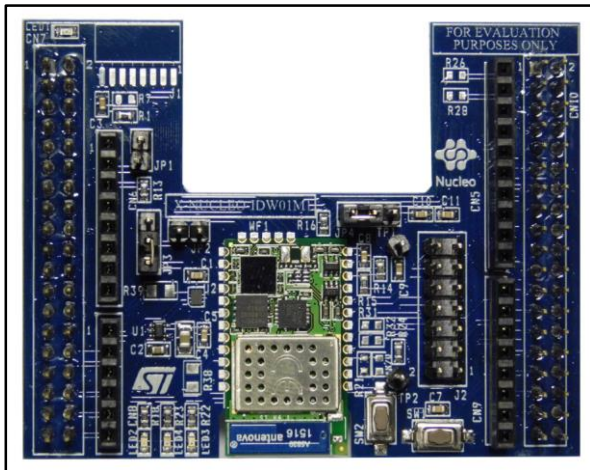


## Wi-Fi expansion board based on SPWF01SA module for STM32 Nucleo

Data brief



- equipped both with ST morpho connector and Arduino UNO R3 connectors
- scalable solution; it can cascade multiple boards for larger systems
- free development firmware library and examples, compatible with STM32Cube
- RoHS compliant

### Description

The X-NUCLEO-IDW01M1 is a Wi-Fi evaluation board based on the SPWF01SA module, which expands the STM32 Nucleo boards. The CE, IC and FCC certified SPWF01SA module has an embedded STM32 MCU, a low-power Wi-Fi b/g/n SoC with integrated power amplifier and power management and an SMD antenna. The SPWF01SA module is also equipped with 1 MByte of external FLASH for firmware update over-the-air (FOTA). The firmware features a complete software IP stack to open up to 8 TCP/UDP sockets, as well as dynamic web pages with SSI to interact with the module and a REST API (get & post) for conveniently transferring files to/from servers in the cloud. The module can simultaneously behave as a socket server and socket client. The firmware supports secure sockets with TLS/SSL encryption, ensuring secure end-to-end communications with the cloud, with or without authentication. The module operates as a client STA, IBSS, or miniAP (with up to 5 client STAs). The X-NUCLEO-IDW01M1 interfaces with the MCU on the STM32 Nucleo board via the UART serial port; the user can easily access the stack functions using the AT command. X-NUCLEO-IDW01M1 is compatible with both the ST morpho and Arduino UNO R3 connector layout.

### Features

- X-NUCLEO-IDW01M1 hosts FCC, IC and CE certified SPWF01SA module (FCC ID: VRA-SG9011203, IC: 7420A-SG9011203 and ETSI compliant)
- SPWF01SA module major characteristics:
  - low power IEEE 802.11 b/g/n transceiver
  - integrated SMD antenna
  - STM32 ARM Cortex-M3, with 64 KB RAM and 512KB FLASH memory
  - 1 MByte extended flash for FW update over the air (FOTA)
  - integrated protocol stacks: TCP/IP, TLS/SSL
  - application layer functions: web server supporting dynamic web pages, REST API to get & post web content
  - WEP/WPA/WPA2 personal security
  - system modes: station, IBSS, and miniAP
  - 16 configurable GPIOs available
  - simple AT command set host interface through UART
- compatible with STM32 Nucleo boards



# 1 Radio certification

## 1.1 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 radiates radio frequency energy. The radio frequency energy produced by this device is well below the maximum exposure limit established by the Federal Communications Commission (FCC).

The X-NUCLEO-IDW01M1 contains the FCC certified SPWF01SA module (FCC ID: VRA-SG9011203).

## 1.2 Formal notices required by Industry Canada (IC)

### English:

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.

### French:

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.

The X-NUCLEO-IDW01M1 contains the IC certified SPWF01SA module (IC: 7420A-SG9011203)

## 1.3 Formal notices required by the ETSI (CE)

This module complies with the following European EMI/EMC and safety directives and standards:

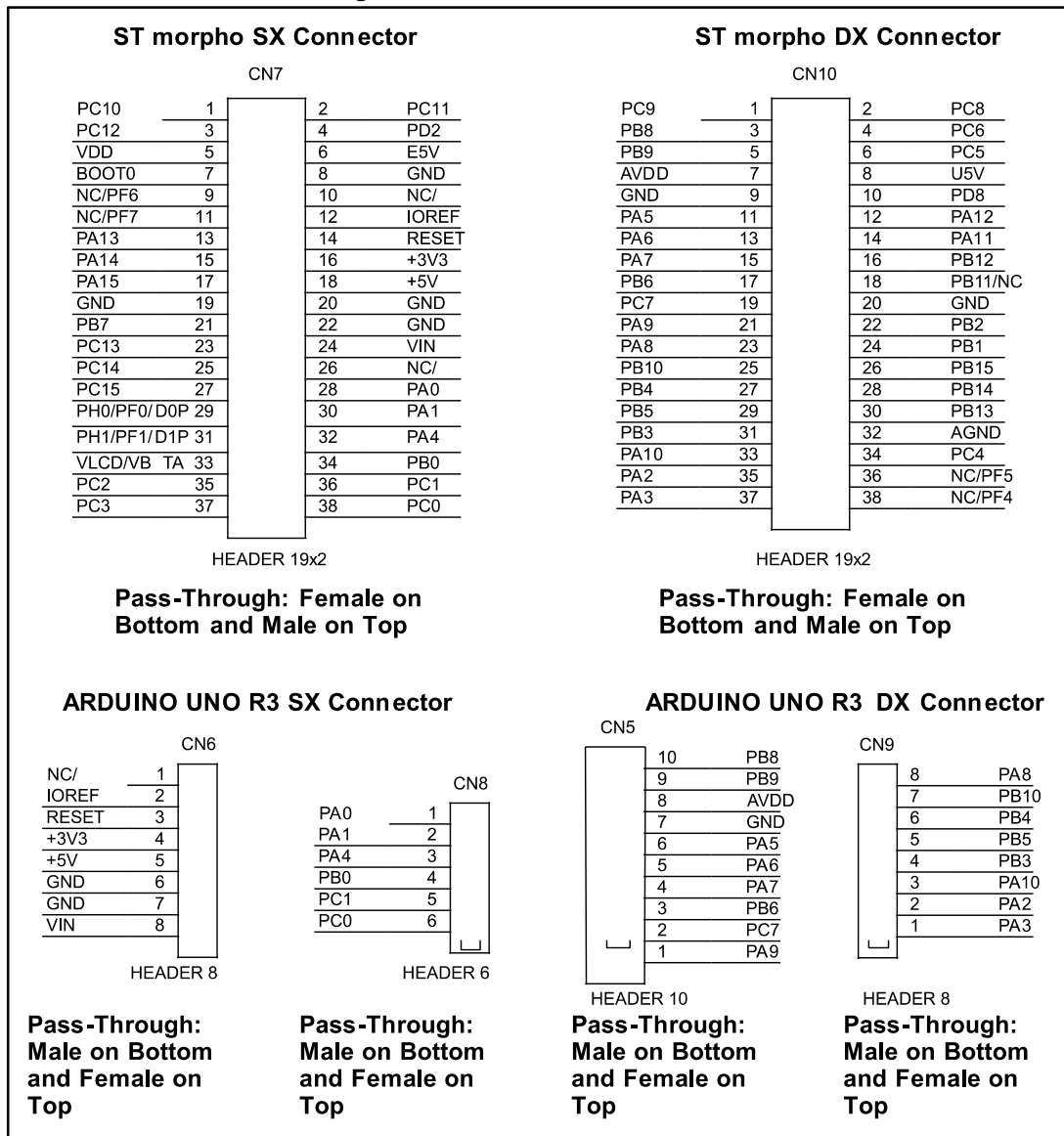
- ETSI EN 300 328 V1.8.1:2012
- EN 301 489-1 V1.9.2:2011 + EN 301 489-17 V2.2.1:2009
- EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + A2:2013
- EN 62479:2010

## 2 Hardware Schematics

### 2.1 STM32 Nucleo connectors

The figure below details the STM32 Nucleo connectors both ST morpho and Arduino UNO R3.

Figure 1: STM32 Nucleo connectors



## 2.2 SPWF01SA module

This section provides some information regarding the SPWF01SA Serial-to-Wi-Fi b/g/n intelligent modules (order code: SPWF01SA.11). More detailed information can be found at the [www.st.com](http://www.st.com) web site.

The main features of the SPWF01SA module are:

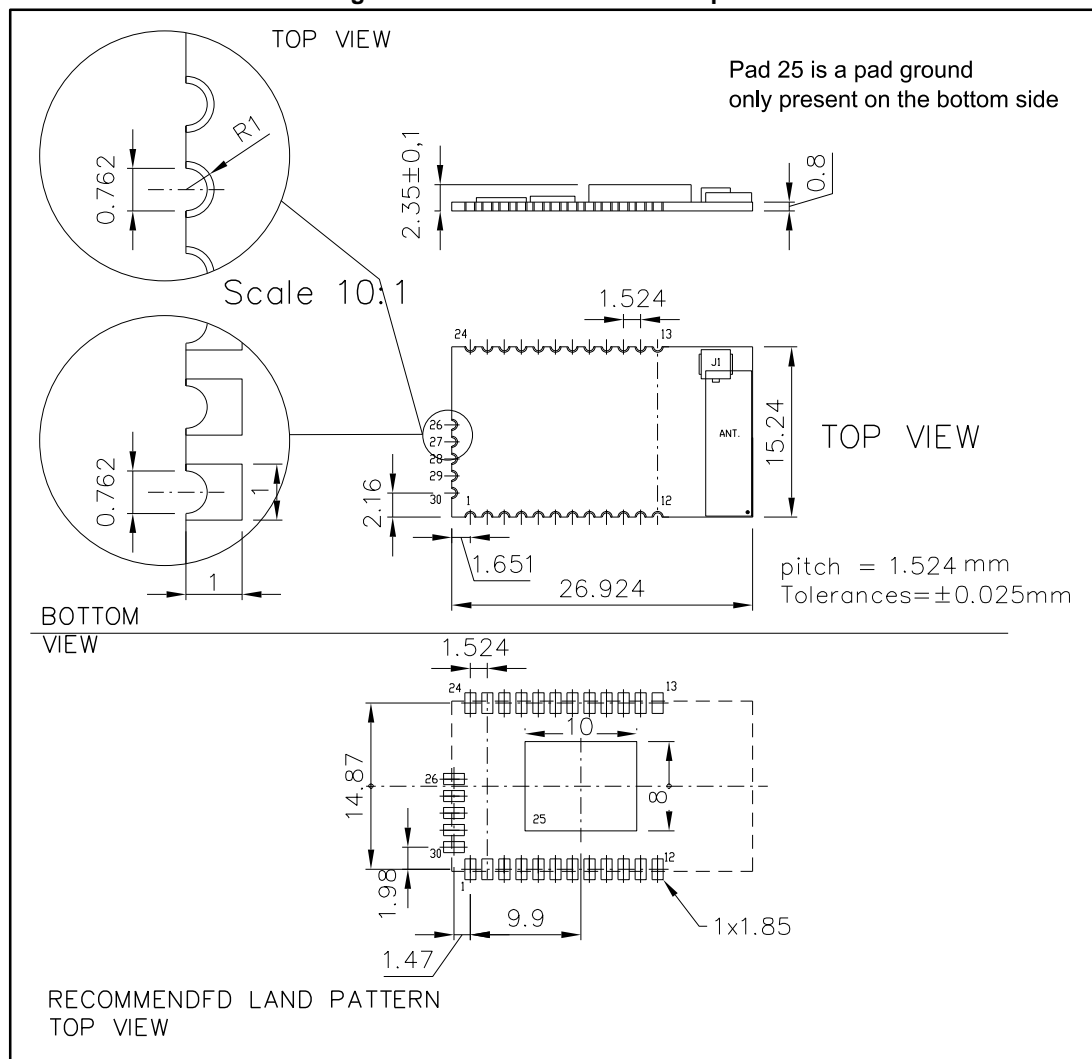
- 2.4 GHz IEEE 802.11 b/g/n transceiver
- STM32 ARM Cortex-M3, with 64 KB RAM and 512KB Flash memory
  - 1 MByte extended FLASH for FW update
  - Over the air (FOTA) only on SPWF01Sx.1y
- Integrated TCP/IP protocol stack
  - 8 Simultaneous TCP or UDP clients and 1 Socket server
  - 1 TLS/SSL Socket client supporting up to TLS 1.2, including common encryption algorithms: AES (128,256), hash (MD5, SHA-1, SHA-256) and public key algorithms (RSA, ECC).
  - Web server supporting dynamic web pages
  - RESTful API to get & post web content
- WEP/WPA/WPA2 personal security
- System modes: station, IBSS, and miniAP
- miniAP easily provisioned (SSID, PWD)
- Industrial temperature range: -40 °C to 85 °C
- SPWF01SA is a fully FCC/IC/CE certified module.

It is suitable for evaluating Wi-Fi connectivity in the following applications:

- smart appliances
- industrial control and data acquisition
- home automation and security systems
- Wireless sensors
- cable replacement
- medical equipment
- machine-to-machine communication

Very small module footprint with easy to solder/inspect pin array

Figure 2: SPWF01SA module footprint



## 2.3 STM32 Nucleo connections

The X-NUCLEO-IDW01M1 expansion board is designed to be plugged directly on the STM32 Nucleo board connectors. The X-NUCLEO-IDW01M1 is configured by default to be compatible with the highest number of STM32 Nucleo boards possible. It may be also be configured, via resistor placement, to use different I/O configurations in order to match specific customer targets. Refer to the X-NUCLEO-IDW01M1 user manual for more detailed information regarding the possible I/O configuration options.

