Description of HMI and device communication via modbus tcp

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I.Applicable conditions

Touch screen and devices supporting Modbus protocol, using network cable communication.
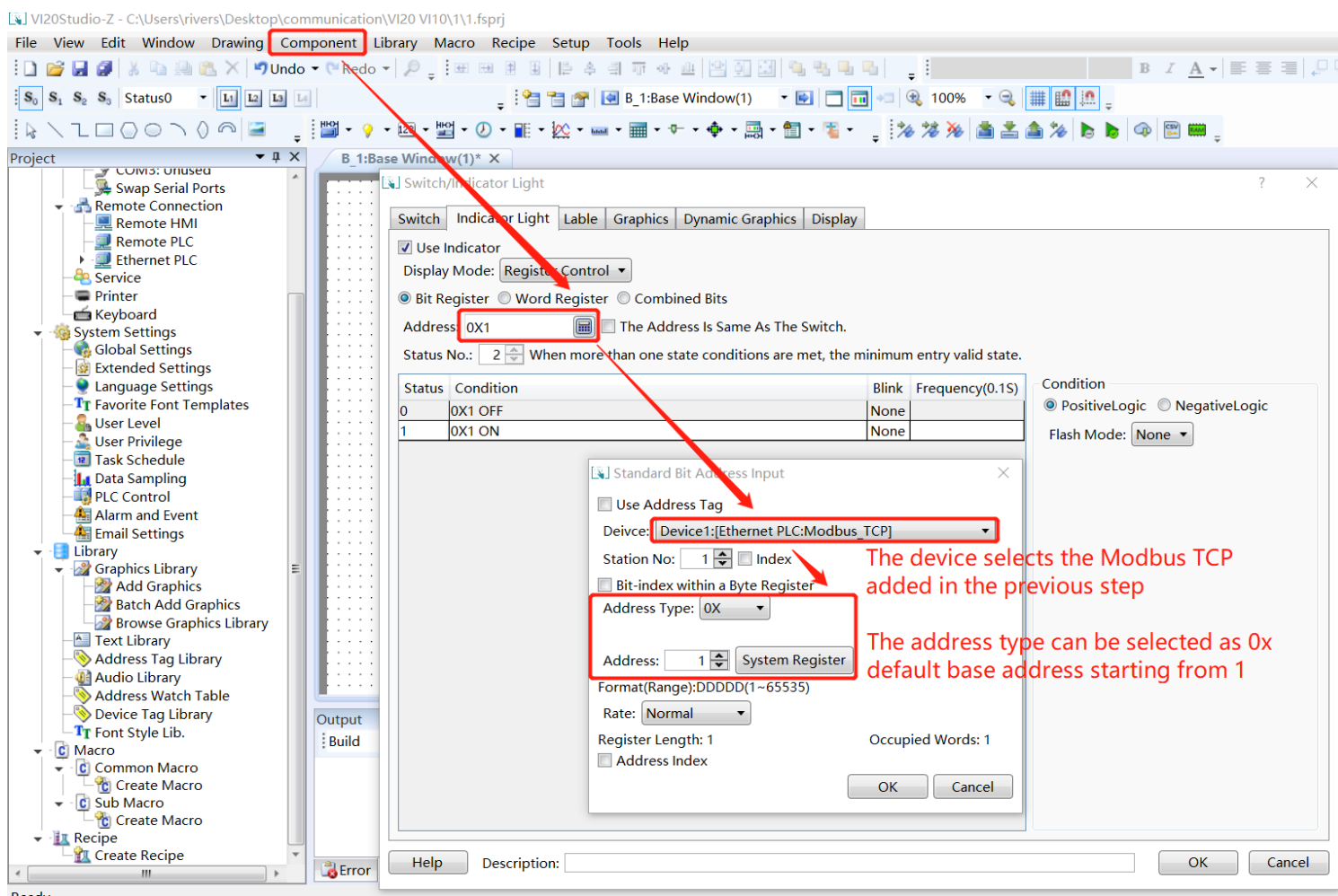
II. Touch screen setting

