

PBP-19AI
Active Backplane

User's Manual



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PBP-19AI 18PCI/ 2PICMG

Active Backplane

The PBP-19AI backplane is fully PICMG Rev 2.1 compliant. It is a member of PBP's PCI product family and is intended to support all PICMG compliant boards on the market.

Introduction

Traditional PC is outstanding with the all-in-one facility, in which processor seat, chipset, memory sockets, ISA/PCI slots, device and power connectors are accommodated over a single PCB. This would absolutely draw the limitation line on multiple peripheral cards adoption as well as the timing needed for board replacement in the event of system failure. The new generation industrial PC has made a new platform with a combination of two parts – SBC and backplane.

Different from traditional motherboards, industrial PC features on easily removable SBC as the working board that has PICMG or ISA form factor so that users may easily apply or remove the SBC from the system. Reducing the system down time is obviously visible. Backplane is hence designed with PICMG slots to hold the SBC as a system. Some backplanes also have ISA/PCI slots to hold ISA/PCI peripheral cards. This design has been proved successful to provide far more PCI slots than traditional motherboard could ever holds (4 PCI slots) to meet the requirement of current technology and market demands, especially in CTI market.

As a matter of fact, with the needs from industrial PC users moving on, applications with SBC and backplane have been fully required and are currently leading the industrial PC market.

Design philosophy

Portwell backplane is designed to meet customer's demand. Better power distribution, thick PCB with more ruggedness, and user-friendly designed are the key design routes. We hold the remind to produce backplane of trustable quality throughout the design phases, and this is how Portwell backplane is made and presented.

In order to keep good power filtering and avoid fire explosion, Electrolytic capacitor and Ceramic capacitor are used to replace traditional Tantalum capacitor. All Portwell backplane models have 4 layers with separate power layer and ground layer to reduce power noise. Assorted connectors, including keyboard connectors and power connectors, are provided for easy installation and expansion. All backplanes models are made to meet industrial grade environment requirement (temperature, humidity, etc.).

