

KMK179 - Wifi Optical Probe User Manual

1. Overview



Front View

1. Power Button: Push to open and push to close
2. Charge LED Group: When connected to charge and Voltage is ok for probe, "VIN" LED will be ON. "CHARGE" LED will also be ON during charge and OFF once battery is fully charged.
3. WiFi Activity LED Group: Those LEDs show the activity during WiFi communication. When the WiFi Module is Powered the "POW" LED will

be ON. This LED is ON when the device is ON and will be OFF when the device is OFF. When the battery is low (device needs to be charged), the same LED will be ON and it will light in RED Color.

"LINK" LED can be in 1 of 3 states

- Will blink fast when there is no connection to WiFi
- Will blink slow when WiFi connection is on but there is no client connected to device
- Will be ON when a client is connected to probe. For example if the TCP port is opened by the meter reading software from PC side, this LED will be ON. "TX" and "RX" LEDs will flash during sending data to meter and receiving data from meter.

4. Speed LED Group: This group shows the operating modes of probe.

There are 4 operating modes of probe.

- Mode 1: 300-7E1 IEC auto Mode C.
- Mode 2: 300-7E1 IEC start and change to DLMS/COSEM (300-8N1 IEC start version also available which is needed for some meter applications)
- Mode 3: Fixed 9600-8N1 communication
- Mode 4: Custom command mode. In this mode the device will work transparently and get some commands from user. The upmost LED will turn ON when the probe is working in Mode 1 and lowermost LED will turn on when the probe works in Mode 4. The other LEDs will turn ON in turn when Mode 2 or Mode 3 is active.



Side View

1. Micro USB or USB Type C Connector: Depending on the hardware version the probe comes with USB C or micro USB connector along with charge cable. Any cell phone charger can be used to charge device.
2. Switches: Switches are used to select the working mode of Probe. It is described as printing as well.

Switch 1	Switch 2	Mode	Mode Function
OFF	OFF	Mode 1	300-7E1 IEC auto Mode C. Auto baud change based on protocol
ON	OFF	Mode 2	300-7E1 IEC start and change to DLMS/COSEM (300-8N1 IEC start version also available which is needed for some meter applications) Auto baud change based on protocol

OFF	ON	Mode 3	Fixed 9600-8N1 communication
ON	ON	Mode 4	Custom command mode. In this mode the device will work transparently and gets some commands from user.



NOTE: Switch change will be applied on next power ON of the device. So in order to change working mode, user has to turn off the probe first.



NOTE: Project specific firmware available based on customer specific needs. Please contact our company for your needs.

Probe Interface View



Probe comes with relevant interface

KMK179 is an IEC probe: it has flat interface to be placed on the meter probe interface

