

Verdin DSI to HDMI Adapter Datasheet



Revision History

Date	Doc. Rev.	Board Version	Changes
13-February-20	Rev. 0.90	V1.0	Initial document release
6-April-20	Rev. 0.91	V1.0	Minor cosmetic improvements
12-July-21	Rev. 0.92	V1.0	Section 1.1: update reference documents links

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1. Introduction

The Verdin DSI to HDMI Adapter is an add-on board for Toradex's carrier boards which uses a MIPI-DSI interface to provide an HDMI output.

The Verdin DSI to HDMI Adapter uses a Lontium Semiconductor LT8912B MIPI® DSI to HDMI bridge. It features a single-channel MIPI® D-PHY receiver front-end configuration with 4 data lanes operating at a maximum of 1.5Gbps per data lane and a maximum input bandwidth of 6Gbps.

The bridge provides an HDMI 1.4 standard data output with a resolution up to 60Hz 1080p 8-bit.

The Verdin DSI to HDMI Adapter can be connected to the MIPI® DSI connector of compatible Verdin carrier boards.

1.1. Reference Documents

For detailed technical information on the suitable computer modules and other reference documents, please refer the following sections:

1.1.1 Verdin Development Board Datasheet

https://docs.toradex.com/107206-verdin_development_board_datasheet.pdf

1.1.2 Dahlia Carrier Board Datasheet

<https://docs.toradex.com/107809-dahlia-carrier-board-datasheet.pdf>

1.1.3 Verdin iMX8M Mini Computer Module Datasheet

The Verdin iMX8M Mini datasheet can be downloaded here:

https://docs.toradex.com/107207-verdin_imx8m_mini_datasheet.pdf

1.1.4 Toradex Developer Website

<http://developer.toradex.com/>

1.1.5 LT8912B MIPI® DSI to HDMI Bridge Product Brief

http://www.lontiumsemi.com/uploadfiles/pdf/LT8912_Product_Brief.pdf

2. Features

2.1. One-Channel MIPI® DSI Receiver

- Compliant with D-PHY1.1 and DSI1.02
- 1 clock lane and 1~4 configurable data lanes
- From 80Mbps up to 1.5Gbps per data lane
- Data lane swappable and polarity swappable
- Internal **Rterm** calibration within less than 5% error
- 2-bit programmable equalization
- Only Non-Burst mode supported

2.2. HDMI Transmitter

- Support HDMI 1.4 standard
- Up to 60Hz 1080p 8-bit HDMI output
- 7-bit automatic or manual output swing calibration
- 3-bit programmable de-emphasis

