

User's Manual

Version 1.0

Multi-Core SBC

Model Number MB-60480 & MB-60490*

AMD Opteron™-based PICMG 1.3-style High-throughput SBC

* The MB-60490 is based on MB-60480 design, but does not include the AMD8132 and ATI M9 chips



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1.0 Chapter 1. Introduction

1.1. Description: AMD Opteron™-based PICMG 1.3-style high-throughput SBC

The MB-60480 and MB-60490 are high-throughput, high performance PICMG 1.3 style SBCs for intense applications such as medical & military imaging, scientific, oil & gas exploration, seismic, etc that support up to two AMD Dual-core Opteron processors.

1.2. Specifications

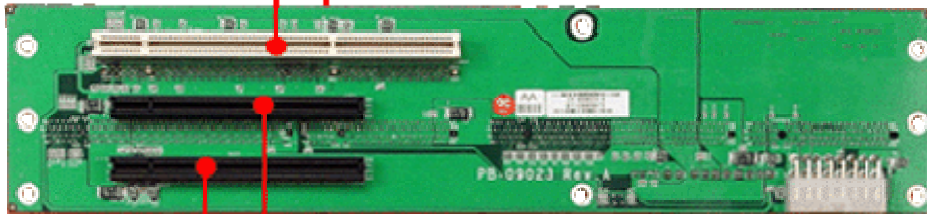
Core Features	
CPU	Supports 32- and 64-bit computing with full range of AMD Opteron Socket 940 processors, low to high power (30/55/95 W) single and dual-core CPUs
Chipset	NVIDIA nForce Professional 2200/ AMD 8132 (AMD8132 on MB-60480 only)
BIOS	AWARD/PHOENIX
Memory	2 slots with up to 8GB; DDR PC-3200 ECC Registered. optional 4 slots/16GB
Hardware Monitoring	System Monitoring: Supports temperature, fan speed, and voltage monitoring. Watchdog Timer: Can generate a system reset. Supports software-selectable timeout interval.
Backplane	Passive backplanes: IP-90120, IP-90190, IP-90220, IP-90230, IP-90240
I/O	
HyperTransport	Stackable 16-lane connector
Serial Port	Two RS232 serial ports
USB	4 USB 2.0 ports
Ethernet	3 10/100/1000 Gigabit Ethernet LAN port
Video Integration	ATI 64MB M9 Graphics on MB-60480 only
PCI Express	16 lanes. Semi-custom pin-out supports PCIX & 16 Lane PCI Express
Graphics	Optional: integrated ATI M9 64MB graphics
S I/O Chipset	Winbond W83627 THF
Storage	
SATA	One EIDE & 4X SATA ports with RAID 0,1
Mechanical & Environmental	
Electrical	ATX power supply
Board Size	13.330 in. x 4.976 in.; 33.86 cm x 12.64 cm
Environmental	Operating Temperature: 0° to 45° degrees C
Ordering Information	
MB-60480	WIN AMD Opteron™-based PICMG 1.3 Full Size SHB Express/PCI-

1.3. Midplane Options

MIDPLANES

IP-90230

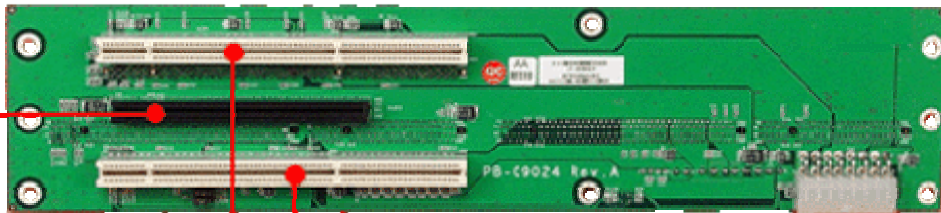
2x PCI-X (1x on front, 1x on back)



2x PCIe x8 (x16 mech.)

