Bluetooth Low Energy expansion board based on the BLUENRG-M2SP module for STM32 Nucleo

Features

- Based on the BlueNRG-M2SP module FCC certified module (FCC ID: S9NBNRGM2SP and IC: B976C-BNRGM2SP)
- Compatible with STM32 Nucleo boards
- Equipped with Arduino UNO R3 connector
- Scalable solution, capable of cascading multiple boards for larger systems
- Free comprehensive development firmware library and examples for BlueNRG-2 compatible with STM32Cube
- BlueNRG-M2SP:
    - Bluetooth v5.0 compliant
    - Supports master and slave modes
    - BLE data packet length extension
    - Embedded BALF-NRG-02D3 integrated matched balun with harmonic filter
- Interfaces:
    - 1 UART, 1 I²C, 1 SPI, 14 GPIOs, 2 multifunction timers, 10-bit ADC, Watchdog & RTC, DMA controller, PDM stream processor, SWD debug interface
- Small form factor: 11.5mmx13.5mm
- Complemented with Bluetooth low energy protocol stack library (GAP, GATT, SM, L2CAP, LL)
- AES security co-processor
- Bluetooth low energy SDK with a wide range of profiles
- Embedded BlueNRG-2 BLE SoC:
    - High performance, ultra-low power Cortex-M0 32-bit based core
    - Programmable embedded 256 KB Flash
    - 24 KB embedded RAM with data retention
    - Up to +8 dBm available output power
    - Down to -88 dBm Rx sensitivity
    - Up to 96 dB link budget with excellent link reliability

Description

The X-NUCLEO-BNRG2A1 expansion board provides Bluetooth low energy connectivity for developer applications and can be plugged onto an STM32 Nucleo development board (e.g., NUCLEO-L476RG with ultra-low power STM32 microcontroller) through its Arduino UNO R3 connectors.

The expansion board features the Bluetooth® v5.0 compliant and FCC certified BlueNRG-M2SP application processor module based on the ST BlueNRG-2 System-on-Chip. This SoC manages the complete Bluetooth low energy stack and protocols on its Cortex-M0 core and programmable Flash, which can accommodate custom applications developed using the SDK. The BlueNRG-M2SP module supports master and slave modes, increased transfer rates with data length extension (DLE), and AES-128 security encryption.

The X-NUCLEO-BNRG2A1 interfaces with the STM32 Nucleo microcontroller via SPI connections and GPIO pins, some of which can be configured by the hardware.

Product summary	
Bluetooth Low Energy expansion board based on the BLUENRG-M2SP module for STM32 Nucleo	X-NUCLEO-BNRG2A1
Very low power application processor module for Bluetooth® low energy v5.0	BlueNRG-M2SP
Bluetooth® low energy wireless system-on-chip	BlueNRG-2
50 Ω conjugate match balun to BlueNRG transceiver, with integrated harmonic filter	BALF-NRG-02D3
Application	Industrial Sensors
	Building Safety and Security
	Climate Control
	Smart Home

DB4086 - Rev 1 - December 2019
For further information contact your local STMicroelectronics sales office.

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Product summary	
	Bluetooth Low Energy
	Gaming and Drones
	Personal Care and Hygiene
	Virtual-Augmented reality
	Wearable

1 Formal notices required by the U.S. Federal Communications Commission ("FCC")

Any changes or modifications to this equipment not expressly approved by STMicroelectronics may cause harmful interference and void the user's authority to operate this equipment.

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 any interference that may cause undesired operation.

This device uses, generates and radiated radio frequency energy. The radio frequency energy produced by this device is well below the maximum exposure allows by Federal Communications Commission (FCC).

The X-NUCLEO-BNRG2A1 contains FCC certified module BlueNRG-M2SP (FCC ID: S9NBNRGM2SP).

2   Formal notices required by the Industry Canada ("IC")

English:

This device complies with Industry Canada licence-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.

French:

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. '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.

The X-NUCLEO-BNRG2A1 contains FCC certified module BlueNRG-M2SP (FCC ID: S9NBNRGM2SP).

