XTend1000

User Manual

TM90020001-A

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Chapter 1: Introduction

1.1 Introduction

XTend1000 is a 64 bit/66 Mhz PCI extender card designed to provide a flexible, low cost alternative for CompactPCI or PMC module development. XTend1000 allows an obsolete or inexpensive PC to take the place of an expensive CompactPCI backplane and/or PMC carrier card. XTend1000 includes a host of options that allow it to ease development and lower costs in a wide variety of situations.

The inclusion of an ATX power connector allows XTend1000 to work either standalone with just a PC compatible power supply, or hosted on an inexpensive PC motherboard. A built in 3.3V power supply allows XTend1000 to overcome the limitations of older 5V only backplanes. Access to all PCI signals is provided through a set of debug headers and a VME connector.

XTend1000 also provides a universal platform for field application engineers. They can host PMC and cPCI demonstrations or product evaluations with a single XTend1000 card and power supply. No bulky (and expensive) chassis to lug through airport security or leave behind at customer sites. Customers benefit, too as they can utilize XTend1000 with our 48 hour delivery program to begin project/software development instantly.

1.2 Features

The list below is a brief description of XTend1000 features. Refer to the specific section in the manual for additional information.

Turns a PC Motherboard Into a CompactPCI or PMC Module Development System	An effective solution for CompactPCI or PMC development, with a variety of options, while maintaining a low cost. Utilizing a typical PC motherboard, the XTend1000 serves as a cPCI backplane and/or PMC carrier card. It's an essential tool for any hardware or software developer.
ATX Power Connector	An ATX Power Connector allows the XTend1000 to be used without the support of a PC. Providing a unique and cost effective portable demonstration or evaluation platform.
Built in 10A, 3.3V Power Supply	Fuse placement selects between an on-board 3.3V supply or an external source. The built-in supply allows for a 3.3 Volt environment even in older 5V only backplanes.
Support for 64 bit/66MHz PCI	The CompactPCI 64EN and PCI M66EN signals are configured by jumpers, empowering operation at a variety of bus speeds with a 32 or 64-bit bus.
Vertical or Horizontal PMC Card Mount	Vertical PMC mounting provides easy access to the card for debugging and signal verification. Horizontal mounting creates a lower-profile connection, perfect for operation within a PC case.
Debug Header Allows Access to All PCI Signals	Headers provides access to all PCI signals, allowing the user to quickly verify signal activity and timing. A JTAG header connected to all three interfaces furnishes additional debug capabilities.

VME Connector	A VME Connector provides quick and convenient access to all PMC J14 I/O signals.
Local Reset Switch	The local reset switch on the XTend1000 allows for easy assertion of PCI RST# signal to all interfaces.
Fuses On All Power Inputs	Fuses protect your system and ensure that it cannot be damaged by power-ground shorts, surges, or user error. The fuses are socketed and there is three available for each power supply rail.
Status LEDs	Status LEDs allow for simple and effective monitoring of power, arbitration, and interrupt signals.

1.3 Technical Information

The technical information in this manual is intended to describe the unique features of XTend1000. It is assumed that the reader has familiarity with the devices and interface standards incorporated into the XTend1000. This information can be found in the following manuals and specifications.

PCI	PCI Local Bus Specification, Revision 2.2	PCI-SIG	
CompactPCI	PICMG 2.0 CompactPCI Core Specification, Revision 3.0	PICMG	
	PICMG 2.3 PMC on CompactPCI Specification, Revision 1.0	PICMG	
	PICMG 2.9 CompactPCI System Management Specification, Revision 1.0	PICMG	
	PICMG 2.10 Keying of CompactPCI Boards and BackPlanes Specification, Revision 1.0	PICMG	
PMC	IEEE Standard for a Common Mezzanine Card Family: CMC	IEEE	1386-2001

