Texas Instruments’ (TI) Serial Gigabit Transceivers provide high-performance, low-power physical layer solutions for optical networking, telecommunications, data communications, wireless infrastructure, and data transmission applications.

The following are highlights from this growing family:

- TTs portfolio of general-purpose, backplane Serializer/Deserializer (SerDes) devices are easy to implement, with low-power requirements and robust built-in testability.
- Gigabit Ethernet/Fibre Channel products feature low-power, high-performance IEEE 802.3z compliant SerDes (Serializer/Deserializer), along with ultra-small form factors.
- TTs CMOS-based line of interface devices supports serial data rates up to 10.3 Gbps/channel. It features one of the industry’s first full-production 10-Gigabit Ethernet backplane SerDes (XGMII to XAUI).
- The SONET family of integrated, CMOS-based transceivers for OC-3 to OC-40-based applications features multi-rate SerDes that incorporate MUX, deMUX and CDR functions.
- Industry-compatible LVDS SerDes devices provide high-performance serial solutions for next-generation systems.

**Key Benefits**

- Ultra-low-power operation at multi-gigabit data rates
- Onboard PRBS generation and verification for easy link testing
- Broad range of devices support standards such as Gigabit Ethernet, 10-Gigabit Ethernet, Fibre Channel, XGMII, XAUI and SONET
- Compatible with TI’s ASIC library SerDes functions

**NEW**

- **TLK2208, TLK2206**
  Octal/HEX Gigabit Ethernet Transceiver

- **SN65LV10xx, 12xx**
  LVDS-based SerDes for speeds 100 to 660 Mbps

**NEW**

- **TLK3118**
  XGMII to XAUI with redundancy

![Diagram of Serial Gigabit Transceiver Family](image)
The TLK1002 is a dual-channel Gbps Ethernet signal conditioner for cleaning Gbps Ethernet/FC serial data streams.

**TLK2208B, TLK2206, TLK2228**
The TLK2208B is the third-generation Gigabit Ethernet transceiver from TI, combining high port density and ultra-low-power in a small form factor footprint. Based on the IEEE 802.3z 1000-Mbps Ethernet specification, the TLK2208B provides eight channels of Gigabit Ethernet for high-speed, full-duplex, point-to-point data transmission. This device features selectable 8B/10B encoding/decoding and two data sampling modes—Multiplex and Nibble—that enable a reduced pin count for interfacing to MAC, ASIC or FPGA. Its primary application is to provide building blocks for developing point-to-point baseband data transmission over controlled impedance media of 50 Ω.

The TLK2208B performs the data encoding, decoding, serialization, deserialization, clock recovery and clock-tolerance compensation functions for a physical-layer interface device. Each channel operates from 1.0 to 1.3 Gbps, providing a maximum total aggregated data bandwidth of 8.32 Gbps over a copper or optical media interface.

The TLK2208B is also available in an industrial temperature version and an ultra-small 5 mm x 5 mm MicroStar Junior™ BGA package intended for high-port density applications where board space is limited.

**10 GIGABIT ETHERNET**
**TLK3104SA, TLK3114SA/SC**
The TLK3114SC, a four-channel transceiver, accepts inputs on four selectable 10/8-bit SSTL2/HSTL parallel-side interfaces and drives four channels of LVPECL signaling (XAUI-serial side) at 3.125 Gbps/channel. The TLK3114SC operates in 10-Gigabit Ethernet (IEEE 802.3ae compliant).
mode and supports an aggregate bandwidth of 12.5 Gbps at approximately 750 mW/channel. A flexible, quad serial transceiver for 10-Gigabit Ethernet backplane applications, the TLK3114SA/SB/SC delivers high-speed, bi-directional, point-to-point data transmission to provide up to 10 Gbps of data transmission capacity. Low power and pin compatible with the TLK3114SC quad serial transceiver, the device supports an operating range of serial data rates from 2.5 Gbps to 3.125 Gbps/channel (IEEE 802.3ae compliant).

