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Zigbee1082

User's Manual

Beijing ART Technology Development Co., Ltd.

Contents

Chapter 1 Overview

ZigBee is the specification of a low-cost, low-power wireless communications solution, meant to be integrated as the main building block of ubiquitous networks.

Zigbee1082 is a data acquisition module based on ZigBee wireless transmission. It can sample data and transfer the data to processing device to constitute the laboratory, product quality testing center and systems for different areas of data acquisition, waveform analysis and processing. It may also constitute the monitoring system for industrial production process.

Unpacking Checklist

Check the shipping carton for any damage. If the shipping carton and contents are damaged, notify the local dealer or sales for a replacement. Retain the shipping carton and packing material for inspection by the dealer.

Check for the following items in the package. If there are any missing items, contact your local dealer or sales.

- Zigbee1082
- ART Card
  a) user's manual (pdf)
  b) drive
  c) catalog
- Warranty Card

FEATURES

- Input Type: Thermocouple, J, K, T, E, R, S, B, N, WRe5-WRe26
- 16-bit resolution
- Analog Input Mode: 8SE
- Sample Rate: 10Hz
- Input Impedance: 20MΩ
- Full-scale Drift: 25ppm/℃
- Isolation Voltage: 3000V
- Built-in Watchdog
- Power Supply: unregulated +10V ~ +30V_{DC}
- Power Consumption: 0.6W @ 24V_{DC} (module does not use XBEE network to transmit data)

Configuration Table

■ TABLE1 Baud Rate Code Table

Code	00	01	02	03	04	05	06	07
Rate	1200	2400	4800	9600	19200	38400	57600	115200

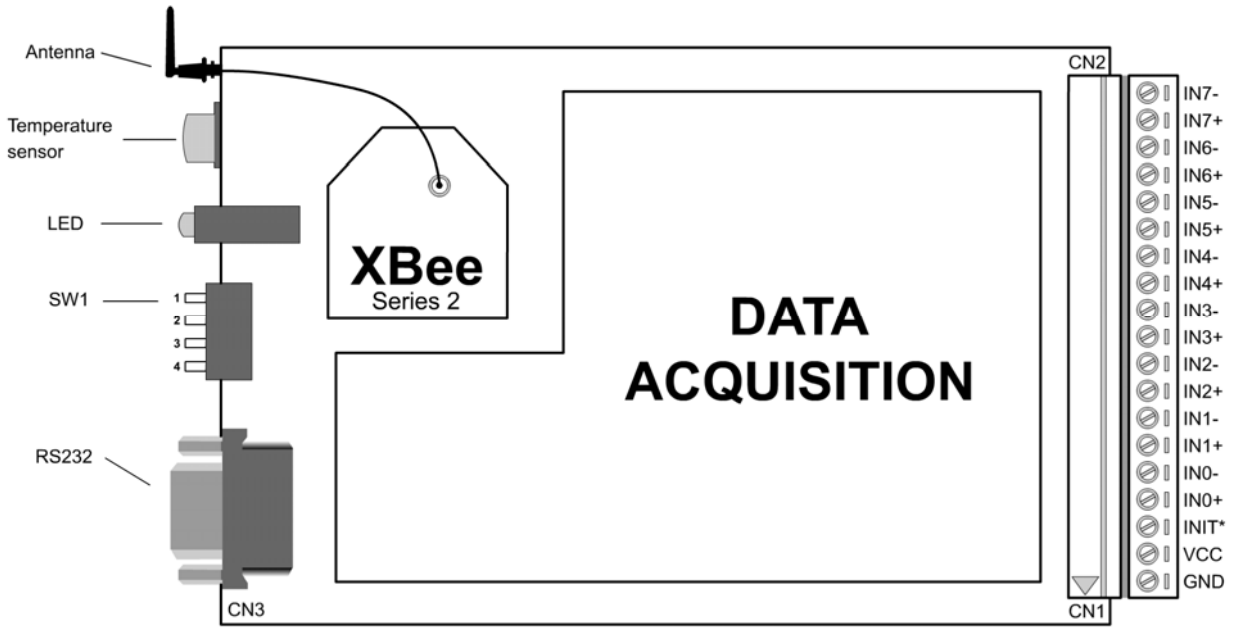
■ **TABLE2 Analog Input Type Code and the Error Table**

