ANT_S212_nrf52832_2.0.1 release notes

Contents

ANT_S212_nrf52832_2.0.1

The ANT_S212_nrf52832_2.0.1 SoftDevice is a bugfix update for the second production release of the S212 for the nRF52 platform.

SoftDevice Properties

- The SoftDevice Specification for the S212 is available on the [ANT website](#)
- This version of the SoftDevice contains the Master Boot Record (MBR) version 2.0.0
- The combined MBR and SoftDevice memory requirements for this version is as follows:
  - Flash: **72kB** (0x12000 bytes)
  - RAM: **2.56kB** (0xA80 bytes)

Compatibility

Compatible with Rev C and Rev 1

Bug fixes

- **ANT**
  - Fixed an issue where encrypted channel negotiation could fail if non-zero encryption key indexes were used.

Limitations

- **SoftDevice**
  - If Radio Notifications are enabled, flash write and flash erase operations initiated through the SoftDevice API will be notified to the application as Radio Events (FORT-809).
  - Applications must not modify the `SEVONPEND` flag in the `SCR` register when running in priority level 2 or 3 as this can lead to undefined behavior.
  - If the application uses TIMER0 inside a timeslot (scheduled with the Radio Timeslot API), INTENSET for TIMER0 must be cleared before the timeslot ends (DRGN-7776).

Known Issues

- **SoftDevice**
  - If `sd_softdevice_enable()` is called with fault_handler set to NULL, to an invalid function pointer or a pointer to a returning function, the behavior will be undefined (DRGN-7122).

ANT_S212_nrf52832_2.0.0

The ANT_S212_nrf52832_2.0.0 SoftDevice is the second production release of the S212 for the nRF52 platform.

SoftDevice Properties

- The SoftDevice Specification for the S212 is available on the [ANT website](#)
- This version of the SoftDevice contains the Master Boot Record (MBR) version 2.0.0
- The combined MBR and SoftDevice memory requirements for this version is as follows:
    - Flash: **72kB** (0x12000 bytes)
    - RAM: **2.56kB** (0xA80 bytes)

Compatibility

Compatible with Rev C and Rev 1

New functionality

- **ANT**
    - **High Duty Search**: High duty search uses the entire available resources of the radio to search for a master device. The effect is that latency to acquire the master device is significantly reduced to an average of ½ period assuming ideal RF conditions. This mode of operation consumes high power while in search and should only be used in applications that have considerable power resources available. This feature can be used with standard search and background scan.
    - **Time Sync**: This feature allows independent devices to synchronize the time at which an event was generated on the transmitting device in the time base of the receiving device(s). Using this method multiple devices can synchronize themselves within two clock ticks. Some examples of usage could include synchronizing data between sensors, LED blinking on devices, or movement in autonomous robotics
    - **Scalable Channels**
        - The application can now specify the size of the event queue on a per channel basis. This allows the application to define a bigger event queue in the case where there is large latency in event processing and the default size of the event queue is not large enough.
        - Encryption keys are now stored in application RAM.
    - **PA/LNA:** New API support to enable/disable switching of external Power Amplifiers and Low Noise Amplifiers using GPIO pins for ANT.

Changes

- **ANT**
    - The ANT version string has been changed to a different format. There are now three numbers and no build letters. The numbers are Major.Minor.Bugfix. Major denotes an API breaking change, Minor denotes a non-API breaking change and Bugfix is a release where only bugs were fixed.
    - The `ANT_ENABLE` structure has a new field called `usNumberOfEvents` that denotes the number of events the ANT stack should use. There is a compulsory change to the `ANT_ENABLE_GET_REQUIRED_SPACE` macro that takes the number of events as well.
    - The functions `sd_ant_coex_config_get` and `sd_ant_coex_config_set` now take an `ANT_BUFFER_PTR` struct as an argument instead of a `uint8_t` array.
- **SoftDevice**
    - New interfaces added for set, get, clear for both `GPREG` registers (`SD_POWER_GPREGRET_GET/CLEAR/SET`).

Bug fixes

- **ANT**
    - Event Filtering no longer generates event interrupts when a filtered event occurs in the stack.

Limitations

- **SoftDevice**
    - If Radio Notifications are enabled, flash write and flash erase operations initiated through the SoftDevice API will be notified to the application as Radio Events (FORT-809).
    - Synthesized low frequency clock source is not tested or intended for use with the BLE stack.
    - Applications must not modify the `SEVONPEND` flag in the `SCR` register when running in priority level 2 or 3 as this can lead to undefined behavior.
    - If the application uses TIMER0 inside a timeslot (scheduled with the Radio Timeslot API), INTENSET for TIMER0 must be cleared before the timeslot ends (DRGN-7776).

