D52M ANT SoC Module

Module Pictures

Module Hardware

- Integrated printed antenna
- On-board 32MHz and 32.768 kHz crystal clocks
- 1.7V to 3.6V supply voltage range:
- Operating temperature: Industrial (-40°C to +85°C)
- Up to 24 GPIOs
- Programmable output/channel from -20dBm to 4dBm
- Excellent receiver sensitivity
  - -93dBm (ANT mode)
  - -96dBm (BLE mode)
- 1dBm resolution RSSI
- Total 512kB flash, 64kB RAM
- SPI, I^2C and UART interfaces
- ARM SWD interface
- Internal DC/DC converter supported
- 14 x 9.8 x 2.0mm module
- Layout compatible options with N5150M8CD, N550M8CC, N548M8CB[1]
- Radio regulatory approval for major markets
- BLUETOOTH SIG qualification
- RoHS compliant
- Preloaded with an ANT Network Processor application and SoftDevice.

ANT® Operation (using the latest s212 or s332 SoftDevice)

- 79 selectable RF channels (2402 to 2480 MHz)
- Flexible network topologies: peer-to-peer, star, tree, high node count, mesh and more
- Broadcast, acknowledged, and burst data communication modes
- Built-in device search and pairing
- Built-in interference handling and radio coexistence management with application radio disable requests and application flash write/erase requests
- Enhanced ANT features:
  - Supports up to 15 logical channels each with configurable channel periods (5.2ms - 2s)
  - Advanced burst data transfer modes (up to 60kbps)
  - Optional channel encryption mode (aes-128)
  - Supports up to 8 public, private and/or managed networks
  - Advanced power management features to optimize application power consumption including Event Filtering and Selective Data Updates
  - Asynchronous transmit channel
  - Fast channel initiation

***Bluetooth®* low energy operation (when loaded with the latest S132 or S332 SoftDevice)**

- Bluetooth 4.2 compliant low energy single-mode protocol stack suitable for Bluetooth low energy products
  - Concurrent Central, Observer, Peripheral, and Broadcaster roles with up to:
    - Multiple connections as a central
    - One connection as a peripheral
    - Observer
    - Broadcaster
  - Link layer
  - L2CAP, ATT, and SM protocols
  - GATT and GAP APIs
  - GATT Client and Server

[1] In certain configurations; See section 2.2 for complete details

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#201, 100 Grande Blvd., Cochrane, Alberta, Canada T4C 0S4

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Notices and Restricted use Information

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DYNASTREAM does not assume any responsibility for the use of the described ANT module ("the Module(s)"). DYNASTREAM makes no representation with respect to the adequacy of the module in low-power wireless data communications applications or systems. Any Products using the Module must be designed so that a loss of communications due to radio interference or otherwise will not endanger either people or property, and will not cause the loss of valuable data. DYNASTREAM assumes no liability for the performance of products which are designed or created using the Modules.

The Modules are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Module could create a situation where personal injury or death may occur. If you use the Modules for such unintended and unauthorized applications, you do so at your own risk and you shall indemnify and hold DYNASTREAM and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that DYNASTREAM was negligent regarding the design or manufacture of the Product.

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DYNASTREAM believes the information contained herein is correct and accurate at the time of its release. However, the information contained in this document is subject to change without notice and should not be construed as a commitment by DYNASTREAM unless such commitment is expressly given in a covering document.