Input Type	Input Range	Typical Accuracy (℃)	Max Error(℃)	Code(Hex)
J	0~1200℃	±0.8	±1.0	10
K	0~1300℃	±0.5	±0.9	11
T	-200~400℃	±0.2	±0.8	12
E	0~1000℃	±0.5	±1.0	13
R	0~1700℃	±1.0	±2.5	14
S	0~1768℃	±1.5	±2.5	15
B	0~1800℃	±1.5	±2.5	16
N	0 ~ 1300℃	±0.5	±1.0	17
WRe5-WRe26	0 ~2300℃	±1.5	±2.5	19

Note: R, S, B and WRe5-WRe26 thermocouple accuracy (MAX: ±2.5℃) range between 500℃ to full-scale.

Chapter 2 Components Layout Diagram and a Brief Description

2.1 The Main Component Layout Diagram



2.2 The Function Description for the Main Component

2.2.1 Wiring Terminal

GND: power negative
VCC: power positive
INIT: reset button, short this pin and GND before power on, then reset the module to the default value: baud rate 9600bps, address 1.
IN0~IN7: 8 thermocouple inputs

2.2.2 DIP switch SW1

SW1: 1=ON, 3=ON, 2=OFF, 4=OFF, configure XBEE module of Zigbee1082.
1=OFF, 3=OFF, 2=ON, 4=ON, transmit the data to Data Center through ZIGBEE Network.

2.2.3 Status Indicator

Green Light: power supply indicator, on for normal.
Yellow Light: network indicator, when ZIGBEE1082 module to join the network, this light is flashing.
Red Light: communication indicator, when ZIGBEE1082 communicate with the data center, this light is flashing.

2.2.4 Temperature Sensor

Collected room temperature, cold junction compensation for the thermocouple.

2.2.5 RS232 Interface

Use this serial port to configure XBEE module (at this time, SW1: 1, 3 =on, 2, 4=OFF).

