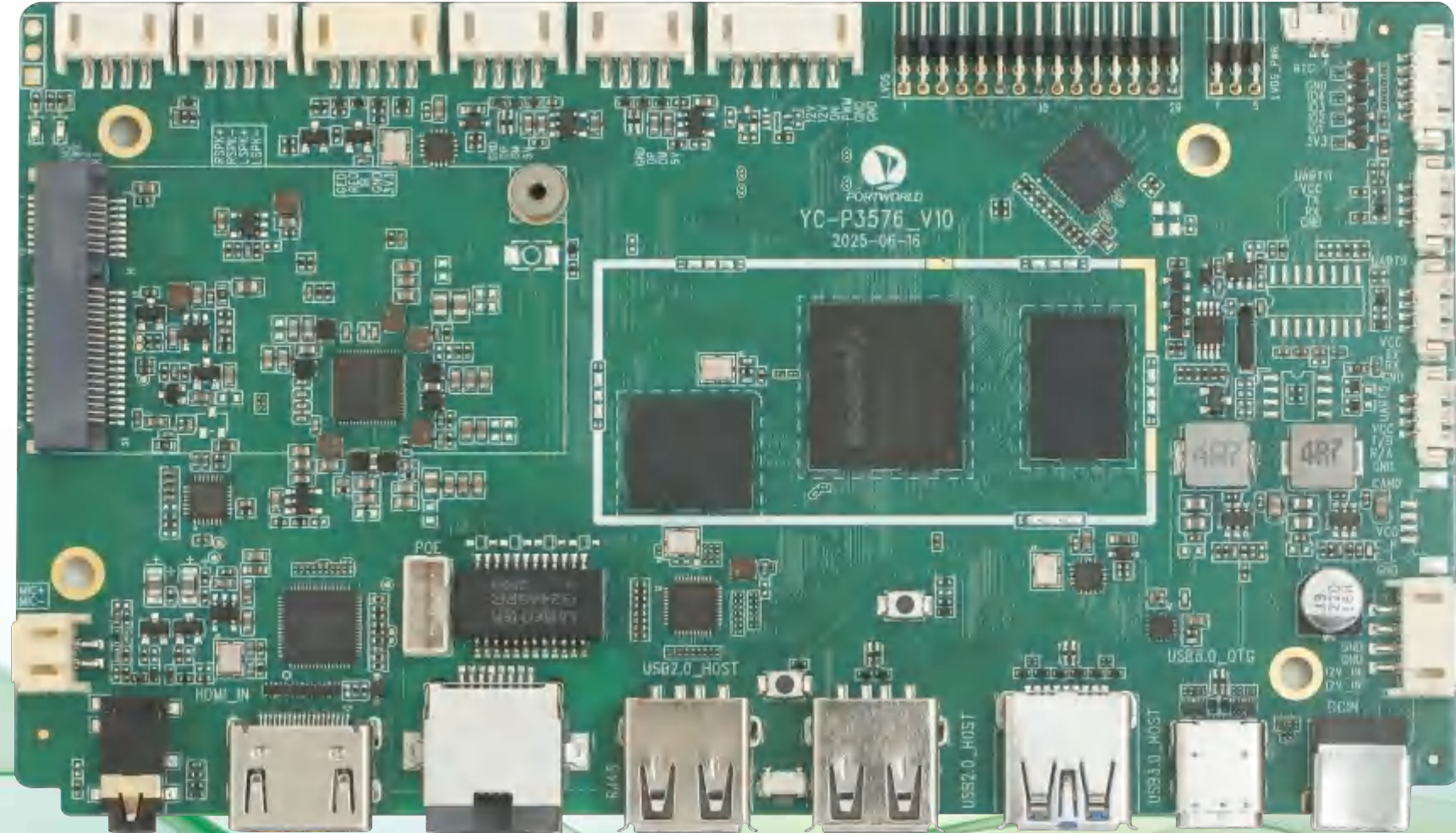




RK3576-P3576

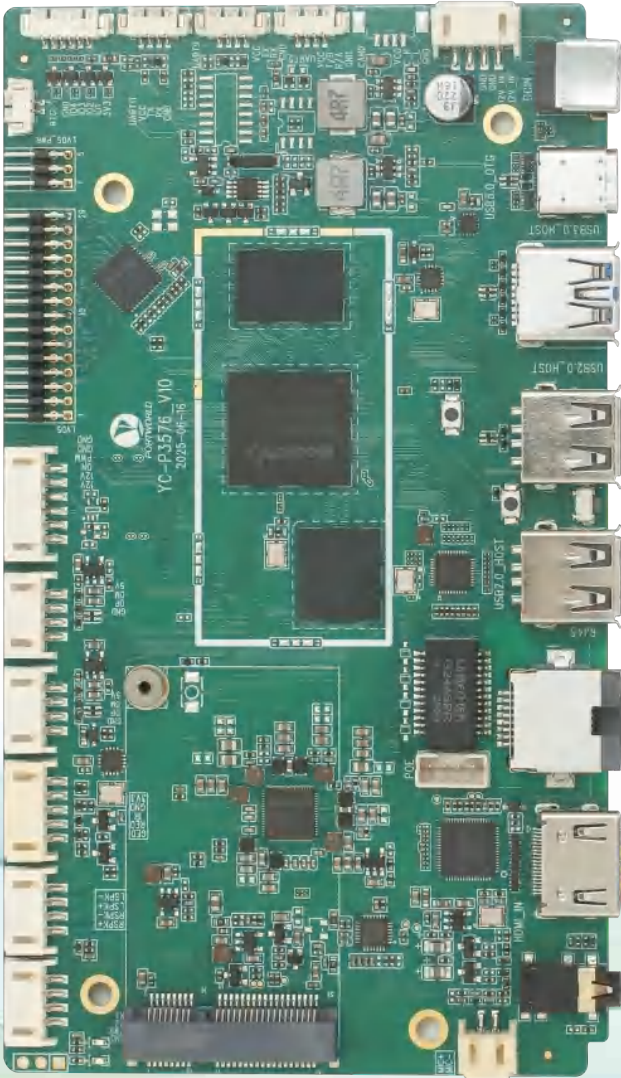
Smart mainboard



V1.0 2025-9-4

PORTWORLD

Product features



Octa-core AIOT processor RK3576

New generation octa-core 64-bit high-performance AIOT processor
big-small core architecture (4 x A72 + 4 x A53)
Maximum frequency up to 2.2GHz

4K Ultra HD Display at 120fps High Frame Rate

Supports HDMI 2.0 IN, eDP 1.3 (4K@60fps), DP 1.4 (4K@120fps), and MIPI DSI (2560 × 1600@60fps) interfaces, with triple independent display capability

Multiple Operating Systems

Supports Android 14, Ubuntu, Buildroot, Debian OS etc

Comprehensive Peripheral Expansion Interfaces

Equipped with MIPI-CSI, MIPI DSI, USB 3.0, USB 2.0, I2C, CAN, UART, and other expansion interfaces to meet diverse peripheral integration requirements.

Built-in powerful 6 TOPS NPU

Mixed precision (INT4/INT8/INT16) |
Compatible with
TensorFlow/MXNet/PyTorch

Wide Application Scenarios

Widely applicable to edge computing, large model localization, smart commercial displays, cloud terminal products, industrial control hosts, and automotive electronics

Open Resources & Customization

Provide full software development SDK, documentation, code samples, technical materials, and development tutorials, enabling users to perform deep customization.