Chapter 2: Printed Circuit Board

2.1 Introduction

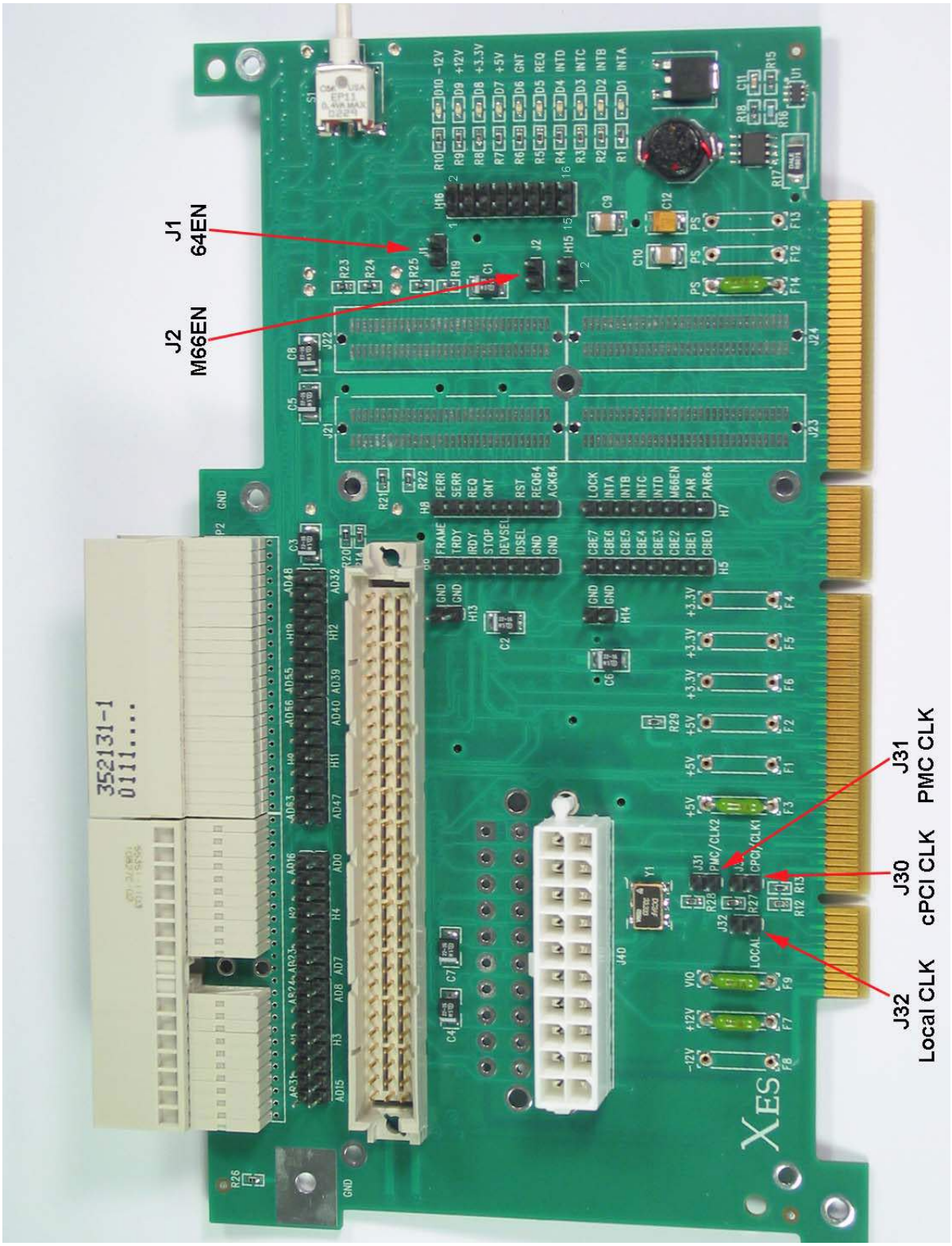
This chapter describes details associated with the printed circuit board. These include jumper configurations, header pin-outs, installation, environmental, and electrical characteristics.

2.2 Jumper Definitions

Table 2.2.1: Jumper Definitions

Jumper	Function
J1	Grounds the 64EN signal to CompactPCI P2 on pin B5. Connecting configures the bus for 64-bit operation.
J2	Grounds the M66EN signal to the PCI connector on pin B49. Connecting prevents operation of the PCI bus at 34 to 66 MHz.
J30	Connects the PCI clock on PCI pin B16 to the Compact-PCI clock.
J31	Connects the PCI clock on PCI pin B16 to the PMC clock.
J32	Connects the PCI clock on PCI pin B16 to the XTend1000's local clock running at 33.333 MHz.

Figure 2.2.2: Jumper Locations



2.3 Header Definition

Table 2.3.1: Debug Header Definitions

Header	Description
H1	Address/Data Lines - AD[31:24]
H2	Address/Data Lines - AD[23:16]
H3	Address/Data Lines - AD[15:8]
H4	Address/Data Lines - AD[7:0]
H5	Bus Command and Byte Enables - CBE[7:0]
H6	Interface Control Signals
H7	Interrupts, Parity, and Control Signals
H8	Arbitration and Error Reporting
H9	Address Lines - AD[63:56]
H10	Address Lines - AD[55:48]
H11	Address Lines - AD[47:40]
H12	Address Lines - AD[39:32]
H13	GND
H14	GND

