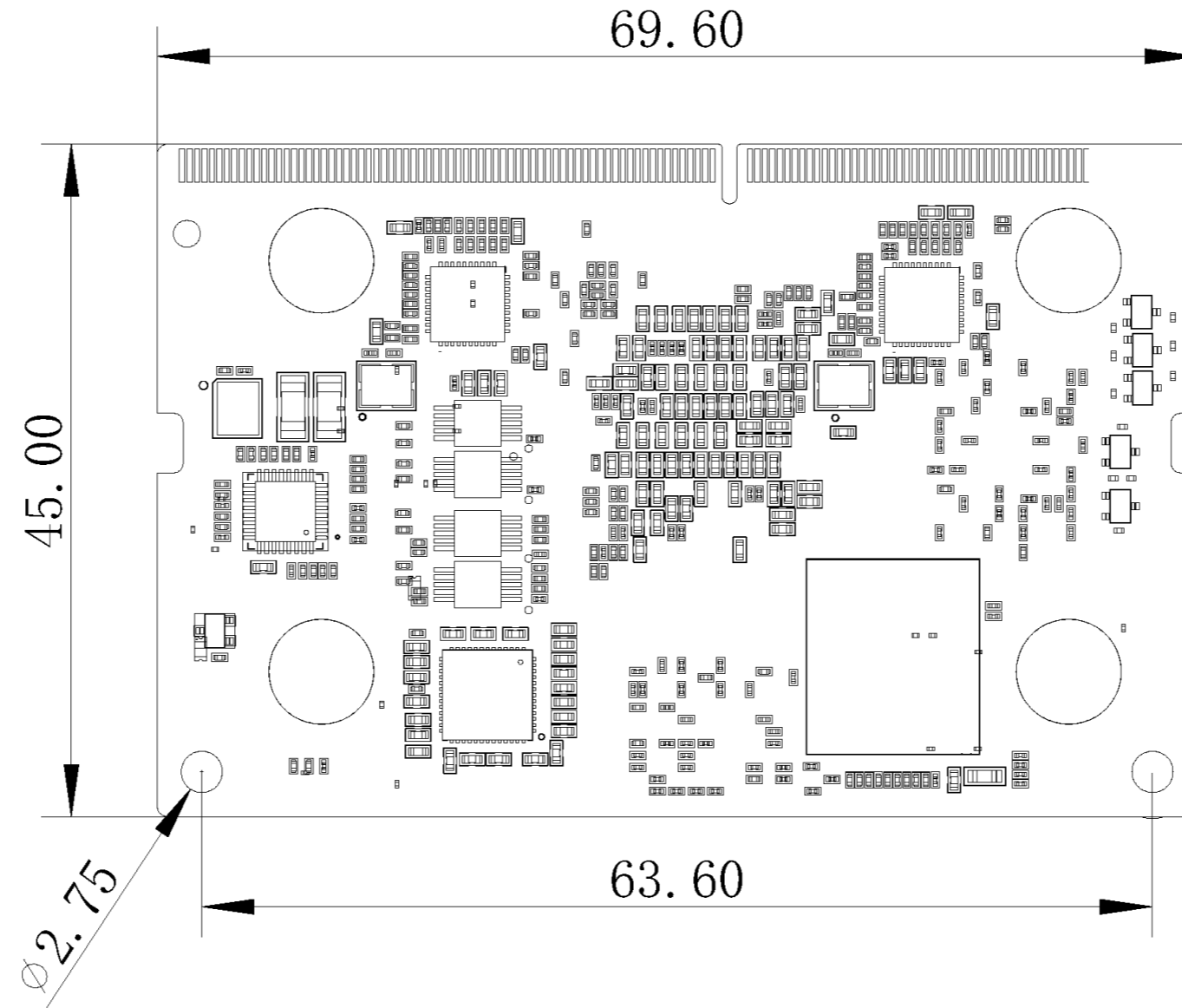
Mainboard Interface description



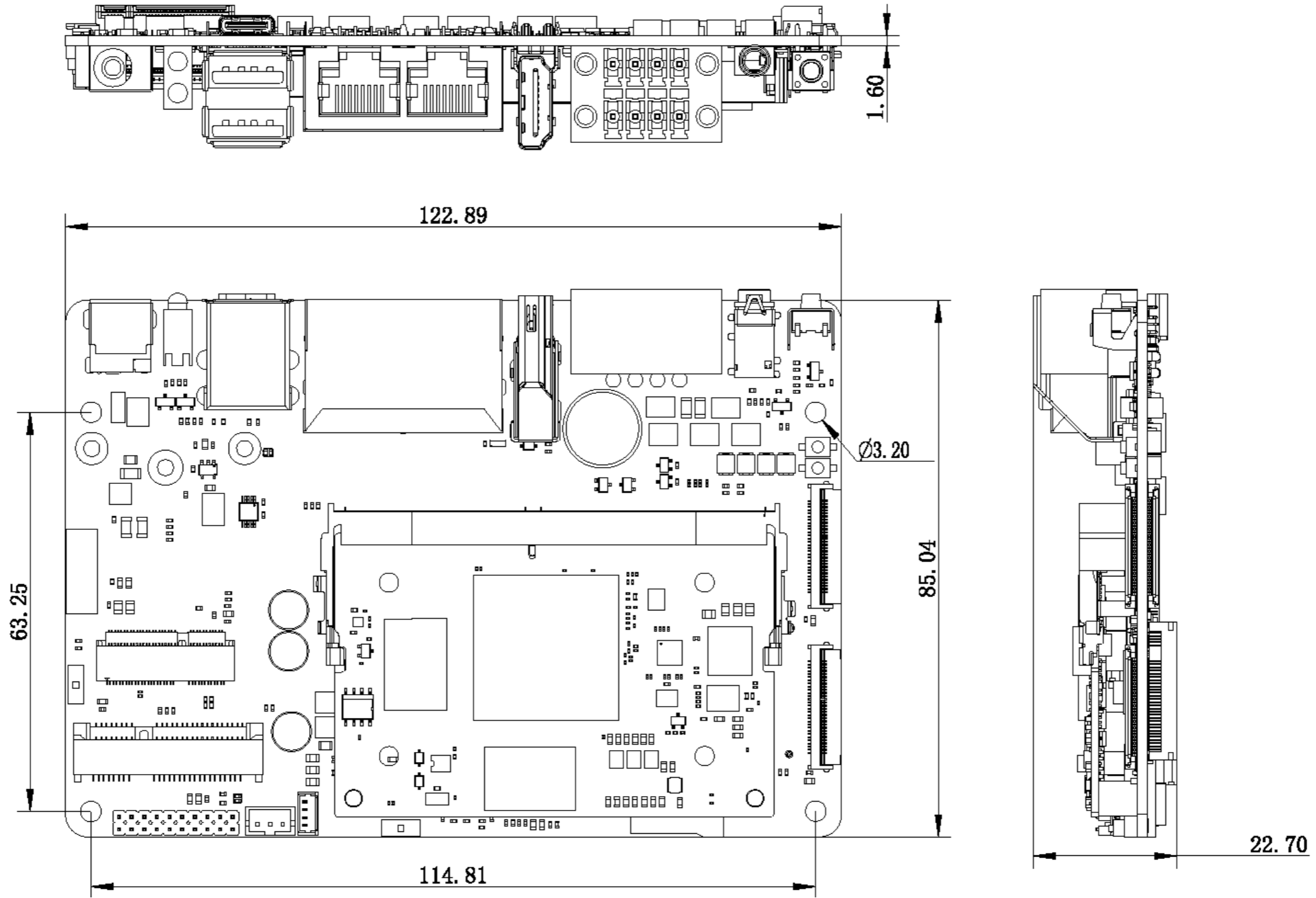
Mainboard Interface description



Core Board Dimension



Mainboard Dimension





Interface definition

① : Pad types: I = input, O = output, I/O = input/output (bidirectional) , G= Ground ,
 P = power supply , DOWN = Internal pull down , UP = Internal pull UP L = Lowe Level H = High level" * Core-186JD4 与 Core-1688JD4 Pin to Pin

PIN	CORE-186JD4 pin definition	BM1688 Pin NO.	Pad type	IO Power domain	IO Pull	Function for Main BOARD (MB-JD4-BM1688)	Defual function description
1	GND		G			GND	GND
3	MIPI_CSI_3N / VI2_D[3] / VI1_D[12] / GPIO145 / DEBUG_7 / VI0_D[20] / IIC1_SCL	B34	I/O	-		CSI1_D0_N	CSI1_D0_N
5	MIPI_CSI_3P / VI2_D[2] / VI1_D[13] / GPIO144 / DEBUG_6 / VI0_D[19] / IIC1_SDA	B33	I/O	-		CSI1_D0_P	CSI1_D0_P
7	GND		G			GND	GND
9	MIPI_CSI_5N / VI2_D[7] / VI1_D[8] / GPIO149 / DEBUG_11 / VI0_D[24] / CAM_MCLK1	A31	I/O	-		CSI1_CLK_N	CSI1_CLK_N
