RK900-10 Ultrasonic automatic Weather Station Communication Protocol

1. RIKA Communication Protocol

Communication parameters: **Baud rate:** 9600, **Data bits:** 8, **Stop bit:**1 , **Check bit:** EVEN.

The weather station receives the correct data frame, replying to the corresponding content, but invalid data frame does not reply any content .no reply is convenient for multiple weather stations to go with 485 bus networking, avoiding data communication conflicts.

2. Instrument internal register description

Register	Byte length	Conception	Type	Range
1	16 bit	Device status	Integer type	0xA000~0xA03F
2	16 bit	Wind direction	Integer type	0-359°
3.4	32 bit	Wind speed	Float point type	0-60m/s
5.6	32 bit	Air Temp.	Float point type	-40~+80℃
7.8	32 bit	Air Humi.	Float point type	0-100%RH
9.10	32 bit	Air pressure.	Float point type	150-1100hPa
11	16 bit	Electronic compass	Integer type	0-359°
12	16 bit	Rain/Snow	Integer type	0x0000~0x000F
13.14	32 bit	Rainfall	Float point type	100mm/h
15.16	32 bit	Rainfall acc.	Float point type	
17	16 bit	Rainfall unit	Integer type	
18	16 bit	Positioning status	Integer type	0. Not positioned, 1. Positioned
19.20	32 bit	Speed of ship	Float point type	Km/h
21	16 bit	Course	Integer type	0-359°
22.23	32 bit	Longitude	Float point type	East longitude is positive, West longitude is negative
24.25	32 bit	Latitude	Float point type	North latitude is positive, Southern latitude is negative
26.27	32 bit	Dust concentration	Float point type	ug/m^3
28.29	32 bit	Visibility	Float point type	m
30.31	32 bit	Illuminance	Float point type	Lux
32.33	32 bit	Radiation(accu.)	Float point type	KJ
34.35	32 bit	Radiation	Float point type	W
36.37	32 bit	Real wind direction	Float point type	0-359°

38.39	32 bit	Altitude	Float point type	m
40.41	32 bit	Real wind speed	Float point type	m/s

3. Read real-time data

Client sends:

01 03 00 00 00 29 84 14

Weather Station Return:

01 03 52 BFFF 0038 C28F3CF5 333341E7 66664274 3E144468 000C 0001 66664256 000042F7

0201 0001 999A 4121 0143 32464125 A59C42CF 00004270 000042C8 4000459C 00004348

399A4559 14084148 33334249 A2E14034 D25D

3.1 Description of Return data format

No.	Conception	Byte Number	Description	Remarks
1	Address block	1	Address(0x01)	0x01
2	Function code	1	Only read(0x03)	0x03
3	Number of bytes	1	0X52	82bytes
4	Device status	2	0xBF 0xFF	Device status
5	Data block	2	Wind direction	0x0038(56°)
		4	Wind speed	0x3CF5C28F(0.03m/s)
		4	Air Temp.	0x41E73333 (28.9℃)
		4	Air Humi.	0x42746666(61.1%)
		4	Air pressure.	0x4468143E(929.0hPa)
		2	Electronic compass	0x000C(12°)
		2	Rain/Snow	0x0010(Rain)
		4	Rainfall	0x42566666(53.6mm/h)
		4	Rainfall acc.	0x42F70000 (123.5mm)
		2	Rainfall unit	0x0201(mm/h)
		2	Positioning status	0x0001(rain)
		4	Speed of ship	0x4121999A(10.1)
		2	Course	0x0143(323)
		4	Longitude	0x41253246(10.324774)
		4	Latitude	0x42CFA59C(103.823456)
		4	Dust concentration	0x42700000(60.0ug/m^3)
		4	Visibility	0x42C80000(100m)
		4	Illuminance	0x459C4000(5000Lux)
		4	Radiation (accu.)	0x43480000(200KJ)

		4	Radiation	0x4559399A(3475.6W)
		4	Real wind direction	0x41481408(12.5°)
		4	Altitude	0x42493333(50.3m)
		4	Real wind speed	0x4034A2E1(2.82m/s)
6	Check block	2		0XD2 0x5D

