

Smart Connectivity (DisplayPort + USB)

High-Speed and High-Resolution Video Transmission

Versatility, scalability, and high-bandwidth make DisplayPort an increasingly popular audio-video interface for users of computers, smart devices, and other multimedia processing products that demand an uncompromised audio-visual experience. Kinetic Technologies offers a variety of DisplayPort converter products, bridging the latest DP standard to other analog and digital audio-video interfaces and addressing both legacy and future connectivity needs. Kinetic also has applications in DP and USB retimer products that extend the PCB trace length and the cable length to carry the high frequency signals. The best-in-class receiver equalization capability and transmitter performance allows user to design the system beyond the standard specification limit. Our chipsets power some of the most popular mobile devices, accessories, and display products in the market, affecting tens of millions of users. Additionally, these products feature Kinetic's innovative technologies in protocol conversion, audio-video rendering, color fidelity, low power, uncompromised content security and device anti-tampering.

Product Lines



Single Port Converters



Multiport Converters



Repeaters



USB Type-C Controllers

Applications

- Desktop Computers
- Video Hubs and Streamers
- Projectors
- Tablets and Laptops
- Games Consoles
- Digital Signage
- Set Top Box (STB)
- Monitors
- DP/USB Type-C Accessories
- AR/AV Headset
- Smart Devices
- 4K TVs
- Docking Stations
- DP and USB Type-C Active Cables

Single Port Converters

Seamlessly Bridges between Different Audio / Video Transport Protocol

Kinetic Technologies' DP/eDP converters transform audio-video signals from DisplayPort to other standards such as HDMI, DVI, VGA, LVDS and digital RGB format and vice-versa. These bridge chips support deep color video and audio with best-in-class interoperability among commercial DisplayPort Graphics sources and displays.

TARGET APPLICATIONS

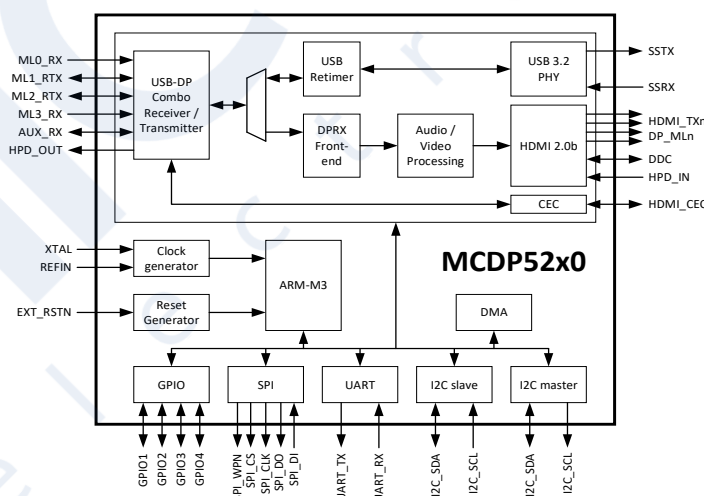
- ▶ TV, Digital Signage, Game Console, HMD
- ▶ USB-C/PC/Phone/Gaming Docking stations / Dongles
- ▶ Desktop, Notebook PCs
- ▶ AV Accessories
- ▶ Monitors/TVs/Digital Signage
- ▶ Video walls
- ▶ POS system
- ▶ Video conferencing system
- ▶ USB-C splitter cable

KEY FEATURES

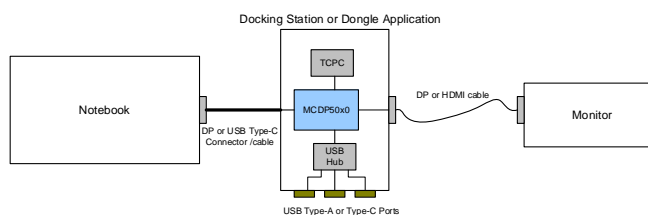
- ▶ USB Type-C "DP Alt mode" receiver
- ▶ USB3.2 Gen1/Gen2 x 1 Retimer
- ▶ DP 1.4a RX with SST/MST support
 - Link rate 1.62/2.7/5.4/8.1 Gbps/lane
- ▶ HDMI 2.0b PHY compliant transmitter
- ▶ Video resolution: 5K3K60Hz
- ▶ HDR support (HDR10, HDR10+, Dolby Vision®, Dolby Atmos®)
- ▶ HBR Audio Formats - Dolby, TrueHD, Atmos, DTS Master
- ▶ LPCM 192KHz 32Ch, HBR 8CH, One Bit, DSD formats support
- ▶ Adaptive sync support
- ▶ CEC Tunneling over AUX
- ▶ HDCP 1.x/2.x repeater with embedded keys
- ▶ ARM Cortex M3 core 300MHz / peripheral controllers

MCDP52x0

USB Type-C / DisplayPort1.4a to DP++ / HDMI 2.0b Protocol Converter*



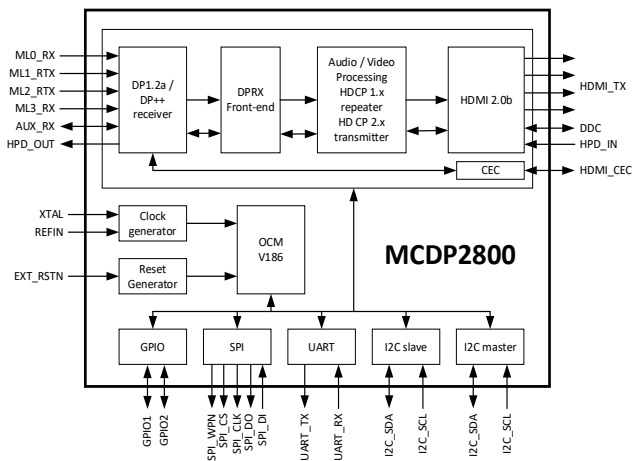
Simplified System Diagram



*Specific device shown may not include all of the features shown to the left.