11	MIPI_CSI_5P / VI2_D[6] / VI1_D[9] / GPIO148 / DEBUG_10 / VI0_D[23] / CAM_MCLK0	B31	I/O	-		CSI1_CLK_P	CSI1_CLK_P
13	GND		G			GND	GND
15	MIPI_CSI_4N / VI2_D[5] / VI1_D[10] / GPIO147 / DEBUG_9 / VI0_D[22]	A32	I/O	-		CSI1_D1_N	CSI1_D1_N
17	MIPI_CSI_4P / VI2_D[4] / VI1_D[11] / GPIO146 / DEBUG_8 / VI0_D[21]	B32	I/O	-		CSI1_D1_P	CSI1_D1_P
19	GND		G			GND	GND
21	MIPI_CSI_9N / VI1_D[3] / GPIO157 / DEBUG_19 / VI0_D[12] / IIC2_SCL	C29	I/O	-		CSI3_D0_N	CSI3_D0_N
23	MIPI_CSI_9P / VI1_D[2] / GPIO156 / DEBUG_18 / VI0_D[13] / IIC2_SDA	D29	I/O	-		CSI3_D0_P	CSI3_D0_P
25	GND		G			GND	GND
27	MIPI_CSI_11N / VI1_D[7] / GPIO161 / DEBUG_23 / VI0_D[8] / CAM_MCLK1 / CAM_VS1	C28	I/O	-		CSI3_CLK_N	CSI3_CLK_N
29	MIPI_CSI_11P / VI1_D[6] / GPIO160 / DEBUG_22 / VI0_D[9] / CAM_MCLK0 / CAM_HS1	D28	I/O	-		CSI3_CLK_P	CSI3_CLK_P
31	GND		G			GND	GND
33	MIPI_CSI_10N / VI1_D[5] / GPIO158 / DEBUG_21 / VI0_D[10] / IIC4_SCL / CAM_VS0	A28	I/O	-		CSI3_D1_N	CSI3_D1_N
35	MIPI_CSI_10P / VI1_D[4] / GPIO158 / DEBUG_20 / VI0_D[11] / IIC4_SDA / CAM_HS0	B28	I/O	-		CSI3_D1_P	CSI3_D1_P
37	GND		G			GND	GND



