RN-41/RN-41N Class 1 Bluetooth Module

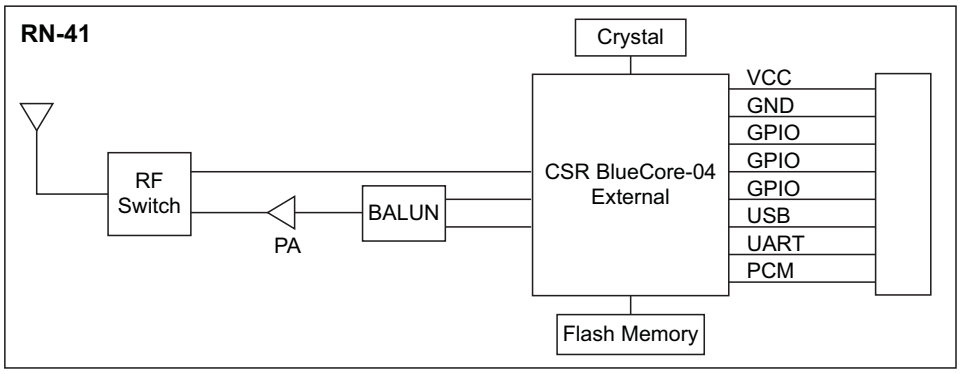
Features:

- Fully qualified Bluetooth® version 2.1 module, supports version 2.1 + Enhanced Data Rate (EDR)
- Backwards-compatible with Bluetooth version 2.0, 1.2, and 1.1
- Postage stamp sized form factor, 13.4 mm x 25.8 mm x 2 mm
- Low power (30 mA connected, < 10 mA sniff mode)
- UART (SPP or HCI) and USB (HCI only) data connection interfaces
- Sustained SPP data rates: 240 Kbps (slave), 300 Kbps (master)
- HCI data rates: 1.5 Mbps sustained, 3.0 Mbps burst in HCI mode
- Embedded Bluetooth stack profiles included (requires no host stack): GAP, SDP, RFCOMM, and L2CAP protocols, with SPP and DUN profile support
- Bluetooth SIG qualified, end product listing
- Castellated SMT pads for easy and reliable PCB mounting
- Class 1 high power amplifier with on board ceramic RF chip antenna (RN-41) or without antenna (RN-41N)
- Certifications: FCC, IC, ICS, CE

Applications:

- Cable replacement
- Barcode scanners
- Measurement and monitoring systems
- Industrial sensors and controls
- Medical devices
- Asset tracking

RN-41 Block Diagram:



1.0 DEVICE OVERVIEW

The RN-41/RN-41N module is a small form factor, low power, class 1 Bluetooth radio that is ideal for designers who want to add wireless capability to their products without spending significant time and money developing Bluetooth-specific hardware and software. The RN-41/RN-41N supports multiple interface protocols, is simple to design in, and is fully certified, making it a complete embedded Bluetooth solution. With its high-performance, on-chip antenna (RN-41) or external antenna (RN-41N), and support for Bluetooth EDR, the RN-41/RN-41N delivers up to a 3-Mbps data rate for distances up to 100 meters.

The module provides FHSS/GFSK modulation and 79 channels at 1-MHz intervals. 128-bit encryption ensures secure communication.

The module can be configured locally via the UART or over-the-air. To support instant cable replacement, auto-discovery/pairing does not require software configuration. Additionally, the module supports auto-connect master, I/O pin (DTR), and character-based trigger modes

Table 1-1, Table 1-2, Table 1-3, Table 1-4, and Table 1-5 provide the module's environmental conditions, electrical characteristics, weight and dimensions, radio characteristics, and digital I/O characteristics.

TABLE 1-1: ENVIRONMENTAL CONDITIONS

Parameter	Value
Temperature Range (Operating)	-40^{o} C ~ 85^{o} C
Temperature Range (Storage)	-40^{o} C ~ 85^{o} C
Relative Humidity (Operating)	≤ 90%
Relative Humidity (Storage)	≤ 90%
Moisture Sensitivity Level	1

TABLE 1-2: ELECTRICAL CHARACTERISTICS

Parameter	Min.	Typ.	Max.	Units
Supply Voltage (DC)	3.0	3.3	3.6	V
RX Supply Current		35	60	mA
TX Supply Current		65	100	mA
Average Power Consumption				
Standby/Idle (Default Settings)		25		mA
Connected (Normal Mode)		30		mA
Connected (Low-Power Sniff)		8		mA
Standby/Idle (Deep Sleep Enabled)	250	2.5		mA

TABLE 1-3: MODULE WEIGHT & DIMENSIONS

Parameter	RN-41	RN-41N	Units
Size	13.4 x 25.8 x 2	13.4 x 19 x 2	mm
Weight	0.055	0.020	Oz.

TABLE 1-4: RADIO CHARACTERISTICS

Parameter	Frequency (GHz)	Min.	Typ.	Max.	Bluetooth Specification	Units
Sensitivity at 0.1% BER	2.402	-	-80	-86	≤ -70	dBm
	2.441	-	-80	-86		dBm
	2.480	-	-80	-86		dBm
RF Transmit Power	2.402	15.0	16.0		≤ 20	dBm
	2.441	15.0	16.0			dBm
	2.480	15.0	16.0			dBm
Initial Carrier Frequency Tolerance	2.402	-	5	75	75	kHz
	2.441	-	5	75		kHz
	2.480	-	5	75		kHz
20-dB Bandwidth for Modulated Carrier		-	900	1000	≤ 1000	kHz
Drift (Five Slots Packet)		-	15	-	40	kHz
Drift Rate		-	13	-	20	kHz
$\Delta f1_{avg}$ Maximum Modulation	2.402	140	165	175	> 140	kHz
	2.441	140	165	175		kHz
	2.480	140	165	175		kHz
$\Delta f2_{avg}$ Minimum Modulation	2.402	140	190	-	115	kHz
	2.441	140	190	-		kHz
	2.480	140	190	-		kHz

TABLE 1-5: DIGITAL I/O CHARACTERISTICS

3.0 V ≤ VDD ≤ 3.3 V	Min.	Typ.	Max.	Units
Input Logic Level Low	-0.4	-	+0.8	V
Input Logic Level High	0.7 VDD	-	VDD + 0.4	V
Output Logic Level Low	-	-	0.2	V
Output Logic Level High	VDD - 0.2	-	-	V
All I/O pins (Except reset) Default to Weak Pull Down	+0.2	+1.0	+5.0	µA

Figure 1-1 and Figure 1-2 show the modules' dimensions.