Single Port Converters



DisplayPort 1.2a-to-HDMI 2.0b LSPCON

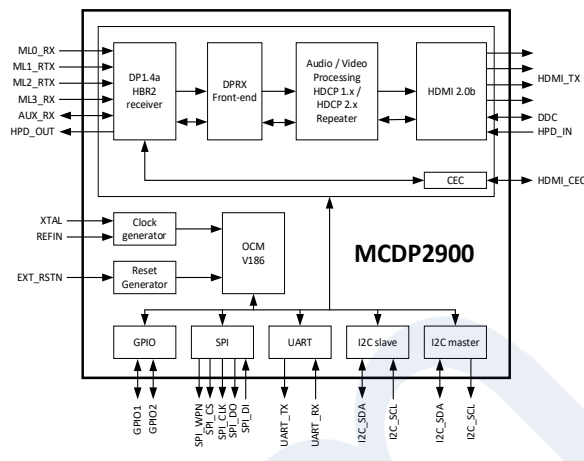
LSPCON for Intel Platform

DP 1.2a to HDMI 2.0b converter (up to 6Gbps)

HDR Imaging 4k2k 60Hz (HDR10/Dolby Vision)

Low Power Operation (470mW Active/0.1mW Standby)

TFBGA77-64 Package



DisplayPort 1.4a-to-HDMI 2.0b Converter

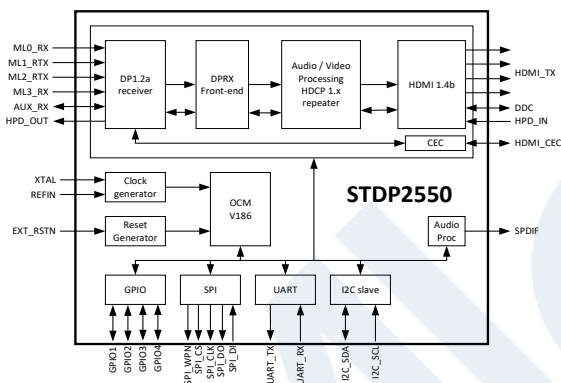
DP 1.4a to HDMI 2.0b converter (up to 6Gbps)

HDR Imaging 4k2k 60Hz (HDR10/Dolby Vision/Dolby ATMOS)

HDCP 2.x Repeater

Low Power Operation (482mW Active/11mW Standby)

TFBGA77-64 Package



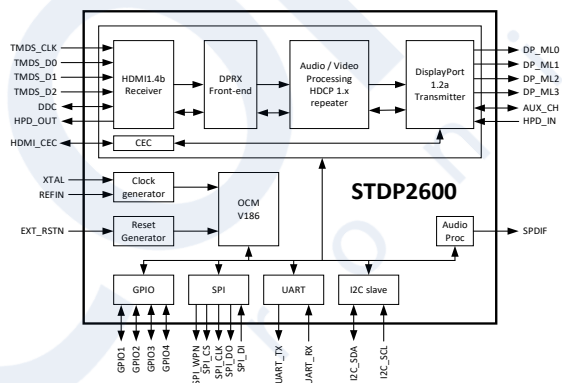
Mobility DisplayPort (MyDP)-to-HDMI 1.4b Converter

MyDP/DP 1.2a to HDMI 1.4b converter (up to 2.97Gbps)

Video Resolution 4K2K 30Hz, 1920x1080@120Hz & 7.1 Ch audio

Low Power Operation (462mW Active/21mW Standby)

VFBGA55-81 Package



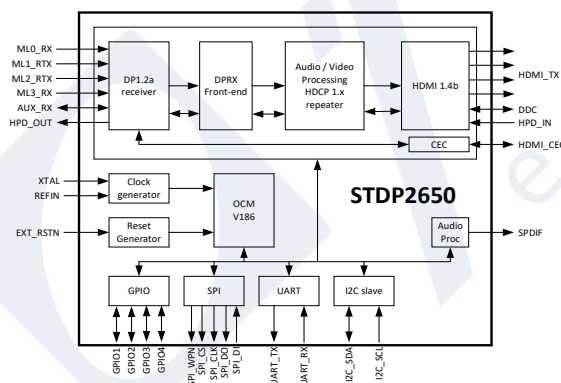
HDMI 1.4b-to-DP1.2a Dual Mode Converter

HDMI 1.4b to Dual Mode DP 1.2a converter (Supports eDP)

Video Resolution 4K2K 30Hz, 1920x1080 & 7.1 Ch audio

Low Power Operation (450mW Active/21mW Standby)

LFBGA88-81 Package



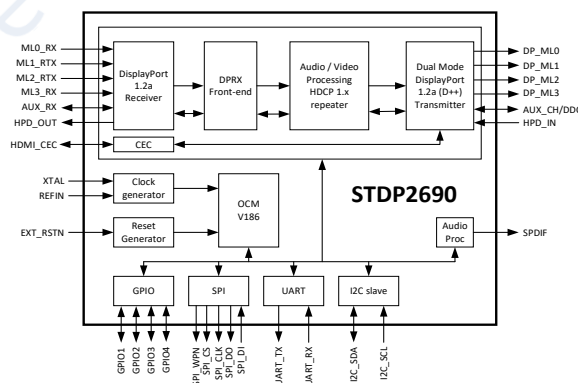
Dual mode DP 1.2a-to-HDMI 1.4b Converter

Dual Mode DP 1.2a (Supports eDP) to HDMI 1.4b converter

Video Resolution 4K2K 30Hz, 1920x1080@120Hz & 7.1 Ch audio

Low Power Operation (462mW Active/21mW Standby)

