USR-K2 Hardware Design Manual

File Version: V1.0

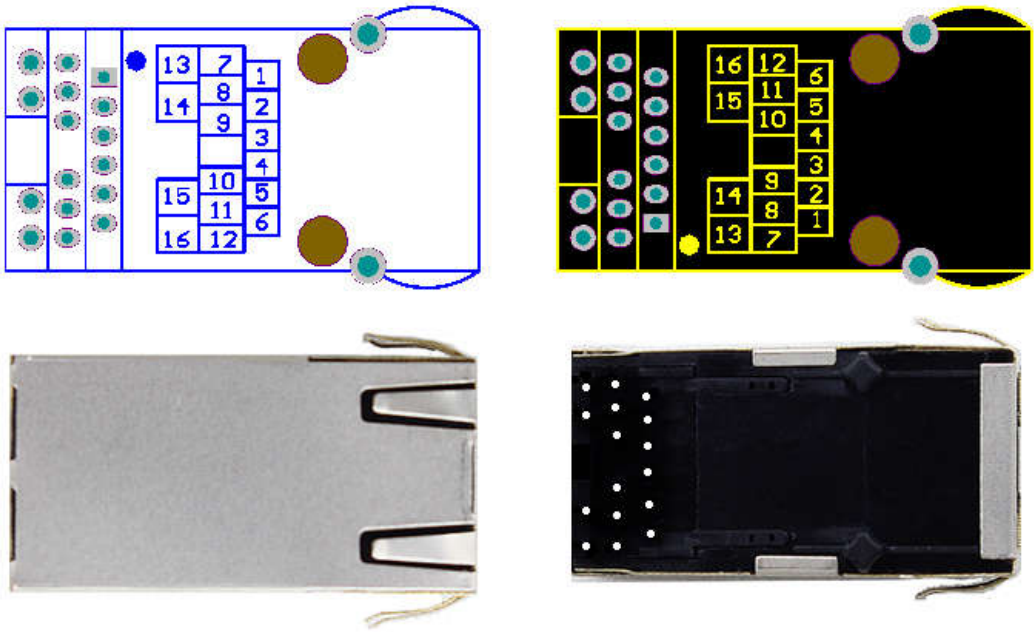
Contents

1. Description

Super Port USR-K2 is a small size UART to Ethernet module, which can realize the transparent transmission between serial port and RJ45 port.

1.1. Pins Definition

See pin diagrams below:



TOP BOTTOM

Figure 1 USR-K2 Pin Assignment

Table 1 USR-K2 Pin Definition

No.	Name	Type	Description
1	NC	NC	Not connect
2	NC	NC	Not connect
3	LINK	O	TCP connection indicator. Can be used as TCP connection status indicator pin
4	RST	I	Restart. With 200ms(or higher) low pulse, module will restart.
5	485_EN	O	485 enable/disable
6	Reload (CFG)	I	Reload pin. Steps: 1. Power off 2. Pull down Reload pin 3. Power on

			4. Waiting for 5s 5. Pull up
7	LED_DATA+	O	LED2 of RJ45 (the LED_DATA pin of microcontroller)
8	RXD	I	Receive data (3.3V, TTL)
9	TXD	O	Transmit data (3.3V, TTL)
10	GND	Power	GND (including power ground and signal ground)
11	3V3	Power	Power (with outer 3.3V DC power)
12	LED_LINK+	O	LED1 of RJ45 (the LED_LINK pin of microcontroller)
13	LED_DATA-	I	LED2 of RJ45 (LED2-)
14	LED_3V3	Power	LED of RJ45, power input
15	LED_3V3	Power	LED of RJ45, power input
16	LED_LINK-	I	LED1 of RJ45 (LED1-)

<Note>

For the use of LED_LINK+ and LED_DATA+, as there exist a 1K resistor in module, so user no need to add additional current-limiting resistor. Pin13 and Pin 16 is the corresponding cathode of LED. Hardware design refer to chapter 2.1.

