ELECROW

CrowPanel-CM4 Display Pi Terminal

Datesheet

V1.1

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1 Product Information

1.1 Product Overview

CM4 Display is a versatile embedded industrial control device designed for the Raspberry Pi platform. It is equipped with a 7-inch capacitive touch screen, multiple industrial interfaces, and supports a variety of wireless communication protocols. Utilizing the CM4 as the main controller, it can rapidly process real-time control tasks and monitor ongoing operations. Its industrial design enables it to withstand harsh environmental conditions.

CM4 Display integrates with Node-RED and is compatible with software running on Raspberry Pi and the pre-installed Raspbian system. With an all-in-one design, it boasts a robust open-source ecosystem, tailored specifically for a wide range of industrial applications.

1.2 Product Features

- Utilizing the Raspberry Pi CM4 as the main controller, it boasts excellent computing power and performance.
- Featuring the Raspberry Pi CM4 as the primary controller, it delivers outstanding computational capabilities and performance, providing robust power for industrial applications.
- Integrated with Node-RED visual programming, it comes with built-in Node-RED flow editing and one-click deployment, compatible with all

software running on Raspberry Pi. This powerful and intuitive programming environment enables developers to quickly build prototypes and conduct tests, significantly enhancing development efficiency and productivity.

- Powerful communication capabilities, supporting a variety of wireless communication protocols including Wi-Fi, Bluetooth compatibility, 4G, LoRa, equipped with Gigabit Ethernet to meet the needs of high-speed wired networks, enabling high-speed data transfer between devices and remote monitoring.
- The Pi Terminal's multifunctional integrated design can serve as an HMI, gateway, or tablet, unifying data flow to create a fully integrated platform.
- Rich industrial interfaces, featuring a CAN bus interface, supporting RS232/RS485 serial communication, integrated with DIO, ADC, and relay interfaces, fully meeting the needs for device interconnection and control.
- Flexible customization, with two programmable button interfaces reserved, and interfaces for speakers and microphones, allowing for flexible configuration as needed.
- The wide voltage design of 12V to 36V can better adapt to different host power supply solutions.

- Industrial-grade design, electronic components capable of operating at high temperatures, and hardware design that fully considers industrial requirements, making it suitable for harsh industrial environments.

1.3 Application Fields

- **Industrial Automation:** Manufacturing, process industries (such as chemical, oil, and power), machinery and equipment manufacturing.
- **Smart Manufacturing/Industry 4.0 Scenarios:** Smart factories, digital workshops, intelligent warehousing and logistics.
- **Building Automation:** Smart buildings, smart homes, intelligent buildings.
- **Transportation:** Intelligent transportation, vehicle information systems, smart public transit/railways.
- **Other Scenarios:** Medical technology, mining, agriculture, retail.

