HARTING Industrial Raspberry Pi

– V.4 –

What is an "Industrial" Raspberry Pi?

Normal Raspberry Pis are sold online for US$50-100. They are PCB board products powered by USB cable, which means they regularly overheat if they are run 24/7. Customers wanted a sturdier version of the Raspberry Pi, which we have dubbed "industrial grade". Our Industrial Raspberry Pis fully utilize Raspberry Pi software and related intellectual assets as found on the Internet while also being able to operate continuously in harsh environments, fulfilling necessary industrial standards.

The Ideal Edge Computer

For edge computing many production engineers have replaced Windows-based industrial PCs with Industrial Raspberry Pis. This often provides significant savings, but in addition, for example, open source software NodeRED can quickly design and deploy complicated data mappings. Using CODESYS, which only costs €50, our Industrial Raspberry Pis can easily communicate with PLCs via Ethernet/IP or EtherCAT. Other benefits include the fact that the custom board on the MICA-R broadens interface options including 4-20mA or IO-Link, which are almost impossible for industrial PCs to handle. For further examples, please refer to our application page.

STM32 Microcontroller and Industrial Raspberry Pi Integration

Inexpensive, European microcontrollers like the Arduino or STM32, which are other main players in the IoT world, can directly drive sensors and actuators with a very fast sampling rate. Major microcontrollers have recently begun to offer a user-friendly programming environment, or integrated development environment (IDE), allowing them to be widely used in electronics classes or high school robot competitions. Our Industrial Raspberry Pi, the MICA-R, has an optional custom board with an ARM-based, high-performance microcontroller, the STM32-F4. Combining I/O processing by the STM32 and complicated data processing and presentation by the Raspberry Pi, the MICA-R can be used in many fields. For example, automated guided vehicles (AGVs) which normally require industrial PCs and PLCs, can be driven only by this MICA-R STM32 CONTROL which costs less than US$500. In addition, sophisticated open source engineering middleware such as ROS can also run on Industrial Raspberry Pis for decentralized collaborative control of multiple AGVs.

Measurement Innovation Combining MEMS chips and Industrial Raspberry Pis

Microelectromechanical systems (MEMS) are IC chips which integrates mechanical sensor elements. Widely used in mobile phones, home appliances, and cars, MEMS contribute to significant size and cost reduction of sensors. While time-of-flight collision sensors for cars and gyroscopes to detect angles of phones are well known, emerging MEMS technologies included doppler sensors to accurately measure speed and gas sensors which detect specific toxic gases. Both have uses in industrial applications. As both MEMS and the above-mentioned microcontrollers are IC chips, these two are easily combined. For example, our new acceleration sensor with the latest 20kHz MEMS accelerometer can directly connect to a MICA-R STM32 SENSOR without any converters. Combining MEMS sensors, a micro-controller, and an Industrial Raspberry Pi results in a high-end, industrial, economic, IoT measurement system.

HARTING Industrial Raspberry Pi

MICA-R4 series P4~

RevPiseries P32~

Edge computing

In this project, we used the MICA-R + IO-Link custom board to receive the data from sensors in the machine tool peripheral equipment (oil circulation unit) in the manufacturing line and the data from the old NC with only a serial port. It is passed to MT Connect, an XML-based equipment condition monitoring network standardized by . By using the MICA-R custom board, it is possible to directly connect MICA-R with on-site equipment with various interfaces. In addition, the host network connected via Ethernet can be of course industry standard networks such as MT Connect, EUROMAP, and OPC UA, as well as messaging protocols such as MQTT to send data to Microsoft and Amazon cloud services. By using middleware, it can be realized without incurring costs. (Upper model: MICA-R4 IO-Link)

Image processing

You can easily build a tailor-made image recognition system for tens of thousands of yen by connecting an industrial Raspberry Pi MICA-R USB and a USB vision camera. In this project, we will develop a custom application using the open source software OpenCV to meet the image processing needs of the automobile assembly process. Specifically, we have developed programs for diagonal reading of QR codes, position detection, shape recognition, worker detection, and transmission of part position information to robots. Machine learning is necessary for worker detection, etc., because each person has a different physique. (Upper model: MICA-R USB IP20/IP65)
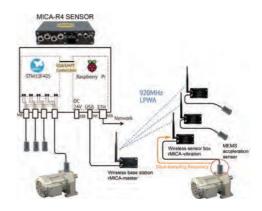
PLC linkage by CODESYS

If you install Germany's largest software PLC CODESYS® on the industrial Raspberry Pi RevPi Core S, you can create a simple PLC with reduced cost. On CODESYS®, control data can be shared with other PLCs via global standard control protocols such as Ethernet/IP, Profinet, and EtherCAT. Control programs can also be written in languages such as ladder and function blocks, which control engineers are good at. In this example, the web-based GUI tool included in the CODESYS® package is used to display the control data shared with the PLC on the graphic screen. Graphic screens created with the CODESYS® Web GUI tool can be displayed directly on a large display via HDMI, and can also be displayed on a PC or tablet with a browser installed.
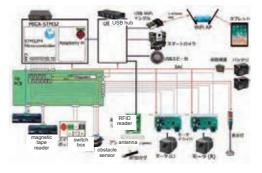
MEMS sensing

This is an example of motor failure diagnosis and predictive maintenance using the acceleration sensor sMICA-ACC equipped with the latest MEMS chip. The MEMS accelerometer attached to the motor can be directly attached to the industrial Raspberry Pi MICA-R STM 32 SENSOR with built-in microcomputer, or it can be connected to the wireless sensor box rMICA-vibration. In this project, measurement data is sent to the wireless base station rMICA-master attached to the industrial Raspberry Pi MICA-R via 920MHz sub-giga band communication via rMICA-vibration. The raw data received by the MICA-R4 is subjected to mathematical processing such as fast Fourier transform and envelope transform at any time by the open software Scipy on the Raspberry Pi, graph drawing, failure judgment, and data file to the host system (customer's server). send. (Upper model: MICA-R4 SENSOR)

AGV control

In this project, we used the industrial Raspberry Pi MICA-R IO series with a built-in microcomputer to develop a control system for an AGV for transport between processes in a factory. The built-in STM32 microcomputer reads the magnetic sensor that detects the magnetic tape on the floor, the obstacle sensor, and the motor encoder, and generates the speed command output that is sent to the left and right brushless motors. On the other hand, smart cameras and RFID readers that read RFID tags embedded in the floor are connected to the Raspberry Pi side via USB connection and are reflected in the control of the AGV in cooperation with the microcomputer. A dedicated Web GUI is provided for AGV operation and teaching, so it can be performed on the browser of a tablet terminal connected to WiFi. Furthermore, open source middleware ROS™ for robot control is run on Raspberry Pi, and advanced cooperative control of many AGVs is performed via a central ROS application server. (Upper model: MICA-R4 Multi IO)

MICA-R4
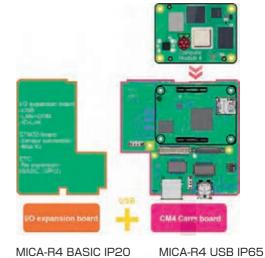
Environmentally resistant Industrial Raspberry Pi

MICA-R4 is an industrial Raspberry Pi with a built-in Raspberry Pi Compute Module 4 (CM4) for embedded applications. The robust aluminum chassis functions as a heat sink throughout, providing excellent heat dissipation for stable and continuous operation. It is designed for industrial use with onboard eMMC, no SD card for boot, 24VDC power supply, and a wide temperature range of -20 to 60°C. Basically, programs that run on ordinary Raspberry Pi can be run on the MICA-R4 without modification, making it easy to introduce the MICA-R4 from the development environment to the field. The IP65 dustproof and waterproof model can be installed without a control panel in harsh environments, including outdoors.

More Expandability for Industrial Raspberry Pi

MICA-R4 can be additionally equipped with a custom board with various interfaces required for IoT in manufacturing and a microcontroller required for AD conversion and high-speed sampling of sensor values. The custom board is located on the left side of the MICA-R4 main unit and is internally coupled to the carrier board with Raspberry Pi Compute Module 4. The custom board is powered by either 5.0 VDC or 24 VDC from the carrier board as required.

The front panel has up to four ports of M5/M8/M12 connectors, which are international standard industrial waterproof connectors, to meet the interface specifications of the custom board. In addition, the Gigabit Ethernet ports on the IP20 models use the ix Industrial interface, a new small Ethernet standard.

I/O expansion board + CM4 Carry board

MICA-R4 BASIC IP20

BASIC model
non-waterproof type

MICA-R4 USB IP65

with additional 2xUSB model
waterproof type
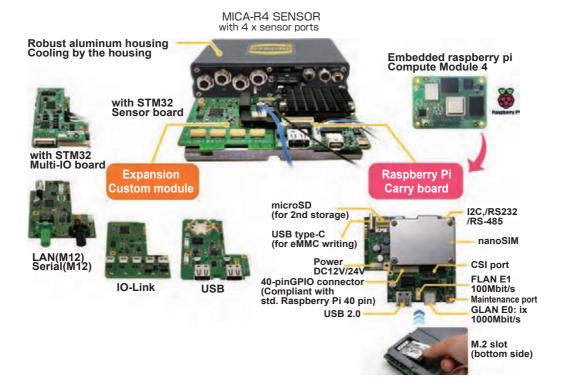
Increased processing power, larger memory capacity, and higher speed

CM4 is a genuine Raspberry Pi for embedded applications, equivalent to the general Raspberry Pi 4B. The high-performance Cortex-A72 processor has been clocked at 1.5GHz, up from 1.2GHz in the previous CM3+, and up to 8GB of LPDDR4 SDRAM is now available. New features such as NVMe storage via an M.2 slot, WWAN expansion*, and Gigabit Ethernet support enable the CM3+ to support more advanced applications than ever before.

*There is one M.2 slot. NVMe storage (SSD) and WWAN module (LTE) cannot be selected at the same time.

Ideal IoT platform by combining custom boards

The industrial Raspberry Pi is an ideal platform for an edge computer. There are currently five types of custom boards in the lineup, with three interface types (USB, IO-Link, and LAN+Serial) and two STM32 microcontroller types for general-purpose control for accelerometers, AGVs, and other applications. In the future, there is also a need for custom boards with FA analog sensor interface (4-20mA) and NVIDIA® Jetson™ GPU for image processing and machine learning, which will be added to the roadmap. We can also develop new custom boards to meet your unique specifications at a low initial cost.

MICA-R4 SENSOR
with 4 x sensor ports

Robust aluminum housing Cooling by the housing

Embedded raspberry pi Compute Module 4

with STM32 Sensor board

with STM32 Multi-IO board

Expansion Custom module

Raspberry Pi Carry board

LAN(M12) Serial(M12)

IO-Link

USB

microSD (for 2nd storage)

USB type-C (for eMMC writing)

Power DC12V/24V

40-pinGPIO connector (Compliant with std. Raspberry Pi 40 pin)

USB 2.0

I2C,/RS232 /RS-485

nanoSIM

CSI port

FLAN E1 100Mbit/s Maintenance port

GLAN E0: ix 1000Mbit/s

M.2 slot (bottom side)

4

MICA-R4 BASIC IP20

Picture

Features

- Industrial Raspberry Pi 4 (CM4)
- New processor, up to 2x faster than CM3
- Raspberry Pi OS compatible (Ubuntu requres 4GB or more RAM)
- DC12/24V power input
- Wide operating temperature range and high noise resistance
- M8, M5, ix connectors with high vibration resistance and connection reliability
- Robust aluminum die-cast housing
- Supports wall mount and DIN rail mount
- On-board eMMC (SD card is not used for boot)
- microSD slot for data storage
- Internal M.2 slot for SSD and WWAN expansion
- Raspi40p connector for expansion board
- Built-in battery backup RTC
- Highly reliable hardware watchdog

Product Specifications

Processor	Broadcom BCM2711, Quad core @ 1.5GHz	
Memory	RAM4GB, eMMC32GB (Depend on model)	
OS	Raspberry Pi OS	
Interface	Front	1x PWR : Power input, 2-line 2x LAN : FLAN 1ch, GLAN 1ch 1x OPT*1 : i2c/RS-232/485 selectable 1x USB : USB2.0 Host Type-A 1x Maintenance :Maintenance port(reserved) [Option]1x WLAN IEEE 802.11 b/g/n/ac, Bluetooth 5.0, BLE [Option]1x LTE(M.2 slot/EM7431)
	Back	1x USB-C : USB Type-C(eMMC writing only) 1x SW : eMMC write switch 1x microSD : microSD slot
	Internal	1x M.2 slot B-key*², 1x nanoSIM slot 1x CSI, 1xGPIO 40p
LED, Button	P: Power status, A0,1: LAN status Pi: User custom/WD error	
RTC/NVRAM	BR1225[or CR1225] Backup RTC	
Watchdog	Built-in hardware watchdog	
Power/ Consumption	BASIC:DC10.7V...28.8V/ 12W(incl.USB 500mAx1)	
Temperature	Operating Temp.: -20...60°C, Storage:-25...85°C	
Humidity	Operating Humi.:0...95%(non-condensing)	
IP grade	IP20	
housing material	Aluminum powder coating	
Dimensions	W132 x D87 x H35 mm (excluding protrusions)	
Weight	BASIC:Approx.540g	
Vibration/shock	IEC 60068-2-6 / IEC 60068-2-27	
EMI	Radiated emissions	EN55016-2-3
EMS	Electrostatic radiation immunity	EN 61000-4-2
	Radio frequency electromagnetic fields	EN 61000-4-3
	Fast transient burst	EN 61000-4-4
Installation method	DIN rail mounting, wall mounting(Option)	

*1 The speed is variable, but Data bit: 8, Parity: N, Stop bit: 1 are fixed.

*2 This is not a full pin connection. USB2.0, PCIe, and SIM are connected.

Details of each part

\<Front\>

ANT2 ANT1 ANT0 PWR E1[FLAN] CSI slit

OPT

Maintenance port

Pi LED USB0 A0 LED E0 [GLAN] P LED A1 LED

\<Back\> eMMC write switch   microSD slot   USB type-C port

Hole for fix barcket   Back cover   Screw for back cover

Interface

\<Connector pin layout\>

PWR connector

M8 A-coded 4pin Male

Pin	Col.	Signal
1	BR	24VDC(V1)
2	WH	24VDC(V2)
3	BL	0V(V1)
4	BK	0V(V2)

E0 connector [GLAN]

ix type-A jack

Pin	Signal	
	10/100M	1G
1	TX+	BI_DA+
2	TX-	BI_DA-
3	N.C.	GND
4	N.C.	BI_DC+
5	N.C.	BI_DC-
6	RX+	BI_DB+
7	RX-	BI_DB-
8	N.C.	GND
9	N.C.	BI_DD+
10	N.C.	BI_DD-

E1 connector [FLAN]

M8 A-coded 4pin Female

Pin	Col.	Signal
1	BR	TX+
2	WH	RX+
3	BL	RX-
4	BK	TX-

OPT connector

M5 4pin Female

Pin	Col.	i2c	RS232	RS485
1	BR	3.3V/5V/none*		
2	WH	SCL	TXD	A
3	BL	0V(RS232:SG)		
4	BK	SDA	RXD	B

*1 pin for power output is no output by default.

\<LED\>

LED	Sts.	Comments
P(GR)	Off	No power supply
	On	Power OK
A0(OR)	Blk	E0 active
A1(OR)	Blk	E1 active
Pi(RD)	Off	WD Normal
	On	WD Error
Pi(GR)	Off	User OFF
	On	User ON

\<ANT SMA port\> [Option]

Type	ANT2	ANT1	ANT0
Wired LAN	---	---	---
Wired LAN+LTE	Main	GNSS	Aux
Wired LAN+Wireless LAN	WL/BT	---	---
Wired LAN+Wireless LAN+LTE	Main	GNSS	WL/BT

\<CSI\>[Internal]

FPC connector

No.1

Pin	Signal	Pin	Signal
1	GND	9	CAM1_C_P
2	CAM1_D0_N	10	GND
3	CAM1_D0_P	11	CAM_GPIO
4	GND	12	NC
5	CAM1_D1_N	13	I2C1_SCL[GPIO45]
6	CAM1_D1_P	14	I2C2_SDA[GPIO44]
7	GND	15	3.3V
8	CAM1_C_N	16-30	NC

\<GPIO\>[Internal]

RasPi GPIO40pin (same layout as Raspberry Pi 40pin BM40B-SRDS-G-TF)

⚠ The GPIOs of CM4 are 3.3V level.

The total GPIO load is up to 50mA. For detailed specifications, please refer to the CM4 datasheet.

Confirmed Devices [Reference]

This is confirmation with the factory default image.
It depends on customer's software environment.

M.2 SSD	TS128GMTE452T, 256,512G model [0-70°C]/Transcend TS128GMTE452T-I, 256,512G model [-40 to 85°C]/Transcend TS128GMTE452T2, 256,512G model [-20 to 75°C]/Transcend
M.2 WWAN	EM7431, EM7430 /Sierra Wireless
USB Wifi	T2U Nano/TP-LINK company
Wifi	LM808/LM technologies
CSI Camera	Raspberry Pi Camera Module 2, Camera Module 2 NoIR Raspberry Pi High Quality Camera Raspberry Pi Camera Module 3/ Raspberry Pi Foundation

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MICA-R4 BASIC IP20

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Internal datails

\<Top side\>

USB Type-C
microSD Slot
SW2:eMMC write SW
- ON
ON:eMMC write mode
OFF*operation mode

\<Main board\>

CN10

CN2: gold pad
GND
VDD(OUT)
VBUS
D-
D+
GND

Expantion board
USB connection

GND
GPIO12

CN3A

U.FL connector

CN7

nanoSIM Slot (to M.2)

SW3:Protect SW
1: Watchdog
ON:Enabled
OFF*: Disabled
2: Wi-Fi
ON: turn off
OFF: turn on
3: Bluetooth
ON: turn off
OFF: turn on
4: EEPROM write
ON: disabled
OFF*: Enabled

Expansion board slot

CN1

L-connector

CN3B

CN13

SW3

CN9
CN5
CN4

CN8

Maintenance port (internal)
CSI

PWR port
OPT port
USB2.0 Type-A
E1:FLAN
E0:GLAN ix Industrial /type-A
Raspberry Pi camera module

\<Bottom side\>

OPT port power output selection(solder jumper)
JP2
5V
3.3V

CN6 M.2 B-key Slot
[Signal connection PCIe Gen2x1,USB2.0,SIM]

Hardware watchdog Timer or CSI selection switch
SW1: Select GPIO44,45
ON*: Watchdog
OFF: CSI(i2c)
- ON
*Default

OPT port comm. selection
SW6: i2c/COM select
ON:COM
OFF:i2c
- ON
SW5:COM select
ON:RS-485
OFF:RS-232
- ON
SW4:COM select
ON:RS-485
OFF:RS-232
- ON

BR1225 or CR1225 Battery

\<Main board\>

Device List

Signal	Device	Port or connection	Comments
E0:GLAN	CM4	eth0	10/100/1000Mbps
E1:FLAN	LAN9514i	eth1	10/100Mbps
Security IC (option)	ATECC508A	i2c-0/0x60	i2c0: GPIO0,1
RTC	DS3231SN	i2c-0/0x68	i2c0: GPIO0,1
OPT:i2c	CM4/GPIO0,1	i2c-0/---	i2c0: GPIO0,1
OPT:RS-232	MCP2200-I	ttyACM0	3-wire, max. 250kbps
OPT:RS-485	MCP2200-I	ttyACM0	2-wire, max. 400kbps
CSI:i2c	CM4/GPI44,45	GPIO44,45/i2c-1	i2c1: GPIO44,45 / when not using WD
CSI	CM4/CAM1	CAM1	MIPI CSI-2 2-lanes
WD Enable	MAX6373KA+T	GPIO44/Out	SET0 (SET1: Always High, SET2: Always Low)
WD Reset	MAX6373KA+T	GPIO45/Out	WDI

Note) It may be changed depending on the Raspberry Pi OS side.

Watchdog (WD) timer and CSI connection
SW1: Watchdog or CSI can be switched by selecting GPIO44,45. Watchdog (WD) and CSI cannot be used at the same time. When WD is selected, GPIO44 and 45 are for WD operation. In addition, when SW3: No.1 of protection SW is off, the reset is forcibly disabled. When CSI is selected, GPIO44 and 45 are used as i2c for CSI.

Software

The boot device of this unit is the onboard eMMC of CM4. Booting from an SSD is also possible. The microSD slot is not for system boot. Turn on the eMMC write switch, connect the USB cable, and use the rpiboot program to read and write images. In addition, the USB port is only for eMMC write.

USB Type-A
USB Type-C
USB Type-C

eMMC write switch

- RPi Boot(Windows Installer)
- Win32 DiskImager(read/write image)

Dimensions and installation adapter

(Unit: mm)

87
HARTING
6.2
8

132
PWR
35
9.8

Two types of mounting parts options
\<DIN rail mount adapter\>

35
1.5
66
132
DIN rail
Φ4.5

\<Wall mount kit\>

37.5
99
21
71.5
wall mount kit mounting hole
96
18
132

Optional accessories

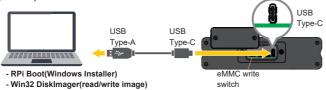| Optional accessories			Part Number
PWR cable	M8 A-code 4-pin female to open end	1m	21348100489010
		2m	21348100489020
E1[FLAN] cable	M8 A-code 4 pin male to RJ45 Plug	1m	72M8M4RM4010LI
		2m	72M8M4RM4020LI
	to RJ45 Jack	0.2m	72T17001449
OPT cable	M5 4-pin male to open end	1m	72M5M4010G0
		2m	72M5M4020G0
E0[GLAN] ix cable	ix plug to RJ45 Plug	1m	33480653830010
		2m	33480653830020
	to RJ45 Jack	0.2m	72T17001450IX
Mount kit	DIN rail mount adapter		20952000004
	wall mount kit		20953000007
Antenna fot LTE	LTE monopole antenna IP20 SMA screw		72MICA0000254
	LTE flat antenna IP67 mounted on glass or plastic		72MICA0000225
	LTE magnetic mount antenna IP65 mounted magnetically on a metal surface		72MICA0000252
	3-in-1 antenna IP67 GPS+2x4G MIMO mounted on glass or plastic		72MICA0000255

Ordering information

2: CM4 IP20 type
R : Wired
W: WiFi/Bluetooth
revision number

[Part Number]**722RUN1 0 0 0R3 3 0** IP20 BASIC model

RAM size [GB]	
1	1
2	2
3	4[standard]
4	8

eMMC size [GB]	
1	8
2	16
3	32[standard]
4	32/SSD128GB
5	32/SSD256GB
6	32/SSD512GB

4,5,6: NVMe fast SSD (Temperature 0-55°C)

Option (OPT) interface	
1	RS-232C[standard]
2	I2C
3	RS-485

Expansion interface	
0	None

⚠ When selecting CodeSys, please use 32bit OS. If you select 64bit, the license key will not be the Raspberry Pi version and you will not be able to use it.

Add-on software	
0	None[standard]
1	CodeSys

Accessory	
0	None[standard]
1	Reserved
L	LTE

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MICA-R4 BASIC IP65

Picture

Features

- Industrial Raspberry Pi 4 (CM4)
- New processor, up to 2x faster than CM3
- Raspberry Pi OS compatible (Ubuntu requres 4GB or more RAM)
- DC12/24V power input
- Wide operating temperature range and high noise resistance
- M8, M5 connectors with high vibration resistance and connection reliability
- Robust aluminum die-cast housing
- Supports wall mount and DIN rail mount
- On-board eMMC (SD card is not used for boot)
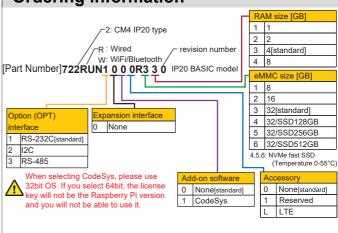- microSD slot for data storage
- Internal M.2 slot for SSD and WWAN expansion
- Raspi40p connector for expansion board
- Built-in battery backup RTC
- Highly reliable hardware watchdog
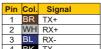
Product Specifications

Processor		Broadcom BCM2711, Quad core @ 1.5GHz
Memory		RAM4GB, eMMC32GB (Depend on model)
OS		Raspberry Pi OS
Interface	Front	1x PWR : Power input, 2-line
		1x LAN : FLAN 1ch
		1x OPT*¹ : i2c/RS-232/485 selectable
		1x USB : PushPull USB2.0 Host Type-A
		[Option]1x WLAN IEEE 802.11 b/g/n/ac, Bluetooth 5.0, BLE
		[Option]1x LTE(M.2 slot/EM7431)
	Back	1x USB-C : USB Type-C(eMMC writing only)
		1x SW : eMMC write switch
		1x microSD : microSD slot
	Internal	1x M.2 slot B-key*², 1x nanoSIM slot
		1x CSI, 1xGPIO 40p
LED, Button		P: Power status, A1: LAN status
		Pi: User custom/WD error
RTC/NVRAM		BR1225[or CR1225] Backup RTC
Watchdog		Built-in hardware watchdog
Power/ Consumption		BASIC: DC10.7V...28.8V/
		12W(incl.USB 500mAx1)
Temperature		Operating Temp.:-20...60°C, Storage:-25...85°C
Humidity		Operating Humi.:0~95%(non-condensing)
IP grade		IP65
housing material		Aluminum powder coating
Dimensions		W132 x D89x H35 mm (excluding protrusions)
Weight		BAISC: Approx.540g
Vibration/shock		IEC 60068-2-6 / IEC 60068-2-27
EMI		Radiated emissions EN55016-2-3
EMS		Electrostatic radiation immunity EN 61000-4-2
		Radio frequency electromagnetic fields EN 61000-4-3
		Fast transient burst EN 61000-4-4
Installation method		DIN rail mounting, wall mounting(Option)

*1 The speed is variable, but Data bit: 8, Parity: N, Stop bit: 1 are fixed.
*2 This is not a full pin connection. USB2.0, PCIe, and SIM are connected.

