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PMC-GIGABIT-DT2

PMC with Dual
10BaseT/100BaseTX/1000BaseT
Gigabit Ethernet Interfaces

User Manual

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PMC-GIGABIT-DT2
PMC with
Dual 10BaseT/
100BaseTX/
1000BaseT Gigabit
Ethernet Interfaces

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Product Information

The PMC-GIGABIT-DT2 provides two high-performance Gigabit Ethernet interface controller ports on a single-wide PCI Mezzanine Card (PMC). The Ethernet network interface complies with the IEEE 802.3 specification for 10BaseT, 100BaseTX, and 1000BaseT over category 5 twisted pair cable. Full and half duplex modes are supported.

The PMC-GIGABIT-DT2 uses the Intel 82546EB that includes 64 Kbytes FIFO buffer memory, allowing back-to-back transmissions with minimum interface latency. It also features a 10BaseT, 100BaseTX and 1000BaseT auto-detection CSMA/CD interface controller.

The Intel 82546EB provides dual integrated low-powered MAC/PHY functionality. The 82546EB appears on the PCI bus as a multifunction device, eliminating one PCI-to-PCI bridge thus significantly improving bus performance. It supports a number of sophisticated features, including auto negotiation, collision detection, link detection, 4B/5B encoding/decoding (100BaseTX), flow control, half duplex/full duplex. Standard network connection is accomplished through a front panel RJ45 connector.

The PMC is compliant with standard single-wide PMC IEEE P1386.1, PCI 2.2 and PCI-X 1.0 specifications.

Key Features

- Dual 10BaseT/100BaseTX/1000BaseT Network Interface Card
- Single-wide 32/64 bit 33/66 MHz PCI, 66/133 MHz PCI-X PMC
- LED indicators for link, speed and activity
- Auto-negotiating protocol selection
- Transmit and receive FIFOs
- Drivers for VxWorks®, Linux®, Windows® NT, and Windows® 2000
- Supports Jumbo frames