Figure 1:Application Domains Illustration

2 Product Exterior Image

Figure 2:Front View

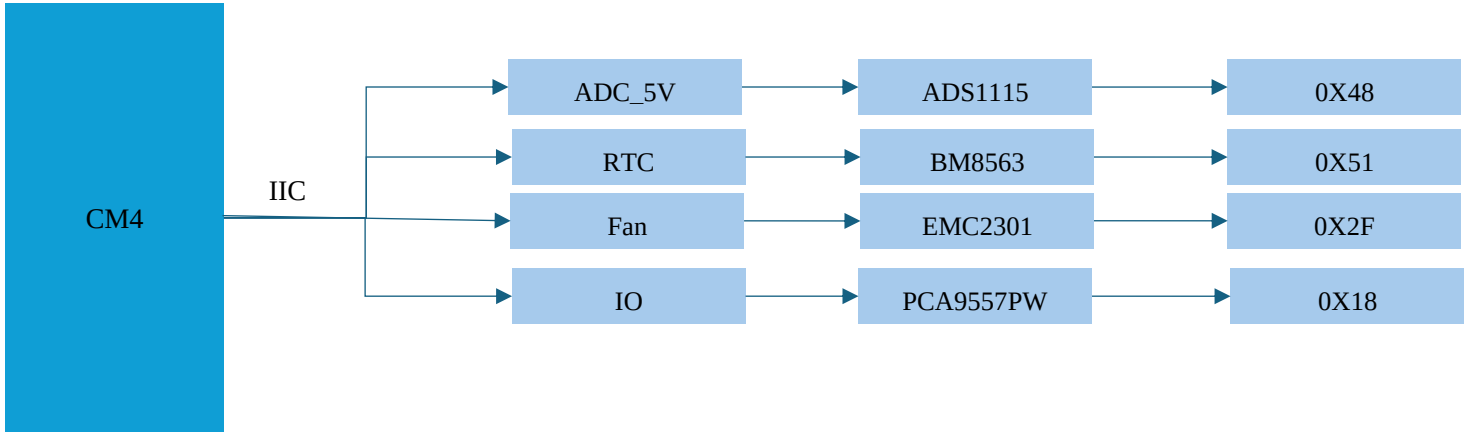
Figure 3:Rear View

Figure 4:Side View

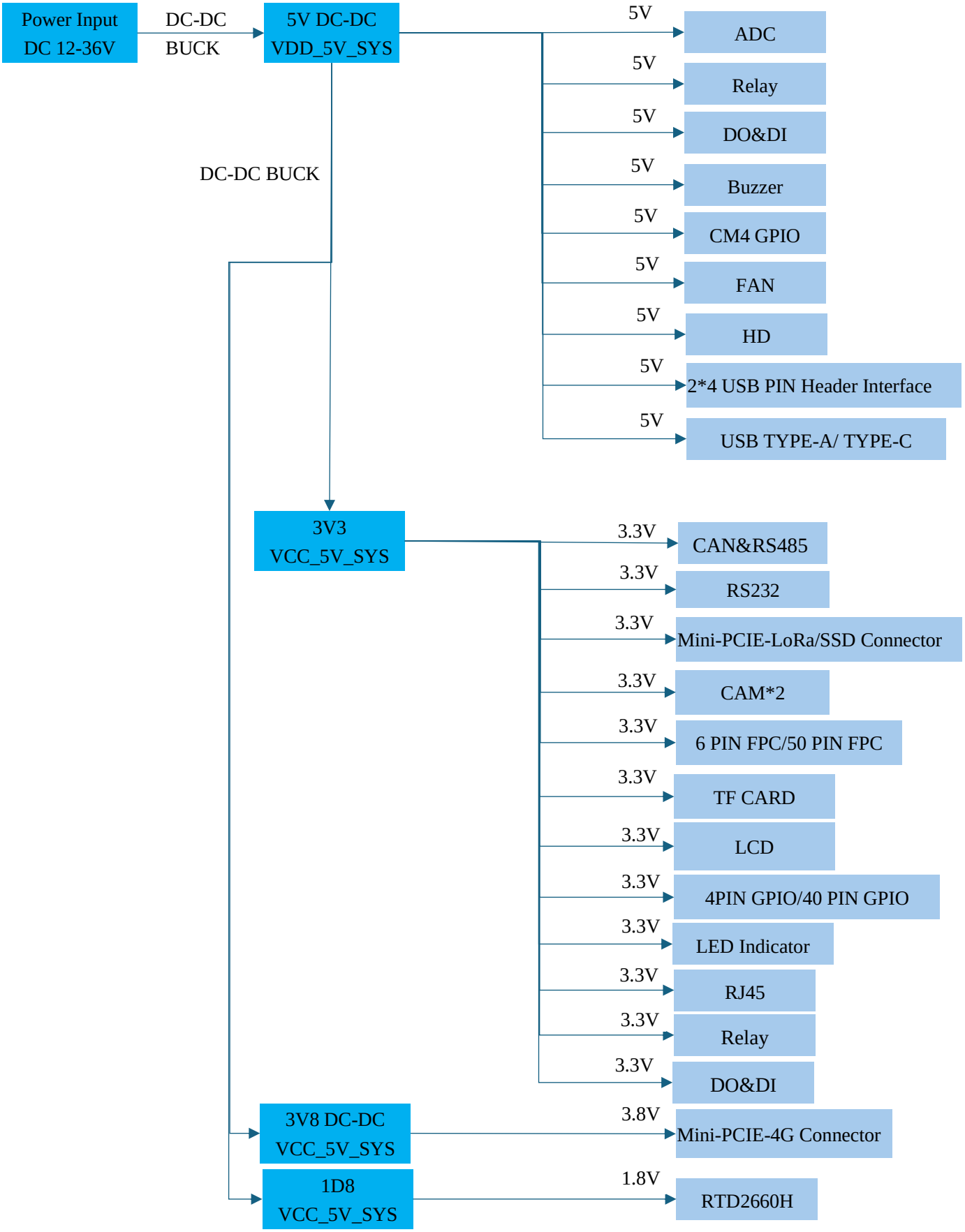
3 Product Dimensional Drawing

Figure 5:Device Dimensions

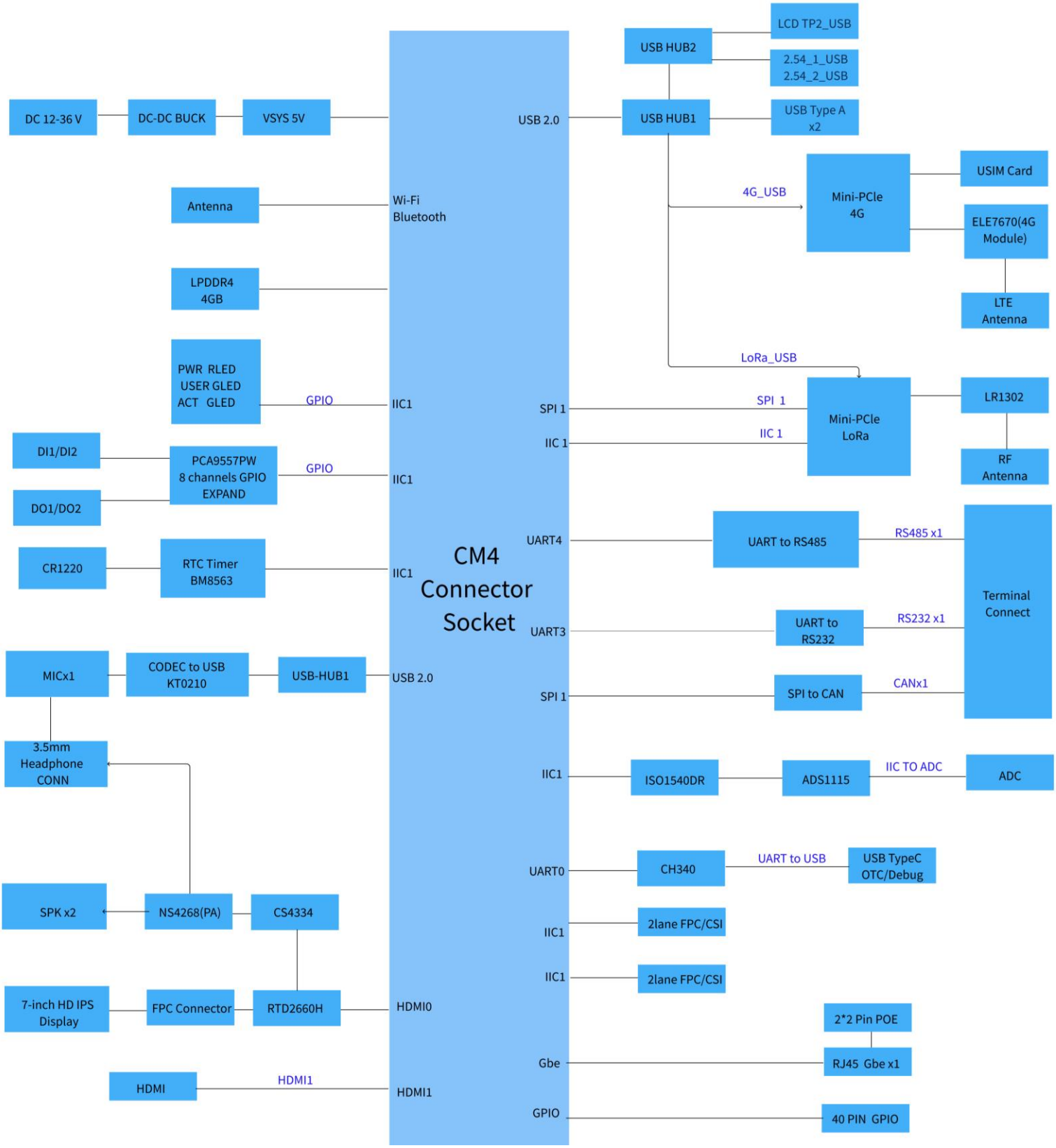
4 I2C Module Diagram



5 Power Supply Diagram



6 Block Diagram



7 Mainboard Overview

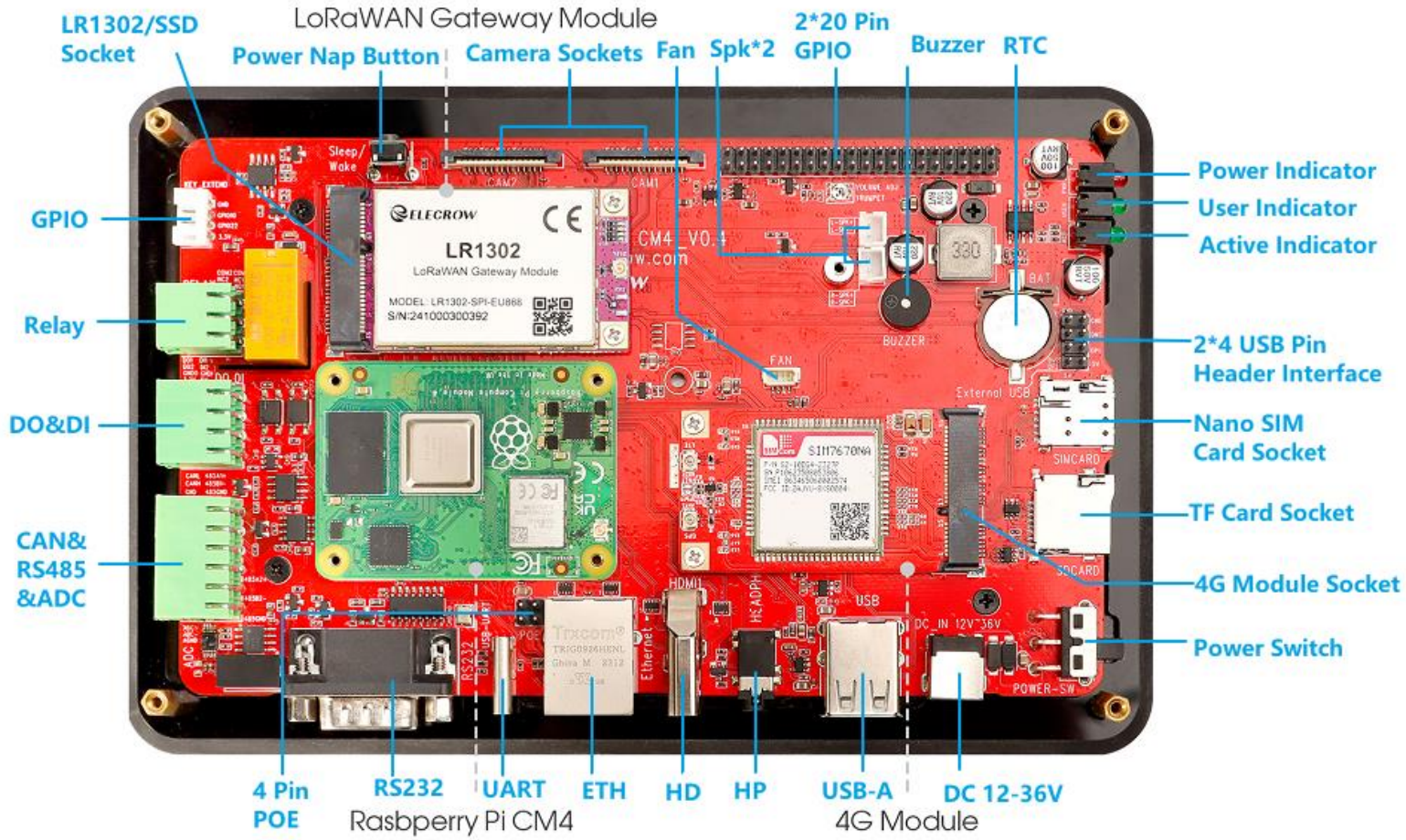


Figure 6:Interface Schematic Diagram

7.1 Internal Interface Layout and Functions

No.	Interface Type	Pin Function	Chip	Function Description	Specification Parameters	Maximum Value
1		CM4 Main Control	/	Suitable for all versions of Raspberry Pi CM4	Operating Voltage: 3.3V	Maximum Voltage: 5.25V Maximum Current: 600mA
2	DC Power Jack	/	/	DC Power Input	Power Voltage:DC 12-36V Input Current:3A (Max)	Rated Voltage: 12V Rated Current: 2A
3	USB-A *2	USB2_N USB2_P	The dual USB signals can be expanded through the FE2.1 conversion chip and then connected to the CM4_USB_HOST interface (USB2_N, USB2_P).	Dual-layer USB-A interface, expanded by a USB-Hub chip from the CM4's native USB interface. Host port, can connect USB devices such as flash drives, network cameras, keyboards, and mice, etc.	Voltage: USB-5V Current: 500mA(Max) USB Communication Protocol: USB2.0	Maximum Current: 500mA Maximum Voltage: 6V
4	HP	USB2_N USB2_P	**1.**Audio signals are converted into analog signals through the RTD2660H. The analog signals are then converted into digital signals by the CS4334 and transmitted via I2S or I2C interfaces. The digital signals are received and amplified by the NS4268, ultimately driving the speakers. **2.**The analog audio signals input from	Left and right audio channels,witha microphone and headphone jack, used for headphone audio output, microphone audio input.	4-segment standard 3.5mm headphone jack, with mic input.	/

			MIC_IN are decoded into digital signals by the KT0210. The decoded digital signals are transmitted through a USB2.0 HUB chip. Subsequently, they are connected to the CM4_USB_HOST via an I/O expansion chip.			
5	HD	HDMI1_TX2_P HDMI1_TX2_N HDMI1_TX1_P HDMI1_TX1_N HDMI1_TX0_P HDMI1_TX0_N HDMI1_CLK_P HDMI1_CLK_N HDMI1_SDA HDMI1_SCL HDMI1_CEC HDMI1_HOTPLUG	/	HDMI video display interface, connecting to the native HDMI0 interface of CM4	Interface Voltage: 5V HDMI 2.0 support video output up to 4K @ 60 fps	/
6	ETH	ETHERNET_PAIR1_P ETHERNET_PAIR1_N ETHERNET_PAIR0_P ETHERNET_PA	/	Gigabit Ethernet port, connecting to the native Ethernet interface of CM4: Has a PoE interface, but does not include a PoE module, requires an external	Supports 10M/100M/1000M network connection	/

		IR0_N ETHERNET_PAIR2_P ETHERNET_PAIR2_N ETHERNET_SYNC_IN(1_8V) ETHERNET_SYNC_OUT(1_8V) ETHERNET_NLED3(3_3V) ETHERNET_NLED2(3_3V) ETHERNET_NLED1(3_3V)		PoE module to support PoE functionality		
7	2*2 PIN POE	/	The 4PIN POE pins are connected to the TRJG0926HENL interface.	POE interface, used for connecting an external POE module to achieve POE functionality	Standard 2.54mm pitch pin header interface	DC Current: 600mA(max) Rated Voltage: 54V(DC)
8	TYPE-C (USB TO UART)	GPIO14(RX) GPIO15(TX)	The TYPE-C (USB-to-UART) input interface is internally connected to the CH340 (USB-to-UART chip), which is linked to the CM4's RX:GPIO14 and TX:GPIO15.	TYPE-C(USB to UART) input interface, internally connected to CH340-USB to UART chip	Supply Voltage: 3.3V-5V Input Voltage: 5V Input Current: 500mA(Max)	Maximum Voltage: 6V
9	RS232	GPIO4(RX) GPIO5(TX)	The standard DB9 male connector, RS232 communication interface, is internally converted through the RS232 chip (GM3232ESA) to communicate with the CM4 at GPIO4 (RX) and GPIO5 (TX)	Standard DB9 male connector, RS232 communication interface, internally uses an RS232 chip to convert voltage levels for communication with CM4	Standard DB9 male RS232 communication interface. Supports standard RS232 communication protocol	Maximum Voltage: 15V