8K30fps Decoding / 4K60fps Encoding

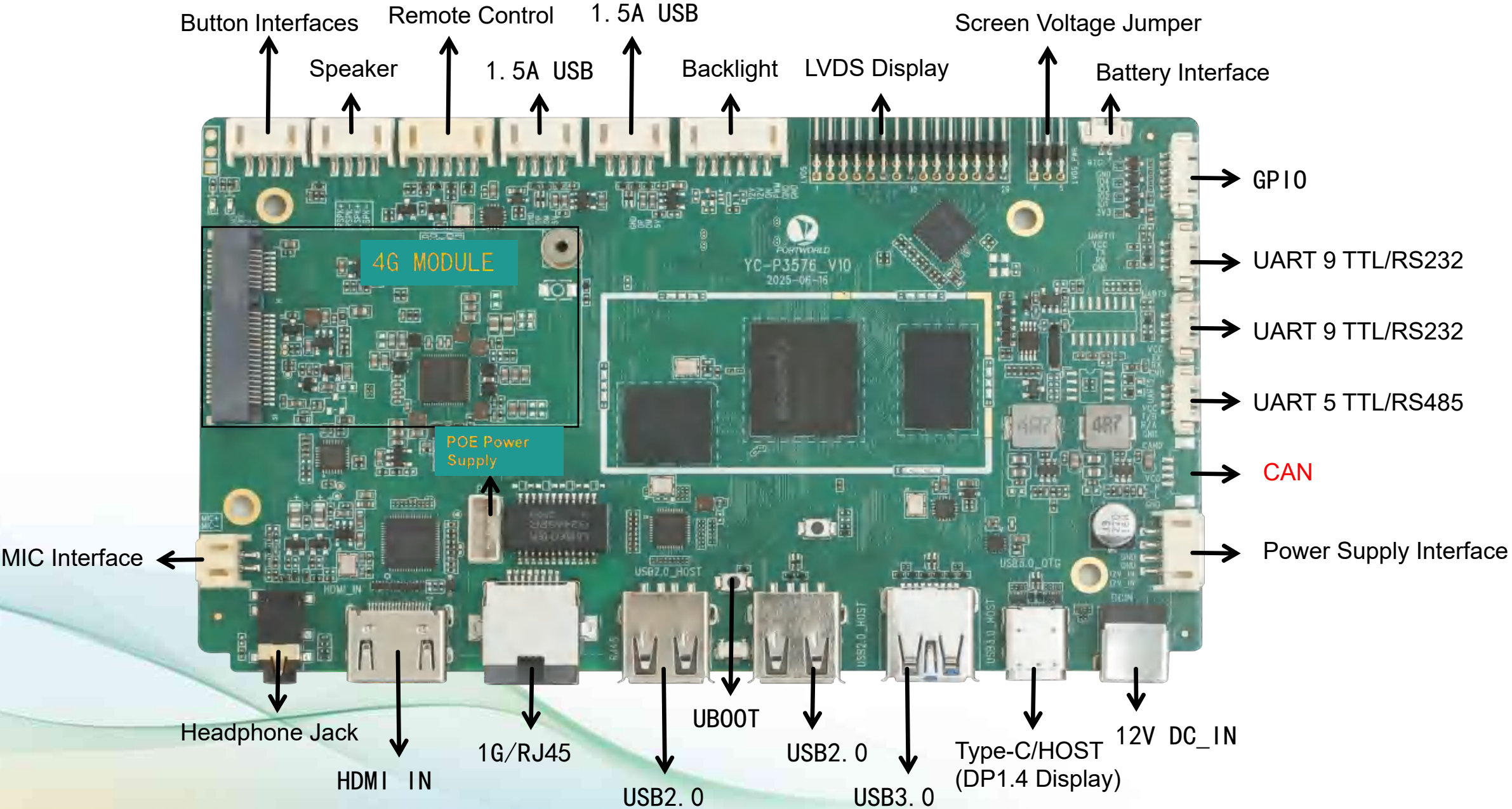
Supports 8K@30fps / 4K@120fps decoding (H.265/HEVC, VP9, AVS2, AV1) and 4K@60fps decoding (H.264/AVC), with 4K@60fps encoding (H.265/HEVC, H.264/AVC)