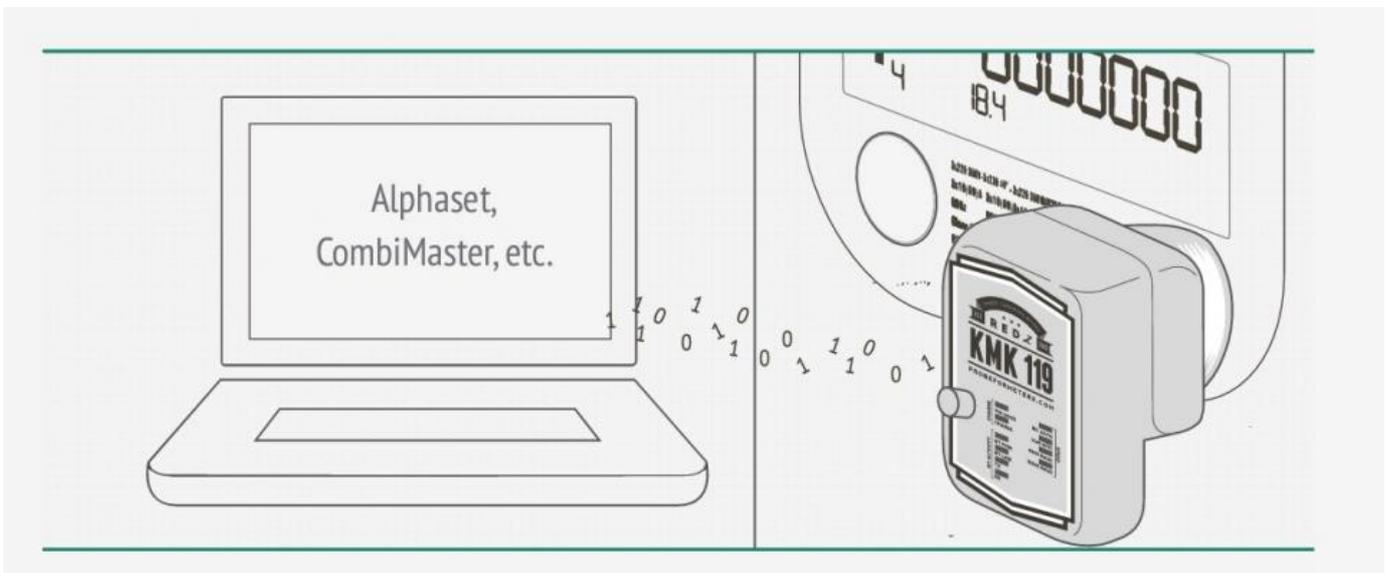


NOTE: All KMK probes use N38 magnet in order to better attach to meter

2. Working Modes

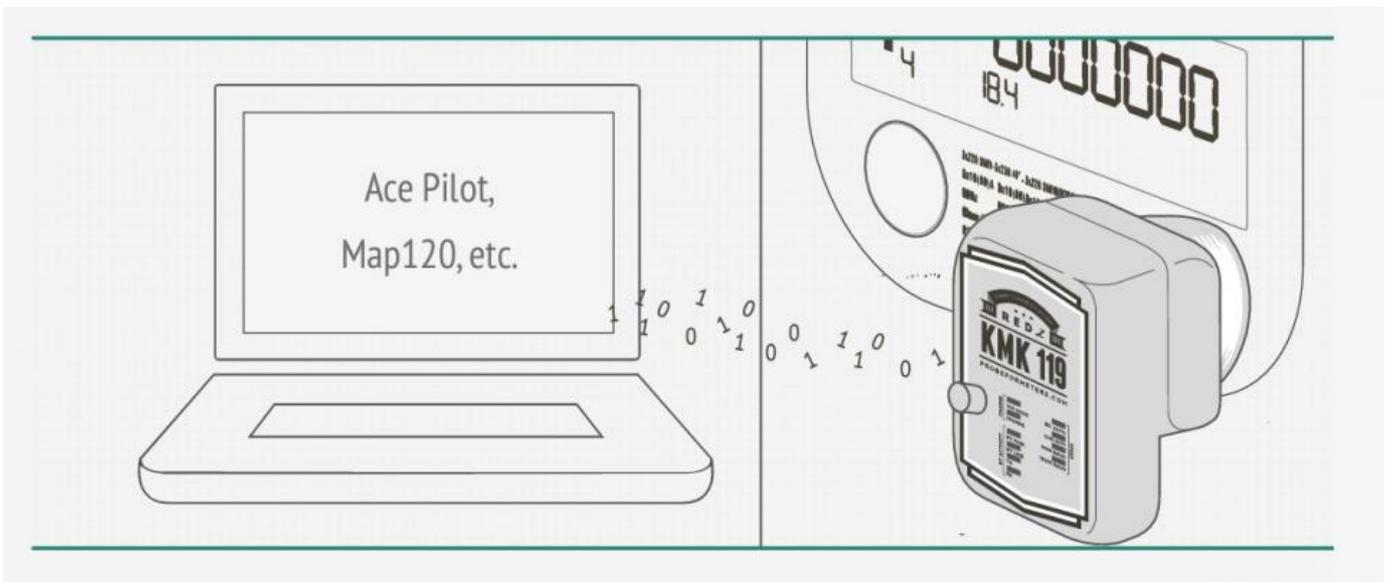
MODE 1: 300-7E1 IEC AUTO MODE C.