Details of each part

\<Front\> ANT2 ANT1 ANT0 PWR E1[FLAN] OPT
USB0 PWR E1 OPT
Pi P A1
P LED
Pi LED
USB0
A1 LED

\<Back\> eMMC write switch   microSD slot   USB type-C port
Hole for fix barcket   Back cover   Screw for back cover

Interface

\<Connector pin layout\>

PWR connector
M8 A-coded 4pin Male

Pin	Col.	Signal
1	BR	24VDC(V1)
2	WH	24VDC(V2)
3	BL	0V(V1)
4	BK	0V(V2)

E1 connector [FLAN]
M8 A-coded 4pin Female

Pin	Col.	Signal
1	BR	TX+
2	WH	RX+
3	BL	RX-
4	BK	TX-

OPT connector
M5 4pin Female

Pin	Col.	i2c	RS232	RS485
1	BR	3.3V/5V/none*		
2	WH	SCL	TXD	A
3	BL	0V(RS232:SG)		
4	BK	SDA	RXD	B

*1 pin for power output is no output by default.

\<LED\>

LED	Sts.	Comments
P(GR)	Off	No power supply
	On	Power OK
A0(OR)	Blk	E0 active
A1(OR)	Blk	E1 active
Pi(RD)	Off	WD Normal
	On	WD Error
Pi(GR)	Off	User OFF
	On	User ON

\<ANT SMA port\> [Option]

Type	ANT2	ANT1	ANT0
Wired LAN	---	---	---
Wired LAN+LTE	Main	GNSS	Aux
Wired LAN+Wireless LAN	WL/BT	---	---
Wired LAN+Wireless LAN+LTE	Main	GNSS	WL/BT

\<CSI\>[Internal]
FPC connector
No.1

Pin	Signal	Pin	Signal
1	GND	9	CAM1_C_P
2	CAM1_D0_N	10	GND
3	CAM1_D0_P	11	CAM_GPIO
4	GND	12	NC
5	CAM1_D1_N	13	I2C1_SCL[GPIO45]
6	CAM1_D1_P	14	I2C2_SDA[GPIO44]
7	GND	15	3.3V
8	CAM1_C_N	16-30	NC

\<GPIO\>[Internal]
RasPi GPIO40pin (same layout as Raspberry Pi 40pin BM40B-SRDS-G-TF)

Top row: 5V 5V Ground GPIO14 GPIO15 GPIO18 Ground GPIO23 GPIO24 Ground GPIO25 GPIO8 GPIO7 ID_SC Ground GPIO12 Ground GPIO16 GPIO20 GPIO21
Pin numbers top: 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40
Pin numbers bottom: 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39
Bottom row: 3.3V GPIO2 GPIO3 GPIO4 Ground GPIO17 GPIO27 GPIO22 3.3V GPIO10 GPIO9 GPIO11 Ground ID_SD GPIO5 GPIO6 GPIO13 GPIO19 GPIO26 Ground

⚠ The GPIOs of CM4 are 3.3V level.
The total GPIO load is up to 50mA. For detailed specifications, please refer to the CM4 datasheet.

Confirmed Devices [Reference]

This is confirmation with the factory default image.
It depends on customer's software environment.

M.2 SSD	TS128GMTE452T, 256,512G model [0-70°C]/Transcend
	TS128GMTE452T-I, 256,512G model [-40 to 85°C]/Transcend
	TS128GMTE452T2, 256,512G model [-20 to 75°C]/Transcend
M.2 WWAN	EM7431, EM7430 /Sierra Wireless
USB Wifi	T2U Nano/TP-LINK company
Wifi	LM808/LM technologies
CSI Camera	Raspberry Pi Camera Module 2, Camera Module 2 NoIR
	Raspberry Pi High Quality Camera
	Raspberry Pi Camera Module 3/ Raspberry Pi Foundation

MICA-R4 BASIC IP65

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Internal datails

<Top side>

USB Type-C
microSD Slot
SW2:eMMC write SW
ON:eMMC write mode
OFF*operation mode
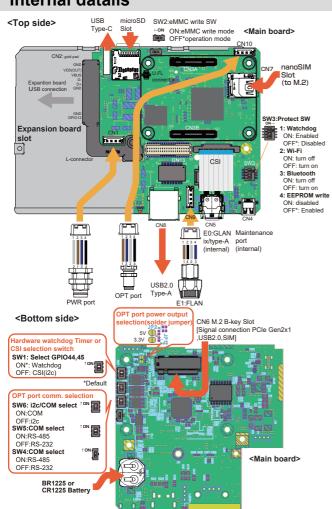**<Main board>**
CN10

CN2: gold pad
GND
VDD(OUT)
VBUS
D-
D+
GND
Expantion board USB connection

CN7
nanoSIM Slot (to M.2)

GND
GPIO12

Expansion board slot

CN1
L-connector

CN3A
U.FL connector
CN3B
CSI
SW3

SW3:Protect SW
1: Watchdog
ON: Enabled
OFF*: Disabled
2: Wi-Fi
ON: turn off
OFF: turn on
3: Bluetooth
ON: turn off
OFF: turn on
4: EEPROM write
ON: disabled
OFF*: Enabled

CN8
CN9
CN5
E0:GLAN ix/type-A (internal)
Maintenance port (internal)

USB2.0 Type-A

PWR port
OPT port
E1:FLAN

<Bottom side>

OPT port power output selection(solder jumper)
5V
3.3V

CN6 M.2 B-key Slot [Signal connection PCIe Gen2x1 ,USB2.0,SIM]

Hardware watchdog Timer or CSI selection switch
SW1: Select GPIO44,45
ON*: Watchdog
OFF: CSI(i2c)
*Default

OPT port comm. selection
SW6: i2c/COM select
ON:COM
OFF:i2c
SW5:COM select
ON:RS-485
OFF:RS-232
SW4:COM select
ON:RS-485
OFF:RS-232

BR1225 or CR1225 Battery

<Main board>

Device List

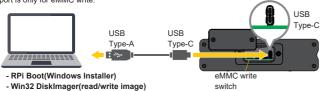| Signal	Device	Port or connection	Comments
E0:GLAN	CM4	eth0	10/100/1000Mbps
E1:FLAN	LAN9514i	eth1	10/100Mbps
Security IC (option)	ATECC508A	i2c-0/0x60	i2c0: GPIO0,1
RTC	DS3231SN	i2c-0/0x68	i2c0: GPIO0,1
OPT:i2c	CM4/GPIO0,1	i2c-0/---	i2c0: GPIO0,1
OPT:RS-232	MCP2200-I	ttyACM0	3-wire, max. 250kbps
OPT:RS-485	MCP2200-I	ttyACM0	2-wire, max. 400kbps
CSI:i2c	CM4/GPI44,45	GPIO44,45/i2c-1	i2c1: GPIO44,45 / when not using WD
CSI	CM4/CAM1	CAM1	MIPI CSI-2 2-lanes
WD Enable	MAX6373KA+T	GPIO44/Out	SET0 (SET1: Always High, SET2: Always Low)
WD Reset	MAX6373KA+T	GPIO45/Out	WDI

Note) It may be changed depending on the Raspberry Pi OS side.

Watchdog (WD) timer and CSI connection
SW1: Watchdog or CSI can be switched by selecting GPIO44,45. Watchdog (WD) and CSI cannot be used at the same time. When WD is selected, GPIO44 and 45 are for WD operation. In addition, when SW3: No.1 of protection SW is off, the reset is forcibly disabled. When CSI is selected, GPIO44 and 45 are used as i2c for CSI.
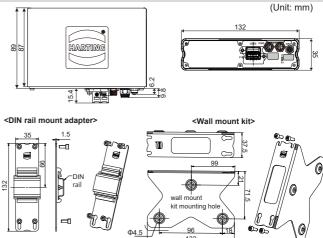
Software

The boot device of this unit is the onboard eMMC of CM4. Booting from an SSD is also possible. The microSD slot is not for system boot. Turn on the eMMC write switch, connect the USB cable, and use the rpiboot program to read and write images. In addition, the USB port is only for eMMC write.

USB Type-A
USB Type-C
USB Type-C

- RPi Boot(Windows Installer)
- Win32 DiskImager(read/write image)
eMMC write switch

Dimensions and installation adapter

(Unit: mm)

89
87
132
35
6.2
15.4
9.8

<DIN rail mount adapter>
35
1.5
132
66
DIN rail

<Wall mount kit>
37.5
99
71.5
21
wall mount kit mounting hole
Φ4.5
96
18
132

Optional accessories

Optional accessories			Part Number
PWR cable	M8 A-code 4-pin female to open end	1m	21348100489010
		2m	21348100489020
E1[FLAN] cable	M8 A-code 4 pin male to RJ45 Plug	1m	72M8M4RM4010LI
		2m	72M8M4RM4020LI
	M8 A-code 4 pin male to RJ45 Jack	0.2m	72T17001449
OPT cablle	M5 4-pin male to open end	1m	72M5M4010G0
		2m	72M5M4020G0
PushPull cable	PushPull USB to standard USB 2.0 Type-A	1m	09454451911
		2m	09454451913
		5m	09454451915
PushPull cover	PushPull protectioncap	Short	09 45 845 0009
		Long	09 45 845 0015
	PushPull easy cover	NBR	72PPCAP01
Dust cap	for M8 Male(PWR)/IP67		72MICA0000033
	for M8 Femal (E1)/IP67		72MICA0000034
	for M5 Female(OPT)/IP67		72MICA0000035
Mount kit	DIN rail mount adapter		20952000004
	wall mount kit		20953000007
Antenna LTE	LTE monopole antenna IP20 SMA screw		72MICA0000254
	LTE flat antenna IP67 mounted on glass or plastic		72MICA0000225
	LTE magnetic mount antenna IP65 mounted magnetically on a metal surface		72MICA0000252
	3-in-1 antenna IP67 GPS+2x4G MIMO mounted on glass or plastic		72MICA0000255

Ordering information

1: CM4 IP65 type
R : Wired
W: Wireless
revision number
[Part Number]**721RUN1 0 0 0R 3 3 0** IP65 BASIC model

RAM size [GB]	
1	1
2	2
3	4[standard]
4	8

eMMC size [GB]	
1	8
2	16
3	32[standard]
4	32/SSD128GB
5	32/SSD256GB
6	32/SSD512GB

4,5,6: NVMe fast SSD (Temperature 0-55°C)

Option (OPT) interface	
1	RS-232C[standard]
2	I2C
3	RS-485

Expansion interface	
0	None

⚠ When selecting CodeSys, please use 32bit OS. If you select 64bit, the license key will not be the Raspberry Pi version and you will not be able to use it.

Add-on software	
0	None[standard]
1	CodeSys

Accessory	
0	None[standard]
1	Reserved
L	LTE

All data given are in line with the actual state of art and therefore not binding.
HARTING reserves the right to modify designs without giving the relevant reasons.
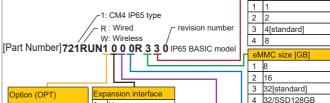
MICA-R4 BASIC RJ Plus IP20

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MICA-R4

Picture

Features

- Industrial Raspberry Pi 4 (CM4)
- New processor, up to 2x faster than CM3
- Raspberry Pi OS compatible (Ubuntu requres 4GB or more RAM)
- DC12/24V power input
- Wide operating temperature range and high noise resistance
- M8, M5, ix connectors with high vibration resistance and connection reliability
- Robust aluminum die-cast housing
- Supports wall mount and DIN rail mount
- On-board eMMC (SD card is not used for boot)
- microSD slot for data storage
- Internal M.2 slot for SSD and WWAN expansion
- Raspi40p connector for expansion board
- Built-in battery backup RTC
- Highly reliable hardware watchdog

Product Specifications

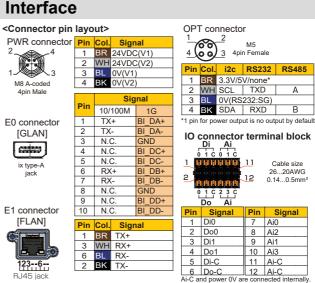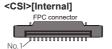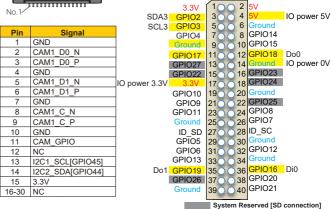|		
Processor	Broadcom BCM2711, Quad core @ 1.5GHz	
Memory	RAM4GB, eMMC32GB (Depend on model)	
OS	Raspberry Pi OS	

Interface	Front	1x PWR :Power input, 2-line
		2x LAN :FLAN[100Mbs]x1ch, GLAN[1000Mbs] x1ch
		1x OPT*¹ :i2c/RS-232/485 selectable
		1x USB :USB2.0 Host Type-A
		1x IO :Di 2ch(Photocoupler input,DC5V-24V)
		   Do 2ch(Photorelay output,DC48V,
		   Max 400mA:25℃/Max250mA:60℃)
		   Ai 4ch(Non-isolated, resolution 12bit, Max3.3kSPS)
		   0-5V/0-10V(100V)
		1x Maintenance :Maintenance port(reserved)
		[Option]1x WLAN IEEE 802.11 b/g/n/ac, Bluetooth 5.0, BLE
		[Option]1x LTE(M.2 slot/EM7431)

	Back	1x USB-C : USB Type-C(eMMC writing only) 1x SW : eMMC write switch 1x microSD : microSD slot
	Internal	1x M.2 slot B-key*², 1x nanoSIM slot 1x CSI, 1xGPIO 40p
LED, Button	P: Power status, A0,1: LAN status Pi: User custom/WD error	
RTC/NVRAM	BR1225[or CR1225] Backup RTC	
Watchdog	Built-in hardware watchdog	
Power/ Consumption	DC10.7V～28.8V 12.5W(incl.USB 500mAx1)	
Temperature	Operating Temp.: -20...60°C, Storage:-25...85°C	
Humidity	Operating Humi.:0...95%(non-condensing)	
IP grade	IP20	
housing material	Aluminum powder coating	
Dimensions	W132 x D87 x H35 mm (excluding protrusions)	
Weight	Approx. 570g	
Vibration/shock	IEC 60068-2-6 / IEC 60068-2-27	
EMI	Radiated emissions	EN55016-2-3
EMS	Electrostatic radiation immunity	EN 61000-4-2
	Radio frequency electromagnetic fields	EN 61000-4-3
	Fast transient burst	EN 61000-4-4
Installation method	DIN rail mounting, wall mounting(Option)	

*1 The speed is variable, but Data bit: 8, Parity: N, Stop bit: 1 are fixed.
*2 This is not a full pin connection. USB2.0, PCIe, and SIM are connected.

Details of each part

\<Front>

ANT2   IO   ANT1 PWR   ANT0   CSI slit
OPT [RS-232/485/I2C]
Maintenance port
E1[FLAN] RJ45   Pi LED   USB   A0 LED   E0[GLAN] ix-Industrial   A1 LED   P LED

\<Back>   eMMC write switch   microSD slot   USB type-C port

Hole for fix barcket   Back cover   Screw for back cover

Interface

\<Connector pin layout>

PWR connector

M8 A-coded 4pin Male

Pin	Col.	Signal
1	BR	24VDC(V1)
2	WH	24VDC(V2)
3	BL	0V(V1)
4	BK	0V(V2)

E0 connector [GLAN]

ix type-A jack

Pin	Signal	
	10/100M	1G
1	TX+	BI_DA+
2	TX-	BI_DA-
3	N.C.	GND
4	N.C.	BI_DC+
5	N.C.	BI_DC-
6	RX+	BI_DB+
7	RX-	BI_DB-
8	N.C.	GND
9	N.C.	BI_DD+
10	N.C.	BI_DD-

E1 connector [FLAN]

RJ45 jack

Pin	Col.	Signal
1	BR	TX+
3	WH	RX+
6	BL	RX-
2	BK	TX-

OPT connector

M5 4pin Female

Pin	Col.	i2c	RS232	RS485
1	BR	3.3V/5V/none*		
2	WH	SCL	TXD	A
3	BL	0V(RS232:SG)		
4	BK	SDA	RXD	B

*1 pin for power output is no output by default.

IO connector terminal block

Di   Ai
Do   Ai

Cable size 26...20AWG 0.14...0.5mm²

Pin	Signal	Pin	Signal
1	Di0	7	Ai0
2	Do0	8	Ai2
3	Di1	9	Ai1
4	Do1	10	Ai3
5	Di-C	11	Ai-C
6	Do-C	12	Ai-C

Ai-C and power 0V are connected internally.

\<LED>

LED	Sts.	Comments
P(GR)	Off	No power supply
	On	Power OK
A1(OR)	Blk	E1 active
Pi(RD)	Off	WD Normal
	On	WD Error
Pi(GR)	Off	User OFF
	On	User ON

\<ANT SMA port> [Option]

Type	ANT2	ANT1	ANT0
Wired LAN	---	---	---
Wired LAN+LTE	---	Main	Aux
Wired LAN+Wireless LAN	WL/BT	---	---
Wired LAN+Wireless LAN+LTE	Main	GNSS	WL/BT

\<CSI>[Internal]

FPC connector

No.1

Pin	Signal
1	GND
2	CAM1_D0_N
3	CAM1_D0_P
4	GND
5	CAM1_D1_N
6	CAM1_D1_P
7	GND
8	CAM1_C_N
9	CAM1_C_P
10	GND
11	CAM_GPIO
12	NC
13	I2C1_SCL[GPIO45]
14	I2C2_SDA[GPIO44]
15	3.3V
16-30	NC

\<GPIO>[Internal]
RasPi GPIO40pin
(same layout as Raspberry Pi 40pin BM40B-SRDS-G-TF)

3.3V		1	2	5V	
SDA3 GPIO2		3	4	5V	IO power 5V
SCL3 GPIO3		5	6	Ground	
GPIO4		7	8	GPIO14	
Ground		9	10	GPIO15	
GPIO17		11	12	GPIO18	Do0
GPIO27		13	14	Ground	IO power 0V
GPIO22		15	16	GPIO23	
IO power 3.3V 3.3V		17	18	GPIO24	
GPIO10		19	20	Ground	
GPIO9		21	22	GPIO25	
GPIO11		23	24	GPIO8	
Ground		25	26	GPIO7	
ID_SD		27	28	ID_SC	
GPIO5		29	30	Ground	
GPIO6		31	32	GPIO12	
GPIO13		33	34	Ground	
Do1 GPIO19		35	36	GPIO16	Di0
GPIO26		37	38	GPIO20	
Ground		39	40	GPIO21	

■ System Reserved [SD connection]
■ System Reserved [IO connection]

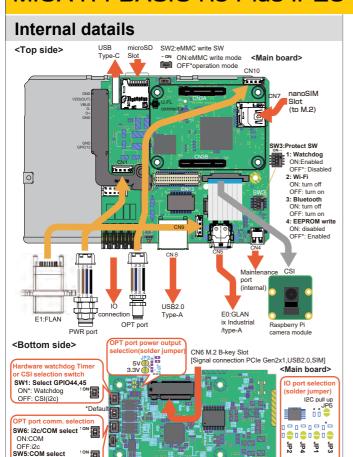⚠ The GPIOs of CM4 are 3.3V level.The total GPIO load is up to 50mA. For detailed specifications, please check the CM4 datasheet.

MICA-R4 BASIC RJ Plus IP20

Internal datails

<Top side>

USB Type-C
microSD Slot

SW2:eMMC write SW
ON:eMMC write mode
OFF*operation mode

<Main board>

CN10

CN7

nanoSIM Slot (to M.2)

SW3:Protect SW
1: Watchdog
  ON:Enabled
  OFF*: Disabled
2: Wi-Fi
  ON: turn off
  OFF: turn on
3: Bluetooth
  ON: turn off
  OFF: turn on
4: EEPROM write
  ON: disabled
  OFF*: Enabled

GND
VDD(OUT)
VBUS
D-
D+
GND

GND
GPIO12

U.FL connector

CN3A

CN3B

CN1

SW3

CN9

CN8

CN5

CN4

Maintenance port (internal)

CSI

E0:GLAN ix Industrial /type-A

Raspberry Pi camera module

E1:FLAN

IO connection

USB2.0 Type-A

PWR port

OPT port

<Bottom side>

OPT port power output selection(solder jumper)
5V
3.3V
JP22
JP21

CN6 M.2 B-key Slot
[Signal connection PCIe Gen2x1,USB2.0,SIM]

<Main board>

Hardware watchdog Timer or CSI selection switch
SW1: Select GPIO44,45
  ON*: Watchdog
  OFF: CSI(i2c)

*Default

OPT port comm. selection
SW6: i2c/COM select
  ON:COM
  OFF:i2c
SW5:COM select
  ON:RS-485
  OFF:RS-232
SW4:COM select
  ON:RS-485
  OFF:RS-232

BR1225 or CR1225 Battery

IO port selection (solder jumper)
I2C pull up JP5

JP2 Ai1 | JP4 Ai3 | JP1 Ai0 | JP3 Ai2
short: 0-5V | short: 0-5V | short: 0-5V | short: 0-5V
open: 0-100V* | open: 0-10V* | open: 0-10V* | open: 0-10V*

Dimensions and installation adapter

(Unit: mm)

87
11.6
132
35

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Two types of mounting parts options
<DIN rail mount adapter>

35
1.5
132
66
DIN rail

<Wall mount kit>

37.5
99
21
71.5
wall mount kit mounting hole
Φ4.5
96
18
132

Optional accessories

Optional accessories				Part Number
PWR cable	M8 A-code 4-pin female to open end		1m	21348100489010
			2m	21348100489020
OPT cable	M5 4-pin male to open end		1m	72M5M4010G0
			2m	72M5M4020G0
E0[GLAN] ix cable	ix plug to	to RJ45 Plug	1m	33480653830010
			2m	33480653830020
		to RJ45 Jack	0.2m	72T17001450IX
Mount kit	DIN rail mount adapter			20952000004
	wall mount kit			20953000007
Antenna fot LTE	LTE monopole antenna IP20 SMA screw			72MICA0000254
	LTE flat antenna IP67 mounted on glass or plastic			72MICA0000225
	LTE magnetic mount antenna IP65 mounted magnetically on a metal surface			72MICA0000252
	3-in-1 antenna IP67 GPS+2x4G MIMO mounted on glass or plastic			72MICA0000255

Device List

Signal	Device	Port or connection	Comments
E0:GLAN(reserved)	CM4	eth0	10/100/1000Mbps
E1:FLAN	LAN9514i	eth1	10/100Mbps
Security IC (option)	ATECC508A	i2c-0/0x60	i2c0:GPIO0,1
RTC	DS3231SN	i2c-0/0x68	i2c0:GPIO0,1
OPT:i2c	CM4/GPIO0,1	i2c-0/---	i2c0:GPIO0,1
OPT:RS-232	MCP2200-I	ttyACM1	3-wire, max. 250kbps
OPT:RS-485	MCP2200-I	ttyACM1	2-wire, max. 400kbps
CSI:i2c	CM4/GPI44,45	GPIO44,45/i2c-1	i2c1: GPIO44,45 / when not using WD
CSI	CM4/CAM1	CAM1	MIPI CSI-2 2-lanes
Pi LED(green)	CM4	GPIO6/Out	2 color LED : Pi LED(green) and WDerror LED(red)
WD Enable	MAX6373KA+T	GPIO44/Out	SET0 (SET1: Always High, SET2: Always Low)
WD Reset	MAX6373KA+T	GPIO45/Out	WD
Di0,1	CM4	GPIO16,17/In	Photocoupler input DC5V ～ 24V, +/- common compatible
Do0,1	CM4	GPIO18,19/Out	Photorelay output MaxDC48V, 250mA,+/-common compatible
Ai0,1,2,3	ADS1015	i2c-1/0x48	Resolution 12bit, 4ch input, 0-5V/0-2000cnt FSR = ±2.048 V, single-ended inputs

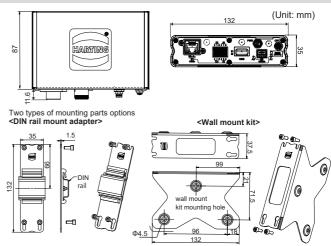Note) It may be changed depending on the Raspberry Pi OS side.