2.3. Hardware Architecture Block Diagram

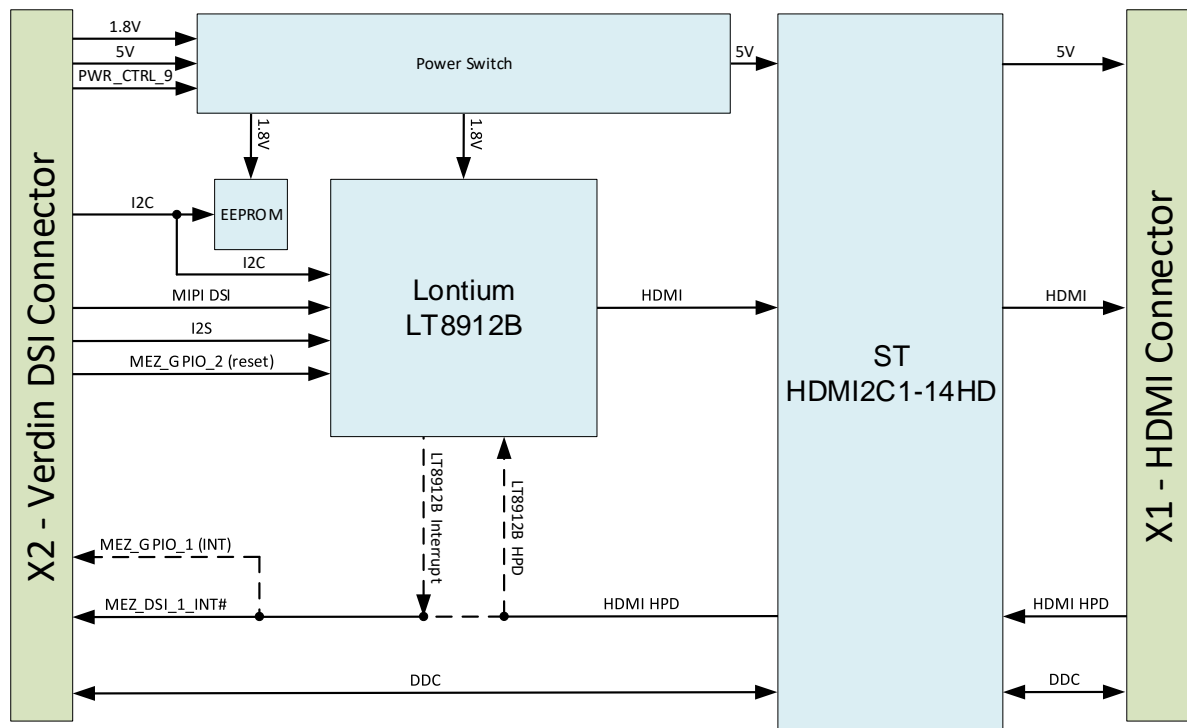


Fig.1 Verdin DSI to HDMI Adapter Hardware Architecture

2.4. Physical Drawings

2.4.1 Board View

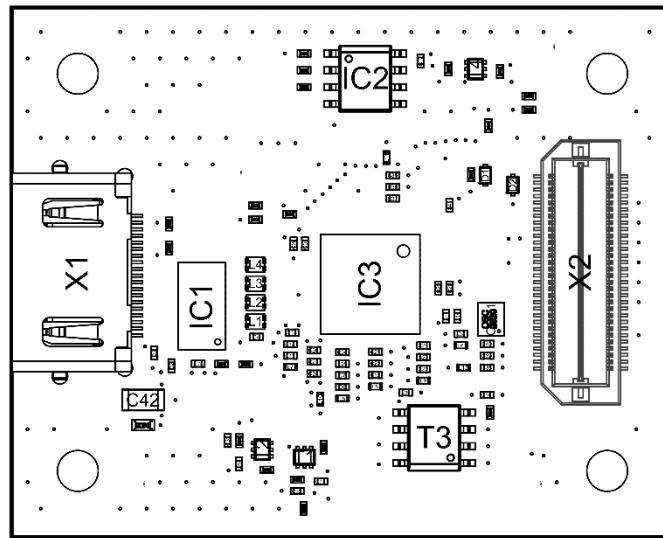


Fig.2 Verdin DSI to HDMI Adapter

Ref	Description	Remarks
X1	HDMI Connector	
X2	MIPI [®] DSI Interface Connector	

2.4.2 Hardware Setup

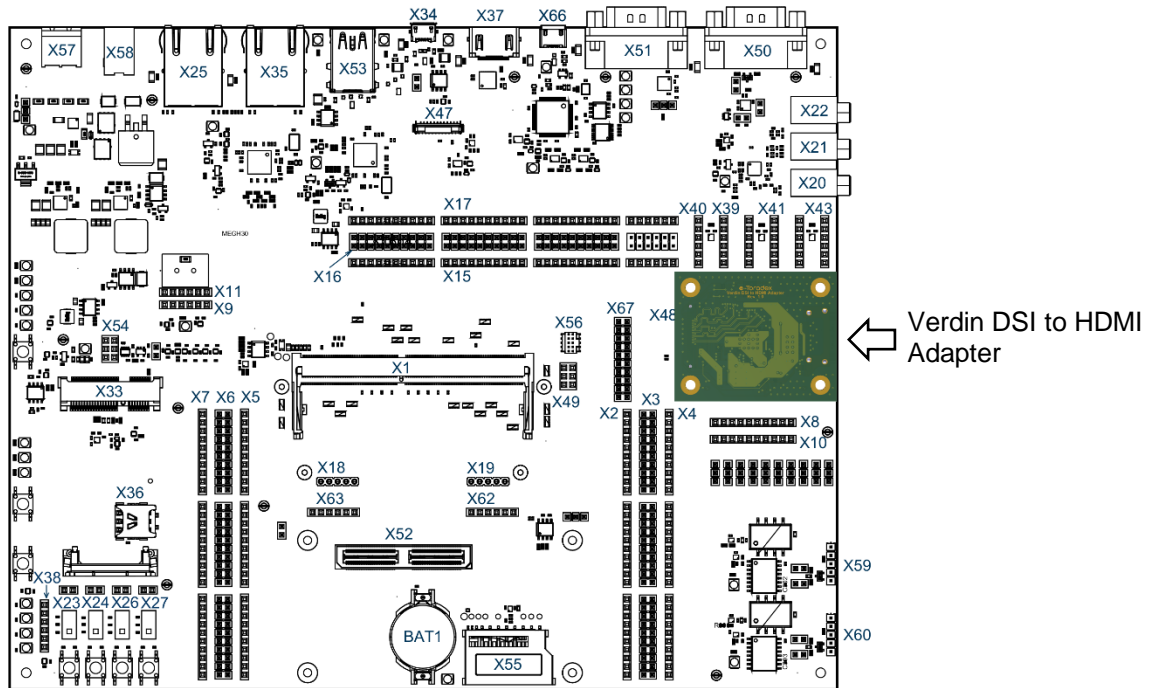


Fig.3 Verdin DSI to HDMI Adapter installed on Verdin Development Board

3. Connector Description

3.1. HDMI Connector (X1)

Manufacturer: Amphenol - 10029449-111RLF

Type: HDMI connector

3.2. MIPI® DSI Interface Connector (X2)

Manufacturer: Samtec - QTH-030-02-L-D-A

Type: Board to board connector

Pin	Signal Name	I/O Type	Voltage	Pull-up/Pull-down
1	MEZ_GPIO_1	IO		
2	MEZ_GPIO_2	IO		Pull-up 10k
3	I2C1_1.8_SDA	IO		
4	GND	PWR		
5	I2C1_1.8_SCL	I		
6	NC			
7	MEZ_DSI_1_INT#	O		
8	V_SUPPLY_FILT_SW	PWR	NOT USED	
9	GND	PWR		
10	V_SUPPLY_FILT_SW	PWR	NOT USED	
11	DSI_1_D0_P	IO		
12	V_SUPPLY_FILT_SW	PWR	NOT USED	
13	DSI_1_D0_N	IO		
14	V_SUPPLY_FILT_SW	PWR	NOT USED	
15	GND	PWR		