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Block Diagram

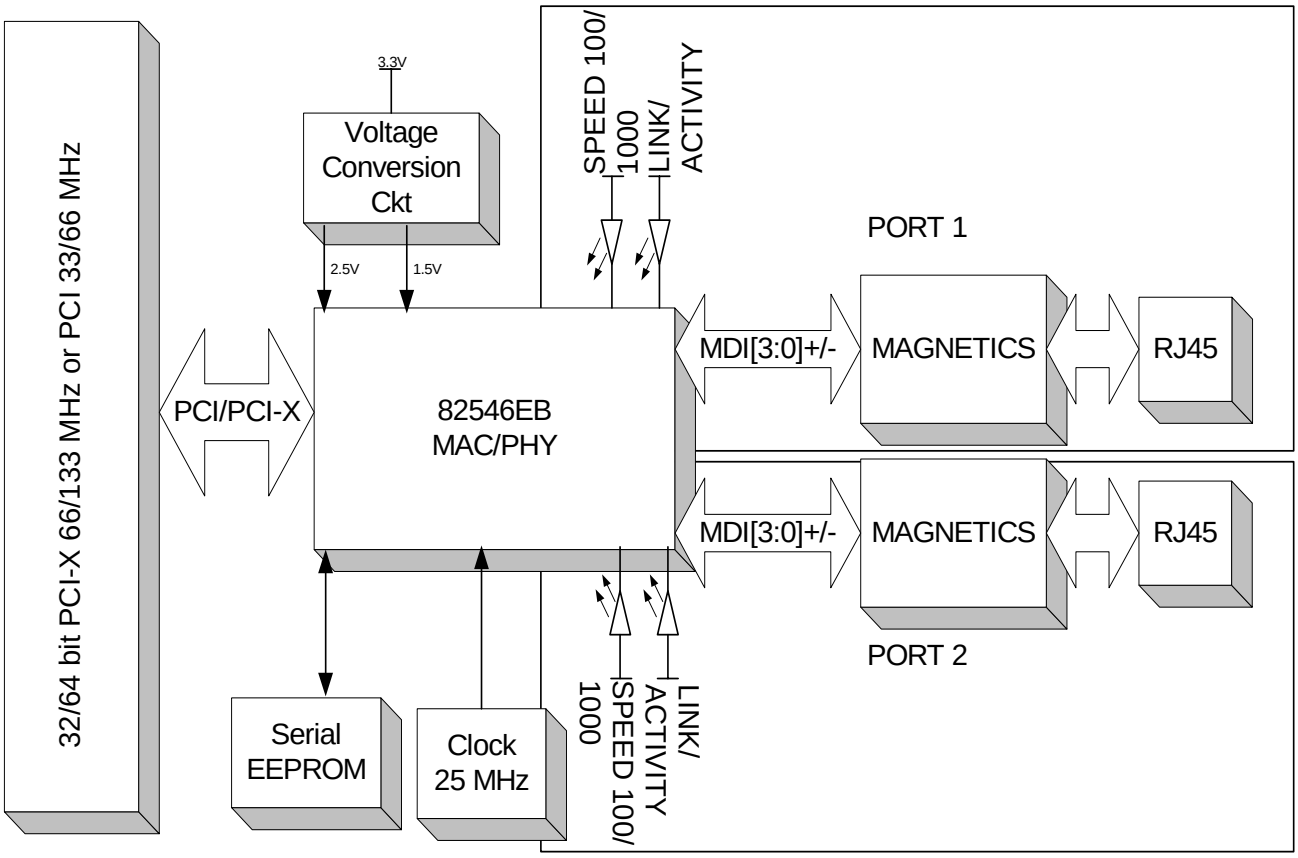


Figure 1. Block Diagram

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Programming

PMC/PCI(-X) Interface

The PMC is accessed by the host system via the 32/64-bit PMC interface running 33/66 MHz PCI bus or 66/133 MHz PCI-X bus. The PMC is compliant with PCI 2.2 and PCI-X 1.0a specifications. It is a multifunction device, with two Ethernet ports that appear as two separate functions to the host. Each function has its own register sets.

The PMC-GIGABIT-DT2 is mapped into PCI memory space. In addition to PCI Configuration Registers, it implements configuration registers that are specific to PCI-X. The PCI configuration registers for the 82546EB Ethernet chip on the PMC-GIGABIT-DT2 are listed in the figure below:

31 16		15 0		Addr
Device ID = 1010h		Vendor ID = 8086h		00h
Status		Command		04h
Class Code = 020000h			Revision ID	08h
BIST	Header Type = 80h	Latency Timer	Cache Line Size	0Ch
Memory Mapped Base Address Register, 128Kbytes in size				10h
Reserved Base Address Register				14h
Reserved Base Address Register				18h
Reserved Base Address Register				1Ch
Reserved Base Address Register				20h
Reserved Base Address Register				24h
Reserved				28h
Subsystem ID = 1004h		Subsystem Vendor ID = 124Bh		2Ch
Expansion ROM Base Address Register				30h
Reserved			Cap_Ptr	34h
Reserved				38h
Max_Lat = 00h	Min_Gnt = FFh	Interrupt Pin = 01h	Interrupt Line	3Ch
Power Management Capabilities		Next Item Pointer	Capability ID	DCh
Data	PMCSR Brigde Support Extension	Power Management ControlStatusRegister		E0h
PCI-X Command		Next Capability	PCI-X Capability ID	E4h
PCI-X Status				E8h

Figure 2. PCI Configuration Registers for Function 0 of 82546EB

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31 16	15 0	Addr
Device ID = 1010h	Vendor ID = 8086h	00h
Status	Command	04h
Class Code = 020000h	Revision ID	08h
BIST / Header Type = 80h	Latency Timer / Cache Line Size	0Ch
Memory Mapped Base Address Register, 128Kbytes in size		10h
Reserved Base Address Register		14h
Reserved Base Address Register		18h
Reserved Base Address Register		1Ch
Reserved Base Address Register		20h
Reserved Base Address Register		24h
Reserved		28h
Subsystem ID = 1004h	Subsystem Vendor ID = 124Bh	2Ch
Expansion ROM Base Address Register		30h
Reserved	Cap_Ptr	34h
Reserved		38h
Max_Lat = 00h / Min_Gnt = FFh	Interrupt Pin = 02h / Interrupt Line	3Ch
Power Management Capabilities	Next Item Pointer / Capability ID	DCh
Data / PMCSR Brigde Support Extension	Power Management ControlStatusRegister	E0h
PCI-X Command	Next Capability / PCI-X Capability ID	E4h
PCI-X Status		E8h

Figure 3. PCI Configuration Registers for Function 1 of 82546EB

The revision ID is a sequential stepping number starting with 0x00 for the first revision of the Gigabit Ethernet Controller. Consult the 82546EB Gigabit Ethernet Controller Specification Update for the latest stepping information.

In a PCI-X system, the PMC-GIGABIT-DT2 can be configured in different PCI(-X) mode depending on the resistor value of R62 that connects to PMC P1 connector pin 39:

R62 Value	PCI(-X) Mode
0 Ohm	PCI 33/66 MHz
10 KOhm	PCI-X 66 MHz
Open	PCI-X 133 MHz

MAC Addresses

A unique Ethernet address is assigned to the Ethernet port at the factory. For convenience, the address is shown on the human- and machine-readable label affixed to the backside of the board.

