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D52 ANT SoC Module Series

D52Q Models   **D52M Models**

Module Hardware

- Integrated printed antenna
- On-board 32MHz and 32.768 kHz crystal clocks
- Supply Voltage range:
    1.7V to 3.6V (D52QD2M4IA, D52MD2M8IA)
    1.71V to 3.6V (D52QD2M4IA-A)
- Operating temperature: Industrial (-40°C to +85°C)
- Up to 30 GPIOs (D52QD2M4IA)
- Up to 24 GPIOs (D52QD2M4IA-A, D52MD2M8IA)
- 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, I2C and UART interface
- ARM SWD interface
- Internal DC/DC converter supported
- 20 x 20mm module (D52QD2M4IA, D52QD2M4IA-A)
- 14 x 9.8 x 2.0mm module (D52MD2M8IA)
- Onboard 3-axis MEMS accelerometer (D52QD2M4IA-A)
    LIS2DH by ST Microelectronics
    2 programmable interrupt pins
- Layout compatible options with N5150M4CD, N550M4CC, N548M4CB, ANTAP281M4IB, ANTC782M4IB (D52Q)[1]
- Layout compatible options with N5150M8CD, N550M8CC, N548M8CB (D52M)[1]
- Radio regulatory approval for major markets
- BLUETOOTH SIG qualification
- RoHS compliant

Series Members:

- D52QD2M4IA, D52QD2M4IA-A, D52QD2M6IA-A, D52MD2M8IA

All models preloaded with ANT Network Processor application.

---

[1] In certain configurations; see section 2.3 - Pin-outs - for complete details

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:
    o Supports up to 15 logical channels each with configurable channel periods (5.2ms - 2s)
    o Advanced burst data transfer modes (up to 60kbps)
    o Optional channel encryption mode (aes-128)
    o Supports up to 8 public, private and/or managed networks
    o Advanced power management features to optimize application power consumption including Event Filtering and Selective Data Updates
    o Asynchronous transmit channel
    o Fast channel initiation
    o High duty search

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
    o Concurrent Central, Observer, Peripheral, and Broadcaster roles with:
        ▪ Multiple connections as a central
        ▪ One connection as a peripheral
        ▪ Observer
        ▪ Broadcaster
    o Link layer
    o L2CAP, ATT, and SM protocols
    o GATT and GAP APIs
    o GATT Client and Server

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D00001687 Rev 2.0   D52 ANT Module OEM/Integrators Installation Manual / Data sheet

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Notices and Restricted Use Information

Information contained in this document is provided only for your ("Customer" or "you") convenience and may be superseded by updates. It is your responsibility to ensure that your application meets with your specifications.

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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.

D52 Modules have been designed to operate in typical operating environments[2] up to 30m.

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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

---

[2] Typical operating environment: commercial IoT use case, less than 5% message packet loss rate.

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. 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):

    o   S212 – ANT only SoftDevice from Dynastream Innovations
    o   S332 – concurrent ANT and Bluetooth low energy SoftDevice from Dynastream Innovations
    o   S132 – Bluetooth low energy only SoftDevice from Nordic Semiconductor

- Certification of compliance with regulation standards in major markets including North America, Europe, Australia / New Zealand, Japan and Korea[3]

- Qualification by the Bluetooth SIG

- Onboard 32MHz and 32.768kHz crystal clocks

- The preloaded Network Processor application provides a standard ANT serial interface that can be connected to an existing external application controller without reprogramming the module. The application uses the S212 SoftDevice (scalable ANT protocol stack with 15 channel support).

- Easy reprogramming via the onboard SWD interface pins using off-the-shelf ARM programming tools

- D52Q models support drop-in compatibility with Dynastream ANTC782M4IB, ANTAP281M4IB, N5150M4CD, N550M4CC and N548M4CB modules (in certain configurations)[4]

- D52M models support drop-in compatibility with Dynastream N5150M8CD, N550M8CC, N548M8CB modules (in certain configurations)[5]

The D52 ANT SoC module series includes the following models, all covered in this document:

Part no.	Description
D52QD2M4IA	20 x 20mm module with up to 30GPIOs and 8 analog inputs
D52QD2M4IA-A	20 x 20mm module with up to 24GPIOs and 5 analog inputs; onboard 3-axis MEMS accelerometer
D52MD2M8IA	14.0 x 9.8 x 2.0mm module with up to 24GPIOs and 8 analog inputs
D52QD2M6IA-A	D52QD2M4IA-A mounted on a carrier board for starter kit and development use

Table 1: D52 ANT SoC Module Series Models

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.

---

[3] Please see section 3 of this data sheet for details about leveraging D52 certification.
[4] Layouts are compatible with D52Q when using the reset pin only; the nRF52832 supports separate reset and SWDIO lines rather than the single shared line from previous Nordic SoCs. See section 2.3 for more information.
[5] Layouts are compatible with D52M when using the SWDIO pin only; the nRF52832 supports separate reset and SWDIO lines rather than the single shared line from previous Nordic SoCs. See section 2.3 for more information.
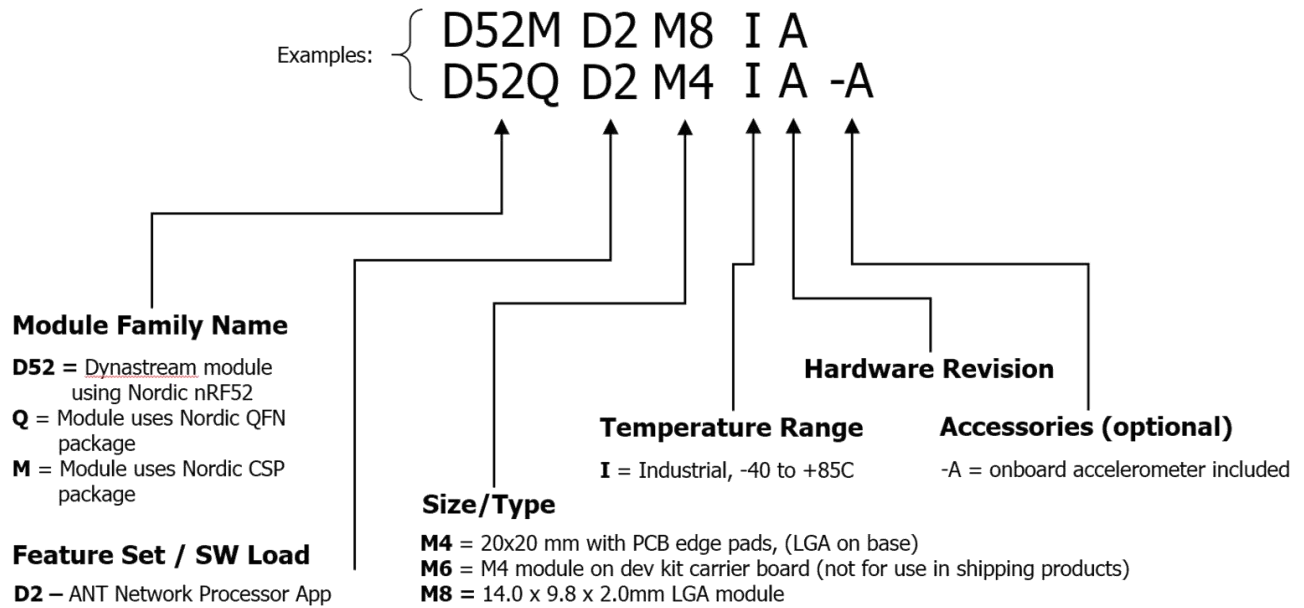
1.1   Nomenclature

Examples:

$$\begin{cases} \text{D52M D2 M8 I A} \\ \text{D52Q D2 M4 I A -A} \end{cases}$$

Module Family Name

D52 = Dynastream module
       using Nordic nRF52
Q = Module uses Nordic QFN
       package
M = Module uses Nordic CSP
       package

Feature Set / SW Load

D2 – ANT Network Processor App

Size/Type

M4 = 20x20 mm with PCB edge pads, (LGA on base)
M6 = M4 module on dev kit carrier board (not for use in shipping products)
M8 = 14.0 x 9.8 x 2.0mm LGA module

Temperature Range

I = Industrial, -40 to +85C

Hardware Revision

Accessories (optional)

-A = onboard accelerometer included

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 ("6V" and "6K" in Figure 2, below) denotes production date code and R ("B" and "2" in Figure 2, below) denotes module version.
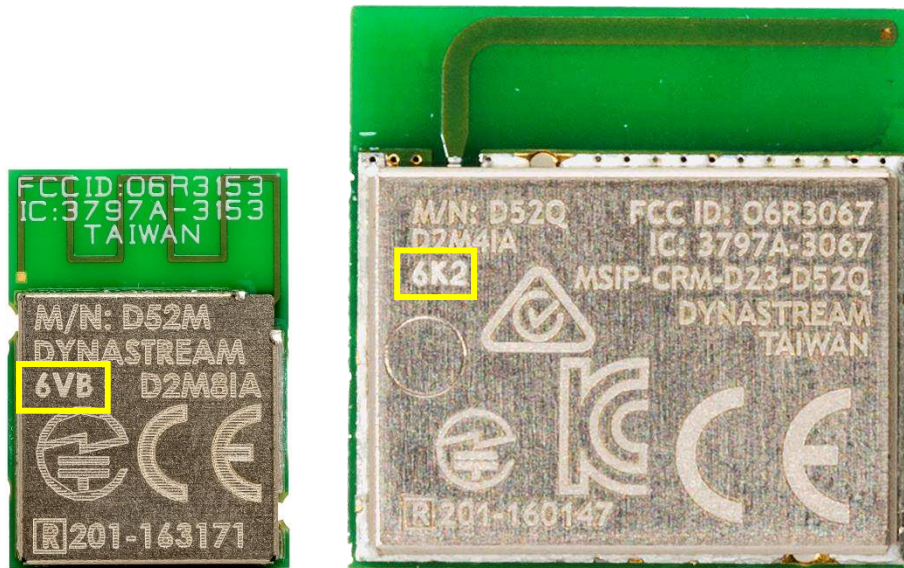
Figure 2: Production Tracking Code for D52M (left) and D52Q (right) modules

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

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1.3   Models

This section details some basic information about orderable SKUs for models in the D52 ANT SoC Module Series.

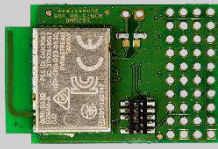| Module	Part No.	Description	Ordering/Package Information	Part Status*
	D52QD2M4IA-A	20 x 20mm module with up to 24GPIOs and 5 analog inputs; onboard 3-axis MEMS accelerometer	• D52QD2M4IA-A-TRAY: 20pc in 4x5 tray • D52QD2M4IA-A-REEL: 800pc on 13" tape and reel	Active
	D52QD2M4IA	20 x 20mm module with up to 30GPIOs and 8 analog inputs	• D52QD2M4IA-TRAY: 20pc in 4x5 tray • D52QD2M4IA-REEL: 800pc on 13" tape and reel	Active
	D52MD2M8IA	14.0 x 9.8 x 2.0mm module with up to 24GPIOs and 8 analog inputs	• D52MD2M8IA-TRAY: 40pc in 8x5 tray • D52MD2M8IA-REEL: 1500pc on 13" tape and reel	Active
	D52D2M6IA-A	D52QD2M4IA-A mounted on a carrier board for starter kit and development use	• D52QD2M6IA-A-TRAY: 10 pc on 150x165mm tray	Active

Table 2: D52 ANT SoC Module Series Models

* ACTIVE: Device, tool, or software recommended for new designs.

1.4   D52 ANT SoC Module Starter Kit and Components

The D52 starter kit (D52DK1) contains all the hardware necessary to get developing with ANT, 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 3, below:
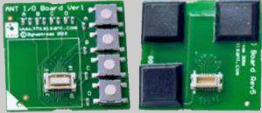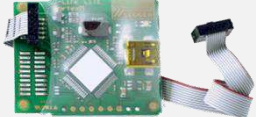
D52 Starter Kit			Part No: D52DK1
Part No.	Description	Quantity	Picture
D52QD2M6IA-A	M4 module on carrier board with 20-pin Molex connector, NFC connections available, SWD programming header, additional through-hole connections for I/O pins	2	
ANTBAT2	Battery board with a Molex socket, a reset button 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 3: D52 ANT SoC Module Starter Kit