FIGURE 1-1: RN-41 MODULE DIMENSIONS

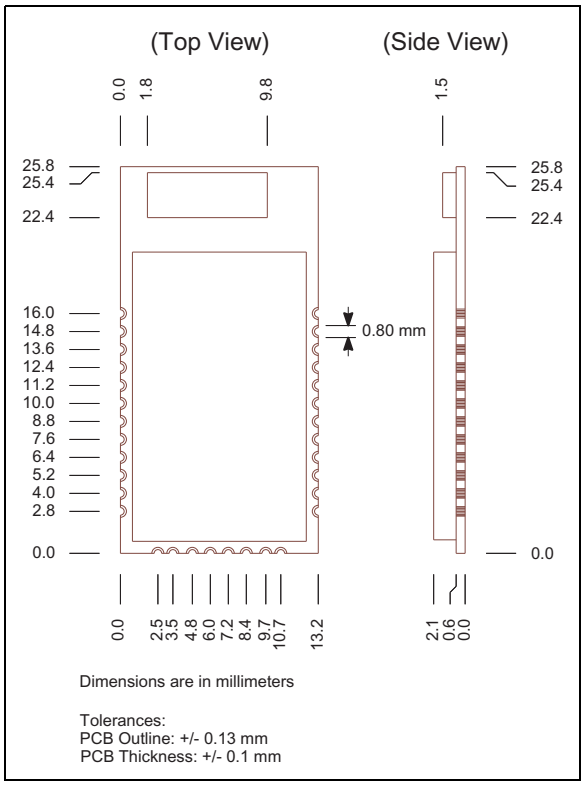


FIGURE 1-2: RN-41N MODULE DIMENSIONS

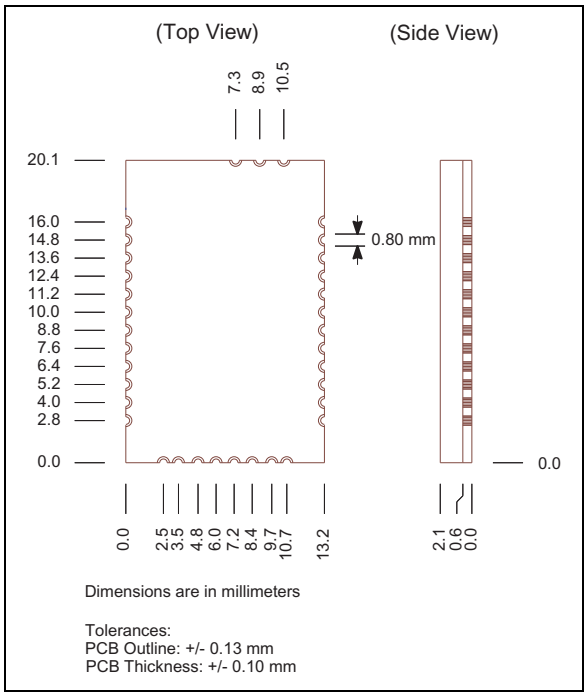


Figure 1-3 and Figure 1-4 show the pinout and Table 1-6 describes the module's pins.