16	V_SUPPLY_FILT_SW	PRW	NOT USED	
17	DSI_1_D1_P	IO		
18	NC			
19	DSI_1_D1_N	IO		
20	5V_SW	PWR	5V	
21	GND	PWR		
22	5V_SW	PWR	5V	
23	DSI_1_CLK_P	IO		
24	5V_SW	PWR	5V	
25	DSI_1_CLK_N	IO		
26	5V_SW	PWR	5V	
27	GND	PWR		
28	5V_SW	PWR	5V	
29	DSI_1_D2_P	IO		
30	NC			
31	DSI_1_D2_N	IO		
32	3.3V	PWR	3.3V	
33	GND	PWR		
34	3.3V	PWR	3.3V	

Pin	Signal Name	I/O Type	Voltage	Pull-up/Pull-down
35	DSI_1_D3_P	IO		
36	3.3V	PWR	3.3V	
37	DSI_1_D3_N	IO		
38	3.3V	PWR	3.3V	
39	GND	PWR		
40	3.3V	PWR	3.3V	
41	DSI_I2S_2_BCLK	IO		
42	NC			
43	DSI_I2S_2_SYNC	IO		
44	1.8V	PWR	1.8V	
45	DSI_I2S_2_D_OUT	IO		
46	1.8V	PWR	1.8V	
47	NC			
48	1.8V	PWR	1.8V	
49	GND	PWR		
50	1.8V	PWR	1.8V	
51	MEZ_I2C_2_DSI_SCL	IO		Pull-up 4.7k
52	1.8V	PWR	1.8V	
53	MEZ_I2C_2_DSI_SDA	IO		Pull-up 4.7k
54	NC			
55	NC			
56	GND	PWR		
57	NC			
58	NC			
59	GND	PWR		
60	PWR_CTRL_9	IO		

4. Electrical Characteristics

4.1. Power Supply Characteristics

4.1.1 Supply Voltage

Parameter	Min.	Typ.	Max.	Unit
1.8V Supply Voltage	1.68	1.8	1.95	V
3.3V Supply Voltage (not used)		-		V
5V_SW Supply Voltage	4.9	5	5.3	V
V_SUPPLY_FILT_SW Supply Voltage (not used)		-		V

