Overview

EM-1000 is a high-performance ARM industrial computer developed by ZLG Zhiyuan Electronics for the industrial computer market.

The EM-1000 industrial computer has multiple Cortex-A53 cores up to 1.1GHz, 2GB of on-board memory, and 8GB of eMMC memory.EM-1000 has a wealth of functional interfaces, including Gigabit Ethernet, LVDS, USB, CAN interfaces, RS485, RS232, DI, DO, ADC, M.2 and MiniPCIe slots.

Feature

◆ Multi-core Cortex-A53，1.1GHz
◆ 2GB DDR3
◆ 8GB eMMC
◆ On board independent watchdog
◆ Supports multi channel hardware interface
  ➢ 4 channel 10/100/1000M Ethernet
  ➢ 2 channel USB Host
  ➢ 8 channel RS-485
  ➢ 2 channel RS-232
  ➢ 3 channel CAN-Bus
  ➢ 1 channel TF Card
  ➢ 1 channel LVDS
  ➢ 18 channel DI
  ➢ 8 channel DO
  ➢ 4 channel ADC
  ➢ 1 channel miniPCIe
  ➢ 1 channel M.2
  ➢ Support backup power

Product Application

◆ Industrial control
◆ Industrial gateway

Ordering information

model	temperature range
EM-1000	-40°C ~ +60°C

产品图片

Revision History

Version	Data	Description
V1.00	2023-08-19	Initial Release.
V1.01	2024-03-20	Update the description of the rated power section.

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EM-1000

ARM industrial computer

Contents

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1. Product Introduction

1.1 Product image

Figure 1 is the appearance of the EM-1000 and the rear panel of the machine shown as Figure 2.

Figure 1   Product Appearance

Figure 2   Rear Panel of the Whole Machine

Note: The appearance of the product in order to prevail in kind. This document is only for illustration.This equipment is not suitable for use in locations where children are likely to be present.

EM-1000

1.2   Main parameter

Name	Main parameter
Processor	Multi-core 1.1GHz
Memory	2GB DDR3
Storage	8GB eMMC
Watchdog	On board hardware watchdog
Working temperature	-40~＋60℃
Working humidity	5%~95%RH
altitude	Below 2,000 meters

1.3   Hardware resource

Hardware interfaces/peripherals	Quantity	Note
Ethernet	4 channel	10/100/1000Mbps
USB	2 channel	Host
CAN-bus	3 channel	
RS485	8 channel	
RS232	3 channel	2 channel for user，1 channel for DEBUG
TF card	1 channel	
LVDS	1 channel	The physical interface is DVI (including 1 USB for touch panel)
M.2	1 channel	PCIe2.0 X1
miniPCIe	1 channel	Support wireless module with USB interfaces
ADC	4 channel	0-20mA, 0-10V, accuracy 1%, sampling rate 40SPS
DI	18 channel	Optocoupler isolation
DO	8 channel	Relay isolation
Nano SIM	1 channel	Use for 4G module
LED	8 channel	Among them, 4 channels are programmable
Supercapacitor	1 channel	Power outage endurance for 5S(depending on workload)

Note：CANFD currently does not support accelerated frames(BRS).

1.4   Software Resources

◆   RT-Linux kernel

◆   Ubuntu system

◆   eMMC driver；

◆   Ext4 file system；

◆   PCIe2.0 and SSD driver

◆   LVDS display driver, LCD backlight driver, touch screen driver；

◆   USB Host driver, supporting USB keyboard, USB mouse, and USB disk；

◆   1000M Ethernet driver；

◆   CAN-Bus driver；

◆   RS485/RS232 driver；

◆ TF card driver, supporting hot swapping；

◆ I2C driver program, including RTC driver, etc；

◆ LED indicator driver；

◆ 4G module driver；

◆ Universal digital I/O driver；

◆ Buzzer driver；

◆ Watchdog and reset driver；

◆ ADC driver

1.5 Application scope

◆ industrial control

◆ Industrial gateway

2. Electrical characteristics

2.1 Working conditions

Name	Work environment
Operating Temperature	-40℃~+60℃
Environmental humidity	5%~95%

2.2 Power and power consumption characteristics

Parameter	Symbol	min	type	max	Unit	Note
working voltage	Vin	12.0	24.0	24.0	V	Maximum and minimum voltage allowed to fluctuate by 5%.
Rated power	P	--	15	25	W	The product's CPU is fully loaded and connected to a 10.1 inch display. All interfaces of the product are working(the miniPCIe interface and M.2 interface are not connected to the device,and the USB interface is connected to 200mA load).