In this mode the probe can automatically detect IEC 62056-21 Mode C (formerly known as IEC1107) protocol and make necessary baud change overs automatically. This mode is designed so that any software that can read IEC62056-21 meters with cable version of optical probe can instantly use Bluetooth version of probe. After paring the probe the already available software can instantly use this mode to read meters such as Elster, EMH, L&Gyr etc.



MODE 2: 300-7E1 IEC START AND CHANGE TO DLMS/COSEM

In this mode the probe can automatically detect IEC 62056-21 Mode C (formerly known as IEC1107) opening on DLMS/COSEM protocol make necessary baud and data type change overs automatically. This mode is designed so that any software that can read DLMS/COSEM meters with IEC opening mode with cable version of optical probe can instantly use Bluetooth version of probe. After paring the probe the already available software can instantly use this mode to read meters such as Itron, L&Gyr etc.



MODE 3: FIXED 9600-8N1 COMMUNICATION

This is fixed speed and data type communication mode. This can be used in IEC870-5-102 standard or in any standard that is necessary to communicate in this data type and baud rate.

MODE 4: CUSTOM COMMAND MODE

In this mode the device will work transparently and can be managed by special commands. Command mode is the best solution if the user is capable of editing or developing their own meter reading software so that user can use Bluetooth Probe for communication.





NOTE: The C# code example for sending command is as follows:

```
////=====
//Initialize Probe at baudrate 300

buffer = new byte[] { 0xFE, 0xFE, 0x42, 0x4C, 0x55, 0x45, 0x30, 0x38, 0x4E,
0x31, 0x30, 0xFF };

this.comport.Write(buffer, 0, buffer.Length);

Thread.Sleep(50);

//Sleep is important, also it is suggested to wait 1000ms after opening the TCP
port.
```

```
////=====
```

This command will change baud rate or data type.

Second char from last can vary so that user can send different commands to probe:

Data Type Settings Commands:

- 0x30 : 300 baud
- 0x31 : 600 baud
- 0x32 : 1200 baud
- 0x33: 2400 baud
- 0x34: 4800 baud
- 0x35: 9600 baud

0x36:19200 baud

0x37: 28800 baud

0x38: 38400 baud

0x40: 7E1 data type

0x41: 8N1 data type

0x42: 8E1 data type

0x43: 8O1 data type

0x50: Break State: Enter

0x51: Break State: Exit

Other Commands:

0xA0: Firmware Version Query The firmware version information will be sent and data will be terminated with 0x00 character.

0xA1: Battery Voltage Query (mV) Battery voltage information will be sent and data will be terminated with 0x00 character.

0xA2: Close Sleep Timer (10 seconds) If there is no connection with the probe for more than 10 seconds, the port goes into sleep mode and power saving mode will be on. When the TCP connection is established, the sleep mode will be off and the port will work as usual and user operation is not affected by this process. Confirmation information will be sent and data will be terminated with 0x00 character.

0xC2: Shut Down The Probe Using this command, the power can be turned off as if the optical probe was closed by the power button.

0xC3: Auto Shutdown Timer Setting A time interval between 0 to 254 seconds should be set (in HEX format). If there is no communication with the probe after that time interval, the device will be turned off (probe shuts down). This can prevent the probes to be left forgotten with power on for long time and consume battery. The default value is 254 seconds. This feature can be

disabled by setting value 255. After sending the command, confirmation information will be sent and data will be terminated with character 0x00. Then the time interval must be set. The next confirmation information will be terminated with character 0x00 again.

0xD0: Probe Reading Sensitivity Setting If user gets some meaningless or corrupted data while reading the meter, it is possible to change the reading accuracy of the probe and make special setting based on meter type to prevent reflections or light interferences. A value between 0 to 255 should be set (in HEX format). As this value increases, sensitivity of the probe decreases and light reception capacity falls. The default value is 26 (0x1A). After sending the command, confirmation information will be sent and data will be terminated with character 0x00. Then the sensitivity value must be set. The next confirmation information will be terminated with character 0x00 again. The user can transmit any data and command to the optical probe without any restrictions and can use the optical probe at any desired data type and communication speed at any time. The commands transmitted to the optical probe and the data transmitted to the meter is always separated.

