



ANT SoC Module Starter Kit User Manual

N5DK1 & D52DK1

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Rev 1.0

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About the User Manual

- This user manual is to facilitate the evaluation and prototyping of solutions based on ANT SoC Module Starter Kits.
- This user manual is for design engineers who are using an ANT SoC Module Starter Kits to evaluate ANT as a low power wireless network solution and develop applications based on ANT. The development kit is not intended as an end product or for use by individuals who do not have a professional background in data communications. Refer to the Copyright Information and Usage Notice page for detailed information and usage restrictions.

Revision History

Revision	Effective Date	Description
1.0	May 2016	First Release

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1 Overview

The ANT SoC Module Starter Kits are development kits for the ANT SoC module turnkey ultra low power wireless solutions from Dynastream Innovations. The following development kits are available:

- N5 Starter Kit (N5DK1): development kit for the N5 module series based on the Nordic Semiconductor nRF51422 System on Chip solution.
- D52 Starter Kit (D52DK1): development kit for the D52 module series, based on the Nordic Semiconductor nRF52832 System on Chip solution.

These development kits include a comprehensive set of hardware components and to allow users to evaluate, design and prototype using the ANT Wireless Protocol. ANT example code, as well as drivers and peripheral code examples, is available in the Nordic nRF5 SDK.

Table 1-1 below lists the hardware components included in the ANT SoC Module Starter Kits.

Table 1-1. N5 Starter Kit Contents

Quantity	Part
2	ANT SoC Modules
1	I/O Board (ANTIO1)
1	Battery Board (ANTBAT2)
1	USB Interface Board (ANTUIF1)
1	Segger J-link Programmer

1.1 ANT SoC Modules

1.1.1 N5 Module Series

The N5 module series uses Nordic Semiconductor's nRF51422, the industry's first System on Chip (SoC) solution that supports both ANT and Bluetooth low energy depending on the loaded protocol stack. The nRF51422 integrates a 32-bit ARM® Cortex™ M0 CPU with 256 KB flash, 16/32 KB RAM, and analog and digital peripherals.

The N5 modules included in the N5 Starter Kit are the N5150M5CD, which is a N5150M8CD soldered onto a 20 mm x 20 mm carrier board. The N5150M5CD, with 32 KB RAM, includes an antenna, onboard 32.768 kHz and 16 MHz crystal clock, DC-DC converter and 13 GPIOs with 6 analogue inputs. Refer to the [N5 ANT SoC Module Series Datasheet](#) for more details.



Figure 1-1. N548M5CB

1.1.2 D52 Module Series

The D52 module series uses Nordic Semiconductor's nRF52832 SoC, supporting both ANT and Bluetooth low energy depending on the loaded protocol stack. The nRF52832 incorporates a 32-bit ARM® Cortex™ M4F CPU with 512 KB flash, 64 KB RAM, on-chip NFC tag, and analog and digital peripherals. The D52 modules included in the D52 Starter Kit are the D52QD2M6IA-A, which is a D52QD2M4IA-A soldered onto a 35 mm x 25 mm carrier board. The D52QD2M6IA-A includes an

antenna, NFC antenna through-hole, onboard 32.768 kHz and 32 MHz crystal clocks, DC-DC converter, 3-axis MEMS accelerometer, and 23 GPIOs with 8 analogue inputs. Refer to the [D52 ANT SoC Module Series Datasheet](#) for more details.

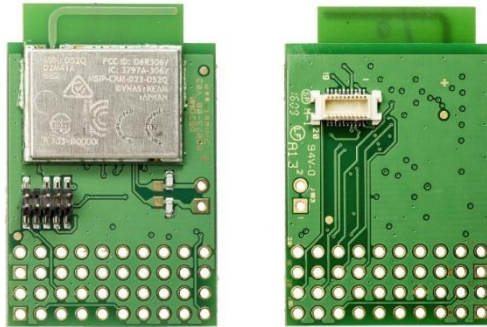


Figure 1-2. D52QD2M6IA

1.2 Battery Board

Table 1-2 describes each of the numbered components shown on the battery board in Figure 1-3.

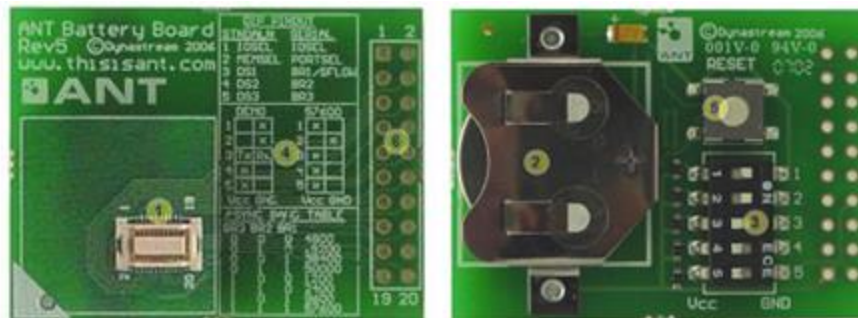


Figure 1-3. Battery Board

Table 1-2. Battery Board Description

Number	Component	Description
1	Module Socket	Used for plugging in an ANT module or an I/O interface board
2	Battery Slot	Used to power the demo mode setup (fits a 2032 coin cell)
3	Dipswitches	Used as inputs to 5 of the module’s IO pins. See Table 1-5. When using the module as a network processor, the dipswitches can be used to set configuration options for the serial interface as described in the silkscreen instructions.
4	Dipswitch Instructions	Silkscreen instructions showing Dipswitch pin-out, Default Baud Rate configuration, and Baud Rate table
5	Reset Button	Resets the module
6	Interface Header	0.1" module interface header. See Table 1-5 for the pin-out of this 20-pin header.

1.3 I/O Interface Board

Table 1-3 describes each of the numbered components shown on the battery board in Figure 1-4.

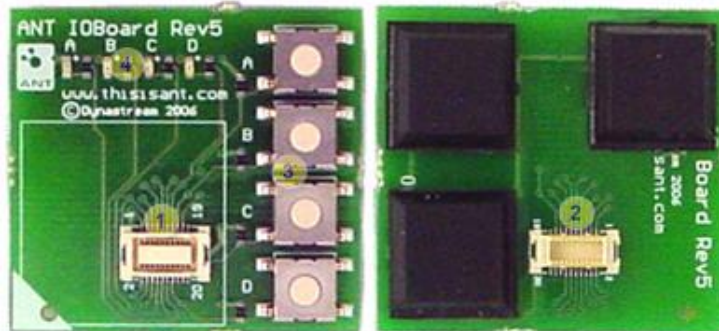


Figure 1-4. I/O Interface Board

Table 1-3. I/O Interface Board Description

Number	Component	Description
1	Module Socket	Used for plugging in an ANT module
2	Connector	Used to plug onto the battery board
3	Buttons	Used as inputs to 4 of the module's IO pins. See Table 1-5. When a button is released its IO line is pulled up with a 1M Ω resistor. When a button is pressed its IO line is grounded.
4	LEDs	Used as outputs of 4 of the module's IO pins. See Table 1-5. An LED turns ON when its line is low and OFF when its line is high.

