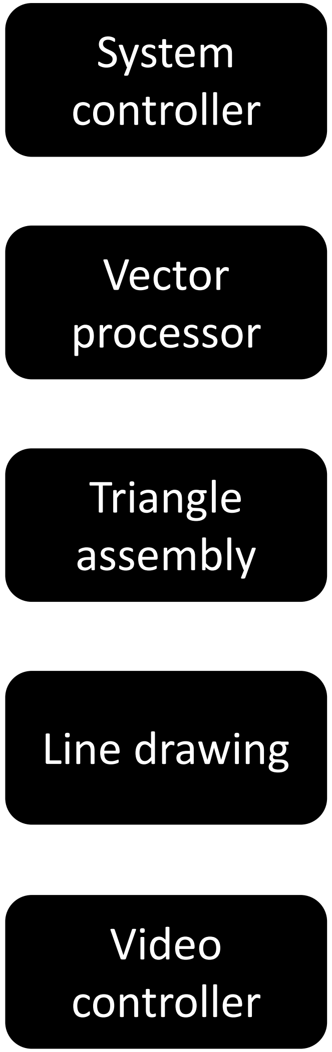
- Overall view



System controller

Vector processor

Triangle assembly

Line drawing

Video controller

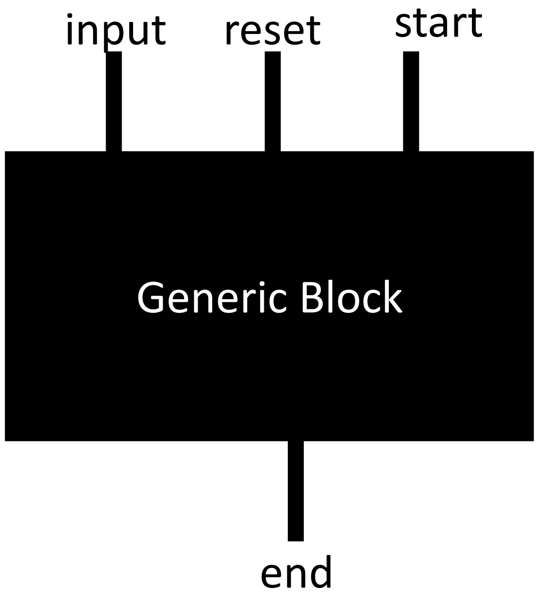
- System Controller

- A giant state machine that coordinate the operation of the whole pipeline.