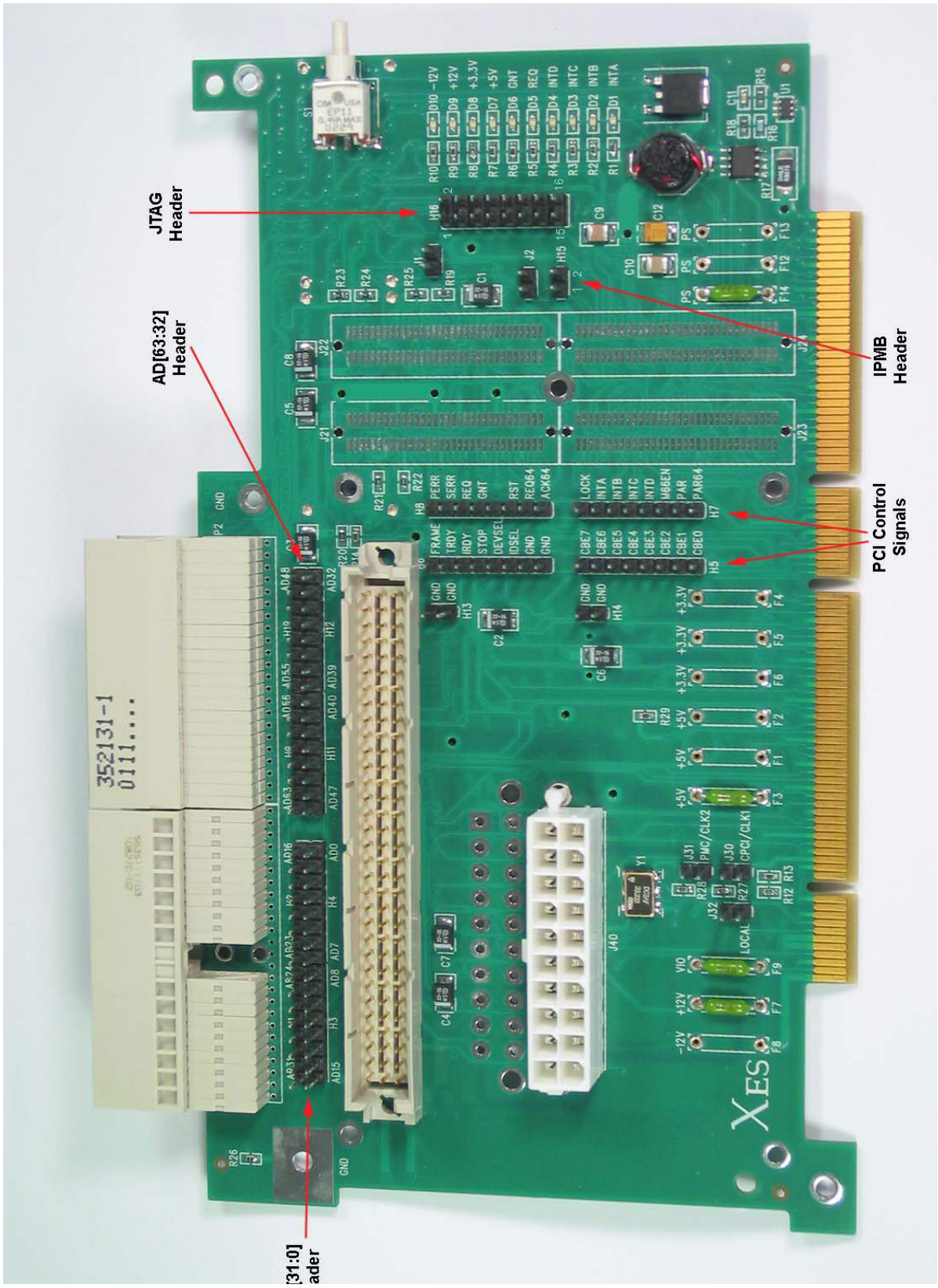
Table 2.3.2: JTAG Header (H16) Definition

Pin	Description	Pin	Description
1	TDO	2	No Connect
3	TDI	4	TRST
5	No Connect	6	VCC
7	TCK	8	No Connect
9	TMS	10	No Connect
11	No Connect	12	GND
13	No Connect	14	No Connect
15	No Connect	16	GND

Table 2.3.3: CompactPCI IPMB Header (H15) Definition

Pin	Description	Pin	Description
1	SDA	2	SCL

Figure 2.3.4: Header Locations



2.4 VME Connector

A VME Connector provides access to all PMC J14 I/O.