2   Product Overview

2.1   D52Q Model Block Diagrams

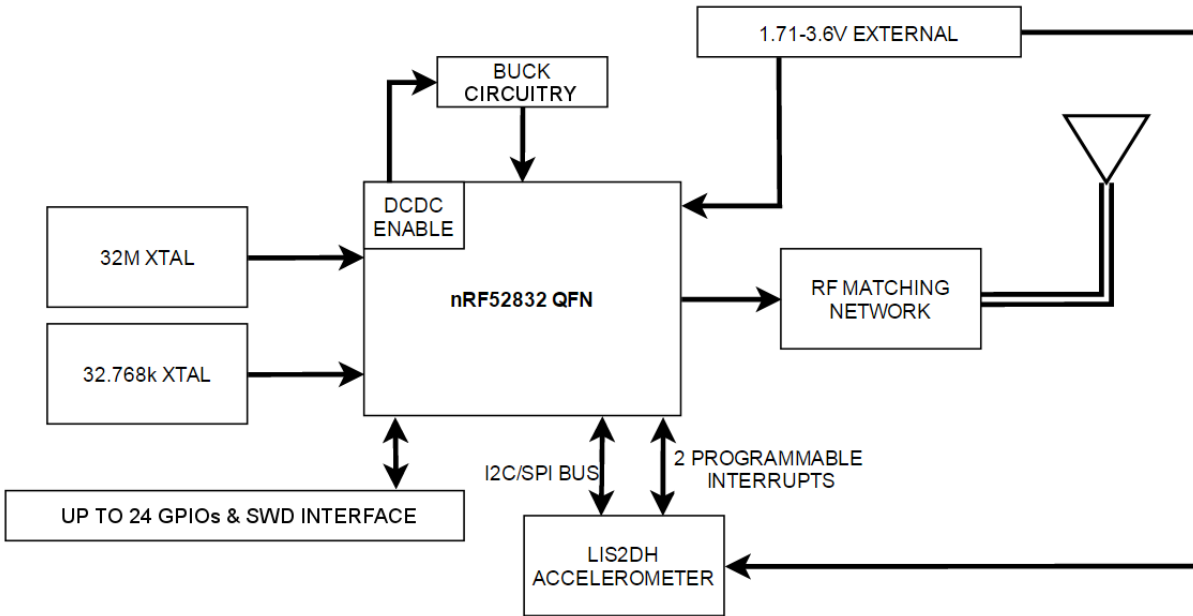**Figure 3: D52QD2M4IA-A Model (<u>with</u> accelerometer) Module Block Diagram**
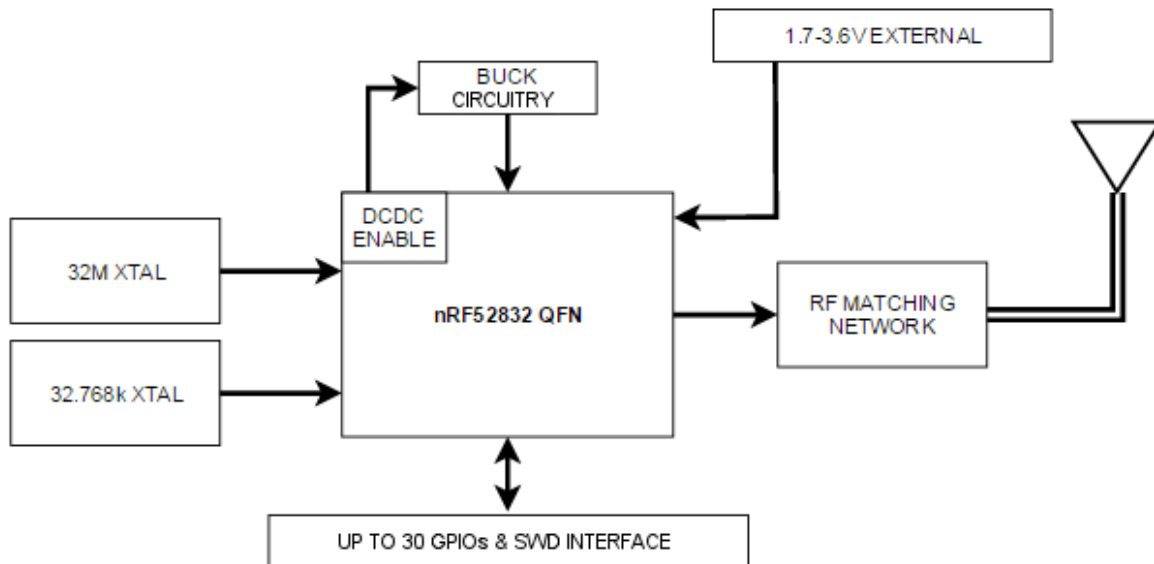

Figure 4: D52QD2M4IA Model (<u>no</u> accelerometer) Module Block Diagram
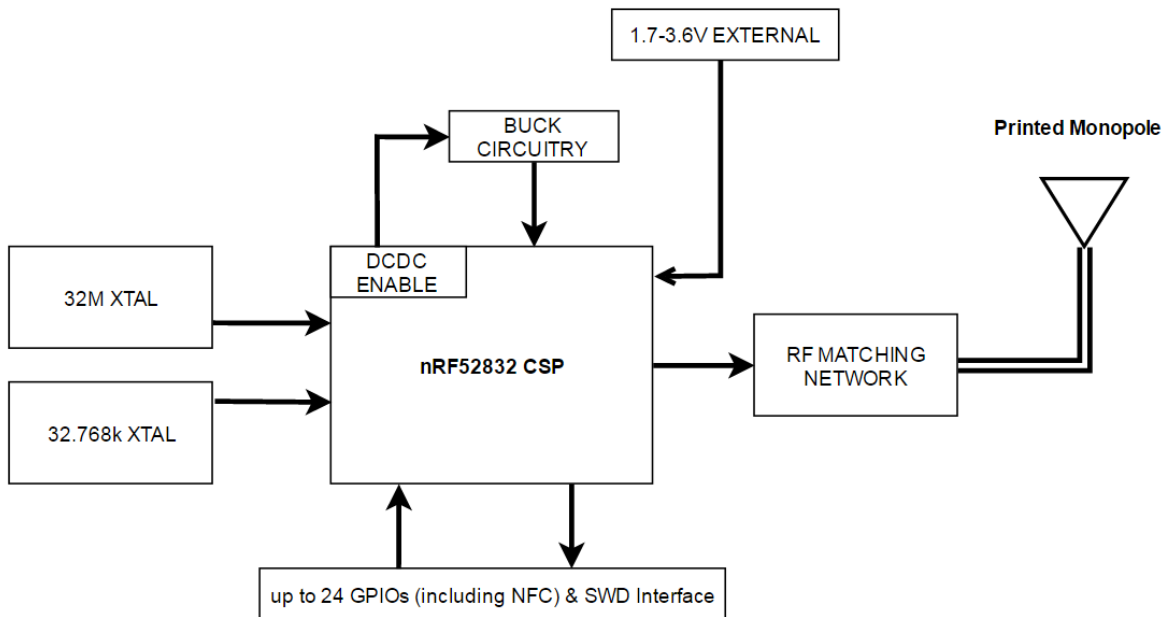
2.2   D52M Model Block Diagram

Figure 5: D52MD2M4IA Model Module Block Diagram

2.3   Pin-outs

A note on backwards drop-in compatibility with D52Q: D52Q M4 modules support drop-in compatibility with ANTAP281M4IB, ANTC782M4IB, N5150M4CD, N550M4CC and N548M4CB modules from Dynastream Innovations under certain configurations. For drop-in compatibility, existing designs must use only the reset capability of the reset/SWDIO pin on previous modules. See pin H202, below. In addition, there must be nothing on existing designs that would contact the new-to-layout LGA pads in the middle of the D52Q modules.

