



MTG765-UT wireless HMI

User manual

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1 MTG765-UT introduction

1-1 Features

■ Display

- 7.0 inches LCD, 16.77 million colors, ultra brightness screen, support bmp, jpeg format pictures, full color, display more vividly
- High speed 400MHz CPU, 128MB memory, excellent data processing ability, fast downloading speed
- Improve the startup loading speed greatly, decrease the waiting time, screen jump and animation more smooth
- Larger storage capacity
- New appearance design, wireless connection, nice touch, good visual effect
- Touch adjustment function
- Support the generation of two-dimensional code
- Support Chinese, English, Japanese, Korean and other language, the font can be set to any size and type, support underline, italics and bold, various artistic effects
- Rich picture library, screen running without stuck

■ Control

- Digital control, dynamic data display and monitor, bar chart, real-time/historic graph, time trend graph, XY trend graph, XY line chart, discrete/continuous data bar chart, real-time alarm, historic alarm records, etc.
- User-defined data collection and storage
- User authority setting, 9 levels of password protection
- Import the program through the USB-A port by flash disk, make the downloading easier
- Powerful C functions including operation, command, communication
- USB-A (USB2.0) port can backup the data in the flash disk, the speed up to 480Mbps
- USB-B (USB2.0) port is for program downloading and uploading, make the data transferring faster
- User-defined animated track design

■ Communication

- Wireless communicate with XC, XD series PLC or Modbus-RTU devices, long battery life, fast speed, stable performance, good anti-interference ability

1-2 General specification

Performance

Item		MTG765-UT
Screen	LCD	7.0"
	Colors	16.77 million
	Resolution	800*480
	Brightness	Adjustable (PFW100)
	Touch panel	4-wire resistor touch panel
	Using life	Up 50000 hours, ambient temperature 25°C, 24 hours running
	Language	Chinese, English, Japanese, Korean, German, Russian...
	Character size	Any font and size
Memory	Memory	128MB

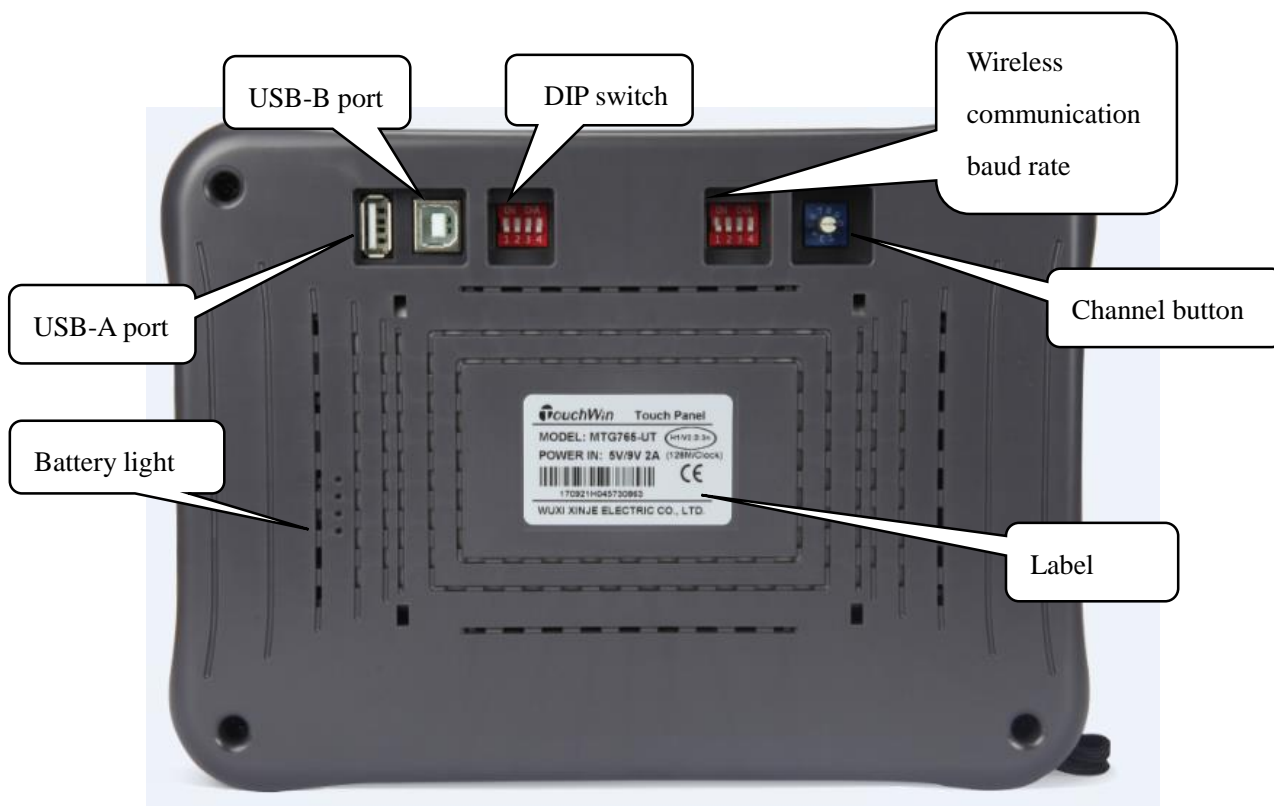
Electrical specifications

Item		MTG765-UT
Electric	Power	4W
	Charging input parameter	5.0V-2.0A 9.0V-2.0A 12V-1.5A
	Battery life (always ON)	8 hours
	Charging time	< 10 hours
Ambient	Operation temperature	0 ~ 45°C
	Ambient humidity	10%RH-90%RH (no condensation)
	Air	No corrosive gas
	Protection	The front cover is accord to IP65
	Cooling mode	Natural cooling
Structure	Dimension (mm)	217.1*158.0*36.6
Interface	PLC port (built-in)	Built-in PLC port integrated wireless communication module
	USB port 1	USB-A (USB2.0), flash disk port
	USB port 2	USB-B (USB2.0), USB download port
	Micro-USB	Micro-USB, USB charging port

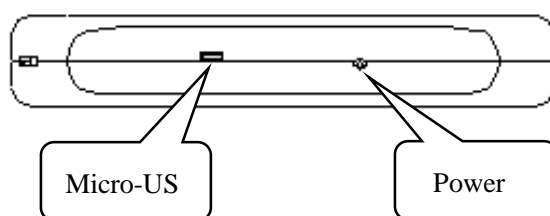
1-3 Parts

1-3-1 Structure

The following diagram is the back cover and bottom cover of MTG765-UT.


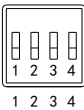


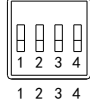
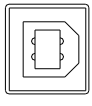



Back cover



Bottom cover

1-3-2 Interface

Appearance	Name	Function
	Channel button	Select the wireless communication channel
	Wireless communication baud rate	Set the wireless communication baud rate

	DIP switch	Set the forced-download mode and screen adjustment
	USB-B port	Upload/download program
	USB-A port	Connect to flash disk to export the data
	Micro-USB	Charging port
	Power	Power supply switch

1. Channel button

All the devices in the network must be on the same channel. If there are groups of S-BOX or some other signal source which may interfere the devices, it can change the channel. The channel range is from 0 to 9.

2. Wireless communication baud rate

The wireless transferring speed is set by the DIP switch. The higher the speed, the shorter the communication delay and transferring distance. Please refer to the following table for details. For the reasons of obstacles blocking or shielding, the transferring distance maybe different from the table, please confirm it according to the actual conditions.

Testing location	DIP1	DIP2	Transferring speed (bps)	Communication distance (meter)	Notes
Building	ON	ON	4800	40~60	At least 3 walls
	ON	OFF	9600	20~45	
	OFF	ON	19200	15~35	
	OFF	OFF	115200	10~20	
Underground garage	ON	ON	4800	80~11	At least 1 wall and many metal block objects
	ON	OFF	9600	70~90	
	OFF	ON	19200	35~60	
	OFF	OFF	115200	15~30	

3. DIP switch

Switch	DIP1	DIP2	DIP3	DIP4	Function
State	ON	OFF	OFF	OFF	Undefined
	OFF	ON	OFF	OFF	Forced-download

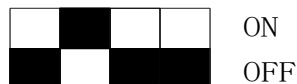
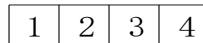
	OFF	OFF	ON	OFF	System menu: clock adjustment, touch screen calibration
	OFF	OFF	OFF	ON	Undefined



For some special conditions, the HMI cannot download or the screen cannot display normally, please try forced-download.

