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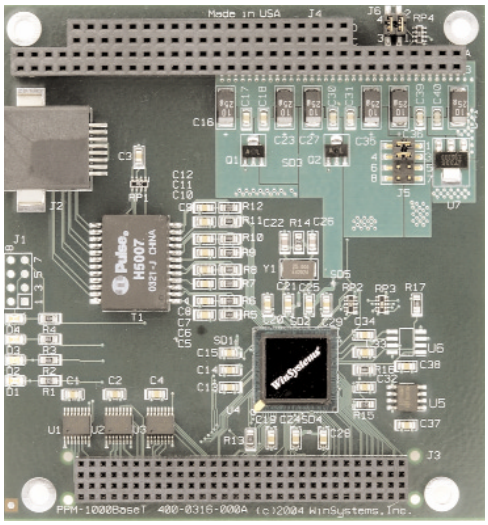
WinSystems®

PC/104-Plus MODULE

PPM-Gigabit High-Performance Ethernet Controller

FEATURES

- IEEE 802.3 support for 1000BASE-T and 100BASE_TX and 10BASE-T applications
- Automatic switching from 1Gbps to 100 or 10 Mbps
- Intel 82541ER Gigabit Ethernet PCI Controller
- 10/100/1000 Mbps full- and half-duplex operation
- IEEE 802.3ab Auto-Negotiation support
- IEEE 802.3x-compliant flow control support
- Supports jumbo frames
- Adaptive equalization supported
- 64Kbyte Rx and Tx packet FIFO
- PHY supports 2-pair and 3-pair cable downshift
- RJ-45 Ethernet interface connector on board
- EEPROM for configuration data storage
- Flash memory for boot program
- Support for Windows CE/XPe and Linux
- PC/104-*Plus* compliant board
- Link Status, Activity and Speed LEDs
- Supports 5V or 3.3V PC/104-*Plus* Bus
- Low power
- Single +5V supply
- Operates from -40° to +85°C



The PPM-Gigabit is a high-performance, PC/104-*Plus* compliant Gigabit Ethernet module. This add-in module allows connection to 10, 100, and 1000 Mbps networks using standard CAT5 twisted pair copper cables. Based upon the popular Intel 82541ER controller, it is supported by a wide range of operating systems including Windows, Linux, and other x86-compatible operating systems.

FUNCTIONAL CAPABILITY

Ethernet Controller - The PPM-Gigabit module uses the Intel 82541ER integrated controller. It combines Intel's fifth-generation Gigabit MAC design with fully integrated state-of-the-art PHY technology that meets or exceeds IEEE 802.3ab specifications for Bit Error Rate performance. The controller provides a direct Peripheral Component Interconnect (PCI) to the PC/104-*Plus* bus.

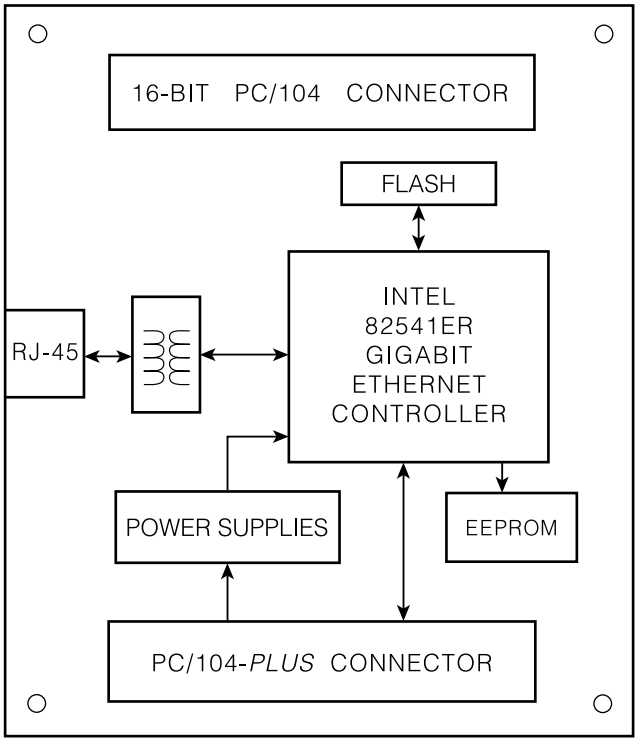
The 82541ER architecture is optimized to deliver both high-performance and PCI bus efficiency with the lowest power and smallest size. It has a pipelined DMA unit and 128-bit wide buses for the fastest performance. The controller handles the gigabit traffic with low network latency and minimal internal processing overhead. The 82541ER uses efficient ring buffer descriptor data structures, with up to 64 packet descriptors cached on chip. A large 64-Kbyte on chip packet buffer maintains superior performance as available PCI bandwidth changes. In addition, using hardware acceleration, the controller offloads tasks from the host controller, such as TCP/UDP/IP checksum calculations and TCP segmentation. The controller is designed to have independent transmit and receive queues to limit PCI bus traffic, and a PCI interface that maximizes the use of bursts for efficient bus usage.

