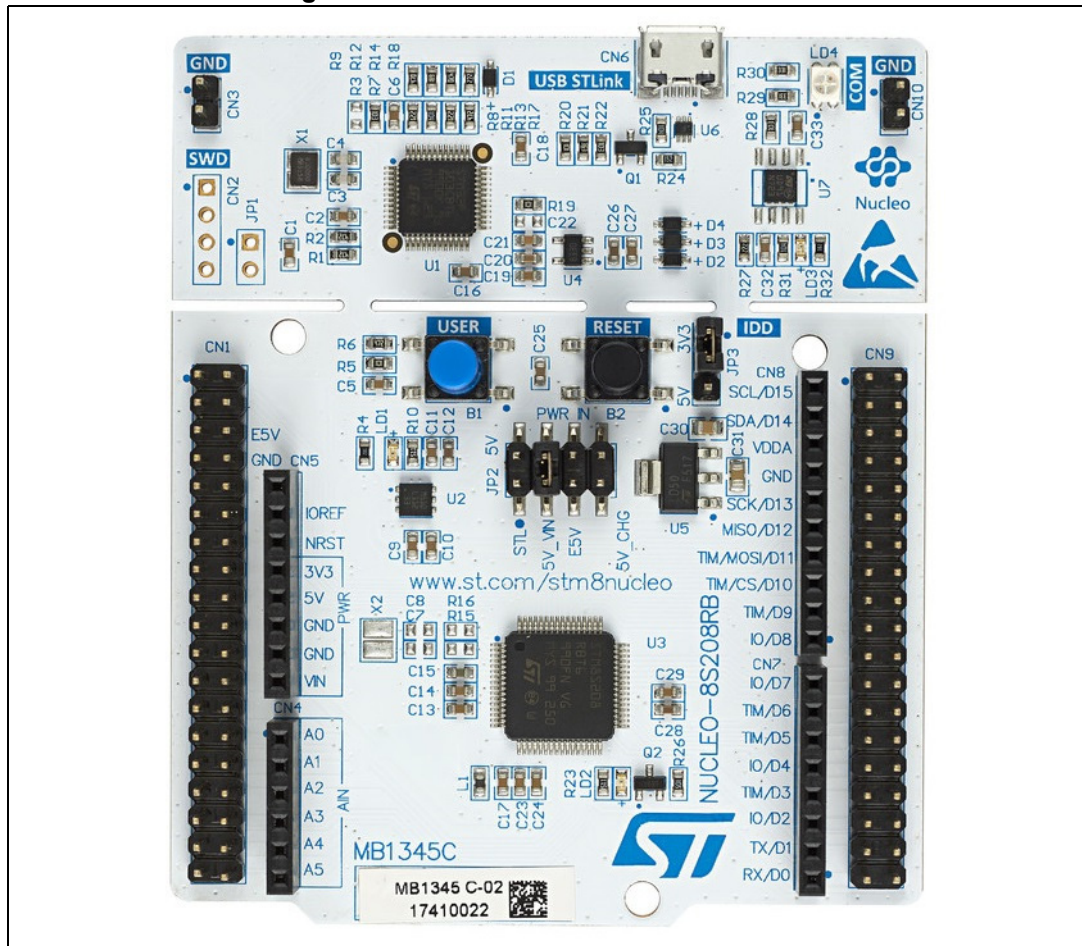


### Introduction

The STM8S208RBT6 Nucleo-64 board (NUCLEO-8S208RB) provides an affordable and flexible way for users to try out new concepts and build prototypes with STM8S Series microcontrollers in the LQFP64 package, which provide various combinations of performance, power consumption and features. The Arduino™ Uno V3 connectivity support and the ST morpho headers allow easy expansion of the functionality of the Nucleo open development platform with a wide choice of specialized shields. The STM8S208RBT6 Nucleo-64 board does not require any separate probe, as it integrates the ST-LINK/V2-1 debugger and programmer.

Figure 1. STM8S208RBT6 Nucleo-64 board



Picture is not contractual.

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# 1 Features

The STM8S208RBT6 Nucleo-64 board offers the following features:

- STM8S208RBT6 microcontroller in LQFP64 package
- Flash memory size: 128 Kbytes
- Four LEDs:
  - USB communication (LD4), 5 V ST-LINK (LD3), user LED (LD2), power LED (LD1)
- Two push-buttons: USER and RESET
- Two types of extension resources
  - Arduino™ Uno V3 connectivity
  - ST morpho extension pin headers for full access to all STM8S I/Os
- Flexible board power supply:
  - USB VBUS or external source (3.3 V, 5 V, 7 - 12 V)
  - Power management access point
- On-board ST-LINK/V2-1 debugger and programmer with SWIM connector
- USB re-enumeration capability. Three different interfaces supported on USB:
  - Virtual COM port
  - Mass storage
  - Debug port
- Comprehensive free software STM8 standard library including a variety of software examples

# 2 Product marking

Evaluation tools marked as "ES" or "E" are not yet qualified and therefore they are not ready to be used as reference design or in production. Any consequences deriving from such usage will not be at ST charge. In no event, ST will be liable for any customer usage of these engineering sample tools as reference design or in production.

"E" or "ES" marking examples of location:

- On the targeted STM8S that is soldered on the board (for illustration of STM8S marking, refer to the section "Package information" of the STM8S208xx datasheet available at [www.st.com](http://www.st.com)).
- Next to the evaluation tool ordering part number, that is stuck or silk-screen printed on the board.

This board features a specific STM8S Series device version which allows the operation of any library. This STM8S Series device shows a "U" marking option at the end of the standard part number and is not available for sales.

### 3 Ordering information

[Table 1](#) lists the order codes and the respective targeted STM8S.

**Table 1. Ordering information**

Order code	Targeted STM8S
NUCLEO-8S208RB	STM8S208RBT6

The meaning of the NUCLEO-TXXXRY codification is explained in [Table 2](#) with an example:

**Table 2. Codification explanation**

NUCLEO-TXXXRY	Description	Example: NUCLEO-8S208RB
TXXXX	STM8 product line	8S208
R	STM8 package pin count	64 pins
Y	STM8 Flash memory size (3 for 256 bytes, 4 or 6 for 32 Kbytes, 8 for 64 Kbytes, B for 128 Kbytes)	128 Kbytes

The order code is printed on a sticker placed at the top or bottom side of the board.

### 4 Conventions

[Table 3](#) provides the conventions used for the ON and OFF settings in the present document.

**Table 3. ON/OFF conventions**

Convention	Definition
Jumper JP1 ON	Jumper fitted
Jumper JP1 OFF	Jumper not fitted
Solder bridge SBx ON	SBx connections closed by solder or 0 ohm resistor
Solder bridge SBx OFF	SBx connections left open

## 5 Quick start

The STM8S208RBT6 Nucleo-64 board (NUCLEO-8S208RB) is a low-cost and easy-to-use development platform used to quickly evaluate and start a development with an STM8S Series microcontroller in LQFP64 package.

Before installing and using the product, accept the Evaluation Product License Agreement from the [www.st.com/epla](http://www.st.com/epla) webpage.

### 5.1 Getting started

Follow the sequence below to configure the STM8S Nucleo board and launch the demo software:

1. Check the jumper position on the board: JP3 (IDD) on position (1-2) or (2-3), and JP2 on position (1-2)
2. Connect the STM8S Nucleo board to a PC with a USB cable 'Type-A to Micro-B' through USB connector CN6 to power the board. As a result, LEDs LD4 (COM) and LD1 (PWR) light up, and the green LED LD2 blinks.
3. The demo software and several software examples that allow to use the STM8S Nucleo board features are available at the [www.st.com/stm8nucleo](http://www.st.com/stm8nucleo) webpage.
4. Develop an application using the available examples.

### 5.2 System requirements

- Windows® OS (7, 8 and 10)
- USB Type-A to Micro-B cable

### 5.3 Development toolchains

- STMicroelectronics: free STVD-STM8 (using Cosmic toolchain)
- IAR™: IAR-EWSTM8
- Cosmic: free IDEA

### 5.4 Hardware configuration variants

The board can be delivered with different configurations of the oscillator of the STM8S. For all the details concerning the high-speed configurations of the oscillator, refer to [Section 6.7: OSC clock supply on page 19](#).



## 6 Hardware layout and configuration

The STM8S Nucleo board is designed around the STM8S Series microcontrollers in a 64-pin LQFP package.

*Figure 2* shows the connections between the STM8S and its peripherals (ST-LINK/V2-1, push-button, LED, Arduino™ connectors and ST morpho connector).

*Figure 3* and *Figure 4* show the location of these features on the STM8S Nucleo board. *Figure 5* shows the mechanical dimension of the STM8S Nucleo board.

