KYL-220 High speed Rate RF Transceiver Data Module



Shenzhen KYL Communication Equipment Co., Ltd

Add: 3705-3707, Building C, Huangdu Square (South of Shenzhen Exhibition Center),Yitian Road, Futian District, Shenzhen, Guangdong, China 518048

Tel: 86-755-82943662
Fax: 86-755-83408785
Skype：KYL-Sunny
Yahoo: KYL_Sunny@yahoo.com
MSN: KYL-Sunny@hotmail.com
Email: sales02@rf-data.com
Web: www.rf-data.com

Before using our products, please read the user manual carefully.
Any questions, please contact me at the above mentioned methods.

I: About KYL-220

KYL-220 is a kind of low power wireless transceiver data module. With small size, low power consumption as well as good stability and reliability, it is widely used as wireless data transceiver in long-ranges. Its channel spacing is as low as 25 KHz.

II: Features:

Technical specification of KYL-220

PERFORMANCE	
Power Output:	10mW
RF Line-of-sight Range:	100m
RF Effective Rate:	1200/2400/4800/9600/19200/38400/100kbps
Space Channel:	1MHz(Default), (12.5/25KHz/other Customization)
Bandwidth:	<25KHz
Receiver Sensitivity:	-118dBm@1200bps (1% BER)
NETWORKING	
Networking Topology:	Point-to-point, point-to-multipoint
COMPATIBILITY	
KYL-210	
POWER	
Supply Voltage:	5V DC
Transmit Current:	<25mA
Receive Current:	<20mA
Sleep current:	<20uA
GENERAL	
Communication Mode:	Half-duplex
Frequency Band:	400-470MHz, 868MHz, 915MHz
Channel:	8(default),16/32/64(optional)
Interface:	USB
PHYSICAL PROPERTIES	
Size:	40mm×22mm×6mm (excluding antenna base and data pin)
Weight:	20g

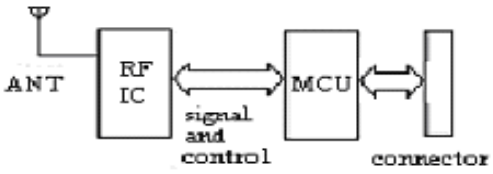
Antenna Base:	50Ω, SMA
Operating Temperature:	commercial:-35℃~+75℃(TCXO)
Frequency Stability:	±2.5ppm
CERTIFICATIONS	
FCC/RoHS/CE	

III: Application of KYL-220:

* Automatic Meter Reading (AMR);
* Wireless alarm and security systems;
* Building automation, security systems, wireless monitor, remote control and access control system;
* Wireless data transmission, automatic data collection system;
* Radio modem can be used for Sports training & competition;
* Wireless dishes ordering;
* Wireless POS, PDA wireless smart terminal;
* RF module can be used for electronic bus station and intelligent traffics;
* RF transmitter, Wireless electronic display screen and Queuing machine;
* Wireless telemetry; charging for parking, parking lot;
* Wireless modem automobile inspection and four-wheel orientation;
* Data communication in the aspects of railway, oil field, dock and army.
* LED display in thruway and public place;

IV: How to use the KYL-220

KYL-220 provide RS-232, RS-485 and UART/TTL level interface ports which can be direct connected with PC, RS485 devices, monolithic processors and other UART components. Please find the schematic diagram below:



KYL-210 Principle map

1. Power supply

The factory setting is +5V (needing 3.3V-3.6V, please notify us when placing the order). Using better ripple factor, KYL-220 transceivers can also share power supply with other equipment. If possible, a voltage-stabilizing chip with 5V voltage is much recommended than Switch power supply. But if only switch power supply is available, the jam caused by switch pulse should be avoided. In addition, the

reliable grounding must be used if there is other device in the system equipment. In case of failing to connect with the ground, it can form its own grounding but must be absolutely separated from the municipal electric supply.

