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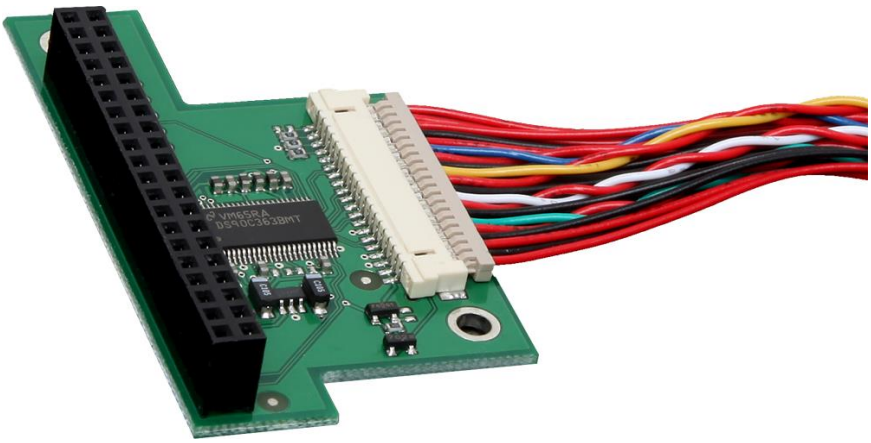
LVDS Converter

Datasheet



Revision history

Date	Doc. Rev.	LVDS Converter Version	Changes
15-Jan-2007	Rev. 1.0	V1.0	Initial Release
16-July-2015	Rev. 1.1	V1.0	Section 4, Installation: added Fig 1 & 2 in the section. Section 8, Product Compliance: added new section.

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1. Introduction

Attached to the Generic Display Connector found on various Toradex products (such as the Colibri Evaluation Board and the Orchid) the Toradex LCD-Converters family of products enables the attachment of Industry Standard Panels with a LVDS Interface.

Currently there are two member of this product line available:

- LVDS_A1715_V01_00a: LVDS Converter 1.25mm pitch
- LVDS_A1715_V01_00b: LVDS Converter 1.0mm pitch

Each of these Converters consists of an assembled PCB implementing the LVDS conversion as well as a corresponding LVDS cable used to interface to the LCD.

2. Reference Document

For detailed technical information about the LVDS Converters please refer to the documents listed below:

- The various configuration of the digital RGB interface provided by the Colibri modules are described in detail in the datasheets of the corresponding processors.
  Note: Marvell requires a Non-Disclosure Agreement to be signed before customers get access to their documentation.
- The VESA SPWG 2.0 Specification (Standard Panel Working Group) defines standard mechanical and electrical characteristics for Industry Standard Panels:
  http://www.vesa.org/Public/Panel%20Standards/StdPanel2.0.pdf
- The definition of the electrical interface is described in:
  TIA/EIA-644 Electrical Characteristics Of Low Voltage Differential Signaling (LVDS) Interface

3. Functional Description

The 18 bit RGB signals from the graphic controller are input to the LVDS Converter module. There the parallel RGB data is multiplexed and converted to a single channel LVDS (Low Voltage Differential Signaling) interface in order to be connected to the LCD.
On the Display itself the received data is then demultiplexed, converted back to TTL levels and sent to the inputs of the timing controller.

The use of the LVDS interface allows the data to travel at faster speeds across a narrow interface, addressing needs associated with high bandwidth communication.

3.1. Supported Display Characteristics

3.1.1 LVDS_A1715_V01_00a

- Maximum WXGA resolution: 1440 x 900 Pixels
- 18 bit color resolution (262'144 different colors)
- Single Channel LVDS Interface
- Connector: Hirose DF14-20P-1.25H or equivalent
- Compliant to Industry Standard Panel 2.0 Specification Style A, XGA with two exceptions: First of all a 1.25mm pitch connector deployed which is found on larger LCDs (15" and 17"). Second this LVDS Converter does also not support the Display Data Channel (DDC) on pins 17, 19 and 20 of the connector. Most Industry Panels do not feature the DDC function anyway.

3.1.2 LVDS_A1715_V01_00b

- Maximum WXGA resolution: 1'440 x 900 Pixels
- 18 bit color resolution (262'144 different colors)
- Single Channel LVDS Interface
- Connector: Hirose DF19G-20P-1H or equivalent
- Compliant to Industry Standard Panel 2.0 Specification Style A, XGA with the exception that the LVDS Converter does not support the Display Data Channel (DDC) on pins 17, 19 and 20 of the connector.

4. Installation

For the installation of the LVDS Converter on Colibri Evaluation Board or on Orchid be cautious to match the Pin 1 indicators of both connectors.

Following images describe represents, how to correctly install the LVDS converter on the Colibri Evaluation Board and Orchid Carrier Board.

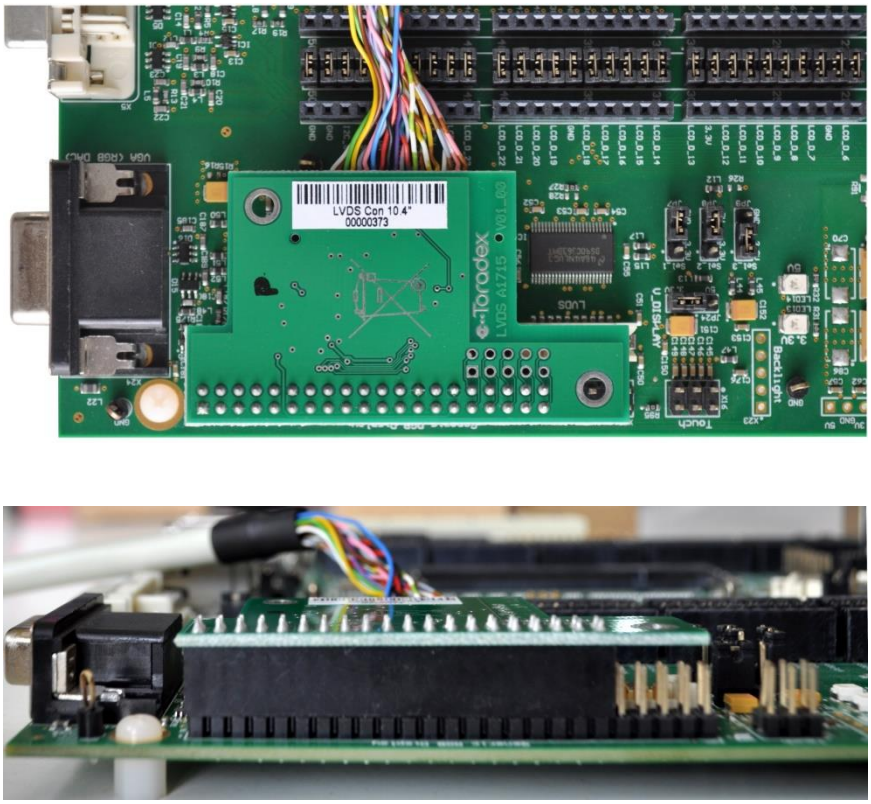

Fig.1 & 2 LVDS Converter installed on the Colibri Evaluation Board V3.1 / V3.2 – Top View and Side View

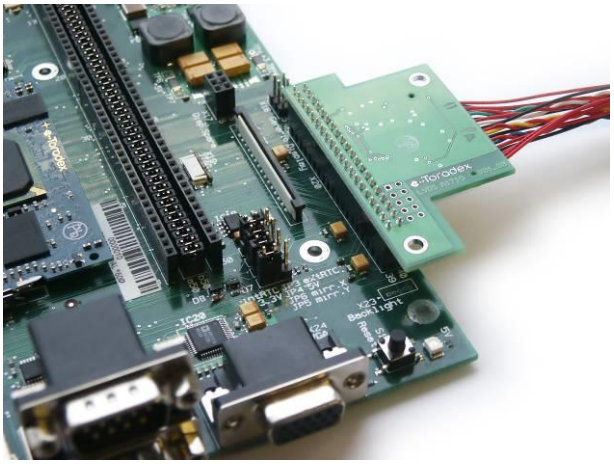

Fig. 3 LVDS Converter installed on the Colibri Evaluation Board V2.1

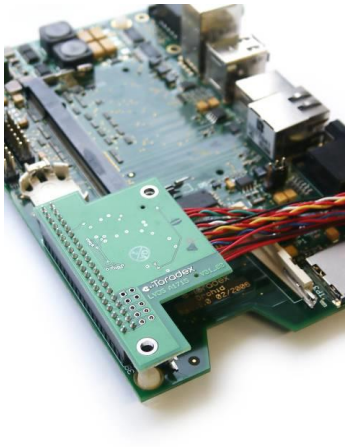

Fig. 4 LVDS Converter installed on Orchid

5. Physical Drawing

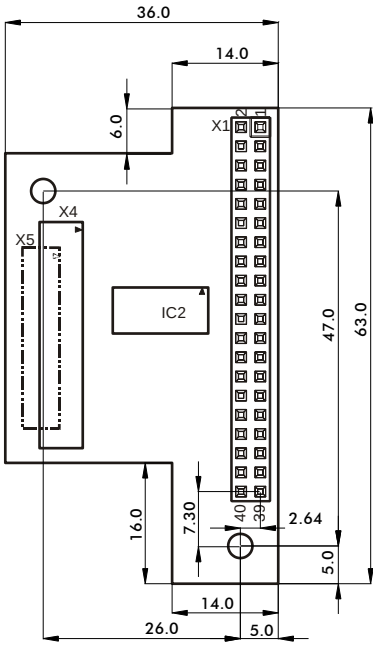

Fig. 4 Physical locations of the connectors

The following list details the connector and their functions:

Reference Designator	Name of the connector
X1	Generic Display RGB
X2	Spare
X4	LVDS 1.25mm
X5	LVDS 1.0mm

6. Connector Pinout

6.1. Generic Display RGB (X1)

Type: 2x10Pin Header Female, 2.54mm
Part number JVE P8562-40S10-01G

Pins 31 – 36 as well as pins 38 – 40 can be used defined and are routed to the Spare connector X2. These interconnections can be used to implement additional functions such as Left/Right, Up/Down, brightness or contrast control. They may also be used to hook up the power to the backlight inverter.

Pin Nr.	Signal Name	IO Type	Voltage	Pullup/Pulldown
1	GND	PWR		
2	L_PCLK	OI	+3V3	
3	L_LCLK	O	+3V3	
4	L_FCLK	O	+3V3	
5	GND	PWR	PWR	
6	LDD[12]	O	+3V3	
7	LDD[13]	O	+3V3	
8	LDD[14]	O	+3V3	
9	LDD[15]	O	+3V3	
10	LDD[16]	O	+3V3	
11	LDD[17]	O	+3V3	
12	GND	PWR		
13	LDD[6]	O	+3V3	
14	LDD[7]	O	+3V3	
15	LDD[8]	O	+3V3	
16	LDD[9]	O	+3V3	
17	LDD[10]	O	+3V3	
18	LDD[11]	O	+3V3	
19	GND	PWR		
20	LDD[0]	O	+3V3	
21	LDD[1]	O	+3V3	
22	LDD[2]	O	+3V3	
23	LDD[3]	O	+3V3	
24	LDD[4]	O	+3V3	
25	LDD[5]	O	+3V3	
26	GND	PWR		
27	L_BIAS	I	+3V3	
28	+V_DISPLAY	PWR	+3V3 or +5V	
29	+V_DISPLAY	PWR	+3V3 or +5V	
30	GND	PWR		
31	DISP_SPARE8		User defined	
32	DISP_SPARE9		User defined	
33	DISP_SPARE1		User defined	
34	DISP_SPARE2		User defined	
35	DISP_SPARE3		User defined	
36	DISP_SPARE4		User defined	
37	BL_ON	O	+3V3	
38	DISP_SPARE5		User defined	
39	DISP_SPARE6		User defined	
40	DISP_SPARE7		User defined	

6.2. Spare (X2)

Type: 2x5Pin Header male, 2.54mm
Part number JVE-21B22564-10S10B-01G

These signals are user definable (with the exception of pin 7) and are simply routed trough from the generic Display RGB connector X1. The signals can be used to implement additional functions such as Left/Right, Up/Down, brightness or contrast control. They may also be used to hook up the power to the backlight inverter.

Pin Nr.	Signal Name	IO Type	Voltage	Pullup/Pulldown
1	DISP_SPARE8		User defined	
2	DISP_SPARE9		User defined	
3	DISP_SPARE1		User defined	
4	DISP_SPARE2		User defined	
5	DISP_SPARE3		User defined	
6	DISP_SPARE4		User defined	
7	BL_ON	O	+3V3	
8	DISP_SPARE5		User defined	
9	DISP_SPARE6		User defined	
10	DISP_SPARE7		User defined	

6.3. LVDS 1.25mm (X4)

Type: 20 Pin Header male, 1.25mm
Part number Hirose DF14-20P-1.25H

Pin Nr.	Signal Name	IO Type	Voltage
1	+V_LCD (switched by BL_ON)	PWR	+V_DISPLAY
2	+V_LCD (switched by BL_ON)	PWR	+V_DISPLAY
3	GND	PWR	
4	GND	PWR	
5	Rin0- Negative LVDS differential data (pixel R0-R5, G0)	O	LVDS
6	Rin0+ Positive LVDS differential data (pixel R0-R5, G0)	O	LVDS
7	GND	PWR	
8	Rin1- Negative LVDS differential data (pixel G1-G5, B0-B1)	O	LVDS
9	Rin1+ Negative LVDS differential data (pixel G1-G5, B0-B1)	O	LVDS
10	GND	PWR	
11	Rin2- Negative LVDS differential data (pixel B2-B5, HS, VS, DE)	O	LVDS
12	Rin2+ Negative LVDS differential data (pixel B2-B5, HS, VS, DE)	O	LVDS
13	GND	PWR	
14	CLK- Negative Clock Signal	O	LVDS
15	CLK+ positive Clock Signal	O	LVDS
16	GND	PWR	
17	GND	PWR	
18	GND	PWR	
19	GND	PWR	
20	GND	PWR	

6.4. LVDS 1.0mm (X5)

Type: 20 Pin Header male, 1.0mm
Part number Hirose DF19G-20P-1H

Pin Nr.	Signal Name	IO Type	Voltage
1	+V_LCD (switched by BL_ON)	PWR	+V_DISPLAY
2	+V_LCD (switched by BL_ON)	PWR	+V_DISPLAY
3	GND	PWR	
4	GND	PWR	
5	Rin0- Negative LVDS differential data (pixel R0-R5, G0)	O	LVDS
6	Rin0+ Positive LVDS differential data (pixel R0-R5, G0)	O	LVDS
7	GND	PWR	

Pin Nr.	Signal Name	IO Type	Voltage
8	Rin1- Negative LVDS differential data (pixel G1-G5, B0-B1)	O	LVDS
9	Rin1+ Negative LVDS differential data (pixel G1-G5, B0-B1)	O	LVDS
10	GND	PWR	
11	Rin2- Negative LVDS differential data (pixel B2-B5, HS, VS, DE)	O	LVDS
12	Rin2+ Negative LVDS differential data (pixel B2-B5, HS, VS, DE)	O	LVDS
13	GND	PWR	
14	CLK- Negative Clock Signal	O	LVDS
15	CLK+ positive Clock Signal	O	LVDS
16	GND	PWR	
17	GND	PWR	
18	GND	PWR	
19	GND	PWR	
20	GND	PWR	

7. LVDS Cable

The cable provided along with the LVDS Converter has a length of 40 cm. For easy installation the cables have the same connector on either side:

7.1. LVDS_A1715_400a

Type: 20Pin Header female, 1.25mm
Part number Hirose DF14-20S-1.25C

7.2. LVDS_A1715_400b

Type: 20Pin Header female, 1.0mm
Part number Hirose DF19-20S-1C

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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