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 4 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.
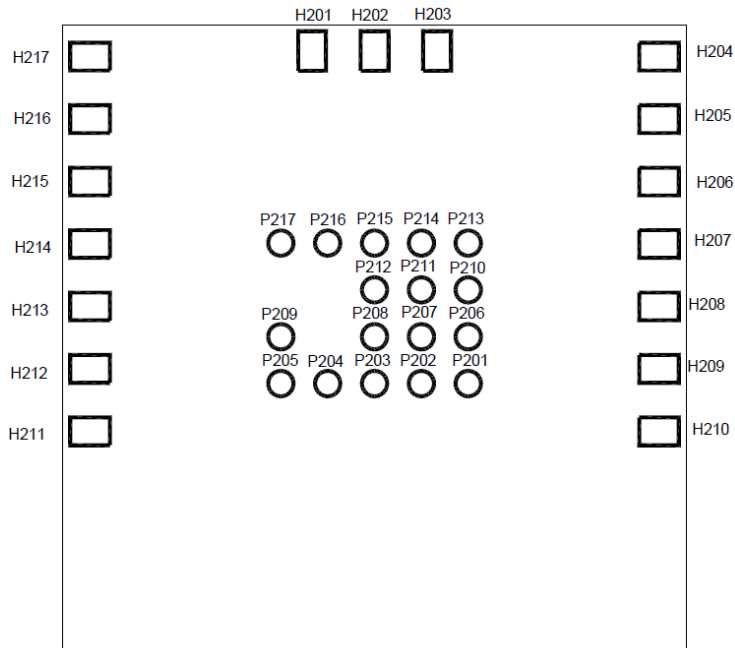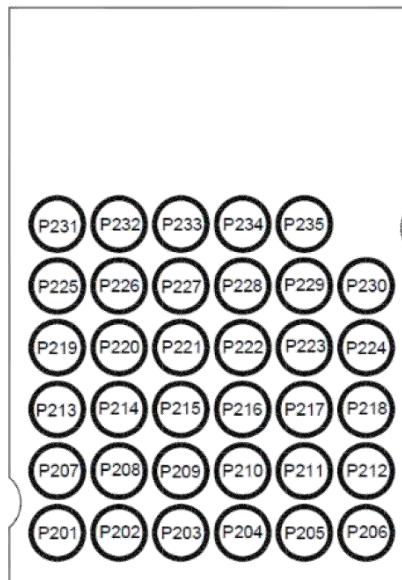
Figure 6: D52Q M4 (20mm x 20mm) Bottom View

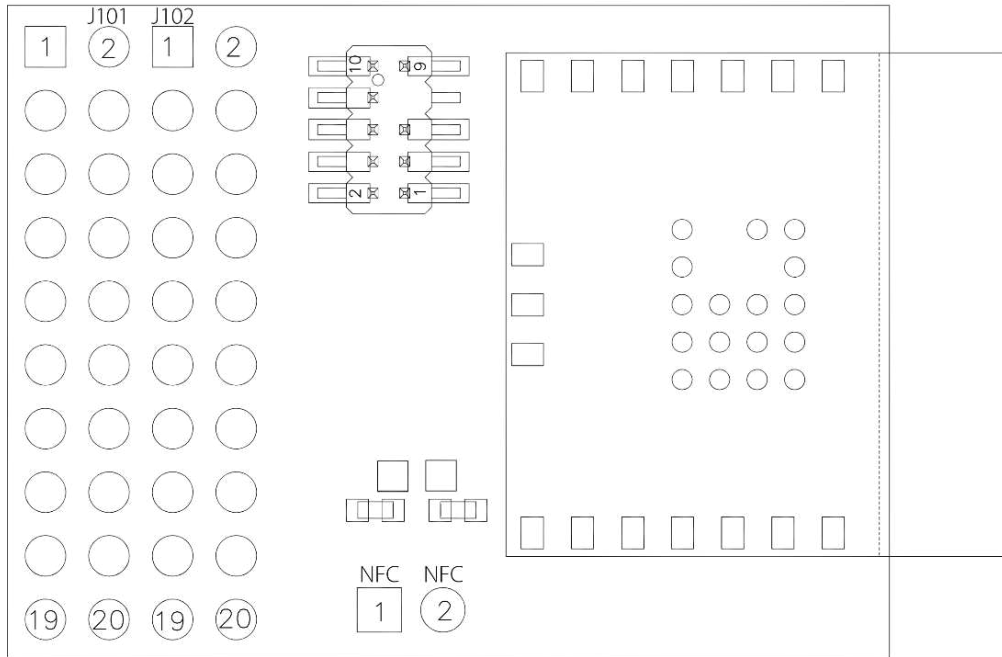**Figure 7: D52M M8 (14.0mm x 9.8mm) Bottom View**
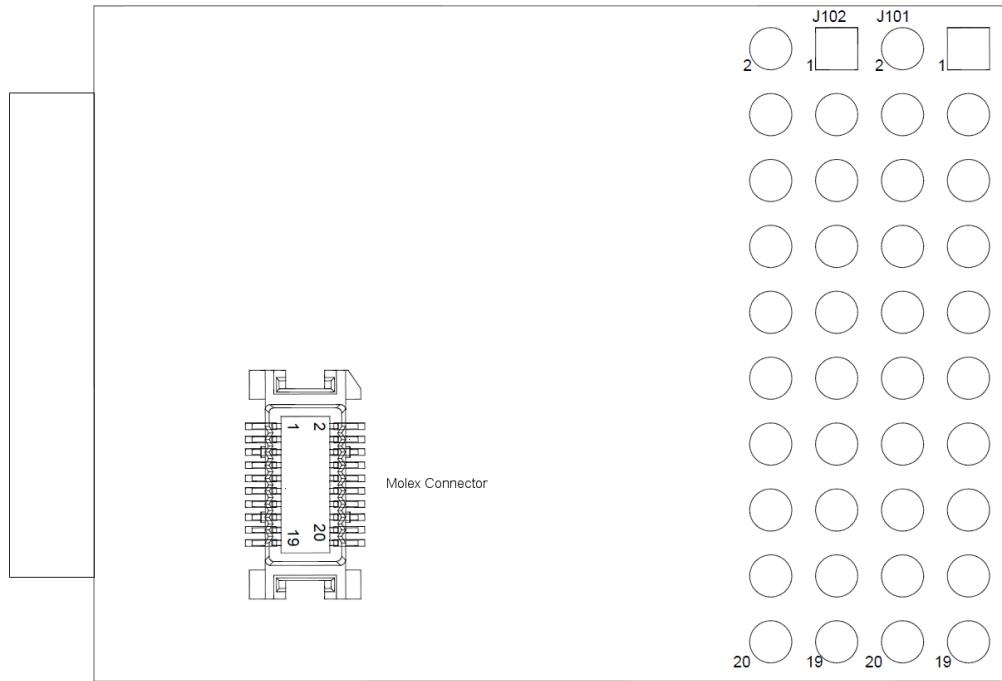
Figure 8: D52Q M6 (Development Module) - Top View

