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Full-size PICMG 1.3 CPU Card Supports 10th/11th Gen. LGA1200 Intel® Core™ i9/i7/i5/i3, Pentium® and Celeron® Processors, Intel® Q470, DDR4, HDMI, Dual Intel® 2.5GbE, USB 3.2, SATA 6Gb/s, M.2, iAudio and RoHS

PCIE-Q470

Quick Installation Guide

Version 1.0

March 1, 2022

Package List

PCIE-Q470 package includes the following items:

- 1 x PCIE-Q470 single board computer
- 1 x SATA cable
- 1 x Mini jumper pack
- 1 x QIG

Specifications

- CPU:
10th/11th Generation LGA1200 Intel® Core™ i9/i7/i5/i3, Pentium® and Celeron® processors
- Chipset:
Intel® Q470
- Memory:
Four 288-pin 2933 MHz dual-channel DDR4 DIMM slots supporting up to 128 GB memory
- BIOS:
AMI UEFI BIOS
- Graphics Engine:
10th Generation CML-S: up to Intel® UHD Graphics 630, Intel® HD 9th Generation Display Engine based on 16 low power execution units supporting DX2015, OpenGL 5.X and OpenCL2.x, ES 2.0
11th Generation RKL-SXe: 12th Generation Graphics Architecture, Intel® UHD Graphics 750, supporting 12-bit end-to-end, AV1, VP9, HEVC 12b, HDR10, FP16
- Display Output:
1 x HDMI 1.4 (up to 4096 x 2160 @ 30 Hz)
- Ethernet:
LAN1: Intel® I225V 2.5GbE controller (colay with I225-LM)
LAN2: Intel® I225V 2.5GbE controller (colay with I225-LM)
- External I/O Interface:
2 x USB 3.2 Gen 1 (5Gb/s) (Type-A)
1 x USB 3.2 Gen 2 (10Gb/s) (Type-C)
- Internal I/O Interface:
4 x SATA 6Gb/s (RAID 0/1/5/10 supported)
6 x USB 2.0 (2x4 pin, p=2.54)
2 x USB 3.2 Gen 1 (5Gb/s) (2x10 pin, p=2.0)
1 x USB 3.2 Gen 1 (Type-A, 180°)
2 x RS-232 (2x5 pin, p=2.0)

- 2 x RS-422/485 (1x4 pin, p=2.0)
- Audio:
 - 1 x IAUDIO connector supporting AC-KIT-888S audio module (2x5 pin, p=2.0)
- Front Panel:
 - 1 x Front panel (2x7 pin, p=2.54; power LED, HDD LED, power button, reset button, speaker)
- LAN LED:
 - 2 x LAN LED (1x2 pin, p=2.54)
- Expansions:
 - 1 x PCIe x16 signal via golden finger (supporting x16, or x8 + x8, or x4 + x4 + x8)
 - 4 x PCIe x1 signal from PCH via golden finger (supporting one x4, or four x1)
 - 4 x PCI signal via golden finger
 - 1 x M.2 2230 A Key (PCIe x2 & USB 2.0)
 - 1 x M.2 3042/3052 B Key w/ SIM holder (PCIe Gen3 x2)
 - 1 x M.2 2280/2242 M Key on solder side (PCIe x4)
- Digital I/O:
 - 1 x 12-bit digital I/O (2x7 pin, p=2.0)
- SMBus:
 - 1 x SMBus (1x4 pin, p=1.25)
- I²C:
 - 1 x I²C (1x4 pin, p=1.25)
- Fan Connector:
 - 1 x CPU fan connector (1x4 pin)
 - 1 x System fan connector (1x4 pin)
- Chassis Intrusion:
 - 1 x Chassis intrusion connector (1x2 pin, p=2.54)
- TPM:
 - Intel® PTT (TPM 2.0)

- Power Supply:
ATX/AT power supply
Support AT/ATX mode
ErP/EuP compliant
- Power Consumption:
3.3V@1.04A, 5V@8.61A, 12V@12.33A
(Intel® Core™ i9-11900K CPU with 4 GB 3200 MHz DDR4 memory)
- Watchdog Timer:
Software programmable support 1–255 sec. system reset
- Operation Temperature: 0°C – 60°C
- Storage Temperature: -30°C – 70°C
- Operation Humidity: 5% – 95%, non-condensing
- Dimensions: 338 mm x 126 mm
- Weight: GW:1000 g / NW:500 g
- Safety: CE/FCC compliant