**Figure 2. Hardware block diagram**

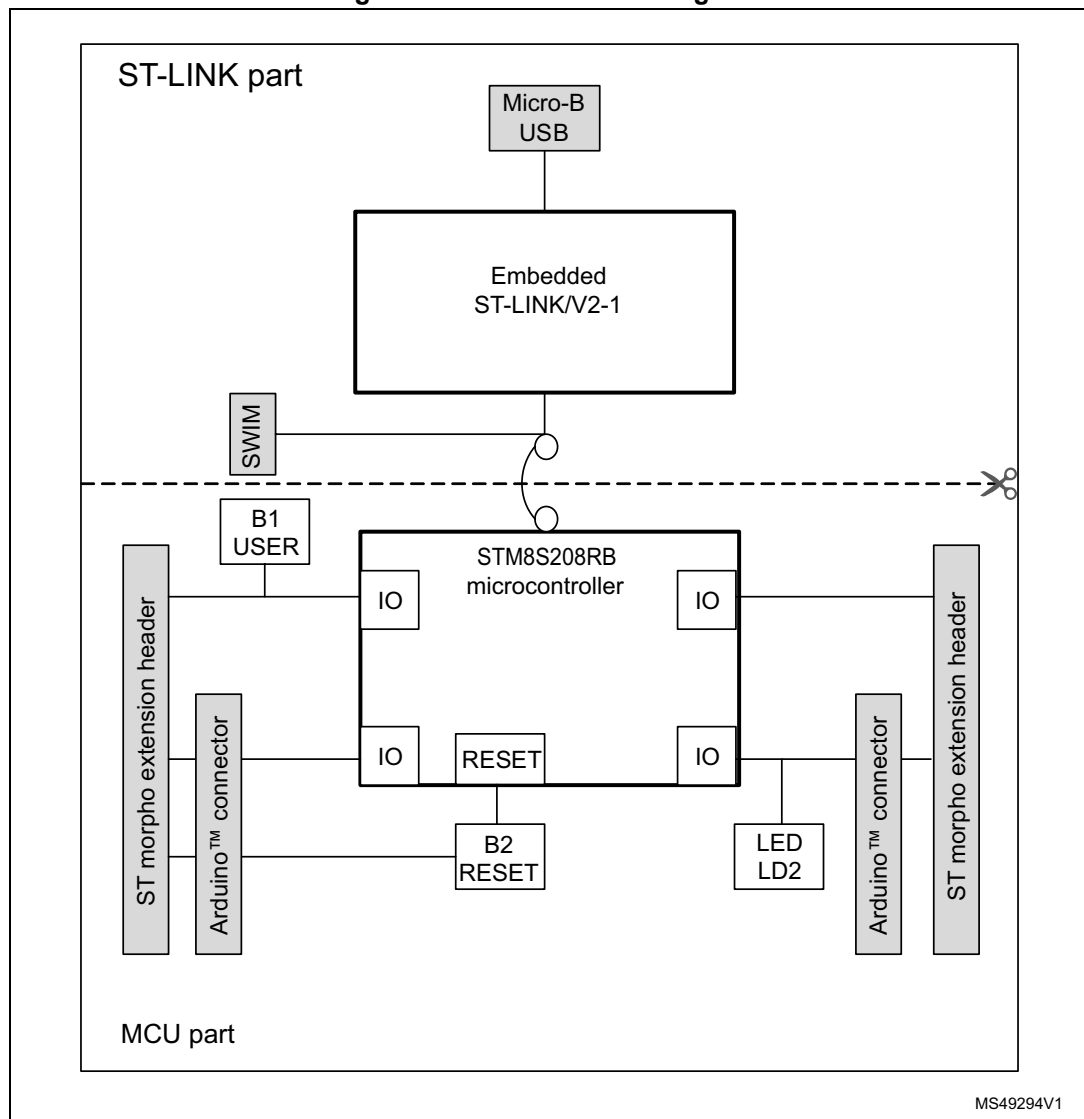


Figure 3. STM8S Nucleo board top layout

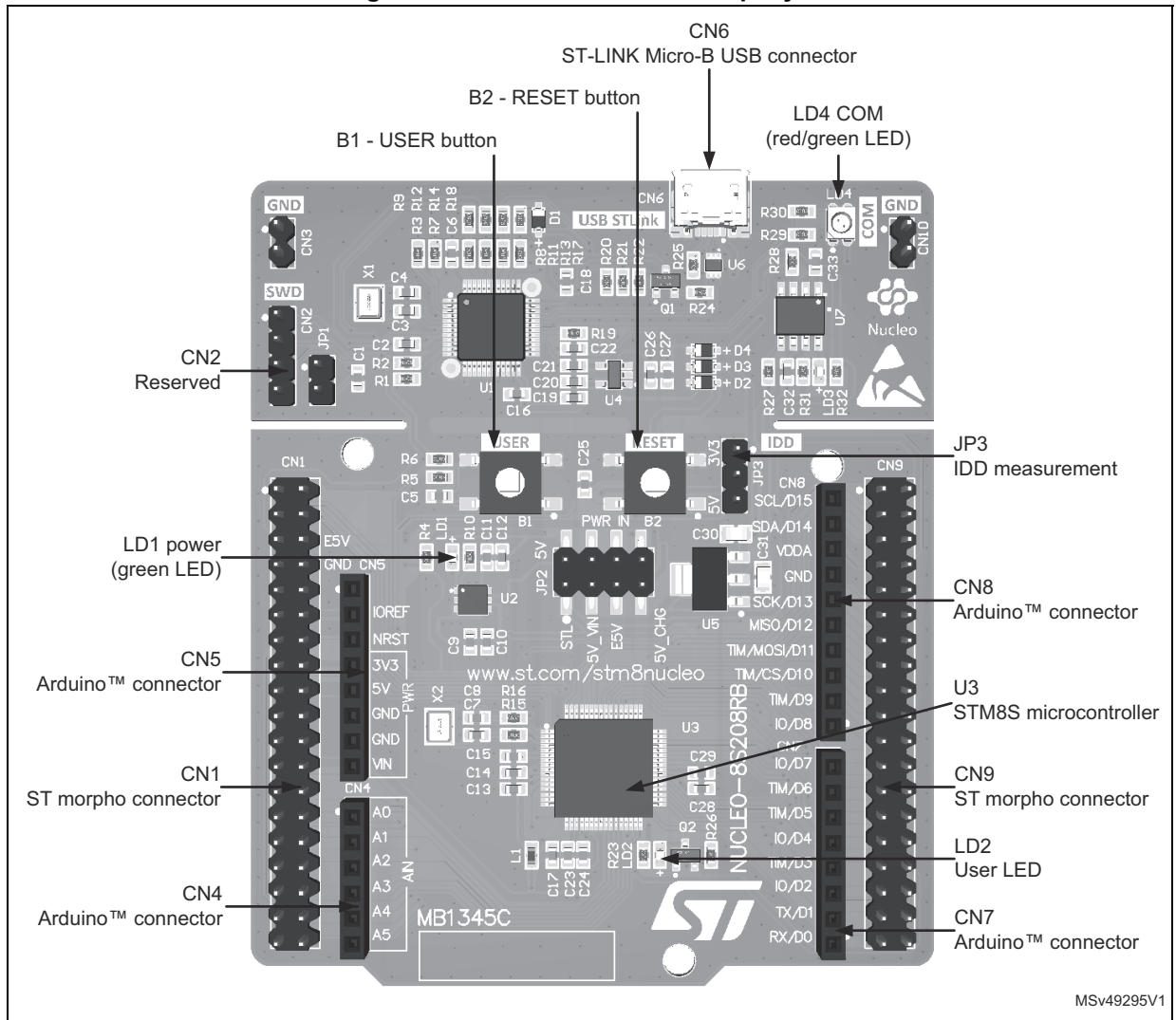


Figure 4. STM8S Nucleo board bottom layout

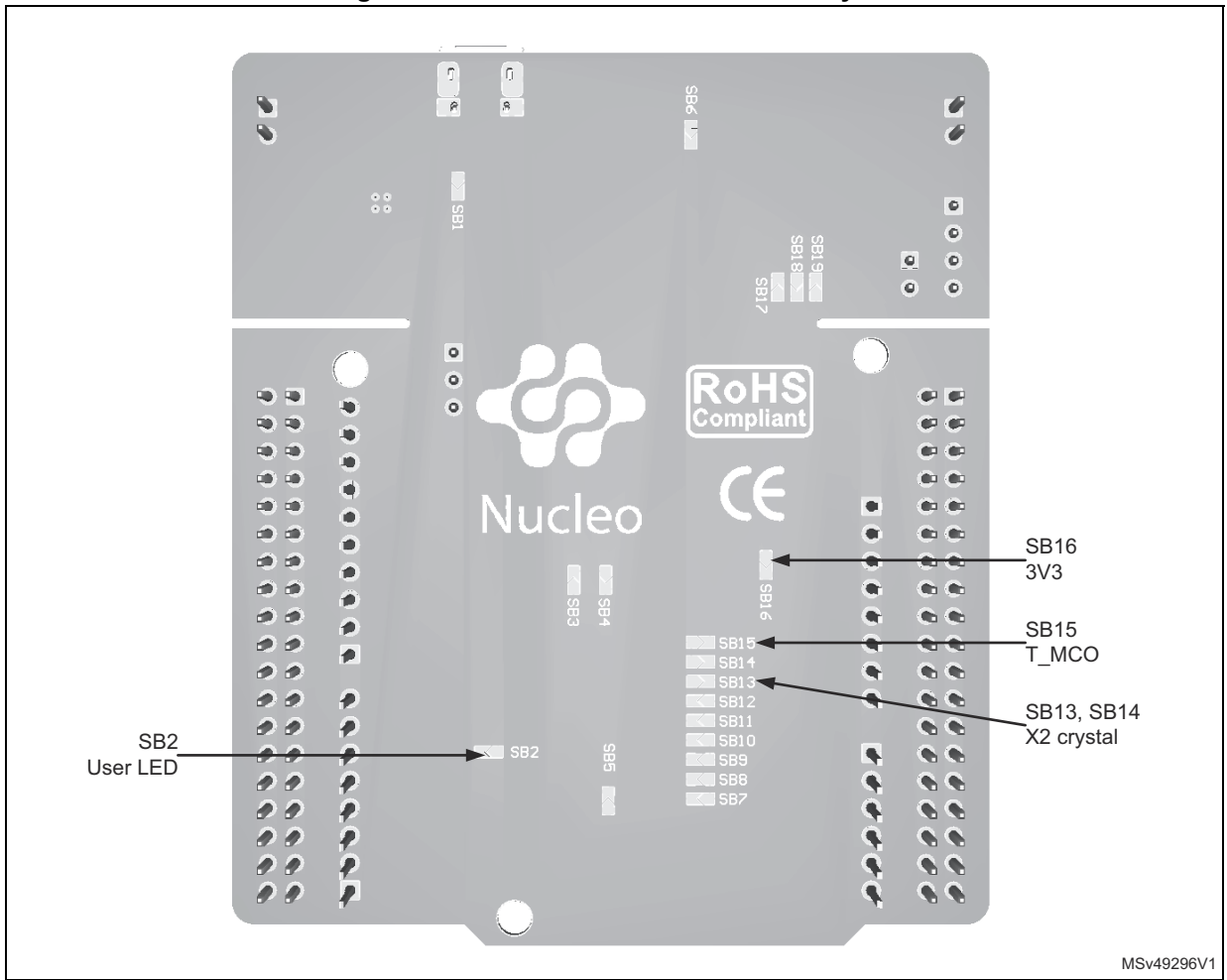
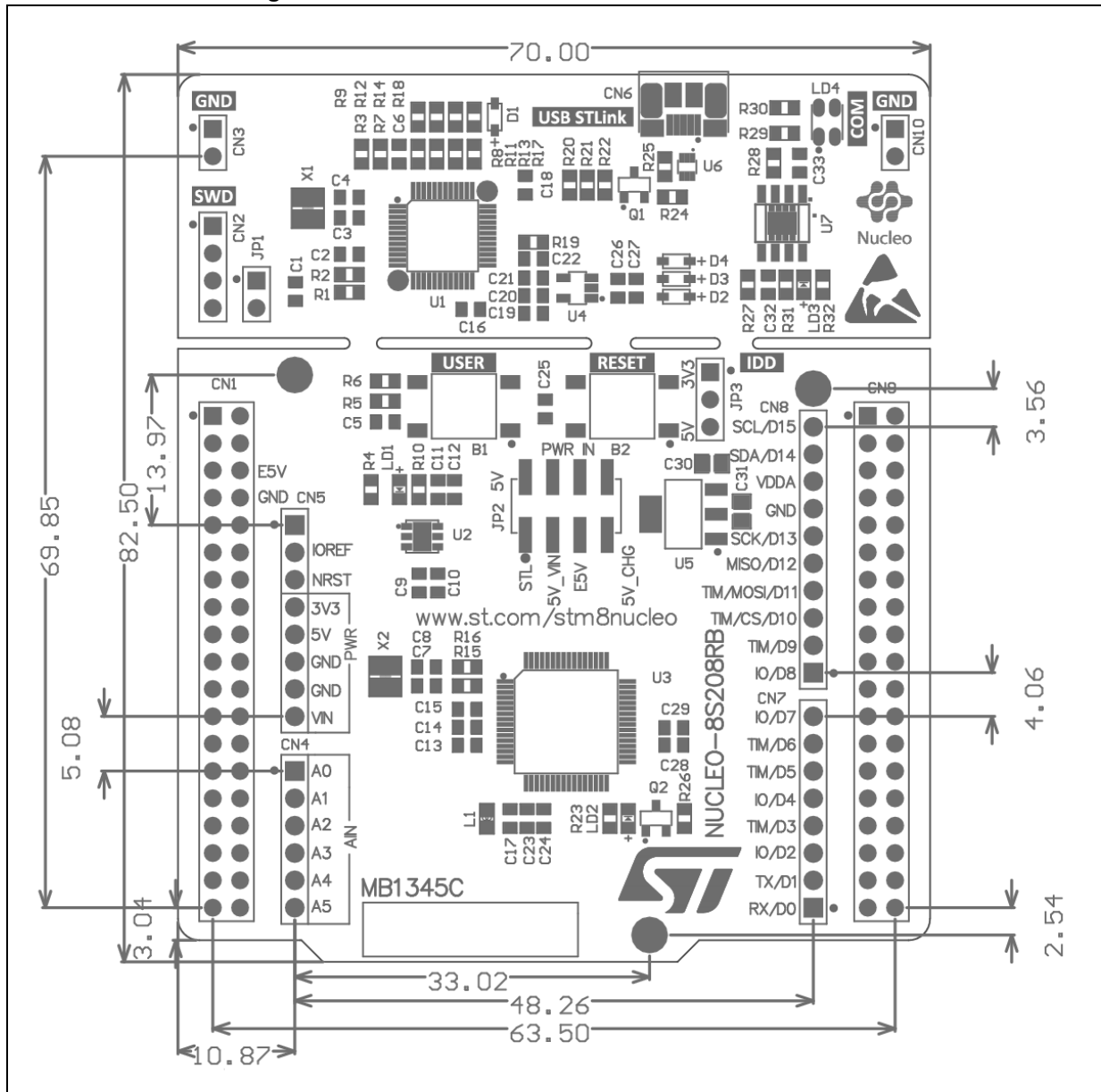


Figure 5. STM8S Nucleo board mechanical dimensions



All dimensions in millimeters.

### 6.1 Cuttable PCB

The STM8S Nucleo board is divided into two parts: ST-LINK part and target STM8S part. The ST-LINK part of the PCB can be cut out to reduce the board size. In this case the remaining target STM8S part can only be powered by VIN, E5V and 3V3 on ST morpho connector CN1 or VIN and 3V3 on Arduino™ connector CN5.

## 6.2 Embedded ST-LINK/V2-1

The ST-LINK/V2-1 programming and debugging tool is integrated in the STM8S Nucleo board.

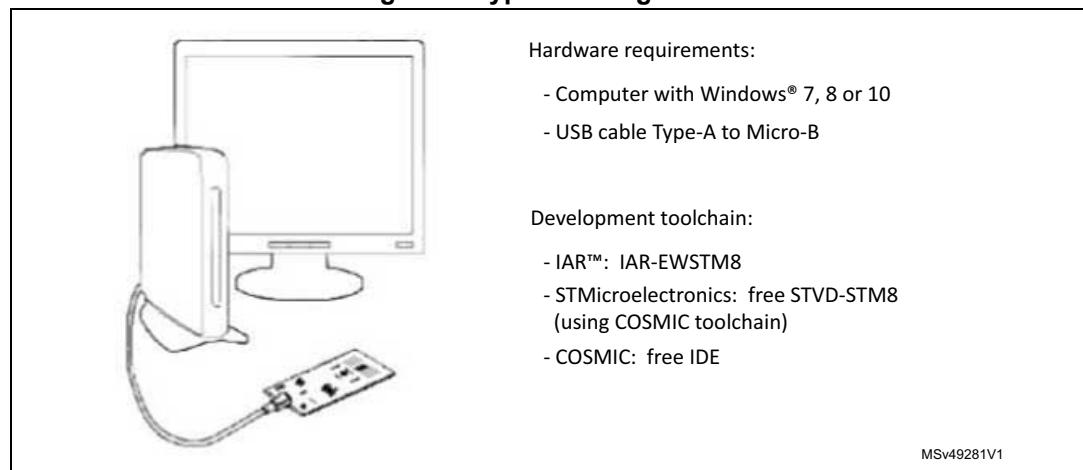
The embedded ST-LINK/V2-1 supports only SWIM for STM8S devices. For information about debugging and programming features refer to the *ST-LINK/V2 in-circuit debugger/programmer for STM8 and STM32* user manual (UM1075), which describes in details all the ST-LINK/V2 features.

