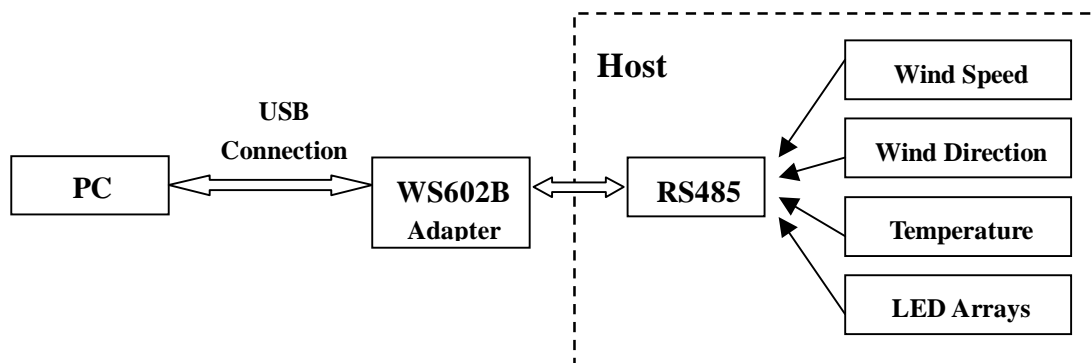


Description of WSV3 Interface (USB-RS485)

1. Feature

- | Read the data from WSV3
- | LED lighting control
- | Wind speed measurement calibration
- | Wind direction measurement calibration
- | Family code read the WSV3 family code
- | Read the WSV3's node number and baud rate
- | Change the node number
- | Change the baud rate
- | Change to default setting

2. System diagram



3. Hardware port

- 1) The I/O port for WSV3 can be RS485. The Protocol below is described for RS485.
- 2) **Baud rate setting**
2400, 4800, 9600, 19200 (9600 bps default)

4. Data format

- 1) **Communication with the WSV3**

The WSV3 can be accessed via RS485 as the data format below

'+'	'w'	's'	Length	Node	Data/command mode	Type	Data	Verify data
1byte	1byte	1byte	1byte	1byte	1byte	1byte	Any	1byte

Head: Beginning with 3 characters as "+ws".

Hex is “0x2B, 0x77, 0x73”

Length: Total number of bytes after Length except Verify data.

Total numbers of the bytes: node + Data/command mode + data = 6

Node: Assign node number for WSV3.If node number is 0 that the on current bus must have only one **WSV3**.Otherwise the control or respond data will be incorrect.

Data/command mode: 0xEA for DATA, 0xEB for command

Type: It means which type of use for these data or command.

Data: the information for communication

Verify data: check sum 8 with Node, Data/command mode and Data.

2) The description on Dada from WSV3

The WSV3 can output the information about the wind speed, wind direction, temperature, and the LED on/off status as well as its intensity. Upon received the read data command, WSV3 will send back a 20-byte data:

‘+’	w	s	Length	Node	Data mode	Type
1byte	1byte	1byte	1byte	1byte	1byte	1byte
			7			
Direction	Speed	Temperature	Lighting mode	Lighting status	Lighting level	Light threshold
1byte	1byte	2byte	1byte	1byte	1byte	1byte
			15			
Voltage	Intensity	Speed cal	Direction cal	Verify data		
1byte	1byte	1byte	1byte	1byte		
			20			

Head: “+ws”.

Length: Total number of bytes after Length except Verify data. Here is15.

Node: WSV3 node number.

Mode: Mode=0xEA(data mode).

Type: Type=0xA1,It means that these data are respond to read data command.

Direction: system current wind direction. (16 directions) 1=N 2=NNE, 3=NE, 4=NEE, 5=E, 6=EES, 7=ES, 8=ESS, 9=S, 10=SSW, 11=SW, 12=SWW, 13=W, 14=WWN, 15=WN, 16=WNN

Speed: system current wind speed.

If (0<Speed cal<200)

Wind speed = count *2.453*1.069*1000/3600* Speed cal /100 (m/s);

Else

Wind speed = count *2.453*1.069*1000/3600 (m/s);

Temperature: 2 bytes,

$$T=T_L/2 \quad T_H=0x00$$

$$T = \sim(T_L)/2 \quad T_H=0xFF$$

Lighting mode:

Mode 0, manual mode.

Mode1...3, system auto control mode.

