Synchronized Debugging of Multi-Core Applications

The UDE® Universal Debug Engine is a powerful development platform for debugging, testing and system analysis of microcontroller software applications. UDE® provides efficient and convenient control and monitoring of multiple cores for a wide range of multi-core architectures within a single common user interface.

Easy-to-Use Debugger Framework

UDE® offers a modern and easy-to-use user interface that provides a system-centric view rather than a core-centric view of the multi-core system. The user interface provides a comprehensive and clear view of the entire system or, optionally, of selected parts.
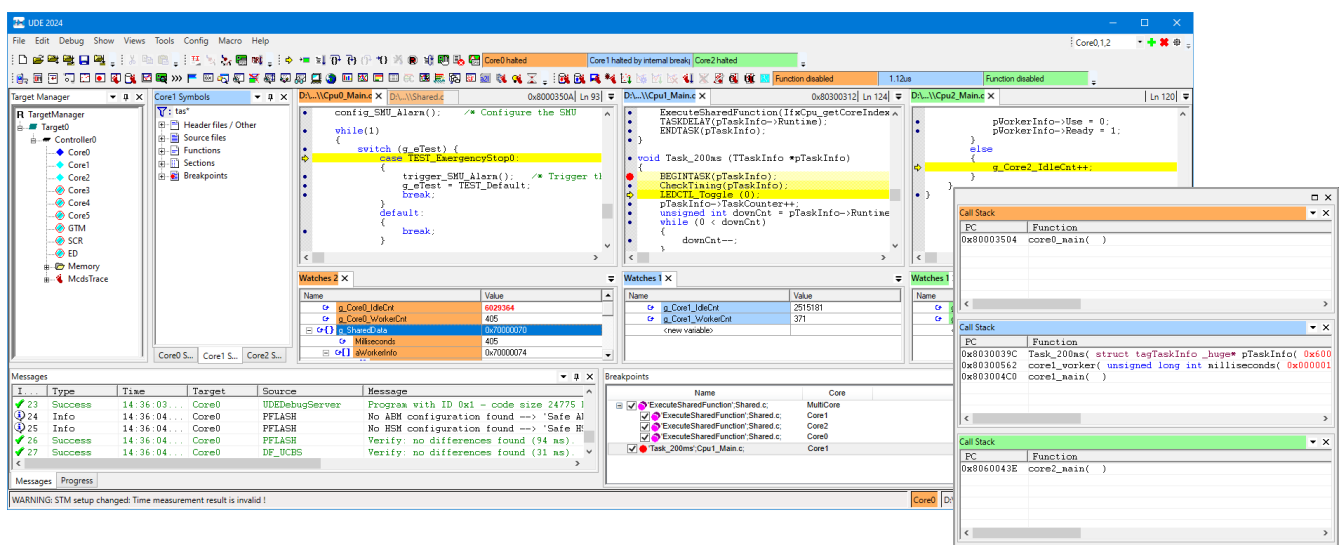
- All cores are visible in a single common user interface
- Easy and fast creation of a debug session via a guided setup process
- Pre-configured target configurations for a large number of evaluation boards
- UDE® Target Manager provides an overall view to the multi-core system as well as central functions for run-control

- Core specific colors for windows and toolbar controls to highlight their core association
- Convenient window management allows the debugger session to be adapted to the preferences of the user (e.g. docked windows, floating windows, multi-monitor operation)

Debug Synchronization

- Simultaneous stop, single step and restart of software execution running on different cores
- Leverage on-chip debug functions for minimal latency
- Support for homogeneous and heterogeneous multi-core systems including special cores (e.g. GTM, HSM, PPU, eTPU, and others)
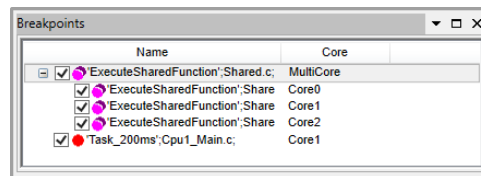
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Multi-Core Run Control

Users can configure multi-core debug synchronization very flexibly and according to their requirements. There are basically three operating modes supported by UDE® for debugging multi-core applications:

- **Fully synchronized.**
  Simultaneous stop, single step and restart of all cores.
- **Partially synchronized.**
  Simultaneous stop, single step and restart of a group of selected cores. Independent run-control for all other cores.
- **No debug synchronization.**
  Independent run-control for all cores.

UDE® Multi-Core Run Control Manager enables flexible configuration and offers a user-friendly way of grouping cores in order to implement the intended synchronization mode.
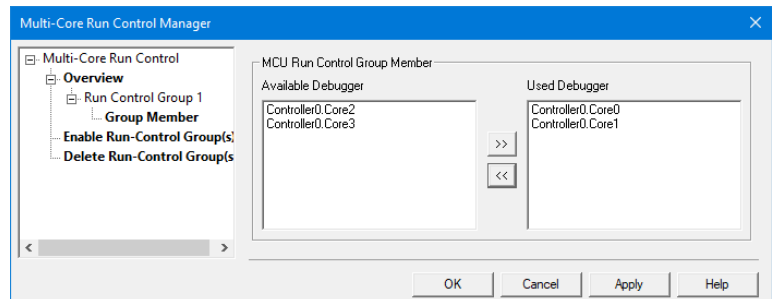
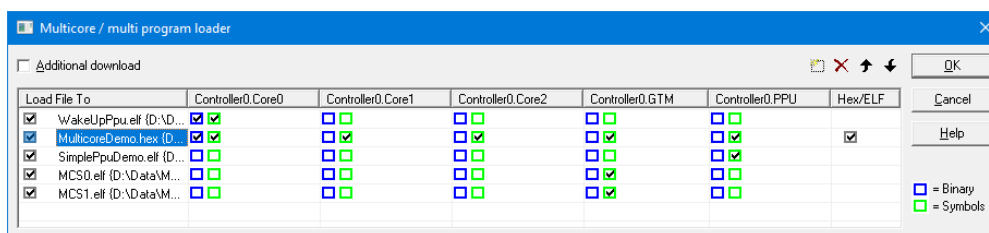**Multi-Core Breakpoints** employed in shared code simplify debugging of complex applications. The Multi-Core Breakpoint always takes effect regardless of which core is currently executing the particular code.

Multi-Core / Multi-Program Loader

The UDE® Multi-Core / Multi-Program Loader takes care of loading program binary files into the various cores of the multi-core system and manages the debug information that is used by UDE®.

- Support for monolithic program binaries (single ELF file) and separate ELF files per core
- Support for various binary formats (e.g. ELF, HEX, AFX, etc.)
- Manages architecture specific memory devices (e.g. shared program flash, core specific local memories
- Assignment of debug information to cores

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