

TIME - Functional Specification Document

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1 Overview

TIME stands for Timing Improvement Made Easy. As the name says it is tool built to help a designer to fix timing violations, namely setup, hold and transition. The tool can work in two modes - automated and assisted. In the automated mode the tool will fix the violations automatically. In the assisted mode the tool provides an intelligent GUI to quickly experiment with various changes to fix the violations.

The first version of the TIME will fix setup violations at the worst case.

2 Tool flow

The tool operates in three stages:

1. Setup

- (a) Read libraries (all corners)
- (b) Read netlist
- (c) Read timing report
- (d) Relate the report to netlist
- (e) Run eQAtor timing engine and calibrate against timing report
- (f) Analyze the timing violations
 - i. Sort violations and create histogram
 - ii. For points on violating paths, find #violating paths passing through each point

2. Automated Fixing

- (a) Decide on an order to fix paths - hardest first, easiest first, parse order, hardest point first
- (b) For each path with a setup violation
 - i. Create histogram of cell delay, net delays and transitions
 - ii. If (cell delay > limit) try to upsize the cell
 - iii. If (net delay > limit) try to upsize the driver

- iv. If (transition > limit) try to upsize driver
- v. Retime all paths through the changed cell
- vi. Repeat until path fixed

3. Manual Fixing

3 Implementation

TIME will be implemented as a modular part of eQAtor i.e. it should be possible to build a version of TIME which only includes the files that are required for running TIME. All TIME specific files should live in eQAtor/timing directory -

- *make_rw_entrpt* - read/write encounter timing analysis report
- *make_rw_prtrpt* - read/write primetime timing analysis report
- *make_anal_trpt* - analyze timing
- *make_fix_timing* - fix timing

4 Enhancement

1. Add fixing for hold violation
2. Add fixing for transition violation
3. Add fixing for max cap
4. Support for multiple libs