The changes versus ST-LINK/V2 version are listed below.

- New features supported on ST-LINK/V2-1:
  - USB software re-enumeration
  - Virtual COM port interface on USB
  - Mass storage interface on USB
  - USB power management request for more than 100 mA power on USB
- Features not supported on ST-LINK/V2-1:
  - SWIM interface
  - Minimum supported application voltage limited to 3 V
- Known limitation:
  - Activating the readout protection on ST-LINK/V2-1 target prevents the target application from running afterwards. The target readout protection must be kept disabled on ST-LINK/V2-1 boards.

A typical hardware setup for using the embedded ST-LINK/V2-1 is shown in [Figure 6](#).

**Figure 6. Typical configuration**



### 6.2.1 Driver

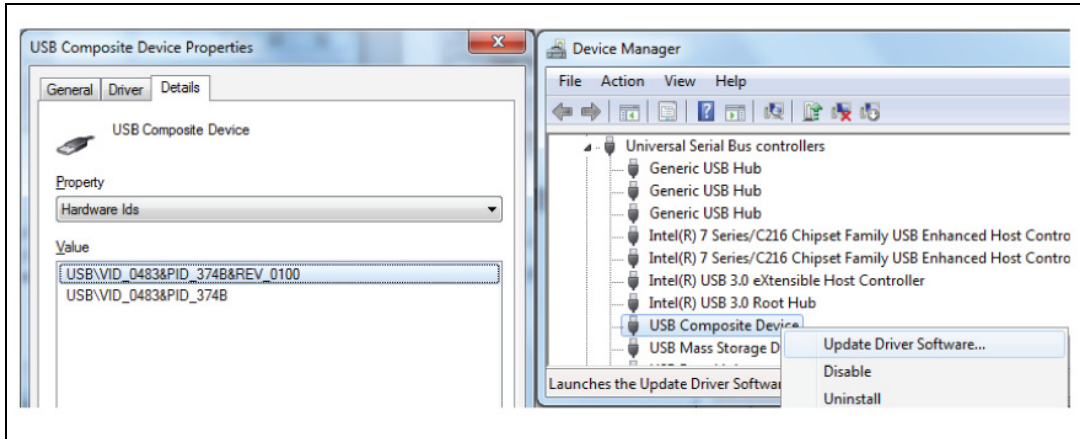
Before connecting the Nucleo-64 board to a Windows® 7, Windows® 8, or Windows® 10 PC via USB, a driver for ST-LINK/V2-1 must be installed. It can be downloaded from the [www.st.com](http://www.st.com) website.

In case the STM8S Nucleo-64 board is connected to the PC before installing the driver, the PC device manager may report some Nucleo interfaces as “Unknown”.

To recover from this situation, after installing the dedicated driver, the association of “Unknown” USB devices found on the STM8S Nucleo-64 board with this dedicated driver, must be updated in the device manager manually.

*Note:* It is recommended to proceed using USB Composite Device, as shown in [Figure 7](#).

**Figure 7. Updating the list of drivers in Device Manager**



### 6.2.2 ST-LINK/V2-1 firmware upgrade

The ST-LINK/V2-1 embeds a firmware upgrade mechanism for in-situ upgrade through the USB port. As the firmware may evolve during the life time of the ST-LINK/V2-1 product (for example new functionality, bug fixes, support for new microcontroller families), it is recommended to periodically visit [www.st.com](http://www.st.com) website before starting to use the STM8S Nucleo board in order to stay up-to-date with the latest firmware version.

## 6.3 Power supply and power selection

The power supply is provided either by the host PC through the USB cable, or by an external source: VIN (7 V - 12 V), E5V (5 V) or 3V3 power supply pins on CN5 or CN1. In case VIN, E5V or 3V3 is used to power the STM8S Nucleo board, using an external power supply unit or an auxiliary equipment, this power source must comply with the standard EN-60950-1: 2006+A11/2009, and must be Safety Extra Low Voltage (SELV) with limited power capability.

### 6.3.1 Power supply input from the USB connector

The ST-LINK/V2-1 supports USB power management allowing to request more than 100 mA current to the host PC.

All parts of the STM8S Nucleo board and shield can be powered from the ST-LINK USB connector CN6 (5V\_STLINK or 5V\_USB\_CHG). Note that only the ST-LINK part is power-supplied before the USB enumeration as the host PC only provides 100 mA to the board at that time. During the USB enumeration, the STM8S Nucleo board requires 300 mA of current to the host PC. If the host is able to provide the required power, the STM8S microcontroller is powered and the green LED LD1 is turned ON, thus the STM8S Nucleo board and its shield can consume a maximum of 300 mA current, not more. If the host is not able to provide the required current, the STM8S microcontroller and the MCU part including the extension board are not power supplied. As a consequence the green LED LD1 remains turned OFF. In such case, it is mandatory to use an external power supply as explained in [Section 6.3.2: External power supply inputs: VIN and E5V on page 16](#).

When the board is power supplied by USB (5V\_STLINK\_SW), a jumper must be connected between pin 1 and pin 2 of JP2 as shown in [Table 6: Power-related jumper on page 16](#).

SB6 is configured according to the maximum current consumption of the board when powered by USB (5V\_STLINK\_SW). The SB6 solder bridge can be set in case the board is powered by USB and the maximum current consumption on 5V\_STLINK\_SW does not exceed 100 mA (including an eventual extension board or Arduino™ shield). In such condition, USB enumeration will always succeed since no more than 100mA is requested to the PC. Possible configurations of SB6 are summarized in [Table 4](#).

**Table 4. SB9 configuration table**

Solder bridge state	Power supply	Allowed current
SB6 OFF	USB power through CN6	300 mA max
SB6 ON		100 mA max

---

**Warning:** If the maximum current consumption of the Nucleo and its extension boards exceeds 300 mA, it is mandatory to power the Nucleo using an external power supply connected to E5V or VIN.

---

*Note:* In case the board is powered by an USB charger, there is no USB enumeration, so led LD1 remains set to OFF permanently and the STM8S is not powered. In this specific case SB6 needs to be set to ON, thus allowing the STM8S to be powered anyway.

### 6.3.2 External power supply inputs: VIN and E5V

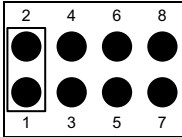
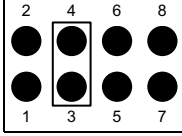
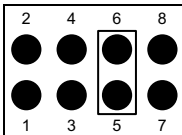
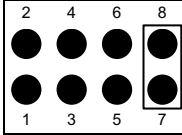
The external power sources VIN and E5V are summarized in the [Table 5](#). When the board is power supplied by VIN or E5V, the jumper configuration must be the following:

- VIN: jumper on JP2 pin 3 and pin 4
- E5V: jumper on JP2 pin 5 and pin 6
- Solder bridge SB6 OFF

**Table 5. External power sources**

Input power name	Connector pins	Voltage range	Max current	Limitation
VIN	CN5 pin 8 CN1 pin 24	7 V to 12 V	800 mA	From 7 V to 12 V only, and input current capability linked to input voltage: – 800 mA input current when $V_{in} = 7\text{ V}$ – 450 mA input current when $7\text{ V} < V_{in} \leq 9\text{ V}$ – 250 mA input current when $9\text{ V} < V_{in} < 12\text{ V}$
E5V	CN1 pin 6	4.75 V to 5.25 V	500 mA	-

**Table 6. Power-related jumper**

Jumper	Description
JP2	5V_STLINK_SW (ST-LINK VBUS) is used as power source when JP2 is set as shown below (Default setting). 
	5V_VIN is used as power source when JP2 is set as shown below. 
	E5V is used as power source when JP2 is set as shown below. 
	5V_USB_CHG is used as power source when JP2 is set as shown below. 



### Using VIN or E5V as external power supply

VIN or E5V can be used as external power supply in case the current consumption of the STM8S Nucleo and extensions boards exceeds the allowed current on USB. In this condition, it is still possible to use the USB for communication, for programming or debugging only, but it is mandatory to power supply the board first using VIN or E5V, and then connect the USB cable to the PC. Proceeding this way ensures that the enumeration occurs thanks to the external power source.

The following power sequence procedure must be respected:

1. Connect the jumper between pin 3 and pin 4 (VIN), or pin 5 and pin 6 (E5V) of JP2
2. Check that SB6 is OFF
3. Connect the external power source to VIN or E5V
4. Power on the external power supply  $7\text{ V} < \text{VIN} < 12\text{ V}$  to VIN, or 5 V for E5V
5. Check that LD1 is turned ON
6. Connect the PC to USB connector CN6

If this order is not respected, the board may be supplied by 5V\_STLINK first, then by VIN or E5V, and the following risks may be encountered:

1. If more than 300 mA current is needed by the board, the PC may be damaged or the current supply can be limited by the PC. As a consequence the board is not powered correctly.
2. 300 mA is requested at enumeration (since SB6 must be OFF) so a risk exists that the request is rejected and the enumeration does not succeed if the PC cannot provide such current. Consequently the board is not power supplied (LED LD1 remains OFF).

### 6.3.3 External power supply input: 3V3

It can be of interest to use the 3V3 (CN5 pin 4, or CN1 pin 16) directly as power input for instance in case the 3.3 V is provided by an extension board. When the STM8S Nucleo board is power supplied by 3V3, the ST-LINK is not powered, thus the programming and debug features are unavailable. The external power source 3V3 is summarized in [Table 7](#).

**Table 7. 3V3 external power source**

Input power name	Connectors pins	Voltage range	Limitation
3V3	CN5 pin 4 CN1 pin 16	3 V to 3.6 V	Used when the ST-LINK part of the PCB is cut off or SB16 is OFF.

Two different configurations are possible when using 3V3 to power the board:

- ST-LINK is removed (PCB cut).
- SB16 (3.3 V regulator) is OFF.

### 6.3.4 External power supply output

When powered by USB, VIN or E5V, the +5 V (CN5 pin 5 and pin 1 or CN1 pin 18) can be used as output power supply for an Arduino™ shield or an extension board. In this case, the maximum current of the power source specified in [Table 5 on page 16](#) must be respected.

The 3V3 (CN5 pin 4 or CN1 pin 16) can be used also as power supply output. The current is limited by the maximum current capability of the regulator U2 (1.2 A max).