Table 2.4.1: VME Connector Pin Assignment

Pin	Description	Pin	Description
1	J14_1	2	J14_3
3	J14_5	4	J14_7
5	J14_9	6	J14_11
7	J14_13	8	J14_15
9	J14_17	10	J14_19
11	J14_21	12	J14_23
13	J14_25	14	J14_27
15	J14_29	16	J14_31
17	J14_33	18	J14_35
19	J14_37	20	J14_39
21	J14_41	22	J14_43
23	J14_45	24	J14_47
25	J14_49	26	J14_51
27	J14_53	28	J14_55
29	J14_57	30	J14_59
31	J14_61	32	J14_63
33-64	No Connect	33-64	No Connect
65	J14_2	66	J14_4
67	J14_6	68	J14_8
69	J14_10	70	J14_12
71	J14_14	72	J14_16
73	J14_18	74	J14_20
75	J14_22	76	J14_24
77	J14_26	78	J14_28
79	J14_30	80	J14_32
81	J14_34	82	J14_36
83	J14_38	84	J14_40
85	J14_42	86	J14_44
87	J14_46	88	J14_48
89	J14_50	90	J14_52
91	J14_54	92	J14_56
93	J14_58	94	J14_60
95	J14_62	96	J14_64

2.5 ATX Power Connector

In order to remove the limitations of requiring a PC motherboard, an ATX Power Connector is provided to allow the XTend1000 to standalone. A PC compatible power supply is all that is required.

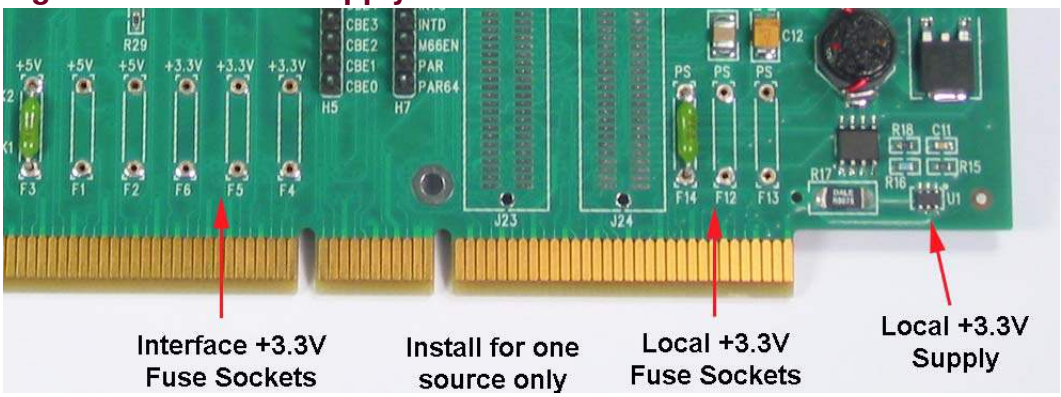
Table 2.5.1: ATX Power Connector Pin Assignment

Pin	Description	Pin	Description
1	+ 3.3 VDC	11	+ 3.3 VDC
2	+ 3.3 VDC (VI/O)	12	- 12 VDC
3	GND	13	GND
4	+ 5 VDC	14	PS_ON# (GND)
5	GND	15	GND
6	+ 5 VDC	16	GND
7	GND	17	GND
8	PWR_OK (No Connect)	18	- 5 VDC (No Connect)
9	+ 5 VSB (No Connect)	19	+ 5 VDC
10	+ 12 VDC	20	+ 5 VDC

2.6 Local +3.3 V Supply

XTend1000 offers a local + 3.3 V supply that can be enabled by fuse positioning. Placing fuses in the sockets located near the local supply includes it in the +3.3 V circuit. At no time should fuses be placed for both supplies. The following figure illustrates the fuse socket positions.

Figure 2.6.1: +3.3 V Supply



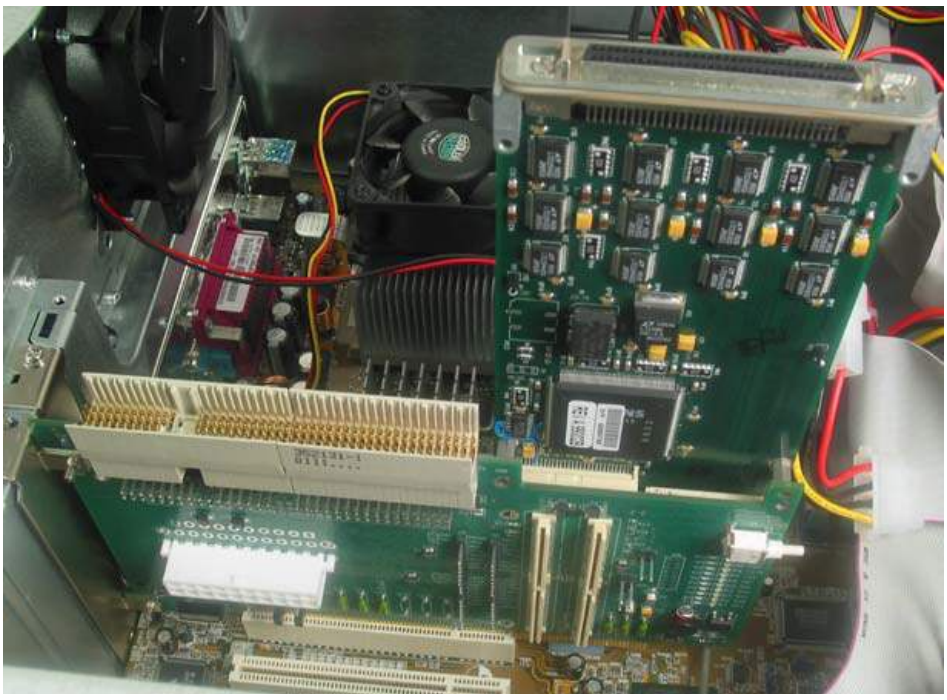
2.7 Installation

XTend1000 can be installed into any PC Motherboard PCI slot or it can standalone, using the ATX Power Connector. A 33.333 MHz on-board clock can be enabled for operation when not attached to a PC motherboard. Pull-up resistors on RESET and FRAME# signals ensure interface functionality.

Figure 2.7.1: XTend1000 Standalone

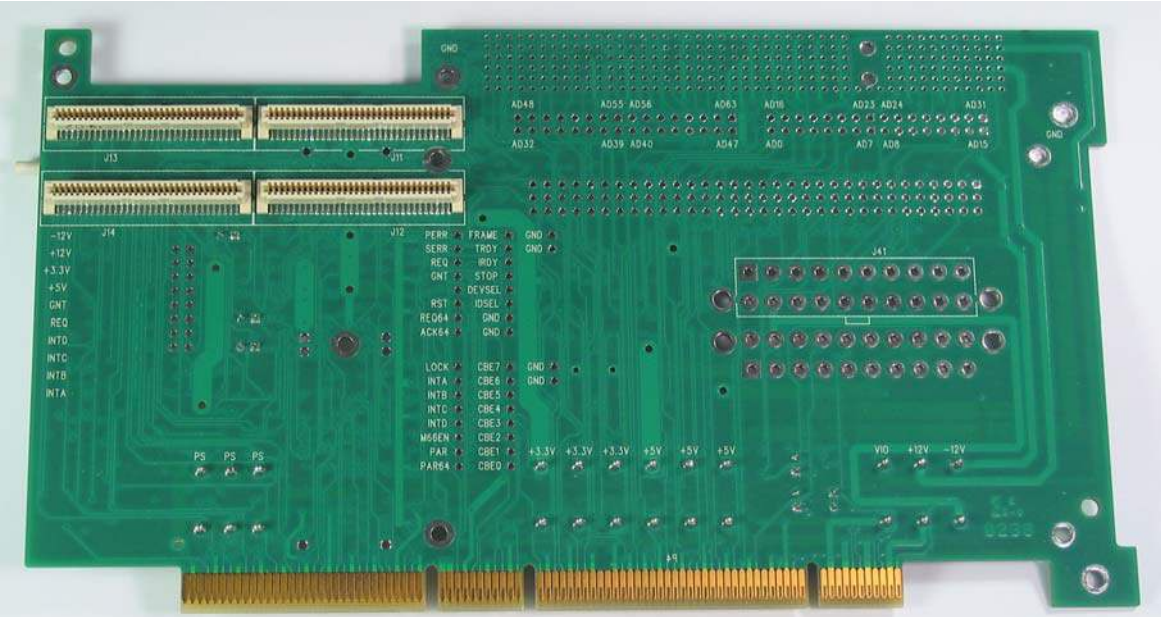
XTend1000 offers two PMC Card mounts, a vertical connection for debugging or a horizontal connection for a lower profile. A VME Connector is also available for access to PMC J14 I/O.

Figure 2.7.2: XTend1000 PMC Mount



XTend1000 supplies CompactPCI P1 and P2 connectors, allowing for 32 or 64-bit PCI signaling and system slot signals. CompactPCI boards mount vertically, permitting easy access to the development module.

Figure 2.7.3: Vertical PMC Connectors (back of XTend1000)



2.8 ESD Protection

XTend1000 can be damaged by electrostatic discharge (ESD). When handling this and other electronic devices, you should be properly grounded to avoid damage.

