Infotainment Business Unit - System & Applications
FreeRTOS specification

1 Introduction

ST GNSS Positioning SW can be used with different Operating System. FreeRTOS usage is one of the solution proposed in our SDK package deliveries. This document describes all information for FreeRTOS usage with ST GNSS Positioning SW including implementation, compilation and debugging.

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4 Document Management

4.1 Revision History

Rev	Date	Author	Notes
0.1	2015-10-05	F. Pointeau	First release

Table 1: Revision history

4.2 Acronyms

Keyword	Definition
GCC	GNU C Compiler
GNSS	Global Navigation Satellite System
gpOS	Generic Positioning Operating System
SDK	Standard Development Kit
RTOS	Real Time Operative System

Table 2. Acronyms

4.3 Bibliography

1. **Boggia F. et al.**, OS20+ operating system specification. Naples: STMicroelectronics, 2011-2015. Release 3.2.

2. **Boggia F. et al.**, STA8090 SDK usage. Naples: STMicroelectronics, 2011-2015. Release 1.8.

5 FreeRTOS usage

5.1 FreeRTOS module

FreeRTOS is a free operating system including source code and API documentation available from http://www.freertos.org .

In SDK package delivery, the FreeRTOS module is divided in 2 parts:

- **os/source**
  contains the provided FreeRTOS version V8.2.2 source code.

- **os/portable**
  contains the GNSS libraries adaptation part implemented by ST including interrupt management, memory management, timer management and global FreeRTOS configuration.

5.2 ST GNSS implementation

The GNSS libraries, generic services and application layer modules (like NMEA, STBIN, DR, NVM, …) are implemented based on a gpOS (Generic Positioning Operating System) API so that they can be used for different Operating System. The gpOS API is described in referenced document [1].

A gpOS to FreeRTOS wrapper is used to adapt the gpOS API to the currently used Operating System FreeRTOS.

5.3 Customer Implementation

Customer implementation could also be based on gpOS API like GNSS libraries however our recommendation is to implement applications/modules directly with FreeRTOS.

The main advantage of using FreeRTOS is that the FreeRTOS API can be used without any reference to ST proprietary API. This enable customers to have applications/modules that could be reusable on any other environment also based on FreeRTOS.

Website http://www.freertos.org gives all information about FreeRTOS API

It's also very easy to get community support for implementation based on FreeRTOS either on website (at this link) or in many other forums on the internet.

Finally customer can get support from ST but also from the whole FreeRTOS community.

5.4 Compiling with FreeRTOS

In the SDK package delivery, FreeRTOS usage is only associated with the GCC compiler tool. This choice has been made because FreeRTOS is an operating system free of charge, so it is better for customer to associate it to a compiler also free of charge.

SDK compilation based on FreeRTOS is delivered in SDK package. Compilation environment installation, configuration and build procedures can be found in document [2].

5.5 Debugging with FreeRTOS

Customer can also take a great benefit to use a free debugger like J-LINK probe from Segger.

SDK package delivers script for the debugging with this type of probe. Its installation and usage is described in document [2].

6 Disclaimer

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