Flow Control - Low-latency transmit and receive queues handle network packets without waiting for buffer overflow. The controller supports the IEEE 802.3.x flow control with software programmable pause times and threshold times. This is to reduce/prevent frame loss from receive overruns.

MAC Features - The MAC has optimized descriptor fetching and write-back mechanisms for efficient system memory use and use of PCI bandwidth. It also caches up to 64-packet descriptors in a single burst. Programmable memory buffers (256 bytes to 16Kbytes) and cache line size (16 bytes to 256 bytes) promotes efficient PCI bandwidth as well. Support for transmission and reception of packets up to 16Kbytes enables jumbo frames.

Integrated PHY - The PHY supports 10/100/1000 Mbps full- and half-duplex operation. IEEE 802.3ab Auto-Negotiation support provides automatic link configuration of speed, duplex and flow control.

The controller incorporates the latest technology DSP architecture that implements digital adaptive equalization, echo cancellation, and crosstalk cancellation to improve performance in noisy environments. It also supports two-pair and three-pair cable downshift.



PPM-Gigabit BLOCK DIAGRAM

EEPROM - The configuration information describing the device's architecture, address, interrupt, etc. can either be loaded from jumpers or from an EEPROM. The module is shipped with the EEPROM programmed.

Ethernet Network Connection - The PPM-Gigabit is hooked to the network through an onboard RJ-45 connector.

Monitor LEDs - Light emitting diodes (LEDs) are on the PPM-Gigabit to provide a visual indication of the link status, network activity and network speed. The yellow Link Integrity LED is lit when there is a valid connection detected. The green Activity LED blinks on and off when activity is detected on the wire. The red LEDs indicate if the link is 10, 100, or 1000 Mbps.

Software - The board emulates the popular Intel Pro/1000 PCI board. Intel has driver support for the most popular operating systems and real time operating systems for its 82541ER controller. Therefore most PCI-compatible drivers, utilities and 10/100/1000 Ethernet supported operating systems will work directly with this module.

Related Information - To get Intel's latest 82541ER data sheet, technical manual, driver support or other product information, visit www.developer.intel.com.

Power Supplies - There are 3 independent power supplies on this module for use by the 82541ER controller. They are 3.3V, 1.8V, and 1.2V. The PPM-Gigabit requires only a single +5 volt input. The +5V input power and ground for the board is supplied from both the PC/104 and PC/104-*Plus* connectors.

PC/104-Plus Interface - The PPM-Gigabit module is designed to offer flexible, high-performance Ethernet networking capability. It provides 32-bits of addressing and data, as well as the complete control interface to operate on the PC/104-*Plus* bus. The chip has a PCI bus master interface and is compliant with the PCI Bus Specification Revision 2.2.

The PPM-Gigabit is designed to support either 5V or 3.3V PC/104-*Plus* signaling. A jumper block selects the voltage range. Multiple PPM-Gigabit boards can be installed and supported on a single PC/104-*Plus* stack. There is a jumper block on board to select the module slot position.

Also, there is a PC/104 connector on the board; however, no control or data signals are wired to it. It simply feeds the signals through the connector to the next module in a stack.

SPECIFICATIONS

Electrical
Data rate: 10, 100, or 1000 megabits per second

Power Requirements
Vcc = +5V ±5% @ TBD mA typical

Mechanical
Dimensions: 3.6" x 3.8" (90mm x 96mm)
Weight: 3.0 oz. (84 gm)

Connectors
Ethernet: RJ-45
PC/104-*Plus*: 120-pin (4 x 30; 2mm) stackthrough with shrouded header
PC/104: 16-bit stackthrough (feed through only)

Environmental
Operating Temperature: -40° to +85°C
Non-condensing relative humidity: 5% to 95%

ORDERING INFORMATION

PPM-Gigabit PC/104-*Plus* Gigabit Ethernet module

WinSystems reserves the right to make changes to products and/or documentation without further notification.

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