
Instruction to Connect AM7000 to Ali Cloud and TCP Server

Cubic Sensor and Instrument Co.,Ltd



Ali Cloud Connection

Ali Cloud Server Network Topology

AM7000 can be connected to Ali cloud server via its built-in Wi-Fi module and after that AM7000 will send real-time data continuously to Ali cloud server. An Android smart phone can access AM7000's data from Ali cloud server via Wi-Fi internet or mobile network(4G/5G) with CubicAir app. To implement this a Wi-Fi router that connects to internet is required for AM7000 to be able to connect to Ali cloud server. An Android smart phone with CubicAir app installed is required to configure AM7000 to connect to Ali cloud server. General steps to configure AM7000 to connect to Ali cloud server is as below:

- Connect Android smart phone to AM7000 via Bluetooth with CubicAir app.
- Input the name and password of the Wi-Fi router with internet connected in AM7000 with CubicAir app.
- Select "Cloud services" and confirm to complete the configuration.



Items Required

To connect AM7000 to Ali Cloud server with CubicAir app, the following items are required:

- AM7000 x 1
- Wi-Fi router x 1
- Andriod Smart Phone with CubicAir App installed x 1

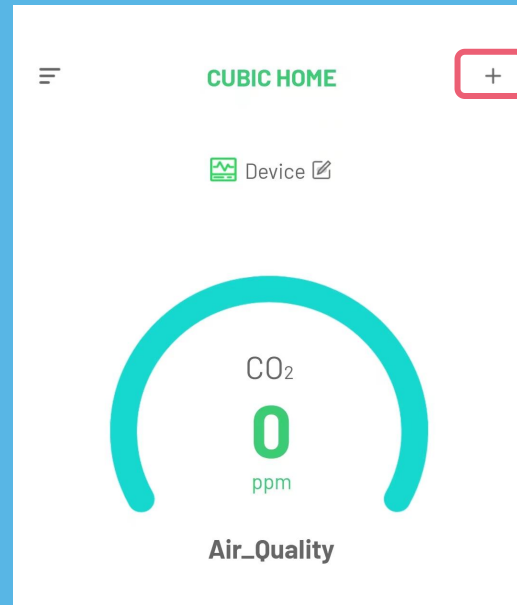


Connect Bluetooth

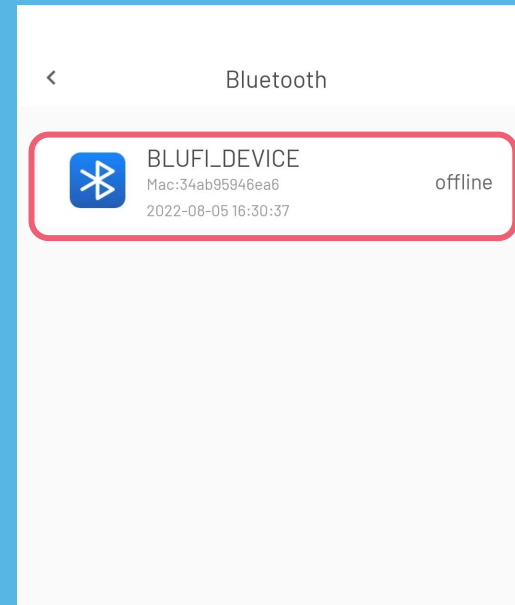
Step 1: Power on AM7000 and the display shows below. Wi-Fi and Bluetooth icons show in red means the device has not been connected to Wi-Fi and Bluetooth.



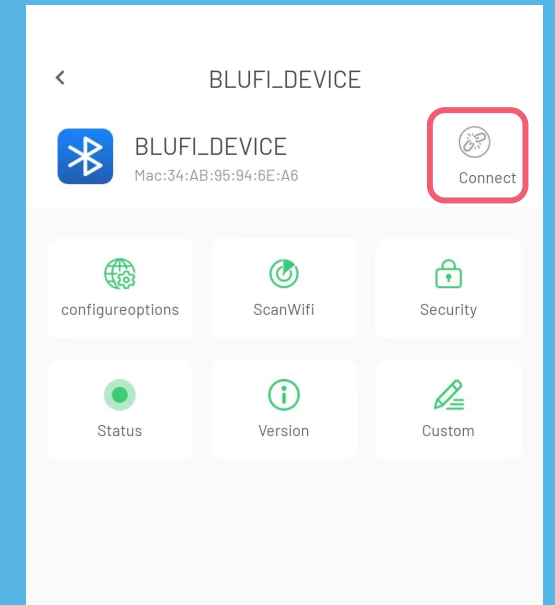
Step 2: Turn on Bluetooth on the Android smart phone and Open CubicAir app then press “+” icon.



