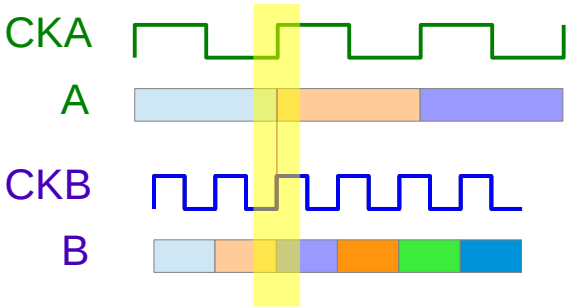
Resolution

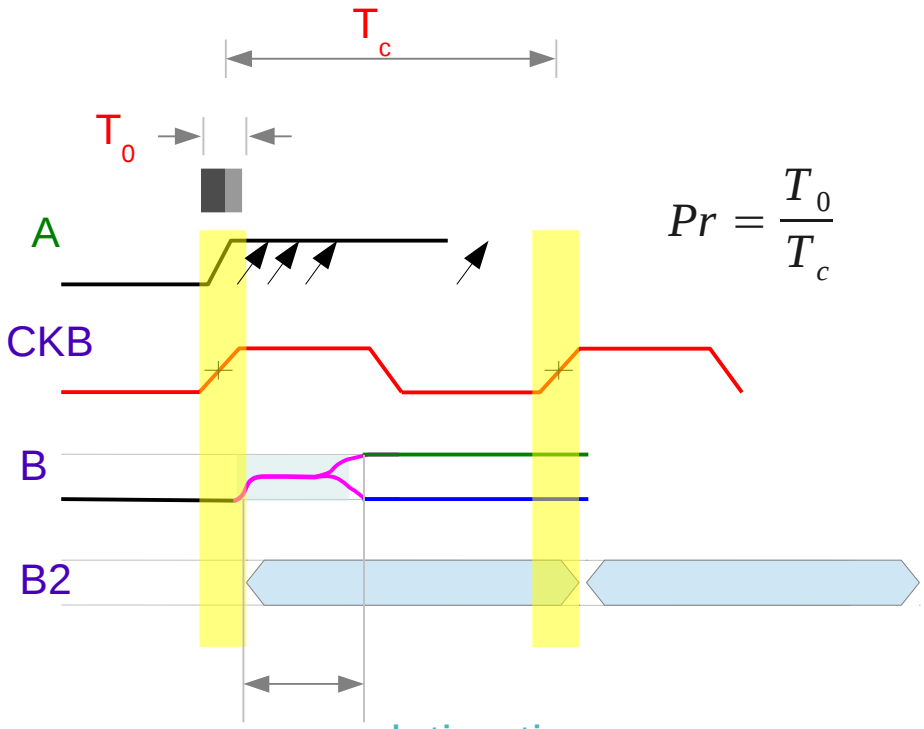
Please send corrections (or suggestions) to youngwlim@hotmail.com.

This document was produced by using OpenOffice and Octave.

Resolution Time



unrelated clock domain

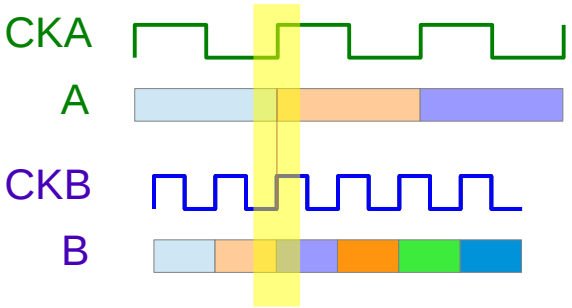


$$Pr = \frac{T_0}{T_c}$$

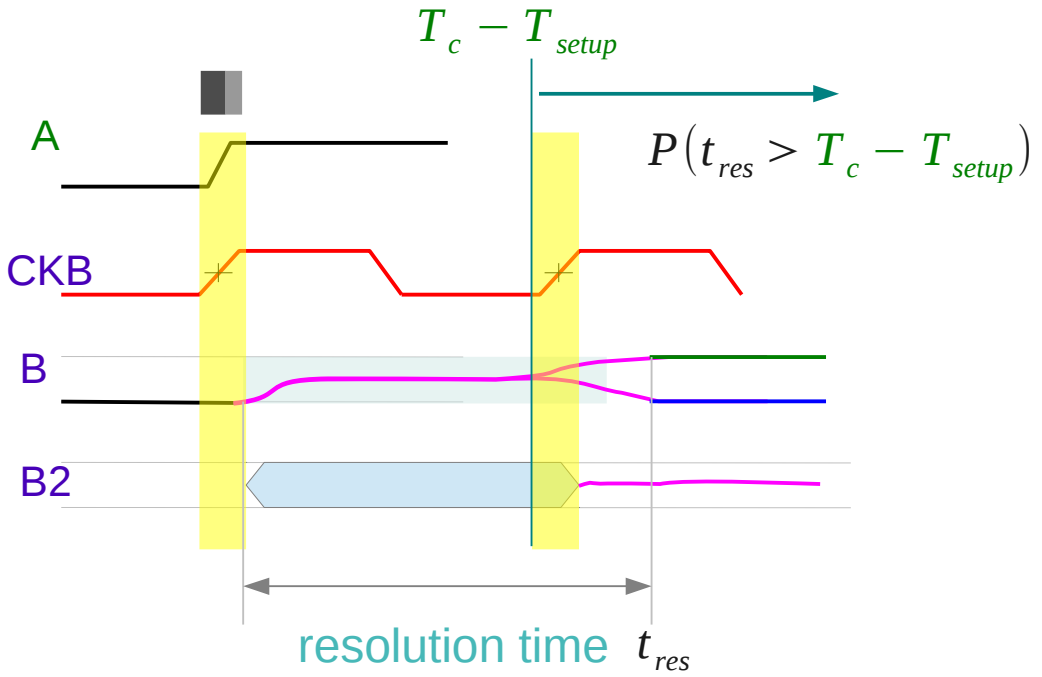
$$P(t_{res} > t) = \frac{T_0}{T_c} e^{-t/\tau}$$