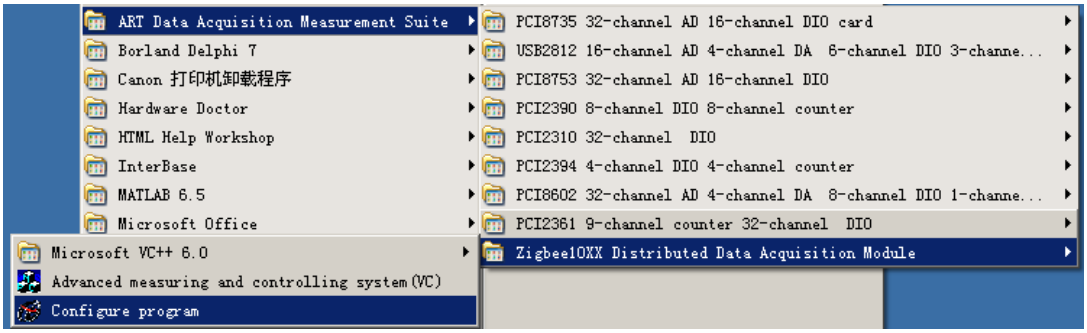
Chapter3 Operation Interface

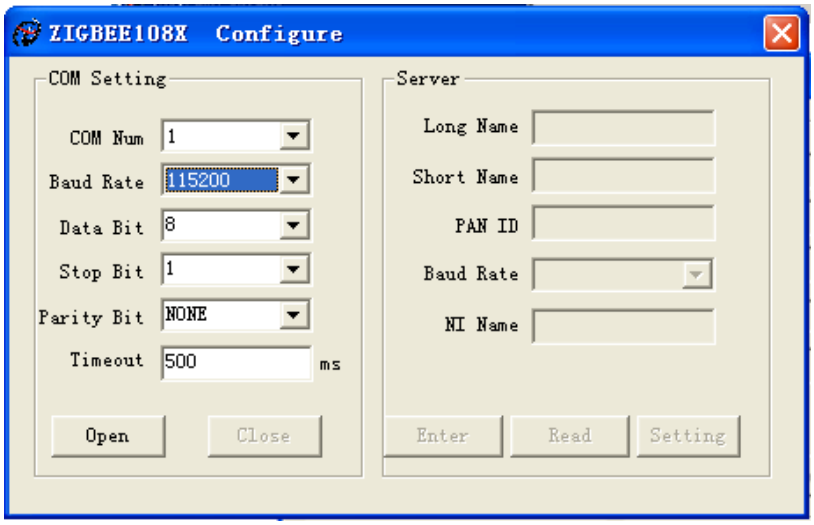
3.1 Configure the server

1. Connect the server to the PC.

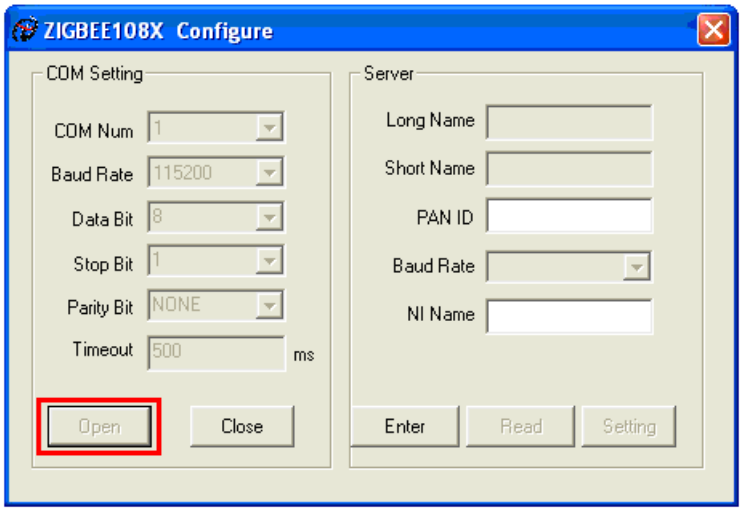
Open the "Configure program": according to the path "Start--Program—ART Data Acquisition Measurement Suite—Zigbee10XX Distributed Data Acquisition Module—Configure program" to configure the server.

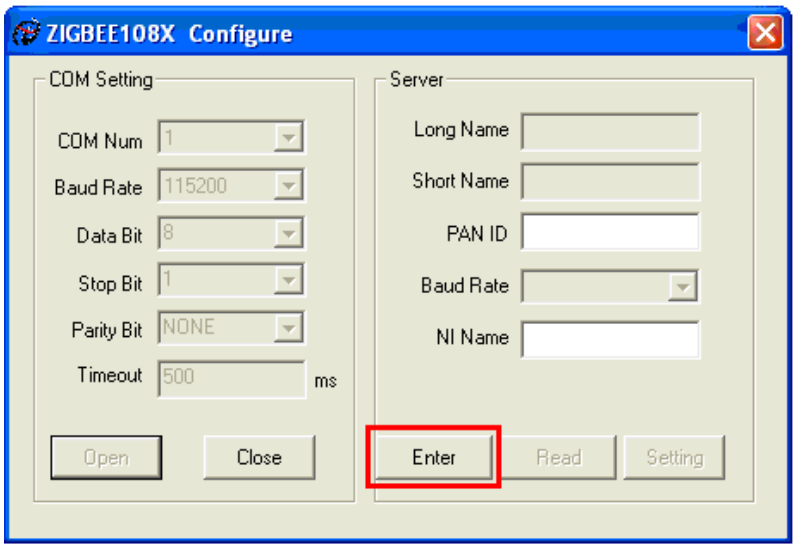
Note: the server's baud rate is 115200, and it can't be modified by users.