Software

The boot device of this unit is the onboard eMMC of CM4. Booting from an SSD is also possible. The microSD slot is not for system boot. Turn on the eMMC write switch, connect the USB cable, and use the rpiboot program to read and write images. In addition, the USB port is only for eMMC write.
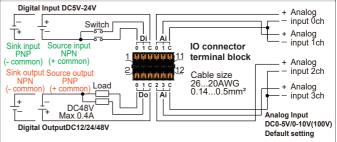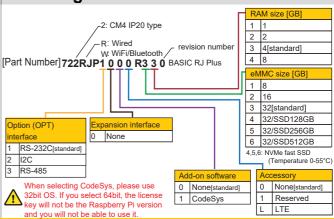
USB Type-A
USB Type-C
USB Type-C

eMMC write switch

- RPi Boot(Windows Installer)
- Win32 DiskImager(read/write image)

IO connection[example]

Digital Input DC5V-24V

Switch

Sink input PNP (- common)
Source input NPN (+ common)

Di | Ai

Sink output NPN (- common)
Source output PNP (+ common)

Load

DC48V Max 0.4A

Digital OutputDC12/24/48V

Do | Ai

+ Analog – input 0ch
+ Analog – input 1ch

IO connector terminal block

Cable size 26...20AWG 0.14...0.5mm²

+ Analog – input 2ch
+ Analog – input 3ch

Analog Input DC0-5V/0-10V(100V) Default setting

Ordering information

-2: CM4 IP20 type

R: Wired
W: WiFi/Bluetooth

revision number

[Part Number] **722RJP1 0 0 0 R3 3 0** BASIC RJ Plus

RAM size [GB]	
1	1
2	2
3	4[standard]
4	8

eMMC size [GB]	
1	8
2	16
3	32[standard]
4	32/SSD128GB
5	32/SSD256GB
6	32/SSD512GB

4,5,6: NVMe fast SSD (Temperature 0-55°C)

Option (OPT) interface	
1	RS-232C[standard]
2	I2C
3	RS-485

Expansion interface	
0	None

Add-on software	
0	None[standard]
1	CodeSys

Accessory	
0	None[standard]
1	Reserved
L	LTE

⚠ When selecting CodeSys, please use 32bit OS. If you select 64bit, the license key will not be the Raspberry Pi version and you will not be able to use it.

MICA-R4 BASIC Plus IP65

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Features

- Industrial Raspberry Pi 4 (CM4)
- New processor, up to 2x faster than CM3
- Raspberry Pi OS compatible (Ubuntu requres 4GB or more RAM)
- DC12/24V power input
- Wide operating temperature range and high noise resistance
- M8, M5 connectors with high vibration resistance and connection reliability
- Robust aluminum die-cast housing
- Supports wall mount and DIN rail mount
- On-board eMMC (SD card is not used for boot)
- microSD slot for data storage
- Internal M.2 slot for SSD and WWAN expansion
- Raspi40p connector for expansion board
- Built-in battery backup RTC
- Highly reliable hardware watchdog

Product Specifications

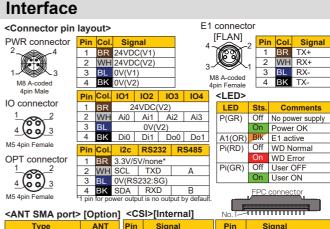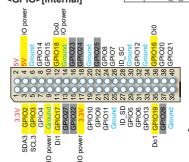|		
Processor	Broadcom BCM2711, Quad core @ 1.5GHz	
Memory	RAM4GB, eMMC32GB (Depend on model)	
OS	Raspberry Pi OS	
Interface	Front	1x PWR :Power input, 2-line 1x LAN :FLAN[100Mbs]x1ch 1x OPT*1 :i2c/RS-232/485 selectable 1x USB :USB2.0 Host Type-A 4x IO :M5 IO port [Dix2ch,Dox2ch,Aix4ch] 　　　　 Ai：0-5V/0-10(100)V[default] 1x Maintenance :Maintenance port(reserved) [Option]1x WLAN IEEE 802.11 b/g/n/ac, Bluetooth 5.0, BLE [Option]1x LTE(M.2 slot/EM7431)
	Back	1x USB-C : USB Type-C(eMMC writing only) 1x SW : eMMC write switch 1x microSD : microSD slot
	Internal	1x M.2 slot B-key*2, 1x nanoSIM slot 1x CSI, 1xGPIO 40p
LED, Button	P: Power status, A0,1: LAN status Pi: User custom/WD error	
RTC/NVRAM	BR1225[or CR1225] Backup RTC	
Watchdog	Built-in hardware watchdog	
Power/	DC10.7V～28.8V	
Consumption	12.5W(incl.USB 500mAx1)	
Temperature	Operating Temp.: -20...60°C, Storage:-25...85°C	
Humidity	Operating Humi.:0...95%(non-condensing)	
IP grade	IP65	
housing material	Aluminum powder coating	
Dimensions	W132 x D89 x H35 mm (excluding protrusions)	
Weight	Approx. 540g	
Vibration/shock	IEC 60068-2-6 / IEC 60068-2-27	
EMI	Radiated emissions	EN55016-2-3
EMS	Electrostatic radiation immunity	EN 61000-4-2
	Radio frequency electromagnetic fields	EN 61000-4-3
	Fast transient burst	EN 61000-4-4
Installation method	DIN rail mounting, wall mounting(Option)	

*1 The speed is variable, but Data bit: 8, Parity: N, Stop bit: 1 are fixed.
*2 This is not a full pin connection. USB2.0, PCIe, and SIM are connected.

Interface

<Connector pin layout>

PWR connector
M8 A-coded 4pin Male

Pin	Col.	Signal
1	BR	24VDC(V1)
2	WH	24VDC(V2)
3	BL	0V(V1)
4	BK	0V(V2)

IO connector
M5 4pin Female

Pin	Col.	IO1	IO2	IO3	IO4
1	BR	24VDC(V2)			
2	WH	Ai0	Ai1	Ai2	Ai3
3	BL	0V(V2)			
4	BK	Di0	Di1	Do0	Do1

OPT connector
M5 4pin Female

Pin	Col.	i2c	RS232	RS485
1	BR	3.3V/5V/none*		
2	WH	SCL	TXD	A
3	BL	0V(RS232:SG)		
4	BK	SDA	RXD	B

*1 pin for power output is no output by default.

E1 connector [FLAN]
M8 A-coded 4pin Female

Pin	Col.	Signal
1	BR	TX+
2	WH	RX+
3	BL	RX-
4	BK	TX-

<LED>

LED	Sts.	Comments
P(GR)	Off	No power supply
	On	Power OK
A1(OR)	Blk	E1 active
Pi(RD)	Off	WD Normal
	On	WD Error
Pi(GR)	Off	User OFF
	On	User ON

FPC connector
No.1

<ANT SMA port> [Option]

Type	ANT
Wired LAN	---
Wired LAN+LTE	Main
Wired LAN+ Wireles LAN	WL/BT
Wired LAN+ Wireless LAN＋LTE	no settings

<CSI>[Internal]

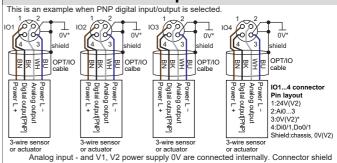| Pin	Signal	Pin	Signal
1	GND	9	CAM1_C_P
2	CAM1_D0_N	10	GND
3	CAM1_D0_P	11	CAM_GPIO
4	GND	12	NC
5	CAM1_D1_N	13	I2C1_SCL[GPIO45]
6	CAM1_D1_P	14	I2C2_SDA[GPIO44]
7	GND	15	3.3V
8	CAM1_C_N	16-30	NC

<GPIO>[Internal]

RasPi GPIO 40pin
(same layout as Raspberry Pi 40pin
BM40B-SRDS-G-TF)

System Reserved [SD connection]
System Reserved [IO connection]

⚠ The GPIOs of CM4 are 3.3V level.
The total GPIO load is up to 50mA.
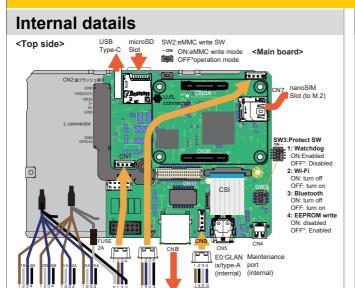For detailed specifications, please check the CM4 datasheet.

Details of each part

<Front>

ANT[option]　PWR　E1[FLAN]
USB　PWR　E1　OPT
OPT
IO1 IO2 IO3 IO4
P LED
A1 LED
IO1 port　IO2 port　IO3 port　IO4 port　Pi LED　USB0　Pi LED

<Back>

eMMC write switch　microSD slot　USB type-C port
Hole for fix barcket　Back cover　Screw for back cover

IO connection example

This is an example when PNP digital input/output is selected.

IO1　IO2　IO3　IO4

0V* shield
OPT/IO cable
3-wire sensor or actuator

Power L –
Power L +
Digital output[PNP]
Analog output
BN BK WH BU

IO1...4 connector Pin layout
1:24V(V2)
2:Ai0...3
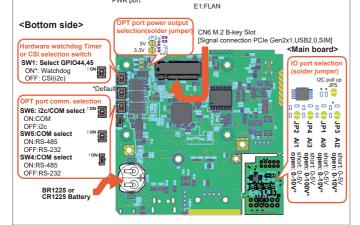3:0V(V2)*
4:Di0/1,Do0/1
Shield:chassis, 0V(V2)

⚠ Analog input - and V1, V2 power supply 0V are connected internally. Connector shield and power supply 0V* are connected internally. Please limit the power output to a maximum of 200mA per channel and the total power supply to 0.8A. The digital output is a photorelay output with a maximum of 250mA @ 60°C.

MICA-R4 BASIC Plus IP65

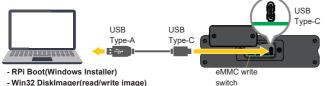## Internal datails

<Top side>

USB Type-C
microSD Slot
SW2:eMMC write SW
-·ON ON:eMMC write mode
OFF*operation mode
<Main board>

CN2:全フラッシュ端子
GND
VDD(OUT)
VBUS
D-
D+
GND
U.FL connector
CN3A
CN7
nanoSIM Slot (to M.2)

L-connector
GND
GPIO12
CN1
CN3B
CSI
SW3

SW3:Protect SW
ON-
1: Watchdog
  ON:Enabled
  OFF*: Disabled
2: Wi-Fi
  ON: turn off
  OFF: turn on
3: Bluetooth
  ON: turn off
  OFF: turn on
4: EEPROM write
  ON: disabled
  OFF*: Enabled

FUSE 2A
CN9
CN8
CN6
CN5
CN4

E0:GLAN ix/type-A (internal)
Maintenance port (internal)

IO1 IO2 IO3 IO4
PWR port
OPT port
USB2.0 Type-A
E1:FLAN

<Bottom side>

OPT port power output selection(solder jumper)
5V
3.3V
JP2a JP2b

Hardware watchdog Timer or CSI selection switch
SW1: Select GPIO44,45
ON*: Watchdog
OFF: CSI(i2c)
*Default

CN6 M.2 B-key Slot
[Signal connection PCIe Gen2x1,USB2.0,SIM]
<Main board>

IO port selection (solder jumper)
I2C pull up
JP5
JP2 Ai1 JP4 Ai3 JP1 Ai0 JP3 Ai2
short: 0-5V short: 0-5V short: 0-5V short: 0-5V
open: 0-10V* open: 0-10V* open: 0-100V* open: 0-10V*

OPT port comm. selection
SW6: i2c/COM select
ON:COM
OFF:i2c
SW5:COM select
ON:RS-485
OFF:RS-232
SW4:COM select
ON:RS-485
OFF:RS-232

BR1225 or CR1225 Battery

Device List

Signal	Device	Port or connection	Comments
E0:GLAN(reserved)	CM4	eth0	10/100Mbps
E1:FLAN	LAN9514i	eth1	i2c0:GPIO0,1
Security IC(option)	ATECC508A	i2c-0/0x60	i2c0:GPIO0,1
RTC	DS3231SN	i2c-0/0x68	i2c0:GPIO0,1
OPT:i2c	CM4/GPIO0,1	i2c-0/---	3-wire, max. 250kbps
OPT:RS-232	MCP2200-I	ttyACM1	2-wire, max. 400kbps
OPT:RS-485	MCP2200-I	ttyACM1	i2c1: GPIO44,45 / when not using WD
CSI:i2c	CM4/GPI44,45	GPIO44,45/i2c-1	MIPI CSI-2 2-lanes
CSI	CM4/CAM1	CAM1	SET0 (SET1: Always High, SET2: Always Low)
WD Enable	MAX6373KA+T	GPIO44/Out	WD
WD Reset	MAX6373KA+T	GPIO45/Out	Photocoupler input DC5V～24V, +/- common compatible
Di0,1	CM4	GPIO16,17	Photorelay output MaxDC48V, 250mA,+/-common compatible
Do0,1	CM4	GPIO18,19	Resolution 12bit, 4ch input, 0-5V/0-2000cnt
Ai0,1,2,3	ADS1015	i2c-3/0x48	FSR = ±2.048 V, single-ended inputs

Note) It may be changed depending on the Raspberry Pi OS side.

Software

The boot device of this unit is the onboard eMMC of CM4. Booting from an SSD is also possible. The microSD slot is not for system boot. Turn on the eMMC write switch, connect the USB cable, and use the rpiboot program to read and write images. In addition, the USB port is only for eMMC write.

USB Type-A
USB Type-C
USB Type-C

- RPi Boot(Windows Installer)
- Win32 DiskImager(read/write image)

eMMC write switch

Dimensions and installation adapter

(Unit: mm)

89
87
132
35
6.2
15.6

Two types of mounting parts options
<DIN rail mount adapter>
35
1.5
132
66
DIN rail

<Wall mount kit>
37.5
99
71.5
21
wall mount kit mounting hole
Φ4.5
96
18
132

Optional accessories

Optional accessories			Part Number
PWR cable	M8 A-code 4-pin female to open end	1m	21348100489010
		2m	21348100489020
E1[FLAN] cable	M8 A-code 4 pin male to RJ45 Plug	1m	72M8M4RM4010LI
		2m	72M8M4RM4020LI
	M8 A-code 4 pin male to RJ45 Jack	0.2m	72T17001449
OPT cablle	M5 4-pin male to open end	1m	72M5M4010G0
		2m	72M5M4020G0
PushPull cable	PushPull USB to standard USB 2.0 Type-A	1m	09454451911
		2m	09454451913
		5m	09454451915
PushPull cover	PushPull protectioncap	Short	09 45 845 0009
		Long	09 45 845 0015
	PushPull easy cover	NBR	72PPCAP01
Dust cap	for M8 Male(PWR)/IP67		72MICA0000033
	for M8 Femal (E1)/IP67		72MICA0000034
	for M5 Female(OPT)/IP67		72MICA0000035
Mount kit	DIN rail mount adapter		20952000004
	wall mount kit		20953000007
Antenna LTE	LTE monopole antenna IP20 SMA screw		72MICA0000254
	LTE flat antenna IP67 mounted on glass or plastic		72MICA0000225
	LTE magnetic mount antenna IP65 mounted magnetically on a metal surface		72MICA0000252
	3-in-1 antenna IP67 GPS+2x4G MIMO mounted on glass or plastic		72MICA0000255

Ordering information

【部品番号】

721RBP1 1 0 0R 3 3 0

1: CM4 IP65 type
R : Wired
W: Wireless
revision number

RAM size [GB]	
1	1
2	2
3	4[standard]
4	8

eMMC size [GB]	
1	8
2	16
3	32[standard]
4	32/SSD128GB
5	32/SSD256GB
6	32/SSD512GB

4,5,6: NVMe fast SSD (Temperature 0-55°C)

Option (OPT) interface	
1	RS-232C[standard]
2	I2C
3	RS-485

Digital Input/Output	
1	Input PNP, Output PNP[standard]

Add-on software	
0	None[standard]
1	CodeSys

Accessory	
0	None[standard]
1	Reserved
L	LTE

⚠ When selecting CodeSys, please use 32bit OS. If you select 64bit, the license key will not be the Raspberry Pi version and you will not be able to use it.

MICA-R4 USB IP20

Picture

Features

- Industrial Raspberry Pi 4 (CM4)
- New processor, up to 2x faster than CM3
- Raspberry Pi OS compatible (Ubuntu requres 4GB or more RAM)
- DC12/24V power input
- Wide operating temperature range and high noise resistance
- M8, M5, ix connectors with high vibration resistance and connection reliability
- Robust aluminum die-cast housing
- Supports wall mount and DIN rail mount
- On-board eMMC (SD card is not used for boot)
- microSD slot for data storage
- M.2 slot inside SSD and WWAN expansion
- Raspi40p connector for expansion board
- Built-in battery backup RTC
- Highly reliable hardware watchdog

Product Specifications

Processor	Broadcom BCM2711, Quad core @ 1.5GHz	
Memory	RAM4GB, eMMC32GB (Depend on model)	
OS	Raspberry Pi OS	
Interface	Front	1x PWR : Power input, 2-line
		2x LAN : FLAN 1ch, GLAN 1ch
		1x OPT*1 : i2c/RS-232/485 selectable
		3x USB : USB2.0 Host Type-A
		1x Maintenance :Maintenance port(reserved)
		[Option]1x WLAN IEEE 802.11 b/g/n/ac, Bluetooth 5.0, BLE
		[Option]1x LTE(M.2 slot/EM7431)
	Back	1x USB-C : USB Type-C(eMMC writing only)
		1x SW : eMMC write switch
		1x microSD : microSD slot
	Internal	1x M.2 slot B-key*2, 1x nanoSIM slot
		1x CSI, 1xGPIO 40p
LED, Button	P: Power status, A0,1: LAN status	
	Pi: User custom/WD error	
RTC/NVRAM	BR1225[or CR1225] Backup RTC	
Watchdog	Built-in hardware watchdog	
Power/	USB:DC10.7V...28.8V/	
Consumption	17.5W(incl.USB 500mAx3)	
Temperature	Operating Temp.: -20...60°C, Storage:-25...85°C	
Humidity	Operating Humi.:0...95%(non-condensing)	
IP grade	IP20	
housing material	Aluminum powder coating	
Dimensions	W132 x D87.1 x H35 mm (excluding protrusions)	
Weight	USB:Approx.560g	
Vibration/shock	IEC 60068-2-6 / IEC 60068-2-27	
EMI	Radiated emissions	EN55016-2-3
EMS	Electrostatic radiation immunity	EN 61000-4-2
	Radio frequency electromagnetic fields	EN 61000-4-3
	Fast transient burst	EN 61000-4-4
Installation method	DIN rail mounting, wall mounting(Option)	

*1 The speed is variable, but Data bit: 8, Parity: N, Stop bit: 1 are fixed.
*2 This is not a full pin connection. USB2.0, PCIe, and SIM are connected.

Details of each part

<Front>

ANT2 ANT1 ANT0 PWR E1[FLAN] CSI slit
OPT
USB1 USB2 Pi LED USB0 A0 LED E0 [GLAN] A1 LED
Maintenance port
P LED

<Back> eMMC write switch microSD slot USB type-C port

Hole for fix barcket Back cover Screw for back cover

Interface

<Connector pin layout>

PWR connector

M8 A-coded 4pin Male

Pin	Col.	Signal
1	BR	24VDC(V1)
2	WH	24VDC(V2)
3	BL	0V(V1)
4	BK	0V(V2)

E0 connector [GLAN]

ix type-A jack

Pin	Signal	
	10/100M	1G
1	TX+	BI_DA+
2	TX-	BI_DA-
3	N.C.	GND
4	N.C.	BI_DC+
5	N.C.	BI_DC-
6	RX+	BI_DB+
7	RX-	BI_DB-
8	N.C.	GND
9	N.C.	BI_DD+
10	N.C.	BI_DD-

E1 connector [FLAN]

M8 A-coded 4pin Female

Pin	Col.	Signal
1	BR	TX+
2	WH	RX+
3	BL	RX-
4	BK	TX-

OPT connector

M5 4pin Female

Pin	Col.	i2c	RS232	RS485
1	BR	3.3V/5V/none*		
2	WH	SCL	TXD	A
3	BL	0V(RS232:SG)		
4	BK	SDA	RXD	B

*1 pin for power output is no output by default.

<LED>

LED	Sts.	Comments
P(GR)	Off	No power supply
	On	Power OK
A0(OR)	Blk	E0 active
A1(OR)	Blk	E1 active
Pi(RD)	Off	WD Normal
	On	WD Error
Pi(GR)	Off	User OFF
	On	User ON

<CSI>[Internal]

FPC connector

No.1

<ANT SMA port> [Option]

Type	ANT2	ANT1	ANT0
Wired LAN	---	---	---
Wired LAN+LTE	Main	GNSS	Aux
Wired LAN+Wireless LAN	WL/BT	---	---
Wired LAN+Wireless LAN+LTE	Main	GNSS	WL/BT

Pin	Signal	Pin	Signal
1	GND	9	CAM1_C_P
2	CAM1_D0_N	10	GND
3	CAM1_D0_P	11	CAM_GPIO
4	GND	12	NC
5	CAM1_D1_N	13	I2C1_SCL[GPIO45]
6	CAM1_D1_P	14	I2C2_SDA[GPIO44]
7	GND	15	3.3V
8	CAM1_C_N	16-30	NC

<GPIO>[Internal]
RasPi GPIO40pin (same layout as Raspberry Pi 40pin BM40B-SRDS-G-TF)

⚠ The GPIOs of CM4 are 3.3V level. The total GPIO load is up to 50mA. For detailed specifications, please check the CM4 datasheet.

Confirmed Devices [Reference]

This is confirmation with the factory default image.
It depends on customer's software environment.

M.2 SSD	TS128GMTE452T, 256,512G model [0-70°C]/Transcend
	TS128GMTE452T-I, 256,512G model [-40 to 85°C]/Transcend
	TS128GMTE452T2, 256,512G model [-20 to 75°C]/Transcend
M.2 WWAN	EM7431, EM7430 /Sierra Wireless
USB Wifi	T2U Nano/TP-LINK company
Wifi	LM808/LM technologies
CSI Camera	Raspberry Pi Camera Module 2, Camera Module 2 NoIR
	Raspberry Pi High Quality Camera
	Raspberry Pi Camera Module 3/ Raspberry Pi Foundation

MICA-R4 USB IP20

Internal datails

<Top side>

USB Type-C
microSD Slot
SW2:eMMC write SW
ON:eMMC write mode
OFF*operation mode
<Main board>
CN10
nanoSIM Slot (to M.2)
CN7

CN2: gold pad
U.FL connector
CN3A

Expansion board USB connection
CN6
CN3B

CN1
CN13

SW3:Protect SW
- **1: Watchdog** ON:Enabled OFF*: Disabled
- **2: Wi-Fi** ON: turn off OFF: turn on
- **3: Bluetooth** ON: turn off OFF: turn on
- **4: EEPROM write** ON: disabled OFF*: Enabled
SW3

CN9
CN8
CN5
CN4

Maintenance port (internal)
CSI

USB2.0 Type-A
PWR port

USB2.0 Type-A
OPT port

USB2.0 Type-A

E0:GLAN ix Industrial /type-A
E1:FLAN

Raspberry Pi camera module

<Bottom side>

OPT port power output selection(solder jumper)
5V 3.3V
JP2a

CN6 M.2 B-key Slot [Signal connection PCIe Gen2x1,USB2.0,SIM]

Hardware watchdog Timer or CSI selection switch
SW1: Select GPIO44,45
ON*: Watchdog
OFF: CSI(i2c)
*Default

OPT port comm. selection
SW6: i2c/COM select
ON:COM
OFF:i2c
SW5:COM select
ON:RS-485
OFF:RS-232
SW4:COM select
ON:RS-485
OFF:RS-232

BR1225 or CR1225 Battery

<Main board>

Device List

Signal	Device	Port or connection	Comments
E0:GLAN	CM4	eth0	10/100/1000Mbps
E1:FLAN	LAN9514i	eth1	10/100Mbps
Security IC (option)	ATECC508A	i2c-0/0x60	i2c0: GPIO0,1
RTC	DS3231SN	i2c-0/0x68	i2c0: GPIO0,1
OPT:i2c	CM4/GPIO0,1	i2c-0/---	i2c0: GPIO0,1
OPT:RS-232	MCP2200-I	ttyACM0	3-wire, max. 250kbps
OPT:RS-485	MCP2200-I	ttyACM0	2-wire, max. 400kbps
CSI:i2c	CM4/GPI44,45	GPIO44,45/i2c-1	i2c1: GPIO44,45 / when not using WD
CSI	CM4/CAM1	CAM1	MIPI CSI-2 2-lanes
WD Enable	MAX6373KA+T	GPIO44/Out	SET0 (SET1: Always High, SET2: Always Low)
WD Reset	MAX6373KA+T	GPIO45/Out	WDI

Note) It may be changed depending on the Raspberry Pi OS side.

Watchdog (WD) timer and CSI connection
SW1: Watchdog or CSI can be switched by selecting GPIO44,45. Watchdog (WD) and CSI cannot be used at the same time. When WD is selected, GPIO44 and 45 are for WD operation. In addition, when SW3: No.1 of protection SW is off, the reset is forcibly disabled. When CSI is selected, GPIO44 and 45 are used as i2c for CSI.

Software

The CM4's onboard eMMC will be the boot device for this unit. Booting from an SSD is also possible. microSD slot is not for system boot. Turn on the eMMC write switch, connect the USB cable, and use the rpiboot program to read and write images. In addition, this The USB port is an eMMC write-only port.

USB Type-A
USB Type-C
USB Type-C

eMMC write switch

- RPi Boot(Windows Installer)
- Win32 DiskImager(read/write image)

Dimensions and installation adapter

(Unit: mm)

87
132
35
6.2
9.8
8

HARTING

USB1 USB2 USB3

Two types of mounting parts options
<DIN rail mount adapter>
35
1.5
132
66
DIN rail
Φ4.5

<Wall mount kit>
37.5
99
21
71.5
wall mount kit mounting hole
96
18
132

Optional accessories

Optional accessories				Part Number
PWR cable	M8 A-code 4-pin female to open end		1m	21348100489010
			2m	21348100489020
E1[FLAN] cable	M8 A-code 4 pin male to RJ45 Plug		1m	72M8M4RM4010LI
			2m	72M8M4RM4020LI
		to RJ45 Jack	0.2m	72T17001449
OPT cable	M5 4-pin male to open end		1m	72M5M4010G0
			2m	72M5M4020G0
E0[GLAN] ix cable	ix plug to	to RJ45 Plug	1m	33480653830010
			2m	33480653830020
		to RJ45 Jack	0.2m	72T17001450IX
Mount kit	DIN rail mount adapter			20952000004
	wall mount kit			20953000007
Antenna fot LTE	LTE monopole antenna IP20 SMA screw			72MICA0000254
	LTE flat antenna IP67 mounted on glass or plastic			72MICA0000225
	LTE magnetic mount antenna IP65 mounted magnetically on a metal surface			72MICA0000252
	3-in-1 antenna IP67 GPS+2x4G MIMO mounted on glass or plastic			72MICA0000255

Ordering information

2: CM4 IP20 type
R : Wired
W : WiFi/Bluetooth
revision number

[Part Number] **722RUB1 0 0 0R3 3 0** IP20 USB model

RAM size [GB]	
1	1
2	2
3	4[standard]
4	8

eMMC size [GB]	
1	8
2	16
3	32[standard]
4	32/SSD128GB
5	32/SSD256GB
6	32/SSD512GB

4,5,6: NVMe fast SSD (Temperature 0-55°C)

Option (OPT) interface	
1	RS-232C[standard]
2	I2C
3	RS-485

Expansion interface	
0	None

Add-on software	
0	None[standard]
1	CodeSys

Accessory	
0	None[standard]
1	Reserved
L	LTE

⚠ When selecting CodeSys, please use 32bit OS. If you select 64bit, the license key will not be the Raspberry Pi version and you will not be able to use it.

MICA-R4 USB IP65

Picture

Features

- Industrial Raspberry Pi 4
- New processor, up to 2x faster than CM3
- Raspberry Pi OS compatible(Ubuntu require RAM4G or more)
- DC12/24V power input
- Wide operating temperature range and high noise resistance
- M8, M5 connectors with high vibration resistance and connection reliability
- Robust aluminum die-cast housing
- Supports wall mount and DIN rail mount
- On-board eMMC (SD card is not used for boot)
- microSD slot for data storage
- M.2 slot inside SSD expansion
- Raspi40p connector for expansion board
- Built-in battery backup RTC
- Highly reliable hardware watchdog

Product Specifications

Processor		Broadcom BCM2711, Quad core @ 1.5GHz
Memory		RAM4GB, eMMC32GB (Depend on model)
OS		Raspberry Pi OS
Interface	Front	1x PWR : Power input, 2-line 1x LAN : FLAN 1ch 1x OPT*1 : i2c/RS-232/485 selectable 3x USB : PushPull USB2.0 Host Type-A
	Back	1x USB-C : USB Type-C(eMMC writing only) 1x SW : eMMC write switch 1x microSD : microSD slot
	Internal	1x M.2 slot B-key*2, 1x nanoSIM slot 1x CSI, 1xGPIO 40p
LED, Button		P: Power status, A1: LAN status Pi: User custom/WD error
RTC/NVRAM		BR1225[or CR1225] Backup RTC
Watchdog		Built-in hardware watchdog
Power/ Consumption		USB: DC10.7V...28.8V/17.5W(incl. USB 500mAx3)
Temperature		Operating Temp.:-20...60°C, Storage:-25...85°C
Humidity		Operating Humi.:0〜95%(non-condensing)
IP grade		IP65
housing material		Aluminum powder coating
Dimensions		W132 x D89x H35 mm (excluding protrusions)
Weight		USB: Approx.570g
Vibration/shock		IEC 60068-2-6 / IEC 60068-2-27
EMI		Radiated emissions EN55016-2-3
EMS		Electrostatic radiation immunity EN 61000-4-2
		Radio frequency electromagnetic fields EN 61000-4-3
		Fast transient burst EN 61000-4-4
Installation method		DIN rail mounting, wall mounting(Option)

*1 The speed is variable, but Data bit: 8, Parity: N, Stop bit: 1 are fixed.

*2 This is not a full pin connection. USB2.0, PCIe, and SIM are connected.

Interface

<Connector pin layout>

PWR connector

Pin	Col.	Signal
1	BR	24VDC(V1)
2	WH	24VDC(V2)
3	BL	0V(V1)
4	BK	0V(V2)

M8 A-coded 4pin Male

OPT connector

M5 4pin Female

Pin	Col.	i2c	RS232	RS485
1	BR	3.3V/5V/none*		
2	WH	SCL	TXD	A
3	BL	0V(RS232:SG)		
4	BK	SDA	RXD	B

*1 pin for power output is no output by default.

E1 connector
[FLAN]

Pin	Col.	Signal
1	BR	TX+
2	WH	RX+
3	BL	RX-
4	BK	TX-

M8 A-coded 4pin Female

<LED>

LED	Sts.	Comments
P(GR)	Off	No power supply
	On	Power OK
A0(OR)	Blk	E0 active
A1(OR)	Blk	E1 active
Pi(RD)	Off	WD Normal
	On	WD Error
Pi(GR)	Off	User OFF
	On	User ON

<CSI>[Internal]

FPC connector

No.1

Pin	Signal	Pin	Signal
1	GND	9	CAM1_C_P
2	CAM1_D0_N	10	GND
3	CAM1_D0_P	11	CAM_GPIO
4	GND	12	NC
5	CAM1_D1_N	13	I2C1_SCL[GPIO45]
6	CAM1_D1_P	14	I2C2_SDA[GPIO44]
7	GND	15	3.3V
8	CAM1_C_N	16-30	NC

<GPIO>[Internal]

RasPi GPIO40pin (same layout as Raspberry Pi 40pin BM40B-SRDS-G-TF)

⚠ The GPIOs of CM4 are 3.3V level.

The total GPIO load is up to 50mA. For detailed specifications, please check the CM4 datasheet.

Details of each part

<Front>

USB1 USB2 Pi LED USB0
PWR E1[FLAN] OPT
P LED
A1 LED

<Back>

eMMC write switch   microSD slot   USB type-C port

Hole for fix barcket   Back cover   Screw for back cover

Confirmed Devices [Reference]

This is confirmation with the factory default image.
It depends on customer's software environment.

M.2 SSD	TS128GMTE452T, 256,512G model [0-70°C]/Transcend
	TS128GMTE452T-I, 256,512G model [-40 to 85°C]/Transcend
	TS128GMTE452T2, 256,512G model [-20 to 75°C]/Transcend
M.2 WWAN	EM7431, EM7430 /Sierra Wireless
USB Wifi	T2U Nano/TP-LINK company
Wifi	LM808/LM technologies
CSI Camera	Raspberry Pi Camera Module 2, Camera Module 2 NoIR
	Raspberry Pi High Quality Camera
	Raspberry Pi Camera Module 3/ Raspberry Pi Foundation

All data given are in line with the actual state of art and therefore not binding.
HARTING reserves the right to modify designs without giving the relevant reasons.

MICA-R4 USB IP65

Internal datails
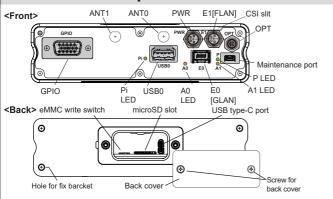
\<Top side\>

USB Type-C
microSD Slot

SW2:eMMC write SW
ON:eMMC write mode
OFF*operation mode

\<Main board\>

CN10

CN7
nanoSIM Slot (to M.2)

U.FL connector

CN3A
CN3B

SW3:Protect SW
1: Watchdog
ON: Enabled
OFF*: Disabled
2: Wi-Fi
ON: turn off
OFF: turn on
3: Bluetooth
ON: turn off
OFF: turn on
4: EEPROM write
ON: disabled
OFF*: Enabled

CN1
CSI
SW3

CN8
CN9
CN5
CN4

E0:GLAN ix/type-A (internal)
Maintenance port (internal)

USB2.0 Type-A
PWR port

USB2.0 Type-A
OPT port

USB2.0 Type-A

E1:FLAN

\<Bottom side\>

OPT port power output selection(solder jumper)
5V
3.3V

CN6 M.2 B-key Slot
[Signal connection PCIe Gen2x1 ,USB2.0,SIM]

Hardware watchdog Timer or CSI selection switch
SW1: Select GPIO44,45
ON*: Watchdog
OFF: CSI(i2c)
*Default

OPT port comm. selection
SW6: i2c/COM select
ON:COM
OFF:i2c
SW5:COM select
ON:RS-485
OFF:RS-232
SW4:COM select
ON:RS-485
OFF:RS-232

\<Main board\>

BR1225 or CR1225 Battery

Device List

Signal	Device	Port or connection	Comments
E0:GLAN	CM4	eth0	10/100/1000Mbps
E1:FLAN	LAN9514i	eth1	10/100Mbps
Security IC (option)	ATECC508A	i2c-0/0x60	i2c0: GPIO0,1
RTC	DS3231SN	i2c-0/0x68	i2c0: GPIO0,1
OPT:i2c	CM4/GPIO0,1	i2c-0/---	i2c0: GPIO0,1
OPT:RS-232	MCP2200-I	ttyACM0	3-wire, max. 250kbps
OPT:RS-485	MCP2200-I	ttyACM0	2-wire, max. 400kbps
CSI:i2c	CM4/GPI44,45	GPIO44,45/i2c-1	i2c1: GPIO44,45 / when not using WD
CSI	CM4/CAM1	CAM1	MIPI CSI-2 2-lanes
WD Enable	MAX6373KA+T	GPIO44/Out	SET0 (SET1: Always High, SET2: Always Low)
WD Reset	MAX6373KA+T	GPIO45/Out	WDI

Note) It may be changed depending on the Raspberry Pi OS side.

Watchdog (WD) timer and CSI connection
SW1: Watchdog or CSI can be switched by selecting GPIO44,45. Watchdog (WD) and CSI cannot be used at the same time. When WD is selected, GPIO44 and 45 are for WD operation. In addition, when SW3: No.1 of protection SW is off, the reset is forcibly disabled. When CSI is selected, GPIO44 and 45 are used as i2c for CSI.

Software

The CM4's onboard eMMC will be the boot device for this unit. Booting from an SSD is also possible. microSD slot is not for system boot. Turn on the eMMC write switch, connect the USB cable, and use the rpiboot program to read and write images. In addition, this The USB port is an eMMC write-only port.

USB Type-A
USB Type-C
USB Type-C

eMMC write switch

- RPi Boot(Windows Installer)
- Win32 DiskImager(read/write image)

Dimensions and installation adapter

(Unit: mm)

89
87
132
35
15.4
6.2
9.8

HARTING

USB1 USB2 USB3 PWR

Two types of mounting parts options
\<DIN rail mount adapter\>

35
1.5
132
66
DIN rail

\<Wall mount kit\>

37.5
99
21
71.5
wall mount kit mounting hole
96
18
Φ4.5
132

Optional accessories

Optional accessories			Part Number
PWR cable	M8 A-code 4-pin female to open end	1m	21348100489010
		2m	21348100489020
E1[FLAN] cable	M8 A-code 4 pin male to RJ45 Plug	1m	72M8M4RM4010LI
		2m	72M8M4RM4020LI
	M8 A-code 4 pin male to RJ45 Jack	0.2m	72T17001449
OPT cablle	M5 4-pin male to open end	1m	72M5M4010G0
		2m	72M5M4020G0
PushPull cable	PushPull USB to standard USB 2.0 Type-A	1m	09454451911
		2m	09454451913
		5m	09454451915
PushPull cover	PushPull protectioncap	Short	09 45 845 0009
		Long	09 45 845 0015
	PushPull easy cover	NBR	72PPCAP01
Dust cap	for M8 Male(PWR)/IP67		72MICA0000033
	for M8 Femal (E1)/IP67		72MICA0000034
	for M5 Female(OPT)/IP67		72MICA0000035
Mount kit	DIN rail mount adapter		20952000004
	wall mount kit		20953000007
Antenna LTE	LTE monopole antenna IP20 SMA screw		72MICA0000254
	LTE flat antenna IP67 mounted on glass or plastic		72MICA0000225
	LTE magnetic mount antenna IP65 mounted magnetically on a metal surface		72MICA0000252
	3-in-1 antenna IP67 GPS+2x4G MIMO mounted on glass or plastic		72MICA0000255

Ordering information

1: CM4 IP65 type
R : Wired
revision number

[Part Number] 721RUB1 0 0 0R 3 3 0 IP65 USB model

RAM size [GB]	
1	1
2	2
3	4[standard]
4	8

eMMC size [GB]	
1	8
2	16
3	32[standard]
4	32/SSD128GB
5	32/SSD256GB
6	32/SSD512GB

4,5,6: NVMe fast SSD (Temperature 0-55°C)

Option (OPT) interface	
1	RS-232C[standard]
2	I2C
3	RS-485

Expansion interface	
0	None

⚠ When selecting CodeSys, please use 32bit OS. If you select 64bit, the license key will not be the Raspberry Pi version and you will not be able to use it.

Add-on software	
0	None[standard]
1	CodeSys

Accessory	
0	None[standard]
1	Reserved
L	LTE[not select]

All data given are in line with the actual state of art and therefore not binding.
HARTING reserves the right to modify designs without giving the relevant reasons.

MICA-R4 GPIO IP20

Picture

Features

- Industrial Raspberry Pi 4 (CM4)
- New processor, up to 2x faster than CM3
- Raspberry Pi OS compatible (Ubuntu requres 4GB or more RAM)
- DC12/24V power input
- Wide operating temperature range and high noise resistance
- M8, M5, ix connectors with high vibration resistance and connection reliability
- Robust aluminum die-cast housing
- Supports wall mount and DIN rail mount
- On-board eMMC does not use SD memory for boot
- microSD slot for data storage
- Internal M.2 slot for SSD and WWAN expansion
- Raspi40p connector for expansion board
- Built-in battery backup RTC
- Highly reliable hardware watchdog

Product Specifications

Processor		Broadcom BCM2711, Quad core @ 1.5GHz
Memory		RAM4GB, eMMC32GB (Depend on model)
OS		Raspberry Pi OS
Interface	Front	1x PWR : Power input, 2-line
		2x LAN : FLAN 1ch, GLAN 1ch
		1x OPT*1 : i2c/RS-232/485 selectable
		1x USB : USB2.0 Host Type-A
		1x GPIO : D-SUB15p GPIO12ch, GND,3.3V,5V
		[Option]1x WLAN IEEE 802.11 b/g/n/ac
		Bluetooth 5.0, BLE
		[Option]1x LTE(M.2 slot/EM7431)
	Back	1x USB-C : USB Type-C(eMMC writing only)
		1x SW : eMMC write switch
		1x microSD : microSD slot
	Internal	1x M.2 slot B-key*2, 1x nanoSIM slot
		1x CSI, 1xGPIO 40p
LED, Button		P: Power status, A0,1: LAN status
		Pi: User custom/WD error
RTC/NVRAM		BR1225[or CR1225] Backup RTC
Watchdog		Built-in hardware watchdog
Power/ Consumption		GPIO:DC10.7V...28.8V/ 12W(incl. USB 500mAx1)
Temperature		Operating Temp.: -20～60°C, Storage:-25～85°C
Humidity		Operating Humi.:0～95%(non-condensing)
IP grade		IP20
housing material		Aluminum powder coating
Dimensions		W132 x D87 x H35 mm (excluding protrusions)
Weight		GPIO:Approx.550g
Vibration/shock		IEC 60068-2-6 / IEC 60068-2-27
EMI		Radiated emissions EN55016-2-3
EMS		Electrostatic radiation immunity EN 61000-4-2
		Radio frequency electromagnetic fields EN 61000-4-3
		Fast transient burst EN 61000-4-4
Installation method		DIN rail mounting, wall mounting(Option)

*1 The speed is variable, but Data bit: 8, Parity: N, Stop bit: 1 are fixed.
*2 This is not a full pin connection. USB2.0, PCIe, and SIM are connected.

Details of each part

<Front>

ANT1 ANT0 PWR E1[FLAN] CSI slit
OPT
GPIO
Pi LED USB0 A0 LED E0[GLAN] Maintenance port
P LED
GPIO Pi LED USB0 LED A0 LED E0 LED[GLAN] A1 LED

<Back> eMMC write switch   microSD slot   USB type-C port

Hole for fix barcket Back cover Screw for back cover

Interface

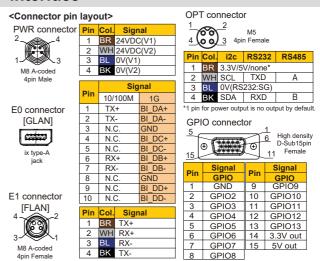### <Connector pin layout>

PWR connector

M8 A-coded 4pin Male

Pin	Col.	Signal
1	BR	24VDC(V1)
2	WH	24VDC(V2)
3	BL	0V(V1)
4	BK	0V(V2)

E0 connector [GLAN]

ix type-A jack

Pin	Signal	
	10/100M	1G
1	TX+	BI_DA+
2	TX-	BI_DA-
3	N.C.	GND
4	N.C.	BI_DC+
5	N.C.	BI_DC-
6	RX+	BI_DB+
7	RX-	BI_DB-
8	N.C.	GND
9	N.C.	BI_DD+
10	N.C.	BI_DD-

E1 connector [FLAN]

M8 A-coded 4pin Female

Pin	Col.	Signal
1	BR	TX+
2	WH	RX+
3	BL	RX-
4	BK	TX-

OPT connector

M5 4pin Female

Pin	Col.	i2c	RS232	RS485
1	BR	3.3V/5V/none*1		
2	WH	SCL	TXD	A
3	BL	0V(RS232:SG)		
4	BK	SDA	RXD	B

*1 pin for power output is no output by default.

GPIO connector

High density D-Sub15pin Female

Pin	Signal GPIO	Pin	Signal GPIO
1	GND	9	GPIO9
2	GPIO2	10	GPIO10
3	GPIO3	11	GPIO11
4	GPIO4	12	GPIO12
5	GPIO5	13	GPIO13
6	GPIO6	14	3.3V out
7	GPIO7	15	5V out
8	GPIO8		

<LED>

LED	Sts.	Comments
P(GR)	Off	No power supply
	On	Power OK
A0(OR)	Blk	E0 active
A1(OR)	Blk	E1 active
Pi(RD)	Off	WD Normal
	On	WD Error
Pi(GR)	Off	User OFF
	On	User ON

<ANT SMA port> [Option]

Type	ANT2	ANT1	ANT0
Wired LAN	---	---	---
Wired LAN+LTE	---	Main	GNSS
Wired LAN+Wireless LAN	---	WL/BT	---
Wired LAN+Wireless LAN+LTE	---	Main	WL/BT

<CSI>[Internal]

FPC connector

No.1

Pin	Signal	Pin	Signal
1	GND	9	CAM1_C_P
2	CAM1_D0_N	10	GND
3	CAM1_D0_P	11	CAM_GPIO
4	GND	12	NC
5	CAM1_D1_N	13	I2C1_SCL[GPIO45]
6	CAM1_D1_P	14	I2C2_SDA[GPIO44]
7	GND	15	3.3V
8	CAM1_C_N	16-30	NC

<GPIO>[Internal]

RasPi GPIO40pin (same layout as Raspberry Pi 40pin BM40B-SRDS-G-TF)

		Pin		Pin		
D-sub15p-14	3.3V	1	○ ○	2	5V	D-sub15p-15
D-sub15p-2	GPIO2	3	○ ○	4	5V	
D-sub15p-3	GPIO3	5	○ ○	6	Ground	D-sub15p-1
D-sub15p-4	GPIO4	7	○ ○	8	GPIO14	
	Ground	9	○ ○	10	GPIO15	
	GPIO17	11	○ ○	12	GPIO18	
	GPIO27	13	○ ○	14	Ground	
	GPIO22	15	○ ○	16	GPIO23	
	3.3V	17	○ ○	18	GPIO24	
D-sub15p-10	GPIO10	19	○ ○	20	Ground	
D-sub15p-9	GPIO9	21	○ ○	22	GPIO25	
D-sub15p-11	GPIO11	23	○ ○	24	GPIO8	D-sub15p-8
	Ground	25	○ ○	26	GPIO7	D-sub15p-7
	ID_SD	27	○ ○	28	ID_SC	
D-sub15p-5	GPIO5	29	○ ○	30	Ground	
D-sub15p-6	GPIO6	31	○ ○	32	GPIO12	D-sub15p-12
D-sub15p-13	GPIO13	33	○ ○	34	Ground	
	GPIO19	35	○ ○	36	GPIO16	
	GPIO26	37	○ ○	38	GPIO20	
	Ground	39	○ ○	40	GPIO21	

: System Reserved (GPIO connector)
: System Reserved (SD connection)

⚠ The GPIOs of CM4 are 3.3V level.The total GPIO load is up to 50mA.
For detailed specifications, please refer to the CM4 datasheet.

All data given are in line with the actual state of art and therefore not binding.
HARTING reserves the right to modify designs without giving the relevant reasons.

MICA-R4 GPIO IP20

Internal datails

\<Top side\>

USB Type-C
microSD Slot
SW2:eMMC write SW
- ON
ON:eMMC write mode
OFF*operation mode
\<Main board\>

GND
VDD(OUT)
VBUS
D-
GND
U.FL connector
CN3A
CN10
CN7
nanoSIM Slot (to M.2)

GND
GPIO12

CN1

CN3B

CN13

SW3:Protect SW
1: Watchdog
ON: Enabled
OFF*: Disabled
2: Wi-Fi
ON: turn off
OFF: turn on
3: Bluetooth
ON: turn off
OFF: turn on
4: EEPROM write
ON: disabled
OFF*: Enabled

SW3

CN8
CN9
CN5
CN4
Maintenance port (internal)
CSI

GPIO Connection

GPIO D-SUB15p Female
PWR port
OPT port
USB2.0 Type-A
E1:FLAN
E0:GLAN ix Industrial /type-A
Raspberry Pi camera module

\<Bottom side\>

OPT port power output selection(solder jumper)
5V
3.3V

CN6 M.2 B-key Slot
[Signal connection PCIe Gen2x1,USB2.0,SIM]

Hardware watchdog Timer or CSI selection switch
SW1: Select GPIO44,45
ON*: Watchdog
OFF: CSI(i2c)
1 ON
*Default

OPT port comm. selection
SW6: i2c/COM select
ON:COM
OFF:i2c
1 ON
SW5:COM select
ON:RS-485
OFF:RS-232
1 ON
SW4:COM select
ON:RS-485
OFF:RS-232
1 ON

BR1225 or CR1225 Battery

\<Main board\>

Device List

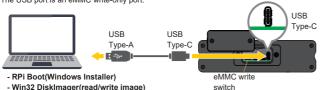| Signal	Device	Port or connection	Comments
E0:GLAN	CM4	eth0	10/100/1000Mbps
E1:FLAN	LAN9514i	eth1	10/100Mbps
Security IC (option)	ATECC508A	i2c-0/0x60	i2c0: GPIO0,1
RTC	DS3231SN	i2c-0/0x68	i2c0: GPIO0,1
OPT:i2c	CM4/GPIO0,1	i2c-0/---	i2c0: GPIO0,1
OPT:RS-232	MCP2200-I	ttyACM0	3-wire, max. 250kbps
OPT:RS-485	MCP2200-I	ttyACM0	2-wire, max. 400kbps
CSI:i2c	CM4/GPI44,45	GPIO44,45/i2c-1	i2c1: GPIO44,45 / when not using WD
CSI	CM4/CAM1	CAM1	MIPI CSI-2 2-lanes
WD Enable	MAX6373KA+T	GPIO44/Out	SET0 (SET1: Always High, SET2: Always Low)
WD Reset	MAX6373KA+T	GPIO45/Out	WDI

Note) It may be changed depending on the Raspberry Pi OS side.

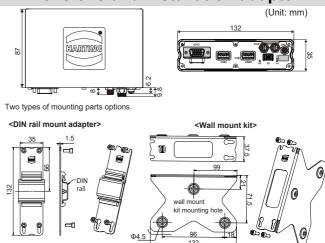**Watchdog (WD) timer and CSI connection**
SW1: Watchdog or CSI can be switched by selecting GPIO44,45. Watchdog (WD) and CSI cannot be used at the same time. When WD is selected, GPIO44 and 45 are for WD operation. In addition, when SW3: No.1 of protection SW is off, the reset is forcibly disabled. When CSI is selected, GPIO44 and 45 are used as i2c for CSI.

Software

The boot device of this unit is the onboard eMMC of CM4. Booting from an SSD is also possible. The microSD slot is not for system boot. Turn on the eMMC write switch, connect the USB cable, and use the rpiboot program to read and write images. In addition, the USB port is only for eMMC write.

USB Type-A
USB Type-C
USB Type-C

- RPi Boot(Windows Installer)
- Win32 DiskImager(read/write image)

eMMC write switch

Dimensions and installation adapter

(Unit: mm)

87
HARTING
8
6.2
9.8

132
GPIO
PWR
35

Two types of mounting parts options
\<DIN rail mount adapter\>

35
1.5
132
66
DIN rail

\<Wall mount kit\>

37.5
99
21
71.5
wall mount kit mounting hole
Φ4.5
96
18
132

Optional accessories

Optional accessories			Part Number
PWR cable	M8 A-code 4-pin female to open end	1m	21348100489010
		2m	21348100489020
E1[FLAN] cable	M8 A-code 4 pin male to RJ45 Plug	1m	72M8M4RM4010LI
		2m	72M8M4RM4020LI
	to RJ45 Jack	0.2m	72T17001449
OPT cable	M5 4-pin male to open end	1m	72M5M4010G0
		2m	72M5M4020G0
E0[GLAN] ix cable	ix plug to to RJ45 Plug	1m	33480653830010
		2m	33480653830020
	to RJ45 Jack	0.2m	72T17001450IX
Mount kit	DIN rail mount adapter		20952000004
	wall mount kit		20953000007
Antenna fot LTE	LTE monopole antenna IP20 SMA screw		72MICA0000254
	LTE flat antenna IP67 mounted on glass or plastic		72MICA0000225
	LTE magnetic mount antenna IP65 mounted magnetically on a metal surface		72MICA0000252
	3-in-1 antenna IP67 GPS+2x4G MIMO mounted on glass or plastic		72MICA0000255

Confirmed Devices [Reference]

This is confirmation with the factory default image.
It depends on customer's software environment.

M.2 SSD	TS128GMTE452T, 256,512G model [0-70°C]/Transcend
	TS128GMTE452T-I, 256,512G model [-40 to 85°C]/Transcend
	TS128GMTE452T2, 256,512G model [-20 to 75°C]/Transcend
M.2 WWAN	EM7431, EM7430 /Sierra Wireless
USB Wifi	T2U Nano/TP-LINK company
Wifi	LM808/LM technologies
CSI Camera	Raspberry Pi Camera Module 2, Camera Module 2 NoIR
	Raspberry Pi High Quality Camera
	Raspberry Pi Camera Module 3/ Raspberry Pi Foundation

Ordering information

2: CM4 IP20 type
R : Wired
W : WiFi/Bluetooth
revision number
[Part Number]**722RUG1 0 0 0R3 3 0** GPIO model

RAM size [GB]	
1	1
2	2
3	4[standard]
4	8

eMMC size [GB]	
1	8
2	16
3	32[standard]
4	32/SSD128GB
5	32/SSD256GB
6	32/SSD512GB

4,5,6: NVMe fast SSD (Temperature 0-55°C)

Option (OPT) interface	
1	RS-232C[standard]
2	I2C
3	RS-485

Expansion interface	
0	None

When selecting CodeSys, please use 32bit OS. If you select 64bit, the license key will not be the Raspberry Pi version and you will not be able to use it.

Add-on software	
0	None[standard]
1	CodeSys

Accessory	
0	None[standard]
1	Reserved
L	LTE

MICA-R4 USB GPIO IP20

HARTING

Picture

Features

- Industrial Raspberry Pi 4 (CM4)
- New processor, up to 2x faster than CM3
- Raspberry Pi OS compatible(Ubuntu require RAM4G or more)
- DC12/24V power input
- Wide operating temperature range and high noise resistance
- M8, M5, ix connectors with high vibration resistance and connection reliability
- Robust aluminum die-cast housing
- Supports wall mount and DIN rail mount
- On-board eMMC (SD card is not used for boot)
- microSD slot for data storage
- M.2 slot inside SSD and WWAN expansion
- Raspi40p connector for expansion board
- Built-in battery backup RTC
- Highly reliable hardware watchdog

Product Specifications

Processor		Broadcom BCM2711, Quad core @ 1.5GHz
Memory		RAM4GB, eMMC32GB (Depend on model)
OS		Raspberry Pi OS
Interface	Front	1x PWR :Power input, 2-line 2x LAN : FLAN 1ch, GLAN 1ch 1x OPT*1 : i2c/RS-232/485 selectable 2 x USB : USB2.0 Host Type-A 1x GPIO : D-SUB15p GPIO12ch, GND,3.3V,5V [Option]1x WLAN IEEE 802.11 b/g/n/ac Bluetooth 5.0, BLE [Option]1x LTE(M.2 slot/EM7431)
	Back	1x USB-C : USB Type-C(eMMC writing only) 1x SW : eMMC write switch 1x microSD : microSD slot
	Internal	1x M.2 slot B-key*2, 1anox microSIM slot 1x CSI, 1xGPIO 40p
LED, Button		P: Power status, A0,1: LAN status Pi: User custom/WD error
RTC/NVRAM		BR1225[or CR1225] Backup RTC
Watchdog		Built-in hardware watchdog
Power/ Consumption		USB/GPIO:DC10.7V...28.8V/ 15W(incl. USB 500mAx2)
Temperature		Operating Temp.: -20～60°C, Storage:-25～85°C
Humidity		Operating Humi.:0～95%(non-condensing)
IP grade		IP20
housing material		Aluminum powder coating
Dimensions		W132 x D87 x H35 mm (excluding protrusions)
Weight		USB/GPIO: Approx.570g
Vibration/shock		IEC 60068-2-6 / IEC 60068-2-27
EMI	Radiated emissions	EN55016-2-3
EMS	Electrostatic radiation immunity	EN 61000-4-2
	Radio frequency electromagnetic fields	EN 61000-4-3
	Fast transient burst	EN 61000-4-4
Installation method		DIN rail mounting, wall mounting(Option)

*1 The speed is variable, but Data bit: 8, Parity: N, Stop bit: 1 are fixed.
*2 This is not a full pin connection. USB2.0, PCIe, and SIM are connected.

Details of each part

<Front>

ANT1   ANT0   PWR   E1[FLAN]   CSI slit
                                          OPT
GPIO   USB1   Pi   USB0   A0   E0   A1 LED
              LED   LED [GLAN]
                                          Maintenance port
                                          P LED

<Back>   eMMC write switch   microSD slot   USB type-C port

Hole for fix barcket   Back cover   Screw for back cover

Interface

<Connector pin layout>

PWR connector

M8 A-coded 4pin Male

Pin	Col.	Signal
1	BR	24VDC(V1)
2	WH	24VDC(V2)
3	BL	0V(V1)
4	BK	0V(V2)

E0 connector [GLAN]

ix type-A jack

Pin	Signal	
	10/100M	1G
1	TX+	BI_DA+
2	TX-	BI_DA-
3	N.C.	GND
4	N.C.	BI_DC+
5	N.C.	BI_DC-
6	RX+	BI_DB+
7	RX-	BI_DB-
8	N.C.	GND
9	N.C.	BI_DD+
10	N.C.	BI_DD-

E1 connector [FLAN]

M8 A-coded 4pin Female

Pin	Col.	Signal
1	BR	TX+
2	WH	RX+
3	BL	RX-
4	BK	TX-

OPT connector

M5 4pin Female

Pin	Col.	i2c	RS232	RS485
1	BR	3.3V/5V/none*		
2	WH	SCL	TXD	A
3	BL	0V(RS232:SG)		
4	BK	SDA	RXD	B

*1 pin for power output is no output by default.

GPIO connector

High density D-Sub15pin Female

Pin	Signal GPIO	Pin	Signal GPIO
1	GND	9	GPIO9
2	GPIO2	10	GPIO10
3	GPIO3	11	GPIO11
4	GPIO4	12	GPIO12
5	GPIO5	13	GPIO13
6	GPIO6	14	3.3V out
7	GPIO7	15	5V out
8	GPIO8		

<LED>

LED	Sts.	Comments
P(GR)	Off	No power supply
	On	Power OK
A0(OR)	Blk	E0 active
A1(OR)	Blk	E1 active
Pi(RD)	Off	WD Normal
	On	WD Error
Pi(GR)	Off	User OFF
	On	User ON

<ANT SMA port> [Option]

Type	ANT2	ANT1	ANT0
Wired LAN	---	---	---
Wired LAN+LTE	---	Main	GNSS
Wired LAN+Wireless LAN	---	WL/BT	---
Wired LAN+Wireless LAN+LTE	---	Main	WL/BT

<CSI>[Internal]

FPC connector

No.1

Pin	Signal	Pin	Signal
1	GND	9	CAM1_C_P
2	CAM1_D0_N	10	GND
3	CAM1_D0_P	11	CAM_GPIO
4	GND	12	NC
5	CAM1_D1_N	13	I2C1_SCL[GPIO45]
6	CAM1_D1_P	14	I2C2_SDA[GPIO44]
7	GND	15	3.3V
8	CAM1_C_N	16-30	NC

<GPIO>[Internal]

RasPi GPIO40pin (same layout as Raspberry Pi 40pin BM40B-SRDS-G-TF)

		Pin		Pin		
D-sub15p-14	3.3V	1	○ ○	2	5V	D-sub15p-15
D-sub15p-2	GPIO2	3	○ ○	4	5V	
D-sub15p-3	GPIO3	5	○ ○	6	Ground	D-sub15p-1
D-sub15p-4	GPIO4	7	○ ○	8	GPIO14	
	Ground	9	○ ○	10	GPIO15	
	GPIO17	11	○ ○	12	GPIO18	
	GPIO27	13	○ ○	14	Ground	
	GPIO22	15	○ ○	16	GPIO23	
	3.3V	17	○ ○	18	GPIO24	
D-sub15p-10	GPIO10	19	○ ○	20	Ground	
D-sub15p-9	GPIO9	21	○ ○	22	GPIO25	
D-sub15p-11	GPIO11	23	○ ○	24	GPIO8	D-sub15p-8
	Ground	25	○ ○	26	GPIO7	D-sub15p-7
	ID_SD	27	○ ○	28	ID_SC	
D-sub15p-5	GPIO5	29	○ ○	30	Ground	
D-sub15p-6	GPIO6	31	○ ○	32	GPIO12	D-sub15p-12
D-sub15p-13	GPIO13	33	○ ○	34	Ground	
	GPIO19	35	○ ○	36	GPIO16	
	GPIO26	37	○ ○	38	GPIO20	
	Ground	39	○ ○	40	GPIO21	

: System Reserved (GPIO connector)
: System Reserved (SD connection)

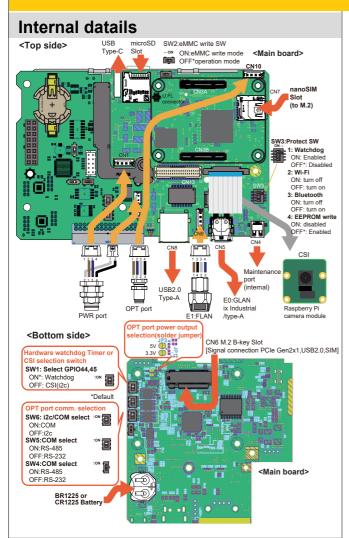⚠ The GPIOs of CM4 are 3.3V level.The total GPIO load is up to 50mA.
For detailed specifications, please check the CM4 datasheet.

MICA-R4 USB GPIO IP20

Internal datails

\<Top side\>

USB Type-C
microSD Slot
SW2:eMMC write SW
- ON
ON:eMMC write mode
OFF*operation mode
\<Main board\>
CN10
U.FL connector
CN3A
CN7
nanoSIM Slot (to M.2)
CN1
CN3B

SW3:Protect SW
- ON
1: **Watchdog**
ON: Enabled
OFF*: Disabled
2: **Wi-Fi**
ON: turn off
OFF: turn on
3: **Bluetooth**
ON: turn off
OFF: turn on
4: **EEPROM write**
ON: disabled
OFF*: Enabled

CN13
SW3
CN9
CN8
CAM1
CN5
CN4
Maintenance port (internal)
CSI

GPIO Connection

GPIO D-SUB15p Female
PWR port
USB2.0 Type-A
OPT port
USB2.0 Type-A
E1:FLAN
E0:GLAN ix Industrial /type-A
Raspberry Pi camera module

\<Bottom side\>

OPT port power output selection(solder jumper)
5V
3.3V
JP2a
JP2b

CN6 M.2 B-key Slot [Signal connection PCIe Gen2x1,USB2.0,SIM]

Hardware watchdog Timer or CSI selection switch
SW1: Select GPIO44,45
ON*: Watchdog
OFF: CSI(i2c)
1ON
*Default

OPT port comm. selection
SW6: i2c/COM select
ON:COM
OFF:i2c
1ON
SW5:COM select
ON:RS-485
OFF:RS-232
1ON
SW4:COM select
ON:RS-485
OFF:RS-232
1ON

\<Main board\>

BR1225 or CR1225 Battery

Device List

Signal	Device	Port or connection	Comments
E0:GLAN	CM4	eth0	10/100/1000Mbps
E1:FLAN	LAN9514i	eth1	10/100Mbps
Security IC (option)	ATECC508A	i2c-0/0x60	i2c0: GPIO0,1
RTC	DS3231SN	i2c-0/0x68	i2c0: GPIO0,1
OPT:i2c	CM4/GPIO0,1	i2c-0/---	i2c0: GPIO0,1
OPT:RS-232	MCP2200-I	ttyACM0	3-wire, max. 250kbps
OPT:RS-485	MCP2200-I	ttyACM0	2-wire, max. 400kbps
CSI:i2c	CM4/GPI44,45	GPIO44,45/i2c-1	i2c1: GPIO44,45 / when not using WD
CSI	CM4/CAM1	CAM1	MIPI CSI-2 2-lanes
WD Enable	MAX6373KA+T	GPIO44/Out	SET0 (SET1: Always High, SET2: Always Low)
WD Reset	MAX6373KA+T	GPIO45/Out	WDI

Note) It may be changed depending on the Raspberry Pi OS side.

Watchdog (WD) timer and CSI connection
SW1: Watchdog or CSI can be switched by selecting GPIO44,45. Watchdog (WD) and CSI cannot be used at the same time. When WD is selected, GPIO44 and 45 are for WD operation. In addition, when SW3: No.1 of protection SW is off, the reset is forcibly disabled. When CSI is selected, GPIO44 and 45 are used as i2c for CSI.

Software

The CM4's onboard eMMC will be the boot device for this unit. Booting from an SSD is also possible. microSD slot is not for system boot. Turn on the eMMC write switch, connect the USB cable, and use the rpiboot program to read and write images. In addition, this The USB port is an eMMC write-only port.

USB Type-A
USB Type-C
USB Type-C
eMMC write switch

- RPi Boot(Windows Installer)
- Win32 DiskImager(read/write image)

Dimensions and installation adapter

(Unit: mm)

132
87
35
6.2
8
9.8
GPIO
PWR
USB1
P1
USB3
E0
A1

Two types of mounting parts options

\<DIN rail mount adapter\>
35
1.5
132
66
DIN rail
Φ4.5

\<Wall mount kit\>
37.5
99
21
71.5
wall mount kit mounting hole
96
18
132

Optional accessories

Optional accessories			Part Number
PWR cable	M8 A-code 4-pin female to open end	1m	21348100489010
		2m	21348100489020
E1[FLAN] cable	M8 A-code 4 pin male to RJ45 Plug	1m	72M8M4RM4010LI
		2m	72M8M4RM4020LI
	to RJ45 Jack	0.2m	72T17001449
OPT cable	M5 4-pin male to open end	1m	72M5M4010G0
		2m	72M5M4020G0
E0[GLAN] ix cable	ix plug to to RJ45 Plug	1m	33480653830010
		2m	33480653830020
	to RJ45 Jack	0.2m	72T17001450IX
Mount kit	DIN rail mount adapter		20952000004
	wall mount kit		20953000007
Antenna fot LTE	LTE monopole antenna IP20 SMA screw		72MICA0000254
	LTE flat antenna IP67 mounted on glass or plastic		72MICA0000225
	LTE magnetic mount antenna IP65 mounted magnetically on a metal surface		72MICA0000252
	3-in-1 antenna IP67 GPS+2x4G MIMO mounted on glass or plastic		72MICA0000255

Confirmed Devices [Reference]

This is confirmation with the factory default image.
It depends on customer's software environment.

M.2 SSD	TS128GMTE452T, 256,512G model [0-70°C]/Transcend
	TS128GMTE452T-I, 256,512G model [-40 to 85°C]/Transcend
	TS128GMTE452T2, 256,512G model [-20 to 75°C]/Transcend
M.2 WWAN	EM7431, EM7430 /Sierra Wireless
USB Wifi	T2U Nano/TP-LINK company
Wifi	LM808/LM technologies
CSI Camera	Raspberry Pi Camera Module 2, Camera Module 2 NoIR
	Raspberry Pi High Quality Camera
	Raspberry Pi Camera Module 3/ Raspberry Pi Foundation

Ordering information

[Part Number]**722RUI1 0 0 0R3 3 0** IP20 GPIO model

2: CM4 IP20 type
R : Wired
W : WiFi/Bluetooth
revision number

RAM size [GB]
1	1
2	2
3	4[standard]
4	8

eMMC size [GB]
1	8
2	16
3	32[standard]
4	32/SSD128GB
5	32/SSD256GB
6	32/SSD512GB

4,5,6: NVMe fast SSD (Temperature 0-55°C)

Option (OPT) interface
1	RS-232C[standard]
2	I2C
3	RS-485

Expansion interface
0	None

Add-on software
0	None[standard]
1	CodeSys

Accessory
0	None[standard]
1	Reserved
L	LTE

⚠ When selecting CodeSys, please use 32bit OS. If you select 64bit, the license key will not be the Raspberry Pi version and you will not be able to use it.

MICA-R4 DIO IP20

HARTING

MICA-R4

Picture

Features

- Industrial Raspberry Pi 4 (CM4)
- New processor, up to 2x faster than CM3
- Raspberry Pi OS compatible (Ubuntu requres 4GB or more RAM)
- DC12/24V power input
- Wide operating temperature range and high noise resistance
- M8, M5, ix connectors with high vibration resistance and connection reliability
- Robust aluminum die-cast housing
- Supports wall mount and DIN rail mount
- On-board eMMC does not use SD memory for boot
- microSD slot for data storage
- Internal M.2 slot for SSD and WWAN expansion
- Raspi40p connector for expansion board
- Built-in battery backup RTC
- Highly reliable hardware watchdog

Product Specifications

Processor		Broadcom BCM2711, Quad core @ 1.5GHz
Memory		RAM4GB, eMMC32GB (Depend on model)
OS		Raspberry Pi OS
Interface	Front	1x PWR : Power input, 2-line
		2x LAN : FLAN 1ch, GLAN 1ch
		1x OPT*1 : i2c/RS-232/485 selectable
		1x USB : USB2.0 Host Type-A
		1x CN1 : Di16ch[14ch] (PNP)/2.4mA at 24VDC
		Do8ch(PNP)/Pushpull0.1A,High-side0.5A
		COM 1ch RS-232/RS485(2w)
		CAN 1 or 2ch/CAN 2.0B,CAN FD 1Mbps
		[Option]1x WLAN IEEE 802.11 b/g/n/ac,Bluetooth5.0,BLE
		[Option]1x LTE(M.2 slot/EM7431)
	Back	1x USB-C : USB Type-C(eMMC writing only)
		1x SW : eMMC write switch
		1x microSD : microSD slot
	Internal	1x M.2 slot B-key*2, 1x nanoSIM slot
		1x CSI, 1xGPIO 40p
LED, Button		P: Power status, A0,1: LAN status, Di/Do,
		Pi: User custom/WD error, Di/Do: CN1-Di/Do status
RTC/NVRAM		BR1225[or CR1225] Backup RTC,
		MCP79410-I:CR1632 backup RTC, NVRAM
Watchdog		Built-in hardware watchdog
Power/Consumption		DC10.7V...28.8V/13.5W(incl. USB 500mAx1)
Temperature		Operating Temp.: -20...60°C, Storage:-25...85°C
Humidity		Operating Humi.:0...95%(non-condensing)
IP grade		IP20
housing material		Aluminum powder coating
Dimensions		W132 x D87 x H35 mm (excluding protrusions)
Weight		DIO: Approx.570g
Vibration/shock		IEC 60068-2-6 / IEC 60068-2-27
EMI	Radiated emissions	EN55016-2-3
EMS	Electrostatic radiation immunity	EN 61000-4-2
	Radio frequency electromagnetic fields	EN 61000-4-3
	Fast transient burst	EN 61000-4-4
Installation method		DIN rail mounting, wall mounting(Option)

*1 The speed is variable, but Data bit: 8, Parity: N, Stop bit: 1 are fixed.
*2 This is not a full pin connection. USB2.0, PCIe, and SIM are connected.

Details of each part

<Front>

ANT0 PWR E1[FLAN] CSI slit
OPT
Maintenance port
P LED
A1 LED
CN1
Di LED Do LED Pi LED USB0 A0 LED E0 [GLAN]

<Back> eMMC write switch   microSD slot   USB type-C port

Hole for fix barcket   Back cover   Screw for back cover

Interface

<Connector pin layout>

PWR connector — M8 A-coded 4pin Male

Pin	Col.	Signal
1	BR	24VDC(V1)
2	WH	24VDC(V2)
3	BL	0V(V1)
4	BK	0V(V2)

OPT connector — M5 4pin Female

Pin	Col.	i2c	RS232	RS485
1	BR	3.3V/5V/none*		
2	WH	SCL	TXD	A
3	BL	0V(RS232:SG)		
4	BK	SDA	RXD	B

*1 pin for power output is no output by default.

E0 connector [GLAN] — ix type-A jack

Pin	Signal	
	10/100M	1G
1	TX+	BI_DA+
2	TX-	BI_DA-
3	N.C.	GND
4	N.C.	BI_DC+
5	N.C.	BI_DC-
6	RX+	BI_DB+
7	RX-	BI_DB-
8	N.C.	GND
9	N.C.	BI_DD+
10	N.C.	BI_DD-

E1 connector [FLAN] — M8 A-coded 4pin Female

Pin	Col.	Signal
1	BR	TX+
2	WH	RX+
3	BL	RX-
4	BK	TX-

Connection side Harness side
- Housing 32-pin: PHDR-32VS
- Contact: BPHD/SPHD-001T-P0.5 AWG26...22/Outer diameter Φ1.0...1.5mm
- Contact: BPHD/SPHD-002T-P0.5 AWG28...24/ Outer diameter Φ 0.9...1.5mm

<CN1 port> [JST/PHD 32pin connector]   CN1

Pin	1	3	5	7	9	11	13	15*	17	19	21	23	25	27	29	31
Signal	Di 0	Di 2	Di 4	Di 6	Di 8	Di 10	Di 12	Di14 or CAN 1+	Do Do	Do 0	Do 2	Do 4	Do 6	RS232(Tx) /RS485(+)	RS232/ 485 SG	CAN 0+
			Digital Input(PNP)							Digital Output(PNP)						

Pin	2	4	6	8	10	12	14	16*	18	20	22	24	26	28	30	32
Signal	Di 1	Di 3	Di 5	Di 7	Di 9	Di 11	Di 13	Di14 or CAN 1-	Do Do	Do 1	Do 3	Do 5	Do 7	RS232(Rx) /RS485(-)	Di COM DC24V	CAN 0-
			Digital Input(PNP)							Digital Output(PNP)						

*:This signal changes depending on the can1/2 port selection.