**TLK3104SC**
The TLK3104SC, a four-channel transceiver, accepts low voltage differential signaling (LVDS), 622 Mbps inputs on 20 channels and compatible signaling at 3.125 Gbps (XAU). It supports an aggregate bandwidth of 12.5 Gbps at approximately 750 mW/channel.

**TLK3118**
A flexible, redundant XAU serial transceiver, the TLK3118 is compliant to the 10 Gbps Ethernet XAU specification. It provides high-speed, bidirectional, point-to-point data transmissions with up to 12.75 Gbps raw data transmission capacity. The primary application is backplanes and front panel connections requiring redundant 10 Gb connections over controlled impedance media of approximately 50 Ω, where the TLK3118 performs the parallel-to-serial and serial-to-parallel conversion as well as clock recovery functions for a physical layer interface.

Additionally, the TLK3118 provides two complete XGXS/PCS functions defined in Clause 47/48 of the IEEE P802.3ae 10-Gbps Ethernet standard. The serial transmitter is implemented using differential current mode logic with integrated termination resistors.

Configured as a redundant XAU transceiver or a full-duplex XAU re-timer, the TLK3118 supports a 32-bit data path, 4-bit control and 10-Gigabit Media Independent Interface (XGMII) to the protocol device.

**SONET**

**SLK2501, SLK2511, SLK2701, SLK2721**
The SLK2xxx family of multirate SONET transceivers with integrated clock and data recovery supports data rates of OC-3/12/24/48 and Gigabit Ethernet payloads. The SLK2701 and SLK2721 also feature support for FEC data rates. Additionally, the SLK2721 is optimized for jitter tolerance. The entire family of devices features auto-rate detection, local and remote loop back and PRBS generation and verification.

**LVDS DEVICES**

**SN65LVDS9x Family**
The SN65LVDS9x family of devices is a three- or four-channel point-to-point transmitter and receiver pair that supports up to 1.365/1.820 Gbps of data throughput. It accepts 21/28 LVTTL inputs and outputs three or four LVDS lines in parallel with a clock signal. Potential applications include video transmission over copper cable or backplanes, as well as wireless infrastructure backplanes.

**SN65LV1021/1023A (TX) and SN65LV1212/1224A (RX) Chipsets**
This TX/RX family of devices provides backplane solutions between 100-660 Mbps. With a 10-bit LVTTL parallel side I/O and a high-speed LVDS serial side I/O, the chipset operates at low power (250-400 mW) and is industrial-temperature qualified.
For More Information

Texas Instruments' Serial Gigabit Transceiver family combines low-power dissipation and multi-gigabit transmission speeds for today's most advanced systems. For more information about serial gigabit samples, datasheets, application reports and EVMs, please contact your local TI field sales representative or visit: www.ti.com/serialgigabit

