

2-Port Modbus TCP to Modbus RTU / ASCII With 2DI / 2DO WPC-832-2-DIO22-Modbus User Manual



v.201809a

<http://www.tcpipweb.com>

*** this user manual is subject to change without prior notice.

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Introduction

WPC-832-2-DIO22-Modbus 2-Port Modbus RTU/ASCII To Modbus TCP Gateway providing new ways of connecting Serial devices, 2 Digital Inputs and 2 Digital Outputs to Ethernet and Wireless LAN (Wi-Fi 802.11 b/g/n). This Gateway is designed to operate 2 Serial ports and 2 DI, 2DO ports through Ethernet and Wireless (Wi-Fi 802.11 b/g/n) over 10/100Mbps TCP/IP network. As the data is transmitted via TCP/IP protocol, data acquisition and controlling is available to go through Intranet and Internet. 2 Serial ports operate in common RS-232, RS-422/RS-485. 2 DI and 2 DO ports operate in Modbus protocol.

WPC-832-2-DIO22-Modbus is a high performance design composed with carefully selecting quality components from reliable and certified sources. This operation manual will guide you to configure functions step by step.

The following topics are covered in this chapter:

- ☐ **Overview**
- ☐ **Package Checklist**
- ☐ **Product Features**
- ☐ **Hardware Specifications**

Overview

WPC-832-2-DIO22-Modbus provides a perfect solution to make your industrial Serial devices connect to Internet instantly via Wireless and Ethernet LAN.

WPC-832-2-DIO22-Modbus embedded with MT7688AN MIPS chipset makes it become the ideal device for transmitting the data from your RS-232 or RS-422/485 Serial interface devices, such as PLCs, various Meters and/or Sensors to an IP-based Wi-Fi LAN, and making it possible for your software to access Serial interface devices anywhere and anytime.

WPC-832-2-DIO22-Modbus providing TCP to RTU Slave, RTU Master to TCP Slave , TCP to ASCII Slave, ASCII Master to TCP Slave for selection. It supports manual configuration via web browser and support various protocols including TCP, IP, UDP, HTTP, DHCP, ICMP, and ARP. These are the best solution to coordinate with your Serial interface devices.

Package Check List

WPC-832-2-DIO22-Modbus attached with the following items:

- ☐ 1 unit of Serial to WPC-832-2-DIO22-Modbus Gateway
- ☐ 1 unit of Power Adaptor (12V DC, 1A) is an option
- ☐ 1 unit of dipole antenna(2.0dBi)
- ☐ Documentation & Utility CD

NOTE: Inform your sales representative if any of the above items missing or damaged.

Product Specifications

System

- ✧ CPU : MT7688AN MIPS CPU, 580 MHz
- ✧ RAM : 128M Bytes DDR2 RAM
- ✧ ROM : 32M Bytes Flash ROM
- ✧ OS : OpenWrt Linux OS

Ethernet

- ✧ Port Type : RJ-45 Connector
- ✧ Speed : 10 /100 M bps (Auto Detecting)
- ✧ Protocol : ARP , IP , ICMP , UDP , TCP , HTTP , DHCP
- ✧ Protocol : DNS, NTP
- ✧ Mode : TCP to RTU support 8 simultaneous TCP Master,
RTU to TCP support 8 TCP Slaves on each port.
- ✧ Setup : HTTP Browser Setup (IE & Netscape)
- ✧ Security : Setup Password
- ✧ Protection : Built-in 1.5KV Magnetic Isolation

WiFi port

- ✧ Support AP / Station
- ✧ Standard : 2.4G IEEE 802.11b/g/n
- ✧ Data Rate : 11/54/72.2 Mbps @ 20Mhz Band Width
- ✧ Modulation : DSSS; OFDM
- ✧ Frequency : 2.4GHz
- ✧ Tx Power 11b : Max. 22dBm
- ✧ Tx Power 11g/n : Max. 19dBm
- ✧ Rx Sensitivity : -76dBm @ 54Mbps; -89.5dBm @ 11Mbps
- ✧ Tx Rate : Max. 54Mbps with auto fallback
- ✧ Tx Distance : Up to 100m
- ✧ Security : WEP 64-bit / 128-bit data encryption, WPA / WPA2 personal
- ✧ Antenna : 2 dBi ; RP-SMA connector
- ✧ Network Mode: Infrastructure; Soft AP (for Setup)
- ✧ Mode : TCP Server / TCP Client / UDP / Virtual Com / Pairing
- ✧ Setup : HTTP Browser Setup (IE, Chrome, Firefox)
- ✧ Security : Login Password

Serial Ports *2

- ✧ Port : RS-232/422/485 * 2 Ports (RS-232 - RX/TX only)
- ✧ Port : RS-422 / 485 (Surge Protect)
- ✧ Speed : 300 bps ~ 921.6 K bps
- ✧ Parity : None , Odd , Even
- ✧ Data Bit : 5 , 6 , 7 , 8
- ✧ Stop Bit : 1 , 2
- ✧ RS-232 Pins : Rx , Tx , GND
- ✧ RS-422 : Rx+ , Rx- , Tx+ , Tx- (Surge Protect)
- ✧ RS-485 : Data+ , Data- (Surge Protect)
- ✧ 15KV ESD for all signals
- ✧

Digital Input / Output

- ✧ Digital Input * 2 Pins (Active High / Active Low Selectable)
Dry contact : Logic level 0 : close to GND , Logic level 1 : open
Wet contact : Logic level 0 : 0~3 V , Logic level 1 : 5 ~ 30V
- ✧ Digital Output * 2 Pins (Active High / Active Low Selectable)
120VAC @ 10A , 240VAC @ 7A , 24VDC @ 10A

Power

- ✧ DC 9~32 V, 1000mA@12V
- ✧ support DC Jack & Terminal Input

Mechanical and Environment

- ✧ Operating Temperature : -20°C ~ 70°C
- ✧ Storage Temperature: -25°C ~ 80°C
- ✧ Dimensions : 110 * 85 * 27 mm (W * D * H), not included protruded components
- ✧ Weight : 350 ± 5gm
- ✧ Housing: metal.