The D52 Series of modules have been designed to support the ANT and/or *Bluetooth®* low energy Protocols and are certified for use in many geographic regions around the globe. However, a product incorporating the D52 series module may carry the certification IDs of the module only if it complies with the restrictions and terms, including use of Dynastream-approved software, provided in the conditions of use available at:

www.dynastream.com/components/d52/conditions-of-use

One Year Limited Warranty

This D52 Module is warranted to be free from defects in materials or workmanship for 1 year from the date of purchase by the end customer. Within this period, Dynastream will, at its sole option, replace any D52 Modules that fail in normal use. Replaced D52 Modules have a 1 year warranty. Dynastream retains the exclusive right to replace (with a new or newly-overhauled replacement product) the D52 Module or offer a full refund of the purchase price at its sole discretion. SUCH REMEDY SHALL BE THE SOLE AND EXCLUSIVE REMEDY FOR ANY BREACH OF WARRANTY. Such replacement will be made at no charge to LICENSEE, provided LICENSEE shall be responsible for any transportation cost. This warranty does not apply to: (i) cosmetic damage, such as scratches, nicks and dents; (ii) damage caused by accident, abuse, misuse, water, flood, fire, or other acts of nature or external causes; (iii) damage caused by service performed by anyone who is not an authorized service provider of Dynastream; or (iv) damage to a D52 Module that has been modified or altered without the written permission of Dynastream. In addition, Dynastream reserves the right to refuse warranty claims against D52 Modules used in contravention of the laws of any country.

THE WARRANTIES AND REMEDIES CONTAINED HEREIN ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES EXPRESS, IMPLIED, OR STATUTORY, INCLUDING ANY LIABILITY ARISING UNDER ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, STATUTORY OR OTHERWISE.

IN NO EVENT SHALL DYNASTREAM BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, WHETHER RESULTING FROM THE USE, MISUSE, OR INABILITY TO USE THIS PRODUCT OR FROM DEFECTS IN THE PRODUCT.

To obtain warranty service, LICENSEE shall contact Dynastream for shipping instructions and obtain a return material authorization (RMA) tracking number. LICENSEE shall securely pack the D52 Modules and enclose a copy of the original sales receipt, which is required as the proof of purchase for a warranty claim, and write the tracking number clearly on the outside of the package. LICENSEE agrees to send the D52 Modules, freight charges prepaid, to the Dynastream address provided in the Module Distribution Agreement (see www.dynastream.com/components/d52/conditions-of-use).

1 D52 ANT SoC Module Series Overview

Dynastream Innovations offers the D52 series of ANT SoC Modules, based on Nordic Semiconductor's nRF52832 SoC supporting ANT, *Bluetooth®* low energy and extended features such as NFC. This expands Dynastream's portfolio of multi-protocol ultra-low power wireless modules, popularized with the N5 series of modules. This draft document describes characteristics of the D52MD2M8IA, the 14.0 x 9.8 x 2.0mm member of the D52 ANT SoC Module Series. General features of the D52 series include:

- Nordic Semiconductor's nRF52832 chip with 64kB RAM, 512kB Flash and a 32-bit ARM Cortex M4F CPU
- Concurrent ANT and Bluetooth low energy protocol operation using supported SoftDevices (pre-compiled protocol stack solutions for the nRF52 SoCs):
    - S212 – ANT only SoftDevice from Dynastream Innovations
    - S232 – concurrent ANT and Bluetooth low energy SoftDevice from Dynastream Innovations
    - S132 – Bluetooth low energy only SoftDevice from Nordic Semiconductor
- Regulatory certification for many global markets
- Qualification by the Bluetooth SIG
- Onboard 32MHz and 32.768kHz crystal clocks
- Preloaded ANT Network Processor Application, which uses the S212 SoftDevice (scalable ANT protocol stack with 15 channel support). The application provides a standard ANT serial interface front-end that can be connected to an external application controller.
- Easy reprogramming via the onboard SWD interface pins using off-the-shelf ARM programming tools.
- D52MD2M8IA supports drop-in compatibility with Dynastream M8 modules[2] (including the following models in certain configurations: N5150M8CD, N550M8CC, N548M8CB).

The D52 series development kit (D52DK1) contains everything necessary to evaluate and begin development with D52 series modules, with support for the Nordic nRF5 SDK.