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## Key Specifications

<table>
<thead>
<tr>
<th>Function</th>
<th>Data Rate</th>
<th>Serial I/F</th>
<th>Parallel I/F</th>
<th>Power</th>
<th>Special Features</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TLK1501</strong> Single-Ch. 16:1 SerDes</td>
<td>0.6-1.5 Gbps</td>
<td>1 CML&lt;sup&gt;2&lt;/sup&gt;</td>
<td>16 LVTTL</td>
<td>200 mW</td>
<td>Built-In Testability</td>
<td>8.00</td>
</tr>
<tr>
<td><strong>TLK2501</strong> Single-Ch. 16:1 SerDes</td>
<td>1.6-2.5 Gbps</td>
<td>1 CML&lt;sup&gt;2&lt;/sup&gt;</td>
<td>16 LVTTL</td>
<td>300 mW</td>
<td>Built-In Testability</td>
<td>12.00</td>
</tr>
<tr>
<td><strong>TLK2701</strong> Single-Ch. 16:1 SerDes</td>
<td>1.6-2.5 Gbps</td>
<td>1 VML&lt;sup&gt;3&lt;/sup&gt;</td>
<td>16 LVTTL</td>
<td>350 mW</td>
<td>MicroStar Junior™ BGA Packaging</td>
<td>12.00</td>
</tr>
<tr>
<td><strong>TLK3101</strong> Single-Ch. 16:1 SerDes</td>
<td>2.5-3.125 Gbps</td>
<td>1 VML&lt;sup&gt;3&lt;/sup&gt;</td>
<td>16 LVTTL</td>
<td>350 mW</td>
<td>Built-In Testability</td>
<td>16.00</td>
</tr>
<tr>
<td><strong>TLK1201A</strong> Single-Ch. 10:1 Gigabit Ethernet Xcvr Gbps</td>
<td>0.6-1.3</td>
<td>1 LVPECL</td>
<td>10 LVTTL</td>
<td>200 mW</td>
<td>Industrial Temperature</td>
<td>3.95</td>
</tr>
<tr>
<td><strong>TLK2201</strong> Single-Ch.</td>
<td>1.0-1.6 Gbps</td>
<td>1 LVPECL</td>
<td>10 LVTTL</td>
<td>200 mW</td>
<td>JTAG; 5-Bit DDR mode</td>
<td>3.95</td>
</tr>
<tr>
<td><strong>TLK22011</strong> Single-Ch. 10:1 Gigabit Ethernet Xcvr</td>
<td>1.2-1.6 Gbps</td>
<td>1 LVPECL</td>
<td>10 LVTTL</td>
<td>200 mW</td>
<td>JTAG; 5-Bit DDR mode, Industrial Temperature Qualified</td>
<td>4.75</td>
</tr>
<tr>
<td><strong>TLK2201JR</strong> Single-Ch. 10:1 Gigabit Ethernet Xcvr&lt;sup&gt;4&lt;/sup&gt;</td>
<td>1.0-1.6 Gbps</td>
<td>1 LVPECL</td>
<td>10 LVTTL</td>
<td>200 mW</td>
<td>MicroStar Junior 5 mm x 5 mm LGA</td>
<td>3.95</td>
</tr>
<tr>
<td><strong>TLK2228</strong> Eight-Ch. Gigabit Xcvr</td>
<td>1.0-1.3 Gbps</td>
<td>8 VML</td>
<td>N/A</td>
<td>&lt;300 mW</td>
<td>High Input Jitter Tolerance &lt; .75 UI</td>
<td>Preview</td>
</tr>
<tr>
<td><strong>TLK2206</strong> Six-Ch. 16:1 Gigabit Ethernet Xcvr</td>
<td>1.0-1.3 Gbps</td>
<td>6 VML</td>
<td>4/5-Bit RTBI or 8/10-Bit DDR Channel Mode</td>
<td>&lt;1 W</td>
<td>MDIO Supported</td>
<td>20.00</td>
</tr>
<tr>
<td><strong>TLK3104SA</strong> Four-Ch. of 10/8:1 Xcvr</td>
<td>2.5-3.125 Gbps</td>
<td>4X 3.125 Gbps LVPECL (XAU1I)</td>
<td>4X 10/8-Bit SSTL/HSTL</td>
<td>700 mW/ch.</td>
<td>JTAG; Programmable Preemphasis and XAUI I/F</td>
<td>55.00</td>
</tr>
<tr>
<td><strong>TLK3104SC</strong> Four-Ch. of 4:1 Xcvr</td>
<td>3.0-3.125 Gbps</td>
<td>4X LVPECL</td>
<td>20x622 LVDS Lines</td>
<td>700 mW/ch.</td>
<td>JTAG, 6b/10b Br/Off</td>
<td>120.00</td>
</tr>
<tr>
