PXROS-HR
REAL-TIME OS

For Safety Critical Multicore Applications.
HighTec Core Products
Development & Consulting

COMPILER
BUILD TOOL

PXROS-HR
REAL-TIME OS

QKIT
TOOL QUALIFICATION

CONSULTING
DESIGN & SUPPORT

Safety Multicore Development Suite
PXROS-HR RTOS Overview

Safety Multicore Real-time OS

- Multicore real-time microkernel
- Message-based inter-task communication
- MPU protected data and code
- Interrupt lock-free
- Static and dynamic resource management
- ISO 61508 SIL-2 certified RTOS
Multicore Real-Time Microkernel

Lightweight OS

- Same programming patterns for single and multi-core → easy migration
- Tasks can be spread across several cores
- One instance of the Microkernel per core
- Uses local memory for OS and task data
- Tasks and objects have unique identifiers
Message-Based Inter-Task Communication

Data Exchange for Multicore Systems

- Provides distributed communication framework critical for asynchronous multi-core environment
- Message objects contain Descriptor and Data
- The Descriptor information is managed by the OS
- Passing of messages between tasks is atomic
- No implicit or explicit memory references

Message delivery is transparent whether at the same core or between cores. It enables easy task core assignment and core load optimization.
**Task 1** Task 2

**DPREG** = MPU Data Protection Register

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** MPU Protected Data and Code**

*Foundation for Safe Environment*

- Memory protection is managed by the OS
  - Transparent for tasks and the user
  - Protection is for module-specific context
  - Read-only data, stack and R/W data are protected for each task individually
  - Messages: Passing the access rights between tasks
- Access violations are detected at runtime
- Exceptions are bound to a task context

DPREG = MPU Data Protection Register
Interrupt Lock-Free Kernel

HW Response Without Compromise

- None of interrupt locks, bus system locks or spinlocks are used by the OS Kernel
- Guarantees lowest IRQ latencies for real-time applications
- Enables to manage asynchronous activity in a multicore system
Static and Dynamic Resource Management

Extended Flexibility

- Enables static configuration and dynamic re-configuration of the system at run-time
- Task right management provides full control over dynamic behavior of tasks
- Task budget management
  - Assigns dedicated resource quotas for each task
  - Limits effects from system-wide resource shortage
ISO 61508 SIL-2 Certified RTOS
Safety Proven System

› DIN EN ISO 9001:2000
  › Certification of HighTec quality management process of development, production, distribution and support of software products

› IEC 61508 SIL-2, EN 50128
  › SIL2 certification of real-time operating system PXROS HR
PXROS-HR – The Trusted RTOS
For Any Application. Worldwide.
Questions?
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Thank You