[2] Layouts are compatible when using the SWDIO pin only; the nRF52832 supports separate reset and SWDIO pins rather than the single shared line from previous Nordic SoCs. Please see section 2.2 for more information.

1.1 Nomenclature

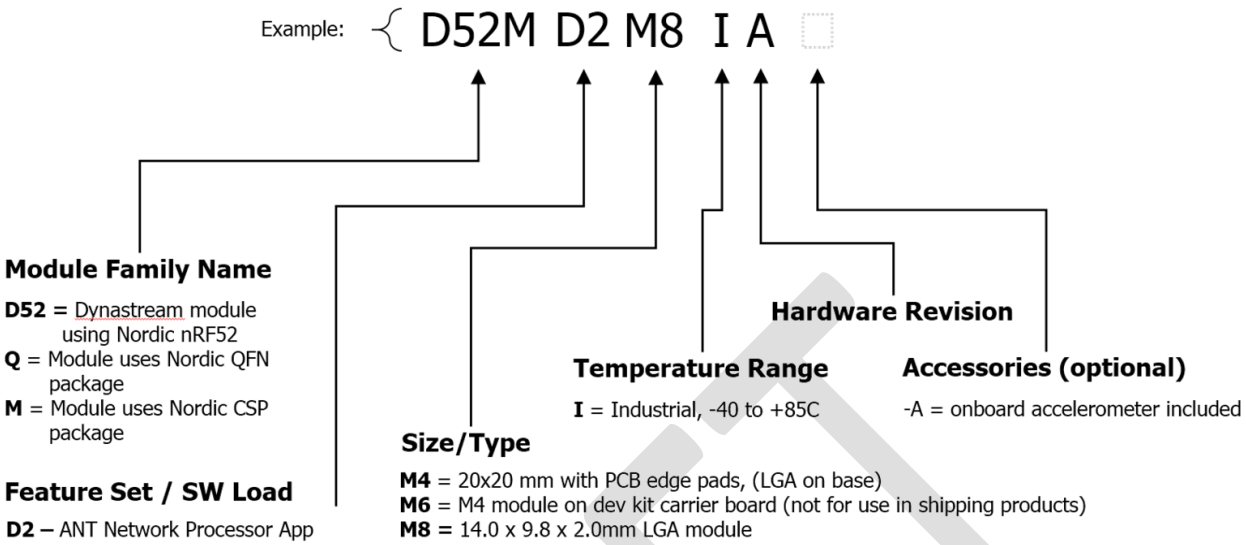


Figure 1: D52 Module Series Nomenclature

1.2 Production Tracking Code

For technical support and customer service purposes, a production code of three characters of the format "YWR" is laser marked on the RF shield as illustrated below. In the code, YW denotes production date code and R denotes module version.

Figure 2: Production Tracking Code

Please refer to Appendix B – D52 Module Pre-Loaded Software Versions for differences and important notes of each version.

1.3 D52 ANT SoC Module Starter Kit and Components

The D52 starter kit (D52DK1) contains all the hardware necessary to get developing with ANT (including with the D52MD2M8IA), and the downloadable ANT SoC Module Starter Kit User Manual has full details on using the kit with reference examples and the nRF5 SDK from Nordic Semiconductor. The kit contents are described in Table 1, below:

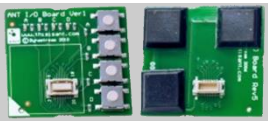
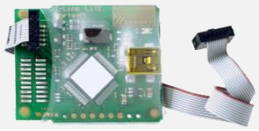
D52 Starter Kit		**Part No: D52DK1**	
Part No.	Description	Quantity	Picture
D52QD2M6IA-A	M4 module on carrier board with 20-pin Molex connector, NFC connections available, SWD programming header, additional through-hole connections for I/O pins	2	
ANTBAT2	Battery board with a Molex socket, a reset button and a five-position dip switch	2	
ANTIO1	I/O board with a Molex connector, a Molex socket, 4 LEDs and 4 buttons	2	
ANTUIF1	USB interface board with a Molex socket	1	
ANTUSB-m	ANT USB dongle	1	
	Segger J-Link Lite Programmer	1	