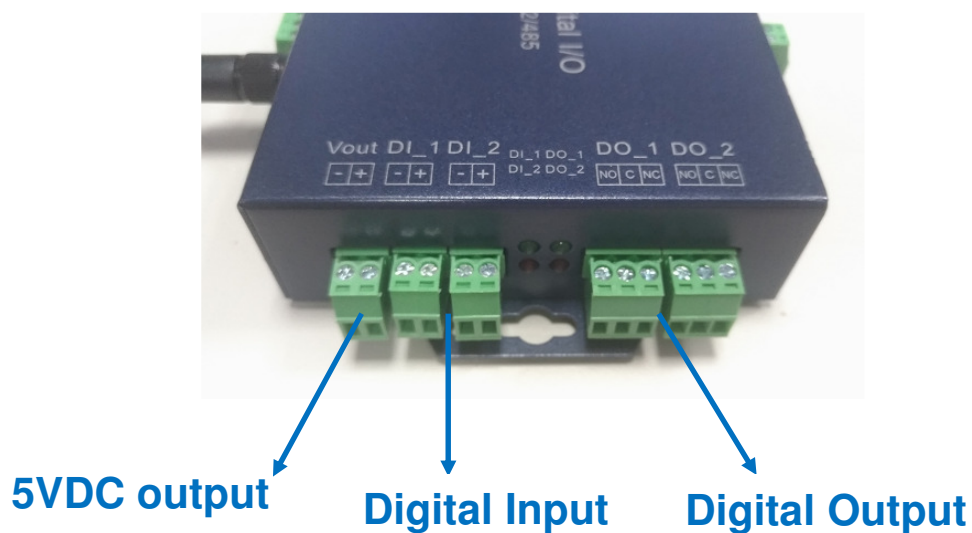
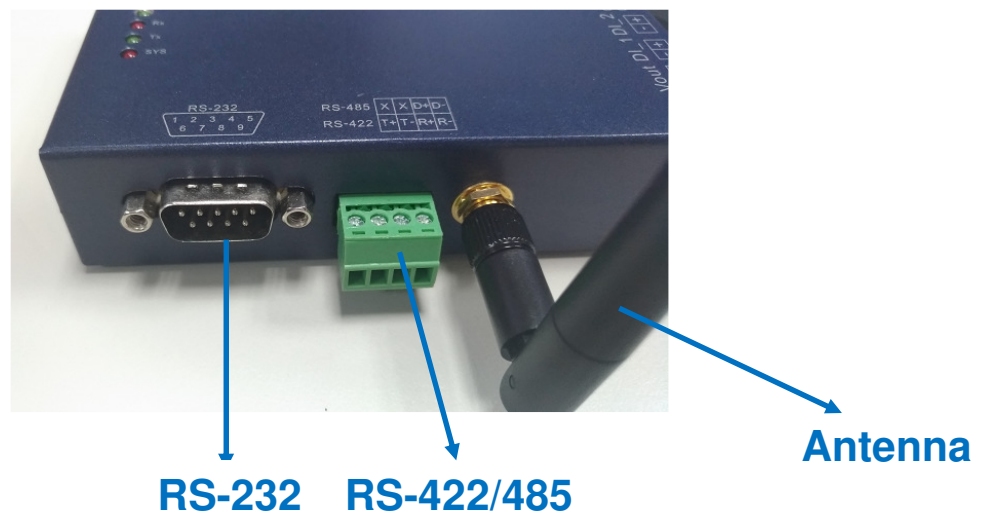
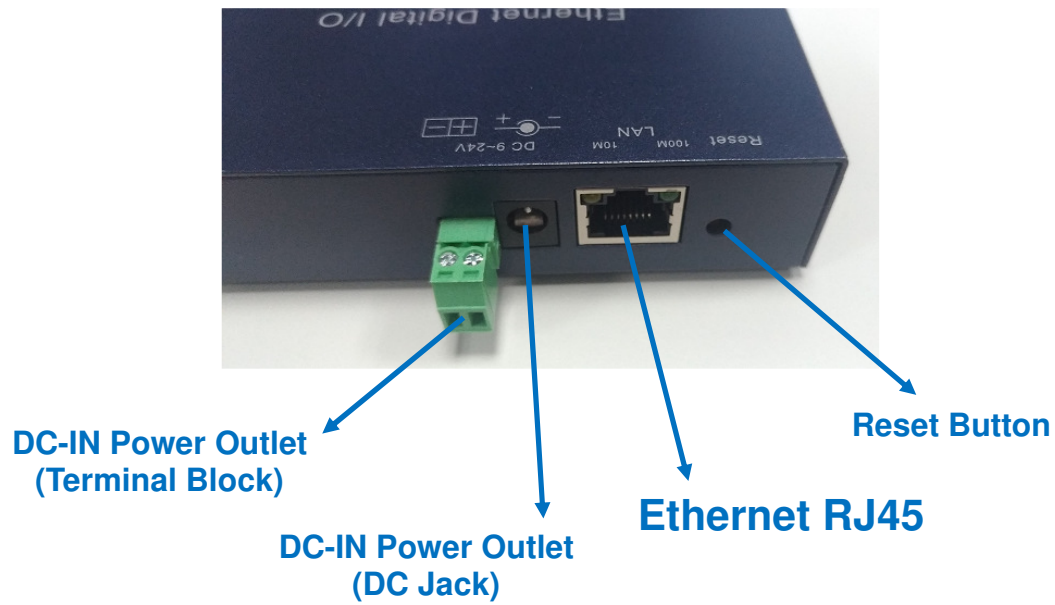
Other Features

- ✧ Led Lamp : SYS, WiFi, RX, TX, LAN, DI, DO
- ✧ RTC : Real Time Clock
- ✧ Watch Dog Function
- ✧ Support Modbus TCP to RTU Slave, Modbus RTU Master to TCP Slave ,
Modbus TCP to ASCII Slave, Modbus ASCII Master to TCP Slave

Warranty

- ✧ Warranty period : 1 year.

Product Panel Views



Antenna Connector

The connector for antenna is a standard reverse SMA jack. Simply connect it to a 2.0dBi dipole antenna (Standard Rubber Duck) and it is 50 Ohms impedance and can support 2.4GHz frequency.

Ethernet Port

The connector for network is the usual RJ45. Simply connect it to your network switch or Hub. When the connection is made, the green color LED of Ethernet port will light on. When data traffic (Rx/Tx) occurs on the network, yellow color LED will blink during data transferring.

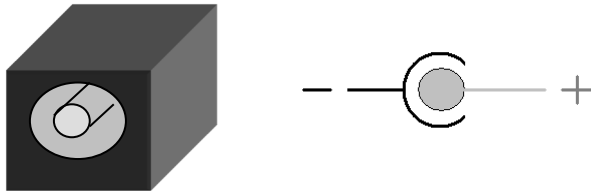
Serial Port of RS-232/RS-422/RS-485

Connect the serial data cable between the WPC-832 converter and the Serial interface device. Follow the web page parameter setup procedures to configure the converter.

