Intel® Ethernet Connection C827 and XL827

Overview

The Intel® Ethernet Connection C827 and XL827 family of retimers extends the reach of the Ethernet signals. Retimers enable system designers to optimize PCB material cost for longer channel routes on server and embedded designs.

These products offer three design options:

• 1x 100GbE or 4x 25GbE retimer at industrial temperature operation
• 1x 100GbE or 4x 25GbE retimer at commercial temperature operation
• 1x 40GbE or 4x 10GbE retimer at commercial temperature operation

By supporting a wide variety of IEEE and industry specifications for Ethernet, these retimers also enable maximum compatibility to Physical Layer (PHY) media types. The retimers also support Common Public Radio Interface (CPRI) to extend the reach between a base station and radio transceiver.

Unlike a redriver, these retimers are capable of recovering and reclocking the data. The retimers support Physical Media Dependent (PMD) control function for BASE-R training and Clause 73 Auto-Negotiation, and enable Forward Error Correction (FEC) independent of the host controller.

With the Intel Ethernet Connection C827 and XL827 family of retimers, the designer can expect a consistent link behavior compliant to IEEE specifications, and eliminate the requirement to manually tune the link on individual channels.

Retimers extend the reach for 10GbE and 25GbE signals

Key Features

• Single port 100GbE to 100GbE retimer
• Four port 25GbE to 25GbE retimer
• Single port 40GbE to 40GbE retimer
• Four port 10GbE to 10GbE retimer
• Supports independent lane speeds
• CPRI Specification V7.0
• Forward Error Correction (FEC)
• Physical Media Dependent (PMD) training
• Synchronous Ethernet (SyncE)
• Auto-negotiation
• 2.6 W (typical) at 4x 25GbE
• 14mm x 14mm FCBGA package
Operating Modes

Depending on data path requirements, the designer has the flexibility to operate the retimers in two operating modes:

**Transparent mode** retimes the data without decoding and re-encoding the PCS/FEC layers which lowers latency through the retimer. In addition, CPRI data rates are supported in transparent mode.

**Terminated mode** decodes/encodes the PCS and FEC layers. Terminated mode can enable FEC on a data path that did not originally implement this Bit Error Rate improvement algorithm. In addition, each link of the retimer can be independent which allows for the mixing and matching of different PMDs.

Platform Support

The Intel® Ethernet Connection C827 and XL827 retimers will be validated on future Intel® Reference Platforms supporting system-on-a-chip products.

Intel Reference Platforms help customers implement solutions with high speed data paths. Please contact your Intel Sales Representative for more information.

<table>
<thead>
<tr>
<th>FEATURES</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transparent mode</td>
<td>• Reduce latency with transparent mode by retiming data without decoding and re-encoding the PCS/FEC layers; CPRI supported</td>
</tr>
<tr>
<td>Terminated (protocol aware) mode</td>
<td>• PCS and FEC layers are terminated (decoded/encoded) enabling independent link segments</td>
</tr>
<tr>
<td>Forward Error Correction (FEC)</td>
<td>• To significantly reduce Bit Error Rate (BER), the retimer can add forward error correction (FEC) in Terminated mode; both RS-FEC (Reed Solomon) and KR-FEC are supported</td>
</tr>
<tr>
<td>Autonomous Adaptive Receiver Equalization</td>
<td>• Automatic receive optimization yields the best performance on any link, eliminating the need for manual training</td>
</tr>
<tr>
<td>IEEE 802.3 Auto-Negotiation and PMD Training</td>
<td>• For CR and KR PMDs, Auto-Negotiation selects the best operating speed and FEC mode, while PMD training optimizes transmitter equalization for the link partner and channel</td>
</tr>
<tr>
<td>Independent port enabling and link speeds</td>
<td>• Each port can be configured and operated at different speeds and in different modes</td>
</tr>
<tr>
<td>On-die thermal sensor</td>
<td>• Monitor on-die temperature; program a threshold temperature to generate an interrupt</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INTERFACE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
</table>
| Ethernet Interface Support | 1GbE: 1000BASE-X/KX, SGMII  
2.5GbE: 2500BASE-KX  
10GbE: SFF-8431 SFI, 10GBASE-KR  
40GbE: XLAI, XLPI, 40GBASE-KR4/CR4  
50GbE: 50GBASE-KR2/CR2 (Consortium)  
100GbE: 100GBASE-KR4/CR4, CAUI-4 |
| Common Public Radio Interface (CPRI) Specification V7.0 | 24330.24 Mb/s  
12165.12 Mb/s  
10137.6 Mb/s  
9830.4 Mb/s  
6144.0 Mb/s  
4915.2 Mb/s  
2457.6 Mb/s |

<table>
<thead>
<tr>
<th>MECHANICAL AND THERMAL</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead-free technology and RoHS-compliant</td>
<td>• Complies with the European Union directive 2011/65/EU to reduce the use of hazardous materials</td>
</tr>
<tr>
<td>Package</td>
<td>• 14mm x 14mm FCBGA</td>
</tr>
<tr>
<td>Commercial temperature SKU</td>
<td>• Intel® Ethernet Connection C827-AM will operate at 0°C to 70°C</td>
</tr>
<tr>
<td>Industrial temperature SKU</td>
<td>• For extreme temperature environments, Intel® Ethernet Connection C827-IM will operate at -40°C to 105°C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PRODUCT NAME</th>
<th>PRODUCT CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel® Ethernet Controller C827-AM</td>
<td>EZC827AM</td>
</tr>
<tr>
<td>Intel® Ethernet Controller C827-IM</td>
<td>EZC827IM</td>
</tr>
<tr>
<td>Intel® Ethernet Controller XL827-AM</td>
<td>EZXL827AM</td>
</tr>
</tbody>
</table>
Warranty
Intel limited lifetime hardware warranty, 90-day money-back guarantee (U.S. and Canada) and worldwide support.

Product Information
For information about Intel® Ethernet Products, visit:
intel.com/ethernet

Customer Support
For customer support options in North America visit:intel.com/content/www/us/en/support/contact-support.html

No license (express or implied, by estoppel or otherwise) to any intellectual property rights is granted by this document. Intel disclaims all express and implied warranties, including without limitation, the implied warranties of merchantability, fitness for a particular purpose, and non-infringement, as well as any warranty arising from course of performance, course of dealing, or usage in trade.

This document contains information on products, services and/or processes in development. All information provided here is subject to change without notice. Contact your Intel representative to obtain the latest forecast, schedule, specifications and roadmaps.

The products and services described may contain defects or errors which may cause deviations from published specifications.

Intel, the Intel logo are trademarks of Intel Corporation or its subsidiaries in the U.S. and/or other countries.

*Other names and brands maybe claimed as the property of others.

© Intel Corporation. All rights reserved.