LFBGA88-81 Package



DP 1.2a-to-DP 1.2a Dual Mode Converter

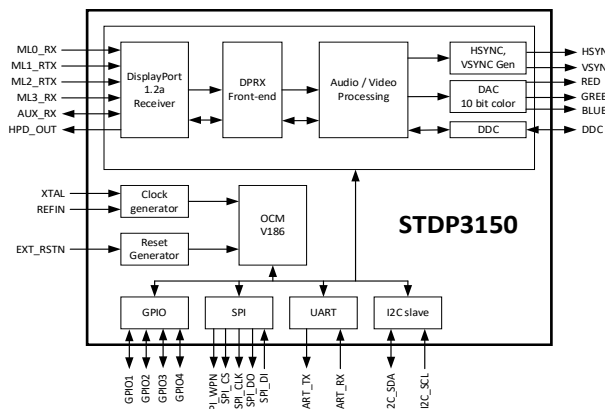
DP 1.2a to Dual Mode DP 1.2a converter (Supports eDP)

Video Resolution 4K2K 60Hz, 1920x1080@120Hz & 7.1 Ch audio

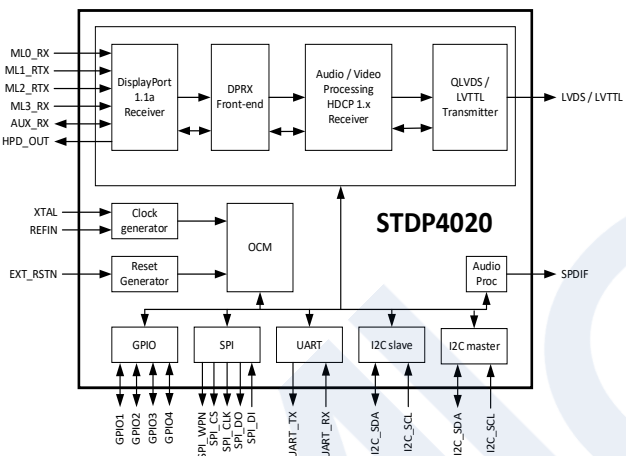
Low Power Operation (493mW Active/21mW Standby)

LFBGA88-81 Package

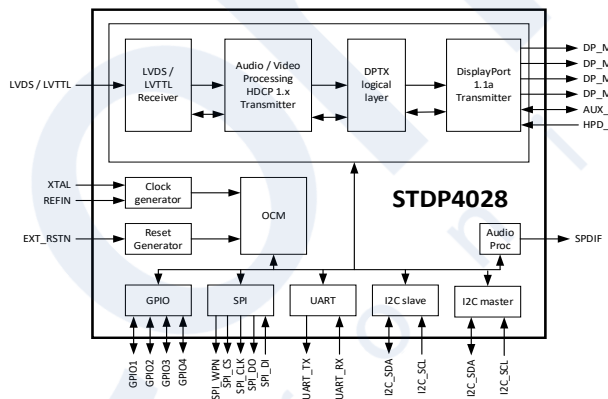
Single Port Converters (cont.)



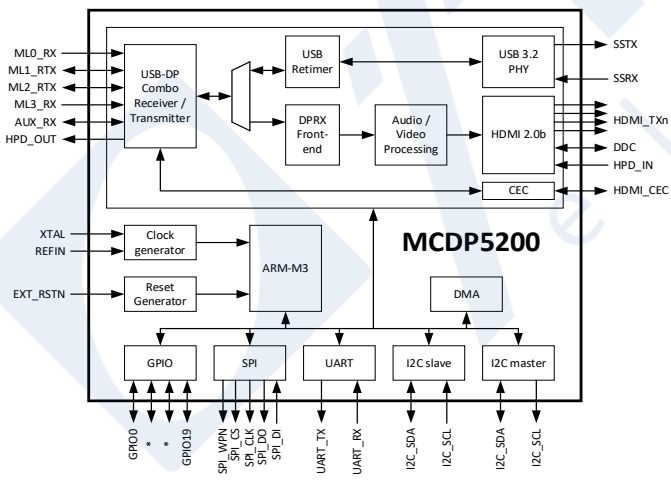
DP 1.2a-to-VGA Converter
 2-lane DP 1.2a to VGA converter
 10b Video DAC, Resolution thro' to WUXGA
 Low Power Operation (400mW Active/15mW Standby)
 QFN66-64 Package



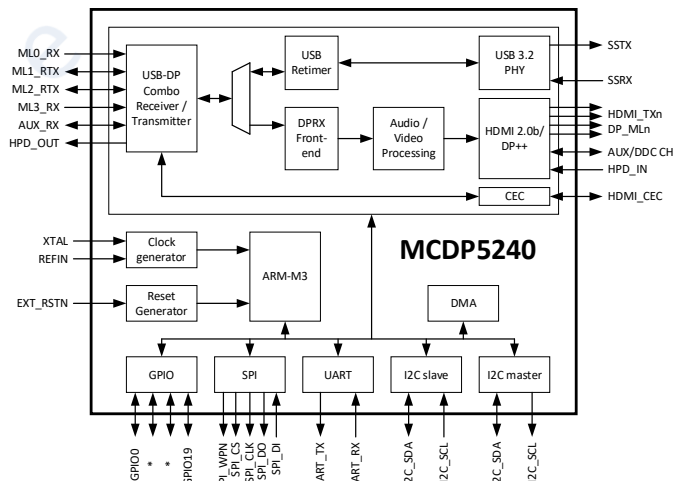
DP 1.1a-to-LVDS/LVTTL Converter
 DP 1.1a-to-LVDS/LVTTL Converter (DP/eDP/iDP Compliant)
 Video Resolution WQXGA, FHD 120Hz, 10b Video & 7.1 Ch audio
 Low Power Operation (520mW Active/24mW Standby)
 LFBGA1212-164 Package



LVDS/LVTTL-to-DP 1.1a Converter
 LVDS/LVTTL-to-DP 1.1a Converter (DP/eDP/iDP Compliant)
 Video Resolution WQXGA, FHD 120Hz, 10b Video & 7.1 Ch audio
 Low Power Operation (270mW Protocol Converter/18mW Standby)
 LFBGA1212-164 Package