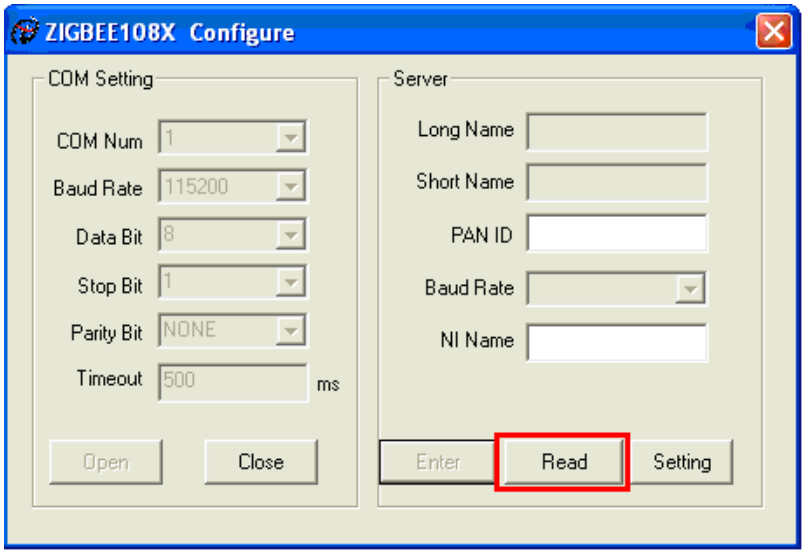


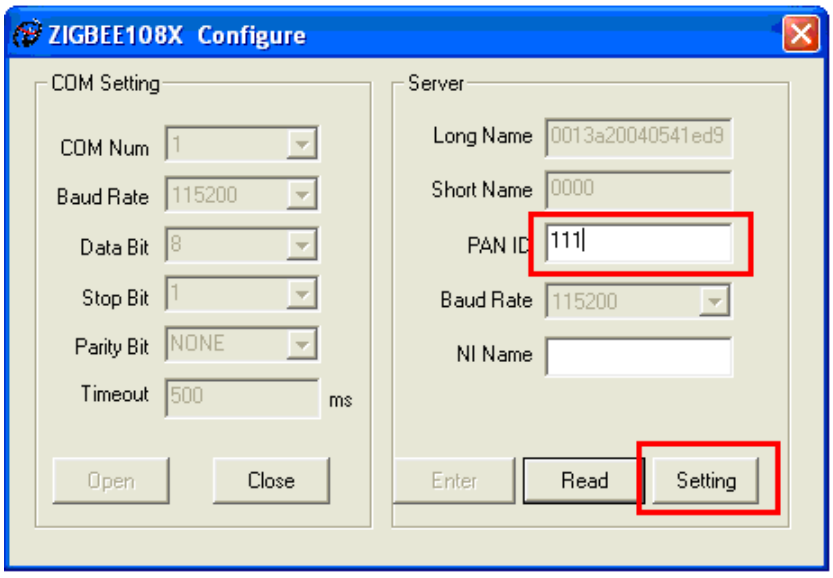
2. Click "Open", and then "Enter", the figures are as followed.