Known Issues

- **SoftDevice**
    - If `sd_softdevice_enable()` is called with fault_handler set to NULL, to an invalid function pointer or a pointer to a returning function, the behavior will be undefined (DRGN-7122).

ANT_S212_nrf52832_1.0.2

The ANT_S212_nrf52832_1.0.2 SoftDevice is the first production release of the S212 for the nRF52 platform.

SoftDevice Properties

- An updated SoftDevice Specification for the S212 is available on the [ANT website](#)
- This version of the SoftDevice contains the Master Boot Record (MBR) version 2.0.0
- The combined MBR and SoftDevice memory requirements for this version is as follows:
    - Flash: **72kB** (0x12000 bytes)
    - RAM: **2.56kB** (0xA80 bytes)

Compatibility

Compatible with Rev C and Rev 1

New functionality

- **ANT**
    - Group Transmitter Initiation will allow a master device to start more effectively in crowded environments. The *sd_ant_channel_search_timeout_set* call has been modified to configure Group Transmitter Initiation.

Changes

- **ANT**
    - *sd_ant_channel_rx_search_timeout_set* has been renamed to *sd_ant_channel_search_timeout_set*

Bug fixes

- **ANT**
    - Under certain timing conditions a call to *sd_ant_stack_reset* would never return. There is a new error code for *sd_ant_stack_reset* for cases where the operation timed out.
- **SoftDevice**
    - Calling *sd_power_pof_threshold_set* will now configure the power-fail comparator correctly (DRGN-7280).
    - Calling *sd_ecb_block_encrypt* will no longer prevent the application from entering sleep mode (DRGN-7381).
    - The instantiation of *nrf_nvic_state_t* shown in a code example in *nrf_nvic.h* is now correctly zero-initialized (DRGN-7198).
    - Several doxygen documentation errors have been corrected (DRGN-7134).

Limitations

- **SoftDevice**
    - If Radio Notifications are enabled, flash write and flash erase operations initiated through the SoftDevice API will be notified to the application as Radio Events (FORT-809).
    - Applications must not modify the `SEVONPEND` flag in the `SCR` register when running in priority level 2 or 3 as this can lead to undefined behavior.

Known Issues

- Asynchronous ANT traffic can cause a synchronous channel on the same device to become misaligned and periodically drop connections. The probability of this increases as asynchronous ANT traffic increases.

ANT_S212_nrf52832_0.9.1.alpha

The ANT_S212_nrf52832_0.9.1.alpha SoftDevice for the nRF52 platform is based upon the S210_nrf51422_5.0.0 SoftDevice for the nRF51 platform.

SoftDevice Properties

- There is no SoftDevice Specification corresponding to this release. The S210 SoftDevice Specification v3.0.0 is applicable in large parts. It is available on the Nordic Infocenter.
- This version of the SoftDevice contains the Master Boot Record (MBR) version 2.0.0
- The combined MBR and SoftDevice memory requirements for this version is as follows:
    - Flash: **72kB** (0x12000 bytes)
    - RAM: **2.56kB** (0xA80 bytes)

Compatibility

Compatible with Rev C and Rev 1

New functionality

- **SoftDevice**
    - The configuration of the 32 kHz RCOSC calibration in sd_softdevice_enable() has been made more flexible (DRGN-6362). It now supports more calibration intervals, and the ability to combine temperature and time triggered calibration.

Changes

- **SoftDevice**
    - The timeslot API clock source selection API has been improved (DRGN-5882).
    - The documentation for `sd_softdevice_enable()` has been corrected to no longer state idempotence (DRGN-6910).
    - The `sd_nvic_*` API calls have changed from being SV calls to being implemented as static functions in the new `nrf_nvic.h` header file (DRGN-7131).
    - The application priority enumeration has been removed. The application now has four interrupt priority levels available:
      levels 2, 3, 6 and 7 (DRGN-6350).
    - The softdevice_assert.h header file is no longer part of the SoftDevice API (DRGN-2548).
    - The nrf_svc.h header file has been updated to be compatible with all GCC versions (DRGN-6747).
    - All header files now include C++ guards (DRGN-6777).
    - Type definitions for certain basic types have been removed (DRGN-5348).
    - The number of PPI channels available for the application when the SoftDevice is enabled has been increased to 17 (DRGN-6131).

Bug fixes

- **SoftDevice**
  - Removed workaround for nRF52832 Erratum-73: The SoftDevice no longer leaves `TIMER0` running at all times which resulted in 5 uA increased average current between BLE events (DRGN-6647).
  - The `sd_nvic_critical_region_enter()` SV call will now return an error when an invalid pointer is provided as an input (DRGN-6302).
  - Fixed an assert that could have occurred on boot due to nRF52832 Erratum-36 (DRGN-7097).