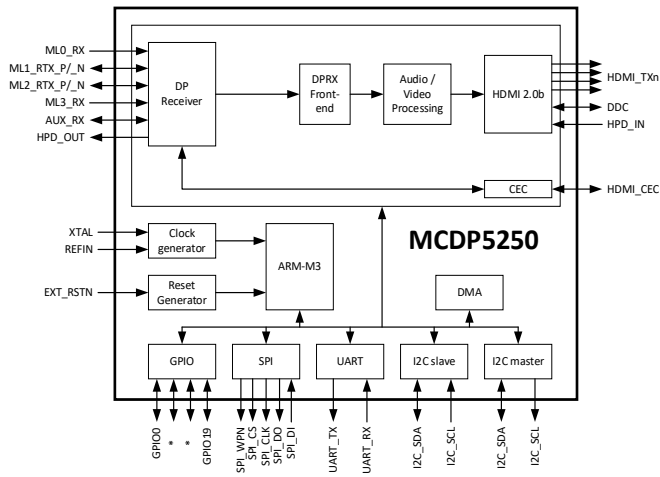


USB Type-C/DP 1.4a Alt-mode-to-HDMI 2.0b Converter with USB Retimer
 Video resolution 4k2k 60Hz, RGB/YCbCr444 & 4k2k 120Hz, 4:2:0 with Adaptive Sync to VRR conversion
 HDR10/HDR10+/Dolby TrueHD/Dolby ATMOS, DTS Master
 HDCP 1.3/2.x to HDCP 1.4/2.x Repeater Function
 USB3.1 compliant retimer
 Low Power Operation (900mW Active w retimer/650mW w/o retimer/9.2mW Standby)
 TFBGA77-169 Package



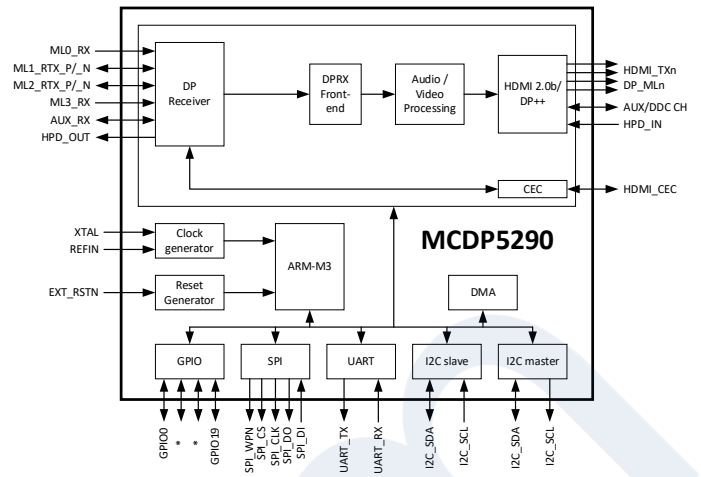
USB Type-C/DP 1.4a Alt-mode-to-DP++ Converter with USB Retimer
 Video resolution 4k2k 60Hz, RGB/YCbCr444 & 4k2k 120Hz, 4:2:0 with Adaptive Sync to VRR conversion
 HDR10/HDR10+/Dolby TrueHD/Dolby ATMOS, DTS Master
 HDCP 1.3/2.x to HDCP 1.4/2.x Repeater Function
 USB3.1 compliant retimer
 Low Power Operation (900mW Active w retimer/650mW w/o retimer/9.2mW Standby)
 TFBGA77-169 Package

Single Port Converters (cont.)



DP 1.4a-to-HDMI 2.0b Converter

Video resolution 4k2k 60Hz, 4k2k 30Hz
 HDR10/HDR10+/Dolby TrueHD/Dolby ATMOS, DTS Master
 HDCP 1.3/2.x to HDCP 1.4/2.x Repeater Function
 Low Power Operation (468mW Active/9.2mW Standby)
 TFBGA77-169 Package



DP 1.4a-to-DP++ Converter

Video resolution 5k3k 60Hz, 8k4k 60Hz, 4k2k 120Hz
 HDR10/HDR10+/Dolby TrueHD/Dolby ATMOS, DTS Master
 HDCP 1.3/2.x to HDCP 1.4/2.x Repeater Function
 Low Power Operation (650mW Active/9.2mW Standby)
 TFBGA77-169 Package