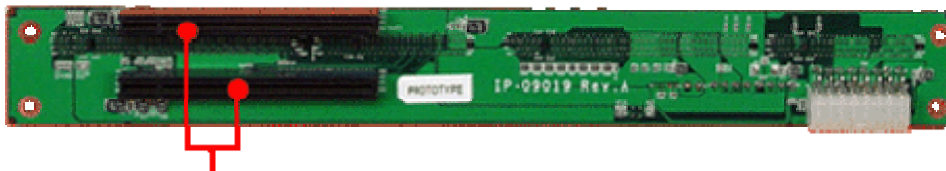
IP-90240

PCI-E x8
(x16 mech.)



3x PCI-X (2x Front, 1x back)

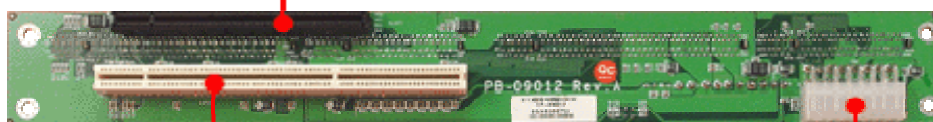
IP-90190



2x PCIe x3 (x16 mech.)

IP-90120

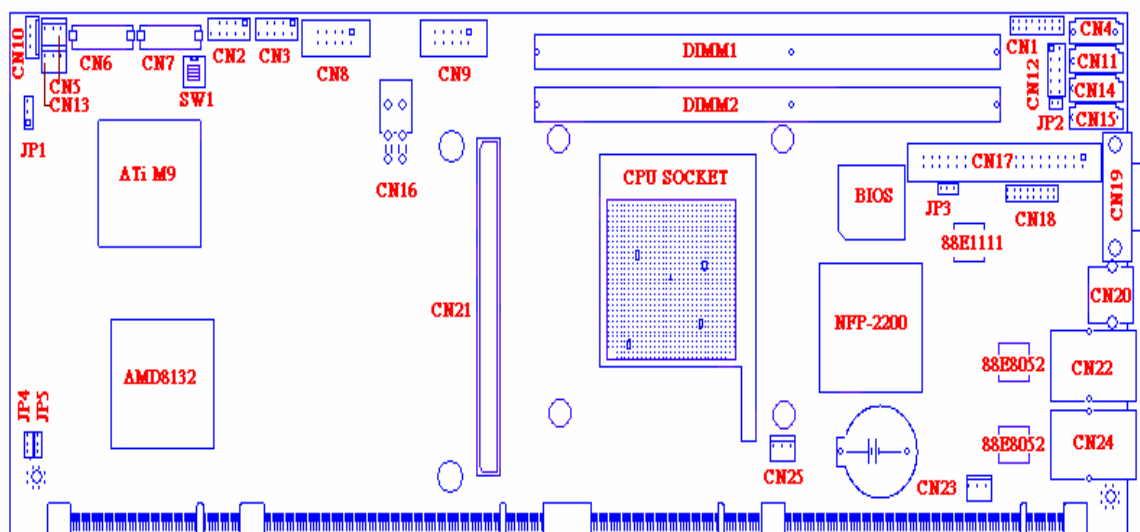
PCI-E x8 (x16 mech.)



PCI-X

Power
Connector

1.4. Location of Connectors & Jumpers



1.5. List of Connectors & Switch

Connector	Description	Connector	Description
CN1	LPC Bus Connector (Port 80)	CN15	SATA Connector
CN2	USB Port0/1 Connector	CN16	Auxiliary +12V Power Connector
CN3	USB Port2/3 Connector	CN17	40-pin IDE Connector
CN4	SATA Connector	CN18	GbE Output Connector
CN5	Fan Connector	CN19	VGA DB-15 Connector
CN6	24-bit LVDS Even Channel	CN20	PS/2 KB/Mouse Mini-DIN
CN7	24-bit LVDS Odd Channel	CN21	Hyper Transport Connector
CN8	COM2 Connector	CN22	GbE RJ-45 Connector
CN9	COM1 Connector	CN23	Fan Connector
CN10	LCD Inverter Connector	CN24	GbE RJ-45 Connector
CN11	SATA Connector	CN25	Fan Connector
CN12	Front Panel Connector		
CN13	Fan Connector		
CN14	SATA Connector	SW1	SW1

