Kim2 shield v0

User manual

Reference:	KINEIS-MU-23-0386
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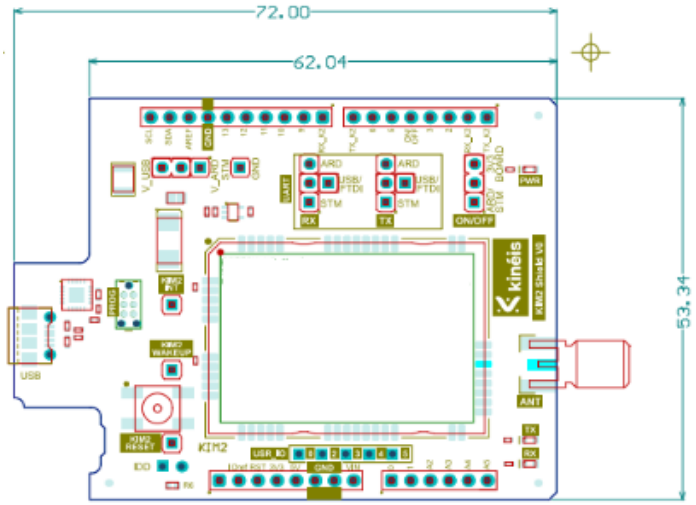
1. Overall description

a. Mechanical characteristics

The KIM2 shield is specifically designed to integrate the KIM2 to the Arduino open-source development platform: it is stackable on the Arduino Uno board. Its dimensions are 8.5cm x 5.3cm x 1.8cm.



b. Configurations

The KIM2 shield may be stacked on the Arduino Uno board or on the STM32 Nucleo board, or operated as an interface board from a computer with the provided Kinéis Device Interface.

When stacked on the Arduino Uno or STM32 Nucleo board, it can benefit from the following features:

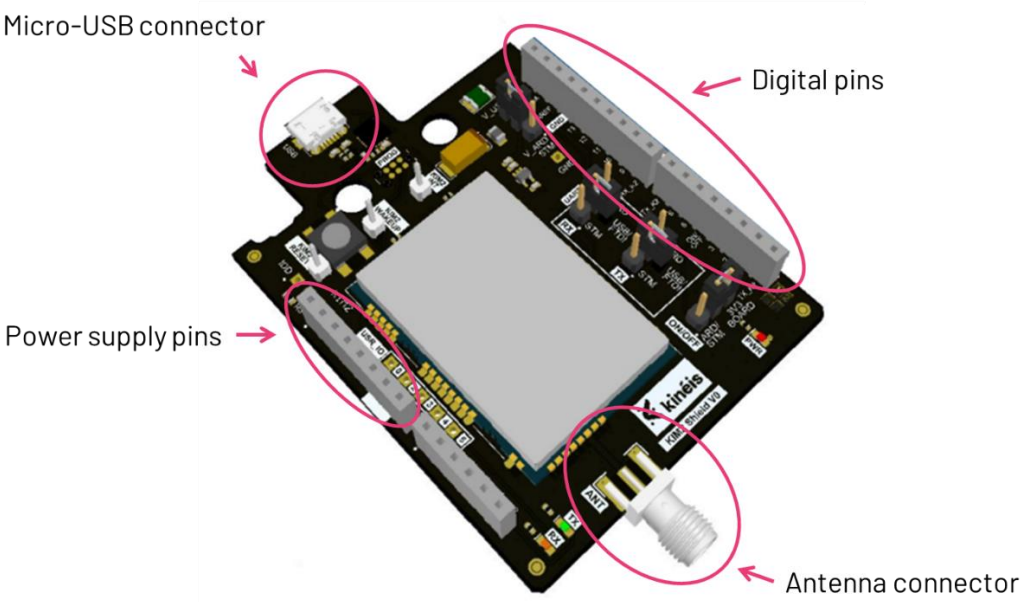
- 5V power supply
- MCU (Microcontroller Unit) with open-source software platform

The configurations below are thus possible:

Power supply	Software unit	Possible use cases
Arduino Uno	Graphical Unit Interface	Easy hands on Kinéis connectivity from a desktop computer (stand-alone mode)
Arduino Uno	Arduino MCU	Embed in a mobile device Develop a user-specific demonstration
External (ex: battery)	Arduino MCU	
STM32 Nucleo	STM32 MCU	
External (ex: battery)	STM32 MCU	
External	External MCU	

2. Detailed description

The KIM2 shield is composed of different parts described in the figure below:



a. Antenna connector

The antenna is connected through a 50-ohm female SMA connector, and thus needs to be matched at 50 ohms at the desired transmission frequency.