Figure 9: D52Q M6 (Development Module) - Bottom View

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D52Q M4 Pin[6]	D52M M8 Pin	D52Q M6		nRF52832 Pin Name	Description
		Molex Connector	Dev Board Pin		
H201	P230	16	J102.19	SWDIO	Serial Wire Debug I/O for debug and programming
H202	P207	10	J101.06	P021/RESET	General Purpose I/O / System Reset pin
H203	P225, P226, P219, P220	1	J101.01	VCC	Power Supply Pin
H204	P231, P232, P233, P234, P235	19	J101.02, J101.08, J102.20	VSS	Ground
H205	P224	6	J101.07	SWDCLK	Serial Wire Debug clock input for debug and programming
H206	P212	17	J101.09	P006	General Purpose I/O
H207	-	15	J101.10	P007	General Purpose I/O
H208	P208	-	J102.01	P002/AIN0	General Purpose I/O / Analog SAADC/COMP/LPCOMP input
H209	P218	11	J101.17	P008	General Purpose I/O
H210	P201	7	J101.19	P011	General Purpose I/O
H211	-	4	J101.04, J101.15	P017	General Purpose I/O
H212	P221	3	J101.03, J101.11	P016	General Purpose I/O
H213	P228	5	J101.18	P015	General Purpose I/O
H214	P217	9	J101.20	P014	General Purpose I/O
H215	P216	-	J102.17	P013	General Purpose I/O
H216	P205	8	J102.15	P031/AIN7	General Purpose I/O / Analog SAADC/COMP/LPCOMP input
H217	P229	2	J101.05	P012	General Purpose I/O
P201	P222	-	NFC.2	NFC2/P010	NFC antenna connection / General Purpose I/O
P202	-	14	J102.04	P019	General Purpose I/O
P203	P227	13	J102.06	P020	General Purpose I/O
P204	P215	18	J102.08	P022	General Purpose I/O
P205	-	20	J102.10	P023	General Purpose I/O
P206	P223	-	NFC.1	NFC1/P009	NFC antenna connection / General Purpose I/O
P207	P211	-	J102.07	P005/AIN3	General Purpose I/O / Analog SAADC/COMP/LPCOMP input
P208	P214	-	J102.02	P018	General Purpose I/O
P209	P213	12	J102.12	P024	General Purpose I/O
P210	P209	-	J102.05	P004/AIN2	General Purpose I/O / Analog SAADC/COMP/LPCOMP input
P211	P210	-	J102.03	P003/AIN1	General Purpose I/O / Analog SAADC/COMP/LPCOMP input
P212[6]	-	-	J102.16	P026	General Purpose I/O
P213[6]	P203	-	J102.11	P029/AIN5	General Purpose I/O / Analog SAADC/COMP/LPCOMP input
P214[6]	P204	-	J102.13	P030/AIN6	General Purpose I/O / Analog SAADC/COMP/LPCOMP input
P215[6]	P202	-	J102.09	P028/AIN4	General Purpose I/O / Analog SAADC/COMP/LPCOMP input
P216[6]	-	-	J102.18	P027	General Purpose I/O
P217[6]	P206	-	J102.14	P025	General Purpose I/O

Table 4: D52 Module Series Pin-Out

---

[6] See section 2.3.1 for onboard accelerometer pin usage (optional; D52Q models with -A suffix only).

2.3.1   (Optional) Accelerometer Specification

The D52 module series includes an accelerometer accessory on the D52QD2M4IA-A model, only. The accelerometer is the LIS2DH by STMicroelectronics. To make use of the accelerometer, the following pins are consumed:

D52QD2M4IA-A Pin	nRF52832 Pin	LISD2H Pin
P212	P026	INT2
P213	P029/AIN5	SDA/SDI/SDO
P214	P030/AIN6	SCL/SPC
P215	P028/AIN4	SDO/SA0
P216	P027	CS
P217	P025	INT1

Table 5: Accelerometer Pin Assignment

SPI or I^{2}C can be used to communicate with the accelerometer. To use I^{2}C, pull-up resistors will need to be added to the appropriate pads.

For more information about D52Q pin assignments, refer to **Table 4: D52 Module Series Pin-Out**.

For more information about this component including data sheet and errata, please refer to the STMicroelectronics website:

- http://www.st.com/web/en/catalog/sense_power/FM89/SC444/PF252928.

2.4   Preloaded Software

D52 series 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 Series 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
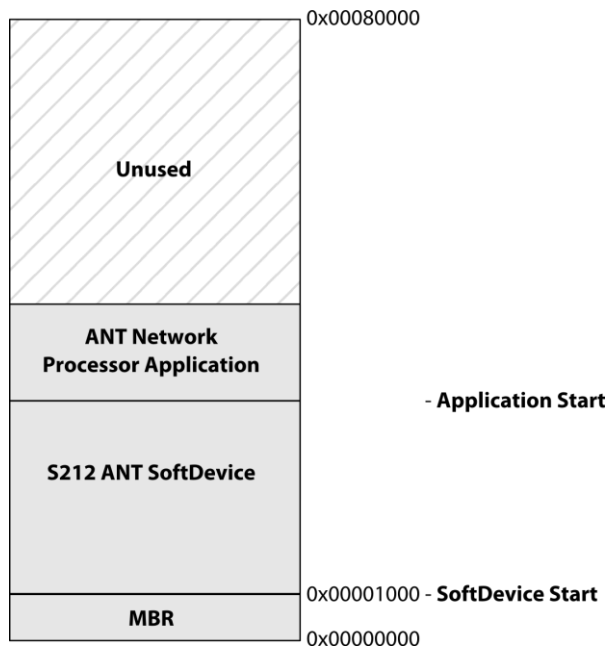

Figure 10: Memory Map of the Preloaded Software

2.5　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.

