

## Getting started with the X-NUCLEO-STMODA1 expansion board for STM32 Nucleo

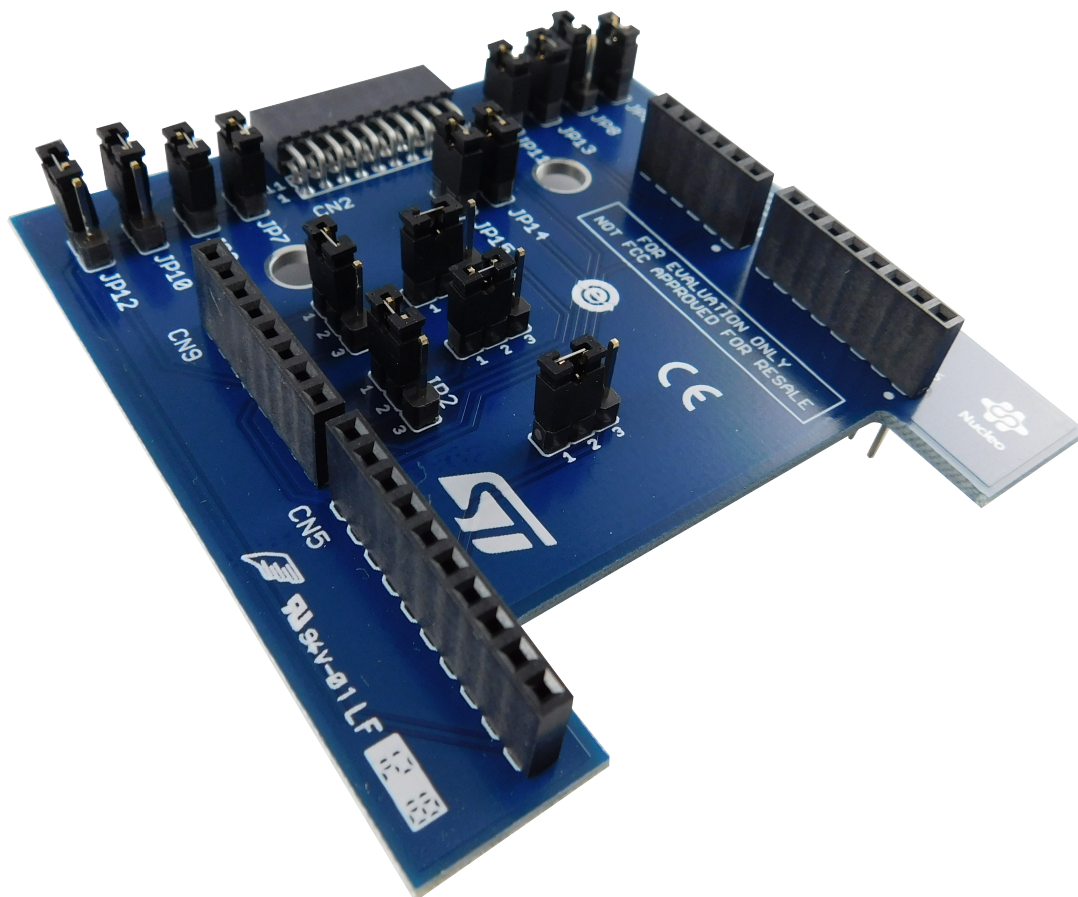
### Introduction

The **X-NUCLEO-STMODA1** provides an easy way to expand your STM32 Nucleo board with the STMod+ connector, which allows interaction with the new set of STM32 Nucleo development boards using this connector. It provides an easy way to evaluate the STMod+ board solution together with other STM32 Nucleo boards.

The STMod+ is a 2x10-pin connector providing a set of interfaces such as SPI, UART, I<sup>2</sup>C and other functions such as RESET, INTERRUPT, ADC, PWM and general purpose I/Os. The X-NUCLEO-STMODA1 has a female STMod+ connector with 2 mm pitch.

The X-NUCLEO-STMODA1 expansion board is equipped with a set of jumpers for the added flexibility of allowing you to also use the board with the STM32 **B-L475E-IOT01A** discovery kit node board.