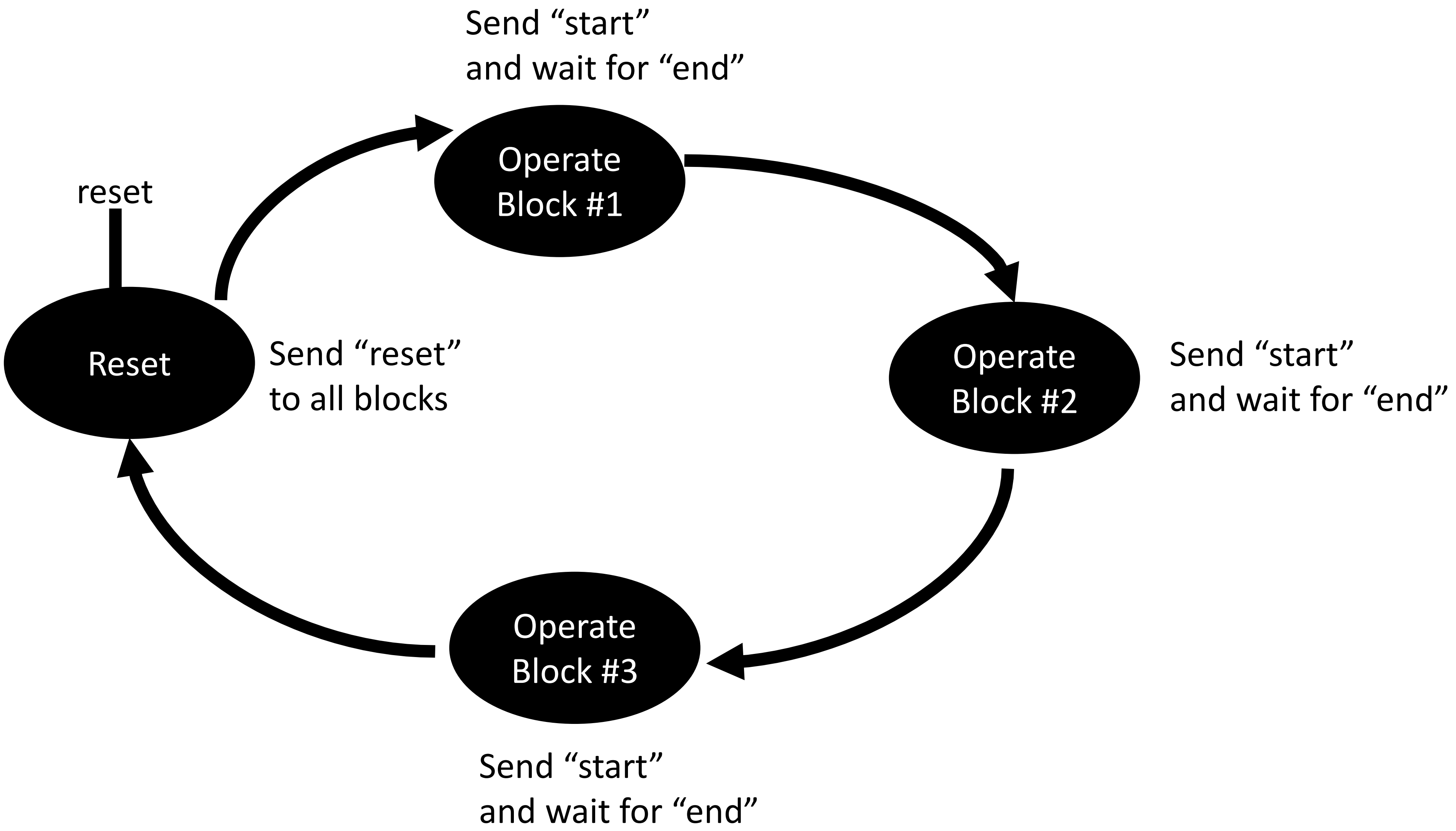
- Operation sequence is enabling the vector processor, wait for completion of stored program, start triangle assembly, feed triangles to line drawing unit, wait for drawing completion and start the video controller

- System Controller(2)

- A simple pipeline managing protocol can be as shown.
- At start up a reset signal should be sent to each block in the pipeline
- Before sending a start signal to any block “input” data should be ready
- “start” signal should go high for only one cycle for the block to start working. When block complete its task “end” signal should go high for one cycle



- System Controller(3)