2.5.1　Programming via SWD Interface

The D52 ANT SoC Module series supports the Serial Wire Debug (SWD) interface, SWDCLK and SWDIO (refer to Table 4: 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.

2.5.2　Initializing the SoftDevice

D52 series modules come with 20ppm onboard 32 kHz crystals. When initializing the SoftDevice, it is important to set the crystal accuracy to be 20ppm. This clock source is selected when enabling the SoftDevice via the *sd_softdevice_enable* command.

2.5.3　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.

2.6　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, a STEP model package and Altium library are available from Dynastream Innovations for all D52 module series models.

2.6.1　D52Q M6 module mounting

The mating socket is Molex 52991-0208.

2.6.2　D52Q M4 Module Mounting

Figure 11 shows D52Q component outline and keepout areas in pink. There should not be any exposed copper or routing in the keepout areas, on any layer. The component body is crosshatched pink, and signal pads are red. Please reference the D52Q Altium Footprint for more accurate keepout dimensions and positioning. Figure 12, on the next page, describes mating PCB characteristics.
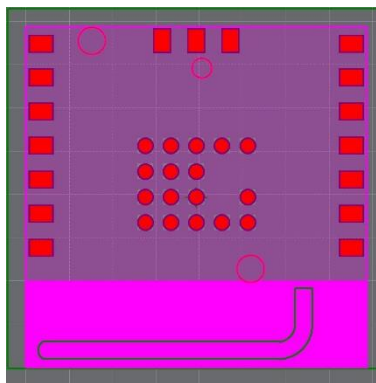

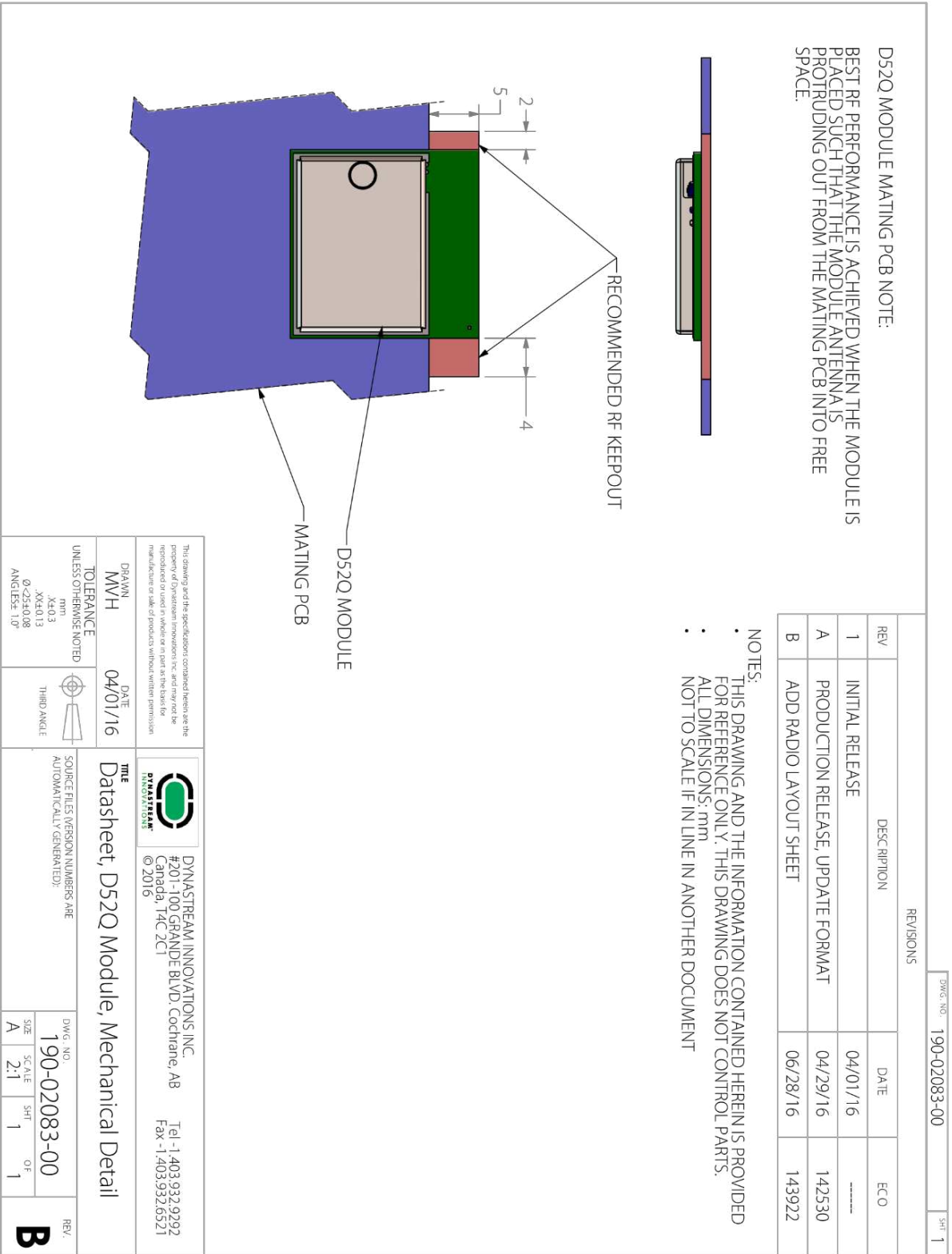**Figure 11: D52Q signal pads, component outline and keepout areas**