Table 2 Indicators of RJ45

Indicator	Function	Description
Green	Connection status	Lights up when connected to the network
Yellow	Data	Blink when module receive / transmit data, including when receive network broadcast packet

1.2. Dimension

Size of USR-K2 see below diagram.

Reference: 33.03*19.01*19.15 mm(including slices)

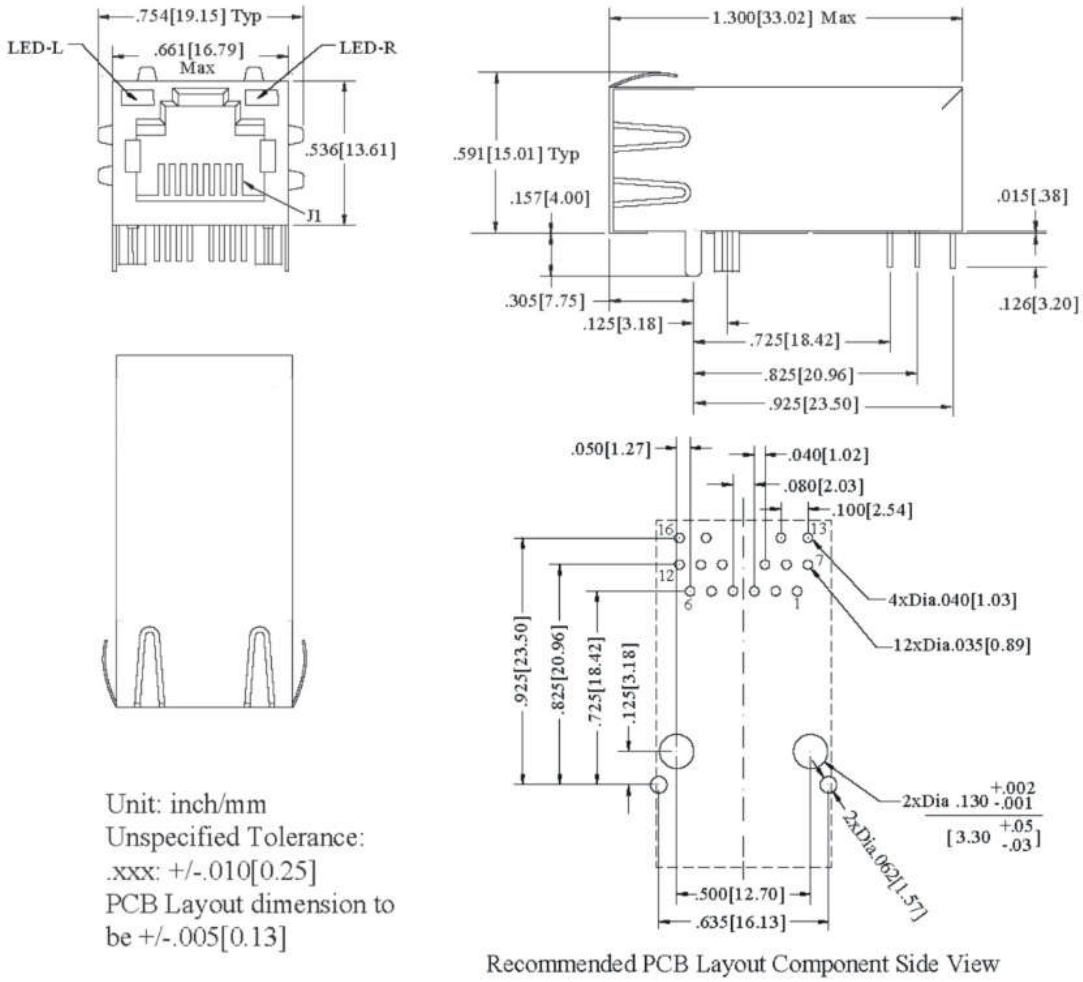


Figure 3 USR-K2 Dimension

1.3. Evaluation Kit

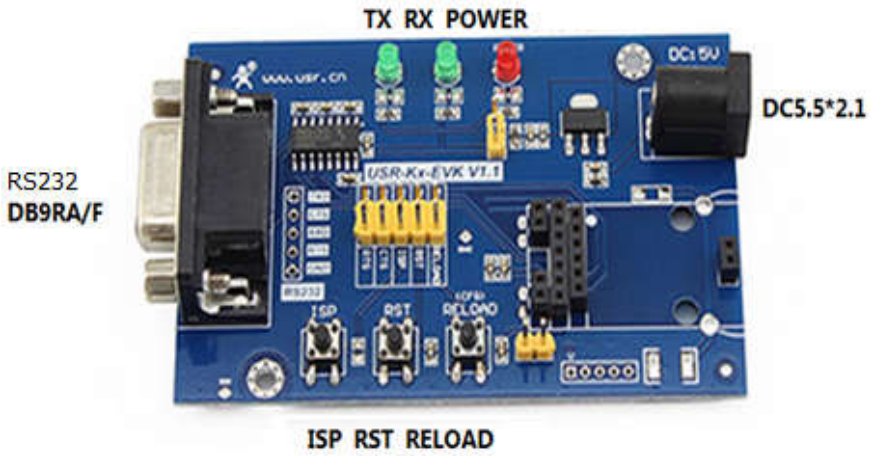


Figure 3 USR-Kx-EVK

Table 3 USR-Kx-EVK Interface

Function	Name	Description
Outer interface	DC 5.5*2.1 DC base	5V power input
	DB9RA/F	9-Pin female connector
	Module	USR-Kx base, K2 can be plugged in
