PMC-8246

Dual-Gigabit Ethernet
PCI-X PMC Module with Failover Function

User's Manual

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Revision History

Revision	Release Date	Description of Change(s)
2.00	2008/04/10	Initial Release
2.10	2008/07/02	Correct Block Diagram, Card Panel drawing, LAN LED description and def'n, OS support, Control Switch pin description, DOS Utilities list. Remove WDT Library Installation. Correct address, remove warranty section.

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Preface

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Using this Manual

Audience and Scope

The PMC-8246 User's Manual is intended for hardware technicians and systems operators with knowledge of installing, configuring and operating industrial grade PMC modules.

Manual Organization

This manual is organized as follows:

Preface: Presents important copyright notifications, disclaimers, trademarks, and associated information on the proper understanding and usage of this document and its associated product(s).

Chapter 1, Introduction: Introduces the PMC-8246, its features, block diagrams, and package contents.

Chapter 2, Hardware Information: Presents layout information, technical drawings, jumper settings and configuration.

Chapter 3, Programming Information: Illustrates bypass control signals and access to PCI controller signals and software defined pins.

Chapter 4, GbE Driver Installation: Describes LAN driver installation for the onboard Ethernet controller.

Important Safety Instructions: Presents safety instructions all users must follow for the proper setup, installation and usage of equipment and/or software.

Getting Service: Contact information for ADLINK's worldwide offices.

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Conventions

Take note of the following conventions used throughout this manual to make sure that users perform certain tasks and instructions properly.



Additional information, aids, and tips that help users perform tasks.



Information to prevent ***minor*** physical injury, component damage, data loss, and/or program corruption when trying to complete a task.



Information to prevent ***serious*** physical injury, component damage, data loss, and/or program corruption when trying to complete a specific task.

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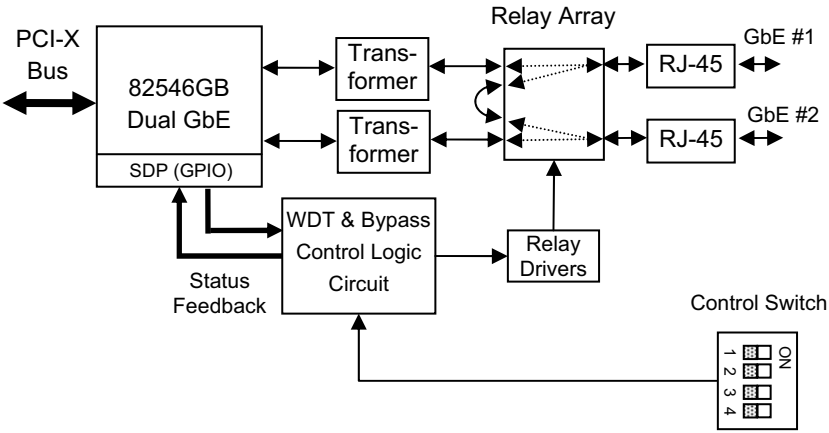
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1 Introduction

PMC-8246 is a high performance 2-port Gigabit Ethernet (GbE) PCI-X PMC module providing bypass capability, which can connect GbE signals on the two GbE connectors while the system is powered down or under software halt.

1.1 Block Diagram



The PMC-8246 is based on the Intel 82546GB dual port Gigabit Ethernet controller. The Intel 82546GB is a highly integrated chip, includes Ethernet MAC, PHY, and provides PCI-X 133MHz capability. Please refer to the Intel 82546GB datasheet for more information on the GbE ports.

The PMC-8246's bypass capability uses a mechanical relay array to control the physical routing of the GbE signals. There are two communications states for the GbE signal routing: 1) Normal State, 2) Bypass State. Please refer to section 1.4 for block diagrams of the two states.

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Watchdog timer (WDT) and bypass control logic circuits are used to control the relay and communication states. The programmer can control those functions via the Software Definable Pins (SDP) on the Intel 82546GB by programming its registers. Please refer to section 1.5 for a block diagram of the bypass control circuits.

1.2 Features

- Dual Gigabit Ethernet Ports
- Supports up to PCI-X 133Mhz
- Bypass capability during system power-off or software halt
- Software programmable bypass control
- Programmable watchdog timer, WDT status read-back
- Intel Boot Agent BIOS
- Low-profile bracket available for OEM requirements

1.3 Specifications

- **PCI bus architecture**
  - Bus Type: PCI/PCI-X
  - Bus Width: 32- or 64-bit
  - Bus Speed: 33/66/100/133 MHz
  - Interrupt Level: INTA
  - Data Transfer Mode: Bus-master DMA
  - PCI Voltage: 3.3V or 5V universal

- **Ethernet Controller**
  - Intel 82546 Gigabit Ethernet Controller, Dual GbE ports
  - Data rates supported (per port): 10,100,1000Mbps
  - IEEE Standard/Network Topology: 10BASE-T, 100BASE-TX, 1000BASE-T
  - IEEE 802.3ab compliant

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- **Ethernet Ports**
  - Connector: Two RJ-45
  - Wiring: Cat-5, 4-pair
  - Cable Distance: Maximum 100 meters (normal mode) or 40 meters (bypass mode)

- **Bypass Capability and Watchdog Timer**
  - A relay array controls signal routing of the two GbE ports
  - Normal State: GbE signals are straight-through to GbE controller
  - Bypass State: GbE signals are connected to another port and bypass the GbE controller
  - Power off status is Bypass State
  - Programmable watchdog timer (WDT) can switch relay array to Bypass State during a software halt
  - WDT time out value is programmable as 1, 2, 4, or 8 seconds by software programmable
  - WDT time out value is defaulted 8 seconds by hardwired and programmable as 1, 2, 4, or 8 seconds by software.

- **Ethernet LED**
  - For each port, two LEDs for Link/Active indication

- **Boot ROM Feature**
  - LAN Boot ROM: 128KB onboard
  - Support INTEL Preboot Execution Environment (PXE) for remote boot

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- **OS Support:**
  - Microsoft Windows Server 2003 and 2000
  - Microsoft Windows XP 32- and 64-bit Editions
  - Windows NT 4.0
  - Linux 2.4.x or later

Note: Please contact ADLINK for other OS availability.

- **Network Management**
  - Intel Boot Agent
  - ACPI Power Management
  - PXE 2.0 (Network Management does not support Wake on LAN)

- **Environment**
  - Operating Temperature: 0°C to 60°C
  - Storage Temperature: -20°C to 80°C
  - Humidity: 10% to 90% non-condensing

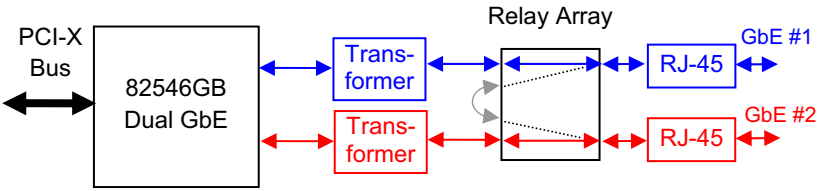
- **Dimensions**
  - 149 mm x 74 mm x 10 mm (L x W x H)

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1.4 Communication States

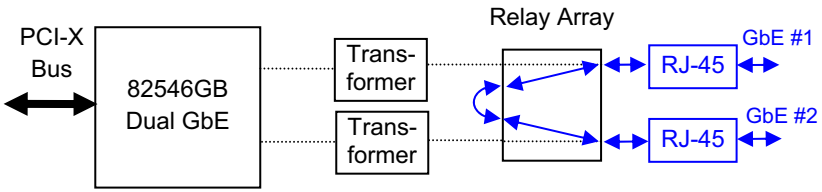
The following diagram illustrates the Normal State: where the two GbE signals are straight-through connected to the GbE ports via the transformers. The two GbE ports work independently as normal dual GbE ports.

Figure 1-1: Communication States: Normal



The following diagram shows the Bypass State: where the two GbE signal are cross-over connected to each other so that the Ethernet connection bypasses the computer or the network appliance where this PMC module is installed in.

Figure 1-2: Communication States: Bypass



The relay array is driven by the relay divers which are controlled by the watchdog timer and bypass control logic circuits.

1.5 WDT & Bypass Control Logic

The block diagram of the WDT and bypass control logic circuits is as follows:

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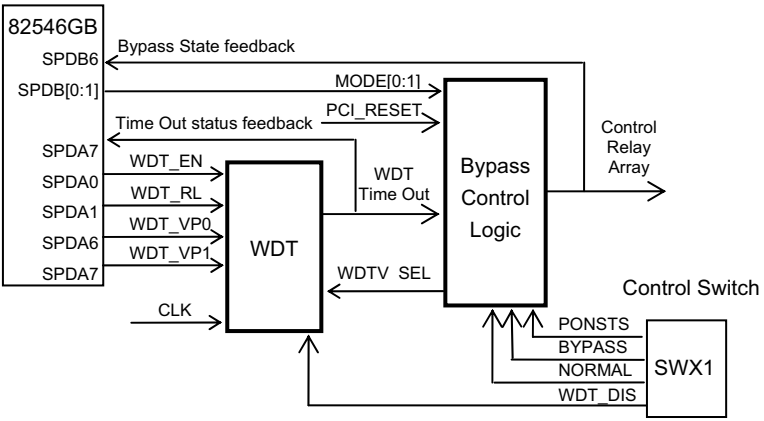


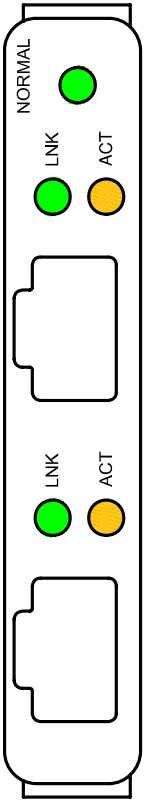
Figure 1-3: WDT & Bypass Control Logic

Please refer to Chapter 2 for switch setting definition; Chapter 3 for programming information including the WDT control.

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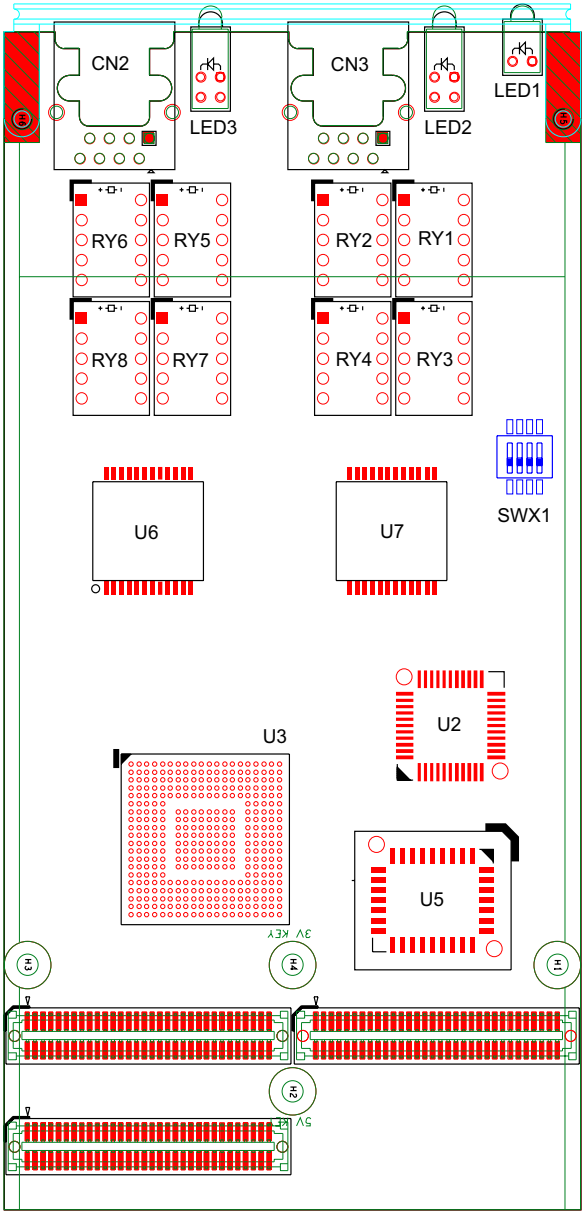
2 Hardware Information

2.1 Card Panel



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2.2 Card Layout



LED1: Normal LED

LED2: LAN 2 LED

LED3: LAN 1 LED

CN2: LAN 1

CN3: LAN 2

RY1-RY8: Relay

U6-U7: Transformer

U2: CPLD

U5: LAN Boot ROM

U3: Intel 82546GB

SWX1: Switch

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2.3 Gigabit Ethernet Connectors

PIN	LAN1 SIGNAL	LAN2 SIGNAL	FUNCTION
1	LAN1_TDP1	LAN2_TDP1	Transmit Data1 +
2	LAN1_TDN1	LAN2_TDN1	Transmit Data1 -
3	LAN1_RDP2	LAN2_RDP2	Receive Data2 +
4	LAN1_RDP3	LAN2_RDP3	Receive Data3 +
5	LAN1_RDN3	LAN2_RDN3	Receive Data3 -
6	LAN1_RDN2	LAN2_RDN2	Receive Data2 +
7	LAN1_TDP4	LAN2_TDP4	Transmit Data4 +
8	LAN1_TDN4	LAN2_TDN4	Transmit Data4 -

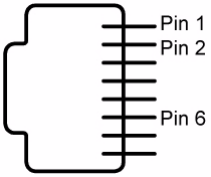


Figure 2-1: LAN Layout, Pin & Signal Descriptions

Status		ACT	LNK
Network link is not established		Off	Off
10/100/1000 Mbps	Link	On	Off
	Active	On	Blinking

Table 2-1: LED Definitions for LAN1/LAN2 (CN2/CN3)

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2.4 Control Switch

The Control Switch (SWX1) is used to enforce Normal and Bypass states as shown below.



Figure 2-2: Control Switch (SWX1) & Pin Descriptions

PIN#	Default	Status	Function
1	ON	ON	Normal State (on startup)
		OFF	Bypass State (on startup)
2	OFF	ON	Force relay array to Bypass State
		OFF	No Enforcement
3	OFF	ON	Force relay array to Normal State
		OFF	No Enforcement
4	OFF	ON	Force WDT disable
		OFF	No Enforcement

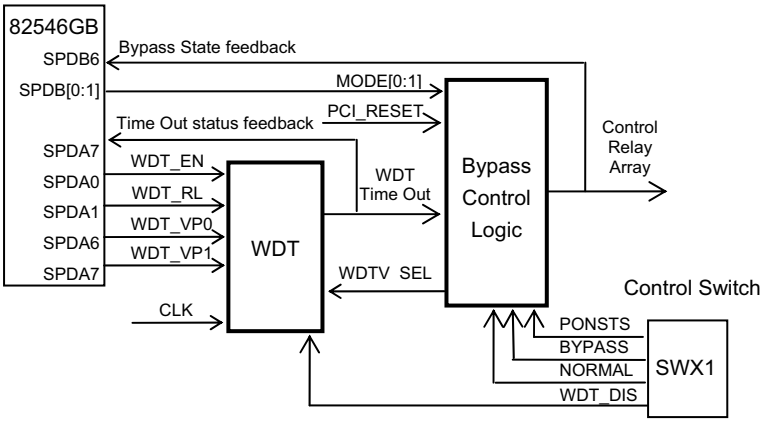
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3 Programming Information

3.1 SDP Register

Block Diagram and 82546GB The following block diagram (identical to chapter 1) illustrates the bypass control signals. Programmers need to know how to access the 82546GB on the PMC and its Software Defined Pins (SDP). Please refer to the 82546GB programming document for detailed information.

Figure 3-1: WDT & Bypass Control Logic



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SDP Registers Definition

The bits in SDP registers are all readable and writable. The following table shows the register definition.

SPD Bit	Name	R/W	Description
SDPB0	MODE0	RW	Bypass control mode bit 0 and 1
SDPB1	MODE1	RW	
SDPB6	Bypass Status	R	Bypass status read back 0: Bypass 1: Normal
SDPB7	WDT Status	R	WDT status read back 0: WDT running or stop 1: WDT Time Out
SDPA0	WDT_CTRL	RW	WDT control bit
SDPA1	WDT_RL	RW	Reload WDT to avoid timeout
SDPA6	WDT_VP0	RW	WDT time out value bit 0 and 1

WDT Enable

WDT_EN	Functions	
0	WDT is disabled.	Power On Default
1	WDT is enabled.	

Bypass Control Mode

MODE0	MODE1	Functions	
0	0	No enforcement. Set WDT reload from the switch setting WDT_VS[1:0]	Power On Default
0	1	No enforcement. Set WDT reload from the programmable WDT_VP[1:0]	
1	0	Disable WDT, enforce relay array in ***Bypass State*** (1)	
1	1	Disable WDT, enforce relay array in ***Normal State*** (2)	

NOTE:

Note 1: If the relay array is forced to Normal State by settings in the Control Switch (SWX1), then this setting is void.
Note 2: If the relay array is forced to Bypass State by settings in the Control Switch (SWX1), then this setting is void.

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WDT Reload

WDT_RL	Functions
0 -> 1 -> 0	Reload WDT to avoid timeout

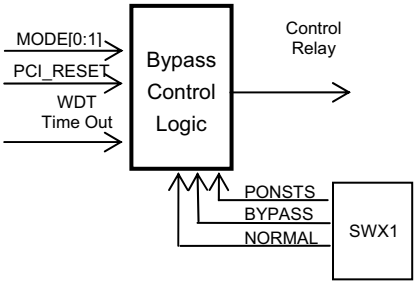
When WDT is reload, the circuit will load the WDT value from either WDT_VP[1:0] or WDV_VS[1:0] dependent on the control modes setting.

WDT Time Out Value Seting

WDT_VP1	WDT_VP0	WDT time out value	
0	0	1 second	Power On Default
0	1	2 seconds	
1	0	4 seconds	
1	1	8 seconds	

3.2 Bypass Control Priority

The relay array is controlled by reset, WDT time out, bypass control mode bits, and external settings from the header. Please refer to the following block diagram.



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The control priority is as follows. The setting with higher priority will override the lower priority setting (or status).

Bypass Control Priority	Control source
Highest ↓ Lowest	Reset
	BYPASS state enforcement switch (SW1-2)
	NORMAL state enforcement switch (SW1-3)
	Bypass control mode setting MODE[0:1]
	WDT time out

3.3 DOS Utilities for Evaluation - Utilities List

Before programming this card, users can evaluate the PMC-8246 bypass capability using the DOS test utility - 8246util.exe:

8246util e [x]:

Enable the WDT. Users can determine the time out value by typing the parameter [x]; only 1, 2, 4, or 8 is valid for [x]. If the user does not reload the WDT before time out in 1, 2, 4 or 8 seconds depending on the setting, then the relay array will be switched to the Bypass State. A 'click' can be heard when the relay switches.

8246util d:

Disable and stop WDT. The relay array will stay in the same state.

8246util w:

Enable WDT and keep reloading WDT. The WDT would keep running unless the program stops running or powers off.

8246util n:

Enforce the relay array to Normal State and WDT will be disabled.

8246util b:

Enforce the relay array to Bypass State and WDT will be disabled.

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3.4 WDT Library Installation for Windows 2000 & XP

ADLINK provides a setup program for installing the PMC-8246 WDT library, driver, and sample program under Windows 2000 or XP. Please contact your ADLINK representative for more information.

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4 GbE Driver Installation

This chapter describes the LAN driver installation for the Intel 82546GB onboard Ethernet controller. The relevant drivers are located on the ADLINK All-in-One CD:

1. Boot Windows 2000/XP/Windows Server 2003.
2. The driver is included in the driver CD.
   Run **pro2kxpm.exe** under the following directory:
   X:\PMC\PMC-8246\Ethernet\Win2kxp
3. On the license agreement - read the license agreement. Click 'I accept the terms in the license agreement' if you agree to continue.
4. Location to Save Files, click Next to save files in folder.

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Important Safety Instructions

For user safety, please read and follow all **instructions**, **warnings**, **cautions,** and **notes** marked in this manual and on the associated equipment before handling/operating the equipment.

- Read these safety instructions carefully.
- Keep this user's manual for future reference.
- Read the specifications section of this manual for detailed information on the operating environment of this equipment.
- When installing/mounting or uninstalling/removing equipment:
  - Turn off power and unplug any power cords/cables.
- To avoid electrical shock and/or damage to equipment:
  - Keep equipment away from water or liquid sources;
  - Keep equipment away from high heat or high humidity;
  - Keep equipment properly ventilated (do not block or cover ventilation openings);
  - Make sure to use recommended voltage and power source settings;
  - Always install and operate equipment near an easily accessible electrical socket-outlet;
  - Secure the power cord (do not place any object on/over the power cord);
  - Only install/attach and operate equipment on stable surfaces and/or recommended mountings; and,
  - If the equipment will not be used for long periods of time, turn off and unplug the equipment from its power source.

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- Never attempt to fix the equipment. Equipment should only be serviced by qualified personnel.
- A Lithium-type battery may be provided for uninterrupted, backup or emergency power.



Risk of explosion if battery is replaced with one of an incorrect type. Dispose of used batteries according to their instructions.

- Equipment must be serviced by authorized technicians when:
  - The power cord or plug is damaged;
  - Liquid has penetrated the equipment;
  - It has been exposed to high humidity/moisture;
  - It is not functioning or does not function according to the user's manual;
  - It has been dropped and/or damaged; and/or,
  - It has an obvious sign of breakage.

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