Figure 12: D52Q Module Mounting

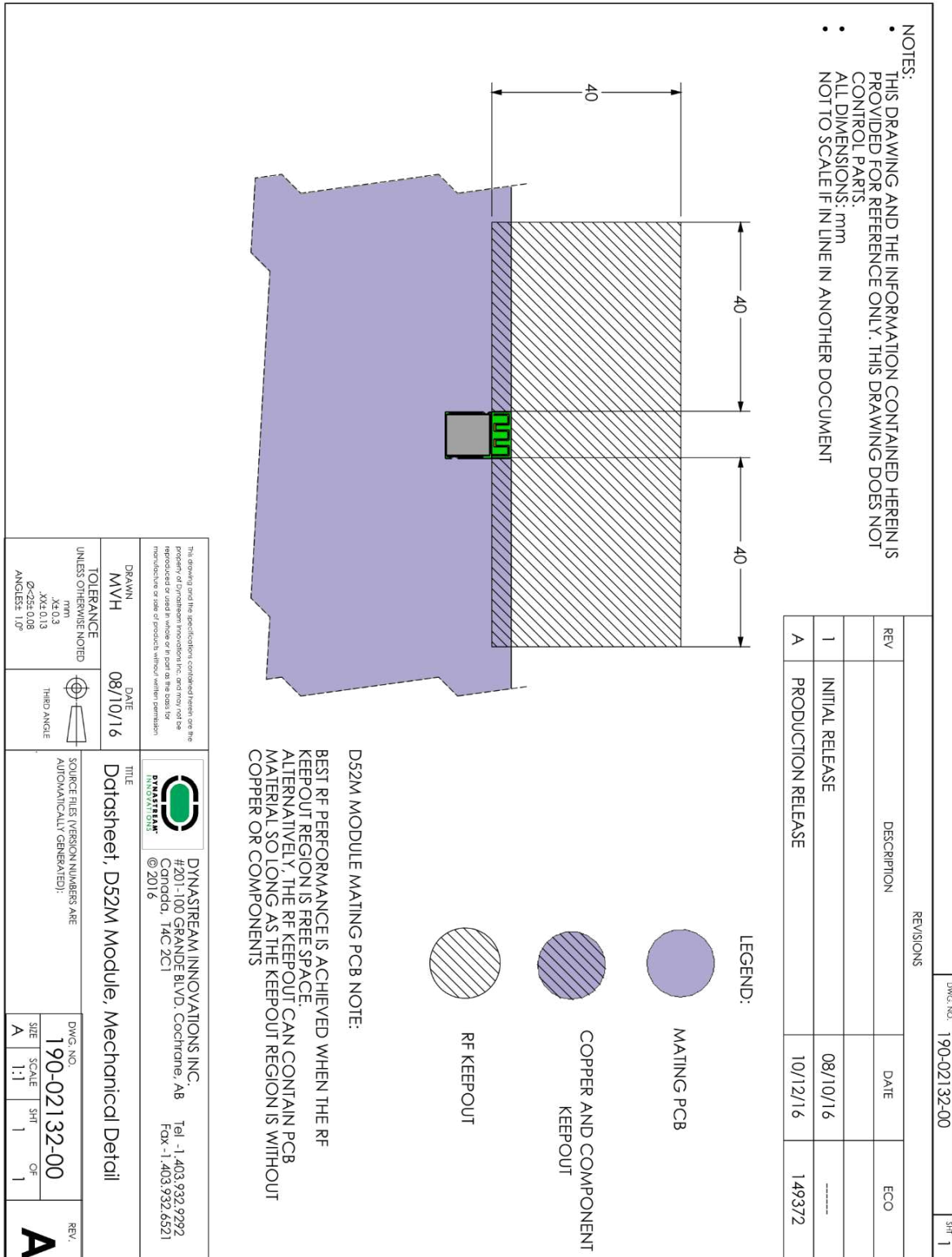### 2.6.3   D52M M8 Module Mounting

Figure 13: D52M Module Mounting

Figure 14, below, shows D52M component outline and keepout areas in pink. There should not be any exposed copper or routing in the keepout areas, on any layer. The component body is crosshatched pink, and signal pads are shown in red. Please reference the D52M Altium Footprint for more accurate keepout dimensions and positioning. Figure 13, on the previous page, describes mating PCB characteristics.
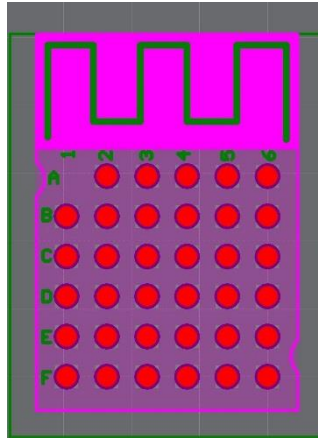

Figure 14: D52M signal pads, component outline and keepout areas

2.7   Assembly Considerations

2.7.1   Moisture Control

D52 series modules are rated at different levels as defined by IPC/JEDEC J-STD-020:

D52 Model	Moisture Control Level
D52QD2M4IA-A	3
D52QD2M4IA	2
D52MD2M8IA	1

Table 6: D52 Module Series Moisture Control Levels

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.

2.7.2   D52Q M4 Module Solder Stencil

The following reference example is used to create the D52QD2M6IA-A development modules:
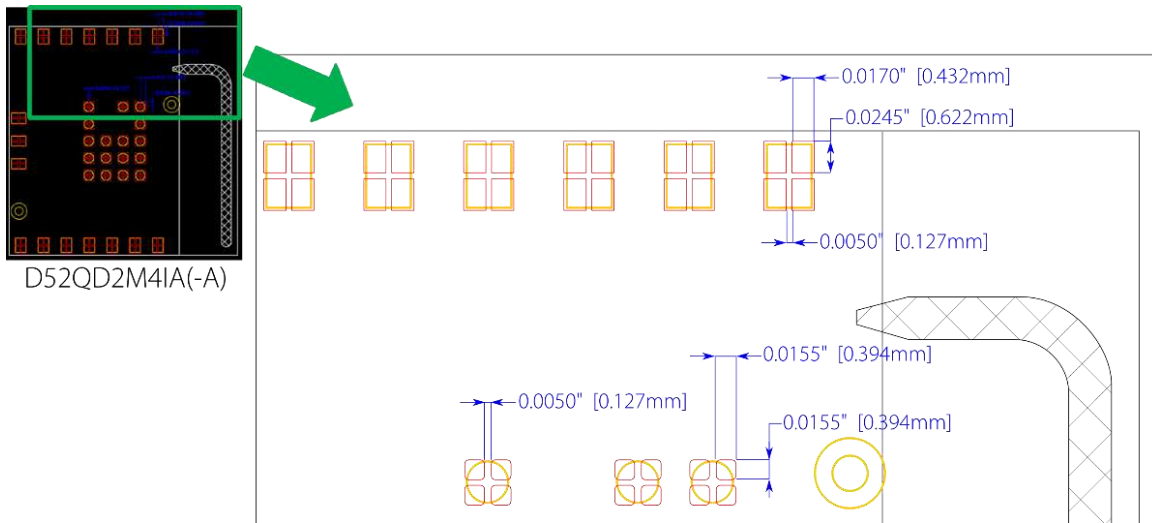