1.6. List of Jumpers

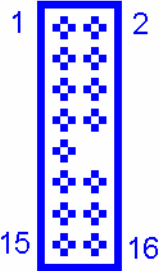
Pin	Define	Pin	Define
JP1	LCD Panel Power Select	JP4	PCI-X 100/133MHz Bus Speed Select
JP2	Flash Recovery Header	JP5	Multi or Single PCI-X slots Select
JP3	Clear CMOS Control		

2.0. Chapter 2. Connectors and Jumpers

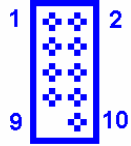
2.1 Connector, Jumper and Switch Settings

CN1: LPC Bus Connector (Port 80)

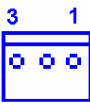
The MB-60480 supports a LPC bus connector for Port-80 card to display the post-code.

	Pin	Assignment	Pin	Assignment
	1	+3.3V	2	LAD0
	3	LAD1	4	LAD2
	5	LAD3	6	LFRAME#
	7	PCIRST	8	+5V
	9	CLK	10	Key-Pin
	11	Ground	12	Ground
	13	LPC_DRQ0#	14	Ground
	15	LPC_SERIRQ	16	Ground

CN2 & CN3: USB0~ 3 connectors

	Pin	Assignment	Pin	Assignment
	1	+5V	2	+5V
	3	Data-	4	Data-
	5	Data+	6	Data+
	7	Ground	8	Ground
	9	Key-Pin	10	Ground

CN5, CN13, CN23, and CN25: Fan Connector

	Pin	Assignment
	1	Ground
	2	+12V
	3	Speed Detect

Note1:


CN5 pin-3 is not connected

CN13 connect to W83627THF TACH2 detect pin.

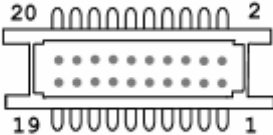
CN25 connect to W83627THF TACH1 detect pin.

CN26 connect to W83627THF TACH3 detect pin.

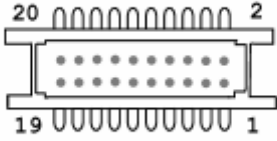
CN4, CN11, CN14, and CN15: SATA Connector

	Pin	Assignment
	1	Ground
	2	SATA_TXP
	3	SATA_TXN
	4	Ground
	5	SATA_RXN
	6	SATA_RXP
7	Ground	

CN6: 24-bit LVDS Even Channel

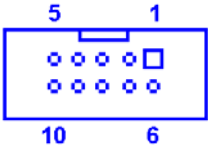
				
1-1	Pin	Define	Pin	Define
	1	LVDS_TXU0P	2	LVDS_TXU0N
	3	Ground	4	Ground
	5	LVDS_TXU1P	6	LVDS_TXU1N
	7	Ground	8	LCD Power Input
	9	LVDS_TXU3P	10	LVDS_TXU3N
	11	LVDS_TXU2P	12	LVDS_TXU2N
	13	Ground	14	Ground
	15	LVDS_TXUCKP	16	LVDS_TXUCKN
	17	ENABKL	18	LCD Power Input
	19	+12V	20	+12V

CN7: 24-bit LVDS Odd Channel



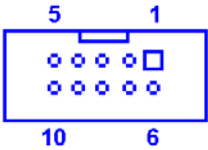
1-2 Pin	Define	Pin	Define
1	LVDS_TXL0P	2	LVDS_TXL0N
3	Ground	4	Ground
5	LVDS_TXL1P	6	LVDS_TXL1N
7	Ground	8	LCD Power Input
9	LVDS_TXL3P	10	LVDS_TXL3N
11	LVDS_TXL2P	12	LVDS_TXL2N
13	Ground	14	Ground
15	LVDS_TXLCKP	16	LVDS_TXLCKN
17	ENABKL	18	LCD Power Input
19	+12V	20	+12V

