Kithara SOFTWARE

Real-Time Multi-Tasking — under Windows® and Dedicated

During the years the »RealTime Suite«™ has been used for high-performance solutions for Windows® by numerous manufacturers of testing rigs, as well as in mechanical engineering, automation and robotics. The system provides "hard real-time" and therefore represents a fundamental basis for a wide range of automation solutions.

The Kithara »RealTime Suite« provides highly accurate real-time mechanisms, in order to execute the programming code supplied by the user cyclically at high frequencies and great accuracy. The application code can also be executed in the real-time multi-tasking environment.

Using the new Dedicated Module, real-time tasks can be executed on exclusively used CPU cores, where only the Kithara real-time system runs. This is achieved by instructing Windows to start on fewer CPU cores than available.

Due to the avoided Windows influence, this results in extremely accurate and reliable timer execution, allows very high timer frequencies with a very low jitter of below one micro-second on selected hardware.

All usual real-time functions are available on Dedicated CPUs, which allows a good scalability of projects.

www.kithara.de

Kithara »RealTime Suite« – RealTime Module & Task Module

Clock Module features:

- » Multiple clock sources used (including TSC, HPET)
- » All hardware clocks are long-term synchronized
- » Precise system time measurement in 0.1 µs steps
- » Exact short-term delays in 0.1 µs steps

RealTime Module features:

- » Delivers "hard real-time" under Windows
- » Timer are executed as tasks, multiple timer usable at the same time, execution controlled by task priority
- » No base resolution / raster-less operation
- » Clocks and timer are synchronous
- » Timer frequencies up to 20 kHz and above
- » Automatic selection of best hardware timer source
- » Independent timer handling on each CPU / Core
- » Timer are running cyclically or can be programmed in one-shot steps
- » Scheduled start of timer possible
- » Synchronous start of multiple timers possible
- » Timer operations are: start, stop, cancel, start-delayed and adjust

MultiTasking Module features:

- » Tasks are priority-controlled (255 levels usable, can be changed dynamically)
- » Task priorities higher than all other Windows activities
- » Unlimited number of tasks per level ("round-robin" scheduling per level)
- » Synchronization objects (semaphore, event, mutex)
- » Events can be auto-reset or manual-reset
- » Event operations are: set, reset, pulse, wait-for
- » Semaphore operations are: request and release
- » Priority inheritance to avoid priority inversion
- » Timer tasks with high resolution and precision
- » Task operations are: suspend, resume, sleep, trigger, wait, yield, exit, terminate
- » Task environment can run both on kernel and user level

On kernel-level:

- » For "hard" real-time execution
- » Preemptive scheduling
- » Multi-core (can use all CPUs / Cores)
- » Tasks, interrupts, timer assignable to a distinct CPU / Core

On user-level:

- » For easy development and debugging
- » Co-operative scheduling
- » Better handling than standard Windows threads

Dedicated Module features:

- » Starts Kithara real-time system on CPUs not used by Windows®
- » Extremely accurate real-time results due to avoiding Windows and driver's influence
- » Max. programmable task frequency up to >100 kHz
- » Jitter below 1µs on selected hardware
- » Special "Speedloop" mode for timer frequencies up to 1MHz possible

Operating systems:

- » Windows 8 (32-bit & 64-bit)
- » Windows 7 (32-bit & 64-bit)
- » Windows Vista (32-bit)
- » Windows XP (32-bit)
- » Windows Server and Embedded versions also supported

Programming languages:

- » C/C++, Delphi, C# and others
- » to achieve real-time capabilities, native 32-bit or 64-bit code (x86/x64) must be generated by the compiler
- » access via COFF or OMF import library, ANSI C
- » recommended: Microsoft® Visual Studio®/C++ 2010 or Embarcadero® C++Builder®

For the latest list of features, supported hardware, operating systems and programming languages, visit our web site at www.kithara.de.
We recommend downloading a test/evaluation version. Please contact us for any questions regarding your project!
Picture: aboutpixel.de – Alfred Beltran

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