FIGURE 1-3: RN-41 PIN DIAGRAM

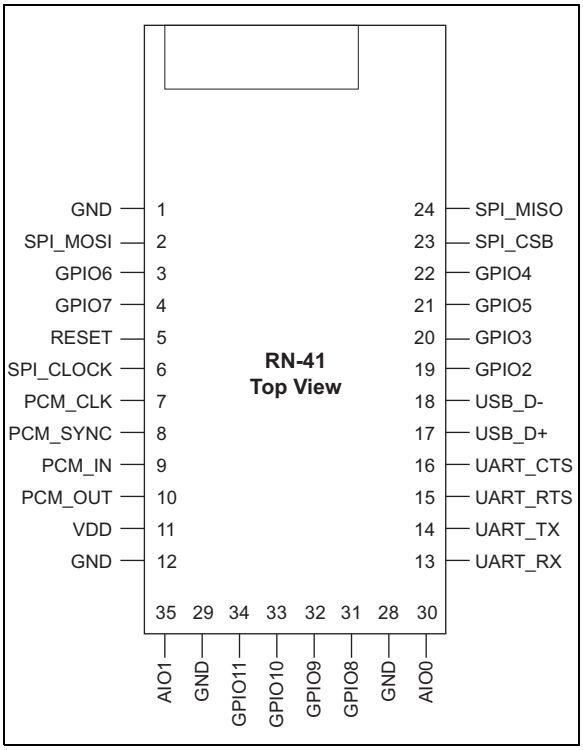


FIGURE 1-4: RN-41N PIN DIAGRAM

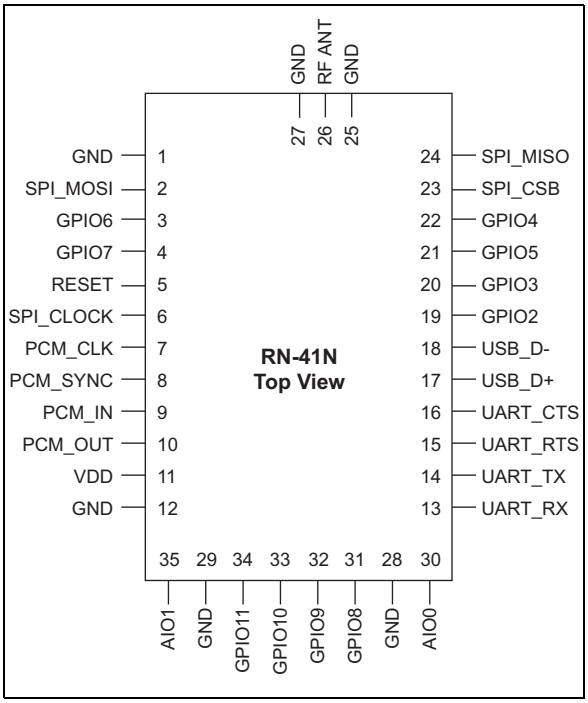


TABLE 1-6: PIN DESCRIPTION

Pin	Name	Description	Default
1	GND	Ground	–
2	SPI_MOSI	Programming only	No connect
3	GPIO6	Set Bluetooth master (high = auto-master mode)	Input to RN-41 module with weak pulldown
4	GPIO7	Set baud rate (high = force 9,600, low = 115 K or firmware setting)	Input to RN-41 module with weak pulldown
5	RESET	Active-low reset	Input to RN-41 module with 1K pullup
6	SPI_CLK	Programming only	No Connect
7	PCM_CLK	PCM interface	No Connect
8	PCM_SYNC	PCM interface	No Connect
9	PCM_IN	PCM interface	No Connect
10	PCM_OUT	PCM interface	No Connect
11	VDD	3.3-V regulated power input	–
12	GND	Ground	–
13	UART_RX	UART receive input	Input to RN-41 module
14	UART_TX	UART transmit output	High level output from RN-41 module
15	UART_RTS	UART RTS, goes high to disable host transmitter	Low level output from RN-41 module
16	UART_CTS	UART CTS, if set high, it disables transmitter	Low level input to RN-41 module
17	USB_D+	USB port	1.5 K pullup activated when USB port is ready (~500 ms after reset)
18	USB_D-	USB port	–
19	GPIO2	Status, high when connected, low otherwise	Output from RN-41 module
20	GPIO3	Auto discovery = high	Input to RN-41 module with weak pulldown
21	GPIO5	Status, toggles based on state, low on connect	Output from RN-41 module
22	GPIO4	Set factory defaults	Input to RN-41 with weak pulldown
23	SPI_CSB	Programming only	No connect
24	SPI_MISO	Programming only	No connect
25	GND	Ground (RN-41N only)	–
26	RF ANT	Antenna, 50-Ohm impedance (RN-41N only)	–
27	GND	Ground (RN-41N only)	–
28	GND	Ground	–
29	GND	Ground	–
30	AIO0	Optional analog input	Not used
31	GPIO8	Status (RF data RX/TX)	Output from RN-41 module
32	GPIO9	I/O	Input to RN-41 module with weak pulldown
33	GPIO10	I/O (remote DTR signal)	Input to RN-41 module with weak pulldown
34	GPIO11	I/O (remote RTS signal)	Input to RN-41 module with weak pulldown
35	AIO1	Optional analog input	Not Used

2.0 APPLICATION INFORMATION

The following sections provide information on designing with the RN-41/RN-41N module, including radio interference, factory reset, solder reflow profile, connection status, etc.

2.1 Reset Circuit

The RN-41/RN-41N contains a 1k pullup to VCC, and the reset polarity is active low. The module's reset pin has an optional power-on-reset circuit with a delay, which should only be required if the input power supply has a very slow ramp or tends to bounce or have instability on power up. Often a microcontroller or embedded CPU I/O is available to generate the reset once power is stable. If not, designers can use one of the many low-cost power supervisor chips currntly available, such as the MCP809 or MCP102/121.

2.2 Factory Reset Using GPIO4

It is recommended to connect the GPIO4 pin to a switch, jumper, or resistor so it can be accessed. This pin can be used to reset the module to its factory default settings, which is critical in situations where the module has been misconfigured. To reset the module to the factory defaults, GPIO4 should be high on power-up and then toggle low, high, low, high with a 1 second wait between the transitions.

2.3 Connection Status

GPIO5 is available to drive an LED, and it blinks at various speeds to indicate status (see Table 2-1). GPIO2 is an output that directly reflects the connection state as shown in Table 2-2.

TABLE 2-1: GPIO5 STATUS

GPIO5 Status	Description
Toggle at 1 Hz	The module is discoverable and waiting for a connection.
Toggle at 10 Hz	The module is in command mode.
Low	The module is connected to another device over Bluetooth.

TABLE 2-2: GPIO2 STATUS

GPIO2 Status	Description
High	The module is connected to another device over Bluetooth.
Low	The module is not connected over Bluetooth.

2.4 Using the SPI Bus to Upgrade the Flash Memory

While not required, this bus is very useful for configuring the Bluetooth modules' advanced parameters. The bus is required when upgrading the module's firmware. The typical application schematic shown in Figure 2-6 shows a 6-pin header that can be implemented to gain access to this bus. A minimum-mode version might simply use the SPI signals (4 pins) and obtain ground and VCC from elsewhere in the design.

2.5 Module Mounting Details

Figure 2-1 and Figure 2-2 show the recommended PCB footprint for the RN-41 and RN-41N, respectively. When laying out the carrier board for the RN-41 module, the areas under the antenna and shielding connections should not have surface traces, ground planes, or exposed vias.

Figure 2-3 and Figure 2-4 show the recommended mounting details for the RN-41 and RN-41N, respectively. For optimal radio performance, the RN-41 module's antenna end should protrude at least 31 mm beyond any metal enclosure.