1.4 USB Interface Board



Figure 1-5. USB Interface Board

Table 1-4 describes each of the numbered components shown on the battery board in Figure 1-5.

Table 1-4. USB Interface Board Description

Number	Component	Description
1	Module Socket	Used for plugging in an ANT module
2	Interface Header	0.1" module interface header. See Table 1-5 for the pin-out of this 10-pin header.

1.5 Segger J-Link Lite Programmer

The Segger J-Link Lite Cortex M (cable and board) provided is used to connect the ANT module to a PC for programming as shown in Figure 1-6.

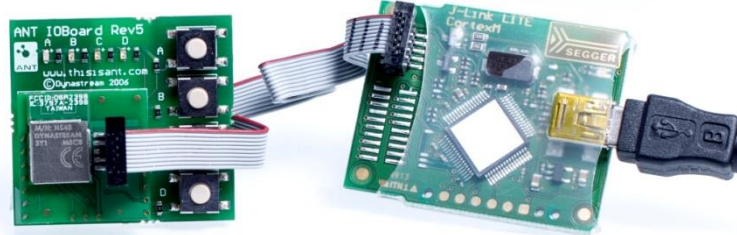


Figure 1-6. Connecting the Segger Cable

NOTE: More advanced J-Link programmers are available from Segger. Refer to Section 7 for details.

1.6 Pinouts

Table 1-5 shows the pinout of the different components in the ANT SoC Starter Kit, focusing on the Molex interface. For a more detailed pinout of the modules, refer to the module datasheets.

Table 1-5. ANT SoC Starter Kit Boards Stack Pinout

Molex Pin #	nRF51 Pins	nRF52 Pins	Battery Board Interface Header Pin #	Battery Board Input	IO Board Components	USB Interface Board Header
1	Vcc	Vcc	1			1
2	P005	P012	5	Switch 1		5
3	P012	P016	3,11		Button C	3
4	P015	P017	4,15		LED C	4
5	P006	P015	18	Switch3		
6	SWDCLK	SWDCLK	7			7
7	P024	P011	19	Switch 4		
8	P003	P031	14		LED B	
9	P009	P014	20	Switch 5		
10	RST/SWDIO	P021/RESET	6	Reset Button		6
11	P000	P008	17	Switch 2		
12	P008	P024	13		LED A	
13	P030	P020	16		LED D	
14	P011	P019	12		Button D	
15	P002	P007	10		Button B	10
16	P021	SWDIO	N/C			
17	P023	P006	9		Button A	9
18	P001	P022	N/C			
19	GND	GND	2,8			2,8
20	P004	P023	N/C			

1.7 Technical Resources

1.7.1 Documentation

To learn more about ANT and the ANT SoC modules included in the starter kit, the following documents are available on www.thisisant.com. To access some of these documents it may be necessary to create an account.

Table 1-6. Related Documents

Document	Description
N5 ANT SoC Module Series Datasheet	The technical specification of the N5 Module Series.
D52Q ANT Module Series Datasheet	The technical specification of the D52Q Module Series
ANT Message Protocol and Usage Document	Describes the ANT protocol and software interface.

1.7.2 SoftDevices and Software Compatibility

SoftDevices are protocol stack solutions for use with the nRF51 and nRF52 series SOCs. SoftDevices for the nRF51 series are available from Nordic Semiconductor, while SoftDevices for the nRF52 series are licensed separately from Dynastream Innovations. Table 1-7 shows the SoftDevices available for the nRF51 and nRF52 series SoCs.

Table 1-7. Available SoftDevices

Protocol Stack	nRF51 SoftDevice	nRF52 SoftDevice
ANT Stack	S210.	S212
Concurrent ANT/ <i>Bluetooth</i> Smart	S310	S332

The version of the Nordic Semiconductor nRF5SDK to use depends on the IC revision and SoftDevice. In order to identify a compatible version of the nRF5SDK to use with the ANT SoC Module Starter Kit, first refer to the corresponding module datasheet (N5/D52Q) for more information on identifying the IC revision and preloaded SoftDevice. Then, refer to the SDK compatibility matrix to determine a compatible SDK for your particular setup.

- nRF51 Series Compatibility Matrix:
http://infocenter.nordicsemi.com/topic/com.nordic.infocenter.nrf51/dita/nrf51/compatibility_matrix/nRF51422_nRF51822_ic_rev_sdk_%20sd_comp_matrix.html?cp=2_0_3
- nRF52 Series Compatibility Matrix:
http://infocenter.nordicsemi.com/topic/com.nordic.infocenter.nrf52/dita/nrf52/compatibility_matrix/ic_rev_sdk_sd_comp_matrix.html?cp=1_1_2

1.7.3 Support

Technical support for the ANT wireless protocol is available via Tech FAQs and the ANT Developer Forum:

<http://www.thisisant.com/developer/resources/tech-faq/>

<http://www.thisisant.com/forum/>

Technical support for the hardware implementation (including radio performance) of ANT chips is provided by the relevant semiconductor supplier and their regional distributors. For nRF51422 and nRF52832 specific help, please contact Nordic Semiconductor.

2 Software Setup

Download the components listed in Table 2-1, Table 2-2, Table 2-3 and Table 2-4 to begin development with the ANT SoC Module Starter Kits. Installation instructions are provided on Section 2.1.

Table 2-1. ANT Software Components

ANT Components		
	Component	Source
1.	ANT USB Interface Board Driver	www.thisisant.com/developer/resources/downloads (ANT USB Interface Board Driver (Windows))
	Description: Windows drivers for the ANT USB Interface Board.	
2.	ANTWareII	www.thisisant.com/developer/resources/downloads (ANTWareII)
	Description: PC Utility tool used to evaluate and debug ANT designs and applications (using the ANT USB Interface Board). Requires Microsoft .NET Framework 3.5 .	

Table 2-2. Third-Party Software Components

Third-Party Components		
	Component	Source
1.	Keil MDK ARM Development Kit v5	https://www.keil.com/download/product (MDK-ARM v5)
	Description: Development environment specifically designed for microcontroller applications that lets you develop using the nRF5 SDK. The evaluation license is sufficient for building the examples in the SDK.	
2.	SEGGER J-Link Programmer Software	http://www.segger.com/jlink-software.html (J-Link software & documentation pack)
	Description: Software package required to use the J-Link programmer included in the development kit. Contains drivers and files required to debug directly from the Keil Development Kit.	