## 6.4 LEDs

**COM LD4:** the tricolor LED (green, orange, red) LD4 (COM) provides information about ST-LINK communication status. LD4 default color is red. LD4 turns to green to indicate that communication is in progress between the PC and the ST-LINK/V2-1, with the following setup:

- Slow blinking Red/OFF: at power-on before USB initialization
- Fast blinking Red/OFF: after the first correct communication between the PC and ST-LINK/V2-1 (enumeration)
- Red LED ON: when the initialization between the PC and ST-LINK/V2-1 is complete
- Green LED ON: after a successful target communication initialization
- Blinking Red/Green: during communication with target
- Green ON: communication finished and successful
- Orange ON: Communication failure

**5 V ST-LINK LD3:** the red LED indicates that the current distribution could not be performed as expected.

**User LD2:** the green LED is a user LED connected to Arduino™ signal D13 corresponding to STM8S I/O PC5 (pin 11). Refer to [Table 11](#) when:

- the I/O is HIGH value, the LED is ON
- the I/O is LOW, the LED is OFF

**PWR LD1:** the green LED indicates that the STM8S part is powered and +5 V power is available.

## 6.5 Push-buttons

**B1 USER:** the user button is connected to the I/O PE4 (pin 52) of the STM8S microcontroller.

**B2 RESET:** this push-button is connected to T\_NRST, and is used to reset the STM8S microcontroller.

*Note: The blue and black plastic hats that are placed on the push-buttons can be removed if necessary, for example when a shield or an application board is plugged on top of the Nucleo board. This avoids pressure on the buttons and consequently a possible permanent STM8S reset.*

## 6.6 JP1 (T\_NRST) and JP3 (IDD)

Jumper JP1 is not fitted and there is no incidence on STM32F103CBT6 (ST-LINK MCU) T\_NRST signal. When JP1 is connected, STM32F103CBT6 (ST-LINK MCU) T\_NRST signal is connected to GND. The STM32F103CBT6 is forced in reset state.

Jumper JP3, labeled IDD, is used to measure the STM8S microcontroller consumption by removing the jumper and by connecting an ammeter:

- Jumper ON: STM8S microcontroller is powered (default).
- Jumper OFF: an ammeter must be connected to measure the STM8S microcontroller current. If there is no ammeter, the STM8S microcontroller is not powered.

It is possible to select VDD to allow power supply of MCU in 3V3 or 5V:

- 3V3: pin 1 and 2 of JP3
- 5V: pin 2 and 3 of JP3

## 6.7 OSC clock supply

There are four ways to configure the pins corresponding to the external high-speed clock (HSE):

- **MCO from ST-LINK:** MCO output of ST-LINK MCU is used as input clock. This frequency cannot be changed, it is fixed at 8 MHz and connected to PA1 of the STM8S microcontroller.

The following configuration is needed:

- SB14 OFF and S13 ON
- SB15 ON
- R15 and R16 removed

- **HSE oscillator on-board from X2 crystal (not provided):** for typical frequencies and their capacitors and resistors, refer to the STM8S microcontroller datasheet. The X2 crystal has the following characteristics: 8 MHz, 8 pF, and 50 ppm. It is recommended to use NX3225GD-8Mhz-EXS00A-CG04874 manufactured by NDK.

The following configuration is needed:

- SB13 and SB14 OFF
- R15 and R16 soldered
- C7 and C8 soldered with 12 pF capacitors
- SB15 OFF

- **Oscillator from external PA1:** from an external oscillator through pin 23 of the CN1 connector.

The following configuration is needed:

- SB14 ON
- SB15 OFF
- R15 and R16 removed

- **HSE not used:** PA1 and PA2 are used as GPIOs instead of clock

The following configuration is needed:

- SB13 and SB14 ON
- SB15 (MCO) OFF
- R15 and R16 removed

## 6.8 USART communication

The USART3 interface available on PD5 and PD6 of the STM8S microcontroller is connected to ST morpho and Arduino™ connectors on D0 and D1. USART connection is detailed in [Table 8](#).

**Table 8. USART connection**

USART name	STM8S pin	ST morpho pin	Arduino™ connector
USART3_TX	PD5	35	D1
USART3_RX	PD6	37	D0

By default, the USART communication between the STM8S and STLINK-MCU is enabled, in order to support virtual COM port (SB11, SB12 OFF and SB17, SB19 ON).

If pins PA4 and PA5 are needed for any others applications as GPIO, SB11 and SB12 must be ON, and SB17, SB19 must be OFF. In this case, the configuration is as shown in [Table 9](#).

**Table 9. STM8S configuration of pins PE3 and PE4**

STM8S GPIO	Solder Bridge STM8S side	Solder Bridge STLINK side
PA4 & PA5 inactive	SB11,SB12 OFF	SB17, SB19 ON
PA4 & PA5 active	SB11,SB12 ON	SB17, SB19 OFF

## 6.9 Solder bridges

**Table 10. Solder bridges**

Bridge	State <sup>(1)</sup>	Description
SB1	ON	5V_USB_CHG is active.
	OFF	5V_USB_CHG is not active.
SB2 (LD2-LED)	ON	Green user LED LD2 is connected to D13 of Arduino™.
	OFF	Green user LED LD2 is not connected.
SB3	ON	B1 push button is connected to PE4.
	OFF	B1 push button is not connected to PE4.
SB4	ON	PD1 is connected.
	OFF	PD1 is not connected: T_SWIM is disconnected from target.
SB5	ON	GND is connected to AGND.
	OFF	GND is not connected to AGND.
SB6	ON	USB power through CN6 allowed (100 mA max).
	OFF	USB power through CN6 allowed (300 mA max).

Table 10. Solder bridges (continued)

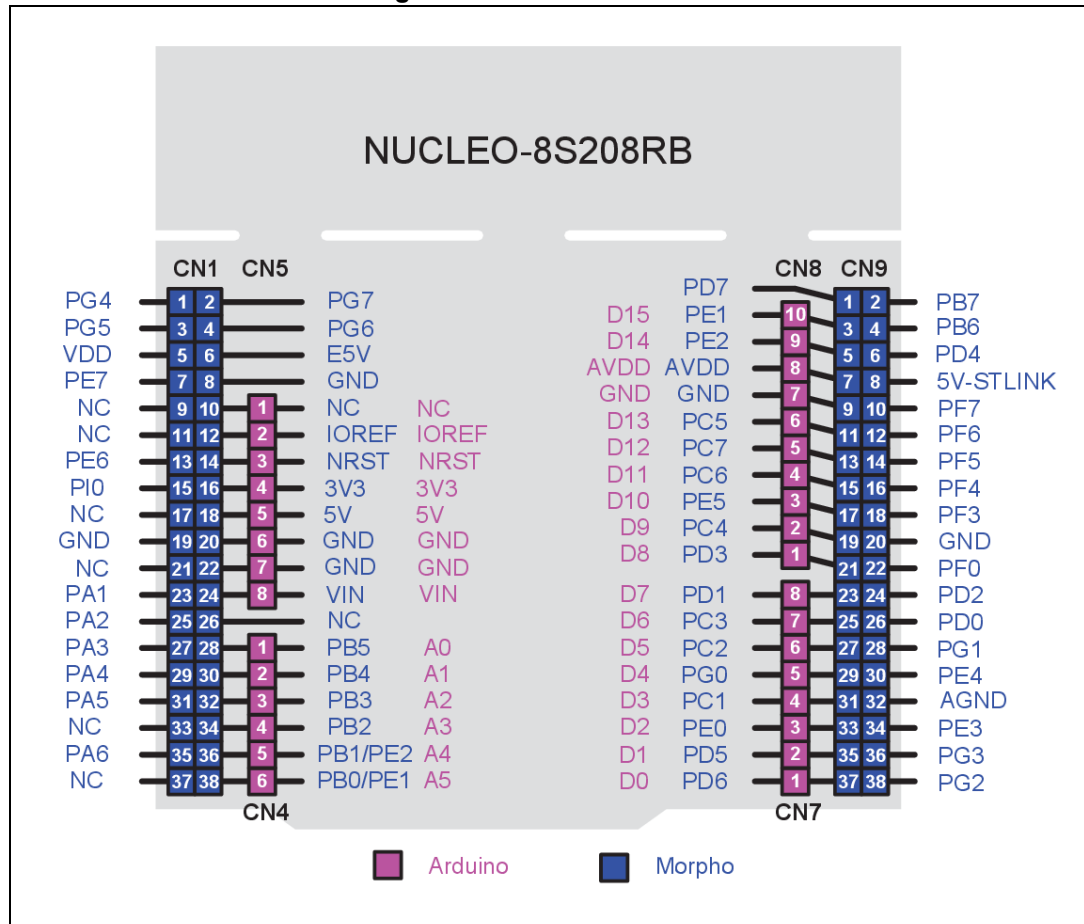
Bridge	State <sup>(1)</sup>	Description
SB7, SB9 (ADC on A4 and A5)	<b>ON</b>	PB1 (ADC in) is connected to A4 and PB0 is connected to A5 (pin 5 and pin 6) on Arduino™ connector CN4 and ST morpho connector CN1 (pin 36 and pin 38). Thus SB8 and SB10 must be OFF.
	OFF	PB1 (ADC in) is disconnected from A4 and PB0 (ADC in) is disconnected from A5 (pin 5 and pin 6) on Arduino™ connector CN4 and ST morpho connector CN1 (pin 36 and pin 38).
SB8, SB10 (I <sup>2</sup> C on A4 and A5)	<b>ON</b>	PE1 (I <sup>2</sup> C) is connected to A5 and PE2 (I <sup>2</sup> C) is connected to A4 (pin 5 and pin 6) on Arduino™ connector CN4 and ST morpho connector CN1 (pin 36 and pin 38) as I <sup>2</sup> C signals. Thus SB7 and SB9 must be OFF.
	<b>OFF</b>	PE1 (I <sup>2</sup> C) is disconnected from A5 and PE2 (I <sup>2</sup> C) is disconnected from A4 (pin 5 and pin 6) on Arduino™ connector CN4 and ST morpho connector CN1 (pin 36 and pin 38).
SB11, SB12	<b>ON</b>	PA4 and PA5 (pin 10 and pin 11) connected to CN1.
	<b>OFF</b>	PA4 and PA5 (pin 10 and pin 11) disconnected from CN1.
SB13, SB14 (X2 crystal)	<b>ON</b>	PA1 and PA2 (pin 2 and pin 3) are connected to CN1 (pin 23 and pin 25) (R15, R16 and SB15 must not be fitted).
	<b>OFF</b>	X2, C7, C8, R15 and R16 provide a clock as shown in <a href="#">Appendix A: Electrical schematics on page 29</a> . PA1 and PA2 (pin 2 and pin 3) are disconnected from CN1 (pin 23 and pin 25).
SB15 (T_MCO)	<b>ON</b>	MCO on STM32F103CBT6 (ST-LINK MCU) is connected to PA1 on STM8S.
	OFF	MCO on STM32F103CBT6 (ST-LINK MCU) is disconnected from PA1 on STM8S.
SB16	<b>ON</b>	Output of voltage regulator LDL112PV33R is connected to 3V3.
	OFF	Output of voltage regulator LDL112PV33R is not connected.
SB17, SB19 (ST-LINK-USART)	<b>ON</b>	PA2 and PA3 on STM32F103CBT6 (ST-LINK MCU) are connected respectively to PA4 and PA5 (pin 10 and pin 11) on STM8S to have USART communication between them. Thus SB12 and SB11 must be OFF.
	OFF	PA2 and PA3 on STM32F103CBT6 (ST-LINK MCU) are disconnected from respectively PA4 and PA5 (pin 10 and pin 11) on STM8S.
SB18	<b>ON</b>	Reserved.
	<b>OFF</b>	Reserved.