FIGURE 2-1: RN-41 RECOMMENDED PCB FOOTPRINT

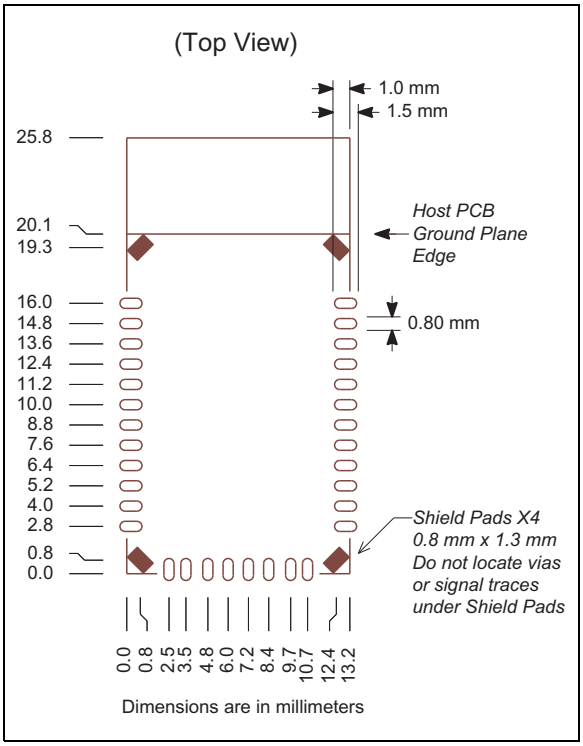


FIGURE 2-2: RN-41N RECOMMENDED PCB FOOTPRINT

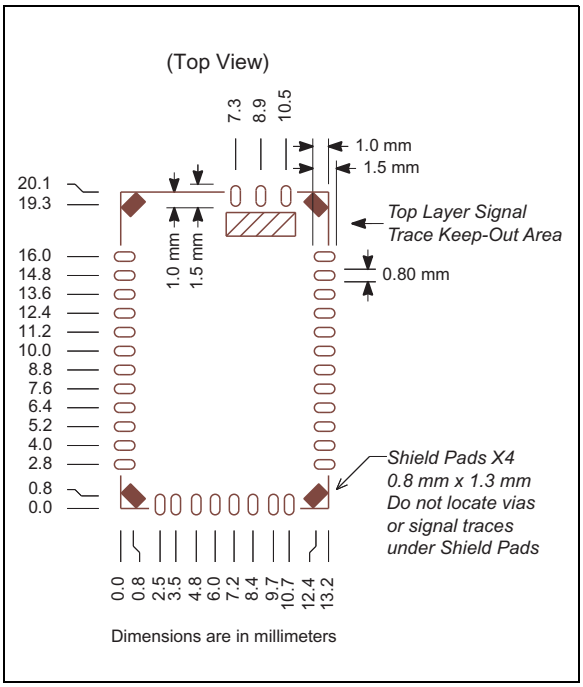


FIGURE 2-3: RN-41 MODULE MOUNTING DETAILS

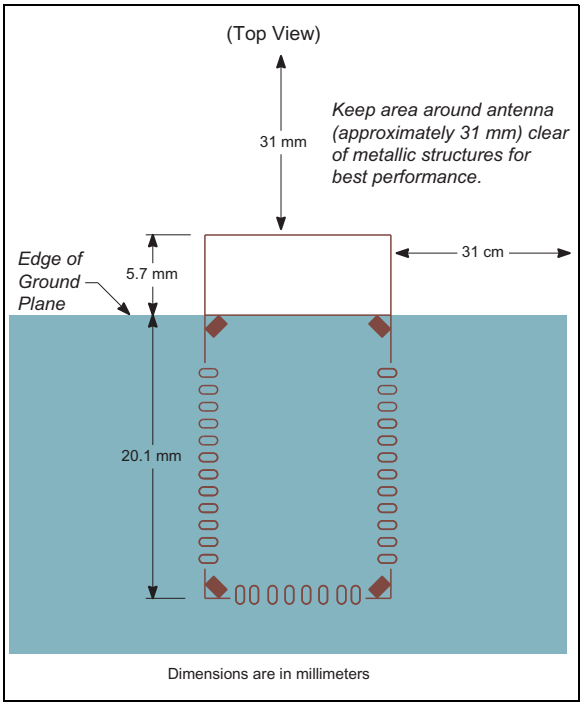


FIGURE 2-4: RN-41N MODULE MOUNTING DETAILS

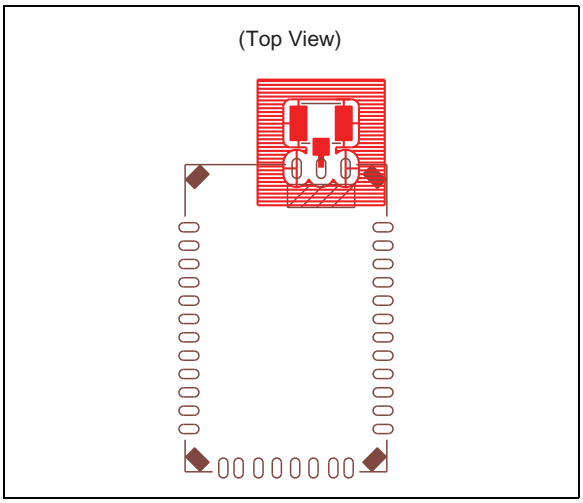
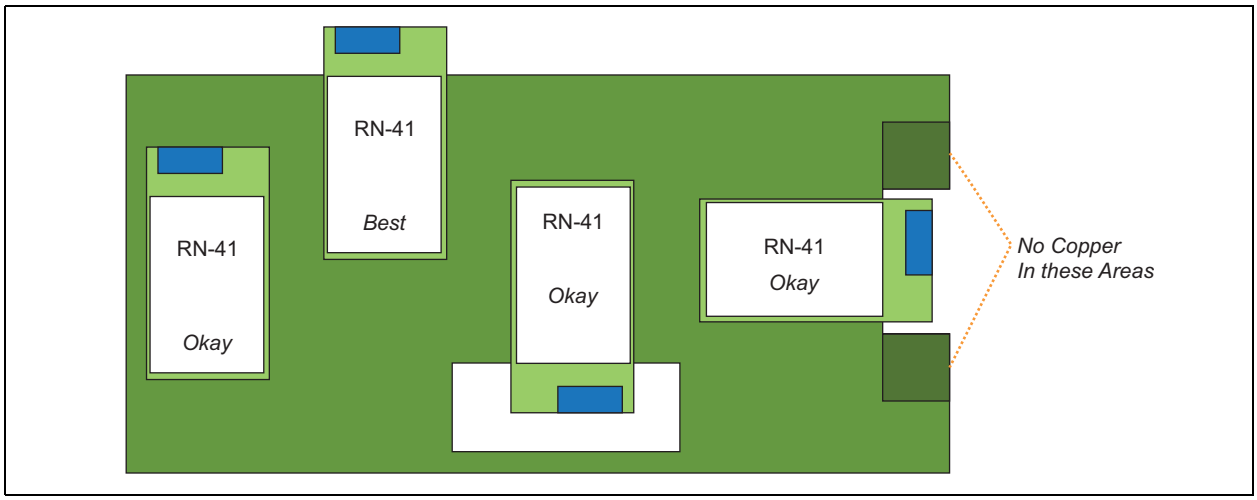


Figure 2-5 shows examples of good, bad, and acceptable positioning of the RN-41/RN-41N on the host PCB.

FIGURE 2-5: RN-41 HOST PCB EXAMPLE LAYOUT



2.6 External Antenna Types (RN-41N)

The RN-41N module's antenna pin (pin 25) provides a 50-ohm impedance to external antennas. Pin 25 can connect directly to a coaxial cable antenna or to an antenna connector such as a U.FL or reverse polarity SMA.

The PCB trace from pin 25 to the coaxial cable or connector should be less than 0.2 inches (5 mm) for minimum loss and the best impedance match. If the PCB trace is longer, it should be a 50-ohm impedance microstrip trace. Connect adjacent ground pins 24 and 26 to a low-impedance ground on the host PCB and the antenna connection. Figure 2-4 gives example host PCB layout to a U.FL connector.

Modular certification of the RN171 module was performed with the external antenna types listed in Table 2-3. Refer to Section 3.0, Regulatory Approval for specific regulatory requirements by country.

TABLE 2-3: TESTED EXTERNAL ANTENNA TYPES

Type	Gain (dBi)
Monopole	0.56
Dipole	8
Yagi	15

2.7 HCI Mode

Roving Networks offers the Host Controller Interface (HCI) mode in addition to the standard operational mode of its Bluetooth modules (standard mode refers to the on-board stack running on the module).