DC-IN Power Outlet

The Serial to Ethernet+WiFi Converter is powered by a single 12V DC (Inner positive, outer negative) power supply and 1.0mA of current. Connect the power adaptor to the AC power socket and put the DC Jack plug into the outlet of device. The "SYS" green color LED will be ON when power is properly supplied. Terminal Block 2 wires power supply is an option.

□ DC Power outlet



Reset Button

If any chance you forgot the login password, or have incorrect settings making converter inoperable. When the power is on and the "SYS" LED light on, use a point tip to press this button and hold it and wait for more than 25 seconds. All the parameters will be reset to the factory default.

LED Indicators



SYS (red): LED is ON after power on, then start blinking per second a after system running.

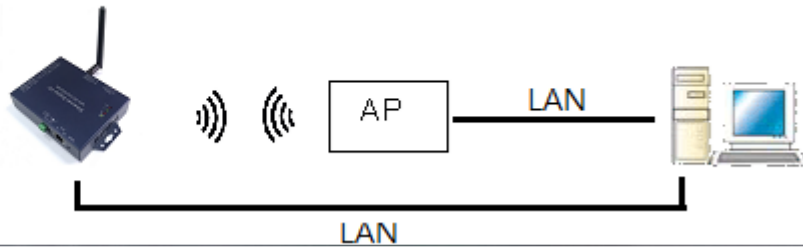
RX / TX (Red / Green) : Data sending or receiving indicator. When data sent out to the network or receiving from the network, the LED will be blinking.

Wiring Architecture

1. RS-232

RS-232 Wiring

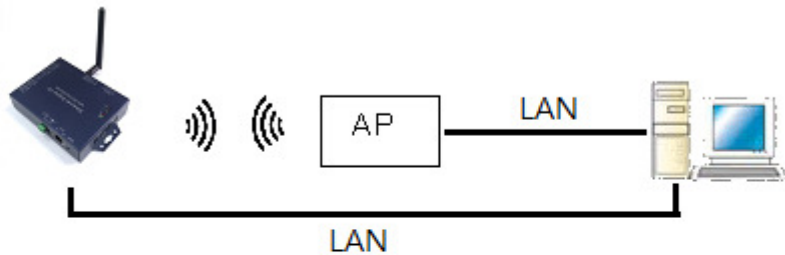
Serial Device	Wifi
DB 9	DB 9



2. RS-422/RS-485

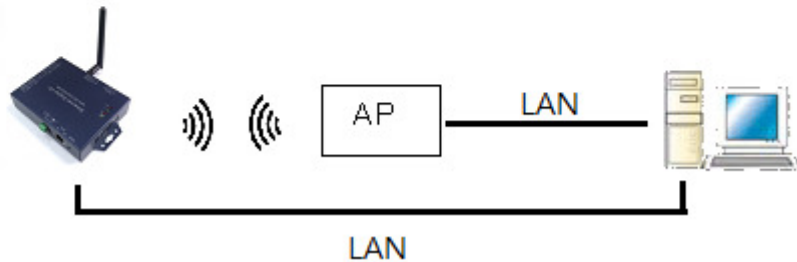
RS-422 Wiring

Serial Device	Wifi
T -	R -
T +	R +
R -	T -
R +	T +



RS-485 Wiring

Serial Device	Wifi
D +	D +
D -	D -



When you finish the steps mentioned above and the LED indicators are as shown, the Gateway is installed correctly. You can check the Software Setup CD to find Utility to setup the IP Address.

To proceed with the parameters setup, please use a web browser (IE or Chrome) to continue the settings.

Configuration

When setting up your Gateway for the first time, the first thing you should do is to configure the IP address.

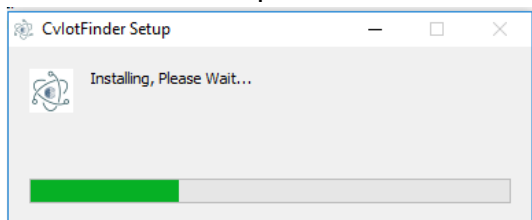
The following topics are covered in this chapter:

- ☐ **IP Search Utility Setup**
- ☐ **Configuration through Web browser**

IP Search Utility Setup



1. Copy “CvlotFinder Setup.exe” from CD ROM to your host computer.
2. “CvlotFinder” is a self-extract-install program. Double click it to install this Wi-Fi IP Searching tool into host computer.



3. Upon running IP search tool (CvlotFinder), if a firewall warning pop up, please click to accept the program pass through firewall.

Customize settings for each type of network

You can modify the firewall settings for each type of network that you use.

Private network settings

- ☒ Turn on Windows Defender Firewall
- ☐ Block all incoming connections, including those in the list of allowed apps
 - ☒ Notify me when Windows Defender Firewall blocks a new app

☒ Turn off Windows Defender Firewall (not recommended)

Public network settings

- ☒ Turn on Windows Defender Firewall
- ☐ Block all incoming connections, including those in the list of allowed apps
 - ☒ Notify me when Windows Defender Firewall blocks a new app

☒ Turn off Windows Defender Firewall (not recommended)

4. CvlotFinder will pop up on the screen after installation or you may double click the icon on desk top of host computer to open this tool.



5. Click on “Find” button. It will scan the network and show up the IP of Gateway.

CvlotFinder 1.0.9



Devices

Product	Version	Name	Description	IP & MAC	Go To
Modbus Gateway 4 ports	1.0.22	Device Name	Device Description	192.168.1.199 9c:65:f9:21:21:4	Go To Setup
Modbus Gateway 4 ports	1.0.22	Device Name	Device Description	10.0.0.1 9c:65:f9:21:21:4	Go To Setup

Ethernet IP

WiFi IP

6. Click "Setup" button will pop up a window. You may change Name, Description, IP, Netmask of device. Click "Setup" to save setup. **The device's IP must be same subnet with host PC/NB enable to use web browser open configuration page.**

Setup

MAC

9c:65:f9:21:0f:cd

Name & Description

Device Name

Device Description

IP & Netmask

192.168.1.199

255.255.255.0

USERNAME:

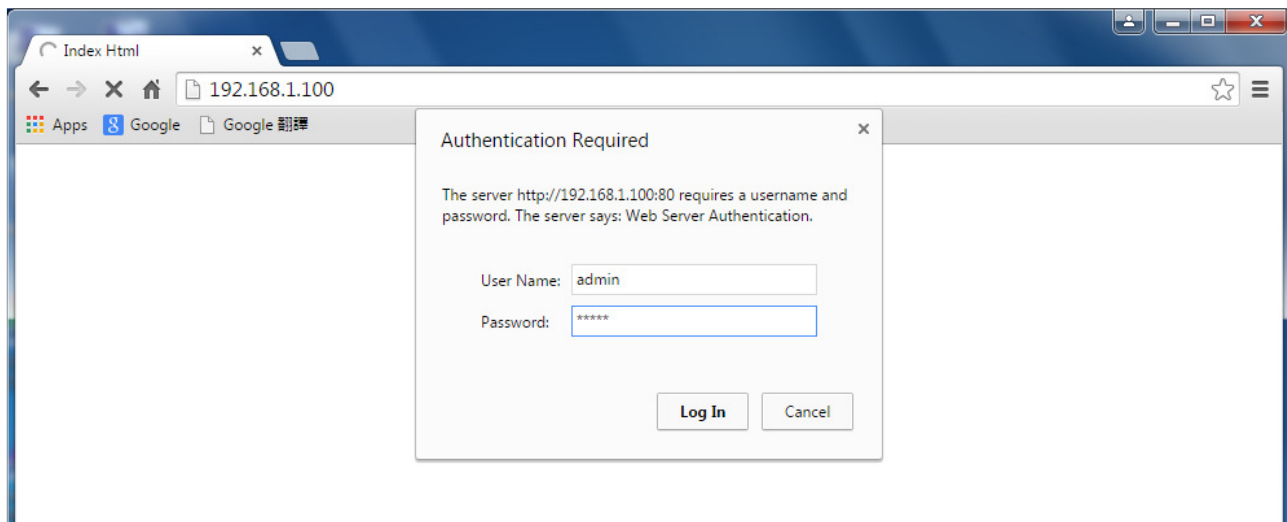
admin

PASSWORD:

Setup

Close

7. Click "Goto" button will open a web page of configuration. (default ID: admin; password: admin).



Login:

User: "admin"

Password: (none or "admin")

8. Follow #5 step, now you have successfully connected to the Gateway.

Modbus Gateway & Digital I/O

Log out
ver : 1.0.25e

System

Network

Serial

Gateway

Control

System

Admin. Password:

Confirm Password:

Auto Reset(Minutes):

0

Device Name:

RD-TEST4

Description:

Device Description

System Up Time:

56 min

Firmware Release:

2018/02/12 15:10

Save

Save and Restart

Restore to factory settings

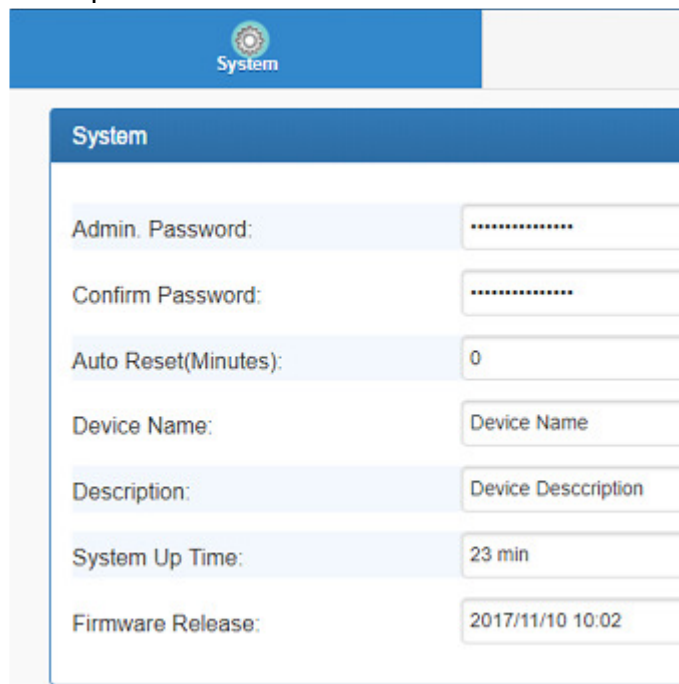
Reboot

Configuration through Web browser

There are 4 setup pages as “System”, “Network”, “Serial”, “Gateway, and “Control”.

1. System Setup

1.1 System: where you can change Password, set up Auto Reset time and modify Device Name, Description of device.



The screenshot shows the 'System' configuration page. At the top, there is a blue header with a gear icon and the word 'System'. Below this, the page is titled 'System'. The form contains several fields: 'Admin. Password:' and 'Confirm Password:' both with masked input fields; 'Auto Reset(Minutes):' with a value of '0'; 'Device Name:' with a text input field containing 'Device Name'; 'Description:' with a text input field containing 'Device Description'; 'System Up Time:' with a value of '23 min'; and 'Firmware Release:' with a value of '2017/11/10 10:02'.

System	
Admin. Password:	*****
Confirm Password:	*****
Auto Reset(Minutes):	0
Device Name:	Device Name
Description:	Device Description
System Up Time:	23 min
Firmware Release:	2017/11/10 10:02

1.2 Appearance of Wireless ad Ethernet setup.

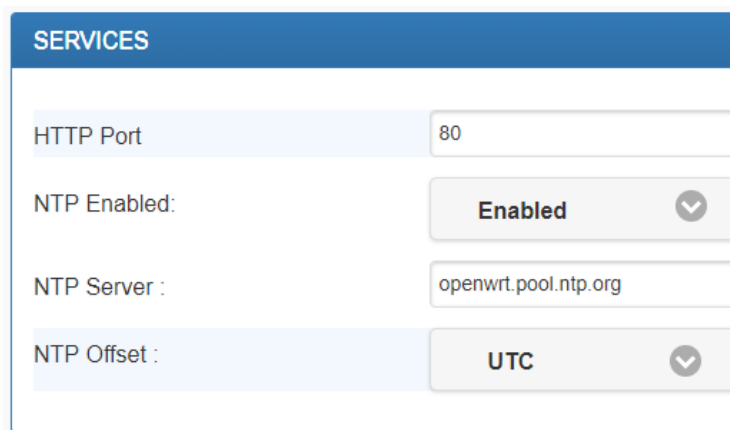


The screenshot shows two configuration pages. The top page is titled 'Wireless' and contains fields for 'IP Address:' (10.0.0.1), 'Subnet Mask:' (255.255.255.0), 'Gateway:' (192.168.1.1), and 'MAC Address:' (9c:65:f9:24:55:56). The bottom page is titled 'Ethernet' and contains fields for 'IP Address:' (192.168.1.199), 'Subnet Mask:' (255.255.255.0), 'Gateway:' (192.168.1.1), and 'MAC Address:' (9c:65:f9:24:2a:36).