Table 1: D52 ANT SoC Module Starter Kit

2 Product Overview

2.1 Block Diagrams

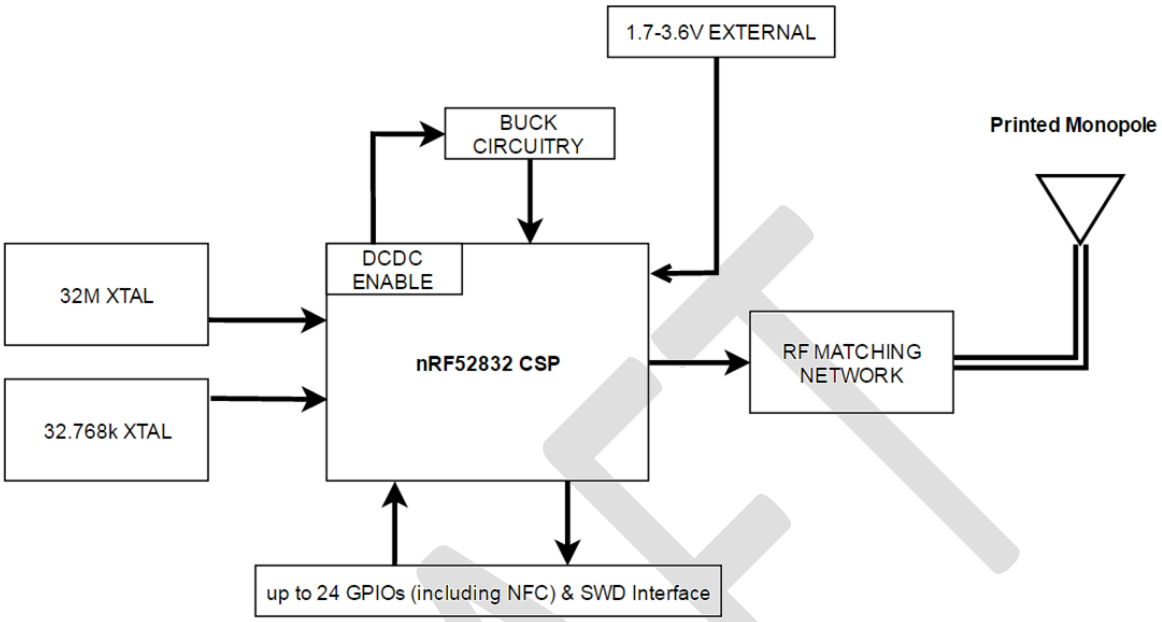


Figure 3: D52MD2M8IA Block Diagram

2.2 Pin-outs

A note on backwards drop-in compatibility: the D52M modules support drop-in compatibility with the following N5 M8 module models from Dynastream Innovations in certain configurations: N5150M8CD, N550M8CC, N548M8CB. For drop-in compatibility, existing designs must use only the SWDIO capability of the reset/SWDIO pad on previous modules. If needed, the reset function can be configured on another pad; see Table 2 below for more information.

A note on the preloaded Network Processor application: Please refer to

Appendix A – Using the ANT Network Processor Configuration for ANT Serial Line specification.

