# USR-WIFI232-B2 Hardware Manual

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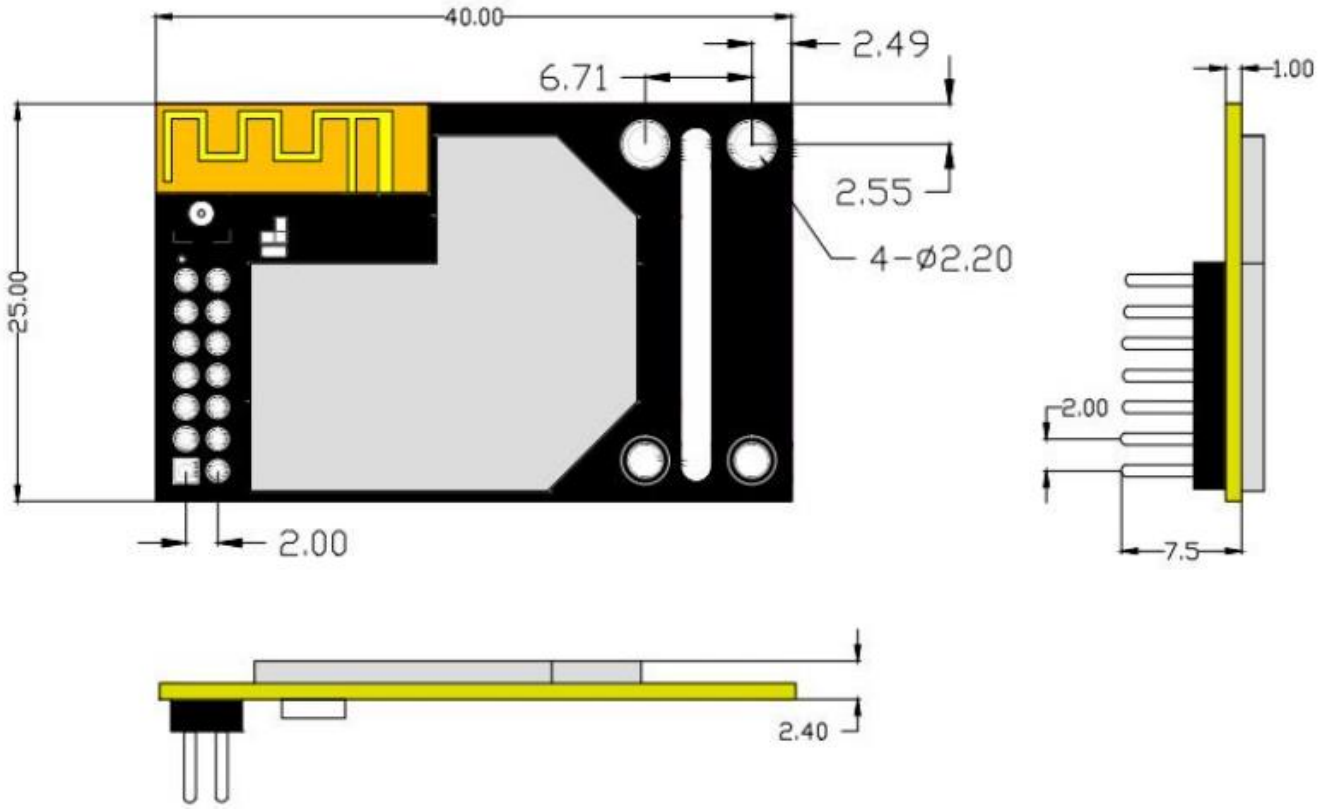


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# 1. Product Overview

## 1.1. Dimension

Module dimension diagram as follows:



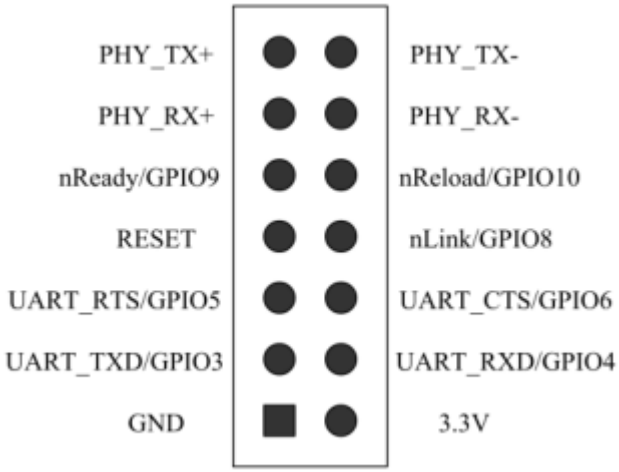

## 1.2. Encapsulation

You can download PCB library from **http://www.usriot.com/pcb-library-usr-wifi232-a2b2-pcb-library-file/**



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## 1.3. Pin Defination



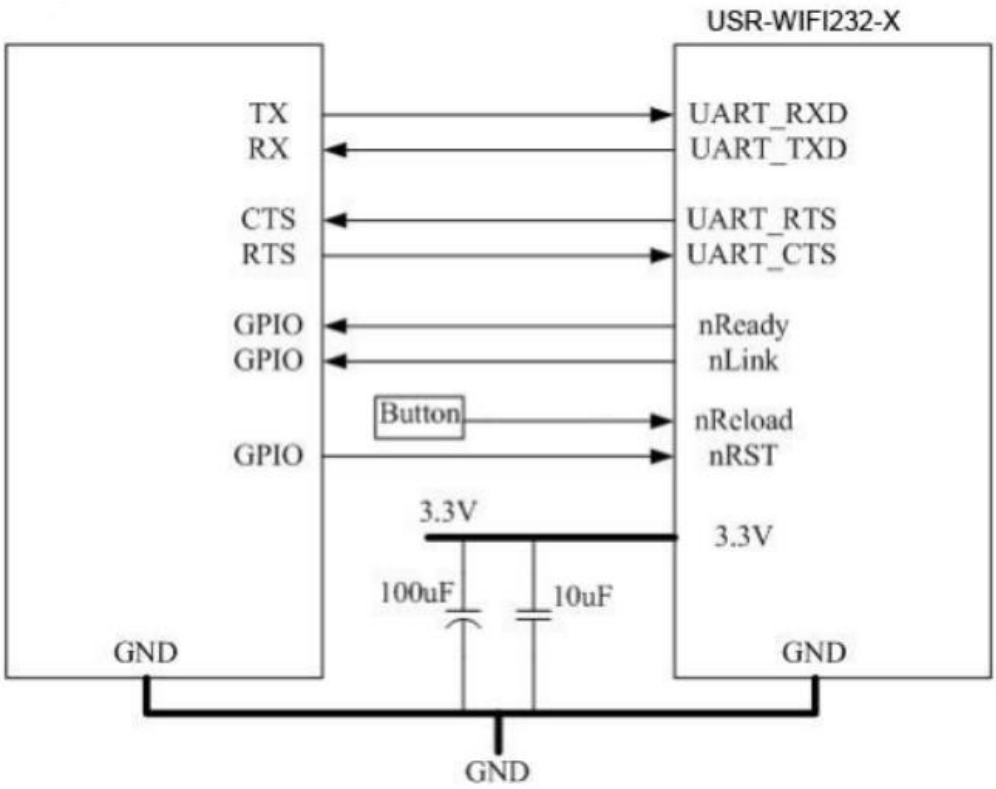

| PIN | Name | Signal Type | Defination |
|---|---|---|---|
| 1 | GND | P | Power Ground |
| 2 | VCC | P | 3.3V @ 350mA power input |
| 3 | UART_TXD | O | If don't use UART function, this four pins can be configured as GPIO pins, and can change GPIO pin status through AT command. |
| | GPIO3 | I/O | |
| 4 | UART_RXD | I | |
| | GPIO4 | I/O | |
| 5 | UART_RTS | O | |
| | GPIO5 | I/O | |
| 6 | UART_CTS | I | |
| | GPIO6 | I/O | |
| 7 | RESET | I | Take effect in low level. |
| 8 | nLink | O | Output high level: WIFI connection available.<br>Output low level: WIFI connection not available.<br>Can be configured as GPIO. |
| | GPIO8 | I/O | |
| 9 | nReady | O | After module starting, output high level or heartbeat signal.<br>Can be configured as GPIO. |
| | GPIO9 | I/O | |
| 10 | nReload | I | Take effect in low level. Press over 3s restore factory settings. |
| | GPIO10 | I/O | |
| 11 | PHY_RX+ | I | Ethernet Input+ |
| 12 | PHY_RX- | I | Ethernet Input- |
| 13 | PHY_TX+ | O | Ethernet Output+ |
| 14 | PHY_TX- | O | Ethernet Output- |



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# 2. Hardware Design

## 2.1. Typical Connection




## 2.2. Power Interface

USR-WIFI232-B2 adopt single-voltage 3.3 V power supply. Peak current is about 350mA, work current is about 200mA and sleep mode current is 100mA.

