**Overview**

**Texas Instruments** provides the world’s most reliable and robust 10/100/1000 Ethernet PHY transceivers. From the industry’s first 10/100 PHY and now the first Gigabit Ethernet PHY tailored for the industrial market, TI has targeted the industry’s highest precision standards with the lowest deterministic latency while giving off less noise emission/interference with other components on the board.

The Ethernet PHY is a transceiver that bridges the digital world – including processors, field-programmable gate arrays (FPGAs), and application-specific integrated circuits (ASICs) – to the analog world. An Ethernet PHY is designed to provide error-free transmission over a variety of media access controllers (MACs). The MAC is usually integrated into a processor, FPGA or ASIC and controls the data-link-layer portion of the OSI model. There are a number of interfaces between the MAC and the PHY that are available which provide minimal pin count and varied data rates depending on system requirements.

![Diagram of Ethernet PHY components]

For more information, please visit [www.ti.com/ethernet](http://www.ti.com/ethernet)

**Key Characteristics**

**EMI mitigation**
Less noise emission means less interference, which allows for more margin in the system design

**Robust ESD performance**
Built-in ESD protection allows for fewer components and lowers costs for more robust and reliable systems

**Designed for low latency**
Faster response time, greater predictability, and more nodes can be daisy-chained for more accurate and efficient systems
**Featured Products**

**DP83822**  
Industry’s lowest-power 10/100 Mbps Ethernet PHY for industrial applications

- Offers the highest operating temperature of any Ethernet PHY  
- Lowest power consumption of any 10/100 Mbps Ethernet PHY on the market (<120 mW)  
- Only 10/100 Mbps Ethernet PHY to support RGMII MAC interface  
- Flexible options with both copper and fiber support  
- Time saving low loop latency by minimizing delay between events  
- IEEE 1588 SFD, WoL and EEE power saving feature  
- 8 kV IEC 61000-4-2 ESD protection

**Key Portfolio Products**

<table>
<thead>
<tr>
<th>Package</th>
<th>Fiber</th>
<th>QFP</th>
</tr>
</thead>
<tbody>
<tr>
<td>DP83822HF – MII, RMII, RGMII</td>
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<tr>
<td>DP83848Q – MII, RMII, SNI</td>
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<td>DP83620 – MII, RMII</td>
<td>Fiber</td>
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<td>DP83630 – MII, RMII</td>
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<td>IEEE1588</td>
</tr>
<tr>
<td>DP83640 – MII, RMII</td>
<td>IEEE1588</td>
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<tr>
<td>DP83848YB – MII, RMII, SNI</td>
<td>IEEE1588</td>
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<td>DP83848 - EP – MII, RMII, SNI</td>
<td>IEEE1588</td>
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<td>DP83867RPAP – MII, RGMII, GMII</td>
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<td>(NEW)</td>
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<td>DP83867E – SGMII, RGMII</td>
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<td>(NEW)</td>
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<td>DP83849C – MII, RMII, SNI</td>
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<td></td>
</tr>
<tr>
<td>DP83849IF – MII, RMII, SNI</td>
<td>Media Converter</td>
<td></td>
</tr>
</tbody>
</table>

Temperature Range (°C):
-55 to 125

- **IEEE1588** Fiber
- **QFP** = QFP
**Featured Products**

**DP83848Q-Q1**
10/100 PHY customized for automotive applications

- Automotive AEC-Q100 grade 2
- Deterministic, low transmit and receive latency
- Excellent jitter tolerance
- Auto-MDI for 10/100 Mbps
- MII/RMII/SNI MAC interfaces
- Industrial temperature range (-40°C to 105°C)
- Low power consumption at 264 mW
- 4 kV (AEC Q100-002) ESD protection

**TI Reference Design**

- Low power consumption (264 mW)
- Meets EN55011 Class A radiated emission requirements

The main benefit of using Ethernet within an OBD-II system is that Ethernet operates at 100 times the speed of a CAN bus and 20 times faster than CAN with flexible data rate (CAN-FD). This increased bandwidth enables software and firmware upgrades in minutes, rather than hours. The longer cable reach also allows for more flexibility in end-of-the-line testing.