CN8: COM2 Connector




Pin	Assignment	Pin	Assignment
1	DCD2	6	DSR2
2	RXD2	7	RTS2
3	TXD2	8	CTS2
4	DTR2	9	RI2
5	Ground	10	NC

CN9: COM1 Connector



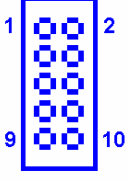
Pin	Assignment	Pin	Assignment
1	DCD1	6	DSR1
2	RXD1	7	RTS1
3	TXD1	8	CTS1
4	DTR1	9	RI1
5	Ground	10	NC

CN10: LCD Inverter connector

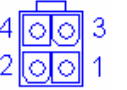


Pin	Assignment
1	+12V
2	ENABKL
3	Ground

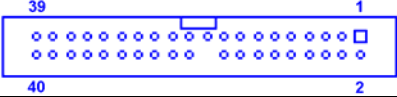
CN12: Front Panel Connector

	Pin	Assignment	Pin	Assignment
	1	Speaker -	2	Speaker +
	3	Power LED-	4	Power LED+
	5	Power Button-	6	Power Button +
	7	Reset Button-	8	Reset Button+
	9	IDE LED-	10	IDE LED+

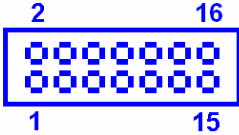
CN16: Auxiliary +12V Power Connector

	Pin	Assignment	Pin	Assignment
	1	Ground	2	Ground
	3	+12V	4	+12V

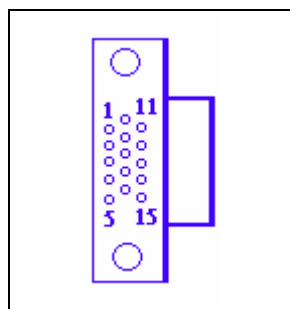
CN17: IDE Connector

			
Pin	Define	Pin	Define
1	RESET*	2	Ground
3	DATA7	4	DATA8
5	DATA6	6	DATA9
7	DATA5	8	DATA10
9	DATA4	10	DATA11
11	DATA3	12	DATA12
13	DATA2	14	DATA13
15	DATA1	16	DATA14
17	DATA0	18	DATA15
19	Ground	20	KEY PIN
21	DREQ	22	Ground
23	DIOW*	24	Ground
25	DIOR*	26	Ground
27	IOCHRDY	28	Ground
29	DACK*	30	Ground
31	IRQ14	32	N/C
33	A1	34	DETECT
35	A0	36	A2
37	HD SELECT 0*	38	HD SELECT 1*
39	ACTIVE*	40	Ground

CN18: GbE Output Connector

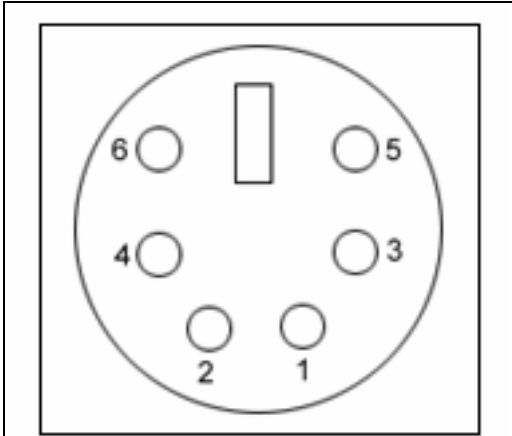
	Pin	Assignment	Pin	Assignment
	1	MDIP0	9	Ground
	2	MDIN0	10	LINK100#
	3	MDIP1	11	NC
	4	MDIN1	12	LINK1000#
	5	MDIP2	13	VDD_GbE_2.5V
	6	MDIN2	14	LED_TX
	7	MDIP3	15	NC
	8	MDIN3	16	Ground