2.9 Environmental Requirements

Table 2.9.1: Environmental Requirements

Requirement	Specification
Operating Temperature	0 to +55 C, Ambient, At Board
Humidity	0 to 85%
Storage Temperature	-40 to 70 C

2.10 Electrical Characteristics

The following table gives the current specifications of different voltages for the XTend1000. Status LEDs monitor +3.3 V, +5 V, +12 V, and -12 V connections to attached modules.

Table 2.10.1: Current Specifications

Voltage	Current
+3.3V	Up to 9 A fusing
+5.0V	Up to 9 A fusing
+12.0V	Up to 3 A fusing
-12.0V	Up to 3 A fusing
VI/O	Up to 3 A fusing

Chapter 3: CompactPCI Interface

3.1 Introduction

XTend1000 offers a CompactPCI backplane connection, conformimg to the PICMG 2.0 specification. A CompactPCI module can be mounted vertically onto XTend1000's P1 and P2 connectors. XTend1000 supports CompactPCI modules with up to a 66 MHz PCI clock and 64-bit address/data bus.

3.2 Status LEDs

Status LEDs monitor activity on REQ#, GNT#, INTA#, INTB#, INTC#, and INTD#.

3.3 Pin Assignments

Table 3.3.1: P1 Connector Pin Assignments

Pin	Z	A	B	C	D	E	F
25	GND	5V	REQ64#	ENUM#	3.3V	5V	GND
24	GND	AD[1]	5V	V(I/O)	AD[0]	ACK64#	GND
23	GND	3.3V	AD[4]	AD[3]	5V	AD[2]	GND
22	GND	AD[7]	GND	3.3V	AD[6]	AD[5]	GND
21	GND	3.3V	AD[9]	AD[8]	M66EN	C/BE[0]#	GND
20	GND	AD[12]	GND	V(I/O)	AD[11]	AD[10]	GND
19	GND	3.3V	AD[15]	AD[14]	GND	AD[13]	GND
18	GND	SERR#	GND	3.3V	PAR	C/BE[1]#	GND
17	GND	3.3V	IPMB_SCL	IPMB_SDA	GND	PERR#	GND
16	GND	DEVSEL#	PCIXCAP	V(I/O)	STOP#	LOCK#	GND
15	GND	3.3V	FRAME#	IRDY#	BD_SEL#	TRDY#	GND
14							
13	KEY AREA						
12							
11	GND	AD[18]	AD[17]	AD[16]	GND	C/BE[2]#	GND
10	GND	AD[21]	GND	3.3V	AD[20]	AD[19]	GND
9	GND	C/BE[3]#	IDSEL	AD[23]	GND	AD[22]	GND
8	GND	AD[26]	GND	V(I/O)	AD[25]	AD[24]	GND
7	GND	AD[30]	AD[29]	AD[28]	GND	AD[27]	GND
6	GND	REQ#	GND	3.3V	CLK	AD[31]	GND
5	GND	BRSVP1A5	BRSVP1B5	PCI_RST#	GND	GNT#	GND
4	GND	IPMB_PWR	HEALTHY#	V(I/O)	INTP	INTS	GND
3	GND	INTA#	INTB#	INTC#	5V	INTD#	GND
2	GND	TCK	5V	TMS	TDO	TDI	GND
1	GND	5V	-12V	TRST#	+12V	5V	GND

Table 3.3.2: P2 Connector Pin Assignments

Pin	Z	A	B	C	D	E	F
22	GND	GA4	GA3	GA2	GA1	GA0	GND
21	GND	RSV	RSV	RSV	RSV	RSV	GND
20	GND	RSV	RSV	RSV	GND	RSV	GND
19	GND	RSV	RSV	RSV	RSV	RSV	GND
18	GND	BRSVP2A18	BRSVP2B18	BRSVP2C18	GND	BRSVP2E18	GND
17	GND	BRSVP2A17	GND	RSV	RSV	RSV	GND
16	GND	BRSVP2A16	BRSVP2B16	RSV	GND	BRSVP2E16	GND
15	GND	BRSVP215	GND	RSV	RSV	RSV	GND
14	GND	AD[35]	AD[34]	AD[33]	GND	AD[32]	GND
13	GND	AD[38]	GND	V(I/0)	AD[37]	AD[36]	GND
12	GND	AD[42]	AD[41]	AD[40]	GND	AD[39]	GND
11	GND	AD[45]	GND	V(I/O)	AD[44]	AD[43]	GND
10	GND	AD[49]	AD[48]	AD[47]	GND	AD[46]	GND
9	GND	AD[52]	GND	V(I/O)	AD[51]	AD[50]	GND
8	GND	AD[56]	AD[55]	AD[54]	GND	AD[53]	GND
7	GND	AD[59]	GND	V(I/O)	AD[58]	AD[57]	GND
6	GND	AD[63]	AD[62]	AD[61]	GND	AD[60]	GND
5	GND	C/BE[5]#	64EN	V(I/O)	C/BE[4]#	PAR64	GND
4	GND	V(I/O)	BRSVP2B4	C/BE[7]#	GND	C/BE[6]#	GND
3	GND	RSV	GND	RSV	RSV	RSV	GND
2	GND	RSV	RSV	UNC	RSV	RSV	GND
1	GND	RSV	GND	RSV	RSV	RSV	GND

