Hardware Accelerated Super Resolution & Framerate Upscaling

ECE532 Design Project
Group 2

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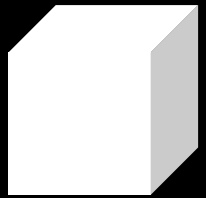
Motivation

1. Real-time rendering 3D content (e.g. gaming) is compute intensive and hardware (GPUs) is expensive.
2. Video sources may be low quality (low resolution, low frame rate)

Solution

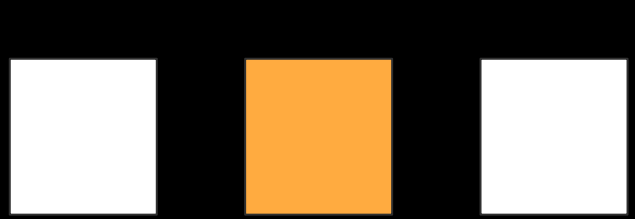
HD@30FPS



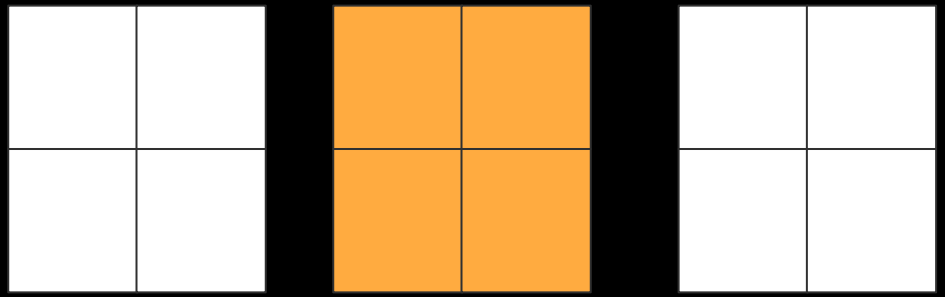
up-scaler

FHD@60FPS

Solution

