# USR-C216 Hardware Manual

File version: 1.0.0.02

# Content

# 1. Product Overview

## 1.1. Dimension

Dimension size as follow(unit: mm, error ±0.3mm):

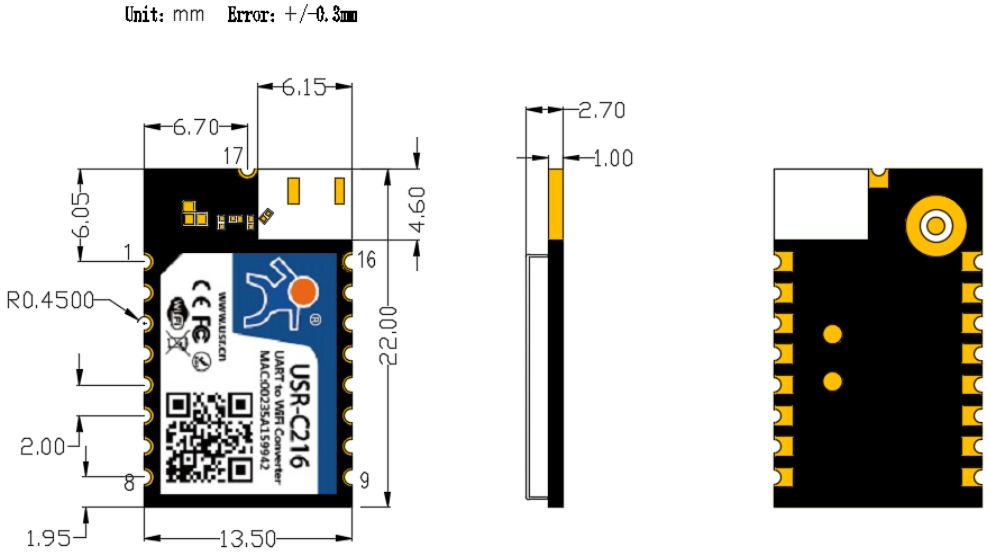



**Figure 1 Dimension**

## 1.2. Encapsulation Size

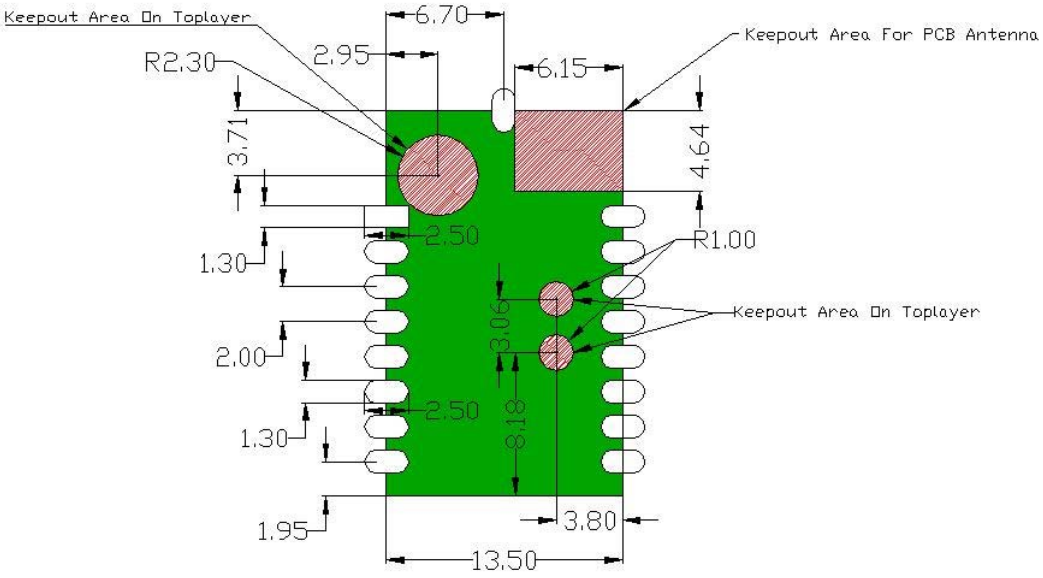
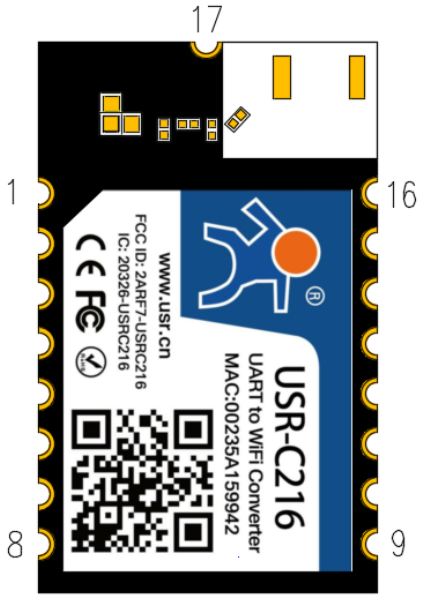