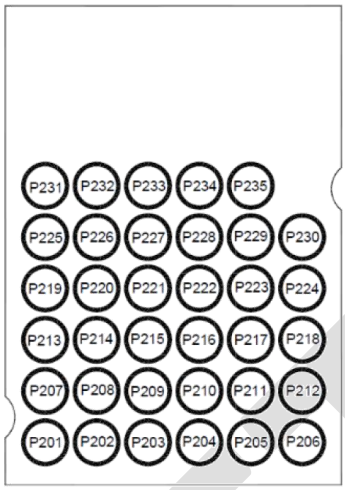


Figure 4: D52M M8 Bottom View

D52M M8 Pin	nRF52832 Pin Name	Description
P230	SWDIO	Serial Wire Debug I/O for debug and programming
P207	P021/RESET	General Purpose I/O / System Reset pin
P225, P226, P219, P220	VCC	Power Supply Pin
P231, P232, P233, P234, P235	VSS	Ground
P224	SWDCLK	Serial Wire Debug clock input for debug and programming
P212	P006	General Purpose I/O
-	P007	General Purpose I/O
P208	P002/AIN0	General Purpose I/O / Analog SAADC/COMP/LPCOMP input
P218	P008	General Purpose I/O
P201	P011	General Purpose I/O
-	P017	General Purpose I/O
P221	P016	General Purpose I/O
P228	P015	General Purpose I/O
P217	P014	General Purpose I/O
P216	P013	General Purpose I/O
P205	P031/AIN7	General Purpose I/O / Analog SAADC/COMP/LPCOMP input
P229	P012	General Purpose I/O
P222	NFC2/P010	NFC antenna connection / General Purpose I/O
-	P019	General Purpose I/O
P227	P020	General Purpose I/O
P215	P022	General Purpose I/O
-	P023	General Purpose I/O
P223	NFC1/P009	NFC antenna connection / General Purpose I/O
P211	P005/AIN3	General Purpose I/O / Analog SAADC/COMP/LPCOMP input
P214	P018	General Purpose I/O
P213	P024	General Purpose I/O
P209	P004/AIN2	General Purpose I/O / Analog SAADC/COMP/LPCOMP input
P210	P003/AIN1	General Purpose I/O / Analog SAADC/COMP/LPCOMP input
-	P026	General Purpose I/O
P203	P029/AIN5	General Purpose I/O / Analog SAADC/COMP/LPCOMP input
P204	P030/AIN6	General Purpose I/O / Analog SAADC/COMP/LPCOMP input
P202	P028/AIN4	General Purpose I/O / Analog SAADC/COMP/LPCOMP input

D52M M8 Pin	nRF52832 Pin Name	Description
-	P027	General Purpose I/O
P206	P025	General Purpose I/O

Table 2: D52 Module Series Pin-Out

2.3 Preloaded Software

D52 modules are preloaded with the S212 ANT SoftDevice and the ANT Network Processor (NP) application as illustrated below. Depending on the module revision, the preloaded code may vary. Please refer to Appendix B – D52 Module Pre-Loaded Software Versions for further details. Licensing terms for the preloaded software are described in the Module Distribution Agreement, which is referenced in Section 4 – Licensing & Conditions of Use.

- **S212 SoftDevice –** Refer to the S212 nRF52832 SoftDevice Specification.
- **ANT Network Processor Application** – Refer to Appendix A – Using the ANT Network Processor Configuration