Mode4...10, user program, system auto control mode.

Lighting status: system current LED status.

Bit0, Bit1, Bit2, used to control Blue LED, it has three levels.

Bit3, Bit4, Bit5, used to control Red LED, it has three levels.

LED status	Bit7	Bit5 Bit4 Bit3	Bit2 Bit1 Bit0
Blue LED level 1	1	000	001
Blue LED level 2	1	000	011
Blue LED level 3	1	000	111
Red LED level 1	1	001	000
Red LED level 2	1	011	000
Red LED level 3	1	111	000
Both LED level 1	1	001	001
Both LED level 2	1	011	011
Both LED level 3	1	111	111
Both LED turn off	0	----	----

Light level: When system LED is running with auto mode, the LED's light level.

When Light level=1, the LED's light is low.

When Light level=3, the LED's light is middle.

When Light level=7, the LED's light is high.

Light threshold: when system's running mode is 1...10, this parameter is available. If intensity higher than light threshold, it means that this time is day time. Then system will running with day light saving mode, The LED will be turn off. If in night time, the intensity is lower than light threshold. Then system will be running with normal mode. the LED will be turn on or flash. If you don't need to turn off the LED, you can set the light

threshold 255 or 0.

Voltage: test power supply voltage

Intensity: daylight intensity to indicate day time or night time

Speed cal: calibration factor for wind speed measurement. (Default = 100).

Direction cal: system current wind direction calibration setting value.

Verify data: Check sum 8 with all bytes after Length except Verify data.

3) Control Command

I Read data from WSV3

Head: “+ws”

Length: 7

Node: Node number to access. If node number is 0 that the on current bus must have only one **WSV3**. Otherwise the control or respond data will be incorrect.

Mode: Mode=0xEB(Command Mode).

Type: Type=0xA1(Command type), It means that read data from WSV3.

NOP: bytes reserved

Verify data: Check sum 8 with all bytes after Length except Verify data.

‘+’	‘w’	‘s’	7	Node	0xEB	0xA1	NOP	Verify data
1byte	1byte	1byte	1byte	1byte	1byte	1byte	4bytes	1byte

1

8

I LED control

Head: “+ws”

Length: 7

Node: Node number to access. If node number is 0 that the on current bus must have only one **WSV3**. Otherwise the control or respond data will be incorrect.

Mode: Mode=0xEB(Command Mode).

Type: Type=0xA2(Command type), LED control command to WSV3.

Lighting mode:

Mode 0, PC control mode.

Mode1...3, system auto control mode.

Mode4...10, user program, system auto control mode.

Light status: This byte is available, when “Light model” is 0.

Bit7=1, Bit0| Bit1| Bit2| Bit3| Bit4| Bit5≠0;LED turn on;

Bit7=0, LED turn off;

Bit0|Bit1| Bit2| Bit3| Bit4| Bit5=0, LED turn off;

Bit0, Bit1, Bit2, used to control Blue LED, it has three levels.

Bit3, Bit4, Bit5, used to control Red LED, it has three levels.

LED status	Bit7	Bit5 Bit4 Bit3	Bit2 Bit1 Bit0
Blue LED level 1	1	000	001
Blue LED level 2	1	000	011
Blue LED level 3	1	000	111
Red LED level 1	1	001	000
Red LED level 2	1	011	000
Red LED level 3	1	111	000
Both LED level 1	1	001	001
Both LED level 2	1	011	011
Both LED level 3	1	111	111
Both LED turn off	0	----	----

Light level: When system LED run with auto model, the LED's light level.

When Light level = 1, the LED's light is low.

When Light level = 2, the LED's light is middle.

When Light level = 3, the LED's light is high.

Light threshold: When system running model is 1...10, this parameter is available. If intensity higher than light threshold, it means that this time is day time. Then system will running with day light saving mode, The LED will be turn off. If in night time, the intensity is lower than light threshold. Then system will be running with normal mode, the LED will be turn on or flash. If you don't need to turn off the LED, you can set the light threshold 255 or 0.

Verify data: Check sum 8 with all bytes after Length except Verify data.

'+'	'w'	's'	7	Node	0xEB	0xA2
1byte	1byte	1byte	1byte	1byte	1byte	1byte

1

7

Mode	Status	Light level	Light threshold	Verify data
1byte	1byte	1byte	1byte	1byte

8

12

I Setting the calibration factor speed cal.