1. Open VI20 software, select Setup - Communication Settings - Remote Connection, and operate as shown in the figure below
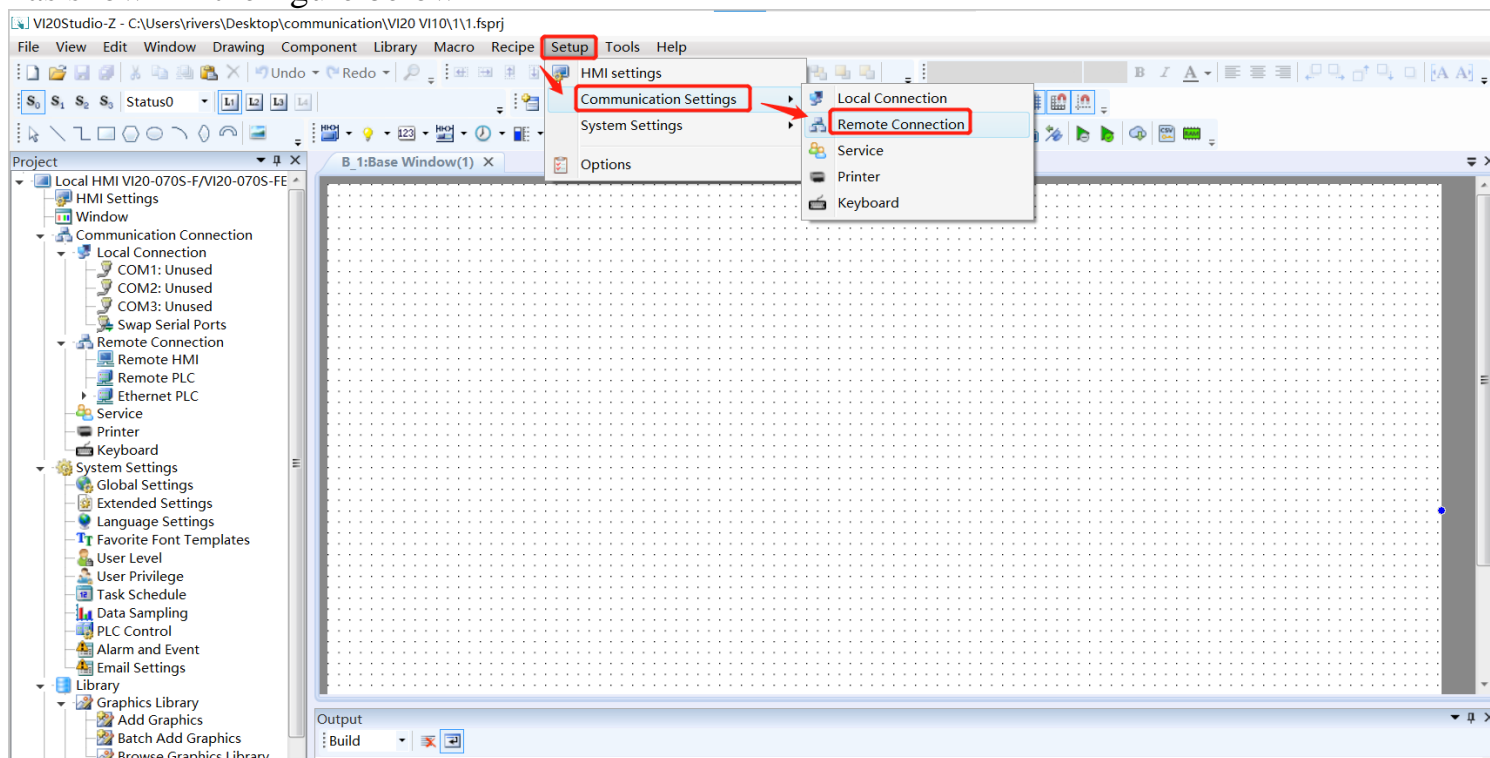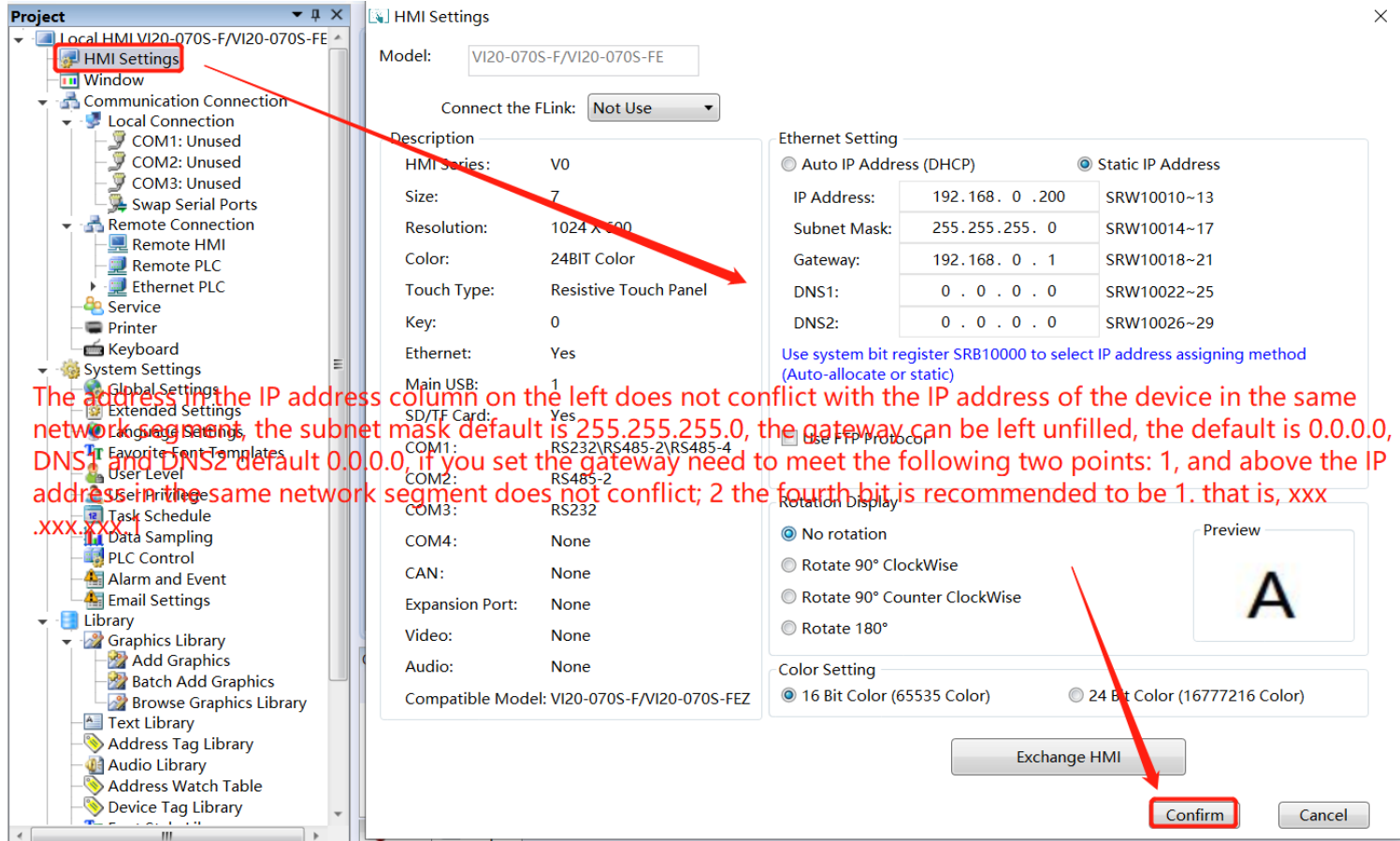
2. In the communication connection, select Ethernet PLC, select Modbus compatible device for the manufacturer, select Modbus TCP for the device type, and