



# **Cortina Systems® LXT9785 Advanced 8-Port 10/100 Mbps PHY Transceiver**

## **Frequently Asked Questions**

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## Revision History

<p style="text-align: center;"><b>Revision 3.0</b> <b>Revision Date: 09 March 2007</b></p>
<p>First Internal Release from Cortina Systems, Inc.</p>

<p style="text-align: center;"><b>Revision 002</b> <b>Revision Date: 01 February 2002</b></p>
<p>Document 249275 was split into two documents: LXT9785 (249275) and LXT9785E (250617).</p>

<p style="text-align: center;"><b>Revision 001</b> <b>Revision Date: 03 January 2002</b></p>
<p>Internal draft.</p>

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## 1.0 Introduction

This document is a composite of the most frequently asked questions (FAQs) and corresponding answers for the LXT9785 Transceiver, Cortina's lowest power, highest performance octal 10/100 Ethernet transceiver with Data Terminal Equipment (DTE) discovery support.

## 2.0 Key Features

### Question 1: What are the key features of the LXT9785 Transceiver?

**Answer:** The following items are key features of the device:

- Low power, 2.5V operation.
- 10BASE-T and 100BASE-TX over UTP cabling.
- 100BASE-FX fiber optic capability.
- Multiple RMII, SMII, or SS-SMII interfaces for independent PHY port operation.
- Supports both auto-negotiation and legacy link partners that do not have auto-negotiation capability.
- Configurable via MDIO port or external control pins.
- Auto MDI/MDIX crossover.
- "Sectionalization" allows this device to be used as two individual 4-port PHYs or a single 8-port PHY.
- CDE protection greater than 5000V.
- Designed for superior EMI performance.
- JTAG boundary scan.
- Robust baseline wander correction.
- Extended temperature operation (-40 °C to +85 °C) for the LXT9785HE.

### Question 2: What package and temperature options are available for the LXT9785 Transceiver?

- The LXT9785 Transceiver is available in options for commercial temperature (0 °C to 70 °C) and extended temperature (-40 °C to +85 °C) operation. The LXT9785HC/BC should be used for commercial temperature applications and the LXT9785HE should be used for extended temperature applications.
- The LXT9785xC is available in both 208-pin PQFP (LXT9785HC) and 241-ball BGA (LXT9785BC) packages
- The LXT9785HE is available in 208-pin PQFP only

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## 3.0 Interface Modes

The LXT9785 Transceiver supports three different interfaces: RMII, SMII and SS-SMII.

### **Question 3: What is the Reduced Media Independent Interface (RMII)?**

**Answer:** The LXT9785 Transceiver provides a Reduced Media Independent Interface (RMII) for each network port, passing received data to the MAC:  $RXD_{n<1:0>}$ ,  $RXER_n$ , and  $CRS\_DV_n$  (where  $n$  reflects the port's number). Three signals are used to transmit data from the MAC:  $TXD_{n<1:0>}$  and  $TXEN_n$ . Both receive and transmit signals are clocked by REFCLK. Data transmission across the RMII is implemented in di-bit pairs, which is equal to a 4-bit-wide nibble.

This interface requires a single 50 MHz reference clock for both transmit and receive signals.

### **Question 4: What is the Serial Media Independent Interface (SMII)?**

**Answer:** The Serial Media Independent Interface (SMII) satisfies the following requirements:

- Provides further pin/trace reduction over the RMII interface.
- Conveys complete MII information between a 10/100 Mbps PHY and MAC with two pins per port.
- Allows for a multi-port MAC/PHY communication with one system clock.
- Operates in both half-duplex and full-duplex.
- Performs per-packet switching between 10 Mbps and 100 Mbps data rates.
- Allows direct MAC-to-MAC communication.
- All SMII ports use a common 125 MHz reference clock and SYNC signals that are synchronous to the reference clock. There are two signals in SMII from MAC-to-PHY for each port (TXD and TxSYNC), and one signal per port from PHY-to-MAC (RXD).

### **Question 5: What is the Source Synchronous-Serial Media Independent Interface (SS-SMII)?**

**Answer:** A new revision to the SMII Specification 2.1 defines a Source Synchronous-Serial Media Independent Interface (SS-SMII). SS-SMII allows for a longer trace length and helps to relieve timing constraints, requiring the addition of four new signals, (TX\_CLK, TX\_SYNC, RX\_CLK, and RX\_SYNC). The transmit TX\_CLK and TX\_SYNC are sourced from the MAC to the PHY and referenced to the REFCLK input. The receive RX\_CLK and RX\_SYNC are sourced by the PHY to the MAC in reference to the REFCLK.

All SMII applications that use these additional signals are referred to as Source Synchronous.

### **Question 6: What is the importance of the boundary scan function on the LXT9785 Transceiver?**

**Answer:** The boundary scan (JTAG) function allows electrical access to every pin on the LXT9785 Transceiver, allowing boundary-level testing where signals can be driven out and input pins can be sensed via control from a 5-pin interface (TRST, TCK, TMS, TDO, and TDI). This may cause a reduction in the number of test points needed, resulting in a simplified board and lower costs.

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## 4.0 Sectionalization

**Question 7: What is the LXT9785 Transceiver Sectionalization concept?**

**Answer:** The LXT9785 Transceiver's sectionalization function allows easier design with MACs and ASICs that do not have a multiple of eight ports. The Section pin allows the device to be configured into a single 8-port, or two independent 4-port sections, each with its own MDIO interface and MDC clock.