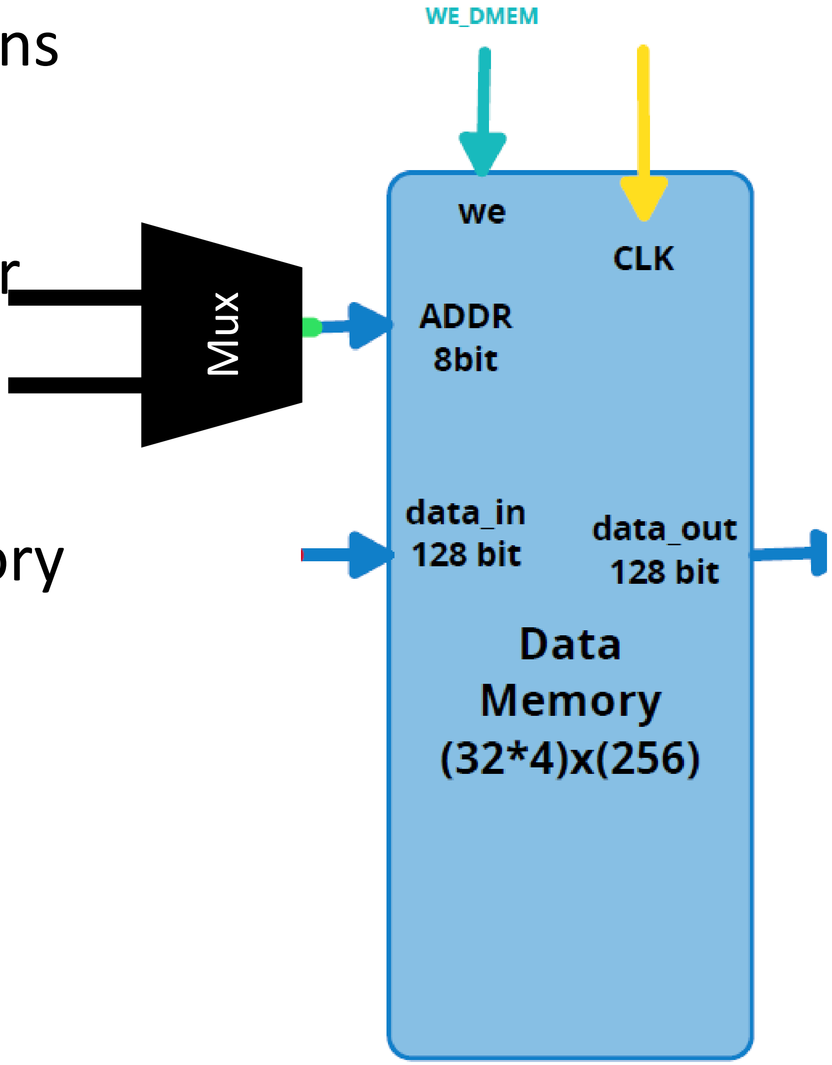
- Vector processor

- The functionality of the vertex processor should be frailly understood. It’s job is applying math operations on vector data using SIMD style

- What’s new here is that we will add another mux for addr port of the mux.

- Data memory will be preloaded with vertex data. Transformed vertices will be stored in certain memory locations (at addr certain offset)

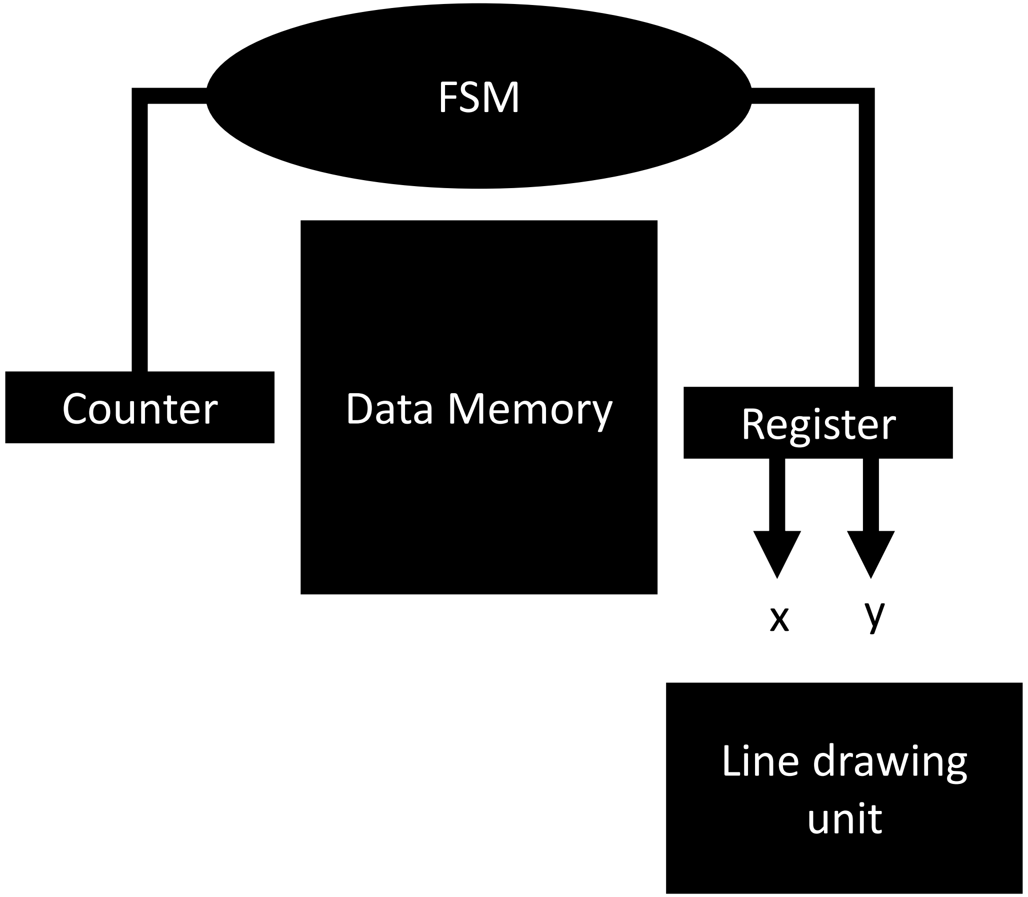
- Triangle assembly unit will read that memory to assemble every three vertices in to one triangle