Specifications

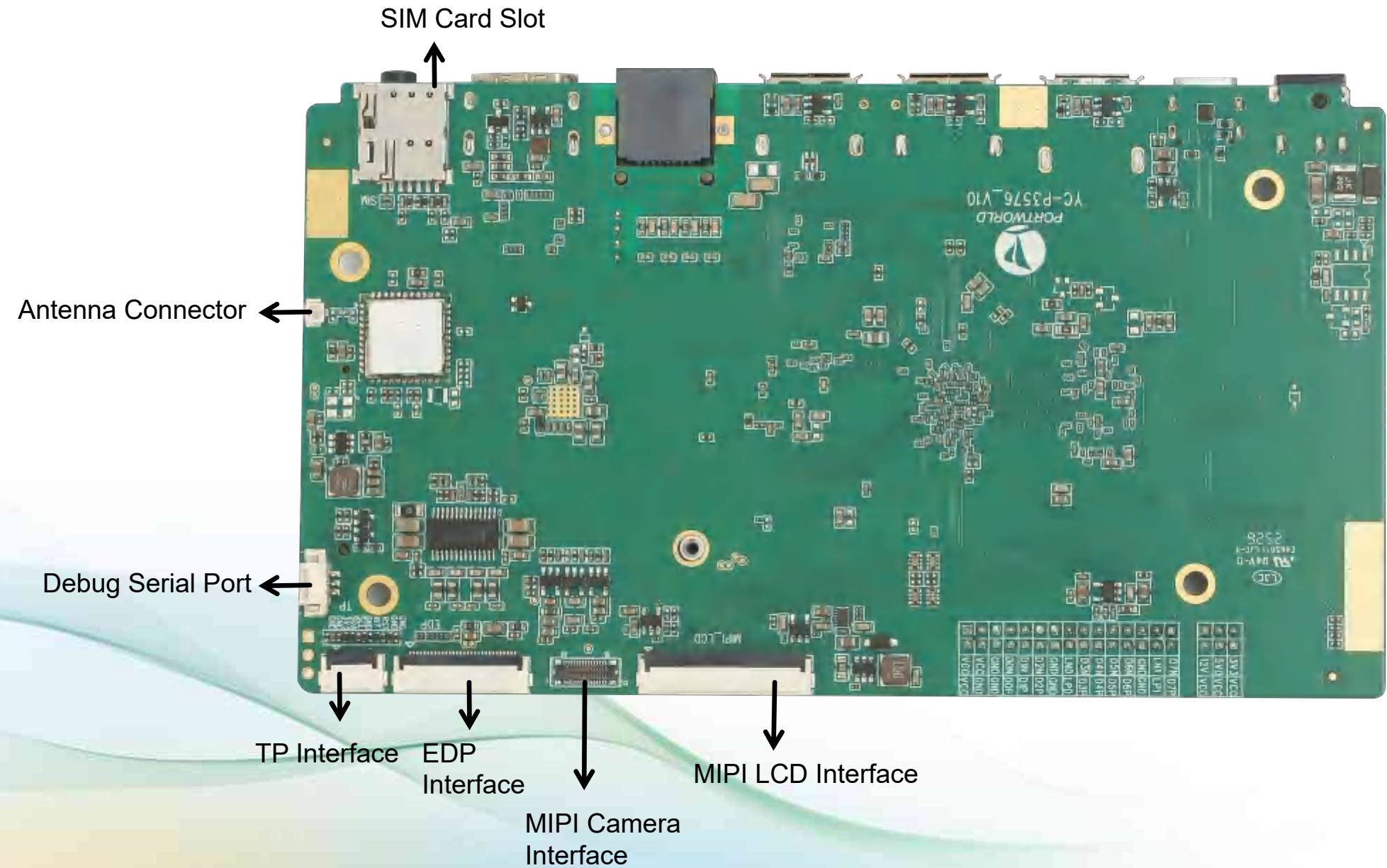
Specifications

Basic Parameters	SOC	Rockchip RK3576
	CPU	Octa-core 64-bit processor (4 × A72 + 4 × A53), 8nm advanced process, max frequency 2.2GHz
	GPU	G52 MC3 @ 1 GHz, supports OpenGL ES 1.1/2.0/3.2, OpenCL 2.0, Vulkan 1.1, embedded high-performance 2D acceleration hardware
	NPU	6 TOPS NPU, supports INT4/INT8/INT16/FP16/BF16/FP32 mixed operations
	Decoding Parameters	Decoding: 8K@30fps/4K@120fps; H.265/HEVC, VP9, AVS2, AV1; 4K@60fps; H.264/AVC Encoding: 4K@60fps; H.265/HEVC, H.264/AVC
	Memory	LPLPDDR4/LPDDR4X (4GB/8GB/16GB optional) Default: 4GB
	Storage	eMMC (16GB/32GB/64GB/128GB/256GB optional) Default: 32GB
	Power	9-12.0V (5.5mm × 2.1mm)
	System	Android14、Ubuntu、Buildroot、Debian, etc
	Size	85mm × 150mm
	Power Consumption	Typical: 1.2W (12V/100mA) Max: 8.4W (12V/700mA) Min: 0.096W (12V/8mA)
Interfaces Parameters	Environment	Operating temperature: -10°C~60°C; Storage temperature: -20°C~70°C; Operating humidity: 10%~90%RH (non-condensing)
	Ethernet	1 × 1000Mbps Ethernet (RJ45) with PoE Power Supply Dual-band WiFi 6 (2.4GHz/5GHz, supporting 802.11 a/b/g/n/ac/ax protocols) and Bluetooth 5.4 Expandable 4G LTE via Mini PCIe
	Video Input	1 × MIPI-CSI DPHY (1 × 4lanes) HDMI 2.0 IN input
	Video Output	1 × eDP (1 × 2 lanes) 1 × DP 1.4 (4K\@120fps) 1 × MIPI-DSI DPHY (2560 × 1600\@60fps, 40Pin-0.5mm, 1 × 4 lanes) or dual 8-bit LVDS 1920 × 1080 output
	Watchdog	Software Watchdog
	USB Interface	4 × USB 2.0 Host, 1 × USB 3.0, 1 × Type-C OTG/HOST supporting DP 1.4 display output
	Expansion Interfaces	3 × TTL Serial Ports (optional RS485/RS232, default TTL), 1 × Debug Serial Port 1 × Remote Control, 1 × Red LED, 1 × Green LED Supports speaker interface, up to two 8Ω 5W dual-channel speakers; 1 × 3.5mm audio jack (supports MIC recording, CTIA standard) Supports 1 × MIC input, 1 × Headphone with audio input, 1 × Audio output 4 × General-purpose GPIOs 1 × Touch Interface Reserved 1 × CAN Interface