Wireless	
IP Address:	10.0.0.1
Subnet Mask:	255.255.255.0
Gateway:	192.168.1.1
MAC Address:	9c:65:f9:24:55:56

Ethernet	
IP Address:	192.168.1.199
Subnet Mask:	255.255.255.0
Gateway:	192.168.1.1
MAC Address:	9c:65:f9:24:2a:36

1.3 NTP: Enable / Disable NTP function; Set up NTP server and Time Zone.



SERVICES

HTTP Port: 80

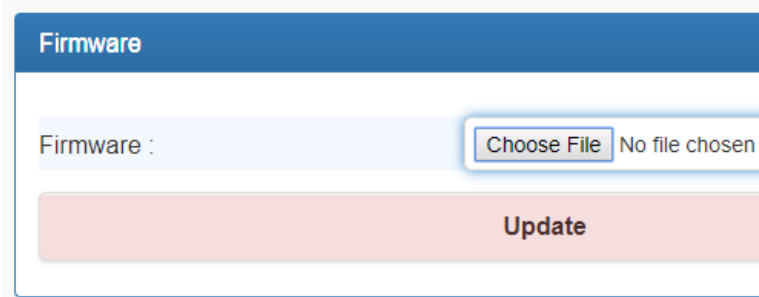
NTP Enabled: **Enabled**

NTP Server: openwrt.pool.ntp.org

NTP Offset: **UTC**

1.4 Firmware update:

If necessary, click “Browse” to open file manager.

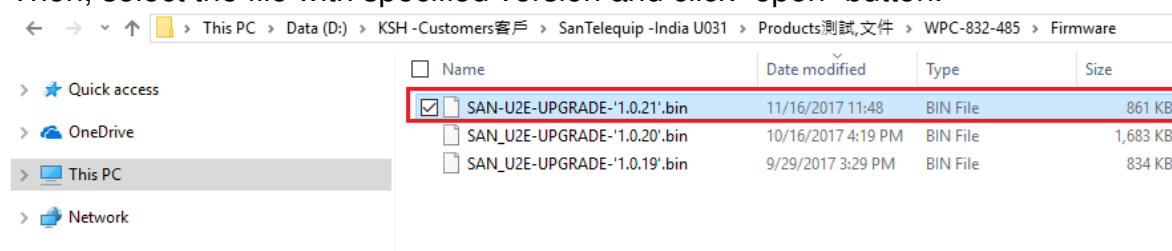


Firmware

Firmware: No file chosen

Update

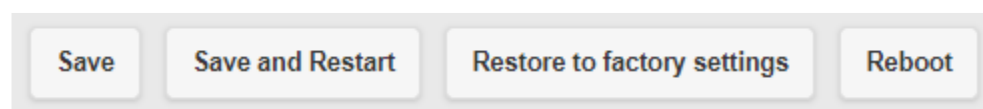
Then, select the file with specified version and click “open” button.



<input type="checkbox"/>	Name	Date modified	Type	Size
<input checked="" type="checkbox"/>	SAN-UZE-UPGRADE-'1.0.21'.bin	11/16/2017 11:48	BIN File	861 KB
<input type="checkbox"/>	SAN_UZE-UPGRADE-'1.0.20'.bin	10/16/2017 4:19 PM	BIN File	1,683 KB
<input type="checkbox"/>	SAN_UZE-UPGRADE-'1.0.19'.bin	9/29/2017 3:29 PM	BIN File	834 KB

When the selected file name appears on the input column, click “Update” button.

1.5 Up to now, Setup is successfully configured. Please click “Save” and go to other pages for configuration or click “Save and Restart” to run new configuration.



Save **Save and Restart** **Restore to factory settings** **Reboot**

2. Network setup

The screenshot shows the 'Network' tab in a configuration interface. Under the 'Wireless' section, the 'Type' is set to 'ACCESS POINT'. The 'SSID' is 'CVIoT_Se_65_f9_01_21_54', 'Password' is empty, 'Encrypt' is 'NONE', 'Mode' is 'STATIC', and 'IP Address' is '10.0.0.1'. At the bottom are 'Save' and 'Save and Restart' buttons.

2.1 Wireless section:

2.1.1 Type: Click to select “Access Point” or “Infrastructure”. “Infrastructure” is for connecting to a local Router.

This screenshot shows the 'Type' dropdown menu open. It lists 'ACCESS POINT' (highlighted in blue) and 'INFRASTRUCTURE'. Other fields like 'SSID', 'Password', 'Encrypt', 'Mode', 'IP Address', and 'Subnet Mask' are visible below.

2.1.2 If select “ACCESS POINT”, input password for the AP and assign IP address with “DHCP” or “STATIC”.

This screenshot shows the configuration form with 'ACCESS POINT' selected for 'Type' and 'STATIC' selected for 'Mode'. Red boxes highlight the 'Password' field, the 'IP Address' field (10.0.0.1), and the 'Subnet Mask' field (255.255.255.0).

2.1.3 When selected “ACCESS POINT”, this Device acts as an Access Point which is allowed to be connected by PC /NB /Smart Phone/ PAD. It supports DHCP server function. Soft AP broadcasts its SSID “CVIoT_XX_XX_XX_XX_XX_XX”. PC /NB /Smart Phone/PAD should connect to this SSID and then able to open web browser with default IP of this Device.

Wireless

Type : **ACCESS POINT**

SSID : **INFRASTRUCTURE**

Password : **DISABLED**

Encrypt : **NONE**

Mode : **STATIC**

IP Address : 10.0.0.1

Subnet Mask : 255.255.255.0

2.1.4 Password: Key in selected AP log in password

SSID : CVIoT_9c_65_f9_24_55_56

ksh66666666

Password :

2.1.5 Encrypt

Encrypt : **NONE**

Mode :

IP Address :

Subnet Mask : 255.255.255.0

2.1.6 Mode: select “DHCP” to let AP assign IP address to itself,

Mode : **DHCP**

or select “STATIC” to input assigned IP address, Subnet Mask manually.

