

Dynamic Source Filtering Sunglasses

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Functional Description

The project will be comprised of a pair of glasses. The glasses will automatically detect and darken areas of intense light perceived by the user.

Example

Before



After



Components to be Designed

- LCD<->Processor interface
- Camera<->Processor interface
- Knob/Button<->Processor interface
- FPGA based microcontroller with SIMD instructions
- Embedded image processing software
- Power supply
- Physical component arrangement and fixture

Spartan 3A Starter Kit

- 50 MHz
- ISE IDE
- 372 IO pins
- 40KB SRAM



PT0353224-A102 LCD Screen

- 320 x 240
- 3.5 inch
- 24-bit color
- See-through enough



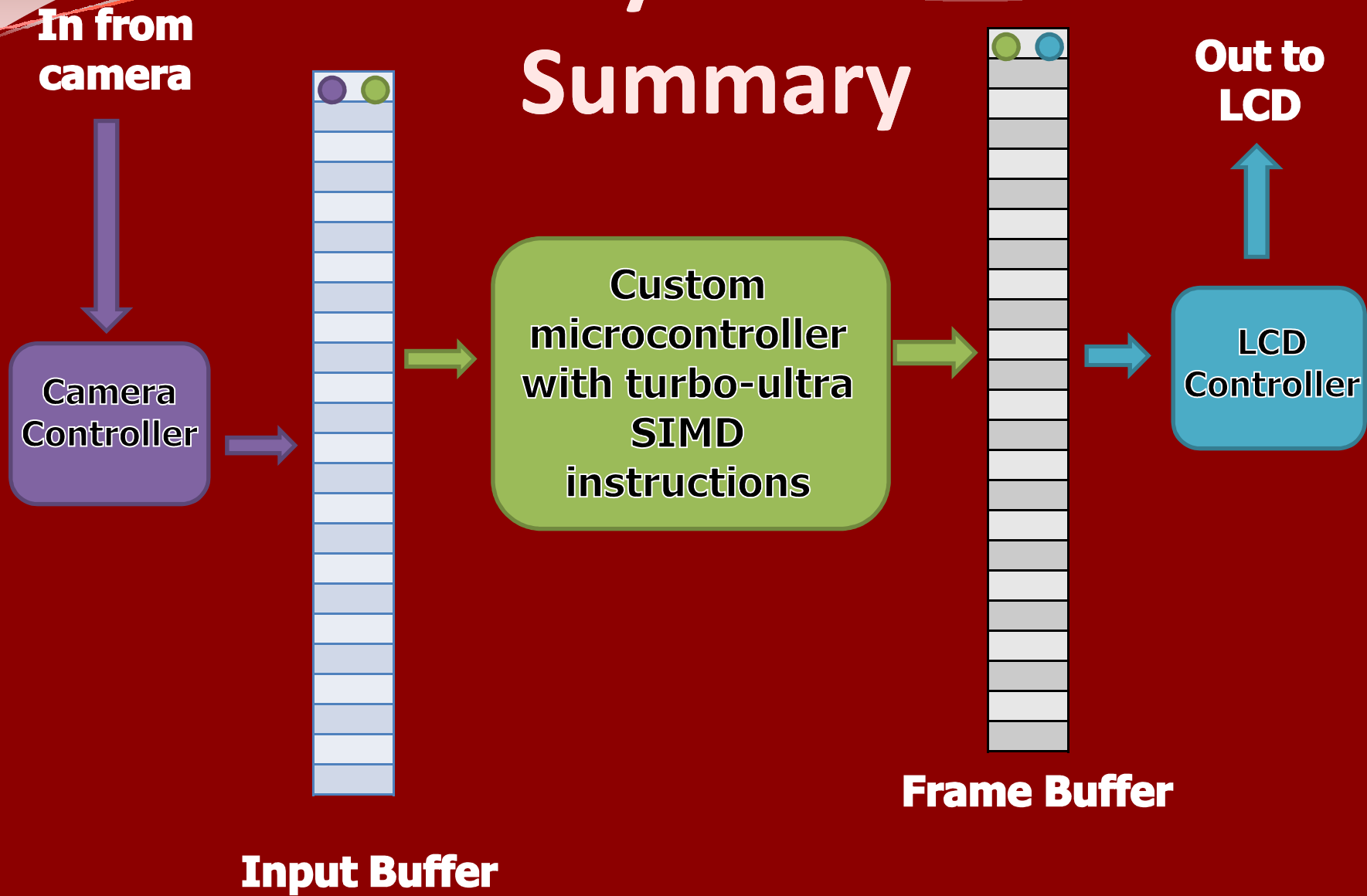
C3188A-6018 Digital Camera

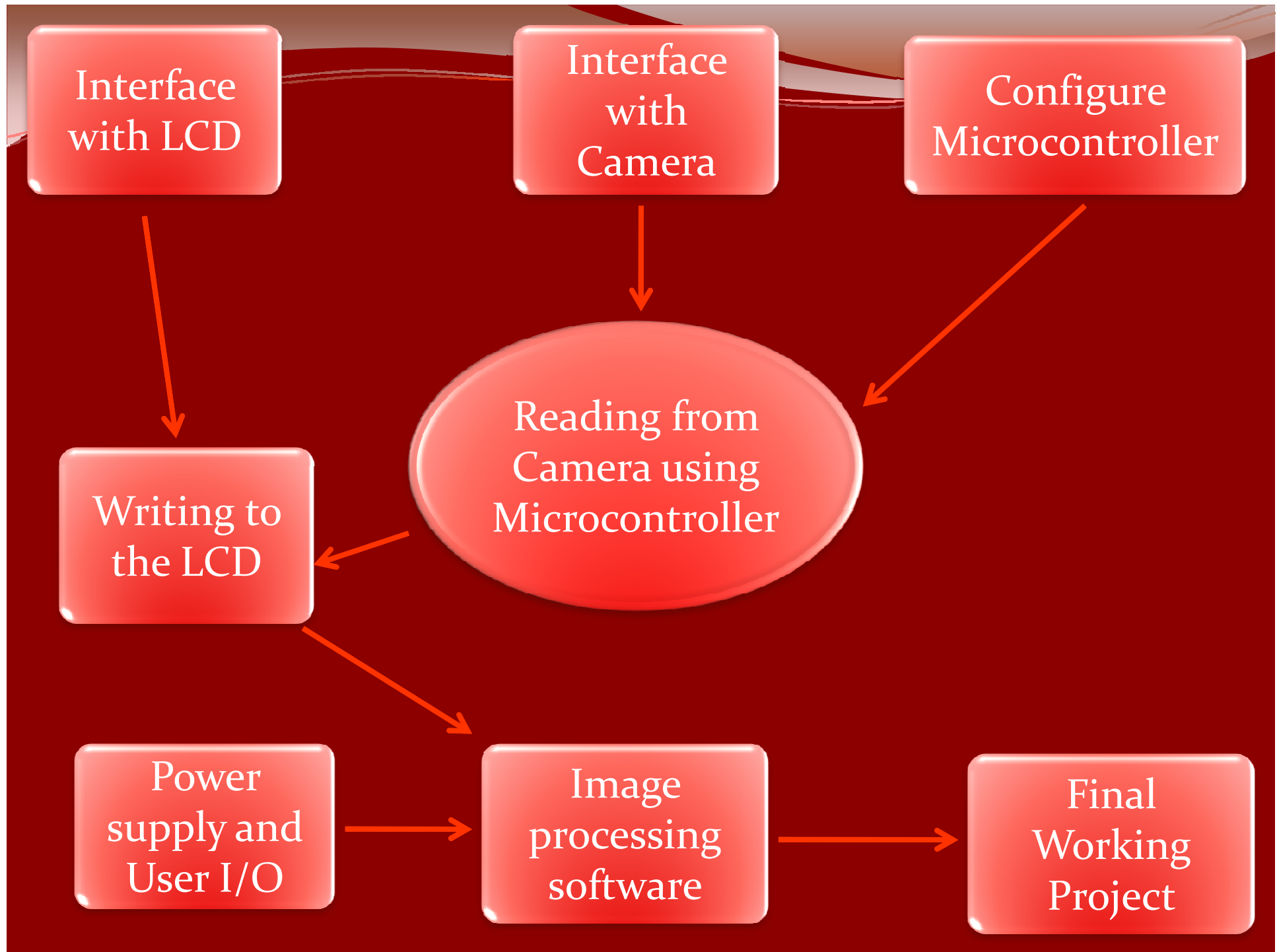
- 640 x 480 (30 FPS)
- 320 x 240 (60 FPS)
- 1/3 inch
- YUV format
- 8 bits of Y per pixel



System

Summary





Bill of Materials

Product	Quantity	Manufacturer	Price	Purchased
PT0353224-A102 LCD Screen	2	Palmtech	\$50.00	yes
C3188A-6018 Digital Camera	2	OmniVision	\$57.00	no
Spartan 3A Starter Kit	2	Xilinx	\$189.00	no
LCD Controller	2	TBD	TBD	no
Helmet	1	Walmart	\$7.00	no
Knobs	6	TBD	TBD	no
Power Supplies	1	TBD	TBD	no

Schedule

- **Start During Summer**
- September 1st – Initial Camera Interface
- September 1st – Initial LCD Interface
- October 1st – Initial FPGA microcontroller implementation.
- November 1st - Integration
- November 15th - Physical Hardware Design
- December – Debug, Prep for Demo

Risks

- ~~LCDs might completely obscure vision~~
- ~~Microprocessor might not be fast enough for image processing~~
- **Camera pixels may not easily translate onto screen pixels (see simulation)**
- ~~LCD interface components might not be able to sustain the targeted 30 frames per second~~