

DP-Alt Type-C 10Gbps Bi-directional Retimer with Adaptive Equalizer, Low-latency, Aux/SBU Switch with 1.8V Single Power Supply

Features

- Compliant for USB 10Gbps / DP1.4 8.1Gbps standard
- DP Alt standard mode support; DP 4-lane, USB 1 lane/DP 2 lane, USB 2 lane Retimer normal / flip insertion
- Support Dual-port USB Jitter cleaning or DP 4-lane Forward/Backward data flow mode
- -23dB at 5GHz channel loss compensation
- Low Latency < 1ns.
- Adaptive Continuous Time Linear Equalizer (CTLE)
- No reference clock design.
- Rx termination detection for power saving control
- Selectable adjustment of 3-taps transmitter.
- Single power supply of 1.8±90mV.
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. “Green” Device (Note 3)
- An automotive-compliant part is available under separate datasheet (The DIODES™ [PI2DPT1021Q](#))

Application(s)

- Source Devices : Tablets, Smart Phones, Notebooks, Desktops, All-In-One PCs
- Sink Devices : Monitors, TVs
- PC Docking, Active Cables, Dongles (Adapters)

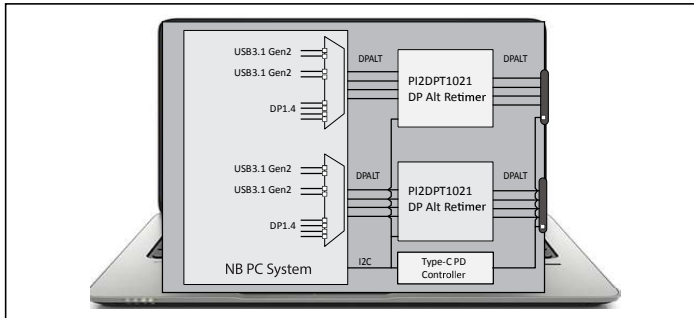


Figure 1-1 DP Alt Type-C Connectors inside PC

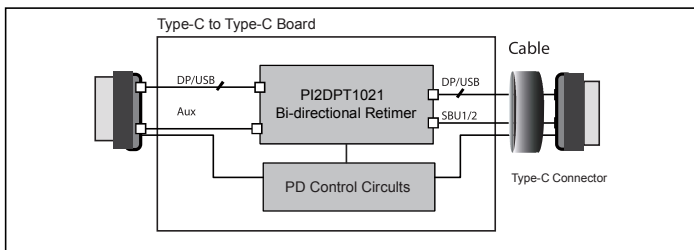


Figure 1-2 DP Alt Bi-directional Active Cable

Description

The DIODES™ PI2DPT1021 is a bit level ReTimer with receiver adaptive CTLE and transmitter 3-tap equalization which can compensate channel loss up to -23dB for 5GHz signal transmission. It supports DP1.4 and USB3.2 standards for USB Type-C® DP ALT mode operation. The operation configurations are programmable via I2C interface to select 4-lane DP, 2-lane DP/1 lane USB3.2 Gen1x1/Gen2x1, 1/2 lane USB3.2 Gen1x1/Gen2x1 or USB3.2 Gen2x2.

To achieve good power saving management, this device uses the common 1.8v Vdd power supply. It complies with USB link power management states for active mode (U0) and power saving mode (U1, U2, U3). USB Rx detection monitors the plug condition of the TX terminals continuously. The LFPS signal detector detects the LBPM (LFPS Based PWM Message) of USB mode.

Under Displayport operation, the AUX Listener will monitor the AUX communication for data rate, lane count, swing & pre-emphasis setting and power saving D3 mode setting. The SINK side HPD connection signal is set via I2C register by the system PD controller. The integrated AUX/SBU switch maps the Displayport AUX+/- pins and to the Type-C SBU1/SBU2 pins automatically.

The bi-directional design provides the flexibility if DFP and UFP signal flow is swapped which is a convenient setting on the fly for active cable application or it can give more layout option for signal flow selection.

With the merit of the bit level ReTimer design, PI2DPT1021 has very low latency from signal input to output (< 1ns) that serves good interoperability among various USB and DP devices.

Ordering Information

Ordering Number	Package Code	Package Description
PI2DPT1021XEAEX	XEA	32-pin, X1-QFN2845-32 (2.85x4.5mm), 0.4mm pitch, 0.45mm height

Notes:

1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, “Green” and Lead-free.
3. Halogen- and Antimony-free “Green” products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. E = Pb-free and Green
5. X suffix = Tape/Reel