Single Port Converters

Single Port Converter Selector Guide

Part Number	Input	Output	Application	Package	Package Size (L x W)
MCDP28x0	DP 1.2a	HDMI 2.0a Level Shifter/ Protocol Converter [LSPCON]	Desktop PC, Notebook, Tablet motherboard, dongle applications	LFBGA77-64	7 x 7mm
MCDP2900	DP 1.4a (HBR2, BT2020 HDR, HDCP 2.2, CEC)	HDMI 2.0b	Notebook/Tablet Accessories (USB Type-C dongles, docking stations), TV, Game Console, STB, etc.	LFBGA77-64	7 x 7mm
MCDP5200	USB-C/DP 1.4a (USB3.2, HBR3, HDCP 2.3)	HDMI 2.0b/USB-A	Notebook, Tablet Accessories (USB Type-C dongles, docking stations), TV, Game Console, STB, etc.	TFBGA77-169	7 x 7mm
MCDP5240	USB-C/DP 1.4a (USB3.2, HBR3, HDCP 2.3)	DP++/USB-A	Notebook, Tablet Accessories (USB Type-C dongles, docking stations), TV, Game Console, STB, etc.	TFBGA77-169	7 x 7mm
MCDP5250	DP 1.4a	HDMI 2.0b	Notebook, Tablet Accessories (Adapters (Dongles), docking stations, and other AV accessories)	TFBGA77-169	7 x 7mm
MCDP5290	DP 1.4a	DP++	Notebook, Tablet Accessories (Adapters (Dongles), docking stations, and other AV accessories)	TFBGA77-169	7 x 7mm
STDP2550	MyDP Mobility DisplayPort	HDMI	Phone dock, gaming dock, dongle	VFBA55-81	5 x 5mm
STDP2600	HDMI 1.4b	DP++	Audio-video accessory (dongle), Docking station, etc.	LFBGA88-81	8 x 8mm
STDP2650	DP 1.2a	HDMI 1.4b	TV, Projector, Audio-video accessory (dongle), Desktop PC, Notebook, Tablet, etc.	LFBGA88-81	8 x 8mm
STDP2690	DP 1.2a	DP++	Audio-video accessory (dongle), Desktop PC, Notebook, Docking station, Thunderbolt source, Peripheral device, etc.	LFBGA88-81	8 x 8mm
STDP31x0	DP 1.2a 10-bit Video DAC	VGA	Notebook, Desktop PC, Dongle, Desktop PC motherboard, etc.	QFN66-64	6 x 6mm
STDP4020	DP/eDP	LVDS/DVI (LVTTTL)	TV, LCD monitor, Mobile display, Projector, dongles (DP2DVI)	LFBGA1212-164	12 x 12mm
STDP4028	LVDS/LVTTTL	DP/eDP	TV, Docking station, STB, Game console, etc.	LFBGA1212-164	12 x 12mm

Single Port Converter Reference Design Evaluation Kits

Part Number	Evaluation Kit Number	Description
STDP2600	RD4-2600	HDMI 1.4b-to-DP 1.2a Dual Mode Converter
STDP2650	RD3-2650	DP 1.2 to HDMI 1.4 Converter
STDP2690	RD5-2690	DP 1.2a to Dual Mode DP 1.2a Converter
STDP2800	RD3-2800	DP 1.2a to HDMI 2.0b Converter (LSPCON)
STDP2900	RD2-2900	DP 1.4a to HDMI 2.0b Converter
STDP4020	RD1-4020	DP 1.1a-to-DVI Converter
STDP4020	RD2-4020	DP 1.1a-to-Quad LVDS Converter
STDP4028	RD2-4028	LVDS-to-DP 1.1a Converter
MCDP5200	RD1-5200	USB Type-C/DP Alt Mode to HDMI2.0 & USB Type-A

Multiport Converters

Reliable and Interoperable Solution to enable Immersive Multiple Displays

Kinetic Technologies' advanced DisplayPort 1.4a MST hub with an integrated USB type-C de-multiplexer is primarily targeted for mobile notebook accessories and display applications. This device functions as a multi-stream audio-video splitter and protocol converter with an HDCP 1.x/HDCP 2.3 repeater supporting both compressed (DSC) and uncompressed AV streams.

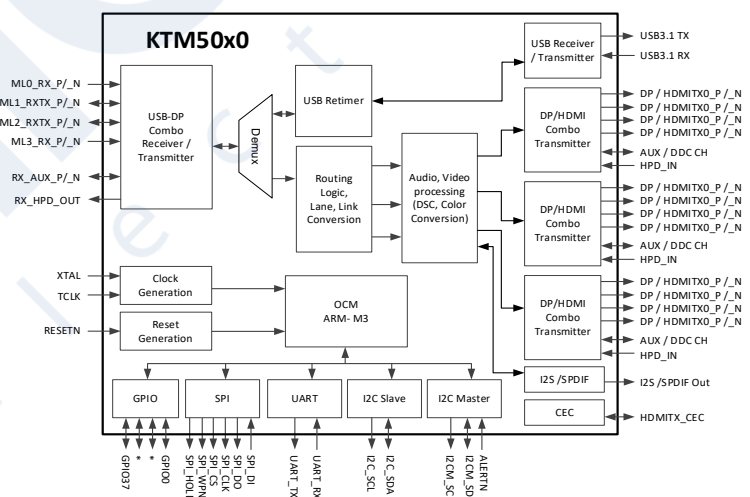
TARGET APPLICATIONS

- ▶ Audi-video Router
- ▶ Docking Station
- ▶ MST Video Hub
- ▶ AR/VR Headset
- ▶ 4k2k TV
- ▶ Information Panels
- ▶ Daisy Chain Monitors
- ▶ Digital Signage

KEY FEATURES

- ▶ USB Type-C "Alt mode" compatible receiver / DP MST hub
- ▶ USB3.1 ESS GEN1/GEN2 Retimer: 5.0Gbps / 10.0Gbps pairs
- ▶ DP 1.4 RX PHY 1.62/2.7/5.4/8.1/Gbps/lane
- ▶ Triple DP++ TX PHY 1.62/2.7/5.4/8.1/Gbps/lane *4 lanes each
- ▶ Video resolution up to 8Kp30Hz uncompressed; 8Kp60Hz compressed
- ▶ HDR Image processing (Static and Dynamic HDR)
- ▶ DP MST routing / DP MST-to-SST conversion / DP-to-HDMI conversion
- ▶ Display Stream Compression (DSC 1.2) and Forward Error Correction (FEC)
- ▶ Pixel format conversion and Chroma down sampling
- ▶ HDCP 1.x/2.x repeater with embedded keys
- ▶ CEC Tunneling over AUX
- ▶ SPDIF / I2S 8CH audio outputs
- ▶ 249-ball LFBGA 12x12mm package

KTM50x0: USB-C / DisplayPort1.4 MTS HUB / 3x DP 1.4a or HDMI 2.0b (DP++)*



Docking Station Application



*Specific device shown may not include all of the features shown to the left.



