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# S7MPI / S7MPI Pro

## User Manual

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# 1. Introduction

It is used for Siemens S7300/400 series PLC Ethernet communication to replace the communication function of Siemens CP343 (Ethernet) and CP341 (Modbus).

## 1.1 Application

The industrial communication bridge (hereinafter referred to as the bridge) mainly provides hardware support for the industrial equipment networking project, and it helps the upper terminal to collect the data of the underlying industrial equipment (mainly PLC, but not limited to PLC equipment) through Ethernet, and then it carries out statistics and analysis on these data.

The bridge is specially designed for Siemens S7300/400 series PLC and supports Siemens 840D and other numerical control systems.

## 1.2 Model selection

The bridge is divided into basic version and professional version, the models are S7MPI and S7MPI Pro (divided into straight-through type and bridge type).

The Pro version includes all the features of the base version, but also adds Modbus master and slave function for the X2 extension (bridge-only support) and S7TCP & Modbus TCP client function for the Ethernet port.

The features of the Basic and Professional editions are as follows:

Function		S7MPI (Basic)	S7MPI PRO Straight-through (Pro)	S7MPI PRO Bridge (Pro)
Ethernet Port Function	Programming and debugging (STEP7, TIA Portal)	√	√	√
	Configured software monitoring	√	√	√
	Modbus TCP server	√	√	√
	S7TCP protocol	√	√	√
	Open TCP protocol	√	√	√
	S7TCP client function	×	√	√
	Modbus TCP client function	×	√	√
X2 Extension Function	HMI monitoring	√	√	×
	Modbus Master	×	×	√
	Modbus Slave	×	×	√

### 1.3 Technical parameter

Basic Parameter	Product Name:	Industrial communication bridge
	Product Type:	S7MPI/ S7MPI Pro
	Description:	Siemens S7-300/400,840 D Ethernet communications
Appearance	Shell color:	Black
	Communication LED:	Pwr/Bus
	Ethernet indicator LED:	Link/Active
	Reset Button:	Reset
	Size (L*W*H):	65*30*17mm
	Weight:	60g
	Installation:	Communication port plug - in type
Power	Power Method:	PLC Direct power/external power supply from communication port DIP2
	Voltage:	24VDC/100mA
Com1	Interface Type:	DSUB9F (RS485)
	Transmission Speed:	9.6/19.2/187.5K/500K/1.5M BPS
	Protocol:	MPI/PROFIBUS
	Device supported:	Siemens S7300/400 PLC
Com2	Interface Type:	DSUB9M (RS485)
	Transmission Speed:	9.6/19.2/187.5K/500K/1.5M BPS
	Protocol:	MPI/PROFIBUS
	Device supported:	Siemens HMI
Ethernet communication port	Interface Type:	RJ45
	Transmission	10/100M

	Speed:	
	Protocol:	S7TCP/ModbusTCP
	TCP client:	16 pcs
Upper software	Programming software:	STEP7/TIA
	Configured software:	WinCC
	OPC software:	Kepware OPC,Matricon OPC
Parameter Configuration	Parameter tool:	NET-LINK
	WEB browser:	Default IP: 192.168.1.188
Work environment	Temperature:	-20~85°C
	Humidity:	95% Non-condensation
Certificate	EMC:	2014/30/EU
	CE	Yes

## 2. Function

### Function: MODBUS TCP

The Ethernet port of the bridge supports Modbus TCP protocol, which can be used by configuration software or MES system to access PLC data.

## 3. Parameter

In order to make it more convenient for the user to manage the field equipment in the application, the bridge opens the 【Device Name】 parameter so that the user can name the field equipment connected by the bridge.