Table 2-3. Nordic Semiconductor Software Components

Nordic Semiconductor Components		
	Component	Source
1.	nRF5 SDK	http://developer.nordicsemi.com/nRF5_SDK/ Refer to Section 1.7.2 for more information on selecting a compatible version of the nRF5 SDK.
	Description: Software Development Kit that provides code examples, drivers, and libraries for developing applications for nRF51 and nRF52 series SoCs. The nRF5 SDK includes: <ul style="list-style-type: none"> • ANT, <i>Bluetooth</i> and peripheral code examples • Drivers • Libraries • nRF5x MDK For more information about the SDK and included code examples, see the online documentation for the nRF5 SDK at http://infocenter.nordicsemi.com/topic/com.nordic.infocenter.sdk/dita/sdk/nrf5_sdk.html?cp=4_0	
2.	nRFgo Studio	https://www.nordicsemi.com/eng/Products/2.4GHz-RF/nRFgo-Studio (nRFgo Studio-Win 32/64)
	Description: Tool to program and configure devices. It supports the programming of nRF51 SoftDevices, applications, and bootloaders. For more information, see the Help menu item in nRFgo Studio.	

Table 2-4. ANT SoftDevices

ANT SoftDevices		
	Component	Source
1.	nRF51422 SoftDevices	http://www.nordicsemi.com/eng/Products/ANT/nRF51422#Downloads (SoftDevices)
	Description: Wireless protocol stack, available from Nordic Semiconductor.	
2.	nRF52832 SoftDevices	https://www.thisisant.com/developer/components/nrf52832#tab_protocol_stacks_tab
	Description: Wireless protocol stack, licensed separately by Dynastream Innovations.	

2.1 Installing the Software Tools

It is recommended the supporting software tools are installed in the order specified below to ensure functionality.

Table 2-5. Installation Order

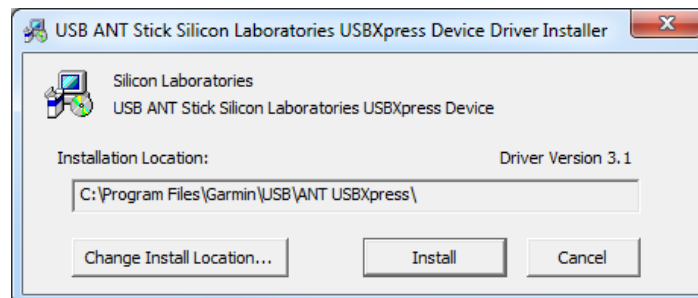
Order	Section	Software Component
1	2.1.1	ANT USB Interface Board Driver
2	2.1.2	ANTWareII
3	2.1.3	Keil MDK Arm Developer Kit
4	2.1.4	SEGGER J-Link Programmer Software
5	2.1.5	nRF5 SDK
6	2.1.6	nRFgo Studio
7	2.1.7	(D52 Only) SoftDevice API headers

2.1.1 ANT USB Interface Board Driver

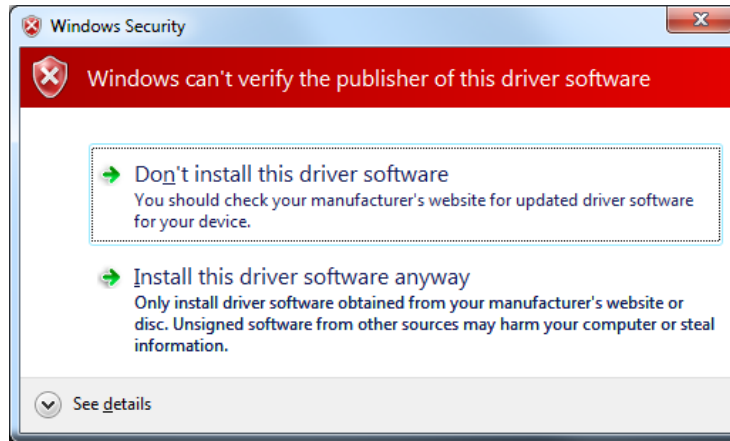
Download the 'ANT USB Interface Board Driver for Windows' package from <http://www.thisisant.com/developer/resources/downloads> and extract the entire contents onto your hard drive.

Run the USBXpressInstaller.exe file contained in the folder.

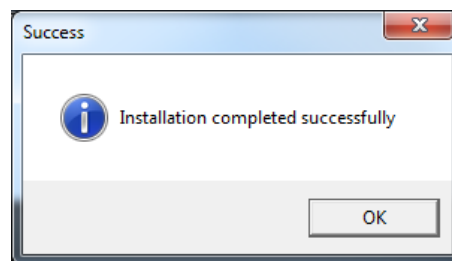
Install the drivers in your desired location.



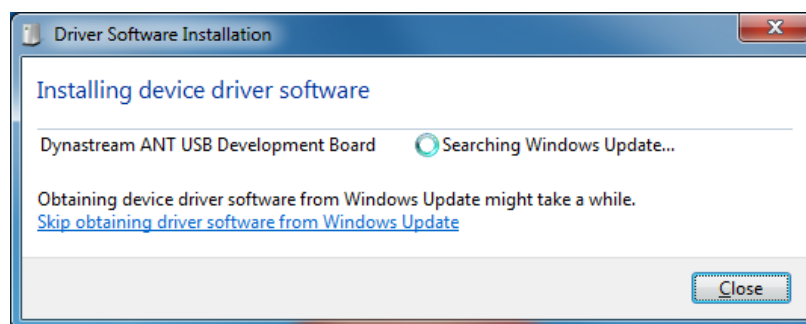
You may receive a warning message that indicates that Windows can't verify the publisher of the driver software. Click 'Install this driver software anyway' to continue.



A window will indicate if the drivers have installed correctly.



Connect an ANT SoC module to the ANT Development Kit's USB interface board and insert into a USB port on your PC. The Driver Software Installation wizard should pop up and begin a search for drivers and indicate the USB device is 'Ready to Use' when it detects the installed drivers on the PC.



Note: The ANT USB Interface Board drivers are unsigned. Systems that require signed drivers for installation (e.g. Windows 8, Windows 10) are required to boot with driver signature enforcement disabled to complete the installation process.

2.1.2 ANTWareII

Download ANTWareII from the ANTWareII link on the www.thisisant.com/developer/resources/downloads page. Follow the steps in the installer to install ANTWareII on your computer.

Please note that the [Microsoft .NET Framework 3.5](https://www.microsoft.com/net/framework) must be installed on your PC in order for this application to run.

2.1.3 Keil MDK Arm Developer Kit

Download the Keil MDK Arm Developer Kit from the MDK-ARM v5 link on the <https://www.keil.com/download/product/> page.