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MII Management Interface

82546EB provides software access to the MII management registers in the PHY via MDIC registers. There are two MDIC registers, one for each port.

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Connectors and Indicators

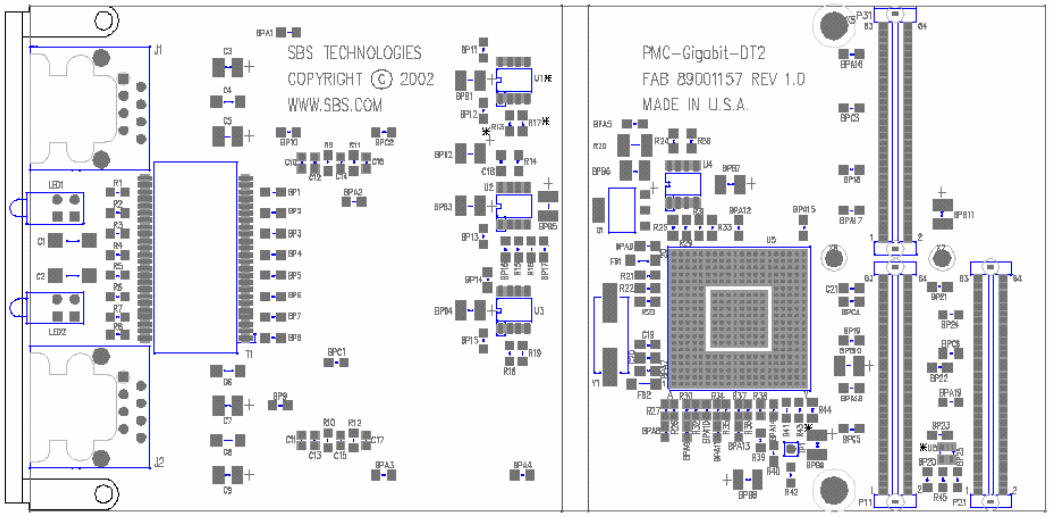


Figure 3. PMC-GIGABIT-DT2 Placement Diagram

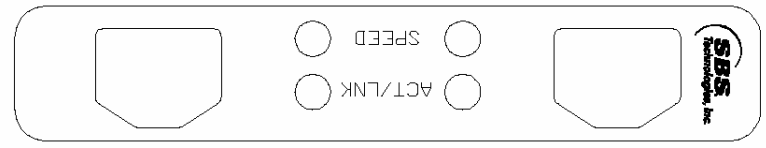


Figure 4. PMC-GIGABIT-DT2 Front Panel Diagram

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Front Panel RJ45 Pin Assignment

There are two RJ45 connectors, one for each port. The RJ45 connector pin assignments are shown below. Note that the 1000BT uses all four pairs at the same time and that each pair can send and receive signals simultaneously. In addition, the controller chip automatically swaps the pairs if necessary.

RJ45 Pin #	Signal
1	TX0/RX0+
2	TX0/RX0-
3	TX1/RX1+
4	TX2/RX2+
5	TX2/RX2-
6	TX1/RX1-
7	TX3/RX3+
8	TX3/RX3-

Figure 5. Front Panel I/O Pin Assignment

Front Panel LED Indicators

Each Ethernet port provides two LED status indicators. The LED functions are shown in the table below.

Name	LED State	Description
ACT/LNK	Solid Green	Indicates Link without Activity
	Blinking Green	Indicates Link with Activity
SPEED	Off	Indicates 10BaseT Speed when LNK/ACT LED is on or blinking
	Solid Yellow	Indicates 100BaseTx Speed
	Solid Green	Indicates 1000BaseT Speed

Figure 6. LED Status Definitions

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PMC P1 Connector Pin Assignment

Pin Number	Signal Name	Signal Name	Pin Number
1	TCK	-12V	2 (BP)
3	Ground	INTA#	4
5	INTB#	INTC#	6 (N/C)
7	BUSMODEl#	+5V	8 (BP)
9 (N/C)	INTD#	PCI-RSVD	10 (N/C)
11	Ground	PCI-RSVD	12 (N/C)
13	CLK	Ground	14
15	Ground	GNT#	16
17	REQ#	+5V	18 (BP)
19	V (I/O)	AD[31]	20
21	AD[28]	AD [27]	22
23	AD[25]	Ground	24
25	Ground	C/BE[3]#	26
27	AD[22]	AD[21]	28
29	AD[19]	+5V	30 (BP)
31	V (I/O)	AD[17]	32
33	FRAME#	Ground	34
35	Ground	IRDY#	36
37	DEVSEL#	+5V	38 (BP)
39	PCIXCAP	LOCK#	40
41 (N/C)	SDONE#	SBO#	42 (N/C)
43	PAR	Ground	44
45	V (I/O)	AD[15]	46
47	AD[12]	AD[11]	48
49	AD[09]	+5V	50 (BP)
51	Ground	C/BE[O]#	52
53	AD[06]	AD[05]	54
55	AD[04]	Ground	56
57	V (I/O)	AD[03]	58
59	AD[02]	AD[01]	60
61	AD[00]	+5V	62 (BP)
63	Ground	REQ64#	64