⚠ The rating per digital output point is 0.1A in the default setting. Make sure that the total current value does not exceed 1A. For protection, an automatic reset fuse is built into the device.

<GPIO>[Internal] RasPi GPIO40pin (same layout as Raspberry Pi 40pin BM40B-SRDS-G-TF)

- :System Used (extension board CN10)
- :System Used (extension board CN6)
- :System Used (SD)

⚠ The GPIOs of CM4 are 3.3V level. The total GPIO load is up to 50mA. For detailed specifications, please refer to the CM4 datasheet.

<LED>

LED	Sts.	Comments
P(GR)	Off	No power supply
	On	Power OK
A0(OR)	Blink	E0 active
A1(OR)	Blink	E1 active
Pi(RD)	Off	WD Normal
	On	WD Error
Pi(GR)	Off	User OFF
	On	User ON
Di0,1	Off	Di OFF
	ON	Di ON
Do0,1	Off	Do OFF
	On	Do ON

<ANT SMA port> [Option]

Type	ANT2	ANT1	ANT0
Wired LAN	---	---	---
Wired LAN+LTE	---	---	Main
Wired LAN+Wireless LAN	---	---	WL/BT
Wired LAN+Wireless LAN+LTE	---	---	None

<CSI>[Internal] FPC connector

Pin	Signal	Pin	Signal
1	GND	9	CAM1_C_P
2	CAM1_D0_N	10	GND
3	CAM1_D0_P	11	CAM_GPIO
4	GND	12	NC
5	CAM1_D1_N	13	I2C1_SCL[GPIO45]
6	CAM1_D1_P	14	I2C2_SDA[GPIO44]
7	GND	15	3.3V
8	CAM1_C_N	16-30	NC

All data given are in line with the actual state of art and therefore not binding.
HARTING reserves the right to modify designs without giving the relevant reasons.

MICA-R4 DIO IP20

Internal datails

\<Top side\>

USB Type-C
microSD Slot
SW2:eMMC write SW
ON:eMMC write mode
OFF*operation mode
\<Main board\>
CN10
CN7
U.FL connector
CN3A
nanoSIM Slot (to M.2)
CN1
CN3B
CN13
SW3
SW3:Protect SW
1: Watchdog
  ON: Enabled
  OFF*: Disabled
2: Wi-Fi
  ON: turn off
  OFF: turn on
3: Bluetooth
  ON: turn off
  OFF: turn on
4: EEPROM write
  ON: disabled
  OFF*: Enabled
CN9
CN4
CN8
CN5
Maintenance port (internal)
CSI
PWR port
OPT port
USB2.0 Type-A
E1:FLAN
E0:GLAN ix Industrial /type-A
Raspberry Pi camera module

\<Bottom side\>

OPT port power output selection(solder jumper)
JP22 JP21
5V 3.3V
CN6 M.2 B-key Slot [Signal connection PCIe Gen2x1,USB2.0,SIM]

Hardware watchdog Timer or CSI selection switch
SW1: Select GPIO44,45
ON*: Watchdog
OFF: CSI(i2c)
*Default

OPT port comm. selection
SW6: i2c/COM select
ON:COM
OFF:i2c
SW5:COM select
ON:RS-485
OFF:RS-232
SW4:COM select
ON:RS-485
OFF:RS-232

BR1225 or CR1225 Battery

\<Main board\>

Internal DIP switch setting

The board on the left side of MCIA-R4 is the IO board. Only the lower board is mounted on the DIO model. Analog range and serial communication can be selected by switching the switch.

Lower board

SW5
SW1 SW2 SW3 SW6
SW4

Switch setting list

SW	Name	Setting
SW1	Do Sig. select	OFF*:PushPull High 0.1A ON:Highside Low 0.5A
SW2	RS comm.	OFF:RS-232C ON*:RS-485
SW3	RS comm.	OFF:RS-232C ON*:RS-485
SW4	CAN0 terminator	OFF:Terminator OFF ON*:Terminator ON
SW5	CAN1 terminator	OFF:Terminator OFF ON*:Terminato ON
SW6	CAN/Di select	Switchable by product model OFF*:1port(CAN1not implemented) ON:2port(CAN0,1implemented)

* :Default configuration

Device List

Main board side device

Signal	Device	Port or connection	Comments
E0:GLAN	CM4	eth0	10/100/1000Mbps
E1:FLAN	LAN9514i	eth1	10/100Mbps
Security IC (option)	ATECC508A	i2c-0/0x60*	i2c0: GPIO0,1
RTC	DS3231SN	i2c-0/0x68	i2c0: GPIO0,1
OPT:i2c	CM4/GPIO0,1	i2c-0/---	i2c0: GPIO0,1
OPT:RS-232	MCP2200-I	ttyACM0	3-wire, max. 250kbps
OPT:RS-485	MCP2200-I	ttyACM0	2-wire, max. 400kbps
CSI:i2c	CM4/GPI44,45	GPIO44,45/i2c-1	i2c1: GPIO44,45 / when not using WD
CSI	CM4/CAM1	CAM1	MIPI CSI-2 2-lanes
WD Enable	MAX6373KA+T	GPIO44/Out	SET0 (SET1: Always High, SET2: Always Low)
WD Reset	MAX6373KA+T	GPIO45/Out	WDI

* Not recognized at i2c bus speed of 400kHz or higher. Therefore, it does not conflict with MCP4728.

IO expansion board side device

Signal	Device	Port or connection	Comments	
Di0...Di15	MCP23S17	spidev1.0/0	Lower board	
Do0...Do7	MCP23S17	spidev1.0/1	Lower board[1.1/0 JP selectable]	
Spare	---	spidev1.1	Lower board	
CAN0	MCP2518FD	spidev0.0:can0	Lower board	
CAN1	MCP2518FD	spidev0.1:can1	Lower board	
RTC,NVRAM*1	CP74910	i2c-5/0x57,6F	Lower board	
RS-232/485	TXD1,RXD1	ttyAMA0	Lower board	RS232 3w Max.250kbps RS485 2w Max.500kbps
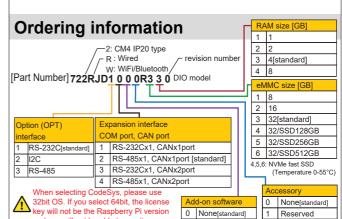
*1 When using MCP79410 on the Raspberry Pi OS side, NVRAM cannot be connected on the Codesys side.

Dimensions and installation adapter

(Unit: mm)

HARTING

87
132
35
6.2
8
9.8

Two types of mounting parts options

\<DIN rail mount adapter\>

35
1.5
132
66
DIN rail

\<Wall mount kit\>

37.5
99
21
71.5
wall mount kit
wall mount kit mounting hole
Φ4.5
96
18
132

Optional accessories

Optional accessories			Part Number
PWR cable	M8 A-code 4-pin female to open end	1m	21348100489010
		2m	21348100489020
E1[FLAN] cable	M8 A-code 4 pin male to RJ45 Plug	1m	72M8M4RM4010LI
		2m	72M8M4RM4020LI
	to RJ45 Jack	0.2m	72T17001449
OPT cable	M5 4-pin male to open end	1m	72M5M4010G0
		2m	72M5M4020G0
E0[GLAN] ix cable	ix plug to RJ45 Plug	1m	33480653830010
		2m	33480653830020
	to RJ45 Jack	0.2m	72T17001450IX
Mount kit	DIN rail mount adapter		20952000004
	wall mount kit		20953000007
Antenna fot LTE	LTE monopole antenna IP20 SMA screw		72MICA0000254
	LTE flat antenna IP67 mounted on glass or plastic		72MICA0000225
	LTE magnetic mount antenna IP65 mounted magnetically on a metal surface		72MICA0000252
	3-in-1 antenna IP67 GPS+2x4G MIMO mounted on glass or plastic		72MICA0000255

Ordering information

revision number

[Part Number] 722RJD1 0 0 0R3 3 0

2: CM4 IP20 type
R : Wired
W: WiFi/Bluetooth
DIO model

RAM size [GB]

1	1
2	2
3	4[standard]
4	8

eMMC size [GB]

1	8
2	16
3	32[standard]
4	32/SSD128GB
5	32/SSD256GB
6	32/SSD512GB

4,5,6: NVMe fast SSD (Temperature 0-55°C)

Option (OPT) interface

1	RS-232C[standard]
2	I2C
3	RS-485

Expansion interface COM port, CAN port

1	RS-232Cx1, CANx1port
2	RS-485x1, CANx1port [standard]
3	RS-232Cx1, CANx2port
4	RS-485x1, CANx2port

Add-on software

0	None[standard]
1	CodeSys

Accessory

0	None[standard]
1	Reserved
L	LTE

⚠️ When selecting CodeSys, please use 32bit OS. If you select 64bit, the license key will not be the Raspberry Pi version and you will not be able to use it.

MICA-R4 Multi IO IP20

HARTING

Picture

Product Specifications

Processor	Broadcom BCM2711, Quad core @ 1.5GHz
Memory	RAM4GB, eMMC32GB (Depend on model)
OS	Raspberry Pi OS

Interface		
	Front	1x PWR : Power input, 2-line
		2x LAN : FLAN 1ch, GLAN 1ch
		1x OPT*¹ : i2c/RS-232/485 selectable
		1x USB : USB2.0 Host Type-A
		1x CN1 : Di16ch[14ch] (PNP)/2.4mA at 24VDC
		Do8ch(PNP)/Pushpull0.1A,High-side0.5A
		COM 1ch RS-232/RS485(2w)
		CAN 1 or 2ch/CAN 2.0B,CAN FD 1Mbps
		1x CN2 : Di4ch (NPN)/7.2 mA at 24VDC
		Do4ch (PNP)/High-side0.5A,pushpull0.1A
		Ai 4ch 16bit(0-5/0-10VDC)
		Note)ch3 only 0-5/0-100VDC
		Ao2ch 12bit(0-5/0-10VDC)
		SPI 1ch/ Max.12Mbps
		1x PRG : STM32 programming port
		1x Maintenance :Maintenance port(reserved)
		[Option]1x WLAN IEEE 802.11 b/g/n/ac,Bluetooth5.0,BLE
		[Option]1x LTE(M.2 slot/EM7431)
	Back	1x USB-C : USB Type-C(eMMC writing only)
		1x SW : eMMC write switch
	Internal	1x microSD : microSD slot
		1x M.2 slot B-key*², 1x nanoSIM slot
		1x CSI, 1xGPIO 40p
LED, Button		P: Power status, A0,1: LAN status
		Pi: User custom/WD error, Di/Do: CN1-Di/Do status,
		USR: User custom, PRG: STM32 Debugger interface,
		RST: Reset switch for STM32
RTC		BR1225[or CR1225] Backup RTC
NVRAM		MCP79410-I:CR1632 backup RTC, NVRAM
Watchdog		Built-in hardware watchdog
Power/Consumption		DC10.7V...28.8V/13.5W(incl. USB 500mAx1)
Temperature		Operating Temp.: -20...60°C, Storage:-25...85°C
Humidity		Operating Humi.:0...95%(non-condensing)
IP grade		IP20
housing material		Aluminum powder coating
Dimensions		W132 x D87 x H35 mm (excluding protrusions)
Weight		Multi IO: Approx.610g
Vibration/shock		IEC 60068-2-6 / IEC 60068-2-27
EMI	Radiated emissions	EN55016-2-3
EMS	Electrostatic radiation immunity	EN 61000-4-2
	Radio frequency electromagnetic fields	EN 61000-4-3
	Fast transient burst	EN 61000-4-4
Installation method		DIN rail mounting, wall mounting(Option)

*1 The speed is variable, but Data bit: 8, Parity: N, Stop bit: 1 are fixed.
*2 This is not a full pin connection. USB2.0, PCIe, and SIM are connected.

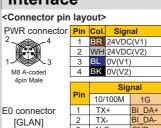## Details of each part

<Front>

<Back>

Features

- Industrial Raspberry Pi 4(CM4)
- New processor, up to 2x faster than CM3
- Raspberry Pi OS compatible (Ubuntu requres 4GB or more RAM)
- DC12/24V power input
- Wide operating temperature range and high noise resistance
- M8, M5, ix connectors with high vibration resistance and connection reliability
- Robust aluminum die-cast housing
- Supports wall mount and DIN rail mount
- On-board eMMC (SD card is not used for boot)
- microSD slot for data storage
- M.2 slot inside SSD and WWAN expansion
- Raspi40p connector for expansion board
- Built-in battery backup RTC
- Highly reliable hardware watchdog

Interface

<Connector pin layout>

PWR connector

M8 A-coded 4pin Male

Pin	Col.	Signal
1	BR	24VDC(V1)
2	WH	24VDC(V2)
3	BL	0V(V1)
4	BK	0V(V2)

OPT connector

M5 4pin Female

Pin	Col.	i2c	RS232	RS485
1	BR	3.3V/5V/none*		
2	WH	SCL	TXD	A
3	BL	0V(RS232:SG)		
4	BK	SDA	RXD	B

*1 pin for power output is no output by default.

E0 connector [GLAN]

ix type-A jack

Pin	Signal	
	10/100M	1G
1	TX+	BI_DA+
2	TX-	BI_DA-
3	N.C.	GND
4	N.C.	BI_DC+
5	N.C.	BI_DC-
6	RX+	BI_DB+
7	RX-	BI_DB-
8	N.C.	GND
9	N.C.	BI_DD+
10	N.C.	BI_DD-

E1 connector [FLAN]

M8 A-coded 4pin Female

Pin	Col.	Signal
1	BR	TX+
2	WH	RX+
3	BL	RX-
4	BK	TX-

<CN1 port>
[JST/PHD 32pin connector]

CN1

Connection side Harness side
- Housing 32-pin: PHDR-32VS
- Contact: BPHD/SPHD-001T-P0.5 AWG26...22/Outer diameter Φ1.0...1.5mm
- Contact: BPHD/SPHD-002T-P0.5 AWG28...24/ Outer diameter Φ 0.9...1.5mm

Pin	1	3	5	7	9	11	13	15*	17	19	21	23	25	27	29	31
Signal	Di0	Di2	Di4	Di6	Di8	Di10	Di12	Di14 or CAN 1+	Do0	Do2	Do4	Do6	GND	RS232(Tx)/RS485(+)	RS232/485 SG	CAN 0+
	Digital Input(PNP)								Digital Output(PNP)							

Pin	2	4	6	8	10	12	14	16*	18	20	22	24	26	28	30	32
Signal	Di1	Di3	Di5	Di7	Di9	Di11	Di13	Di14 or CAN 1-	Do1	Do3	Do5	Do7		RS232(Rx)/RS485(-)	Di COM DC24V	CAN 0-
	Digital Input(PNP)								Digital Output(PNP)							

*:This signal changes depending on the can1/2 port selection.

⚠ The rating per digital output point is 0.1A in the default setting. Make sure that the total current value does not exceed 1A. For protection, an automatic reset fuse is built into the device.

<CN2 port>
[JST/PHD 20pin connector]

CN2
Pin1 ▲

Connection side Harness side
- Housing 20-pin: PHDR-20VS
- Contact: BPHD/SPHD-001T-P0.5 AWG26...22/Outer diameter Φ1.0...1.5mm
- Contact: BPHD/SPHD-002T-P0.5 AWG28...24/Outer diameter Φ 0.9...1.5mm

Pin	1	3	5	7	9	11	13	15	17	19
Signal	STM Di0	STM Di2	STM Di,Do	Ai0	Ai2	STM Do0	STM Do2	Ao0	CS1	MISO
	STM Digital Input (NPN)		GND	Analog input		STM Digital Output (PNP)		Analog Output	SPI	

Pin	2	4	6	8	10	12	14	16	18	20
Signal	STM Di1	STM Di3	Ai,Ao	Ai1	Ai3	STM Do1	STM Do3	Ao1	SCK	MOSI
	STM Digital Input (NPN)		GND	Analog input		STM Digital Output (PNP)		Analog Output	SPI	
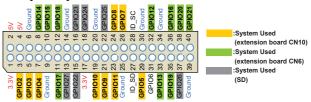
Note) GND of Di, Do, STM-Di, Do, Ai, Ao, SPi and SG are connected.

<PRG port>
[JST/SH 6pin connector]

Pin1 ▶

Connection side Harness side
-Housing 6-pin: SHR-06V-S or SHR-06V-S-B
-Contact: SSH-003T-P0.2-H AWG32...28 /Outer diameter Φ0.4...0.8mm

Pin	1	2	3	4	5	6
Signal	3.3V Passive	SWCLK in	GND	SWDIO io	NRST in	SWO out
			STLINK			

<GPIO>[Internal] RasPi GPIO40pin (same layout as Raspberry Pi 40pin BM40B-SRDS-G-TF)

:System Used (extension board CN10)
:System Used (extension board CN6)
:System Used (SD)

⚠ The GPIOs of CM4 are 3.3V level.The total GPIO load is up to 50mA. For detailed specifications, please check the CM4 datasheet.

MICA-R4 Multi IO IP20

<LED>

LED	Sts.	Comments
P(GR)	Off	No power supply
	On	Power OK
A0(OR)	Blink	E0 active
A1(OR)	Blink	E1 active
Pi(RD)	Off	WD Normal
	On	WD Error
Pi(GR)	Off	User OFF
	On	User ON
Di0,1	Off	Di OFF
	ON	Di ON
Do0,1	Off	Do OFF
	On	Do ON
USR	Off	User On/Off
	On	
	On	

<ANT SMA port> [Option]

Type	ANT2	ANT1	ANT0
Wired LAN	---	---	---
Wired LAN+LTE	---	---	Main
Wired LAN+Wireless LAN	---	---	WL/BT
Wired LAN+Wireless LAN+LTE	---	---	None

<CSI>[Internal]

FPC connector
No.1

Pin	Signal	Pin	Signal
1	GND	9	CAM1_C_P
2	CAM1_D0_N	10	GND
3	CAM1_D0_P	11	CAM_GPIO
4	GND	12	NC
5	CAM1_D1_N	13	I2C1_SCL[GPIO45]
6	CAM1_D1_P	14	I2C2_SDA[GPIO44]
7	GND	15	3.3V
8	CAM1_C_N	16-30	NC

Device List

Main board side device

Signal	Device	Port or connection	Comments
E0:GLAN	CM4	eth0	10/100/1000Mbps
E1:FLAN	LAN9514i	eth1	10/100Mbps
Security IC (option)	ATECC508A	i2c-0/0x60	i2c0: GPIO0,1
RTC	DS3231SN	i2c-0/0x68	i2c0: GPIO0,1
OPT:i2c	CM4/GPIO0,1	i2c-0/---	i2c0: GPIO0,1
OPT:RS-232	MCP2200-I	ttyACM1	3-wire, max. 250kbps
OPT:RS-485	MCP2200-I	ttyACM1	2-wire, max. 400kbps
CSI:i2c	CM4/GPI44,45	GPIO44,45/i2c-1	i2c1: GPIO44,45 / when not using WD
CSI	CM4/CAM1	CAM1	MIPI CSI-2 2-lanes
WD Enable	MAX6373KA+T	GPIO44/Out	SET0 (SET1: Always High, SET2: Always Low)
WD Reset	MAX6373KA+T	GPIO45/Out	WDI

* Not recognized at i2c bus speed of 400kHz or higher. Therefore, it does not conflict with MCP4728.

IO expansion board side device

| Signal	Device	Port/Address	Comments
Di0...Di15	MCP23S17	spidev1.0/0	Lower board
Do0...Do7	MCP23S17	spidev1.0/1	Lower board[1.1/0JP selectable]
Reserve	---	spidev1.1	Lower board
Ext.SPI	---	spidev1.2	Upper board
CAN0	MCP2518FD	spidev0.0:can0	Lower board
CAN1	MCP2518FD	spidev0.1:can1	Lower board
Ai0...Ai3	ADS1115	i2c-1/0x48	Upper board[CSI i2c-3/0x48]
Ao0...Ao1	MCP4728	i2c-5/0x60	Upper board[i2c-0 JP selectable]
RTC,NVRAM*1	MCP74910	i2c-5/0x57,6F	Lower board
RS-232/485	TXD1,RXD1	ttyAMA0	Lower board RS232 3w Max.250kbps RS485 2w Max.500kbps
STM32 VCOM	STM32-VCOM	ttyACM0	Upper board Max.921.6kbps[vcom]
STM32 DIO*2	STM GPIO	---	Upper board
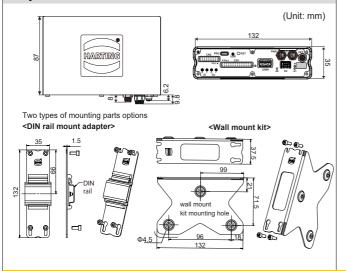
*1 When using RTC on the Raspberry Pi OS side, NVRAM cannot be connected on the Codesys side.
*2 The default protocol to access IO and LED of STM32 is ModbusRTU.

STM32 ModbusRTU link map (slave address 1)

<Digital Input / Modbus Holding Register>		<Digital Output / Modbus Holding Register>	
memory offset word/bit	STM32 Link	memory offset word/bit	STM32 Link
0/0...7(unused8...15)	Di0 ... Di7	10/0...3(unused4...15)	Do0 ... Do3
1...9/0...15	Reserved	11/0...1(unused2...15)	LED Red, Green
		12...19/0...15	Reserved
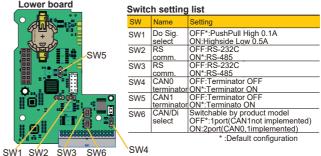
Optional accessories

(Unit: mm)

132
87
35
6.2
9.8
8

Two types of mounting parts options

<DIN rail mount adapter>

35   1.5
66
132
DIN rail

<Wall mount kit>

37.5
99
71.5
21
Φ4.5
96   18
132
wall mount kit mounting hole

Internal DIP switch setting

The board on the left side of MCIA-R4 is the IO board. Only the lower board is mounted on the DIO model. Analog range and serial communication can be selected by switching the switch.
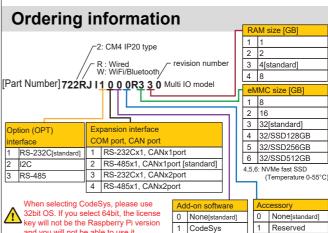
Lower board

SW5
SW1 SW2 SW3 SW6
SW4

Switch setting list

SW	Name	Setting
SW1	Do Sig. select	OFF*:PushPull High 0.1A ON:Highside Low 0.5A
SW2	RS comm.	OFF:RS-232C ON*:RS-485
SW3	RS comm.	OFF:RS-232C ON*:RS-485
SW4	CAN0 terminator	OFF:Terminator OFF ON*:Terminator ON
SW5	CAN1 terminator	OFF:Terminator OFF ON*:Terminato ON
SW6	CAN/Di select	Switchable by product model OFF*:1port(CAN1not implemented) ON:2port(CAN0,1implemented)

* :Default configuration

Upper board
(DIO model is not mounted)

SW2
SW9
SW8
SW3
SW6
SW5
SW7
SW4
SW1

Switch setting list

SW	Name	Setting
SW1	STM32 Reset	OFF*:Invalid ON:Valid
SW2	STM3 Boot0	OFF:Invalid ON*:User Flash
SW3	Do Sig. select	OFF*:PushPull High 0.1A ON:Highside Low0.5A
SW4	Ai0	OFF:0-10VDC ON*:0-5VDC
SW5	Ai1	OFF:0-10VDC ON*:0-5VDC
SW6	Ai2	OFF:0-10VDC ON*:0-5VDC
SW7	Ai3	OFF:0-100VDC ON*:0-5VDC
SW8	Ao0	OFF:0-10VDC ON*:0-5VDC
SW9	Ao1	OFF:0-10VDC ON*:0-5VDC

* : Default configuration

Optional accessories

Optional accessories			Part Number
PWR cable	M8 A-code 4-pin female to open end	1m	21348100489010
		2m	21348100489020
E1[FLAN] cable	M8 A-code 4 pin male to RJ45 Plug	1m	72M8M4RM4010LI
		2m	72M8M4RM4020LI
	to RJ45 Jack	0.2m	72T17001449
OPT cable	M5 4-pin male to open end	1m	72M5M4010G0
		2m	72M5M4020G0
E0[GLAN] ix cable	ix plug to to RJ45 Plug	1m	33480653830010
		2m	33480653830020
	to RJ45 Jack	0.2m	72T17001450IX
Mount kit	DIN rail mount adapter		20952000004
	wall mount kit		20953000007
Antenna fot LTE	LTE monopole antenna IP20 SMA screw		72MICA0000254
	LTE flat antenna IP67 mounted on glass or plastic		72MICA0000225
	LTE magnetic mount antenna IP65 mounted magnetically on a metal surface		72MICA0000252
	3-in-1 antenna IP67 GPS+2x4G MIMO mounted on glass or plastic		72MICA0000255

Ordering information

2: CM4 IP20 type
R : Wired
W : WiFi/Bluetooth
revision number

[Part Number] **722RJ I 1 0 0 0R3 3 0** Multi IO model

Option (OPT) interface		Expansion interface COM port, CAN port	
1	RS-232C[standard]	1	RS-232Cx1, CANx1port
2	I2C	2	RS-485x1, CANx1port [standard]
3	RS-485	3	RS-232Cx1, CANx2port
		4	RS-485x1, CANx2port

⚠ When selecting CodeSys, please use 32bit OS. If you select 64bit, the license key will not be the Raspberry Pi version and you will not be able to use it.

