Six-in-one sensor module TTL

Function: Detect real-time data of CO2, formaldehyde, TVOC, PM2.5 and temperature and humidity in the environment

Product Manual

Version number: V1.2 Implementation date: 2018 Nian 07 Yue 12 Ri

Repair set record record						
version number	change content	Implementation date				
V1.0	initial version	20170402				
V1.1	 Add PM10 data Add users to change the data upload cycle instruction by themselves The unit of TVOC and CH2O is unified to ug/m3 Users can know the version information of the firmware 	20171101				
V1.2	The module port is changed to 4P port , Dust sensor to change with locking screws PCB	20180712				

statement

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Thank you for using the series of products. In order to enable you to use the company's products better and reduce the production caused by improper use

If the product fails, please read this manual carefully before use and use it in accordance with the suggested method of use. If you do not use this manual or remove, disassemble, or replace the internal components of the sensor without authorization, our company will not bear any losses caused thereby. The color, style and size of the product you purchased are subject to the actual

Six-pass sense module is a collection of CO2, laser dust, temperature and humidity, TVOC integrated air mass sensor and formaldehyde in one. Can be in the ring

The company upholds the concept of technological advancement and is constantly committed to product improvement and technological innovation. Therefore, the company reserves

The right to make any product improvements without prior notice. When using this manual, please confirm that it is a valid version. At the same time, the company encourages users to explore more optimized methods of using this product

based on their usage.

1. Product function description

Real-time detection in the environment, and output data through a certain protocol format, easy to use, with good stability.

Please keep this manual properly so that you can consult it and get help in time when you need it in the future.

product.

The illustrations are for reference only, and the actual products shall prevail. 2. Product application areas: Portable meters, vehicle-mounted systems, air quality monitoring equipment, air purifiers, fresh air ventilation systems, air conditioners, smart home equipment and other places . 3. Product technical indicators 1. Detection parameters and resolution Measurement measurement Measuring range resolution accuracy eCO2 400~5000ppm 1ppm ±75ppm 0.3 ug/m^3 0~1000 ug/m³ PM2.5 ±10% 0~1000 ug/m³ PM10 ±10%

1 ug/m³ $\pm 12 \text{ ug/m}^3$ 0-1200ug/m³ TVOC 1 ug/m³ ±3 ug/m³ eCH2O 0-500ug/m³ The CO2 value and CH2O measured by the module are the equivalent value output of TVOC, please pay attention when using or purchasing. 2. Working voltage: DC5V±0.2V (The ripple must not exceed 200mv)

0.01 $^{\circ}$ C

0.04%

5. Communication method: serial port output data 1S/ time (data transmission cycle can be changed by instructions) 6. Warm-up time : ≤3 minutes

4. Working environment: working temperature 0~50°C working humidity: 15%RH-90 % RH (non-condensing)

7. Service life: 5 years (in the air) Fourth, product specifications

description

Serial port receiver /RS485_B

0~60°C

0~100%RH

±0.5°C

±3%RH

1. Wiring definition Serial number

Temperature

Humidity

3. Working current : ≤125mA

RX/B 1 TX/A

2	TX/A	Serial port sender /RS485_A
3	GND	GND
4	5V	DC5V input

The length of the CRC check byte is: 17 (that is, the bytes of sequence number 1 to sequence number 17). Select A001 or 8005 in reverse order.

Remarks: The interface spacing is 2.54mm, and the 90° pin interface is used without special instructions.

1. Data format (module -> user MCU)

Five, product communication protocol

2. Dimensions (55.8*50*15 mm)

Message header (1 Byte) + function code (1Byte) + data length (1Byte) + data (n Byte) + CRC16 check (2Byte) Serial Description The data calculation method is as follows:

name

number

(hexadecimal)

Serial TTL communication protocol (9600, parity bit, none, stop bit, 1 bit) data transmission cycle: default 1s (can be changed)

 $CO2 (ppm) = CO2_H*256+CO2_L$ 01 Header TVOC (ug/m 3) = $(TVOC_H*256+TVOC_L)/10.0$ function

(1 v o c (ug/ m o) (1 v o c_m 2 o o o o o o o o o o o o o o o o o o				2	code		03			
CH2O (ug/m 3) = (CH2O_H*	[•] 256+CH2O_L)/10.0	3	Data leng	th	0E			
				4	Data 1		CO2_H			
PM2.5 (ug/m	5			CO2_L						
PM10 (ug/m	3) = PM1	0_H*256+ P	M10_L	6	Data 2	TVOC_H				
humidity (%RF	7	TVOC_L								
, ,	8	Data 3		CH2O_H						
S RH:	9			CH2O_L						
temperature (°C) = -46.85+	10	Data 4		PM2.5_H					
S tem = Temperature_H *256+ Temperature_L				11			PM2.5_L			
				12	Data 5	H	umidity_H			
				13		н	umidity_L			
	14	Data 6 Temperature_H Temperature_L								
	15			nperature_L						
				16	Data 7 PM10_H PM10_L		PM10_H			
				17			PM10_L			
				18	CRC16 chec	k	CRC16_L			
				19	CRC16 chec	k	CRC16_H			
2. Modify the	data transmis	ssion cycle for	mat (the maximu	m can only be	changed to 10) seconds)				
Serial number	1	2	3	4	5	6	7	8		
•			Transmission							