Ordering Information

- **PCIE-Q470-R10:**
Full-size PICMG 1.3 CPU card supports 10th/11th Gen. LGA1200 Intel® Core™ i9/i7/i5/i3, Pentium® and Celeron® processors, Intel® Q470, DDR4 DIMM, HDMI, dual Intel® 2.5GbE, USB 3.2 Gen 2, SATA 6Gb/s, M.2, iAudio and RoHS
- **CB-USB02-RS:**
Dual port USB cable with bracket, 300mm, p=2.54
- **32102-000100-200-RS:**
SATA power cable, MOLEX 8981-4M to SATA15P, 150mm
- **32205-002700-200-RS:**
RS-232/422/485 cable, 200mm, p=2.0
- **AC-KIT-888S-R10:**
Realtek ALC888S 7.1 Channel HD Audio peripheral board, RoHS
- **CF-1150SA-R10**
Special cooler kit for LGA1150, high-performance compatible, 95W
- **CF-1150SB-R11**
Special cooler kit for LGA1150, high-performance compatible, 65W
- **CF-1150SC-R20**
Special cooler kit for LGA1150, 1U chassis compatible, 65W
- **CF-1150SE-R11**
Special cooler kit for LGA1150, high-performance compatible, 95W

Jumpers Setting and Connectors

LABEL	FUNCTION
J_ATX_AT1	AT/ATX power mode setting
SW_BIOS1_1	BIOS selection switch
J_CMOS1	Clear CMOS jumper
J_FLASH1	Flash descriptor security override jumper
CPU12V1	ATX CPU 12V power connector
J_AUDIO1	Audio connector
BAT1	RTC battery connector
CHASSIS1	Chassis intrusion connector
CHA_DIMM0, CHA_DIMM1 CHB_DIMM0, CHB_DIMM1	DDR4 DIMM slots
DIO1	Digital I/O connector
DBG_SPI1	EC debug connector
CPU_FAN1, SYS_FAN1	Fan connectors
JSPI1	Flash SPI ROM connector
JEC1	Flash EC ROM connector
F_PANEL1	Front panel connector
I2C1	I ² C connector
LED_LAN1	LAN1 link LED connector
LED_LAN2	LAN2 link LED connector
M2_A1	M.2 A-key slot
M2_B1	M.2 B-key slot
M2_M1	M.2 M-key slot (on solder side)
PWR_SW1	On-board power switch
COM1, COM2	RS-232 serial port connectors
COM3, COM4	RS-422/485 serial port connectors
S_ATA3, S_ATA4, S_ATA5, S_ATA6	SATA 6Gb/s connectors
SMB1	SMBus connector
SIM1	SIM card slot
JUSB3, JUSB4, JUSB5	Internal USB 2.0 connectors

USB1	Internal USB 3.2 Gen 1 connector (Type-A)
JUSB3-1	Internal USB 3.2 Gen 1 connector
LAN1, LAN2	External 2.5GbE RJ-45 connectors
HDMI1	External HDMI connector
CN1, CN2	External USB 3.2 Gen 1 connectors
CON1	External USB 3.2 Gen 2 connector

J_ATX_AT1: AT/ATX Power Mode Setting

PIN NO.	DESCRIPTION
Short 1 - 2	ATX Power Mode (default)
Short 2 - 3	AT Power Mode

SW_BIOS1_1: BIOS Selection Switch

PIN NO.	DESCRIPTION
Short A - B	BIOS1: four PCIe x1 slots (default)
Short B - C	BIOS2: one PCIe x4 slot

J_CMOS1: Clear CMOS Jumper

Status	DESCRIPTION
NC	Keep CMOS Setup (Normal Operation)
Press	Clear CMOS Setup

J_FLASH1: Flash Descriptor Security Override Jumper

PIN NO.	DESCRIPTION
Short 1-2	Disabled (default)
Short 2-3	Enabled

USB Power SW: USB Power Setting	
USB Power SW	DESCRIPTION
+5V DUAL	Power is provided in S3/S4 sleep state (default)
+5V	Power is not provided in S3/S4 sleep state

Use the **USB Power SW** BIOS options to configure whether to provide power to the corresponding USB connector(s) when the system is in S3/S4 sleep state. This option is valid only when the above **Power Saving Function (ERP)** BIOS option is disabled.

