Simple Digital Camera with Image Editor

Group 3
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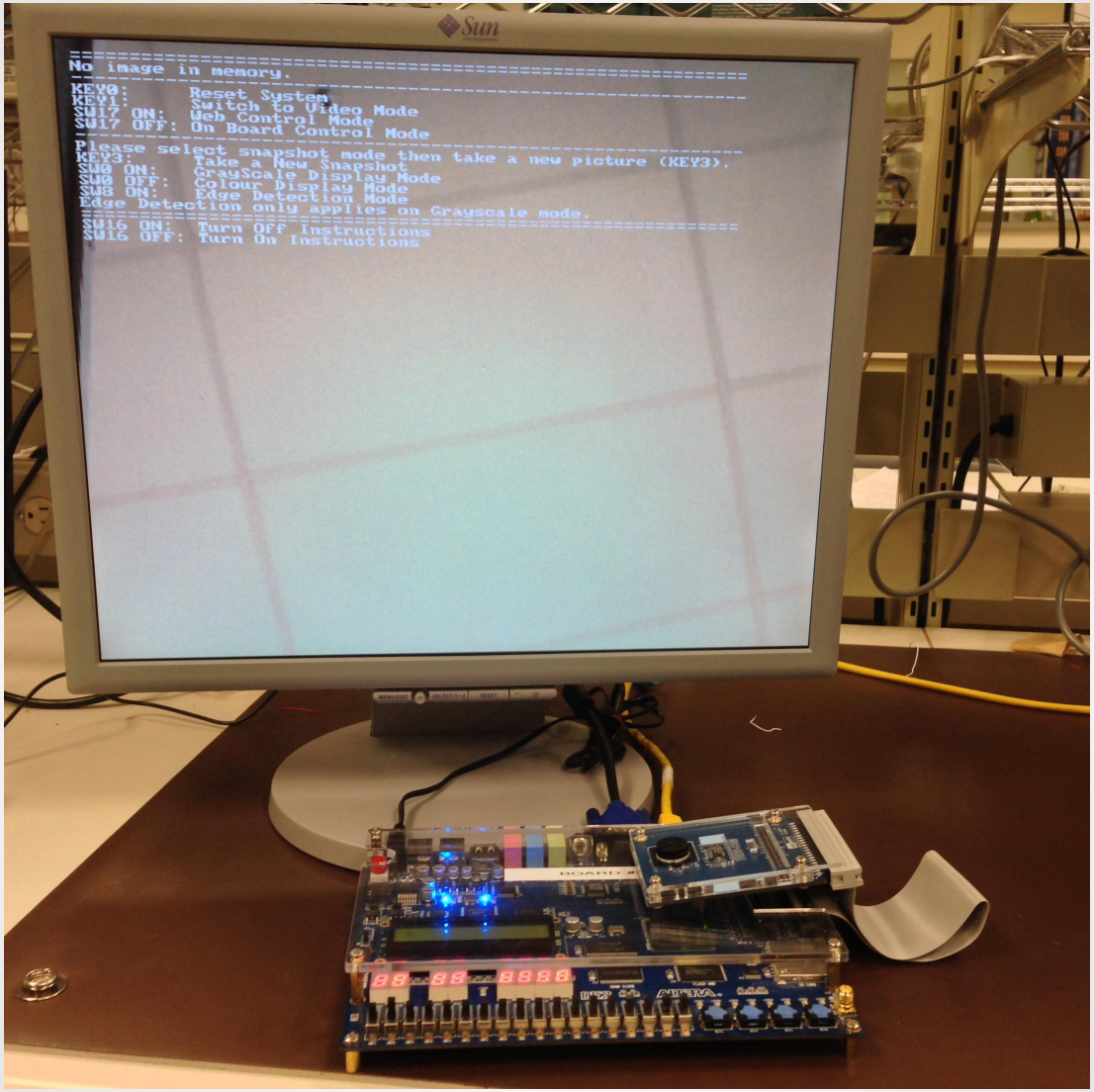

No image in memory.
KEY0: Reset System
KEY1: Switch to Video Mode
SW17 ON: Web Control Mode
SW17 OFF: On Board Control Mode
Please select snapshot mode then take a new picture (KEY3).
KEY3: Take a New Snapshot
SW0 ON: GrayScale Display Mode
SW0 OFF: Colour Display Mode
SW8 ON: Edge Detection Mode
Edge Detection only applies on Grayscale mode.
SW16 ON: Turn Off Instructions
SW16 OFF: Turn On Instructions

