

1. Introduction

This document illustrates how to setup the painter demo on the DE10-Standard and the MTL2 as shown in **Figure 1**. The demo is designed to show how to implement a painter demo on the Multi-touch LCD module based on Altera Qsys tool and the Video and Image Processing (VIP) suite. It demonstrates how to use multi-touch gestures and resolution. The GUI of this demonstration is controlled by the program in Nios II.

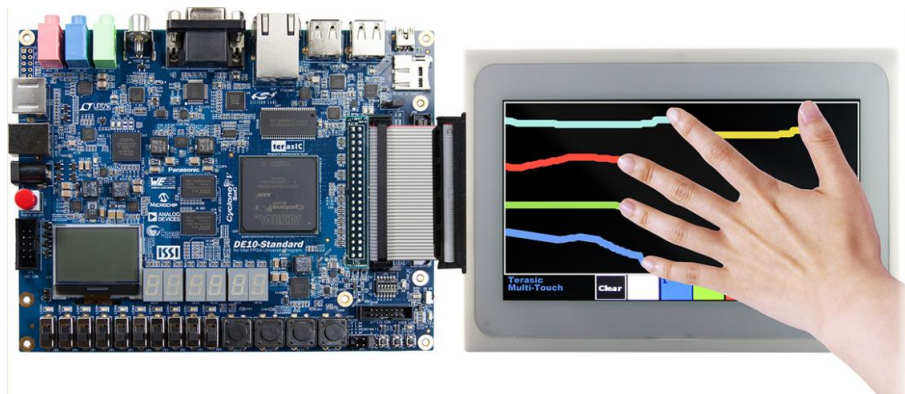


Figure 1 MTL2 Painter Demo

2. System Requirements

The following items are required to perform this demonstration:

- DE10-Standard and power supply
- MTL2 LCD multi-touch module

3. Operation Demonstration

Figure 2 shows the Graphical User Interface (GUI) of Painter demo. The GUI is classified into four separate areas: Painting Area, Gesture Indicator, Clear Button, and Color Palette. Users can select a color from the color palette and start painting in the paint area. If a gesture is detected, the associated gesture symbol will be shown in the gesture area. To clear the painting area, click the “Clear” button.

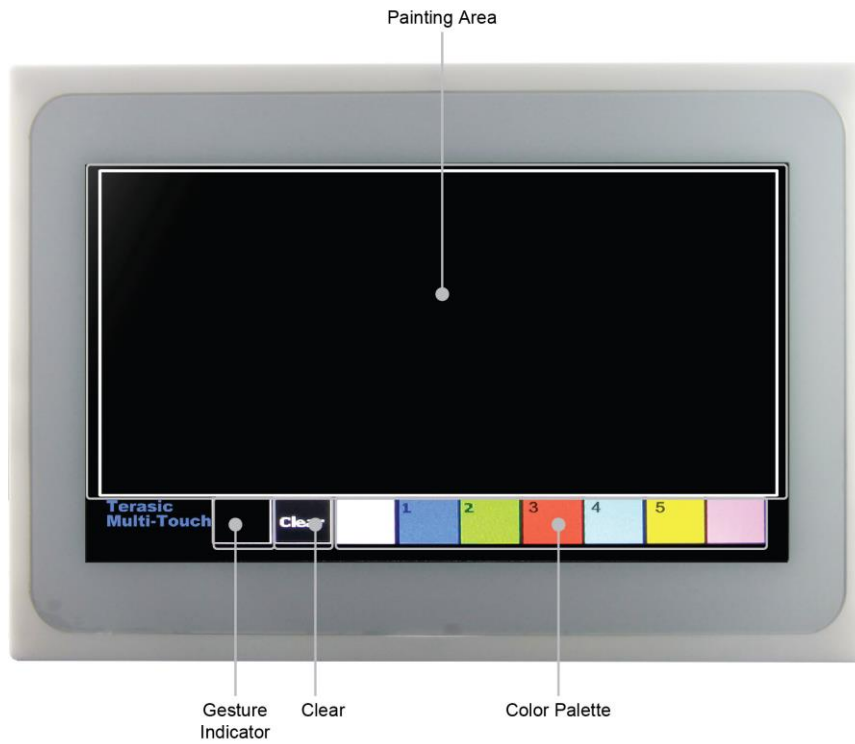


Figure 2 GUI of Painter demo

Figure 3 shows the single-finger painting of canvas area.



Figure 3 Single-finger painting

Figure 4 shows the zoom-in gesture.



Figure 4 Zoom-in gesture

Figure 5 5-Point painting of canvas area.



Figure 5 5-Point painting

4. Execute Demonstration

Please follow the procedures below to setup the demonstration:

1. Make sure Quartus II 16.1 or later is installed on your host PC.
2. Make sure both Quartus II and USB-Blaster II driver are installed on the host PC.
3. Power off the DE10-Standard board.
4. Connect a mini-USB cable to an UB2 port of the DE10-Standard and the host PC.
5. Mount the MTL2 onto the 2x20 GPIO (JP1) expansion header of the DE10-Standard.
6. Power on the DE10-Standard Board.
7. Launch the “test.bat” from the folder demo_batch of the **DE10_Standard_MTL2_Painter**.
8. Now, you should see the painter GUI on the LCD of MTL2.

5. Project Description

For LCD display processing, the reference design is developed based on Altera's Video and Image Processing (VIP) suite. The Frame Reader VIP is used for reading data to be displayed from the associated video memory, and the VIP Video Out is used to display the video data. The data is drawn by the Nios II processor according to user input.

For multi-touch processing, when touch activity occurs, an I2C Controller IP is used to retrieve serial data from the I2C interface, the associated touch information including multi-touch gestures and 5 Point touch coordinates can be calculated through the data in Nios II Processor.

Figure 6 shows the system generic block diagram of painter demonstration.

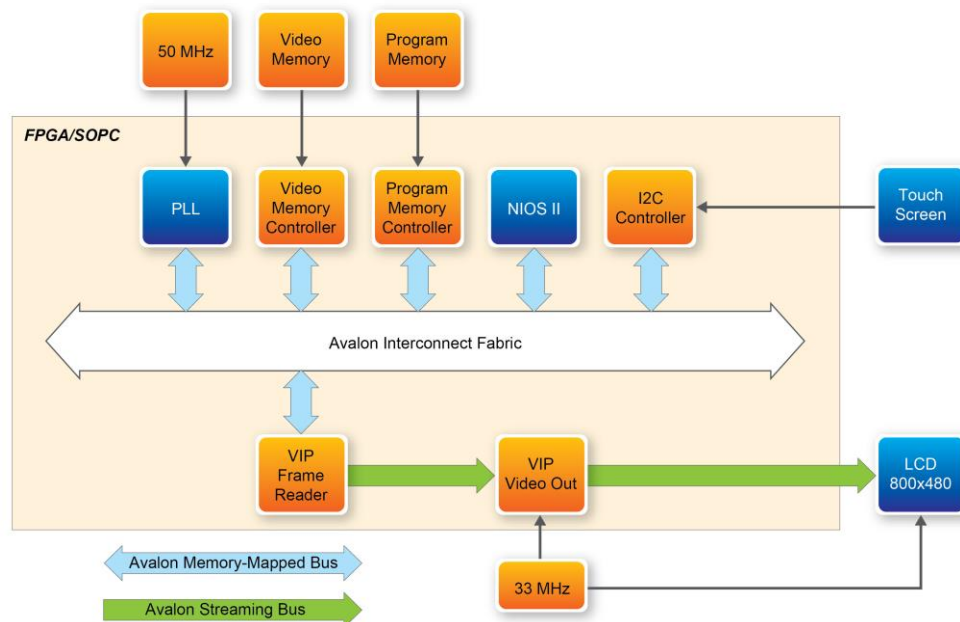


Figure 6 System Block Diagram