Step 3: Put smart phone close to AM7000 for scanning Bluetooth device. A Bluetooth icon with the Mac address of AM7000 will appear as shown below if AM7000 is found. The Bluetooth is now offline.



Step 4: Press the Bluetooth icon and press “Connect” icon to connect AM7000 to smart phone via Bluetooth.

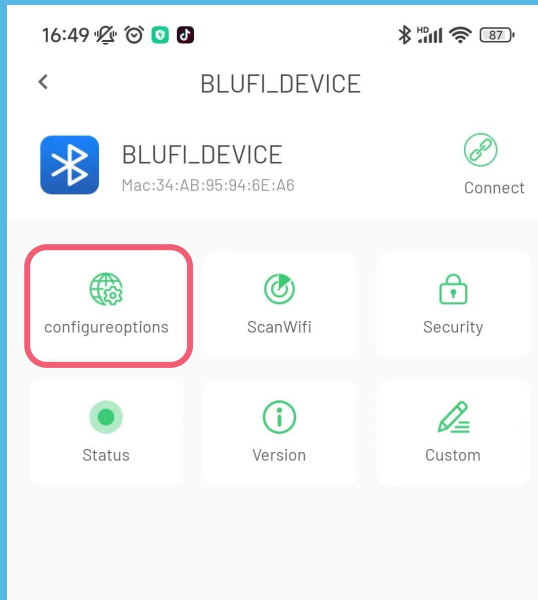


Connect Ali Cloud

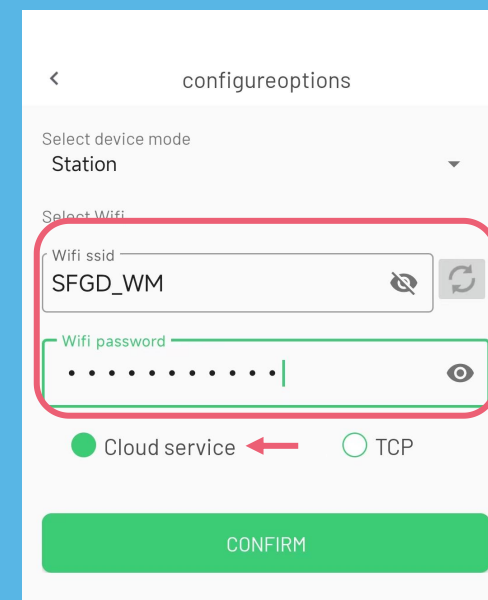
Step 1: The Bluetooth icon on AM7000 turns grey indicating it has been connected to smart phone by Bluetooth.



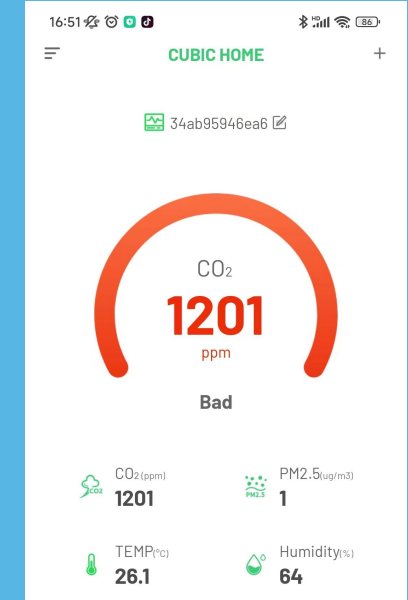
Step 2: Press “configuration” icon to open configuration options.



Step 3: Input Wi-Fi ssid and password then select “Cloud service” option and press “CONFIRM” icon.



Step 4: Wait for a while for AM7000 to connect to Ali cloud server and if succeed data will be displayed on CubicAir app in real-time.



TCP Server Connection

TCP Server Network Topology

AM7000 can be connected to a TCP server via its built-in Wi-Fi module. AM7000 users can build their own TCP server to request data from AM7000 and provide data interface for a TCP client to access the data. To implement this a Wi-Fi router that builds a LAN network is required for AM7000 to be able to connect to TCP server. An Android smart phone with CubicAir app installed is required to configure AM7000 to connect to TCP server. General steps to configure AM7000 to connect to TCP server is as below:

- Connect Android smart phone to AM7000 via Bluetooth with CubicAir app.
- Input the name and password of the Wi-Fi router with CubicAir app.
- Select “TCP” option and configure TCP server’s IP address and port number in AM7000 with CubicAir app.