**Figure 1. X-NUCLEO-STMODA1 expansion board**



## 1 Getting started

### 1.1 Board overview

The X-NUCLEO-STMODA1 expansion board key features are:

- Extend the STM32 Nucleo development board power supply to the connected STMod+ daughter board, since the current limitation are related to STM32 Nucleo development board capability, please refer to [UM1724](#) for details
- 15 jumpers to manage USART, I<sup>2</sup>C and SPI connections
- Compatible with Arduino UNO V3 connector
- Compatible with STM32 Nucleo boards
- RoHS compliant

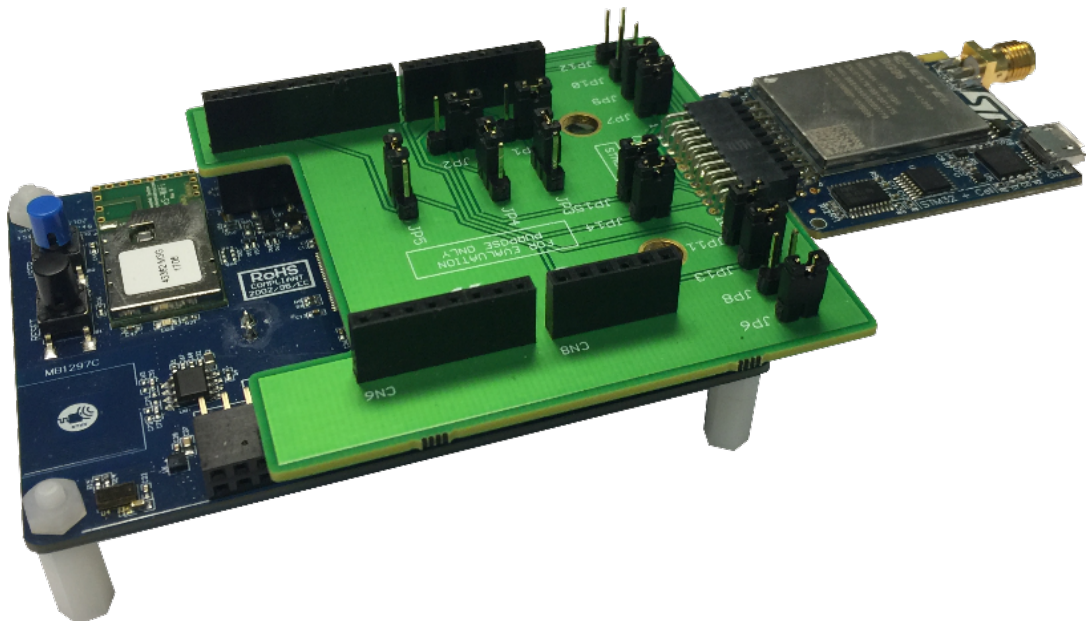
### 1.2 Hardware and software requirements

To use STM32 Nucleo development boards with the [X-NUCLEO-STMODA1](#) expansion board, the following software and hardware are required:

- a Windows PC (XP, Vista 7, Win 8, Win 10 ) to install the software package
- an STM32 Nucleo development board
- a type A USB to mini-B USB cable to connect the STM32 Nucleo board to the PC
- an IDE among
  - IAR Embedded Workbench for ARM (EWARM)
  - Keil microcontroller development kit (MDK-ARM)
  - System Workbench for STM32 (SW4STM32)
- A daughter board to be connected at STMod+ connector, like the LTE modem in the [P-L496G-CELL02](#) discovery pack.

You can also mount the X-NUCLEO-STMODA1 on an STM32 [B-L475E-IOT01A](#) discovery kit node board via Arduino connectors, as shown below.