Head: “+ws”

Length: 6

Node: Node number to access. If node number is 0 that the on current bus must have only one **WSV3**. Otherwise the control or respond data will be incorrect.

Mode: Mode=0xEB(Command Mode).

Type: Type=0xA3, Setting the calibration factor speed cal command to **WSV3**.

Speed cal: read to set into **WSV3** for speed correction

Verify data: Check sum 8 with all bytes after Length except Verify data.

‘+’	‘w’	‘s’	6	Node	0xEB	0xA3	Speed cal	NOP	Verify data
1byte	1byte	1byte	1byte	1byte	1byte	1byte	1byte	2bytes	1byte

1

11

I Setting the initial wind direction

Head: “+ws”

Length:4

Node: Node number to access. If node number is 0 that the on current bus must have only one **WSV3**. Otherwise the control or respond data will be incorrect.

Mode: Mode=0xEB(Command Mode).

Type: Type=0xA3, Setting the initial wind direction command to **WSV3**.

Direction cal: It means that the current wind direction is this value. When this value will be send to system successfully, System direction will be changed to this value as a initial direction.

Direction cal(1—16).

Verify data: Check sum 8 with all bytes after Length except Verify data.

‘+’	‘w’	‘s’	4	Node	0xEB	0xA4	Direction cal	Verify data
1byte	1byte	1byte	1byte	1byte	1byte	1byte	1byte	1byte

1

9

I Read the **WSV3** family code

Head: “+ws”

Length: 4

Node: Node number to access. If node number is 0 that the on current bus must have only one **WSV3**. Otherwise the control or respond data will be incorrect.

Mode: Mode=0xEB(Command Mode).

Type: Type=0xB1, Read the WSV3 family code command.

NOP: Bytes reserved

Verify data: Check sum 8 with all bytes after Length except Verify data.

'+'	'w'	's'	4	Node	0xEB	0xB1	Nop	Verify data
1byte	1byte	1byte	1byte	1byte	1byte	1byte	1byte	1byte

1

9

I Read the WSV3 node number and baud rate

Head: "+ws"

Length: 4

Node: Node number to access. If node number is 0 that the on current bus must have only one **WSV3**. Otherwise the control or respond data will be incorrect.

Mode: Mode=0xEB(Command Mode).

Type: Type=0xB2, Read the WSV3 node number and baud rate command.

NOP: Bytes reserved

Verify data: Check sum 8 with all bytes after Length except Verify data.

'+'	'w'	's'	4	Node	0xEB	0xB2	Nop	Verify data
1byte	1byte	1byte	1byte	1byte	1byte	1byte	1byte	1byte

1

9

I Assign the WSV3 node number

Head: "+ws"

Length: 4

Node: Node number to access. If you didn't know the Node number that you can set the Node number value is 0. It means to access the current WSV3. When the node number is 0 that the on current bus must have only one **WSV3**. Otherwise the control or respond data will be incorrect.

Mode: Mode=0xEB(Command Mode).

Type: Type=0xB3, Assign the WSV3 node number command.

New node: updated node number

Verify data: Check sum 8 with all bytes after Length except Verify data.

'+'	'w'	's'	4	Node	0xEB	0xB3	New node	Verify data
1byte	1byte	1byte	1byte	1byte	1byte	1byte	1byte	1byte

1

9

I Setting Baud rate

Head: "+ws"

Length: 4

Node: Node number to access. If node number is 0 that the on current bus must have only one **WSV3**. Otherwise the control or respond data will be incorrect.

Mode: Mode=0xEB(Command Mode).

Type: Type=0xB3, Setting Baud rate command.

Baud rate: 1(2400bps), 2(4800bps), 3(9600bps), 4(19200bps)

NOP: Bytes reserved

Verify data: Check sum 8 with all bytes after Length except Verify data.

'+'	'w'	's'	6	站号	0xEB	0xB4	Baud rate	NOP	Verify data
1byte	1byte	1byte	1byte	1byte	1byte	1byte	1byte	2bytes	1byte

1

11

I Return to Default setting

Head: "+ws"

Length: 4

Node: Node number to access. If node number is 0 that the on current bus must have only one **WSV3**. Otherwise the control or respond data will be incorrect.

Mode: Mode=0xEB(Command Mode).

Type: Type=0xB3, Return to Default setting command.