Mode : **STATIC**

IP Address : 10.0.0.1

Subnet Mask : 255.255.255.0

2.1.7 If The Type selected with “Infrastructure”, set SSID of Router and the other inputs.

Wireless

Type : **INFRASTRUCTURE**

SSID : **Scan** edimax_2.4G_ksh

Password : arp78945612

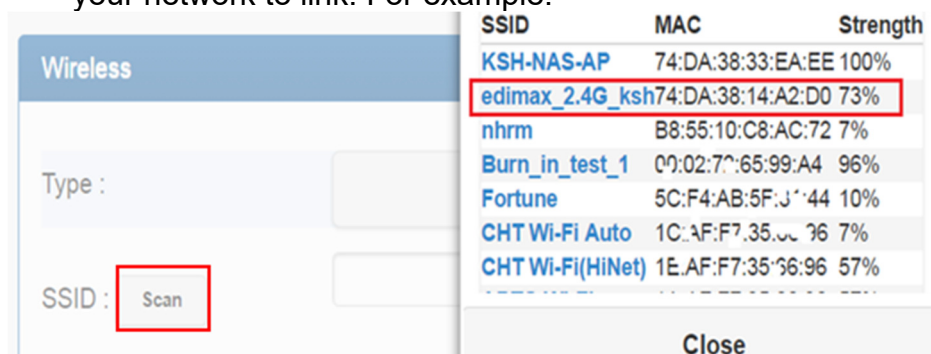
Encrypt : **WPA2**

Mode : **STATIC**

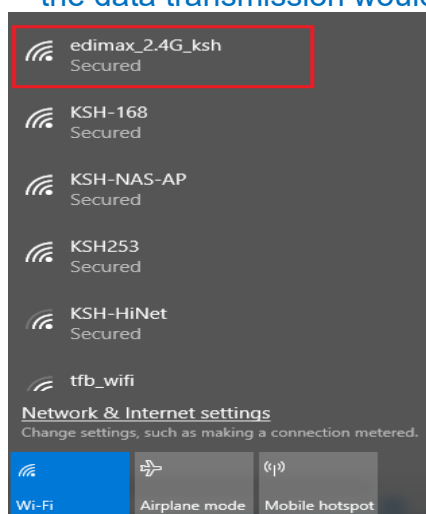
IP Address : 192.168.1.100

Subnet Mask : 255.255.255.0

2.1.8 Go to item SSID, click “Scan” will get list of available SSID of Access Points, select the one in your network to link. For example:



2.1.9 On the NB/PC, choose same SSID to link. NB/PC must close Ethernet in advance otherwise the data transmission would not work.



2.2 Ethernet section: select “STATIC” or “DHCP” to assign IP address.

Ethernet

Mode :

STATIC

DHCP
PPPoE

IP Address :
Mask :

255.255.255.0

Gateway

Gateway :

192.168.0.2

2.3 Gateway and DNS section: check with MIS for right IP address. The Gateway must be set with correct IP enable to connect with Internet.

Gateway

Gateway :

192.168.1.1

DNS

DNS :

168.95.1.1

2.4 Up to now, Setup is successfully configured. Please click “Save” for this page temporarily and go to other pages for configuration or click “Save and Restart” to run this Device with new settings.

Save

Save and Restart

3. Serial Port page

Please clearly set each parameters from Serial 1 to Serial 2 (default 9600,n,8,1).

Modbus Gateway & Digital I/O

Log out
ver : 1.0.25a

System

Network

Serial

Gateway

Control

Serial 1

Baud Rate:

9600

Parity:

None

Data Bits:

8

Stop Bits:

1

Flow Control:

None

Save

Save and Restart

3.1 Baud Rate: 300 bps to 921.6K bps

3.2 Parity: None, Even, Odd

3.3 Data Bits: 5, 6, 7, 8

3.4 Stop Bits: 1, 2

3.5 Flow Control: None, XON/XOFF

3.6 RxDelay(ms)

3.7 TxDelay(ms)

3.8 Up to now, Setup is successfully configured. Please click “Save” for this page temporarily and go to other pages for configuration or click “Save and Restart” to run this Device with new settings.

Save

Save and Restart

4. Gateway page (Serial port over TCP/IP)

4.1 There are “Modbus Gateway” #1 and #2 port.

Modbus Gateway 1

Gateway Type : TCP To RTU Slave

Message Timeout (ms): 500

TCP Properties

Listener Port : 502

TCP inactive timeout(Minutes): 5

4.2 Gateway Type: 4 types for selection or to disable.

Modbus Gateway 1

Gateway Type : RTU To TCP Slave, ASCII To TCP Slave, TCP To RTU Slave, TCP To ASCII Slave, DISABLED

Message Timeout (ms):

TCP Properties

Listener Port : 502

4.3 For RTU To TCP Slave can set up to 8 slaves.

Modbus Gateway 2

Gateway Type : RTU To TCP Slave

Message Timeout (ms): 500

TCP Slave map

No.	ID Start	ID End	IP[:Port] (ex:192.168.1.100 or192.168.1.100:502)
1	1	32	
2	33	64	

4.2 Up to now, Setup is successfully configured. Please click “Save” and go to other pages for configuration or click “Save and Restart” to run new configuration.

Save Save and Restart

4.3 After configured all parameters, click “Save and Restart” to reboot system.

The system is restarting.....

Save Save and Restart

System Message

!!! RESTART COMPLETED. !!!

Close

5.Control page

The screenshot shows the 'Control' page of a device configuration interface. At the top, there is a navigation bar with five tabs: 'System', 'Network', 'Serial', 'Gateway', and 'Control'. The 'Control' tab is currently selected and highlighted in blue. Below the navigation bar, the 'Modbus properties' section is visible. It contains a 'Protocol' field with the value '[MODBUS/TCP on PORT 502] and [MODBUS/RTU on Serial 2]' and a red note below it stating '(Is reference to Gateway1 and Gateway2 type)'. The 'Slave ID' field is set to '1'. Below this, the 'Digital Input' section is shown. It has a table with two columns: 'Title' and 'Value'. The first row is 'DI 1' with a value of '0'. The second row is 'DI 2' with a value of '0'. At the bottom of the page, there are two buttons: 'Save' and 'Save and Restart'.

5.1 Modbus properties:

Protocol according to configuration in Gateway page as per port #2. To send Slave ID for DI/DO control (RTU device must be with different ID, otherwise will conflict)

This screenshot shows the 'Modbus properties' section of the configuration page. It features a 'Protocol' field with the text '[MODBUS/TCP on PORT 502] and [MODBUS/RTU on Serial 2]' and a red note below it that says '(Is reference to Gateway1 and Gateway2 type)'. The 'Slave ID' field is set to '1'.

5.2 Digital Input:

To appear the High/Low status of DI port.