0xE0: Save Settings. It is possible to save settings for following data Sleep Timer, Auto Power seconds, Reading Sensitivity, Baud Rate and Data type. After sending the command, confirmation information will be sent and data will be terminated with character 0x00. All listed values are saved as it is set and next time the device restarted they will be used based on saved values.

0xE1: Restore Factory Defaults (available with v3 designs and later) Command sets values as follows and saves them

- Sleep Timer: ON
- Auto Power Down Seconds : 254
- Reading Sensitivity: 26
- Baud Rate: 300
- Data Type: 7E1 After sending the command, confirmation information will be sent and data will be terminated with character 0x00.

3. Charge & Battery Status

Charge Port



NOTE: Charge port can be Micro USB or USB Type C based on version of hardware. Probe comes with relevant charge cable and by using that cable probe can be charged with any PC or Phone charger that has USB Type A on it.

Battery Status

The probe gives a low battery warning via LEDs to warn the low battery status and remind user to recharge. When battery is low, "POW" LED turns into RED light and remains until it's charged enough.

KMK179 uses a 1200mAh battery inside.

4. Firmware Change

The probe has capability to change firmware over wireless connection. This way the user can get latest updates of probe operation and also user may also ask for changes. Here are some examples:

- Firmware change for specific meter model and protocol
- Firmware change to disable switches and work only in command mode
- Firmware change to put any feature that user needs

Firmware change procedure need specific firmware prepared by our company and the firmware upgrade software abcZ software also developed by our company. In order to use the software the specific firmware must be selected. After selecting the firmware path by clicking «Select Path» button the firmware can be loaded to probe.

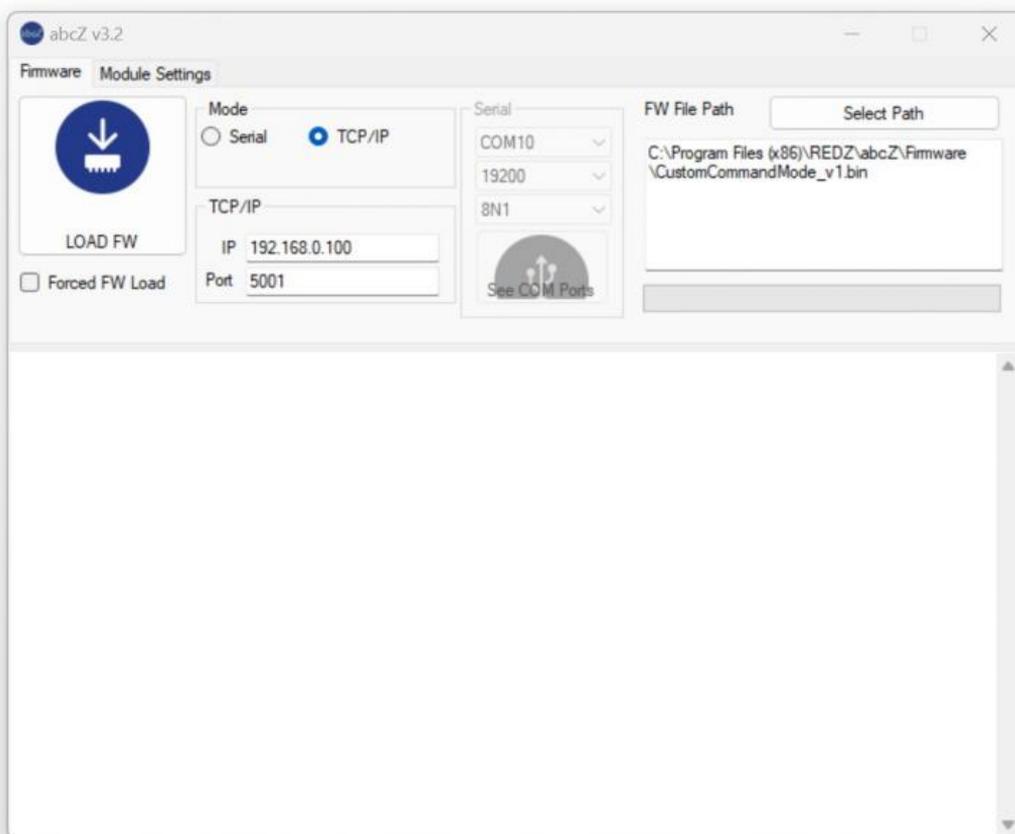


NOTE: The probe has protection time window 60 seconds after the powered up so the process must be started within 60 seconds after probe powered up.

User should make TCP/IP connection with probe and click "LOAD FW" button using abcZ Software. The software will show the percentage of process visually in terms of number of sent data packages and that process can also be monitored by LEDs (work mode LEDs) on probe. Also power LED will blink RED during operation. (once %25 of process finished LED1 will be on and continue with LED2, 3 and finish with LED4 after %100 finished). The process will take less than a minute and the probe will restart itself. Device should not be powered off during update process.



NOTE: If somehow the firmware upgrade process is interrupted and upload file has failed, the probe will lose firmware and stay in bootloader mode. In that case user can try upgrading the firmware again and this time should mark the "Forced FW Load" check box.



5. Setting Up WiFi Connection and TCP/IP Connection to Probe

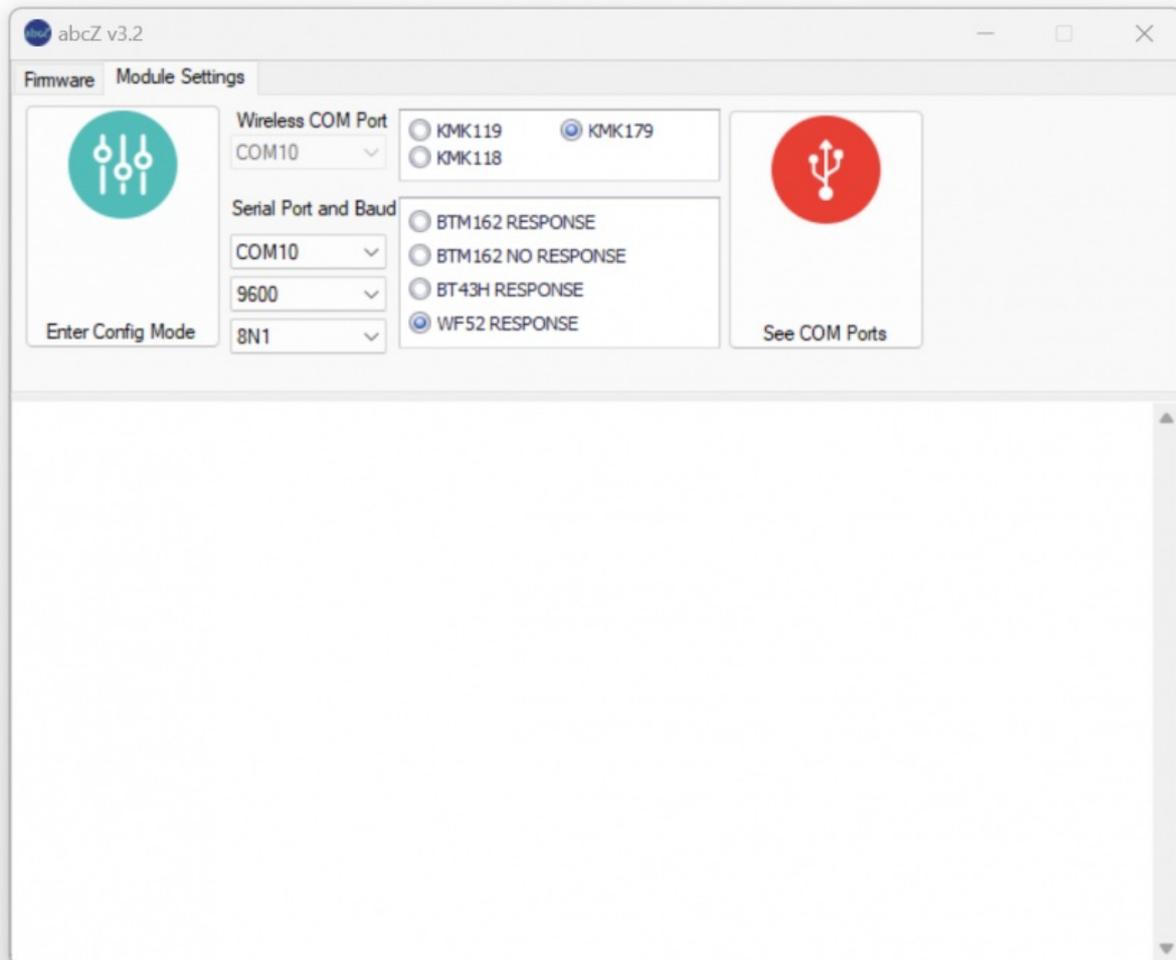
In order to configure WiFi settings, additional optical probe is needed. So user