39	USB1_RX0M	A23		-		USBSS1_RX_N	USBSS1_RX_N
41	USB1_RX0P	B23		-		USBSS1_RX_P	USBSS1_RX_P
43	GND		G			GND	GND
45	USB1_TX0M	B22		-		USBSS1_TX_N	USBSS1_TX_N
47	USB1_TX0P	C22		-		USBSS1_TX_P	USBSS1_TX_P
49	GND		G			GND	GND
51	MIPI_CSI_15N / GPIO169 / DEBUG_31 / VI0_D[3]	C26	I/O	-		CSI5_D0_N	CSI5_D0_N
53	MIPI_CSI_15P / GPIO168 / DEBUG_30 / VI0_D[2]	D26	I/O	-		CSI5_D0_P	CSI5_D0_P
55	GND		G			GND	GND
57	I2S0_SD11 / PWM3 / GPIO3 / UART6_RX / SPI0_SCK / KEY_ROW3 / CAM_VS1	AK6	I/O	1.8V		NC	GPIO3 (NC)
59	MIPI_DSI0_N1 / VO0_D17 / CAM_MCLK3 / GPIO177 / I2C6_SCL / VO1_D17	B9	I/O	1.8V		GPIO177	GPIO177
61	GND		G			GND	GND
63	HDMI_N2	AP2	O	-		HDMI_TX2N	HDMI_TX2N
65	HDMI_P2	AP3	O	-		HDMI_TX2P	HDMI_TX2P
67	GND		G			GND	GND
69	HDMI_N1	AN1	O	-		HDMI_TX2N	HDMI_TX2N
71	HDMI_P1	AN2	O	-		HDMI_TX2P	HDMI_TX2P
73	GND		G			GND	GND
75	HDMI_N0	AM1	O	-		HDMI_TX0N	HDMI_TX0N
77	HDMI_P0	AM2	O	-		HDMI_TX0P	HDMI_TX0P
79	GND		G			GND	GND
81	HDMI_CLKN	AL1	O	-		HDMI_TXCN	HDMI_TXCN



83	HDMI_CLKP	AL2	O	-		HDMI_TXCP	HDMI_TXCP
85	GND		G			GND	GND
87	PWR_GPIO11	F28	I/O	1.8V		PWR_GPIO11	PWR_GPIO11
89	IIC5_SDA / KEY_ROW2 / TC906_JTAG0_TRST_X / GPIO103 / UART6_TX / SPI3_SDO	L6	I/O	1.8V		SPI3_MOSI	SPI3_MOSI
91	IIC5_SCL / KEY_ROW3 / TC906_JTAG0_SRST_X / GPIO104 / UART6_RX / SPI3_SCK	M6	I/O	1.8V		SPI3_SCK	SPI3_SCK
93	IIC4_SCL / KEY_ROW1 / TC906_JTAG0_TMS / GPIO102 / UART5_RX / SPI3_SDI	K6	I/O	1.8V		SPI3_MISO	SPI3_MISO
95	IIC4_SDA / KEY_ROW0 / TC906_JTAG0_TCK / GPIO101 / UART5_TX / SPI3_CS_X	K5	I/O	1.8V		SPI3_CS0	SPI3_CS0
97	PWR_GPIO4	F17	I/O	1.8V		SPI3_CS1	SPI3_CS1
99	UART4_TX / SD2_1_CLK / GPIO91 / UART1_RTS / SPI3_SCK / IIC8_SDA / KEY_ROW0	R6	I/O	1.8V		UART4_TXD	UART4_TXD
101	UART4_RX / SD2_1_CMD / GPIO92 / UART1_CTS / SPI3_SDO / IIC8_SCL / KEY_ROW1	M5	I/O	1.8V		UART4_RXD	UART4_RXD
103	UART4_RTS / GPIO93 / UART3_RTS / SPI3_SDI / IIC9_SDA / KEY_ROW2	V6	I/O	1.8V		UART4_RTS	UART4_RTS
105	UART4_CTS / GPIO94 / UART3_CTS / SPI3_CS_X / IIC9_SCL / KEY_ROW3	P6	I/O	1.8V		UART4_CTS	UART4_CTS
107	GND		G			GND	GND
109	USB0_DM0	A19		-		USB0_D_N	USB0_D_N
111	USB0_DP0	B19		-		USB0_D_P	USB0_D_P
113	GND		G			GND	GND
115	USB1_DM0	B20		-		USB1_D_N	USB1_D_N (default USB1)
117	USB1_DP0	C20		-		USB1_D_P	USB1_D_P N (default USB1)
119	GND		G			GND	GND
121	USB2_DN(Options)	B20	I/O	-		USB2_DN(Options)	USB2_DN (Options) --GPIO178=H
123	USB2_DP(Options)	C20	I/O	-		USB2_DP(Options)	USB2_DP (Options) --GPIO178=H
125	GND		G			GND	GND