**Single-Port 10/100 Ethernet PHY**

<table>
<thead>
<tr>
<th>Device</th>
<th>Interface</th>
<th>Package</th>
<th>Temp Range (°C)</th>
<th>Cable Length (m)</th>
<th>No. LEDs</th>
<th>JTAG</th>
<th>WoL</th>
<th>Fiber Support</th>
<th>IEEE1588 Support</th>
<th>50 MHz Clock Out</th>
<th>Cable Diagnostics</th>
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<td>SFD**</td>
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<td>QFN-48</td>
<td>–40 to 85</td>
<td>150</td>
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</tbody>
</table>

*New product** **Start of frame detect**
**Featured Products**

**DP83867**

*Industry’s first gigabit PHY customized for harsh industrial environments*

- Exceeds industry’s performance at ISO/IEC 8 kV
- Lowest latency for both 100 Mbps and 1 Gbps modes, <90 ns TX & <290 ns RX
- Multiple MAC interfaces: S/R/GMII and MII
- Industrial temperature range (−40°C to 105°C)
- Low power consumption <460 mW
- Small QFP and QFN package options available
- Output clock: 25 MHz or 125 MHz for daisy chaining or supporting system clock
- JTAG (IEEE 1149.1) for easy design-in and debug
- Start of frame detect for IEEE 1588 time stamp

**TI Reference Design**

- Dual-port Gigabit PHY evaluation kit with wide input voltage range: 18-60 V
- Exceeds immunity requirements as per IEC61000-4-2, IEC61000-4-3, IEC61000-4-4, and IEC61000-4-6
- Full reference schematics available for easy design-in

**Single-Port 10/100/1000 Gigabit Ethernet PHY**

<table>
<thead>
<tr>
<th>Device</th>
<th>Interface</th>
<th>Package</th>
<th>Temp Range (°C)</th>
<th>ESD (kV)</th>
<th>Cable Length (m)</th>
<th>No. LEDs</th>
<th>JTAG</th>
<th>WoL</th>
<th>IEEE1588 Support</th>
<th>25/125 MHz Clock Out</th>
<th>Cable Diagnostics</th>
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</tbody>
</table>

*New product*
**Featured Products**

**DP83849IF**  
*Dual-port 10/100 Ethernet PHY*

- Copper-to-fiber media converter
- Flexible port management
- JTAG (IEEE 1149.1) for easy design-in and debug
- Fiber support

### Flexible-port block diagram

Flexible port switching allows the data path between the cable side ports and the MAC interfaces to be modified either at system development or dynamically via the controlling software.

Multiple uses include the following:

- Extender
- Software-assisted failover
- Dedicated copper/fiber ports
- Ring network

### Media conversion block diagram

The DP83849IF features a media converter mode as depicted in the figure to the left, allowing conversion of copper to fiber and vice-versa at 100 Mbps. This configuration allows longer run fiber to be used in situations where fiber support is not built into the end device. This can also be combined with power over Ethernet on the copper side.

### Dual-Port 10/100 Ethernet PHY

<table>
<thead>
<tr>
<th>Device</th>
<th>Interface</th>
<th>Package</th>
<th>Temp Range (°C)</th>
<th>ESD (kV)</th>
<th>Cable Length (m)</th>
<th>No. LEDs</th>
<th>JTAG</th>
<th>Fiber Support</th>
<th>Cable Diagnostics</th>
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<td>4</td>
<td>137</td>
<td>3</td>
<td>•</td>
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</tr>
</tbody>
</table>

* Flexible port
End Applications

**Commercial**

*Everyday consumer products*
- Network printers
- Broadband gateways
- Set-top boxes
- Point of sale (POS)
- Smart TVs
- IP Phones

**Industrial**

*Robust and reliable*
- Factory automation (motor drives)
- Smart grid (e-meters)
- Building automation (robots)
- Single-board computers (SBC)
- Motor control (stepper motors)
- Power systems (relays)
- Human machine interface (HMI)
- Programmable logic controller (PLC)
- Control panels

**Automotive**

*External gateway connections*
- On-board diagnostics (OBD)
- Firmware upgrades
- Navigation updates
Ethernet blogs
Latest Ethernet PHY blog posts
- Fiber in industrial applications
- Top three considerations for harsh industrial Ethernet
- How Ethernet technology is shifting modern markets
- Three things you should know about Ethernet PHY

See more

Ethernet instructional videos
Hands-on instructional content
- Reduce design time with easy IEEE 802.3 compliance
- EMI/EMC compliant industrial temp dual port gigabit Ethernet reference design

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Direct Email asktexas@ti.com

Japan
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Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
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