RAM size [GB]	
1	1
2	2
3	4[standard]
4	8

eMMC size [GB]	
1	8
2	16
3	32[standard]
4	32/SSD128GB
5	32/SSD256GB
6	32/SSD512GB

4,5,6: NVMe fast SSD (Temperature 0-55°C)

Add-on software	
0	None[standard]
1	CodeSys

Accessory	
0	None[standard]
1	Reserved
L	LTE

All data given are in line with the actual state of art and therefore not binding.
HARTING reserves the right to modify designs without giving the relevant reasons.

MICA-R4 SENSOR IP65

HARTING

Picture

Features

- Industrial Raspberry Pi 4(CM)
- New processor, up to 2x faster than CM3
- Raspberry Pi OS compatible (Ubuntu requres 4GB or more RAM)
- DC12/24V power input
- Wide operating temperature range and high noise resistance
- M8, M5 connectors with high vibration resistance and connection reliability
- Robust aluminum die-cast housing
- Supports wall mount and DIN rail mount
- On-board eMMC (SD card is not used for boot)
- microSD slot for data storage
- M.2 slot inside SSD and WWAN expansion
- Raspi40p connector for expansion board
- Built-in battery backup RTC
- Highly reliable hardware watchdog

Product Specifications

Processor		Broadcom BCM2711, Quad core @ 1.5GHz
Memory		RAM4GB, eMMC32GB (Depend on model)
OS		Raspberry Pi OS
Interface	Front	1x PWR : Power input, 2-line 1x LAN : FLAN 1ch 1x OPT*¹ : i2c/RS-232/485 selectable 1x USB : PushPull USB2.0 Host Type-A 4x SENSOR1/2/3/4：M8 8pin [Option]1x WLAN IEEE 802.11 b/g/n/ac 　　　　　　　　Bluetooth 5.0, BLE [Option]1x LTE(M.2 slot/EM7431)
	Back	1x USB-C : USB Type-C(eMMC writing only) 1x SW : eMMC write switch 1x microSD : microSD slot
	Internal	1x M.2 slot B-key*² , 1x nanoSIM slot 1x CSI, 1xGPIO 40p
LED, Button		P: Power status, A0,1: LAN status Pi: User custom/WD error
RTC/NVRAM		BR1225[or CR1225] Backup RTC
Watchdog		Built-in hardware watchdog
Power/ Consumption		GPIO:DC10.7V...28.8V/ 12.5W(incl. USB 500mAx1)
Temperature		Operating Temp.: -20〜60°C, Storage:-25〜85°C
Humidity		Operating Humi.:0〜95%(non-condensing)
IP grade		IP65
housing material		Aluminum powder coating
Dimensions		W132 x D89 x H35 mm (excluding protrusions)
Weight		Approx.610g
Vibration/shock		IEC 60068-2-6 / IEC 60068-2-27
EMI		Radiated emissions　　　　　　EN55016-2-3
EMS		Electrostatic radiation immunity　EN 61000-4-2
		Radio frequency electromagnetic fields EN 61000-4-3
		Fast transient burst　　　　　　EN 61000-4-4
Installation method		DIN rail mounting, wall mounting(Option)

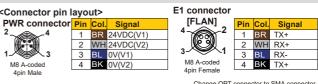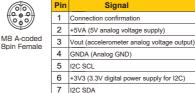*¹When WiFi/Bluetooth or LTE options are selected, the OPT connector is replaced to an SMA connector for the antenna.
*²Not a full pin connection. USB2.0, PCIe, SIM are connected.

Details of each part

<Front>

PWR　E1[FLAN]　OPT
Sensor　Pi LED　USB0　P LED　A1 LED

<Back>

Back cover

Screw for back cover

eMMC write switch　microSD slot　USB type-C port　Hole for fix barcket

Interface

<Connector pin layout>

PWR connector

M8 A-coded
4pin Male

Pin	Col.	Signal
1	BR	24VDC(V1)
2	WH	24VDC(V2)
3	BL	0V(V1)
4	BK	0V(V2)

E1 connector [FLAN]

M8 A-coded
4pin Female

Pin	Col.	Signal
1	BR	TX+
2	WH	RX+
3	BL	RX-
4	BK	TX+

OPT connector

M5
4pin Female

Pin	Col.	i2c	RS232	RS485
1	BR	3.3V/5V/none*		
2	WH	SCL	TXD	A
3	BL	0V(RS232:SG)		
4	BK	SDA	RXD	B

*1 pin for power output is no output by default.

Change OPT connector to SMA connector

Type	OPT
Wired LAN	---
Wired LAN+LTE	Main
Wired LAN+Wireless LAN	WL/BT
Wired LAN+Wireless LAN+LTE	---

Note) When wireless LAN or LTE is selected, the waterproof performance of the ANT port and antenna is different from IP65.

Sensor
S1/2/3/4 communication port

M8 A-coded
8pin Female
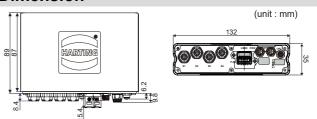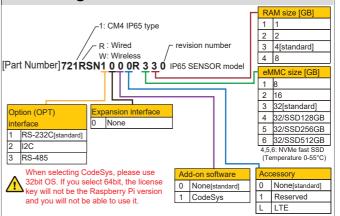
Pin	Signal
1	Connection confirmation
2	+5VA (5V analog voltage supply)
3	Vout (accelerometer analog voltage output)
4	GNDA (Analog GND)
5	I2C SCL
6	+3V3 (3.3V digital power supply for I2C)
7	I2C SDA
8	GNDD (Digital GND)

<LED>

LED	Sts.	Comments
P(GR)	Off	No power supply
	On	Power OK
A0(OR)	Blk	E0 active
A1(OR)	Blk	E1 active
Pi(RD)	Off	WD Normal
	On	WD Error
Pi(GR)	Off	User OFF
	On	User ON

Dimension

(unit : mm)

89　87　6.2
8.4　15.4　9.8
132　35

Ordering information

1: CM4 IP65 type
R : Wired
W: Wireless
revision number

[Part Number]**721RSN1 0 0 0R 3 3 0** IP65 SENSOR model

RAM size [GB]	
1	1
2	2
3	4[standard]
4	8

eMMC size [GB]	
1	8
2	16
3	32[standard]
4	32/SSD128GB
5	32/SSD256GB
6	32/SSD512GB

4,5,6: NVMe fast SSD
(Temperature 0-55°C)

Option (OPT) interface	
1	RS-232C[standard]
2	I2C
3	RS-485

Expansion interface	
0	None

⚠ When selecting CodeSys, please use 32bit OS. If you select 64bit, the license key will not be the Raspberry Pi version and you will not be able to use it.

Add-on software	
0	None[standard]
1	CodeSys

Accessory	
0	None[standard]
1	Reserved
L	LTE

All data given are in line with the actual state of art and therefore not binding.
HARTING reserves the right to modify designs without giving the relevant reasons.

MICA-R4 optional accesories

Power cable

for PWR port

Power cable		Part Number
M8 A-coded, 4pin, Female ...openend	1m	21348100489010
	2m	21348100489020 [STD stock]
	5m	21348100489050

OPT cable

for OPT port

Option port cable		Part Number
M5 4pin, Male ... openend	1m	72M5M4010G0
	2m	72M5M4020G0 [STD stock]
	5m	72M5M4050G0

PushPull USB cable

for MICA-R4 IP65 model
PushPull USB port

PushPull USB cable		Part Number
PushPull USB 2.0A ... standard USB 2.0Type-A	1m	09 45 445 1911
	2m	09 45 445 1913 [STD Stock]
	5m	09 45 445 1915

Sensor cable cor MICA-R4 SENSOR

SENSOR model S1...S4 port

sensor cable		Part Number
M8, 8pin, Male... openend	2m	72T17000113

extention cable for sensor cable		Part Number
M8, 8pin, Male - M8, 8pin, Female	3m	72T17000130
	8m	72T17000131

Dust cap

Dust cap for M5, M8, M12 connector	Part Number
for M8 Male (PWR)	72MICA0000033
for M8 Female(E1, sensor model S1~S4)	72MICA0000034
for M5 Female(OPT, BASIC Plas IP65 model's IO port)	72MICA0000035

DIN-rail adapter

Wall mount kit

Installation adapter

Installation adapter	Part Number
DIN-rail mount adapter	20952000004
Wall mount kit	20953000007

DIN rail mout

Wall mount
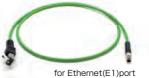
Startup power supply kit

MICA-R/MICA-R4 General Startup Power Supply Kit	Part Number
DC24V AC adapter + DC jack	72MRPOWK01

LAN cable

- E1 port (FLAN)

for Ethernet(E1)port

LAN cable		Part Number
M8 A-coded, 4pin, Male ... RJ45 plug	1m	72M8M4RM4010LI
	2m	72M8M4RM4020LI [STD stock]
	5m	72M8M4RM4050LI

- E1 port (FLAN)

connect to E1 port   for RJ45 cable

LAN cable		Part Number
M8 A-coded, 4pin, Male ... RJ45 jack	0.2m	72T17001449

- E0 port (GLAN)

connect to E0 port   for RJ45 cable

LAN cable		Part Number
ix Type A plug ... RJ45 jack	0.2m	72T17001450IX

PushPull protection cover

Short   Long

PushPull protection cover	Part Number
Short type	09 45 845 0009
Long type	09 45 845 0015
Easy cap (refer to p41)	72PPCAP01

LTE antenna

LTE antenna		Part Number
LTE monopole antenna IP20		72MICA0000254
LTE flat antenna P67	1m	72MICA0000225
LTE magnetic mount antenna IP65	2m	72MICA0000252
LTE 3-in-1 antenna (GPS + 2x4G MIMO) IP67	2m	72MICA0000255

LTEmonopole antenna
SMA screw

LTE flat antenna
mounted on glass or plastic

cable 1m

LTEmagnetic mount antenna
mounted magnetically on a
metal surface

cable 2m

LTE 3-in-1antenna
mounted on glass or plastic

cable 2m

CUSTOM

Examples of the latest AI utilization

By installing machine learning/deep learning libraries on MICA-R, cutting-edge AI algorithms can be used for fault diagnosis. HARTING supports customers from the selection of the latest algorithms based on the data collected by MICA-R to the visualization of AI diagnosis results.

- PCA (principal factor analysis) method
Define new features that can be visualized by dimensionality reduction that maximizes the differences between samples.

- Hotelling T2 method
Using a multivariate analysis method, after normalizing a large number of feature values, the Mahalanobis distance is comprehensively evaluated.
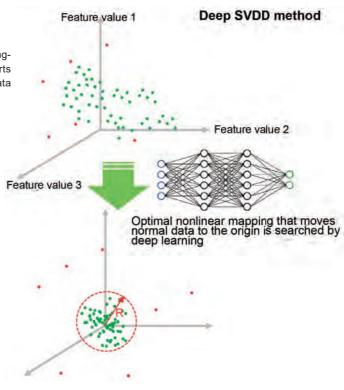
- 1-class SVM/Deep SVDD method
Define clusters of normal values using support vectors common in machine learning classifiers.

-Autoencoder method
We define an encoder/decoder that transforms the original data to a lower dimension and restores it by inverse transform, and tune the NN to minimize the loss.

Deep SVDD method

Feature value 1

Feature value 2

Feature value 3

Optimal nonlinear mapping that moves normal data to the origin is searched by deep learning
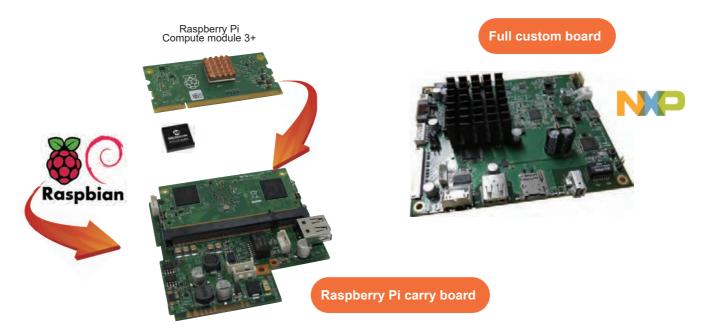
Customize board

The optimal solution for short development periods, low development costs, and unpredictable quantities. Using the Raspberry Pi core module, we develop a carry board that meets the customer's specifications. The Raspberry Pi is an ultra-compact single-board computer (SBC) and is used all over the world, not only in related products and books, but also in many program codes published on the Internet, making it easy for beginners to get started.

Full custom solution

The best solution for long supply periods, high volumes, and when dedicated hardware or special driver designs are required. In this case, we consistently provide an ARM-based embedded Linux board computer that meets customer specifications, from prototype development to the mass production phase, as well as driver, firmware, and software development.

Raspberry Pi
Compute module 3+

Full custom board

Raspberry Pi carry board

The first steps of shop floor IoT wireless sensing

The need for wireless is also increasing in IoT projects on the manufacturing floor. In particular, wireless sensors greatly reduce installation costs, and the synergistic effect of low-cost general-purpose microcomputers and MEMS sensor chips lowers the threshold for introducing predictive diagnosis IoT. In the IoT of social infrastructure, information from sensors and on-site equipment is often uploaded to cloud servers in the Internet space, but at manufacturing sites, the destination of sensor data is generally the local network for control systems and diagnostic systems. WiFi, Bluetooth, Zigbee, etc. are famous for on-premises (on-site) wireless technology, but due to the availability of bands, propagation characteristics, and power consumption, the sub-giga band known as LoRa (915 MHz in Japan, 866 MHz in Europe, 920 MHz in the United States) is selected in many projects.
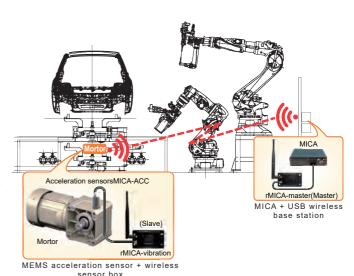
Building wireless sensor network

HARTING's wireless sensor communication using the sub-giga band implements a unique modulation method on a wireless chip from Semtech, Inc., and achieves a communication speed of nearly 300kbps (reaching distance of 100m), which is more than 10 times that of LoRa. . If you want to focus on distance, you can also transmit up to 10km or more by selecting LoRa modulation.

A USB wireless receiver rMICA-master is connected to an industrial Raspberry Pi as a master device, and communicates with a wireless sensor box that corresponds to a slave device connected to a sensor. It is possible to place multiple wireless sensor boxes (slave units) for one master receiver. The number of wireless sensor boxes is limited by the amount of data sent from the box and the transmission interval. The wireless module also supports multi-hop, so it is possible to relay a USB-connected wireless receiver between parent and child (in that case, a Raspberry Pi is not required, but a 5V power supply is required).

The sub-giga band (915-930MHz) is a frequency band allocated by the Ministry of Internal Affairs and Communications in 2010 mainly for wireless sensors and UHF RFID tag communication. Some channels are also shared by UHF RFID tags, so please check the radio wave usage status. Multiple sensor networks can be constructed in the same area by selecting different channels.

MICA

rMICA-master(Master)
MICA + USB wireless base station

Acceleration sensorsMICA-ACC

(Slave)

Mortor

rMICA-vibration

MEMS acceleration sensor + wireless sensor box

rMICA Product List

USB wireless base station
rMICA-master
Base station for communicating with the wireless sensor box

Wireless sensor box
MICA-vibration
Process measurements from accelerometer probes
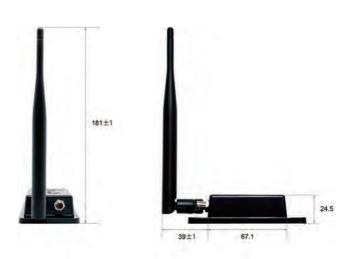Transmitted wirelessly to host computer

USB wireless base station
rMICA-master

A base station for communicating with the wireless sensor box. connect to a host computer such as MICA-R via USB.
- Built-in 920MHz wireless module
- Industry's fastest transmission speed of 300kbps by adoptinga wireless chip manufactured by Semtech in the United States. (200m) achieved.
- Compatible with frequency bands around the world (requires radio certification separately)
- USB power supply
- Dustproof and waterproof IP65

Product specifications

Model name	rMICA-master
main chip	FTDI FT234XD-R、SEMTECH SX series
Interafce	M8 4pin male x 1: USB2.0A RMA female x 1: external antenna
Power	Not required (USB power supply)
IP class	IP65
Certification	TELEC(Wireless)
Wireless standard	Domestic 920MHz band sub-giga standard
wireless chanel	24（916MHz）～ 61（928MHz）
Wireless output (module)	20mW
Antenna	Omnidirectional 3dBi, RMA male
Host cnnection	USB 2.0 A
Housing	Flame-retardant ABS
Operating temp. range	-15... 60° C
Size WxHxD(mm)	100 x 24.5 x 59
Mounting	4 x M4 screws

Oder information
Main unit

Model	Part Number
USB wireless base station rMICA-master	72RMICAMSTR01

USB cable

USB cable（MICA-R4 or general PC connection）		Part Number
M8 A-coded, 4pin, Female ... USB 2.0A [aux.]	2m	Please contact us

USB cable（MICA-R4, waterproof）		Part Number
M8 A-coded, 4pin, Female...PushPull USB 2.0A	2m	Please contact us

<Attached cable>
M8 A-coded, 4-pin female
~USB 2.0A, 2m

MICA-R/MICA-R4 and others
Connect to computer via USB

PushPull USB 2.0 A
（waterproof）

181±1

24.5

39±1 67.1

50.7 20

15

59 40

84

100
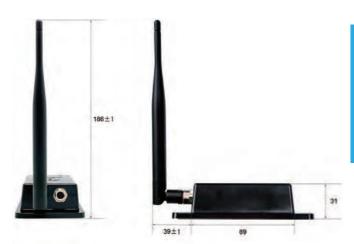
Wireless sensor box for acceleration sensor

rMICA-vibration

(unit : mm)
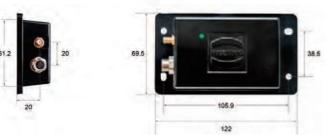
It processes the readings from the accelerometer probe and wirelessly sends them to the host computer

· Super power saving microcomputer STM32L4 adopted
· Industry's fastest transmission speed of 300kbps by adopting a wireless chip manufactured by Semtech in the United States (200m) achieved.
· Compatible with frequency bands around the world (requires radio certification separately)
· Battery drive, built-in high-capacity long-life battery
· Dustproof and waterproof IP65

Product specifications

Model name	rMICA-vibration
main chip	STM32 L432K、SEMTECH SX series
Interafce	M8 8pin Female x 1: sensor input RMA Female x 1:external antenna
Power	Built-in battery: 3.6 V, 13.5 Ah
IP class	IP65
Wireless standard	Domestic 920MHz band sub-giga standard
wireless chanel	24（916MHz）〜 61（928MHz）
Wireless output (module)	20mW
Antenna	Omnidirectional 3dBi, RMA male
Housing	Flame-retardant ABS
Certification	TELEC(Wireless)
Operating temp. range	-15... 60° C
Size WxHxD(mm)	122 x 31 x 69.5
Mounting	4 x M4 screws

Oder information

Main unit

Model	Part Number
Wireless box for acceleration sensor rMICA-vibration	72RMICAVIBR01

Accessories

Model	Part Number
Battery for acceleration sensor wireless sensor box	72RMICABATR01

Analog voltage output 0-10kHz 1-axis acceleration sensor

sMICA-ACC

DC current sensor

sMICA-CUR

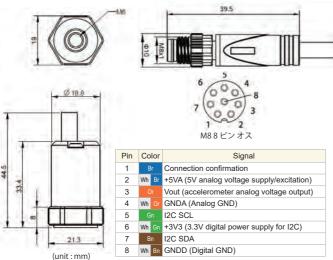High-precision measurement of vibrations of motors etc., using high-performance MEMS sensors

- Measuring range over 20,000 Hz by adopting the latest MEMS chip Achieves overwhelmingly low noise
- Suitable for motor failure diagnosis
- Built-in temperature sensor (I2C) and low
- speed 3-axis acceleration sensor (I2C)
- Dustproof and waterproof IP66
- Industrial Raspberry Pi MICA-R STM32 SENSOR or
  Used by connecting to the wireless sensor box rMICA-vibration

Compact, space-saving, low-cost current sensor
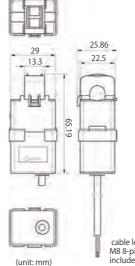-Space-saving design with a width of 25.9 mm
-Separate type for easy retrofitting
-DC30A φ10mm
-Response performance of 10μsec or less at 0 → rated current
-Easy-to-use +5V single power supply specification

Product specifications

Model/Part Number		sMICA-ACC / 72SMICAACCR01
probe	Mounting method	M6 screw
	Operating temp. range	-20... 85° C
	IP rating	IP66
	Material	Hard anodized
	Size	φ21.3 x 33.4mm (excl. protrusions and cables)
Attached cable	Length	2m
	Connector	M8 8pinMale
1 axis Acceleration sensor (analog voltage output))	Acceleration range	-10g...+10g
	Frequency range	0...10kHz(±10%)
	Noise level	25μg/√Hz
	Nominal sensitivity	40mV/g
	Sensitivity due to temp.	±2%
	Linearity error	0.1%FS
	Cross-axis sensitivity	-1...+1%
	Supply voltage	5V
temperature sensor (I2C output)	Temp. sensor range	-40...125°C
	Temp. sensor accuracy	±3°C(-40～85°C)
	Resolution	10bits
	Supply voltage	3.3V
low speed 3 axis Acceleration sensor (I2C output)	Acceleration range	2～16g
	Sample rate	1Hz
	Resolution	10bits
	0g offset error	－ 250～250mg
	0g offset temp. coefficient	±1.2mg/°C
	Linearity error	±0.5%FS
	Cross-axis sensitivity	-1...+1%
	Supply voltage	3.3V

(Built-in sensor)

Product specifications

Model/Part Number	sMICA-CUR / 72MICACTF3010DC
Rated current	DC 30A
Allowable current	DC 33A
Output voltage	+30A input : DC +4.5V 0Ainput : DC +2.5V -30A input: DC +0.5V
Attachable wire diameter	Max.φ10mm
Accuracy	±2.0%F.S
Temp. coefficient	±0.1%/℃
Response speed	0 → 10 μsec or less at rated current
Power supply voltage	+5V±5%(Single power supply)
Withstand voltage	AC 2000V/1min(Outer case - Output)
Insulation resistance	DC 500V/100MΩ 以上 (Outer case - Output)
Operating temp./humi. range	-10 ～ 65℃ / Less than 85%RH(No condensation)
Reference standard	RoHS
cable	20cm (connector：M8 8pin male)
Wiring	Red：Power +5V White：Output OUT Shield：Power 0V/Output GND
Size / Weight	W25.9×H65.2×D31.1mm / approx.36g

Probe dimensions

M8 connector cable details

Pin	Color	Signal
1	Br	Connection confirmation
2	Wh Br	+5VA (5V analog voltage supply/excitation)
3	Or	Vout (accelerometer analog voltage output)
4	Wh Or	GNDA (Analog GND)
5	Gn	I2C SCL
6	Wh Gn	+3V3 (3.3V digital power supply for I2C)
7	Bn	I2C SDA
8	Wh Bn	GNDD (Digital GND)

M8 8 ピン オス

(unit : mm)

Dimensions

M8 connector wiring

M8 8pin male

Pin	Wiring
1	NC
2	Red：Power+5V
3	White：Output OUT
4	Shield：Poweer0V・Output GND
5	NC
6	NC
7	NC
8	NC

cable length about 20cm
M8 8-pin male connector included

(unit: mm)

Raspberry Pi ready for industrial use

The RevPi series is an industrial Raspberry Pi that is equipped with an embedded Raspberry Pi Compute Module (CM) and can be easily introduced at a low cost. As a computer that can be easily attached to a control panel with a DIN rail, it is ideal for applications such as traceability data collection, linkage with PLCs, and digital signage (displaying information on a large screen). It is in actual operation on automobile manufacturing lines and machine tools.

