TriCore Development Platform

The Development Platform consists of the following basic elements:

- **C/C++ compiler with leading optimization technology**
- **Eclipse™ integrated development environment**
- **Universal Debug Engine**

The TriCore Development Platform is a well integrated joint product of HighTec and PLS Development Tools. The platform can be extended by the PXROS-HR realtime operating system with integrated MPU management.

Features

The Development Platform includes powerful wizards, and supports all TriCore derivatives. It manages the project settings and the entire build process for compiler, assembler and linker.

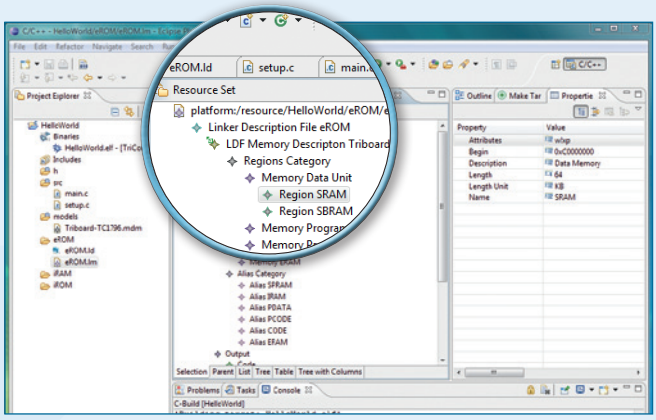
- **Project management**
- **Setup wizards**
- **Version control**
- **DAvE importer**
- **Model-driven memory layout configuration**

PLS have integrated their UDE debugger into the standard Eclipse™ environment. Launching the debugger within Eclipse™ will open the new UDE perspective with high-end debugging features.

The Eclipse™-based TriCore Development Platform allows the simple definition of projects. After having selected a particular microcontroller derivative, the generation of a project with a correct startup code, the necessary hardware initialization, a valid memory layout, and the corresponding header file for the names and bit fields of the peripheral register can be prompted virtually at the push of a button. The project contains a simple main function, which allows the implementation to be started immediately.

The memory layout can easily be adapted by means of the model-driven GUI in Eclipse™.

This configuration will be verified against the derivative memory layout and will assist customers in placing the code and data in the appropriate regions of the memory.



C/C++ compiler

- **Robust, compact and fast executing code**
- **AUTOSAR driver support**
- **Addressing modes: absolute, register relative, circular**
- **SIMD and FPU support**
- **Long-term support**
- **PCP C compiler**

The TriCore GNU C/C++ compiler is the fastest build system on the market. Furthermore, it can be started several times simultaneously for speeding up the build process by parallel compilation processes.

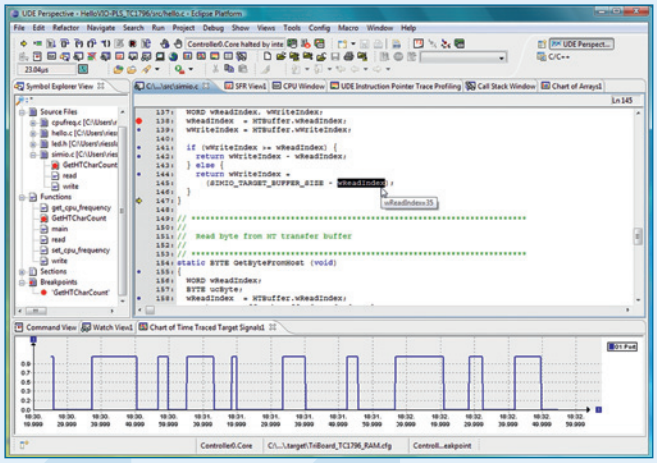
In conjunction with AUTOSAR operating systems, some vendors need to reserve different TriCore registers for exclusive usage. For this purpose, the compiler provides an option for specifying so-called fixed registers, which the compiler is prevented from using.

The GNU compiler is fully EABI-compliant and conforms to all relevant language and ISO standards.

The TriCore GNU-based compiler supports homogenous and heterogenous Multicore architectures as well as the possibility of linking different elf-Files.

Universal Debug Engine

For debugging and testing the applications, the Development Platform includes a direct connection to the Universal Debug Engine (UDE) from PLS. The UDE can be started with all necessary settings directly from the IDE, thus hugely simplifying program function tests on the target hardware. The UDE, of course, also allows testing PXROS-HR applications with memory protection.



- Target access via JTAG
- Supports OCDS LII and on-chip trace
- FLASH programming
- Real time data monitoring and graphical view
- Execution time measurement
- Instruction pointer profiling
- Simulated I/O
- PXROS-HR debug support

Debugger Hardware

- High speed host interfaces: USB 2.0, FireWire, Ethernet-100MBit
- JTAG and DAP support
- Galvanically isolated target interfaces
- Extended cable length by build-in JTAG extender technology
- Support for CAN bus recording and CAN monitors

MCDS Option

- Code-coverage measurement without code instrumentation
- Cycle-accurate run-time measurement
- Performance counter measurement (code and data hotspots)

PXROS-HR

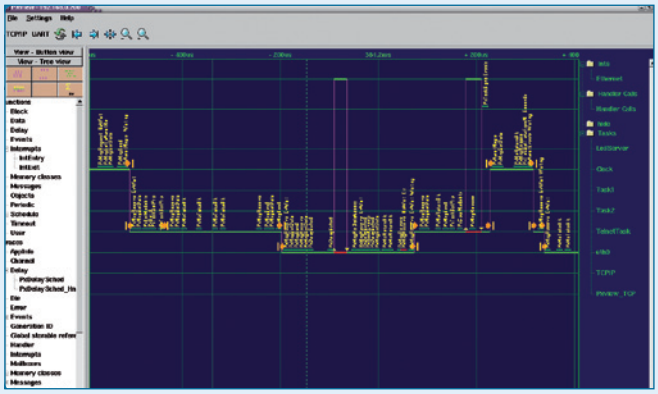
The PXROS-HR microkernel realtime operating system with integrated MPU management is an optional component of the Development Platform. Modern microcontrollers, such as ARM Cortex-M3, TriCore and Power Architecture, include a Memory Protection Unit, which guarantees safe integration of functionalities consisting of different software components. With these features PXROS-HR is ideally suited for safety-critical applications and rugged industrial solutions.

Furthermore, a library, especially developed for the PXROS-HR debug monitor PXmon, allows the Universal Debug Engine to use the JTAG debug channel as a fast communication vehicle for the exchange of data with running PXROS-HR applications.

System conditions, such as the stack consumption of individual tasks, the process sequence of tasks, the processor workload due to individual application parts, or the workload of resources, are graphically displayed. The user is thus provided with an effective tool for testing PXROS-HR based programs and optimising the performance parameters of the application.

PXview

A graphic interface is used for visualising the tracing information of PXROS-HR tasks and services such as scheduling, message passing and event handling.



PXview allows a detailed view into a running PXROS-HR application; the system can be analysed by the debugger without having to stop the application.

Debugging and error diagnosis

The first operating mode uses a JTAG debugger for debugging the PXROS-HR kernel.

The second operating mode enables debugging of reloadable PXROS-HR tasks. Since it is not desirable to halt the hardware in this case, debugging of the application takes place via a debug monitor, which is integrated into the target operating system. The monitor encapsulates task-specific breakpoints, context handling and call stacks for the debugger, which is largely transparent and can be addressed by means of a gdb-compatible command interface. Ethernet, JTAG, CAN and serial interfaces serve as standard connections to the target monitor.