**Figure 2 Encapsulation size**

## 1.3. Pin Definition




| PIN | Name | Signal Type | Definition |
|---|---|---|---|
| 1 | GPIO1 | NC | Not available |
| 2 | GPIO2 | NC | Not available |
| 3 | GPIO3 | I/O | GPIO, don't support now |
| 4 | GPIO4 | I/O | GPIO, don't support now |
| 5 | UART0_ TX | O | Serial port TX pin |
| 6 | UART0_ RX | I | Serial port RX pin |
| 7 | UART0_ CTS | I | Serial port CTS pin |
| 8 | UART0_ RTS | O | Serial port RTS pin |
| 9 | SPI_IRQ | I/O | Control RS485 pin |
| 10 | nReset | I | Reset module and take effect in low level. Press at least 100ms |
| 11 | nReady | O | Indication pin for module working normally, take effect in low level and can connect to external LED |
| 12 | nReload | I | Press 0.5~3s to enter Simple Config or Airkiss mode, press over 3s to restore default setting |
| 13 | nLink | O | Indication pin for module WIFI linking successfully, take effect in low level and can connect to external LED |
| 14 | WPS | I/O | WPS function pin, don't support now |
| 15 | VCC | P | 3.3V VCC |
| 16 | GND | P | Power ground |
| 17 | RFIO | O | Radio-frequency signal output |

**Figure 3 Pin definition**

# 2. Hardware Design

## 2.1. Typical Connection

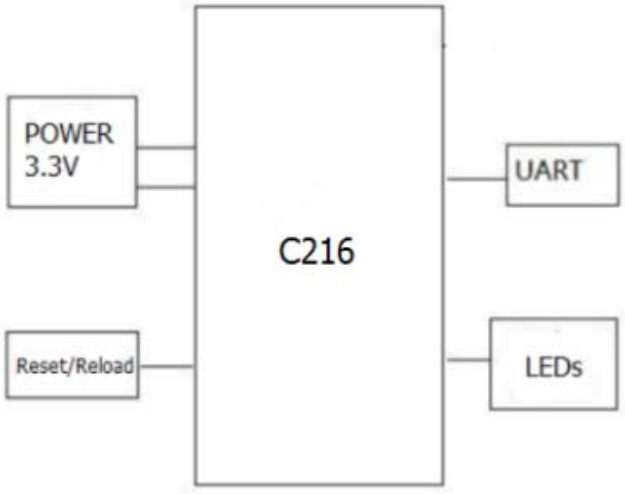



**Figure 4 Typical connection**

## 2.2. Power Interface

Switching power supply is recommended. Working voltage VCC range from 3.0V~3.6V, 3.3V is recommended. Power the module by main power pin, pin interface is in parallel with appropriate energy-storage capacitance and high frequency capacitance.

When user design the peripheral circuit for C216, should ensure: 1.Provide adequate power supply. 2.Voltage range from 3.0V~3.6V. 3.Voltage fluctuate within 200mv. 4.Place large capacitance after DC/DC or LDO to prevent external power supply voltage dropping during pulse current period.

## 2.3. UART Interface

When communicate to MCU with 3.3V, just connecting TXD of module to RXD of MCU and RXD of module to TXD of MCU.

