

## Data sheet for DVI Receiver Core

### Functional Description

The DVI receiver IP receives the serial TMDS encoded data and clock via the four differential channels. It then decodes 10 bit data to 8-bit RGB data and outputs to the display controller.

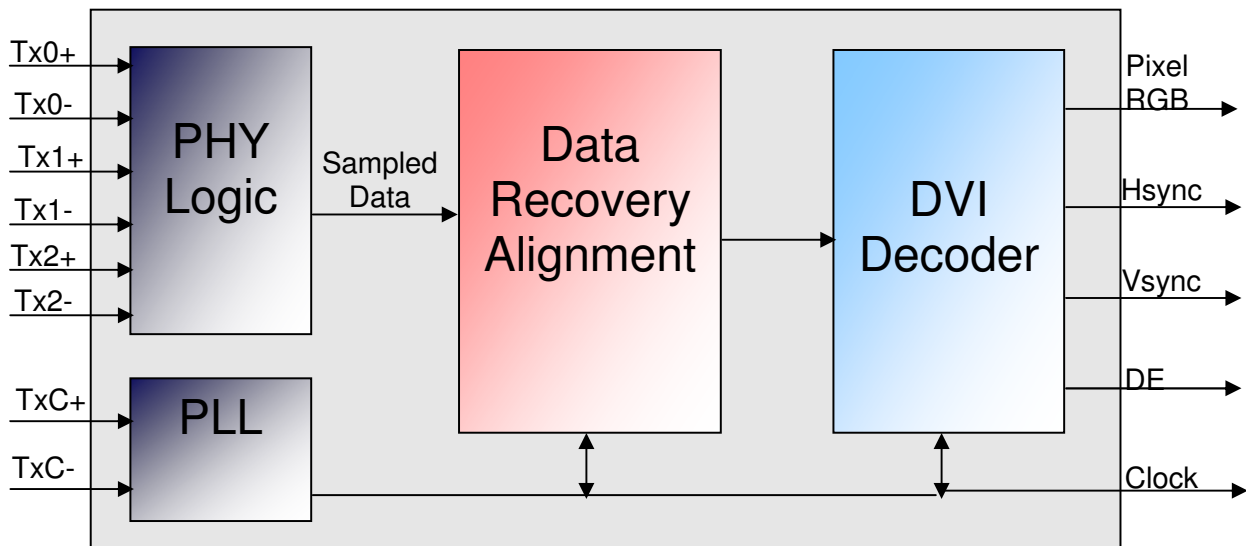
The data recovery alignment logic aligns phase of incoming pixel clock with high speed serial data and captures it. The capture logic works at 10x speed of incoming pixel clock.

The DVI decoder logic converts the 10-bit TMDS encoded data to 8-bit RGB data. It also extracts the control signals such as vertical sync, horizontal sync etc from the incoming data stream.

### Features:

- Support resolutions 640x480p, 720x480p and 720x576p on Spartan3A device
- Support 24-bit true color pixel format

### Block Diagram



### Signal definition table:

Signal Name	Width	Direction	Description
reset_n	1	Input	System Reset
pixel_clock	2	Input	TMDS (Differential) pixel clock from transmitter.
Channel 0	2	Input	TMDS (Differential) blue color serial link from transmitter.
Channel 1	2	Input	TMDS (Differential) green color serial link from transmitter.
Channel 2	2	Input	TMDS (Differential) red color serial link from transmitter.
pixel_data	24	Output	24-bit RGB decoded pixel data.
Hsync	1	Output	Decoded sync signal from serial data.
Vsync	1	Output	Decoded sync signal from serial data.

Signal Name	Width	Direction	Description
DE	1	Output	Decoded sync signal from serial data.
clock	1	Output	This is pixel clock signal send out.

**Performance:**

Device	LUT Count	Frequency(MHz)
Spartan-3A (xc3s700A)	90	30.92
Virtex 4 (xc4vlx25)	99	47.7

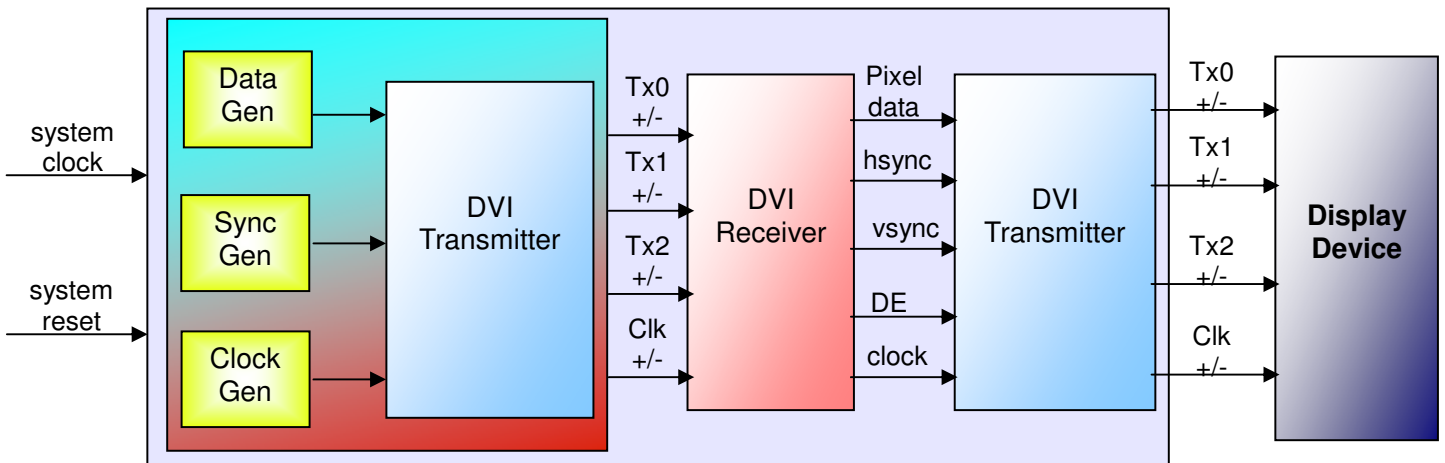
**Verification:**

The DVI receiver core module has been verified with following approaches:

- Exhaustive Functional/Timing simulation.
- Tested with connecting DVI Tx core to DVI Rx core as shown in following figure 1.

**Deliverables:**

- Verilog RTL source code
- Test benches
- Synthesis and Simulation scripts.
- Detailed user documentation, including RTL source code documentation



**Figure 1: DVI Rx Test Setup**