



NXP High-Speed Muxes/Switches

Supporting DP/PCIe/SATA/mSATA/SAS/USB/LVDS



AC-Coupled High Speed Interfaces Summary

NXP's high-speed muxes/switches support AC-coupled and non-AC-coupled interfaces in a range of formats, from LVDS to PCI3 Gen 3. The table lists the mux/switch formats for AC-coupled interfaces.

Our portfolio covers bandwidth from 1.5 to more than 8 GHz and includes standard and custom solutions for existing and emerging architectures. Each solution builds on the expertise that comes from active support for and participation in key standard-setting committees.

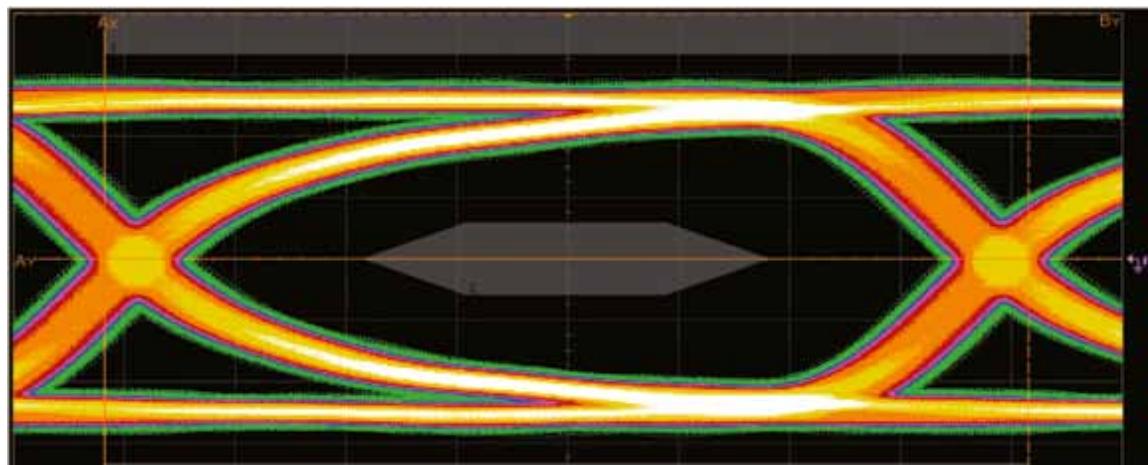
Interface	Bandwidth (per Lane)	# Diff Pairs	Side Band Signals
DisplayPort 1.1a/eDP	2.7 Gbps	1/2/4 Tx	AUX/DDC, HPD
DisplayPort 1.2/eDP	5.4 Gbps	1/2/4 Tx	FAUX/AUX/DDC, HPD
PCI Express Gen 1	2.5 Gbps	1 Tx / 1 Rx	N/A
PCI Express Gen 2	5.0 Gbps	1 Tx / 1 Rx	N/A
PCI Express Gen 3	8.0 Gbps	1 Tx / 1 Rx	N/A
SATA Gen 1	1.5 Gbps	1 Tx / 1 Rx	N/A
SATA Gen 2	3.0 Gbps	1 Tx / 1 Rx	N/A
SATA Gen 3	6.0 Gbps	1 Tx / 1 Rx	N/A
USB 3.0	5.0 Gbps	1 Tx / 1 Rx	N/A

Key Parametric Considerations

Depending on application requirements, consider the following characteristics when selecting a mux/switch:

- ▶ Insertion loss and bandwidth
- ▶ Number of differential pairs
- ▶ Peak-to-peak differential voltage

- ▶ Common mode voltage
- ▶ Inter-/intra-pair skew
- ▶ Rise/fall time
- ▶ Differential mode return loss
- ▶ Common mode return loss
- ▶ Cross-talk



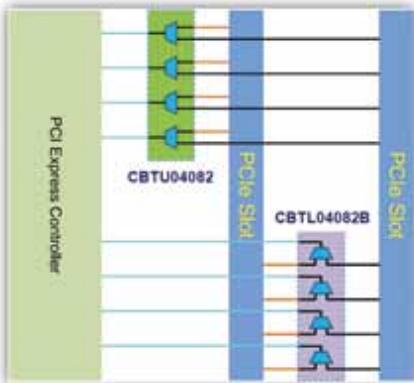
"Eye" diagram showing excellent Signal Integrity

