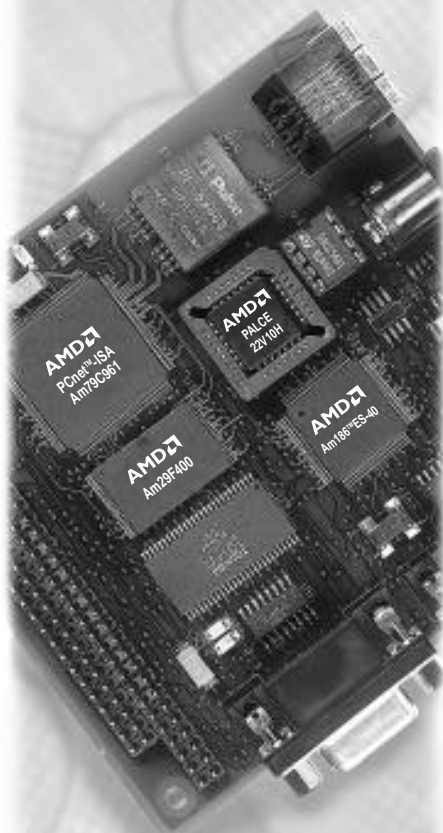




## AMDNet186 Demonstration Board



**AMD**

## PRODUCT BRIEF

### AMDNet186 Stand-Alone Evaluation Platform

The Net186 evaluation board meets the needs of designers working with embedded networking control applications using the Am186™ES microcontroller and the PCnet™-ISA II single-chip Ethernet controller. This board provides a complete stand-alone, microcontroller- and Ethernet-based evaluation platform in a low-cost, exceptionally small form-factor product.

The evaluation board features the Am186ES, a high-performance 16-bit embedded controller, and the PCnet-ISA II high-performance, 16-bit, single-chip Ethernet controller for ISA. The Am186ES microcontroller offers enhanced system functionality (2 async serial ports, programmable bus sizing) and on-chip integration that add up to lower system costs, faster time-to-market, and performance in the 32-bit range.

The microcontroller section consists of the Am186ES, 512 Kbytes Flash and 512 Kbytes SRAM. The Ethernet section consists of a PAL® device for glue logic and the Am79C961A PCnet-ISA II. The design takes advantage of the Bus Mastering capability of the PCnet-ISA II to achieve high performance and low system cost while reducing the amount of software overhead on the microcontroller.

Communication with the Net186 board can be accomplished through either one of the two RS-232 serial ports or through the high-speed 10Mbps Ethernet 10Base-T port.

## PRODUCT HIGHLIGHTS

### Am186™ES-40MHz Microcontroller

- 80C186 core, familiar 80C186 peripherals
- Glueless interface to PSRAM, SRAM, FLASH, and ROM memory systems
- Integrated system peripherals for lower cost plus:
  - Two full-featured async serial ports allow full-duplex, 7-, 8-, or 9-bit data transfers with hardware flow control
  - Independent serial port baud rate generators
  - Data strobe, true async bus interface option included for DEN
- 8 external interrupts, 8 internal interrupts
- Two DMA channels
- 32 programmable I/O (PIO) pins
- Non-multiplexed address bus and programmable bus sizing for improved memory access
  - 1x or /2 CPU clock
  - 12 programmable chip selects

### Am79C961A PCnet™-ISA II Ethernet Controller

- Single-chip Ethernet controller for direct interface to ISA and EISA buses
- Supports IEEE 802.3/ANSI 8802-3 Ethernet standards

- Supports full duplex operation on the 10Base-T, AUI and GPSI ports
- Supports Magic Packet™ Technology for waking up remote Ethernet nodes
- Software compatible with Am7990/Am79C90 LANCE™/CLANCE™ register and descriptor architecture

### Communication Ports

- Two RS-232 serial ports driven by the Am186ES via two DB-9 DCE connectors
- One 10Base-T Ethernet port driven by the PCnet-ISA II via an RJ-45 connector

### Expansion Bus

- Am186 Expansion Interface

### Memory

- One 512 Kbytes SRAM
- One 512 Kbytes Flash (Am29F400)
- Capable of addressing up to 1 Mbyte of Flash