the IP address, station number and port number of the network PLC should be consistent with the settings of the device, as shown in the following figure
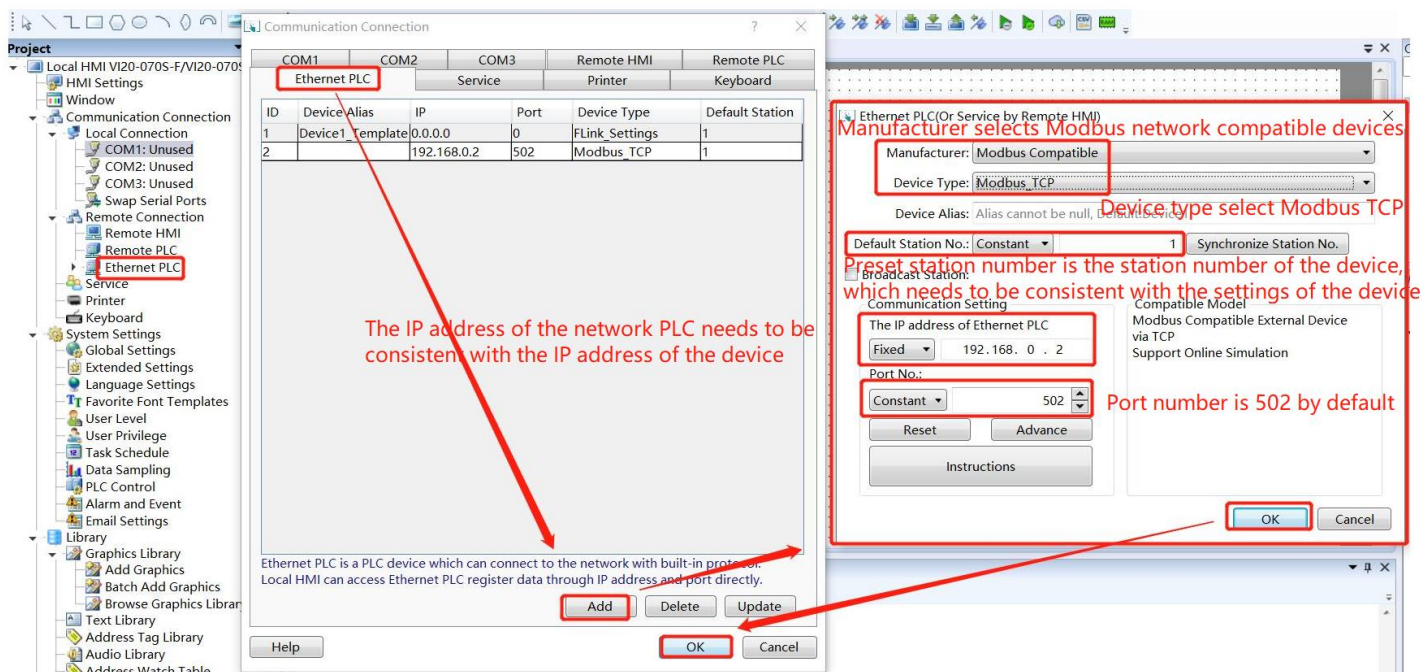
3. You can create a new indicator light component and set the appropriate graphics, add the address of the device, the operation is shown in the following figure

