PMC-GIGABIT-ST3

PMC with One
10BaseT/100BaseTX/1000BaseT
Gigabit Ethernet Interface

User Manual

Hardware Revision: A
Part No. 89004520 Rev. 2.0 20050117

PMC-GIGABIT-ST3
PMC with
One 10BaseT/
100BaseTX/
1000BaseT Gigabit
Ethernet Interface

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Product Information

The PMC-GIGABIT-ST3 provides one high-performance Gigabit Ethernet interface controller port 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-ST3 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 82545EM provides integrated low-powered MAC/PHY functionality. 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

- 10BaseT/100BaseTX/1000BaseT Ethernet port using front panel RJ45 connector
- Single-wide 32/64 bit conduction cooled friendly PMC
- LED indicators for link, speed and activity
- Auto-negotiating protocol selection
- Transmit and receive FIFOs
- Drivers for VxWorks®, Linux®, and Windows® NT

Block Diagram

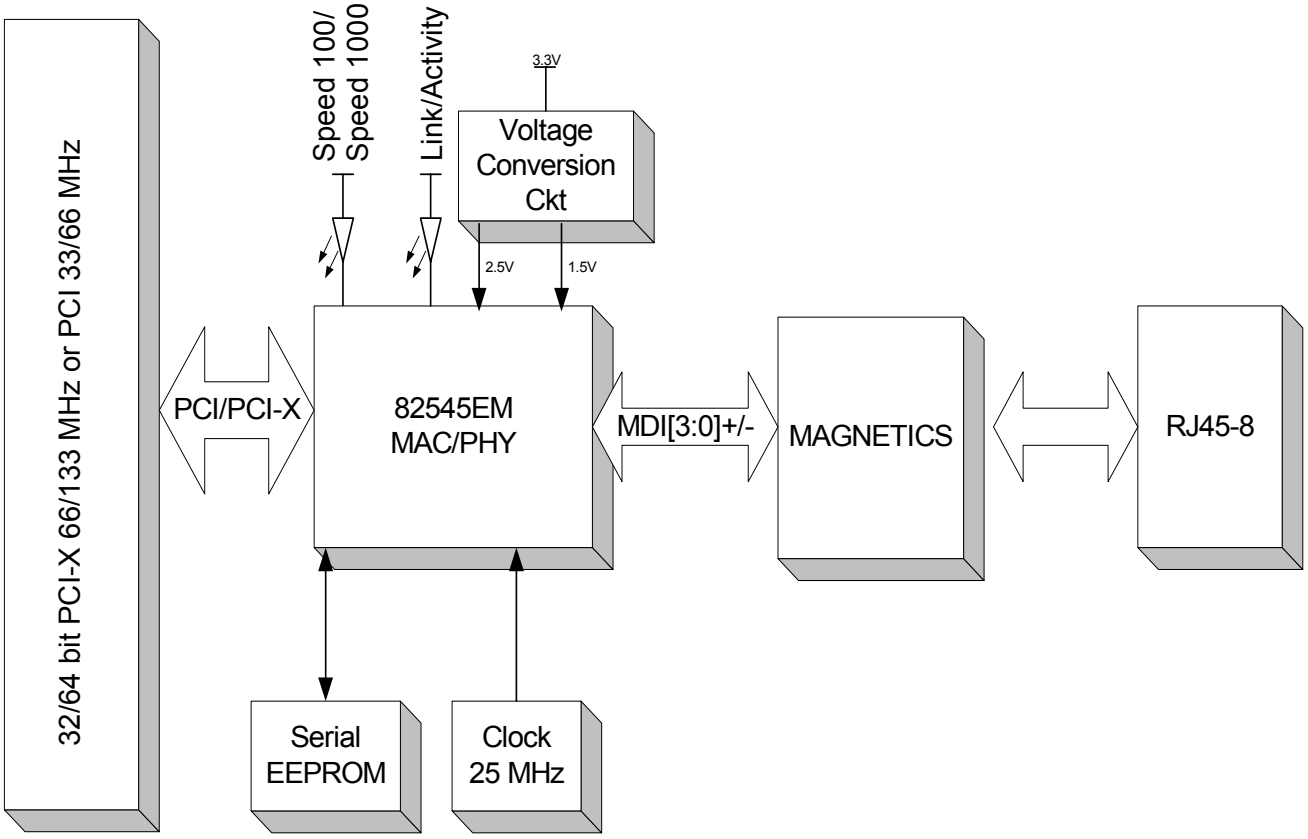

Figure 1. Block Diagram

Programming

PMC/PCI(-X) Interface

The PMC-GIGABIT-ST3 is accessed by the host system via 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.