1. The default SB state is shown in bold.

## 6.10 Extension connectors

Figure 8 shows the signals connected by default to Arduino™ Uno V3 connectors (CN4, CN5, CN7, CN8) and to ST morpho connector (CN1 and CN9), for STM8S208RBT6 Nucleo board.

Figure 8. NUCLEO-8S208RB



## 6.11 Arduino™ connectors

CN4, CN5, CN7 and CN8 are female connectors compatible with the Arduino™ standard. Most shields designed for Arduino™ can fit the STM8S Nucleo board.

The Arduino™ connectors on STM8S Nucleo board support Arduino™ Uno V3.

For compatibility with Arduino™ Uno V1, apply the following modifications:

- SB8 and SB10 ON,
- SB7 and SB9 OFF to connect I<sup>2</sup>C on A4 (pin 5) and A5 (pin 6 of CN4).

**Caution 1:** The I/Os of the STM8S microcontroller are 3.3 V-compatible instead of 5 V for Arduino™ Uno V3.

*Table 11* shows the pin assignment of the STM8S microcontroller on Arduino™ connectors.

**Table 11. Arduino™ connectors on NUCLEO-8S208RB**

Connector	Pin	Pin name	STM8S pin	Function
Left connectors				
CN5 power	1	+5V_VIN	-	5 V input
	2	IOREF	-	3.3 V Ref
	3	RESET	T_NRST	RESET
	4	3V3	-	3.3 V input/output
	5	+5V	-	5 V output
	6	GND	-	ground
	7	GND	-	ground
	8	VIN	-	Power input
CN4 analog	1	A0	PB5	Analog input 5
	2	A1	PB4	Analog input 4
	3	A2	PB3	Analog input 3
	4	A3	PB2	Analog input 2
	5	A4	PE2 or PB1 <sup>(1)</sup>	I2C1_SDA (PE2) or Analog input 1 (PB1)
	6	A5	PE1 or PB0 <sup>(1)</sup>	I2C_SCL (PE1) or Analog input 0 (PB0)

**Table 11. Arduino™ connectors on NUCLEO-8S208RB (continued)**

Connector	Pin	Pin name	STM8S pin	Function
Right connectors				
CN8 digital	10	D15	PE1	I2C_SCL
	9	D14	PE2	I2C_SDA
	8	AREF	-	VDDA
	7	GND	-	ground
	6	D13	PC5	SPI1_SCK
	5	D12	PC7	SPI1_MISO
	4	D11	PC6	SPI1_MOSI
	3	D10	PE5	SPI1_NSS
	2	D9	PC4	TIM_CH4
	1	D8	PD3	TIM2_CH2
CN7 digital	8	D7	PD1	SWIM
	7	D6	PC3	TIM1_CH3
	6	D5	PC2	TIM1_CH2
	5	D4	PG0	CAN_TX
	4	D3	PC1	TIM1_CH1
	3	D2	PE0	CLK_CCO
	2	D1	PD5	UART3_TX
	1	D0	PD6	UART3_RX

1. Refer to [Table 10: Solder bridges](#) for details.



## 6.12 ST morpho connector

The ST morpho connector consists in male pin headers (CN1 and CN9) accessible on both sides of the board. They can be used to connect the STM8S Nucleo board to an extension board or a prototype/wrapping board placed on top or on bottom side of the STM8S Nucleo board. All signals and power pins of the STM8S are available on the ST morpho connector. This connector can also be probed by an oscilloscope, logical analyzer or voltmeter.

[Table 12](#) shows the pin assignments of the STM8S on the ST morpho connector.

**Table 12. ST morpho connector on NUCLEO-8S208RB**

CN1 odd pins		CN1 even pins		CN9 odd pins		CN9 even pins	
Pin	Name	Name	Pin	Pin	Name	Name	Pin
1	PG4	PG7	2	1	PD7	PB7	2
3	PG5	PG6	4	3	PE1	PB6	4
5	VDD	E5V	6	5	PE2	PD4	6
7	PE7	GND	8	7	VDDA	5V_STLINK <sup>(1)</sup>	8
9	-	-	10	9	GND	PF7	10
11	-	IOREF VDD	12	11	PC5	PF6	12
13	PE6	RESET T_NRST	14	13	PC7	PF5	14
15	PI0	3V3	16	15	PC6	PF4	16
17	-	+5V	18	17	PE5	PF3	18
19	GND	GND	20	19	PC4	GND	20
21	-	GND	22	21	PD3	PF0	22
23	PA1	VIN	24	23	PD1	PD2	24
25	PA2	-	26	25	PC3	PD0	26
27	PA3	PB5	28	27	PC2	PG1	28
29	PA4	PA4	30	29	PG0	PE4	30
31	PA5	PB3	32	31	PC1	AGND	32
33	-	PB2	34	33	PE0	PE3	34
35	PA6	PE2 or PB1 <sup>(2)</sup>	36	35	PD5	PG3	36
37	-	PE1 or PB0 <sup>(2)</sup>	38	37	PD6	PG2	38

1. 5V\_STLINK is 5 V power from ST-LINK/V2-1 USB connector and it rises before +5V.

2. Refer to [Table 10: Solder bridges](#) for details.

## 7 Product history and limitations

### 7.1 Identification

The sticker located on the top of the PCB shows the information about the STM8S Nucleo-64 board product identification such as board reference, revision and serial number. The format of the identification is the following:

- *Bxxxx p-bb*: The board reference is MB1345, *p* corresponds to the PCB revision and *bb* to the BOM revision: for example C-02 stands for PCB revision C and BOM revision 02.
- *yywwnnnn*: *yy* are the two last digits of the manufacturing year, *ww* identifies the manufacturing week and *nnnn* is the board serial number.

### 7.2 Board revision history

#### Revision C-02

Revision C-02 of the STM8S208RBT6-based Nucleo-64 board is the initial released version.

### 7.3 Known limitations

#### Revision C-02

It is recommended, when measuring the IDD current, to take into account the fact that ST-LINK pins must be isolated. Otherwise, it is necessary to put a jumper on JP1 when performing such measurement.

## 8 CE Compliance Statement

### 8.1 Electromagnetic compatibility and immunity

The sample examined is in conformance with the requirements of below standards:

- EN 55032:2015
- EN 61000-3-2:2014
- EN 61000-3-3:2013
- EN 55024:2010 +A1:2015

## 9 FCC Compliance Statement

### 9.1 Part 15.19

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.

### 9.2 Part 15.105

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 instruction, 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 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

### 9.3 Part 15.21

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.