127	SD1_PWR_EN / PWM1 / GPIO68 / CAM_MCLK1 / CAM_VS2	C3	I/O	1.8V		GPIO68	GPIO68
129	GND		G			GND	GND
131	PCIE1_RX0_N	AD2	I	-		PCIE1_RX0_N	PCIE1_RX0_N
133	PCIE1_RX0_P	AD3	I	-		PCIE1_RX0_P	PCIE1_RX0_P
135	GND		G			GND	GND
137	PCIE1_RX1_N	AB2	I	-		PCIE1_RX1_N	PCIE1_RX1_N
139	PCIE1_RX1_P	AB3	I	-		PCIE1_RX1_P	PCIE1_RX1_P
141	GND		G			GND	GND
143	CAN0_RX / WG0_D1 / GPIO106 / UART2_CTS / PWM3 / CAM_VS2	C1	I/O	3.3V		CAN0_RX	CAN0_RX
145	CAN0_TX / WG0_D0 / GPIO105 / UART2_RTS / PWM2 / CAM_HS2	C2	I/O	3.3V		CAN0_TX	CAN0_TX
147	SARADC1	K4	I	1.8V		ADC1	ADC1 INPUT
149	UART1_RTS / GPIO85 / UART5_TX	G3	I/O	1.8V		UART5_TX	UART5_TX
151	UART1_CTS / GPIO86 / UART5_RX	C12	I/O	1.8V		UART5_RX	UART5_RX
153	GND		G			GND	GND
155	PCIE0_RX1_N / SATA_RX1_N	AF2	I	-		PCIE0_RX1_N / SATA_RX1_N	PCIE0_RX1_N / SATA_RX1_N
157	PCIE0_RX1_P / SATA_RX1_P	AF3	I	-		PCIE0_RX1_P / SATA_RX1_P	PCIE0_RX1_P / SATA_RX1_P
159	GND		G			GND	GND
161	USB0_RX0M	B16	I	-		USBSS0_RX_N	USBSS0_RX_N
163	USB0_RX0P	C16	I	-		USBSS0_RX_P	USBSS0_RX_P
165	GND		G			GND	GND
167	PCIE0_RX0_N / SATA_RX0_N	AH2	I	-		PCIE0_RX0_N / SATA_RX0_N	PCIE0_RX0_N / SATA_RX0_N
169	PCIE0_RX0_P / SATA_RX0_P	AH3	I	-		PCIE0_RX0_P / SATA_RX0_P	PCIE0_RX0_P / SATA_RX0_P



171	GND		G			GND	GND
173	PCIE0_EP_CLK_N	AE1	O	-		PCIE0_EP_CLK_N	PCIE0_EP_CLK_N In/Out
175	PCIE0_EP_CLK_P	AE2	O	-		PCIE0_EP_CLK_P	PCIE0_EP_CLK_P In/Out
177	GND		G			GND	GND
179	PCIE1_L0_WAKEUP_X SATA0_DEVSLP GPIO44 CAN1_RX UART2_RX I2C7_SCL	AK3	I/O	3.3V		PCIE_WAKE*	PCIE_WAKE*
181	PCIE1_L0_RESET_X GPIO43 CAN1_TX UART2_TX I2C7_SDA	AL4	I/O	3.3V		PCIE1_RST*	PCIE1_RST*
183	PCIE0_L0_RESET_X / GPIO40	AH6	I/O	3.3V		PCIE0_RST*	PCIE0_RST*
185	SD1_CMD / PWM16 / GPIO63 / SPI2_SDI / I2C4_SCL / CAM_VS0	E5	I/O	3.3V		I2C4_SCL	I2C4_SCL
187	SD1_CLK / PWM15 / GPIO62 / SPI2_SDO / I2C4_SDA / CAM_HS0	E4	I/O	3.3V		I2C4_SDA	I2C4_SDA (Core board series resistance 33R)
189	SD1_D1 / PWM18 / GPIO65 / UART7_TX / I2C5_SCL / CAM_VS1	E6	I/O	3.3V		I2C5_SCL	I2C5_SCL
191	SD1_D0 / PWM17 / GPIO64 / SPI2_CS_X / I2C5_SDA / CAM_HS1	D4	I/O	3.3V		I2C5_SDA	I2C5_SDA
193	I2S0_SDO / PWM4 / GPIO4 / UART7_TX / CAM_HS2	AL6	I/O	1.8V		I2S0_DOUT	I2S0_DOUT
195	I2S0_SDI0 / PWM2 / GPIO2 / UART6_TX / SPI0_SDO / KEY_ROW2 / CAM_HS1	AK7	I/O	1.8V		I2S0_DIN	I2S0_DIN
197	I2S0_WSI / PWM1 / GPIO1 / UART5_RX / SPI0_SDI / KEY_ROW1 / CAM_VS0	AL7	I/O	1.8V		I2S0_FS	I2S0_FS
199	I2S0_SCLK / PWM0 / GPIO0 / UART5_TX / SPI0_CS_X / KEY_ROW0 / CAM_HS0	AL8	I/O	1.8V		I2S0_SCLK	I2S0_SCLK
201	GND		G			GND	GND
203	MIPI_DSI1_P0 / I2S1_SCLK / GPIO185 / UART1_TX / SPI1_SDI / I2C8_SDA	AN4	I/O	1.8V		DSI_D0_P	DSI_D0_P
205	MIPI_DSI1_N0 / I2S1_WSI / GPIO186 / UART1_RX / SPI1_SDO / I2C8_SCL	AP4	I/O	1.8V		DSI_D0_N	DSI_D0_N
207	MIPI_DSI1_P1 / I2S1_SDI / GPIO187 / UART1_RTS / SPI1_SCK / I2C9_SDA	AN5	I/O	1.8V		DSI_D1_P	DSI_D1_P
209	MIPI_DSI1_N1 / I2S1_SDO / GPIO188 / UART1_CTS / SPI2_CS_X / I2C9_SCL	AP5	I/O	1.8V		DSI_D1_N	DSI_D1_N
211	I2S0_MCLK / PWM5 / GPIO5 / UART7_RX / CAM_VS2	AK8	I/O	1.8V		I2S0_MCLK	I2S0_MCLK
213	GPIO128 / VO0_D7 / UART4_RX / IIC0_SCL / VO1_D7	AC5	I/O	3.3V		CAM_I2C_SCL	I2C0_SCL (Core board pull up resistance 4.7K)