Rainfall uint(Factory Settings)			Rain/Snow 0x0001:Rain 0x0010:Snow 0x0100:Solid(such as hail)
High eight		Low eight(Reserved)	
00	mm/s	**	
01	mm/m	**	
02	mm/h	**	

3.2 Device status table

Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8
1	0	1	Real wind speed	Real wind direction	Altitude	Visibility	Illuminance
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Solar radiation	Dust concentration	GPS	Rainfall	Electronic compass	Pressure	Wind speed and direction	Temperature & humidity

The high three digits are fixed numbers, and the remaining values of each digit are 0 or 1. For example, the device status is restored to 0xA082, and the binary is converted to 1010000010000010, corresponding to the above table, indicating the following parameters : solar radiation, wind speed, wind direction.

4. Clear Rainfall acc.

Client sends

01 10 00 0F 00 02 04 00 00 00 00 B3 EF

Weather Station Return

01 10 00 0F 00 02 71 CB

5.Instrument configuration(you can choose ASCII or Hex)

Through the connecting with the instrument, some parameters of the instrument can be configured, such as changing the communication address and changing the Baud rate

- **Command one: Enter the Settings mode**

Sent

（ASCII） >*\r\n

（Hex） 3E 2A 0D 0A

Response

（ASCII） \n>CONFIGURE MODE\r\n

（Hex） 0A 3E 43 4F 4E 46 49 47 55 52 45 20 4D 4F 44 45 0D 0A

- **Command two: Set the serial port configuration**

Sent

（ASCII） >CUS 9600 8-N-1\r\n

（Hex） 3E 43 55 53 20 39 36 30 30 20 38 2D 4E 2D 31 0D 0A

Response

（ASCII） >CMD IS SET\r\n

（Hex） 3E 43 4D 44 20 49 53 20 53 45 54 0D 0A

Note: The CUS is required followed by the serial port parameters that will need to be set. If it is not followed by the parameters, the command becomes the current query configuration.(Such as sent: '>ID\r\n', Response:' \n>COM USART SET : 9600 N-8-1\r\n')

- **Command three: Set the address**

Sent

（ASCII） >ID 2\r\n

（Hex） 3E 49 44 20 32 0D 0A

Response

（ASCII） >CMD IS SET\r\n

（Hex） 3E 43 4D 44 20 49 53 20 53 45 54 0D 0A

Note: This 2 is the address you want to set(set according to the need,1-255)，which must be in decimal format, If 'ID' is not followed by address, the command becomes the current query address(Such as sent: >ID\r\n, Response: ID(HEX) : 02\r\n)

- **Command four: Reset**

Sent:

（ASCII） >RESET\r\n

（Hex） 3E 52 45 53 45 54 0D 0A

After the instrument receives this command successfully，Soft reset is performed.

- **Command five: Manually exit the Settings mode**

Sent:

（ASCII） >!\r\n

（Hex） 3E 21 0D 0A

Response:

（ASCII） \n>NORMAL MODE\r\n

（Hex） 0A 3E 4E 4F 52 4D 41 4C 20 4D 4F 44 45 0D 0A

5.1 Steps:

1. Set the address

'Command one' => 'Command three' => 'Command five' => 'Command four'

2. Set the serial port configuration

'Command one' => 'Command two' =>' Command five' =>' Command four'

Note:

1. There are two spaces in the 'CUS 9600 8-N-1'to note,'8-N-1' separated by'-', no spaces.

Baud rate	Data Bits	Parity	Stop Bits
2400-115200	8	N:NONE, E:EVEN, O:ODD	1 2

2. Any setting instruction (2, 3) must first let the instrument enter the setting mode, and the setting mode will be automatically closed if no operates on setting within 15-second. so the setting instruction must be input within 15 seconds. and the 15-second countdown reset restart after successful input.

3. After setting the instrument, "Command four must be sent to make the instrument soft reset before the new setting can take effect.

4. "\r\n" is the carriage return line feed, corresponding to HEX (0x0D,0x0A)

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