CORTINA

Product Brief

Cortina Systems® CS4317 Quad Electronic Dispersion Compensation PHY with MAC Security

Product Description

Increasing demand for network security is driving the adoption of Media Access Control Layer Security (MACsec) into Ethernet devices to secure LANs from wire tapping and outside attacks by identifying unauthorized stations and encrypting the communication between trusted stations. Due to reduced cost, higher port density, and lower power consumption, SFP+ and QSFP are becoming the predominant optical module format of new 10 GbE and 40 GbE platforms. The Cortina Systems® CS4317 Quad Electronic Dispersion Compensation PHY with MAC Security (CS4317 Quad EDC PHY), designed to enable this market, includes Synchronous Ethernet and IEEE 1588 v2 Precision Timing Protocol functionalities. It is a low power, serial 10 Gbps PHY device with built-in MACsec. Like the previous three generations of Cortina™ EDC PHYs, it continues to integrate the latest standards and technology, and supports a variety of 10G and 40G (4 × 10G) optical modules, as well as both passive and active copper interconnects. The CS4317 Quad EDC PHY provides Electronic Dispersion Compensation capability on the receive SFI interface that exceeds the requirements of IEEE 802.3aq 10GBase-LRM, SFF8431 linear interface, and IEEE 802.3ba specifications.

Media Access Control Layer Security (MACsec)

MACsec integrates security protection into Ethernet devices to secure LANs from attacks such as passive wiretapping, masquerading, and some denial-of-service attacks. MACsec ensures network security by encrypting Ethernet packets on a per-hop basis. The packet encapsulation and the cryptography framework for MACsec is defined by IEEE 802.1AE. By integrating these functionalities inside the PHY device, the CS4317 Quad EDC PHY offloads this functionality from the MAC/Switch ASIC enabling quick and low cost deployment of secure network solutions.

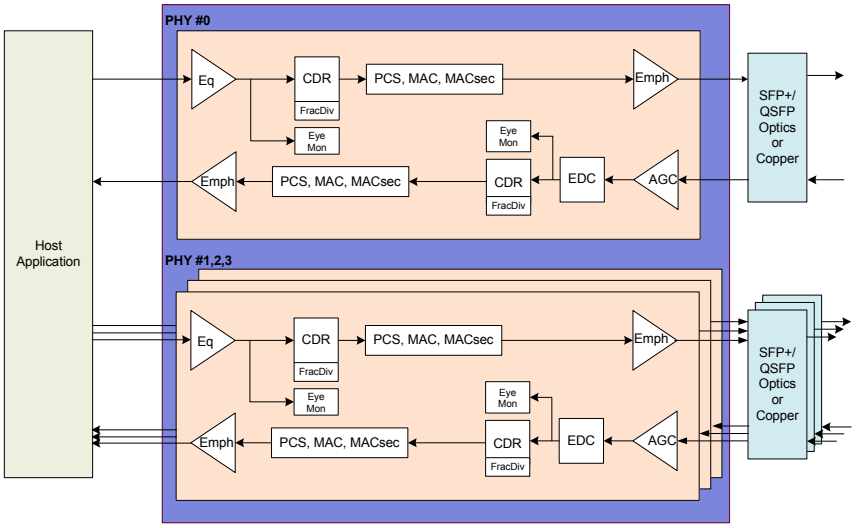
Line Interface

The CS4317 Quad EDC PHY enables the 10G and 40G enterprise, metro, and core market segments across all form factors. The lead application for the CS4317 Quad EDC PHY is to enable the migration of 10G and 40G data communications and telecommunications routers and switches to SFP+ and QSFP, creating high-density line card designs with low power, low latency, small footprint, and support for all interface types. The CS4317 Quad EDC PHY supports SFP+ and QSFP interface types including 10Gbase-SR, LR, RM, ZR, SFF8431 Direct Attach Copper, 40GBase-SR4, CR4, 100GBase-SR10, CR10, and 10G/8G/4G/2G/1G Fibre Channel.