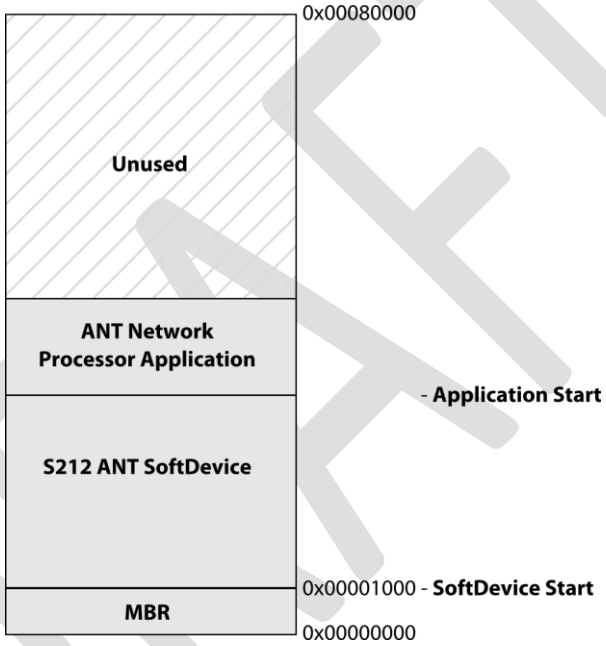


Figure 5: Memory Map of the Preloaded Software

2.4 D52 Module Programming

The D52 ANT SoC module series supports programming by standard Serial Wire Debug (SWD) interface. The two software components (the SoftDevice and the application code) must be version compatible to operate properly. To ensure proper operation after reprogramming, it is recommended that the module undergoes a full erasure (e.g. using the erase-all option in nrfjprog.exe/nRFgo Studio) and all desired software components be explicitly programmed onto the module.

2.4.1 Programming via SWD interface

The D52 ANT SoC Module series supports the Serial Wire Debug (SWD) interface, SWDCLK and SWDIO (refer to Table 2: D52 Module Series Pin-Out). Programming and debugging of the module only require commonly available tools, such as the Keil software development environment and the Segger J-Link programmer.

Please refer to "ANT SoC Module Starter Kit User Manual" from Dynastream Innovations for reference software setup and use with ANT using the Keil software and a J-Link programmer.

2.4.2 Initializing the SoftDevice

- *Specification/information for D52M modules will be available in later data sheet revisions.*

2.4.3 Configuring the dc/dc converter

D52 series modules can make use of the DC/DC Converter on nRF52832 chips. This can improve power consumption under certain conditions.

2.5 Design considerations

RF performance is always affected by the environment. Good design makes a product less susceptible to adverse conditions. The recommendations in this section are guidelines only; you should thoroughly test your products in the intended use case environments and make necessary modifications and trade-offs.

For assistance in design, STEP model packages and Altium libraries are available from Dynastream Innovations.

Note: STEP model and Altium Libraries for D52M will be available on product release

2.5.1 M8 (D52M) module mounting

Mechanical drawings will be available in later data sheet drafts along with solder stencils.

2.6 Assembly Considerations

2.6.1 Moisture Control

The D52MD2M8IA is rated at level 1 (MSL1) as defined by IPC/JEDEC J-STD-020.

To ensure good solderability of the PCB pads, it is highly recommended to always have the modules intended for reflow well sealed when in storage.

2.6.2 Cleaning Process

The module is made using no-clean solder paste. No-clean process is recommended.

3 Regulatory Approvals and Compliance

Note: *This device has not been authorized as required by the Federal Communications Commission. This device is not, and may not be, offered for sale or lease, or sold or leased, until authorization is obtained.*

Modules in the D52 ANT SoC module series, when loaded with an ANT and/or BLUETOOTH low energy stack, have received regulatory approvals in the United States (FCC) and Canada (IC), and have been verified to conform to the appropriate regulations in Europe, Australia and New Zealand, Japan and South Korea. The modules have been qualified by BLUETOOTH SIG. Such approvals and qualification allow the user to place the module inside a finished product and, in most cases, not require regulatory testing for an intentional radiator, provided no changes or modifications are made to the module circuitry. This does not preclude the possibility that some other form of authorization or testing may be required for the finished product.

Changes or modifications could void the user's authority to operate the equipment. The end user must comply with all of the instructions provided by the Grantee, which indicate installation and/or operating conditions necessary for compliance.

3.1 United States

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

A host product manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational. For example, if a host product was previously authorized as an unintentional radiator under the Declaration of Conformity procedure without containing a certified transmitter module, then a module is added, the host manufacturer is responsible for ensuring that the host continues to be compliant with the Part 15 subpart B unintentional radiator requirements after the module is installed and operational. Because this may depend on the details of how the module is integrated within the host, the module grantee (the party responsible for the module grant) shall provide guidance to the host manufacturer for ensuring compliance with the Part 15 Subpart B requirements.