10	CAN& RS485& ADC	GPIO8(TX) GPIO9(RX) GPIO11(CTRL)	**RS485:** RS485 signals with 485A1 and 485B1 are connected to the A and B ports of the SP3485EN-L/TR (two sets), and connected to CM4's GPIO11 (in output mode, used to control the RE and DE pins of the SP3485EN-L/TR), GPIO8 (UART's TX pin), and GPIO9 (UART's RX pin)	2*6-KF350 terminal curved pin interface, including 2*RS485 communication interfaces: The two RS485 interfaces cannot transmit and receive data at the same time, use them separately when needed	Supports standard RS485 communication protocol	**RS485:** voltage ±15V
		GPIO16(CS) GPIO12(INT) GPIO19(MISO) GPIO20(MOSI) GPIO21(SCK)	**CAN :** The CAN bus high and low level signals are connected to the SN65HVD230DR for driver input data and receiver MCP2515T-I/ST's RXD input. They communicate with the CM4 via the SPI interface, connecting the MCP2515T-I/ST's SPI pins (SCK, MOSI, MISO, CS) to the corresponding SPI pins of the CM4, GPIO16(CS), GPIO12(INT), GPIO19(MISO), GPIO20(MOSI), GPIO21(SCK)	1*CAN bus communication interface	Supports standard CAN communication protocol	**CAN:** voltage:±25V
		GPIO2(SCL) GPIO3(SDA)	**ADC:** The ADC analog signal is input to the ISO1540DR (isolated I2C), which	Isolated 1*ADC differential analog input interface: ADC+/ADC- can be used separately to	Uses ADS1115 conversion chip, ADC voltage collection range ±6.144V	**ADC:** Maximum Voltage: 5.5V

			is then converted by the analog-to-digital conversion chip ADS1115 to output ADC signals. These signals are connected to the CM4's GPIO2 (SCL) and GPIO3 (SDA)	collect AD signals	Sampling frequency: 8-860SPS	
11	DO&DI	GPIO2(SCL) GPIO3(SDA)	The CM4 connects to the PCA9557PW-IO expansion chip via the I2C interface, thereby extending the DO and DI interfaces.	Includes isolated 2*DI digital input interfaces	Interface input voltage: 3.3V/5V	**DO**: Maximum Voltage: 80V **DI**: Forward Voltage): Typical Forward Voltage (Vf): 1.2V
				2*4-KF350 terminal curved pin interface, isolated 2 DO digital output interfaces (DO interfaces are open-drain outputs, do not have high-level output capability, external pull-up resistors are required when using)	Interface output voltage: 3.3V/5V	
				1*3.3V， 1*5V power output interface	Interface output voltage: 3.3V/5V Interface output current: 500mA(Max)	
12	Relay	GPIO2(SCL) GPIO3(SDA)	The CM4's pins GPIO2 (SCL) and GPIO3 (SDA) are connected via the I2C interface to the PCA9557PW-IO expansion chip, which controls the operation of the relays.	2*3-KF350 terminal curved pin interface, 2 relay control interface	**Relay:** Rated Voltage: 5V (DC) Rated Current: 29.9-72mA	**Relay Contact Rating:** DC 5V-SHC AC 1A 125V DC 2A 30V
13	4Pin GPIO	GPIO10 GPIO22	/	1*4 PH2.0 Bent Pin Interface（GND/IO10/IO22/3.3V）, General Purpose Input/Output (GPIO) interface, which can be used for connecting custom function	Interface Power Output: Operating Voltage: 3.3V Operating Current: 300mA	**Output Current:** By default, the maximum output current per GPIO pin is 8mA. **Total Output**

				buttons externally, connected to the native GPIO port of CM4.		**Current for All GPIO Pins:** The maximum total output current for all GPIO pins combined is 50mA. **Power Output:** The 3.3V and 1.8V outputs of the CM4 can provide a maximum of 300mA per pin, not exceeding a total of 600mA. **Maximum Voltage:** 3.6V
14	Display Backlight Control Key	GPIO26	/	A button for display functions, used to put the screen into sleep mode or to wake it up.	/	/
15	Camera Sockets	CAM1_C_N CAM1_C_P CAM1_D0_N CAM1_D0_P CAM1_D1_N CAM1_D1_P	/	2*15PIN FPC Ribbon Cable Interface, CSI camera interface, connecting to the native CAM1 interface of CM4.	Interface Supply Voltage: 3.3V, supports 15PIN FPC ribbon cable with a 1.0mm pitch CSI camera interface.	/
16		CAM0_C_N CAM0_C_P CAM0_D0_N CAM0_D0_P CAM0_D1_N CAM0_D1_P	/	2*15PIN FPC Ribbon Cable Interface, CSI camera interface, connecting to the native CAM0 interface of CM4.		
		SCL0 SDA0	/			

		CAMERA_GPIO				
17	2*20 PIN GPIO	GPIO2-27 ID_SC ID_SD	/	Raspberry Pi standard 40Pin-GPIO interface, native GPIO interface of CM4, with all GPIO pins internally set to a default high level of 3.3V. Some GPIO pins are not available for use due to their internal multiplexing as SPI /I2C/UART interfaces.	Standard 2.54mm pitch header interface, compatible with Raspberry Pi series GPIO interface. IO High Level (Operating Voltage): 3.3V Output Operating Current: 300mA	**Output Current:** By default, the maximum output current per GPIO pin is 8mA. **Total Output Current for All GPIO Pins:** The maximum total output current for all GPIO pins combined is 50mA. **Power Output:** The 3.3V and 1.8V outputs of the CM4 can provide a maximum of 300mA per pin, not exceeding a total of 600mA. **Maximum Voltage:** 3.6V
18	SPK*2	/	Audio signals are converted into analog signals through the RTD2660H. The analog signals are then converted into digital signals by the CS4334 and transmitted via I2S	Left Channel Audio Speaker Output Interface, used for connecting external speakers.	1*2 PH2.0 male header socket, for connecting external 8Ω 1W/2W PH2.0 interface speakers.	Maximum driving power: 3W x 2 @ 3Ω
19				Right Channel Audio Speaker Output Interface, used for	1*2 PH2.0 male header socket, for connecting	

			or I2C interfaces. The digital signals are received and amplified by the NS4268, ultimately driving the speakers.	connecting external speakers.	external 8Ω 1W/2W PH2.0 interface speakers.	
20	Fan	GPIO2(SCL) GPIO3(SDA)	The CM4's GPIO2 (I2C_SCL) and GPIO3 (I2C_SDA) are connected to the EMC2301 chip, which controls the operation of the fan.	1*4 SH1.0 male header interface, cooling fan interface, used for cooling the CM4 motherboard.	Interface Supply Voltage: 5V. Compatible with Raspberry Pi 5-4PIN JST cooling fan interface, with adjustable cooling fan speed.	Rated Current: 500mA DC Rated Voltage: 5.2 V DC
21	RTC	GPIO2(SCL) GPIO3(SDA)	The CM4 microcontroller's GPIO2 (I2C_SCL) and GPIO3 (I2C_SDA) are connected to the BM8563 chip, controlling the operation of the RTC.	RTC Clock Chip Power Battery Holder, supplies power to the RTC clock chip when power is off.	Battery Voltage:3V Battery Model: CR1220	The supply voltage range for the RTC battery is: 2.8V to 3.0V.
22	2*4 PIN USB Pin Header Interface	USB2_N USB2_P	The 2.54_1_USB and 2.54_2_USB dual signals pass through the SL2.1s (USB conversion chip) and are connected to the CM4_USB HOST (USB2_N USB2_P)	Two 5V USB 2.0 interfaces, expanded from the native USB interface of CM4 via a USB-Hub chip.	Interface Voltage: 5V Output Current: 500mA (Max)	Maximum Voltage: 5.2V Maximum Current: 500mA
23	Nano SIM Card Socket	/	/	4G Nano SIM Card Slot, when connected to a 4G module, allows for the insertion of a 4G SIM card for 4G internet access.	Card Slot Supply Voltage: 1.8V	/
24	TF Card Socket	SD_DAT0 SD_DAT1 SD_DAT2 SD_DAT3	/	Micro SD Card Slot, used for storing the system image on an SD card.	Card Slot Supply Voltage: 3.3V	/

		SD_PWR_ON SD_CMD RESERVED SD_CLK				
25	Power Switch	/	/	Control system power on and off; Up position is OFF, and Down position is ON.	/	/
26	CM4 Mainboard Socket	/	/	Applicable to all versions of the Raspberry Pi CM4.	Input Voltage: 5V	/
27	MINI PCIE Interface Socket - 4G Module	USB2_N USB2_P GPIO13	Connect the USB pins of the 4G module to the CM4_USB_HOST via a USB 2.0 HUB expansion chip, and connect the power pins of the 4G module to CM4's GPIO13 to achieve control over the 4G module.	Mini PCIE-52P interface, designed for connecting the ELE7670 4G module. For specific pin definitions, refer to the appendix on the pinout definition of the Mini PCIE ELE7670 4G interface.	Interface Supply Voltage: 3.8V Supports ELE7670 4G series modules.	Working power supply: 3.8V
28	MINI PCIE Interface Socket - LoRa/SSD Module	**LoRa Module** GPIO2 GPIO3 GPIO7 GPIO18 GPIO19 GPIO20 GPIO21 GPIO23 GPIO24 GPIO25 GPIO27		Mini PCIE-52P Interface, for connecting the LR1302 LoRaWAN gateway module / M.2 interface NVME SSD external hard drive (M.2 to Mini PCIE adapter board required). For specific pin definitions, refer to the appendix on the pinout definition of the Mini PCIE LR1302/M.2 NVMe SSD PCIE adapter board interface.	Interface Supply Voltage: 3.3V, supports LR1302 SPI/USB interface gateway module, and supports M.2 NVME SSD (M.2 to Mini PCIE adapter board required).	Working power supply: 3.3V
		SSD PCIE_NRST PCIE_CLK_NREQ PCIE_TX_N PCIE_TX_P PCIE_RX_P PCIE_RX_N	/			