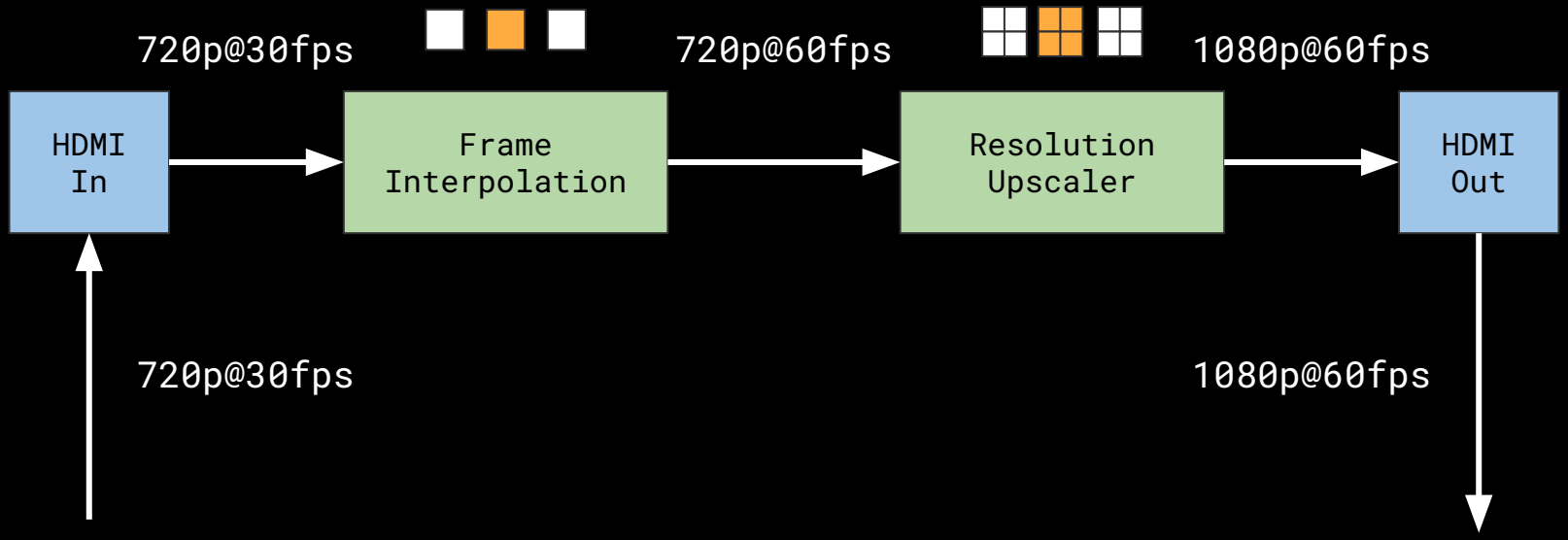


Interpolate



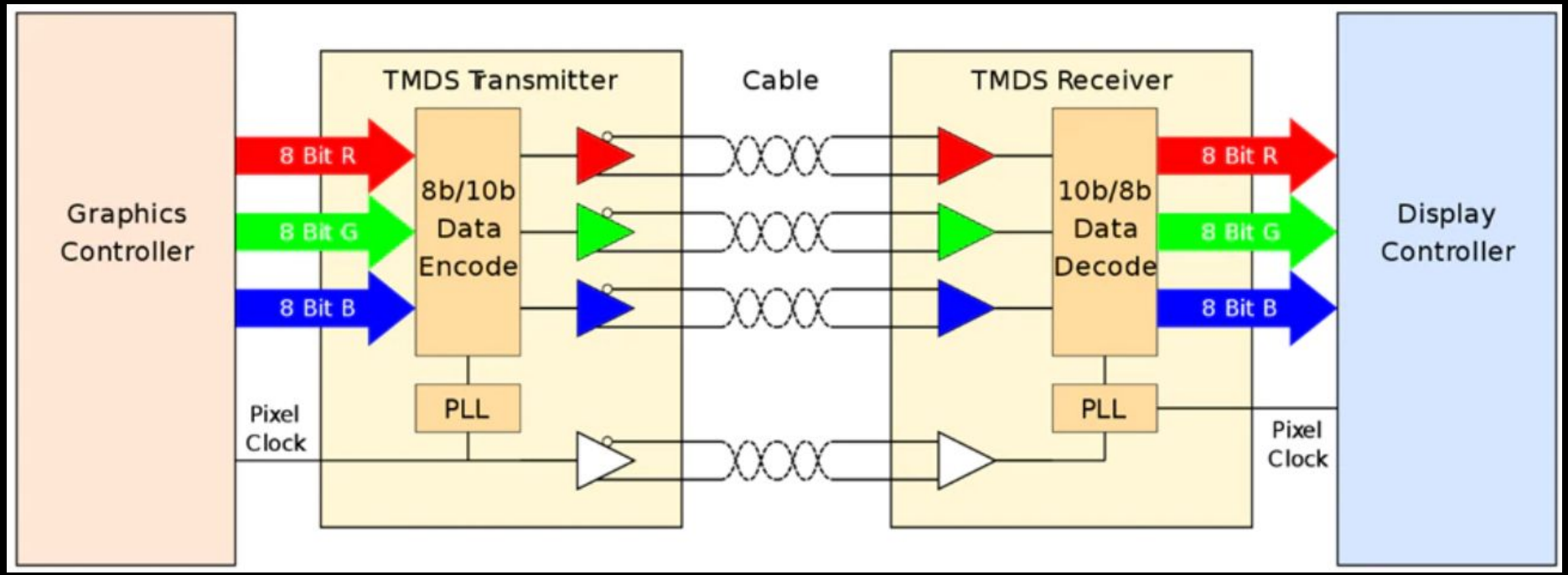
Upscale

High Level Design

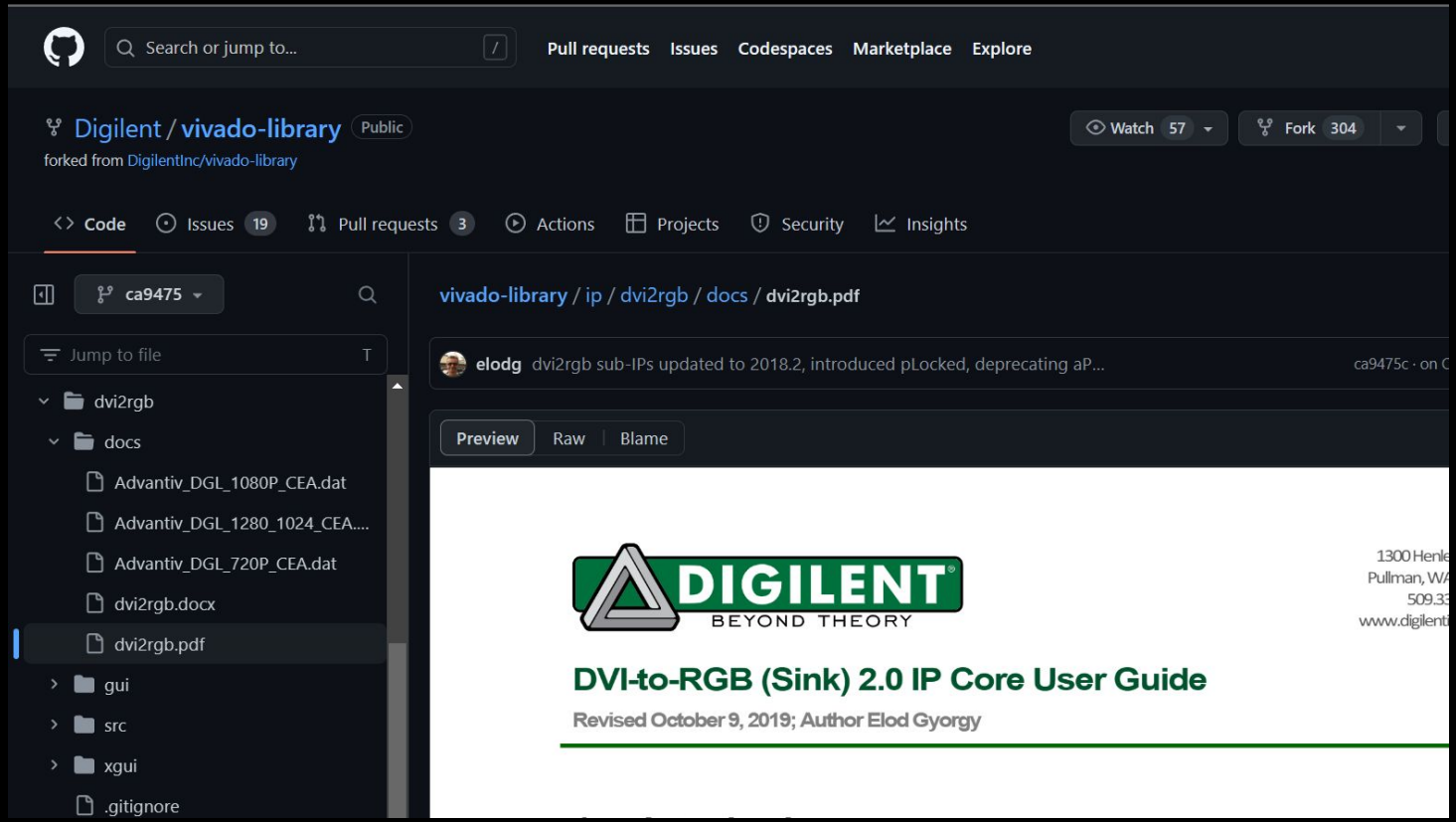


Component Architectures

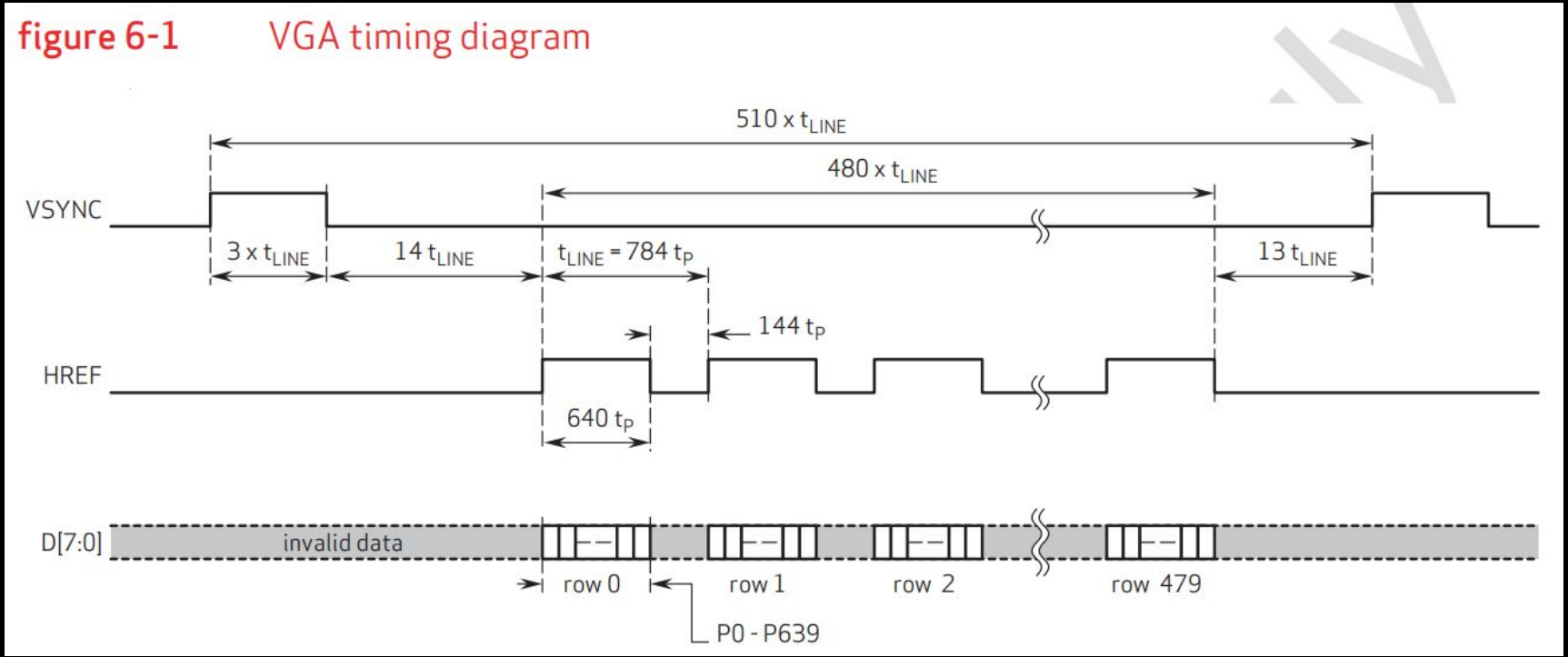
HDMI Video Processing



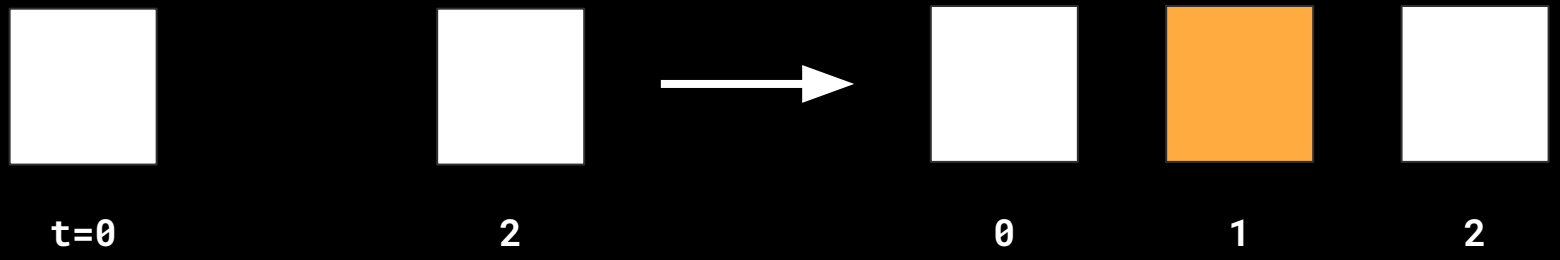
HDMI Video Processing



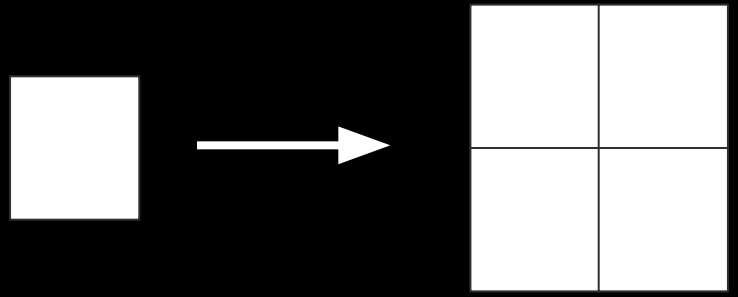
HDMI Video Processing



Framerate Upscaling

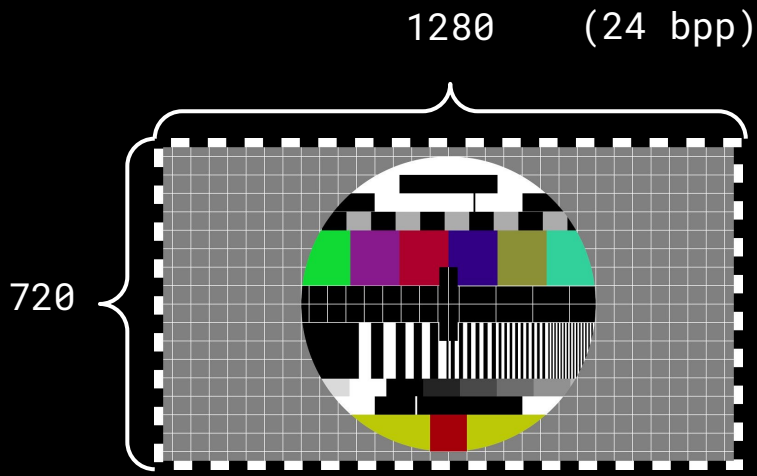


Resolution Upscaling



720p ***1080p***

Key Challenges