## Configure the parameter via software

### 3.1 Device search

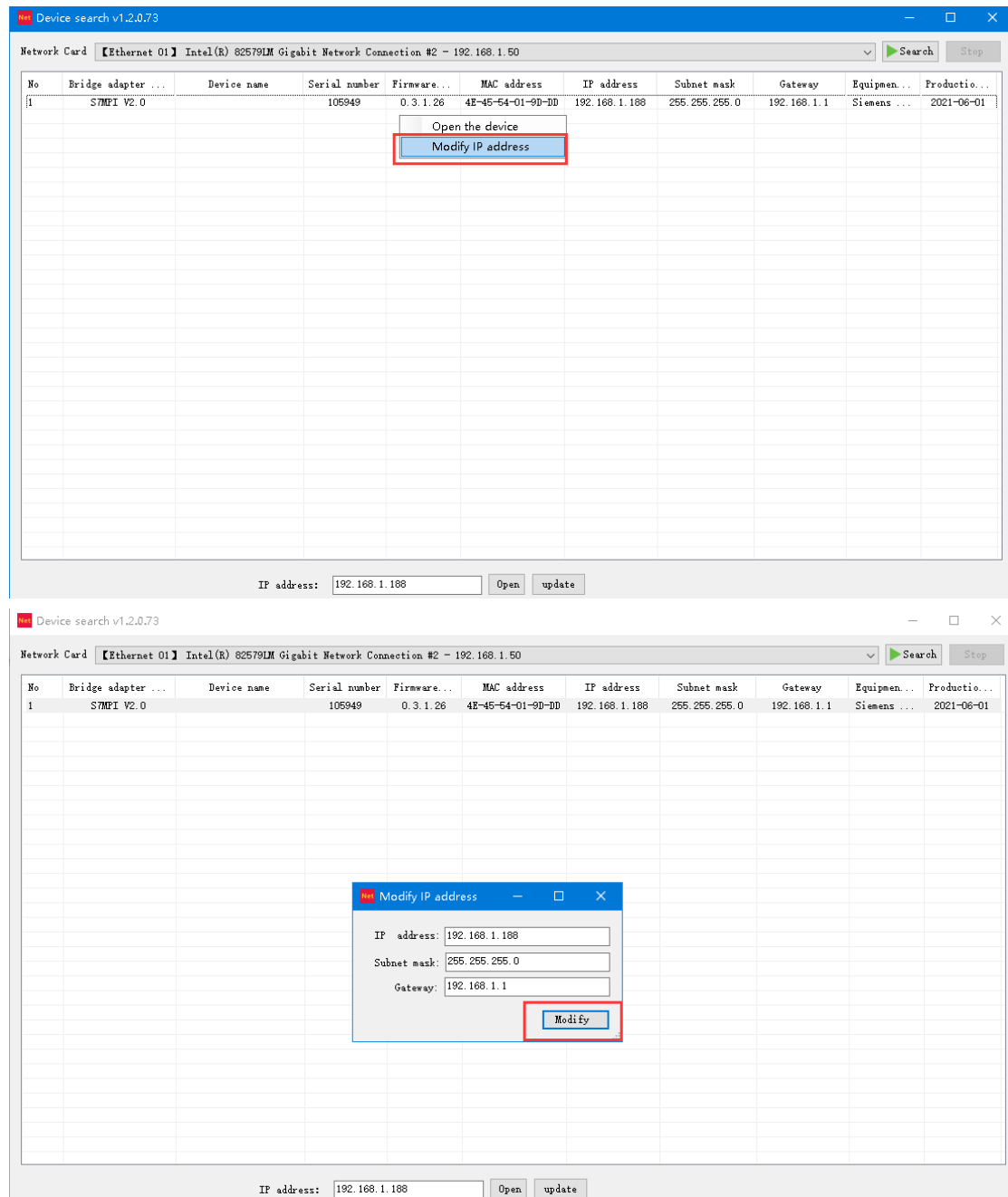
Open the parameter configuration tool Net-Link, select the network card connected between the computer and the bridge, and click the "Search" button to search the bridge. It supports cross-network search, and the cross-network search bar shows yellow.

The software interface displays a table of network devices. The top screenshot shows the search process, with the search button highlighted. The bottom screenshot shows the search results, with the first row highlighted in yellow.

No	Bridge adapter ...	Device name	Serial number	Firmware...	MAC address	IP address	Subnet mask	Gateway	Equipmen...	Productio...
1	STMPI V2.0		105949	0.3.1.26	4E-45-54-01-9D-DD	192.168.1.188	255.255.255.0	192.168.1.1	Siemens ...	2021-06-01

