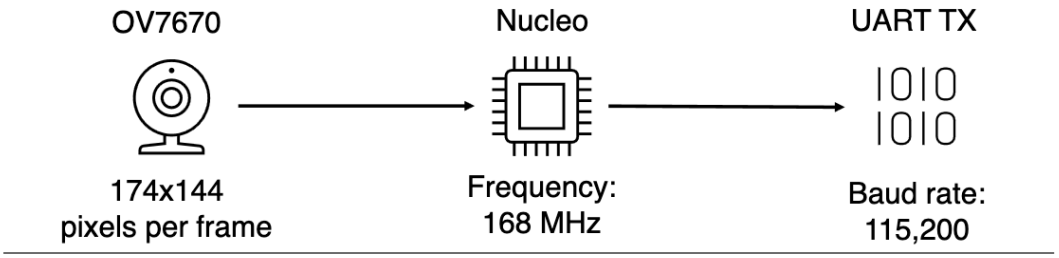
Bandwidth Analysis

- how fast each one operates and which one becomes the bottleneck & increase performance/decrease energy
  - how fast each component is currently running?
  - what's the fastest each component **can** run?
- example:
  - 177×144 frame, 16bit channel, 177*144*16 = 400, 896 bits per frame
  - 30 fps
  - 12, 000, 000 bits per second
  - 168 MHz GPU, copies 32 bits per cycle
  - 400 800 bits per frame / 32 bits / cycle = 12528 cycles/frame

- UART TX is the slowest at 0.46 fps and is the bottleneck for this system.



Maximum FPS	30	13,410	0.46

- How will the analysis change when we only send 4-bits per pixel?
  - Frame size = 174 x 144 x 4 = 100,224 bits = 12,528 bytes
  - Frame rate = 11,520 bytes/sec ÷ 12,528 bytes = **0.92 FPS**.

Data Compression

- reducing amount of data by removing redundancies
- **compression ratio** = original data size / compressed data size

Run-Length Encoding (RLE)

- 4 bits for count
- **worst case** every pixel value is different ⇒ twice as long
- **best case** every pixel value is the same