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Product features

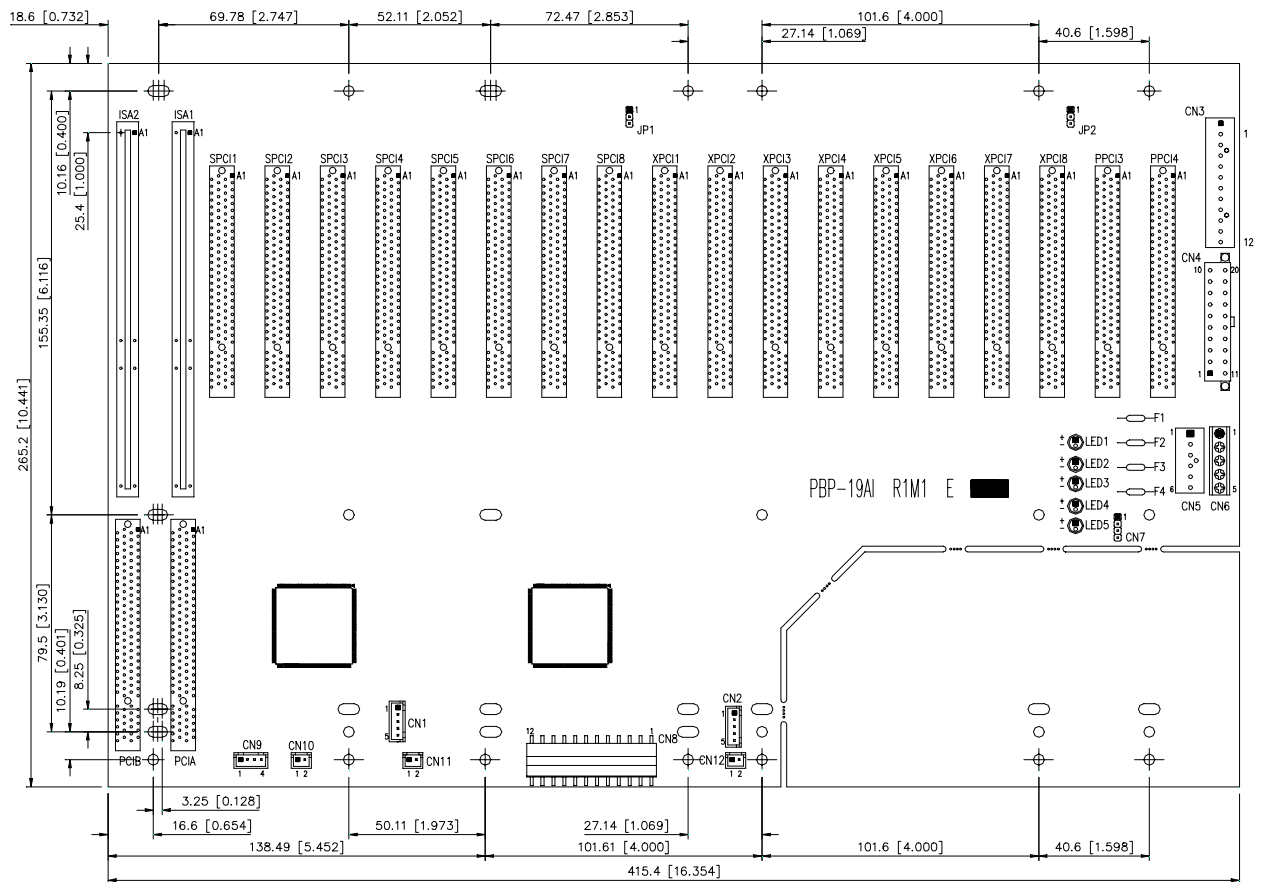
<p>Connector</p>	<p>Dual slot PCI/ISA for the CPU board</p> <p>Two 5V 32bit PCI slots for full-size boards on the Primary bus. These slots are Master/Slave configurable by using Bus Mastering Scheme.</p> <p>Sixteen 5V/3.3V 32-bit PCI slots for full-size boards on the Secondary bus.</p> <p>One AT standard power connector and one flush-mount AT standard power connector: 12 pins, 5A max. per pin for +5V, -5V, +12V, -12V voltages, Ground.</p> <p>One ATX standard power connector: 20 pins, 5A max. per pin for +5V, -5V, +12V, -12V, +3.3V, +5VSB voltages, Ground, and Power Good signal.</p> <p>One ATX control connector to distribute signals coming from the CPU boards onto connector for soft on/off an ATX power supply.</p> <p>One P10 standard power connector, 5A max. per pin for +5V voltage and Ground.</p> <p>Pairs of header for local connection of a keyboard, three fan powers, and Power LEDs.</p>
<p>PCB</p>	<p>The Printed Circuit Board's (PCB) overall dimensions are 265.2mm x 415.4mm (104.41"x163.54"), and total thickness is 1.6mm.</p> <p>Thirty-Four mounting holes are provided and are located to conform to the baby AT form factor. Mounting holes are connected to Signal Ground internally.</p> <p>Operating Temperature : 0 to 55 degree C (32 to 140 degree F)</p> <p>Storage Temperature : -20 to 75 degree C (-4 to 185 degree F)</p> <p>Humidity : 5% to 95%, non-condensing</p> <p>EMI/Safety : Meets FCC and CE Class A, and UL/CSA/TUV</p>
<p>Standard</p>	<p>PCI- conforms to PICMG rev. 2.1 specification</p> <p>ISA- conforms to IEEE P996 specification.</p>

Routing Table

	SPCI1	SPCI2	SPCI3	SPCI4	SPCI5	SPCI6	SPCI7	SPCI8
IDSEL	SAD31	SAD30	SAD29	SAD28	SAD27	SAD26	SAD25	SAD24
INTA	A	D	C	B	A	D	C	B
INTB	B	A	D	C	B	A	D	C
INTC	C	B	A	D	C	B	A	D
INTD	D	C	B	A	D	C	B	A

	XPCI1	XPCI2	XPCI3	XPCI4	XPCI5	XPCI6	XPCI7	XPCI8	PPCI3	PPCI4
IDSEL	XAD31	XAD30	XAD29	XAD28	XAD27	XAD26	XAD25	XAD24	AD29	AD28
INTA	B	A	D	C	B	A	D	C	D	A
INTB	C	B	A	D	C	B	A	D	A	B
INTC	D	C	B	A	D	C	B	A	B	C
INTD	A	D	C	B	A	D	C	B	C	D

Board drawing



Jumpers and Connectors

JUMPER/ CONNECTOR	DESCRIPTION
PCI A~B	PICMG connectors
PPCI3-4	32BIT PCI BUS connectors (primary)
SPCI1-8	32BIT PCI BUS connectors (secondary)
XPCI1-8	32BIT PCI BUS connector (secondary)
CN1,CN2	keyboard connector
CN3	P8/P9 power connector
CN4	ATX power connector
CN5	P10-type power connector
CN6	Power extension terminal block
CN7	Power extension pins
CN8	Horizontal P8/P9 power connector
CN9	ATX P/S control connector
JP1,JP2	Secondary PCI slot VIO 3.3V/5V select