4.1.2 Current Consumption

Parameter	Conditions	Typ. Supply Current	Unit
1.8V Supply Voltage	HDMI output at 1080p 60Hz	155	mA
5V_SW Supply Voltage		600	μA

5. Operating Conditions

5.1. Operating Temperature Range

- -20 to +85 °C

6. Mechanical Data

6.1. Verdin DSI to HDMI Adapter Dimensions

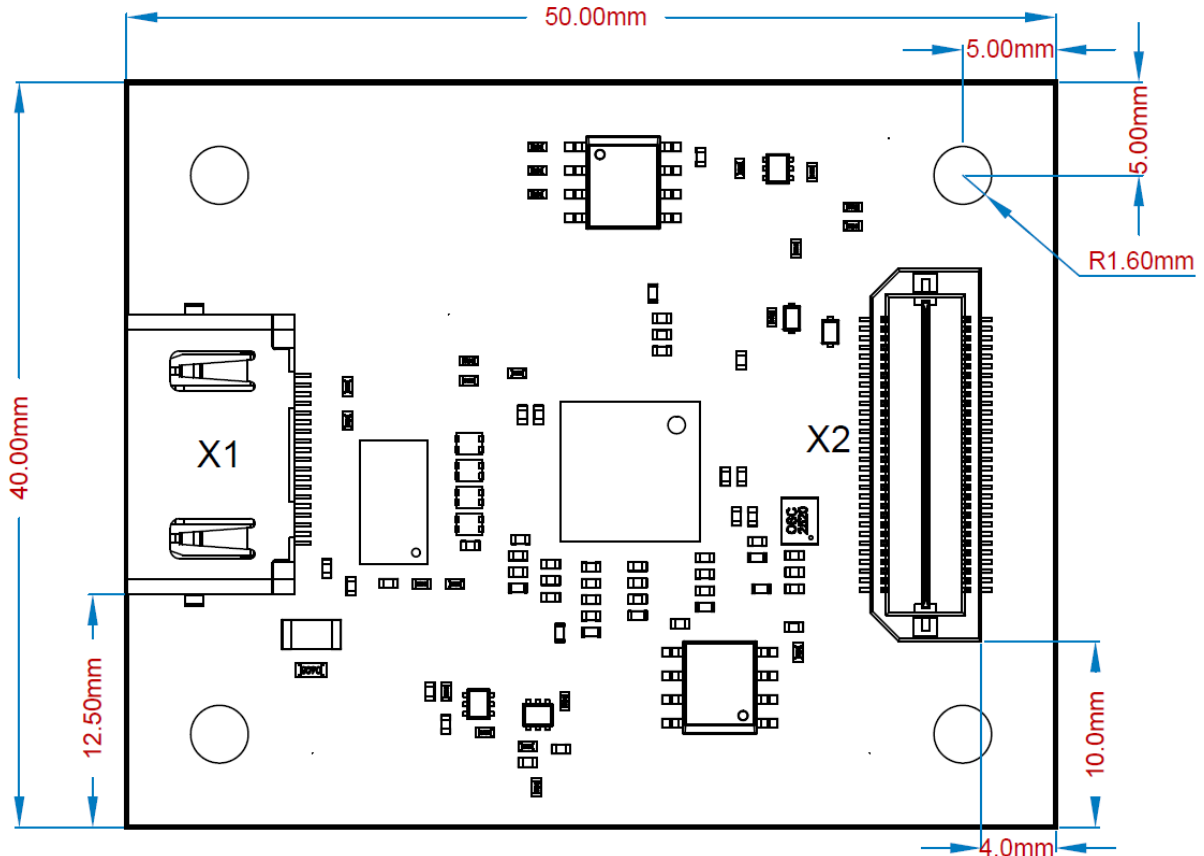


Fig.4 Verdin DSI to HDMI Adapter Dimensions
All dimensions are in millimeters (mm)

7. Design Data

The design data for the Toradex carrier boards and adapter boards are freely available in the Altium Designer format. The design data includes schematics, layout, Bill of Materials (BoM) and component libraries.

To download the board design data, please use the link below:

<http://developer.toradex.com/carrier-board-design/reference-designs>

8. Product Compliance

Up-to-date information about product compliance such as RoHS, CE, UL-94, Conflict Mineral, REACH etc. can be found on our website at: <http://www.toradex.com/support/product-compliance>

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