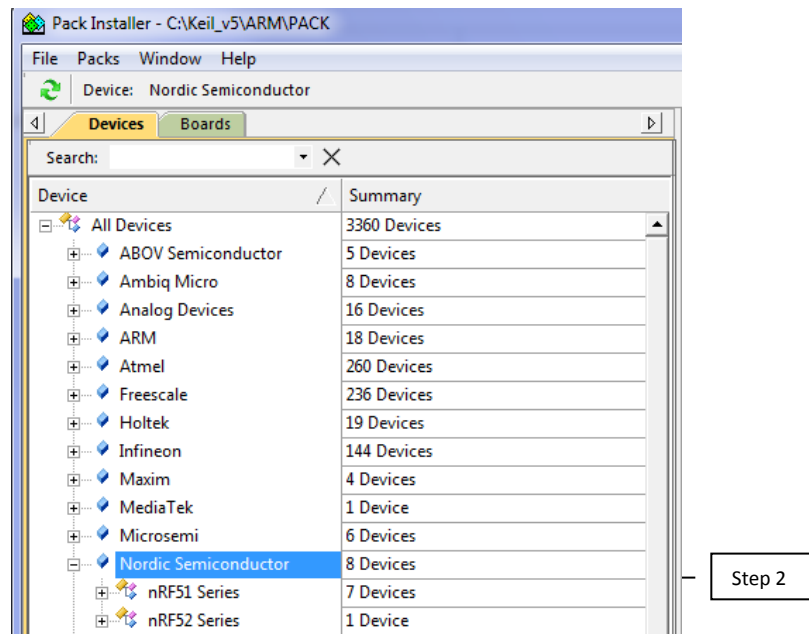
Run the MDK installer. It is recommended that you use the default install locations.

Continue to follow the steps in the installer. Upon completion of the installer, the Keil Pack Installer will automatically open. If you are using an existing Keil v5 installation, you can open the Keil Pack Installer by clicking on the "Pack Installer" button:

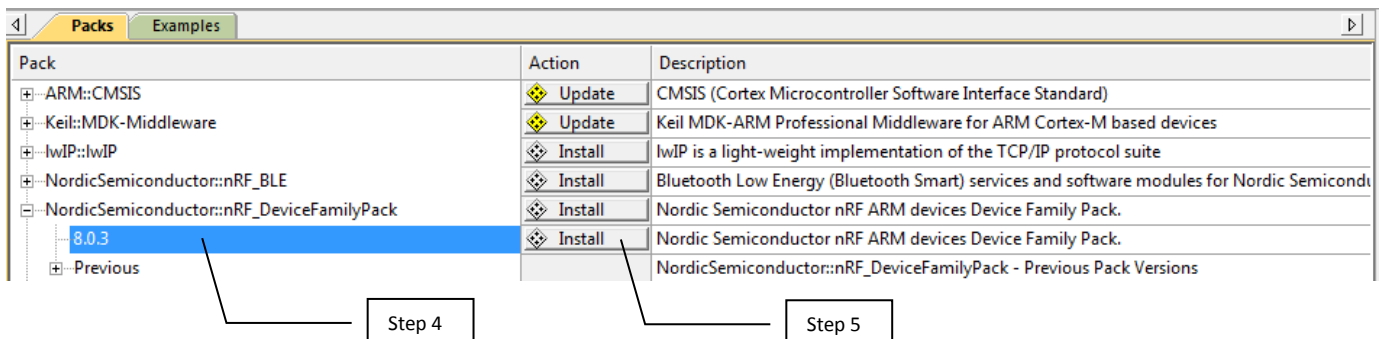


Follow these steps to install the Nordic Semiconductor Device Family Pack:

1. Click "Packs" and select "Check For Updates". The pack installer will download up-to-date information about available packs.
2. Click on "Nordic Semiconductor" within the "Devices" Tab.



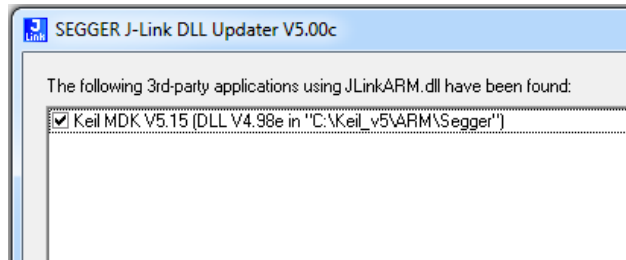
3. Expand "NordicSemiconductor::nRF_DeviceFamilyPack" within the "Packs" Tab.
4. Select the latest Device Family Pack.
5. Click "Install"



- Exit the pack installer

2.1.4 SEGGER JLink Programmer Software

Download the Segger JLink Programmer from <http://www.segger.com/jlink-software.html>. Follow the steps in the installer to install the required Segger drivers on the computer. During the installation, any third party applications that use the JLinkARM.dll should be detected, select your version of Keil MDK.



2.1.5 nRF5 SDK

Download the Nordic nRF5 SDK zip file appropriate for your IC and SoftDevice, as described in Section 1.7.2.

Unzip the contents of the zip file in a directory of your choice, ensuring the directory structure in the zip file is preserved.

Note: There is no need to run the nRF5 MDK installer, these files were already installed with the Keil pack installer in Section 2.1.3

2.1.6 nRFGo Studio

Download the nRFGo Studio tool from <https://www.nordicsemi.com/eng/Products/2.4GHz-RF/nRFGo-Studio>. Follow the steps in the installer to install nRFGo Studio on the computer.

2.1.7 SoftDevice API Headers

The Nordic nRF5 SDK does not include API header files for the ANT SoftDevices for the nRF52 series SoCs. To add the headers to the nRF5 SDK, perform the following steps:

- Download the SoftDevice from https://www.thisisant.com/developer/components/nrf52832#tab_protocol_stacks_tab
- Extract the entire contents of the downloaded zip file onto your hard drive in a temporary location of your choice.
- Copy the entire contents of the `ANT_sXXX_nrf52832_Y.Y.Y_API/include` directory of the unzipped SoftDevice download package into the `components/softdevice/sXXX/headers` directory of your nRF5 SDK installation. If the latter directory does not exist, create it.

Note: This is not necessary when using SoftDevices for the nRF51 series SoCs. Headers for these are already included in the SDK.


3 Compiling and Running a First Example

The IO Tx demo is a simple example application that demonstrates the functionality of the LEDs and buttons of the I/O board in the ANT SoC Module Starter Kits, as well as showcases basic bidirectional communication between two nodes using ANT. This example is a good starting point for beginning development with ANT SoC modules.

The ANT SoC modules in the D52 Starter Kit come preloaded with the S212 SoftDevice and ANT network processor firmware. The ANT network processor application code enables the module to function as a generic ANT RF module when connected to an external application controller (e.g. a PC application). Either of the modules can be used for running the example.

The ANT SoC modules in the N5 Starter Kit come preloaded with the S210 SoftDevice. The module stacked on the ANT USB interface board comes preloaded with ANT network processor firmware. The module stacked on the I/O and battery boards comes preloaded with the IO Tx demo. Make sure the markings on the modules match the markings on the mounting boards, and use the module stacked on the I/O and battery boards to run the example.

Follow the steps below to compile and run the IO Tx demo:

1. Navigate to the installation folder for the Nordic nRF5 SDK, and locate the example project. The source code for this demo is available under *examples/ant/experimental/ant_io_demo/ant_io_tx*. Select the appropriate project for your specific kit, as described in Section 5.2.
2. Open the project in Keil by double clicking the uvprojx file.
3. Click the "Build" icon to compile the project. 

Note: If using the D52 Starter Kit, an error regarding the license key will be generated when compiling the code for the first time. Follow the instructions provided in the error message to successfully compile the project.

4. Stack the ANT SoC module to be programmed onto the IO and Battery Boards, as shown in Figure 3-1 and Figure 3-2. Note that it is not possible to program an ANT SoC module while it is mounted to the USB interface board and connected to a PC.



Figure 3-1. N5 Module stacked on IO and Battery Boards.



Figure 3-2. D52Q Module stacked on IO and Battery Boards.

5. Insert a CR2032 Coin Cell battery into the Battery Board.

- Attach the JLink Segger Ribbon Cable to the programming header on the ANT SoC module as shown in Figure 3-3 and Figure 3-4.

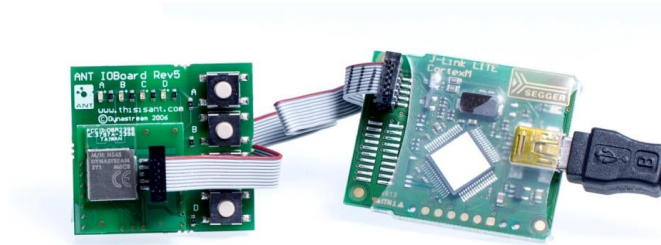


Figure 3-3. Stacked N5 Module with Segger JLink Programmer Ribbon Cable

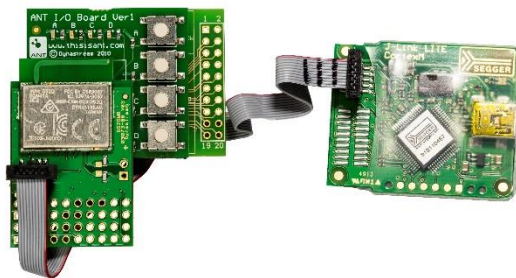



Figure 3-4. Stacked D52Q Module with Segger JLink Programmer Ribbon Cable

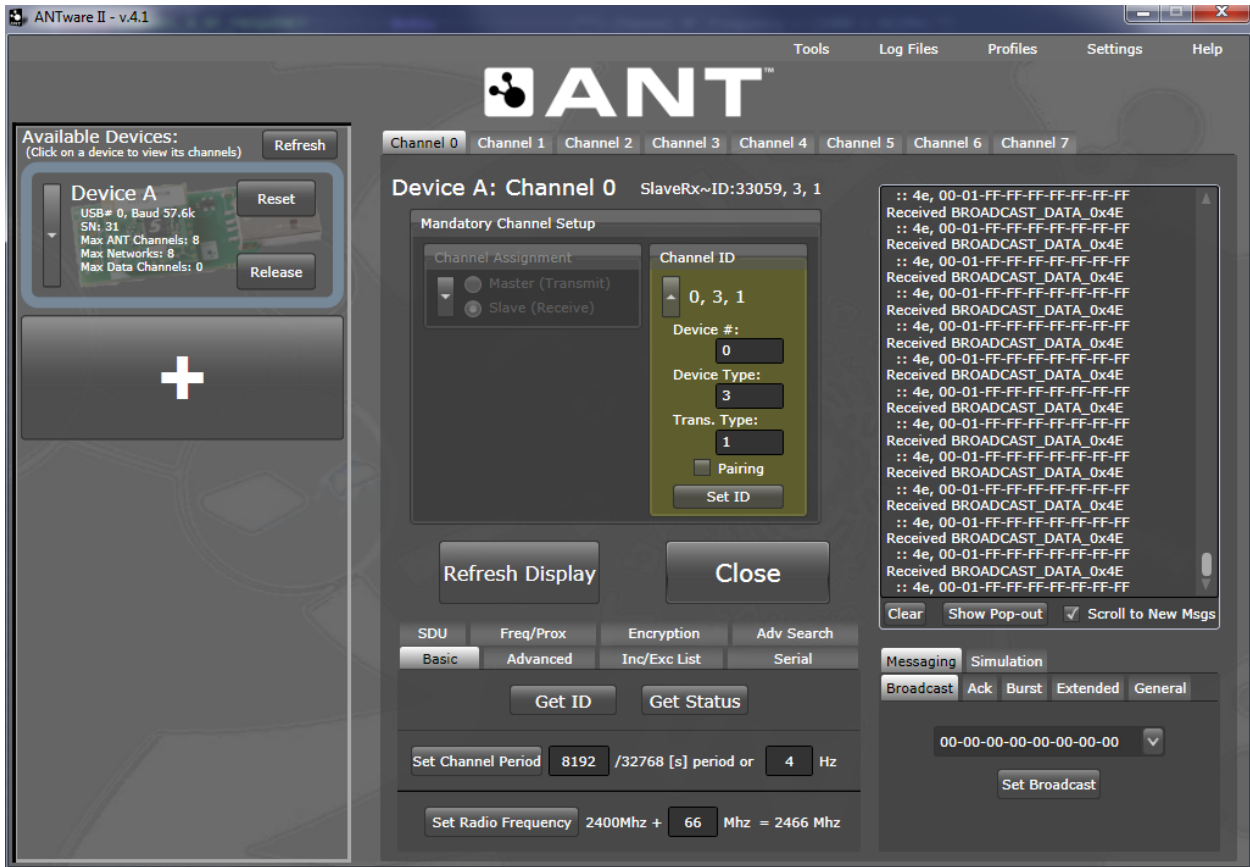
- Connect the Segger JLink Programmer to the computer using a USB to mini-USB cable.
- For D52 Starter Kit only:** Before programming a module for the first time, open a command prompt and type the following:

```
nrfjprog.exe -f NRF52 --recover
```

Then program the S212 SoftDevice as described in Section 4.

- Click the "Load" icon to load the firmware onto the module. 
- Mount a module with the ANT network processor firmware on an ANT USB interface board and connect it to the PC.
- Open the ANTWare tool.
- Configure Channel 0 as a Slave.
- Set the Channel ID to "0, 3, 1".
- Open the channel with default values for all the other channel configuration parameters to begin the search for the other ANT SoC module.

- Once the two modules have paired (indicated by receiving broadcasts in the ANTWare log window), you can begin to test the buttons and LEDs on the IO board.



- Click on the "Simulation" tab on the right-hand side of the ANTWare application. Modify the "Respond With" field to either of these values:

Table 3-1. IO Demo LED Control Message Format

Tx Buffer Value	Description
01-00-00-00-00-00-00-FE	Turns on LED A on the IO Board
01-00-00-00-00-00-00-FD	Turns on LED B on the IO Board
01-00-00-00-00-00-00-FB	Turns on LED C on the IO Board
01-00-00-00-00-00-00-F7	Turns on LED D on the IO Board

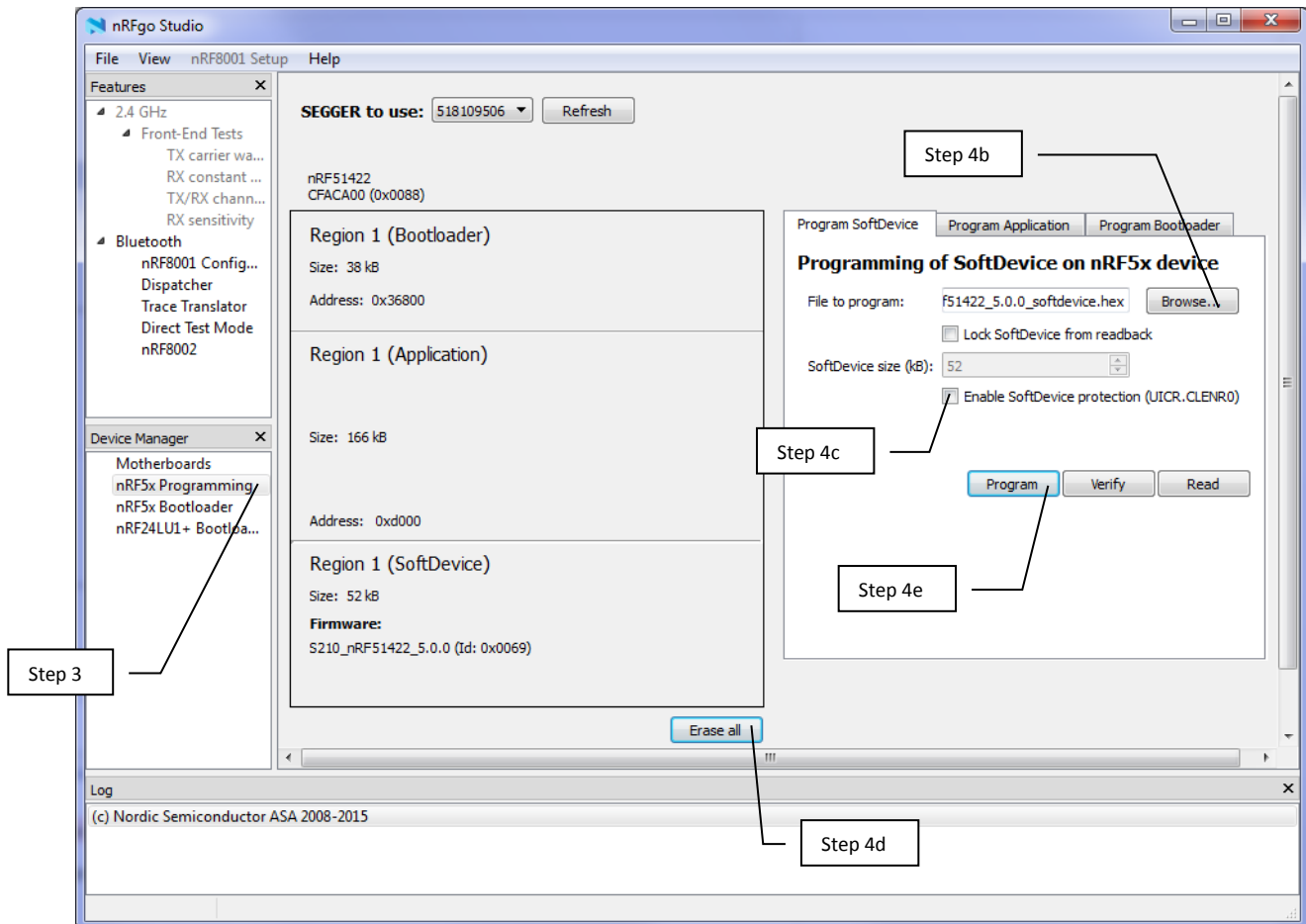
- Check the "Auto Send Response to Received Msgs" check box. The ANT SoC module will now respond with a message of its own every time it receives an ANT broadcast message to control the LEDs on the IO board.
- The buttons on the IO board will allow you to modify the contents of the broadcast messages being transmitted to ANTWare.

Note: Binaries for the preloaded network processor firmware for N5 modules are available at <https://www.thisisant.com/developer/resources/downloads/>.

4 Programming an ANT SoC Module using nRFGo Studio

In order to program an ANT SoC module using nRFGo Studio:

1. Follow steps 4-7 of Section 3.
2. Launch nRFGo Studio.
3. Click on the "nRF5x Programming" option in the "Device Manager" panel on the left-hand side of the application.



4. To program a SoftDevice:
 - a. Click on the "Program SoftDevice" tab on the right-hand side of the application.
 - b. Click the "Browse..." button and navigate to the directory where the hex file for the SoftDevice is present.
 - c. Disable the checkbox "Enable SoftDevice protection (UICR.CLENR0)" if you are planning on using the ANT Bootloader/DFU.
 - d. Click the "Erase all" button at the bottom of the screen.
 - e. Click the "Program" button in the "Program SoftDevice" tab to program the SoftDevice onto the ANT SoC Module.
5. To program an application binary:

- f. Click on the "Program Application" tab
- g. Click the "Browse..." button and navigate to the location of the desired application hex file.
- h. Click the "Program" button in the "Program Application" tab to program the application onto the ANT SoC Module

5 Running Examples from the nRF5 SDK on the ANT SoC Module Starter Kits

The Nordic nRF5 SDK provides a hardware layer of abstraction that easily allows the developer to modify an example to run on a different board. This layer of abstraction occurs within the Board Support Package (BSP) module.

Here are some general considerations that should be thought of before running an example from the nRF5 SDK on an ANT SoC Module Starter Kit.

5.1 Project compatibility with the ANT SoC Module Starter Kit

Make sure that the Nordic SDK version is compatible with the SoftDevice loaded on the ANT SoC module, as code intended for a different version of the SoftDevice may not work without some modifications.