Items Required

To connect AM7000 to a TCP server with CubicAir app, the following items are required:

- AM7000 x 1
- Wi-Fi router x 1
- Laptop with Wi-Fi adapter x 1
- Android Smart Phone with CubicAir App installed x 1
- SSCOM Serial Assistance software x 1

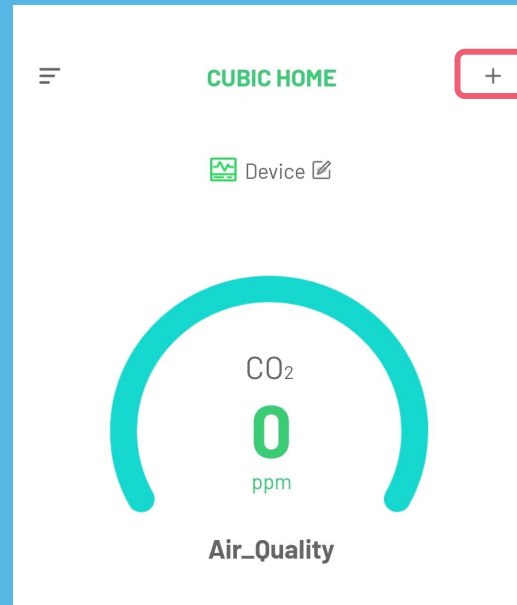


Connect Bluetooth

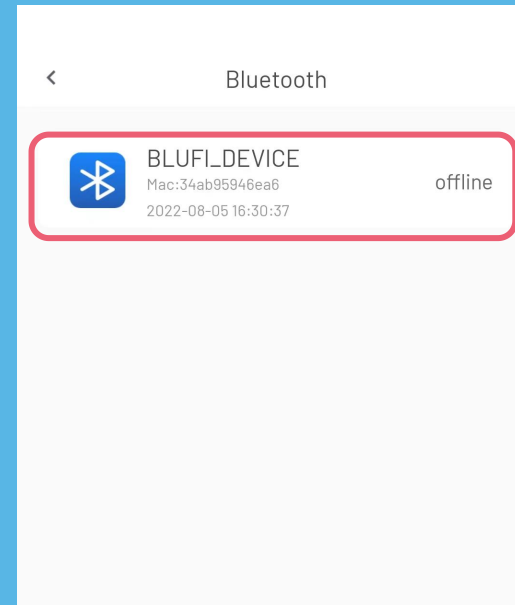
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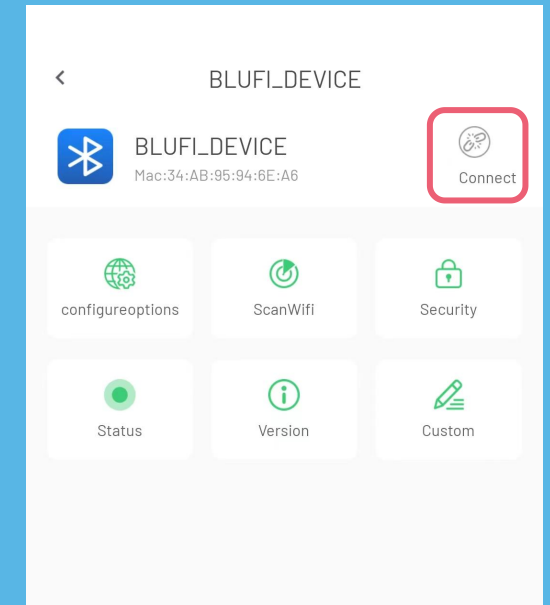
Step 2: Turn on Bluetooth on the Android smart phone and Open CubicAir app then press “+” icon.



Step 3: Put smart phone close to AM7000 for scanning Bluetooth device. A Bluetooth icon with the Mac address of AM7000 will appear as shown below if AM7000 is found. The Bluetooth is now offline.