Pin Assignment

P8P9 (CN3/CN8)	
PIN	NAME
1	NC
2	+5V
3	+12V
4	-12V
5	GND
6	GND
7	GND
8	GND
9	-5V
10	+5V
11	+5V
12	+5V

ATX (CN4)			
PIN	NAME	PIN	NAME
1	+3.3V	11	+3.3V
2	+3.3V	12	-12V
3	GND	13	GND
4	+5V	14	PS-ON
5	GND	15	GND
6	+5V	16	GND
7	GND	17	GND
8	PWR-OK	18	-5V
9	5V SB	19	+5V
10	+12V	20	+5V

CN9	
PIN	NAME
1	PW-OK
2	5VSB
3	PS-ON
4	GND

***Note:** If you are using a non-ATX featured SBC board with ATX power supply, you can turn the ATX power supply into AT type by adding an on-off switch over pin3 and 4. By default, pin 3 and 4 is short to trigger the ATX power supply to ON status.

CN1, CN2	
PIN	NAME
1	CLK
2	DATA
3	NC
4	GND (Via SBC)
5	+5V (Via SBC)

*Note: this keyboard assignment varies if a non-ROBO SBC is used with the backplane

CN6 (Power Extension)	
PIN	NAME
1	GND
2	+12V @ 5A
3	+5V @ 5A
4	-12V @ 0.5A
5	-5V @ 0.5A

P10 (+5V, CN5)	
PIN	NAME
1	+5V
2	+5V
3	+5V
4	GND
5	GND
6	GND

JP1/JP2* (1/2 Secondary PCI)	
1-2 short	V _{IO} =5V
2-3 short	V _{IO} =3.3V

*Note: JP1/JP2 can set the Secondary PCI slots working voltage to 3.3V if 3.3V PCI cards are used. Default setting is 5V.

CN10, CN11, CN12	
PIN	NAME
1	+12V
2	GND

CN7	
PIN	NAME
1	+12V
2	GND
3	GND
4	+5V

Installation guide

SBC

Apply only one full-size SBC over PICMG slot or half-sized SBC over ISA slot. Apply your ISA/PCI cards over ISA/PCI slots (**Fig.1**).

Power Supply

1. If you are using AT power supply, please apply the P8/P9 connector over P8/P9 or P8/P9-1. If you have two sets of P8/P9 connectors, you may apply both of them over these two AT power connector (**Fig.2**).



Fig.1



Fig.2

2. If your are using ATX power supply, please apply the 20-pin ATX power connector over ATX connector (**Fig.3**). Besides, you need to apply one 4-pin ATX power control cable between your SBC and backplane over the 4-pin header CN9. (A toggle switch is required over your SBC for this application, **Fig.4**).



Fig.3



Fig.4



Fig.5



Fig.6

3. If you are using ATX power supply, you may also apply a jumper over pin-3 and pin-4 of CN9. In this application, the 4-pin ATX power control cable is not required, and your ATX power supply will then act as a AT power supply (**Fig.5**).

Keyboard

1. If you are using a standard PC/AT keyboard, please apply a 5-pin keyboard control cable between your SBC and backplane over the 5-pin shrouded header CN1 (CN2). Also, please connect another similar 5-pin keyboard cable on chassis onto CN2 (CN1). This will then enable the chassis keyboard DIN connector (**Fig.6**).
2. If you are using a PS/2 keyboard, simply apply them over the PS/2 connector on your SBC. In this application, the 5-pin keyboard control connector is not required (**Fig.7**).

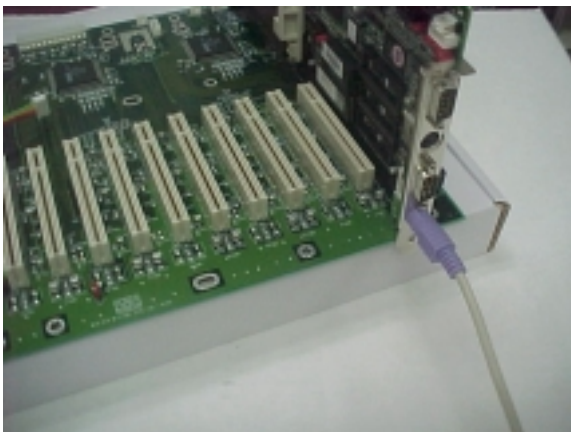


Fig.7



Fig.8

Chassis

Make sure the copper lifting stands are placed below all the mounting holes of your backplane.

Jumpers

There is one jumper for you to configure the PCI slot working voltages (5V or 3.3V). By default, you should use the factory setting as this is the standard working voltage (5V, **Fig.8**).

Fan

CN 10, CN 11, and CN 12 are fan connectors. Please refer to the pin assignment table for proper connection.

Additional power connectors

P10 are additional power connectors that help to introduce more power balanced distribution for full loading system. Users need to create a P8-like power connector with three 5V pins and three ground pins. For pin assignment, please refer to pin assignment section.