4. Click "Read", and then set the PAN ID, at last, click "Setting.". PAN ID's range is 1-3FFF.



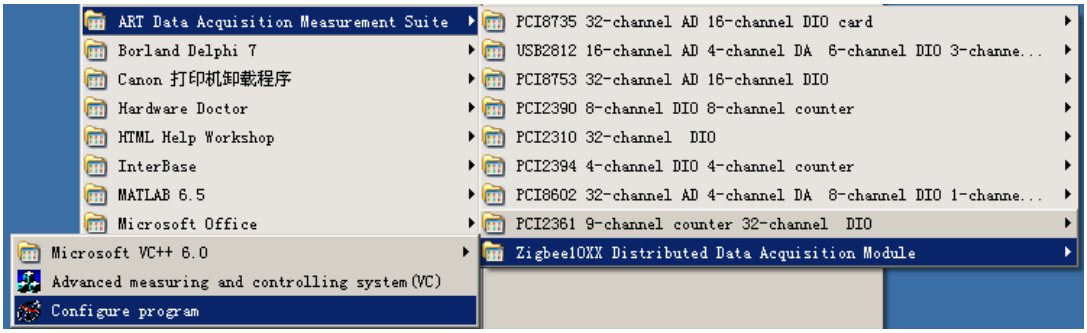


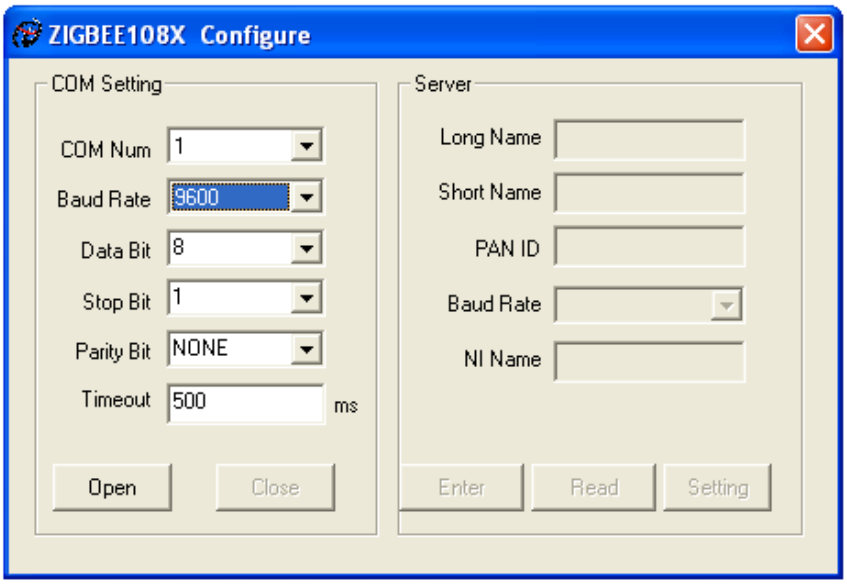
3.2 Configure Zigbee1082

1. Connect Zigbee1082 to the PC.

Open the "Configure program": according to the path "Start--Program—ART Data Acquisition Measurement Suite—Zigbee10XX Distributed Data Acquisition Module—Configure program" to configure the server.

Note: the module's serial port baud rate is 9600, and it can't be modified by users.