- Triangle assembly

- The function of this block is to gather vertex data from “Data memory” and assemble it into triangle vertices

- Triangle vertices has to be internally organized so that line drawing unit is fed with line segments needed to draw each line

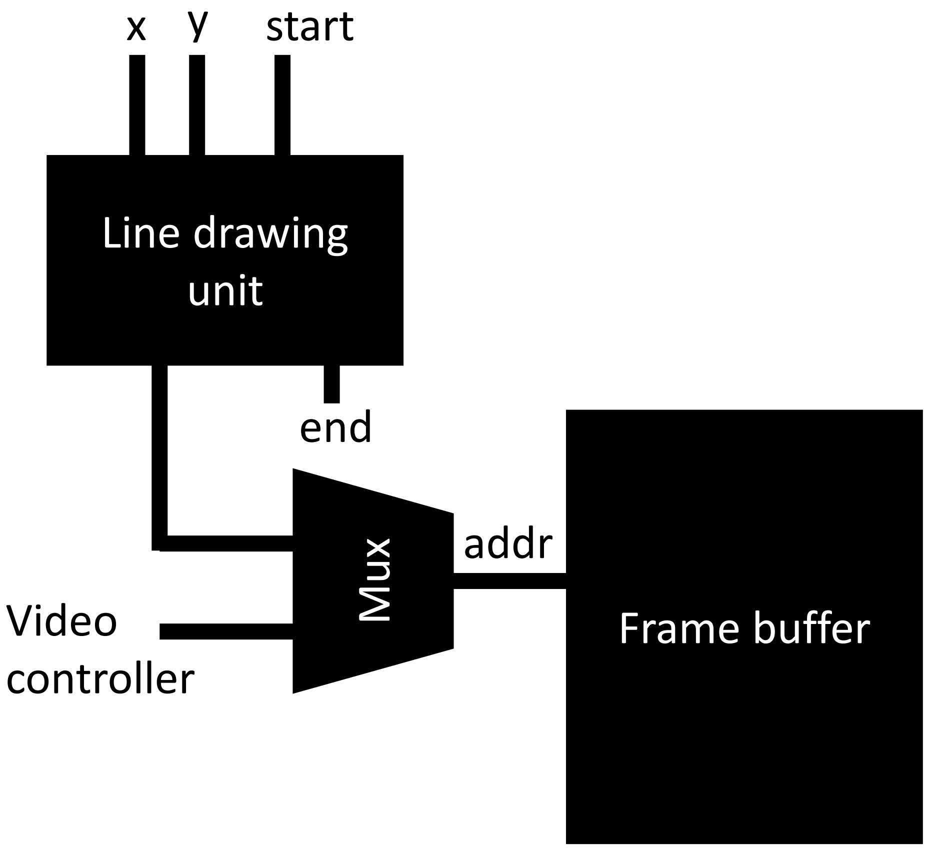


- Line drawing

- This unit is designed to draw lines. It should be fed with 2d vertices (x, y) for each line segment.

- Drawing will happen in the frame buffer. When it's complete "end" signal will go high

- Control signals for frame buffer mux should control access rounds between line drawing (writing pixels) & video controller (reading pixels)


x
y
start
Line drawing unit
end
Mux
addr
Video controller
Frame buffer