CN19: VGA DB-15 Connector



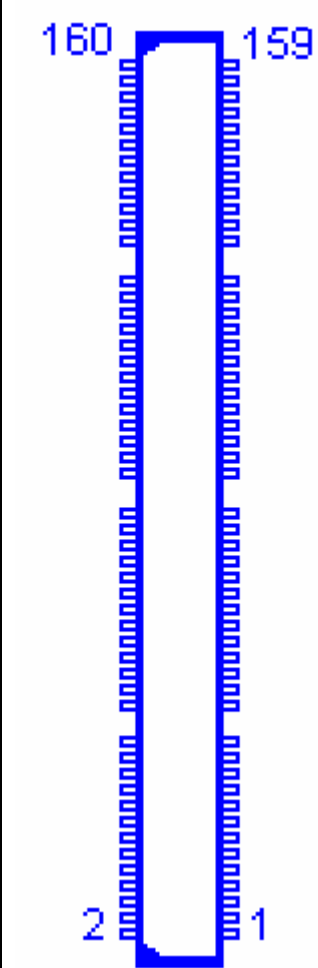
Pin	Define
1	RED
2	GREEN
3	BLUE
4	NC
5	Ground
6	Ground
7	Ground
8	Ground
9	+5V
10	Ground
11	NC
12	DDC DATA
13	HSYNC
14	VSYNC
15	DDC CLOCK

CN20: Keyboard/Mouse Connector



Pin	Define
1	MS-DATA
2	KB-DATA
3	Ground
4	+5V
5	MS-CLK
6	KB-CLK

CN21: HyperTransport Connector

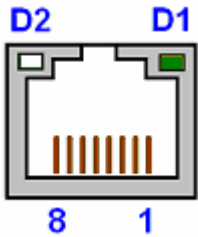


The diagram shows a vertical connector with pins numbered 160 at the top left, 159 at the top right, 2 at the bottom left, and 1 at the bottom right. The pins are arranged in two columns of 45 pins each, with a gap between the two columns.



Pin	Assignment	Pin	Assignment
1	+3.3V	2	+3.3V
3	+3.3V	4	+3.3V
5	+3.3V	6	+3.3V
7	H_TDI	8	NC
9	CPU1_CLK#	10	H_TMS
11	CPU1_CLK	12	CPU1_HT_VLD
13	VTIN	14	SMB_MEM_SCL
15	IO_AGND	16	SMB_MEM_SDA
17	H_TRST	18	Ground
19	H_TCK	20	HT1_TXD0
21	Ground	22	HT1_TXD#0
23	HT1_TXD8	24	Ground
25	HT1_TXD#8	26	HT1_TXD1
27	Ground	28	HT1_TXD#1
29	HT1_TXD9	30	Ground
31	HT1_TXD#9	32	HT1_TXD2
33	Ground	34	HT1_TXD#2
35	HT1_TXD10	36	Ground
37	HT1_TXD#10	38	HT1_TXD3
39	Ground	40	HT1_TXD#3
41	HT1_TXD11	42	Ground
43	HT1_TXD#11	44	HT1_TXCLK0
45	Ground	46	HT1_TXCLK#0
47	HT1_TXCLK1	48	Ground
49	HT1_TXCLK#1	50	Ground
51	Ground	52	HT1_TXD4
53	HT1_TXD12	54	HT1_TXD#4
55	HT1_TXD#12	56	Ground
57	Ground	58	HT1_TXD5
59	HT1_TXD13	60	HT1_TXD#5
61	HT1_TXD#13	62	Ground
63	Ground	64	HT1_TXD6
65	HT1_TXD14	66	HT1_TXD#6
67	HT1_TXD#14	68	Ground
69	Ground	70	HT1_TXD7
71	HT1_TXD15	72	HT1_TXD#7
73	HT1_TXD#15	74	Ground
75	Ground	76	HT1_TXCTL0
77	NC	78	HT1_TXCTL#0
79	NC	80	Ground
81	Ground	82	NC
83	HT1_RXCTL#0	84	NC
85	HT1_RXCTL0	86	Ground
87	Ground	88	HT1_RXD15#
89	HT1_RXD#7	90	HT1_RXD15
91	HT1_RXD7	92	Ground

Pin	Assignment	Pin	Assignment
93	Ground	94	HT1_RXD#14
95	HT1_RXD#6	96	HT1_RXD14
97	HT1_RXD6	98	Ground
99	Ground	100	HT1_RXD#13
101	HT1_RXD#5	102	HT1_RXD13
103	HT1_RXD5	104	Ground
105	Ground	106	HT1_RXD#12
107	HT1_RXD#4	108	HT1_RXD12
109	HT1_RXD4	110	Ground
111	Ground	112	HT1_RXCLK#1
113	Ground	114	HT1_RXCLK1
115	HT1_RXCLK#0	116	Ground
117	HT1_RXCLK0	118	HT1_RXD#11
119	Ground	120	HT1_RXD11
121	HT1_RXD#3	122	Ground
123	HT1_RXD3	124	HT1_RXD#10
125	Ground	126	HT1_RXD10
127	HT1_RXD#2	128	Ground
129	HT1_RXD2	130	HT1_RXD#9
131	Ground	132	HT1_RXD9
133	HT1_RXD#1	134	Ground
135	HT1_RXD1	136	HT1_RXD#8
137	Ground	138	HT1_RXD8
139	HT1_RXD#0	140	Ground
141	HT1_RXD0	142	HT_STOP#
143	Ground	144	CPU_PWRGD
145	NC	146	CPU1_DET#
147	CPU_RST#	148	HTVDD_EN
149	CPU1_+2.5V	150	CPU1_VLD
151	NC	152	CPUVDD_EN
153	PECLK_TEST	154	NC
155	+3.3V	156	+3.3V
157	+3.3V	158	+3.3V
159	+3.3V	160	+3.3V



CN22 & CN24: Single port GbE Connector

	Pin	Assignment
	1	MDIP0
	2	MDIN0
	3	MDIP1
	4	MDIP2
	5	MDIN2
	6	MDIN1
	7	MDIP3
	8	MDIN3
D1: Link/Activity LED		
Link	Green Color	
Activity	Blinking	
D2: Speed indicated LED		
10 Mbps	DIM	
100 Mbps	Green Color	
1000 Mbps	Orange Color	



JP2: Flash Recovery Header

Setting		Define
 1 2	Close	Normal
 1 2	Open	Recovery



JP3: Clear CMOS Control

Setting		Define
 1 2 3	1-2	Clear CMOS
 1 2 3	2-3	Normal Status (Default)



JP1: LCD Panel Power Select

Setting		Define
 1 2 3	1-2	+3.3V (Default)
 1 2 3	2-3	+5V

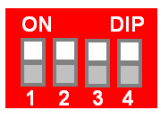
JP4: PCI-X 100/133MHz Bus Speed Select

Setting		Define
 1 2 3	1-2	100MHz
 1 2 3	2-3	133MHz

JP5: Multi or Single PCI-X slots Select

Setting	Define
 1 2 3	1-2 Multi Slots
 1 2 3	2-3 Single Slot

SW1: VGA mode Select Switch

Switch 1	P-1	P-2	P-3	P-4	Resolution
 ON DIP 1 2 3 4	ON	OFF	OFF	X	800x600, 18bit, 1CH
	OFF	ON	OFF	X	1024x768, 18bit, 1CH
	ON	ON	OFF	X	1024x768, 24bit, 1CH
	ON	OFF	ON	X	1280x1024, 36bit, 2CH
	OFF	OFF	ON	X	1400x1050, 36bit, 2CH
	OFF	ON	ON	X	1600x1200, 36bit, 2CH
	ON	ON	ON	X	1920x1200, 36bit, 2CH

Note: Position 4 without any signal connected.