Figure 7. PMC P1 Connector PCI Pin Assignment

N/C = Not Connected, BP = Bypass only

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PMC P2 Connector Pin Assignment

Pin Number	Signal Name	Signal Name	Pin Number
1	+12V	TRST#	2
3	TMS	TDO	4
5	TDI	Ground	6
7	Ground	PCI-RSVD	8 (N/C)
9 (N/C)	PCI-RSVD	PCI-RSVD	10 (N/C)
11 (N/C)	BUSMODE2#	+3.3V	12
13	RST#	BUSMODE3#	14
15	3.3V	BUSMODE4#	16
17	PME#	Ground	18
19	AD[30],	AD[29]	20
21	Ground	AD[26]	22
23	AD[24]	+3.3V	24
25	IDSEL	AD[23]	26
27	+3.3V	AD[20]	28
29	AD[18]	Ground	30
31	AD[16]	C/BE[2]#	32
33	Ground	PMC-RSVD	34 (N/C)
35	TRDY#	+3.3V	36
37	Ground	STOP#	38
39	PERR#	Ground	40
41	+3.3V	SERR#	42
43	C/BE[1]#	Ground	44
45	AD[14]	AD[13]	46
47	M_66EN	AD[10]	48
49	AD[08]	+3.3V	50
51	AD[07]	PMC-RSVD	52 (N/C)
53	+3.3V	PMC-RSVD	54 (N/C)
55 (N/C)	PMC-RSVD	Ground	56
57 (N/C)	PMC-RSVD	PMC-RSVD	58 (N/C)
59	Ground	PMC-RSVD	60 (N/C)
61	ACK64#	+3.3V	62
63	Ground	PMC-RSVD	64 (N/C)

Figure 8. PCI P2 Connector PCI Pin Assignment

N/C = Not Connected, BP = Bypass only

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PMC P3 Connector Pin Assignment

Pin Number	Signal Name	Signal Name	Pin Number
1 (N/C)	PMC-RSVD	Ground	2
3	Ground	C/BE[7]#	4
5	C/BE[6]#	C/BE[5]#	6
7	C/BE[4]#	Ground	8
9	V (I/O)	PAR 64	10
11	AD[63]	AD[62]	12
13	AD[61]	Ground	14
15	Ground	AD[60]	16
17	AD[59]	AD[58]	18
19	AD[57],	Ground	20
21	V (I/O)	AD[56]	22
23	AD[55]	AD[54]	24
25	AD[53],	Ground	26
27	Ground	AD[52]	28
29	AD[51]	AD[50]	30
31	AD[49]	Ground	32
33	Ground	AD[48]	34
35	AD[47]	AD[46]	36
37	AD[45]	Ground	38
39	V (I/O)	AD[44]	40
41	AD[43]	AD[42]	42
43	AD[41]	Ground	44
45	Ground	AD[40]	46
47	AD[39]	AD[38]	48
49	AD[37]	Ground	50
51	Ground	AD[36]	52
53	AD[35]	AD[34]	54
55	AD[33]	Ground	56
57	V (I/O)	AD[32]	58
59 (N/C)	PMC-RSVD	PMC-RSVD	60 (N/C)
61 (N/C)	PMC-RSVD	Ground	62
63	Ground	PMC-RSVD	64 (N/C)

Figure 9. PCI P3 Connector PCI Pin Assignment

N/C = Not Connected, BP = Bypass only

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Specifications

PCI Interface	66/133 MHz PCI-X bus PCI-X 1.0 specification 33/66 MHz, 32/64-bit, master and slave, 3.3/5V signaling PCI Protocol and Electrical Rev. 2.2
PMC Conformance	64-bit PMC Specification IEEE P1386.1
PCI Controller / Ethernet MAC	Intel 82546EB
Number of Ports	Two
Protocols	Ethernet 10BaseT, 100BaseTX and 1000BaseT
Receive/Transmit FIFOs	64 Kbytes total
Front panel I/O	Two RJ45 connectors
Rear panel I/O (P4)	None
Dimensions	74.0 mm x 149.0 mm
Weight	0.07 kg (0.16 lb.)
Power Requirements	+3.3 VDC at 1590 mA (typical)
Environmental	Operating temperature: 0° to +55°C Humidity: 5% to 95% non-condensing Storage: -40° to +85°C

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