How to do:

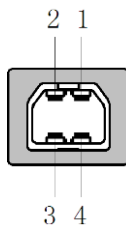
- (1) Power off the MTG765-UT, turn on DIP switch 2
- (2) Power on the MTG765-UT, connect USB cable, download the program
- (3) Turn off the switch 2, repower on the HMI.



4. USB-B port

MTG765-UT has one USB-B port (USB2.0) which is located at the back left side of the cover. It can download and upload program. The transferring speed is 480Mbps.

USB-B port pin definition:





Pin	Definition	Note
1	+5V	+5V voltage signal
2	DATA-	Data negative signal
3	DATA+	Data positive signal
4	GND	Signal ground



- (1) Please use shielding USB cable



- (2) please install the USB driver
- (3) connect the PC and HMI via USB cable, click  or  to download program.

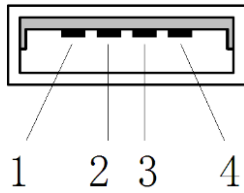
5. USB-A port

The USB-A (USB2.0) has the following functions:

Data import and export, data backup, the transferring speed is 480Mbps.

Pin	Definition	Notes
1	+5V	+5V voltage signal
2	DATA+	Data signal +

USB-A interface diagram



3	DATA-	Data signal -
4	-5V	-5V ground signal

6. Micro-USB port

Standard Micro-USB port, the interface to charge the wireless HMI. Input parameters: 5.0V-2.0A 9.0V-2.0A 12V-1.5A.

7. Power

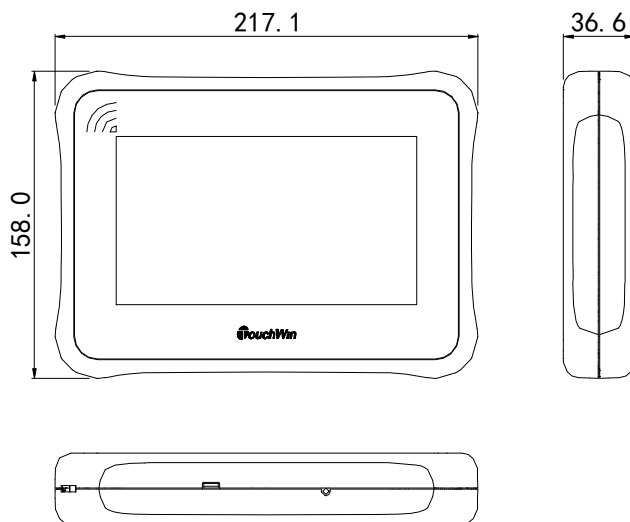
Please touch and hold the power button to startup or shut down the MTG765-UT HMI.

1-4 Dimensions

1-4-1 Dimensions

MTG765-UT

(Unit: mm)



1-4-2 Using environment

MTG765-UT is often used indoor.



Do not use the HMI in dangerous environment filled with flammable gas, vapour or dust, do not install the HMI in the environment whose temperature is changing too fast or the humidity is too high, otherwise the moisture will condense inside the HMI.

1-5 Programming software

MTG765-UT is fit for the programming software Toucwhin v2.d.3k and up version.

The details please refer to Touchwin software manual.

Note:

The communication device in the software only can be PLC port device, and the device model must be XINJE XC or XD series PLC or Modbus RTU device. The communication parameters must be 19200bps, 8 data bit, 1 stop bit, even parity.

2 S-BOX

2-1 Introduction

The wireless radio frequency data module s-box is based on the 433MHz carrier frequency band. The serial communication parameter of the device is 19200,8,1,E, and the user cannot modify this parameter. In order to adapt to the requirements of the field transmission distance, it provides 4800~115200bps multi-shift serial port rate adjustment, and the higher the transmission rate, the shorter the transmission distance. In order to improve the anti-interference ability of the equipment, 10 channels are available for selection, all of which are channel 0 by default, and users can adjust them according to the actual situation on site.

2-2 Module settings

S-BOX has two models including S-BOX-T and XD-SBOXT-ED. The first one (left one in below figure) is RS232C serial port communication, the second one(right one in below figure) is special expansion module for XD series PLC. All of them use 24V DC power supply.



Product appearance

The definitions of LED lights on the modules:

LED	Meaning
-----	---------

POWER	Power supply, always ON after power on
COM	Wireless receive serial port send, flicker once when serial port sent one pack of data, it seems always ON when sending very fast
RF	Serial port receive wireless send, flicker once when wireless sent one pack of data, it seems always ON when sending very fast
RUN	Running, module is error when RUN is OFF
RSSI3	Signal intensity 3
RSSI2	Signal intensity 2
RSSI1	Signal intensity 1

- Note:
1. signal intensity LED has margin. If the environment is good, the device can communicate well when the signal intensity LED all OFF.
 2. The signal intensity LED shows the intensity of wireless receiving the last pack of data.

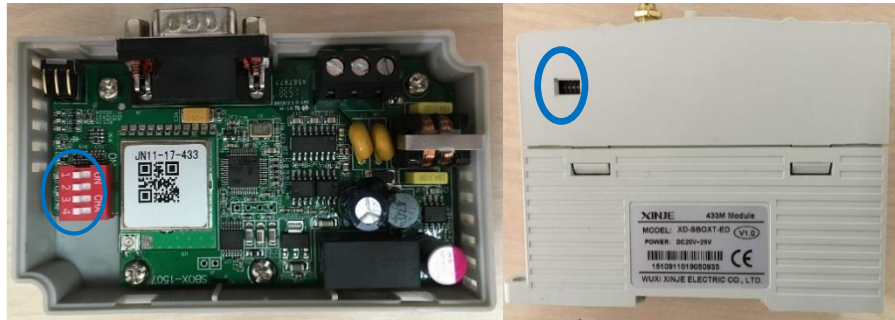


S-BOX LED light

The wireless transmission rate is set by the dial code switch. The higher the wireless baud rate, the lower the communication delay and the shorter the transmission distance. For detailed data, please refer to the following table. The transmission distance may be inconsistent with the following table due to obstacles, shielding and other reasons. Please confirm according to the field application:

Environment	DIP1	DIP2	Transmission rate	Communication distance (meter)	Notes
Office	ON	ON	4800bps	40~60	At least 3 blocks of solid walls
	ON	OFF	9600pbs	20~45	
	OFF	ON	19200bps	15~35	
	OFF	OFF	115200bps	10~20	
Underground garage	ON	ON	4800bps	80~110	A solid wall and many metal shielding
	ON	OFF	9600pbs	70~90	
	OFF	ON	19200bps	35~60	
	OFF	OFF	115200bps	15~30	

Note: to ensure the stable transmission connection of equipment signals, be sure to use the standard signal antenna! Due to high antenna gain, signal saturation may occur in connection within a short distance. It is recommended to guarantee at least 1 meter space between the equipment and antennas.



S-BOX DIP switch

Such problems can be avoided by adjusting the channel switch when there are multiple sets of s-box or signal sources that may interfere with the equipment, such as interphones. Network equipment must be kept on the same channel.



S-BOX channel selection button

3 MTG765-UT application

The handheld wireless HMI (MTG765) plays the advantages of good intuitive, strong interactivity and anti-interference ability in industrial field application. The HMI integrated wireless communication module and mobile power, is able to wireless monitor the filed status. It has long battery life, stable monitoring performance, is easy to debug and control.

It is fit for the occasions that the distance is not too far, wiring is complicated or hard to do. It needs to use together with wireless communication module S-BOX. MTG765-UT can communicate with various devices such as Xinje XC, XD series PLC, Mitsubishi PLC, Omron PLC, Delta PLC, Modbus-RTU devices and so on.

Note:

- (1) wireless RF data module S-BOX worked based on 433MHz carrier frequency, the serial port parameters are 19200bps, 8 data bits, 1 stop bit, even parity, the parameters cannot be changed.
- (2) S-BOX can be equipped with mobile antenna to enhance the wireless communication ability.

