Orthogone

PRODUCT BRIEF

LICENSABLE INTELLECTUAL PROPERTY FOR FPGA, ASIC OR ASSP DESIGNS

10G

Ultra-Low Latency 10G Ethernet MAC and PCS

ULTRA-LOW LATENCY, HIGH-SPEED, FLEXIBILITY AND SCALABILITY.

APPLICATIONS

- High Frequency Trading
- Smart NIC
- Low-Latency Switches

The Ultra-Low Latency 10G Ethernet MAC and PCS is the industry leading solution for latency critical Ethernet applications. The core is designed using advanced design techniques leading to unmatched ultra-low gate count utilization and amazing latency performances.

The IP core can support full wire line speed with a 64-byte packet length. It also supports back-to-back or mixed length traffic with no dropped packets.

GENERAL FEATURES

User logic Interface	SERDES Interface	
- AXI-4 Stream 16b @ ~644MHz	- 16b @ ~644MHz	Early SoP Indication (Tx)
- AXI-4 Stream 32b @ ~322MHz	- 32b @ ~322MHz	Early SoF Detection (Rx)

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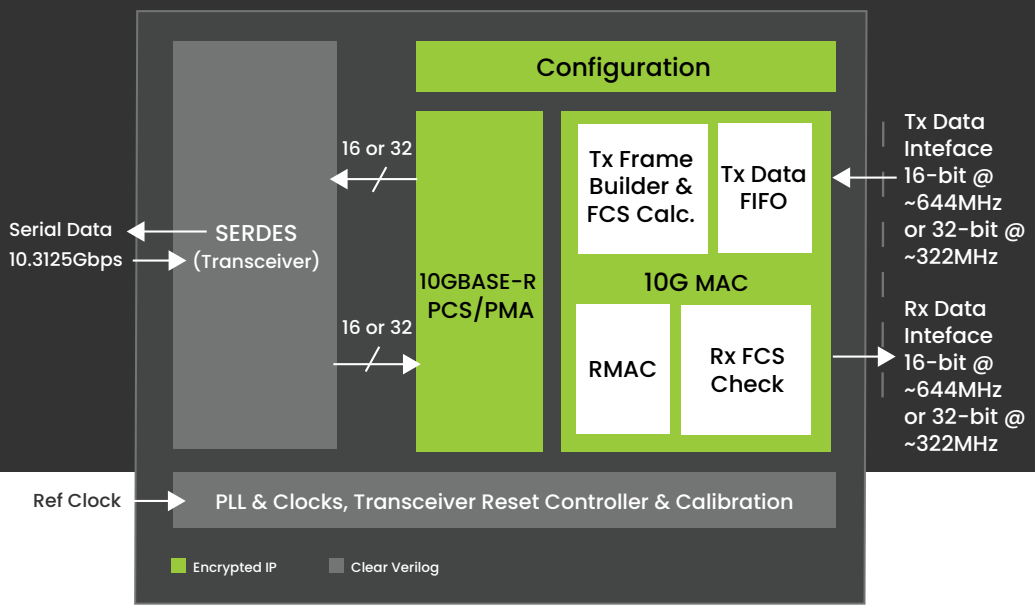
Contact us for a personalized evaluation and to discuss the best way to try our products.

HIGH-LEVEL BLOCK DIAGRAM



DELIVERABLES

- **Datasheet & user guide**
- **Encrypted Verilog**
- **Constraints file**
- **Reference design**
- **Technical support**
- **Optional IP design customization**

MAC FEATURES

- Deficit idle counter (DIC) to maintain a 12-byte inter-packet gap (IPG) average
- User facing logic interface 16-bit @ 644.531250MHz or 32-bit @ 322.265625MHz
- Tx Frame Check Sequence (FCS) computation and insertion
- Rx FCS error detection
- Fully compatible with Orthogone 10G TCP/UDP IP core

PCS FEATURES

- Supports 10GBASE-R PHY based on 64B/66B encoding and scrambling
- Supports block synchronization

PERFORMANCES OVERVIEW EXAMPLE

Device Family	Rate [Gbps]	SERDES Width	AXI-4 Stream Width	Resources Utilization			Core clock [MHz]	Wire to Wire Round-Trip Latency
				LUTs	FFs	BRAM		
UltraScale +	10-Gbps	16b	16b	1.4k	1.1k	0	644.531	17.1ns (1)
UltraScale +	10-Gbps	16b	32b	1.5k	1.1k	0	644.531	34.1ns (2)

(1) Latency: GTY + MAC/PCS (Measured from TxSoP to RxSoF using serial loopback)
(2) Latency: GTY + MAC/PCS + CDC (Measured from TxSoP to RxSoP using serial loopback)

sales@orthogone.com
514.316.1917 x777

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