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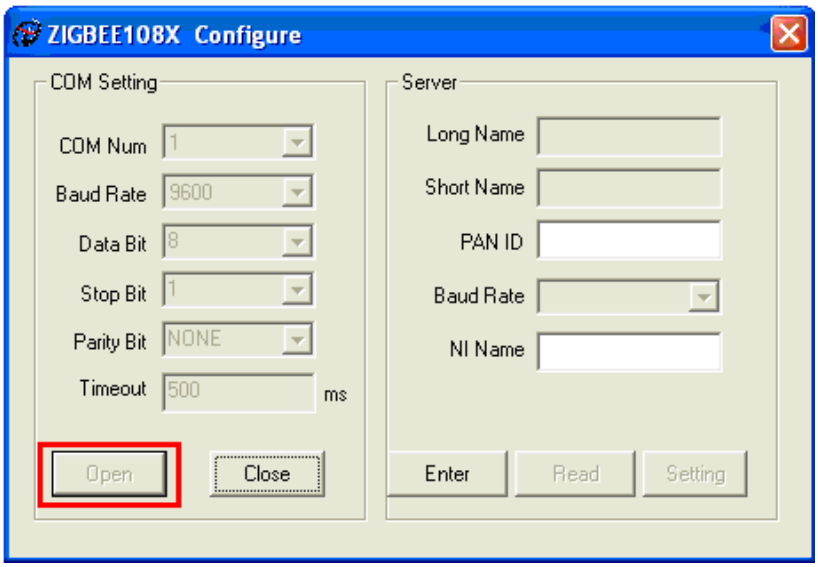
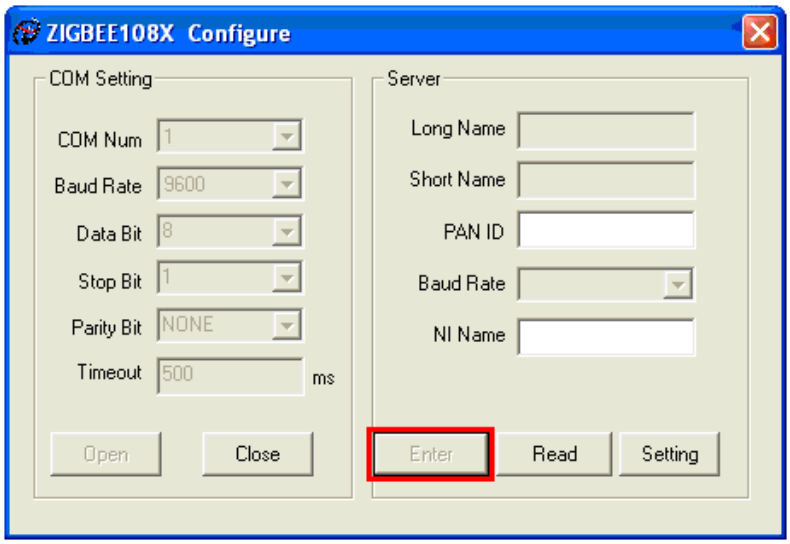
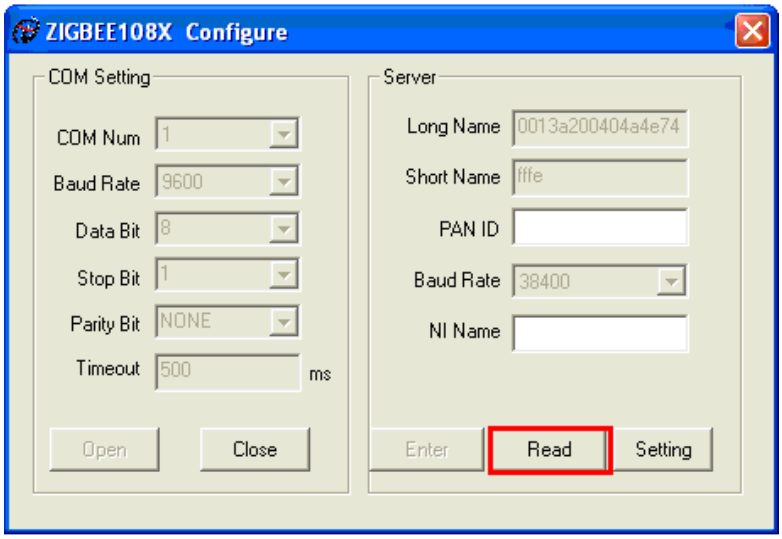
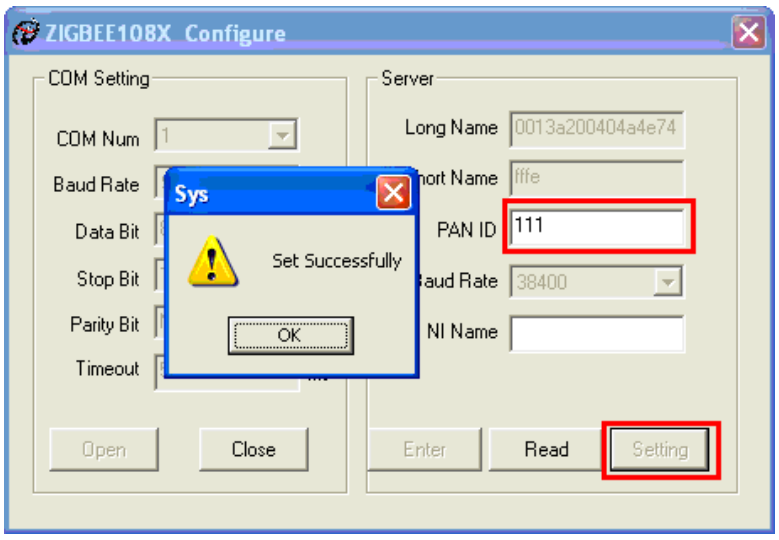




4. Click "Read", and then set the PAN ID, at last, click "Setting."

Note: Zigbee1082's "PAN ID" must be the same as the server's. Its range is also 1-3FF.