3   Schematic diagrams

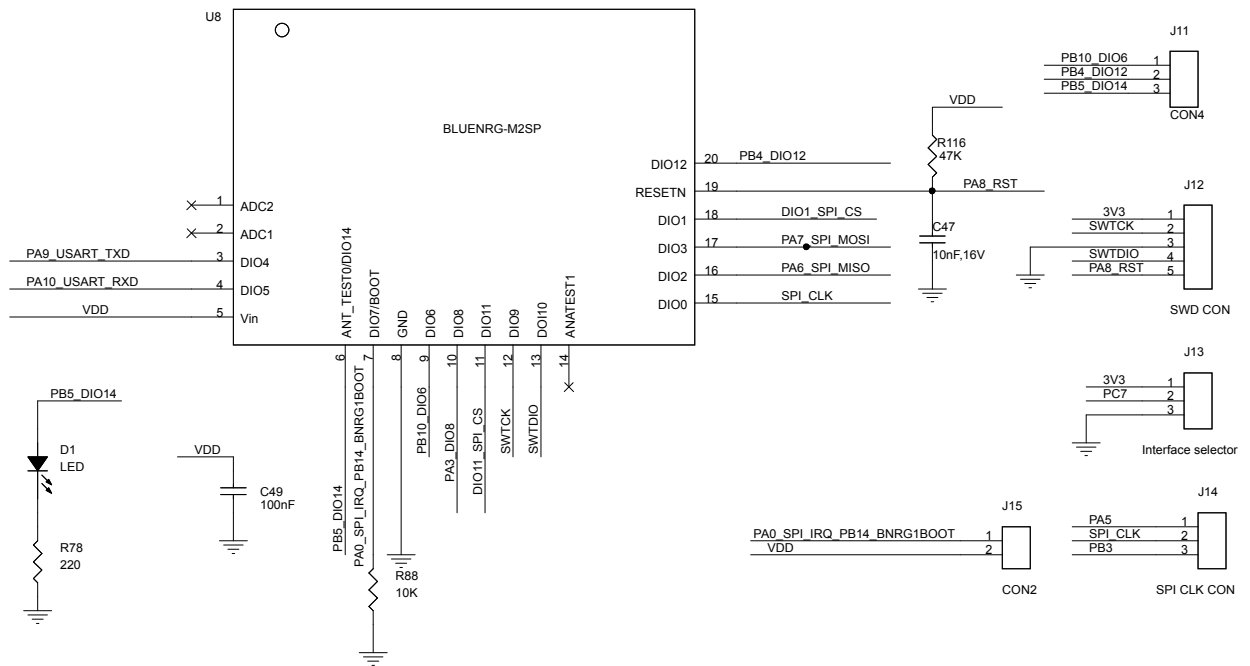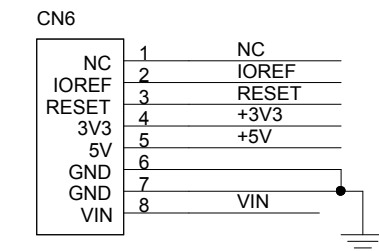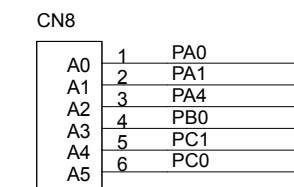**Figure 1. X-NUCLEO-BNRG2A1 schematic diagram - BlueNRG-M2SP**

Figure 2. X-NUCLEO-BNRG2A1 schematic diagram - Arduino connectors
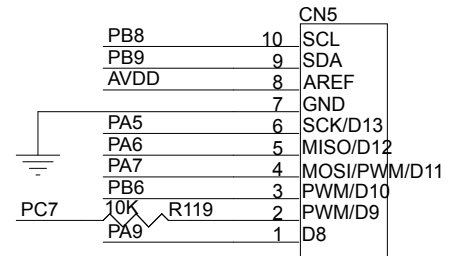
Figure 3. X-NUCLEO-BNRG2A1 schematic diagram - morpho connectors

ST morpho SX Connector

ST morpho DX Connector

Pass-Through: Female on
Bottom and Male on Top

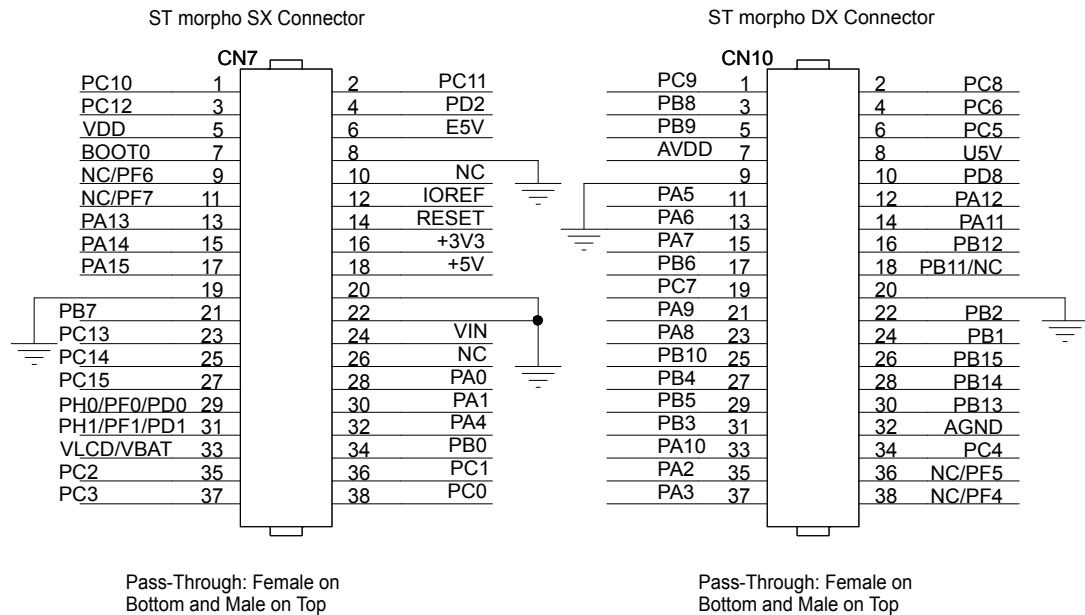Pass-Through: Female on
Bottom and Male on Top