Figure 15: D52Q M4 Solder Stencil

2.7.3   D52M M8 Module Solder Stencil

Below is a diagram describing a solder stencil for Dynastream M8 modules, including the D52M:
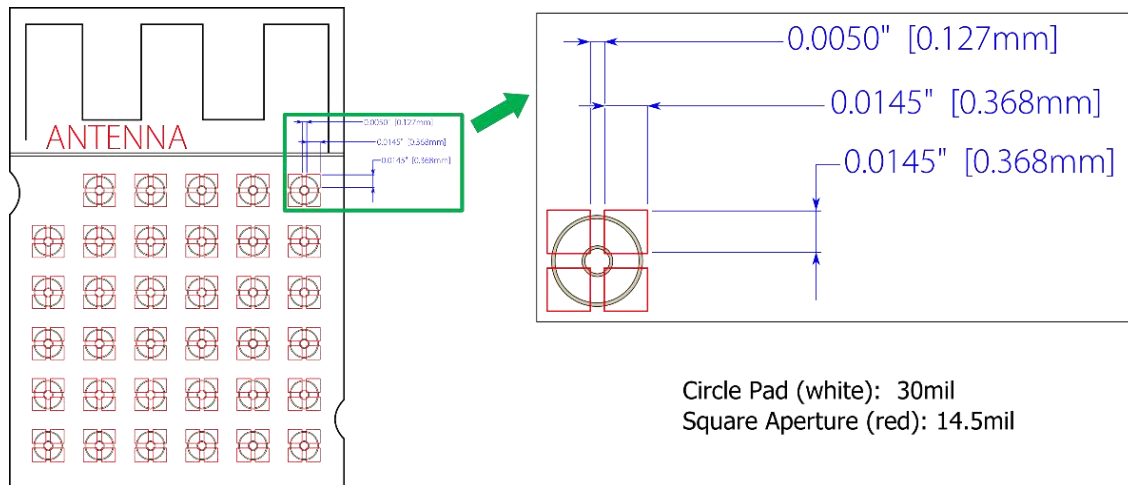

Figure 16: D52M M8 Solder Stencil

2.7.4   Cleaning Process

D52 series modules are made using no-clean solder paste. No-clean process is recommended.

3   Regulatory Approvals and Compliance

Modules in the D52 ANT SoC Module Series, <u>when loaded with an ANT and/or BLUETOOTH low energy stack[7]</u>, 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 must be used:

- For **D52Q** modules: "Contains Transmitter Module FCC ID: 06R3067" or "Contains FCC ID: 06R3067"
- For **D52M** modules: "Contains Transmitter Module FCC ID: 06R3153" or "Contains FCC ID: 06R3153"

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.

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[7] Refer to section 4

To comply with Industry Canada regulations, it is required that products containing the D52 module series display a label referring to the enclosed module. This exterior label can use wording similar to the following:

- For **D52Q** modules**:** "Contains IC: 3797A-3067"
- For **D52M** modules**:** "Contains IC: 3797A-3153"

This information shall be affixed in such a manner as not to be removable except by destruction or defacement. The size of the lettering shall be legible without the aid of magnification but is not required to be larger than 8-point font size. If the device is too small to meet this condition, the information can be included in the user manual upon agreement with Industry Canada.

3.3   European Economic Area

D52 series modules are declared to be in conformance with the essential requirements and other relevant provisions of Directive 1999/5/EC, as a low-powered unlicensed transmitter:

IEC 60950-1:2005(2nd Edition) + Am1:2009 + AM 2:2013 EN 60950-1: 2006 /A11:2009 /A1:2010 /A12:2011 /A2:2013	Information technology equipment. Safety. General requirements
EN 300 328 V1.9.1:2015	Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive
EN 300 440-2 v1.4.1:2010	Electromagnetic compatibility and Radio spectrum Matters (ERM); Short range devices; Radio equipment to be used in the 1 GHz to 40 GHz frequency range
EN 301 489-1 v1.9.2/-3 v1.6.1:2013 /-17 v2.2.1:2012	Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 3: Specific conditions for Short-Range Devices (SRD); Part 17: Specific conditions for Broadband Data Transmissions

3.4   Australia and New Zealand

The D52 ANT SoC module series has been tested and found to comply with:

ACMA Radiocommunications (Short Range Devices) Standards 2014; 2400 and 5700 MHz bands only **EN 60950-1: (2nd Edition)** Information technology equipment. Safety. General requirements
AS/NZS CISPR 22:2009 Information technology equipment. Radio disturbance characteristics. Limits and methods of measurement **AS/NZS 4268:2012** – Radio equipment and systems – Short Range Devices – Limits and methods of measurement
EN 301 489-1/-3/-17 Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements ; Part 3: Specific conditions for Short-Range Devices (SRD); Part 17: Specific conditions for Broadband Data Transmission systems
EN 300 440 Electromagnetic compatibility and Radio spectrum Matters (ERM); Short range devices; Radio equipment to be used in the 1 GHz to 40 GHz frequency range **EN 300 328** Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband transmission systems

The ACMA supplier code number is N20233

3.5   Japan

D52Q and D52M models have been granted type certificate (mark numbers below). Standard applied: 2.4GHz band wide-band low-power data communication system (item 19 of Article 2 paragraph 1).

- For **D52Q** models: mark number R201-160147
- For **D52M** models: mark number R201-163171

3.6   Korea

The D52Q and D52M modules have been certificated under the Clause 2, Article 58-2 of Radio Wave Act by Ministry of Science, ICT and future Planning, Republic of Korea. The certification No's. are:

- For **D52Q** models: MSIP-CRM-D23-D52Q
- For **D52M** models: MSIP-CRM-D23-D52M

3.7   BLUETOOTH Qualification

D52Q and D52M modules are listed as Bluetooth components (tested) on the Bluetooth SIG Qualified Design List:

- For **D52Q** models: Qualified Design ID 83227; Declaration ID is D030904
- For **D52M** models: Qualified Design ID 89214; Declaration ID is D032894

Further use of this design to create subsequent BLUETOOTH implementations can be achieved without further qualification provided that the resulting implementation has no negative material impact on the BLUETOOTH performance or functionality of the design.