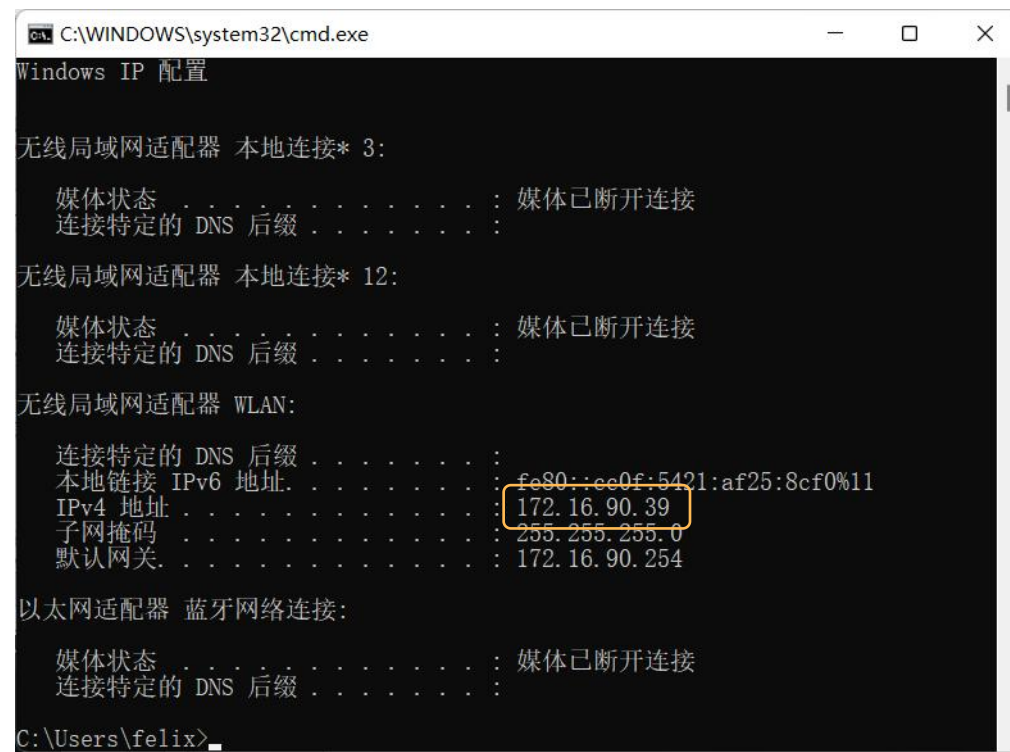
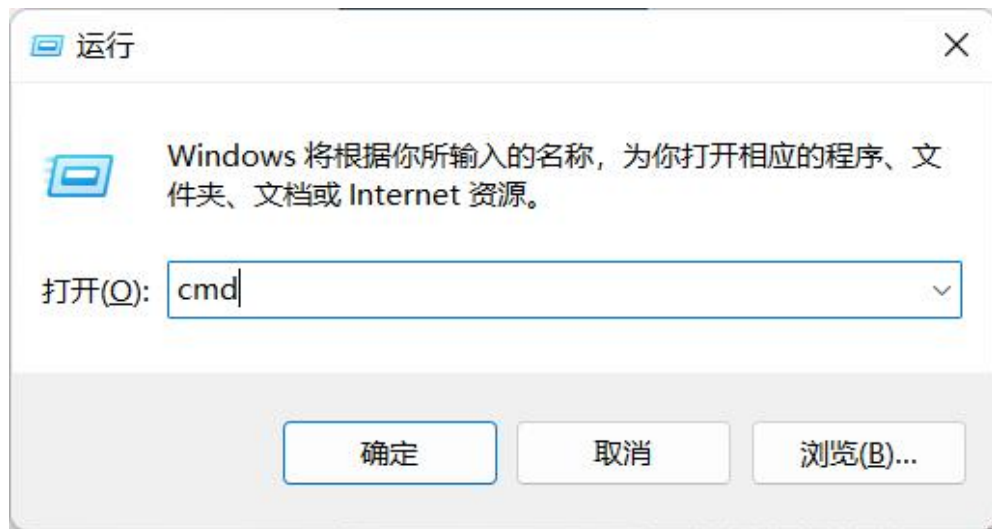
Step 4: Press the Bluetooth icon and press “Connect” icon to connect AM7000 to smart phone via Bluetooth.



Check TCP Server's IP and Port

Check the IP address of the wireless network adapter of the laptop to be used as a TCP server.

- (1) Press "Win + R" to open "Run" menu and type in "cmd" and press "Enter" to open Windows command prompt.
- (2) Type in "ipconfig" in the command line and press "Enter".
- (3) Note the IPv4 address of the wireless network adapter. The IPv4 address in this case is 172.16.90.39