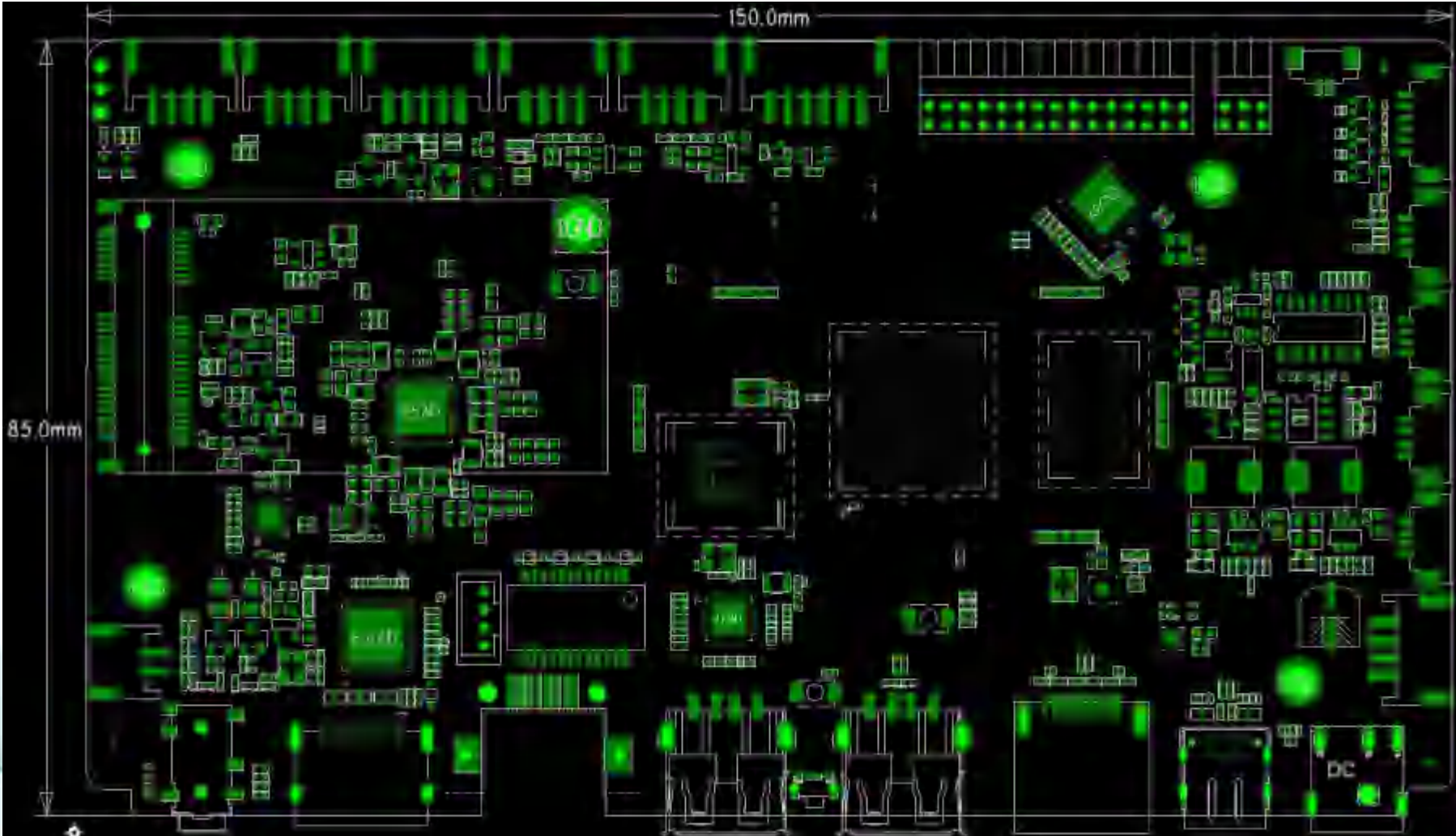
Interface description



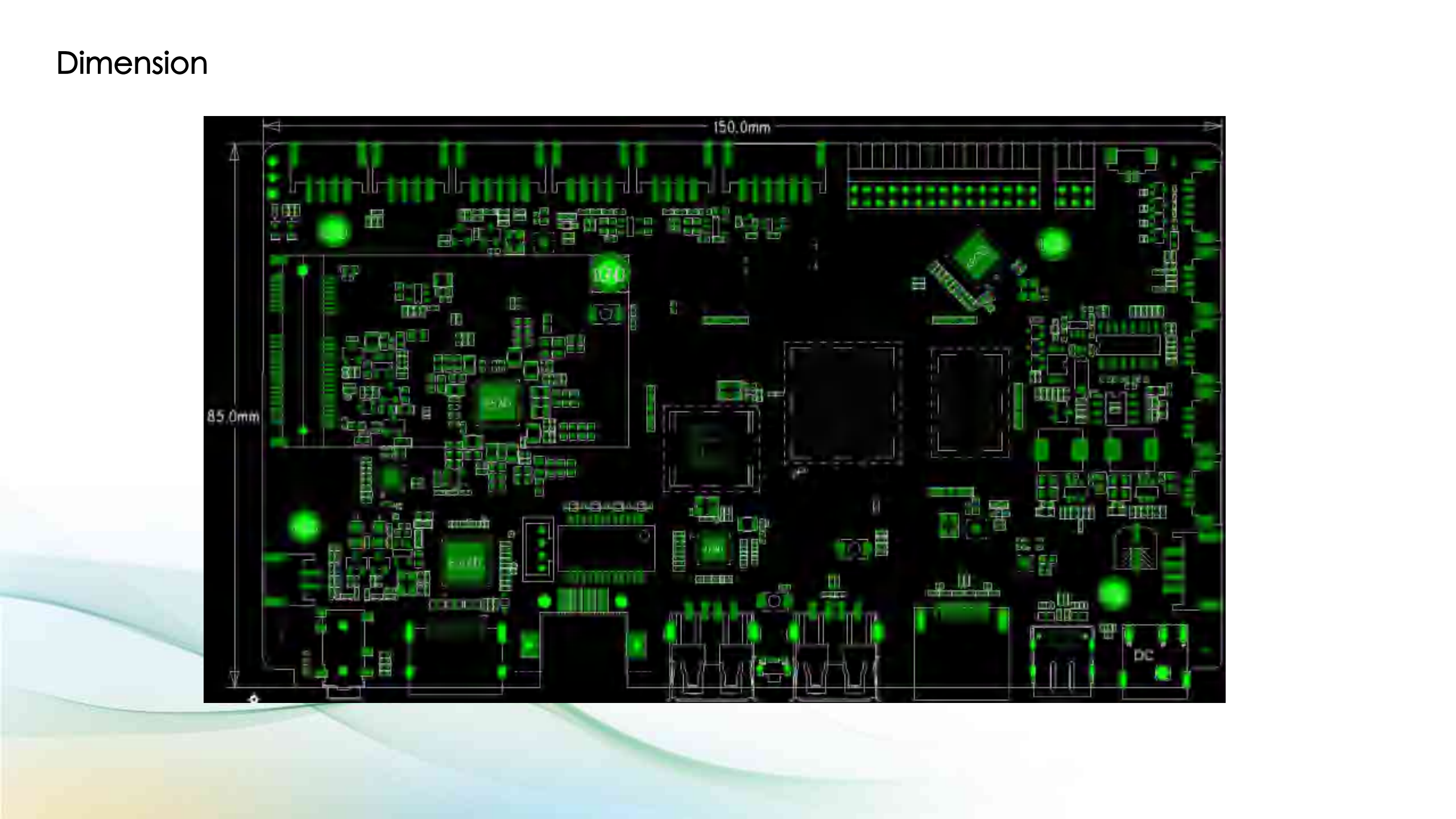
Interface description



Dimension



The image displays a complex PCB layout with a black background and white component outlines. Green highlights are used to emphasize specific areas, including a large central IC, several smaller ICs, and various passive components. The layout is organized into functional blocks, with a dense array of components on the left and a more sparse arrangement on the right. Dimensions are indicated by white lines and text: 150.0mm for the total width and 85.0mm for the total height. A small 'DC' label is visible near the bottom right corner.



Interface definition



12、 Power Supply Interface (2.0mm*4P)

Appearance	Number	Definition	Description
	1	12V	Power Positive (+)
	2	12V	Power Positive (+)
	3	GND	Ground
	4	GND	Ground

13、 CAN Interface (1.25mm*4P)

Appearance	Number	Definition	Description
