Lab 3 – Timing Optimizations

# List of Optimizations

## Optimization 1:

Figure - Summary of Paths

Table

Description automatically generated with medium confidence

### Critical Path:

* FIFO -> multout of timing

Figure - Statistics showing Cell Data as 68% of the delay

Application, table, Excel

Description automatically generated

Figure - Data Arrival Path Showing dataout[17] with 3.076 delay

Table

Description automatically generated

* Can infer the longest path of 3.076 is talking about the output data from the multipler
* Can infer it is talking about the fifo read data coming into the multipler and the output from the multiplier.

After Optimization:

Table

Description automatically generated

## Optimization 2:

### The same signals were still causing the most slack, so I tried another optimization.

### This time, I registered the rd\_data output which increased the clock again.

After optimization:

Table

Description automatically generated

## Optimization 3:

Figure - Summary of Paths and Statistics for Optimization 3

Table

Description automatically generated

### Critical Path:

* total\_count\_r -> total\_count\_r

### Code Changed:

After Optimization:

Table

Description automatically generated

## Optimization 4:

Summary of Paths and Statistics for Optimization 4

Table

Description automatically generated

Figure - Path of Longest Slack

Diagram, schematic

Description automatically generated

### Critical Path:

* IC and CELL of multiply.

### Code Changed:

* Registered the fifo\_rd\_data signal

After Optimization:

Table

Description automatically generated

## Optimization 5:

Summary of Paths and Statistics for Optimization 5

Graphical user interface, application, table

Description automatically generated

### Critical Path:

* Count\_r

### Code Changed:

* Removed one bit from count\_r, used the almost full signal instead of FULL, removed the rd\_en, since valid\_rd is only based on !empty

After Optimization:

A picture containing table

Description automatically generated

## Optimization 6:

Summary of Paths and Statistics for Optimization 6



Applied faster clock constraint

Graphical user interface, application, table, Excel

Description automatically generated

### Critical Path:

* Total\_count\_r

### Code Changed:

* Increased the multicycle clock path by 1 temporarily to find more bottlenecks

# List of Code Changes

1. Got rid of read during write behavior and optimized the counter
2. Registered the rd\_data output