3-1 Xinje XC series PLC (One master one slave communication)

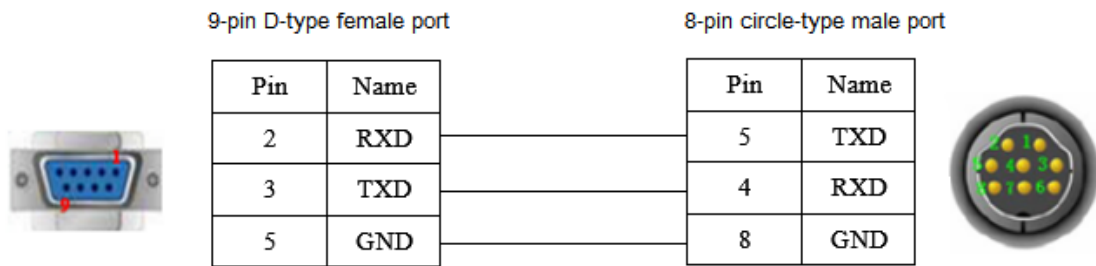
This application will make the wireless communication between MTG765-UT and XC3 series PLC.

The devices in the network: MTG765-UT, S-BOX-T, XC3-32T-E, DVP cable.

3-1-1. Connection

S-BOX-T needs to connect DC24V power supply, and connect to PLC com1 port via DVP cable.

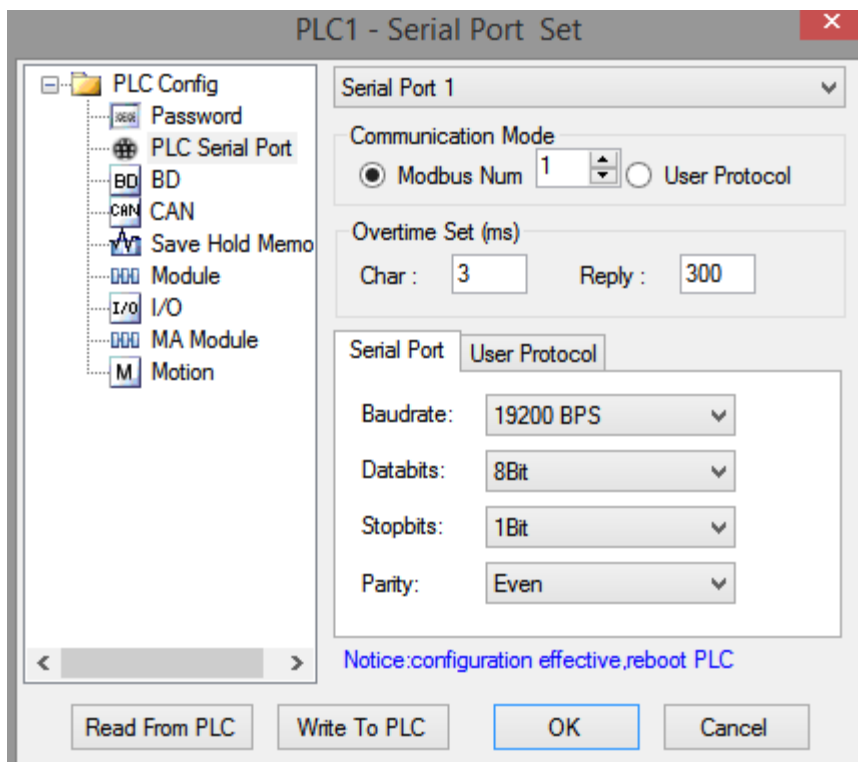
The DVP cable diagram is shown as below:



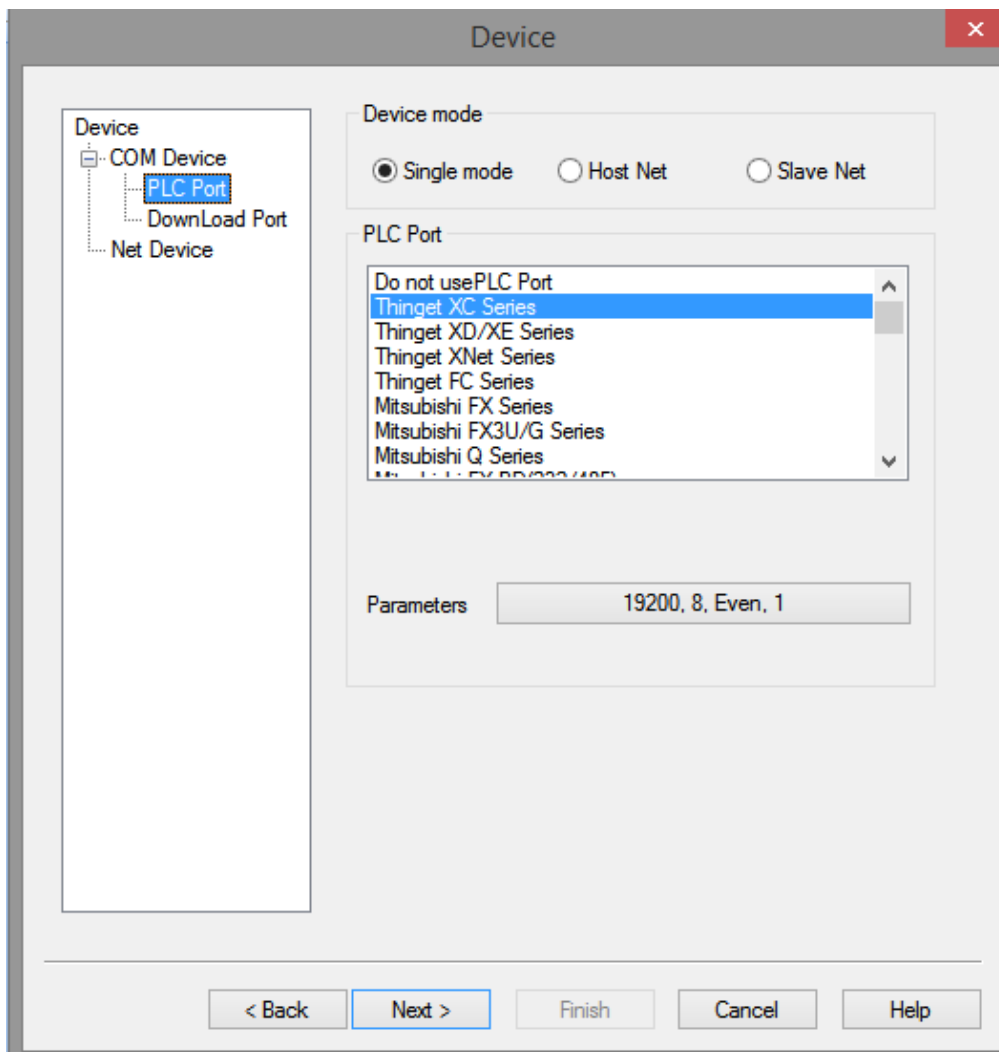
3-1-2. Parameter setting

It needs to meet the following requirements when the MTG765-UT communicates with XC3 series PLC through S-BOX-T: same wireless communication channel, same wireless baud rate, same communication parameters of MTG765-UT PLC port and PLC port 1 and must be 19200bps, 8, 1, E which cannot be changed.

1. Set the serial port parameters to 19200, 8, 1, E



PLC serial port 1 settings



MTG765-UT PLC port settings

2. Set the same transferring speed for the devices in the network

Set the speed to 115200bps, set off all the DIP switch at the back of MTG765-UT and S-BOX-T.



MTG765-UT



S-BOX-T

3. Set the same communication channel for the devices

We select channel 0 for MTG765-UT and S-BOX-T. Turn the channel button to 0 for all the devices.



MTG765-UT



S-BOX-T

4. The networking is completed

Edit the HMI program and download.

3-2 Xinje XD series PLC (One master multi slave)

Application: MTG765-UT monitors two XD3 series PLC through left expansion board S-BOX-T-ED.

The devices in the network: 1 MTG765-UT, 2 S-BOX-T-ED, 2 XD3-16R.

