

1.8V 10Gbps USB-C DP-Alt Bi-directional ReTimer with Adaptive Equalizer

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 port USB3.2 Gen1/2, 1/2 port USB3.2 Gen1/2. 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.

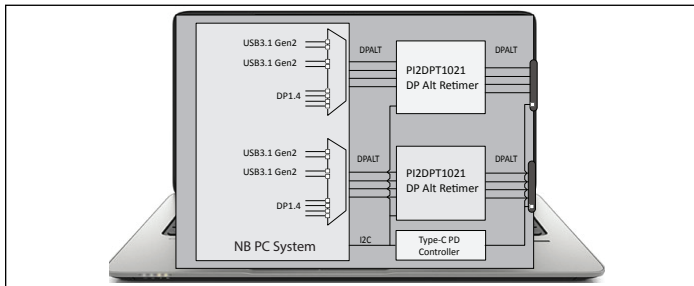


Figure 1-1 DP Alt Type-C Connectors inside PC

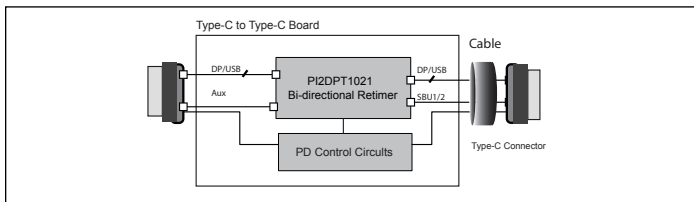


Figure 1-2 DP Alt Bi-directional Active Cable

Features

- Supports 10Gbps USB Type-C DP1.4 Alt ReTimer
- Configurable for USB 3.2 Gen 2 x1 or x2, USB 3.2 Gen 2 x1/2- Lane DP1.4 (Source Side Only), 4-Lane DP1.4 (Source Side Only) Operations
- Supports Jitter Cleaning and 4-Lane Bi-Directional
- -23dB at 5GHz Channel Loss Compensation
- Low Latency < 1ns.
- Adaptive Continuous Time Linear Equalizer (CTLE)
- Default USB Type-C Safe State (Hi-Z) After Power-On
- Rx Termination Detection for Power Saving Control
- Integrated AUX Channel Crossbar Switch for Side Band Signal
- Integrated AUX Listener for Power Management
- Type-C Connector Flip and Non-Flip Plug Support
- I2C Slave Support with Speed Up to 1MHz
- Single Power Supply: 1.8V +/-5%
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative.

<https://www.diodes.com/quality/product-definitions/>

Application(s)

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

Ordering Information

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

Notes:

- E = Pb-free and Green
- X suffix = Tape/Reel

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.