

恩智浦 FreeRTOS 产品简介

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1. 软件产品概述

FreeRTOS 是一个实时内核（或实时调度程序），可以在其上构建嵌入式应用程序以满足其硬件实时要求。它允许将应用程序组织为一个独立执行线程的集合。在只有一个核的处理器上，同一时间只能执行一个线程。内核通过检查应用程序设计人员分配给每个线程的优先级来决定应该执行哪个线程。在最简单的情况下，应用程序设计人员可以将较高的优先级分配给有硬实时要求的线程，而将较低的优先级分配给有软实时要求的线程。这将确保硬实时线程始终在软实时线程之前执行，但优先级分配决策并不总是那么简单。

2. 软件内容

FreeRTOS 具有以下标准特性：

- 抢占式或协作式操作
- 非常灵活的任务优先级分配
- 灵活、快速、轻量级的任务通知机制
- 队列
- 二进制信号量
- 计数信号量
- 互斥锁
- 递归互斥锁
- 软件定时器
- 事件组
- 时间片钩子函数
- 空闲钩子函数
- 栈溢出检查
- 跟踪记录
- 任务运行时统计信息收集。有关 FreeRTOS V10.x.x 的信息，参见 <https://www.freertos.org/FreeRTOS-V10.html>
- 可选的商业许可和支持
- 完全中断嵌套模型（适用于某些架构）
- 适用于超低功耗应用的无滴答功能
- 在适当的情况使用软件管理的中断栈（这可以帮助节省 RAM）

恩智浦 FreeRTOS 软件包包含恩智浦 S32 Design Studio 中使用的“配置工具（Configuration Tool）”组件，可实现快速简便的配置。该组件安装在恩智浦 S32 Real Time Drivers 版本上。

3. 支持的目标

本文档中描述的软件适用于恩智浦半导体的下列器件：

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

4. 质量、符合的标准和测试方法

恩智浦 FreeRTOS 产品是根据“恩智浦软件开发流程”开发的，符合 Automotive-SPICE（为开源量身定制）、IATF16949 和 ISO9001 标准。

恩智浦 FreeRTOS 产品是根据“恩智浦软件开发流程”O 级（开源）开发的。

5. 文档信息

表 1. 修订历史

| 版本号 | 日期 | 实质性变更 |
|---------|------------|-------|
| 第 1.0 版 | 2023 年 2 月 | 初版发布 |

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