IEEE 1588 v2

The CS4317 Quad EDC PHY includes Synchronous Ethernet and IEEE 1588 Precision Timing Protocol functionalities that provide the precise timing-synchronization capabilities required to support 3G/4G cellular infrastructure and industrial Ethernet applications. IEEE 1588 v2 provides the mechanism for distribution of a precision timing over a packetized Ethernet network. By integrating a IEEE 1588 v2 compliant low jitter hardware time stamping unit and support for single step transparent clocks, the CS4317 Quad EDC PHY enables the rollout of IEEE 1588 v2 capable solutions without requiring costly upgrades to the MAC/Switch ASIC, or the need for external FPGAs to implement the packet parsing and hardware time stamping functionalities.

Sample Application – SFP+ Line Card with MAC Security



CS4317 Quad EDC PHY

Functional Description

■ Functionality	□ Designed to meet the requirements for SFP+ and QSFP modules, linear and limited optical, and both passive and active copper. □ EDC capability designed to exceed the requirements of IEEE 802.3aq □ Line side complaint to SFF8431 and IEEE 802.3ba nPPI specifications □ XFI interface complies with XFP MSA and IEEE 802.3ba nAUI specifications □ IEEE 802.1AE compliant MAC Security □ IEEE 1588 v2 PTP and Synchronous Ethernet support □ Integrated 2×2 switch for protection switching and broadcast applications □ 40GBase-CR4 and 100GBase-CR10 autonegotiation and training □ Supports IEEE 802.3az Energy Efficient Ethernet operation □ Supports 10/8/4/2/1G FC, and Fibre channel rate negotiation □ Supports independent data rate on each port
■ Transmit Path	□ 3-Tap pre-emphasis with level programmability □ Exceeds XFP jitter generation requirements
■ Receive Path	□ Supports extended XFI trace lengths □ Integrated EDC with option to bypass □ Exceeds XFP and nAUI jitter generation and jitter tolerance requirements □ Primary and secondary recovered clocks for Synchronous Ethernet (SyncE) applications
■ EDC	□ Optional EDC Equalizer exceeds the comprehensive stressed receiver test described in 10GBASE-LRM specification □ Adaptation algorithm does not require any external processor or memory □ Continuously tracks and adapts as fiber dynamically changes
■ Autonegotiation and Training	□ 40GBase-CR4 autonegotiation and training □ Fibre channel rate autonegotiation
■ Layer 2 Features	□ MAC layer security □ Packet classification and packet counters □ Hardware support for IEEE 1588 v2 single step transparent clock update
■ Low speed I/Os	□ Seven GPIOs per port with optional preset functionality to control and monitor SFP+ module signals □ Two direct drive LED pins per port with support for bi-color LEDs and LED brightness control □ Independent I^2C interface per port allows caching of the module EEPROM contents periodically
■ Physical Characteristics	□ 256-ball 17 mm × 17 mm BGA □ 1.0 mm ball pitch
■ Test and Monitoring	□ Multiple loopback modes □ Extensive set of performance and status registers □ Eye scan capabilities for TX and RX path signals □ JTAG 1149.1 and 1149.9 (ACJTAG) Scan support

Cortina in Communications

Cortina is a leading supplier of intelligent communication solutions through continuous innovations in advanced port processing and intelligent port connectivity to the Core, Metro, Access, and Enterprise Market Segments. With our state-of-the-art high speed analog digital integration, we deliver a wide suite of products that address our customers' performance, density, and flexibility needs enabling faster time-to-market, longer time-in-market, and increased revenue opportunities. Working closely with our customers to understand their system requirements and anticipate their needs, we are creating the foundation ingredients for new generations of services.

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

LINKING PEOPLE GLOBALLY

CORTINA™

Cortina Systems, Inc.
www.cortina-systems.com