When communicate to MCU with 5V, switching circuit is necessary. Switching circuit diagram as follows:

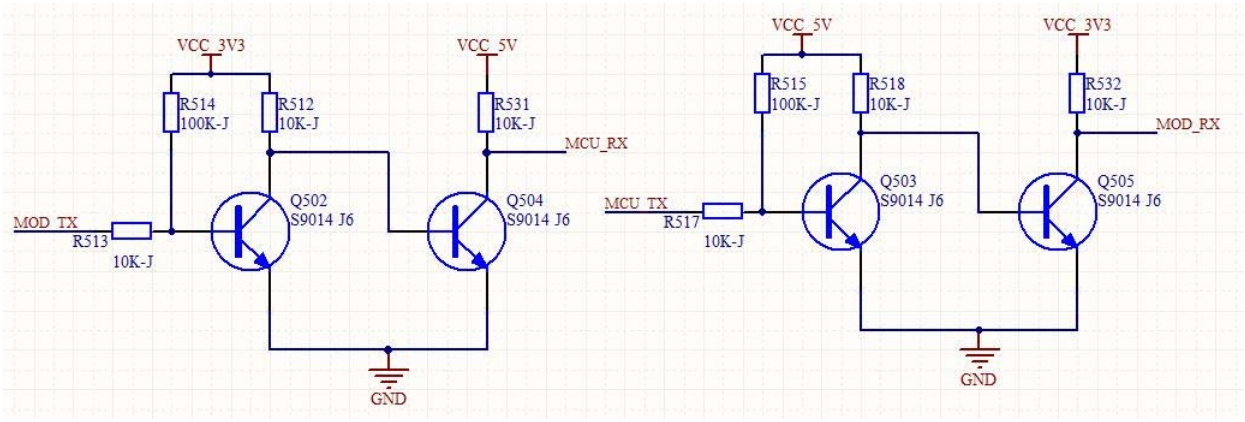



**Figure 5 UART interface**

## 2.4. LED

Module provide LED output and can display module working status by LED status. Connecting to 1K Ohm pull-up resistor to 3.3V is recommended. User can also drive LED by triode to improve LED luminance.

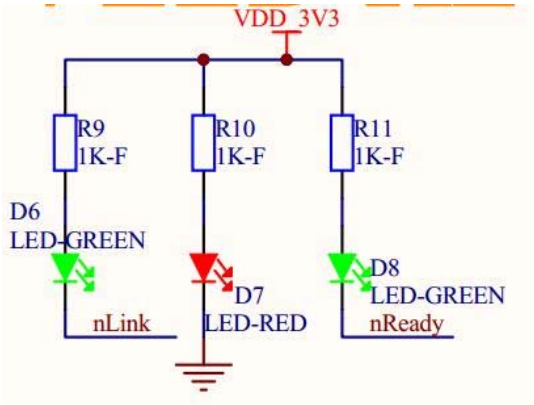



**Figure 6 LED interface**

## 2.5. Reset and Reload

nReload: nReload pin can connect to external button or configuration pin. Press button 1s to 3s to enter simplelink mode, press over 3s to restore default settings. nReload pin should connect to external 4.7k-10k Ohm pull-up resistor.

nReset: Resetting the module and taking effect in low level. nReset pin connect to internal 100K Ohm pull-up resistor to 3.3V. Press over 0.5s and release to reset the device.

Circuit diagram as follows:

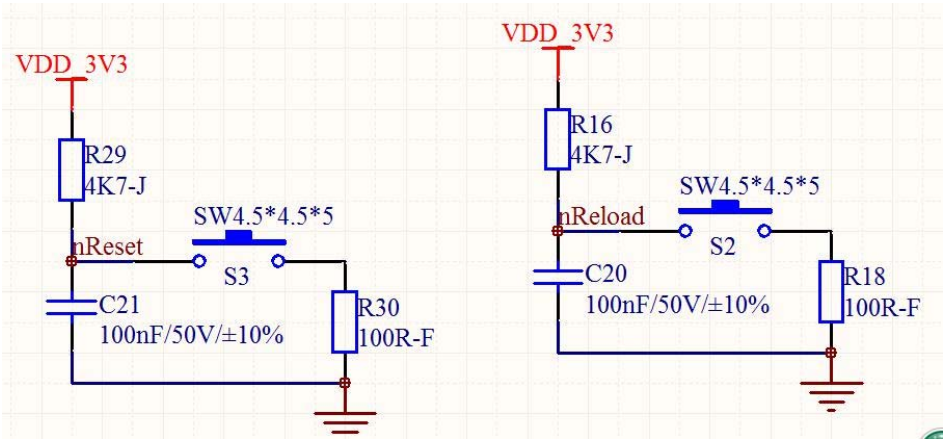



**Figure 7 Reset and Reload**

## 2.6. Antenna

### 2.6.1 USR-C216b

The module is limited to wearable BCI device.

User need reserved π type match circuit to output radio-frequency signal. RF line need guarantee 50ohm impedance matching. User can refer to below reserved match circuit:

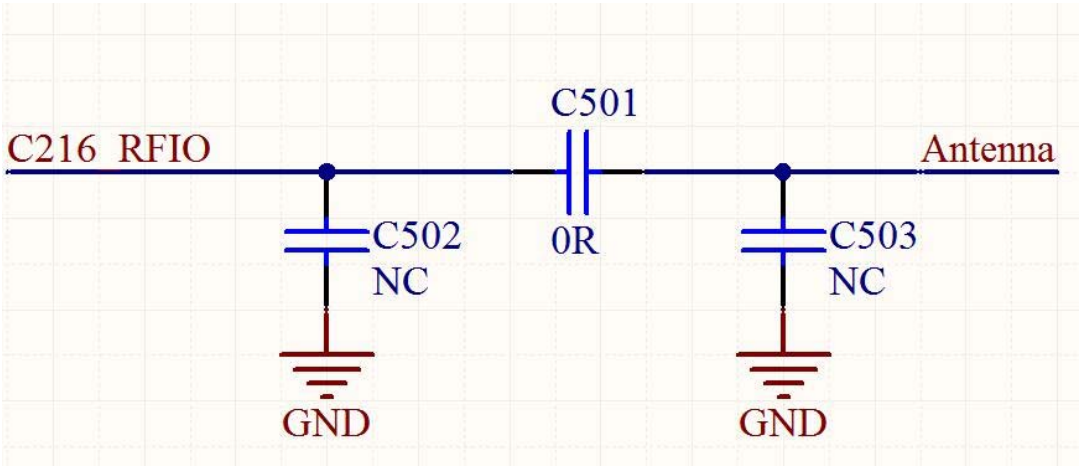



**Figure 10 USR-C216b reserved match circuit**

# 3. Contact

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# 4. Disclaimer

This document provide the information of USR-C216 products, it hasn't been granted any intellectual property license by forbidding speak or other ways either explicitly or implicitly. Except the duty declared in sales terms and conditions, we don't take any other responsibilities. We don't warrant the products sales and use explicitly or implicitly, including particular purpose merchantability and marketability, the tort liability of any other patent right, copyright, intellectual property right. We may modify specification and description at any time without prior notice.

# 5. Update History

2017-09-26 V1.0.0.01 created.
2018-12-12 V1.0.0.02 created.

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.
changes or modifications not expressly approved by the party responsible for compliance could void the user’ s authority to operate the equipment.
Please notice that if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: “Contains FCC ID: 2ARF7-USRC216” any similar wording that expresses the same meaning may be used.
Manual Information to the End User
The module is limited to OEM installation ONLY.
The OEM integrator is responsible for ensuring that the end-user has no manual instruction to remove or install module.
A separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093 and difference antenna configurations.
There is requirement that the grantee provide guidance to the host manufacturer for compliance with Part 15B requirements.
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End user must follow the specific operating instructions for satisfying RF exposure compliance. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
The portable device is designed to meet the requirements for exposure to radio waves established by the Federal Communications Commission (USA). These requirements set a SAR limit of 1.6 W/kg averaged over one gram of tissue. The highest SAR value reported under this standard during product certification for use when properly worn on the head.