Limitations

- **SoftDevice**
  - If Radio Notifications are enabled, flash write and flash erase operations initiated through the SoftDevice API will be notified to the application as Radio Events (FORT-809).
  - Applications must not modify the `SEVONPEND` flag in the `SCR` register when running in priority level 2 or 3 as this can lead to undefined behavior.

Known Issues

- The address in the pc parameter of the `nrf_fault_handler_t` callback for `NRF_FAULT_ID_APP_MEMACC` might be 2 or 4 bytes higher than the one of the actual instruction that triggered the fault (DRGN-7110).
- If `sd_softdevice_enable()` is called with `fault_handler` set to NULL, to an invalid function pointer or a pointer to a returning function, the behaviour will be undefined (DRGN-7122).
- `sd_nvic_*` functions do not operate with interrupts with an IRQ number higher than 31.
- `sd_nvic_critical_region_enter()` is not functional.

ANT_S212_nrf52832_0.6.0.alpha

The ANT_S212_nrf52832_0.6.0.alpha SoftDevice for the nRF52 platform is based upon the S210_nrf51422_5.0.0 SoftDevice for the nRF51 platform.

Notes:

- This is a major release which has changed the Application Programmer Interface (API), requiring application(s) to be recompiled.

SoftDevice Properties

- There is no SoftDevice Specification corresponding to this release. The S210 SoftDevice Specification v3.0.0 is applicable in large parts. It is available on the [Nordic Infocenter](#).
- This version of the SoftDevice contains the Master Boot Record (MBR) version 2.0.0-1.alpha
- The combined MBR and SoftDevice memory requirements for this version is as follows:
    - Flash: **72kB** (0x12000 bytes)
    - RAM: **2.56kB** (0xA00 bytes)

Compatibility

Compatible with Eng Rev B and Eng Rev C.

New functionality

- **SoftDevice**
    - The `sd_ecb_block_encrypt()` SV call now puts the CPU to sleep while waiting for the encryption to complete. In addition, a new SV call, `sd_ecb_blocks_encrypt()`, has been added to perform multiple block encryptions in a single call (DRGN-6359).
- **ANT**
    - Search Uplink feature now available. Search Uplink allows Acknowledged messages and Bursts to be received when using Background Scan. Broadcast and Acknowledged messages can also be sent to devices from the Background Scan channel. Latency is also reduced in sending messages to devices when the devices are acquired from Search. See migration notes for additional details.

Changes

- **SoftDevice**
    - A new MBR (2.0.0-1) is included with this release. The size has been reduced to 4KB in code memory (DRGN-6134, DRGN-6609, DRGN-5436). In order to issue the `SD_MBR_COMMAND_COPY_BL` and `SD_MBR_COMMAND_VECTOR_TABLE_BASE_SET` commands to the bootloader `UICR.NRFFW[1]` must be set to an address corresponding to a page in the application flash space. This page will be cleared by the MBR and used to store parameters before reset. When the `UICR.NRFFW[1]` field is set the page it refers to should not be used by the application. If the `UICR.NRFFW[1]` is set to `0xFFFFFFFF` (the default) all MBR commands will return `NRF_ERROR_NO_MEM` and DFU will be unavailable.
    - The CPU Cache is now turned on when enabling the SoftDevice (DRGN-6479).
    - SoftDevice assert handling has been completely overhauled. The application now provides a pointer to the new `nrf_fault_handler_t` callback type that handles all types of unrecoverable errors. The file name and line number parameters to this callback have been replaced by parameters including the program counter of the instruction that triggered the error (DRGN-6587).
    - The SV call handler has been optimized to reduce overhead when invoking SV calls from the application (DRGN-6692).

Bug fixes

- **SoftDevice**
    - The whole of the RAM is no longer configured not to go into low-power mode when entering either CPU idle (WFE, WFI) or SYSTEM OFF (DRGN-6635).
    - The DebugMonitor interrupts are now correctly forwarded by the MBR (DRGN-6242).
    - Pointers addressing the Code RAM section are now permitted as parameters to the SoftDevice (DRGN-6535).

Limitations

- **SoftDevice**
    - If Radio Notifications are enabled, flash write and flash erase operations initiated through the SoftDevice API will be notified to the application as Radio Events (FORT-809).

Known Issues

- **SoftDevice**
    - Temperature based calibration of the RC low frequency clock source does not work. (DRGN-5429).
    - Due to nRF52832 Errata-73, the SoftDevice leaves TIMER0 running at all times which results in 5uA increased average current between ANT events (DRGN-6647).