Also note that not all of the example projects will run on the ANT SoC Module Starter Kit due to differences in hardware. As an example, the ANT SoC Module Starter Kits do not include the necessary peripherals to run the temperature example.


5.2 Selecting the correct project file

ANT examples are located under the *examples/ant* folder of the Nordic nRF5 SDK, while the ANT Bootloader/DFU example is located under *examples/dfu*. The *examples* folders contains additional examples for *Bluetooth* Smart and peripheral usage.

It is important to open the correct project file as Nordic has provided a variety of project configurations based on whether the nRF5 SDK was installed with/without Keil packs. When opening Keil projects developed by Nordic, select the μ Vision5 Project file (*.uvprojx) inside the *arm5_no_packs* folder within the following board-specific folders:

- *n5_starterkit*: Project configured for running in the N5 Starter Kit without any modifications.
- *d52_starterkit*: Project configured for running in the D52 Starter Kit without any modifications.
- *pca10028*: Project configured for the Nordic nRF51 Development Kit (PCA10028). The project can be run on the N5 Starter Kit by modifying the selected board.
- *pca10036*: Project configured for the Nordic nRF52 Preview Development Kit (PCA10036). The project can be run on the D52 Starter Kit by modifying the selected board.
- *pca10040*: Project configured for the Nordic nRF52 Development Kit (PCA10040). The project can be run on the D52 Starter Kit by modifying the selected board.


To modify the selected board:

1. Open the desired project file.
2. Click on the "Options for target" button. 
3. Click on the "C/C++" tab
4. Change "BOARD_PCA100XX" to "BOARD_N5DK1" (N5 Starter Kit) or "BOARD_D52DK1" (D52 Starter Kit) in the "Define:" text box.

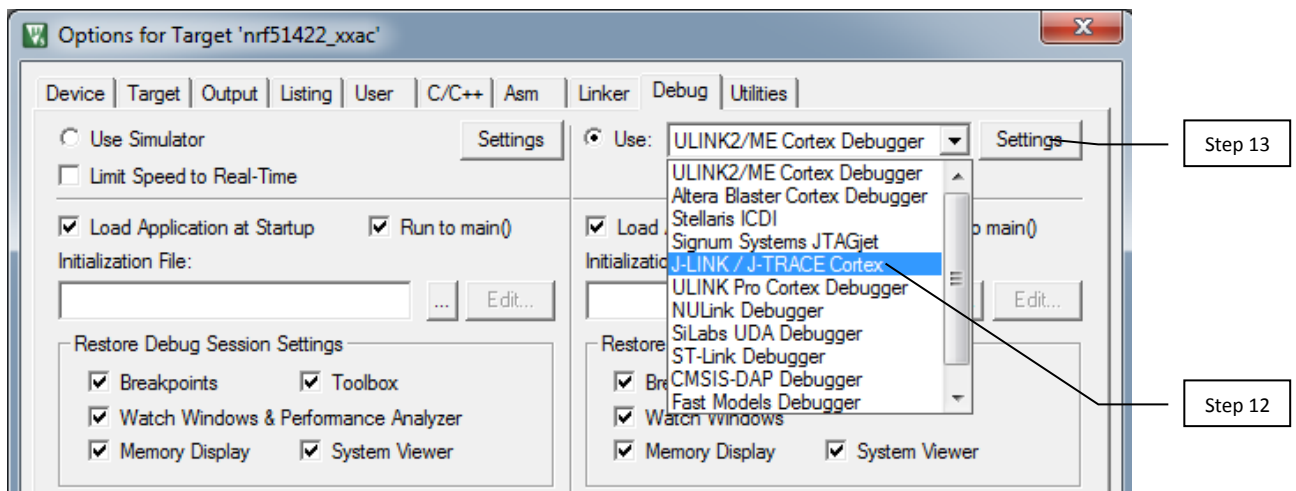
5.3 Using the appropriate target device

You may need to modify the project settings to use the correct device (IC). Refer to the corresponding module datasheet for information on how to identify the IC revision in your module.

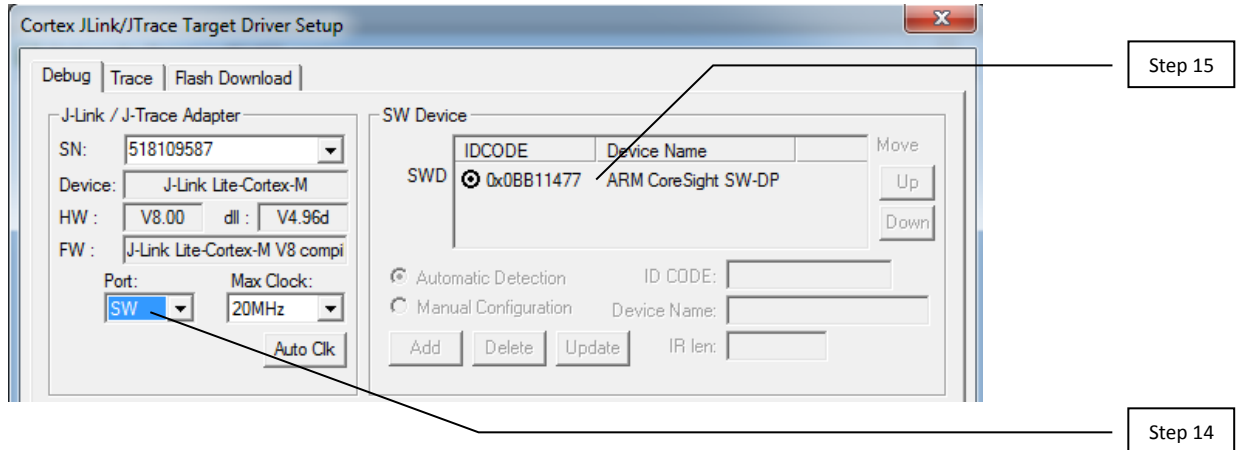
To modify the target:

1. Open the project.
2. Click on the "Options for target" button. 
3. Click on the "Device" tab.

4. Check that the target device corresponds to the ANT SoC module you are using. For example, if using an N5150M5CD based on the nRF51422-CFAC V3 chip, the appropriate target would be "nrf51422_xxAC" under "nRF51 Series". If the device is correct, no further changes are needed.
5. If the device does not match the current project settings, click on the "Target" tab.
6. Take note of ALL the Target information for the specific project (IROM1 and IRAM1). If the targeted device is changed, these settings will be reset and must be re-entered to have proper functionality of the example.
7. Click on the "Device" tab.
8. Change the target device to the appropriate device.
9. Reconfigure the Target settings to what they were before the Device was changed.
10. Mount the ANT SoC module on a powered battery board and connect it to the SEGGER J-Link programmer.
11. Click on the "Debug" tab.
12. Select "J-LINK / J-TRACE Cortex" from the dropdown menu.