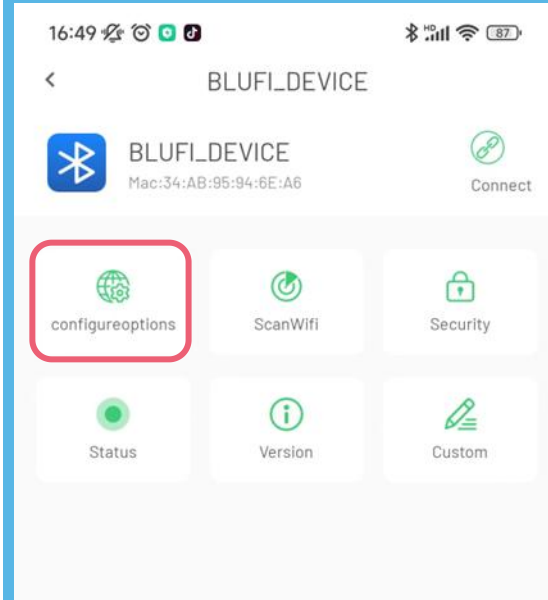


Connect TCP Server

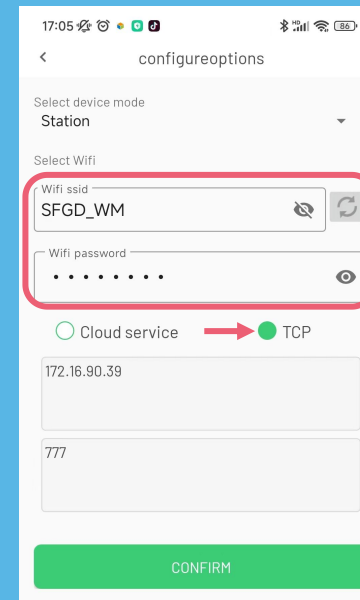
Step 1: The Bluetooth icon on AM7000 turns grey indicating it has been connected to smart phone by Bluetooth.



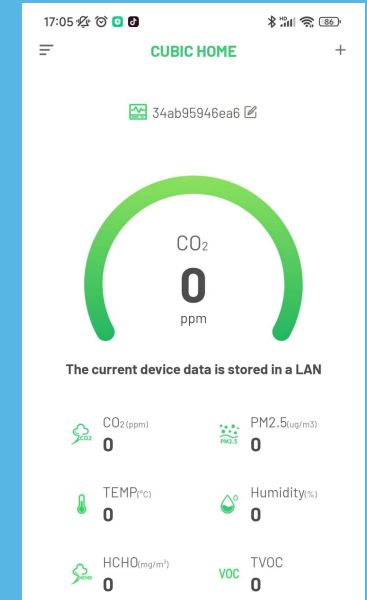
Step 2: Press “configuration” icon to open configuration options.



Step 3: Input Wi-Fi ssid and password then select “TCP” option. Input the TCP server’s IP address and port number then press “CONFIRM” icon.



Step 4: A message “The current device data is stored in a LAN” will appear on CubicAir app indicating that it has been connected to a TCP server.



Start TCP Server

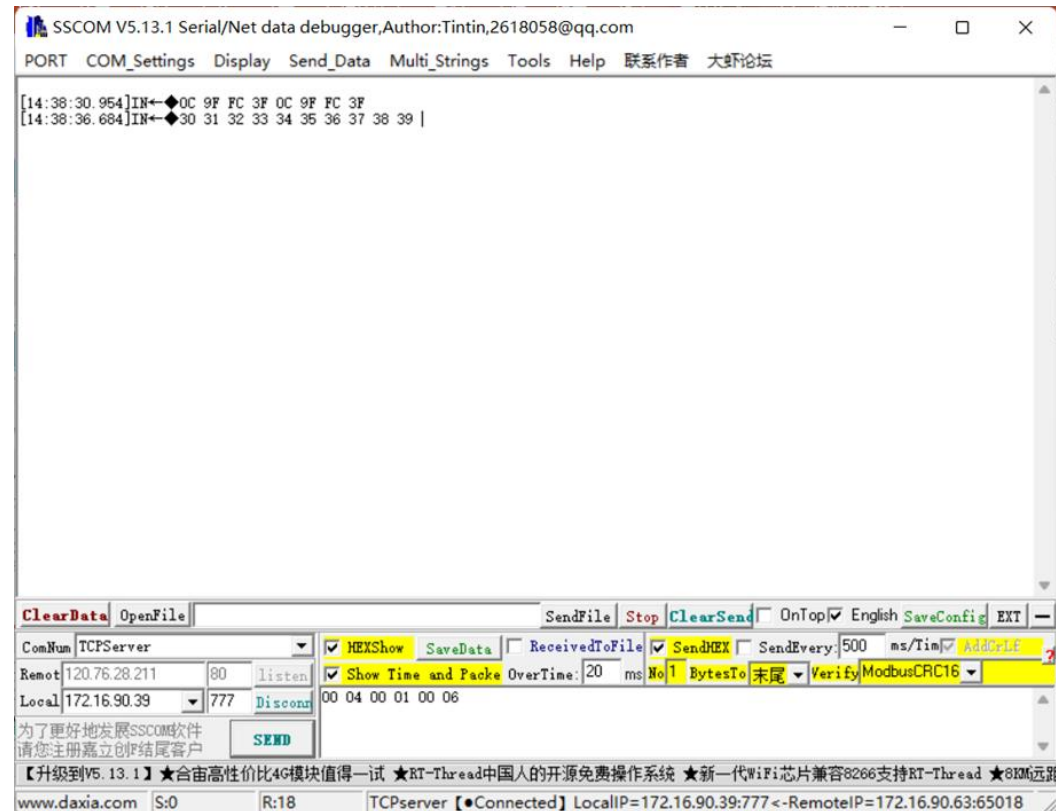
Step 1: Select ComNum to “TCP Server” in SSCOM software. And make the settings as shown below:

- Set “Local” IP address to 172.16.90.39
- Set Port number: 777
- Tick “HEXShow” “SendHEX”, “Show Time and Packe”.
- Set “Verify to ModbusCRC16”.

