

LT9721 --- Product Brief

MIPI DSI/HDMI to DP with Type-C

Features

● Single-Port MIPI® DSI Receiver

- Compliant with D-PHY1.1 and DSI1.02
- 1 Clock Lane and 1~4 Configurable Data Lanes
- 80Mb/s~1.5Gb/s per Data Lane
- Data Lane and Polarity Swapping
- Internal Rterm Calibration with Less than 5% Error
- Programmable Equalization
- Only Non-Burst Mode Supported
- Support up to 24-bit RGB/YUV Data Format
- Support YUV4:2:0 Video Format

● HDMI1.4 Receiver

- Compliant to HDMI1.4 Standard
- Support 3D Video Data Stream
- Support HDCP1.4 and DDC Slave for EDID
- Support HDMI2.0 YUV4:2:0 Video Format
- Support Resolution up to 4Kx2K@30Hz for RGB and 4Kx2K@60Hz for YUV4:2:0
- Support Hot-Plug Detect
- Support Status and Control Data Channel (SCDC)
- No HEAC and CEC Support

● DP1.2 Transmitter

- Compliant to VESA DP1.2 Standard
- Support Four Lanes with 1.62Gbps (RBR), 2.7Gbps (HBR) or 5.4Gbps (HBR2) Data Rate
- Data Lane and Polarity Swapping
- Support HDCP1.3 Encryption
- Support 18/24-bit RGB and YUV4:2:0 Data Format
- Build-in Pattern Generation
- Support Hot-Plug Detect
- Support Backlight Control for Screen Application
- Optional SSC 0.5% Down-Spreading Output
- Configurable and Power-on-Calibrated Output Swing for Optimized EMI

- Internal Rterm Calibration with Less than 5% Error

● USB Type-C

- Compatible with USB3.1 Gen1, USB Type-C R1.0, DP Alt Mode V1.0 and USB PD R2.0
- 3 Data Roles Supported: DFP, UFP and DRP
- 2 Power Roles Supported: Source and Sink
- USB PD-PHY (Tx/Rx) and BMC Encoding / Decoding
- USB PD Protocol Control by Software
- Bi-directional Differential Passive Switch for USB3.1 Gen1 SS signal with less than 2.5-dB Insertion Loss, Controlled by Internal or External CC logic module
- USB Full-Featured, Orientation and Role Detection
- 3-level Current Ability Advertise (Host Mode) or Detection (Device Mode) for Type-C Power: USB Default, 1.5A@5V, 3A@5V
- SBU Data Path Control for DP Alt Mode
- OCP Control for External VBUS Power Switch
- Dead Battery Supports (Sink Mode) When No Power Applied

● Audio Input

- Support SPDIF and up to 8-CH I2S Audio Input in MIPI mode

● Miscellaneous

- 1.8V/3.3V Dual Supply Power
- External 25MHz Rystal Reference Clock
- Temperature Range: -40°C to +85°C
- Packaged in 5mm x 5mm BGA81 and 7.5mm x 7.5mm QFN64

Description

The Lontium LT9721 is MIPI/HDMI to DP converter with internal Type-C Alternate Mode switch and PD controller. For MIPI DSI® input, LT9721 features a single-port MIPI DSI receiver with 1 clock lane and 4 data lanes operating at maximum 1.5Gbps per data lane and a maximum input

bandwidth of 6Gbps. The converter decodes the input 18/24-bit RGB packets and converts the formatted video data stream to a 4-lane DP1.2 compliant output, supporting RBR(1.62Gbps), HBR(2.7Gbps) and HBR2(5.4Gbps) link speeds. The build-in optional SSC function reduces EMI effect on EMI-concerned system application.

For HDMI input, LT9721 features a HDMI1.4 receiver with 1 clock lane and 3 data lanes operating at maximum 3.4Gbps per data lane and a maximum input bandwidth of 10.2Gbps, allowing resolution up to 4Kx2K@30Hz for RGB format and 4Kx2K@60Hz for YUV420 format. The converter also integrates a DDC controller and supports HDCP1.4.

In order to be adaptable to the latest USB Type-C ecosystem, LT9721 integrates a high performance bi-directional passive differential switch controlled by CC

logic and PD management unit to relieve mobile system design complexity and BOM cost. The switch function is compliant with VESA DP Alternate Mode on USB Type-C Standard.

The LT9721 is fabricated in advanced CMOS process and implemented in a small outline 5mm x 5mm BGA81 (LT9721-B81) and 7.5mm x 7.5mm QFN64 (LT9721-Q64) package. This package is RoHS compliant and specified to operate from -40°C to +85°C.

Applications

- Mobile systems
- Cellular handsets
- Digital video cameras
- Digital still cameras
- Tablet PC, Notebook PC
- Car Display and Camera System



Figure 1. Application Diagrams

Ordering Information

Part Number	Operating Temperature Range	Package	Packing Method
LT9721-Q64	-40°C to +85°C	QFN64 (7.5*7.5)	Tray
LT9721-B81	-40°C to +85°C	BGA81 (5*5)	Tray

LONTIUM CONFIDENTIAL

Copyright © 2016-2017 Lontium Semiconductor Corporation, All rights reserved.

Lontium Semiconductor Proprietary & Confidential

This document and the information it contains belong to Lontium Semiconductor. Any review, use, dissemination, distribution or copying of this document or its information outside the scope of a signed agreement with Lontium is strictly prohibited.

LONTIUM DISCLAIMS ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING THOSE OF NONINFRINGEMENT, MERCHANTABILITY, TITLE AND FITNESS FOR A PARTICULAR PURPOSE. CUSTOMERS EXPRESSLY ASSUME THEIR OWN RISK IN RELYING ON THIS DOCUMENT.

LONTIUM PRODUCTS ARE NOT DESIGNED OR INTENDED FOR USE IN LIFE SUPPORT APPLIANCES, DEVICES OR SYSTEMS WHERE A MALFUNCTION OF A LONTIUM DEVICE COULD RESULT IN A PERSONAL INJURY OR LOSS OF LIFE.

Lontium assumes no responsibility for any errors in this document, and makes no commitment to update the information contained herein. Lontium reserves the right to change or discontinue this document and the products it describes at any time, without notice. Other than as set forth in a separate, signed, written agreement, Lontium grants the user of this document no right, title or interest in the document, the information it contains or the intellectual property it embodies.

Trademarks

Lontium™ and ClearEdge™ is a registered trademark of Lontium Semiconductor. All Other brand names, product names, trademarks, and registered trademarks contained herein are the property of their respective owners.

Visit our corporate web page at: www.lontiumsemi.com

Technical support: support@lontium.com

Sales: sales@lontium.com