## 3.2 Change the IP address

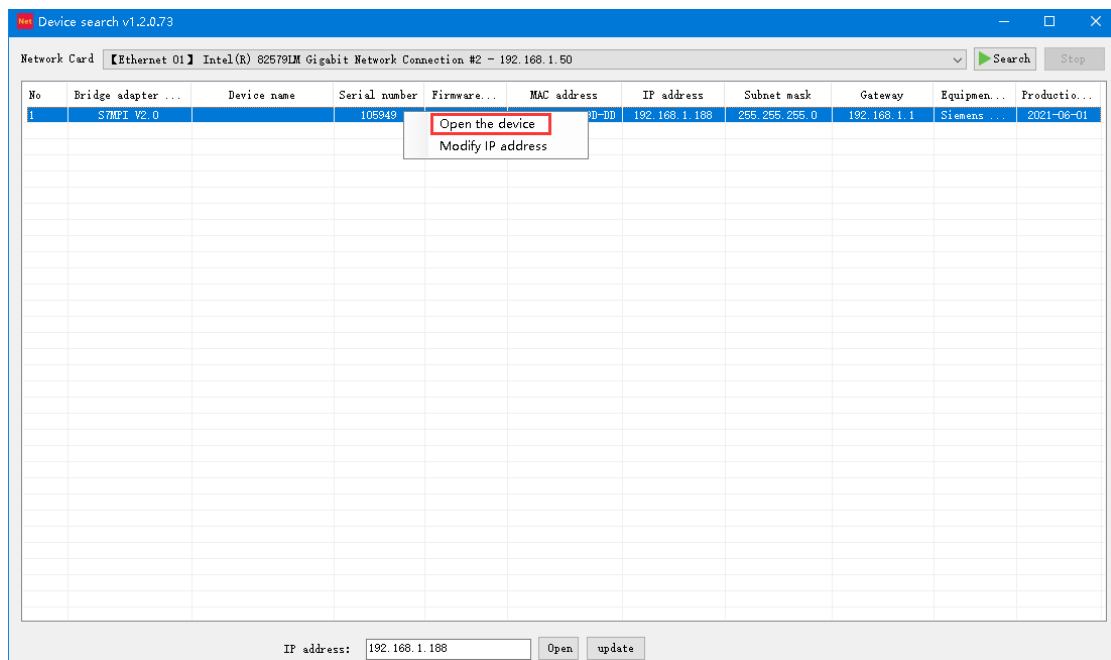
If you want to modify the IP address, subnet mask and gateway parameters of the bridge, you can select the bridge, right mouse button, and select "Modify IP address". In the pop-up dialog box, enter the IP address, subnet mask and gateway that you want to modify, and then click "Modify" button.



## 3.3 Open the device

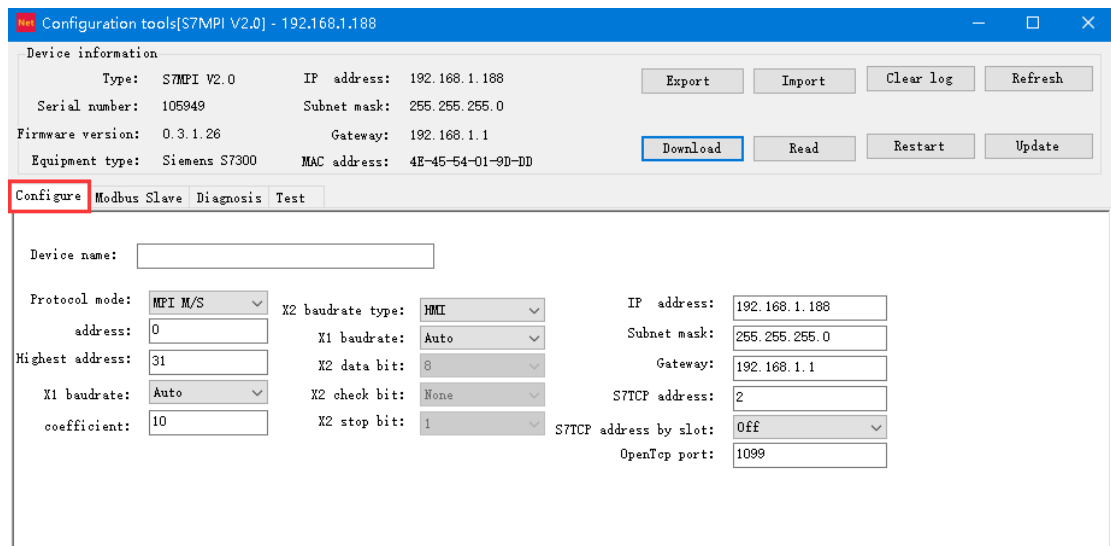
Select the bridge, right mouse button and select "Open Device" to enter the page of parameter

setting, diagnosis and test of the bridge.