Chapter 4: PMC Interface

4.1 Introduction

XTend1000 offers two PMC card mounts, vertical and horizontal. Attached modules can operate with a 32 or 64-bit address/data bus at 33Mhz or 66Mhz PCI. PMC P14 I/O is routed to a VME connector for quick and convenient access.

4.2 Status LEDs

Status LEDs monitor activity on REQ#, GNT#, INTA#, INTB#, INTC#, and INTD#.

4.3 Pin Assignments

Table 4.3.1: J11/J12 Connector Pin Assignments

Pin	J11	J12	Pin	J11	J12
1	TCK	+12V	2	-12V	TRST#
3	GND	TMS	4	INTA#	TDO
5	INTB#	TDI	6	INTC#	GND
7	BUSMODE1#	GND	8	+5V	PCI-RSVD
9	INTD#	PCI-RSVD	10	PCI-RSVD	PCI-RSVD
11	GND	BUSMODE2#	12	PCI-RSVD	+3.3V
13	CLK	RST#	14	GND	BUSMODE3#
15	GND	+3.3V	16	GNT#	BUSMODE4#
17	REQ#	PCI-RSVD	18	+5V	GND
19	V(I/O)	AD[30]	20	AD[31]	AD[29]
21	AD[28]	GND	22	AD[27]	AD[26]
23	AD[25]	AD[24]	24	GND	+3.3V
25	GND	IDSEL	26	C/BE[3]#	AD[23]
27	AD[22]	+3.3V	28	AD[21]	AD[20]
29	AD[19]	AD[18]	30	+5V	GND
31	V(I/O)	AD[16]	32	AD[17]	C/BE[2]#
33	FRAME#	GND	34	GND	PMC-RSVD
35	GND	TRDY#	36	IRDY#	+3.3V
37	DEVSEL#	GND	38	+5V	STOP#
39	GND	PERR#	40	LOCK#	GND
41	SDONE#	+3.3V	42	SBO#	SERR#
43	PAR	C/BE[1]#	44	GND	GND
45	V(I/O)	AD[14]	46	AD[15]	AD[13]
47	AD[12]	GND	48	AD[11]	AD[10]
49	AD[9]	AD[8]	50	+5V	+3.3V
51	GND	AD[7]	52	C/BE[0]#	PMC-RSVD

Pin	J11	J12	Pin	J11	J12
53	AD[6]	+3.3V	54	AD[5]	PMC-RSVD
55	AD[4]	PMC-RSVD	56	GND	GND
57	V(I/O)	PMC-RSVD	58	AD[3]	PMC-RSVD
59	AD[2]	GND	60	AD[1]	PMC-RSVD
61	AD[0]	ACK64#	62	+5V	+3.3V
63	GND	GND	64	REQ64#	PMC-RSVD

Table 4.3.2: J13/J14 Connector Pin Assignments

Pin	J13	J14	Pin	J13	J14
1	PCI-RSVD	C[1]	2	GND	A[1]
3	GND	C[2]	4	C/BE[7]#	A[2]
5	C/BE[6]#	C[3]	6	C/BE[5]#	A[3]
7	C/BE[4]#	C[4]	8	GND	A[4]
9	V(I/O)	C[5]	10	PAR64	A[5]
11	AD[63]	C[6]	12	AD[62]	A[6]
13	AD[61]	C[7]	14	GND	A[7]
15	GND	C[8]	16	AD[60]	A[8]
17	AD[59]	C[9]	18	AD[58]	A[9]
19	AD[57]	C[10]	20	GND	A[10]
21	V(I/O)	C[11]	22	AD[56]	A[11]
23	AD[55]	C[12]	24	AD[54]	A[12]
25	AD[53]	C[13]	26	GND	A[13]
27	GND	C[14]	28	AD[52]	A[14]
29	AD[51]	C[15]	30	AD[50]	A[15]
31	AD[49]	C[16]	32	GND	A[16]
33	GND	C[17]	34	AD[48]	A[17]
35	AD[47]	C[18]	36	AD[46]	A[18]
37	AD[45]	C[19]	38	GND	A[19]
39	V(I/O)	C[20]	40	AD[44]	A[20]
41	AD[43]	C[21]	42	AD[42]	A[21]
43	AD[41]	C[22]	44	GND	A[22]
45	GND	C[23]	46	AD[40]	A[23]
47	AD[39]	C[24]	48	AD[38]	A[24]
49	AD[37]	C[25]	50	GND	A[25]
51	GND	C[26]	52	AD[36]	A[26]
53	AD[35]	C[27]	54	AD[34]	A[27]
55	AD[33]	C[28]	56	GND	A[28]
57	V(I/O)	C[29]	58	AD[32]	A[29]
59	PCI-RSVD	C[30]	60	PCI-RSVD	A[30]