Multiport Converters

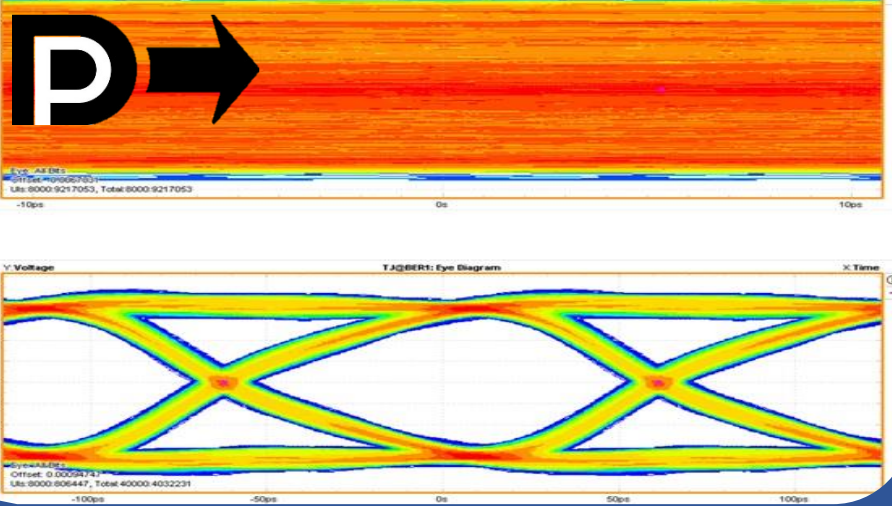
Multiport Converter Selector Guide

Part Number	Input	Output	Application	Package	Package Size (L x W)
KTM50x0	USB-C (DP alt-mode) (DP 4 lanes OR 2 lanes DP and 2 lanes USB3.2)	3x DP++ (DP or HDMI) 1x USB3.2	Audio-video router, Docking station, Hub, 4K2K TV, Signage, Daisy chain monitor, Digital signage	LFBGA-289 0.65mm pitch	12 x 12mm
KTM54x0*	USB-C (DP alt-mode) (DP 4 lanes OR 2 lanes DP and 2 lanes USB3.1)	1x HDMI2.1 2xDP2.0++ (DP2.0 or HDMI2.0) 1x USB3.1	Audio-video router, Docking station, Hub, 8K TV, Signage, Daisy chain monitor, Digital signage	LFBGA-249, 0.65mm pitch	12 x 12mm
STDP4320	DP 1.2a/HDMI 1.4b	DP 1.2a/HDMI 1.4b DP 1.2a/HDMI 1.4b	Audio-video router, Docking station, Hub, 4K2K TV, Signage, Daisy chain monitor, Digital signage	LFBGA-172	12 x 12mm

*Please contact Kinetic Technologies Sales for availability

Multiport Converter Reference Design Evaluation Kits

Part Number	Evaluation Kit Number	Description
KTM50x0	RD4-5000	USB-C / DP Alt-mode Input to 1xUSB-C, 1xDP, 1xHDMI + 2xUSB-A
KTM50x0 + MCDP5200	RD5-5000	Intel-Based Goshen Ridge -Gulliver Creek with Thunderbolt™ 4
STDP4320	RD1-4320	DP 1.2a to 2x DP 1.2a Splitter
STDP4320	RD5-4320	DP 1.2a to 2x HDMI 1.4b Splitter



Repeaters (Retimers)

High Quality Receiver and Transmitter to Extend PCB Trace and Cable Length

Kinetic Technologies' retimers extend the PCB trace length and the cable length to carry the high frequency signals. The best-in-class receiver equalization capability and transmitter performance allows a user to design the system beyond the standard specification limit. Comprehensive monitoring features provides useful debugging interface as well as manufacturing test capabilities.

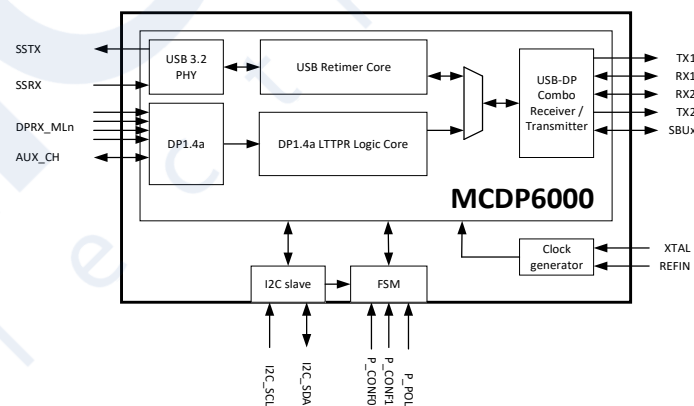
TARGET APPLICATIONS

- ▶ AR/VR Headset
- ▶ DP/USB Active cable for embedded systems
- ▶ DisplayPort extender
- ▶ Smartphone/Tablets
- ▶ Desktop/Laptop for DP Channel
- ▶ Monitors
- ▶ Video walls
- ▶ USB 1:2 Switching retimer

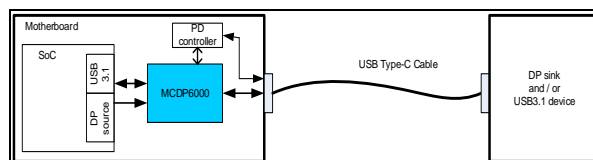
KEY FEATURES

- ▶ DP 1.4a Retimer (1.62 / 2.7 / 5.4 / 8.1 Gbps)
- ▶ USB3.2 x1 compliant Retimer for both SS and ESS mode (5 / 10 Gbps)
- ▶ Compliant with DP 1.4a specification, supports LT tunable PHY repeater (LTTTPR)
- ▶ Reliable PHY performance
- ▶ 1.8V / 1.2V dual supply
- ▶ Low Power consumption
- ▶ TWI slave for device configuration (compatible with I2C)
- ▶ Sophisticated monitoring features
- ▶ Eye Opening Monitor
- ▶ QFN4.5 x 6.5mm-46 package