CPU12V1: ATX CPU 12V Power Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	5	+12V
2	GND	6	+12V
3	GND	7	+12V
4	GND	8	+12V

J_AUDIO1 : Internal Audio Connector for Audio Module			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	HDA_SYNC	2	HDA_BIT_CLK
3	HDA_SDOUT	4	HDA_SPKR
5	HDA_SDIN	6	HDA_RST#
7	HDA_VCC	8	HDA_GND
9	HDA_+12V	10	HDA_GND

BAT1: RTC Battery Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VBATT	2	GND

CHASSIS1: Chassis Intrusion Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+3.3VSB	2	CHASSIS_OPEN

DIO1 : Digital Input/Output Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	VCC
3	Output 5	4	Output 4
5	Output 3	6	Output 2
7	Output 1	8	Output 0
9	Input 5	10	Input 4
11	Input 3	12	Input 2
13	Input 1	14	Input 0

DBG_SPI1: EC Debug Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	NC	4	EDICLK
2	EDICS	5	EDIDI
3	EDIDO	6	GND

CPU_FAN1, SYS_FAN: CPU/System Fan Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	3	FANIO
2	+12V	4	PWM

JSPI1: Flash SPI ROM Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+V3.3M_SPI_CON	4	SPI_CLK_SW
2	SPI_CS	5	SPI_SI_SW
3	SPI_SO_SW	6	GND

JEC1: Flash EC ROM Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	FSCE#	2	VCC
3	FMISO	4	NC
5	EC_DET_FLASH	6	FSCK
7	GND	8	FMOSI

F_PANEL1: Front Panel Connector					
	PIN	DESCRIPTION	PIN	DESCRIPTION	
PWR LED	1	PWR_LED+	2	BEEP_PWR	SPKR
	3	NC	4	NC	
	5	PWR_LED-	6	NC	
PWR BTN	7	PWR_BTN+	8	PC_BEEP	
	9	PWR_BTN-	10	NC	
HDD LED	11	HDD_LED+	12	Reset+	RESET
	13	HDD_LED-	14	Reset-	

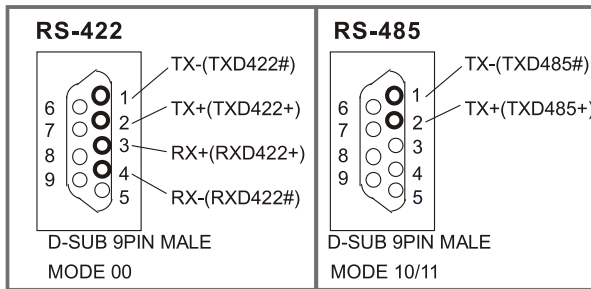
I2C1: I²C Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	3	I2C_CLK
2	I2C_DATA	4	+5V

LED_LAN1: LAN1 Link LED Connector			
PIN	DESCRIPTION	PIN	DESCRIPTION
1	+3.3V	2	LAN1_LED_LNK#_ACT

LED_LAN2: LAN2 Link LED Connector			
PIN	DESCRIPTION	PIN	DESCRIPTION
1	+3.3V	2	LAN2_LED_LNK#_ACT

COM1, COM2: RS-232 Serial Port Connectors			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTS
7	DTR	8	RI
9	GND	10	GND

COM3, COM4: RS-422/428 Serial Port Connectors			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RXD422-	3	TXD422+/TXD485+
2	RXD422+	4	TXD422-/TXD485-



S_ATA3, S_ATA4, S_ATA5, S_ATA6: SATA 6Gb/s Connectors			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	5	SATA_RX-
2	SATA_TX+	6	SATA RX+
3	SATA_TX-	7	GND
4	GND	8	N/C

SMB1: SMBus Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	3	SMB_CLK
2	SMB_DATA	4	+5V

JUSB3, JUSB4, JUSB5: Internal USB 2.0 Connectors			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	2	GND
3	USB_DATA-	4	USB_DATA+
5	USB_DATA+	6	USB_DATA-
7	GND	8	VCC