		PCIE_CLK_N_RPI PCIE_CLK_P_RPI GPIO3 GPIO2				
29	Buzzer	GPIO2(SCL) GPIO3(SDA)	The CM4 microcontroller's GPIO2 and GPIO3 pins are connected through the PCA9557PW chip (an I2C-to-GPIO expander) to control the buzzer for alarm purposes.	For sound emission or alarm purposes.(Top sound electromagnetic type)	Buzzer Operating Voltage: 1.8V-4.5V(DC)	/
30	POWER LED Indicator	NPI_LED_PWR	/	Power indicator light, stays on when the system power is connected, turns off when power is disconnected.	Operating Voltage: 3.3V	/
31	USER LED Indicator	LED_USER	The CM4 microcontroller's GPIO2(SCL) and GPIO3(SDA) pins are connected through the PCA9557PW chip (an I2C-to-GPIO expander) to control the USER indicator light.	User-defined function indicator lights.		/
32	ACTIVITY LED Indicator	PI_NLED_ACTIVITY	/	Internal status indicator light for the CM4 system, used to indicate various states of the CM4 system.		/
33	6 PIN FPC Connector	/	The TP_SCL and TP_SDA pins are connected to the CH554T and FSUSB42MUX chips, and through	Touch Screen Interface FPC Ribbon Cable Connector	Supports multi-touch functionality. FPC pin pitch: 0.5mm.	/

			the USB-2.0 Hub chip (SL2.1S, FE2.1_QFP48) interface, they are connected to the touch pins of the display screen.			
34	50 PIN FPC Connector	HDMI0_TX0_N HDMI0_TX0_P HDMI0_TX1_N HDMI0_TX1_P HDMI0_TX2_N HDMI0_TX2_P HDMI0_CLK_N HDMI0_CLK_P HDMI0_SCL HDMI0_SDA HDMI0_CEC HDMI0_HOTPLUG	The RTD2660H connects to HDMI0 video signal input, converting the signal into TTL and LVDS output signals, and drives liquid crystal displays with various resolutions.	7-inch IPS Display Interface FPC Ribbon Cable	For 7-inch IPS high-definition display with a resolution of 1280(RGB)×720(adjustable).Screen brightness: 400 cd/m². FPC pin pitch: 0.5mm.	/

7.2 Interface Pins Description

7.2.1 DC Power Socket

PIN	Pin Signal	Description
1	DC 12-36V IN	Minimum current required for power-on: 0.42A

7.2.2 USB-A *2 Interface

PIN	Silk-Screen	Pin Signal	Chip	CM4 Main Control Signal	Description
1	VCC	5V	The dual USB signals can be expanded through the FE2.1 conversion chip and then connected to the CM4_USB_HOST interface (USB2_N, USB2_P).		Power input 5V
2	D-	USB-A-1_DM		USB2_N	Data transmission end (negative signal) Data-
3	D+	USB-A-1_DP		USB2_P	Data transmission end (positive signal) Data+
4	GND	/			Ground
5	VCC	5V			Power input 5V
6	D-	USB-A-2_DM		USB2_N	Data transmission end (negative signal) Data-
7	D+	USB-A-2_DP		USB2_P	Data transmission end (positive signal) Data+
8	GND	/			Ground

7.2.3 USB TYPE-C Interface

PIN	Silk-Screen	Pin Signal	Chip	CM4 Main Control Signal	Description
1	GND		The TYPE-C (USB-to-UART) input interface is internally connected to the CH340 (USB-to-UART chip), which is linked to the CM4's RX:GPIO14 and TX:GPIO15.	GPIO14(RX) GPIO15(TX)	Ground
2	VBUS1	TYPE-C_5.0V			Power Input
3	CC1	TYPE-C_CC1			Configuration Channel 1, for USB power and data transmission negotiation
4	D1+	TYPE-C_D+			Data 1, Positive Signal
5	D1-	TYPE-C_D-			Data 1, Negative Signal
6	VBUS11	TYPE-C_5.0V			Power Input
7	GND				Ground
8	GND				Ground
9	VBUS2	TYPE-C_5.0V			Power Input
10	CC2	TYPE-C_CC2			Configuration Channel 2, for USB power and data transmission negotiation
11	D2+	TYPE-C_D+			Data 2, Positive Signal
12	D2-	TYPE-C_D-			Data 2, Negative Signal
13	VBUS1	TYPE-C_5.0V			Power Input
14	GND				Ground

USB Type-A and USB Type-C Interfaces

TYPE	Quantity	Protocol	Function	Description
Type-C	1	USB 2.0 Interface	USB Device	Used for serial debugging and burning images
Type-A	2	USB 2.0 Interface	USB Host	Can connect to various USB devices, such as flash drives, USB keyboards, and mice, etc.

7.2.4 HP Interface

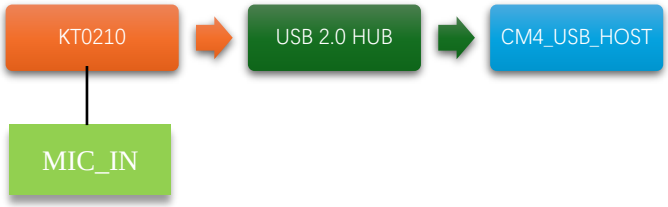


Figure 7:USB interface hardware connection diagram

Figure 8:Audio hardware connection diagram

HP

PIN	Pin Signal	Interface	Chip	CM4 Main Control Signal	Description
1	MIC_IN	PJ35A117-F06J2BR-C	**1.**Audio signals are converted into analog signals through the RTD2660H. The analog signals are then converted into digital signals by the CS4334 and transmitted via I2S or I2C interfaces. The digital signals are received and amplified by the NS4268, ultimately driving the speakers. **2.**The analog audio signals input from MIC_IN are decoded into digital signals by		Microphone Input
2	AUDIO_L			HDMI0_TX0_N HDMI0_TX0_P	Left Channel Audio Signal Output
3	AUDIO_R			HDMI0_TX1_N HDMI0_TX1_P	Right Channel Audio Signal Output
4	HP_IN			HDMI0_TX2_N HDMI0_TX2_P	Headphone Audio Input
5	JACK			HDMI0_CLK_N HDMI0_CLK_P HDMI0_SCL HDMI0_SDA HDMI0_CEC	Headphone, Microphone Jack, Audio Connector
6	SLEEVE_REF			HDMI0_ HOTPLUG USB2_N USB2_P	Voltage Connection Point

			the KT0210. The decoded digital signals are transmitted through a USB2.0 HUB chip. Subsequently, they are connected to the CM4_USB_HOST via an I/O expansion chip.		

7.2.5 SPK*2

PIN	Interface		Pin Signal	Chip	CM4 Main Control Signal	Description
1	SPK_R	1	R_SPK+	Audio signals are converted into analog signals through the RTD2660H. The analog signals are then converted into digital signals by the CS4334 and transmitted via I2S or I2C interfaces. The digital signals are received and amplified by the NS4268, ultimately driving the speakers.	HDMI0_TX0_N HDMI0_TX0_P HDMI0_TX1_N HDMI0_TX1_P HDMI0_TX2_N HDMI0_TX2_P HDMI0_CLK_N HDMI0_CLK_P HDMI0_SCL HDMI0_SDA HDMI0_CEC HDMI0_ HOTPLUG	Positive terminal of the right channel speaker; differential input signal to the amplifier
2		2	R_SPK-			Negative terminal of the right channel speaker; differential output signal from the amplifier
3	SPK_L	1	L_SPK+			Positive terminal of the left channel speaker; differential input signal to the amplifier
4		2	L_SPK-			Negative terminal of the left channel speaker; differential output signal from the amplifier

7.2.6 HD Interface

PIN	Pin Signal	Pin Signal	CM4 Main Control Signal	Description
1	TMDSDATA2+	HDMI1_D2_P	HDMI1_TX2_P	The positive data line of the second channel, which transmits TMDS (Transition Minimized Differential Signaling) encoded video data.
2	TMDSDATA2SHIELD	GROUND		Ground pin.
3	TMDSDATA2-	HDMI1_D2_N	HDMI1_TX2_N	The negative data line of the second channel, which works together with TMDSDATA2+ to form a differential signal pair.
4	TMDSDATA1+	HDMI1_D1_P	HDMI1_TX1_P	The positive data line of the first channel.
5	TMDSDATA1SHIELD	GROUND		Ground pin.
6	TMDSDATA1-	HDMI1_D1_N	HDMI1_TX1_N	The negative data line of the first channel.
7	TMDSDATA0+	HDMI1_D0_P	HDMI1_TX0_P	The positive data line of the third channel.
8	TMDSDATA0SHIELD	GROUND		Ground pin.
9	TMDSDATA0-	HDMI1_D0_N	HDMI1_TX0_N	The negative data line of the

				third channel.
10	TMDSCLOCK+	HDMI1_CK_P	HDMI1_CLK_P	The positive clock signal, used for synchronizing data transmission.
11	TMDSCLOCKSHIELD	GROUND		Ground pin.
12	TMDSCLOCK-	HDMI1_CK_N	HDMI1_CLK_N	The negative clock signal.
13	CEC	HDMI1_CEC	HDMI1_CEC	Consumer Electronics Control interface, used for intelligent control between devices.
14	RESERVED(N_C_)	GROUND		Ground pin.
15	SCL	HDMI1_SCL	HDMI1_SCL	I2C clock line, used for DDC (Display Data Channel) communication.
16	SDA	HDMI1_SDA	HDMI1_SDA	I2C data line, used for DDC communication.
17	DDC/CECGROUND	GROUND		Ground pin.
18	+5VPOWER	HDMI_5V		Power supply pin.
19	HOTPLUGDETECT	HDMI1_HOTPLUG	HDMI1_ HOTPLUG	Hot plug detect pin, used for detecting the connection status of the HDMI interface.
20-23	EH	GROUND		Ground pin.

7.2.7 ETH(RJ45-1)

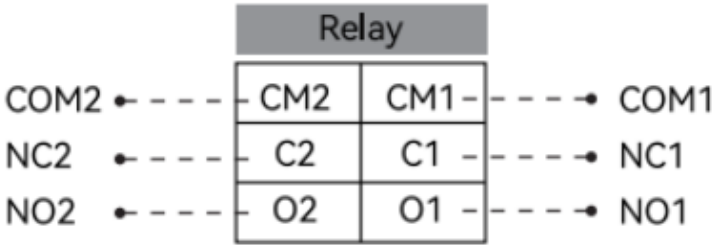
ETH

PIN	Pin Signal	Interface	CM4 Main Control Signal	Description
1	TRD1_P	RJ45-1	ETHERNET_PAIR1_P	Differential Signal Lines, used for data transmission.
2	TRD1_N		ETHERNET_PAIR1_N	
3	TRD0_P		ETHERNET_PAIR0_P	
4	TRD0_N		ETHERNET_PAIR0_N	
5	TRD2_P		ETHERNET_PAIR2_P	
6	TRD2_N		ETHERNET_PAIR2_N	
7	TRD3_P		ETHERNET_PAIR3_P	
8	TRD3_N		ETHERNET_PAIR3_N	
9	ETH_LEDY		ETHERNET_NLED_2(3_3v)	Control the yellow LED indicator light for the Ethernet port.
10	ETH_LEDG		ETHERNET_NLED_3(3_3v)	Control the green LED indicator light for the Ethernet port.

7.2.8 2*2 PIN POE Interface

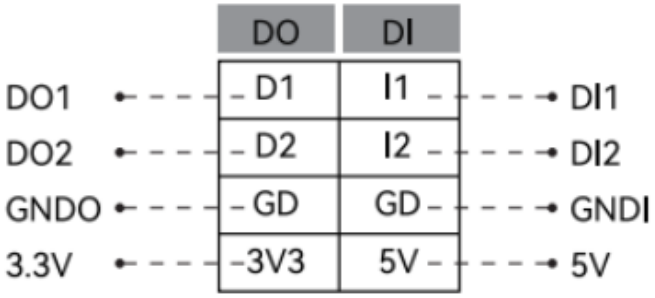
PIN	Pin Signal	Pin Connection	CM4 Main Control Signal	Description
1	TR1_TAP	The 4PIN POE pins are connected to the TRJG0926HENL interface.	ETHERNET_PAIR1_P ETHERNET_PAIR1_N	Transmit data and power.
2	TR2_TAP		ETHERNET_PAIR2_P ETHERNET_PAIR2_N	
3	TR0_TAP		ETHERNET_PAIR0_N ETHERNET_PAIR0_P	
4	TR3_TAP		ETHERNET_PAIR3_P ETHERNET_PAIR3_N	

7.2.9 Relay Interface (6-Pin Phoenix Type Connector)



PIN	Silk-Screen	Pin Signal	Chip	CM4 Main Control Signal	Description
1	CM1	COM1	The CM4's pins GPIO2 (SCL) and GPIO3 (SDA) are connected via the I2C interface to the PCA9557PW-IO expansion chip, which controls the operation of the relays.	GPIO2(SCL) GPIO3(SDA)	Communication Port 1, used for data transmission.
2	CM2	COM2			Communication Port 2, used for data transmission.
3	C1	NC1			Normally Closed 1 (NC1)
4	C2	NC2			Normally Closed 2 (NC2)
5	O1	NO1			Normally Open 1 (NO1)
6	O2	NO2			Normally Open 2 (NO2)

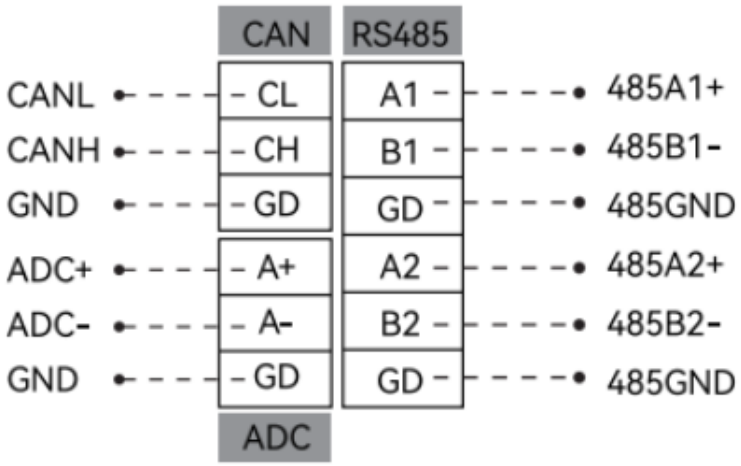
7.2.10 DO&DI Interface (8-Pin Phoenix Type Connector)



PIN	Silk-Screen	Pin Signal	Chip	CM4 Main Control Signal	Description
1	I1	DI1	The CM4 connects to	GPIO2(SCL) GPIO3(SDA)	Digital Input 1
2	I2	DI2			Digital Input 2

3	O1	DO1	the PCA9557PW-IO expansion chip via the I2C interface, thereby extending the DO and DI interfaces.		Digital Output 1
4	O2	DO2			Digital Output 2
5	GD	GNDI			Digital Input Ground
6	GD	GNDO			Digital Output Ground

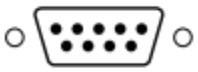
7.2.11 CAN&RS485&ADC Interface (12-Pin Phoenix Type Connector)



PIN	Silk-Screen	Pin Signal	Chip	CM4 Main Control Signal	Description
1	CL	CANL	**CAN :** The CAN bus high and low level signals are connected to the SN65HVD230DR for driver input data and receiver MCP2515T-I/ST's RXD (receive data) input. They communicate with the CM4 via the SPI interface, connecting the MCP2515T-I/ST's SPI pins (SCK, MOSI, MISO, CS) to the corresponding SPI pins of the CM4, GPIO16(CS), GPIO12(INT), GPIO19(MISO), GPIO20(MOSI), GPIO21(SCK)	GPIO12(INT) GPIO16 (CS) GPIO19(MISO) GPIO20(MOSI) GPIO21(SCK)	Low Signal
2	CH	CANH			High Signal
3	GD	GND		/	Ground
4	A+	ADC+	**ADC:** The ADC analog signal is input to the ISO1540DR (isolated I2C), which is then converted by the analog-to-digital conversion chip ADS1115 to output ADC	GPIO2(SCL) GPIO3(SDA)	ADC Reference Voltage Positive
5	A-	ADC-			ADC Reference Voltage Negative
6	GD	GND		/	ADC Ground

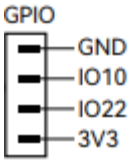
			signals. These signals are connected to the CM4's GPIO2 (SCL) and GPIO3 (SDA)		
7	A1	485A1+	**RS485:** RS485 signals with 485A1 and 485B1 are connected to the A and B ports of the SP3485EN-L/TR (two sets), and connected to CM4's GPIO11 (in output mode, used to control the RE and DE pins of the SP3485EN-L/TR), GPIO8 (UART's TX pin), and GPIO9 (UART's RX pin)	GPIO8(TX) GPIO9(RX) GPIO11(CTRL)	RS485 A1 Positive Signal
8	B1	485B1-			RS485 B1 Negative Signal
9	GD	485GND			RS485 Ground
10	A2	485A2+			RS485 A2 Positive Signal
11	B2	485B2-			RS485 B2 Negative Signal
12	GD	485GND			RS485 Ground

7.2.12 RS232



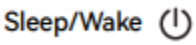
PIN	Silk-Screen	Pin Signal	Chip	CM4 Main Control Signal	Description
1	DCD	/	The standard DB9 male connector, RS232 communication interface, is internally converted through the RS232 chip (GM3232ESA) to communicate with the CM4 at GPIO4 (RX) and GPIO5 (TX)		/
2	RXD	DB9_RX		GPIO4 (RX)	Receive Data
3	TXD	DB9_TX		GPIO5(TX)	Transmit Data
4	DTR	/			/
5	GND	/			Ground
6	DSR	/			/
7	RTS	/			/
8	CTS	/			/
9	RI	/			/

7.2.13 4 PIN GPIO



PIN	Pin Signal	CM4 Main Control Signal	Description
1	GND	/	Ground
2	GPIO10	GPIO10	Data Transmission
3	GPIO22	GPIO22	Data Transmission
4	3.3V	/	Power Input 3.3V

7.2.14 Screen Backlight Control Key



PIN	Pin Signal	CM4 Main Control Signal	Description
1	HAT_GPIO26	GPIO26	Connects to the Cortex-M4 controller for screen backlight control key , used for controlling screen sleep and wake-up.
2	GND	/	Ground
3	GND	/	Ground

7.2.15 Camera Sockets

CAM0 CAM1

CAM0

PIN	Silk-Screen	Pin Signal	CM4 Main Control Signal	Description
1	GND	5V	/	Ground
2	CAM_DN0	CAMO_D0_N	CAMO_D0_N	MIPI CSI Interface Differential Negative Signal, for transmitting image data captured by the camera.
3	CAM_DP0	CAMO_D0_P	CAMO_D0_P	MIPI CSI Interface Differential Positive Signal, for transmitting image data captured by the camera.
4	GND1	5V		Ground
5	CAM_DN1	CAMO_D1_N	CAMO_D1_N	MIPI CSI Interface Differential Negative Signal, for transmitting image data captured by the camera.
6	CAM_DP1	CAMO_D1_P	CAMO_D1_P	MIPI CSI Interface Differential Positive Signal, for transmitting image data captured by the camera.
7	GND2	5V		Ground

8	CAM_DN	CAMO_C_N	CAMO_C_N	MIPI CSI Interface Differential Negative Signal, for transmitting image data captured by the camera.
9	CAM_DP	CAMO_C_P	CAMO_C_P	MIPI CSI Interface Differential Positive Signal, for transmitting image data captured by the camera.
10	GND3	5V		Ground
11	GPIO	CAMERA_GPIO	CAMERA_GPIO	Data Transfer
12	CLK	CLK-1		Clock Control
13	SCL	I2C_SCL_1	SCL0	I2C Bus Clock Line, for data synchronization.
14	SDA	I2C_SDA_1	SDA0	I2C Bus Data Line, for data transfer.
15	VCC	VCC3V3	/	Power Input 3.3V

CAM1

PIN	Silk-Screen	Pin Signal	CM4 Main Control Signal	Description
1	GND	5V		Ground
2	CAM_DN0	CAM1_D0_N	CAM1_D0_N	MIPI CSI Interface Differential Negative Signal, for transmitting image data captured by the camera.
3	CAM_DP0	CAM1_D0_P	CAM1_D0_P	MIPI CSI Interface Differential Positive Signal, for transmitting image data captured by the camera.
4	GND1	5V		Ground
5	CAM_DN1	CAM1_D1_N	CAM1_D1_N	MIPI CSI Interface Differential Negative Signal, for transmitting image data captured by the camera.
6	CAM_DP1	CAM1_D1_P	CAM1_D1_P	MIPI CSI Interface Differential Positive Signal, for transmitting image data captured by the camera.
7	GND2	5V		Ground
8	CAM_DN	CAM1_C_N	CAM1_C_N	MIPI CSI Interface Differential Negative Signal, for transmitting image data captured by the camera.
9	CAM_DP	CAM1_C_P	CAM1_C_P	MIPI CSI Interface Differential Positive Signal, for transmitting image data captured by the camera.
10	GND3	5V		Ground
11	GPIO	CAMERA_GPIO	CAMERA_GPIO	Data Transfer
12	CLK	CLK-0		Clock Control
13	SCL	CAM0_I2C_SCL	SCL0	I2C Bus Clock Line, for

				data synchronization.
14	SDA	CAM0_I2C_SDA	SDA0	I2C Bus Data Line, for data transfer.
15	VCC	VCC3V3		Power Input 3.3V

7.2.16 Fan

PIN	Pin Signal	Chip	CM4 Main Control Signal	Description
1	FAN_5V	The CM4's GPIO2 (I2C_SCL) and GPIO3 (I2C_SDA) are connected to the EMC2301 chip, which controls the operation of the fan.	GPIO2(SCL) GPIO3(SDA)	Power Input 5V to Fan for Operation
2	FAN_PWM			Pulse Width Modulation (PWM) for Controlling Fan Speed
3	GND			Ground
4	FAN_TACH			Used for Detecting Fan Speed