In HCI mode, the on-board stack is bypassed and the module is put in a state that runs the Bluetooth baseband. The HCI provides a command reference interface to the baseband controller and the link manager, and provides access to the hardware status and control registers. This interface provides a uniform method for accessing the Bluetooth baseband capabilities.

In this mode, the Bluetooth stack is no longer on-board the module. It is offloaded to the interfacing host processor. The Bluetooth module is used as a radio, performing the lower level MAC functionalities, while the application stack runs on the host processor.

Using the module in HCI mode allows designers to implement profiles that are not natively supported on the Bluetooth module.

Note: HCI mode requires a separate firmware build that must be loaded into the module's flash at the factory. Is not upgradeable in the field.

Roving Networks offers HCI mode in two hardware interfaces:

- HCI over UART (RN-41HCI-I/RM)
- HCI over USB (RN-41U-I/RM)

2.7.1 HCI OVER UART

In this mode, the hardware interface between the host processor and the Bluetooth module is the UART. You must interface the flow control signals between the host processor and the Bluetooth module for the HCI interface to work. Failure to do so can cause the host processor and the Bluetooth module to become out of sync and break the Bluetooth link.

2.7.2 HCI OVER USB

In this mode, the hardware interface between the host processor and the Bluetooth module is the USB. In this architecture, the Bluetooth module is the USB slave and the host processor is the USB host.

Using the USB interface offers the advantage of a faster data link between the Bluetooth module and the host processor. With this architecture, it is possible to achieve Bluetooth's theoretical maximum throughput of 3 Mpbs.

