FPGA-Scope: A Labkit Implemented Oscilloscope
6.111 Final Project Checklist

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**Data Collection (Anartya)**

**ADC**
- AD574 12-bit ADC
- max input frequency 1kHz
- if time permits, multiple channels

**ADC Controller**
- tells ADC to sample with period delta-t

**Samples BRAM**
- stores 748 * 4 samples, each 12 bits

**Data Processing (Anartya/Kevin)**

**Math Module (Anartya)**
- measures input signal statistics
  - average voltage
  - peak-to-peak voltage
  - frequency
- trigger address
  - peak triggering
  - if time permits, edge/level triggering

**Decimal Module (Kevin)**
- converts statistics and delta-V to decimal
- stores decimal images and labels in numbers BRAM

**Numbers BRAM (Kevin)**
- stores 700 * 242 pixels, each 1 bit

**Scaling Module (Kevin)**
- converts samples BRAM data to a scaled waveform
- horizontal scale (delta-T) and vertical scale (delta-V) set by user
- if time permits, delta-T and delta-V may be autoset
- finds correct sample window using trigger address
- converts 12-bit samples to scaled 10-bit samples

**Waveform BRAM (Kevin)**
- stores 748 samples, each 10 bits

**User Interface (Kevin)**

**Menu FSM**
- takes debounced button inputs from the user
• specifies the delta-V and delta-T parameters for other modules
• button one selects delta-T, button two selects delta-V
• up and down buttons change the parameter values
• creates the image of delta-t that is stored in the delta-t BRAM.

**Delta-T BRAM**
• stores 100 * 34 pixels, each 1 bit

**VGA Display (Kevin)**

**VGA Controller**
• combines the numbers BRAM, the delta-t BRAM and the waveform to create display
• positions BRAMs relative to each other
• provides read warnings for other modules
• converts samples in waveform BRAM to image and adds grid-lines