## 5.0 Initialization

**Question 8: What is the Power-Down Mode on the LXT9785 Transceiver?**

**Answer:** The LXT9785 Transceiver incorporates numerous features to maintain the lowest power possible. The device can be put into a low-power state via Register bit 0.11, as well as a near-zero power state with the power-down pin. When the device is in the power-down mode, it cannot transmit or receive packets. *For more information, please refer to the Operating Requirements Section in the LXT9785/9785E Datasheet.*

## 6.0 Extended Temperature

**Question 9: What temperature options are available in the LXT9785 Transceiver?**

**Answer:** The LXT9785HE is available for the extended temperature range (-40 °C to +85 °C) for Carrier Class Ethernet applications.

**Question 10: Why is the extended temperature version available in QFP only?**

**Answer:** The LXT9785HE QFP package with an internal heat spreader provides proper heat dissipation for extended temperature operation. A BGA package with greater heat dissipation would have greater unit cost and require a new package qualification.

**Question 11: Is there a price difference between the LXT9785HC and the LXT9785HE?**

**Answer:** Yes, on an average, the LXT9785HE price is approximately 15 percent higher than the LXT9785HC.

**Question 12: Is there an extended temperature version of the LXT9785 Transceiver (with DTE)?**

**Answer:** No. DTE is used almost exclusively for IP Telephony applications. IP Telephony applications are located in office environments/wiring closets where the equipment environment is well- controlled and does not require extended temperature components.

**Question 13: What is the feature set in the LXT9785HE?**

**Answer:** The major features include fiber interface, reduced power consumption, and integrated termination resistors. The hardware integrity feature is not available on the LXT9785HE. [Table 1](#) shows the features in detail.

**Table 1**      **LXT9785HE Feature Set**

Feature	LXT9785HE
Process Technology	.25 $\mu$ m CMOS
Package(s)	208 PQFP 241 PBGA
Supply Voltage	2.5V
Power Consumption (Per-Port Typical/Max)	250 mW/270 mW
Interface Type	RMII/SMII/SS-SMII
Media	Copper/Fiber Optic
Hardware Integrity (HWI)	No
MDIO Partitioning	Yes
Integrated Termination Resistors	RX and TX

## 7.0      General Information

**Question 14: What is Auto MDI/MDIX?**

**Answer:** The LXT9785 Transceiver's Automatic MDI Crossover (auto MDI/MDIX) feature detects the position of the link partner's transmit and receive cable pairs and determines whether they are aligned correctly. If not, it automatically swaps the transmit and receive signals internally, eliminating the need for installation of a crossover cable when connecting peer-to-peer.

**Question 15: What are the magnetic requirements for the LXT9785 Transceiver?**

**Answer:** The LXT9785 Transceiver requires a 1:1 ratio transformer for both the receive and transmit transformer twisted-pairs. The device uses a current-driven driver (to save power) and requires both magnetic center taps to be connected together to analog VCC. *See the LXT9785/9785E Design and Layout Guide (249509) for more information on design and recommended transformers.*

**Question 16: Why is no termination required for the LXT9785 Transceiver?**

**Answer:** The load termination resistors for the TX and RX pairs of the LXT9785 Transceiver are integrated into the device. This technique helps reduce the analog power of the PHY and reduces total system cost by eliminating 16 resistors per device.

**Question 17: What is the significance of the LXT9785 Transceiver Next Page feature?**

**Answer:** The Next Page feature allows the LXT9785 Transceiver to share additional information with its link partner during auto-negotiation. Next Page exchange occurs only if both ends of the link advertise their ability to exchange Next Pages.

**Question 18: Are BSDL and IBIS model files available for the LXT9785 Transceiver?**

**Answer:** Both Boundary Scan Description Language (BSDL) files and I/O Buffer Information Specification (IBIS) models for the LXT9785 Transceiver are available. Contact your Cortina representative for more information.

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**Question 19: What collateral is available for the LXT9785 Transceiver?**

**Answer:** The LXT9785 Transceiver collateral listed below is available:

- LXT9785/9785E Datasheet (249241)
- Product Brief
- LXT9785/9785E Design and Layout Guide (249509)
- Four LXT9785/9785E Development Kit Manuals:
  - SS-SMII (249326)
  - SMII (249325)
  - SS-SMII [Fiber] (249323)
  - RMII (249324)
- Competitive Response Guide (249273)
- Specification Update (249357)
- IBIS and BSDL models

**Question 20: Are LXT9785 Transceiver reference designs or evaluation tools available?**

**Answer:** The following fully functional evaluation boards and their documents are available for the LXT9785 Transceiver device:

- SS-SMII PQFP Demo Board
- SMII PQFP Demo Board
- SS-SMII PQFP Fiber Demo Board
- RMII PQFP Demo Board

Schematics for all of the demo boards are included in the user guides that accompany each board. System reference designs for the LXT9785 Transceiver are available. CAD files, UNH test reports, and information on system reference designs may be obtained from your local Cortina representative.

**Question 21: What is the availability of samples and production quantities?**

**Answer:** The LXT9785 Transceiver is in production and samples are available. The lead-time for production quantities is dependent on volume ordered.



**For additional product and ordering information:**

[www.cortina-systems.com](http://www.cortina-systems.com)