This module is limited to OEM installation ONLY. The OEM Integrator is responsible for ensuring that the end-user has no manual instructions to remove or install the module. Changes or modifications not expressly approved by Dynastream could void the user's authority to operate the equipment.

If (1) the module's FCC ID is not visible when installed in the host, or (2) if the host is marketed so that end users do not have straightforward commonly used methods for access to remove the module so that the FCC ID of the module is visible; then an additional permanent label referring to the enclosed module: "Contains Transmitter Module FCC ID: O6R3153" or "Contains FCC ID: O6R3153" must be used. The host OEM user manual must also contain clear instructions on how end users can find and/or access the module and the FCC ID.

3.2 Canada

This device complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions:

(1) This device may not cause interference; and

(2) This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

3.3 European Economic Area

- *Information for D52M modules will be finalized in later drafts.*

3.4 Australia and New Zealand

- *Information for D52M modules will be finalized in later drafts.*

3.5 Japan

- *Information for the D52M modules will be finalized in later drafts.*

3.6 Korea

- *Information for the D52M modules will be finalized in later drafts.*

3.7 BLUETOOTH Qualification

- *Information for the D52M modules will be finalized in later drafts.*

4 Licensing & Conditions of Use

Products incorporating D52 series modules wishing to make use of the certifications outlined in section 0 must guarantee that they are using an approved ANT and or Bluetooth low energy SoftDevice and have entered into a D52 Series Module Distribution Agreement with Dynastream Innovations. Section 4.1 outlines the conditions of use for D52 modules (which includes the D52 Series Module Distribution Agreement), and Section 4.2 outlines where to obtain licenses for the approved SoftDevices.

4.1 Conditions of Use

The D52 Series of modules have been designed to support the ANT and/or Bluetooth low energy Protocols and are certified for use in many geographic regions around the globe. However, a product incorporating the D52 series module may carry the certification IDs of the module only if it complies with the restrictions and terms, including use of Dynastream-approved software, provided in the conditions of use available at:

www.dynastream.com/components/d52/conditions-of-use

4.2 SoftDevice Licensing

ANT and Bluetooth low energy SoftDevices approved for use on the D52 Module series as referenced in section 4.1 – Conditions of Use – are licensed separately from Dynastream Innovations and Nordic Semiconductor:

SoftDevice	Protocol(s)	Licensor	Link
S212	ANT	Dynastream Innovations	Dynastream SoftDevices
S332	ANT and Bluetooth low energy	Dynastream Innovations	Dynastream SoftDevices
S132	Bluetooth low energy	Nordic Semiconductor	Nordic Downloads

Table 3: SoftDevice Licensing and Downloads

5 Electrical Specifications

5.1 Recommended Operating Conditions

Parameter	Min	Max	Unit
Operating ambient temperature range, T_A	-40	+85	°C
Operating supply voltage	1.7	3.6	V

Table 4: Recommended Operating Conditions

5.2 Absolute Maximum Ratings

Parameter	Test Conditions	Min	Max	Unit
Supply Voltage (VCC)		-0.3	3.9	V
$V_{I/O}$, VCC ≤ 3.6V		-0.3	VCC+0.3	V
$V_{I/O}$, VCC > 3.6V		-0.3	3.9	V
Storage temperature range		-40	85	°C
ESD	All pads, according to human-body model, JEDEC STD 22, method A114		4	kV
	According to charged-device model, JEDEC STD 22, method C101		500	V

Table 5: Absolute Maximum Ratings

Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under Recommended Operating Conditions are not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

5.3 Radio Operation Specifications and Antenna Characteristics

nRF52832 Output Setting (dBm)	Typical Peak Radio Current (mA)*
0 (DCDC, 3V)	5.3
0 (LDO, 3V)	11.6
+4 (DCDC, 3V)	7.5
+4 (LDO, 3V)	16.6

Table 6: Current Consumption of Radio Operation

* For additional information regarding radio current please refer to the nRF52832 product specification from Nordic Semiconductor

- *Radiation patterns for D52M will be added in later drafts.*

To understand and properly use the radiation pattern for your design, please refer to the application note: Interpreting RF Radiation Patterns.