USB1: Internal USB 3.2 Gen 1 Connector (Type-A)			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	6	USB3_RX+
2	USB_DATA-	7	GND
3	USB_DATA+	8	USB3_TX-
4	GND	9	USB3_TX+
5	USB3_RX-		

JUSB3-1: Internal USB 3.2 Gen 1 Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	11	USB_DATA+
2	USB_RX-	12	USB_DATA-
3	USB_RX+	13	GND
4	GND	14	USB3_TX+
5	USB3_TX-	15	USB3_TX-
6	USB3_TX+	16	GND
7	GND	17	USB3_RX+
8	USB3_DATA-	18	USB3_RX-
9	USB3_DATA+	19	VCC
10	NC		

M2_A1: M.2 A-key Slot			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	+3.3V
3	USB+	4	+3.3V
5	USB-	6	NC

7	GND	8	Module Key
9	Module Key	10	Module Key
11	Module Key	12	Module Key
13	Module Key	14	Module Key
15	Module Key	16	NC
17	NC	18	GND
19	NC	20	NC
21	NC	22	NC
23	GND	24	GND
25	NC	26	NC
27	NC	28	NC
29	GND	30	GND
31	NC	32	NC
33	GND	34	NC
35	PCIE_TXP1	36	GND
37	PCIE_TXN1	38	NC
39	GND	40	NC
41	PCIE_RXP1	42	NC
43	PCIE_RXN1	44	NC
45	GND	46	NC
47	PCIE_CLKP0	48	NC
49	PCIE_CLKN0	50	NC
51	GND	52	PLT_RST
53	CLKREQ0#	54	Pull up +3.3V
55	PCIE_WAKE	56	Pull up +3.3V
57	GND	58	M2_DAT
59	PCIE_TXP2	60	M2_CLK
61	PCIE_TXN2	62	NC
63	GND	64	NC
65	PCIE_RXP2	66	M2_RST
67	PCIE_RXN2	68	CLKREQ0#
69	GND	70	PCIE_WAKE
71	PCIE_CLKP1	72	+3.3V
73	PCIE_CLKN1	74	+3.3V
75	GND		

M2_M1: M.2 M-key Slot			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	+3.3V
3	GND	4	+3.3V
5	PCIE_RXN3	6	N/C
7	PCIE_RXP3	8	N/C
9	GND	10	DAS/DSS#
11	PCIE_TXN3	12	+3.3V
13	PCIE_TXP3	14	+3.3V
15	GND	16	+3.3V
17	PCIE_RXN2	18	+3.3V
19	PCIE_RXP2	20	N/C
21	GND	22	N/C
23	PCIE_TXN2	24	N/C
25	PCIE_TXP2	26	N/C
27	GND	28	N/C
29	PCIE_RXN1	30	N/C
31	PCIE_RXP1	32	N/C
33	GND	34	N/C
35	PCIE_TXN1	36	N/C
37	PCIE_TXP1	38	DEVSLP
39	GND	40	N/C
41	PCIE_RXN0	42	N/C
43	PCIE_RXP0	44	N/C
45	GND	46	N/C
47	PCIE_TXN0	48	N/C
49	PCIE_TXP0	50	PERST#
51	GND	52	CLKREQ#
53	REFCLKN	54	PEWAKE
55	REFCLKP	56	N/C
57	GND	58	N/C
59	Module Key	60	Module Key
61	Module Key	62	Module Key
63	Module Key	64	Module Key

65	Module Key	66	Module Key
67	NC	68	SUSCLK
69	PEDET	70	+3.3V
71	GND	72	+3.3V
73	GND	74	+3.3V
75	GND		

M2_B1: M.2 B-key Slot			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	CONFIG_3	2	+3.3V
3	GND	4	+3.3V
5	GND	6	NC
7	USB+	8	NC
9	USB-	10	NC
11	GND	12	Module Key
13	Module Key	14	Module Key
15	Module Key	16	Module Key
17	Module Key	18	Module Key
19	Module Key	20	NC
21	CONFIG_0	22	NC
23	PCH_WAKE_N	24	NC
25	NC	26	NC
27	GND	28	NC
29	PCIE_RXN1	30	SIM_RST
31	PCIE_RXP1	32	SIM_CLK
33	GND	34	SIM_IO
35	PCIE_TXN1	36	SIM_VCC
37	PCIE_TXP1	38	NC
39	GND	40	NC
41	PCIE_RXP0	42	NC
43	PCIE_RXN0	44	NC
45	GND	46	NC
47	PCIE_TXN0	48	NC
49	PCIE_TXP0	50	M2_RST