7.2.17 RTC

PIN	Silk-Screen	Pin Signal	Chip	CM4 Main Control Signal	Description
1	OSCI	OSCO	The CM4 microcontroller's GPIO2 (I2C_SCL) and GPIO3 (I2C_SDA) are connected to the BM8563 chip, controlling the operation of the RTC.	GPIO2(SCL) GPIO3(SDA)	External Crystal Oscillator Input Pin
2	OSCO	OSCI			External Crystal Oscillator Output Pin
3	INT	BN-INT			Interrupt Pin
4	VSS	/			Ground Pin
5	SDA	SDA_GPIO2_RPI			I2C Data Line for Data Transmission
6	SCL	SDA_GPIO3_RPI			I2C Clock Line for Clock Control
7	CLKOUT	/			Clock Output
8	VDD	/			Power Pin

7.2.18 2*4 PIN USB Header Interface

PIN	Pin Signal	Chip	CM4 Main Control Signal	Description
1	5V	The 2.54_1_USB and 2.54_2_USB dual signals pass through the SL2.1s (USB conversion chip) and are connected to the CM4_USB HOST (USB2_N USB2_P)	USB2_N USB2_P	Power Pin
2	5V			Power Pin
3	DP			Data Positive Signal
4	DP			Data Positive Signal
5	DM			Data Negative Signal
6	DM			Data Negative Signal
7	GND			Ground Pin
8	GND			Ground Pin

7.2.19 Nano SIM Card Socket

PIN	Silk-Screen	Pin Signal	CM4 Main Control Signal	Description
1	VCC	4G_SIM_VDD	/	Power Pin, Providing Power Voltage
2	RST	4G_SIM_RST		Reset Pin, Resets to Initial State
3	CLK	4G_SIM_CLK_1		Clock Pin, for Synchronizing Data Transmission
4	CARD-DETECT	4G_SIM_DET		Detection Pin, for Detecting SIM Card Insertion
5	GND	/		Ground Pin
6	VPP	/		/
7	I/O	4G_SIM_DATA		Reponsible for transmitting data between the SIM card and the module.
8-11	SHELL	/		Ground Pin

7.2.20 TF Card Socket

PIN	Silk-Screen	Pin Signal	CM4 Main Control Signal	Description
1	DATA2	SD_DAT2	SD_DAT2	Data Transfer, Reading from or Writing to SD Card
2	DATA3/CD	SD_DAT3	SD_DAT3	Data Transfer, Reading from or Writing to SD Card
3	CMD	SD_CMD	SD_CMD	Command Pin, for Sending Commands from Host to SD Card
4	VDD	SD_PWR	SD_PWR_ON	Power Pin
5	CLK	SD_CLK	SD_CLK	Differential Clock Signal Lines, for Synchronizing Data Transfer
6	VSS	/		Ground
7	DAT0	SD_DAT0	SD_DAT0	Data Transfer, Reading from or Writing to SD Card
8	DAT1	SD_DAT1	SD_DAT1	Data Transfer, Reading from or Writing to SD Card
9	DET	SD_DET	RESERVED	Detection Pin, for Detecting if SD Card is Inserted. This pin is pulled low when an SD card is inserted.
10-13	GND	/		Ground

7.2.21 Power Switch

PIN	Pin Signal		CM4 Main Control Signal	Description
1	Switch	2	/	Closed state, the circuit forms a closed loop, and the voltage from DC_IN is passed through the switch to VSYS, providing power output.
2		5		Open state, the circuit does not form a closed loop, and there is no voltage output at VSYS.
3	Common Terminal			/

7.2.22 Buzzer

PIN	Pin Signal	Chip	CM4 Main Control Signal	Description
1	BZ_RPI	The CM4 microcontroller's GPIO2 and GPIO3 pins are connected through the PCA9557PW chip (an I2C-to-GPIO expander) to control the buzzer for alarm purposes.	GPIO2(SCL) GPIO3(SDA)	Raspberry Pi I/O Pin
2	5V_BZ			Power Pin
3	VSYS_5V			Main System Input Voltage Pin

7.2.23 LED Indicator Light

PIN	Indicator Light	Pin Signal	CM4 Main Control Signal	Description
1	Power Indicator Light	NPI_LED_PWR	NPI_LED_PWR	Used to indicate the power of the Cortex-M4 (CM4). When the CM4 is powered on, the LED lights up under normal conditions.
2	User Indicator Light	LED_USER	The CM4 microcontroller's GPIO2(SCL) and GPIO3(SDA) pins are connected through the PCA9557PW chip (an I2C-to-GPIO expander) to control the USER indicator light.	LED_USER is configured as an output pin.
3	Activity Indicator Light	PI_NLED_ACT	PI_NLED_ACTIVITY	Used to indicate various states of the CM4 system.

7.2.24 6 PIN FPC Connector

PIN	Silk-Screen	Pin Signal	Chip	CM4 Main Control Signal	Description
1	RES	RES	The TP_SCL and TP_SDA pins are connected to the CH554T and FSUSB42MUX chips, and through the USB-2.0 Hub chip (SL2.1S, FE2.1_QFP48) interface, they are connected to the touch pins of the display screen.	USB2_N USB2_P	Reset Pin, resets to its initial state.
2	VDD	TP_3V3			Reset Pin, resets to its initial state.
3	GND	/			Ground
4	INT	INT			Interrupt Pin, sends interrupt signals.
5	SDA	TP_SDA			I2C Data Pin, for data transmission.
6	SCL	TP_SCL			I2C Clock Pin, for synchronizing data transmission.

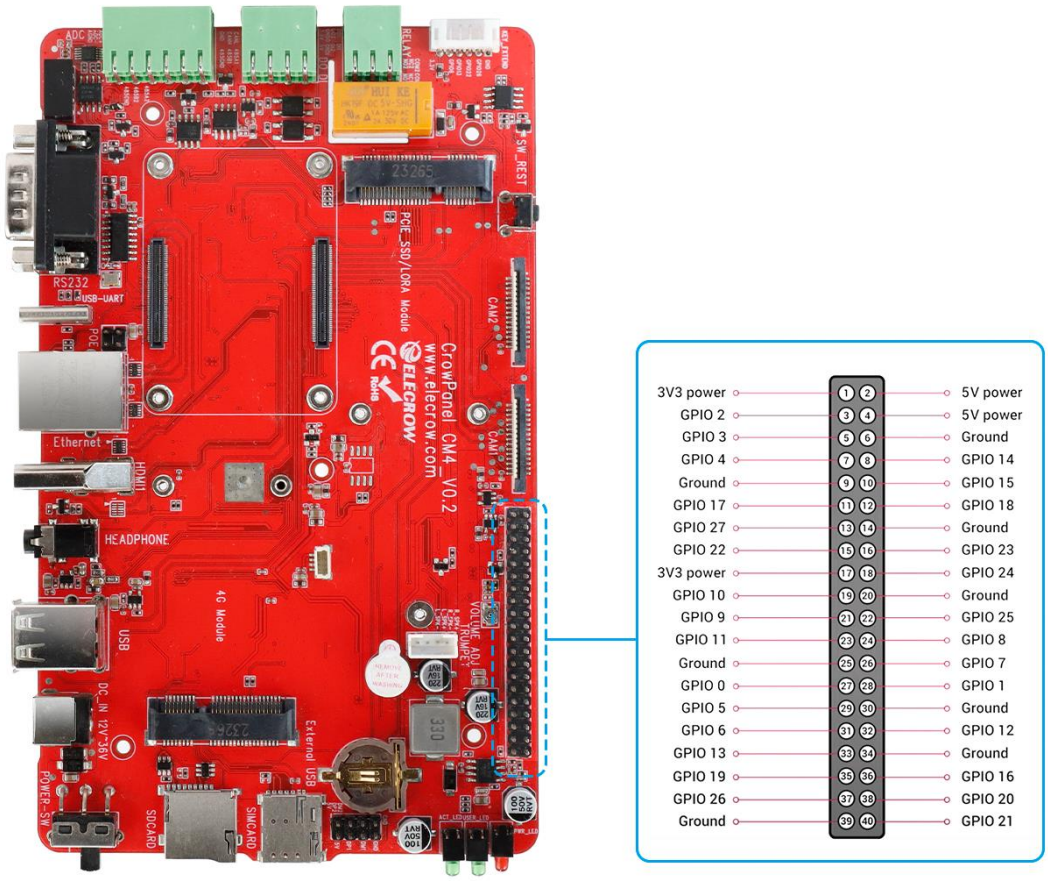
7.2.25 50 PIN FPC Connector

PIN	Silk-Screen	Pin Signal	I/O	Chip	CM4 Main Control Signal	Description
1	VLED+	VLED+	P	The RTD2660H connects to HDMI0 video signal input, converting the signal into TTL and LVDS output signals, and drives liquid crystal displays with various resolutions.	HDMI0_TX0_N HDMI0_TX0_P HDMI0_TX1_N HDMI0_TX1_P HDMI0_TX2_N HDMI0_TX2_P HDMI0_CLK_N HDMI0_CLK_P HDMI0_SCL HDMI0_SDA HDMI0_CEC HDMI0_ HOTPLUG	LED backlight positive terminal, connects to the LCD screen LED+, enabling the display of images on the LCD screen.
2	VLED+	VLED+				
3	VLED-	VLED-	P			LED backlight positive terminal, connects to the LCD screen LED+, enabling the display of images on the LCD screen.
4	VLED-	VLED-				
5	GND		P			Ground.
6	VCOM	VCOM	P			Common Power Supply.
7	DVDD	LCD-3V3	P			Operating Voltage 3.3V
8	MODE	MODE	I			DE/SYNC mode selection, H: DE mode, L: Sync mode.
9	DEN	DEN	I			Data Enable signal, used to control whether data is sent to the LCD screen.
10	VS	VS	I			Vertical and Horizontal Sync signals (negative polarity), used to control the refresh of the LCD screen.
11	HS	DHS	I			
12	B7	RXO1-	I/O			Input Blue Display Data.
13	B6	RXO1+				
14	B5	RXO2-				
15	B4	RXO2+				