MCDP6000: USB Type-C DP Alt-mode Repeater*



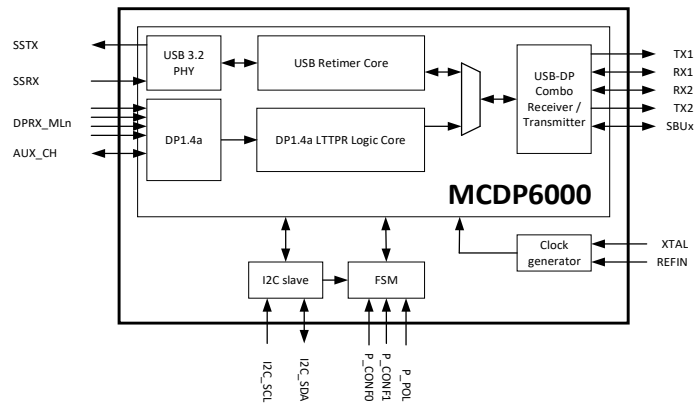
Motherboard Down-use Scenario



*Specific device shown may not include all of the features shown to the left.

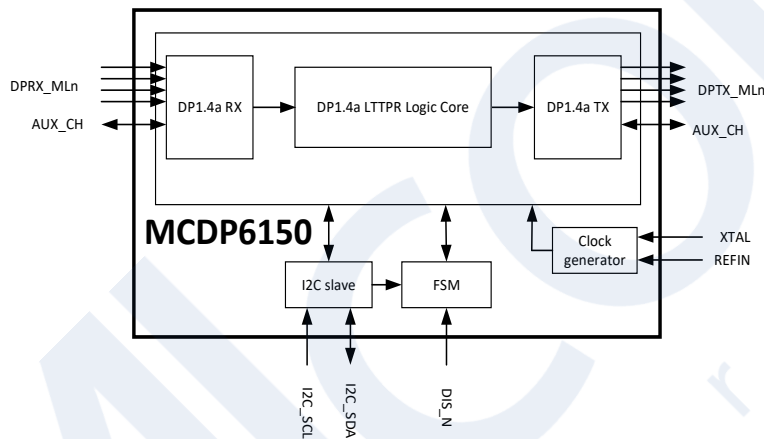


Repeaters



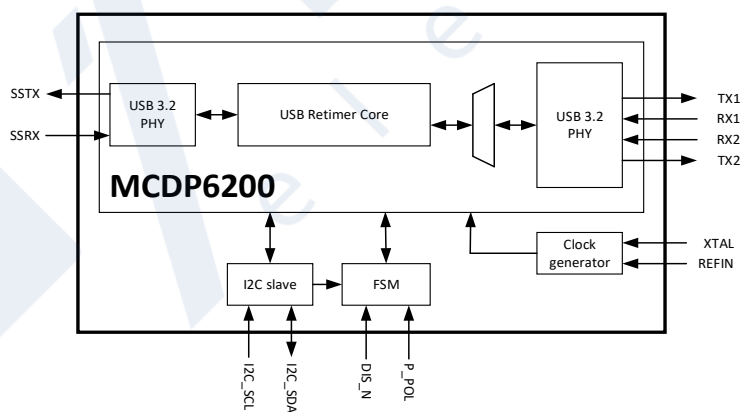
6:4 USB-C DP 1.4a Alt-mode Retimer

USB 3.2 x1 Compliant Retimer for both Gen1 and Gen2 mode (5/10 Gbps)
 DP 1.4a Compliant Retimer (RBR/HBR/HBR2/HBR3)
 DP 1.4a Compliant Retimer (1.62/2.7/5.4/8.1 Gbps)
 Low Power Operation (520mW in USB3.1 Gen2 + 2-lane HBR3 config.)
 QFN4.5x6.5-46 Package



DisplayPort 1.4a Retimer

DP 1.4a Link Trainable Tunable (LTTTPR) PHY Retimer (RBR/HBR/HBR2/HBR3)
 DP 1.4a Compliant Retimer (1.62/2.7/5.4/8.1 Gbps)
 Low Power Operation (460mW in 4-lane HBR3 in typ. condition)
 QFN4.5x6.5-46 Package



USB 3.2 x1 Gen1/Gen2 Retimer

USB 3.2 x1 Compliant Retimer for both Gen1 and Gen2 mode (5/10 Gbps)
 TWI slave to configure integrated lane mode and mapping.
 Low Power Operation (270mW in USB3.2 Gen2 mode with 1.2V/1.8V power supply)
 QFN4.5x6.5-46 Package

Repeaters

Repeater Selector Guide

Part Number	Input	Application	Package	Package Size (L x W)
KTM6400*	USB-C DP2.0/USB4 retimer	Laptop, 2-in-1 PC, Desktop, AIO PC, Tablet, Smartphone, Set-top-box, active cable, KVM switch, motherboard enabling USB Type-C DP Alt-mode	WLCSP or BGA (small form factor)	TBD
MCDP6000	6:4 USB-C DP 1.4a Alt-mode Retimer	Laptop, 2-in-1 PC, Desktop, AIO PC, Tablet, Smartphone, Set-top-box, active cable, KVM switch, motherboard enabling USB Type-C DP Alt-mode	QFN4.5x6.5-46	4.5 x 6.5mm
MCDP6150	DP 1.4a Retimer	Laptop, 2-in-1 PC, Desktop, AIO PC, Tablet, Smartphone, Gaming monitor, DP active cable, KVM switch, public display	QFN4.5x6.5-46	4.5 x 6.5mm
MCDP6200	USB3.2 x1 Gen1/Gen2 Retimer	Laptop, 2-in-1 PC, Desktop, AIO PC, Tablet, Smartphone, USB active cable	QFN4.5x6.5-46	4.5 x 6.5mm

*Please contact Kinetic Technologies Sales for availability

Repeater Reference Design Evaluation Kits

Part Number	Evaluation Kit Number	Description
MCDP6000	RD4-6000	USB Type-C DP Alt-mode Switching Retimer