Step 2: Click on “listen” button to start the TCP server.

Step 3: Reset AM7000 to make it connect to the TCP server.

A message “30 31 32 33 34 35 36 37 38 39” will be received from AM7000 via wireless network and the Wi-Fi icon will turn white which indicates AM7000 has been connected to the TCP server successfully.



At the bottom of the SSCOM software gives the TCP server status:

TCPServer [●Connected]LocalIP=172.16.90.39:777←RemotelP=172.16.90.63:65018

Request Data on TCP Server

Message Frame Format and Register and Function Code List

Command Send Format

IP	Function Code	Register Address		Register Data		CRC16	
01	04	00	01	00	06	21	C8

Note: set IP to 00 if you don't know the device's IP address.

Data Receive Format

IP	Function Code	Data Length	DF0	...	DFn	CRC16	
01	04	0C	DF0	...	DF11	CRC16-H	CRC16-L

Register List

Input Register	Register Address	0x0001	0x0002	0x0003	0x0004	0x0005	0x0006
	Register Data	CO2	PM2.5	TVOC	HCHO	Humidity	Temp.
Hold Register	Register Address	0x0010	0x0011	0x0012	0x0013		
	Register Data	Modbus Device ID	Server Port	Server IP1,IP2	Server IP3,IP4		

Function Code List

Function Code	04	03	06	10
Description	Read input register	Read hold register	Write single hold register	Write Multi hold registers

AM7000 uses Modbus Protocol to communicate with other devices.



Request Data on TCP Server

◆ Request AM7000's monitoring data

Send: 00 **04** 00 01 00 06 [CRC16]

Response: 05 **04** 0C 08 86 00 10 00 00 00 00 18 43 0B 0C FA A0

00	04	00	DF0	DF1	DF2	DF3	DF4	DF5	DF6	DF7	DF8	DF9	DF10	DF11	CRC16	
05	04	0C	08	86	00	10	00	00	00	00	18	43	0B	0C	FA	A0
IP	04	0C	CO2	PM2.5	TVOC	HCHO	Humidity	Temperature	CRC16							

Interpretation of the data is shown as below:

IP: Device's IP address. Up to 254 devices can be connected to the network. *Set IP to 00 if you don't know the device's IP address.*

CO2 = DF0*256 + DF1 (unit: ppm)

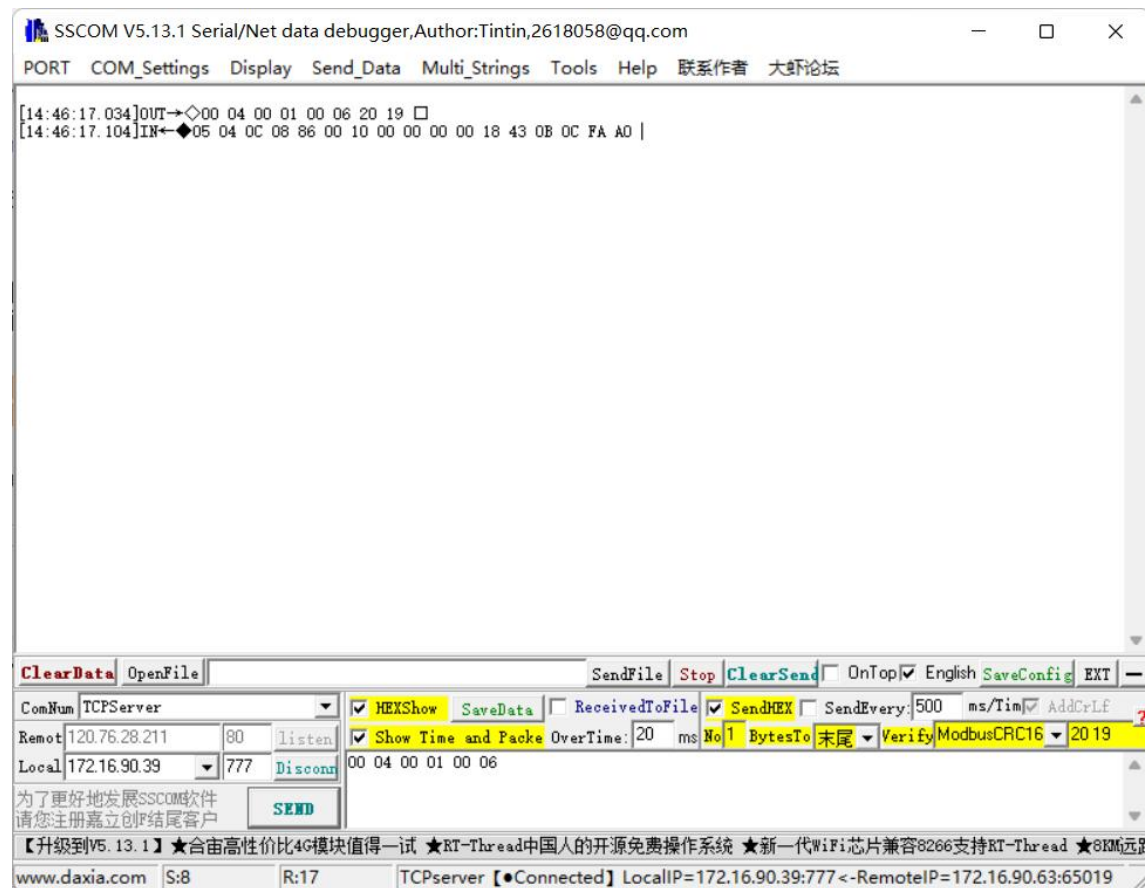
PM2.5 = DF2*256+DF3 (unit: $\mu\text{g}/\text{m}^3$)