Reset XXX: 0xC0

Verify data: Check sum 8 with all bytes after Length except Verify data.

'+'	'w'	's'	4	Node	0xEB	0xC0	0xC0	Verify data
1byte	1byte	1byte	1byte	1byte	1byte	1byte	1byte	1byte

1

9

I LED program

Head: "+ws"

Length: 28

Node: Node number to access. If node number is 0 that the on current bus must have only one **WSV3**. Otherwise the control or respond data will be incorrect.

Mode: Mode=0xEB(Command Mode).

Type: Type=0xA5, Return to Default setting command.

Program location: $1 \leq \text{Program location} \leq 10$; system have 10 block used to LED program, system used 3 block, and user can used 7 block to program LED with he liked.

Step time: Each step time. (Default= 1, it means about 1 second each step)

Nop: Bytes reserved (2 Bytes)

Step count: $1 \leq \text{Step count} \leq 20$; it means that in the LED Program data,

there are Step count number of bytes is available. When system running with auto mode, system can be used these available LED Program data in a cycle and flash the LED.

LED Program data: $1 \leq \text{LED Program data} \leq 3$;

When LED Program data = 1, it means Red LED turn on.

When LED Program data = 2, it means Blue LED turn on.

When LED Program data = 3, it means both LED turn on.

Verify data: Check sum 8 with all bytes after Length except Verify data.

'+'	'w'	's'	4	Node	0xEB	0xA5	Program location	
1byte	1byte	1byte	1byte	1byte	1byte	1byte	1byte	
1			8					
Step time	Nop	Step count	LED Program data		Verify data			
1byte	2bytes	1byte	20bytes		1byte			
9			33					

4) Feedback message from WSV3

I WSV3 respond to read DATA control command.

Look forward to the description on Dada from WSV3

I WSV3 respond to control the status of LED command.

Look forward to the description on Dada from WSV3

I WSV3 respond to read family code.

Head: "+ws"

Length: 7

Node: Node number to respond.

Mode: Mode=0xEA(data mode).

Type: Type=0xB1, WSV3 respond to read family code command.

Family: Family number.

Code: The only serial code for the WSV3.

Verify data: Check sum 8 with all bytes after Length except Verify data.

'+'	'w'	's'	7	Node	0xEB	0xB1	family	code	Verify data
1byte	1byte	1byte	1byte	1byte	1byte	1byte	1byte	3byte	1byte

1

12

I WSV3 respond to read Node number and Baud rate.

Head: "+ws"

Length: 7

Node: Node number to respond

Mode: Mode=0xEA(data mode).

Type: Type=0xB2, WSV3 respond to read Node number and Baud rate command.

Node: Node number to respond

Baud rate: 1 (2400bps), 2(4800bps), 3(9600bps), 4(19200bps)

Default value is 3

NOP: Bytes reserved

Verify data: Check sum 8 with all bytes after Length except Verify data.

'+'	'w'	's'	7	Node	0xEB	0xB2	Node	Baud rate	NOP	Verify data
1byte	1byte	1byte	1byte	1byte	1byte	1byte	1byte	1byte	2byte	1byte

1

12

I WSV3 respond to setting and configuration.

Head: "+ws"

Length: 4

Node: Node number to respond

Mode: Mode=0xEA(data mode).

Respond type:

Respond type = 0xA3, It means that the respond is for the wind speed calibration.

Respond type = 0xA4, It means that the respond is for setting the initial wind direction.

Respond type = 0xA5, It means that the respond is for setting the initial wind direction.

Respond type = 0xB3, It means that the respond is for assign the WSV3 node number

Respond type = 0xB4, It means that the respond is for setting the baud rate of communication.

Respond type = 0xC0, It means that the respond is for used default setting.

Result of setting: Result of setting=0x1E,Setting success.

Result of setting=0x45,Setting failing.

Verify data: Check sum 8 with all bytes after Length except Verify data.

'+'	'w'	's'	4	Node	0xEB	Res type	Result setting	Verify data
1byte	1byte	1byte	1byte	1byte	1byte	1byte	1byte	1byte

1

12

appendix:

1. How to use check sum 8 ?

The check sum8 function is:

```
char check_sum8(char * data, char length)
{
    char i;
    char check_sun_data;
    check_sun_data = 0;
    for( i=0; i<length; i++ )
    {
        check_sun_data = check_sun_data + data[i];
    }
    return check_sun_data;
}
```