Appendix A: Golden Finger Pinouts

x16 PCIe Connector A			x8 PCIe Connector B			x16 PCIe Connector C			x8 PCIe Connector D		
Side B		Side A	Side B		Side A	Side B		Side A	Side B		Side A
1	SMCLK	SMDAT	1	+5Vaux	+5Vaux	1	C/BE6#	GND	1	INTB#	INTA#
2	GND	GND	2	GND	NC	2	C/BE4#	GND	2	INTD#	INTC#
3	TDI	TCK	3	PE0_OUT8	GND	3	GND	C/BE7#	3	GND	VIO
4	NC	TMS	4	PE0_OUT8#	GND	4	GND	C/BE5#	4	REQ3#	GNT3#
5	TRST#	WAKE#	5	GND	PE0_IN8	5	AD63	GND	5	REQ2#	GNT2#
6	PWRBT#	NC	6	GND	PE0_IN8#	6	AD61	GND	6	PCI_RST#	GNT1#
7	PWRGD	PS_ON#	7	PE0_OUT9	GND	7	GND	AD62	7	REQ1#	GNT0#
8	SHB_RST#	PERST#	8	PE0_OUT9#	GND	8	GND	AD60	8	REQ0#	SERR#
9	NC	NC	9	GND	PE0_IN9	9	AD59	GND	9	NC	+3.3V
10	NC	NC	10	GND	PE0_IN9#	10	GND	AD58	10	GND	CLKFI
11	GND	GND	11	RSVD	GND	11	AD57	GND	11	CLKFO	GND
Mechanical Key			Mechanical Key			Mechanical Key			Mechanical Key		
12	GND	RSVD	12	GND	NC	12	GND	AD56	12	CLK2	CLK3
13	NC	GND	13	PE0_OUT10	GND	13	AD55	GND	13	GND	+3.3V
14	NC	GND	14	PE0_OUT10#	GND	14	AD53	GND	14	CLK0	CLK1
15	GND	NC	15	GND	PE0_IN10	15	GND	AD54	15	+3.3V	GND
16	GND	NC	16	GND	PE0_IN10#	16	GND	AD52	16	AD31	NC
17	NC	GND	17	PE0_OUT11	GND	17	AD51	GND	17	AD29	+3.3V
18	NC	GND	18	PE0_OUT11#	GND	18	AD49	GND	18	M66EN	AD30
19	GND	NC	19	GND	PE0_IN11	19	GND	AD50	19	AD27	AD28
20	GND	NC	20	GND	PE0_IN11#	20	GND	AD48	20	AD25	GND
21	NC	GND	21	PE0_OUT12	GND	21	AD47	GND	21	GND	AD26
22	NC	GND	22	PE0_OUT12#	GND	22	AD45	GND	22	C/BE3#	AD24
23	GND	NC	23	GND	PE0_IN12	23	GND	AD46	23	AD23	+3.3V
24	GND	NC	24	GND	PE0_IN12#	24	GND	AD44	24	GND	AD22
25	NC	GND	25	PE0_OUT13	GND	25	AD43	GND	25	AD21	AD20
26	NC	GND	26	PE0_OUT13#	GND	26	AD41	GND	26	AD19	PCIXCAP
27	GND	NC	27	GND	PE0_IN13	27	GND	AD42	27	+5V	AD18
28	GND	NC	28	GND	PE0_IN13#	28	GND	AD40	28	AD17	AD16
29	REFCLK0+	GND	29	PE0_OUT14	GND	29	NC	GND	29	C/BE2#	GND
30	REFCLK0-	GND	30	PE0_OUT14#	GND	30	NC	GND	30	GND	FRAME#
31	GND	REFCLK1+	31	GND	PE0_IN14	31	AD39	AD38	31	IRDY#	TRDY#
32	NC	REFCLK1-	32	GND	PE0_IN14#	32	AD37	AD36	32	DEVSEL#	+5V
33	NC	GND	33	PE0_OUT15	GND	33	AD35	AD34	33	LOCK#	STOP#
34	NC	GND	34	PE0_OUT15#	GND	34	AD33	GND	34	PERR#	GND
35	GND	NC	35	GND	PE0_IN15	35	NC	GND	35	GND	C/BE1#
36	NC	NC	36	GND	PE0_IN15#	36	GND	AD32	36	PAR	AD14
37	NC	GND	37	NC	GND	37	GND	NC	37	NC	GND
38	NC	GND	38	NC	NC	38	ACK64#	GND	38	GND	AD12
39	GND	NC	39	GND	GND	39	PAR64	GND	39	AD15	AD10
40	NC	NC	40	GND	GND	40	GND	NC	40	AD13	GND
41	NC	GND	41	GND	GND	41	GND	REQ64#	41	GND	AD09
42	NC	GND	42	GND	GND	42	+3.3V	+3.3V	42	AD11	C/BE0#
43	GND	NC	43	GND	GND	43	+3.3V	+3.3V	43	AD08	GND

