

# NXP FreeRTOS Product Brief

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## 1. Software Product Overview

FreeRTOS is a real-time kernel (or real-time scheduler) on top of which embedded applications can be built to meet their hard real-time requirements. It allows applications to be organized as a collection of independent threads of execution. On a processor that has only one core, only a single thread can be executing at any one time. The kernel decides which thread should be executing by examining the priority assigned to each thread by the application designer. In the simplest case, the application designer could assign higher priorities to threads that implement hard real time requirements, and lower priorities to threads that implement soft real-time requirements. This would ensure that hard real-time threads are always executed ahead of soft real-time threads, but priority assignment decisions are not always that simplistic.

## 2. Software Content

FreeRTOS has the following standard features:

- Pre-emptive or co-operative operation
- Very flexible task priority assignment
- Flexible, fast and light weight task notification mechanism
- Queues
- Binary semaphores
- Counting semaphores
- Mutexes
- Recursive Mutexes
- Software timers
- Event groups
- Tick hook functions
- Idle hook functions
- Stack overflow checking
- Trace recording
- Task run-time statistics gathering. See <https://www.freertos.org/FreeRTOS-V10.html> for information about FreeRTOS V10.x.x.
- Optional commercial licensing and support
- Full interrupt nesting model (for some architectures)
- A tick-less capability for extreme low power applications
- Software managed interrupt stack when appropriate (this can help save RAM)

NXP FreeRTOS software package contains a Configuration Tool component used in NXP S32 Design Studio for quick and easy to use configuration. This component is installed over NXP S32 Real Time Drivers releases.

## 3. Supported Targets

The software described in this document is intended to be used with all NXP devices that include the following:

- Cores: ARM: M0+, M7, M33, R52, M4F, A53
- Platforms: S32G, S32K1xx, S32K3xx, S32M, S32R45, S32Z, S32E

## 4. Quality, Standards Compliance and Testing Approach

NXP FreeRTOS product is developed according to NXP Software Development Processes that are Automotive-SPICE (tailored for open source), IATF16949 and ISO9001 compliant.

NXP FreeRTOS product is developed according to NXP Software Development Processes class O (Open Source).

## 5. Document Information

Table 1. Revision History

Revision number	Date	Substantive changes
1.0	2/2023	Initial release

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