should use USB service probe sent with WiFi probe and place them against to each other



Steps for Preparation

1. Connect the USB optical probe to PC and detect the COM port
2. Set WiFi Probe to Mode 3: 9600 8N1 fixed baud rate
3. Power On the WiFi probe and place it on top of USB probe as shown in picture
4. Open abcZ Software



Steps for Configuration

1. Select USB probe com port and make sure with baud and data type settings: 9600 8N1
2. Select probe type "KMK179"
3. Select "WF52 Response"
4. Click "Enter Config Mode"
5. abcZ software will try to enter config mode through USB probe and it will show available settings

abcZ v3.2

Firmware Module Settings



Enter Config Mode

Wireless COM Port

COM10

KMK119 KMK179

KMK118

Serial Port and Baud

COM10

9600

8N1

BTM162 RESPONSE

BTM162 NO RESPONSE

BT43H RESPONSE

WF52 RESPONSE



See COM Ports

Now will try UART port connection.
Successful Connection to Serial Interface UART
Break Sequence has been sent
Command Mode entered:
UART -> AT-WF -CommandMode-

Mac Address Query has been sent
Mac Address:
UART -> var3 MAC_ADDR = 00043e71b91
Valid values are: example - 00043e241172

Device Name Query has been sent
Device Name:
UART -> var2 DeviceName = KMK179 00043e-71b91
Valid values are: Any alphanumeric character string

DHCP Mode Query has been sent
DHCP Mode:
UART -> var4 DHCPMode = true
Valid values are: true, false, 1, or 0

IP Address Query has been sent
IP Address:UART -> Auto Join
var5 IPAddress = 192.168.0.2

Degerler

WF52 Wifi

Device Details

MAC Address: 00043e71b91

Device Name: KMK179 00043e-71b91

Network Settings

DHCP Client: Disabled

IP Address: 192.168.1.50

Netmask: 255.255.255.0

Gateway: 192.168.1.1

DNS Mode: IP

DNS Domain Name: 8.8.8.8

Wireless Settings

SSID: ZT_LAB

Pass Phrase: 123456789

Authentication Type: WPA2-PSK

Device Mode: STA

Auto Join ON Auto Join OFF

Gateway Settings

IP Protocol: TCP Server

Host IP Address: 192.168.0.10

Host Port: 2015

Local Port: 2015

Make REDZ

WRITE NEW VALUES



NOTE: Device will be ready for configuration once the settings page opened

Device Settings

1. Network Settings:

Select "Disabled" in DHCP Client to give a static Ip to device and enter local IP settings

2. Wireless Settings:

Enter SSID name, password and Authentication type

Device mode will be "STA" for standard operation and "Auto Join ON" should be selected for auto WiFi connection