2.8 Solder Reflow Profile

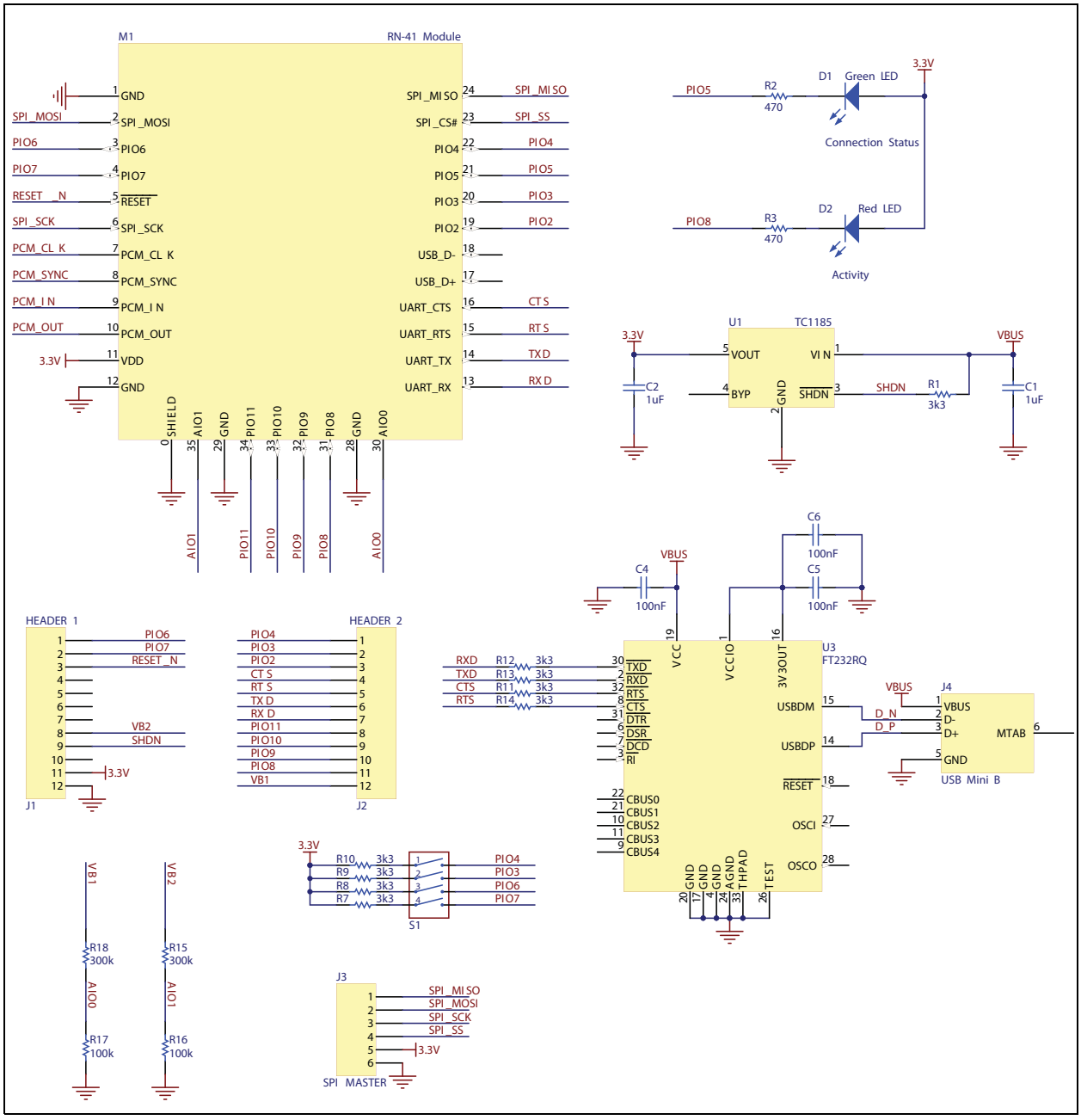
The lead-free solder reflow temperature and times are:

- **Temperature**—230° C, 30 - 40 seconds, peak 250° C maximum
- **Preheat temperature**—165° ± 15° C, 90 to 120 seconds
- **Time**—Single pass, one time

2.9 Application Schematic

Figure 2-6 shows a example application circuit. This schematic is for the RN-41-EK development tool.

FIGURE 2-6: TYPICAL APPLICATION CIRCUIT



3.0 REGULATORY APPROVAL

This section outlines the regulatory information for the RN-41/RN-41N module for the following countries:

- United States
- Canada
- Europe
- Australia
- New Zealand

3.1 United States

The RN-41/RN-41N module has received Federal Communications Commission (FCC) CFR47 Telecommunications, Part 15 Subpart C “Intentional Radiators” modular approval in accordance with Part 15.212 Modular Transmitter approval. Modular approval allows the end user to integrate the RN-41/RN-41N module into a finished product without obtaining subsequent and separate FCC approvals for intentional radiation, provided no changes or modifications are made to the module circuitry. 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.

The finished product is required to comply with all applicable FCC equipment authorizations regulations, requirements and equipment functions not associated with the transmitter module portion. For example, compliance must be demonstrated to regulations for other transmitter components within the host product; to requirements for unintentional radiators (Part 15 Subpart B “Unintentional Radiators”), such as digital devices, computer peripherals, radio receivers, etc.; and to additional authorization requirements for the non-transmitter functions on the transmitter module (i.e., Verification, or Declaration of Conformity) (e.g., transmitter modules may also contain digital logic functions) as appropriate.

3.1.1 LABELING AND USER INFORMATION REQUIREMENTS

The RN-41/RN-41N module has been labeled with its own FCC ID number, and if the FCC ID is not visible when the module is installed inside another device, then the outside of the finished product into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording as follows:

RN-41:
Contains Transmitter Module FCC ID: T9JRN41-3

or

Contains FCC ID: T9JRN41-3

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

RN-41N:
Contains Transmitter Module FCC ID: OA3-RN41N

or

Contains FCC ID: OA3-RN41N

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 user's manual for the product should include the following statement:

> This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
> - Reorient or relocate the receiving antenna.
> - Increase the separation between the equipment and receiver.
> - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
> - Consult the dealer or an experienced radio/TV technician for help.

Additional information on labeling and user information requirements for Part 15 devices can be found in KDB Publication 784748 available at the FCC Office of Engineering and Technology (OET) Laboratory Division Knowledge Database (KDB) http://apps.fcc.gov/oetcf/kdb/index.cfm.

3.1.2 RF EXPOSURE

All transmitters regulated by FCC must comply with RF exposure requirements. OET Bulletin 65, Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields, provides assistance in determining whether proposed or existing transmitting facilities, operations or devices comply with limits for human exposure to Radio Frequency (RF) fields adopted by the Federal Communications Commission (FCC). The bulletin offers guidelines and suggestions for evaluating compliance.

If appropriate, compliance with exposure guidelines for mobile and unlicensed devices can be accomplished by the use of warning labels and by providing users with information concerning minimum separation distances from transmitting structures and proper installation of antennas.