3-2-1 Connection

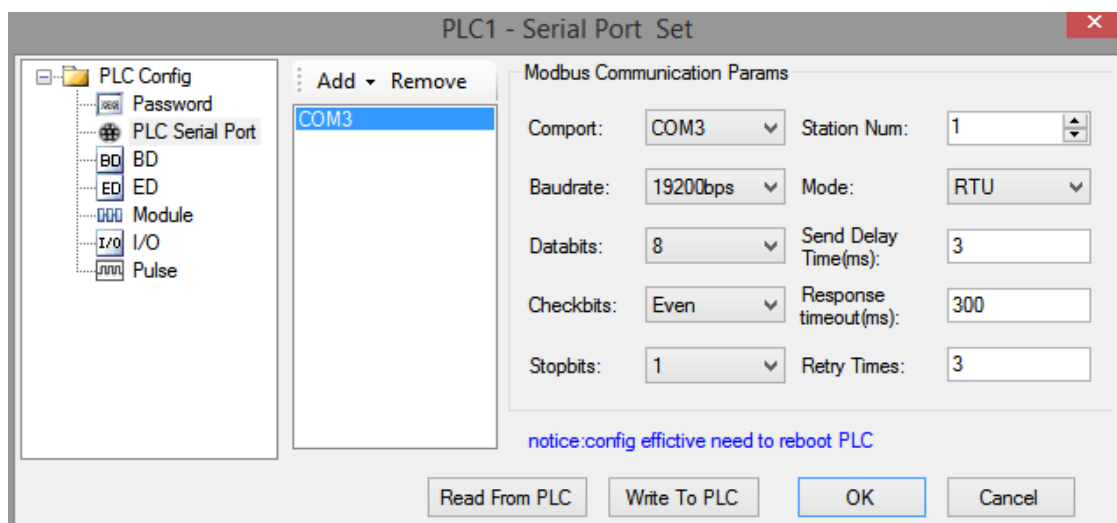
Connect DC24V power supply to S-BOX-T-ED, connect the extension cable of S-BOX-T-ED to the XD3 PLC.



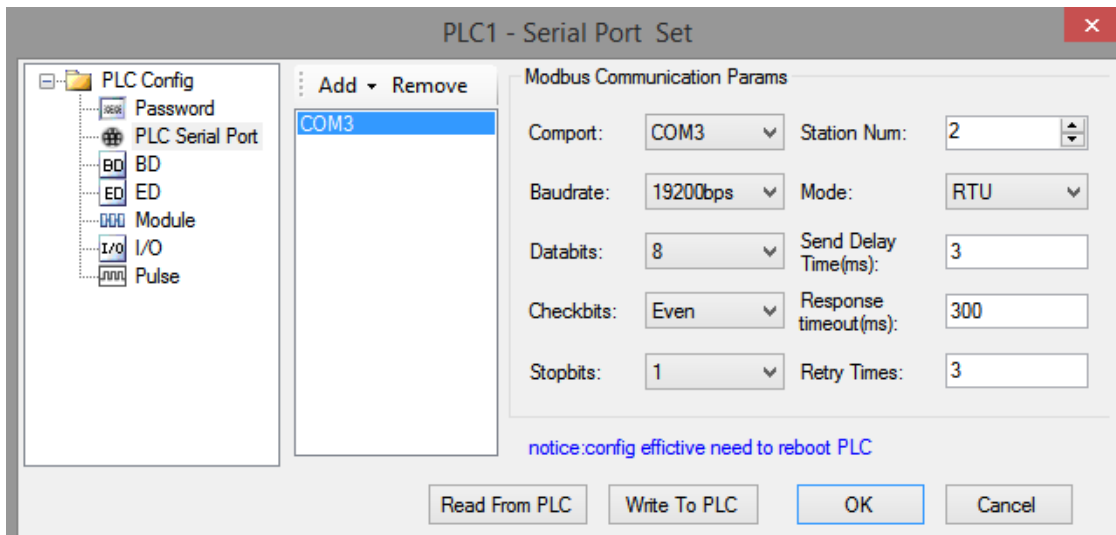
3-2-2 Parameter setting

It needs to meet the following requirements when the MTG765-UT wireless monitors the XD3 series PLC through S-BOX-T-ED: same wireless communication channel, same wireless baud rate, same communication parameters of MTG765-UT PLC port and PLC port 3 and must be 19200bps, 8, 1, E which cannot be changed.

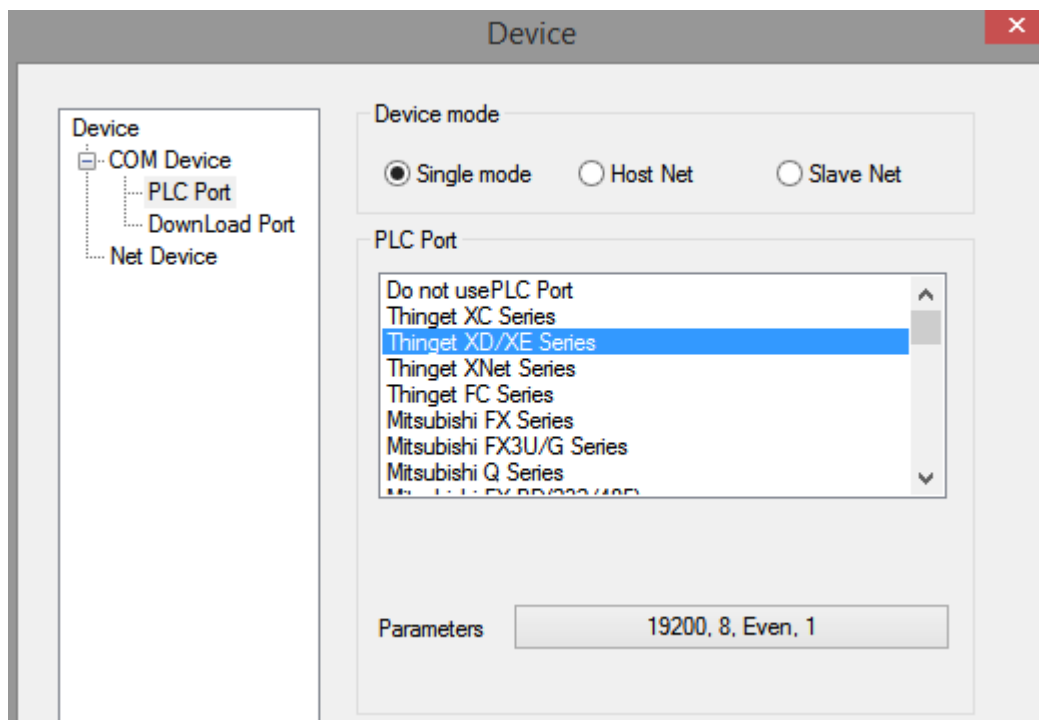
1. Set the PLC serial port parameters to 19200, 8, 1, E. The station no. of the two PLC is 1 and 2.



PLC station no.1 settings



PLC station no.2 settings



MTG765-UT PLC port settings

2. Set the same transferring speed for the devices

Set the speed to 115200bps, set off all the DIP switch at the back of MTG765-UT and S-BOX-T-ED.



MTG765-UT



S-BOX-T

3. Set the same communication channel for the devices

We select channel 0 for MTG765-UT and S-BOX-T-ED. Turn the channel button to 0 for all the devices.



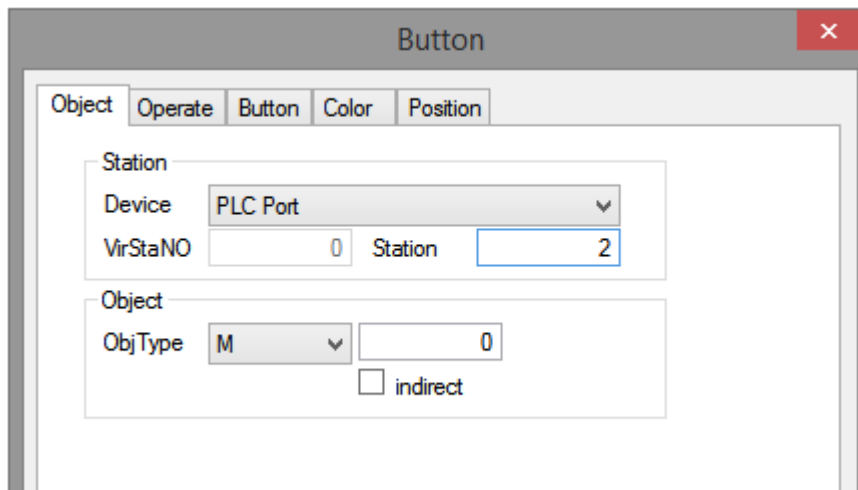
MTG765-UT



S-BOX-T-ED

4. The networking is completed

Edit the HMI program and download in the HMI. The object station no. in the HMI program is the PLC station no.



