

FPGA Passport

6.111 Project Checklist

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1 Baseline Goals

- (1) Background “destination” images stored on Flash; the FPGA is able to read these images out of Flash memory and display them on the monitor
- (2) Camera input to the Labkit
 - (a) NTSC camera pointing at user standing in front of green screen
- (3) User poses and then flips a switch to freeze the image
 - (a) Processing begins: green screen detected and removed/replaced by user-selected background (user selects background via input switches)
 - (b) Composited image shown on monitor
 - (c) User proceeds with image editing by using switches to select editing options and using buttons for customization (see expected goals)
- (4) After editing the image, the user flips a switch to store current VGA output in BRAM; the user can then press a button to initiate image data transfer to PC; image is transferred in uncompressed bitmap format

2 Expected Goals

- (1) User will be able to toggle a switch to add text to the composited image
 - (a) Default text will be “GREETINGS FROM ___” – these will be pre-programmed and will correspond to user-selected backgrounds; for example, if there is an image of the Eiffel Tower in the background, the blank will say “Paris”
 - (b) User will be able to move text around the screen using four button inputs
- (2) User will be able to toggle a switch to add graphics to the composited image

- (a) Example Graphics
 - i. Crown
 - ii. Mustache
 - iii. Adventure Hat
 - iv. Sunglasses
 - (b) User will be able to move graphics using four button inputs
- (3) User will be able to toggle a switch to add filter effects to the output image
- (a) Implemented filters will be selected via button inputs
 - (b) Basic filters: sepia, negative
- (4) User will be able to enhance the composited image
- (a) User will be able to change the saturation and brightness of the image
 - (b) Enhancements will be made visible on the monitor in real-time

3 Stretch Goals

- (1) User will be able to add custom text to the composited image
 - Custom text (up to a max number of characters in length) will be sent as a series of character bytes from the PC to the FPGA
 - Corresponding text will be generated and overlaid on the image
- (2) Face detection to assist in auto-placement of graphics
- (3) Improved chroma key detection
- (4) More advanced filters: soft glow, cartoon