



AutoBench™ Version 1.1

Benchmark Name: Angle to Time Conversion

Benchmark Description

This EEMBC benchmark simulates an embedded automotive application where the CPU reads a counter which measures the real-time delay between pulses sensed from a toothed wheel (gear) on the crankshaft of an engine. Then the CPU determines the Top Dead Center (TDC) position on the crankshaft, computes the engine speed, and provides a conversion from the tooth wheel pulses to precise crankshaft angle position. This value is expressed in linear time from TDC. The tooth wheel pulses actually represent crankshaft angle, and the delay between pulses yields angular velocity of the crankshaft (engine speed).

The kernel starts each pass of the loop by reading a previous real-time counter value from the test data file. The previous counter value is subtracted from the current counter value to determine the time between teeth edges. As long as the CPU does not detect TDC, the tooth pulse counter is incremented, and indicates progress through a crankshaft revolution. As the tooth pulse counter increments, each cylinder is 'fired' in turn once its 'firing angle' (tooth number) is reached. At each cylinder firing a precise 'firing time' is issued to some external hardware counter. Detection of the next TDC causes the tonewheel tooth counter to be reset to zero, and the entire process begins again.

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