### Software

- E86MON monitor program with source code
- Utility programs for PCnet-ISA II with source code
- PAL equations for board setup
- Source file for configuration EEPROM

## PRODUCT DESCRIPTION

### Am186ES Microcontroller

The Am186ES and its companion, the Am188<sup>™</sup>ES microcontroller, integrate the functions of the CPU, non-multiplexed address bus, three timers, a watchdog timer, chip selects, interrupt controller, two DMA controllers, PSRAM controller, asynchronous serial ports, programmable bus sizing, and programmable I/O (PIO) pins on one chip. Compared to the 80C186/188 microcontrollers, the Am186ES and the Am188ES microcontrollers can reduce the size, power consumption, and cost of embedded systems while increasing reliability, functionality, and performance.

The Am186ES and Am188ES microcontrollers are part of AMD's E86<sup>™</sup> family of embedded microcontrollers and microprocessors based on the x86 architecture. The E86 family provides designers with a variety of x86 compatible 16- and 32-bit microcontroller and microprocessor solutions.

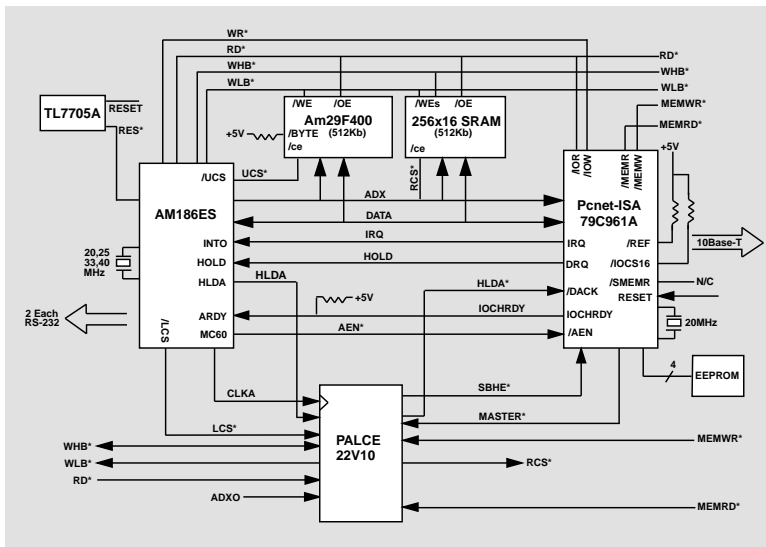
### PCnet-ISA II Ethernet Controller

The Am79C961A PCnet-ISA II Ethernet controller, a single-chip Ethernet controller, is a highly integrated "bus-mastering" Ethernet controller with a built in ISA bus and PHY layer (Manchester Encoder/Decoder and 10Base-T transceiver). The 16-bit ISA interface makes an ideal straightforward connection to a x186-style local bus. The PCnet-ISA II has two features which, while not implemented in the Net186, would be very

useful for certain embedded networking control applications: full duplex operation (making it possible to transmit and receive packets at the same time, for a combined bi-directional data transfer rate of up to 20Mbps) and Magic Packet Technology (making it possible to remotely wake up a sleeping system on an Ethernet node).

The PCnet-ISA II is available in either 132-pin PQFP (plastic quad flat package) or 144-pin TQFP (thin quad flat package). Implemented on the Net186 is the 144-pin TQFP. It is specifically designed to reduce part count and cost, and addresses applications where higher system throughput is desired.

The PCnet-ISA II Ethernet controller is part of the AMD PCnet Family of single-chip Ethernet controllers based on the original LANCE/CLANCE architecture. Other members include the Am79C965 PCnet-32 (for VL or other general 32-bit bus environments) and the Am79C970A PCnet-PCI II (for PCI bus environments). Like the PCnet-ISA II, the PCnet-32 and the PCnet-PCI II are 10Mbps Ethernet controllers. The latest member of the PCnet Family is the Am79C971 PCnet-FAST, a 10/100Mbps Ethernet controller.



Simplified Net186 Schematic Diagram



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