PCIe Gen4 x16 External Retimer-Based Host Board

Overview

Serial Cables PCIe Gen4 x16 External retimer card introduces Astera Labs, Inc PT4161L x16 PCIe 4.0 Smart Retimers. This retimer card is ready for SRIS/SRNS as well as common clock direct attach applications. The PT4161L has 16 physical lanes on the Root complex side and 16 physical lanes on the Endpoint side. Logically these lanes can be configured to form multiple independent links of different link widths.

Astera Labs retimer was chosen due to the pin-for-pin compatibility between the Gen4 and Gen5 PCIe specs as this will make the transition from Gen4 to Gen5 simple and painless.

Astera Labs Smart Retimers for PCIe 4.0 and 5.0 interconnects are purpose-built for latency sensitive compute and storage applications.
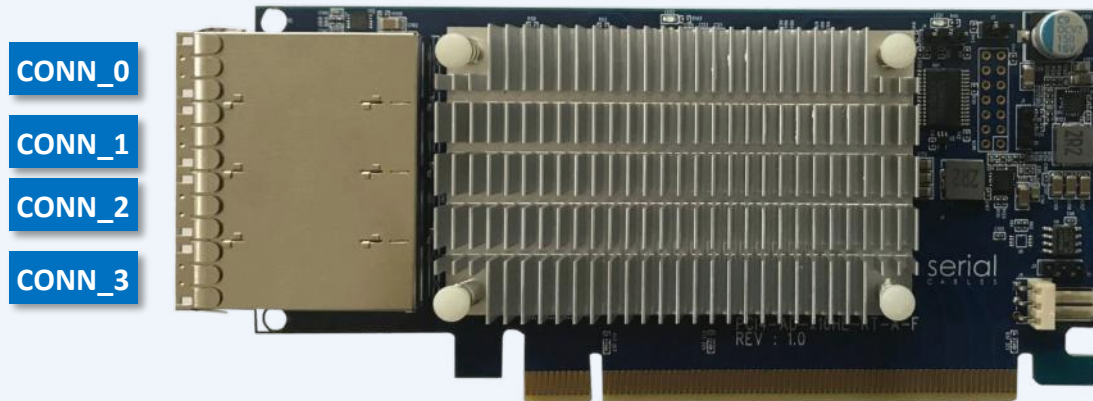
Card Features

- LEDs indication for port bifurcation and port failure

- Incorporates micro-controller for card health and link status monitoring

- Compliant with PCIe-SIG PCIe lane ordering, connecting to external devices and running in SRIS or SRNS or with reference clock and PERST# signals to support direct attached drives in common clock mode

- Support one x16, two x8, four x4, and eight x2 port bifurcation

- Standard low profile PCIe AIC form factor, compatible with 2U and higher server enclosures

PT4161L

- 16 GT/s, 8 GT/s, 5 GT/s, and 2.5 GT/s Data Rates with automatic link equalization

- 16 Lanes with flexible link bifurcation including 1x16, 2x8, 4x4, 8x2, and others

- Extends reach by >28 dB at 16 GT/s enabling low-cost PCB materials and connectors

- Supports SRIS, SRNS, and common clock systems, supports hot plug and hot un-Plug