215	GPIO184 / VOO_CLK / UART4_TX / IIC0_SDA / VO1_CLK	AB6	I/O	3.3V		CAM_I2C_SDA	I2C0_SDA (Core board pull up resistance 4.7K)
217	UART1_RX / DBG_I2C_SDA / GPIO84	F3	I/O	3.3V		NC	MODULE_ID (Core board pull down resistance 1K)
219	SD0_D0 / PWM9 / DEBUG_3 / GPIO56 / SPI0_SCK / SPI3_CS_X / I2C2_SDA	E19	I/O	3.3V		SDMMC_DAT0	SDMMC_DAT0
221	SD0_D1 / PWM10 / DEBUG_4 / GPIO57 / SPI3_SCK / SPI0_CS_X / I2C2_SCL	D23	I/O	3.3V		SDMMC_DAT1	SDMMC_DAT1
223	SD0_D2 / PWM11 / DEBUG_5 / GPIO58 / SPI0_SDI / I2C3_SDA	E17	I/O	3.3V		SDMMC_DAT2	SDMMC_DAT2
225	SD0_D3 / PWM12 / DEBUG_6 / GPIO59 / SPI0_SDO / I2C3_SCL	E18	I/O	3.3V		SDMMC_DAT3	SDMMC_DAT3
227	SD0_CMD / PWM8 / DEBUG_2 / GPIO55 / SPI3_SDI / I2C1_SCL	D21	I/O	3.3V		SDMMC_CMD	SDMMC_CMD
229	SD0_CLK / PWM7 / DEBUG_1 / GPIO54 / SPI3_SDO / I2C1_SDA	E21	I/O	3.3V		SDMMC_CLK	SDMMC_CLK (Core board series resistance 33R)
231	GND		G			GND	GND
233	PWR_SAR0 / I2S2_MCLK / PWR_GPIO0 / CAM_MCLK1 / UART3_RTS	F22	I/O	5.0V		SHUTDOWN_REQ	SHUTDOWN_REQ (Core board pull up resistance 4.7K)
235	RTC_BAT		P	3.0V		RTC_BAT	RTC_BAT INPUT
237	POWER_EN		I	5.0V		POWER_EN	POWER_EN INPUT, Active H
239	RSTN	K1	I	3.3V		SYS_RESET*	SYS_RESET INPUT, Active L (Core board pull up resistance 10K)
241	GND		G	GND		GND	GND
243	GND		G	GND			
245	GND		G	GND			
247	GND		G	GND			
249	GND		G	GND			
251	VDD5V0_IN		P	5.0V		VCC5V0_IN	Input Voltage 5.0V +/-5%



253	VDD5V0_IN		P	5.0V			
255	VDD5V0_IN		P	5.0V			
257	VDD5V0_IN		P	5.0V			
259	VDD5V0_IN		P	5.0V			
PIN	CORE-186JD4 pin definition	BM1688 Pin NO.	Pad type	IO Power domain	IO Pull	Function for Main BOARD (MB-JD4-BM1688)	Defual function description
2	GND		G			GND	GND
4	MIPI_CSI_0N / VI2_D[8] / GPIO139 / DEBUG_1	E34	I/O	1.8V		CSI0_D0_N	CSI0_D0_N
6	MIPI_CSI_0P / VI2_CLK0 / GPIO138 / DEBUG_0	E33	I/O	1.8V		CSI0_D0_P	CSI0_D0_P
8	GND		G			GND	GND
10	MIPI_CSI_2N / VI2_D[1] / GPIO143 / DEBUG_5	C34	I/O	1.8V		CSI0_CLK_N	CSI0_CLK_N
12	MIPI_CSI_2P / VI2_D[0] / GPIO142 / DEBUG_4	C33	I/O	1.8V		CSI0_CLK_P	CSI0_CLK_P
14	GND		G			GND	GND
16	MIPI_CSI_1N / VI2_D[10] / GPIO141 / DEBUG_3	D34	I/O	1.8V		CSI0_D1_N	CSI0_D1_N
18	MIPI_CSI_1P / VI2_D[9] / GPIO140 / DEBUG_2	D33	I/O	1.8V		CSI0_D1_P	CSI0_D1_P
20	GND		G			GND	GND
22	MIPI_CSI_6N / VI1_D[14] / GPIO151 / DEBUG_13 / VI0_D[25] / CAM_MCLK3 / CAM_VS0	A30	I/O	1.8V		CSI2_D0_N	CSI2_D0_N
24	MIPI_CSI_6P / VI1_CLK0 / GPIO150 / DEBUG_12 / VI0_CLK1 / CAM_MCLK2 / CAM_HS0	B30	I/O	1.8V		CSI2_D0_P	CSI2_D0_P
26	GND		G			GND	GND
28	MIPI_CSI_8N / VI1_D[1] / GPIO155 / DEBUG_17 / VI0_D[14] / CAM_VS2	A29	I/O	1.8V		CSI2_CLK_N	CSI2_CLK_N
30	MIPI_CSI_8P / VI1_D[0] / GPIO154 / DEBUG_16 / VI0_D[15] / CAM_HS2	B29	I/O	1.8V		CSI2_CLK_P	CSI2_CLK_P
32	GND		G			GND	GND
34	MIPI_CSI_7N / VI1_D[16] / GPIO153 / DEBUG_15 / VI0_D[27] / CAM_VS1	C30	I/O	1.8V		CSI2_D1_N	CSI2_D1_N