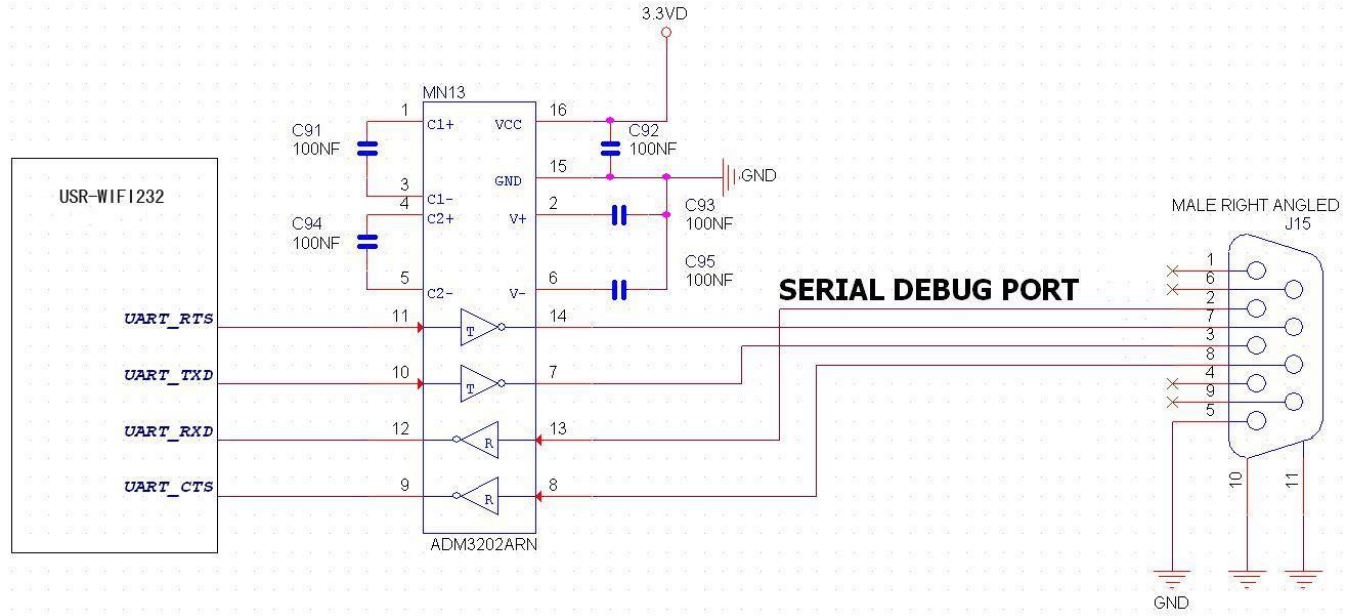
The power filter is recommended to be used near the connector of the user board, and it is recommended to use two parallel decoupling capacitors with 100uF and 10uF to improve the stability of the system and wireless performance.