This screenshot shows the 'Digital Input' section. It contains a table with two columns: 'Title' and 'Value'. The first row is 'DI 1' with a value of '0'. The second row is 'DI 2' with a value of '0'.

5.3 Digital Output:

The Value is a button to test On/Off status.

This screenshot shows the 'Digital Output' section. It contains a table with two columns: 'Title' and 'Value'. The first row is 'DO 1' with a value of '0'. The second row is 'DO 2' with a value of '0'.

5.4 Modbus Register Table

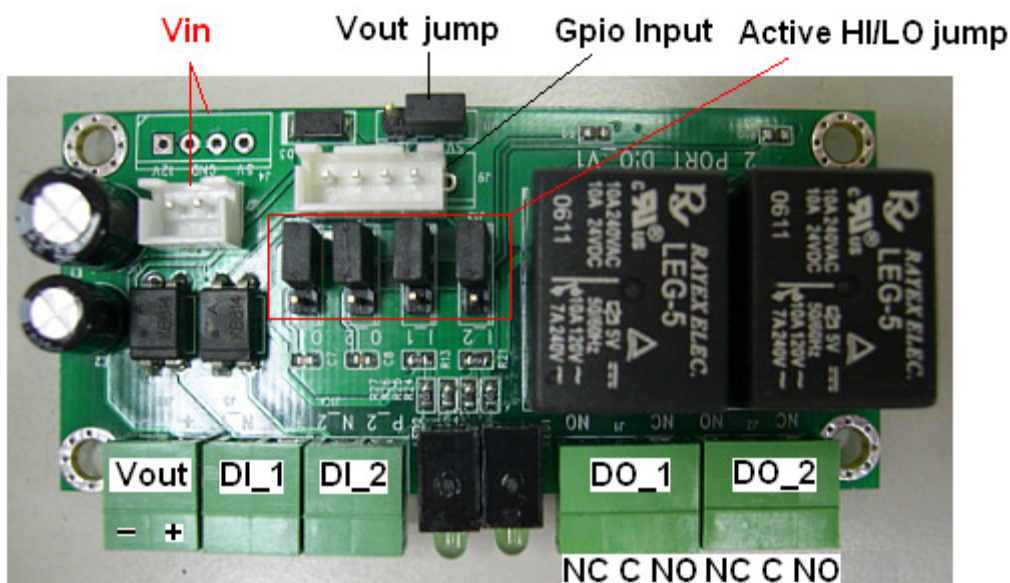
The DI/DO support HTTP Command. A HTTP Command List is attached with this user manual.

Modbus Register Table

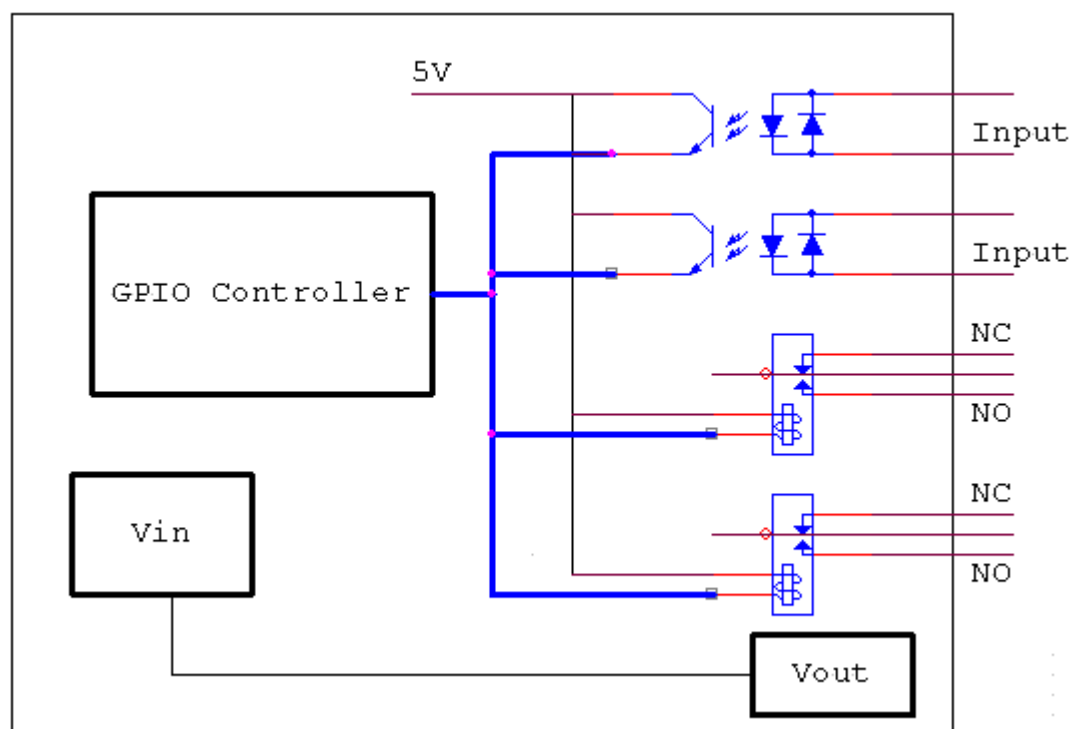
Function	Description		
0x01	Read/Write discrete output or coils		
	Address	ID	Name
	0	00001	DO1
	1	00002	DO2
0x02	Read discrete inputs		
	Address	ID	Name
	0	10001	DI1
	1	10002	DI2
0x04	Read input registers - 16 bits		
	Address	ID	Bit Order
	0	30001	[xxxxxxxx xxxxxxDI2DI1]
0x03	Read/Write holding registers - 16 bits		
	Address	ID	Bit order
	0	40001	[xxxxxxxx xxxxxxDO2DO1]
	1	40002	[xxxxxxxx xxxxxxDI2DI1] (readonly)

5.5 DI/DO Hardware

5.5.1 Interface







5.5.2 Block Diagram:

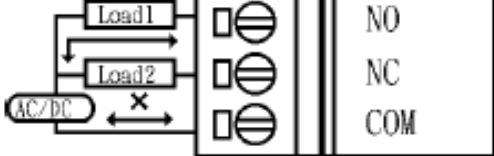
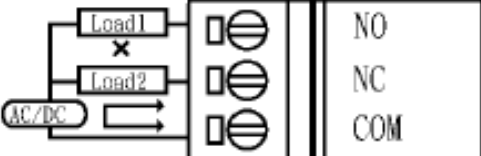