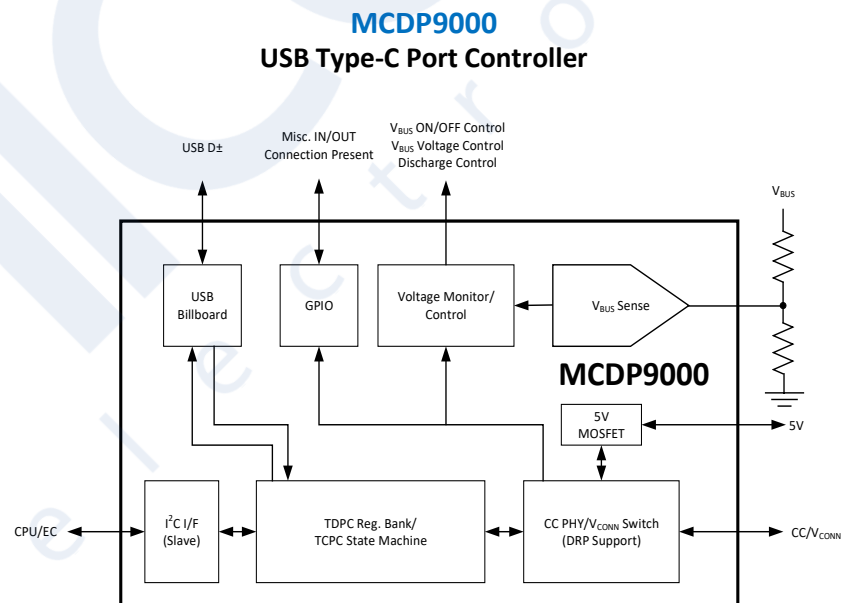
USB Type-C Port Controllers

Enabling Comprehensive Support for USB Type-C Accessories

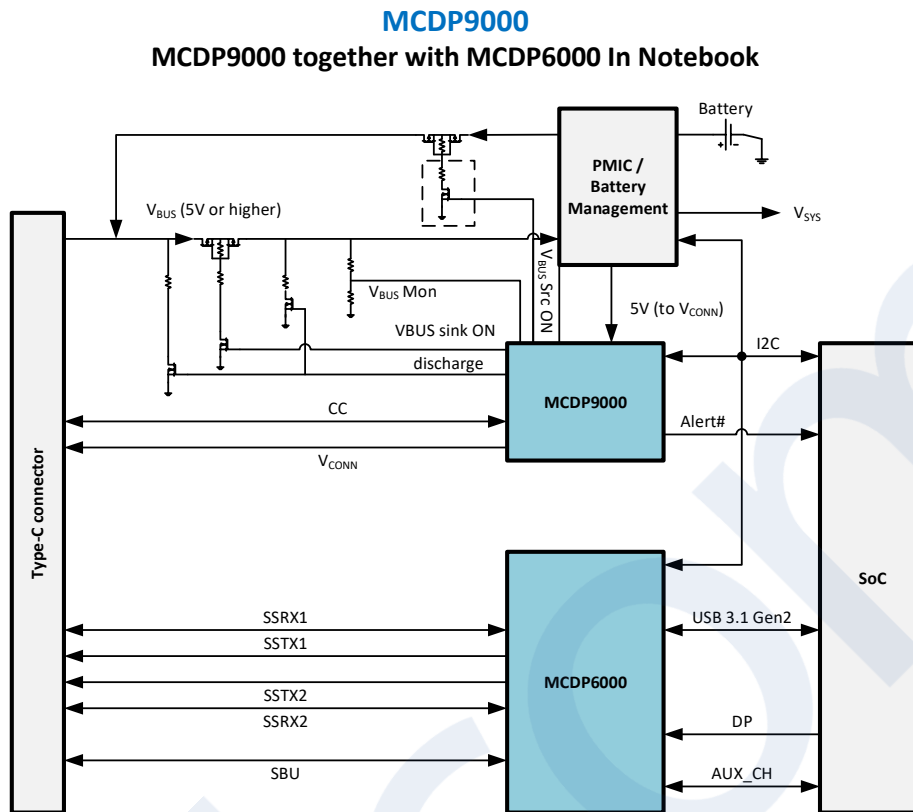
Kinetic Technologies' power delivery controllers together with MST routers and/or SST converters provide customers with one stop support for both USB Type-C power delivery communications and DisplayPort protocol conversion over USB Type-C. The combination of the Kinetic port protection, load switch and DC-DC converter provides the complete set of USB Type-C accessories.

TARGET APPLICATIONS

- ▶ Smartphone/Tablet
- ▶ Desktop/Notebook Computers
- ▶ Digital Still/Video Cameras
- ▶ Monitors
- ▶ Docking Station
- ▶ VR/AR Headsets
- ▶ All device with USB Type-C Port
- ▶ KEY FEATURES
- ▶ TCPC specification compliant device
- ▶ PD 3.0 specification compliant with Kinetic's PD protocol stack
- ▶ DRP/DFP/UEP support
- ▶ Fast-Role-Swap support
- ▶ Debug Accessory Detection
- ▶ VCONN switch to support 1.5W
- ▶ Integrated Billboard device (USB FS mode)
- ▶ I²C interface as defined in TCPC standard
- ▶ Up to 1MHz
- ▶ Dead battery operation
 - R_D expose on both CC1 and CC2
- ▶ 5V single power supply
- ▶ QFN44-24 package



USB Type-C Port Controller



USB Type-C Port Controller Selector Guide

Part Number	Input	Application	Package	Package Size (L x W)
MCDP9000	USB Type-C Port Controller	Laptop, 2-in-1 PC, Desktop, AIO PC, Tablet, Smartphone, USB-C Docking station, USB-C DA/V dongle, Set-top-box, USB-C monitor, KVM switch, public display	QFN44-24	4.0 x 4.0mm