## 2.3. UART Interface

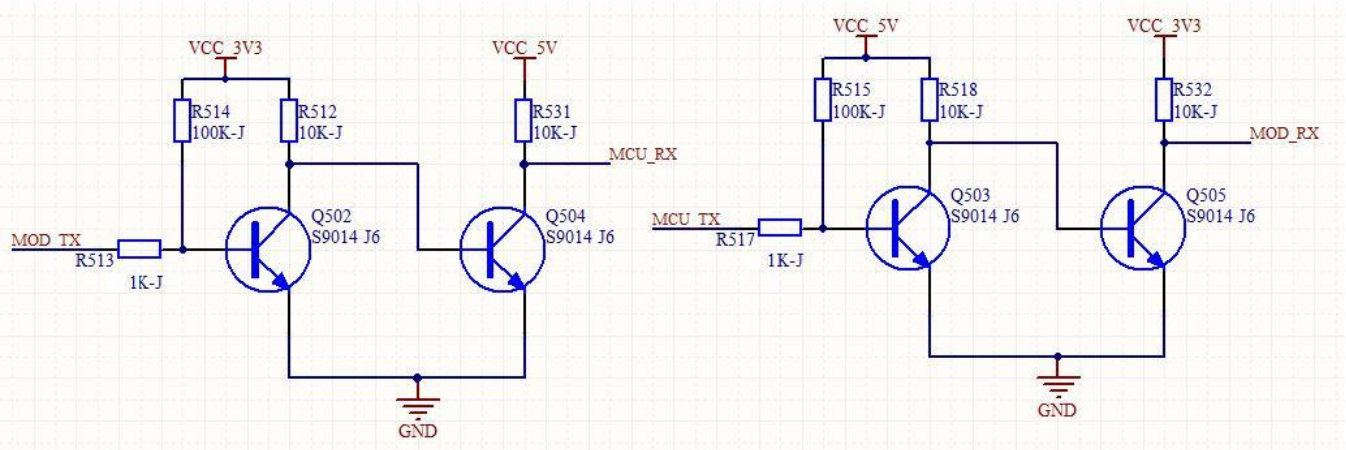
UART is serial data interface that can connect the RS-232 chip and transfer to the RS-232 level. UART interface includes TXD/RXD/RTS/CTS.Take the RS-232 level as a reference circuit diagram as follows:



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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:



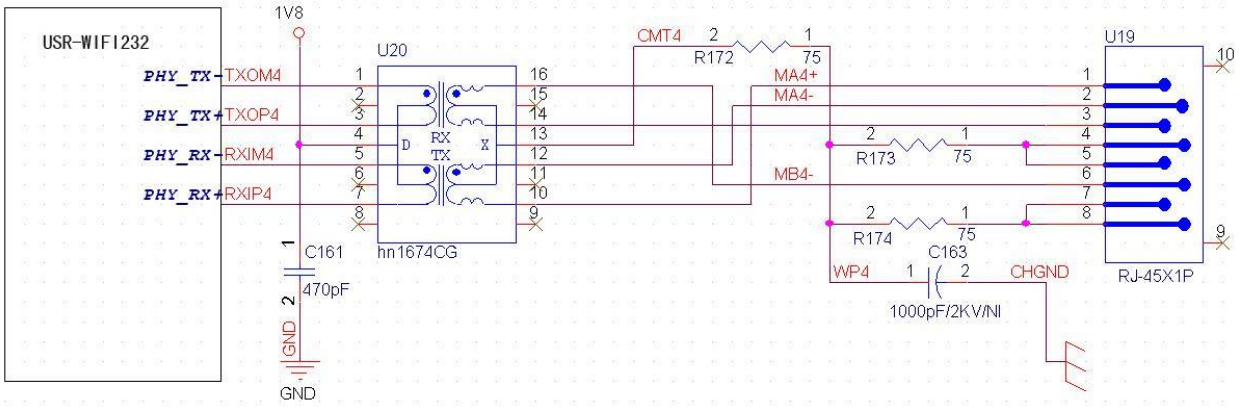

# 2.4. 10/100M Ethernet Interface

## 2.4.1.Ethernet Interface with Transformer

Put the Ethernet transformer and RJ45 connector on the circuit board can get the standard 10/100M Ethernet interface.The reference circuit diagram as follows:

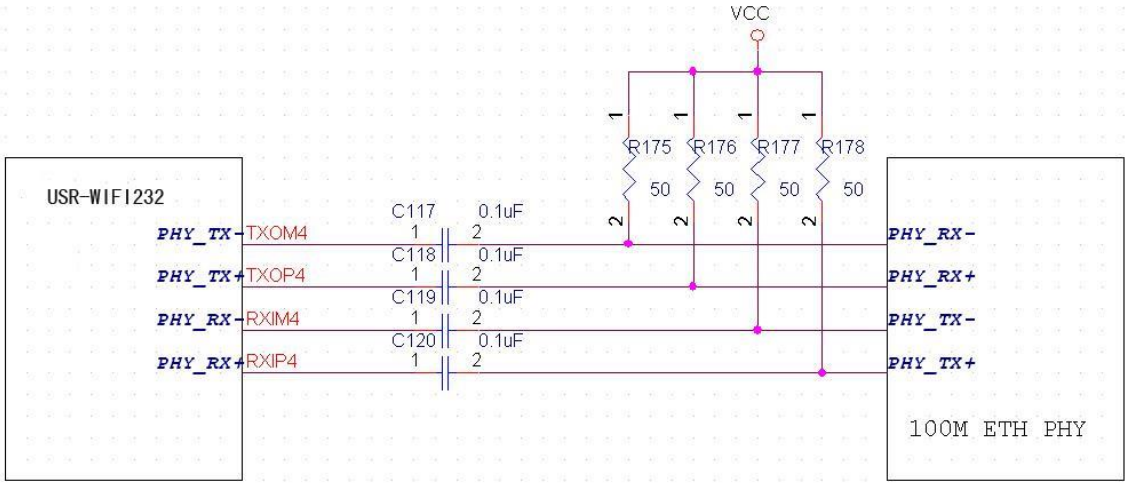


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## 2.4.2.Ethernet Interface without Transformer

For this application, Ethernet interface will work as internal data interface. Ethernet PHY-to-PHY connection will use AC coupled connection. This is a space and cost optimized solution.The design should pay attention to the driving type of PHY chip. PHY chip inside B2 module is current driven, so two side PHY chip are current drivers can be directly connected.Otherwise, transformer can't be saved. Circuit diagram as follows:




Note: VCC signal at reference design shall base on user board PHY chipset voltage level, such as 2.5V power supply for general Ethernet PHY chipset.

USR-WIFI232-B2 Ethernet interface default is for the application with transformer connection. If user need PHY-PHY directly connection, please refer to above diagram and use follows AT commands：

AT + VEW = enable < CR > to open Ethernet WAN port (Can restore to default settings by reload)
or AT + FVEW = enable < CR > open Ethernet WAN port (not affected by Reload).

Remark:
1. Only when Ethernet used as WAN, this command is needed. Module default is LAN port.
2. After this command, ensure module WAN IP and LAN IP in different network segment. (Modify the LAN IP



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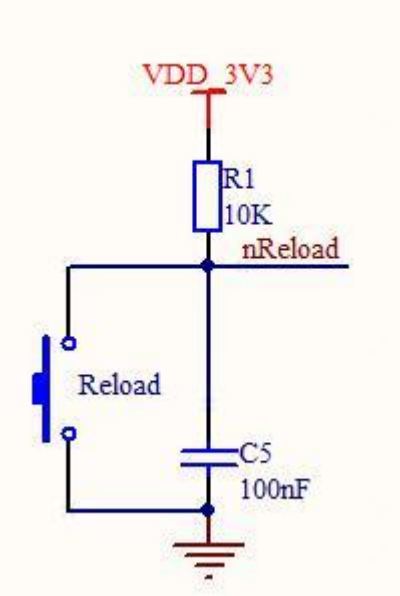
in AP Settings, modify the WAN IP in STA Settings).

AT + FEPTP = on < CR > Query/Set Ethernet PHY to PHY function ON/OFF
AT + FEPHY = on < CR > Permanently opens the Ethernet function
AT + RELD < CR > Make settings take effect

When user design, should note:
1. Cable connection should be AC coupling and cable need be pulled up to VCC (fit with PHY chip level).
2. Cable TX connected to RX. In PHY-PHY direct connection, PHY chip dose not support direct/ cross self-adaption.
3. PHY chip on board should better to be forced into 100M work mode.

## 2.5. Reset and Reload

nReload: nReload pin can connect to external button or configuration pin. Press button over 3s to restore factory settings. nReload pin should connect to external 4.7k-10k Ohm pull-up resistor. Circuit diagram as follows:




nReset:Reseting the module and taking effect in low level. nReset pin connect to internal 100K Ohm pull-up resistor to 3.3V and no need to connect to external pull-up resistor.

## 2.6. Antenna

USR-WIFI232-B2 adpot external antenna and USR-WIFI232-B2 need connect to the 2.4GHz antenna that conforms to 802.11b/g/n.The specific parameters of the antenna as the following table:



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| Frequency | 2.4~2.5GHz |
|---|---|
| Impedance | 50 Ohm |
| VSWR | 2 (Max) |
| Return Loss | -10dB (Max) |
| Connector | I-PEX or populate directly |

# 3. Contact

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Support: **h.usriot.com**
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# 4. Disclaimer

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# 5. Update History

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