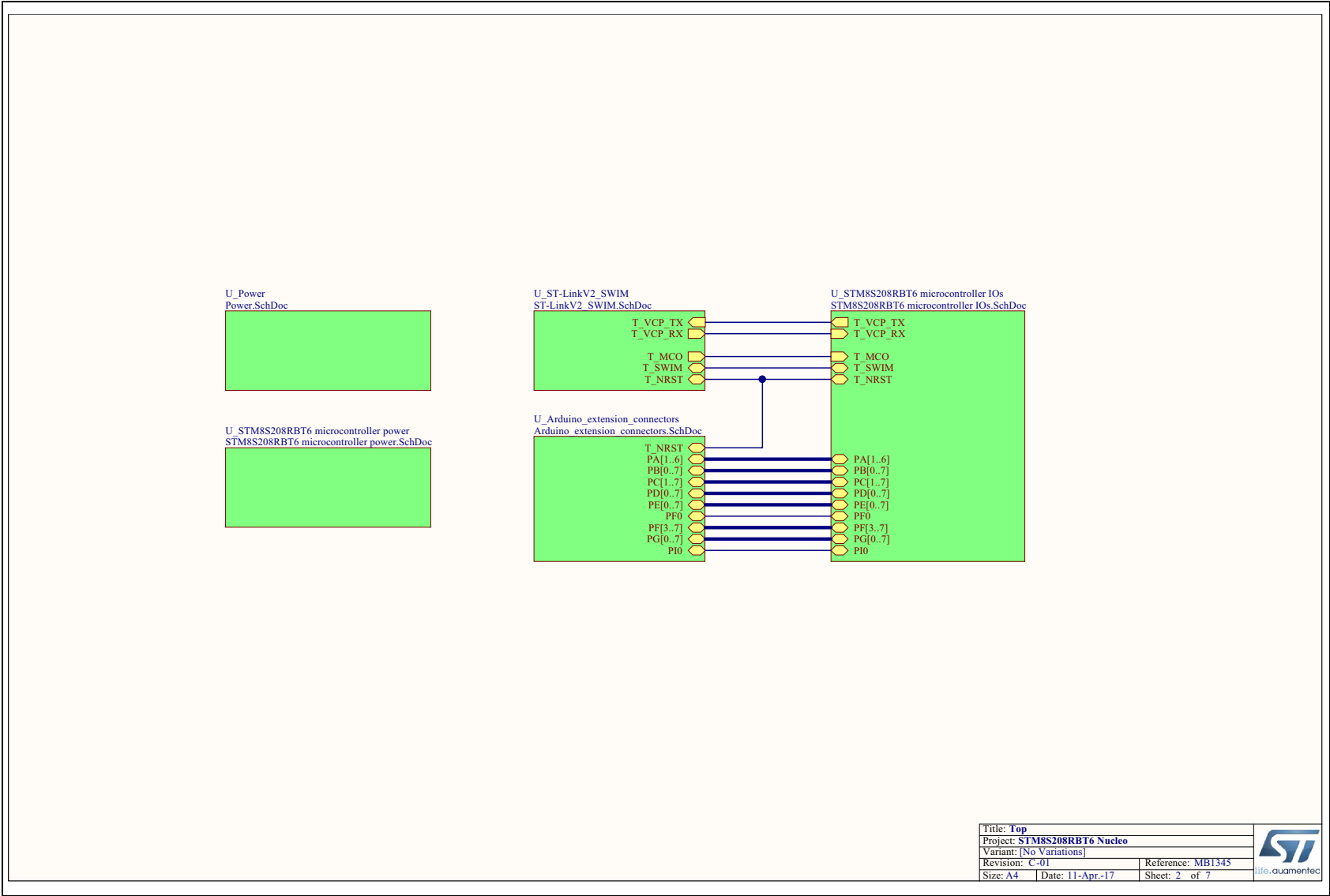
## Appendix A    Electrical schematics

This appendix presents the electrical schematics of the STM8S Nucleo-64 board:

- [Figure 9: STM8S Nucleo board top schematics](#)
- [Figure 10: STM8S I/Os](#)
- [Figure 11: STM8S power](#)
- [Figure 12: Arduino™ extension connectors](#)
- [Figure 13: Nucleo power](#)
- [Figure 14: ST-LINK/V2 SWIM](#)



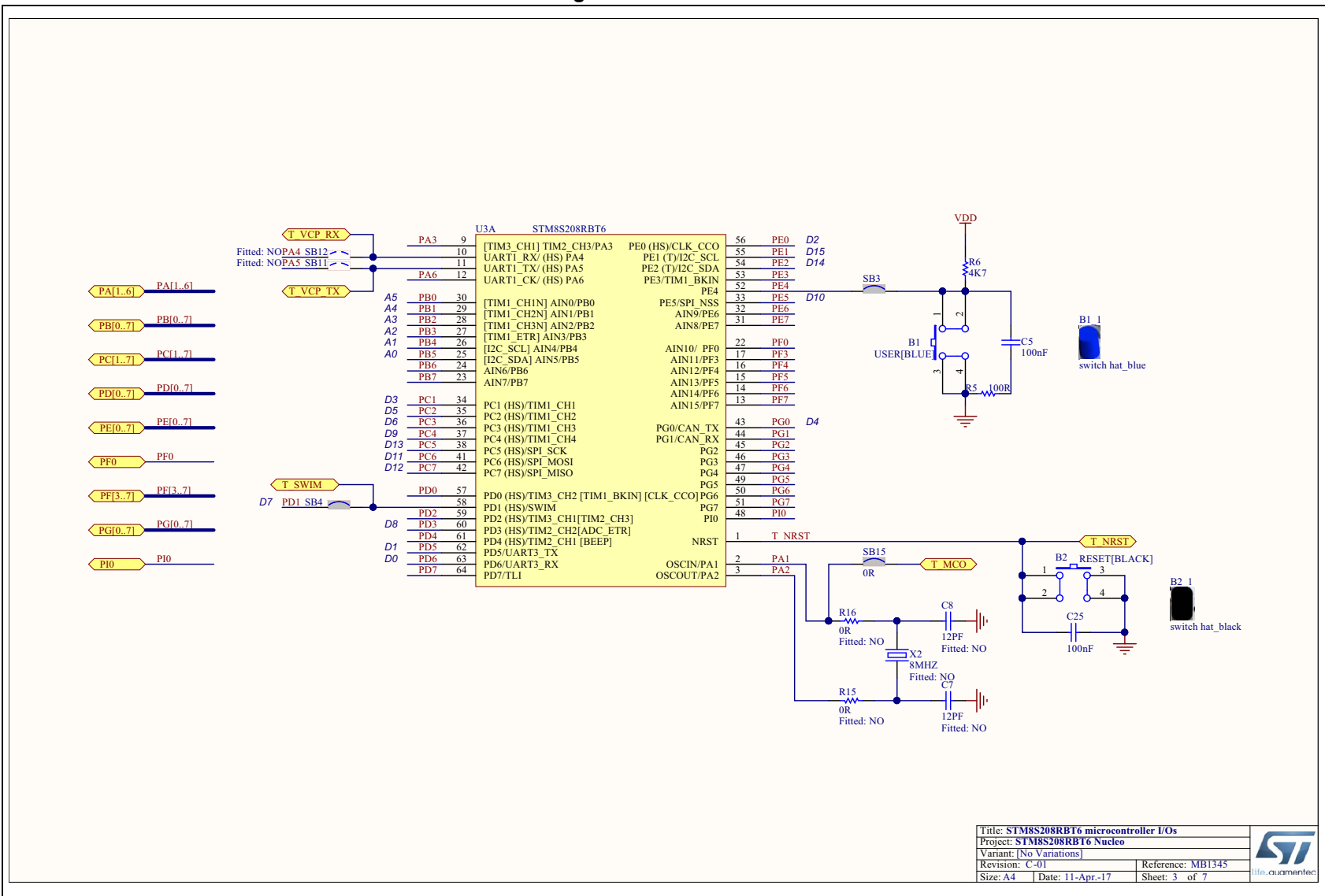
Figure 9. STM8S Nucleo board top schematics



Title: Top	
Project: STM8S208RBT6 Nucleo	
Variant: [No Variations]	
Revision: C-01	Reference: MB1345
Size: A4	Date: 11-Apr.-17
Sheet: 2 of 7	

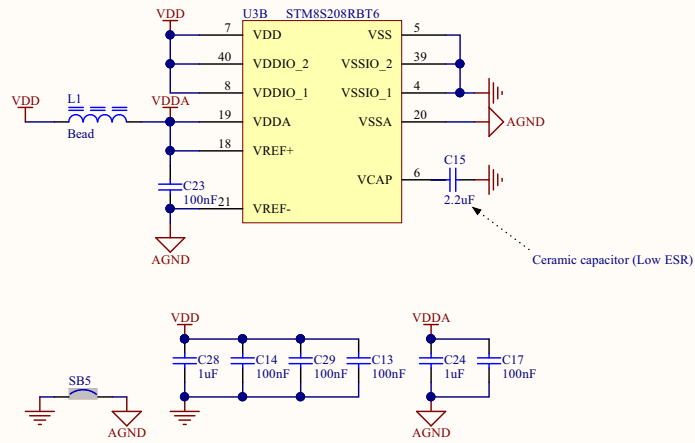


Figure 10. STM8S I/Os



Title: STM8S208RBT6 microcontroller I/Os		
Project: STM8S208RBT6 Nucleo		
Variant: [No Variations]		
Revision: C-01	Reference: MB1345	
Size: A4	Date: 11-Apr-17	Sheet: 3 of 7

Figure 11. STM8S power




Title: STM8S208RBT6 microcontroller power			 stmicroelectronics.com
Project: STM8S208RBT6 Nucleo			
Variant: [No Variations]			
Revision: C-01	Reference: MBI345		
Size: A4	Date: 11-Apr-17	Sheet: 4 of 7	