x16 PCIe Connector A			x8 PCIe Connector B			x16 PCIe Connector C			x8 PCIe Connector D		
Side B		Side A	Side B		Side A	Side B		Side A	Side B		Side A
44	GND	NC	44	+12V	+12V	44	+3.3V	+3.3V	44	GND	AD6
45	PE0_OUT0	GND	45	+12V	+12V	45	+3.3V	+3.3V	45	AD7	AD5
46	PE0_OUT0#	GND	46	+12V	+12V	46	+3.3V	+3.3V	46	AD4	GND
47	GND	PE0_IN0	47	+12V	+12V	47	+3.3V	+3.3V	47	GND	AD2
48	GND	PE0_IN0#	48	+12V	+12V	48	+3.3V	+3.3V	48	AD3	AD1
49	PE0_OUT1	GND	49	+12V	+12V	49	+3.3V	+3.3V	49	AD0	GND
50	PE0_OUT1#	GND				50	+3.3V	+3.3V			
51	GND	PE0_IN1				51	GND	GND			
52	GND	PE0_IN1#				52	GND	GND			
53	PE0_OUT2	GND				53	GND	GND			
54	PE0_OUT2#	GND				54	GND	GND			
55	GND	PE0_IN2				55	GND	GND			
56	GND	PE0_IN2#				56	GND	GND			
57	PE0_OUT3	GND				57	GND	GND			
58	PE0_OUT3#	GND				58	GND	GND			
59	GND	PE0_IN3				59	+5V	+5V			
60	GND	PE0_IN3#				60	+5V	+5V			
61	PE0_OUT4	GND				61	+5V	+5V			
62	PE0_OUT4#	GND				62	+5V	+5V			
63	GND	PE0_IN4				63	GND	GND			
64	GND	PE0_IN4#				64	GND	GND			
65	PE0_OUT5	GND				65	GND	GND			
66	PE0_OUT5#	GND				66	GND	GND			
67	GND	PE0_IN5				67	GND	GND			
68	GND	PE0_IN5#				68	GND	GND			
69	PE0_OUT6	GND				69	GND	GND			
70	PE0_OUT6#	GND				70	GND	GND			
71	GND	PE0_IN6				71	GND	GND			
72	GND	PE0_IN6#				72	GND	GND			
73	PE0_OUT7	GND				73	+12V	+12V			
74	PE0_OUT7#	GND				74	+12V	+12V			
75	GND	PE0_IN7				75	+12V	+12V			
76	GND	PE0_IN7#				76	+12V	+12V			
77	NC	GND				77	+12V	+12V			
78	+3.3V	+3.3V				78	+12V	+12V			
79	+3.3V	+3.3V				79	+12V	+12V			
80	+3.3V	+3.3V				80	+12V	+12V			
81	+3.3V	+3.3V				81	+12V	+12V			
82	+3.3_Dual	+3.3_Dual				82	+12V	+12V			

Appendix B: SMBus Addresses Map

Device	Address
DIMM0	0x50h
DIMM1	0x51h
SIO	0x2Dh



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