τ time constant depending on a specific flip flop implementation

P(failure)



unrelated clock domain

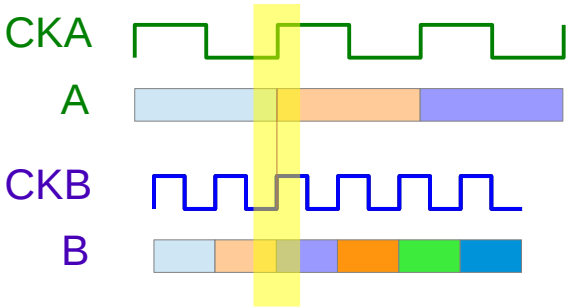


$$P(t_{res} > t) = \frac{T_0}{T_c} e^{-t/\tau}$$

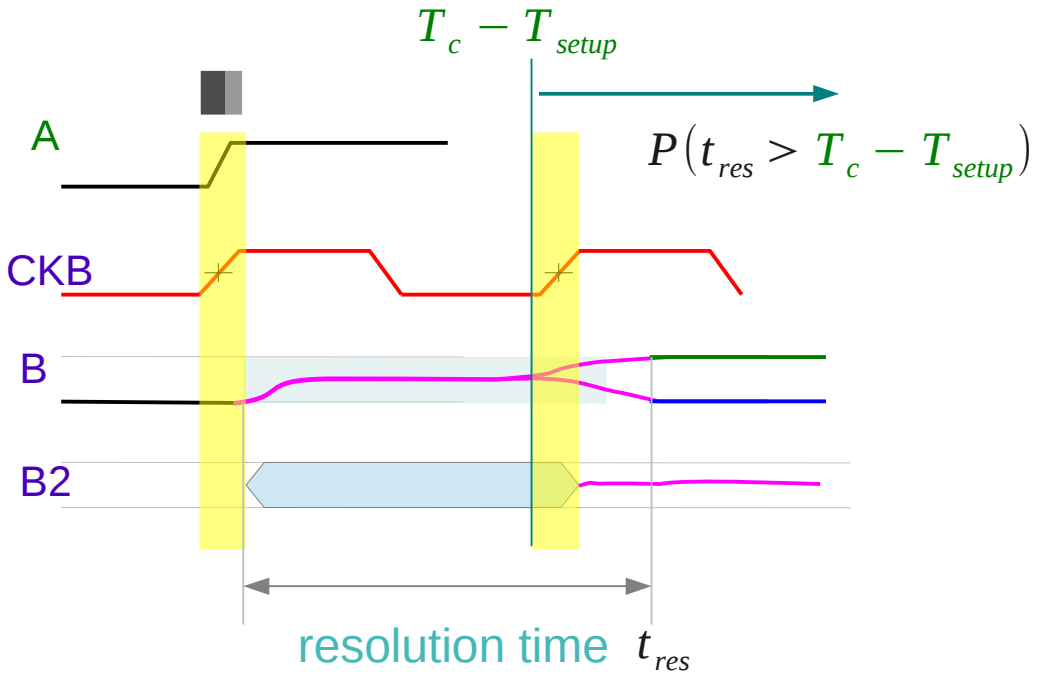
$$P(t_{res} > T_c - T_{setup}) = \frac{T_0}{T_c} e^{-(T_c - T_{setup})/\tau}$$

$$P(failure) = \frac{T_0}{T_c} e^{-(T_c - T_{setup})/\tau}$$

Mean Time Between Failures



unrelated clock domain



$$P(t_{res} > t) = \frac{T_0}{T_c} e^{-t/\tau}$$

$$P(t_{res} > T_c - T_{setup}) = \frac{T_0}{T_c} e^{-(T_c - T_{setup})/\tau}$$

$$P(failure) = \frac{T_0}{T_c} e^{-(T_c - T_{setup})/\tau}$$

input A changes N times per second

$$MTBF = \frac{1}{P(failure) / sec}$$

$$= \frac{T_c}{N T_0} e^{+(T_c - T_{setup})/\tau}$$

Resolution Time

References

[1] http://en.wikipedia.org/
[2] M. M. Mano, C. R. Kime, “Logic and Computer Design Fundamentals”, 4th ed.
[3] J. Stephenson, Understanding Metastability in FPGAs. Altera Corporation white paper. July 2009.