	1	VCC_3V3	Power Positive (+)
	2	CAN_H	CAN+
	3	CAN_L	CAN-
	4	GND	Power Negative (-)

14、 UART 5/RS485 (1.25mm*4P)

Appearance	Number	Definition	Description
	1	VCC_3V3	Power Positive (+)
	2	TX/B	Transmit/485_B
	3	RX/A	Receive/485_A
	4	GND	Power Negative (-)

15、 UART 5/RS232 (1.25mm*4P)

Appearance	Number	Definition	Description
	1	VCC_3V3	Power Positive (+)
	2	TX	Transmit
	3	RX	Receive
	4	GND	Power Negative (-)

16、 UART 5/RS232 (1.25mm*4P)

Appearance	Number	Definition	Description
	1	VCC_3V3	Power Positive (+)
	2	TX	Transmit
	3	RX	Receive
	4	GND	Power Negative (-)

17、 GPIO Interface (1.25mm*4P)

Appearance	Number	Definition	Description
	1	VCC_3V3	Power Positive (+)
	2	IO1	IO Port 1
	3	IO2	IO Port 2
	4	IO3	IO Port 3
	5	IO4	IO Port 4
	6	GND	Ground

Interface definition



18、Battery Connector (1.25mm*2P)

Appearance	Number	Definition	Description
	1	BAT+	Power Positive (+)
	2	BAT-	Power Negative (-)

