

Product Description

HighTec PXROS-HR Basic Training Course

2-day training on PXROS-HR, the RTOS for Functional Safety

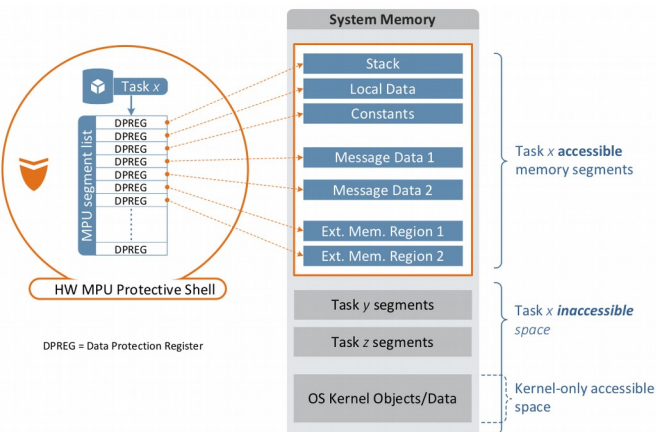
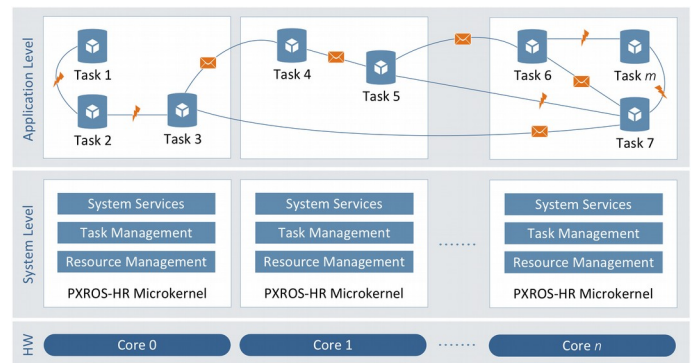
PXROS-HR is a safety IEC 61508 SIL-3 & ISO 26262 ASIL-D certified micro-kernel real time operating system, providing the highest level of data protection, functional safety and robustness. It is inherently designed for multicore environment and distributed systems to fit demanding requirements of industrial and automotive applications.

Purpose

The PXROS-HR Basic Training enables software engineers to gain practical knowledge of PXROS-HR Real Time Operating System, designed specifically for Safety Critical Applications and multicore environments. Participants are introduced to fundamentals of PXROS-HR architecture, application patterns, basic Kernel mechanisms and APIs.

Audience

The course is aimed to Technical Directors, Software developers and System Engineers. The main prerequisite is a working knowledge of C/C++. Although useful, knowledge of RTOS or multicore concepts is not required. A practical prerequisite for hands-on is to have your own workstation equipped with a HighTec Free Entry Toolchain (or a regular HighTec commercial license) and the suggested evaluation board for the specific architecture on which the course is oriented.



Method

The course consists in spoken sessions and hands-on example exercises. The method relies on a great interaction between the trainer and the participants, with the possibility of Q&A sessions between one topic and another. First day is focused on the fundamental elements of the PXROS-HR operating system, while on the second day the main elements are explored in depth, by proposing a guided hands-on which allows incrementally to build a basic example application useful to start developing your project.

Outcome

At the end of the course, the trainees should be familiar with the key aspects of PXROS-HR development framework, and ready to begin practical development on real applications. Participants learn PXROS-HR framework, build toolchain, and safety mechanisms. They learn how to create, configure and manage RTOS tasks in a real software project. Last, they can practically set up and build their first OS-based examples, test and debug them on an evaluation board.



Course agenda and summary of contents.

Day 1: PXROS-HR fundamentals

- Tuning-in / Session Introduction. Introduction to the basic mechanisms of PXROS-HR.
- OS Tasks. Tasks in the PXROS-HR context, anatomy of a task and scheduling.
- Inter-task Communication. The task communication framework: events, messages and shared memory.
- I/O Management. Access to hardware peripherals using the extended memory regions. Driver example.
- Time Elements. The flexible time system in PXROS-HR: ticks, timeouts, periodic events and delayed jobs.
- PXROS-HR Multicore Concept. How multicore is managed by PXROS-HR and the easy migration from a single-core to a multicore chip.
- PXROS-HR API Nomenclature. The notation used in PXROS-HR APIs for data types and functions.
- PXROS-HR Framework. Introduction to the structure of a project based on PXROS-HR. Tools/hardware verification and first practical demonstration.
- Resource Management. Objects and object pools for resource management. Memory Class concept and memory protection mechanisms. Release server kernel service.
- Recap, retrospective and discussion.

Day 2: Inside the PXROS-HR elements and hands-on

- Task Event Interface. Task's event basics: waiting for, sending and processing an event.
- Timing Objects. Timing objects basics: creating a time object and starting a time operation, with hands-on.
- Creating New Task in C-based Framework. Task structure overview and hands-on on how to create a new task.
- I/O Interface. Extended memory regions as access door to peripherals. Direct/indirect register access and hands-on.
- Name Server. Name server concept and use-case scenario, with final hands-on.
- Message Communication. How to create and release a message. Message flow from sender to receiver and hands-on.
- Interrupt Handling. How to install handlers in PXROS-HR and enable hardware interrupts. Handler processing flow and hands-on.
- Single to Multicore Migration. Task distribution concept and hands-on from single core to multicore.
- Multicore Hands-on Evolution [optional]. Evolution of multicore hands-on, adding new elements.
- Recap, retrospective and discussion.

Bluewind Srl

Via della Borsa, 16/A - 31033
Castelfranco Veneto (TV) - Italy
+39 0423 723431 - info@bluewind.it

www.bluewind.it