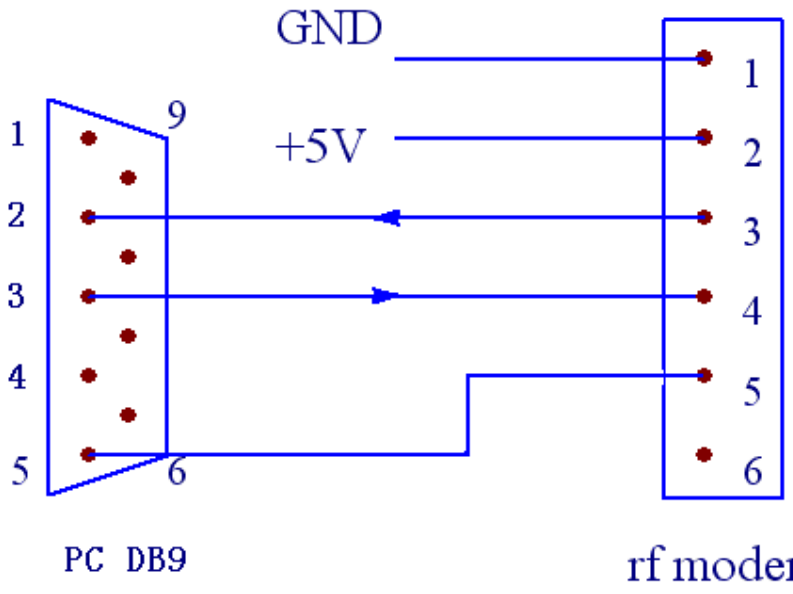
2. **Connection Definition with terminal**

KYL-220 transceivers supply one 9-pin connector (JP1), their definitions and connection methods with terminals are shown in Table 1.

Table 1: JP1 Pin Definitions and connection methods

Pin No.	Signal Name	Function	I/O	Level	Remarks
1	GND	Grounding of power supply	-	-	
2	Vcc	Power supply DC	-	3.1~5.5V	Other power supply need customized
3	RS232 TXD	Data Transmission	O(output)	RS232	Choose one of the three interface ports
	TTL TXD	Data Transmission	O(output)	TTL	
	RS485 A	RS485 A	IO	-	
4	RS232 RXD	Data Receiving	I(input)	RS232	Choose one of the three interface ports
	TTL RXD	Data Receiving	I(input)	TTL	
	RS485 B	RS485 B	IO	-	
5	DGND	Signal Ground	-	-	
6	NC	-	-	-	

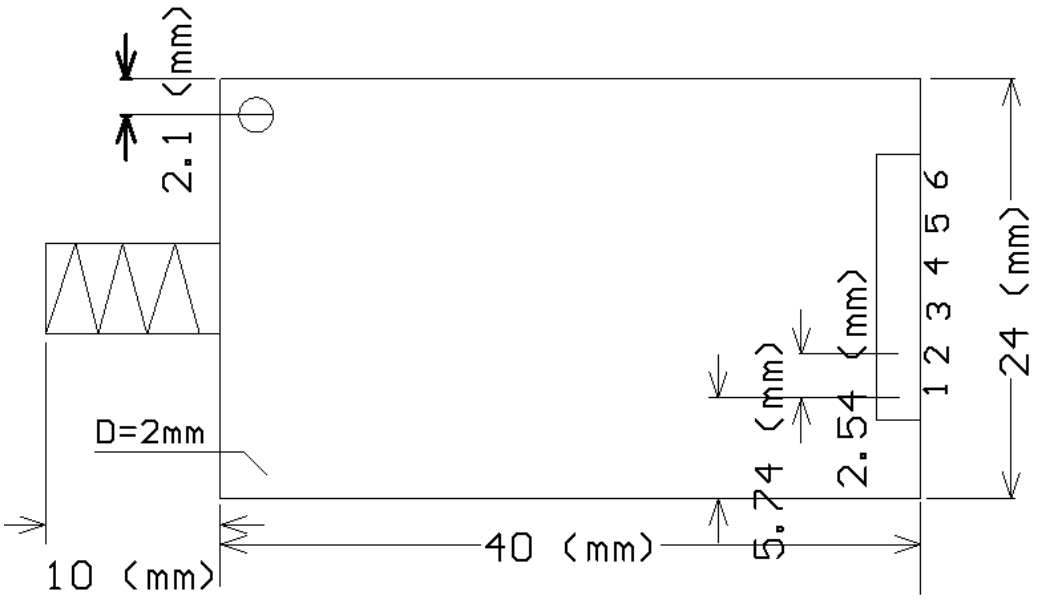
3. The connection schematic diagram between computer and our RF module



4. Setting of channel, interface, and data format

Before using KYL-220, the user needs to make simple configuration to determine the channel, interface mode and data format based on his own needs. You can view or change the module's interface baud rate, channel and address code, parameter setting or reading as per the testing software KYLCOM in the PC

5. **Installation dimension:**



6. The Function-indicator light

a. The LED indicator light will turn red for 0.5S once switch on.

b. The LED indicator light will turn green continually while receiving data from air.

c. The LED indicator light will turn red continually when transmitting data into air after receiving from COM.

d. If the module keeps sleep function, LED indicator light is always dark.