3. Gateway Settings:

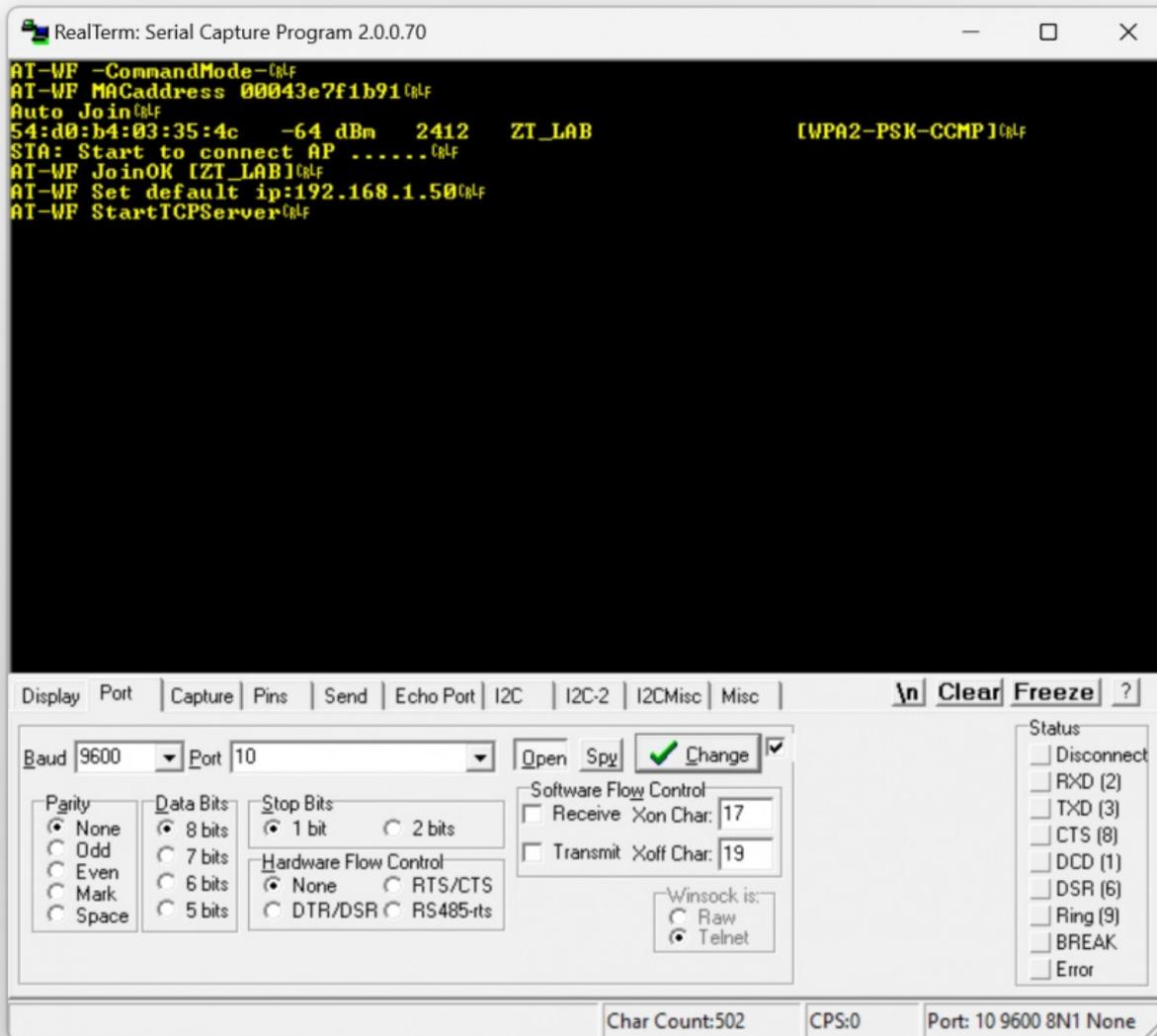
Device will be in "TC Server" Mode and will listen connections over "Local Port" which is 2015 in default



NOTE: Click "Write New Values" when all settings are done. New settings will be written and device will restart. User can manually restart device as well.

After all settings done, user may monitor status of connection with RealTerm (free open source terminal) software.

