

LED Display

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Agenda

- Project Summary
- Design Details
 - HDMI input to FPGA
 - Image scaling
 - LED driving interface
- Manufacturing
 - Soldering & Wiring
- Budget
- Schedule

Project Summary

Problem Statement:

We aim to update the existing LED Display project to allow for receiving an HDMI signal and outputting to one or more 32x32 LED panels in real time.

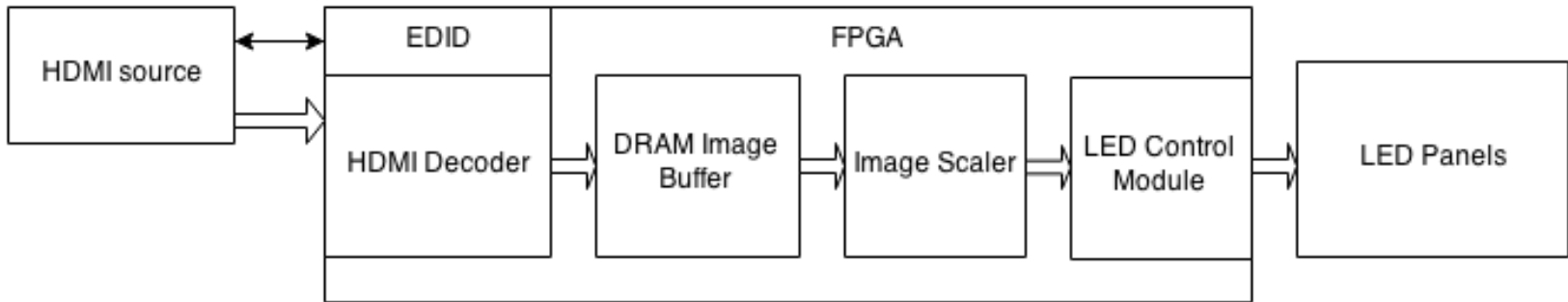
Project Summary

Design Specifications:

- Color Depth: 6+
- Tiling: 1 (preferably 4+) 32x32 panels
- No image artifacts
- HDMI input source resolution: 640x480
- Stable: can run indefinitely without failing