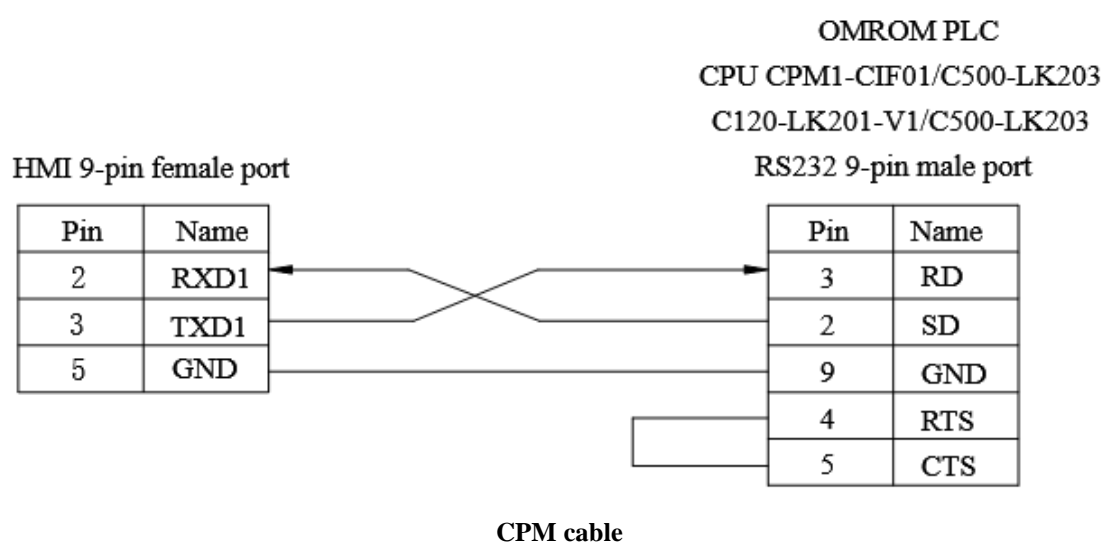
3-3 Omron PLC

Application: wireless communication between MTG765-UT and Omron PLC RS232 serial port.

Network devices: 1 MTG765-UT, 1 S-BOX-T, 1 Omron CP1E-N30SDR-A PLC 1, 1 CPM cable.

3-3-1 Connection

The S-BOX-T needs to be connected to the DC 24V power supply, and RS232 serial port (CPM cable) cable is used to connect the PLC com1 port with the S-BOX-T. The RS232 serial port cable is made as follows.



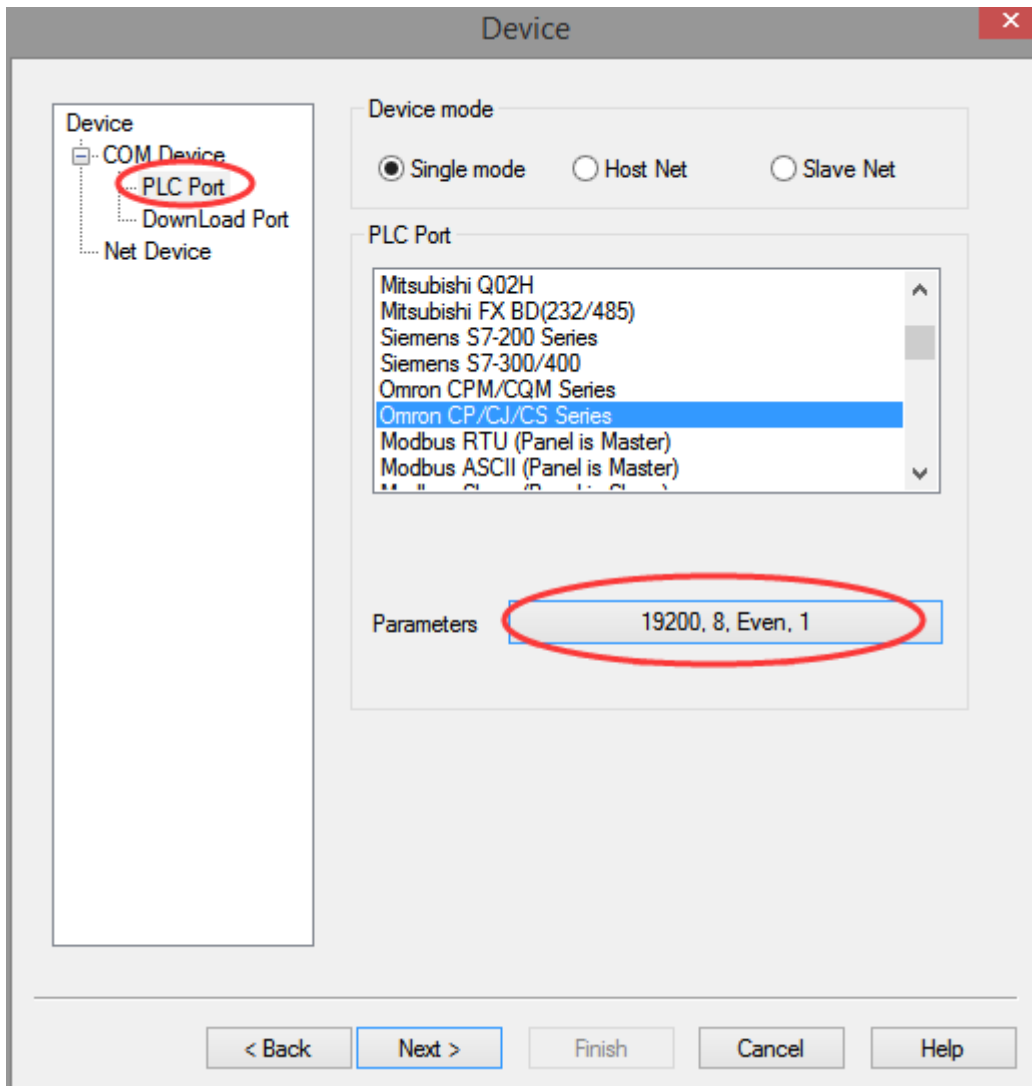
3-3-2 Parameter setting

In order to realize the wireless communication between MTG765-UT via s-box-t and Omron PLC, the following points must be satisfied: the wireless communication channel is the same, the wireless transmission baud rate is the same, and the communication parameters of PLC port equipment of MTG765-UT are the same as that of PLC serial port 1, and must be 19200,8,1, E, which cannot be modified.

1. Set the serial port parameters to 19200, 8, 1, E;



PLC serial port 1 settings



MTG765-UT PLC port settings

2. Set same transmission rate for network devices

Set the wireless transmission baud rate to 115200bps, set OFF all the switches at the back of MTG765-UT, set OFF all the switches of S-BOX-T.



MTG765-UT



S-BOX-T

3. Set same channel for network devices

For this project, please set channel 0 for all the devices. Rotate the channel button to 0 for MTG765-UT and S-BOX-T.



MTG765-UT



S-BOX-T

4. Check the network result

Edit the HMI program and download to HMI.

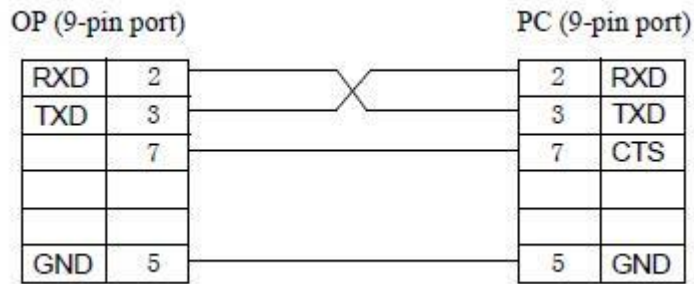
3-4 Mitsubishi FX BD

Application project: realize wireless communication between MTG765-UT and Mitsubishi PLC.