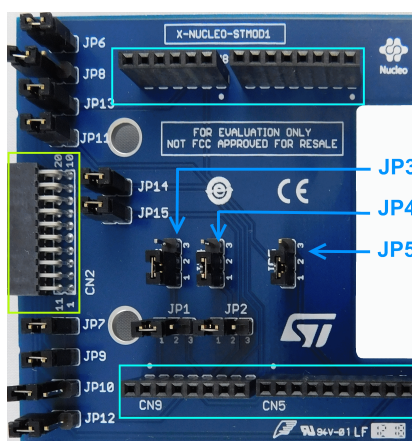
**Figure 2. Cellular LTE board setup using the X-NUCLEO-STMODA1**



## 2 Hardware description and configuration

The figure below indicates the board connector and jumper positions.

**Figure 3. X-NUCLEO-STMODA1 connector and jumper positions**



**Note:** In cyan the Arduino connectors and in green the STMod+ connectors.

The jumper settings allow you to modify the USART, I<sup>2</sup>C and SPI connections. The following table lists the jumper default settings.

**Table 1. Jumper default settings**

Jumper	Default position		Use
JP1	1-2 LEFT		USART1/2 Selection (default USART2)
JP2	1-2 LEFT		USART1/2 Selection (default USART2)
JP3	1-2 DOWN		SPI/UART Selection (default UART)
JP4	1-2 DOWN		SPI/UART Selection (default UART)
JP5	1-2 DOWN		SPI/UART Selection (default UART)
JP6	ON		Enable/Disable INT (default Enable)
JP7	ON		Enable/Disable RESET (default Enable)
JP8	OFF		Enable/Disable ADC (default Disable)
JP9	ON		Enable/Disable PWM (default Enable)
JP10	OFF		Enable/Disable GPIO1 (default Disable)
JP11	ON		Enable/Disable GPIO2 (default Enable)
JP12	OFF		Enable/Disable GPIO3 (default Disable)
JP13	ON		Enable/Disable GPIO4 (default Enable)
JP14	ON		Enable/Disable SPI_MISO (default Enable)
JP15	ON		Enable/Disable SPI_MOSI (default Enable)

### 3 Connectivity diagram

The table below shows the pin assignments and descriptions for the STMod+ connector.

