Renesas Ready Partner Ecosystem Solution

PX5 MODULES

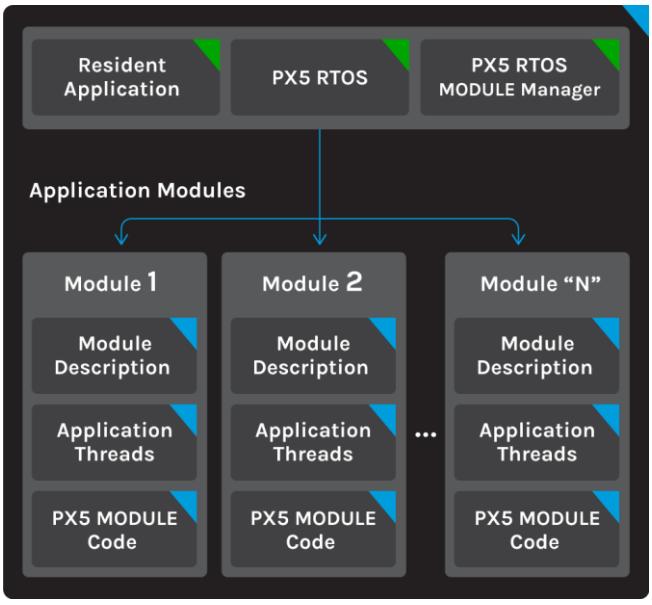
Solution Summary

PX5 MODULES technology enables dynamic or in-place execution of separately compiled and linked C application code, called a “module.” A module can be built in a position-independent manner (code and data) or linked to a fixed address in the firmware memory. Dynamic module loading can be part of a broader partial application update strategy. The PX5 MODULES technology is available today on the full range of RA Family MCUs, RX Family of MCUs, RZ Family of MPUs and RISC-V Family of MCUs and MPUs.

Features/Benefits

- Separately built application modules
- Position-independent Code/Data supported (PIC/PID)
- Dynamic module loading/unloading (partial update support)
- Same PX5 RTOS APIs available from module code
- Memory isolation via MPU/MMU
- Time domain protection via module thread priority ceiling
- Royalty-free

Diagrams/Graphics

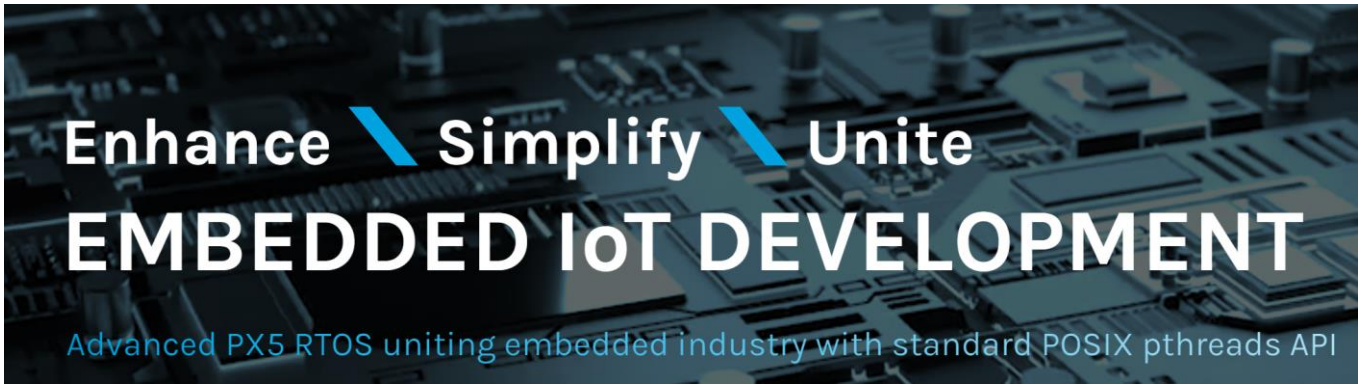


Target Markets and Applications

- Automotive
- Industrial IoT
- Smart cities
- Smart homes
- Smart sensors
- Consumer electronics

https://px5rtos.com/px5-modules/

2024.08



Industrial Grade Lightweight Process

Dynamic Loading of Separately Built Application Modules

A key component in a partial update strategy

Supports 3rd party code execution

Isolate execution via MPU/MMU memory protection

Best-of-class Technology

Technology not available with most RTOS

Small footprint (minimal 3.5KB Flash)
Memory Protection via MPU/MMU

m

OUR MISSION

Our "why" at PX5 is to make embedded development easier and faster than ever before. Developers using the PX5 MODULES technology have fewer problems and can deliver better-quality products to market in record time.

UNITING EMBEDDED

PX5 MODULES features the PX5 RTOS native implementation of the industry-standard POSIX pthreads API, which instantly enables a vast number of developers who are already fluent with POSIX pthreads. In addition to the native POSIX pthread API support (semaphore, mutex, message queue, etc.), the PX5 RTOS also offers real-time extensions such as event flags, fast queues, tick timers, memory management, and more.

SAFETY AND SECURITY

The PX5 MODULES technology can isolate the execution of application modules such that they can't touch any memory they are not supposed to. In addition, PX5 MODULES enforces a maximum thread priority level for module execution, which provides time-domain protection.

ADVANCED TECHNOLOGY

The PX5 MODULES technology is somewhat unique in RTOS settings. Since each module has its own distinct and well-defined memory area, the MPU or MMU can be used to isolate its execution during runtime. The PX5 MODULES technology is small, requiring only 3.5KB of FLASH and 2.5KB of RAM for minimal use. It is easy to restrict which PX5 RTOS APIs are available to an application module.

As for safety and security, the PX5 MODULES technology leverages the advanced Pointer/Data Verification (PDV) technology, which enables developers to verify at run-time function return addresses, function pointers, system objects, global data, and memory pools. This technology is unique to the PX5 RTOS.

SIMPLE TO USE

The PX5 MODULES technology is simple to use. It consists of just two C source files, so adding it to any application build environment is easy. It is also fully integrated with all the most popular development tools.

CONTACT US TO EVALUATE

Please contact us to evaluate PX5 MODULES.

PX5 Real-Time Operating System (RTOS) Support (px5rtos.com)

[MODULES]