New RevPi S/SE series with CM4S

The previous RevPi was equipped with CM3+, which is equivalent to the general Raspberry Pi 3B+, but the new RevPi S series / SE series equipped with CM4S based on the same ARM Cortex-A72 processor as the latest CM4 has appeared. The form factor of CM4S has not changed from CM3+, the clock has been improved from 1.2GHz to 1.5GHz, and the RAM has been enhanced from LPDDR2 to LPDDR4.

Compare main specifications

Model	RevPi Core 3+	RevPi Connect+	RevPi Core S/SE	RevPi Connect S/SE
Compute Module	CM3+		CM4S	
Processsor	Broadcom BCM2837B0, quad-core ARM Cortex-A53		Broadcom BCM2711, quad-core ARM Cortex-A72	
Clock rate	1.2 GHz		1.5 GHz	
RAM	1 GB LPDDR2		1 GB LPDDR4	
eMMC Flash memory	8 GB / 16 GB / 32 GB		8 GB / 16 GB / 32 GB	
HDMI version	HDMI 1.3a (FHD)		HDMI 2.0a (4K)	
Power	12 - 24 V DC			
RJ45 LAN port (10/100Mbit/s)	1	2 (separate MAC addresses)	1	2 (separate MAC addresses)
USB2.0	2	2	2	2
microHDMI	1	1	1	1
microUSB2.0(for eMMC writing)	1	1	1	1
RS-485(4-pin terminal connector)	-	1	-	1
PiBridge(I/O exp.module, Gate module)	2	1	2	1
ConBridge(RevPi Con module)	-	1	-	1
UPS shutdown signal 24V input	-	1	-	1
Programable relay switch contact	-	1	-	1
Size (D x W x H)	110.5 x 22.5 x 96 mm	110.5 x 45 x 96 mm	110.5 x 22.5 x 96 mm	110.5 x 45 x 96 mm
IP rating	IP20			
ESD protection	4 kV/8 kV			
EMI (acc. to EN61131-2 and IEC61000-6-2)	Passed			
Surge/Burst(acc. to EN61131-2 and IEC61000-6-2)	Passed			
CE, RoHS	Yes			
UL	Yes, UL-File-No. E494534			

RevPi Core S / Connect S

Compute Module 4S installed, onboard eMMC8/16/32GB, fieldbus module compatible

RevPi Core S

RevPi Connect S

Product Specifications

Powered by Raspberry Pi	Compute Module 4S (CM4S)*
Processor	Broadcom BCM2711, Quad-core Arm Cortex-A72, 1.5GHz
RAM	1GB LPDDR4
Flash	Onboard eMMC 8/16/32GB
OS	Raspberry Pi OS
Interface	1 x power input connector
	2 x USB Type-A (max. current up to 900mA for both)
	1x RJ45 10/100Mbps Ethernet
	1 x Micro-USB (only for image transfer to eMMC)
	1 x Micro HDMI : HDMI 2.0a (4K)
Expansion interface	2 x PiBridge system bus (black)
	Connectable expansion modules**:
	RevPi IO Module and RevPi Gate Module
LED	PWR normal (green), abnormal (red)
	A1, A2 custom enabled LEDs (green/red)
Power input range	DC12-24V -15%/+20%
Power consumption	about 10W
Operating temp. range	-25 ... 55°C
Storage temp. range	-40 ... 85°C
Operating humidity range	93% (no condensation)
Degree of protection	IP20
Housing material	Polycarbonate
Dimensions	H96 x D22.5 x W110.5mm (excluding protrusions)
weight	Approx. 115g
ESD protection	4kV / 8kV (EN61131-2, IEC61000-6-2)
EMI	EN61131-2, IEC61000-6-2
Surge/burst	EN61131-2, IEC61000-6-2
Certification	CE, RoHS
RTC buffer time	min.24h
Installation method	DIN rail mounting
Add-on Software	Software PLC CODESYS pre-installable

*Please note that CM4S new CPUs are only supported with kernel 5.10.

** RevPi Core S can use his IO expansion module for digital/analog input/output expansion and Gate module for fieldbus.

● Optional accessory
RevPistart up power kit
(AC adopter + Connector)
【Part Number :
72PRPOWK01】

Ordering information

Model	CODESYS	eMMC	Part Number
RevPi Core S	not-installed	8GB	72PR100359
		16GB	72PR100360
		32GB	72PR100361
	pre-installed	8GB	72PR100359C01
		16GB	72PR100360C01
		32GB	72PR100361C01

Product Specifications

Powered by Raspberry Pi	Compute Module 4S (CM4S)*
Processor	Broadcom BCM2711, Quad-core Arm Cortex-A72, 1.5GHz
RAM	1GB LPDDR4
Flash	Onboard eMMC 8/16/32GB
OS	Raspberry Pi OS
Interface	1 x power input connector
	1 x digital input/output connector
	Input: 24V input, about 3.0V (0->1)/2.3V (1->0)
	Relay output: 2A @ DC30V (resistive load)
	2 x USB Type-A (max current up to 1A for both)
	2 x RJ45 10/100 Mbps Ethernet (separate MAC)
	1 x RS-485 connector (without electrical isolation)
	1 x Micro-USB (only for image transfer to eMMC)
	1 x Micro HDMI : HDMI 2.0a (4K)
Extended interface	1 x PiBridge system bus (black)
	1 x ConBridge system bus (grey)
	Connectable expansion modules**:
	RevPi IO Module, RevPi Con Module,
	and RevPi Gate module
LED	PWR normal (green), abnormal (red)
	A1, A2, A3 Custom usable LEDs (green/red)
	WD Watchdog normal (green), abnormal (red)
	REL relay output status on (green), off (light off)
Power input range	DC12-24V -15%/+20%
Power consumption	about 20W
Operating temp. range	-25 ... 55°C
Storage temp. range	-40 ... 85°C
Operating humidity range	93% (no condensation)
Degree of protection	IP20
Housing material	Polycarbonate
Dimensions	H96 x D45 x W110.5mm (excluding protrusions)
Weight	Approx. 224g (including connector)
ESD protection	4kV / 8kV (EN61131-2, IEC61000-6-2)
EMI	EN61131-2, IEC61000-6-2
Surge/burst	EN61131-2, IEC61000-6-2
Certification	CE, RoHS
RTC buffer time	min.24h
Installation method	DIN rail mounting
Add-on Software	Software PLC CODESYS pre-installable

*Please note that CM4S new CPUs are only supported with kernel 5.10.
** RevPi Connect S can use his IO expansion module for digital/analog input/output expansion, Con module for M-bus/CAN-bus and Gate module for fieldbus.

Ordering information

Model	CODESYS	eMMC	Part Number
RevPi Connect S	not-installed	8GB	72PR100362
		16GB	72PR100363
		32GB	72PR100364
	pre-installed	8GB	72PR100362C01
		16GB	72PR100363C01
		32GB	72PR100364C01

All data given are in line with the actual state of art and therefore not binding.
HARTING reserves the right to modify designs without giving the relevant reasons.

RevPi

RevPi Core SE / Connect SE

Compute Module 4S installed, onboard eMMC8/16/32GB
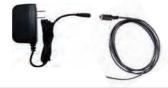
RevPi Core SE

Product Specifications

Powered by Raspberry Pi	Compute Module 4S (CM4S)*
Processor	Broadcom BCM2711, Quad-core Arm Cortex-A72, 1.5GHz
RAM	1GB LPDDR4
Flash	Onboard eMMC 8/16/32GB
OS	Raspberry Pi OS
Interface	1 x power input connector
	2 x USB Type-A (max.current up to 900mA for both)
	1x RJ45 10/100Mbps Ethernet
	1 x Micro-USB (only for image transfer to eMMC)
	1 x Micro HDMI : HDMI 2.0a (4K)
Expansion interface	2 x PiBridge system bus (black)
	Connectable Expansion Modules**: RevPi IO Module
LED	PWR normal (green), abnormal (red)
	A1, A2 custom enabled LEDs (green/red)
Power input range	DC12-24V -15%/+20%
Power consumption	about 10W
Operating temp. range	-25 ... 55°C
Storage temp. range	-40 ... 85°C
Operating humidity range	93% (no condensation)
Degree of protection	IP20
Housing material	Polycarbonate
Dimensions	H96 x D22.5 x W110.5mm (excluding protrusions)
weight	Approx. 115g
ESD protection	4kV / 8kV (EN61131-2, IEC61000-6-2)
EMI	EN61131-2, IEC61000-6-2
Surge/burst	EN61131-2, IEC61000-6-2
Certification	CE, RoHS
RTC buffer time	min.24h
Installation method	DIN rail mounting
Add-on Software	Software PLC CODESYS pre-installable

*Please note that CM4S new CPUs are only supported with kernel 5.10.

**RevPi Core SE does not support RevPi Gate module for fieldbus.

● Optional accessory
RevPistart up power kit
(AC adapter + Connector)
【Part Number :
72PRPOWK01】

Ordering information

Model	CODESYS	eMMC	Part Number
RevPi Core SE	not-installed	8GB	72PR100365
		16GB	72PR100366
		32GB	72PR100367
	pre-installed	8GB	72PR100365C01
		16GB	72PR100366C01
		32GB	72PR100367C01

RevPi Connect SE

Product Specifications

Powered by Raspberry Pi	Compute Module 4S (CM4S)*
Processor	Broadcom BCM2711, Quad-core Arm Cortex-A72, 1.5GHz
RAM	1GB LPDDR4
Flash	Onboard eMMC 8/16/32GB
OS	Raspberry Pi OS
Interface	1 x power input connector
	1 x digital input/output connector
	Input: 24V input, about 3.0V (0->1)/2.3V (1->0)
	Relay output: 2A @ DC30V (resistive load)
	2 x USB Type-A (max current up to 1A for both)
	2 x RJ45 10/100 Mbps Ethernet (separate MAC)
	1 x RS-485 connector (without electrical isolation)
	1 x Micro-USB (only for image transfer to eMMC)
	1 x Micro HDMI : HDMI 2.0a (4K)
Extended interface	1 x PiBridge system bus (black)
	1 x ConBridge system bus (grey)
	Connectable expansion modules**:
	RevPi IO Module and RevPi Con Module
LED	PWR normal (green), abnormal (red)
	A1, A2, A3 Custom usable LEDs (green/red)
	WD Watchdog normal (green), abnormal (red)
	REL relay output status on (green), off (light off)
Power input range	DC12-24V -15%/+20%
Power consumption	about 20W
Operating temp. range	-25 ... 55°C
Storage temp. range	-40 ... 85°C
Operating humidity range	93% (no condensation)
Degree of protection	IP20
Housing material	Polycarbonate
Dimensions	H96 x D45 x W110.5mm (excluding protrusions)
Weight	Approx. 224g (including connectors)
ESD protection	4kV / 8kV (EN61131-2, IEC61000-6-2)
EMI	EN61131-2, IEC61000-6-2
Surge/burst	EN61131-2, IEC61000-6-2
Certification	CE, RoHS
RTC buffer time	min.24h
Installation method	DIN rail mounting
Add-on Software	Software PLC CODESYS pre-installable

*Please note that CM4S new CPUs are only supported with kernel 5.10.

** RevPi Connect SE can use his IO expansion module for digital/analog I/O expansion, Con module for M-bus/CAN-bus. RevPi Gate module for fieldbus is not supported.

Ordering information

Model	CODESYS	eMMC	Part Number
RevPi Connect SE	not-installed	8GB	72PR100368
		16GB	72PR100369
		32GB	72PR100370
	pre-installed	8GB	72PR100368C01
		16GB	72PR100369C01
		32GB	72PR100370C01

All data given are in line with the actual state of art and therefore not binding.
HARTING reserves the right to modify designs without giving the relevant reasons.

RevPi

Revolution Pi expansion modules Digital IO modules

HARTING

Product Specifications

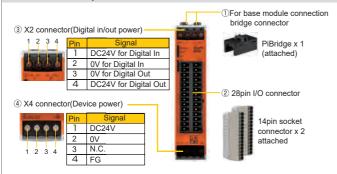|	
Digital input channel	14ch PNP
Digital input	Insulation: internal logic, DC24V(Device power/output)
Electrical specifications	Input current limitation : 2.4 mA (at 24 V power supply)
	counter input : 2kHz(corresponding to 500Hz encoder)
Digital input connection	14pin socket connectors (0.2 ...1.5 mm²)
Digital output channel	14ch PNP
Digital output	Insulation: internal logic, DC24V(Device power/output)
Electrical specifications	Current output : 500mA(High-Side Mode),
	100mA(Push-Pull Mode)
	PWM* : 40/80/160/200/400Hz(selectable)
Digital output connection	14pin socket connectors (0.2 ...1.5 mm²)
Alarm	Thermal shutdown or short circuit of outputs(for each output).
Dual	In the event of communication failure with the controller (after
Watchdog	50 ms or 500 ms 4) or internal communication with the CPU (after
	9 ms, hardware-controlled), the outputs are reseted to zero.
Output protection	According to EN 61131-2 (IEC 61000-4-4, -5, -6, and -2) against
	short circuit, overload, burst, ESD.
Power input range	DC12-24V -15%/+20%
Power input protection	Reverse polarity protected, transient overvoltages
Power consumption	1.5 Watt (X4/power supply)
Operating temp. range	-40 ... 55 °C
Storage temp. range	-40 ... 85 °C
Operating humidity range	0 ... 93% (non-condensing)
Degree of protection	IP20
housing material	Polycarbonate
External dimensions	H96 x D22.5 x W110.5mm (excluding protrusions)
weight	approx. 100 g / 130 g (incl. connectors)
Installation method	DIN rail mount
CE, RoHS	Yes

*PWM pulse width is stored in 1 byte in the process image as a value between 0 and 100. The maximum
resolution of conversion (%) of this value by the module depends on the PWM frequency (40 Hz/1%, 80
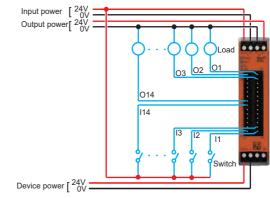Hz/2%, 160 Hz/4%, 200 Hz/5%, 400 Hz/10%)

Details of parts

③ X2 connector(Digital in/out power)

① For base module connection
bridge connector

PiBridge x 1
(attached)

Pin	Signal
1	DC24V for Digital In
2	0V for Digital In
3	0V for Digital Out
4	DC24V for Digital Out

④ X4 connector(Device power)

② 28pin I/O connector

Pin	Signal
1	DC24V
2	0V
3	N.C.
4	FG

14pin socket
connector x 2
attached

Ordering information

Model	Name	Part Number
Digital input 14ch / output 14ch module	RevPi DIO	72PR100197

Dimension

22.5
96
110.5mm
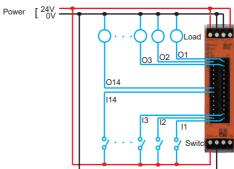
Wiring diagram
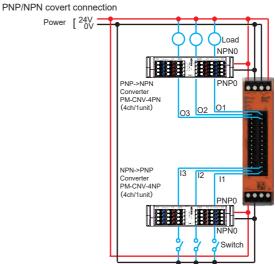
Wiring diagram for 3-port isolation method

Input power [24V 0V]
Output power [24V 0V]
Load
O3 O2 O1
O14
I14
I3 I2 I1
Switch
Device power [24V 0V]

Wiring diagram for single power supply system

Power [24V 0V]
Load
O3 O2 O1
O14
I14
I3 I2 I1
Switch

Wiring diagram for single power supply system

PNP/NPN covert connection

Power [24V 0V]
Load
NPN0
PNP->NPN
Converter
PM-CNV-4PN
(4ch/1unit)
PNP0
O3 O2 O1
NPN->PNP
Converter
PM-CNV-4NP
(4ch/1unit)
I3 I2 I1
PNP0
NPN0
Switch

Revolution Pi expansion modules Analog IO module

Dimension

22.5
96
110.5mm
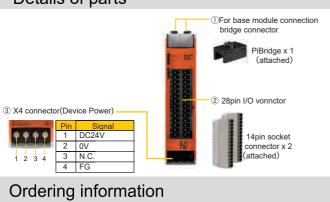
Product Specifications

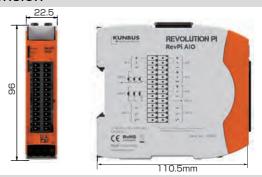|	
Analog input channel	6ch
Analog input Electrical specifications	for voltage Max.4ch : ±10 V | ±5 V | 0…10 V | 0…5 V for current Max.4ch : 0…20 mA | 0…24 mA | 4…20 mA | ±25 mA for RTD (Pt100/Pt1000) Max.2ch : 2/3/4w -200…+850 °C
Analog input connection	14pin connector (0.2 - 1.5 mm²)
Analog output channel	2ch
Analog output Electrical specifications	for voltage Max.2ch : ±10 V | ±11 V | ±5 V | ±5.5 V | 0…10 V | 0…11 V |0…5 V | 0…5.5 V, for current Max.2ch : 0…20 mA | 0…24 mA | 4…20 mA
Analog output connection	14pin connector (0.2 - 1.5 mm²)
Galvanic isolation	Input to Input : No, Input to Output : Yes, Output to Output : No, System bus to inputs/outputs : Yes
Input type	Voltage/current : differential, RTD : 2, 3, 4-wire
Output type	single ended, common ground, short-circuit proof
ADC/DAC	24 bit ΔΣ / 16 bit
Input resolution	Voltage:1mV(16bit), Current:1µA(16bit), RTD:0.1 K(16bit)
Output resolution	Voltage:1mV(16bit), Current:1µA(16bit)
Input accuracy @25°C	Voltage:±10 mV (±5 mV @ 0…5 V range) Current:±20 µA (±24 µA @ 0…24 µA range) RTD :±0.5 K
Output accuracy @25°C	Voltage:±15 mV Current:±20 µA
input conversion time	8…1000 mss (adjustable)
Output slew rate	1 LSB@3.3 kHz up to 128 LSB@258 kHz
input impedance	Voltage:>900 kΩ, Current:<250 Ω
output impedance	Voltage:<16 Ω, Max. capacitive load 5 nF @1 kΩ
Load resistance	Max. load resistance for current output:600 Ω, Min. load resistance for voltage output:1 kΩ
Power input range	DC12…24V -15%/+20%
Power input protection	Reverse polarity protection, overvoltage protection
Current consumption	Max.200mA/24V(full load), Max.500mA(start up)
Operating temp. range	-30…55 °C
Storage temp. range	-40…85 °C
Operating humidity range	0…93%(No condensation)
IP rating	IP20
Housing	Polycarbonate
Size	H96 x D22.5 x W110.5mm (Does not include protrusions)
Weight	approx. 115g(incl. connector)
Installation method	DIN-rail mount
CE, RoHS	Yes

Details of parts

①For base module connection bridge connector

PiBridge x 1 （attached)

② 28pin I/O vonnctor

14pin socket connector x 2 （attached)

③ X4 connector(Device Power)

Pin	Signal
1	DC24V
2	0V
3	N.C.
4	FG

Ordering information

Model	Name	Part Number
Analog in 6ch/Out 2ch AIO module	RevPi AIO	72PR100250

Wiring diagram

Analog input

Current

Current IN 1
Requires external wiring
Current IN 2
Current IN 3
Current IN 4

Voltage

Voltage IN 1
Voltage IN 2
Voltage IN 3
Voltage IN 4

RTD input

4-wire

RTD2
RTD1

3-wire

RTD2
RTD1

2-wire

RTD2
RTD1
Requires external wiring

Analog output

電流

Device Internal Wiring
Current OUT 2
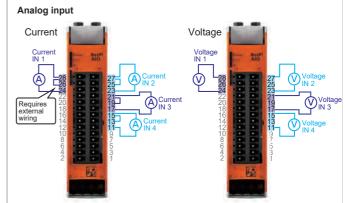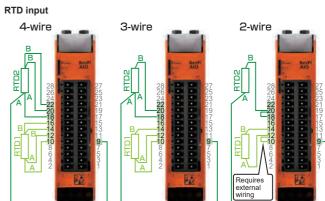Device Internal Wiring
Current OUT1

電流

Device Internal Wiring
Voltage OUT 2
Device Internal Wiring
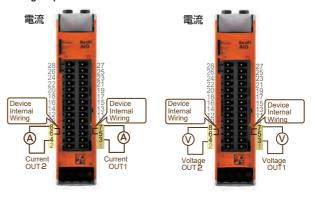Voltage OUT1

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2.0MP, CMOS, USB 2.0 camera

- Maximum resolution: 1920 x 1080
- Video monitoring by plug and play with PC, no additional power supply required
- Reliable function in both high and low light environments
- High-performance Sony IMX322 sensor adopted
- Voice support

Construct an image processing application in combination with the RevPi series and MICA-R4

Product specifications

Sensor	Sony IMX322
Pixel size	12.8X11.6 mm
Lens size	1/2.9"
Lens parameters	5-50mm, varifocal lens, CS mount
Image area	2000 (H) X1121 (V) Approx. 2.24 M pixels
Resolution	Up to 1920 x 1080P, 2 megapixels
Frame rate	H264: Up to 1920X1080@30fps MJPEG: Up to 1920X1080 @ 30fps YUV: Up to 800X600@15fps
Dynamic range	86dB
SNR	42dB
Sensitivity	5.0 V/lux-sec @ 550nm
Minimum illumination	0.01 lux
Gain	adjustable
Exposure time	adjustable
Shutter mode	Electronic rolling shutter/frame exposure
Data interface	USB2.0 High Speed
Compression method	H264 /MJPEG / YUV2(YUYV)
Power supply	DC5V, USB BUS POWER 4P-2.0mm socket
Temperature	Operating temperature -20 ... 85°C
Size	Board 41 x 41 mm
Weight	About 200g
OS	Win7, Win8, Win10 Linux 2.6 or higher Android 4.0 or higher
Cable	USB cable 3m (standard)

Order information

Product name	Part Number
2.0MP, CMOS, USB 2.0 camera	72USBFHD06H-SFV

Industrial USB hub

- 4-port industrial USB2.0 hub
- 1 x USB Type-B: Upstream
- 4 x USB Type-A: Downstream
- 120...480Mbps
- DC7V to DC24V (power supply connector)
- Support USB bus power (jumper selection)
- Compatible with Windows, Linux, Mac OS
- Compatible with DIN rail mounting (mounting kit included)
- Wide operating temperature range 0°C to +55°C
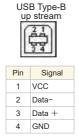- Protection class IP30

Product specifications

Part Number	72EX-1163HM
Chipset	NEC uPD720114
Data rate	120...480Mbit/s
Support OS	Windows 98SE/ME/2000/ XP/Vista/7/8.x/10(32&64-Bit)/ CE/ Server(2003, 2008 & 2012 R2), Linux, Mac OS 10.x
Connector	4x USB 2.0 Type-A ports 1x USB 2.0 Type-B port 1x DC7V~DC24V 3-pin connector terminal block
Support system	USB 1.1, 2.0, 3.0, 3.1
Power	DC7V...DC24V
Operating temp. range	Operating temp. 0 ... +55°C/Storage temp. -40 ... 85°C
Operating Humi. range	0...95%(non-condensing)
IP rating	IP30
Size	114.5 x 66.43 x 26.0 mm
Weight	420g
Accessories	USB cable 2.0m DIN rail mount kit
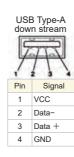
Details of each part
Interface

DC7V~24V power connector
4 x USB2.0 Type-A down stream
PWR LED
USB Type-B up stream
Status LED

Connector

power connector

GND
DC7V~24V

USB Type-B up stream

Pin	Signal
1	VCC
2	Data−
3	Data +
4	GND

USB Type-A down stream

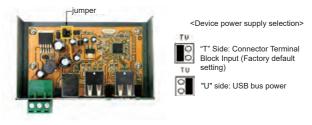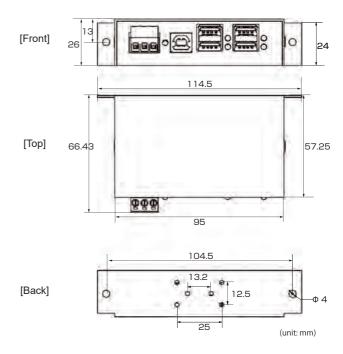| Pin	Signal
1	VCC
2	Data−
3	Data +
4	GND

Device power supply selection (jumper selection)

The unit supports two types of device power input via internal jumpers.

The factory setting is the jumper "T" side, and the power input is wired on the connector terminal block. Switch the jumper to the "U" side to operate the device with USB bus power from the upstream side. When changing the jumper settings, be sure to remove all wiring, remove the two screws, and open the housing.

jumper

<Device power supply selection>

"T" Side: Connector Terminal Block Input (Factory default setting)

"U" side: USB bus power

Dimensions

[Front]

13
26
24

114.5

[Top]

66.43

57.25

95

[Back]

104.5
13.2
12.5
Φ 4
25

(unit: mm)

Order information

Product name	Part Number
4 port industrial usb hub	72EX-1163HM

HARTING

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Since 1945

www.pi4industry.com

Industrial Raspberry Pi
website