### 3.4 Configuration interface

Open the communication interface as follows:



Parameter description is as follows:

**【Equipment name】** : The field equipment connected by the bridge can be named, such as No. 1 air compressor, or it could not be set;

**【protocol mode】** : It can be set as the MPI master and slave station (when the bridge is inserted in the PLC MPI port) or PROFIBUS (when the bridge is inserted in the PLC DP port);



【Module address】 : Set the bridge's station address, which does not conflict with the station address of other devices on the bus;

【Bus highest address】 : Set the highest station address that the bus can recognize. It is recommended to be default.

【serial port X1 baud rate】 : It can be set to automatic, automatic state: bridge automatic recognition and PLC communication baud rate, can also be set according to the actual PLC baud rate manual;

【address interval refresh coefficient】 : It is recommended to be default;

【Serial port X2 mode】 : The default is HMI, without modification;

【Serial port X2 baud rate】 : It can be set to automatic. Automatic state: the baud rate of the bridge automatic recognition and touch screen communication, or the baud rate can be set manually according to the actual touch screen baud rate. This parameter is only meaningful for bridge type;

【IP address】 : Set the IP address of the bridge;

【subnet mask】 : Sets the subnet mask of the bridge;

【Gateway】 : The gateway to set the bridge;

【S7TCP target address slot number is determined】 : Open state: S7TCP target address is determined by slot number;

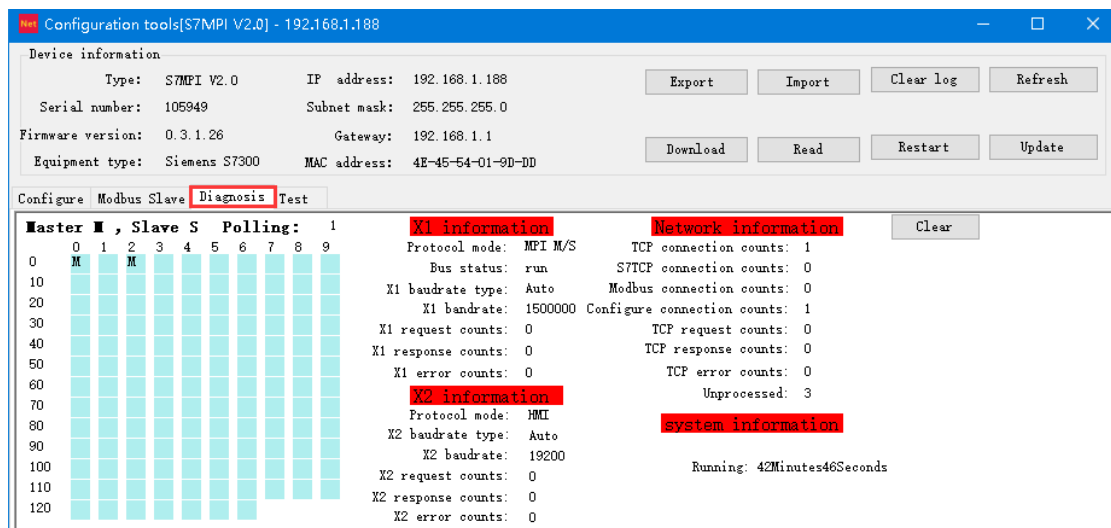
【S7TCP target address】 : When 【S7TCP target address slot number determined】 is off, this parameter will take effect, manually set the S7TCP target address;

【OpenCP port】 : Default is 1099, recommended default;

After modifying the parameters, click the "Download" button.