(USB probe is still connected to PC and WiFi probe is still on top of it and set to Mode 3, no change until now with hardware and software setup)

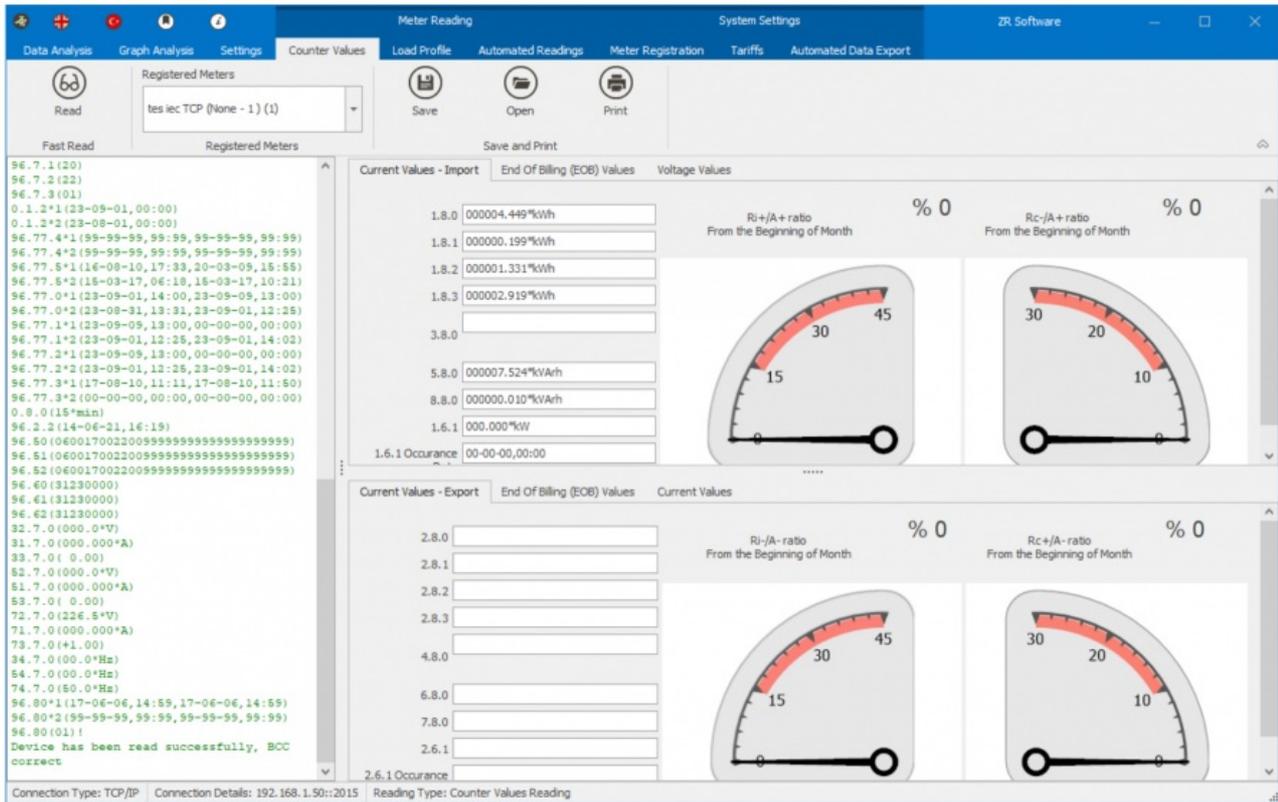


NOTE: "Link" LED will blink slowly when the probe is connected to WiFi network. Now the probe is ready to use and user can read meter over WiFi probe with defined TCP IP and TCP port.



NOTE: Please do not forget to set switch settings to desired position before using the probe in normal operation and after configuration.

Here is example reading via ZR Software with IP: 192.68.1.50 and port 2015



6. Testing Command Mode

User can test Command mode of the probe with a terminal program. User should set the switch position to Mode 4 and power up probe before start testing.

In this example RealTerm (free open source terminal) software has been used. Open terminal, enter TCP/IP and port of probe and click connect.



NOTE: Connection is available only after the WiFi connection is established ("Link" LED will blink slowly)

"Link" LED will turn ON continuously once the program connected to probe. Then user can communicate with the probe using different commands via terminal program.

For example to read battery voltage of the probe user can send following byte Array to probe:

0xFE 0xFE 0x42 0x4C 0x55 0x45 0x30 0x38 0x4E 0x31 **0xA1** 0xFF

Copy and paste this command to terminal and click "Send Numbers", Probe will answer with battery voltage in mV.



NOTE: Command byte is last byte before 0xFF. Other bytes are fixed and do not change. To query the battery voltage, the command byte should be 0xA1.