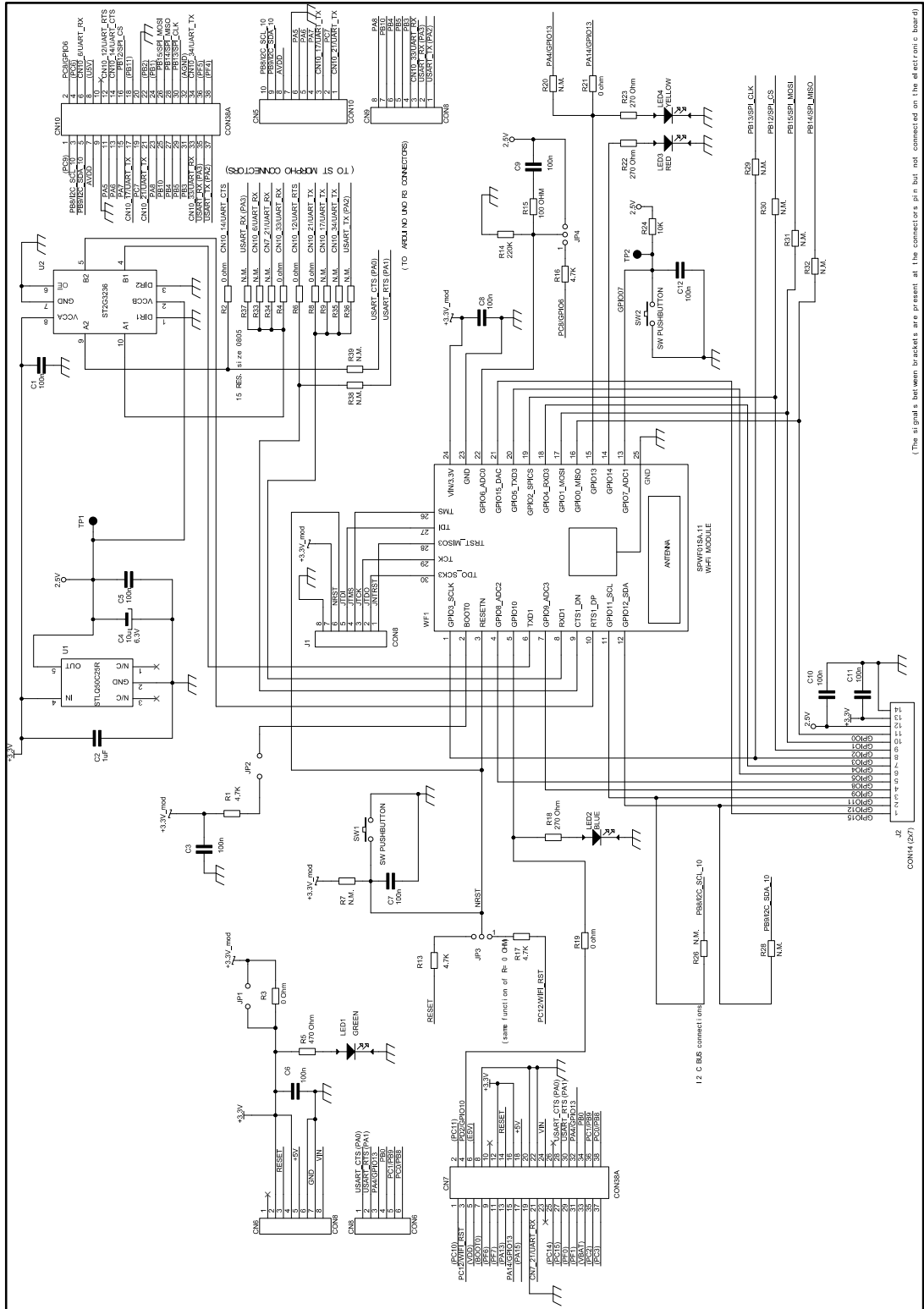
Check to see if resistor R21 is present; if it is, please remove it as it may interfere with JTAG debug.

## 2.4 EEPROM

The module has an embedded EEPROM used to host web pages and/or firmware over the air (OTA) to remotely update the module firmware images.

# 2.5 Schematic diagram

Figure 3: X-NUCLEO-IDW01M1 board schematic



(The signals between brackets are present at the connectors pin but not connected on the electronic board)



### 3 Revision history

**Table 1: Document revision history**

Date	Version	Changes
06-Nov-2015	1	Initial release.
23-Feb-2016	2	Updated cover page description.
23-Jun-2016	3	Updated board photo on the cover page.

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