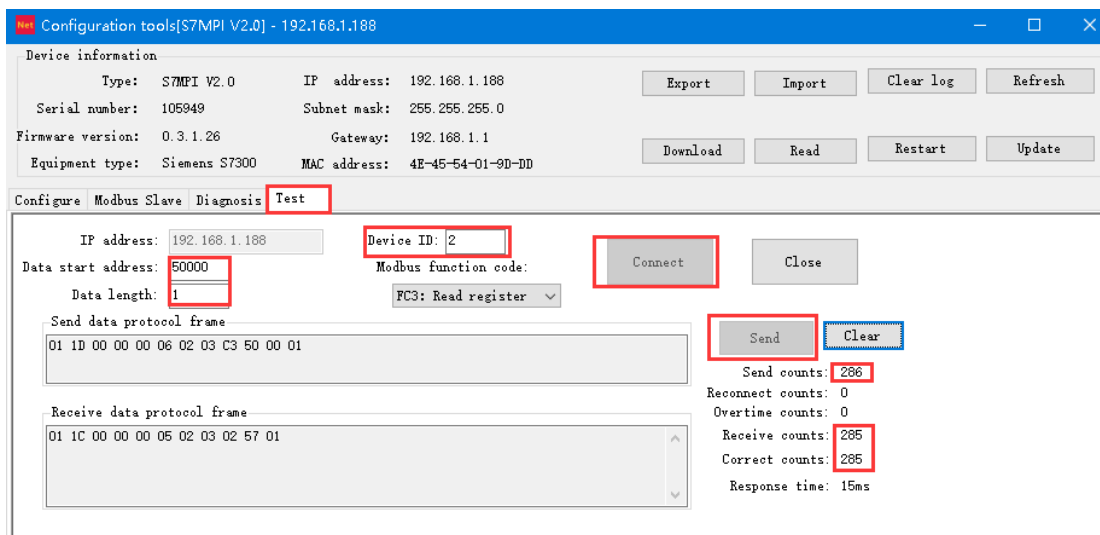
### 3.5 Diagnostic interface

Select the "Communication Diagnosis" option page and open the diagnosis interface to view the operation of the bridge:



### 3.6 Testing interface

Select the "Test" option page, open the test interface, set the communication parameters, and then click the "Connect" button ---- "Send" to test the communication between the bridge and PLC.



## 4.Modbus TCP Communication

### 4.1 Modbus Mapping Table

PLC internal register address and Modbus address corresponding table

Modbus address	PLC Internal register address	Data Type	Computational Formula	MODBUS Function no.	Maximum instruction number
000001~	Q0.0~	Bit	$Qm.n = 000001 + m*8 + n$ ①	FC1 (reading coil)	S7-200: 119 S7-300: 784
050001~	M0.0~		$Mm.n = 050001 + m*8 + n$	FC5 (writing coil)	FC5: 1
100001~	I0.0~		$Im.n = 100001 + m*8 + n$	FC2 ( Reading the input )	S7-200: 119 S7-300: 784
400001~	DBx.DBW0~		$DB1.DBWm = 400001 + m/2, m \text{ is even}$ ②		

450001~	MW0~	Word	$MWm = 450001 + m/2$ , <i>m is even</i>	FC3 (Read multiply register)  FC16 (Write multiply register)  FC6 (Write a single multiply register)	FC3: 111  FC16: 111  FC6: 1
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**Notes:**

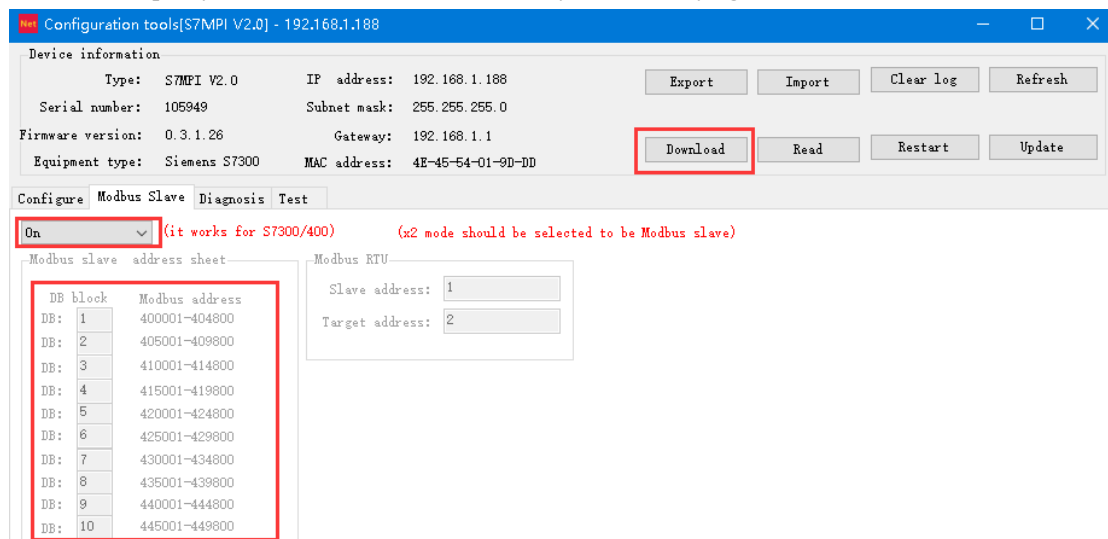
① : For example, Q1.5, its corresponding Modbus address is:  $Q1.5 = 000001 + 8 * 1 + 5 = 000014$ ;

②: For example, DB1.DBW100, its corresponding Modbus address is:

$$DB1.DBW100 = 400001 + 100/2 = 400051;$$

By default, the Modbus address area 400001-450000 corresponds to the DB1 data block of Siemens 300PLC.

