Communication Protocol for AMT

Author		

Check		

Approval		

Review records

Version No.	Date	Review record No.

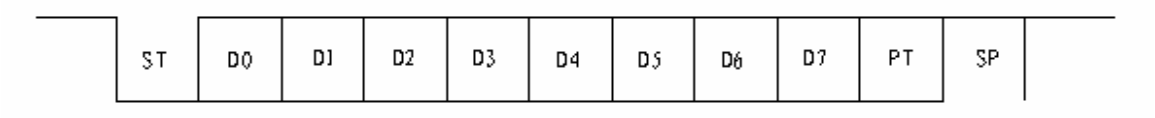
Amendment records

Version No.	Date	Amendments
V01	4-May-2011	First edition
V02	26-Sep-2011	Add the fault description at address 3124 & 3125
V03	26-Feb-2012	Update value description
V04	10-May-2012	Update value description

1: Communication with master controller

1.1: Transmission Type:

Communication mode: Serial Asynchronous Half Duplex
Baud rate: 1200BPS
Data Bit Length：8Bit (LSB first)
Parity Bit：EVEN
Start Bit：1Bit (Lo)
Stop Bit：2Bit (Hi)
Byte data transmission format:



ST：Start Bit
D0~D7 Data Bit
PT：Parity Bit
SP：Stop Bit

2: Communication Protocol: MODBUS RTU protocol

2.1: Introduction

Master / Slave communication
Master: Wired remote controller
Slave: Modular system

Each frame data transmission format:

Address	Function	Data	CRC check
8bits	8bits	N*8bits	16bits

Address: slave address, range of 1～247
Function: read or write function
Data: communication data in read and write function
CRC check: each frame data error check method

2.2: Function code and data definition

2.2.1: Function code definition

Detailed description of Function code, please refer to the MODBUS protocol. There will be two Function codes. Please see following:

Function code = 03H: function of reading multi Registers, the Master requests to read multi 8-bit binary data from the Slave. Data frame definition see following:

Address
Function code (03)
Register start address (Hi)
Register start address (Lo)
No. of Registers (Hi)
No. of Registers (Lo)
CRC check (Lo)
CRC check (Hi)

Address
Function code (03)
Data length
Data 1 (Hi)
Data 1 (Lo)
:
:
Data N (Hi)
Data N (Lo)
CRC check (Lo)
CRC check (Hi)

Function code = 06H: function of presetting single register, the Master sends two binary 8-bit data to the Slave. Data frame definition see following:

The Master (Query)

Address
Function code (06)
Register start address (Hi)
Register start address (Lo)
Data (Hi)
Data (Lo)
CRC check (Lo)
CRC check (Hi)

the Slave (Response)

Address
Function code (06)
Register start address (Hi)
Register start address (Lo)
Data (Hi)
Data (Lo)
CRC check (Lo)
CRC check (Hi)

Function code = 16H: function of presetting multi registers, the Master sends multi binary 8-bit data to the Slave. Data frame definition see following:

The Master (Query)
Address
Function code (16)
Register start address (Hi)
Register start address (Lo)
No. of Registers (Hi)
No. of Registers (Lo)
Data length
Data 1 (Hi)
Data 1 (Lo)
:
:
Data N (Hi)
Data N (Lo)
CRC check (Lo)
CRC check (Hi)

the Slave (response)
Address
Function code (16)
Register start address (Hi)
Register start address (Lo)
No. of Registers (Hi)
No. of Registers (Lo)
CRC check (Lo)
CRC check (Hi)

2.2.2, Register Data Definition

Read/write Register Data

1: Setting Run Mode: Address 3000

0: Standby

1: Cooling Mode

4: Heating Mode

2: System Command: Address 3001

0: Room Temperature Control Mode

1: Water Temperature Control Mode

3: Water Heater Mode

3: Setting Temperature: Address 3002

7~50=7℃~50℃

(Actual temperature scope is 7℃~50℃)

4: Room Temperature: Address 3003

0~80=0℃~80℃

(Actual temperature scope is 0℃~80℃)

5: Reserved: address 3004～3009

Read only register data

1: Compressor operation mechanical frequency: Address 3100

0 ~ 120=0.00 ~ 120.00Hz

2: System Operation Mode: Address 3101

0: Standby

1: Cooling Mode

4: Heating Mode

3: Outdoor outlet water temperature: Address 3102

Value=(temperature+60℃)*2

4: Outlet water temperature: Address 3103

Value=(temperature+60℃)*2

5: Inlet water temperature: Address 3104

Value=(temperature+60℃)*2

5: Heat sink temperature: Address 3105

Reserved

6: Indoor coil temperature: Address 3106

Value=(temperature+60℃)*2

7: Outdoor inlet water temperature: Address 3107

Value=(temperature+60℃)*2

8: Outdoor coil temperature: Address 3108

Value=(temperature+60℃)*2

9: Outdoor exhausting temperature: Address 3109

Value=(temperature+60℃)*2

10: Input current value: Address 3120

Value: 0 ~ 225=0.0 ~ 22.5 Arms

11: Input AC voltage value: Address 3121

Value: 95 ~ 365=0~ 365V

12: Expansion Valve Openness: Address 3122

Value: 0 ~ 500=0 ~ 500P

13: DC Bus Voltage: Address 3123

Reserved

14: System Faults 1: Address 3124

1: Communication error

15: System Faults 2: Address 3125

1: Indoor temperature sensor fault

16: System Faults 3: Address 3126

1: Input voltage or current sensor fault

17: System Faults 4: Address 3127

1: Drive failure protection or drive fault

18: System Faults 5: Address 3128

1: Indoor unit EEPROM fault

19: System Faults 6: Address 3129

1: Overload protection

20: System Faults 7: Address 3130

1: Input under voltage protection

21: System Faults 8: Address 3131

1: High pressure sensor fault

22: System Faults 9: Address 3132

1: Outdoor unit EEPROM fault

23: System Faults 10: Address 3133

1: Outdoor water flow protection

24: System Faults 11: Address 3134

1: Outdoor temperature sensor fault

25: System Faults 12: Address 3135

1: High-pressure protection

26: System Faults 13: Address 3136

1: Outdoor temperature protection

27: System Faults 14: Address 3137

1: Indoor coil temperature protection

28: System Faults 15: Address 3138

1: Indoor water flow protection

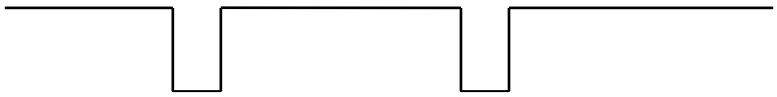
29: Address 3139~3140: Reserved

2.3: Communication process

After connect to power, the Master, based on the Function requirements, first sends the Address and Function codes data frame to the Slave. The Related Slave will feedback data with 100ms delay after it correctly receives the data from the Master. The Master will send again related Function code data frame with 100ms delay after it correctly receives the data from the Slave. Repeat this. The Master will re-send that frame data if it receives no signal from the Slave 4S after it sends it out. If the Master receives no signal from the Slave for 2min, then there will be communication fault display. During this moment, the Master will send to the Slave every 2S until the communication is normal. If the Slave receives no signal from the Master, it will wait until 2 min, then there will be communication fault display, until the communication is normal.

Communication diagram:

The Master:



The Slave:

