A Real-Time Video Processor
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Overview

- Applies overlay, zoom, and blue screen functionality to video signal
- Used for news or sports broadcasts
- Input and output NTSC signals
- PS/2 mouse and keyboard and VGA monitor for control interface
System Block Diagram
Framegrab Module

- Stores one frame (both fields) of video
- Starts at vertical sync following trigger
- Read by overlay and blue screen modules
Calibrate Logic computes correct threshold values to store in registers.

Background filter replaces background with stored frame.

Background filter accesses data from framegrab buffer a cycle early.
Zoom Module

- ZBT Buffer stores the frame so that it can be enlarged at the next cycle.

- Interpolation filter enlarges a specified portion of the image.
Overlay Module

- Rendering Logic updates pixel value based on which overlay objects are enabled
- Select Logic writes to the BRAMs
- BRAMs are dual-port – simultaneous read-write not a problem
Control GUI

1024x768

FRAMEGRABBER
- TRIGGER

BLUE SCREEN
- ENABLE
- CALIBRATE

ZOOM
- ENABLE
- 2x
- 4x
- 8x

OVERLAY
- TEXT1
  - ENABLE
  - SET POSITION
  - ENTER TEXT
- TEXT2
  - ENABLE
  - SET POSITION
  - ENTER TEXT
- FRAMEGRAB
  - ENABLE
  - SET POSITION
- TRACE
  - ENABLE
  - CLEAR
  - DRAW

TEXT BUFFER:
NOW IS THE TIME FOR ALL GOOD MEN...
Control Logic

- Mouse logic indicates when object is illuminated by mouse.
- Output registers/logic actuated by left click and mouse logic output.
Control GUI

- Generates XVGA timing signals
- Renders static objects – buttons, etc
- Renders dynamic objects – cursor, checkboxes, etc
Wrap-Up

- Apply overlays, zoom, and blue screen functions to video in real time
- Useful in TV production
- Five modular sub-parts, can be tested independently
- Questions?