Humidity = (DF8*256 + DF9)/100 (unit: %)

Temp.= (DF10*256+DF11)/100 (unit: $^{\circ}\text{C}$)

TVOC = (DF4*256+DF5)/1000 (unit: ppb)

HCHO = (DF6*256+DF7)/1000 (unit: ppb)



Request Data on TCP Server

◆ Request Server's IP address, Port number and Device ID

Send: 01 **03** 00 10 00 04 [CRC16]

Response: 01 **03** 08 00 01 03 09 AC 10 5A 27 03 0A

01	03	08	DF0	DF1	DF2	DF3	DF4	DF5	DF6	DF7	CRC16	
01	03	08	00	01	03	09	AC	10	5A	27	03	0A
			1		777		172	16	90	39		
IP, Function Code and Data Length			Device ID		Port Number		Server's IP Address				CRC16	

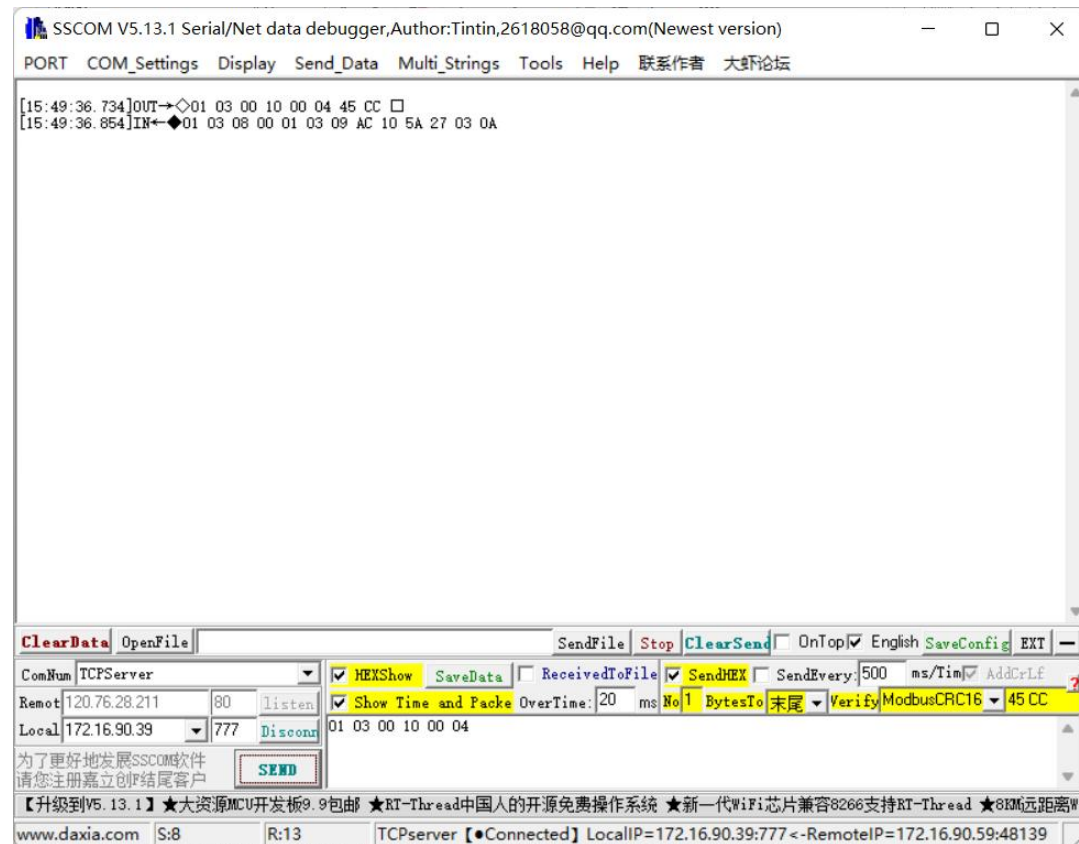
Interpretation of the data is shown as below:

IP: Device's IP address. Up to 254 devices can be connected to the network. *Set IP to 00 if you don't know the device's IP address.*

Device ID: DF0 DF1 = 0x0001 = 1

Port Number: DF2 DF3 = 0x0309 = 777

IP Address: DF4 DF5 DF6 DF7 = 172.16.90.39



Change AM7000's IP on TCP Server

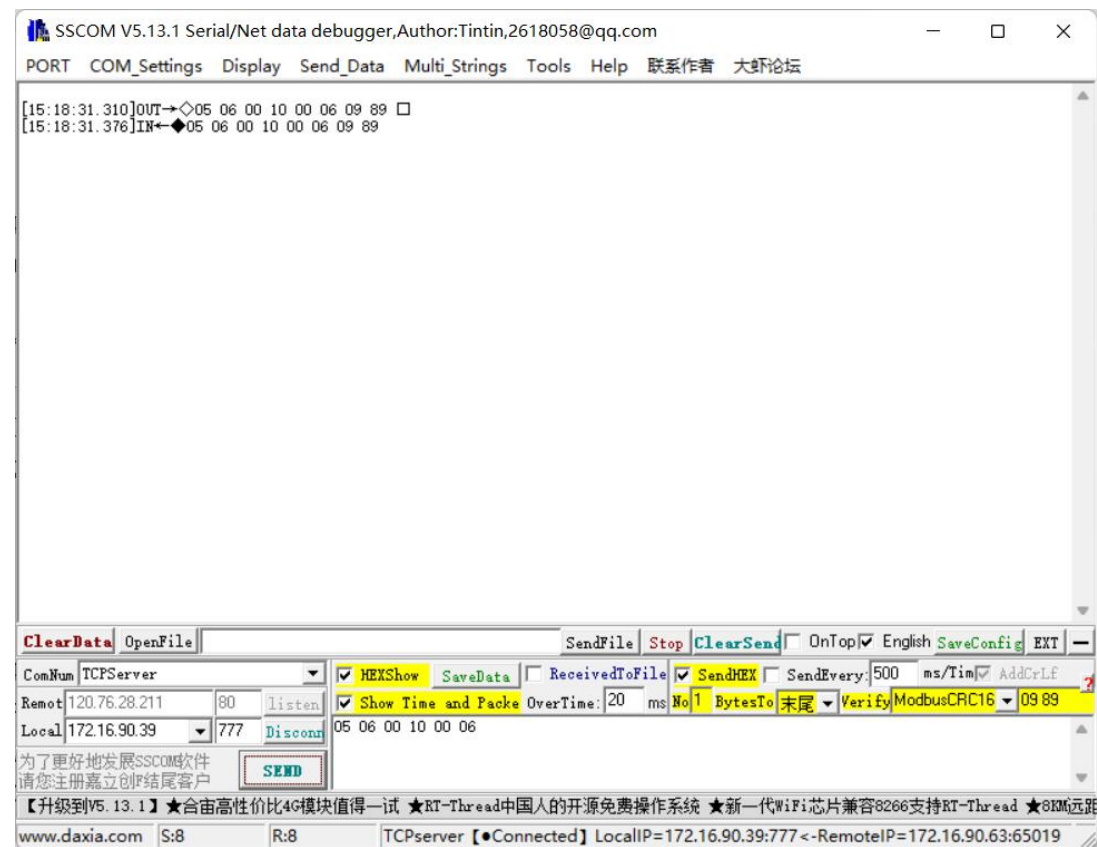
◆ Change AM7000's IP address from 05 to 06

Send: 05 06 00 10 00 06 [CRC16]

IP		Function Code		Register Address		Register Data		CRC16	
05	06	00	10	00	06	09	89		
Current IP	Write command	Modbus Device ID Address		Changed IP		CRC16-H		CRC16-L	

Response: 05 06 00 10 00 06 09 89

If more than one device is connected to the network, the IP address for each device must be changed so as to be distinguished from each other. Up to 254 devices can be added to the network.



Thank You



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