Chapter4 MODBUS Address Mapping Table

1. Read Holding Register

Function Code: 03

Data start address: 40001 ~ 40288

Note: read the value of the register

Data Description: Read 16-bit integer or unsigned integer

Address	Description	Note
40129	Module type register	Such as 1080（HEX）
40130	Module type suffix register	Such as 4244（HEX）-'BD'(ASC II)
40131	MODBUS Protocol ID	'+': 2B20(HEX) - ASC II
40132	Module version	Such as 0600（HEX）
40133	Module address	Such as 01
40134	Module baud rate	Such as 03-9600bit/s
Reservation		
40257	Ch-1 Analog Input Type	Bit15-Bit 8 must be inputted 0. Bit7-Bit 0 sample Type. The type of Zigbee1082, please reference TABLE2. In addition, Zigbee1082 does not support single-channel configuration, so we only can read and write 1-ch input type.
40258	Ch-2 Analog Input Type	
40259	Ch-3 Analog Input Type	
40260	Ch-4 Analog Input Type	
40261	Ch-5 Analog Input Type	
40262	Ch-6 Analog Input Type	
40263	Ch-7 Analog Input Type	
40264	Ch-8 Analog Input Type	
Reservation		
40288	Temperature Calibration	0 ~ 0xFF, signed number, the corresponding range: -12.8 ~ 12.7 (only write). Note: This data can adjust the thermocouple cold-end compensation factor.
Reservation		
40851	Restore zero-point and full-scale to default value	1: restore to default value, the other values are invalid (write only)
40852	Zero-point calibration	1: Zero-point calibration, the other values are invalid (write only)
40853	Calibrate the full-scale of the all channels	Select ±15mv to calibrate, then select ±50mv to calibrate (write only)
Reservation		

Request

Function Code	1 BYTE	0x03
Start Address	2 BYTE	0x0000~0xFFFF

Read Amount	2 BYTE	1 TO 125(0x7D)

Response

Function Code	1 BYTE	0x03
Byte Count	1 BYTE	N*2
Input Status	N*2 BYTE	

Exception

Function Code	1 BYTE	0x03+ 0x80
Error Code	1 BYTE	0x1 or 0x2

Example

Request		Response	
Address	Data（hex）	Address	Data（hex）
Function Code	03	Function Code	03
Start Address H（byte）	00	Byte Count	02
Start Address L（byte）	08	Holding Registers H	00
Read Amount H (byte)	00	Holding Registers L	0A
Read Amount L (byte)	01		

Note: the addresses of the holding registers 851 to 854 is used for calibration, we can use setting single register (function code 0x06) instruction and setting multiple registers (function code 0x10) instruction, but if we use setting multiple registers, the number of the register is only 1, that is 851 ~ 854 address can not be set in succession.

2. Read input register

Function Code: 04
Data start address: 30001 ~ 30272
Note: Read input data

Data Description: Read 16-bit integer or unsigned integer

Address	Description	Note
30257	CH-1 Analog Input L16-bit	0~0xFFFF, corresponding to full-scale Min ~ Max.
30258	CH-1 Analog Input H16-bit	high 16-bit is 0
30259	CH-2 Analog Input L16-bit	
30260	CH-2 Analog Input H16-bit	
30261	CH-3 Analog Input L16-bit	
30262	CH-3 Analog Input H16-bit	
30263	CH-4 Analog Input L16-bit	
30264	CH-4 Analog Input H16-bit	
30265	CH-5 Analog Input L16-bit	
30266	CH-5 Analog Input H16-bit	
30267	CH-6 Analog Input L16-bit	
30268	CH-6 Analog Input H16-bit	
30269	CH-7 Analog Input L16-bit	

30270	CH-7 Analog Input H16-bit	
30271	CH-8 Analog Input L16-bit	
30272	CH-8 Analog Input H16-bit	
Reservation		

Request

Function Code	1 BYTE	0x04
Start Address	2 BYTE	0x0000~0xFFFF
Read Amount	2 BYTE	1 TO 125 (0x7D)

