Scope of work

Measure code performance via the CPU performance counters.

The CPU performance counters are counting the number of instructions, clock ticks and multi counters ticks. They are used to measure the run-time of a c-function. The result is stored in a global variable.
Introduction

The CPU performance counters are part of the TriCore™ CPU core and need to be accessed via the On-Chip Debug Support (OCDS) module, which is used for debugging and performance optimization.
Hardware setup

This code example has been developed for the board KIT_AURIX_TC297_TFT_BC-Step.
Implementation

Running CPU performance counters

The function `runCpuPerfCounters()` measures the run-time of the function `loop()`, which is placed between the `IfxCpu_resetAndStartCounters()` and `IfxCpu_stopCounters()`:

- `IfxCpu_resetAndStartCounters()` to start CPU performance counters. A parameter is specifying the counter mode:
  - **Normal** mode: The counters increment on their respective triggers.
  - **Task** mode: Allow an additional gating from the debug unit which can filter data based on specific criteria.
- `IfxCpu_stopCounters()` to stop and return counters values.

**Note:** For using the performance counters, the On-Chip Debug System has to be enabled. This is ensured by the debugger itself, therefore the example has to be tested within an active debug session.
Run and Test

After code compilation and flashing the device, perform the following steps:

› Add the result of the measurement (\texttt{g\_perfCounts}) to the Watch View of the debugger
› Check the performance of the function \texttt{loop()} through the values stored in the structure \texttt{g\_perfCounts} displayed in the Watch View:
  - Instruction Counter
  - CPU Clock Cycle Counter
  - Counter 1 (implementation specific)
  - Counter 2 (implementation specific)
  - Counter 3 (implementation specific)

\begin{table}
\centering
\begin{tabular}{|l|l|l|}
\hline
Name & Type & Value \\
\hline
\texttt{CPU\_Perf\_Counters.c\_x: g\_perfCounts} & struct & \{ instruction = \{ .. \}; clock = \{ .. \}; counter1 = \{ .. \}; counter2 = \{ .. \}; counter3 = \{ .. \} \} \\
\texttt{instruction} & struct & \{ counter = 1342; overflow = 0 \_\_0; \} \\
\texttt{clock} & struct & \{ counter = 1379; overflow = 0 \_\_0; \} \\
\texttt{counter1} & struct & \{ counter = 190; overflow = 0 \_\_0; \} \\
\texttt{counter2} & struct & \{ counter = 4; overflow = 0 \_\_0; \} \\
\texttt{counter3} & struct & \{ counter = 0; overflow = 0 \_\_0; \} \\
\hline
\end{tabular}
\end{table}
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https://www.infineon.com/aurixdevelopmentstudio
Use the „Import...“ function to get access to more code examples.

More code examples can be found on the GIT repository:
https://github.com/Infineon/AURIX_code_examples

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## Revision history

<table>
<thead>
<tr>
<th>Revision</th>
<th>Description of change</th>
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</thead>
<tbody>
<tr>
<td>V1.0.1</td>
<td>Removed function for the initialization of OCDS, added a note in Implementation slide</td>
</tr>
<tr>
<td>V1.0.0</td>
<td>Initial version</td>
</tr>
</tbody>
</table>
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