5.4 Electrical Specifications

Please refer to the nRF52832 Product Specification by Nordic Semiconductor.

6 Mechanical Drawings

6.1 D52M

- *Mechanical drawings will be added in later drafts.*

7 Support

The D52 ANT SoC module series uses nRF52832 from Nordic Semiconductor. You can seek technical support from Nordic Semiconductor, www.nordicsemi.com. Application support can be sought from Dynastream Innovations, via www.thisisant.com.

7.1 ANT Forum

Customers are encouraged to participate in the ANT forum moderated by the application engineering team of Dynastream Innovations for any engineering discussions. Joining the ANT forum is free and open at http://www.thisisant.com/forum.

7.2 Technical References

Documents

1. nRF52832 Product Specification, Nordic Semiconductor
2. nRF52 Series Compatibility Matrix, Nordic Semiconductor Infocenter
3. nRF52832 Objective Product Specification, Nordic Semiconductor
4. nRF52832 S212 SoftDevice Specification, Dynastream Innovations
5. nRF52832 S332 SoftDevice Specification, Dynastream Innovations
6. nRF52832 S132 SoftDevice Specification, Nordic Semiconductor
7. nRF52 Development Kit Documentation, Nordic Semiconductor Infocenter
8. ANT SoC Module Starter Kit User Manual, Dynastream Innovations
9. ANT Message Protocol and Usage, Dynastream Innovations
10. Interfacing with ANT General Purpose Chipsets and Modules, Dynastream Innovations
11. ANT Technical Note – Migrating an ANT nRF51 Project to nRF52
12. Application Note: Interpreting RF Radiation Patterns, Dynastream Innovations

Software

1. S212 nRF52832 SoftDevice, Dynastream Innovations
2. S332 nRF52832 SoftDevice, Dynastream Innovations
3. S132 nRF52832 SoftDevice, Nordic Semiconductor
4. nRF5 SDK, Nordic Semiconductor
5. ANT Network Processor Application Code
6. ANTwareII – a system testing and debugging tool, Dynastream Innovations
7. ObservANT – an ANT debugging tool, Dynastream Innovations

Design models

1. D52M Altium library, Dynastream Innovations *(available on product launch)*
2. D52M module STEP model, Dynastream Innovations *(available on product launch)*

The above documents and software are available at www.dynastream.com, www.thisisant.com and/or www.nordicsemi.com / infocenter.nordicsemi.com. User registration may be required.

7.3 ANT Developer's Zone

ANT development software tools, application notes, reference designs and other public resources are found in the ANT Developer's Zone at http://www.thisisant.com/developer.

To begin development with the ANT+ interoperability, please become an ANT+ Adopter or ANT+ Alliance member to obtain the access to the ANT+ Adopter Zone. ANT+ documents and design tools contained in the ANT+ Adopter zone include the ANT+ Device Profiles, ANT-FS specification, ANT software (PC/Mac) libraries with source code, simulator tools (SimulANT+), ObservANT, embedded reference designs with source code, and more.

7.4 ANT and ANT+ Social Media

Further information, resources and news about ANT can be found in social media:

- YouTube: http://www.youtube.com/user/ANTAlliance
- Twitter: http://twitter.com/ANTPlus
- Facebook: https://www.facebook.com/thisisant
- LinkedIn: http://www.linkedin.com/groups?gid=1379137

Appendix A – Using the ANT Network Processor Configuration

- *Appendix to be added in later data sheet drafts.*

Appendix B – D52 Module Pre-Loaded Software Versions

- *Information to be included in future data sheet drafts.*