Networking equipment: 1 MTG765-UT, 1 S-BOX-T, 1 Mitsubishi FX3U-32M type PLC, Mitsubishi RS232 port extended BD board, and 1 OP cable.

3-4-1 Connection

The S-BOX-T needs to be connected to the DC 24V power supply. In addition, the BD communication port and S-BOX-T can be connected with the OP cable. The RS232 serial port cable is made as follows.



OP cable

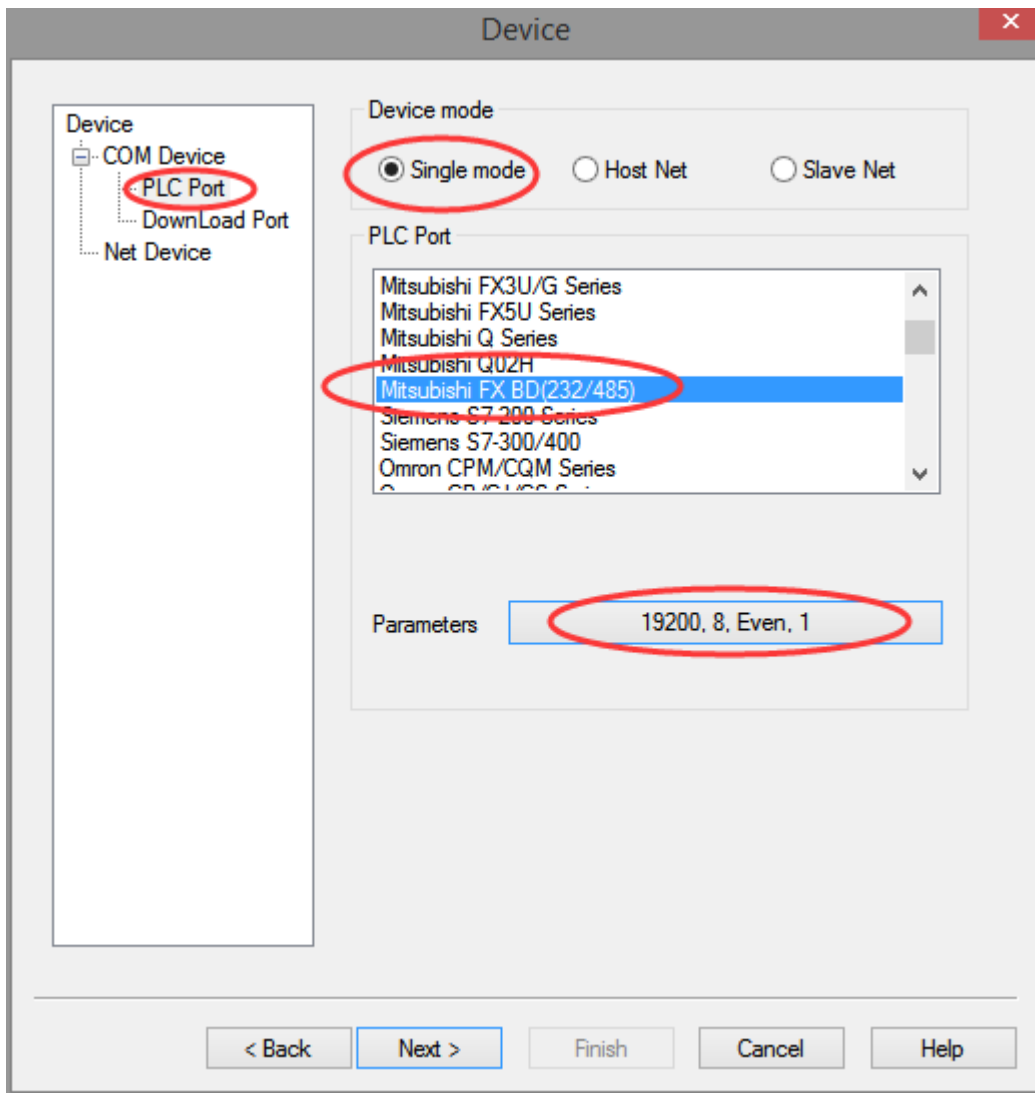
3-4-2 Parameter setting

In order to realize the wireless communication between MTG765-UT via S-BOX-T and Mitsubishi PLC, the following points must be met: the wireless communication channel is the same, the wireless transmission baud rate is the same, and the communication parameters of PLC port 1 and MTG765-UT PLC port are the same, which must be 19200,8,1, E and cannot be modified.

1. Set the networking device serial port parameters to 19200, 8, 1, E;



PLC left extended BD board setting



MTG765-UT PLC port setting

2. Set the networking device to same baud rate

In this project, the wireless transmission baud rate was chosen to be 115200bps, so the wireless communication baud rate on the back of MTG765-UT was selected to be all OFF, and the S-BOX-T dial switch was all OFF.



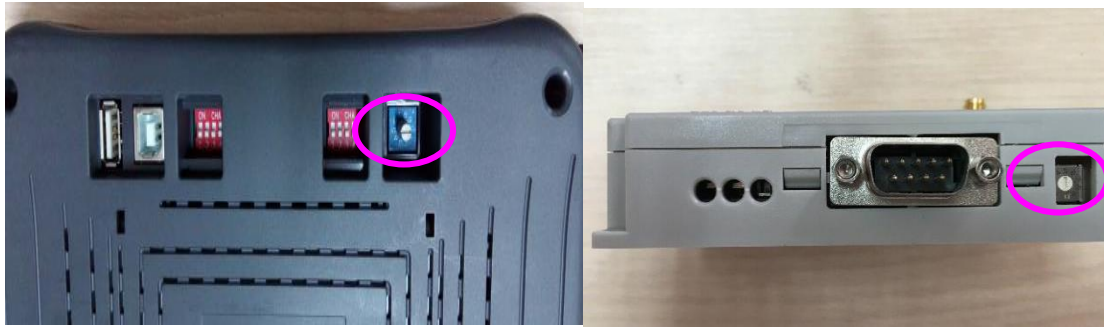
MTG765-UT



S-BOX-T

3. Set the same channel for the networking device

In this project, channel 0 is selected, set the button to 0 for MTG765-UT and S-BOX-T.



MTG765-UT

S-BOX-T

4. Check the networking result

Edit the HMI program and download to the HMI.

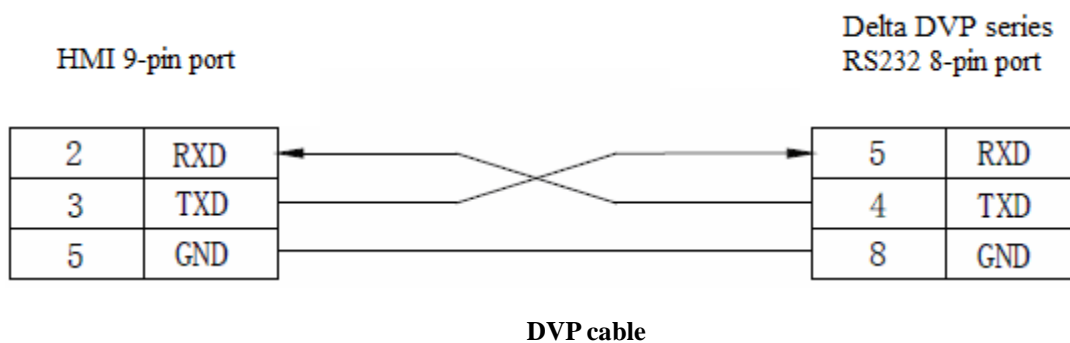
3-5 Delta DVP series

Application project: realize wireless communication between MTG765-UT and Delta PLC.

Networking equipment: 1 MTG765-UT, 1 S-BOX-T, 1 Delta DVP-60ES type PLC, DVP cable.