You can also specify a number of DB data blocks freely here. Modifying this with Net-Link tool:



Open **【Modbus slave mapping address】**, and specify the corresponding relationship between multiple DB block numbers and Modbus address area;

By default, such as DB2.DBW100, the corresponding Modbus address is:

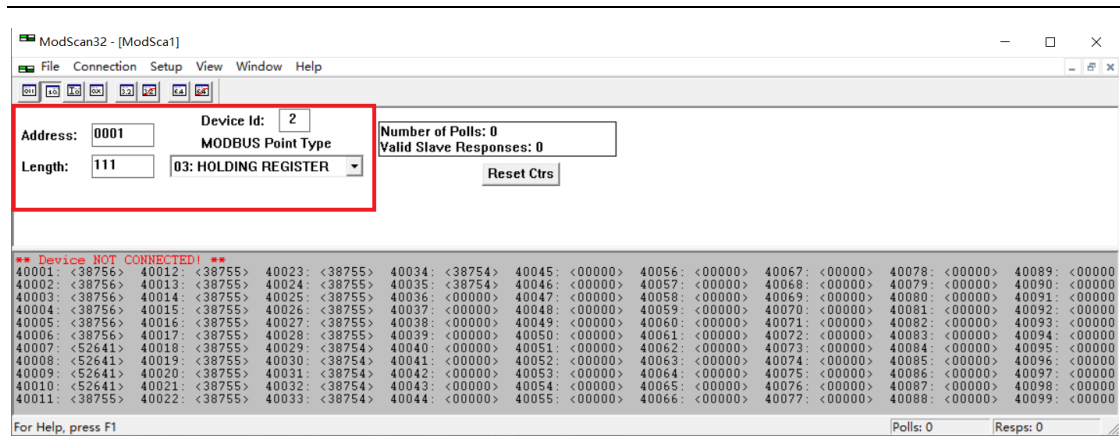
$$DB2.DBW100 = 405001 + 100/2 = 405051.$$

And Users can modify the DB block number according to their needs.

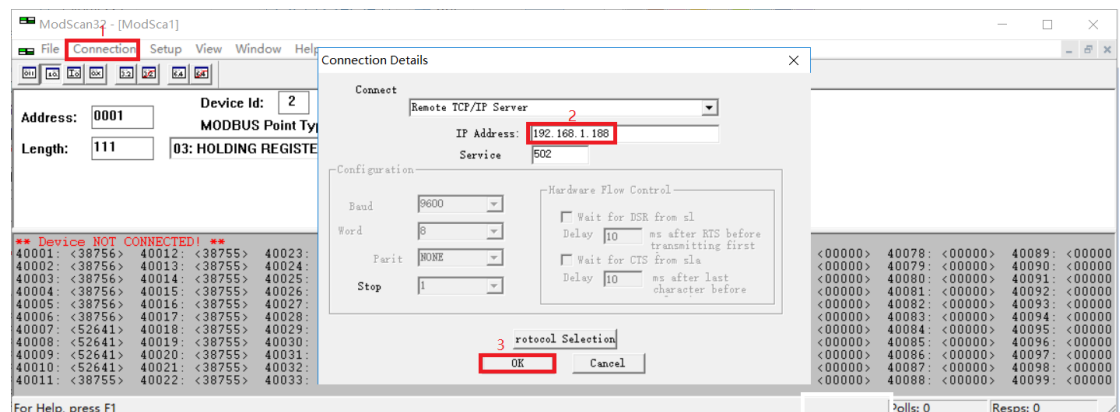
## 4.2 Modbus Communication Test

Test with the ModScan32 tool

1. Open the software and set the data to be tested. For example, read the 111 words starting from 400001, set as follows:



2. Select the menu bar **【Connection】** --Connect, enter the IP Address of the bridge at **【IP Address】** in the dialog box, and click the **【OK】** button;



3. The screen of normal test result is as follows:

