



AutoBench™ Version 1.1

Benchmark Name: Tooth to Spark

Benchmark Description

This EEMBC benchmark simulates an automotive application where the CPU controls fuel injection and ignition in the engine combustion process. Tooth-to-Spark, part of an Engine Control Unit (ECU), performs real-time processing of air/fuel mixture and ignition timing. Based on the operating conditions presented to the ECU, the CPU adjusts the output values for fuel injector duration and ignition timing from ‘nominal’ values on each pass.

The ECU determines whether the engine is running or not, and enables the fuel pump and igniters accordingly. While the engine is being started, the ECU performs special fuel injection duration and spark timing to optimize starting conditions.

Once the engine is running, the CPU processes the output variables for injector and igniter timing on each pass. The CPU primarily makes adjustments according to the engine speed/load parameters, but also makes lesser adjustments for other variables.

The entire process is repeated on each pass, taking input values from the test data and computing new output values. The input test data can reside in ROM or RAM, so comparisons can be made for performance from either memory source.

Optimization Rules

Category	Allowed	Disallowed
ANSI C	X	
Intrinsics/Language Extensions	X	
Custom Libraries	X	
Assembly Language	X	
HW Accelerators	X	

Algorithm Flowchart (page 2)

Algorithm
Flowchart