The following statement must be included as a CAUTION statement in manuals and OEM products to alert users of FCC RF exposure compliance:

> To satisfy FCC RF Exposure requirements for mobile and base station transmission devices, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during operation. To ensure compliance, operation at closer than this distance is not recommended.
>
> The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

If the RN-41/RN-41N module is used in a portable application (i.e., the antenna is less than 20 cm from persons during operation), the integrator is responsible for performing Specific Absorption Rate (SAR) testing in accordance with FCC rules 2.1091.

3.1.3 APPROVED EXTERNAL ANTENNA TYPES

To maintain modular approval in the United States, only the antenna types that have been tested shall be used. It is permissible to use different antenna manufacturer provided the same antenna type and antenna gain (equal to or less than) is used.

Testing of the RN-41N module was performed with the antenna types listed in Table 2-3.

3.1.4 HELPFUL WEB SITES

Federal Communications Commission (FCC): http://www.fcc.gov

FCC Office of Engineering and Technology (OET) Laboratory Division Knowledge Database (KDB): http://apps.fcc.gov/oetcf/kdb/index.cfm

3.2 Canada

The RN-41/RN-41N module has been certified for use in Canada under Industry Canada (IC) Radio Standards Specification (RSS) RSS-210 and RSSGen. Modular approval permits the installation of a module in a host device without the need to recertify the device.

3.2.1 LABELING AND USER INFORMATION REQUIREMENTS

Labeling Requirements for the Host Device (from Section 3.2.1, RSS-Gen, Issue 3, December 2010): The host device shall be properly labeled to identify the module within the host device.

The Industry Canada certification label of a module shall be clearly visible at all times when installed in the host device, otherwise the host device must be labeled to display the Industry Canada certification number of the module, preceded by the words “Contains transmitter module”, or the word “Contains”, or similar wording expressing the same meaning, as follows:

RN-41:
Contains transmitter module IC: 6514A-RN413

RN-41N:
Contains transmitter module IC: 7693A-RN41N

User Manual Notice for License-Exempt Radio Apparatus (from Section 7.1.3 RSS-Gen, Issue 3, December 2010): User manuals for license-exempt radio apparatus shall contain the following or equivalent notice in a conspicuous location in the user manual or alternatively on the device or both:

This device complies with Industry Canada license-exempt RSS standard(s). 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.

Transmitter Antenna (from Section 7.1.2 RSS-Gen, Issue 3, December 2010): User manuals for transmitters shall display the following notice in a conspicuous location:

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

The above notice may be affixed to the device instead of displayed in the user manual.

3.2.2 APPROVED EXTERNAL ANTENNA TYPES

Transmitter Antenna (from Section 7.1.2 RSS-Gen, Issue 3, December 2010):

The RN-41N module can only be sold or operated with antennas with which it was approved. Transmitter may be approved with multiple antenna types. An antenna type comprises antennas having similar in-band and out-of-band radiation patterns. Testing shall be performed using the highest gain antenna of each combination of transmitter and antenna type for which approval is being sought, with the transmitter output power set at the maximum level. Any antenna of the same type having equal or lesser gain as an antenna that had been successfully tested with the transmitter, will also be considered approved with the transmitter, and may be used and marketed with the transmitter.

When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer. For transmitters of output power greater than 10 milliwatts, the total antenna gain shall be added to the measured RF output power to demonstrate compliance to the specified radiated power limits.

Approved external antenna types for the RN-41N module are listed in Table 2-3.

3.2.3 HELPFUL WEB SITES

Industry Canada: http://www.ic.gc.ca/

3.3 Europe

The RN-41/RN-41N module is an R&TTE Directive assessed radio module that is CE marked and has been manufactured and tested with the intention of being integrated into a final product.

The RN-41/RN-41N module has been tested to R&TTE Directive 1999/5/EC Essential Requirements for Health and Safety (Article (3.1(a)), Electromagnetic Compatibility (EMC) (Article 3.1(b)), and Radio (Article 3.2) and are summarized in Table 3-1: European Compliance Testing. A Notified Body Opinion has also been issued. All test reports are available on the RN-41/RN-41N product web page at http://www.microchip.com.

The R&TTE Compliance Association provides guidance on modular devices in document **Technical Guidance Note 01** available at http://www.rtteca.com/html/download_area.htm.

Note: To maintain conformance to the testing listed in Table 3-1, the module shall be installed in accordance with the installation instructions in this data sheet and shall not be modified.

When integrating a radio module into a completed product the integrator becomes the manufacturer of the final product and is therefore responsible for demonstrating compliance of the final product with the essential requirements of the R&TTE Directive.

3.3.1 LABELING AND USER INFORMATION REQUIREMENTS

The label on the final product which contains the RN-41/RN-41N module must follow CE marking requirements. The R&TTE Compliance Association **Technical Guidance Note 01** provides guidance on final product CE marking.

3.3.2 ANTENNA REQUIREMENTS

From R&TTE Compliance Association document **Technical Guidance Note 01**:

> Provided the integrator installing an assessed radio module with an integral or specific antenna and installed in conformance with the radio module manufacturer's installation instructions requires no further evaluation under Article 3.2 of the R&TTE Directive and does not require further involvement of an R&TTE Directive Notified Body for the final product. [Section 2.2.4]

The European Compliance Testing listed in Table 3-2 was performed using the antenna types listed in Table 2-3.

3.3.3 HELPFUL WEB SITES

A document that can be used as a starting point in understanding the use of Short Range Devices (SRD) in Europe is the European Radio Communications Committee (ERC) Recommendation 70-03 E, which can be downloaded from the European Radio Communications Office (ERO) at: http://www.ero.dk/.