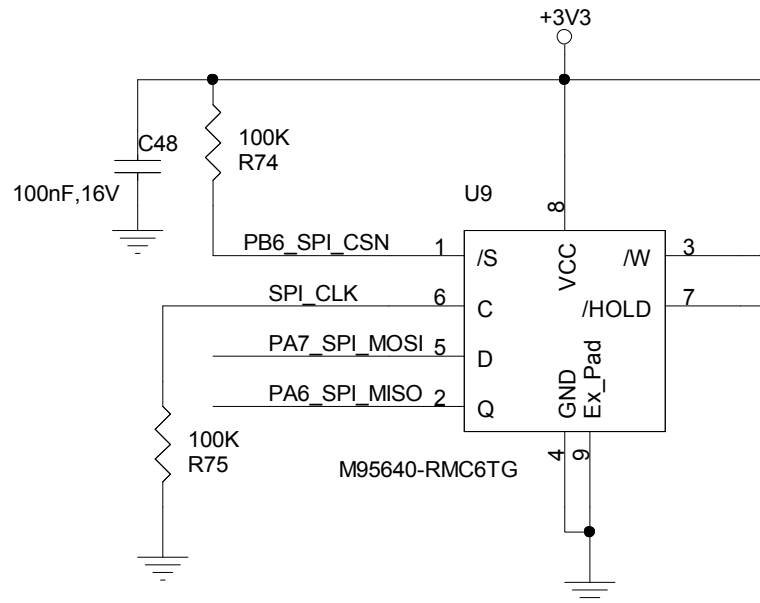**Figure 4. X-NUCLEO-BNRG2A1 schematic diagram - M95640-RMC6TG**
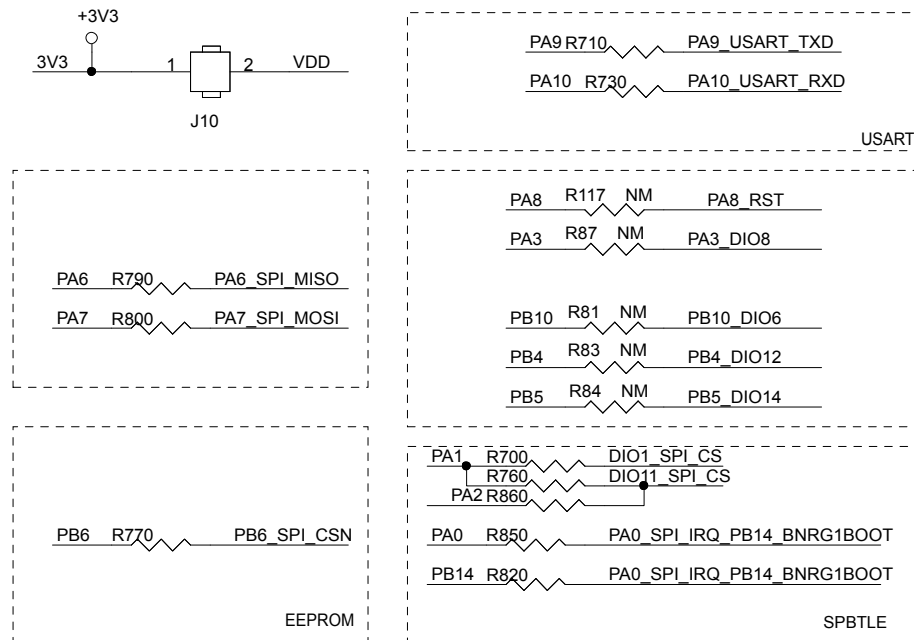
Figure 5. X-NUCLEO-BNRG2A1 schematic diagram - resistor mapping

Revision history

Table 1. Document revision history

Date	Version	Changes
10-Dec-2019	1	Initial release.

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