36	MIPI_CSI_7P / VI1_D[15] / GPIO152 / DEBUG_14 / VI0_D[26] / CAM_HS1	D30	I/O	1.8V		CSI2_D1_P	CSI2_D1_P
38	GND		G			GND	GND
40	MIPI_CSI_12N / GPIO163 / DEBUG_25 / VI0_D[16] / CAM_MCLK3 / CAM_VS2	A27	I/O	1.8V		CSI4_D0_N	CSI4_D0_N
42	MIPI_CSI_12P / GPIO162 / DEBUG_24 / VI0_CLK0 / CAM_MCLK2 / CAM_HS2	B27	I/O	1.8V		CSI4_D0_P	CSI4_D0_P
44	GND		G			GND	GND
46	MIPI_CSI_14N / GPIO167 / DEBUG_29 / VI0_D[1]	A26	I/O	1.8V		CSI4_CLK_N	CSI4_CLK_N
48	MIPI_CSI_14P / GPIO166 / DEBUG_28 / VI0_D[0]	B26	I/O	1.8V		CSI4_CLK_P	CSI4_CLK_P
50	GND		G			GND	GND
52	MIPI_CSI_13N / GPIO165 / DEBUG_27 / VI0_D[18]	C27	I/O	1.8V		CSI4_D1_N	CSI4_D1_N
54	MIPI_CSI_13P / GPIO164 / DEBUG_26 / VI0_D[17]	D27	I/O	1.8V		CSI4_D1_P	CSI4_D1_P
56	GND		G			GND	GND
58	MIPI_CSI_16N / GPIO171 / VI0_D[5]	A25	I/O	1.8V		CSI5_D1_N	CSI5_D1_N
60	MIPI_CSI_16P / GPIO170 / VI0_D[4]	B25	I/O	1.8V		CSI5_D1_P	CSI5_D1_P
62	GND		G			GND	GND
64	MIPI_CSI_17N / GPIO173 / VI0_D[7] / CAM_MCLK5	C25	I/O	1.8V		CSI5_CLK_N	CSI5_CLK_N
66	MIPI_CSI_17P / GPIO172 / VI0_D[6] / CAM_MCLK4	D25	I/O	1.8V		CSI5_CLK_P	CSI5_CLK_P
68	GND		G			GND	GND
70	GBE1_MDIO_P		I/O	-		GBE1_MDIO_P	GBE1_MDIO_P (To Ethernet Transformer)
72	GBE1_MDIO_N		I/O	-		GBE1_MDIO_N	GBE1_MDIO_N (To Ethernet Transformer)
74	GBE1_MDI1_P		I/O	-		GBE1_MDI1_P	GBE1_MDI1_P (To Ethernet Transformer)
76	GBE1_MDI1_N		I/O	-		GBE1_MDI1_N	GBE1_MDI1_N (To Ethernet Transformer)
78	GND		G			GND	GND



80	GBE1_MDI2_P		I/O	-		GBE1_MDI2_P	GBE1_MDI2_P (To Ethernet Transformer)
82	GBE1_MDI2_N		I/O	-		GBE1_MDI2_N	GBE1_MDI2_N (To Ethernet Transformer)
84	GBE1_MDI3_P		I/O	-		GBE1_MDI3_P	GBE1_MDI3_P (To Ethernet Transformer)
86	GBE1_MDI3_N		I/O	-		GBE1_MDI3_N	GBE1_MDI3_N (To Ethernet Transformer)
88	47K Resistance pull-up 3V3			3.3V	UP	HDMI0_TX_ON_H	HDMI0_TX_ON_H (H:HDMI2.0 ; L:HDMI2.1)
90	GBE1_LED_LINK		I/O	3.3V		PHY1_CFG_EXT	PHY1_CFG_EXT
92	GBE1_LED2_ACT		I/O	3.3V		PHY1_CFG_LDO1	PHY1_CFG_LDO1
94	MIPI_DSI0_N0 / VO0_D15 / CAM_MCLK1 / GPIO175 / I2C5_SCL / VO1_D15	AB10	I/O			HDMITX0_CEC	HDMITX0_CEC
96	HDMI_HPD	AK5	I	5.0V		HDMITX0_HPDIN	HDMI_HPD INPUT, Active H (Core board series resistance 1.2K)
98	HDMI_DDC_SDA / GPIO71	B2	I/O	1.8V		HDMI_DDC_SDA	HDMI_DDC_SDA (Core board pull up resistance 4.7K)
100	HDMI_DDC_SCL / GPIO72	B1	I/O	1.8V		HDMI_DDC_SCL	HDMI_DDC_SCL (Core board pull up resistance 4.7K)
102	GND		G			GND	GND
104	PWM2 / KEY_COL2 / SD2_0_D0 / GPIO77 / UART6_TX / SPI1_SDO / IIC4_SDA / CAM_HS1	D8	I/O	1.8V		SPI1_MOSI	SPI1_MOSI
106	PWM3 / KEY_COL3 / SD2_0_D1 / GPIO78 / UART6_RX / SPI1_SCK / IIC4_SCL / CAM_VS1	E10	I/O	1.8V		SPI1_SCK	SPI1_SCK (Core board series resistance 33R)
108	PWM1 / KEY_COL1 / SD2_0_CMD / GPIO76 / UART5_RX / SPI1_SDI / IIC3_SCL / CAM_VS0	E9	I/O	1.8V		SPI1_MISO	SPI1_MISO
110	PWM0 / KEY_COL0 / SD2_0_CLK / GPIO75 / UART5_TX / SPI1_CS_X / IIC3_SDA / CAM_HS0	E8	I/O	1.8V		SPI1_CS0	SPI1_CS0 (Core board series resistance 33R)
112	PWR_SPINOR_SDO / CAM_MCLK5 / PWR_GPIO5 / IIC2_SCL	F23	I/O	1.8V		SPI1_CS1	SPI1_CS1
114	CAM_XLR0 / GPIO69	F9	I/O	1.8V		CAM0_PWDN	CAM0_PWDN
116	CAM_MCLK0 / GPIO46	F8	I/O	1.8V		CAM0_MCLK	CAM0_MCLK