- Full portfolio of Pin- and Register-Compatible retimers enables easy performance scaling up to PCI Express® Gen-5
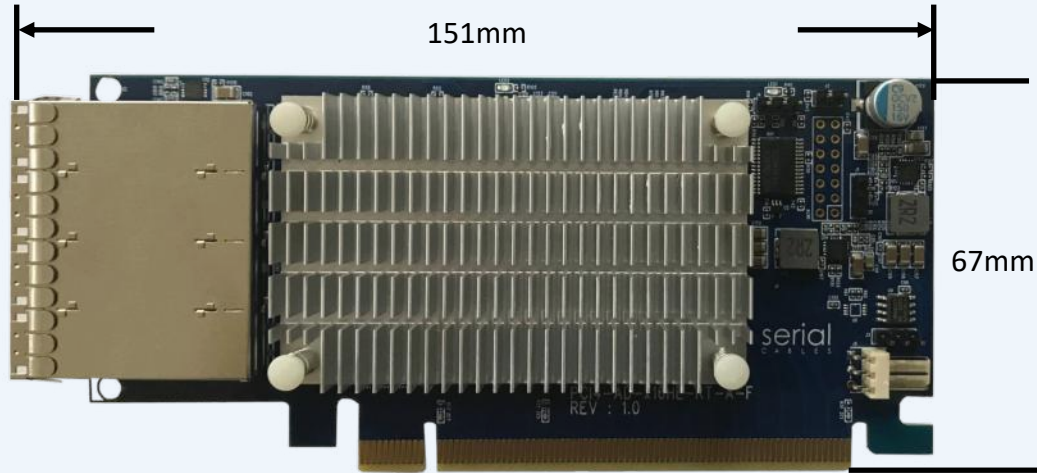
SFF8674 Pins Definition

CONN_0
CONN_1
CONN_2
CONN_3

		1	2	4	5	7	8
CONN_0	A	CLK_6_N	CLK_6_P	PERP15	PERN15	PERP12	PERN12
	B	CLK_7_N	CLK_7_P	PERP14	PERN14	PERP13	PERN13
	C	I2C_SCL_3	I2C_SDA_3	PETP15	PETN15	PETP12	PETN12
	D	PERST#_6	PERST#_7	PETP14	PETN14	PETP13	PETN13
CONN_1	A	CLK_4_N	CLK_4_P	PERP11	PERN11	PERP8	PERN8
	B	CLK_5_N	CLK_5_P	PERP10	PERN10	PERP9	PERN9
	C	I2C_SCL_2	I2C_SDA_2	PETP11	PETN11	PETP8	PETN8
	D	PERST#_4	PERST#_5	PETP10	PETN10	PETP9	PETN9
CONN_2	A	CLK_2_N	CLK_2_P	PERP7	PERN7	PERP4	PERN4
	B	CLK_3_N	CLK_3_P	PERP6	PERN6	PERP5	PERN5
	C	I2C_SCL_1	I2C_SDA_1	PETP7	PETN7	PETP4	PETN4
	D	PERST#_2	PERST#_3	PETP6	PETN6	PETP5	PETN5
CONN_3	A	CLK_0_N	CLK_0_P	PERP3	PERN3	PERP0	PERN0
	B	CLK_1_N	CLK_1_P	PERP2	PERN2	PERP1	PERN1
	C	I2C_SCL_0	I2C_SDA_0	PETP3	PETN3	PETP0	PETN0
	D	PERST#_0	PERST#_1	PETP2	PETN2	PETP1	PETN1

Note

whole x16 lanes is reversed to be compliance with PCI-SIG pin definition

Hardware Specification

Models	PCI4-AD-x16HE-RT
Form Factor	Standard half-height, half-length PCIe Add-in Card form factor
Card Physical Dimension	151mm (L) x 67mm (H) PCI Express add-in card standard, PCB thickness .063" +/- 0.008" (1.6mm +/- 0.2mm)
Retimer	Astera PT4161L PCI Express ® Gen-4 x16 Low-Latency Smart Retimer Pin to Pin compatible with Gen5 retimer PT5161L
Connectors	Quad Ports x16 SFF8674 MiniSAS-HD connector
LEDs indication	Retimer heartbeat (Blue) Port link status (Red) Card healthy (Red)
Port Bifurcation	1x16, 2x8, 4x4, 8x2 link bifurcation
CLI Commands	Retimer temperatures, ports link status query and log dump Reference clock enable/disable control for SRIS/SRNS drive testing purpose Retimer FW upgrading for port bifurcation application, etc. x16, x8, x4 or x2
Environmental conditions	Operating Temperature: 5C to 60C Storage Temperature: -10C to 85C Operating Humidity: 10% to 90% relative humidity non-condensing

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