Warning: always connect a matched antenna to the TX connector when transmitting. Attempting a transmission without connecting a properly matched antenna or a 50-ohm load can result in permanent damage of the KIM2 shield.

b. Micro-USB connector

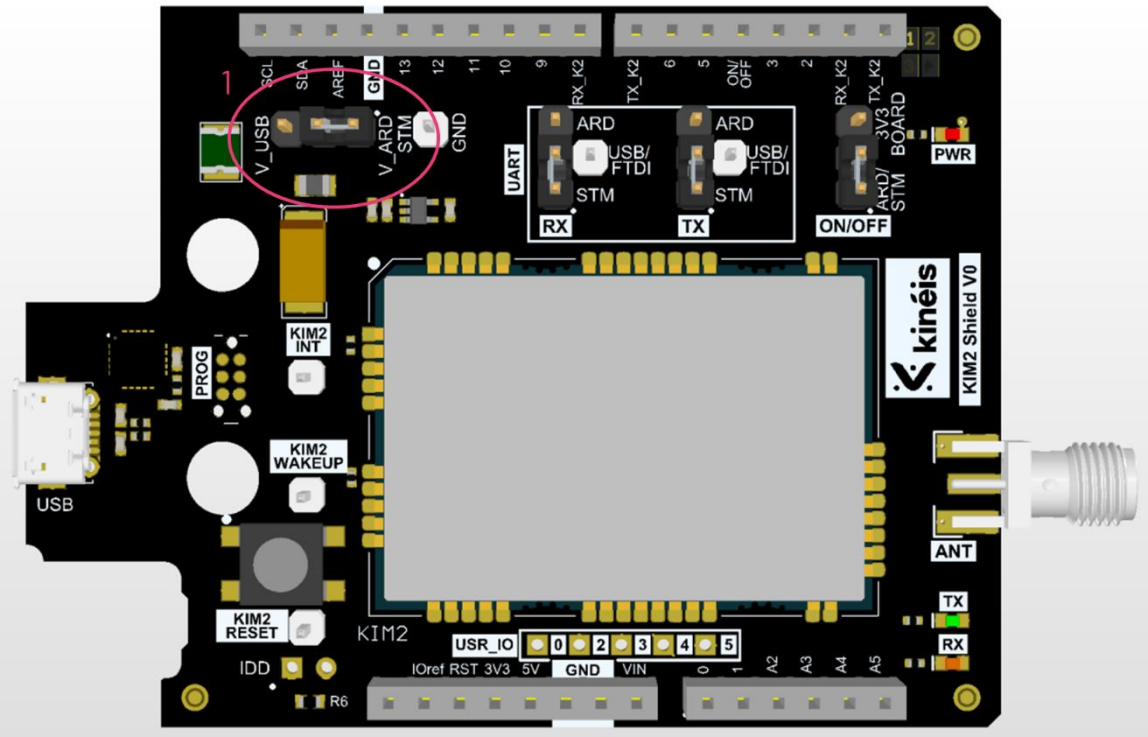
In stand-alone mode, the Micro-USB connector has a dual purpose:

- provide the power supply to the board
- allow the UART communication with the KIM2 module

c. Power supply

The KIM2 shield requires a 5V DC power supply from the Arduino Uno board, the STM32 Nucleo board, or from an external power supply. As shown in the picture below, jumper 1 allows to select the source for the power supply by connecting the center pin to one of the side pins:

- "V_ARD STM" for the power supply from the Arduino Uno, STM32 Nucleo or any other board via the on-board power supply pins ("5V" and "GND" pins, see picture above for power supply pins)
    - **Warning**: when powering the KIM2 Shield from the Arduino Uno, STM32 Nucleo or any other board, and the latter from a USB port, please make sure that the USB socket used can deliver enough current during the transmission. A USB 2.0 socket can usually deliver a maximum current of about 500mA.
- "V_USB" for an external power supply given through the Micro-USB connector (stand-alone mode)