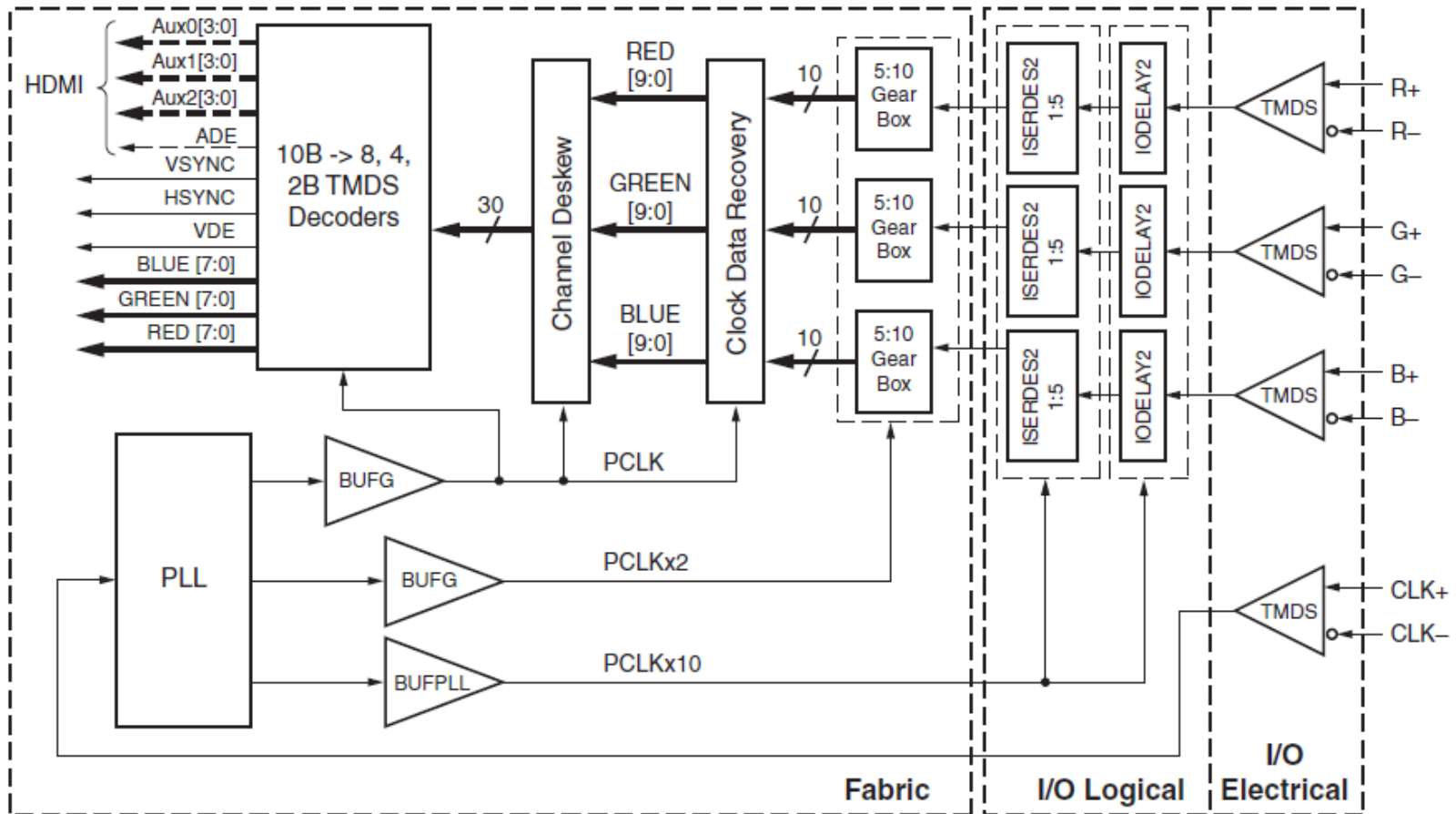
Design Details

Overview:



Design Details

HDMI input to FPGA:



Design Details

EDID

- Simple I2C protocol, sends a binary to PC
- “edidslave” module from HDMI2USB should work more or less as-is.
- EDID tool from Linux Kernel can be used to generate custom EDID binaries using gcc. (There are also probably GUI EDID editors for windows).
- We’ll use a generic 640x480 EDID to make the FPGA act like a low-res monitor.

Design Details

HDMI Input

- Complicated, but already done for us (Xilinx and HDMI2USB HDL)
- Only need EDID and support for receiving video signal
- None of the “fancy” features involved in a complete HDMI implementation are required.

Design Details

Image Scaling

????? :D

Design Details

Image Buffering

Buffering hopefully hardest part of scaling:

DDR2: Xilinx MIG tool can produce a FIFO based DDR2 controller called MCB, described in UG388. Kinda complex.

Block Ram: Large enough to meet our basic goals. Way easier.

Not clear how fancy we'll have time to get

Design Details

LED driving interface:

Have working VHDL code from past project

R1, G1, B1: Color Signals for upper half

R2, G2, B2: Color Signals for lower half

A, B, C, D: Row Address Pins

CLK: Clock

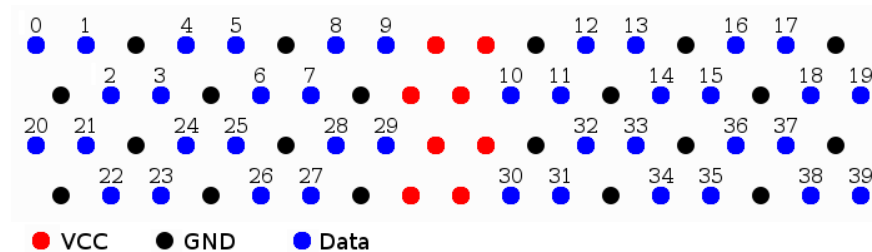
LAT: Data Latch

OE: Output Enable

Manufacturing

Soldering and Wiring:

- FPGA based project, so not too intense.
- LED Panel Data Signals
- LED Panel Power
- VHDCI Connector (Already Soldered)



Budget

Assuming none of our equipment explodes then everything apart from Expo Poster should be bought and paid for already. Yay!

But here's some fun numbers:

Atlys FPGA was: ~230\$ (with discount)

HDMI cable was: Overpriced - Radioshack!

32x32 LED panels: Currently around 50\$

But sold out!

Current Progress

HDMI:

Under Control (hopefully)

Scaling and buffering:

Scary

LED Panel Driving:

Needs a bit more soldering and
experimenting

Schedule

- 3/10: Proof of Concept for Snapshot
(if possible)
- 3/27: 4x4 Panels
- 4/21: 4x4 Panels with Scaling / Buffering
- 5/1: Completely Done. Expo Stuff.
- After 5/1: Ice-Cream. Finish Wiki. Etc.

Quuuuuuestions???