7. Supported protocol and Transmit capability

KYL-220 standard transceivers offer transparent protocol to support various applications and protocols of users. If you need to decrease his cost or ease the workload of terminal CPU, we can add other specific functions based on the transparent protocol, such as addressing, data acquisition, command interpretation, etc.

8. Sleep function

In order to reduce consumption, KYL-220 transceivers support sleep function. In sleep mode, the current consumption is less than 20uA.

a. How to use sleep function:

The Pin8 'SLP' in JP1 is the signal of sleep control. At high power level, transceiver stays in working mode. At low power level (<0.5V), transceiver stays in sleep mode. The SLP signal can convert transceiver from working to sleep mode in 1ms after falling edge. If the Sleep signal arrives when the transceiver is transmitting data, the module will move to sleep mode after finishing transmission. From sleep moves to working, it takes the transceiver 1ms after rising edge.

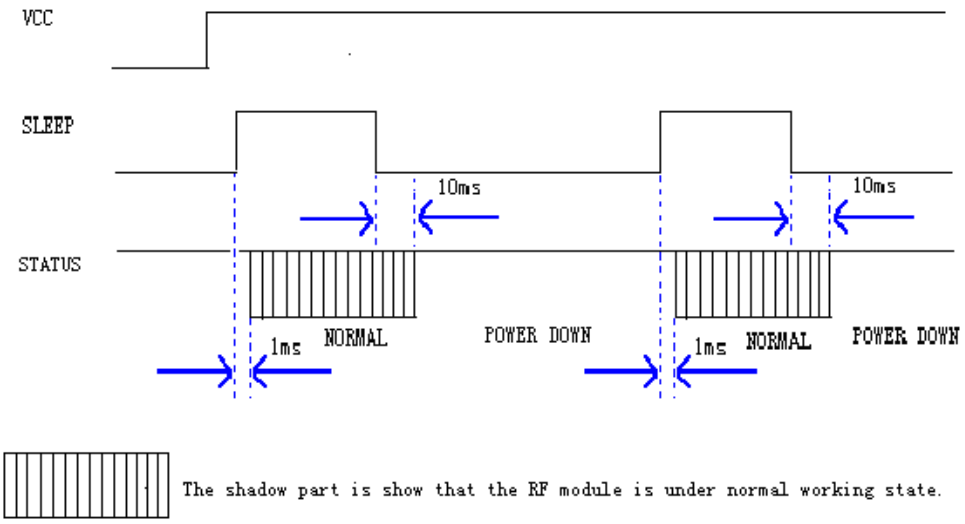
To disable the opened sleep function of KYL-220, the SLP (SLEEP) pin should be definitely connected with 0 or ground.

b. Attentions about using sleep function:

When the sleep function enabled, or any supply glitches, such as switch dithering, fire striking or quick switching on and off, may cause the transceiver switch to wrong sleep mode.

After switching on, users can avoid this error by making a compulsive restoration once after the CPU delays 100ms.

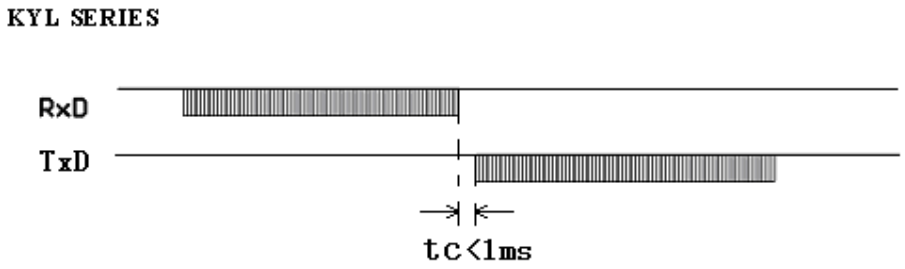
Sleep Timing Diagram:



9. The attentions of data transmission

a. The delay time (tc) of conversion between transmitting and receiving is less than 1ms.