51	GND	52	CLKREQ0#
53	PCIE_CLKN0	54	PCH_WAKE_N
55	PCIE_CLKP0	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	NC
67	M2_RST	68	NC
69	M2BCONF	70	+3.3V
71	GND	72	+3.3V
73	GND	74	+3.3V
75	GND		

SIM1: SIM Card Slot			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
C1	SIM_VCC	C5	GND
C2	SIM_RST	C6	NC
C3	SIM_CLOCK	C7	SIM_IO

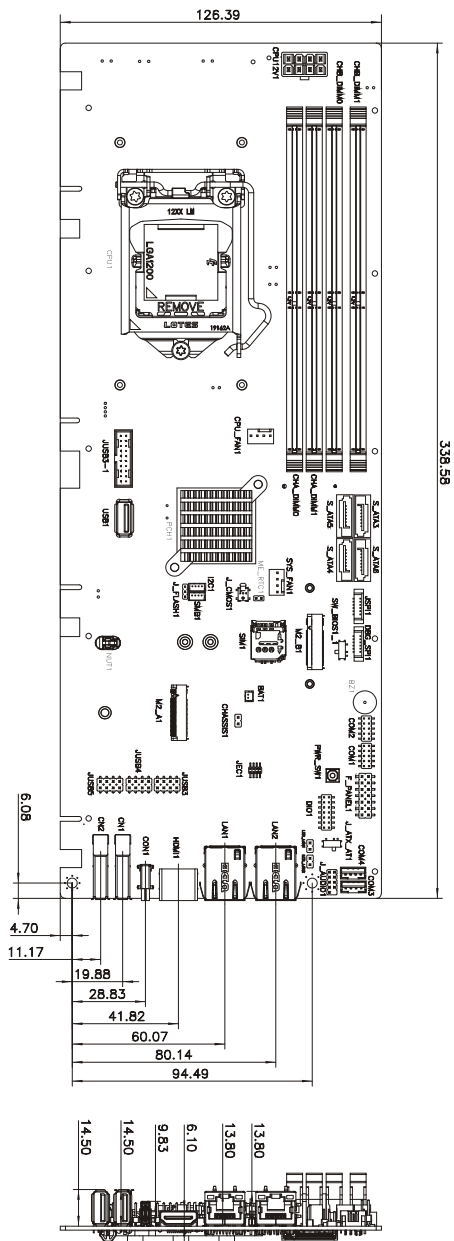
LAN1, LAN2: External 2.5GbE RJ-45 Connectors			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	MDIA3-	5	MDIA1+
2	MDIA3+	6	MDIA2+
3.	MDIA2-	7	MDIA0-
4.	MDIA1-	8	MDIA0+

HDMI1: External HDMI Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
21	HDMI_DATA2	31	GND
22	GND	32	HDMI_CLK#
23	HDMI_DATA2#	33	N/C
24	HDMI_DATA1	34	N/C
25	GND	35	HDMI_SCL
26	HDMI_DATA1#	36	HDMI_SDA
27	HDMI_DATA0	37	GND
28	GND	38	+5V
29	HDMI_DATA0#	39	HDMI_HPD
30	HDMI_CLK		

CN1, CN2: External USB 3.2 Gen 1 Connectors (Type-A)			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	6	USB3_RX+
2	USB_DATA-	7	GND
3	USB_DATA+	8	USB3_TX-
4	GND	9	USB3_TX+
5	USB3_RX-		

CON1: External USB 3.2 Gen 2 Connector (Type-C)			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
A1	GND	B12	GND
A2	TX1+	B11	RX1+
A3	TX1-	B10	RX1-
A4	VBUS	B9	VBUS
A5	CC1	B8	SBU2
A6	D+	B7	NC
A7	D-	B6	NC
A8	SBU1	B5	VCONN
A9	VBUS	B4	VBUS
A10	RX2-	B3	TX2-
A11	RX2+	B2	TX2+
A12	GND	B1	GND

Board Layout: Jumper and Connector Locations



(Unit: mm)