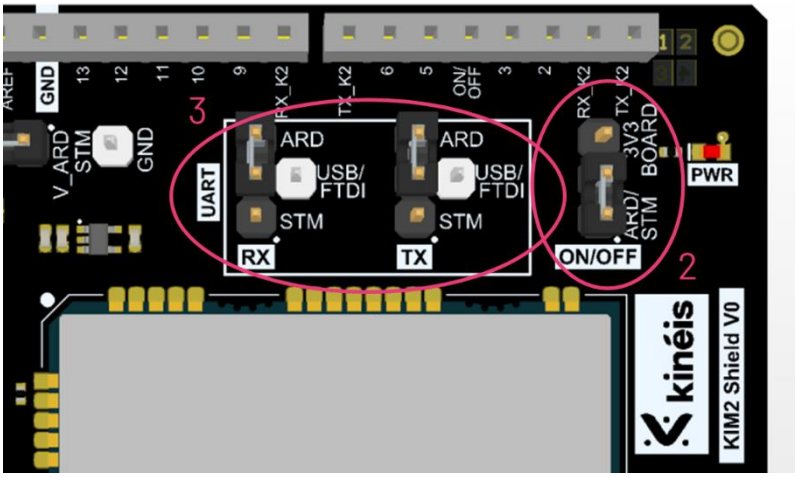
d. UART Communication with KIM2

The KIM2 module serial interface uses a basic TTL 3.3V level signals with UART protocol. The UART interface uses the following parameters:

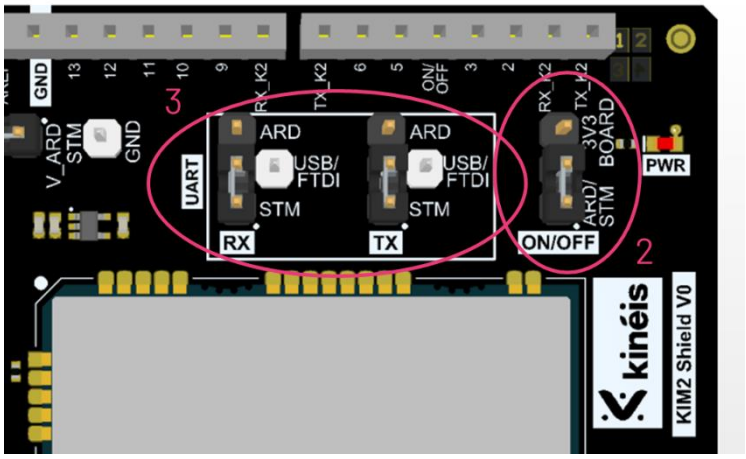
9600 Bauds
8-bit data
No parity
1-bit stop

The UART communication with the KIM2 can be performed in 3 different ways, which can be selected by changing the connections of the jumper 2 and the jumpers 3:

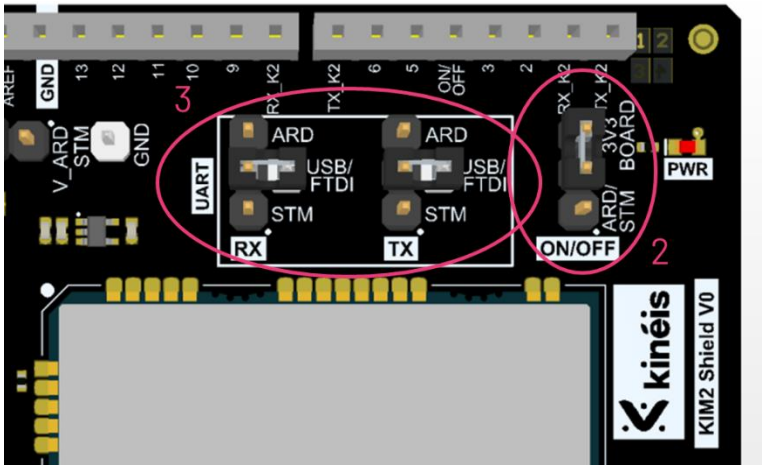
- by the Arduino Uno board via digital pins 7 and 8 (labeled "TX_K2" and "RX_K2"):
  - jumper 2 (**ON/OFF**) must be connected in Arduino/STM32 position (center pin connected with side pin labeled "ARD/STM", as shown in the picture below)
  - both jumpers 3 (**RX** and **TX**) must be connected in Arduino position (center pins connected with top pins labeled "ARD", as shown in the picture below)



- by the STM32 Nucleo board via digital pins 1 and 0 (also labeled "TX_K2" and "RX_K2")
    - jumper 2 (**ON/OFF**) must be connected in Arduino/STM32 position (center pin connected with side pin labeled "ARD/STM", as shown in the picture below)
    - both jumpers 3 (**RX** and **TX**) must be connected in STM32 position (center pins connected with bottom pins labeled "STM", as shown in the picture below)



- with the Micro-USB connector
    - jumper 2 (**ON/OFF**) must be connected in 3V3 BOARD position (center pin connected with top pin labeled "3V3 BOARD", as shown in the picture below)
    - both jumpers 3 (**RX** and **TX**) must be connected in USB/FTDI position (center pins connected with side pins labeled "USB/FTDI", as shown in the picture below)



To manage the UART communication with an external MCU, the following connections are required:

- Jumper 2 must be connected in:
  - Arduino position if KIM2 ON/OFF pin is controlled by the external MCU via digital pin 4 (**ON/OFF**). In this case, digital pin 4 must be connected to a GPIO from the external MCU
  - "5V alim" position for the KIM2 ON/OFF pin to be continuously supplied by the 5V power supply (this forces the KIM2 in ON mode, as it is done in stand-alone mode)
- Both jumpers 3 (**RX** and **TX**) must be:
  - connected in Arduino position (center pin connected with side pin labeled "ARD/STM") for use of digital pins 7 and 8 (labeled "TX_K2" and "RX_K2") for UART communication
  - connected in STM32 position (center pin connected with side pin labeled "ARD/STM") for the use of digital pins 1 and 0 (also labeled "TX_K2" and "RX_K2") for UART communication
  - connected in USB/FTDI position (center pins connected with side pins labeled "USB/FTDI") for use of the Micro-USB cable

e. LED indicators

(1) Power supply indicator

When the KIM2 is powered, the Power Supply LED indicator (**PWR**) turns red.

(1) Tx_Status indicator

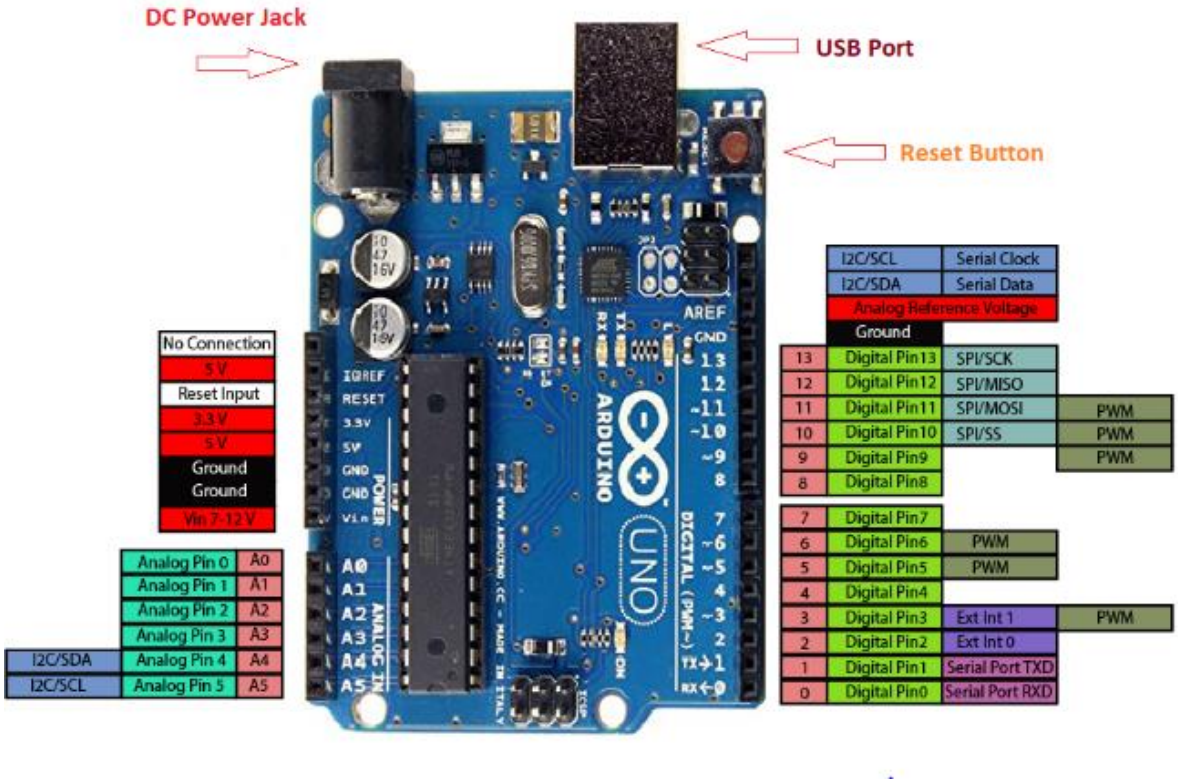
When the KIM2 is transmitting, the Tx_Status LED indicator (**TX**) turns green.

(1) Rx_Status indicator

When the KIM2 is receiving, the Rx_Status LED indicator (**RX**) turns orange.

B. Arduino Uno board

The KIM2 shield is stackable on the Arduino Uno board shown below:



Documentation for the Arduino Uno board is available at the following link:

https://store.arduino.cc/arduino-uno-rev3

C. STM32 Nucleo board

The KIM2 shield is stackable on the STM32 Nucleo-64 board shown below: