



AirTouch 5

Communication Protocol

| version | data | content | Contributors |
|---------|-----------|----------------------------------|--------------|
| V1.0 | 7/9/2022 | Create | Vincent |
| V1.1 | 5/10/2022 | Added Intelligent Auto fan speed | Vincent |

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1. Overview

AirTouch 5 allows connection through TCP to control the device. It supports querying the status of AC and zones and controlling the AC and zones.

2. Connection

Join AirTouch 5 console to local WiFi network.

Connect to AirTouch 5 console at port 9005 by TCP protocol. If there are two consoles, connect to the master console. If failed, try to connect to the other one.

Page in "Settings" -> "Installer" -> "General" shows which console is the master(only for two consoles).

To see the IP address of the console, go to "Settings" -> "Options", click the wifi button. Click "SEE MORE" to go to Android wifi setting page. Click "Wi-Fi", then click the connected wifi name to go to the Network details page. IP address is in the "Advanced" section.

a. Discovery

AirTouch 5 supports UDP broadcast to discover devices.

Broadcast **"::REQUEST-POLYAIRE-AIRTOUCH-DEVICE-INFO;"** to port 49005 to discover AirTouch 5 devices on the local network.

AirTouch 5 will response a UDP message to 49005.

Message format is: [IP],[ConsoleID],AirTouch5,[AirTouch ID],[Device Name]

For hubs that integrate home smart devices, it is recommended this message be used only during setup. Fixing the IP of the device in the router will increase stability.

3. Message Format

A message has following components:

- Header (4 bytes)
- Address (2 bytes)
- Message id (1 byte)
- Message type (1 byte)
- Data length (2 bytes)
- Data
- CRC16 check bytes (2 bytes)

a. Header

Header is always 0x55 0x55 0x55 0xAA.

b. Address

Address should be 0x80 0xb0 or 0x90 0xb0 (for Extended message) when sending to AirTouch. When receiving from AirTouch, last byte of address will be 0x80 or 0x90/0x91 (for Extended message).

c. Message id

When sending message to AirTouch, message id can be any data. The response message should have the same message id.

d. Message type

There are two message types: 0xC0 – control command and status message, 0x1F – extended message.

Ignore any other received types.

e. Data length

Data length is the length of actual data. The first byte is the high byte, the second byte is the low byte.

f. Data

See section 4 Messages for details.

g. Check bytes

The algorithm of checksum is CRC16 MODBUS. Use all data except the header and redundant bytes.

h. Redundant bytes in message

To prevent the message from containing the same data as header, a 00 is inserted after every three consecutive 0x55s in the message. The inserted 00 is redundant bytes.

4. Messages

a. Control command and status message (0xC0)

This message contains sub message type (Zone control, Zone status, AC control and AC status), data length detail and sub data.

First 8 bytes are the sub message type and data length details.

| | |
|-------|-------------------------|
| Byte1 | Sub message type |
| Byte2 | Keep 0 |
| Byte3 | Normal data length |
| Byte4 | |
| Byte5 | Each repeat data length |
| Byte6 | |
| Byte7 | Repeat data count |
| Byte8 | |

For one (0xC0) message:

Data length (3.e.) = 8 + Normal data length + repeat data length * repeat data count

Sub data length = Normal data length + repeat data length * repeat data count = Data length - 8

i. Zone control (0x20)

Zone control messages are to control all zones. Each message to AirTouch is to control one or more specific zones.

No normal data (byte3 byte4: 0).

Each repeat data (4 bytes) controls one specific zone. (byte5 byte6: 0x00 0x04).

| Byte in repeat data | | | |
|---------------------|--------|--------------------|---|
| Byte1 | Bit8-7 | | Keep 0 |
| | Bit6-1 | Zone number | Valid value 0 - 15(0x00 – 0x0F). |
| Byte2 | Bit8-6 | Zone setting value | 010: Value decrease (-1°C/-5%) 011: Value increase (+1°C/+5%) 100: Set open percentage 101: Set target setpoint Other: Keep setting value |
| | Bit5-4 | | Keep0 |
| | Bit3-1 | Power | 001: Change on/off state 010: Set to off 011: Set to on 101: Set to turbo Other: Keep power state |
| Byte3 | | Value to Set | When set percentage: 0-100 When set temperature: 0-250, setpoint=(value+100)/10 Other: Keep setting value |
| Byte 4 | | | Keep 0 |

Example:

Turn off the second zone:

0x55 0x55 0x55 0xAA 0x80 0xB0 0x0F 0xC0 0x00 0x0C

Header Address Id Type Length

0x20 0x00 0x00 0x00 0x00 0x04 0x00 0x01

Sub Type normal length repeat length repeat count

0x01 0x02 0xFF 0x00 CRC Bytes

Data

AirTouch will respond a message with sub type 0x21. (See next table)

ii. Zone status (0x21)

Sending this message to AirTouch without any sub data (data length: 0x00 0x08, repeat count: 0x00, repeat length: 0x00) to request zone status from AirTouch.

Note: AirTouch will send a zone status message automatically when zone status is changed.

Data received from AirTouch:

No normal data (byte3 byte4: 0).

Repeat data count is the zone count in this message.

Each repeat data (8 bytes) contains one zone data. (byte5 byte6: 0x00 0x08).

| Byte in repeat data | | | |
|---------------------|--------|------------------|---|
| Byte1 | Bit8-7 | Zone power state | 00: Off 01: On 11: Turbo |
| | Bit6-1 | Zone number | 0-15 |
| Byte2 | Bit8 | Control method | 1: temperature control, 0: percentage control |
| | Bit7-1 | Open percentage | Current open percentage setting |
| Byte3 | | Set point | setpoint=(value+100)/10, 0xFF invalid |
| Byte4 | Bit8 | Sensor | 1: has sensor, 0: no sensor |
| | Bit7-1 | | NOT USED |
| Byte5 | | Temperature | Temperature=(value- 500)/10, temp>150 invalid |
| Byte6 | | | |
| Byte7 | Bit8-3 | | NOT USED |
| | Bit2 | Spill | 1: Spill active, 0: Spill inactive. |
| | Bit1 | Low battery | 1: Low battery, 0: Normal |
| Byte8 | | | NOT USED |

Example:

Request status of zones:

0x55 0x55 0x55 0xAA 0x80 0xB0 0x01 0xC0 0x00 0x08
 Header Address Id Type Length
0x21 0x00 0x00 0x00 0x00 0x00 0x00 0x00 CRC Bytes
 Sub type

AirTouch 5 response with data for 1 zone:

0x55 0x55 0x55 0xAA 0xB0 0x80 0x01 0xC0 0x00 0x18 0x21 0x00 0x00 0x00 0x00 0x08 0x00 0x01
0x40 0x80 0x96 0x80 0x02 0xE7 0x00 0x00 0x01 0x64 0xFF 0x00 0x07 0xFF 0x00 0x00 CRCBytes

Zone 1 data:

0x40 0x80 0x96 0x80 0x02 0xE7 0x00 0x00
01000000 10000000 10010110 10000000 00000010 11100111 00000000 ...

Power on, Temperature control, Set point = (150[0x96]+100)/10 : 25,

Has sensor, Temperature = (743[0x2E7]-500)/10: 24.3

Zone 2 data:

0x01 0x64 0xFF 0x00 0x07 0xFF 0x00 0x00

00000001 01100100 11111111 00000000 0000011111111111 ...

Power off, Current open percentage setting: 100 (1100100 = 0x64) .

No sensor, invalid temperature

iii. AC control (0x22)

AC control messages are to control all ACs. Each message to AirTouch is to control one or more specific ACs.

No normal data (byte3 byte4: 0).

Each repeat data (4 bytes) controls one specific zone. (byte7 byte8: 0x00 0x04).

| Byte in repeat data | | | |
|---------------------|--------|------------------|--|
| Byte1 | Bit8-5 | Power setting | 0001: Change on/off status 0010: Set to off 0011: Set to on 0100: Set to away 0101: Set to sleep Other: Keep power setting |
| | Bit4-1 | AC number | Valid value 0 - 7. |
| Byte2 | Bit8-5 | AC mode | 0000: Set to auto 0001: Set to heat 0010: Set to dry 0011: Set to fan 0100: Set to cool Other: Keep mode setting |
| | Bit4-1 | AC fan speed | 0000: Set to auto 0001: Set to quite 0010: Set to low 0011: Set to medium 0100: Set to high 0101: Set to powerful 0110: Set to turbo 1000: Set to Intelligent Auto Other: Keep fan speed setting |
| Byte3 | | Setpoint control | 0x40: Change setpoint. 0x00: Keep setpoint value Other: Invalidate data. |
| Byte 4 | | Setpoint value | Available when byte3 is 0x40 Setpoint = (data+100)/10. Range [10.0-35.0] |

Example:

Turn off the second AC:

```

0x55 0x55 0x55 0xAA 0x80 0xb0 0x01 0xC0 0x00 0x0C
Header      Address  Id   Type  Length
0x22 0x00 0x00 0x00 0x00 0x04 0x00 0x01
Sub Type   normal length repeat length repeat count
0x21 0xFF 0x00 0xFF CRC Bytes
Data
  
```

Set the first AC to cool mode and second AC 26 degree:

```

0x55 0x55 0x55 0xAA 0x80 0xb0 0x01 0xC0 0x00 0x10
0x22 0x00 0x00 0x00 0x00 0x04 0x00 0x02
  
```

AirTouch will respond a message with sub type 0x23. (See next table)

iv. AC status message (0x23)

Sending this message to AirTouch without any sub data (data length: 0x00 0x08, repeat count: 0x00, repeat length: 0x00) to request AC status from AirTouch.

Note: AirTouch will send an AC status message automatically when AC status is changed.

Data received from AirTouch:

No normal data (byte3 byte4: 0).

Repeat data count is the AC count in this message.

Each repeat data (10 bytes) contains one AC data. (byte5 byte6: 0x00 0x0A).

| | | | |
|-------|--------|----------------|---|
| Byte1 | Bit8-5 | AC power state | 0000: Off 0001: On 0010: Away(Off) 0011: Away(On) 0101: Sleep Other: Not available |
| | Bit4-1 | AC number | 0-7 |
| Byte2 | Bit8-5 | AC mode | 0000: auto 0001: heat 0010: dry 0011: fan 0100: cool 1000: auto heat 1001: auto cool Other: Not available |
| | Bit4-1 | AC fan speed | 0000: auto 0001: quiet 0010: low 0011: med 0100: high 0101: powerful 0110: turbo 1001 - 1110: Intelligent Auto Other: Not available |
| Byte3 | | Setpoint | 0-250: Setpoint = (VALUE + 100)/10. Other: Not available |
| Byte4 | Bit8-5 | | <i>NOT USED</i> |
| | Bit4 | Turbo | 1: Turbo active, 0: Turbo inactive |
| | Bit3 | Bypass | 1: Bypass active, 0: Bypass inactive |
| | Bit2 | Spill | 1: Spill active, 0: Spill inactive |
| | Bit1 | Timer status | 1: Timer set, 0: Timer not set |
| Byte5 | | Temperature | 0-2000: Temperature=(VALUE – 500)/10. |
| Byte6 | | | Other: Not available |
| Byte7 | | Error code | 0:No error |
| Byte8 | | | Other: Error code of this AC |
| Byte9 | | | <i>NOT USED</i> |

| | | |
|--------|--|--|
| Byte10 | | |
|--------|--|--|

Example:

Request status of ACs:

0x55 0x55 0x55 0xAA 0x80 0xB0 0x01 0xC0 0x00 0x08
Header Address Id Type Length
0x23 0x00 0x00 0x00 0x00 0x00 0x00 0x00 CRC Bytes
Sub type

AirTouch 5 response with data for 2 ACs:

0x55 0x55 0x55 0xAA 0xB0 0x80 0x01 0xC0 0x00 0x1C
0x23 0x00 0x00 0x00 0x00 0x0A 0x00 0x02
0x10 0x12 0x78 0xC0 0x02 0xDA 0x00 0x00 0x80 0x00
0x01 0x42 0x64 0xC0 0x02 0xE4 0x00 0x00 0x80 0x00 CRC Bytes

AC 0 data:

0x10 0x12 0x78 0xC0 0x02DA 0x0000 0x0000
00010000 00010010 01111000 ~~11000000~~ 00000010 11011010 0000000000000000 ...

AC 0 is on, in heat mode and low fan speed and no error.

Current target setpoint setting: 22, VALUE=120(01111000 = 0x78), (120 + 100)/10 = 22

Current Temperature: 23, VALUE=730(0000001011011010 = 0x02DA), (730-500)/10 = 23.

AC 1 data:

0x01 0x42 0x64 0xC0 0x02E4 0x0000 0x0000
00000001 01000010 01100100 ~~11000000~~ 00000010 11100100 0000000000000000 ...

AC 1 is off, in cool mode and low fan speed and no error.

Current target setpoint setting: 20, VALUE=100(01100100 = 0x64), (100+100)/10 = 20

Current Temperature: 24, VALUE=740(0000001011100100 = 0x02E4), (740-500)/10 = 24.

b. Extended message(0x1F)

Extended messages are used to obtain the available modes, fan speeds, error codes of the ACs and names of zones.

When sending an extended message, **the address should be 0x90 0xb0**. When receiving the data for the extended message, **the last byte of address will be 0x90**.

The first two bytes of the data are used to specify the specific command.

i. AC ability (0xFF 0x11)

This message is only available for console version 1.0.3 and above.

Sending an extended message with data 0xFF 0x11 or (0xFF 0x11 [0-3]) to request the ability of all ACs or one specific AC.

Data received from AirTouch:

| | | | |
|----------|--------|----------------------------|---|
| Byte1 | | | Fixed 0xFF |
| Byte2 | | | Fixed 0x11 |
| Byte3 | | AC number | 0-7 |
| Byte4 | | Following data length | This data shows the count of following bytes belong to the ability of this AC.(24 at this moment) |
| Byte5-20 | | AC Name | 16 bytes in total. If less than 16 bytes, end with 0. |
| Byte21 | | Start zone number | |
| Byte22 | | Zone count | |
| Byte 23 | Bit8-6 | | <i>NOT USED</i> |
| | Bit5 | Cool mode | 1: support, 0: not support |
| | Bit4 | Fan mode | 1: support, 0: not support |
| | Bit3 | Dry mode | 1: support, 0: not support |
| | Bit2 | Heat mode | 1: support, 0: not support |
| | Bit1 | Auto mode | 1: support, 0: not support |
| Byte 24 | Bit8 | Fan speed Intelligent Auto | 1: support, 0: not support |
| | Bit7 | Fan speed turbo | 1: support, 0: not support |
| | Bit6 | Fan speed powerful | 1: support, 0: not support |
| | Bit5 | Fan speed high | 1: support, 0: not support |
| | Bit4 | Fan speed medium | 1: support, 0: not support |
| | Bit3 | Fan speed low | 1: support, 0: not support |
| | Bit2 | Fan speed quite | 1: support, 0: not support |
| | Bit1 | Fan speed auto | 1: support, 0: not support |
| Byte25 | | Min cool set point | |
| Byte26 | | Max cool set point | |
| Byte27 | | Min cool set point | |
| Byte28 | | Max cool set point | |

If there are more than one AC, the data will be repeated with relevant values. E.g. 2 ACs will receive 54(2+26+26) bytes data, 3 ACs will receive 80(2+26+26+26) bytes data.

It is recommended to request the AC ability when an AC back to normal state from any abnormal state.

Example:

Request ability of AC 0:

0x55 0x55 0x55 0xAA 0x90 0xB0 0x01 0x1F 0x00 0x03 0xFF 0x11 0x00 CRCBytes

Header Address Id Type Length Data CRC

AirTouch 5 response:

0x55 0x55 0x55 0xAA 0xB0 0x90 0x01 0x1F 0x00 0x1A 0xFF 0x11 0x00 0x18
0x55 0x4E 0x49 0x54 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00
0x00 0x00 0x00 0x00 0x00 0x04 0x17 0x1D 0x10 0x1f 0x12 0x1f CRCBytes

AC 0 data:

0x00 0x16 0x55 0x4E 0x49 0x54 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00

AC0 22 U N I T

0x00 0x00 0x00 0x04 0x17 0x1D 0x10 0x1F 0x12 0x1F
0 4 00010111 00011101 16 31 18 31

Name of AC0 is "UNIT" and it has 4 zones, start with zone 0.

It has cool, heat, fan, auto modes and has low, mid, high, auto fan speeds.

Minimum setpoint for cool mode is 16, for heat mode is 18;

Maximum setpoint for cool and heat mode is 31.

ii. AC error information (0xFF 0x10)

This message is only available for console version 1.0.3 and above.

Sending an extended message with data 0xFF 0x10 [0-3] to request the error code of one specific AC.

Data received from AirTouch:

| Byte1 | Byte2 | Byte3 | Byte4 | Byte5.. |
|------------|------------|-----------|---|------------|
| Fixed 0xFF | Fixed 0x10 | AC number | Error info length | Error info |
| | | 0-3 | Error info length(If no error, will be 0) | String |

Example:

Request Error of AC 0:

0x55 0x55 0x55 0xAA 0x90 0xB0 0x01 0x1F 0x00 0x03 0xFF 0x10 0x00 CRCBytes

Header Address Id Type Length Data CRC

AirTouch 5 response:

0x55 0x55 0x55 0xAA 0xB0 0x90 0x01 0x1F 0x00 0x1A 0xFF 0x10 0x00 0x08
0x45 0x52 0x3A 0x20 0x46 0x46 0x46 0x45 CRCBytes

Data:

0xff 0x10 0x00 0x08 0x45 0x52 0x3A 0x20 0x46 0x46 0x46 0x45
AC0 Len:8 E R : F F F E

iii. Zone name (0xFF 0x13)

This message is only available for console version 1.0.3 and above.

Sending an extended message with data 0xFF 0x12 [0-15] to request the name all zones or one specific zone.

Data received from AirTouch:

| | | |
|----------|-------------|------------|
| | | |
| Byte1 | | Fixed 0xFF |
| Byte2 | | Fixed 0x13 |
| Byte3 | Zone number | 0-15 |
| Byte4 | Name length | |
| Byte5..n | Zone name | |

If there are more than one zone, the data will be repeated with relevant values.

Example:

Request name of zone 0:

0x55 0x55 0x55 0xAA 0x90 0xB0 0x01 0x1F 0x00 0x03 0xFF 0x13 0x00 CRCBytes

Header Address Id Type Length Data CRC

AirTouch 5 response:

0x55 0x55 0x55 0xAA 0xB0 0x90 0x01 0x1F 0x00 0x0A 0xFF 0x13
0x00 0x06 0x4C 0x69 0x76 0x69 0x6E 0x67 CRCByts
 Zone0 Name has 6 chars L i v i n g

Name of Zone 0 is "Zone1"

Request name of all zones:

0x55 0x55 0x55 0xAA 0x90 0xB0 0x01 0x1F 0x00 0x02 0xFF 0x13 CRCByts

Header Address Id Type Length Data CRC

AirTouch 5 response:

0x55 0x55 0x55 0xAA 0xb0 0x90 0x01 0x1F 0x00 0x1D 0xFF 0x12
0x00 0x06 0x4C 0x69 0x76 0x69 0x6E 0x67
 Zone0 6 L i v i n g
0x01 0x07 0x4B 0x69 0x74 0x63 0x68 0x65 0x6E
 Zone1 7 K i t c h e n
0x02 0x07 0x42 0x65 0x64 0x72 0x6F 0x6F 0x6D CRCByts
 Zone2 7 B e d r o o m

Name of zone0 is "Living".

Name of zone1 is "Kitchen".

Name of zone2 is "Bedroom".

iv. Console Version(0xFF 0x30)

Sending an extended message with data 0xFF 0x30 to request the version of the console.

Data received from AirTouch:

| | | |
|---------|-----------------------|---|
| | | |
| Byte1 | | Fixed 0xFF |
| Byte2 | | Fixed 0x30 |
| Byte3 | Update sign | 0-latest version, Other-new version available. |
| Byte4 | Version string length | |
| Byte5.. | Versions | Two consoles separated by “,”. The first one is the master. |

If airtouch has two consoles, the first value is the version of the one that communicates with.

Example:

Request Versions:

0x55 0x55 0x55 0xAA 0x90 0xB0 0x01 0x1F 0x00 0x02 0xFF 0x30 CRC Bytes
Header Address Id Type Length Data

AirTouch 5 response:

0x55 0x55 0x55 0xAA 0xB0 0x90 0x01 0x1F 0x00 0x0F 0xFF 0x30 0x00 0x0B
0x31 0x2E 0x30 0x2E 0x33 0x2C 0x31 0x2E 0x30 0x2E 0x33 CRC Bytes

Data:

0xFF 0x30 0x00 0x0B 0x31 0x2E 0x30 0x2E 0x33 0x2C 0x31 0x2E 0x30 0x2E 0x33
Latest Len:11 1 . 0 . 3 , 1 . 0 . 3