Note：It is recommended to use a power supply that meets the specifications of ES1 and PS2 for power supply.

2.3 Interface performance

2.3.1 System frequency parameters

Name	min	type	max	Unit
System main frequency	-	1.1	-	GHz

2.3.2 TF card storage performance parameters

Parameter	Test conditions	min	type	max	Unit	Note
Write speed	Write 1GB of data	-	13	-	MB/s	SAMSUNG TFcard 16GB（C10）
Reading speed	Read 1GB of data	-	40	-	MB/s	SAMSUNG TFcard 16GB（C10）

2.3.3 DI interface performance parameters

Signal type	Input high-level effective voltage	Input low-level invalid voltage
Wet contact(DI13~DI18)	DC 9~24V	0-7V

2.3.4 DO interface performance parameters

Interface type	Contact（resistive）	Max swiching voltage	Max swiching current	Max swiching power

Interface type	Contact（resistive）	Max swiching voltage	Max swiching current	Max swiching power
Mechanical relay	3A/5A 277VAC/30VDC	250VAC/30VDC	5A	1385VA/150W

2.3.5 Ethernet interface performance parameters

Parameter	Test conditions	min	type	max	Unit
Sending rate	One-way Transmission	-	109MB/s	-	MB/s
Receiving rate	One-way Transmission	-	116MB/s	-	MB/s

2.3.6 USB storage performance parameters

Parameter	Test conditions	min	type	max	Unit
Write speed	SONY USB drive	-	11MB/s	-	MB/s
Reading speed	SONY USB drive	-	34MB/s	-	MB/s

2.4   Electromagnetic compatibility

Test project	Test interface	Test standards	Test level	Note
ESD	Power and signal ports	GB/T 17626.2-2018 / IEC61000-4-2:2008	Level 3	air discharge ± 8KV, contact discharge ±6KV
EFT	Power and signal ports	GB/T 17626.4-2018 / IEC61000-4-4:2012	Level 3	
Surge	Power and signal ports	GB/T 17626.5-2019 / IEC61000-4-5:2014	Level 3	
CS	Power and signal ports	GB/T 17626.6-2017 / IEC61000-4-6:2013	Level 3	10V/150kHz~80MHz

2.5   Environmental adaptability

| Test project	Test standards	Test condition	Result
Low temperature startup and operation test	GBT 2423.1-2008	-40℃	PASS
High temperature startup and operation test	GBT 2423.2-2008	+60℃	PASS
Constant damp heat test	GB/T 2423.3-2016	+40℃/95%RH	PASS

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Test project	Test standards	Test condition	Result
Temperature change test	GB/T 2423.22-2012	-40~+60℃	PASS

3. Mechanical dimensions
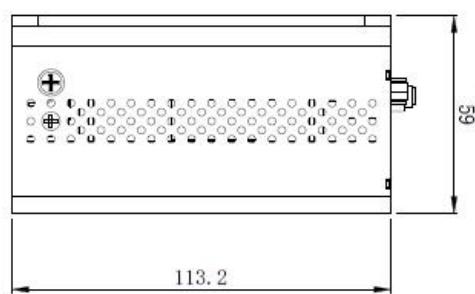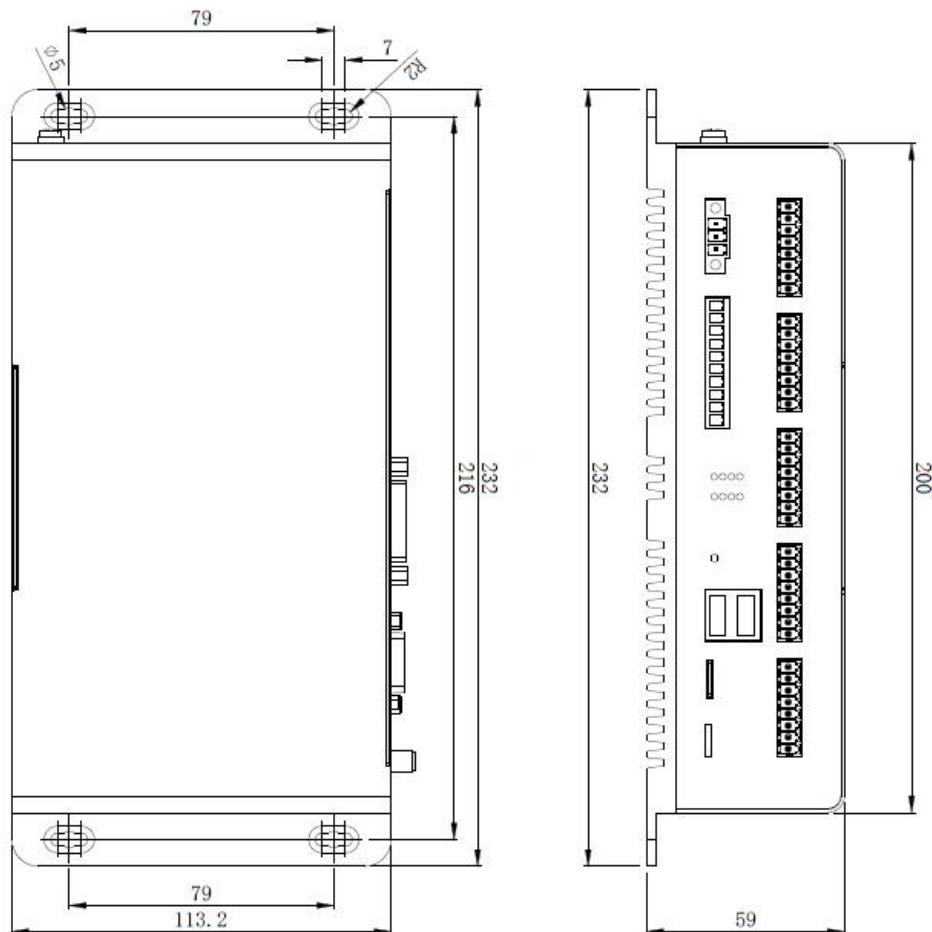
4. Accessories supported

Number	Name	Model	Manufacturer	Note
1	4G module	EC200U-CN	QUECTEL	LTE Cat1
2	4G module	EC20	QUECTEL	LTE Cat4
3	4G module	L610-CN	FIBOCOM	LTE Cat1
4	4G module	NL668	FIBOCOM	LTE Cat4
5	4G module	Air724UG	LuatOS	LTE Cat1
6	4G module	N58-CB	neoway	LTE Cat1
7	4G module	EG21-G	QUECTEL	LTE Cat1
8	4G module	EG25-G	QUECTEL	LTE Cat4
9	LCD display screen	LMT070DICFWD-AKA	TOPWAY	7 寸，800*480，resistive touch panel
10	LCD display screen	LMK104DNEFWU-AKA	TOPWAY	10.4 寸，800*600，resistive touch panel
11	LCD display screen	LMT101DNLFWD-BAD	TOPWAY	10.1 寸，1280*800，resistive touch panel
12	LCD kit	LCD-1280800W101TC	ZLG	10.1 寸，1280*800
13	DVI connection cable	SAMZHE 1.5m 25-pin DVI male to male	SAMZHE	Connecting the LCD display screen
14	SSD	M.2 2242	/	PCIe2.0 x1
15	USB-WiFi	FW150US(MT7601U）	FAST	
16	USB-WiFi	AC650(RTL8821CU）	UGREEN	

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5. Packing list

Number	Name	Model	Quantity	Note
1	ARM industrial computer	EM-1000 V1.00	1	
2	Terminal blocks	3.81-03P	1	Power wiring terminal, been plugged on the gateway
3	Terminal blocks	3.81-06P	5	DI/DO and ADC terminal blocks, been plugged on the gateway
4	Terminal blocks	3.81-08P	6	RS485 and RS232 terminal blocks, been plugged on the gateway
5	Terminal blocks	3.81-10P	1	CAN-Bus terminal blocks, been plugged on the gateway
6	Hardware bracket	DIN rail bracket, 48 * 37 * 9.5mm, aluminum	1	Guide rail installation accessories
7	Metric screw	M4*8mm,round head,nickel plated	4	Product installation fixed to wall or cabinet.
8	Metric screw	M3 * 8, countersunk head	4	DIN rail bracket fixing screws
9	Combination screw	PM4 * 8 triple combination flat washer	1	Side grounding screw
10	Metric screw	PM2*6,D=3.5,round head	2	miniPCIe module fixing screws
11	Metric screw	PM3*5,D=5.5,round head	1	M.2 module fixing screws
12	Certificate of conformity	Certificate of conformity	1	Certificate of conformity

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6. Disclaimers

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Integrity and win-win situation, continuous learning, customer first, professional focus, and focus on being the first

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