13. Click on "Settings" located to the right side of the drop down menu.
14. In the "J-Link / J-Trace Adapter" section set "Port:" to SW.
15. Check that the SW device was detected.



16. Click on the "Flash Download" Tab.
17. Check to see if there is a Programming Algorithm.
 - a. If there is no Programming Algorithm listed, click "Add"
 - b. Select nRF51xxx or nRF52xxx depending on the ANT SoC Module used.
 - c. Click "Add"
18. Click "OK".


6 Changing SoftDevices

When updating to a new SoftDevice (e.g. a new version of the same SoftDevice, or moving from S210/S212 to S310/S332), note that new SoftDevices may introduce API and functional changes. Please review the release notes and migration document included in the SoftDevice download package, as well as the SoftDevice Specification for the new SoftDevice, for any changes required in your application when moving to a different SoftDevice. A different Nordic nRF5 SDK version may be required to support the new API.

If migrating an existing application from nRF51 to nRF52, please refer to the following migration document:

http://infocenter.nordicsemi.com/topic/com.nordic.infocenter.nrf52/dita/nrf52/migration/preface.html?cp=1_4

New SoftDevices may have different memory settings. To adjust the memory settings of your project:

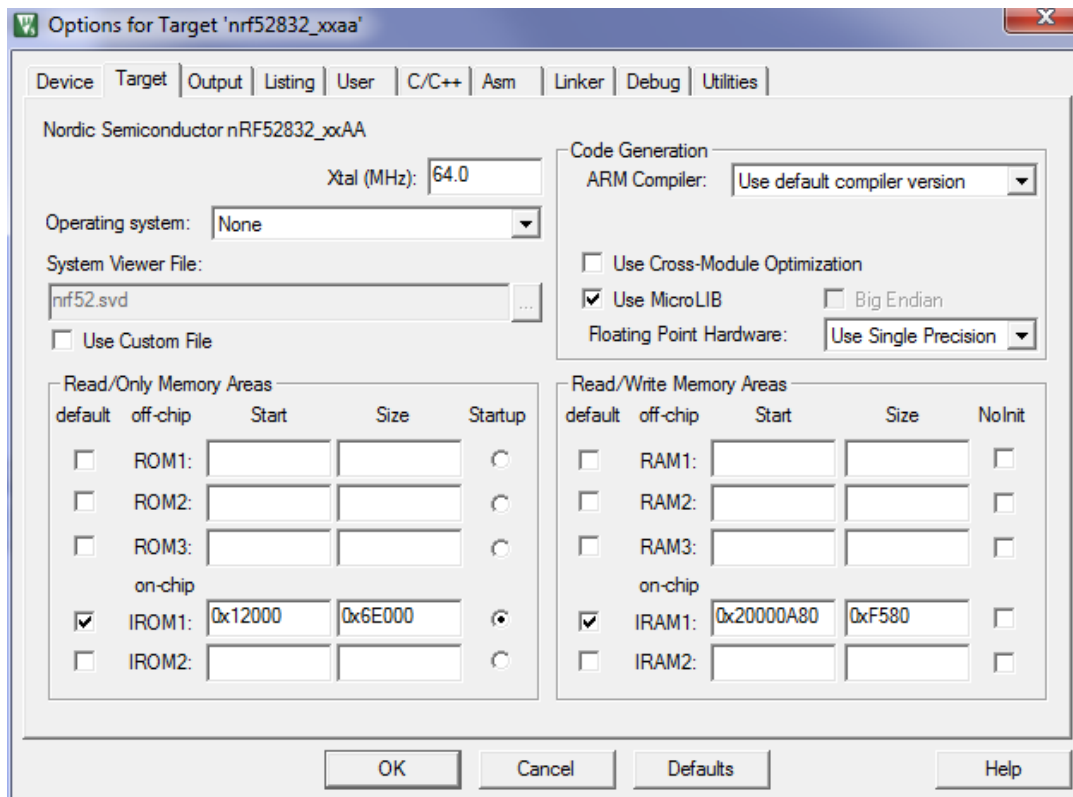
1. Open the project.
2. Click on the "Options for target" button. 
3. Click on the "Target" tab.
4. Configure the flash (IROM1) start and size for the application. You can find the flash start location in the SoftDevice release notes, under "SoftDevice properties". The flash size can be determined by subtracting the flash start location from the total flash size of the chip.
5. Configure the RAM (IRAM1) start and size for the application. You can find the RAM start location in the SoftDevice release notes, under "SoftDevice properties"; add a 0x20000000 offset to this value. The RAM size can be determined by subtracting the RAM start location (without the offset) from the total RAM size of the chip.
6. Click "OK".

For example, for the ANT SoftDevice S212 v0.9.1, the release notes indicate the following memory requirements:

- Flash: 72 kB (0x12000 bytes)
- RAM: 2.56 kB (0xA80 bytes)

This translates into the following settings:

- Flash:
 - Start = 0x12000
 - Size = 0x80000 (flash size for nRF52832) – 0x12000 (flash start) = 0x6E000
- RAM:
 - Start = 0x20000000 + 0xA80 = 0x20000A80
 - Size = 0x10000 (RAM size for nRF52832) – 0xA80 (RAM start) = 0xF580



Important: The actual RAM requirements of some versions of the S310/S332 SoftDevices depends on the configuration selected when enabling the *Bluetooth* stack. Refer to the corresponding SoftDevice release notes and SoftDevice Specification for more details.

7 Appendix 1 – A Note from Segger

A SEGGER J-Link Lite Cortex-M is included in this kit. The J-Link Lite is a very small form factor debug probe which is software compatible to the widely acknowledged J-Link line. This device has a JTAG clock of up to 2 MHz. It supports SWD and -SWO. The J-Link Lite is only delivered and supported as part of a starter kit, which includes an evaluation board. It is not sold separately. It may only be used with the evaluation board it came with. The SEGGER public forum is available at: <http://forum.segger.com/>.



When you have completed your use of the J-Link Lite while working with this starter kit and are ready to move to a full debug probe and/or production flash programmer, we are confident you will find one of the following SEGGER solutions a perfect fit.

J-Link PRO



Debug Probe with USB and Ethernet interface
Includes all software enhancement modules

J-Link ULTRA+



Ultra Fast Debug Probe
Includes all software enhancement modules

J-Link PLUS



Debug Probe
Includes all software enhancement modules

J-Link BASE



Debug Probe

J-Link EDU



Educational Use Debug Probe

SEGGER also offers a full featured RTOS and middleware offering (File System, USB Stack, TCP/IP Stack, and Graphics Package).

Additional information may be found at: www.segger.com and: www.segger.com/debug-probes.html

Flasher ARM



Production Flash Programmer

Flasher Portable



Portable Flash Programmer