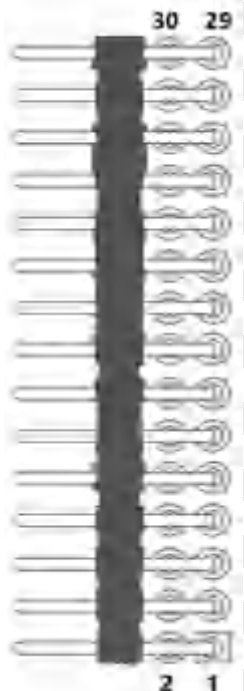
19、LVDS Screen Power Jumper (6PIN * 2.0mm, Right Angle)

Appearance	Number	Definition	Description
	1	12V	12V Supply
	2	VCC_LCD	Screen voltage
	3	5V	5V Supply
	4	VCC_LCD	Screen voltage
	5	3.3V	3.3V Supply
	6	VCC_LCD	Screen voltage

21、LVDS Backlight Connector (2mm * 6P)

Appearance	Number	Definition	Description
	1	GND	Ground
	2	GND	Ground
	3	PWM	Backlight brightness adjustment
	4	EN	Backlight on/off control
	5	12V	Backlight power supply
	6	12V	Backlight power supply

20、MIPI LCD Display (FPC 0.5 * 40P)

Appearance	Number	Definition	Description
	1	VCC	Power Supply
	2	VCC	Power Supply
	3	VCC	Power Supply
	4	GND	Ground
	5	GND	Ground
	6	GND	Ground
	7	D0N	LVDS Signal
	8	D0P	LVDS Signal
	9	D1N	LVDS Signal
	10	D1P	LVDS Signal
	11	D2N	LVDS Signal
	12	D2P	LVDS Signal
	13	GND	Ground
	14	GND	Ground
	15	CLK0N	LVDS Signal
	16	CLK0P	LVDS Signal
	17	D3N	LVDS Signal
	18	D3P	LVDS Signal
	19	D5N	LVDS Signal
	20	D5P	LVDS Signal
	21	D6N	LVDS Signal
	22	D6P	LVDS Signal
	23	D7N	LVDS Signal
	24	D7P	LVDS Signal
	25	GND	Ground
	26	GND	Ground
	27	CLK1N	LVDS Signal
	28	CLK1P	LVDS Signal
	29	D8N	LVDS Signal
	30	D8P	LVDS Signal

Interface definition



22、USB Interface (2.0mm*4P)

Appearance	Number	Definition	Description
	1	+5V	Power Supply
	2	D-	DM
	3	D+	DP
	4	GND	Ground

23、USB Interface (2.0mm*4P)

Appearance	Number	Definition	Description
	1	+5V	Power Supply
	2	D-	DM
	3	D+	DP
	4	GND	Ground

24、Remote Control Interface (2.0mm*5P)

Appearance	Number	Definition	Description
	1	VCC	3.3V Supply
	2	GND	Ground
	3	IR	Remote Control
	4	RED	Red Indicator Light
	5	GED	Green Indicator Light

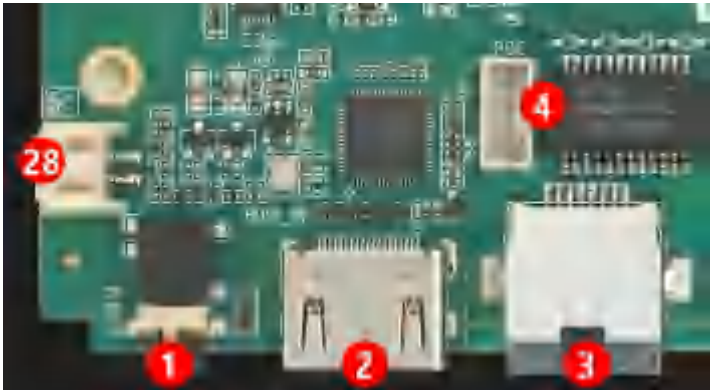
25、Speaker Interface (2.0mm*4P)

Appearance	Number	Definition	Description
	1	LPK-	Left Channel -
	2	LPK+	Left Channel +
	3	RPK-	Right Channel -
	4	RPK+	Right Channel +

26、Button Interface (1.25mm*4P)

Appearance	Number	Definition	Description
	1	K1	Reserved Button K1
	2	K2	Reserved Button K2
	3	PWR	Power On/Off
	4	GND	Ground

Interface definition



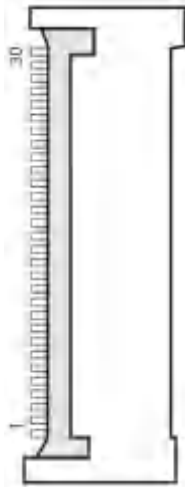
28、Microphone Interface (2.0mm*4P)			
Appearance	Number	Definition	Description
	1	MICP+	Microphone Positive
	2	MICN-	Microphone Negative

26、POE Power Supply (2.0mm*4P)			
Appearance	Number	Definition	Description
	1	CT1	Communication Data 1
	2	CT2	Communication Data 2
	3	CT3	Communication Data 3
	4	CT4	Communication Data 4