**Table 2. Pin assignments and descriptions**

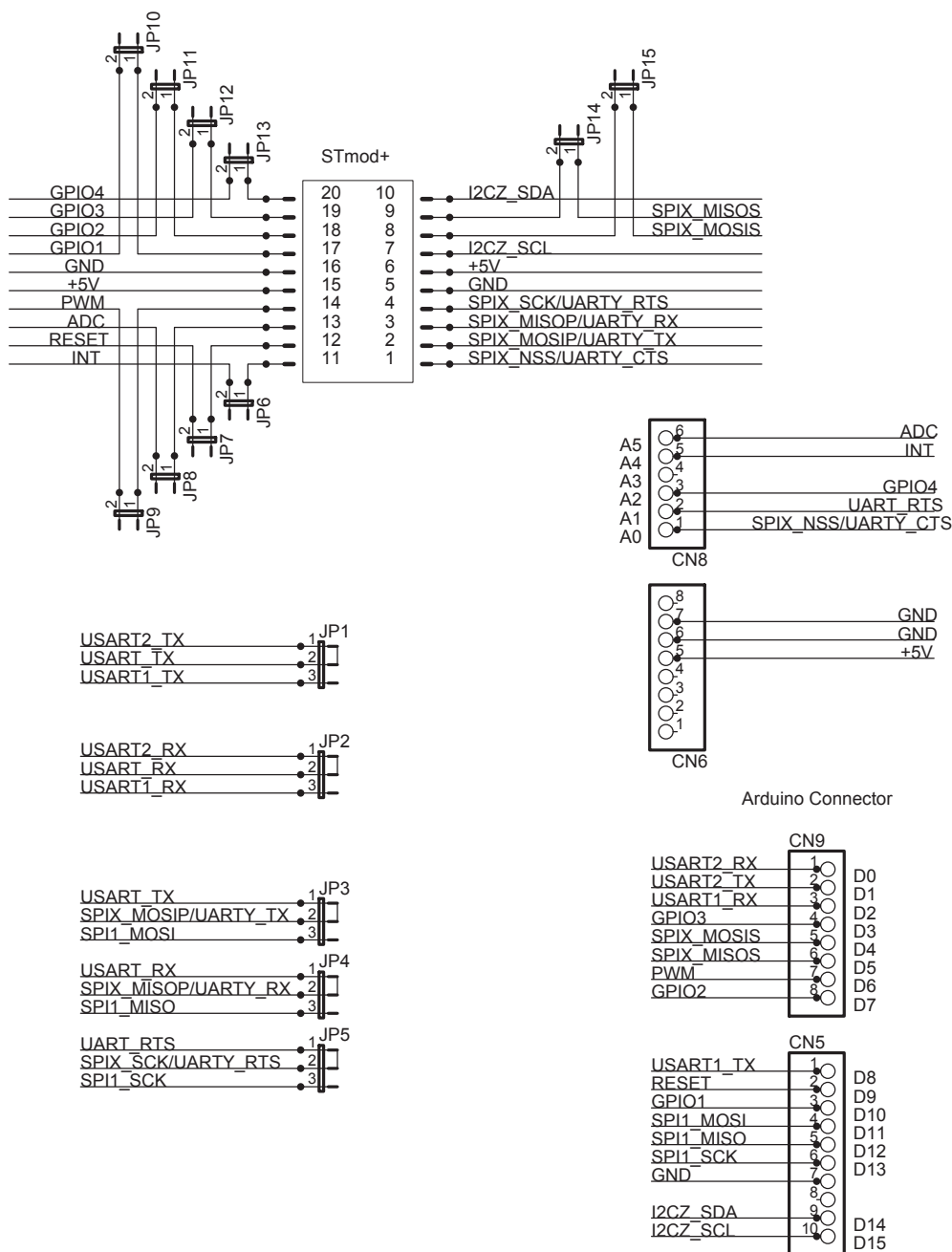
STMod+ Pin	Function of the primary host mapped <sup>(1)</sup>	Description
1	SPIx_NSS / UARTy_CTS <sup>(2)</sup>	Output / Input
2	SPIx_MOSIp / UARTy_TX <sup>(3)</sup>	Output / Output
3	SPIx_MISOp / UARTy_RX	Input / Input
4	SPIx_SCK / UARTy_RTS	Output / Output
5	GND	Ground Reference
6	+5 V	Power supply
7	I2Cz_SCL	Input / Output
8	SPIx_MOSIs <sup>(2)</sup>	Output
9	SPIx_MISOs <sup>(4)</sup>	Input / Output
10	I2Cz_SDA	Input / Output
11	INT <sup>(6)</sup>	Input
12	RESET	Output
13	ADC	Input
14	PWM	Output
15	+5 V	Power supply <sup>(5)</sup>
16	GND	Ground Reference
17	GPIO	Input / Output
18	GPIO <sup>(7)</sup>	Input / Output
19	GPIO <sup>(7)</sup>	Input / Output
20	GPIO <sup>(7)</sup>	Input / Output

1. If two functions are provided on an STMod+ connector pin, you can connect two different I/O ports from STM32 and the firmware will manage any conflicts. MOSIs means used in Serial Daisy Chained-SPI mode and MOSIp means used in Parallel SPI mode. More alternate functions may be available from STM32, refer to the User manual of the host board and the corresponding STM32 datasheet available on [www.st.com](http://www.st.com)
2. Instead of SPIx\_NSS, a GPIO can be used as SPI Chip Select
3. Pins 2 and 8 are the same SPIx\_MOSI signals, but they must come from two different I/Os
4. Pins 3 and 9 are the same SPIx\_MISO signals, but they must come from two different I/Os
5. Power Supply is Output or Input, depending on host / daughterboard configuration
6. INT is an interrupt line
7. GPIO ports with many alternate functions (like UART, I2C, SPI and analog inputs/outputs) are privileged to offer optimum flexibility



## 4 Schematic diagrams

**Figure 4. X-NUCLEO-MODA1 circuit schematics**



## Revision history

**Table 3. Document revision history**

Date	Version	Changes
17-Apr-2018	1	Initial release.

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