118	CAM_MCLK4 / GPIO50 / IIC8_SDA	D7	I/O	1.8V		GPIO50	GPIO50
120	CAM_XLR1 / GPIO70	G10	I/O	1.8V		CAM1_PWDN	CAM1_PWDN
122	CAM_MCLK1 / GPIO47	E7	I/O	1.8V		CAM1_MCLK	CAM1_MCLK
124	PWR_SPINOR_WP_X / CAM_MCLK2 / PWR_GPIO2 / UART7_RX / IIC1_SDA	F18	I/O	1.8V		PWR_GPIO2	PWR_GPIO2
126	SD1_CD_X / PWM14 / GPIO61 / CAM_MCLK0 / CAM_HS0	D3	I/O	1.8V		GPIO61	GPIO61
128	PWM4 / CAN1_TX / SD2_0_D2 / GPIO79 / UART4_TX / IIC5_SDA / CAM_HS2	D9	I/O	1.8V		GPIO79	GPIO79
130	PWM5 / CAN1_RXD / SD2_0_D3 / GPIO80 / UART4_RX / IIC5_SCL / CAM_VS2	D10	I/O	1.8V		GPIO80	GPIO80
132	GND		G			GND	GND
134	PCIE1_TX0_N	Y3	O	-		PCIE1_TX0_N	PCIE1_TX0_N
136	PCIE1_TX0_P	Y2	O	-		PCIE1_TX0_P	PCIE1_TX0_P
138	GND		G			GND	GND
140	PCIE1_TX1_N	AA2	I	-		NC	NC
142	PCIE1_TX1_P	AA1	I	-		NC	NC
144	GND		G			GND	GND
146	SARADC2	L4	I	1.8V		SARADC2	ADC2 Input
148	MIPI_DSIO_P4 / VO0_D22 / GPIO182 / CAM_HS1 / I2C9_SDA / VO1_D22	A6	I/O	1.8V		GPIO182	GPIO182
150	MIPI_DSIO_N4 / VO0_D23 / GPIO183 / CAM_VS1 / I2C9_SCL / VO1_D23	B6	I/O	1.8V		GPIO183	GPIO183
152	GND		G			GND	GND
154	PCIE0_TX1_N / SATA_TX1_N	AJ1	O	-		PCIE0_TX1_N / SATA_TX1_N	PCIE0_TX1_N / SATA_TX1_N
156	PCIE0_TX1_P / SATA_TX1_P	AJ2	O	-		PCIE0_TX1_P / SATA_TX1_P	PCIE0_TX1_P / SATA_TX1_P
158	GND		G			GND	GND
160	PCIE1_EP_CLK_N	AC1	O	-		PCIE1_EP_CLK_N	PCIE1_EP_CLK_N