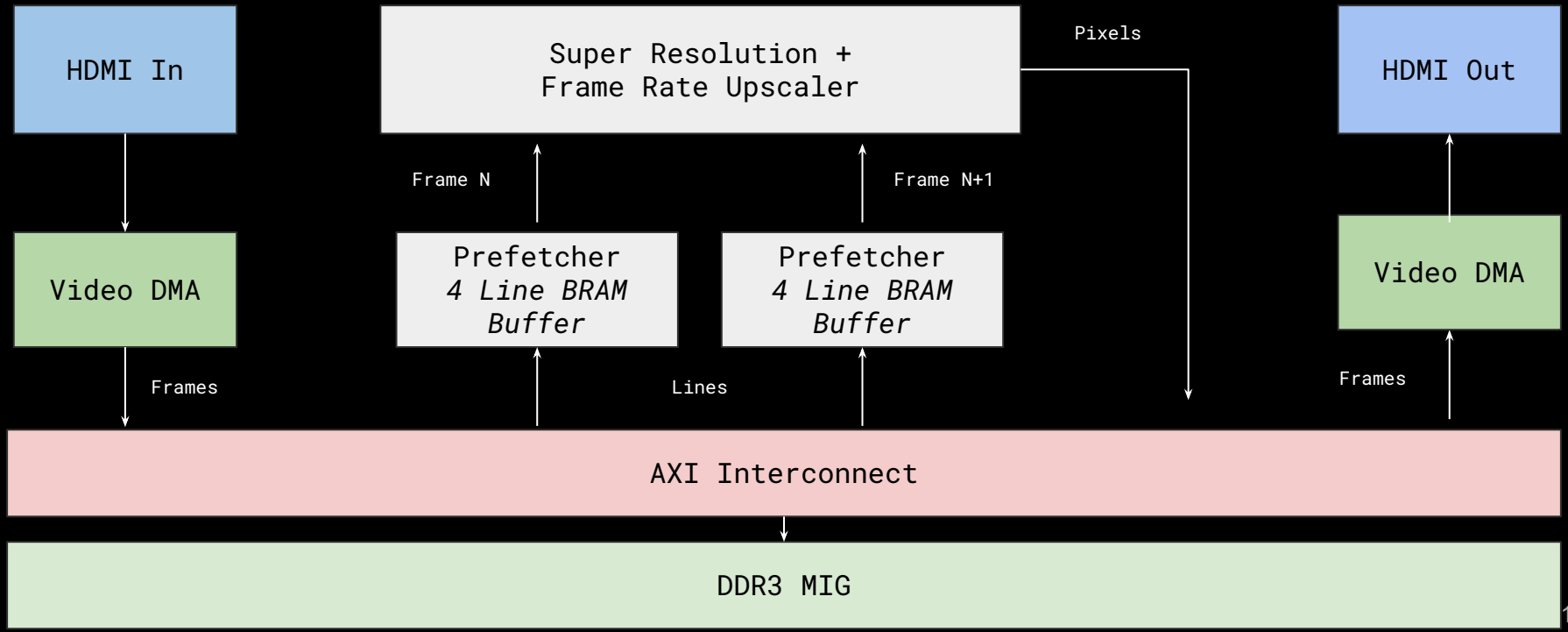


> 22 Mbits

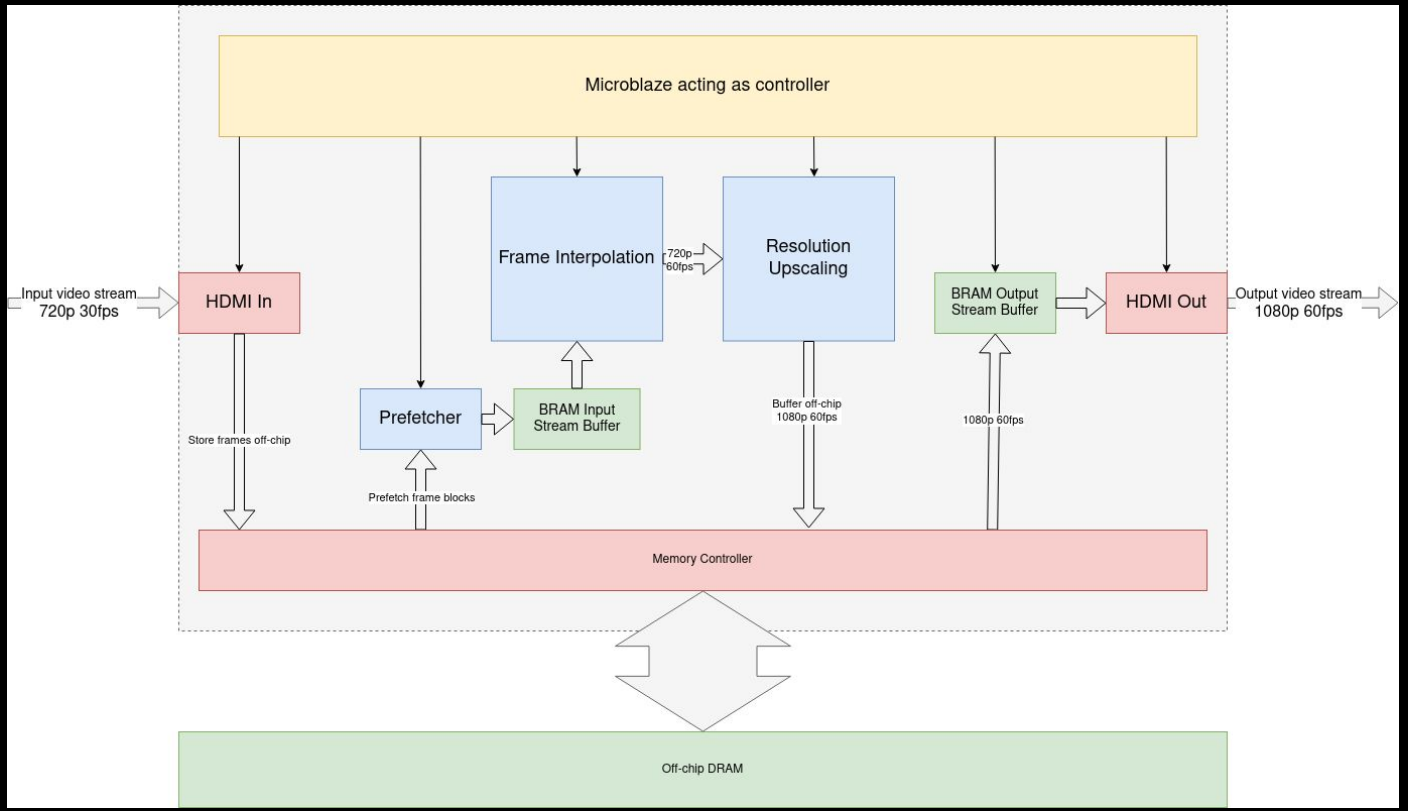
>

13,140 kbits
BRAM

Key Challenges



System Architecture



Milestones

Video Upscaling Interpolation Control

Milestone 1

Design + Environment

Video Upscaling Interpolation Control

Milestone 2

HDMI

Video Upscaling Interpolation Control

Milestone 3

Passthrough

Video Upscaling Interpolation Control

Milestone 4-5

Algorithms

Video Upscaling Interpolation Control

Milestone 6

Control

Video Upscaling Interpolation Control

Q&A