The System

- Major Components
  - D5M camera
  - DE2 Board
  - VGA monitor
- Image processing operations
  - Color Negation
  - Brightness Adjustment
  - Image rotation/reflection
  - Color filters
  - Edge detection
  - Color to Grayscale conversion

Algorithm

- **Negation**

  buffer[pixel] = 0xFF – buffer[pixel]

- **Brightness**

  buffer[pixel(R,G,B)] = buffer[pixel(R,G,B)] +/ – Brightness Step Size

- **Clockwise Rotation**

  index = 2*(320 *(320 – ((index/2) mod x) – 1) + row number)

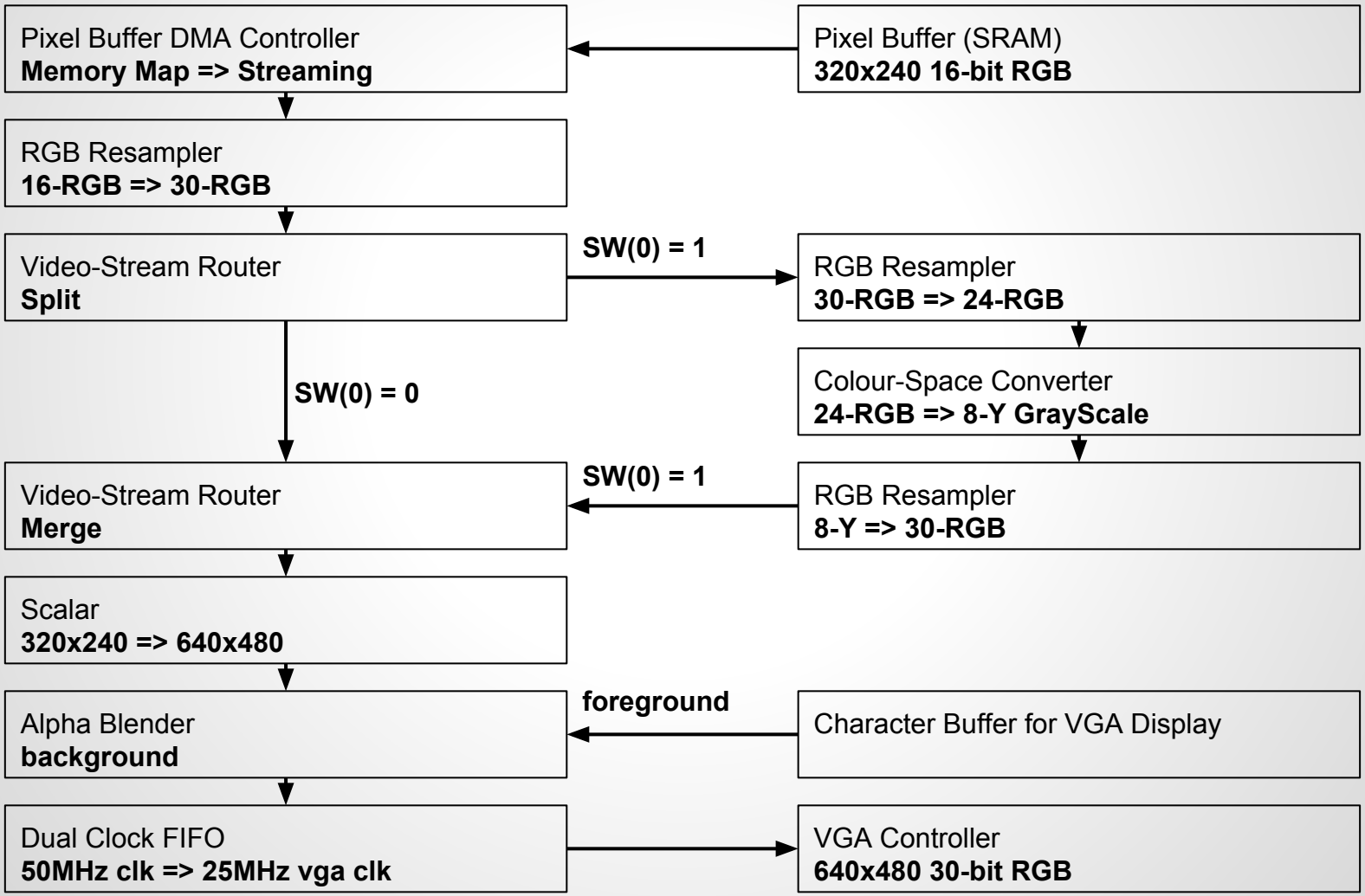
- **Mirror Reflection**

  index = 2*(320* row number + (320 – ((index/2) mod 320) – 1))

- **Ageing Effect**

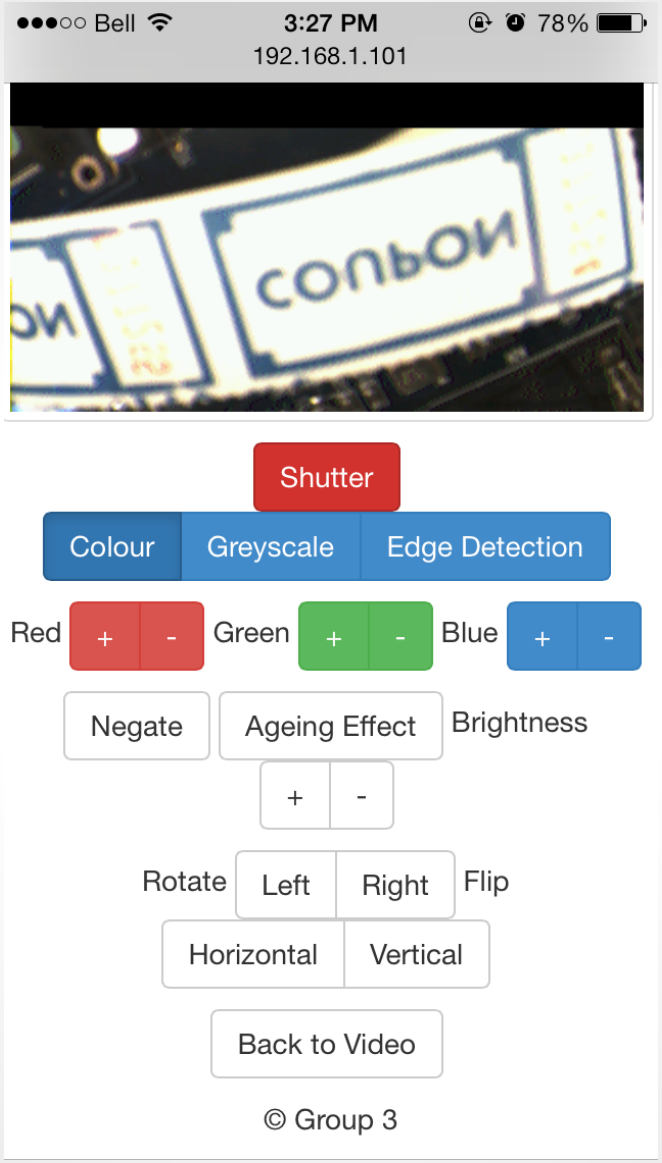
  pixel(R)=pixel(R)+0x03; pixel(G)=pixel(G)+0x02; pixel(B)=pixel(B)–0x03

Video Streaming



Web Editor

- Better user interface
- Server on DE2 board
- Client on web browser
- Send user control messages to the system
- Transfer image via Ethernet


●●●○○ Bell
3:27 PM
78%
192.168.1.101
Shutter
Colour
Greyscale
Edge Detection
Red
+
-
Green
+
-
Blue
+
-
Negate
Ageing Effect
Brightness
+
-
Rotate
Left
Right
Flip
Horizontal
Vertical
Back to Video
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Motivation

- Image quality of smartphones not comparable to high-end cameras
- Limited editing options
- Exploit the hardware capability

Optional Features to Add

- More editor functions
  - Noise deduction
  - More interesting filters
- Replace Ethernet with Wi-Fi module
- Smart phone APP

Or as the Base of Other Systems

- Camera Remote Control

- Add real time video streaming to the web server - Surveillance System!

System Demo