Additional helpful web sites are:

- Radio and Telecommunications Terminal Equipment (R&TTE): http://ec.europa.eu/enterprise/rtte/index_en.htm
- European Conference of Postal and Telecommunications Administrations (CEPT): http://www.cept.org
- European Telecommunications Standards Institute (ETSI): http://www.etsi.org
- European Radio Communications Office (ERO): http://www.ero.dk
- The Radio and Telecommunications Terminal Equipment Compliance Association (R&TTE CA): http://www.rtteca.com/

TABLE 3-1: RN-41 EUROPEAN COMPLIANCE TESTING

Certification	Standards	Article	Laboratory	Report Number	Date
Safety	EN 60950-1:2006+A11:2009+A1:2010	(3.1(a))			
Health	EN 50371:2002-03				
EMC	EN 301 489-1 V1.8.1 (2008-04)	(3.1(b))			
	EN 301 489-17 V2.1.1 (2009-05)				
Radio	EN 300 328 V1.7.1 (2006-10)	(3.2)			
Notified Body Opinion					
DoC					

TABLE 3-2: RN-41N EUROPEAN COMPLIANCE TESTING

Certification	Standards	Article	Laboratory	Report Number	Date
Safety	EN 60950-1:2006+A11:2009+A1:2010	(3.1(a))			
Health	EN 50371:2002-03				
EMC	EN 301 489-1 V1.8.1 (2008-04)	(3.1(b))			
	EN 301 489-17 V2.1.1 (2009-05)				
Radio	EN 300 328 V1.7.1 (2006-10)	(3.2)			
Notified Body Opinion					
DoC					

3.4 Australia

The Australia radio regulations do not provide a modular approval policy similar to the United States (FCC) and Canada (IC). However, RN-41/RN-41N module RF transmitter test reports can be used in part to demonstrate compliance in accordance with ACMA Radio communications “Short Range Devices” Standard 2004 (The Short Range Devices standard calls up the AS/NZS 4268:2008 industry standard). The RN-41/RN-41N module test reports can be used as part of the product certification and compliance folder. For more information on the RF transmitter test reports, contact Microchip Technology Australia sales office.

To meet overall Australian final product compliance, the developer must construct a compliance folder containing all relevant compliance test reports e.g. RF, EMC, electrical safety and DoC (Declaration of Conformity) etc. It is the responsibility of the integrator to know what is required in the compliance folder for ACMA compliance. All test reports are available on the RN-41/RN-41N product web page at http://www.microchip.com. For more information on Australia compliance, refer to the Australian Communications and Media Authority web site http://www.acma.gov.au/.

3.4.1 EXTERNAL ANTENNA REQUIREMENTS

The compliance testing listed in Table 3-2 was performed using the antenna types listed in Table 2-3.

3.4.2 HELPFUL WEB SITES

The Australian Communications and Media Authority: www.acma.gov.au/.

3.5 New Zealand

The New Zealand radio regulations do not provide a modular approval policy similar to the United States (FCC) and Canada (IC). However, RN-41/RN-41N module RF transmitter test reports can be used in part to demonstrate compliance against the New Zealand “General User Radio License for Short Range Devices”. New Zealand Radio communications (Radio Standards) Notice 2010 calls up the AS / NZS 4268:2008 industry standard. The RN-41/RN-41N module test reports can be used as part of the product certification and compliance folder. All test reports are available on the RN-41/RN-41N product web page at http://www.microchip.com. For more information on the RF transmitter test reports, contact Microchip Technology sales office.

Information on the New Zealand short range devices license can be found in the following web links:

http://www.rsm.govt.nz/cms/licensees/types-ofli-cence/general-user-licences/short-range-devices

and

http://www.rsm.govt.nz/cms/policy-and-planning/spec-trum-policy-overview/legislation/gazette-notices/prod-uct-compliance/radiocommunications-radiostandards-notice-2010.

To meet overall New Zealand final product compliance, the developer must construct a compliance folder containing all relevant compliance test reports e.g. RF, EMC, electrical safety and DoC (Declaration of Conformity) etc. It is the responsibility of the developer to know what is required in the compliance folder for New Zealand Radio communications. For more information on New Zealand compliance, refer to the web site http://www.rsm.govt.nz/.

3.5.1 EXTERNAL ANTENNA REQUIREMENTS

The compliance testing listed in Table 3-2 was performed using the antenna types listed in Table 2-3.

3.5.2 HELPFUL WEB SITES

Radio Spectrum Ministry of Economic Development: http://www.rsm.govt.nz/.

4.0 ORDERING INFORMATION

Table 4-1 provides ordering information for the RN-41 module.

TABLE 4-1: ORDERING INFORMATION

Part Number	Description
RN41-I/RM	Standard Application firmware (SPP/DUN Master and Slave).
RN41HCI-I/RM	HCI firmware (HCI over H4 UART).
RN41U-I/RM	USB firmware (HCI over USB port, slave device at 12-Mbps rate).
RN41HID-I/RM	HID firmware supporting HID device and SPP profiles.
RN41N-I/RM	Standard application firmware (SPP and DUN) without antenna.
RN41NHCI-I/RM	HCI firmware (HCI over H4 UART) without antenna.
RN41NU-I/RM	USB firmware (HCI over USB port) without antenna.
RN41NHID-I/RM	HID firmware supporting HID device and SPP profiles without antenna.
For other configurations, contact Roving Networks directly.	

Go to http://www.rovingnetworks.com for current pricing and a list of distributors carrying Roving Networks products.

5.0 DOCUMENT REVISION HISTORY

5.1 Version 3.43 5/21/2013

- Updated the regulatory information.
- Updated schematics.
- Changed the document formatting.
- Minor text changes throughout.

5.2 Version 3.42r 4/11/2013

Updated the module part numbers.

5.3 Version 3.41r 10/15/2012

Updated the GPIO5 status table to correctly show that when GPIO5 is low, it indicates that the module is connected to another device over Bluetooth.

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