LED indicator	Power	3.3V power
	TXD	Transmit data
	RXD	Receive data
Button	Restart	Restart module
	Reload	Reload factory defaults
	ISP	Unavailable

2. Hardware Design Reference

2.1. Typical Application Hardware Connection

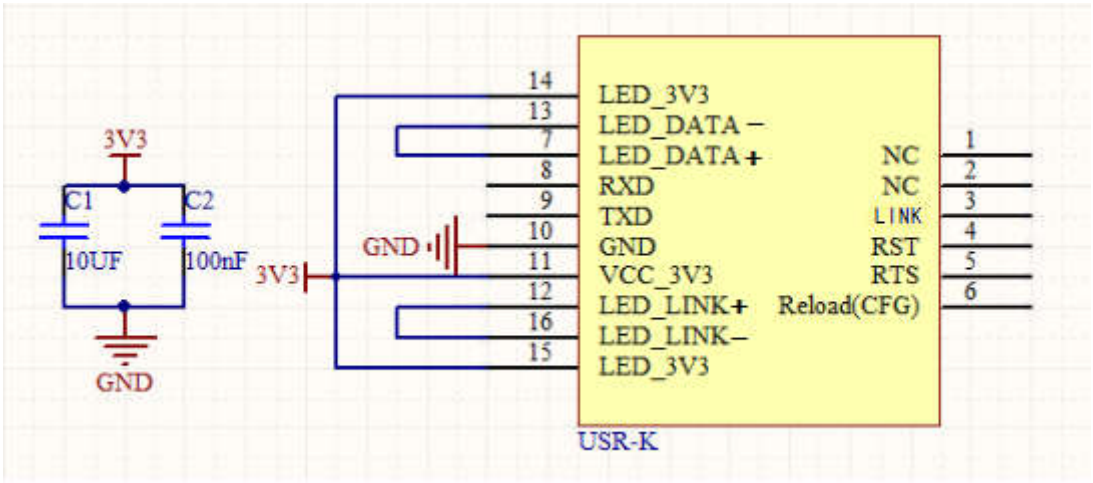


Figure 4 USR-K2 Hardware Connection

<Note>

For hardware connection design, user need to do the following steps:

1. Connect 2 LED_3V3 pins to VCC_3V3
2. Connect pin 12 (LED_LINK+) with pin 16 (LED_LINK-), do not need to add register
3. Connect pin 7 (LED_DATA+) with pin 13 (LED_DATA-), do not need to add register
4. RST: module restart signal, valid in low level. There is a built-in 10K resistor pulled up to 3.3V.

