

# LAN7500

## Hi-Speed USB 2.0 to 10/100/1000 Gigabit Ethernet Controller

SMSC's LAN7500 is a Hi-Speed USB 2.0 to 10/100/1000 Gigabit Ethernet controller providing a high-performance and cost-effective USB to Ethernet connectivity solution. The LAN7500 contains an integrated 10/100/1000 Gigabit Ethernet PHY, USB PHY, Hi-Speed USB 2.0 device controller, 10/100/1000 Gigabit Ethernet MAC, TAP controller, EEPROM controller and a FIFO controller with a total of 32KB internal packet buffering. The device supports 10BASE-T, 100BASE-TX and 1000BASE-T Ethernet and implements Control, Interrupt, Bulk-in and Bulk-out USB endpoints. The Ethernet controller supports auto-negotiation, auto-polarity correction, HP Auto-MDIX\* support and is compliant with IEEE 802.3/802.3u/802.3ab standards.

USB-based networking provides flexibility for the routing and placement of network connections anywhere in the system. USB-based solutions leverage the existing USB stack for the Ethernet driver. The LAN7500 is also available with a wide range of drivers including Windows®, Mac® and Linux®.

The LAN7500 also offers SMSC's NetDetach™ and UniClock™ technologies. NetDetach allows for up to a 25% reduction in power by enabling the host CPU to enter a low-power state when Ethernet is inactive. UniClock simplifies the clocking scheme and reduces system BOM cost by using a single 25MHz crystal for both USB and Ethernet connectivity. Multiple power management features are provided, including various low-power modes and Magic Packet™, Wake-on LAN (WOL) and Link Status Change wake events. These wake events can be programmed to initiate a USB remote wakeup. The device is available in commercial (0° to 70°C) and industrial temperature range (-40° to 85°C) options.

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### Highlights

- Single-chip, Hi-Speed USB 2.0 to 10/100/1000 Gigabit Ethernet controller
- Implements NetDetach technology for reduced system power consumption
- Supports EEPROM-less operation for reduced BOM costs
- Requires only a single 25MHz crystal
- Easy upgrade for USB-based 10/100 Ethernet (LAN9500/9500A) to 10/100/1000 Gigabit Ethernet
- Supports IEEE 802.3/802.3u/802.3ab standards
- Industrial temperature range option available (LAN7500i)
- 8x8mm, 56-pin QFN, lead-free RoHS-compliant package

### Target Applications

- Embedded Systems
- Consumer Electronics Devices
- Netbooks/Smartbooks/MIDs
- Docking Stations
- Digital TVs (DTVs)
- Set-top Boxes
- Personal Video Recorders (PVRs)
- Network Printers
- USB Port Replicators
- Stand-alone USB to Ethernet Dongles
- Industrial Designs

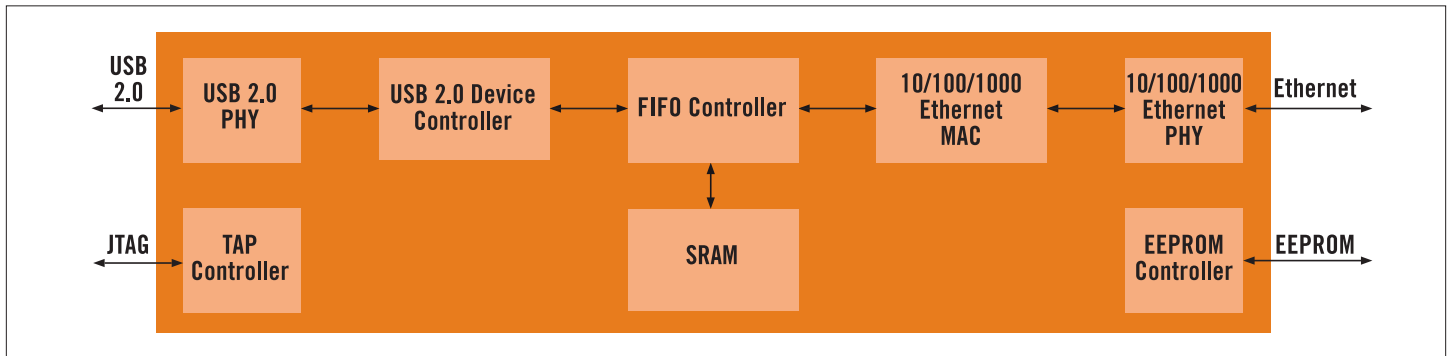


## Key Features

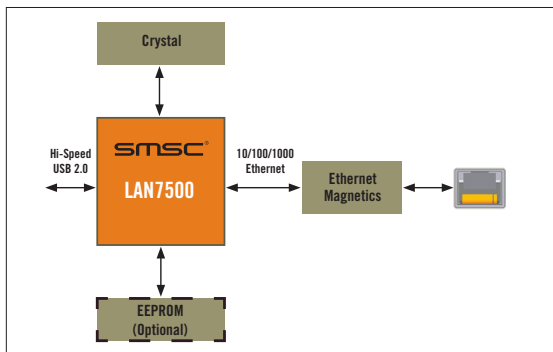
|   |   |
|---|---|
| NetDetach technology  | Allows CPU to enter low-power state when Ethernet is inactive |
| UniClock technology utilizing a single 25MHz crystal  | Reduces BOM component count and cost                          |
| Multiple Operating Systems supported: Windows 7, Windows XP, Windows Vista®, Windows CE, PXE, DOS ODI, Mac and Linux. | Diverse applications supported                                |
| PME pin wake-up support   | Reduces system power requirements                             |
| Supports TCP segmentation offload and full hardware TxRx checksum offloads (IPV4, IPV6, TCP, UDP)                     | Reduces CPU loading   |

## Benefits

## LAN7500 Block Diagram



## LAN7500 Application Diagram



## LAN7500 Target Applications



## Which USB to Ethernet Controller is Right for Your Design?

|          | Ethernet    | Host Interface | NetDetach Technology | UniClock Technology | Industrial Temp Option (-40° to 85°C) | Pin & Package |
|----------|-------------|----------------|----------------------|---------------------|---------------------------------------|---------------|
| LAN7500  | 10/100/1000 | USB 2.0        | Yes                  | Yes                 | LAN7500i                              | 56-pin QFN    |
| LAN9500A | 10/100      | USB 2.0        | Yes                  | Yes                 | LAN9500Ai                             | 56-pin QFN    |

LAN9500A is SMSC's USB 2.0 to 10/100 Ethernet product with NetDetach and UniClock technologies in a small 56-pin QFN package

\*HP Auto-MDIX eliminates the need for special "crossover" cables when connecting LAN devices together.

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