Selection Guide: High-Speed Muxes/Switches

Device Type	Voltage	Features	Support	Package
CBTL04DP211	3.3 V	2.7 Gbps, DP1.1, eDP Panel Switch	DP1.1a	HVQFN-32
CBTL06DP211	3.3 V	2.7 Gbps, 2:1 Switchable GFX Mux/Demux, 4:1 Aux or DDC	DP1.1a	TFBGA-48
CBTL06121A	3.3 V	2.7 Gbps, 6-channel Mux/Demux, ATX	DP1.1a	QFN-56
CBTL06121B	3.3 V	2.7 Gbps, 6-channel Mux/Demux, BTX	DP1.1a	QFN-56
CBTL12131	3.3 V	Panel Switch for All-in-One PCs with Rcvr Equalizer	DP1.2	TFBGA-64w
CBTL03SB212	3.3 V	5.4 Gbps Side Band Switch for AUX, DDC, HPD	DP1.2	QFN-20
CBTL04DP212	3.3 V	5.4 Gbps, DP 1.2 eDP Panel Switch	DP1.2	HVQFN-32
CBTL06DP212	3.3 V	5.4 Gbps, 2:1 Switchable GFX Mux/Demux, 4:1 Aux or DDC	DP1.2	TFBGA-48
CBTL06122A	3.3 V	5.4 Gbps, 6-channel Mux/Demux, ATX	DP1.2	QFN-56
CBTL06122B	3.3 V	5.4 Gbps, 6-channel Mux/Demux, BTX	DP1.2	QFN-56
CBTL06123A*	3.3 V	5.4 Gbps, 6-channel Mux/Demux, ATX	DP1.2	QFN-56
CBTL06123B*	3.3 V	5.4 Gbps, 6-channel Mux/Demux, BTX	DP1.2	QFN-56
CBTU0808	1.8 V	2.5 Gbps, 4-channel Demux/Mux, or 8-channel 1:1 Bypass	PCIe1	TFBGA-48
CBTL02042A	3.3 V	5 Gbps, 2-channel Mux/Demux Flow Through Pinout	PCIe2/DP1.1/SAS1/SATA2/mSATA/LVDS/USB 3.0	QFN-20
CBTL02042B	3.3 V	5 Gbps, 2-channel Mux/Demux, Wrap Around Pinout	PCIe2/DP1.1/SAS1/SATA2/mSATA/LVDS/USB 3.0	QFN-20
CBTL02043A	3.3 V	8 Gbps, 2-channel Mux/Demux, Flow Through Pinout	PCIe2/DP1.1/SAS1/SATA2/mSATA/LVDS/USB 3.0	QFN-20
CBTL02043B	3.3 V	8 Gbps, 2-channel Mux/Demux, Flow Through Pinout	PCIe2/DP1.1/SAS1/SATA2/mSATA/LVDS/USB 3.0	QFN-20
CBTL04082A	3.3 V	5 Gbps, 4-channel Mux/Demux, Flow Through Pinout	PCIe2/DP1.1/SAS1/SATA2/mSATA/LVDS/USB 3.0	QFN-42
CBTL04082B	3.3 V	5 Gbps, 4-channel Mux/Demux, Wrap Around Pinout	PCIe2/DP1.1/SAS1/SATA2/mSATA/LVDS/USB 3.0	QFN-42
CBTL04083A	3.3 V	8 Gbps, 4-channel Mux/Demux, Flow Through Pinout	PCIe2/DP1.1/SAS1/SATA2/mSATA/LVDS/USB 3.0	QFN-42
CBTL04083B	3.3 V	8 Gbps, 4-channel Mux/Demux, Wrap Around Pinout	PCIe2/DP1.1/SAS1/SATA2/mSATA/LVDS/USB 3.0	QFN-42
CBTU04082	1.8 V	5 Gbps, 4-channel Mux/Demux	PCIe2/DP1.1/SAS1/SATA2/mSATA/LVDS/USB 3.0	QFN-42
CBTU04083	1.8 V	8 Gbps, 4-channel Mux/Demux	PCIe2/DP1.1/SAS1/SATA2/mSATA/LVDS/USB 3.0	QFN-42
CBTW28DD14	1.5/1.8 V	14-bit Mux/Bus switch	DDR2/DDR3	TFBGA-48
CBTU4411	1.8 V	11-bit DDR2 SDRAM Mux/Bus Switch, with 12 ohm Ron	DDR2	LFBGA-72