   When USR-K2 works as TCP Client, it will actively connect to TCP Server. With Restart module, it will try to connect TCP Server for 30 times, if still no connection, module will automatically restart. This function can be set by our software, default not chosen.
5. Reload. Steps:
   ① Power off
   ② Pull down Reload pin
   ③ Power on
   ④ Waiting for 5s

⑤ Pull up

6. TXD/RXD, data receive and transmit signal.(USR-K2 has been linked with 10K pulled-up resistor)

2.2. Power Interface

USR-K2 is powered with 3.3V Working current: 136mA@3.3V

Pin 11 is 3.3V power pin, can be connected with bypass patch capacitance (10UF/6V3/10% and 100nF/50V/10%) to stabilize module working.

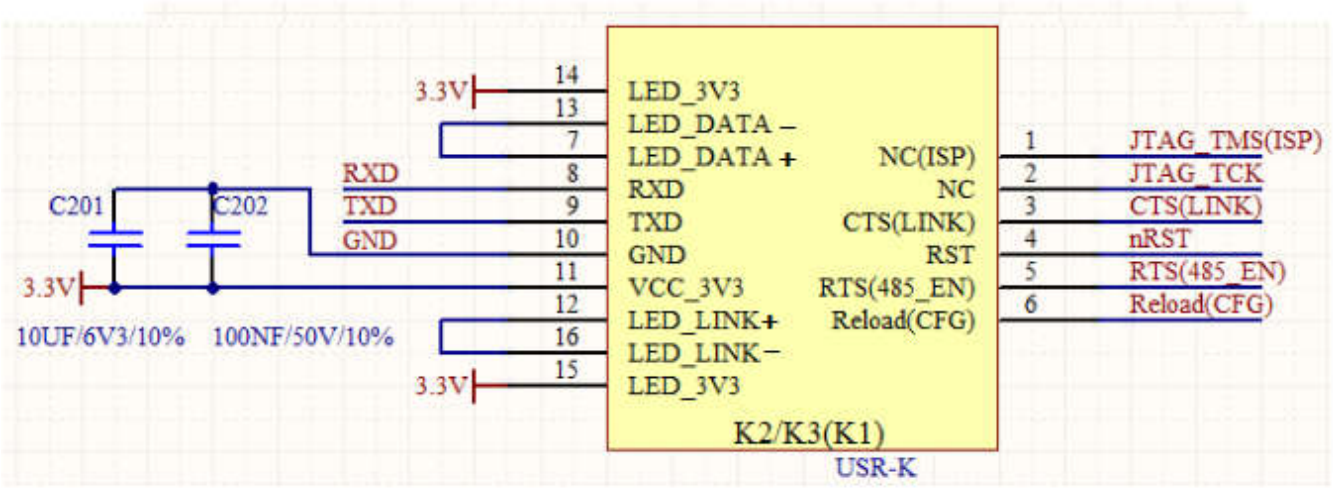


Figure 5 USR-K2 Power Interface Connection

2.3. UART Interface

UART is the serial data interface, can be connected with RS-232 chip, then it turn into RS-232 level and connect with RS-232 devices. UART interface include TXD/RXD signal line. Take RS-232 level as example, reference circuit as follows:

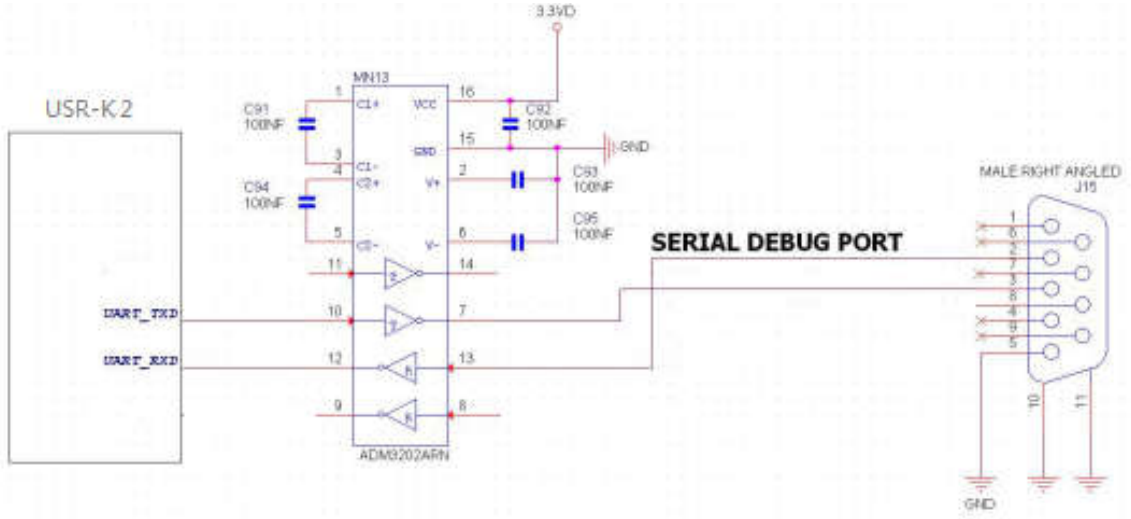


Figure 6 USR-K2 UART Connection

If communicate with MCU (3.3V level) directly, just connect TXD of module with RXD of MCU, and connect RXD of module with TXD of MCU.

If MCU is with 5V level, a TTL level converter circuit should be added, please refer to Figure 7.

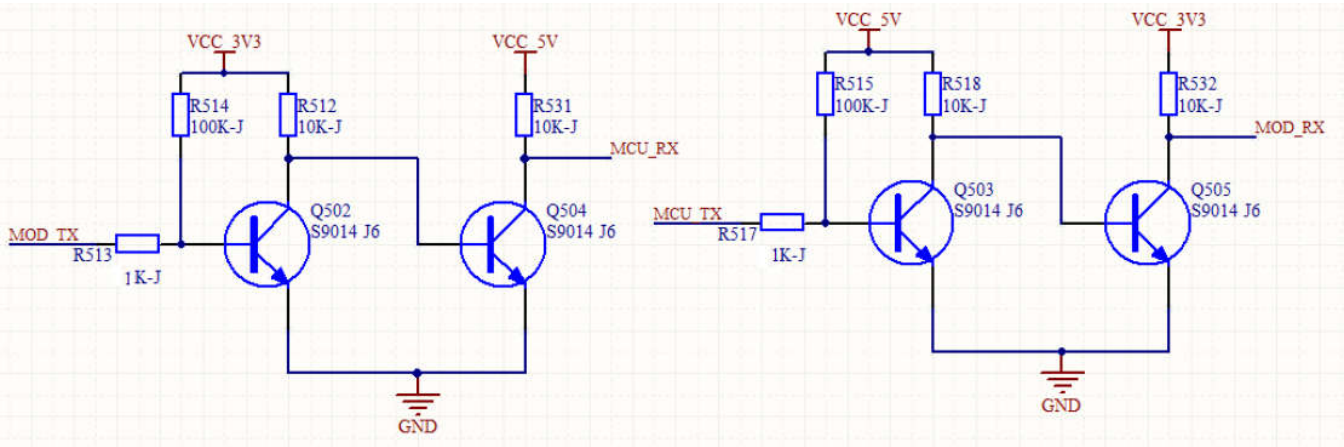


Figure 7 UART 3.3V To 5V Transfer

2.4. PCB Library

Please download PCB Library File on USR website: http://www.usriot.com/usr-k1k2k3-pcb-library-file/

3. Contact Us

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5. Update History

2016-4-21 V1.0 first version