ANT_S212_nrf52832_0.5.1.alpha

The ANT_S212_nrf52832_0.5.1.alpha SoftDevice for the nRF52 platform is based upon the S210_nrf51422_5.0.0 SoftDevice for the nRF51 platform.

SoftDevice Properties

- There is no SoftDevice Specification corresponding to this release. The S210 SoftDevice Specification v3.0.0 is applicable in large parts. It is available on the [Nordic Infocenter](#).
- This version of the SoftDevice contains the Master Boot Record (MBR) version 1.1.0-2.alpha
- The combined MBR and SoftDevice memory requirements for this version is as follows:
  - Flash: **72kB** (0x12000 bytes)
  - RAM: **2.56kB** (0xA00 bytes)

Compatibility

Tested on Eng Rev B.

Bug fixes

- **SoftDevice**
  - Fixed a problem where memory was being incorrectly loaded by the softdevice scatter file.

ANT_S212_nrf52832_0.5.0.alpha

The ANT_S212_nrf52832_0.5.0.alpha SoftDevice for the nRF52 platform is based upon the S210_nrf51422_5.0.0 SoftDevice for the nRF51 platform.

SoftDevice Properties

- There is no SoftDevice Specification corresponding to this release. The S210 SoftDevice Specification v3.0.0 is applicable in large parts. It is available on the Nordic Infocenter.
- This version of the SoftDevice contains the Master Boot Record (MBR) version 1.1.0-2.alpha
- The combined MBR and SoftDevice memory requirements for this version is as follows:
  - Flash: **72kB** (0x12000 bytes)
  - RAM: **2.56kB** (0xA00 bytes)

Compatibility

Tested on Eng Rev B.

New functionality

ANT functionality in the ANT_S212_nrf52832_0.5.0.alpha SoftDevice for the nRF52 platform is equivalent to the content in the Nordic ANT_S212_nrf52832_0.3.0.alpha SoftDevice.

- **SoftDevice**
  - A variable called `p_license_key` has been added to the `sd_softdevice_enable()` call for the SoftDevices that include ANT. If this license key is set incorrectly the SoftDevice will not enable. An evaluation key can be found in nrf_sdm.h which will enable the full stack, however you may use the evaluation key for non-commercial use only, under the terms described in the license.pdf file included in the root directory of the ANT_S212 .zip file. It is a requirement to obtain and use a commercial use license key with the S212 in any product that is sold or otherwise distributed for revenue-generating purposes. Commercial use license keys will be made available by ANT Wireless. Further information about obtaining a license key can be found here: https://www.thisisant.com/developer/ant/licensing

Bug fixes

- **SoftDevice**
  - Fixed a problem which prevented application from enabling the Floating-Point Unit (FPU) when running from the Process Stack Pointer (PSP) (DRGN-6556).

Limitations

- **SoftDevice**
  - If Radio Notifications are enabled, flash write and flash erase operations initiated through the SoftDevice API will be notified to the application as Radio Events (FORT-809).

ANT_S212_nrf52832_0.3.0.alpha

The ANT_S212_nrf52832_0.3.0.alpha SoftDevice for the nRF52 platform is based upon the S210_nrf51422_5.0.0 SoftDevice for the nRF51 platform.

SoftDevice Properties

- There is no SoftDevice Specification corresponding to this release. The S210 SoftDevice Specification v3.0.0 is applicable in large parts. It is available on the [Nordic Infocenter](#).
- This version of the SoftDevice contains the Master Boot Record (MBR) version 1.1.0
- The combined MBR and SoftDevice memory requirements for this version is as follows:
  - Flash: **72kB** (0x12000 bytes)
  - RAM: **2.5kB** (0xA00 bytes)

Compatibility

The ANT_S212_nrf52832_0.3.0.alpha is restricted to use with nRF52832 IC rev Engineering A.

New functionality

ANT functionality in the ANT_S212_nrf52832_0.3.0.alpha SoftDevice for the nRF52 platform is equivalent to the functionality in the S210_nrf51422_5.0.0 SoftDevice for the nRF51 platform.

Changes

- API changes from **S210_nrf51422_5.0.0**
  - New event: NRF_EVT_FLASH_OPERATION_VERIFY_FAILED, only available on nRF52
  - sd_flash_protect() has been changed to be compatible both with nRF52 and with future nRF51 releases.

Bugfixes

There are no bug fixes in this release.

Limitations

- **MBR**
  - The MBR in this release uses 12 kB of flash, meaning that the SoftDevice start address is 0x3000. This is subject to change in future releases (DRGN-5436).
- **SoftDevice**
  - If Radio Notifications are enabled, flash write and flash erase operations initiated through the SoftDevice API will be notified to the application as Radio Events (DRGN-5197).