The device selects the Modbus TCP added in the previous step

The address type can be selected as 0x default base address starting from 1

4. Set the IP address of the touch screen and the IP address of the device supporting Modbus protocol to be in the same network segment and not in conflict, as shown in the following figure

5. Download the project to the touch screen and observe whether the component can read the data normally

6. Modbus TCP protocol address base modification

The address base can be changed to 0 or 1 as required

III.read and write data

1. The address type in the touch screen is 0X,1X,3X,4X. The address base setting affects the initial address (i.e. the initial address starts from 0 or 1) and the available address range, as shown in the following figure

(1) Address base set to 1 (this is the default value)

Driver	Address base setting	Characters/Bits	Address Type	Range
Modbus TCP	1	B(bits)	0X	1-65535
		B(bits)	1X	1-65535
		B(bits)	4X_bit	1.0-65535.15
		W(Character)	3X	1-65535
		W(Character)	4X	1-65535

(2) Address base set to 0

Driver	Address base setting	Characters/Bits	Address Type	Range
Modbus TCP	0	B(bits)	0X	1-65535
		B(bits)	1X	1-65535
		B(bits)	4X_bit	1.0-65535.15
		W(Character)	3X	1-65535
		W(Character)	4X	1-65535

2. The correspondence between address type and function code is shown below

Address Type	Read and Write Properties	Corresponding read function code	Corresponding write function code	
			Single write	Multiple writes
0X	Readable and writable	01	05	0F
1X	Read Only	02	Not supported	Not supported
3X	Read Only	04	Not supported	Not supported
4X	Readable and writable	03	06	10

0X：Read and writeable bit addresses，The corresponding read function code is 01, the single address write function code is 05, and the multiple address write function code is 0F;

1X：Read-only bit address，The corresponding read function code is 02;

3X: Read-only word address，The corresponding read function code is 04;

4X: Readable and writable word addresses，The corresponding read function code is 03, the single address write function code is 06, and the multiple address write function code is 10;

3. Address correspondence between device and touch screen

(1) If the initial address of the device starts from 1 and the address base in VI20Studio uses the default value of 1, the conversion to the touch screen is one-to-one; if the initial address of the device starts from 0 and the address base in VI20Studio uses the default value of 1, the conversion to the touch screen needs to add 1; if the initial address of the device starts from 0 and the address base in VI20Studio is set to 0, the conversion to the touch screen is one-to-one。

(2) For example, if the address of the read device is 40001 and 30010

The 4 in 40001 corresponds to address type 4X in the VI20Studio software, and the 3 in 30010 corresponds to address type 3X in the VI20Studio software

If the initial address of the device starts from 0 and the address base in VI20Studio is set to 0, then 40001 corresponds to 4X1 on the touch screen and 30010 to 3X10

If the initial address of the device starts from 0 and the default value of 1 is used for the address base in VI20Studio, then 40001 corresponds to 4X2 on the touch screen and 30010 to 3X11.

If the initial address of the device starts from 1 and the default value of 1 is used for the address base in VI20Studio, then 40001 corresponds to 4X1 on the touch screen and 30010 to 3X10

（3）Add a numeric display element to the VI20Studio software and read the data at device address

40001 as shown in the following figure

Read the data of device address 4001
1、If the initial address of the device starts from 0 and the address base in the software is set to 0, the address on the left side needs to be filled in 4X1
2、If the initial address of the device starts from 0, and the address base in the software uses the default value of 1, the left address should be filled in 4X2
3、If the initial address of the device starts from 1, and the address base in the software uses the default value of 1, the left address needs to be filled in 4X1

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IV. wiring instructions

1. Modbus TCP series cable, crossover network cable method, wiring diagram as shown in the following diagram (the following diagram indicates the view from the terminal of the connection cable)

Crossover network cable using Modbus TCP Ethernet method	HMI terminal		PLC terminal
	1 TX+(Orange and White)		3 RX+(GreenWhite)
	2 TX-(Orange)		6 RX-(Green)
	3 RX+(Green White)	12345678	1 TX+(Orange and White)
	4 BD4+(Blue)		4 BD4+(Blue)
	5 BD4-(Blue White)		5 BD4-(Blue White)
	6 RX-(Green)		2 TX-(Orange)
	7 BD3+(Brown White)		7 BD3+(Brown White)
	8 BD3-(Brown)		8 BD3-(Brown)

2. Modbus TCP series cable, directly connected to the network cable, the wiring diagram is shown below (the diagram below shows the view from the terminal of the connection cable)

Direct network connection using Modbus TCP Ethernet method	HMI terminal		PLC terminal
	1 TX+(Orange and White)		1 TX+(Orange and White)
	2 TX-(Orange)		2 TX-(Orange)
	3 RX+(Green White)	12345678	3 RX+(Green White)
	4 BD4+(Blue)		4 BD4+(Blue)
	5 BD4-(Blue White)		5 BD4-(Blue White)
	6 RX-(Green)		6 RX-(Green)
	7 BD3+(Brown White)		7 BD3+(Brown White)
	8 BD3-(Brown)		8 BD3-(Brown)

V.Solutions to common problems

1.Q：The touch screen reports a communication timeout or communication error, and the data is not read

A：This is the touch screen and the PLC did not communicate on, you need to check the PLC and

touch screen communication settings (check against the above instructions), as well as wiring (use the

line meter to measure whether the wiring corresponds)

2. Q：The touch screen reports communication timeout or communication error, and the data is read

A：The touch screen reports communication timeout or communication error, and the data is

read

3. Q：The data is read, but the value is not correct, or the number *** is displayed**

A: This is usually the result of incorrect data type selection, you can change the data type in the
numeric component to match the PLC. As shown in the figure below