Timing diagram:

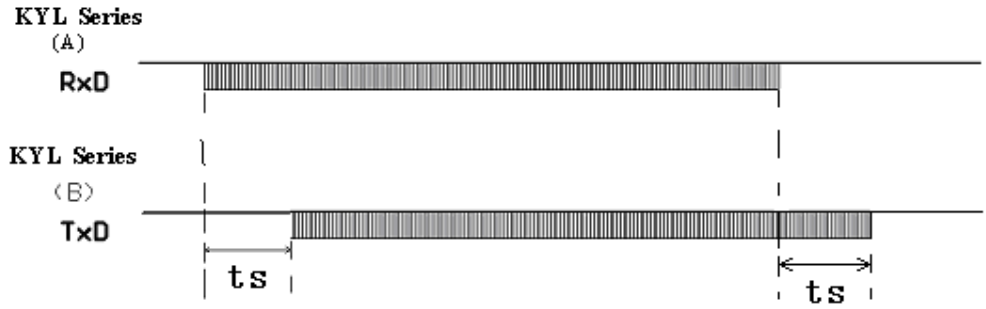


b. The delay time of transceivers between the first bit sent by TxD to the first bit received by RxD.

As data processing will be made on user's data by KYL-220 transceiver using FEC (Forward Error Correction) or other correction algorithm, when RxD of a KYL-200L transceiver 'A' receives the data, then transmits it, the other one transceiver 'B' will have a delay (ts) to receive and transmit by TxD. Different RF data rate causes different delay time. Please see the specific delay time below:

RF Date Rate (bps)	Delay Ts(mS)	RF Date Rate (bps)	Delay Ts(mS)
1200	90	9600	16
2400	48	19200	10
4800	30		

Timing diagram:



c. Error dealing procedure:

To enhance the reliability and stability of user's systems, a verify bit or a Cyclic Redundancy Check (CRC) mode is highly recommended to prevent wrong information while using KYL-220 modules.

d. Large-number data transmission

In theory, when the interface data rate is faster than the RF data rate, KYL-220 transceivers can sent unlimited-long data package, but long packages more than 120B are not recommended. The length of each package should be between 60~100B. We also recommend our users to use Automatic Error Request Equipment (ARQ) to prevent wrong information.

Reasons:

What if the actual transmission BER (Bit Error Rate) is 10^{-4}, 1 packet with 1KB data which is about 10-thousand bits, is sent, theoretically, at least 1 bit will be received wrongly, then the 1KB information will never be received correctly.

But if we package the data into 10 packets with 100B for each, when all 10 packets are sent, there will be only 1 packet wrong according to this probability. After that, resend this wrong packet using ARQ mode. So by resending one more packet and the efficiency rate is reduced 10%, all data will be absolutely received correctly.

10. Antenna configuration:

Many appropriative antennas for low power RF modules are selected to meet different user antenna configurations. Please ask our Sales office for further information about the antenna's dimension and performance.

a. Helical SMA antennas

KYL-ANT-433-10-SMA: 100mm helical SMA antennas with high gain and low cost, reach a long distance.



b. Magnetic vehicle antenna

KYL-ANT-O433S-300H1.5-SMA: include magnetic antenna base, suitable for equipment with metal shell, easy for fixing, effective to enhance the transmission distance.



For more kinds of antennas，please go to our website:
http://www.rf-data.com/Products_list_en.asp?classid=163

If you have special requirements on antennas, please specify, we can design and produce for you individually.

V. Technical specification of KYL-220

* Modulation mode: GFSK/FSK
* Working frequency: 400MHz~470MHz, 868MHz, 915MHz;
* Power supply: DC 5V (3.1~5V informed when placing the order);
* RF power: ≤10mW;
* RF data rate: 1200/2400/4800/9600/1920038400/100Kbps;
* Receive current: <20mA (TTL connect);
* Receive sensitivity: -112dBm (1200bps); -108dBm (9600bps);
* Transmitting current: <40mA;
* Sleep current: <20uA;
* Interface data format: 8E1/8N1/8O1;
* Working temperature: -35□~+75□ (industrial)
* RF Line-of-sight Range: 100m
* Size: 40mm*22mm*6mm (without antenna port).

VII. Description of type