<td><strong>TLK3114SC</strong> Four-Ch. of 10/8:1 Xcvr</td>
<td>2.5-3.125 Gbps</td>
<td>4X 3.125 Gbps LVPECL (XAU1I)</td>
<td>4X 10/8-Bit SSTL/HSTL</td>
<td>600 mW/ch.</td>
<td>IEEE 802.3ae Backplane Transceiver Compliant</td>
<td>55.00</td>
</tr>
<tr>
<td><strong>TLK3118</strong> Four-Ch. 10/8:1 Xcvr w/ (XAUI) Full Redundancy</td>
<td>2.5-3.125 Gbps/ch.</td>
<td>4X 3.125 Gbps LVPECL (XAU1I)</td>
<td>8/10 HSTLx4 (XGMII)</td>
<td>&lt;2 W</td>
<td>Full Redundancy for Four Channels (XAUI)</td>
<td>Web</td>
</tr>
<tr>
<td><strong>TLK4015</strong> Four-Ch. of 16:1 Xcvr</td>
<td>0.6-1.5 Gbps/ch.</td>
<td>4X CML</td>
<td>16 LVTTL/ch.</td>
<td>1 W</td>
<td>Four-Channel Version of TLK1501</td>
<td>28.00</td>
</tr>
<tr>
<td><strong>SLK2501/2511</strong> Single-Ch. 4:1 Multirate SONET Xcvr with CDR</td>
<td>OC-3/12/24/48</td>
<td>1 LVPECL</td>
<td>4x622 LVDS</td>
<td>900 mW</td>
<td>Auto-Rate Detection, Local and Remote Loop Back</td>
<td>40.00</td>
</tr>
<tr>
<td><strong>SLK2701/2721</strong> Single-Ch. 4:1 Multirate SONET Xcvr with CDR</td>
<td>OC 3/12/24/48</td>
<td>PECL</td>
<td>4 x LVDS</td>
<td>900 mW</td>
<td>FEC Rate Compatible, SLK2721 is Optimized for Jitter Tolerance</td>
<td>40.00</td>
</tr>
<tr>
<td><strong>SN65LVDS93/94</strong> Four-Ch. 28.4 TX/RX Chipset</td>
<td>140-455 Mbps/ch.</td>
<td>4 LVDS</td>
<td>28 LVTTL</td>
<td>250 mW/chip</td>
<td>Supports Up to 1.82 Gbps Throughput</td>
<td>3.73</td>
</tr>
<tr>
<td><strong>SN65LVDS95/96</strong> Three-Ch. 21.3 TX/RX Chipset</td>
<td>140-455 Mbps/ch.</td>
<td>4 LVDS</td>
<td>28 LVTTL</td>
<td>250 mW/chip</td>
<td>Supports Up to 1.82 Gbps Throughput</td>
<td>3.73</td>
</tr>
<tr>
<td><strong>SN65LV1021/1212</strong> Single-Ch. 10:1 TX/RX Chipset</td>
<td>100-400 Mbps</td>
<td>1 LVDS</td>
<td>10 LVTTL</td>
<td>&lt;400 mW total</td>
<td>Low Power Solution</td>
<td>5.00</td>
</tr>
<tr>
<td><strong>SN65LV1023/1024</strong> Single-Ch. 10:1 TX/RX Chipset</td>
<td>300-860 Mbps</td>
<td>1 LVDS</td>
<td>10 LVTTL</td>
<td>&lt;400 mW total</td>
<td>Low Power Solution</td>
<td>5.20</td>
</tr>
</tbody>
</table>

<sup>1</sup>A* revision will support 100 to 660 Mbps  
<sup>2</sup>CML (Current Mode Logic)  
<sup>3</sup>VML (Voltage Mode Logic)  
<sup>4</sup>Suggested resale price in U.S. dollars in quantities of 1,000  

*Preview devices listed in blue.
Package Overview

80-ball MicroStar Junior™ BGA
TLK2201 Jr
TLK2711 Jr
(GQE)

64-pin VQFP PowerPAD™
TLK1201
TLK1501
TLK2201
TLK2251
TLK2501
TLK2701
TLK2711
TLK3101
(RCP)

289-pin PBGA
TLK2208
TLK3104SA/SB
TLK3104SC
TLK3114SA
TLK4015
(GNT)

100-pin VQFP PowerPAD
SLK2501
SLK2511
SLK2551
SLK2721
(PZP)

Pitch: 0.5mm
Height: 1mm (max)
Footprint: 26mm² (max)

Pitch: 0.5mm
Height: 1mm (max)
Footprint: 148mm² (max)

Pitch: 1.0mm
Height: 2mm (max)
Footprint: 368mm² (max)

Pitch: 0.5mm
Height: 1.2mm (max)
Footprint: 262.4mm² (max)