Pin	J13	J14
61	PCI-RSVD	C[31]
63	GND	C[32]

Pin	J13	J14
62	GND	A[31]
64	PCI-RSVD	A[32]

Chapter 5: PCI Interface

5.1 Introduction

XTend1000 mounts on a common PCI bus connector. It is capable of operating on a system with up to a 66 MHz PCI clock and 64-bit address/data bus. Fuse placement can enable XTend1000's on-board 3.3 V power supply for PCI backplanes that only offer a 5 Volt signal.

5.2 Status LEDs

Status LEDs monitor activity on REQ#, GNT#, INTA#, INTB#, INTC#, and INTD#.

5.3 Pin Assignments

Table 5.3.1: PCI Connector Pin Assignments

Pin	B	A	Pin	B	A
1	-12V	TRST#	2	TCK	+12V
3	GROUND	TMS	4	TDO	TDI
5	+ 5 V	+ 5 V	6	+ 5 V	INTA#
7	INTB#	INTC#	8	INTD#	+ 5 V
9	PRSNT1#	Reserved	10	Reserved	+ VI/O
11	PRSNT2#	Reserved	12	KEYWAY	KEYWAY
13	KEYWAY	KEYWAY	14	Reserved	3.3 Vaux
15	GROUND	RST#	16	CLK	+ VI/O
17	GROUND	GNT#	18	REQ	GROUND
19	+ VI/O	PME#	20	AD31	AD30
21	AD29	+ 3.3 V	22	GROUND	AD28
23	AD27	AD26	24	AD25	GROUND
25	+ 3.3 V	AD24	26	C/BE3#	IDSEL
27	AD23	+ 3.3 V	28	GROUND	A22
29	AD21	AD20	30	AD19	GROUND
31	+ 3.3 V	AD18	32	AD17	AD16
33	C/BE2#	+ 3.3 V	34	GROUND	FRAME#
35	IRDY#	GROUND	36	+ 3.3 V	TRDY#
37	DEVSEL#	GROUND	38	GROUND	STOP#
39	LOCK#	+ 3.3 V	40	PERR#	Reserved
41	+ 3.3 V	Reserved	42	SERR#	GROUND
43	+3.3 V	PAR	44	C/BE1#	AD15
45	AD14	+ 3.3 V	46	GROUND	AD13
47	AD12	AD11	48	AD10	GROUND
49	M66EN	AD9	50	KEYWAY	KEYWAY

Pin	B	A
51	KEYWAY	KEYWAY
53	AD7	+3.3V
55	AD5	AD4
57	GROUND	AD2
59	+ VI/O	+ VI/O
61	+ 5 V	+ 5 V
63	Reserved	GROUND
65	C/BE6#	C/BE5#
67	GROUND	PAR64
69	AD61	GROUND
71	AD59	AD58
73	GROUND	AD56
75	AD53	+ VI/O
77	AD51	AD50
79	+ VI/O	AD48
81	AD45	GROUND
83	AD43	AD42
85	GROUND	AD40
87	AD37	GROUND
89	AD35	AD34
91	GROUND	AD32
93	Reserved	GROUND

Pin	B	A
52	AD8	C/BE0#
54	+ 3.3 V	AD6
56	AD3	GROUND
58	AD1	AD0
60	ACK64#	REQ64#
62	+ 5 V	+ 5 V
64	GROUND	C/BE7#
66	C/BE4#	+ VI/O
68	AD63	AD62
70	+ VI/O	AD60
72	AD57	GROUND
74	AD55	AD54
76	GROUND	AD52
78	AD49	GROUND
80	AD47	AD46
82	GROUND	AD44
84	AD41	+ VI/O
86	AD39	AD38
88	+ VI/O	AD36
90	AD33	GROUND
92	Reserved	Reserved
94	GROUND	Reserved