3-5-1 Connection

The S-BOX-T needs to be connected to the DC 24V power supply. The PLC and S-BOX-T can be connected with the DVP cable. The RS232 serial port cable is made as follows.



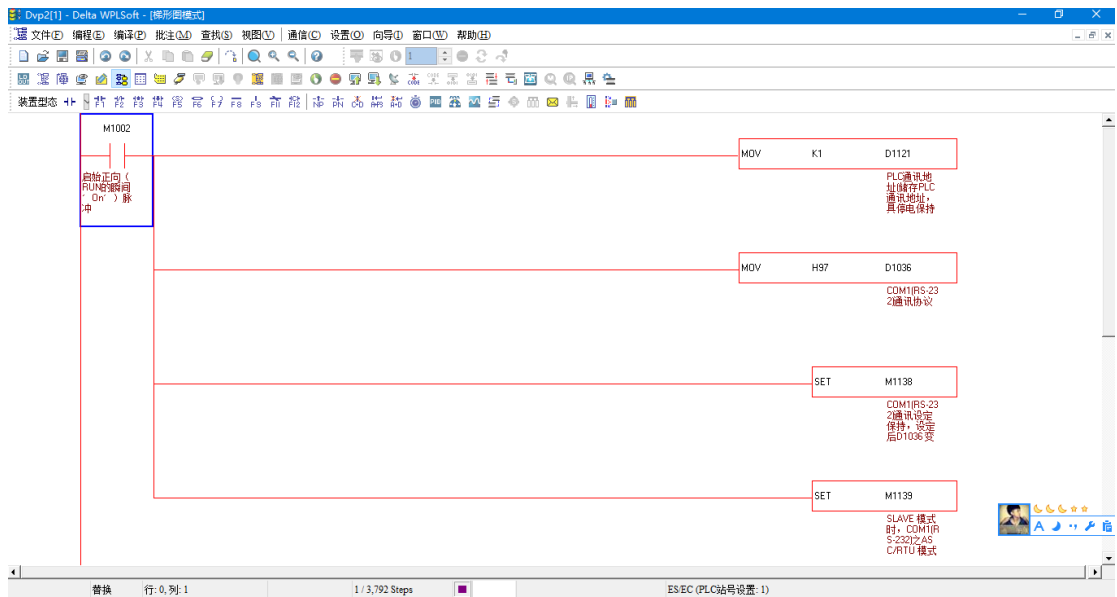
3-5-2 Parameters

In order to realize the wireless communication between MTG765-UT via S-BOX-T and Delta PLC, the following points must be met: the wireless communication channel is the same, the wireless transmission baud rate is the same, and the communication parameters of PLC port 1 and MTG765-UT PLC port are the same, which must be 19200,8,1, E and cannot be modified.

Method 1:

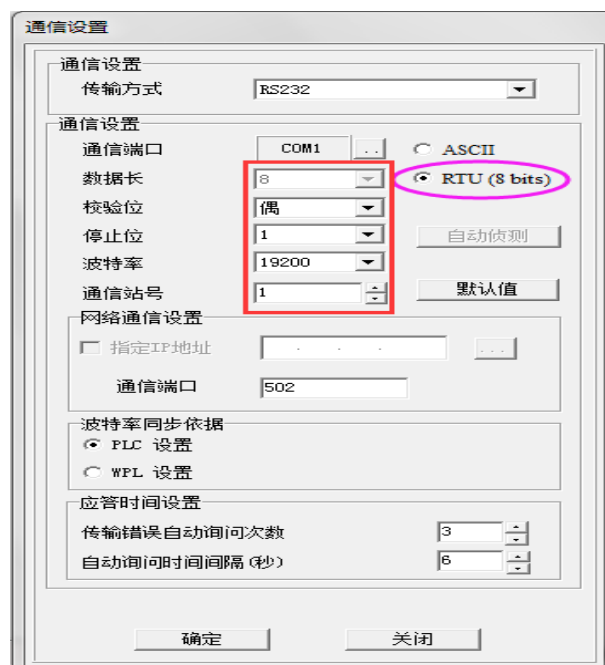
1. Set the networking device serial port parameters to 19200, 8, 1, E;

2. Connect the PC with PLC, the default parameters of Delta PLC port 1 are modbus ASCII, 9600, 7, 1, E, make the program to modify the serial port 1 parameters:

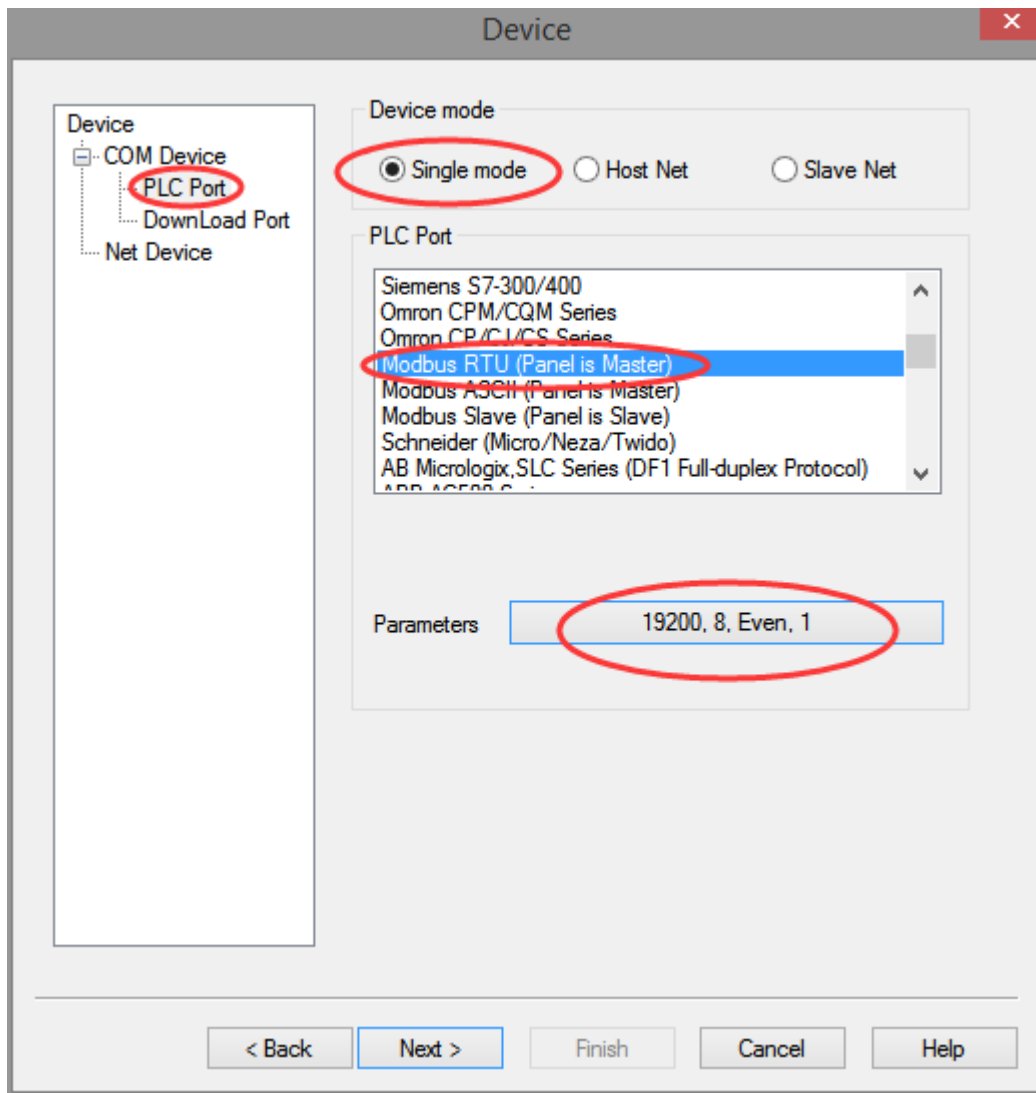


3. Make sure the dial switch is in RUN status after downloading the program, power on again, modify the PLC software communication settings, the serial port parameters are Modbus RTU, 19200, 8, 1, E.

Note: do not power on again when the dial switch is in STOP status, this operation will revert all the serial port parameters to defaulted value.