Figure 12. Arduino™ extension connectors

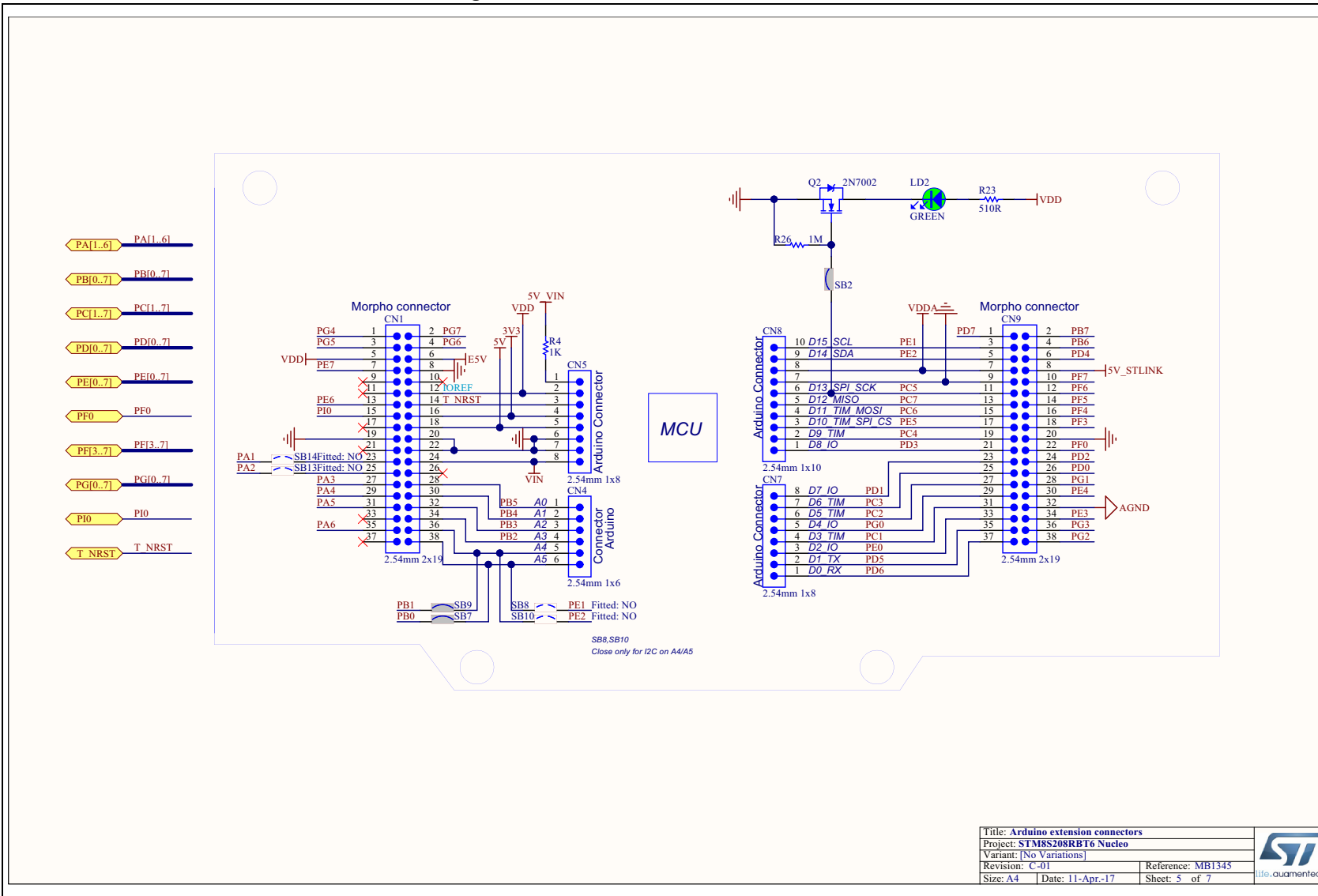
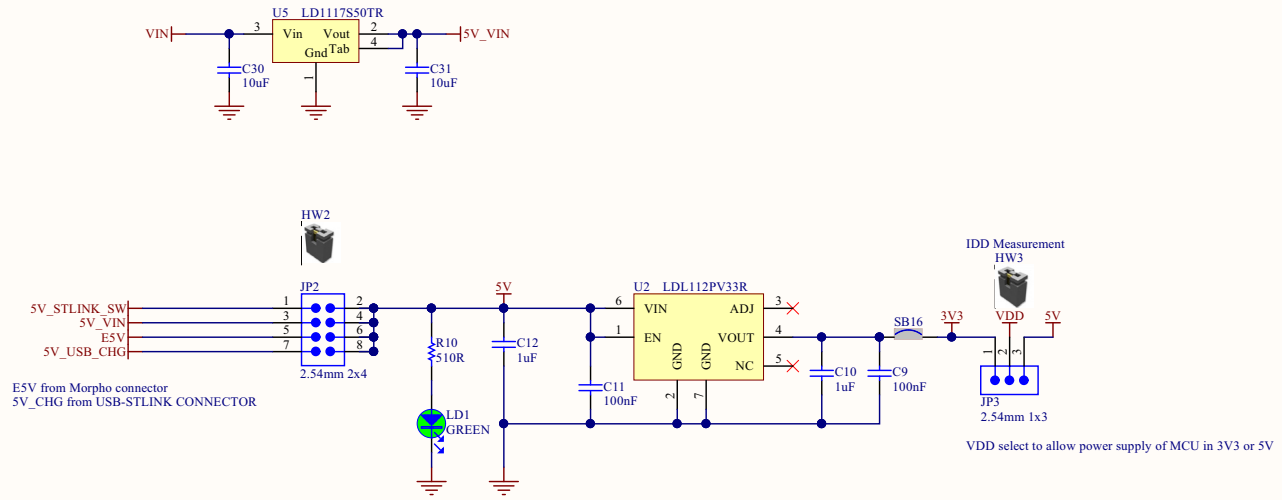


Figure 13. Nucleo power



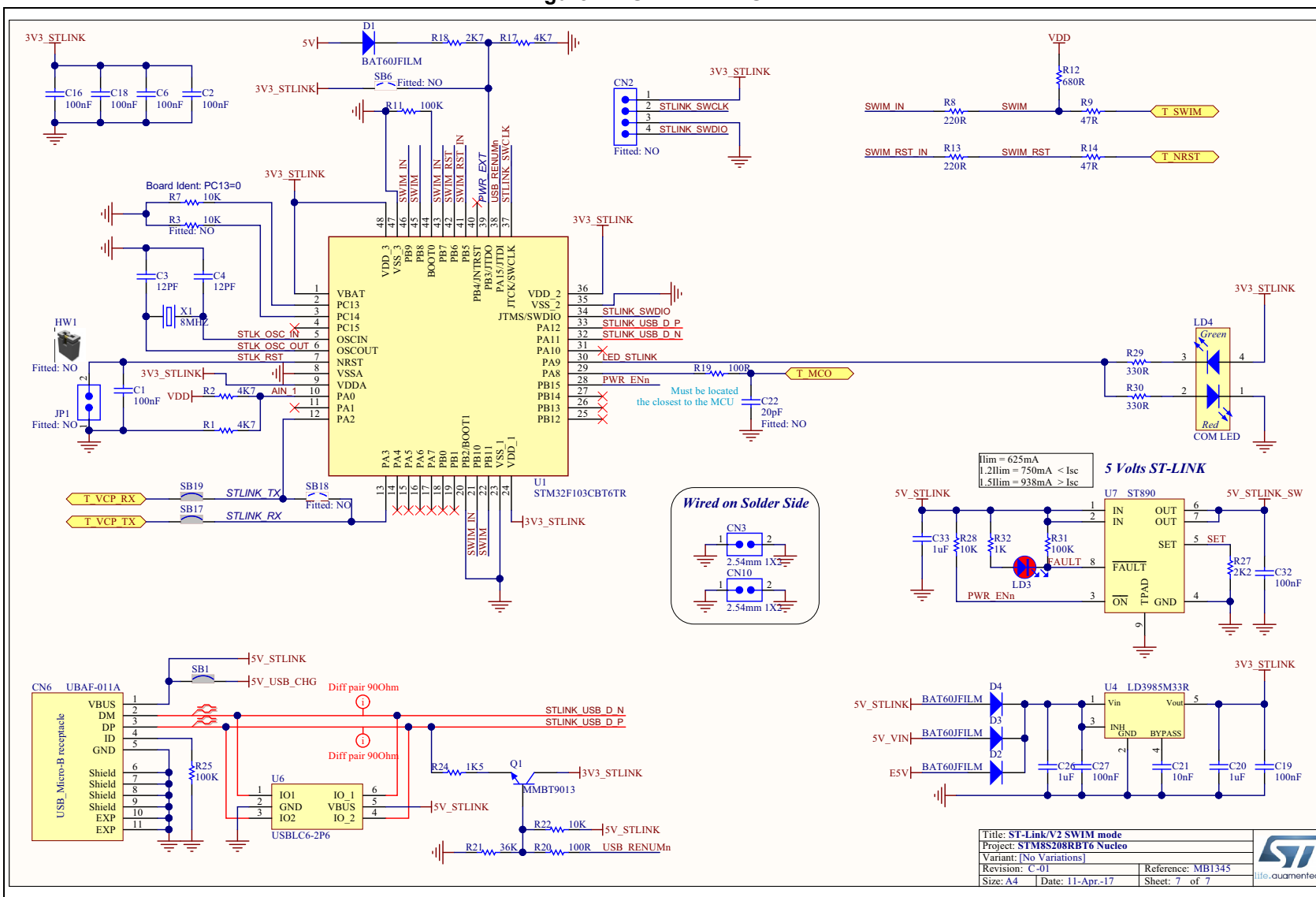
Title: Power	
Project: STM8S208RB16 Nucleo	
Variant: [No Variations]	
Revision: C-01	Reference: MBI345
Size: A4	Date: 11-Apr.-17
Sheet: 6 of 7	



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Figure 14. ST-LINK/V2 SWIM



Title: ST-Link/V2 SWIM mode		
Project: STM32408RFB16 Nucleo		
Variant: [No Variations]		
Revision: C-01	Reference: MB1345	
Size: A4	Date: 11-Apr-17	Sheet: 7 of 7

## Revision history

**Table 13. Document revision history**

Date	Revision	Changes
3-May-2018	1	Initial release.

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