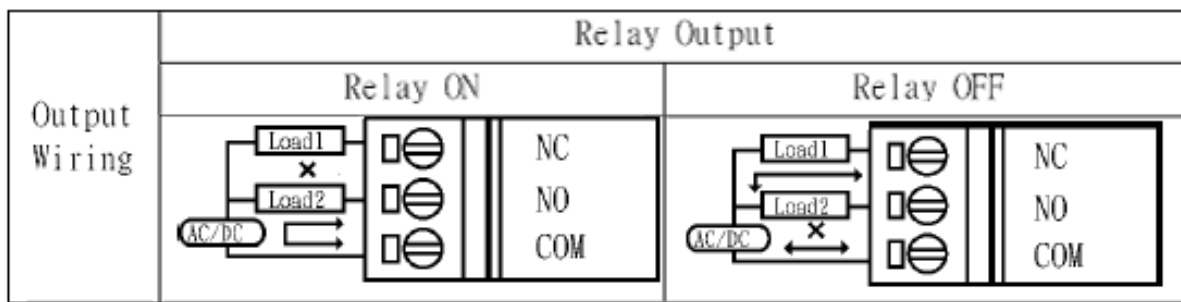
5.5.3 Wiring:

✧ Digital Output

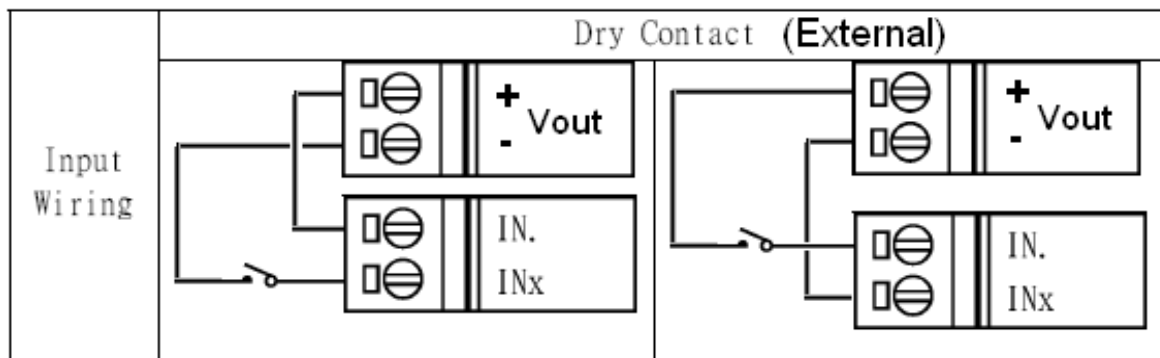
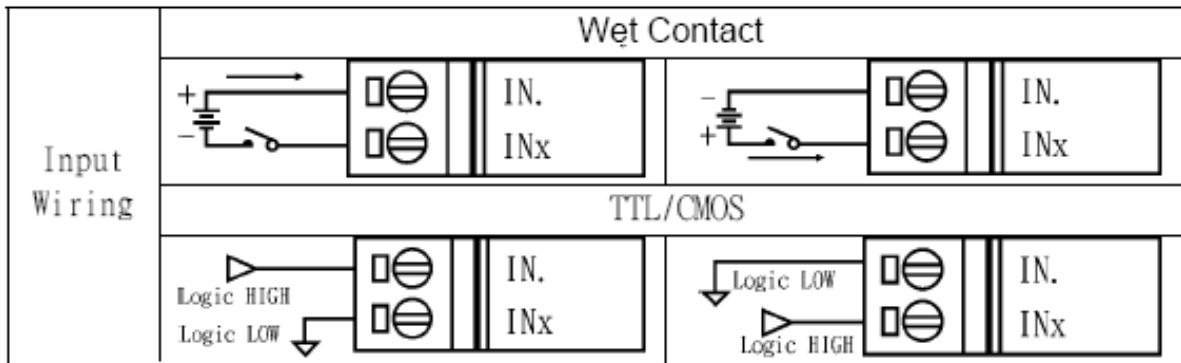
Output Wiring	Relay Output	
	Relay ON	Relay OFF
		

Output Wiring	Relay Output			
	Relay ON		Relay OFF	
				

Output Wiring	Relay Output	
	Relay ON	Relay OFF
		



✧ Digital Input

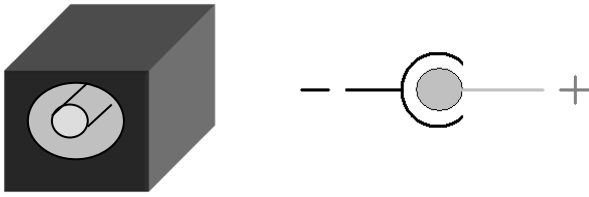


6.Reset (if needed)

Ensure power is on, press “Reset” button for over 20 seconds then release it. Device will set configuration back to default.

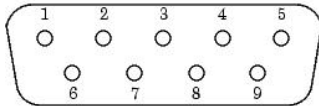
Pin Assignment

□ DC Power outlet



□ RS-232 Pin Assignment

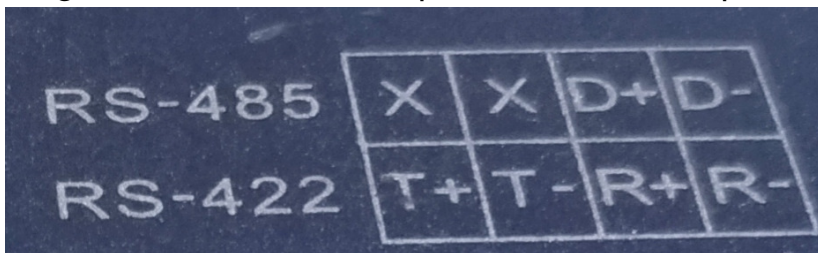
The pin assignment scheme for a 9-pin male connector on a DTE is given below.



PIN 1 : DCD PIN 2 : RXD PIN 3 : TXD PIN 4 : DTR
 PIN 5 : GND PIN 6 : DSR PIN 7 : RTS PIN 8 : CTS
 PIN 9 : X

□ RS-422/485 Pin Assignment

The pin assignment scheme for 4-pin RS-422 and 2-pin RS-485 as below.



□ RS-422 Wiring Diagram

Serial Device	Converter
<u>R-</u>	<u>T-</u>
<u>R+</u>	<u>T+</u>
<u>T-</u>	<u>R-</u>
<u>T+</u>	<u>R+</u>

□ RS-485 Wiring Diagram

Serial Device	Converter
<u>D+</u>	<u>D+</u>
<u>D-</u>	<u>D-</u>

Please look our website <http://www.tcpiweb.com/> for more information.