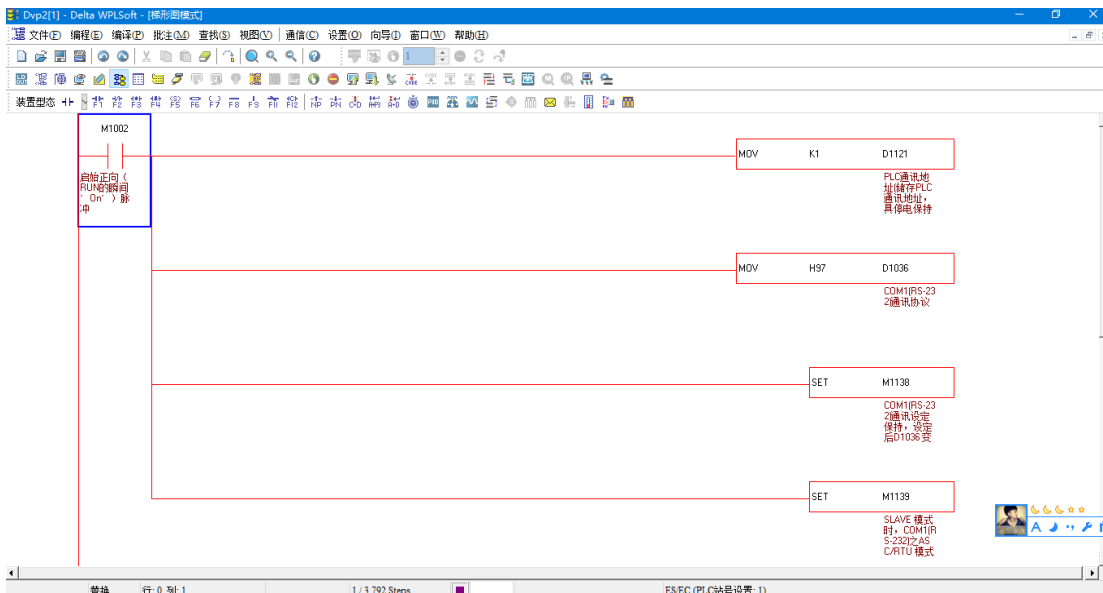
PLC settings



MTG765-UT PLC port settings

Method 2:

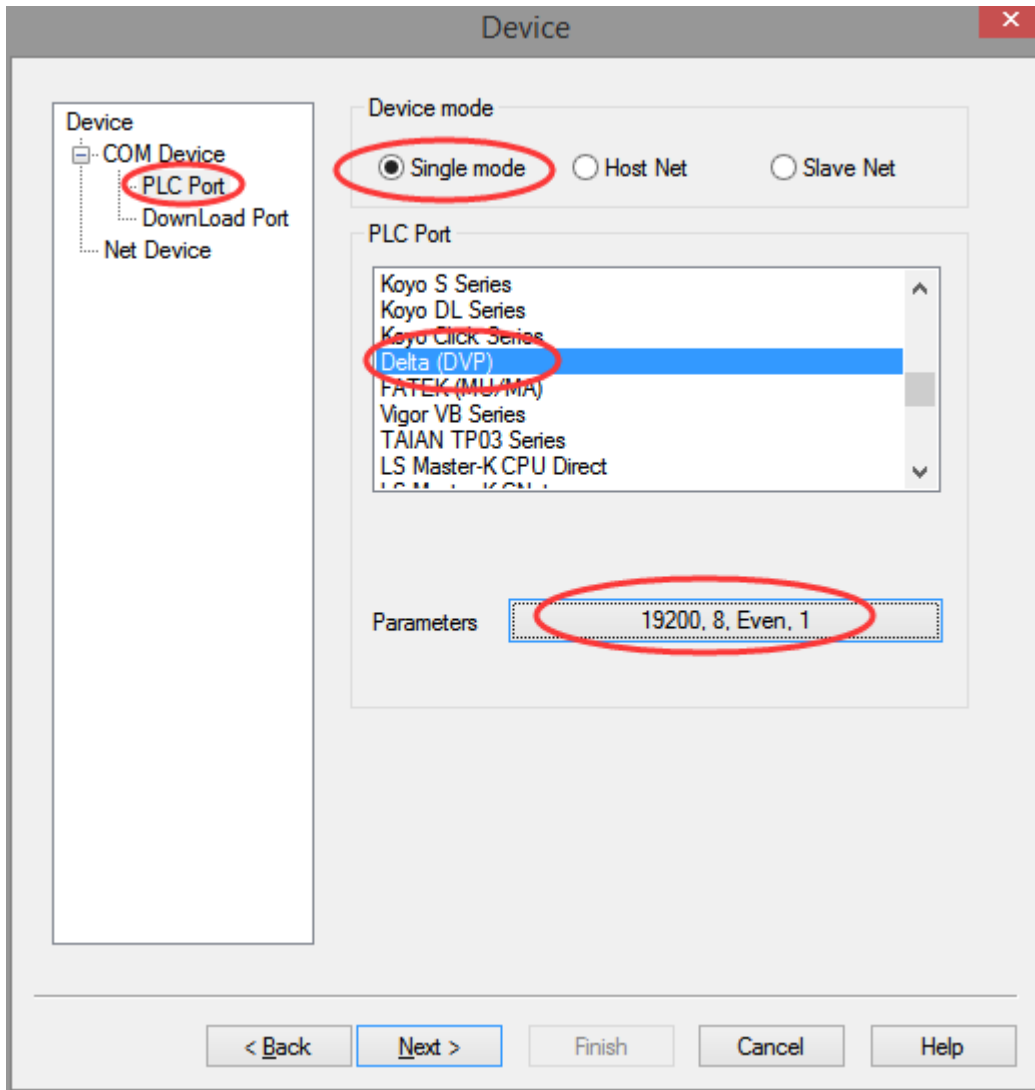
1. Set the networking device serial port parameters to 19200, 8, 1, E;
2. Connect the PC with PLC, the default parameters of Delta PLC port 1 are modbus ASCII, 9600, 7, 1, E, make the program to modify the serial port 1 parameters:



3. Make sure the dial switch is in RUN status after downloading the program, power on again, modify the PLC software communication settings, the serial port parameters are Modbus RTU, 19200, 8, 1, E.

Note: do not power on again when the dial switch is in STOP status, this operation will revert all the serial port parameters to defaulted value.

PLC setting



MTG765-UT PLC port settings

2. Set the networking device to same baud rate

In this project, the wireless transmission baud rate was chosen to be 115200bps, so the wireless communication baud rate on the back of MTG765-UT was selected to be all OFF, and the S-BOX-T dial switch was all OFF.



MTG765-UT



S-BOX-T

3. Set the same channel for the networking device

In this project, channel 0 is selected, set the button to 0 for MTG765-UT and S-BOX-T.



MTG765-UT



S-BOX-T

4. Check the networking result

Edit the HMI program and download to the HMI.

Appendix

Communication error and solutions:

1. The definitions of LED lights on the S-BOX module:

LED	Meaning
POWER	Power supply, always ON after power on
COM	Wireless receive serial port send, flicker once when serial port sent one pack of data, it seems always ON when sending very fast
RF	Serial port receive wireless send, flicker once when wireless sent one pack of data, it seems always ON when sending very fast
RUN	Running, module is error when RUN is OFF
RSSI3	Signal intensity 3
RSSI2	Signal intensity 2
RSSI1	Signal intensity 1

Note:

- (1) signal intensity LED has margin. If the environment is good, the device can communicate well when the signal intensity LED all OFF.
- (2) The signal intensity LED shows the intensity of wireless receiving the last pack of data.

2. The wireless communication channel and wireless communication baud rate of networking equipment are inconsistent.

The wireless communication channel of all devices should be adjusted to the same baud rate.

3. The communication parameters of PLC port equipment selected by the HMI are inconsistent with the connected PLC serial port parameters, or the baud rate is not 19200bps.

Check whether the communication parameters set by the HMI program are consistent with the PLC serial port parameters, which are 19200bps, 8-bit data bits, 1-bit stop bits, and even parity.

4. The station number of the component object of the HMI program is inconsistent with that of the connected PLC.

The Settings should be the same.

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