16	B3	RXOC-				
17	B2	RXOC+				
18	B1	RXO1-				
19	B0	RXO1+				
20	G7	RXO2-	I/O			Data Input
21	G6	RXO2+				
22	G5	RXOC-				
23	G4	RXOC+				
24	G3	RXO3-				LVDS interface data and clock channels, for bidirectional data transfer.
25	G2	RXO3+				
26	G1	RXE0-				
27	G0	RXE0+				
28	R7	RXE1-	I/O			
29	R6	RXE1+				
30	R5	RXE2-				
31	R4	RXE2+				
32	R3	BLU4				Blue Data Input, for adjusting backlight brightness or color.
33	R2	BLU5				
34	R1	BLU6				
35	R0	BLU7				
36	GND					Ground.
37	DCLK	CLK	I			Clock Signal
38	GND		P			Ground.
39	L/R	R/L	I			Left/Right display control, for scrolling or moving display content.
40	U/D	U/D	I			Up/Down display control, for scrolling or moving display content.
41	VGH	VGH-LCD	P			TFT high signal provides different

42	VGL	VGL-LCD	P			voltage levels, used to control LCD display characteristics.
43	AVDD		P			Analog Power Supply.
44	RESET	RESET	I			Reset Signal, used to reset the LCD screen or its control circuit.
45	NC		/			NC
46	VCOM	VCOM	P			Common Power Supply.
47	NC	ITHB	I			No Connection
48	GND		P			Ground.
49	NC		/			NC
50	NC		/			NC

7.2.26 2*20 PIN GPIO



Description	Pin Multiplexing	Pin	Physical Pin		Pin	Pin Multiplexing	Description
Output Power 3.3V		3V3	1	2	5V		
I2C Data Transmission	SDA_GPIO2_RPI	GPIO2	3	4	5V		
I2C Clock Transmission	SCL_GPIO2_RPI	GPIO 3	5	6	GND		
RS232 Transmit Data	RXD_RS232_RPI	GPIO 4	7	8	GPIO14	TYPE-C_RXD0_RPI	USB TYPE-C Data Transmit
		GND	9	10	GPIO15	TYPE-C_TXD0_RPI	USB TYPE-C Data Receive
LoRa SX1262 Chip Select Signal	LoRa_SX1262_CSN_RPI	GPIO17	11	12	GPIO18	LoRa_SX1302_CSN_RPI	LoRa SX1302 Chip Select Signal
	LORA_NRST_RPI	GPIO27	13	14	GND		
Connect to Pin 2 of 4-Pin GPIO	HAT_GPIO22	GPIO22	15	16	GPIO23	LoRa_SX1262_IO1_RPI	LoRa SX1262 IO1 Data Transmission
Output Power		3V3	17	18	GPIO24	LoRa_SX1262_	LoRa SX1262 IO2

3.3V						IO2_RPI	Data Transmission
Connect to Pin 3 of 4-Pin GPIO	HAT_GPIO10	GPIO10	19	20	GND		
RS485 Receive Data	RS485_TX1_RPI	GPIO9	21	22	GPIO25	LoRa_SX1262_RESET_RPI	LoRa SX1262 Reset Signal
RS485 Control Signal, Controls the Direction of Data Transfer	RS485_CTRL1_RPI	GPIO11	23	24	GPIO8	RS485_RX1_RPI	RS485 Transmit Data
		GND	25	26	GPIO7	LORA_SX1262_BUSY_RPI	LoRa SX1262 Busy Signal
		GPIO0	27	28	GPIO1		
RS232 Receive Data	TXD_RS232_RPI	GPIO5	29	30	GND		
Connect to LoRa Module and SSD Power Switch Signal	HAT_GPIO6	GPIO 6	31	32	GPIO12	CAN_INT	CAN Bus Interrupt Signal
Connect to 4G Module Power Switch Signal	HAT_GPIO13	GPIO 13	33	34	GND	/	/
LoRa Module SPI Master Input Slave Output Signal	LORA_SPI_MISO_RPI	GPIO 19	35	36	GPIO16	CAN_CS	CAN Bus Chip Select Signal
Screen Backlight Control Key Pin	HAT_GPIO26	GPIO 26	37	38	GPIO20	LORA_SPI_MOSI_RPI	LoRa Module SPI Master Out Slave In Signal
/	/	GND	39	40	GPIO21	LORA_SPI_SCK_RPI	LoRa Module SPI Clock Signal

7.3 Optional Modules

7.3.1 MINI PCIE Interface Socket - 4G Module

Used in conjunction with the ELE7670 4G Module

PIN	Mini PCIE PIN	ELE7670 4G PIN	IO TYPE	CM4 Main Control Signal	FUNCTION
1	WAKE#	NC			
2	3.3VAUX	VBAT	Power		A7670/SIM7670 Power PIN
3	COEX1	NC			
4	GND	GND	Ground		Ground PIN
5	COEX2	NC			
6	1.5V	NC			
7	CLKREQ#	NC			
8	UIM PWR	USIM VDD	Power		USIM Card VDD PIN
9	GND	GND	Ground		Ground PIN
10	UIM DATA	USIM DATA	DIO		USIM Card DATA PIN
11	REFCLK-	NC			
12	UIM CLK	USIM CLK	DI		USIM Card CLK PIN
13	REFCLK+	NC			
14	UIM RESET	USIM RST	DI		USIM Card CLK PIN
15	GND	GND			Ground PIN
16	UIM VPP	USIM DET	DO		USIM Card DET PIN
17	Reserved	NC			
18	GND	GND	Ground		Ground PIN
19	Reserved	NC			
20	W DISABLE#	GPS 1PPS	DO		A7670/SIM7670 GNSS 1PPS PIN
21	GND	GND	Ground		Ground PIN

22	PERST#	P RESET	DI		A7670/SIM7670 RESRET PIN
23	PERn0	NC			
24	3.3VAUX	VBAT	Power		A7670/SIM7670 Power PIN
25	PERp0	NC			
26	GND	GND	Ground		Ground PIN
27	GND	GND	Ground		Ground PIN
28	1.5V	NC			
29	GND	GND	Ground		Ground PIN
30	SMB CLK	I2C CLK	DI		A7670/SIM7670 I2C CLK PIN
31	PETn0	NC			
32	SMB DATA	I2C SDA	DIO		A7670/SIM7670 I2C SDA PIN
33	PETp0	VDD 1V8	Power		A7670/SIM7670 1.8V Power Output
34	GND	GND	Ground		Ground PIN
35	GND	GND	Ground		Ground PIN
36	USB D-	USB D-	DIO	USB2_N	A7670/SIM7670 USB D- PIN
37	GND	GND	Ground		Ground PIN
38	USB D+	USB D+	DIO	USB2_P	A7670/SIM7670 USB D+ PIN
39	3.3VAUX	VBAT			A7670/SIM7670 Power PIN
40	GND	GND			Ground PIN
41	3.3VAUX	VBAT	Power		A7670/SIM7670 Power PIN
42	LED WWAN#	NET LTE	DO		A7670/SIM7670 NET LTE LED PIN
43	GND	GND	Ground		Ground PIN
44	LED WWAN#	NC			
45	Reserved	NC			
46	LED WWAN#	P_PWRKEY	DI	GPIO13	A7670/SIM7670 PWRKEY PIN
47	Reserved	NC			

48	1.5V	NC			
49	Reserved	NC			
50	GND	GND	Ground		Ground PIN
51	Reserved	NC			
52	3.3VAUX	VBAT	Power		A7670/SIM7670 Power PIN

7.3.2 MINI PCIE Interface Socket - LoRa Module

Used with LR1302 Gateway Module EU868 or LR1302 Gateway Module US915

PIN	Mini PCIE PIN	LR1302 PIN	IO TYPE	CM4 Main Control Signal	FUNCTION
1	WAKE#	NC			
2	3.3VAUX	3V3	Power		Power PIN
3	COEX1	NC			
4	GND	GND	Ground		Ground PIN
5	COEX2	NC			
6	1.5V	NC			
7	CLKREQ#	NC			
8	UIM PWR	SX1261_BUSY	DO	GPIO7	SX1261 BUSY PIN
9	GND	GND	Ground		Ground PIN
10	UIM DATA	SX1261_RST	DI	GPIO25	SX1261_RST PIN
11	REFCLK-	NC			
12	UIM CLK	NC			
13	REFCLK+	NC			
14	UIM RESET	NC			
15	GND	GND	Ground		Ground PIN
16	UIM VPP	NC			
17	Reserved	NC			
18	GND	GND	Ground		Ground PIN
19	Reserved	1PPS			The GPS 1PPS (Pulse Per Second) signal.
20	W DISABLE#	NC			
21	GND	GND	Ground		Ground PIN
22	PERST#	RESET	DI	GPIO27	SX1302 RESET PIN

23	PERn0	NC			
24	3.3VAUX	3V3	Power		Power PIN
25	PERp0	SX1261_CSN		GPIO17	SX1261_CSN PIN
26	GND	GND	Ground		Ground PIN
27	GND	GND	Ground		Ground PIN
28	1.5V	NC			
29	GND	GND	Ground		Ground PIN
30	SMB CLK	I2C_SCL	DI	GPIO2	Temperature Sensor I2C CLK PIN
31	PETn0	SX1261_IO2	DIO	GPIO24	SX1261_IO2 PIN
32	SMB DATA	I2C_SDA	DIO	GPIO3	Temperature Sensor I2C SDA PIN
33	PETp0	SX1261_IO1	DIO	GPIO23	SX1261_IO1 PIN
34	GND	GND	Ground		Ground PIN
35	GND	GND	Ground		Ground PIN
36	USB D-	USB D-	DIO		STM32 USB D- PIN
37	GND	GND	Ground		Ground PIN
38	USB D+	USB D+	DIO		STM32 USB D+ PIN
39	3.3VAUX	3V3			Power PIN
40	GND	GND			
41	3.3VAUX	3V3	Power		Power PIN
42	LED WWAN#	NC			
43	GND	GND	Ground		Ground PIN
44	LED WWAN#	NC			
45	Reserved	SPI_SCK	DI	GPIO21	SX1302 SPI SCK PIN
46	LED WWAN#	NC			

47	Reserved	SPI_MISO	DIO	GPIO19	SX1302 SPI MISO PIN
48	1.5V	NC			
49	Reserved	SPI_MOSI	DIO	GPIO20	SX1302 SPI MOSI PIN
50	GND	GND	Ground		Ground PIN
51	Reserved	SPI_CS	DI	GPIO18	SX1302 SPI CS PIN
52	3.3VAUX	3V3	Power		Power PIN

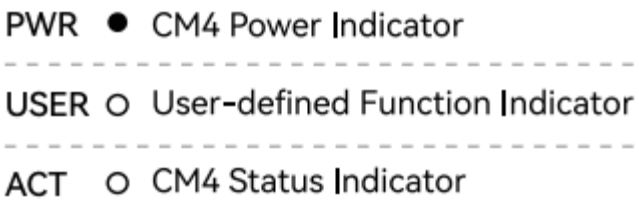
7.3.3 M.2 NVMe SSD PCIE Adapter Interface Socket -SSD