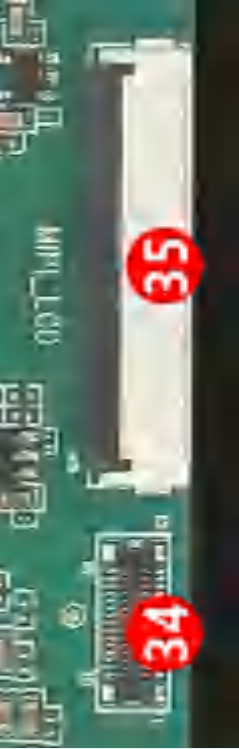
Interface definition



32、TP Touch (FPC0.5*10P)			
Appearance	Number	Definition	Description
	1	GND	Power
	2	GND	Power
	3	VCC_TP	3.3V Power
	4	SDA	Data
	5	SCL	Clock
	6	GND	Ground
	7	TP_INT	Input Interrupt
	8	TP_RESET	Reset
	9	GND	Ground
	10	GND	Ground

33、EDP Display (FPC0.5*30P)			
Appearance	Number	Definition	Description
	1	/	/
	2	GND	Ground
	3	TX1N	EDP Signal
	4	TX1P	EDP Signal
	5	GND	Ground
	6	TX0N	EDP Signal
	7	TX0P	EDP Signal
	8	GND	Ground
	9	AUXP	EDP Signal
	10	AUXN	EDP Signal
	11	GND	Ground
	12	VCC	3.3V Power
	13	VCC	3.3V Power
	14	/	/
	15	GND	Ground
	16	GND	Ground
	17	/	/
	18	GND	Ground
	19	GND	Ground
	20	GND	Ground
	21	GND	Ground
	22	EN	EN Enable Pin
	23	ADJ	PWM Control Pin
	24	/	/
	25	/	/
	26	VDD	3.3V Power
	27	VDD	3.3V Power
	28	VDD	3.3V Power
	29	VDD	3.3V Power
	30	/	/

Interface definition

35、MIPI LCD Display (FPC0.5*40P)			
Appearance	Number	Definition	Description
	1	NC	/
	2	VDD_LCD	3.3V Power
	3	VDD_LCD	3.3V Power
	4	NC	/
	5	MIPI_RST	Reset (Level 1.8V)
	6	NC	/
	7	GND	Ground
	8	MIPI_TX0N	MIPI Signal
	9	MIPI_TX0P	MIPI Signal
	10	GND	
	11	MIPI_TX1N	MIPI Signal
	12	MIPI_TX1P	MIPI Signal
	13	GND	
	14	MIPI_TX_CLKN	MIPI Clock
	15	MIPI_TX_CLKP	MIPI Clock
	16	GND	
	17	MIPI_TX2N	MIPI Signal
	18	MIPI_TX2P	MIPI Signal
	19	GND	
	20	MIPI_TX3N	MIPI Signal
	21	MIPI_TX3P	MIPI Signal
	22	GND	Ground
	23	NC	/
	24	NC	/
	25	GND	/Ground
	26	NC	/
	27	NC	/
	28	NC	/
	29	VCC_LCD18	1.8V Power
	30	GND	Ground
	31	LED-	Backlight Negative
	32	LED-	Backlight Negative
	33	NC	/
	34	NC	/
	35	AVEE	Negative 5.6V
	36	NC	/
	37	NC	/
	38	AVDD	Positive 5.6V
	39	LED+	Backlight Positive
	40	LED+	Backlight Positive

34、MIPI Camera (0.4BTB 2*15Pin)			
Appearance	Number	Definition	Description
	1	GND	Ground
	2	MIPI_MCLK	MIPI Clock
	3	GND	Ground
	4	MIPI_PDNI	Enable Signal
	5	MIPI_RST	Reset Data
	6	SDA	IIC Data
	7	SCL	IIC Clock
	8	GND	Ground
	9	VCC_DVP	2.8V Power
	10	GND	Ground
	11	VCC	2.8V Power
	12	GND	Ground
	13	VCC	1.8V Power
	14	VCC	1.8V Power
	15	GND	Ground
	16	GND	Ground
	17	MIPI_DON	MIPI Signal
	18	MIPI_DOP	MIPI Signal
	19	GND	Ground
	20	MIPI_D1N	MIPI Signal
	21	MIPI_D1P	MIPI Signal
	22	GND	Ground
	23	MIPI_CLKN	MIPI Clock
	24	MIPI_CLKP	MIPI Clock
	25	GND	Ground
	26	MIPI_D2N	MIPI Signal
	27	MIPI_D2P	MIPI Signal
	28	GND	Ground
	29	MIPI_D3N	MIPI Signal
	30	MIPI_D3P	MIPI Signal



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