UDE Trace Support

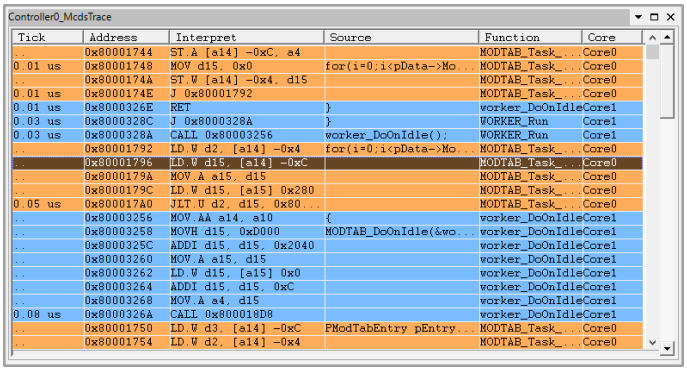
UDE Trace Data Visualization and Analyzing

Inherently, hard real-time and multicore applications with parallel code execution do not allow influencing the runtime behavior during debugging. Trace is a suitable and powerful method to debug and analyze these types of applications. It allows non-intrusive observation – without influencing the run-time behavior – and also records exactly the time sequence of program execution or other parameters. Among other things, tracing enables the investigation of timing problems or misbehavior caused by parallel execution.

Based on the recorded trace information the Universal Debug Engine® UDE provides a variety of analysis functions and visualizations helping developers to perform debug tasks, run-time-analysis and system-level-analysis.

Trace Window

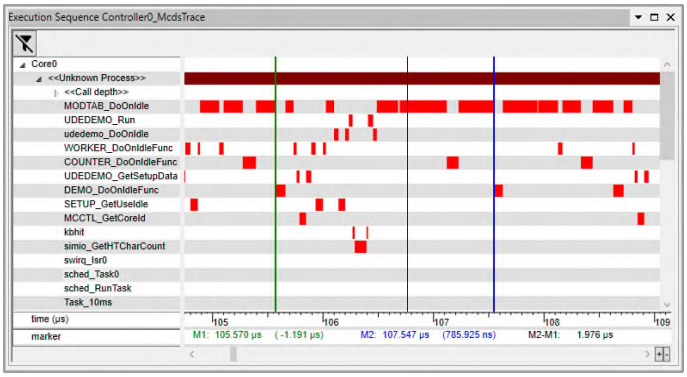
The Trace Window shows the captured trace data in tabular form and provides an precise reproduction of the program flow.



- Support for different trace sources depending on the device-specific trace system (multiple cores, busses, peripherals, etc.)
- Core-specific coloring and filtering of trace information
- Easy navigation to source code
- Highly configurable
- Fast search function for searching the entire trace recording

Execution Sequence Chart

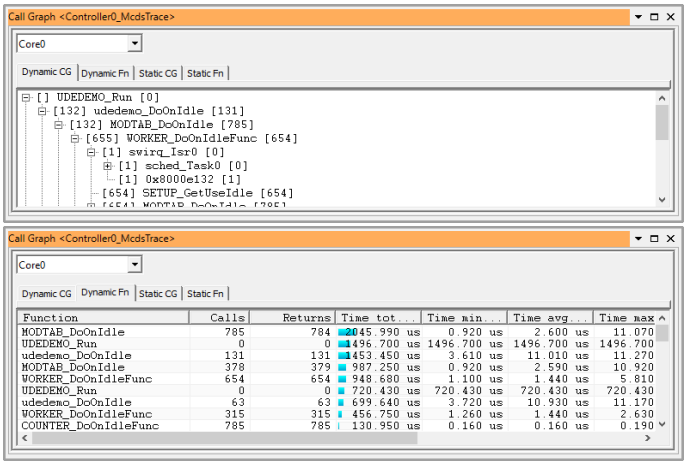
The Execution Sequence Chart visualizes the program flow and its timing and is the perfect tool to find bottlenecks or synchronization problems in software that is executed in parallel on a multicore system.



- Exact temporal display of the executed tasks and functions
- Call-depth for every point in time
- Visualization of execution sequence for multicore applications
- Easy and fast navigation and zoom
- Time measurement between user-definable markers

Call Graph Analysis and Profiling

The Call Graph Analysis creates a representation of the control flow at software level. It represents the calling relationships between functions and sub-functions.