PIN	Mini PCIE PIN	M.2 NVMe SSD PCIe	IO TYPE	CM4 Main Control Signal	FUNCTION
1	WAKE#	PERST#	DI	PCIE_NRST	M.2 Nvme SSD PERST# PIN
2	3.3VAUX	3V3	Power		Power PIN
3	COEX1	NC			
4	GND	GND	Ground		Ground PIN
5	COEX2	PETn0/SATA-A-	DIO	PCIE_TX_N	M.2 Nvme SSD PETn0/SATA-A- PIN
6	1.5V	CLKREQ#	DIO	PCIE_CLK_NREQ	M.2 Nvme SSD CLKREQ# PIN
7	CLKREQ#	PETp0/SATA-A+	DIO	PCIE_TX_P	M.2 Nvme SSDPETp0/SATA-A+ PIN
8	UIM PWR	NC			
9	GND	GND	Ground		Ground PIN
10	UIM DATA	NC			
11	REFCLK-	PERp0/SATA-B-	DIO	PCIE_RX_P	M.2 Nvme SSD PERp0/SATA-B- PIN
12	UIM CLK	NC			
13	REFCLK+	PERn0/SATA-B+	DIO	PCIE_RX_N	M.2 Nvme SSD PERn0/SATA-B+ PIN
14	UIM RESET	NC			
15	GND	GND	Ground		Ground PIN
16	UIM VPP	NC			
17	Reserved	REFCLKN	DIO	PCIE_CLK_N_RPI	M.2 Nvme SSD REFCLKN PIN
18	GND	GND	Ground		Ground PIN
19	Reserved	REFCLKP	DIO	PCIE_CLK_P_RPI	M.2 Nvme SSD REFCLKP PIN
20	W DISABLE#	NC			

21	GND	GND	Ground		Ground PIN
22	PERST#	NC			
23	PERn0	NC			
24	3.3VAUX	3V3	Power		Power PIN
25	PERp0	NC			
26	GND	GND	Ground		Ground PIN
27	GND	GND	Ground		Ground PIN
28	1.5V	NC			
29	GND	GND	Ground		Ground PIN
30	SMB CLK	NC			
31	PETn0	NC			
32	SMB DATA	NC			
33	PETp0	NC			
34	GND	GND	Ground		Ground PIN
35	GND	GND	Ground		Ground PIN
36	USB D-	NC			
37	GND	GND	Ground		Ground PIN
38	USB D+	NC			
39	3.3VAUX	3V3			Power PIN
40	GND	GND			
41	3.3VAUX	3V3	Power		Power PIN
42	LED WWAN#	NC			
43	GND	GND	Ground		Ground PIN
44	LED WWAN#	NC			
45	Reserved	NC			
46	LED WWAN#	NC			
47	Reserved	NC			
48	1.5V	NC			

49	Reserved	NC			
50	GND	GND	Ground		Ground PIN
51	Reserved	NC			
52	3.3VAUX	3V3	Power		Power PIN

7.4 LED Indicator Light Functions



No.	Label	Signal	CM4 Main Control Signal	Color	Description
1	POWER Power Indicator	NPI_LED_PWR	NPI_LED_PWR	Red	Used to indicate the power of the CM4. When the CM4 is powered, the LED lights up under normal conditions.
2	USER User Indicator	LED_USER	GPIO2(SCL) GPIO3(SDA)	Green	User-defined function indicator, for changing the switching frequency.
3	ACT Status Indicator	PI_NLED_ACT	PI_NLED_ACTIVITY	Green	Used to indicate various states of the CM4 system.

7.4.1 ACT Status Table

If a Raspberry Pi fails to boot for some reason, or has to shut down, in many cases an LED will flash a specific number of times to indicate what happened. The LED will blink for a number of long flashes (0 or more), then produce short flashes, to indicate the exact status. In most cases, the pattern will repeat after a two-second gap.

NO.	Long flashes	Short flashes	Status
1	0	3	Generic failure to boot
2	0	4	start*.elf not found
3	0	7	Kernel image not found
4	0	8	SDRAM failure
5	0	9	Insufficient SDRAM
6	0	10	In HALT state
7	2	1	Partition not FAT
8	2	2	Failed to read from partition
9	2	3	Extended partition not FAT
10	2	4	File signature/hash mismatch -Pi 4 and Pi 5
11	3	1	SPI EEPROM error -Pi 4and Pi 5
12	3	2	SPI EEPROM is write protected -Pi 4 and Pi 5
13	3	3	I2C error - Pi 4 and Pi 5
14	3	4	Secure-boot configuration is not valid
15	4	3	RP1 not found
16	4	4	Unsupported board type
17	4	5	Fatal firmware error
18	4	6	Power failure type A
19	4	7	Power failure type B
20	4	3	RP1 not found

7.5 Button Functions

No.	Button Name	Function
1	Power Button	Used for device power, toggles power on/off by flipping the switch.
2	Screen Backlight Control Button	Pressing the button quickly puts the device into sleep mode with no sound output, press again to wake up.

8 Specifications

No.	Item		Specification
1	Processor	CPU/Soc	Broadcom BCM2711, Quad-core Cortex-A72 (ARM v8), 64-bit SoC @ 1.5GHz
2		System Memory	4GB（LPDDR4-3200 SDRAM）
3		Storage	Operating System on 64G TF Card (Image File Loaded), compatible with SSD slot expansion (no eMMC)
4		Operating System	Raspbian (compatible with Node-RED), compatible with all software running on Raspberry Pi (pre-installed system)
5	Display	Size	7inch
6		Aspect Ratio	4:3
7		Panel Ratio	IPS Panel
8		Resolution	1280(RGB)×720(adjustable)
9		Max Colors	16.7M（8-bit）
10	Wireless Communication	Wi-Fi	2.4 /5.0 GHz（onboard CM4）
11		Bluetooth	BLE 5.0 (onboard CM4)
12		LoRa Series	➢ Mini PCIE-52P interface; interface power supply voltage: 3.3V ➢ Supports LR1302-LoRaWAN-SPI/USB interface gateway module;(Optional) ➢ Supports M.2 NVME SSD (requires M.2 to Mini PCIE interface adapter) (Optional)
13		4G LTE Network	➢ Mini PCIE-52P interface; interface power supply voltage: 3.8V ➢ Supports ELE7670 4G series module(Optional)
14	Compatibility	Operating System	➢ Raspbian series ➢ Ubuntu Mate ➢ Ubuntu Core
15		Software	➢ Integrated Node-RED software, supports OpenGL ES 3.0, comes with the latest 64-bit Raspberry Pi operating system, ready to use out of the box; ➢ Compatible with all software running on Raspberry Pi
16	Other function	Hardware	Use ATECC608A for encryption

		encryption	
17		Watchdog	Equip with

9 Mechanical Specifications

No.	Item		Specification
1	With Acrylic Case	Dimensions	192*125*46mm
2		Net Weight	676g
3	Without Acrylic Case	Dimensions	182*115*29mm
4		Net Weight	389g
5	LCD Specifications		164.7（H）* 99.9（V）*3.5（T）mm
6	Front Glass Thickness		1.8mm
7	Antenna Interface		4 detachable antenna holes reserved for SMA external antennas
8	Cooling Method		Exposed on the case / Fan cooling

10 24Electrical Specifications

10.1 Power Consumption Parameters

Input Power Supply: DC 12V-2A

No.	Item	Condition 1	Condition 2	Specification		Unit
				Min	Max	
1	Total Power Consumption	Maximum Brightness, Maximum Volume, Playing the Same Video (No External Devices Connected)	Only CM4 connected	6.8	8.9	W
			CM4 and LR1302 connected	7.0	9.0	
			CM4 and 4G module connected	7.3	9.4	
			CM4 and SSD connected	7.5	9.6	
			CM4, LR1302, and 4G module connected	7.4	9.5	
			CM4, SSD, and 4G module connected	7.6	9.8	
2	Power Consumption in Standby Mode with Screen Off	/	Only CM4 connected	3.6	3.7	
			CM4 and LR1302 connected	3.6	4.0	
			CM4 and 4G module connected	3.9	4.2	
			CM4 and SSD connected	4.2	4.5	
			CM4, LR1302, and 4G module connected	4.0	4.2	
			CM4, SSD, and 4G module connected	4.3	4.6	

10.2 Environmental Parameters

No.	Item	Specification
1	Operating Temperature	-10°C to 60°C
2	Storage Temperature	-20°C to 70°C
3	Relative Humidity	10% -90% ,@40°C (non-condensing)

10.3 Screen Characteristics

No.	Item	Specification
1	Product Name	CrowPanel CM4
2	Screen Size	7 inches
3	Aspect Ratio	4:3
4	Resolution	1280 (RGB) x 720 (adjustable)
5	Refresh Rate	60Hz
6	Color Gamut	50% NTSC
7	Touch Type	5-point capacitive touch
8	Panel Type	IPS
9	Brightness	400 cd/m²
10	Viewing Angles	85/85/85/85 (L/R/U/D)
11	Signal Interface	RGB
12	Display Area	154.214mm (W) x 85.92mm (H)
13	Surface Hardness	6H (Mohs scale)

11 Installation and Usage Instructions

Before use, please consult the user manual for specific guidance on operating this device. Please click to download the full user manual:

- User Guide

12 Related Documents and Resources

- Pi Terminal
- Pi Terminal Wiki
- LR1302 LoRaWAN Gateway Module SPI EU868
- LR1302 LoRaWAN Gateway Module SPI US915
- SIM7670 4G Module
- Raspberry Pi Compute Module 4/CM4 CM4001008
- 12V-2A AC/DC Power Adapter with Cable

13 Revision History

Date	Version	Release Notes
2025/1/17	V1.1	The following modifications have been implemented in the Block Diagram: 1. An input power supply of DC 12-36V has been incorporated. This power supply is fed into a buck converter module, which stably steps down the voltage to 5V. The output of the buck converter is then connected to the CM4, thereby providing a stable and reliable power input for the system. 2. The RS232 interface has been connected to the CM4. In addition, the communication interface has been reconfigured by replacing the IIC1 interface with the UART3 interface. This change is aimed at fulfilling the data transmission requirements under different communication protocols. 3. The connection between the CS4334 IC and the CM4, which was present in the original design, has been eliminated. 4. In the transmission path of the ADC analog signals, an ADS1115 analog-to-digital converter (ADC) chip has been introduced. The ADC analog signals are converted into digital signals by the ADS1115 and subsequently transmitted to the CM4 main controller.