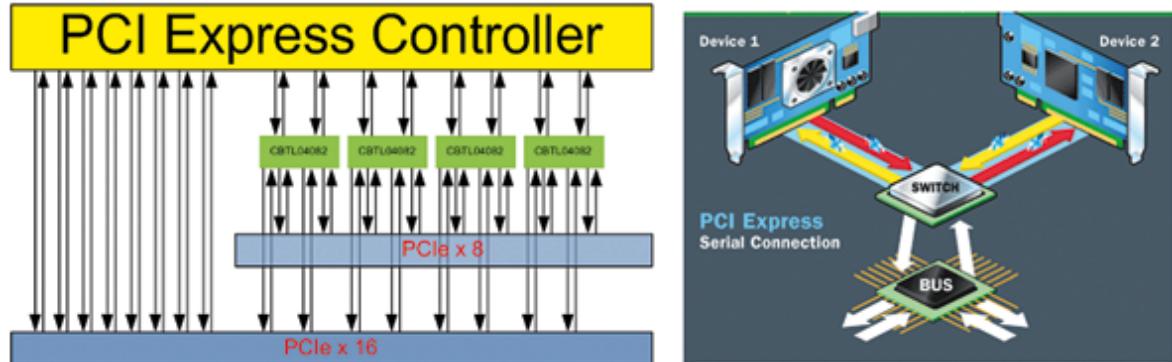
* Sampling

Application Example: Mux Support of Balanced or Unbalanced Propagation Delays

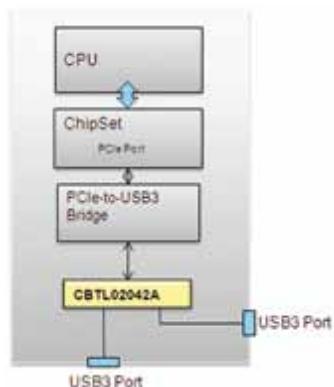


In the CBTL0408x and CBTL0204x families, two pinout configurations are available for high-speed USB, PCIe, SAS, DP, SATA, and mSATA applications. When signal propagation delay varies and trace length is not important, the flow-through pinout, designated by an "A" suffix, is recommended. For applications where balanced propagation delay is required, the wrap-around or loop-back pinout, designated by a "B" suffix, should be used.

Application Example: PCIe Slot Configuration Using CBTL04082



Application Example: CBTL02042A Used to Mux Between Main Laptop Motherboard and Docking Station

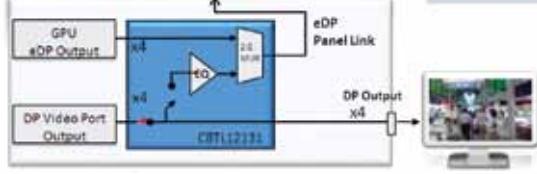


Application Example: CBTL12131 Used for All-In-One (AIO) Computers with Dual-Video Displays

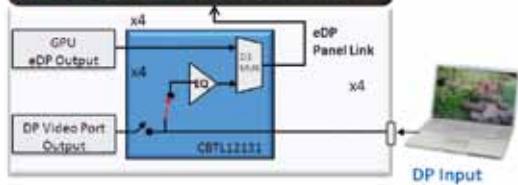


- The CBTL12131 has an eDP interface for the LCD panel, and a DP input connector
- Reuse the internal LCD panel as a secondary display, driven by an external DP source

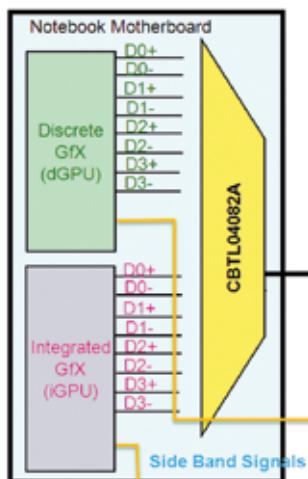
Operation Mode	DP Signal Path
DualPath Through	GPU → eDP Panel DP Port → External DP Connector



Operation Mode	DP Signal Path
ExternalSource	External DP Connector → eDP Panel

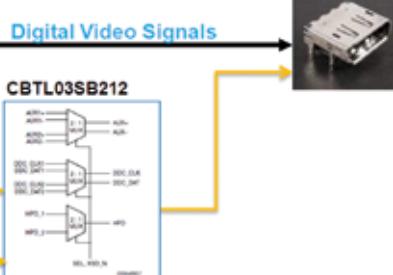


Application Example: CBTL04082A and CBTL03SB212 Providing Flexible Control in Switchable Graphics Applications



The CBTL04082A and the CBTL03SB212 provide separate layout and switching control for:

- High-speed digital video signal
- Low-speed side band signal





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