The PMC-GIGABIT-ST3 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 82545EM Ethernet chip on the PMC-GIGABIT-ST3 are listed in the figure below:

31 16	15 0	Addr
Device ID = 100Fh	Vendor ID = 8086h	00h
Status	Command	04h
Class Code = 020000h	Revision ID	08h
BIST / Header Type / 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 = 1023h	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 82545EM

The revision ID is a sequential stepping number starting with 0x00 for the first revision of the Gigabit Ethernet Controller. Consult the 82545EM Gigabit Ethernet Controller Specification Update for the latest stepping information.

In a PCI-X system, the PMC-GIGABIT-ST3 can be configured in different PCI(-X) mode depending on the resistor value of R47 that connects to PMC P1 connector pin 39:

R47 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.

MII Management Interface

82545EM provides software access to the MII management registers in the PHY via MDIC registers.

Connectors and Indicators

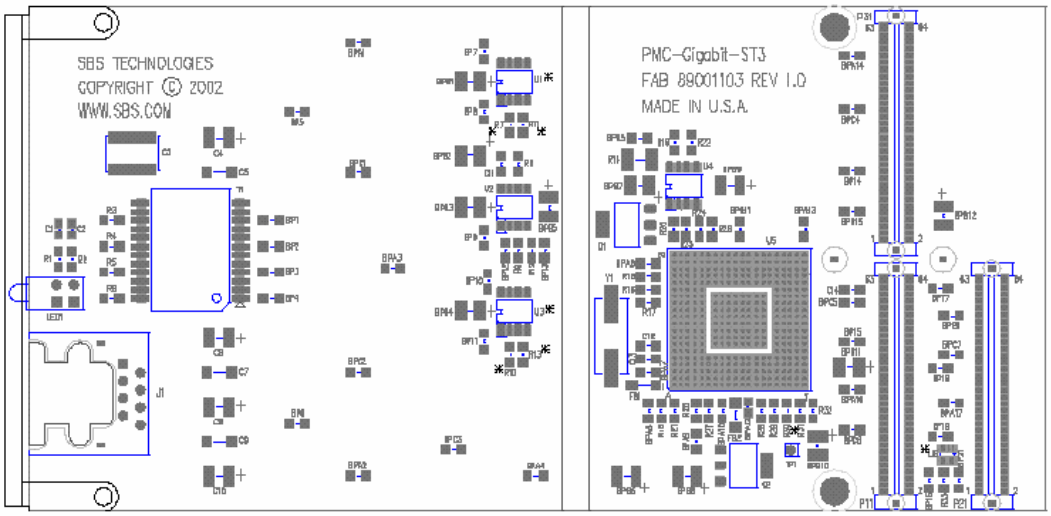

Figure 3. PMC-GIGABIT-ST3 Placement Diagram

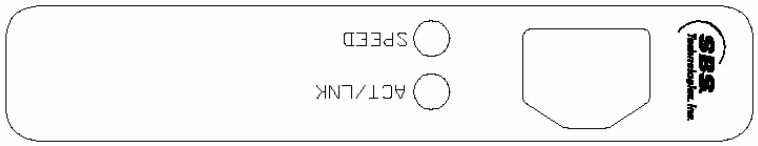

Figure 4. PMC-GIGABIT-ST3 Front Panel Diagram

Front Panel RJ45 Pin Assignment

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

PMC P1 Connector Pin Assignment

Pin Number	Signal Name	Signal Name	Pin Number
1	TCK	-12V	2 (BP)
3	Ground	INTA#	4
5 (N/C)	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

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

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

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/PHY	Intel 82545EM
Number of Ports	One
Protocols	Ethernet 10BaseT, 100BaseTX and 1000BaseT
Receive/Transmit FIFOs	64 Kbytes total
Front panel I/O	One RJ45 connector
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 1180 mA (typical)
Environmental	Operating temperature: 0° to +70°C Humidity: 5% to 95% non-condensing Storage: -40° to +85°C

Repair

Service Policy

Before returning a product for repair, verify as soon as possible that the suspected unit is at fault; then call the Customer Service Department for a RETURN MATERIAL AUTHORIZATION (RMA) number. Carefully package the unit, in the original shipping carton if it is available, and ship prepaid and insured with the RMA number clearly written on the outside of the package. Include the return address and telephone number of a technical contact. For out-of-warranty repairs, a purchase order for repair charges must accompany the return. SBS Technologies, Inc. will not be responsible for damages due to improper packaging of returned items. For service of SBS Technologies, Inc. products not purchased directly from SBS Technologies, Inc., contact your reseller. Products returned to SBS Technologies, Inc. for repair by other than the original customer will be treated as out-of-warranty.

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