162	PCIE1_EP_CLK_P	AC2	O	-		PCIE1_EP_CLK_P	PCIE1_EP_CLK_P
164	GND		G			GND	GND
166	USB0_TX0M	A17	O	-		USBSS0_TX_N	USBSS0_TX_N
168	USB0_TX0P	B17	O	-		USBSS0_TX_P	USBSS0_TX_P
170	GND		G			GND	GND
172	PCIE0_TX0_N / SATA_TX0_N	AG1	O	-		PCIE0_TX0_N / SATA_TX0_N	PCIE0_TX0_N / SATA_TX0_N
174	PCIE0_TX0_P / SATA_TX0_P	AG2	O	-		PCIE0_TX0_P / SATA_TX0_P	PCIE0_TX0_P / SATA_TX0_P
176	GND		G			GND	GND
178	PWR_BUTTON1 / PWR_GPIO8	F27	I	1.8V		MOD_SLEEP*	MOD_SLEEP* INPUT, Active L
180	PCIE1_L0_CLKREQ_IN_X SATA1_DEVSLP GPIO45	AK4	I/O	3.3V		PCIE1_CLKREQ*	PCIE1_CLKREQ* (Core board pull up resistance 4.7K)
182	PCIE0_L0_CLKREQ_IN_X / GPIO42 / UART2_CTS / I2C4_SCL	AH5	I/O	3.3V		PCIE0_CLKREQ*	PCIE0_CLKREQ* (Core board pull up resistance 4.7K)
184	GBE0_MDIO_N		I/O	-		GBE0_MDIO_N	GBE0_MDIO_N (To Ethernet Transformer)
186	GBE0_MDIO_P		I/O	-		GBE0_MDIO_P	GBE0_MDIO_P (To Ethernet Transformer)
188	GBE0_LED_LINK		I/O	3.3V		PHY0_CFG_EXT	PHY0_CFG_EXT
190	GBE0_MDI1_N		I/O	-		GBE0_MDI1_N	GBE0_MDI1_N (To Ethernet Transformer)
192	GBE0_MDI1_P		I/O	-		GBE0_MDI1_P	GBE0_MDI1_P (To Ethernet Transformer)
194	GBE0_LED2_ACT		I/O	3.3V		PHY0_CFG_LDO1	PHY0_CFG_LDO1
196	GBE0_MDI2_N		I/O	-		GBE0_MDI2_N	GBE0_MDI2_N (To Ethernet Transformer)
198	GBE0_MDI2_P		I/O	-		GBE0_MDI2_P	GBE0_MDI2_P (To Ethernet Transformer)
200	GND		G			GND	GND
202	GBE0_MDI3_N		I/O	-		GBE0_MDI3_N	GBE0_MDI3_N (To Ethernet Transformer)



204	GBE0_MDI3_P		I/O	-		GBE0_MDI3_P	GBE0_MDI3_P (To Ethernet Transformer)
206	SD0_CD_X / PWM6 / DEBUG_0 / GPIO53 / IIC0_SDA	D17	I/O	1.8V		GPIO53	GPIO53
208	PWR_SPINOR_HOLD_X / I2S1_MCLK / PWR_GPIO1 / PWR_SAR1 / UART7_TX / UART3_CTS	E22	I/O	1.8V		PWR_GPIO1	PWR_GPIO1
210	CLK_32K_OUT		O	3.3V		32KOUT_WIFI	32.768KHz OUTPUT TO WIFI
212	IIC2_SCL / TC906_JTAG0_TDI / GPIO100 / UART3_RX	H5	I/O	1.8V		GPIO100	GPIO100
214	FORCE_RECOVERY*	G28	I/O	1.8V		FORCE_RECOVERY*	FORCE_RECOVERY*
216	CAM_MCLK5 / GPIO51 / IIC8_SCL	G9	I/O	1.8V		GPIO51	GPIO51
218	SD0_PWR_EN / PWM13 / DEBUG_7 / GPIO60 / IIC0_SCL	D19	I/O	1.8V		GPIO60	GPIO60
220	MIPI_DS11_N4 / I2S2_SDO / GPIO127 / WG1_D0 / SPI3_SDO / I2C3_SCL	AP8	I/O	1.8V		I2S2_DOUT	I2S2_DOUT
222	MIPI_DS11_P4 / I2S2_SDI / GPIO126 / WG1_D1 / SPI3_SDI / I2C3_SDA	AN8	I/O	1.8V		I2S2_DIN	I2S2_DIN
224	MIPI_DS11_N3 / I2S2_WSI / GPIO125 / UART3_RX / SPI3_CS_X / SPI1_CS_X	AP7	I/O	1.8V		I2S2_FS	I2S2_FS
226	MIPI_DS11_P3 / I2S2_SCLK / GPIO124 / UART3_TX / SPI2_SCK / SPI3_SCK	AN7	I/O	1.8V		I2S2_SCLK	I2S2_SCLK
228	A53_JTAG0_TCK / I2S1_WSI / DEBUG_9 / GPIO112 / UART2_RX / SPI1_SDI / IIC6_SCL / PWM9	F1	I/O	1.8V		GPIO112	GPIO112
230	A53_JTAG0_TMS / I2S1_SDO / DEBUG_11 / GPIO114 / UART2_CTS / SPI1_SCK / IIC7_SCL / PWM11	D1	I/O	1.8V		GPIO114	GPIO114
232	MIPI_DS11_N2 / I2S2_MCLK / GPIO190 / UART2_RX / SPI2_SDO / I2C1_SCL	AP6	I/O	1.8V		I2C1_SCL	I2C1_SCL
234	MIPI_DS11_P2 / I2S1_MCLK / GPIO189 / UART2_TX / SPI2_SDI / I2C1_SDA	AN6	I/O	1.8V		I2C1_SDA	I2C1_SDA
236	DEBUG_UART0_TX / GPIO81	H3	I/O	1.8V		UART0_TXD	Debug_UART0_TXD
238	DEBUG_UART0_RX / GPIO82	H4	I/O	1.8V		UART0_RXD	Debug_UART0_RXD
240	SLEEP/WAKE	F31	I	5.0V		SLEEP/WAKE	SLEEP/WAKE
242	GND		G	GND		GND	GND
244	GND		G	GND			



246	GND		G	GND			
248	GND		G	GND			
250	GND		G	GND			
252	VDD5V0_IN		P	5.0V		VCC5V0_IN	Input Voltage 5.0V +/-5%
254	VDD5V0_IN		P	5.0V			
256	VDD5V0_IN		P	5.0V			
258	VDD5V0_IN		P	5.0V			
260	VDD5V0_IN		P	5.0V			



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