

DS90UB96x CSI-2 Output Bandwidth Calculation Example

$\text{freq_csi} := 800\text{MHz}$	<i>csi_2 lane rate</i>
$\text{Hactive} := 1280$	<i>video line length in pixels</i>
$\text{bits_per_pxl} := 12$	<i>bits per pixel</i>
$\text{num_lanes} := 4$	<i>number of csi lanes</i>
$\text{num_cameras} := 4$	<i>number of sensors / cameras</i>
$\text{Pkt_Overhead1} := 1.84\mu\text{s}$	<i>Pkt_overhead1: Turnaround value without continuous clock</i> <i>1.6 Gbps: 1.555us</i> <i>800 Mbps: 1.840us</i>
$\text{Pkt_Overhead2} := 0.82\mu\text{s}$	<i>Pkt_overhead2: Turnaround value with continuous clock</i> <i>1.6 Gbps: 675ns</i> <i>800 Mbps: 820ns</i>

Output Bandwidth with Line-Concatinated Forwarding

$$\text{BW}_{\text{lconc_out1}} := \frac{\text{num_cameras} \cdot \text{Hactive} \cdot \text{bits_per_pxl}}{\left(\frac{\text{num_cameras} \cdot \text{Hactive} \cdot \text{bits_per_pxl}}{\text{num_lanes} \cdot \text{freq_csi}} + \text{Pkt_Overhead1} \right)} = 2.92\text{-GHz} \quad \text{w/o continuous clock}$$

$$\text{BW}_{\text{lconc_out2}} := \frac{\text{num_cameras} \cdot \text{Hactive} \cdot \text{bits_per_pxl}}{\left(\frac{\text{num_cameras} \cdot \text{Hactive} \cdot \text{bits_per_pxl}}{\text{num_lanes} \cdot \text{freq_csi}} + \text{Pkt_Overhead2} \right)} = 3.069\text{-GHz} \quad \text{w/ continuous clock}$$

Output Bandwidth with Basic Synchronized or Line-interleaved Forwarding

$$\text{BW}_{\text{out1}} := \frac{\text{Hactive} \cdot \text{bits_per_pxl}}{\left(\frac{\text{Hactive} \cdot \text{bits_per_pxl}}{\text{num_lanes} \cdot \text{freq_csi}} + \text{Pkt_Overhead1} \right)} = 2.313\text{-GHz} \quad \text{w/o continuous clock}$$

$$\text{BW}_{\text{out2}} := \frac{\text{Hactive} \cdot \text{bits_per_pxl}}{\left(\frac{\text{Hactive} \cdot \text{bits_per_pxl}}{\text{num_lanes} \cdot \text{freq_csi}} + \text{Pkt_Overhead2} \right)} = 2.733\text{-GHz} \quad \text{w/ continuous clock}$$