Response

Function Code	1 BYTE	0x04
Byte Count	1 BYTE	N*2
Input State	N*2 BYTE	

Exception

Function Code	1 BYTE	0x04+ 0x80
Error Code	1 BYTE	0x1 or 0x2

Example

Request		Response	
Address	Data（hex）	Address	Data（hex）
Function Code	04	Function Code	04
Start Address H（byte）	00	Byte Count	02
Start Address L（byte）	08	Input register high (9)	00
Read Amount H (byte)	00	Input register low (9)	0A
Read Amount L (byte)	01		

3. Set Single Holding Registers

Function Code: 06

Request

Function Code	1 BYTE	0x06
Setting Address	2 BYTE	0x0000~0xFFFF
Setting Content	2 BYTE	0x0000~0xFFFF

Response

Function Code	1 BYTE	0x06
Setting Address	2 BYTE	0x0000~0xFFFF
Setting Content	2 BYTE	0x0000~0xFFFF

Exception

Function Code	1 BYTE	0x06+ 0x80
Error Code	1 BYTE	0x1 or 0x2

Example

Request		Response	
Module address	Data（hex）	Module address	Data（hex）
Function Code	06	Function Code	06
Set Address H (byte)	00	Set Address H (byte)	00
Set Address L (byte)	08	Set Address L (byte)	08
Set the content H (byte)	00	Set the content H (byte)	00
Set the content L (byte)	19	Set the content L (byte)	19

4. Set number of Holding Registers

Function Code: 10

Request

Function Code	1 BYTE	0x10
Set the start address	2 BYTE	0x0000~0xFFFF
Set length	2 BYTE	0x0000~0x7B0
Byte count	1 BYTE	N*2
Set content	N*2 BYTE	

Response

Function Code	1 BYTE	0x10
Set the start address	2 BYTE	0x0000~ 0xFFFF
Set length	2 BYTE	0x0000~ 0x7B0

Exception

Function Code	1BYTE	0x10+ 0x80
Error Code	1BYTE	0x1 or 0x2

Example

Request		Response	
Module address	Data（hex）	Module address	Data（hex）
Function Code	10	Function Code	10
Set Address H (byte)	00	Set Address H (byte)	00
Set Address L (byte)	01	Set Address L (byte)	01
Set digital H(byte)	00	Set digital H (byte)	00
Set digital L (byte)	02	Set digital L (byte)	02
Byte count	04		
Set the content H (byte)	00		

Set the content L (byte)	0A	
Set the content H (byte)	01	
Set the content L(byte)	02	

Chapter5 Notes and Warranty Policy

5.1 Notes

In our products' packing, user can find a user manual, a Zigbee1082 module and a quality guarantee card. Users must keep quality guarantee card carefully, if the products have some problems and need repairing, please send products together with quality guarantee card to ART, we will provide good after-sale service and solve the problem as quickly as we can.

When using Zigbee1082, in order to prevent the IC (chip) from electrostatic harm, please do not touch IC (chip) in the front panel of Zigbee1082 module.

5.2 Warranty Policy

Thank you for choosing ART. To understand your rights and enjoy all the after-sales services we offer, please read the following carefully.

1. Before using ART's products please read the user manual and follow the instructions exactly. When sending in damaged products for repair, please attach an RMA application form which can be downloaded from: www.art-control.com.

2. All ART products come with a limited two-year warranty:

- The warranty period starts on the day the product is shipped from ART's factory
- For products containing storage devices (hard drives, flash cards, etc.), please back up your data before sending them for repair. ART is not responsible for any loss of data.
- Please ensure the use of properly licensed software with our systems. ART does not condone the use of pirated software and will not service systems using such software. ART will not be held legally responsible for products shipped with unlicensed software installed by the user.

3. Our repair service is not covered by ART's guarantee in the following situations:

- Damage caused by not following instructions in the User's Manual.
- Damage caused by carelessness on the user's part during product transportation.
- Damage caused by unsuitable storage environments (i.e. high temperatures, high humidity, or volatile chemicals).
- Damage from improper repair by unauthorized ART technicians.
- Products with altered and/or damaged serial numbers are not entitled to our service.

4. Customers are responsible for shipping costs to transport damaged products to our company or sales office.

5. To ensure the speed and quality of product repair, please download an RMA application form from our company website.