- Dynamic call graph. Each subroutine call is treated as a unique event unless the same subroutine is called again from the same call stack parent
- Static call graph. All calls to a subroutine are accumulated regardless of caller relationship
- Profiling information and statistics about runtime behavior
- Total, minimum, maximum and average execution time
- Number of calls and returns

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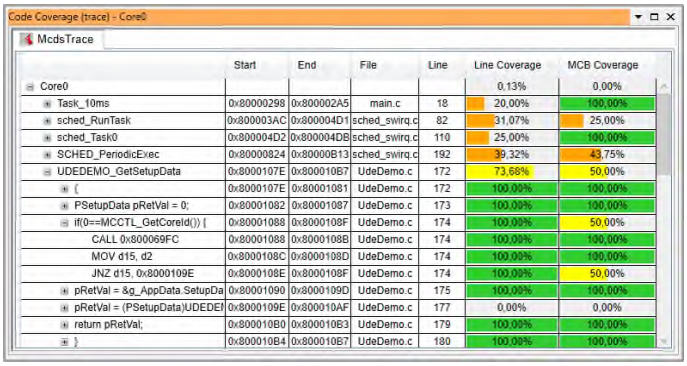
Code Coverage Support

The trace-based Code Coverage Support in UDE is a non-intrusive method that allows to determine the statement coverage (C0 coverage) and branch coverage (C1 coverage) even with optimized code. No code instrumentation is required.

- Line markers in the program window indicating fully covered, partially covered, and uncovered source lines and statements
- Code Coverage Window with detailed information and bar chart for C0 and C1 coverage



	Start	End	File	Line	Line Coverage	MCB Coverage
Core0					0,13%	0,00%
Task_10ms	0x80000298	0x800002A5	main.c	18	20,00%	100,00%
sched_RunTask	0x800003AC	0x800004D1	sched_swirq.c	82	31,07%	25,00%
sched_Task0	0x800004D2	0x800004DB	sched_swirq.c	110	25,00%	100,00%
SCHED_PeriodicExec	0x80000824	0x80000B13	sched_swirq.c	192	39,32%	43,75%
UDEDEMO_GetSetupData	0x8000107E	0x800010B7	UdeDemo.c	172	73,68%	50,00%
{	0x8000107E	0x80001081	UdeDemo.c	172	100,00%	100,00%
PSetupData pRetVal = 0;	0x80001082	0x80001087	UdeDemo.c	173	100,00%	100,00%
if(0==MCCTL_GetCoreId()) {	0x80001088	0x8000108F	UdeDemo.c	174	100,00%	50,00%
CALL 0x800069FC	0x80001088	0x8000108B	UdeDemo.c	174	100,00%	100,00%
MOV d15, d2	0x8000108C	0x8000108D	UdeDemo.c	174	100,00%	100,00%
JNZ d15, 0x8000109E	0x8000108E	0x8000108F	UdeDemo.c	174	100,00%	50,00%
pRetVal = &g_AppData.SetupDa	0x80001090	0x8000109D	UdeDemo.c	175	100,00%	100,00%
pRetVal = (PSetupData)UDEDE	0x8000109E	0x800010AF	UdeDemo.c	177	0,00%	0,00%
return pRetVal;	0x800010B0	0x800010B3	UdeDemo.c	179	100,00%	100,00%
}	0x800010B4	0x800010B7	UdeDemo.c	180	100,00%	100,00%

Trace Recording

UDE provides powerful capabilities for recording trace data from a variety of trace sources, including on-chip trace memories and various external trace interfaces for single and multicore SoCs and microcontrollers.

UAD2^{next} – Combining debugging and trace

- Easy mounting plug-in modules for a wide range of trace interfaces
- AURORA serial high-speed trace with up to 1.25 Gbit/s
- Parallel trace with up to 12 bit @ 125 MHz DDR
- 512 Mbyte trace memory

UAD3+ – High end trace pushing the limits

- Separate Trace Pod connected to UAD3+ by a gigabit serial multi-lane cable (length up to 5 meters)
- AURORA serial high-speed trace with up to 12.5 Gbit/s
- Parallel trace with up to 20 bit @ 500 MHz Up to 8 Gbyte trace memory

Supported Trace Sources

MCDS/miniMCDS for Infineon AURIX / TriCore

IEEE-ISTO 5001 **Nexus** for NXP MPC5xxx, ST SPC5

Arm **CoreSight** (ETM, ETB, TMC, ITM, PTM, FTM) for Arm Cortex A/R/M based devices

Supported Trace Interfaces

Serial AURORA trace

Arm HSSTP

Nexus parallel trace

Arm parallel trace

Arm SWO

On-Chip trace buffers, trace data to be transferred by standard debug interface

If you have any questions about our products, please feel free to contact us:

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