Note: The value range of the transmission period is: $0x01^{0}x0A$, 0X11 in the serial number 5 is the version number (v1.1) CRC check calculation method: /*CRC check table high order */

0x00

0x01

0x00

0x11

0x00

0x00

0x00

0x00

0xFF

0xFF

0x40, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x40, 0x81, 0x40, 0x61, 0x61, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81,

/*CRC check the number, generate CRC*/

return (((u 16) uchCRCHi) << 8 | uchCRCLo);

U32 CRC_ Compute (U8 * pushMsg, U8 usDataLen)

unsigned char auchCRCHi [] = {

0x42

0x42

0x78

0x78

cycle

cycle

Transmission

receive

answer

0x40, 0x01, 0xC0, 0x80, 0x4 1, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x81, 0x40, 0xC1, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40,

0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81,

0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x40, 0x81, 0x40, 0xC1, 0xE1, 0xE10xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC 0, 0x80, 0x41,

0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x40, 0x40, 0x81, 0x40, 0xC1 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41,

0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40 /* CRC check table low bit */ unsigned char auchCRCLo [] = {

0x00, 0xC0, 0xC1, 0x01, 0xC3, 0x03, 0x02, 0xC2, 0xC6, 0x06, 0x07, 0xC7, 0x05, 0xC5, 0xC4, 0x04, 0xCC, 0x0C, 0x0D, 0xCD, 0x0F, 0xCF, 0xCE, 0x0E, 0x0A, 0xCA, 0xCB, 0x0B, 0xC9, 0x09, 0x08, 0xC8, 0xD8, 0x18, 0x19, 0xD9, 0x1B, 0xDB, 0xDA, 0x1 A, 0x1E, 0xDE, 0xDF, 0x1F, 0xDD, 0x1D, 0x1C, 0xDC, 0x14, 0xD4, 0xD5, 0x15, 0xD7, 0x17, 0x16, 0xD6, 0xD2, 0x12, 0x13, 0xD3, 0x11, 0xD1, 0xD0, 0x10, 0xF0, 0x30, 0x31, 0xF1, 0x33, 0xF3, 0xF2, 0x32, 0x36, 0xF6, 0xF7,

0x37, 0xF5, 0x35, 0x34, 0xF4, 0x3C, 0xFC, 0xFD, 0x3D, 0xFF, 0x3F, 0x3E, 0xFE, 0xFA, 0x3A, 0x3B, 0xFB, 0x39, 0xF9, 0xF8, 0x38, 0x28, 0xE8, 0xE9, 0x29, 0xEB, 0x2B, 0x2A, 0xEA, 0xEE, 0x2E, 0x2F, 0xEF, 0x2D, 0xED, 0xEC, 0x2C, 0xE4, 0x24, 0x25, 0xE5, 0x27, 0xE7, 0xE6, 0x26, 0x22, 0xE2, 0xE3, 0x23, 0xE1, 0x21, 0x20, 0xE0, 0xA0, 0x60, 0x61, 0xA1, 0x63, 0xA3, 0xA2, 0x62, 0x66, 0xA6, 0xA7, 0x67, 0xA5, 0x65, 0x64, 0xA4, 0x6C, 0xAC, 0xAD, 0x6D, 0xAF, 0x6F, 0x6E, 0xAE, 0xAA, 0x6A, 0x6B, 0xAB, 0x69, 0xA9, 0xA8, 0x68, 0x78, 0xB8, 0x B9, 0x79, 0xBB,

0x7B, 0x7A, 0xBA, 0xBE, 0x7E, 0x7F, 0xBF, 0x7D, 0xBD, 0xBC, 0x7C, 0xB4, 0x74, 0x75, 0xB5, 0x77, 0xB7, 0xB6, 0x76, 0x72, 0xB2, 0xB3, 0x73, 0xB1, 0x71, 0x70, 0xB0, 0x50, 0x90, 0x91, 0x51, 0x93, 0x53, 0x52, 0x92, 0x96, 0x56, 0x57, 0x97, 0x55, 0x95, 0x94, 0x54, 0x9C, 0x5C, 0x5C0x5D, 0x9D, 0x5F, 0x9F, 0x9E, 0x5E, 0x5A, 0x9A, 0x9B, 0x5B, 0x99, 0x59, 0x58, 0x98, 0x88, 0x48, 0x49, 0x89, 0x4B, 0x8B, 0x8A, 0x4A, 0x4E, 0x8E, 0x8F, 0x4F, 0x8D, 0x4D, 0x4C, 0x8C, 0x44, 0x84, 0x85, 0x45, 0x87, 0x47, 0x46, 0x86, 0x82, 0x42, 0x43, 0x83, 0x41, 0x81, 0x80, 0x40

U8 uchCRCHi = 0xFF; // high CRC byte initialization U8 uchCRCLo = 0xFF; // low CRC byte initialization U8 uindex; // CRC cable loop primer while(usDataLen --) ulndex = uchCRCLo ^ * pushMsg ++;// Calculate CRC uchCRCLo = uchCRCHi ^ auchCRCHi [ulndex]; uchCRCHi = auchCRCLo [ulndex];

Six, matters needing attention 1. Avoid contact with organic solvents (including silica gel and other adhesives), paints, chemicals, oils and high-concentration gases.

2. The module cannot withstand excessive impact or vibration.

3. Do not apply this module to systems involving personal safety. 4. Do not install the module in a strong air convection environment.