

xArrow SCADA Tutorial

Version 2.0

xArrow Software 1999 – 2018

<http://www.xarrow.com>

xArrow SCADA System Installation

1 System Requirements

1.1 Hardware

The configuration part of xArrow SCADA is run on windows platform, the PC requirements as follows:

- CPU: Intel x86 and compatible CPU
- Memory: 64MB and above
- Video Card: Windows compatible video card
- Hard Disk: 250M and above
- Network Card: for device communication and downloading project

The running part is required to run on the following hardware:

- CPU: Generally support ARM CPU, if you need to support other CPU types, please contact us
- Memory: 64MB and above
- Network Card: Should have a MAC address to support TCP / IP communication for device communication and download project.
- RS232/RS485 interface: used for device communication.

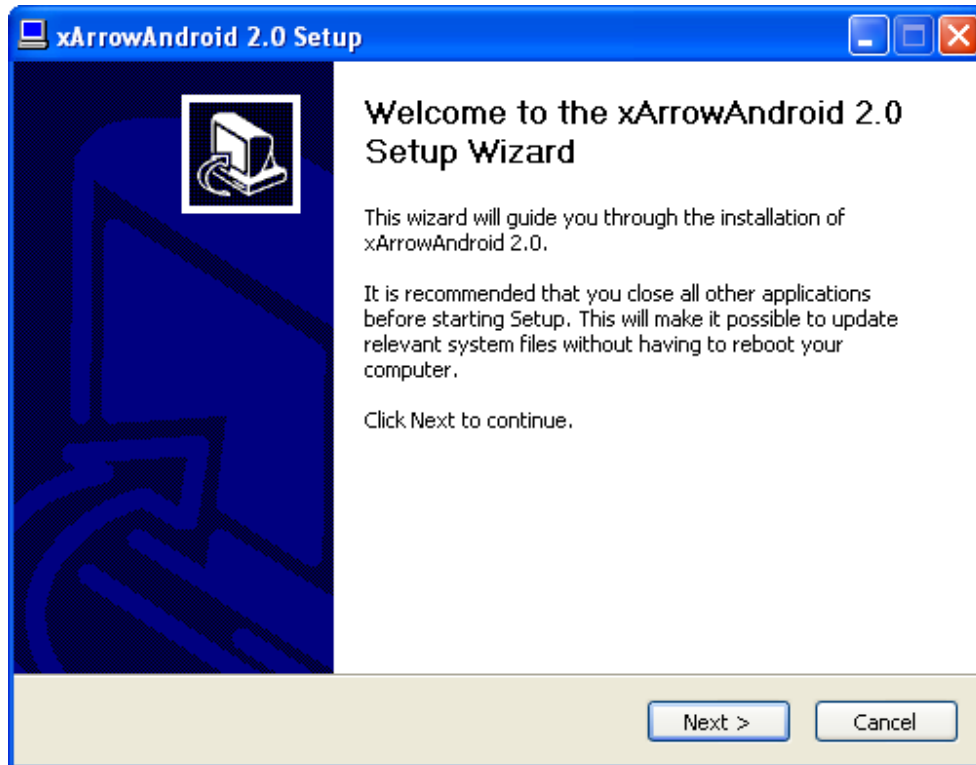
1.2 Software

- Configuration: WINDOWS XP/2003/Vista/2008/7/8/10
- Running: Android 4.4.2 and above

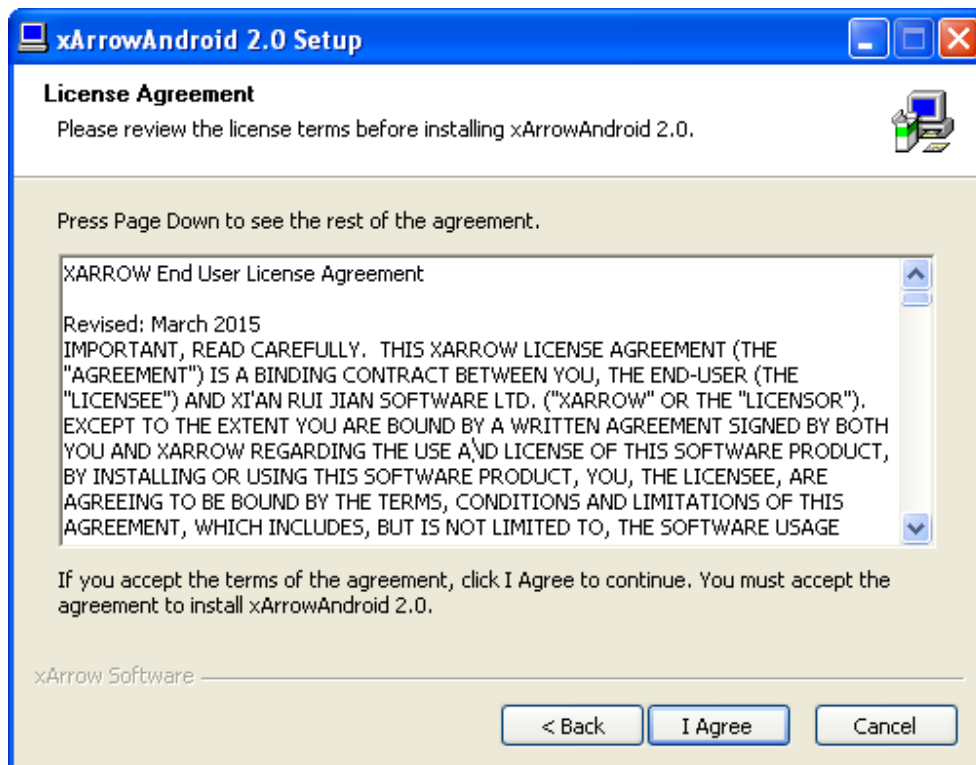
2 Installation

2.1 Configuration Environment

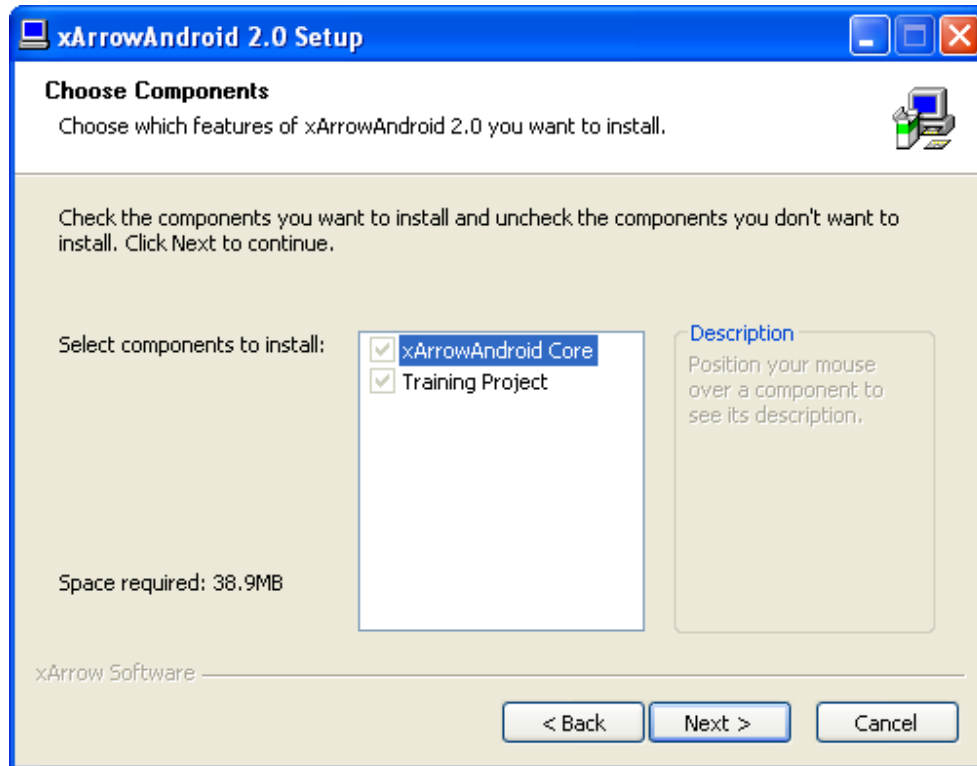
1. Launch xArrowAndroid.exe



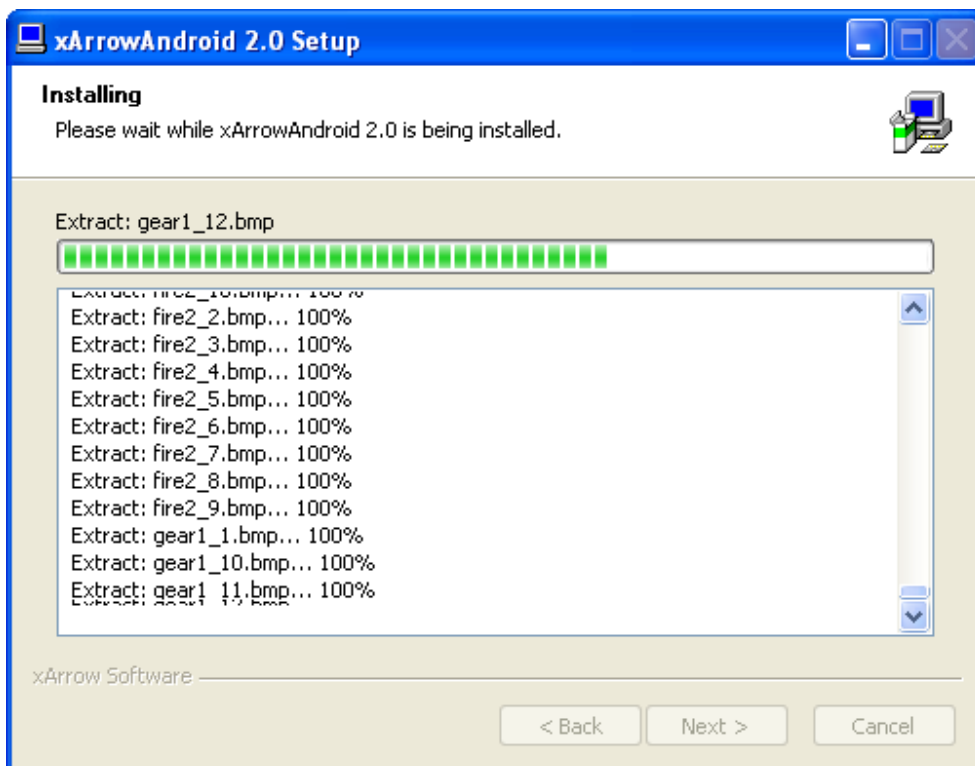
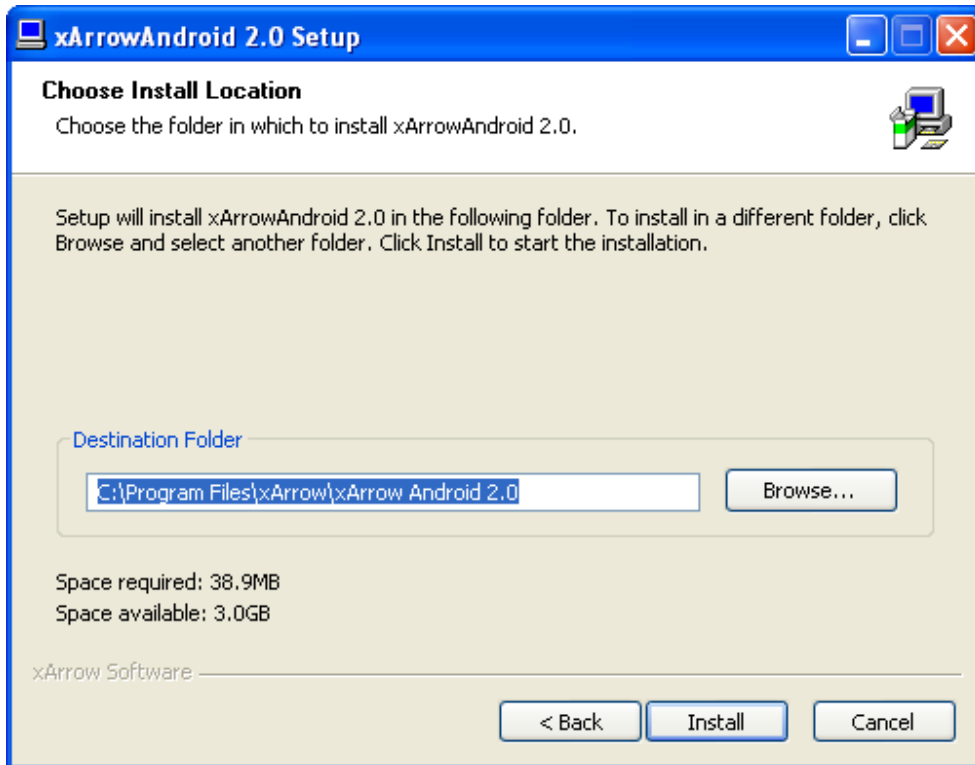
2. Read And Agree The License Agreement



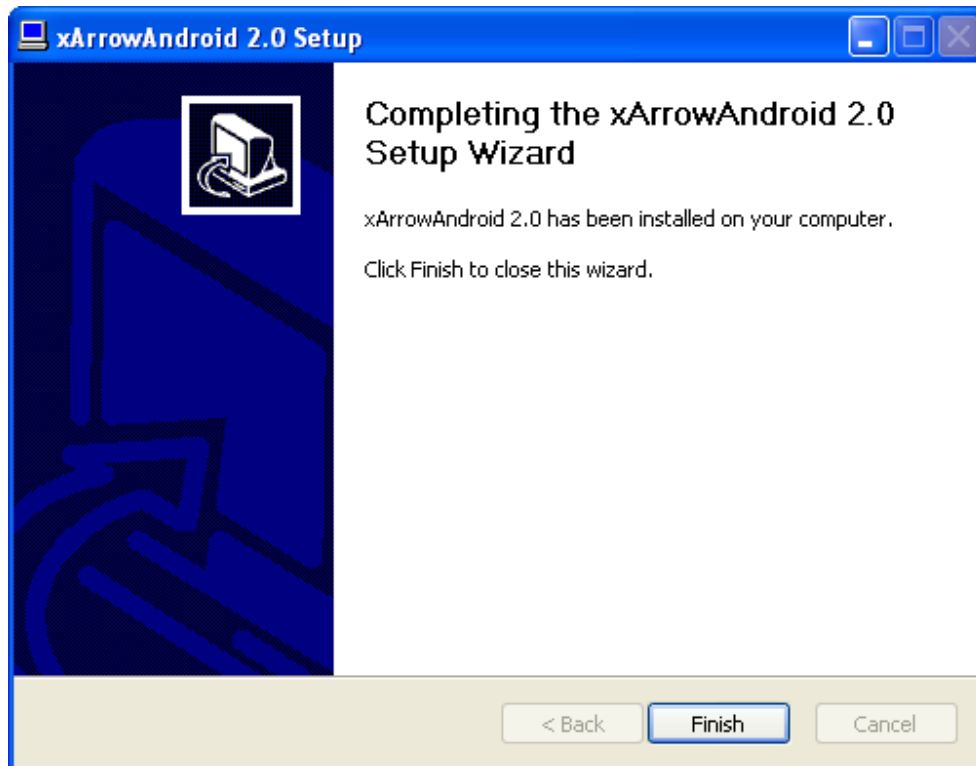
3. Select Modules



4. Choose Folder To Install



5. Install Successfully



2.2 Running Environment

2.2.1 Install

When the configuration program installation is over, user can find the Android APK at: [xArrowAndroid Install Folder\Out\ANDROID_BIN\xArrowAndroid.apk], and install this xArrowAndroid.apk to the given Android device.

For how to install apk to Android device, user can google the internet, here is 2 common way to install:

1. Use ADB

Put the xArrowAndroid.apk to the working folder of the Android SDK use the command:
adb install xArrowAndroid.apk

2. Manually Install

Copy the xArrowAndroid.apk to the Android device, use file manager to locate the file, then click on it.

Note: xArrowAndroid.apk need 2 permissions:

Storage: Modify/delete SD card contents

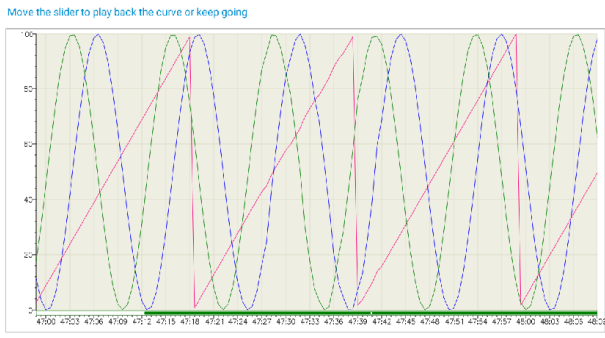
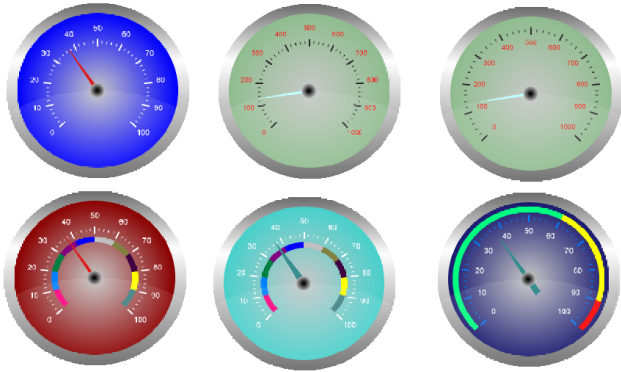
Phone Calls: Read Phone State and Identity

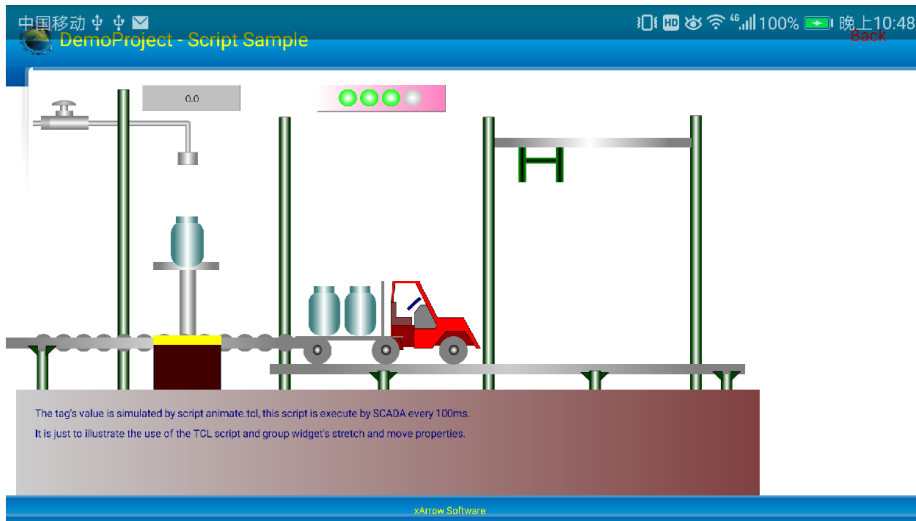
2.2.2 Running

User can run the xArrow SCADA when it is installed OK on the android device, and click the “Start” button to start the current project.

Note: The APP have a demo project which show the common feature of the software, user can make and download their own project to the device.







Double click the header to query the historical data

索引	时间	value_1	value_2	value_3	value_4	value_5
1	2018-01-20 22:35:30	23.0	27.0	23.0	90.4	20.6
2	2018-01-20 22:35:40	72.0	76.0	72.0	86.4	84.2
3	2018-01-20 22:35:50	121.0	24.0	20.0	23.2	92.2
4	2018-01-20 22:36:00	170.0	73.0	69.0	3.5	31.5
5	2018-01-20 22:36:10	220.0	22.0	18.0	54.6	0.2
6	2018-01-20 22:36:20	261.0	63.0	59.0	88.1	82.3
7	2018-01-20 22:36:30	310.0	11.0	7.0	25.3	93.5
8	2018-01-20 22:36:40	359.0	60.0	56.0	2.7	33.9
9	2018-01-20 22:36:50	408.0	8.0	4.0	57.0	0.5
10	2018-01-20 22:37:00	457.0	57.0	53.0	99.9	47.7

xArrow SCADA buttons as follows:

2.2.2.1 Start

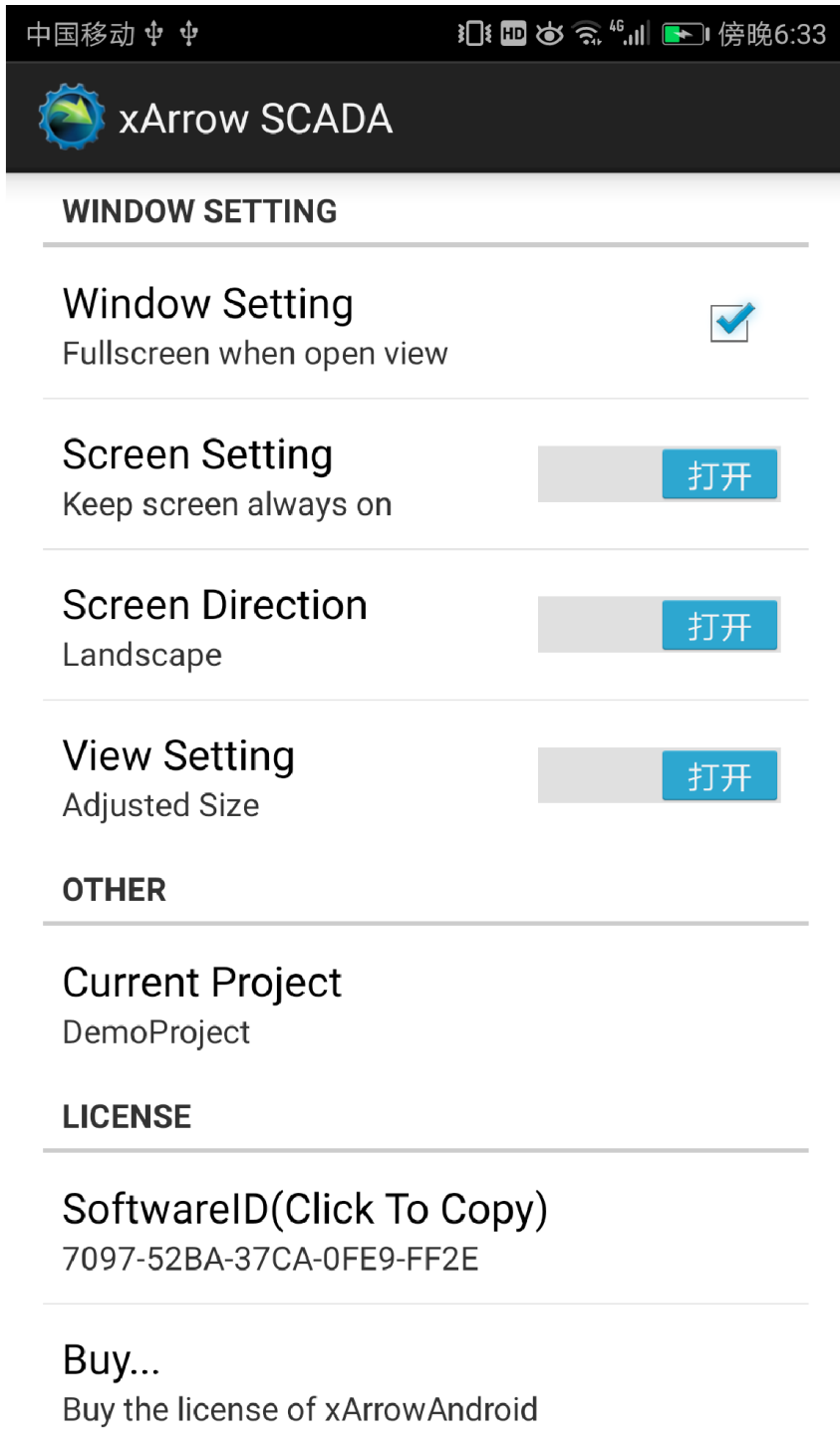
Start current project.

2.2.2.2 Stop

Stop current project.

2.2.2.3 Setting

Configure running properties of xArrow SCADA, as follows:



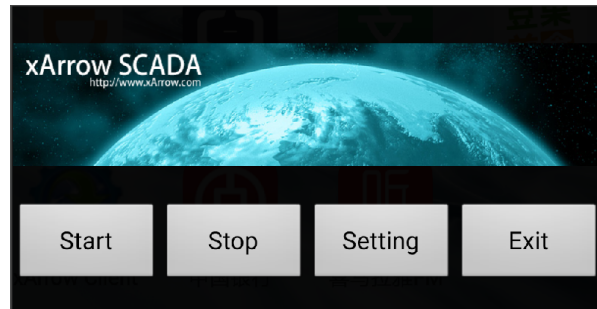
2.2.2.4 Exit

Exit xArrow SCADA app.

3 Download Project

To download the project from xArrowMaker(the configuration program) to the APP, user should launch the APP first.

The xArrow SCADA's working interface as follows:



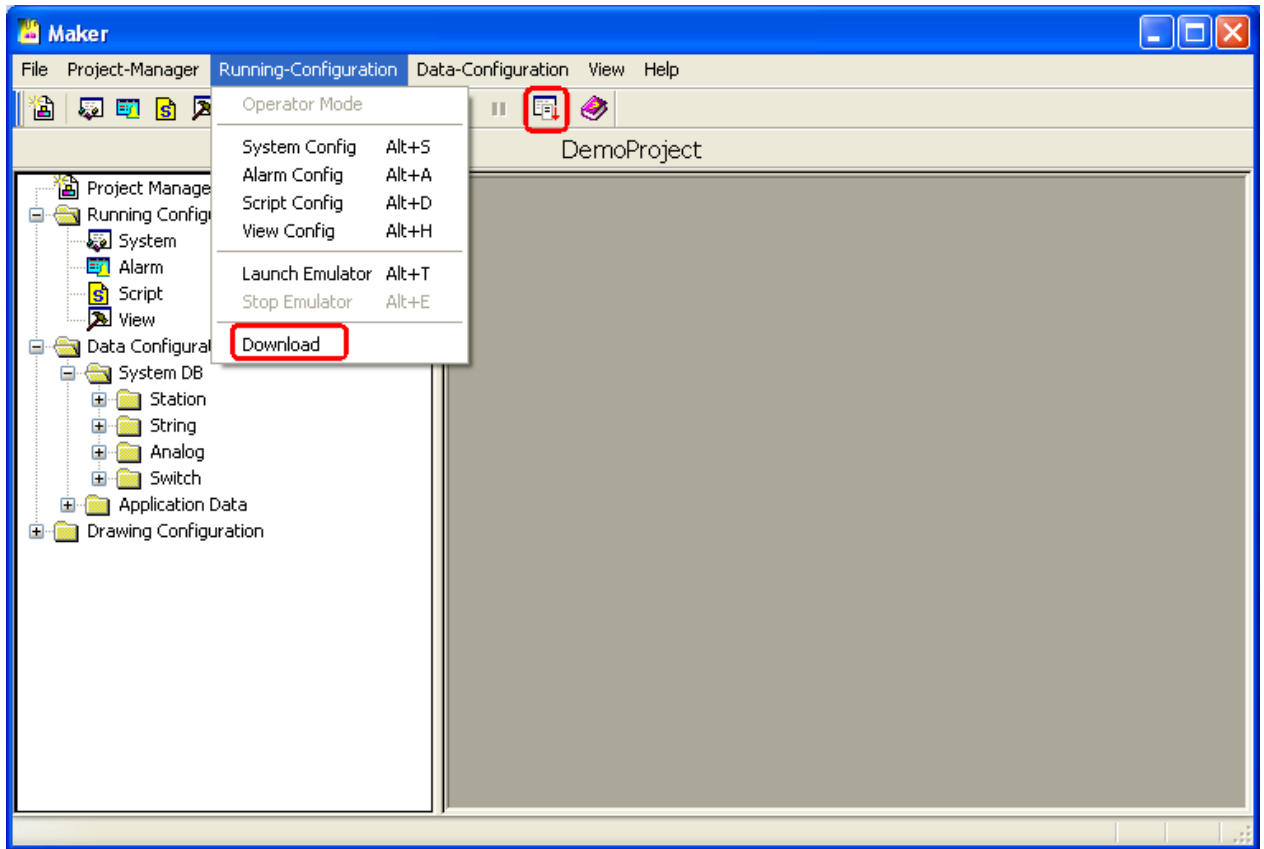
3.1 Make Project

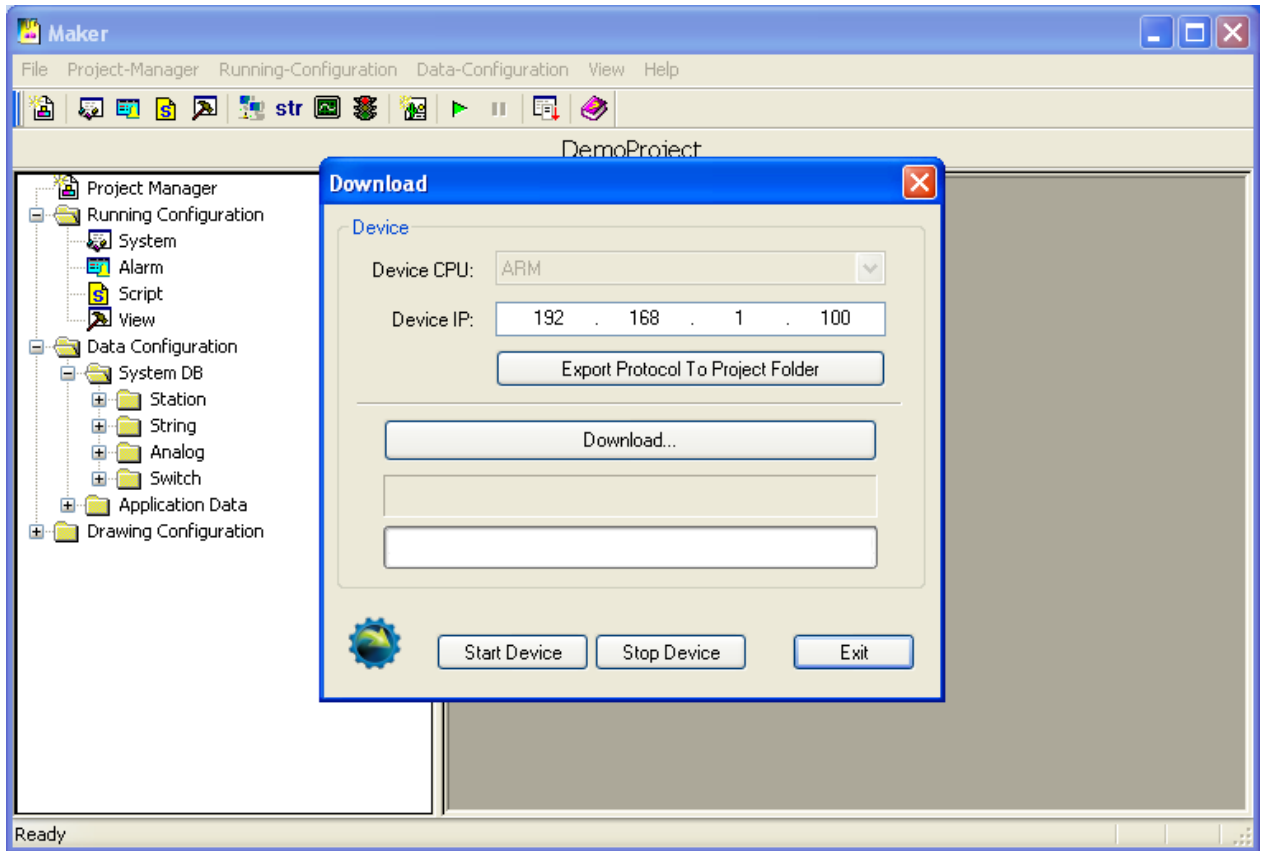
User use xArrowMaker to make the project, for more information about how to use xArrowMaker, user can reference the xArrow help document and the tutorial video:

<http://www.xarrow.com/download.php?file=GetStart.avi>.

3.2 Download Project

When the project is complete, first of all to ensure the xArrow SCADA APP is started. Then in xArrowMaker, click the menu item [Running Configuration\Download] or click the corresponding toolbar button, it will show the download dialog, as follows:

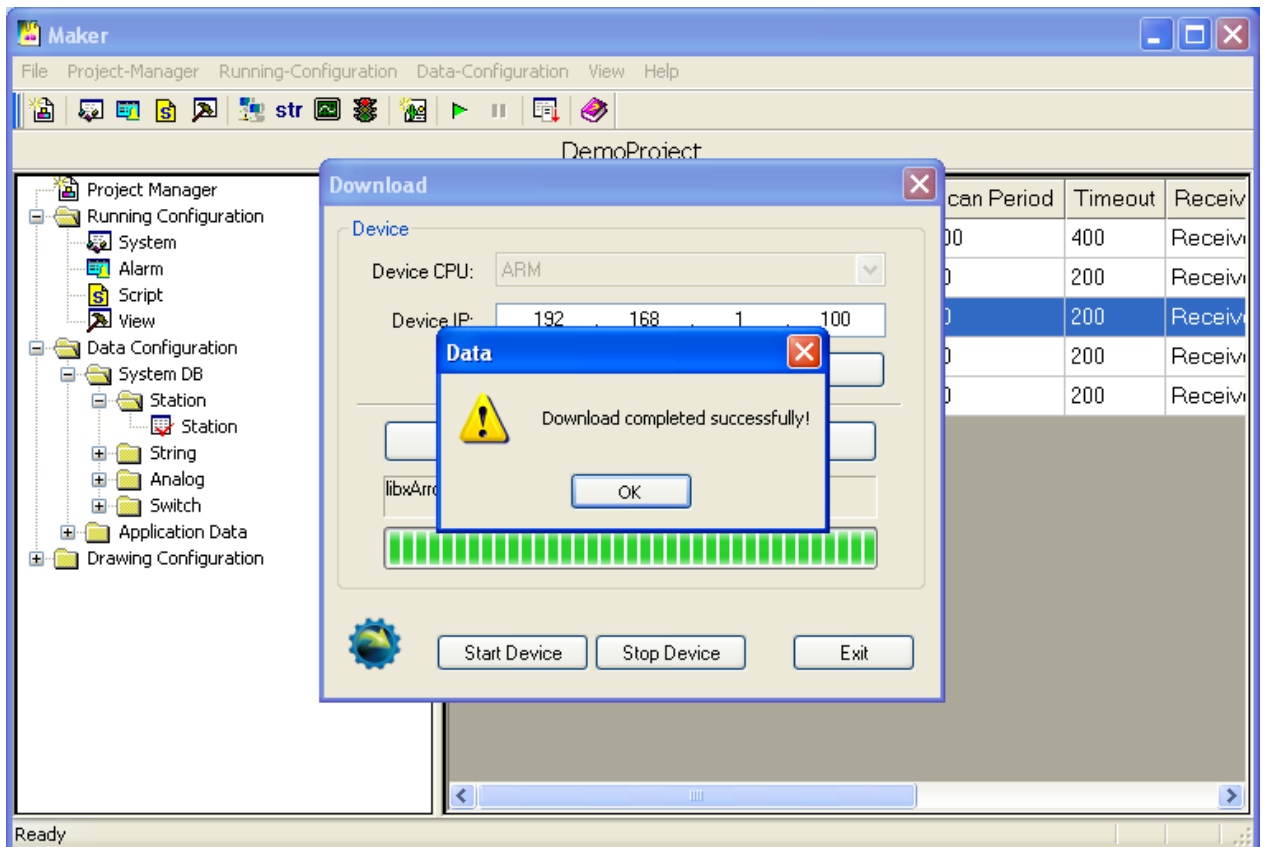
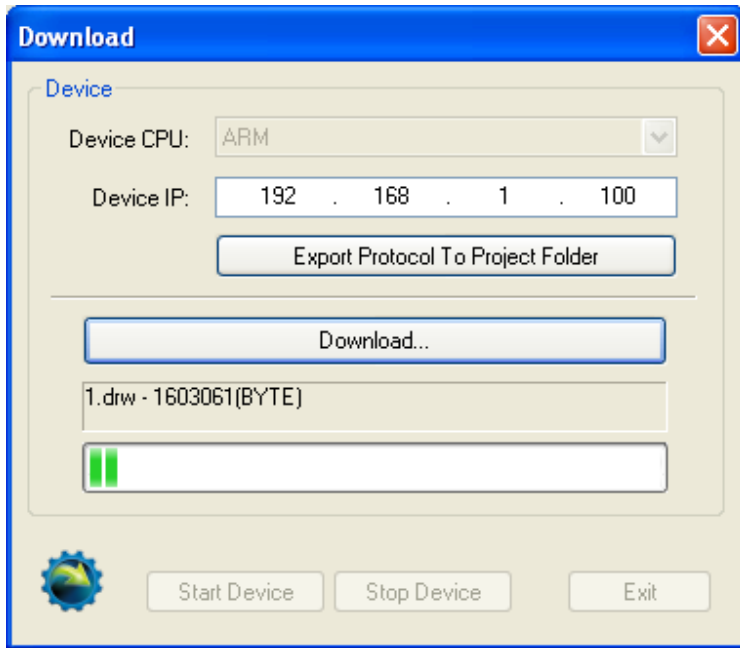


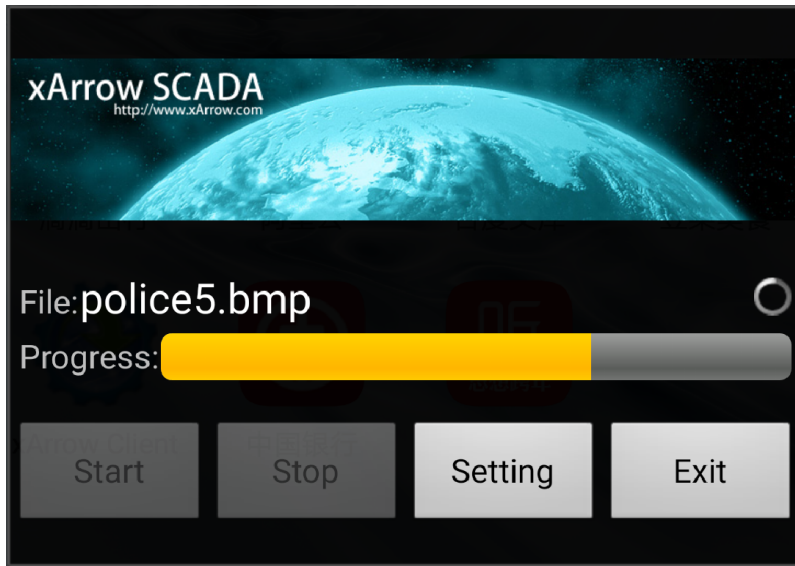


[Device IP]: This is the IP address of the Android device which run the xArrow SCADA.

Note: The TCP/IP network between the computer and the Android device must be stable and unobstructed.

[Download...]: Click this button to download the project from the computer to the Android device, as follows:





When download over, user can click the “Start” button to start the project.



PLC Connection Samples

1 ModbusTCP

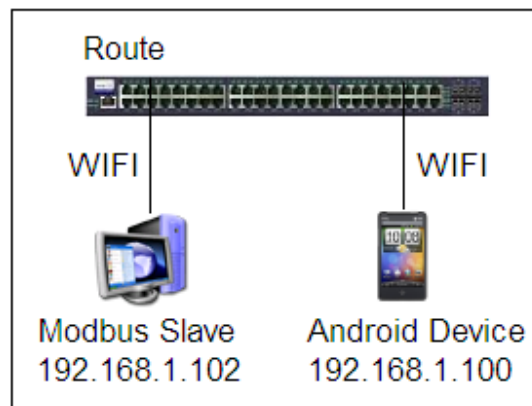
1.1 Test Environment

1.1.1 xArrow SCADA 1.2.5

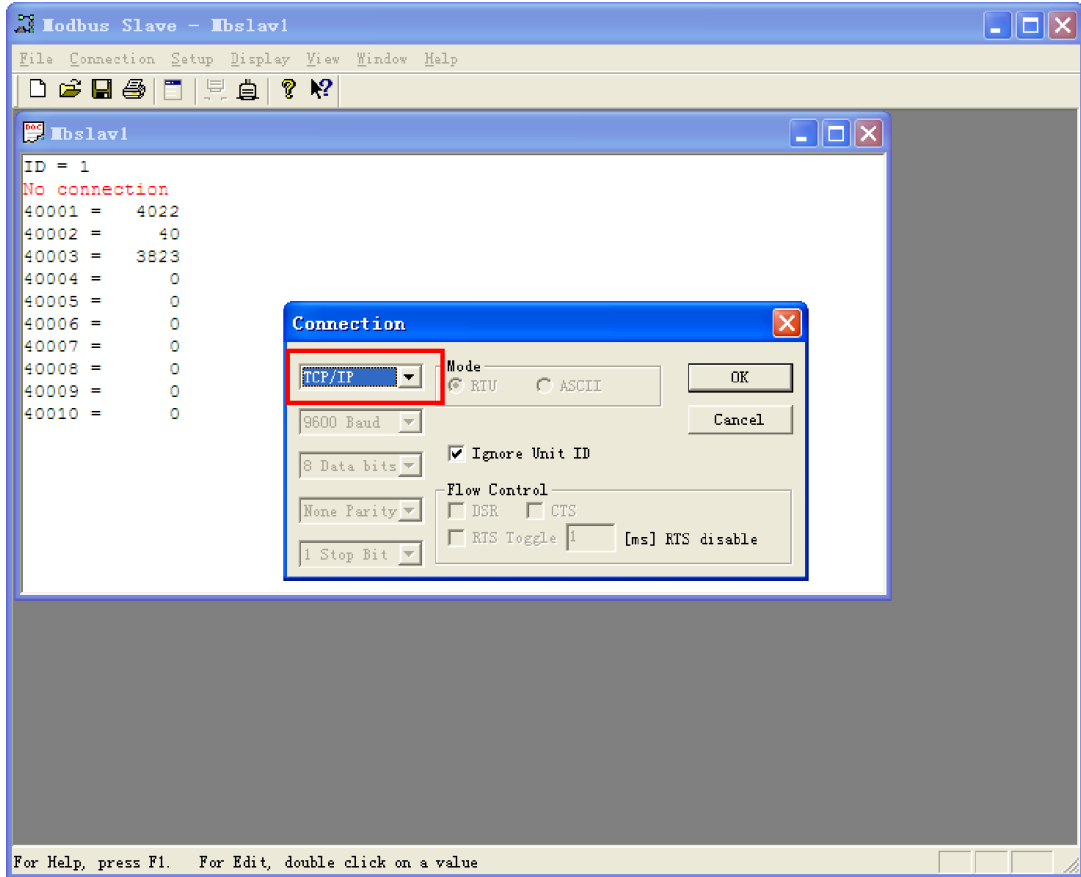
The Android device used to test is Huawei Honor 6+ (Android 4.4.2), it connected to the router via WIFI, and its IP assigned by the router is 192.168.1.100. The phone have already installed the xArrow SCADA APP (the apk file can be found at [xArrowAndroid Install Folder\Out\ANDROID_BIN\xArrowAndroid.apk]).

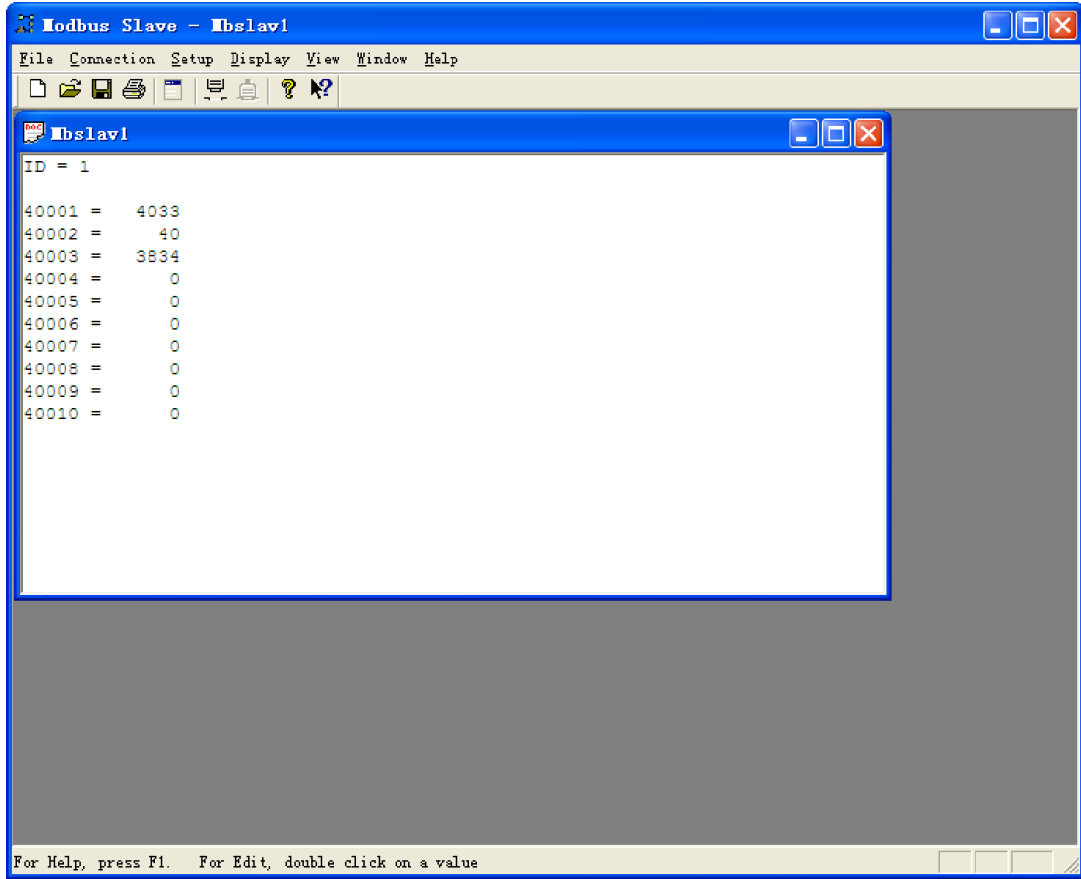
1.1.2 Modbus Slave 3.0

Modbus Slave is a modbus simulation program, it install on the computer, worked as a modbus device. The computer connect to the router, and the IP address is 192.168.1.102.



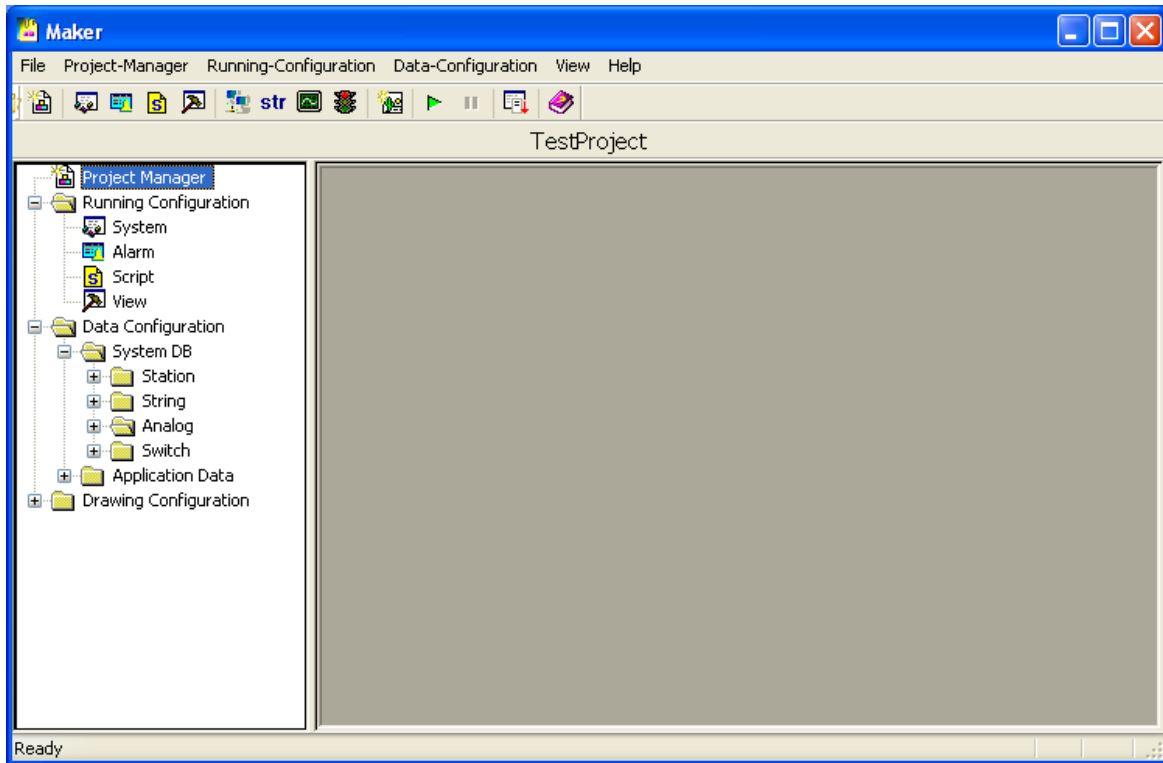
Launch Modbus Slave, configure its connection as TCP/IP, and configure 10 tags, as follows:



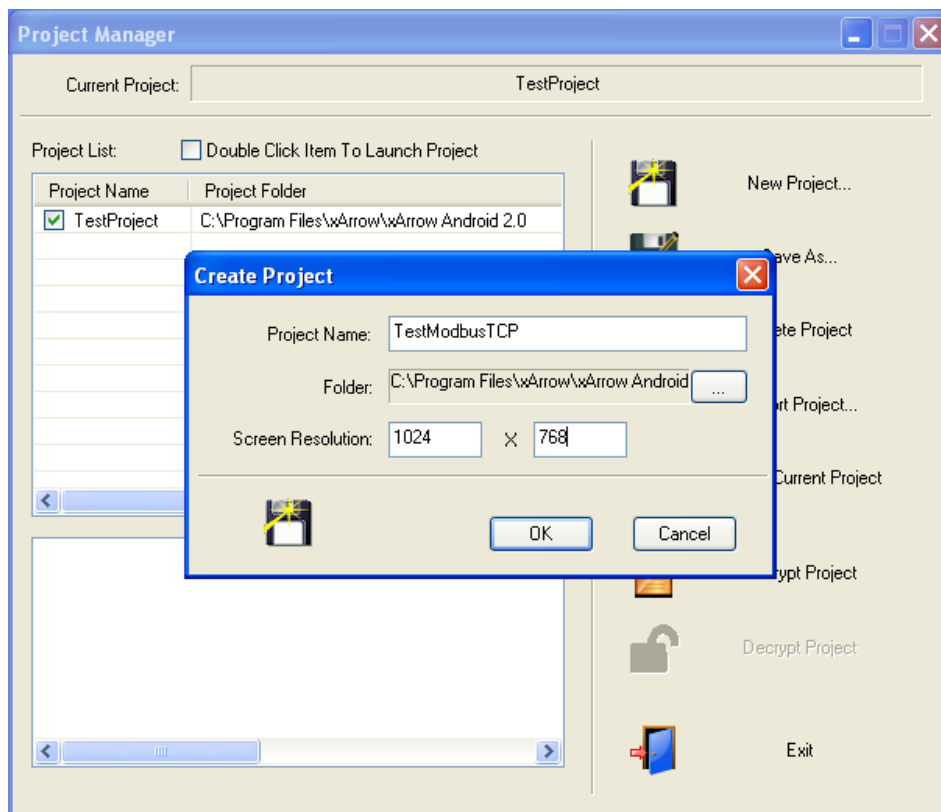


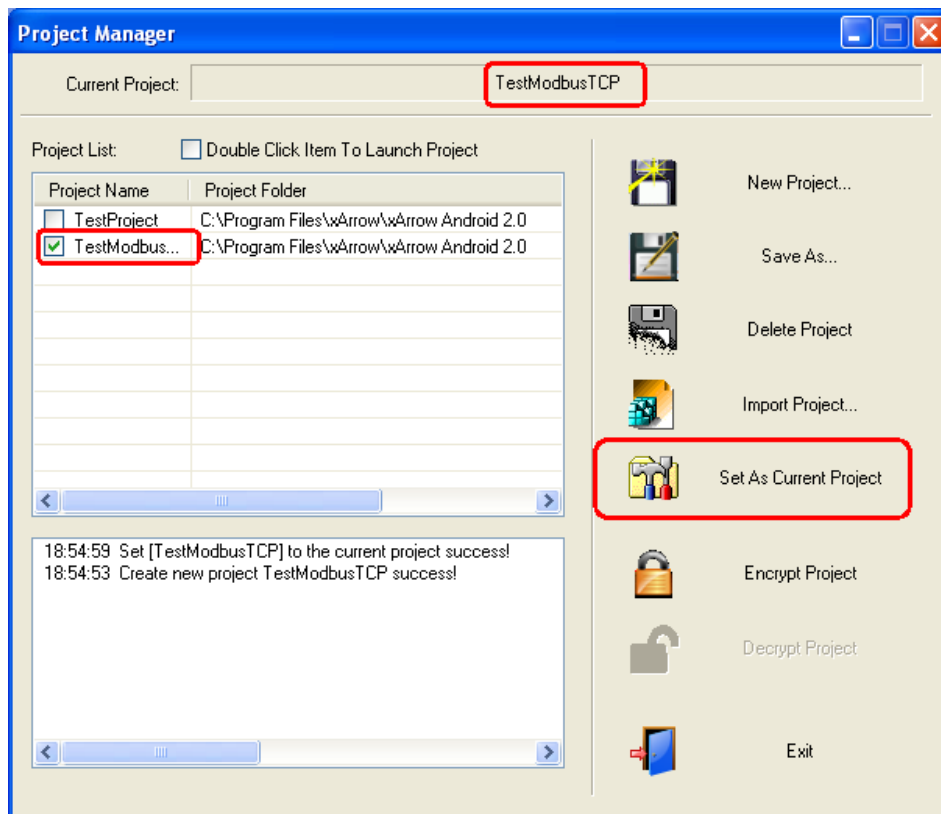
1.2 Configuration

1.2.1 Create New Project



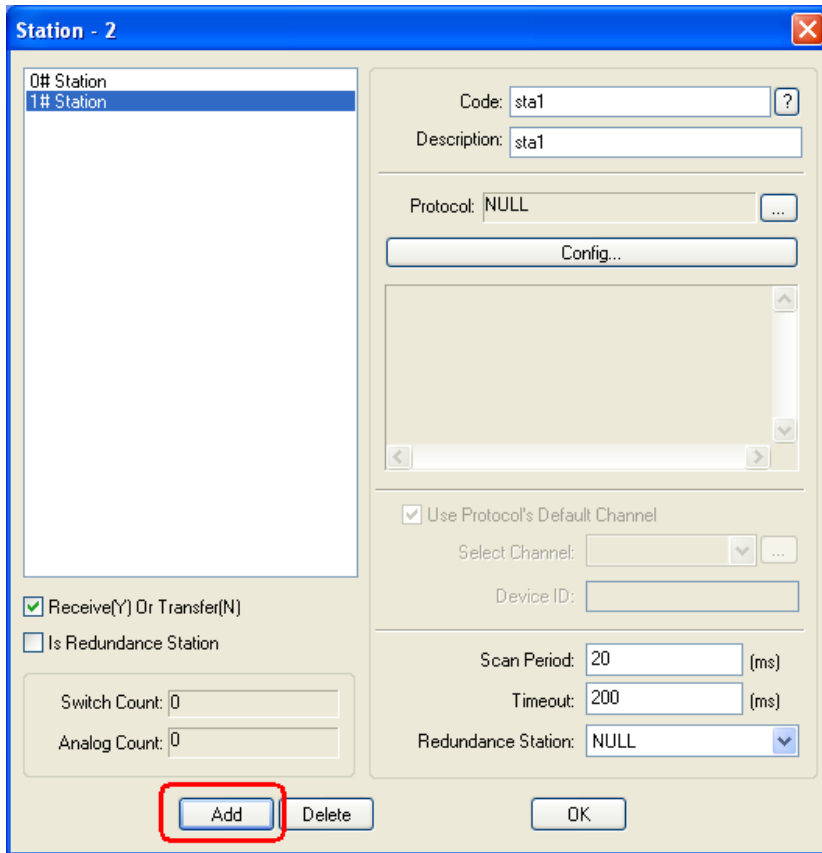
Click **[Project Manager]** to create new project, as follows:



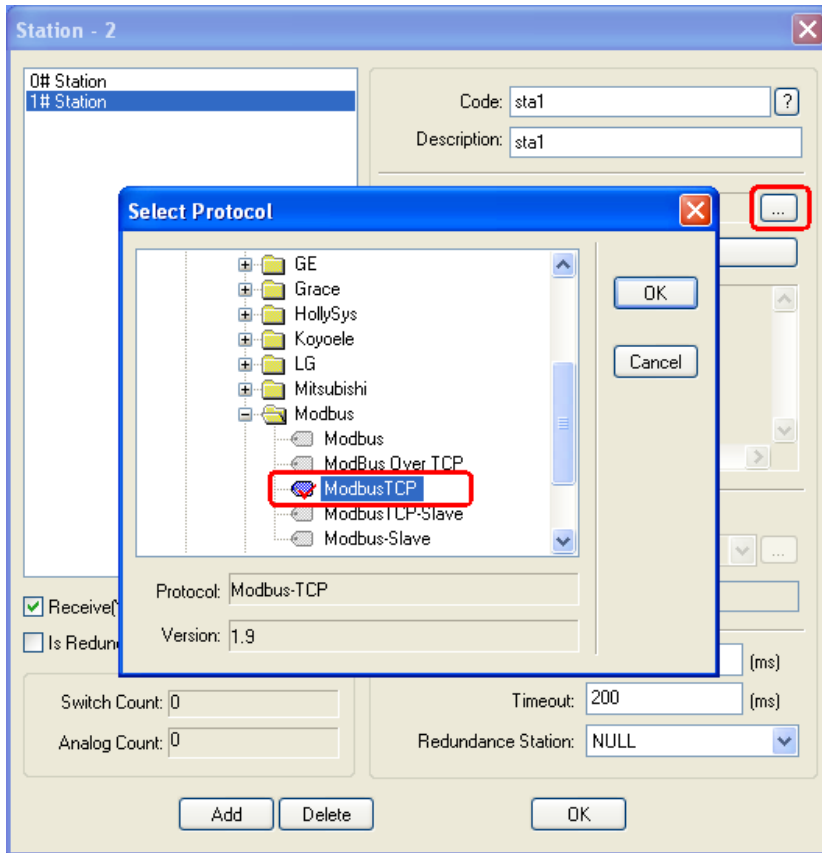


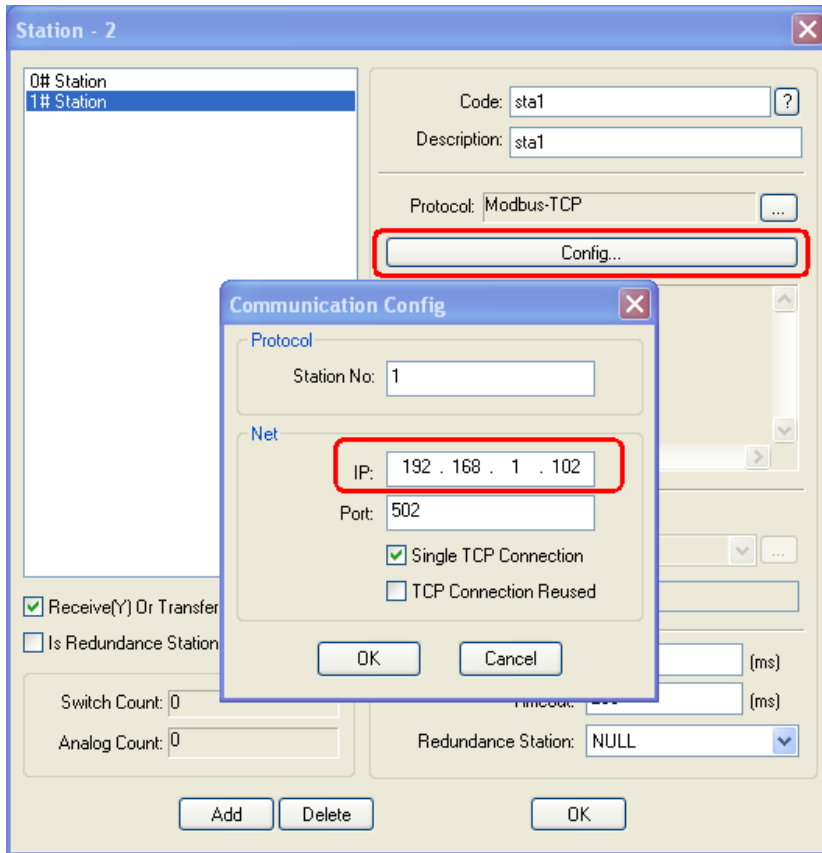
1.2.2 Create Station

Click menu **[Data Configuration\Station...]** to create station, as follows:

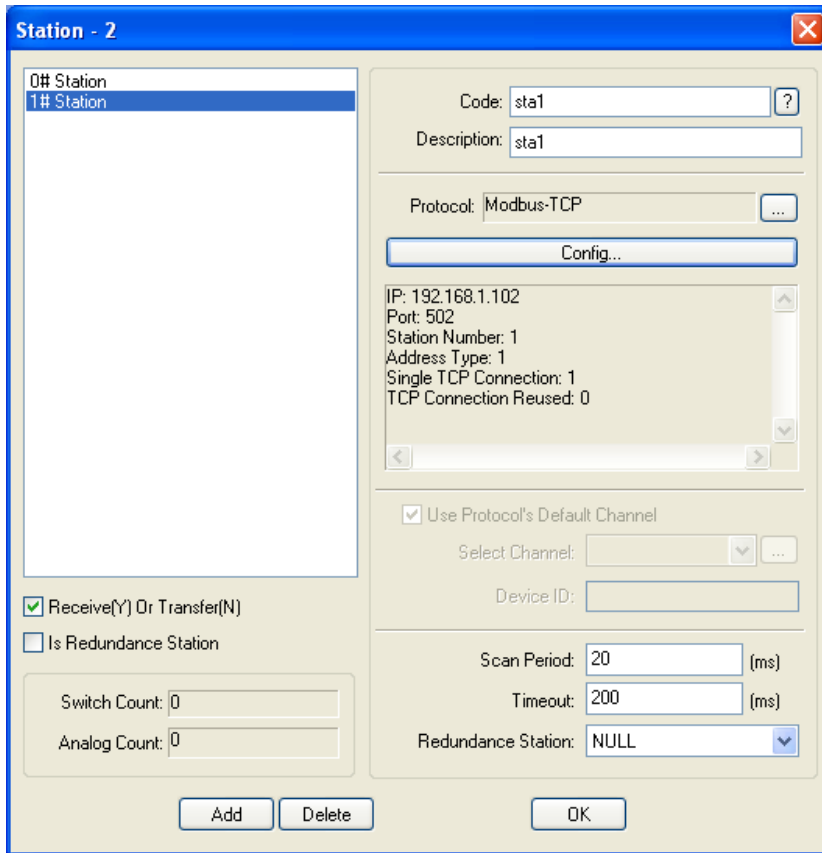


Configure the protocols, as follows:



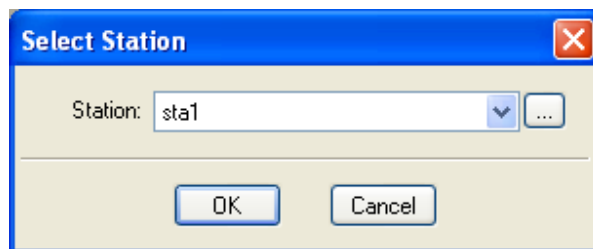


Note: This IP address is the IP of the Modbus Slave.



1.2.3 Configure Analog

Configure [\[Data Configuration\Analog...\]](#) to set analog tags, as follows:



Analog ✖

Code: ? Description:

I/O Address: <input type="text"/> ...	High Limit: <input type="text"/> 0
Coefficient: <input type="text"/> 1	Low Limit: <input type="text"/> 0
Original Value: <input type="text"/> 0	High High Limit: <input type="text"/> 0
Base: <input type="text"/> 0	Low Low Limit: <input type="text"/> 0
Dead Zone: <input type="text"/> 0	Variation Range: <input type="text"/> 0 (%)
Decimal Place: <input type="text"/> 1	Alarm Delay: <input type="text"/> 0 (s)
Unit: <input type="text"/>	Alarm Process: <input type="text"/> ...

Alarm Triggered: Display no drawing ▾ Drawing Name: ...

<input type="checkbox"/> Writeable	<input type="checkbox"/> Invert	<input type="checkbox"/> Lock	<input type="checkbox"/> Read Always
<input type="checkbox"/> Accumulate	<input type="checkbox"/> Voice Alarm	<input type="checkbox"/> Print Alarm	

<< < > >>

Click **Add** button to add 4 analog, and navigate to the first one, as follows:

Analog - sta1 | 1

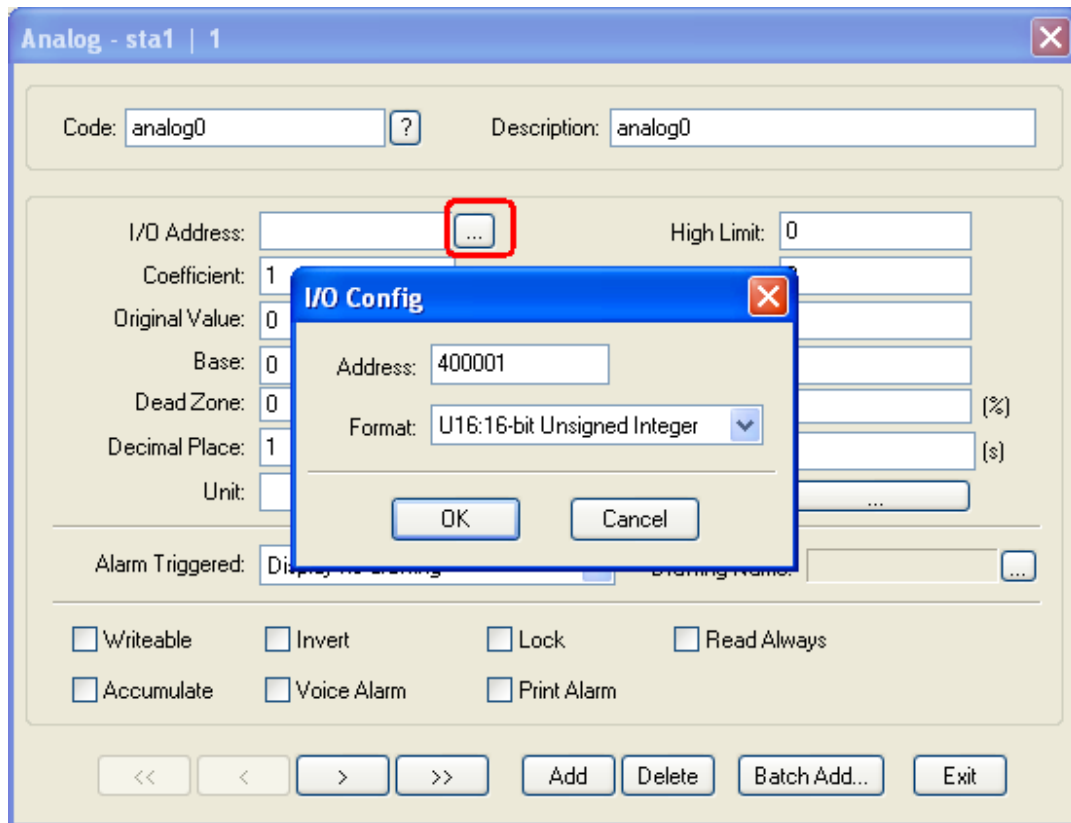
Code: ? Description:

I/O Address: <input type="text"/>	High Limit: <input type="text" value="0"/>
Coefficient: <input type="text" value="1"/>	Low Limit: <input type="text" value="0"/>
Original Value: <input type="text" value="0"/>	High High Limit: <input type="text" value="0"/>
Base: <input type="text" value="0"/>	Low Low Limit: <input type="text" value="0"/>
Dead Zone: <input type="text" value="0"/>	Variation Range: <input type="text" value="0"/> (%)
Decimal Place: <input type="text" value="1"/>	Alarm Delay: <input type="text" value="0"/> (s)
Unit: <input type="text"/>	Alarm Process: <input type="text" value="..."/>

Alarm Triggered: Drawing Name:

Writeable Invert Lock Read Always
 Accumulate Voice Alarm Print Alarm

Configure the I/O address, as follows:



Set writeable property if needed, as follows:

Analog - sta1 | 1

Code: analog0 ? Description: analog0

I/O Address: 400001:U16 ... High Limit: 0

Coefficient: 1 Low Limit: 0

Original Value: 0 High High Limit: 0

Base: 0 Low Low Limit: 0

Dead Zone: 0 Variation Range: 0 (%)

Decimal Place: 1 Alarm Delay: 0 (s)

Unit: Alarm Process: ...

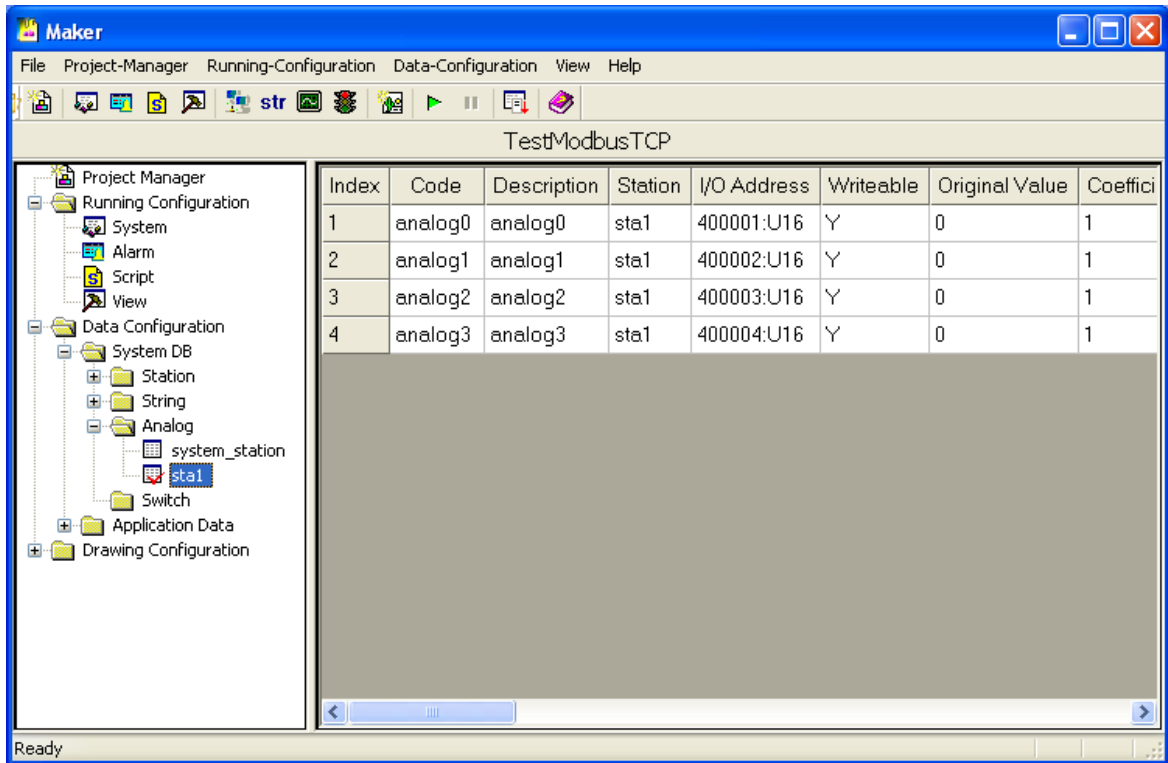
Alarm Triggered: Display no drawing v Drawing Name: ...

Writeable Invert Lock Read Always

Accumulate Voice Alarm Print Alarm

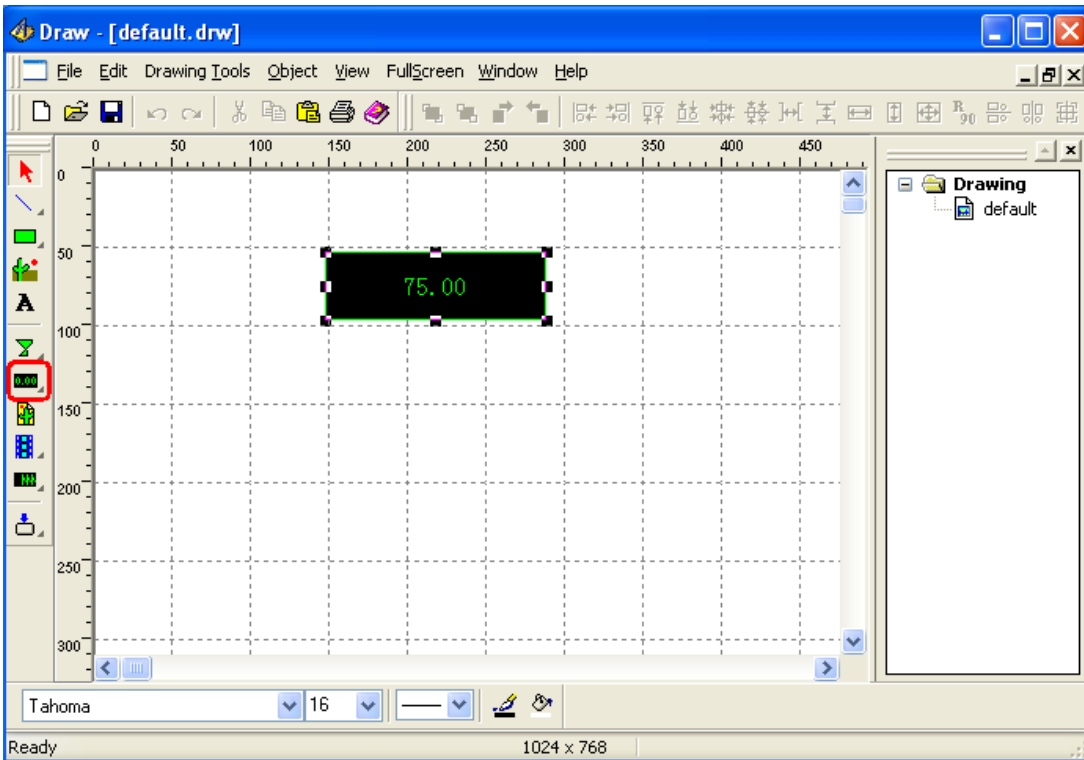
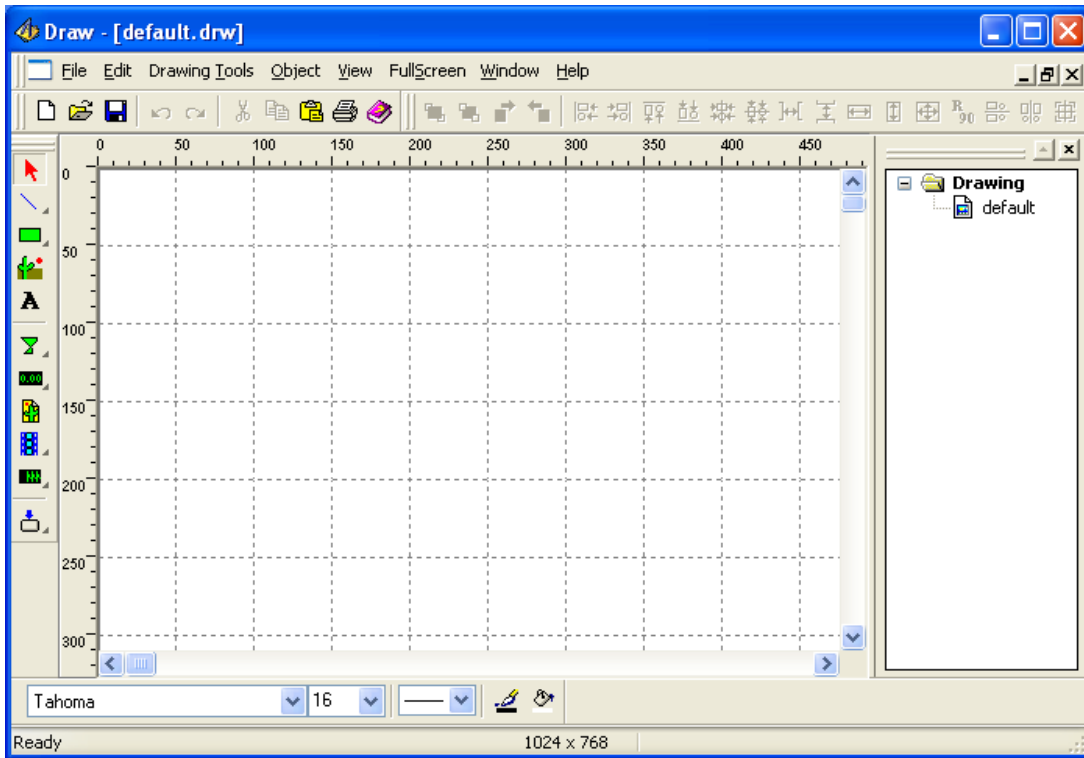
<< < > >> Add Delete Batch Add... Exit

When all the tag set OK, as follows:

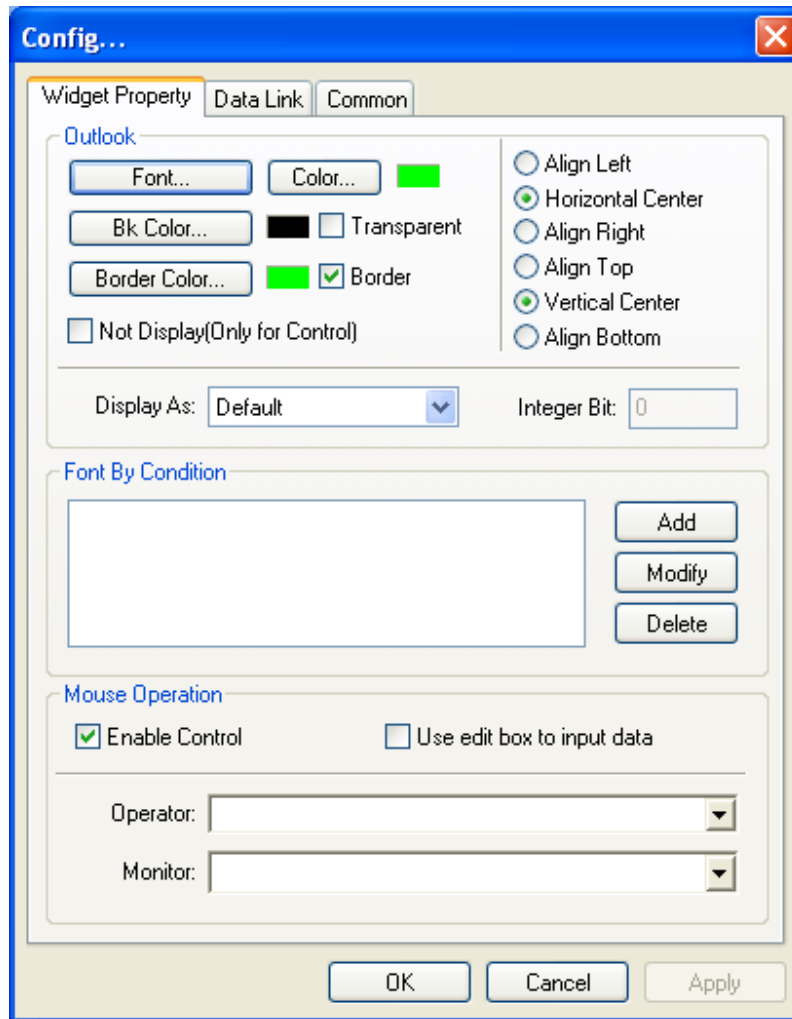


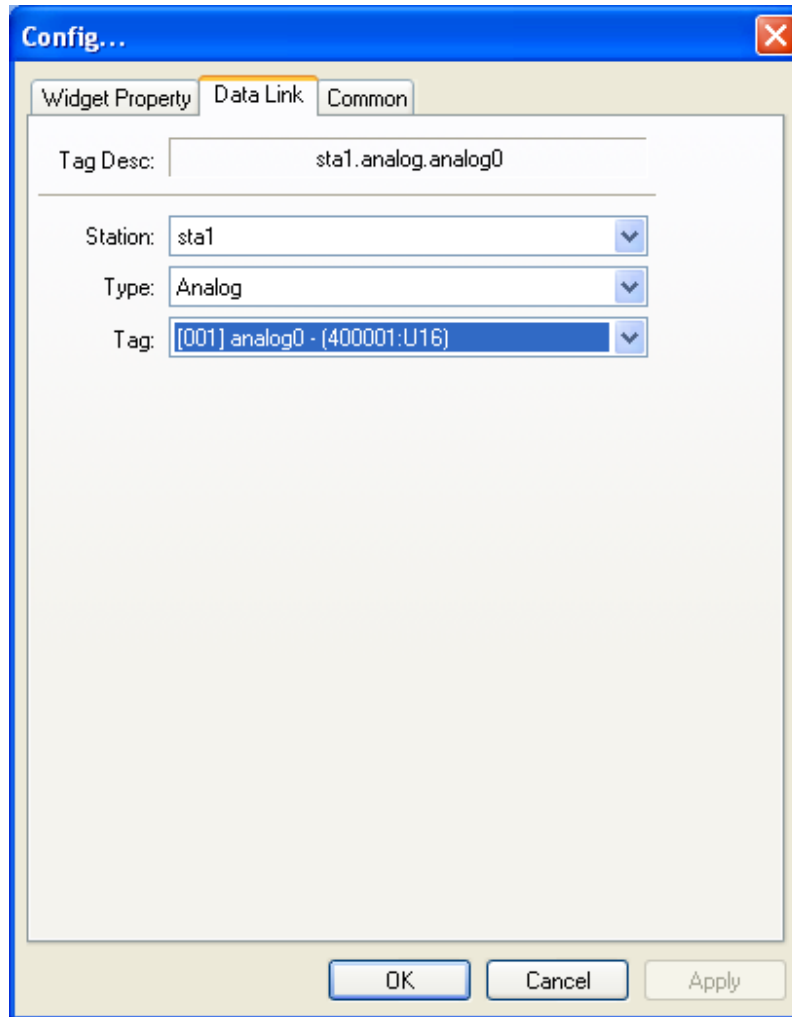
1.2.4 Make Drawings

Launch Draw, as follows:

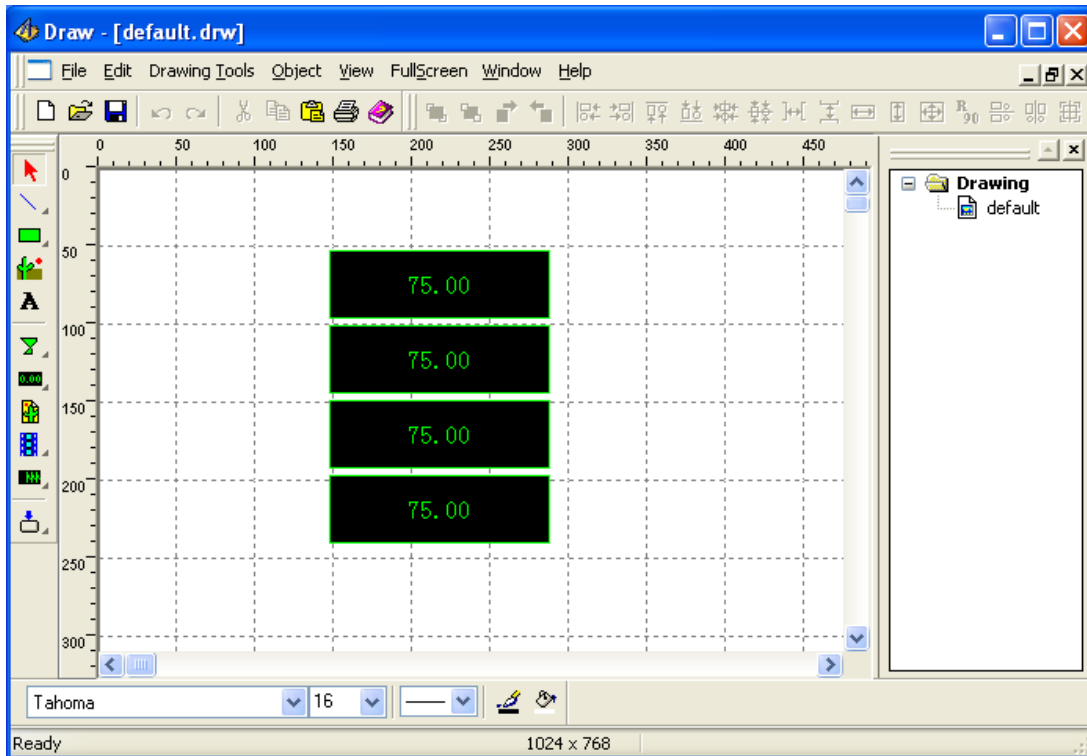


Double click the widget to set its properties:



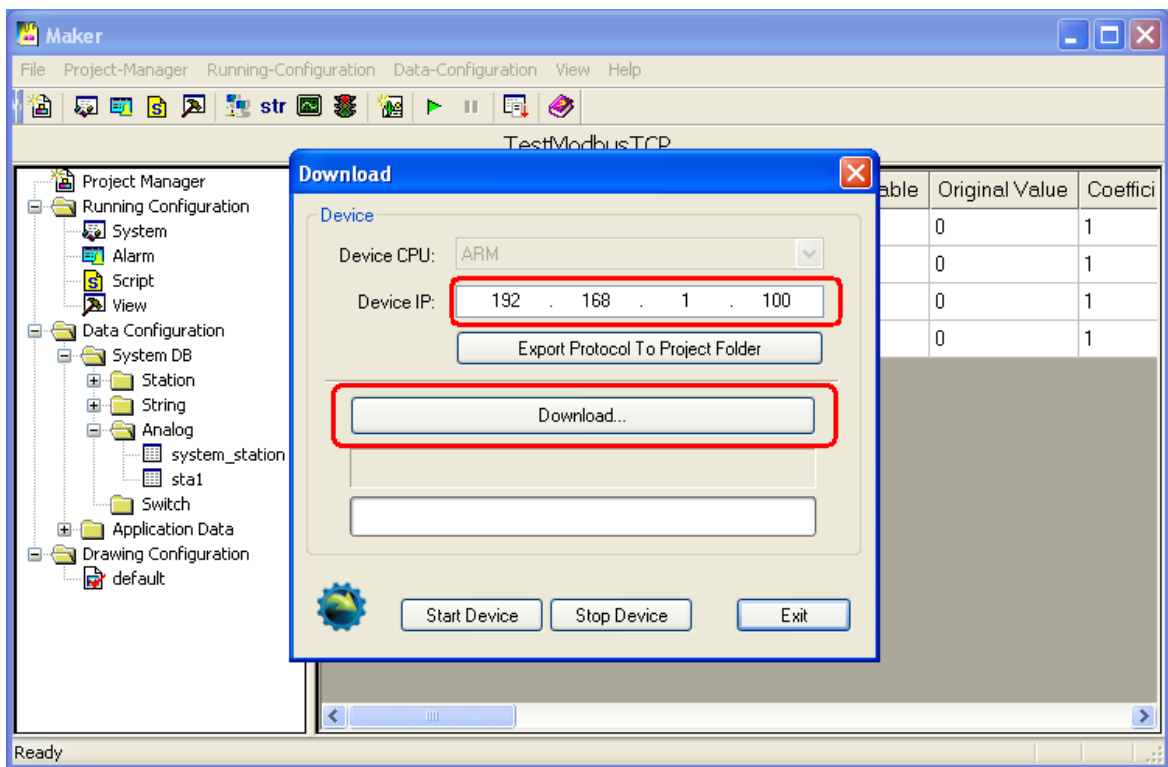


Draw and configure the other 3 widgets, as follows:

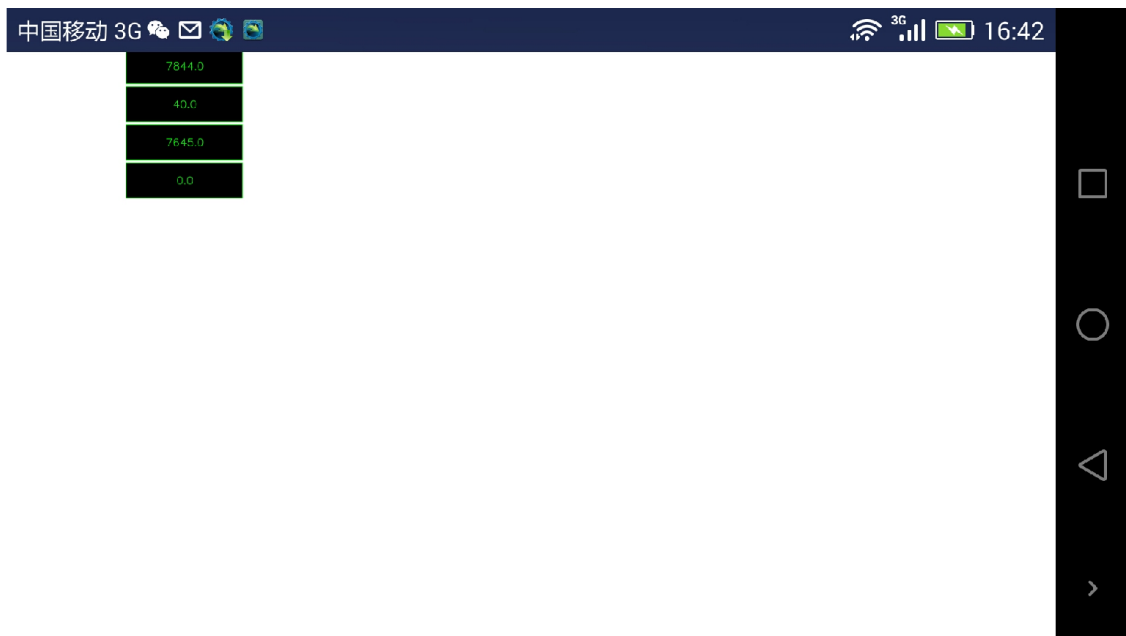


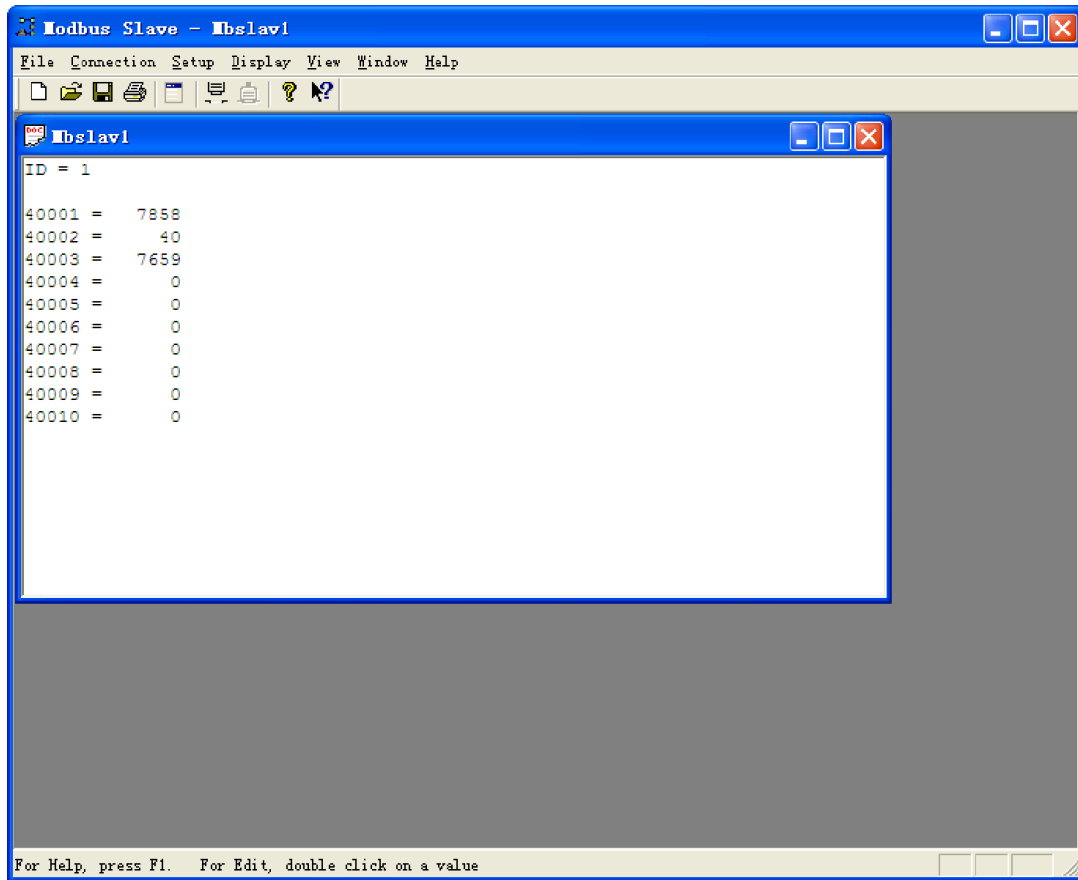
1.2.5 Download Project

Note: the xArrow SCADA should already started in the android phone.



1.2.6 Run The Project

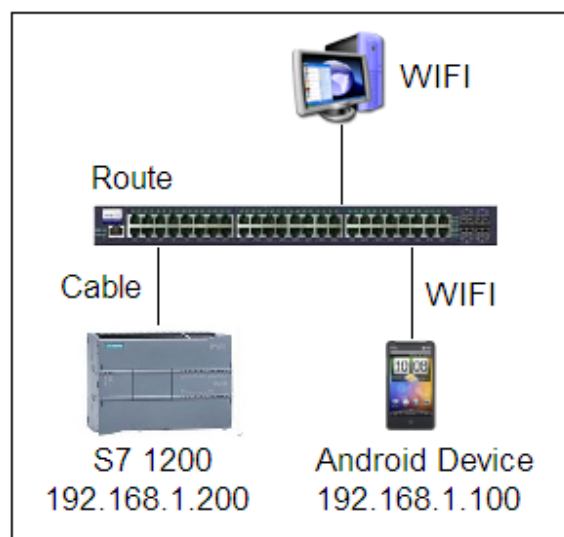




2 S7-1200

2.1 Test Environment

- Router is TP-Link(TL-WR842N), provide WIFI connection, its IP address is 192.168.1.1
- The Android phone used to test is Huawei Honor 6+ (Android 4.4.2), the phone connect to route via WIFI, its IP address is 192.168.1.100 (assigned by the router). The phone have already installed the xArrow SCADA APP (the apk file can be found at [xArrowAndroid Install Folder\Out\ANDROID_BIN\xArrowAndroid.apk]).
- PLC's IP is 192.168.1.200, connect to the LAN port of the router.



2.1.1 Hardware

PLC: S7-1215C (6ES7 215-1AG40-0XB0) , Firmware Version: 4.1.3

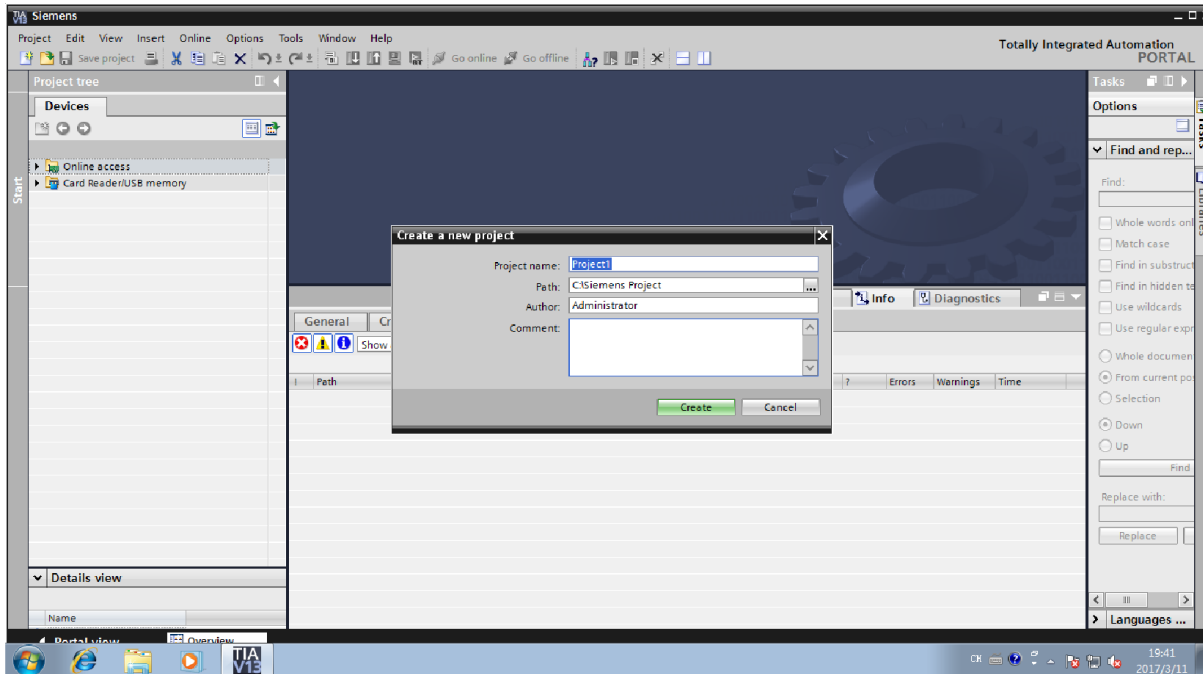
Program Software: TIA Portal V13 SP1 + UPD7

2.1.2 Software

xArrow SCADA 1.3.0

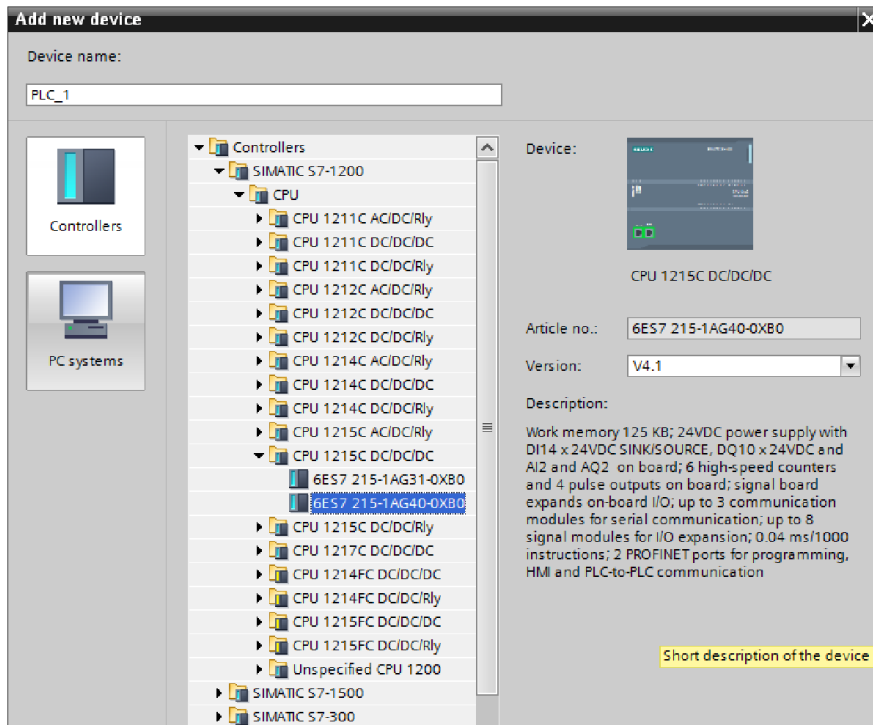
2.2 PLC Settings

2.2.1 New Project



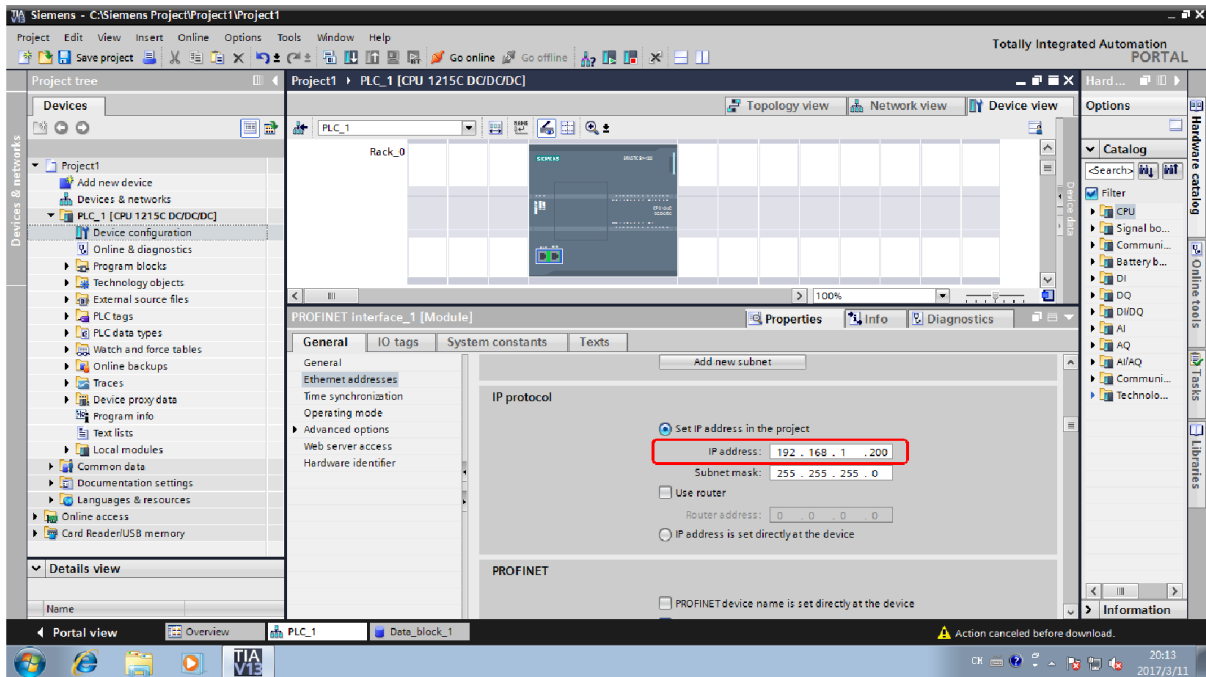
2.2.2 CPU Configuration

2.2.2.1 Add New CPU

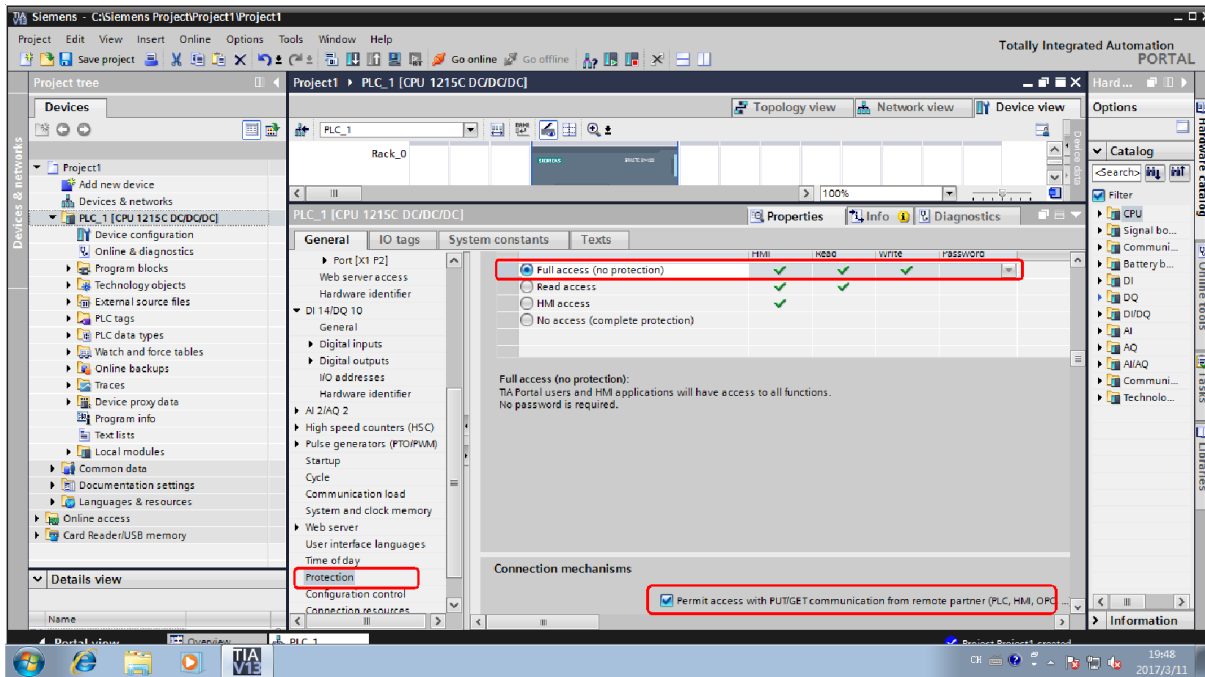


2.2.2.2 Device Configuration

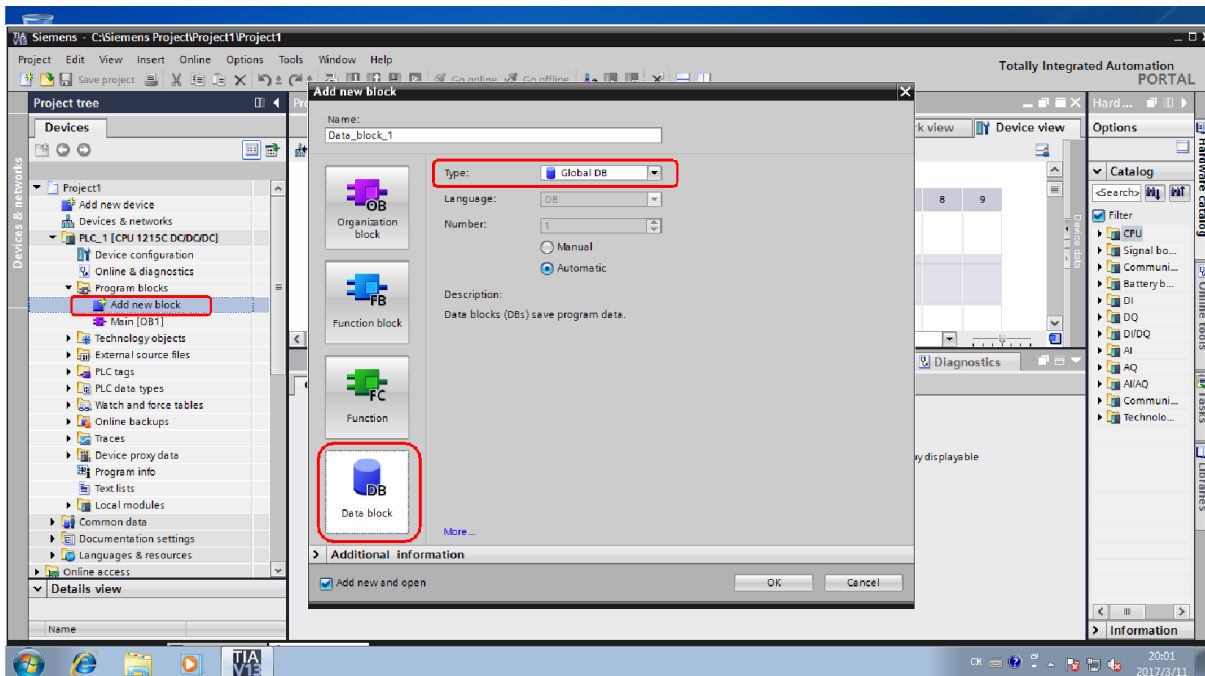
1. Set IP Address

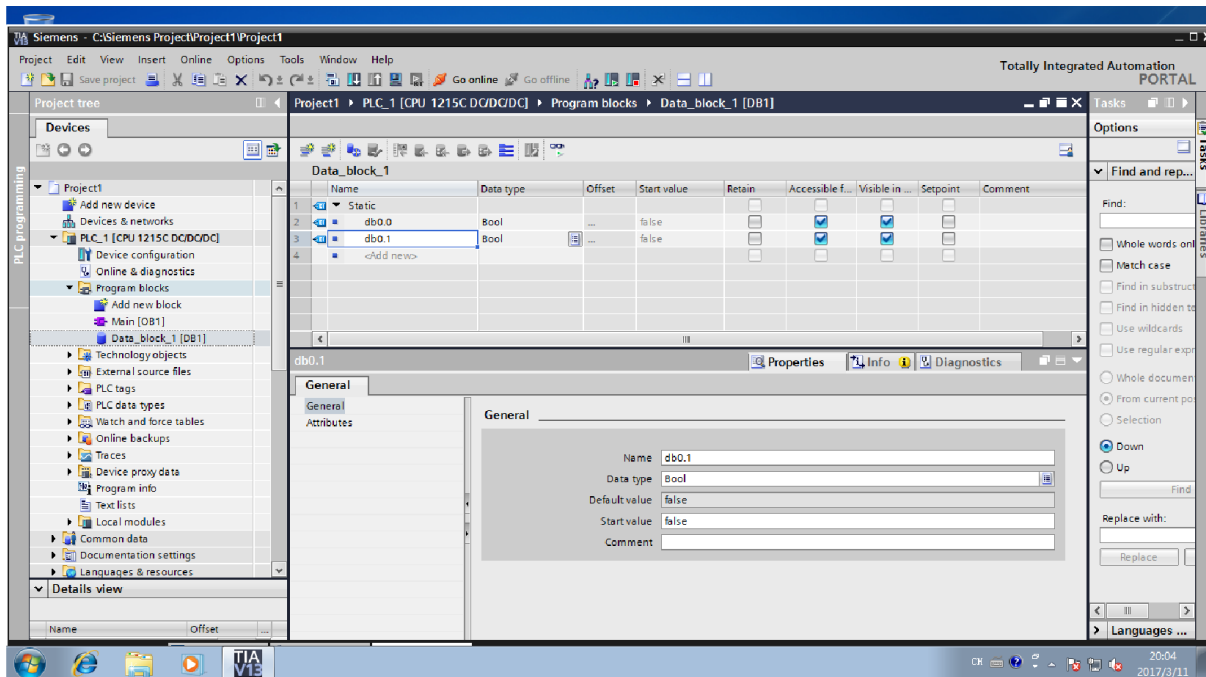
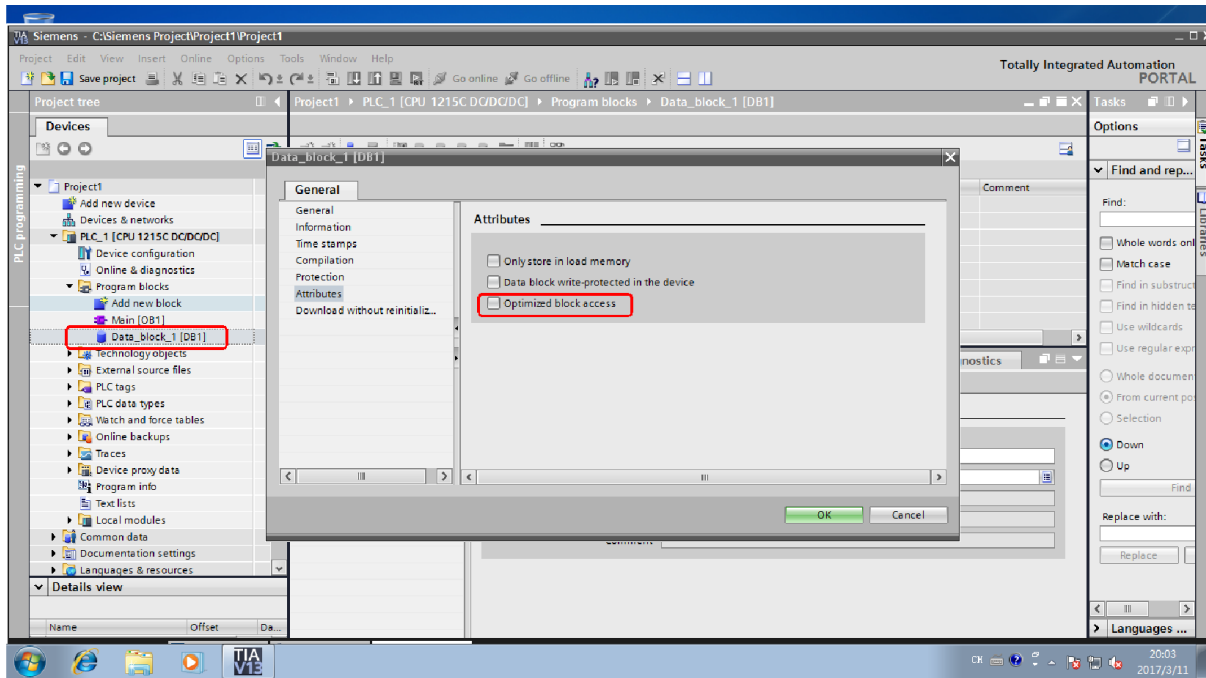


2. Set Protection

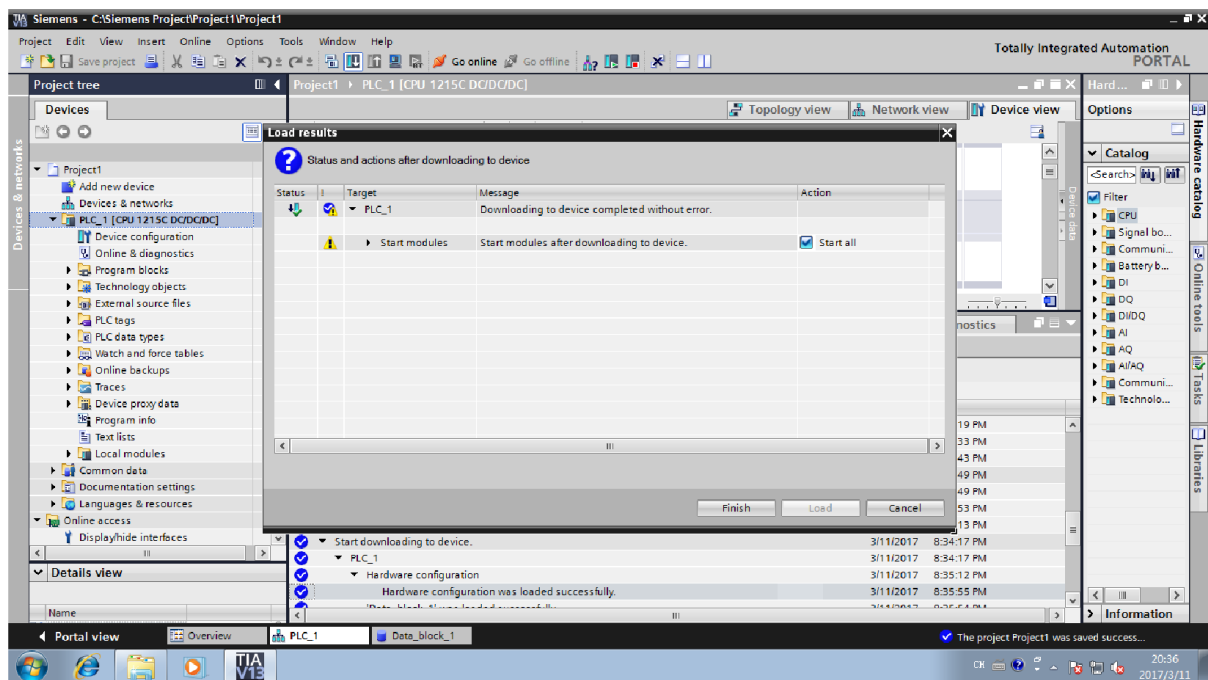
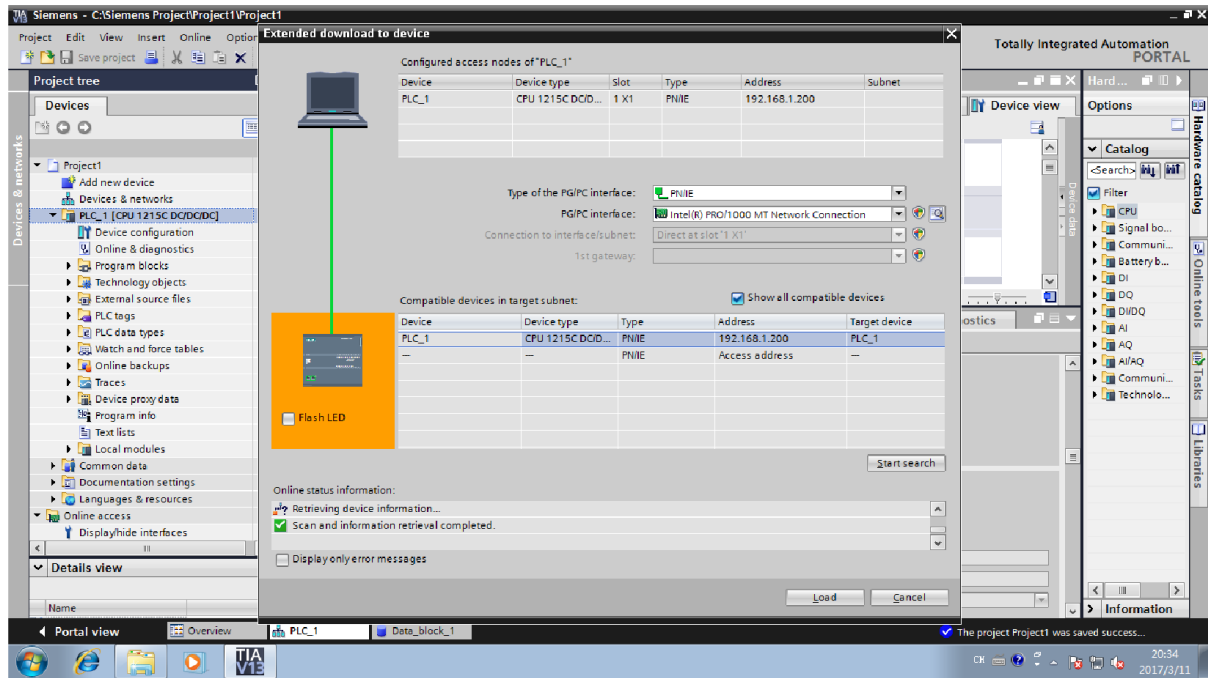


3. Set DB Block (Optional)





4. Download configuration to PLC



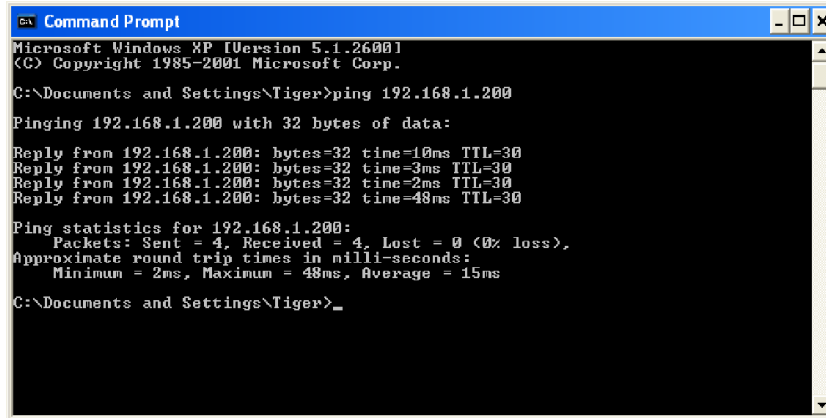
5. Connect PLC to route

6. Restart PLC

Check if the PLC connected OK:

ping 192.168.1.200

If all OK, it will show the following:



```
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\Tiger>ping 192.168.1.200

Pinging 192.168.1.200 with 32 bytes of data:

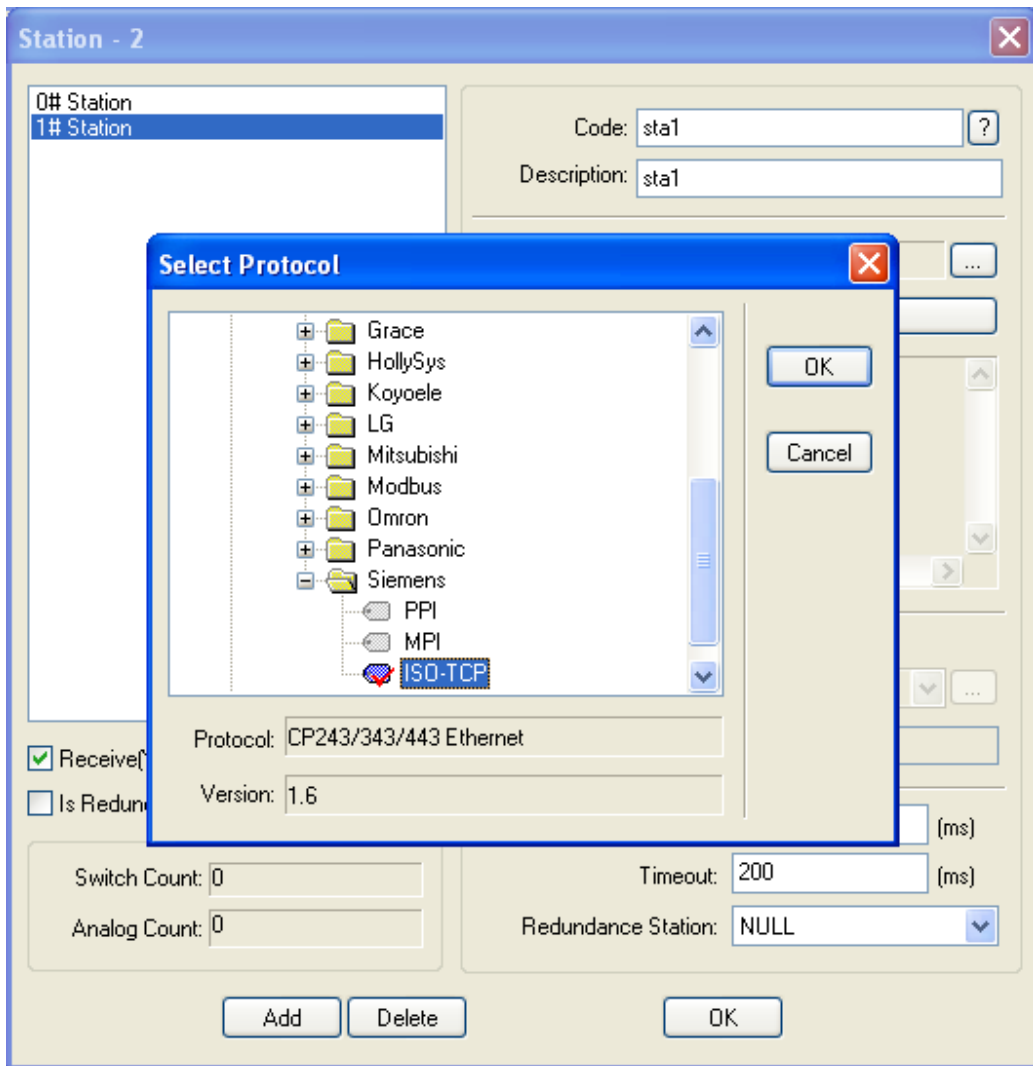
Reply from 192.168.1.200: bytes=32 time=10ms TTL=30
Reply from 192.168.1.200: bytes=32 time=3ms TTL=30
Reply from 192.168.1.200: bytes=32 time=2ms TTL=30
Reply from 192.168.1.200: bytes=32 time=48ms TTL=30

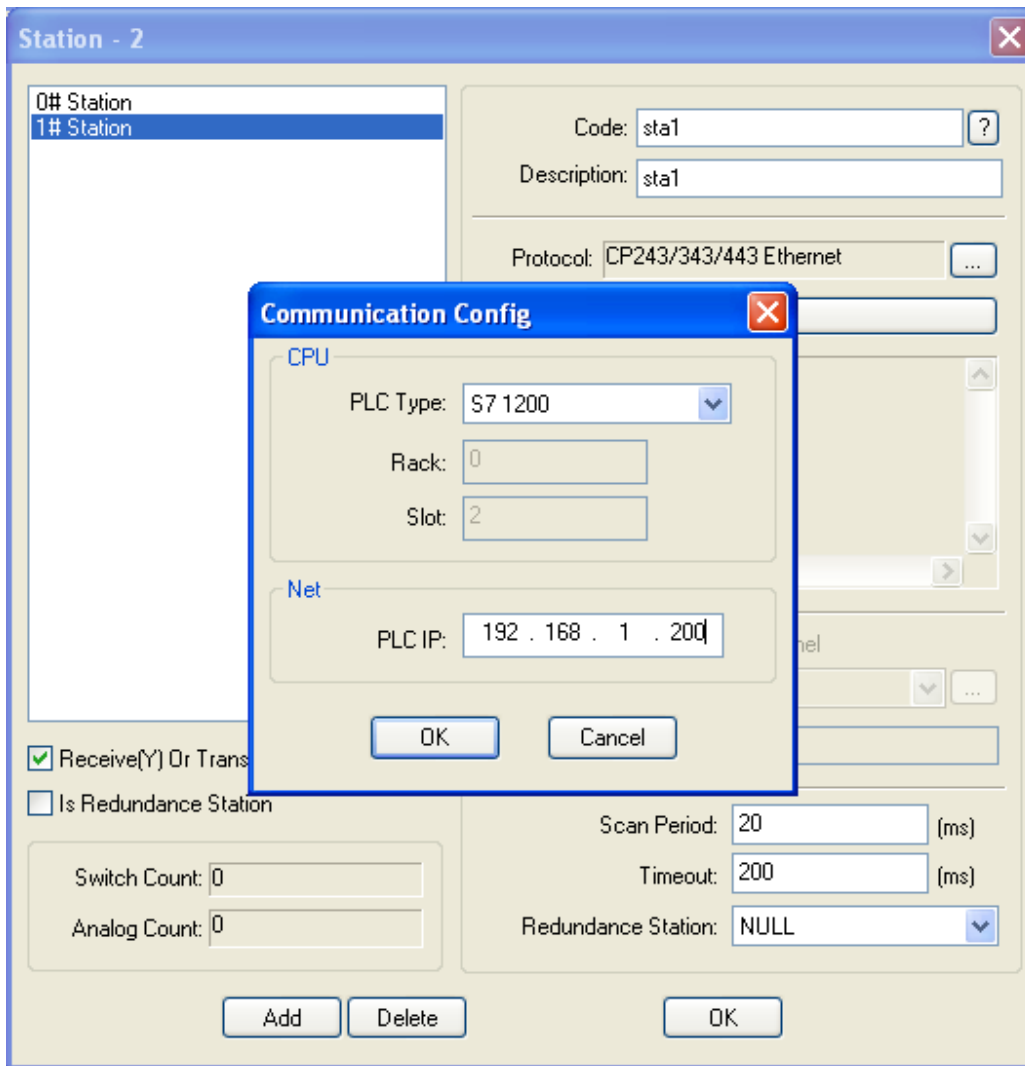
Ping statistics for 192.168.1.200:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 48ms, Average = 15ms

C:\Documents and Settings\Tiger>
```

2.3 Configuration

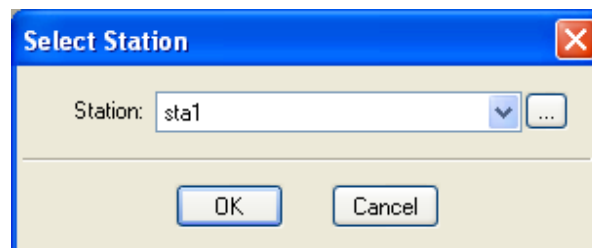
2.3.1 Create Station

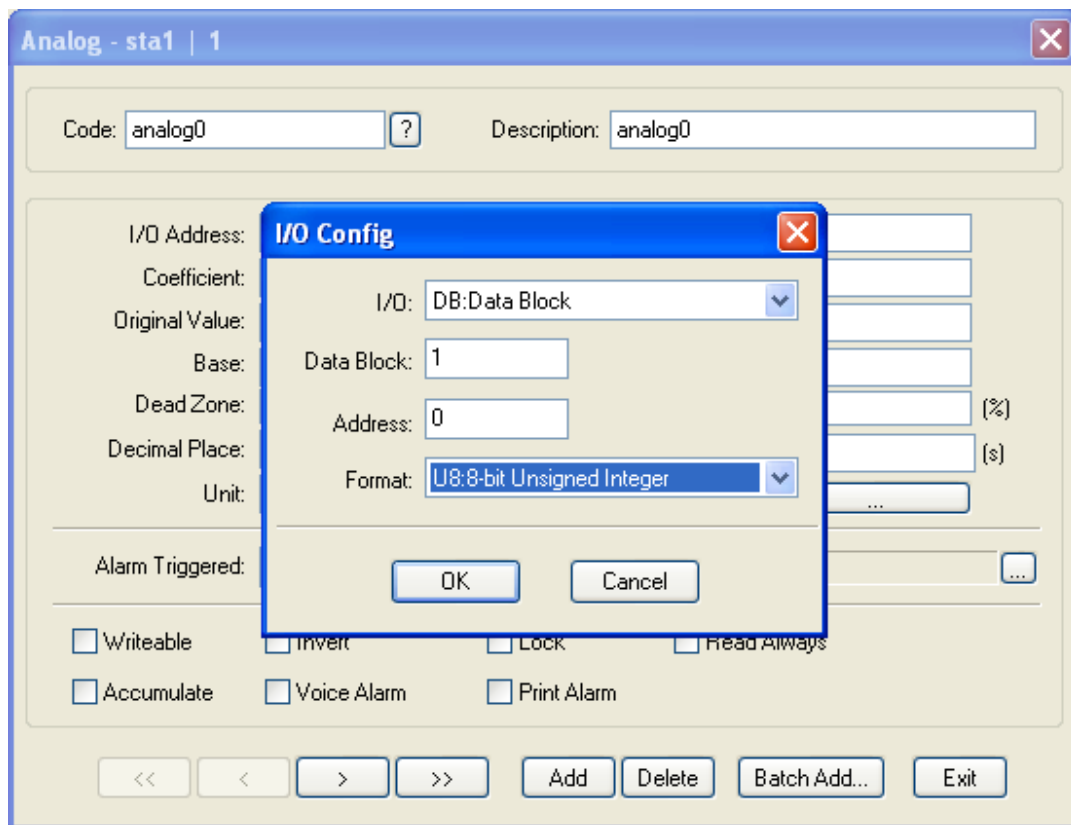




2.3.2 Configure Analog

Configure [\[Data Configuration\Analog...\]](#) to set analog tags, as follows:





Analog - sta1 | 1

Code: ? Description:

I/O Address: ...

High Limit:

Coefficient: Low Limit:

Original Value: High High Limit:

Base: Low Low Limit:

Dead Zone: Variation Range: (%)

Decimal Place: Alarm Delay: (s)

Unit: Alarm Process:

Alarm Triggered: Drawing Name:

Writeable Invert Lock Read Always

Accumulate Voice Alarm Print Alarm

<< < > >> Add Delete Batch Add... Exit

Maker

File Project-Manager Running-Configuration Data-Configuration View Help

Test_S71200

Index	Code	Description	Station	I/O Address	Writeable	Original Value	Coefficient	Bi
1	analog0	analog0	sta1	DB1:0:U8	Y	0	1	0
2	analog1	analog1	sta1		N	0	1	0
3	analog2	analog2	sta1		N	0	1	0
4	analog3	analog3	sta1		N	0	1	0

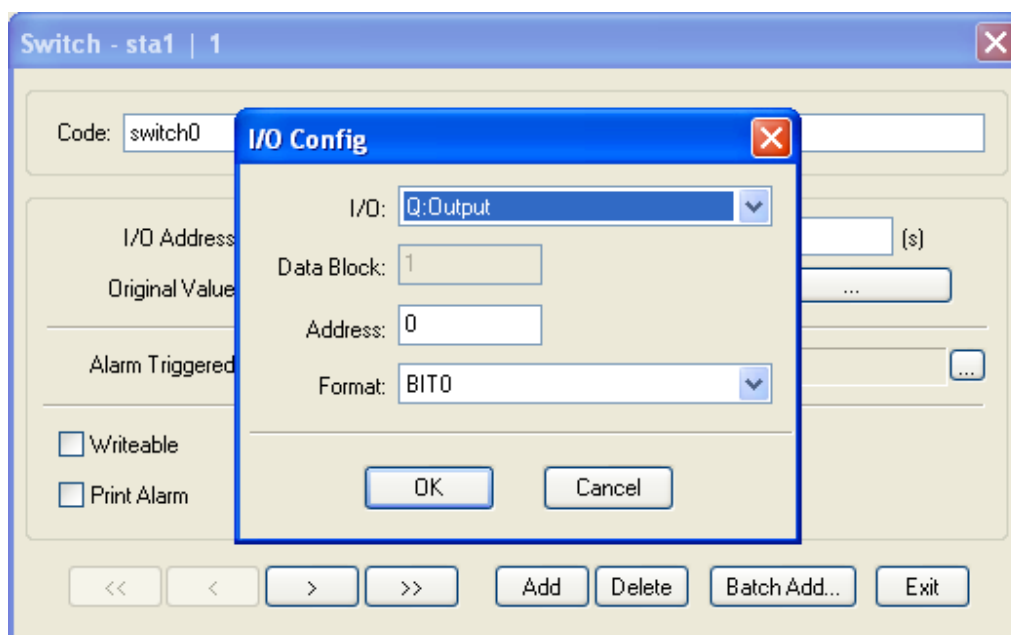
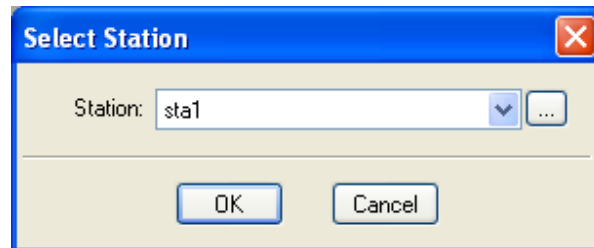
Project Manager

- Running Configuration
 - System
 - Alarm
 - Script
 - View
- Data Configuration
 - System DB
 - Station
 - Station
 - String
 - Analog
 - system_station
 - sta1
 - Switch
 - Application Data
 - Drawing Configuration

Ready

2.3.3 Configure Switch

Configure **[Data Configuration\Switch...]** to set switch tags, as follows:



Switch - sta1 | 1

Code: ? Description:

I/O Address: ... Alarm Delay: (s)

Original Value: Alarm Process:

Alarm Triggered: Drawing Name:

Writeable Invert Lock Read Always

Print Alarm Voice Alarm

<< < > >> Add Delete Batch Add... Exit

Maker

File Project-Manager Running-Configuration Data-Configuration View Help

Test_S71200

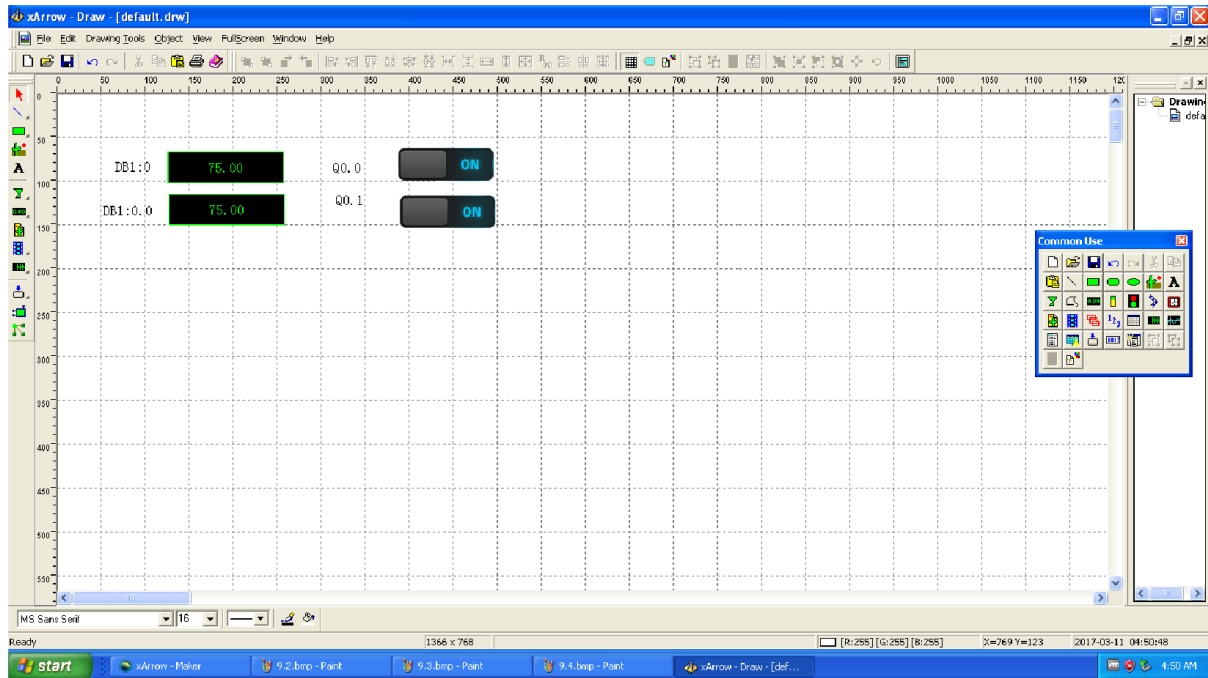
Index	Code	Description	Station	I/O Address	Writeable	Original Value	Lock	Invert	F
1	switch0	switch0	sta1	Q:0:BIT0	Y	0	N	N	N
2	switch1	switch1	sta1	Q:1:BIT0	Y	0	N	N	N
3	switch2	switch2	sta1	DB1:0:BIT0	Y	0	N	N	N
4	switch3	switch3	sta1		N	0	N	N	N
5	switch4	switch4	sta1		N	0	N	N	N

Project Manager

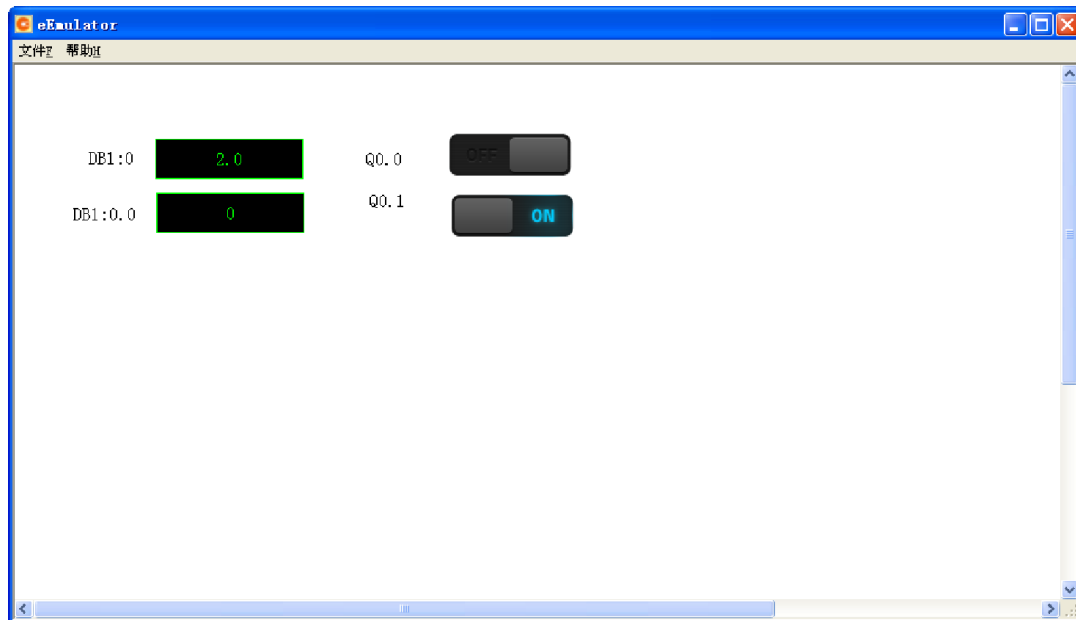
- Running Configuration
 - System
 - Alarm
 - Script
 - View
- Data Configuration
 - System DB
 - Station
 - Station
 - String
 - Analog
 - Switch
 - sta1
 - Application Data
 - Drawing Configuration

Ready

2.3.4 Make Drawings

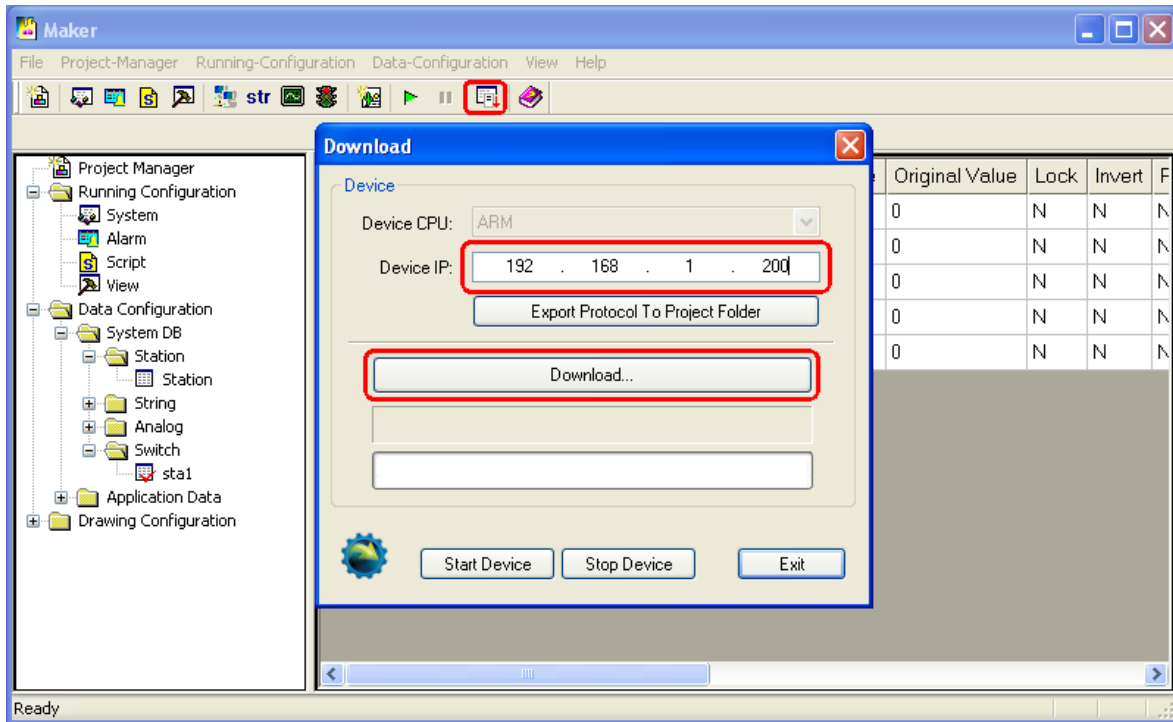


2.3.5 Run Emulator



2.3.6 Download Project

Note: the xArrow SCADA should already started in the android phone.



2.4 Running



3 Fx3U

3.1 Test Environment

3.1.1 xArrow SCADA 1.3.0

The Android device used to test is Huawei Honor 6+ (Android 4.4.2), it connected to the router via WIFI, and its IP assigned by the router is 192.168.1.100. The phone have already installed the xArrow SCADA APP (the apk file can be found at [xArrowAndroid Install Folder\Out\ANDROID_BIN\xArrowAndroid.apk]).

3.1.2 Fx3U + Fx3U-ENET-ADP

Program Software: GX Works2 1.555D

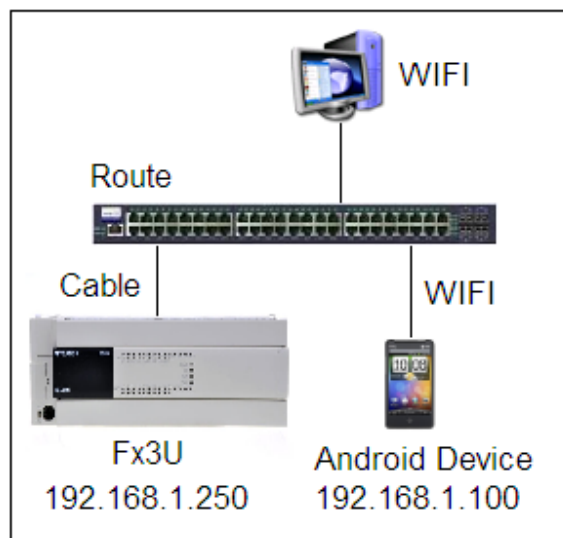


Program Cable: SC-09

The PLC connect to the LAN port of the router, its IP address of the PLC is 192.168.1.250

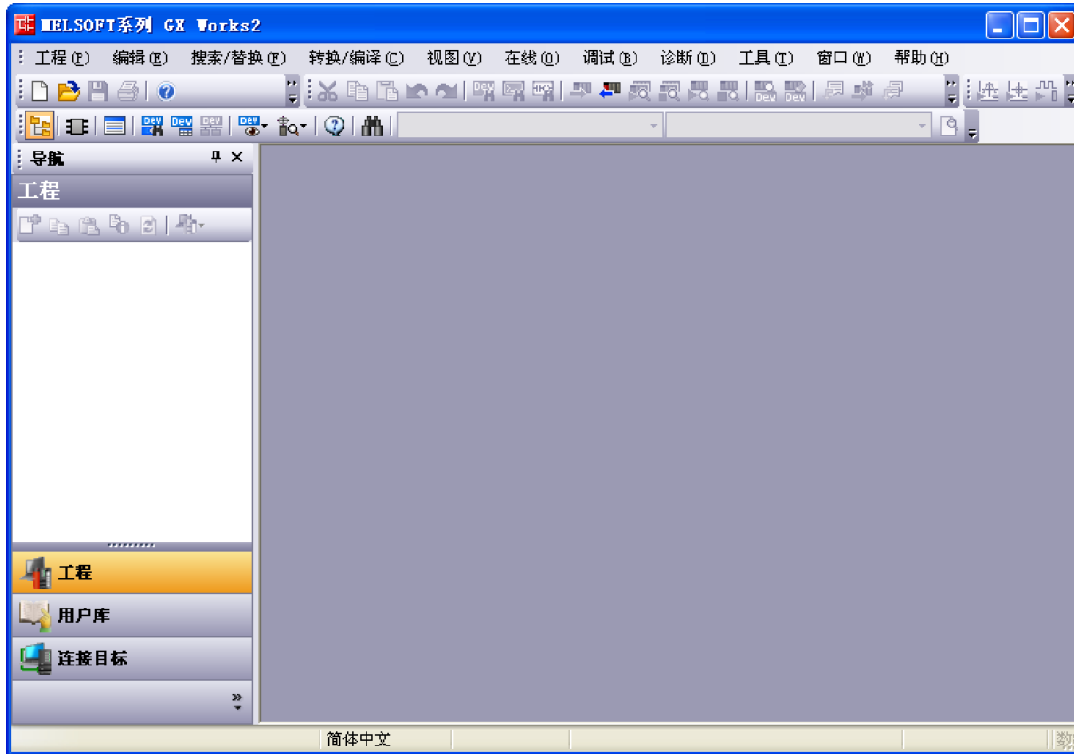
3.1.3 Router

TP-Link, Address is 192.168.1.1

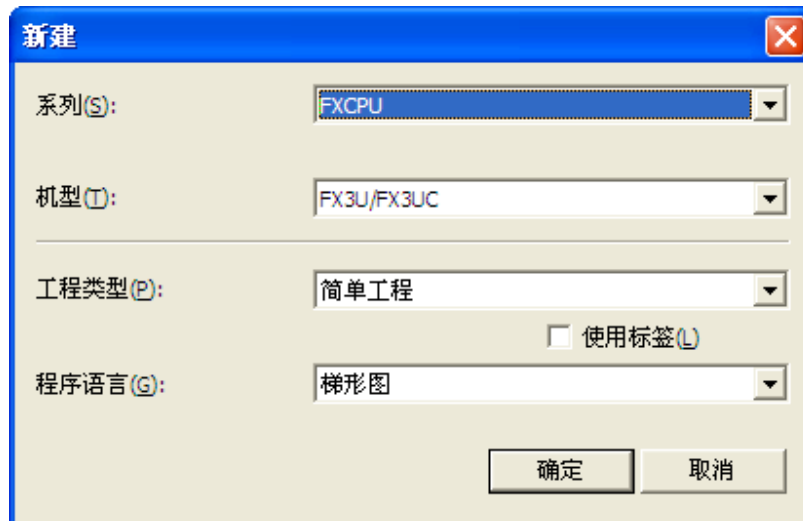


3.2 PLC Settings

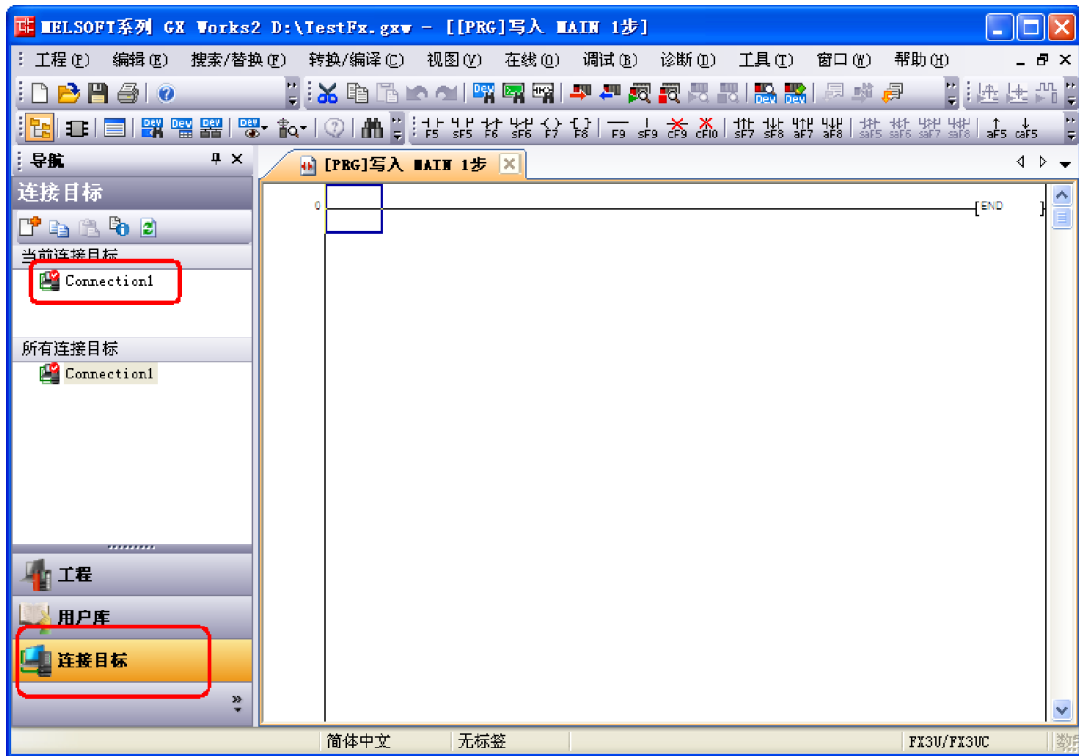
Launch GX Works2.

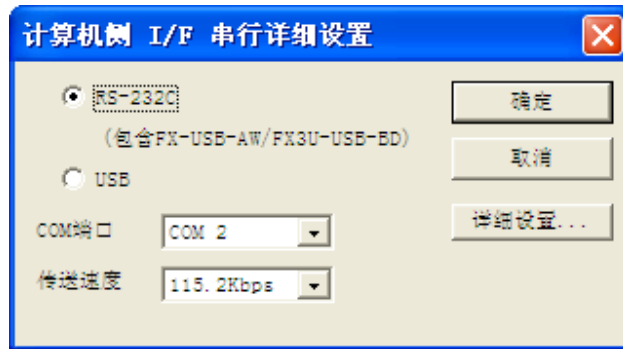


3.2.1 New Project

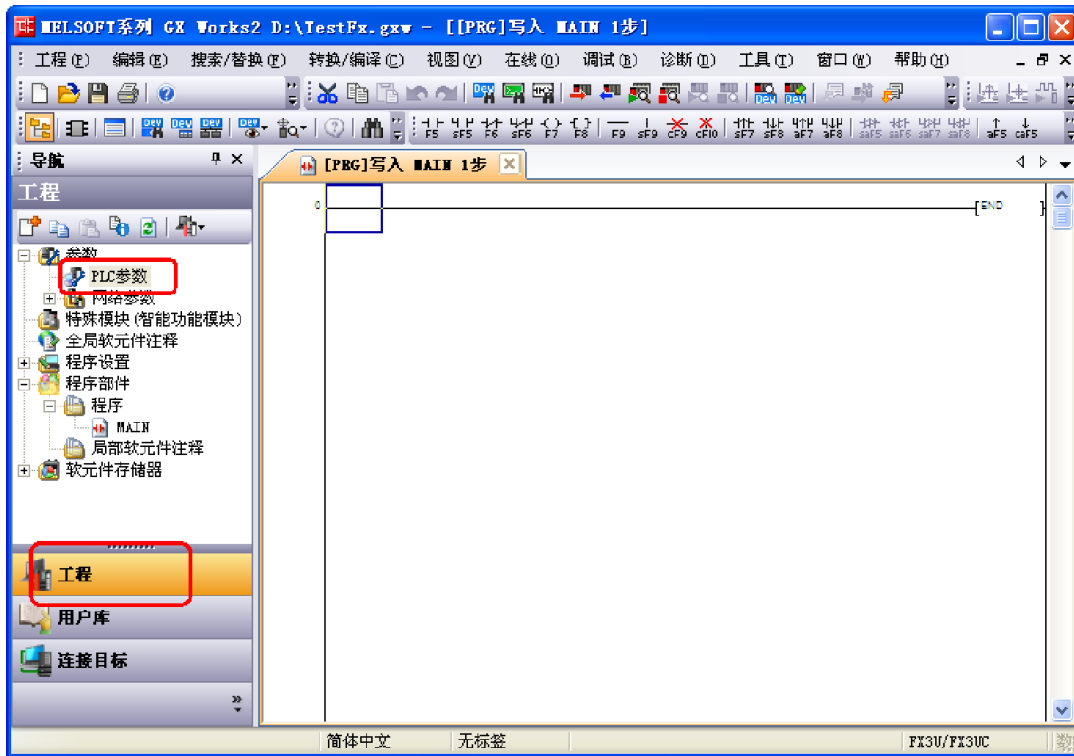


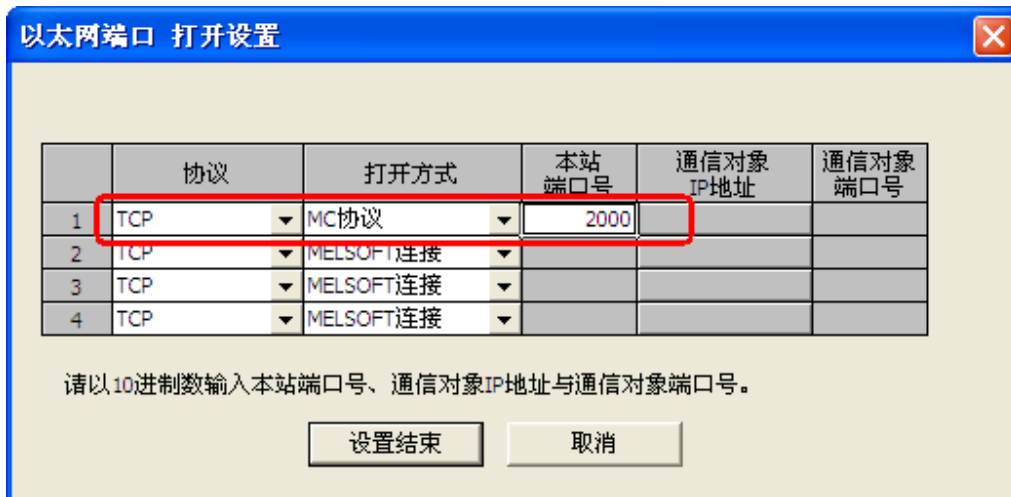
3.2.2 PLC Connection



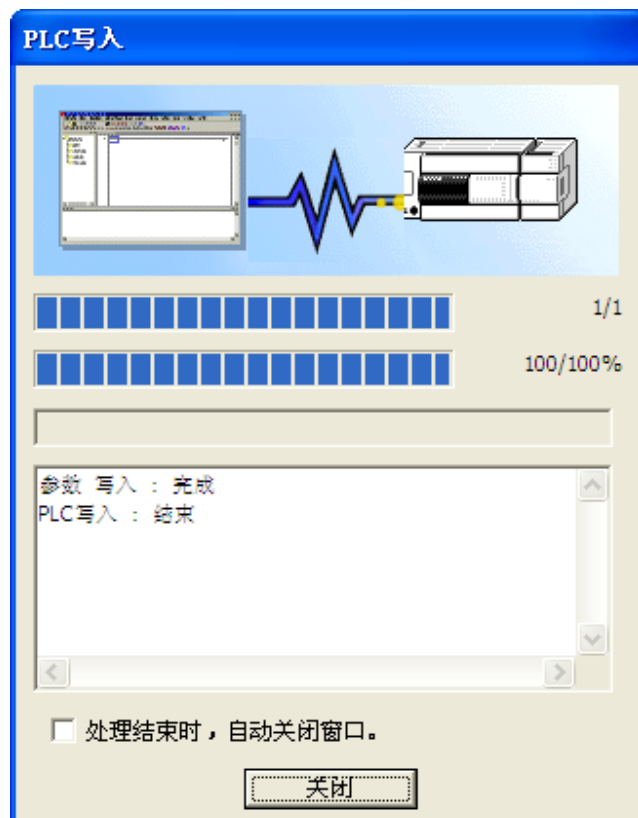
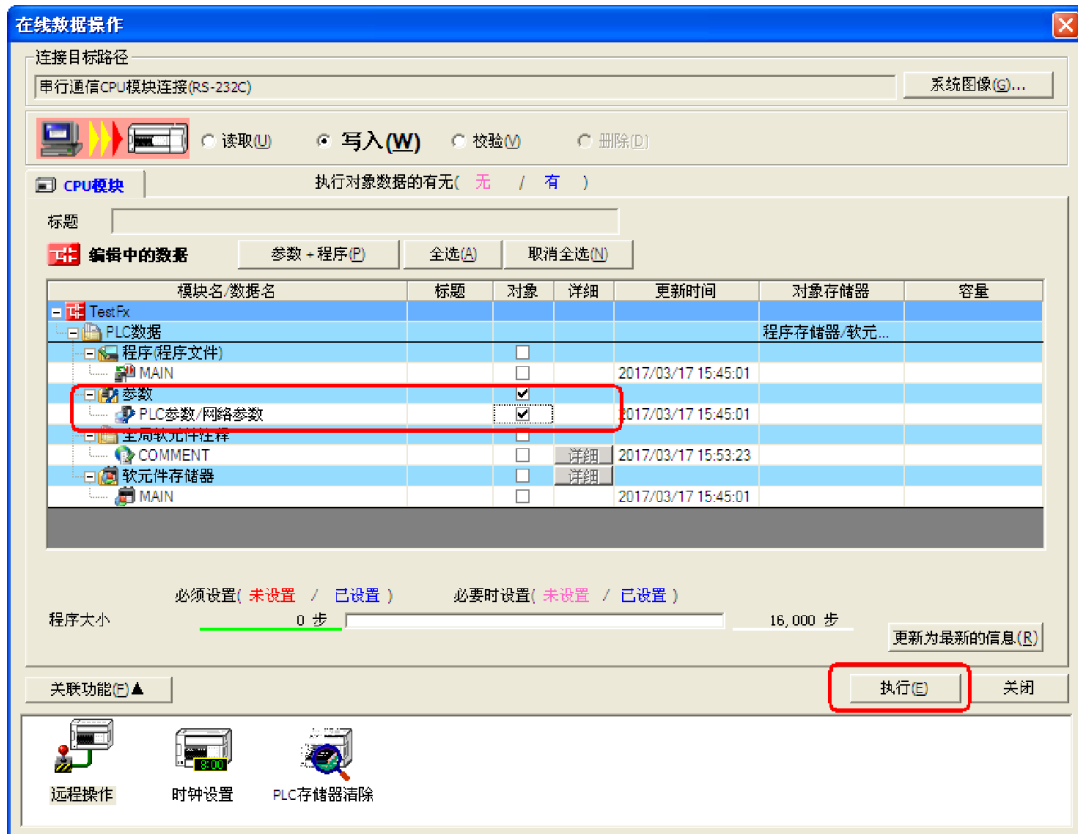


3.2.3 Configure





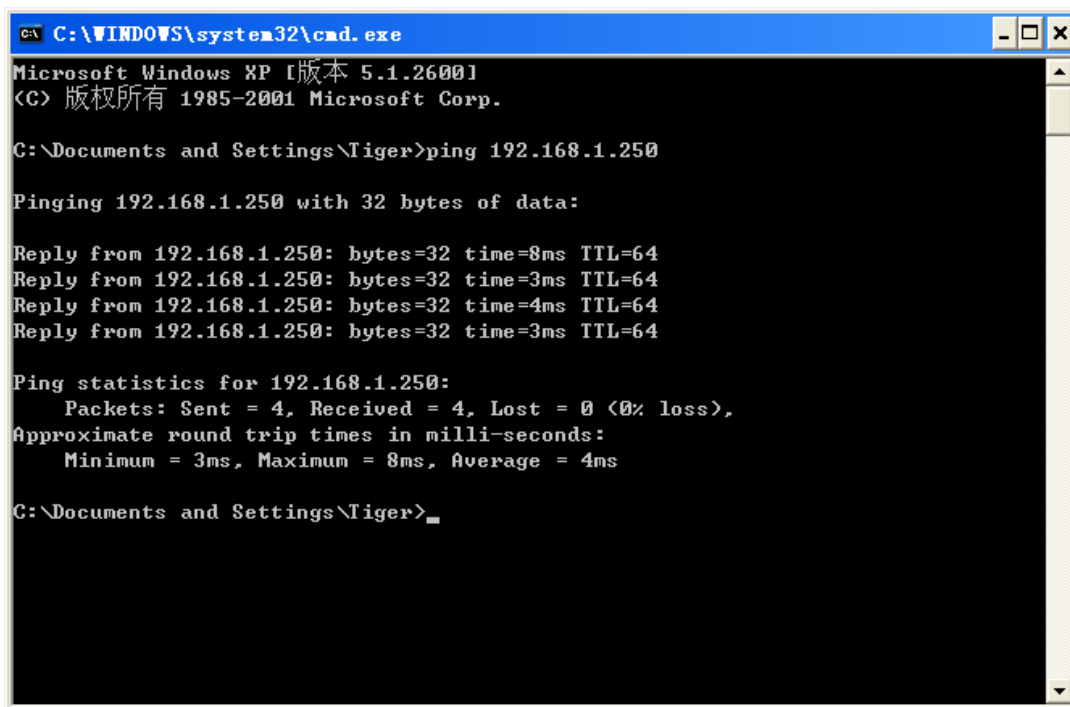
3.2.4 Write configuration to PLC



3.2.5 Restart PLC

Restart PLC, and connect PLC to the LAN port of the router.

If all ok, user can ping the PLC from the computer, as follows:



```
C:\WINDOWS\system32\cmd.exe
Microsoft Windows XP [版本 5.1.2600]
(C) 版权所有 1985-2001 Microsoft Corp.

C:\Documents and Settings\Tiger>ping 192.168.1.250

Pinging 192.168.1.250 with 32 bytes of data:

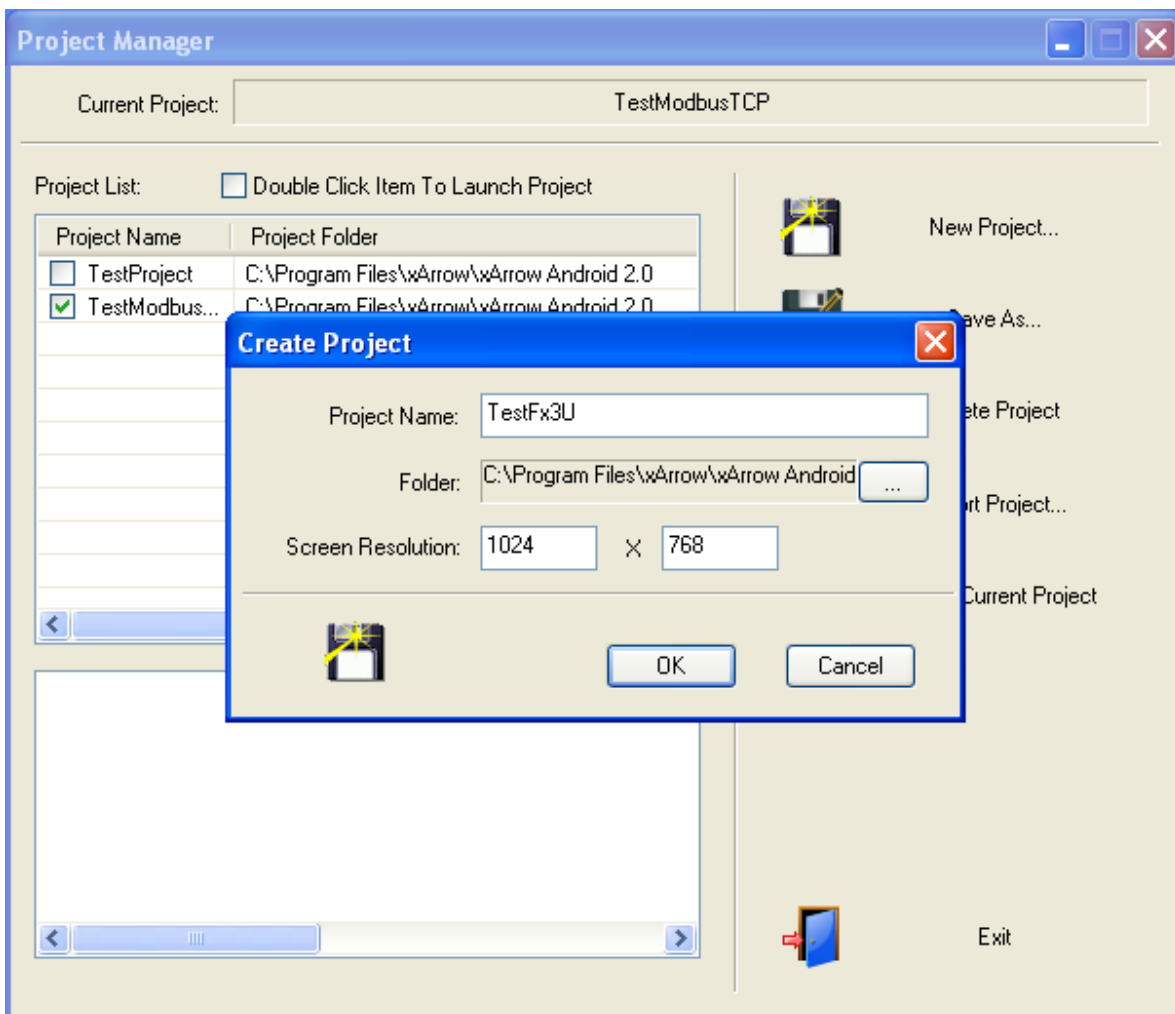
Reply from 192.168.1.250: bytes=32 time=8ms TTL=64
Reply from 192.168.1.250: bytes=32 time=3ms TTL=64
Reply from 192.168.1.250: bytes=32 time=4ms TTL=64
Reply from 192.168.1.250: bytes=32 time=3ms TTL=64

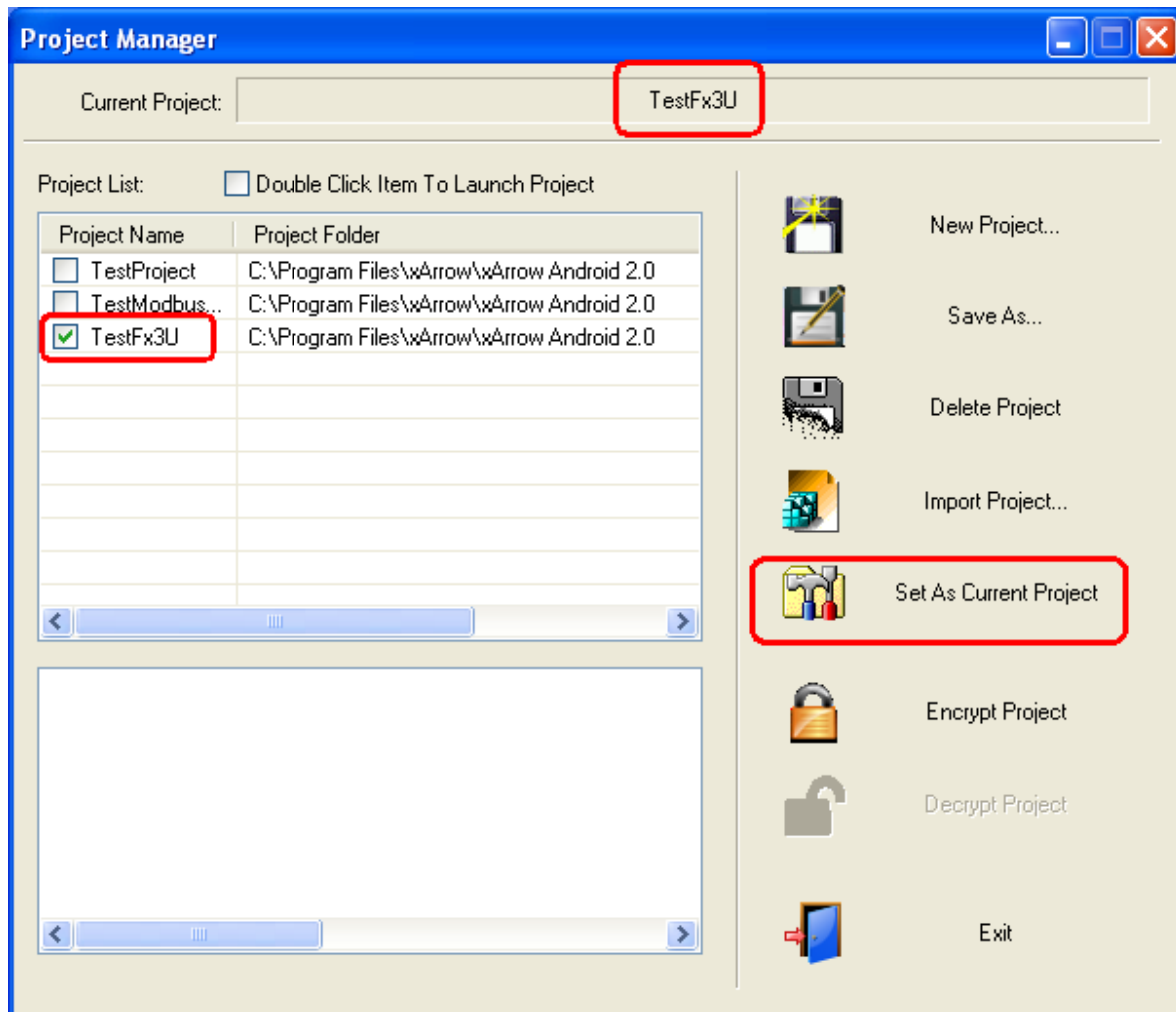
Ping statistics for 192.168.1.250:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 3ms, Maximum = 8ms, Average = 4ms

C:\Documents and Settings\Tiger>
```

3.3 Configuration

3.3.1 Create New Project





3.3.2 Create Station

Click menu **[Data Configuration\Station...]** to create station, as follows:

Station - 2

0# Station
1# Station

Code: sta1 ?
Description: sta1

Protocol: NULL ...
Config...

Use Protocol's Default Channel
Select Channel: ...
Device ID: ...

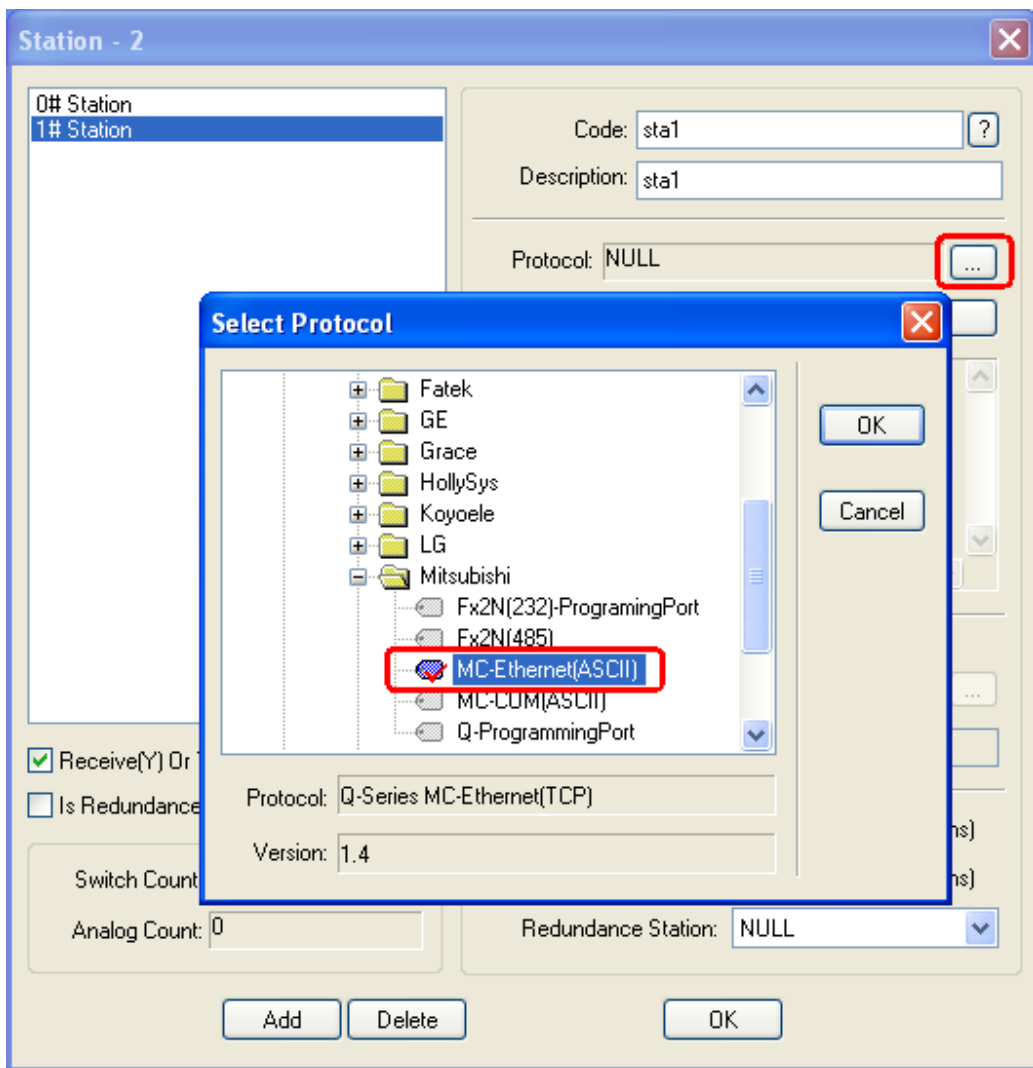
Scan Period: 20 (ms)
Timeout: 200 (ms)
Redundance Station: NULL

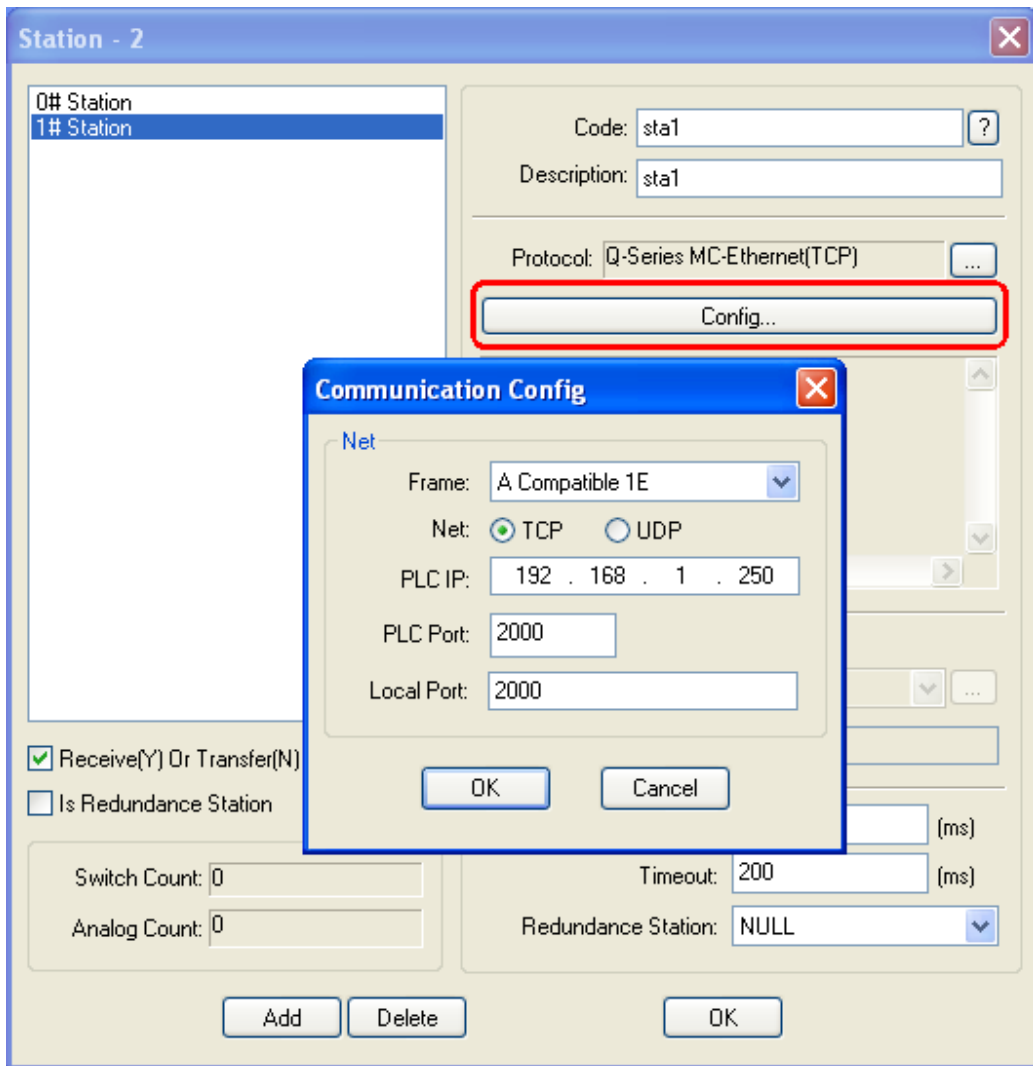
Receive(Y) Or Transfer(N)
 Is Redundance Station

Switch Count: 0
Analog Count: 0

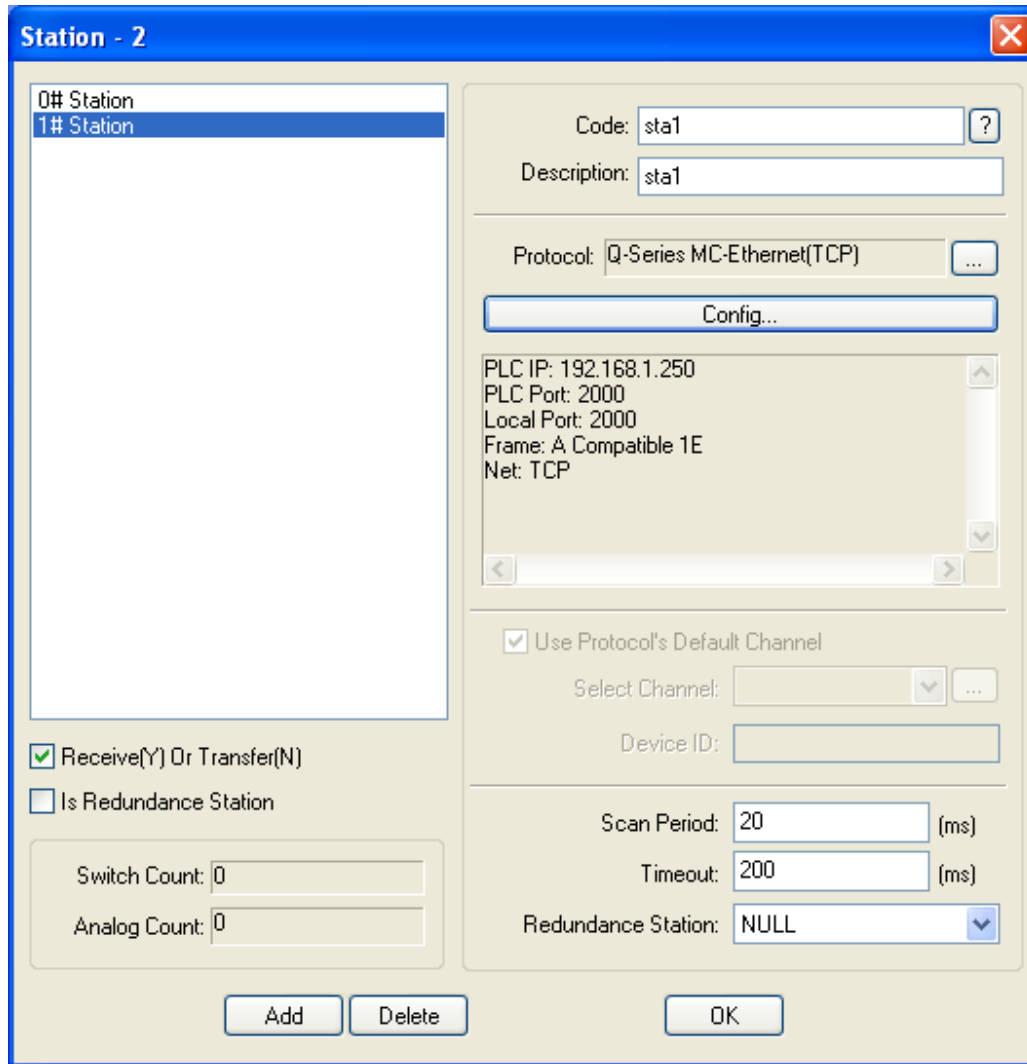
Add Delete OK

Configure the protocols, as follows:



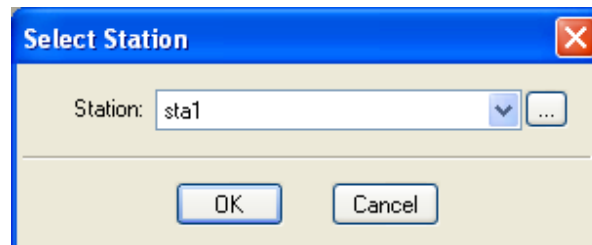


Note: This IP address is the IP of the PLC.



3.3.3 Configure Analog

Configure [\[Data Configuration\Analog...\]](#) to set analog tags, as follows:



Analog - sta1 | 1 [X]

Code: [?] Description:

I/O Address: ... High Limit:
Coefficient: Low Limit:
Original Value: High High Limit:
Base: Low Low Limit:
Dead Zone: Variation Range: (%)
Decimal Place: Alarm Delay: (s)
Unit: Alarm Process:

Alarm Triggered: Drawing Name:

Writeable Invert Lock Read Always
 Accumulate Voice Alarm Print Alarm

<< < > >> **Add** Delete Batch Add... Exit

Analog - sta1 | 1 [X]

Code: [?] Description:

I/O Address: ... High Limit:
Coefficient: Low Limit:
Original Value: High High Limit: (%)
Base: Low Low Limit: (s)
Dead Zone: Variation Range:
Decimal Place: Alarm Delay:
Unit: Alarm Process:

Alarm Triggered: Drawing Name:

Writeable Invert Lock Read Always
 Accumulate Voice Alarm Print Alarm

<< < > >> Add Delete Batch Add... Exit

I/O Config [X]

I/O: [v]
Address: [Decimal]
Format: [v]

OK Cancel

Analog - sta1 | 1

Code: analog0 ? Description: analog0

I/O Address: D:0:116 ... High Limit: 0

Coefficient: 1 Low Limit: 0

Original Value: 0 High High Limit: 0

Base: 0 Low Low Limit: 0

Dead Zone: 0 Variation Range: 0 (%)

Decimal Place: 1 Alarm Delay: 0 (s)

Unit: Alarm Process: ...

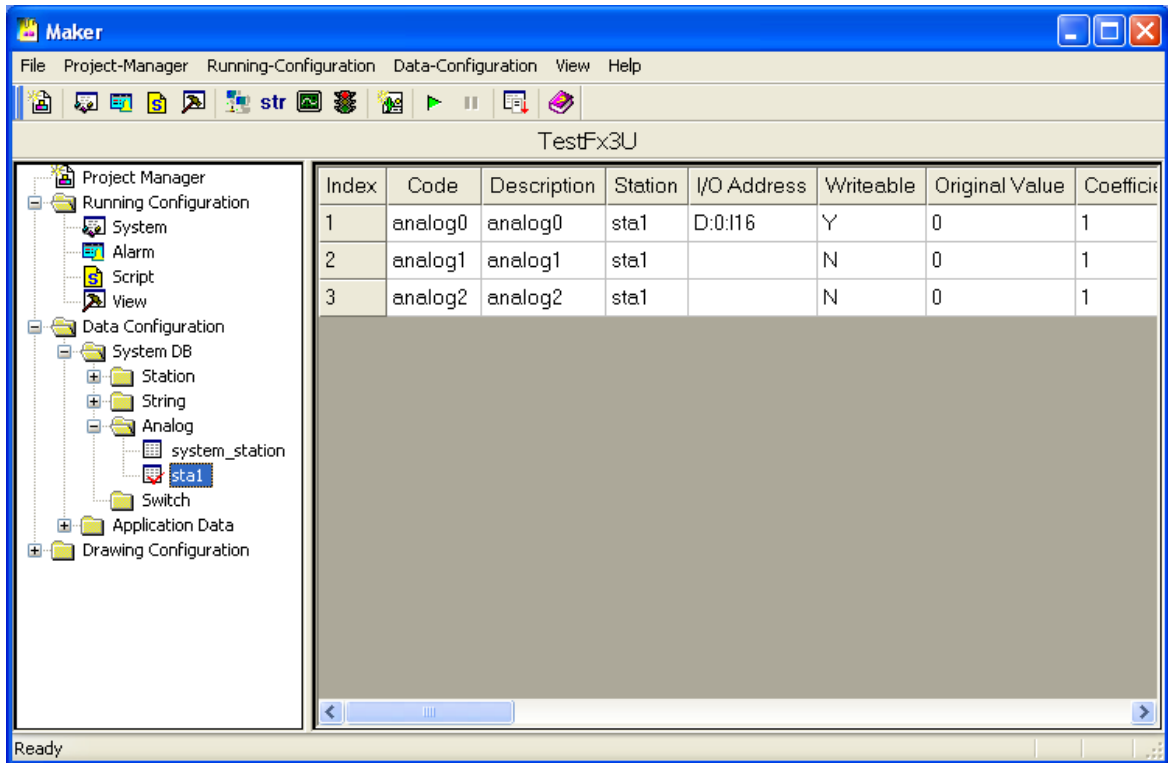
Alarm Triggered: Display no drawing v Drawing Name: ...

Writeable Invert Lock Read Always

Accumulate Voice Alarm Print Alarm

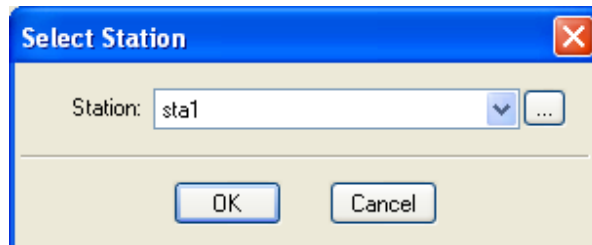
<< < > >> Add Delete Batch Add... Exit

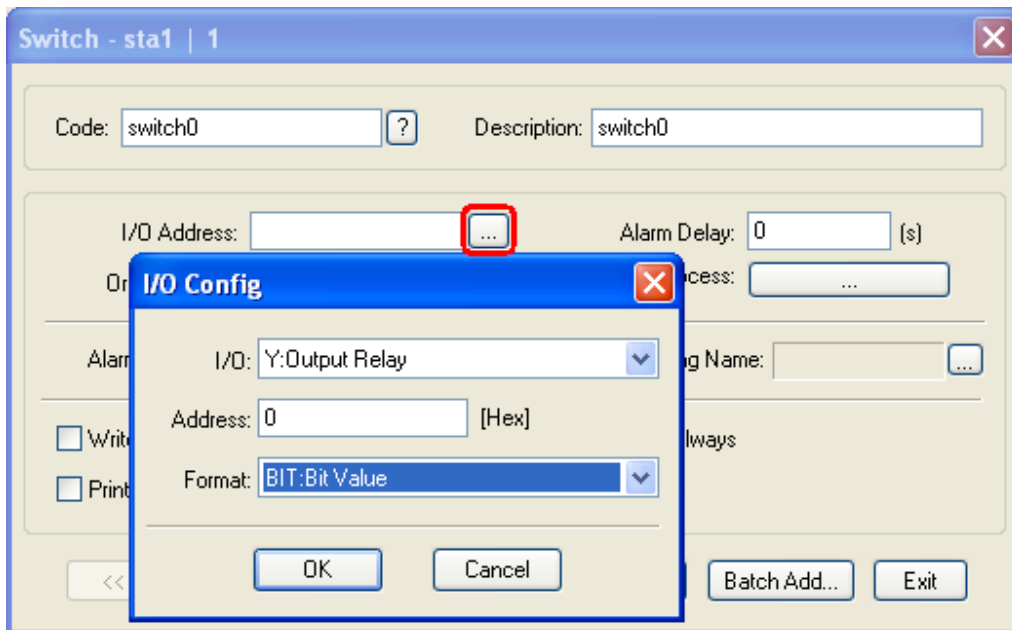
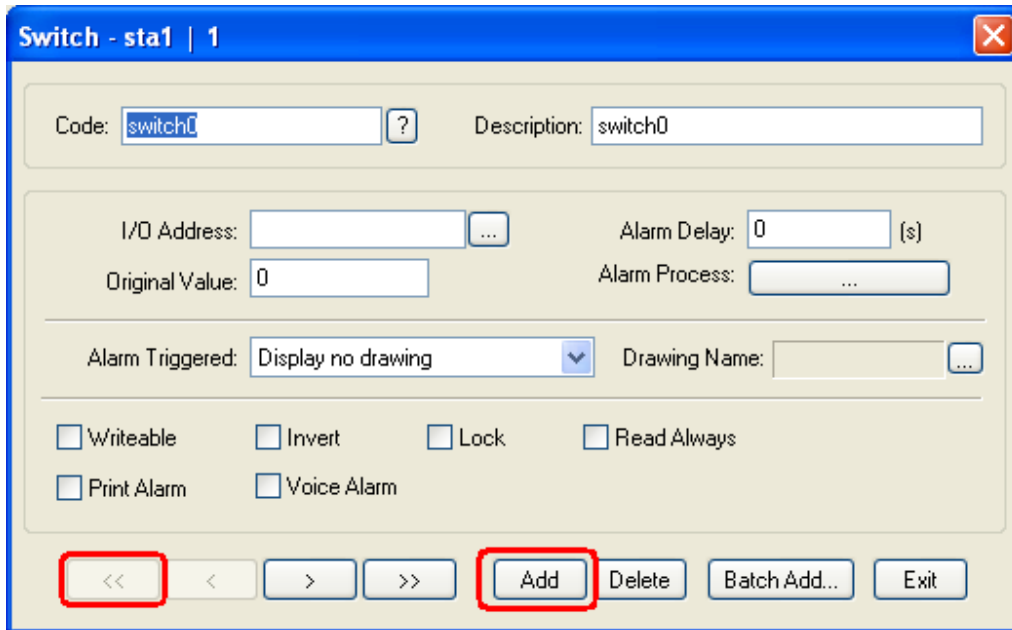
When all the tag set OK, as follows:

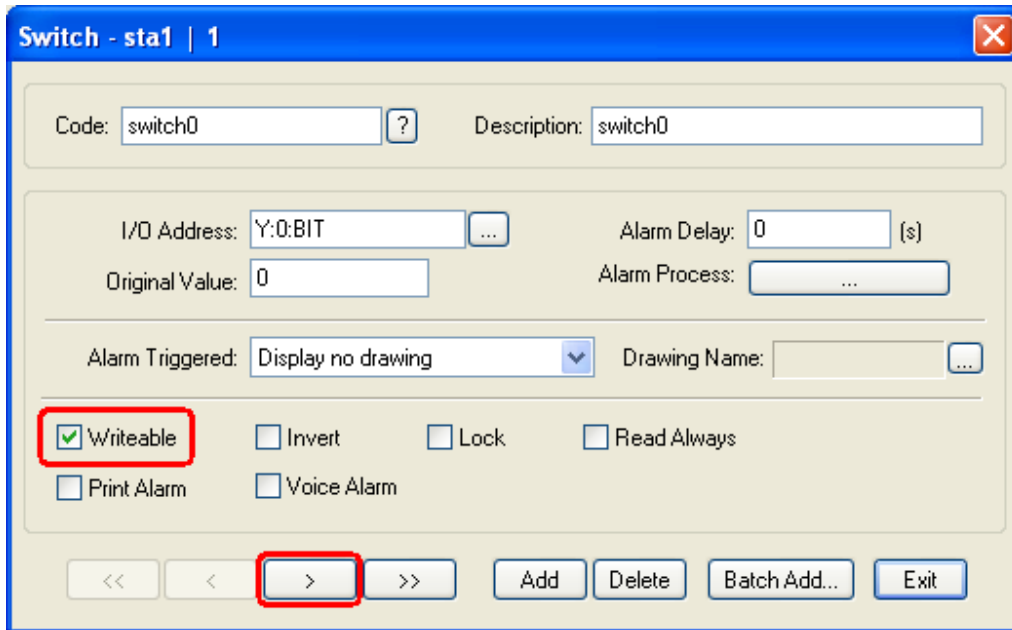


3.3.4 Configure Switch

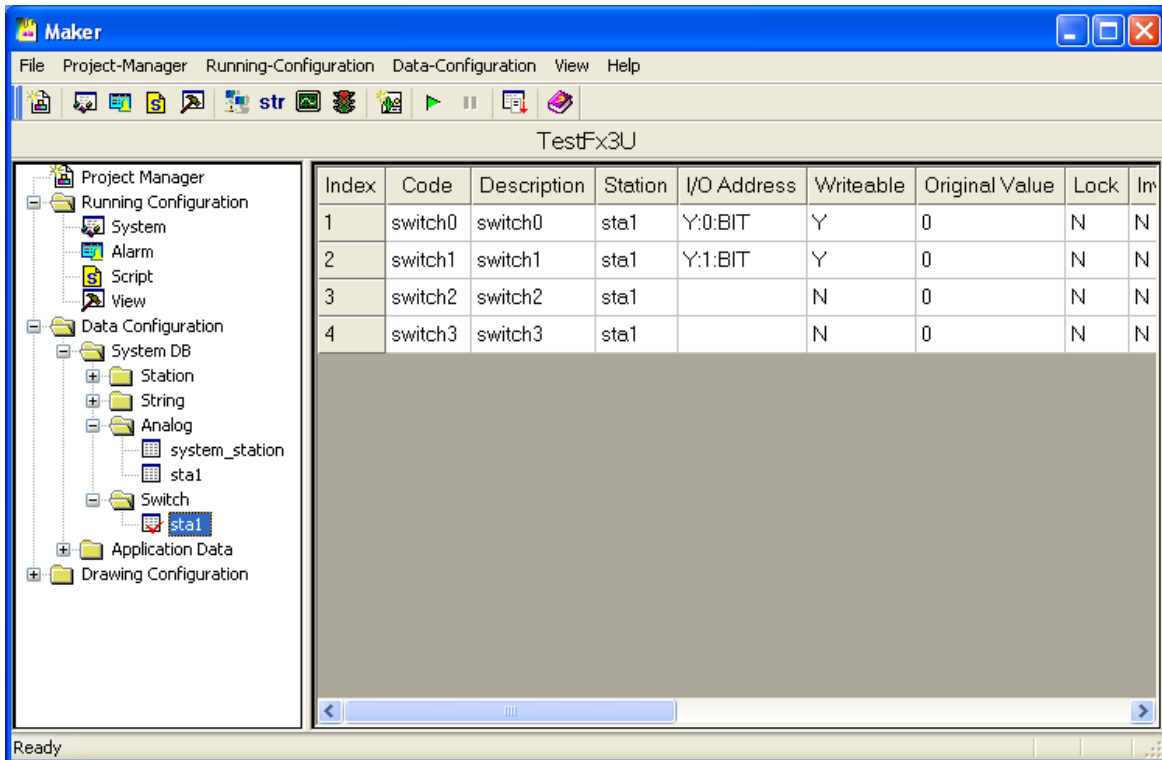
Configure **[Data Configuration\Switch...]** to set switch tags, as follows:



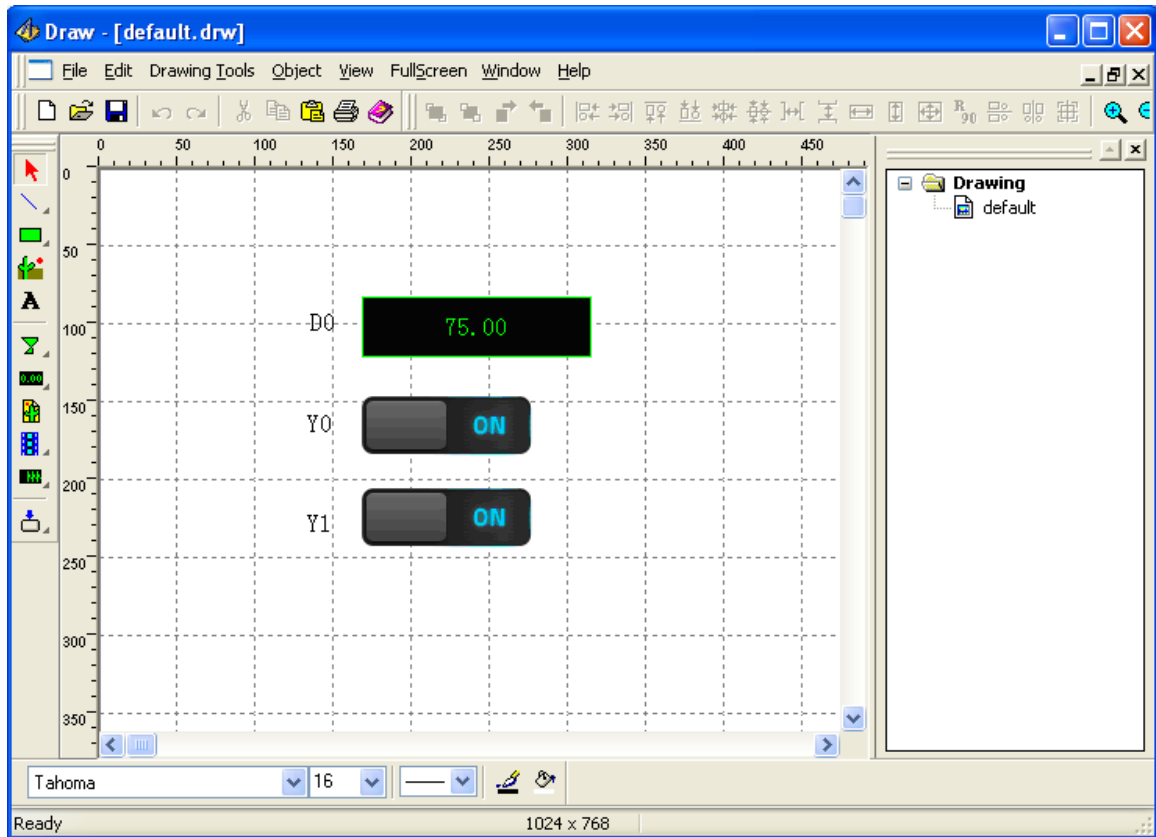




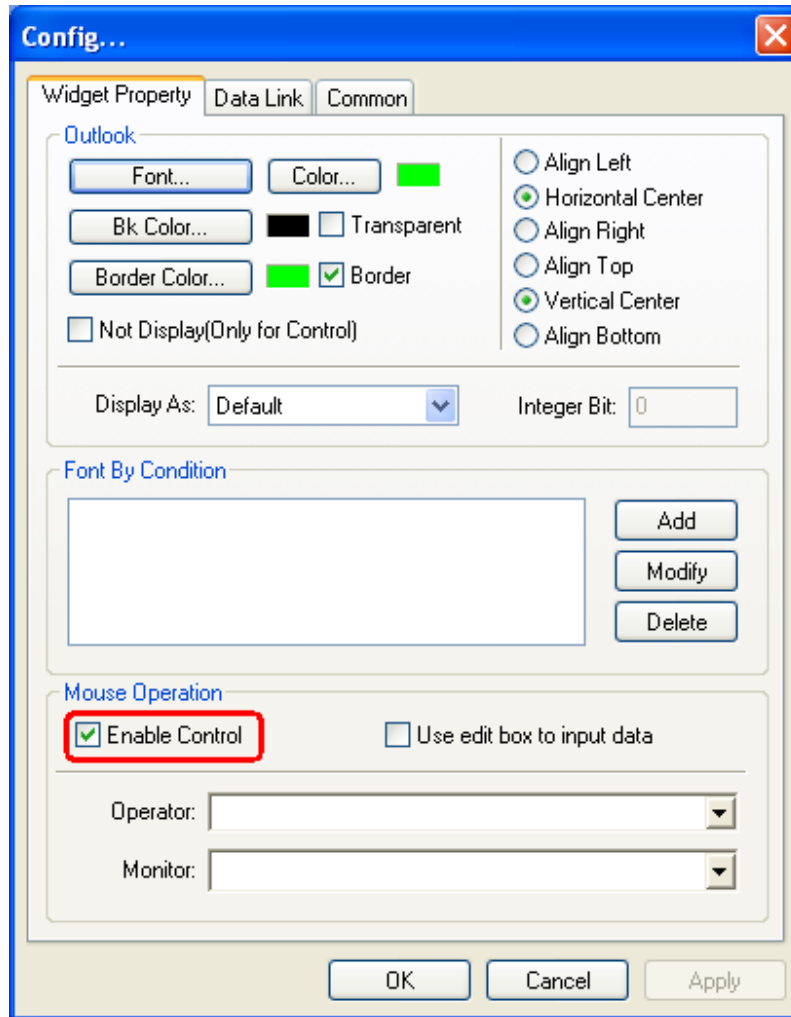
When all the tag set OK, as follows:

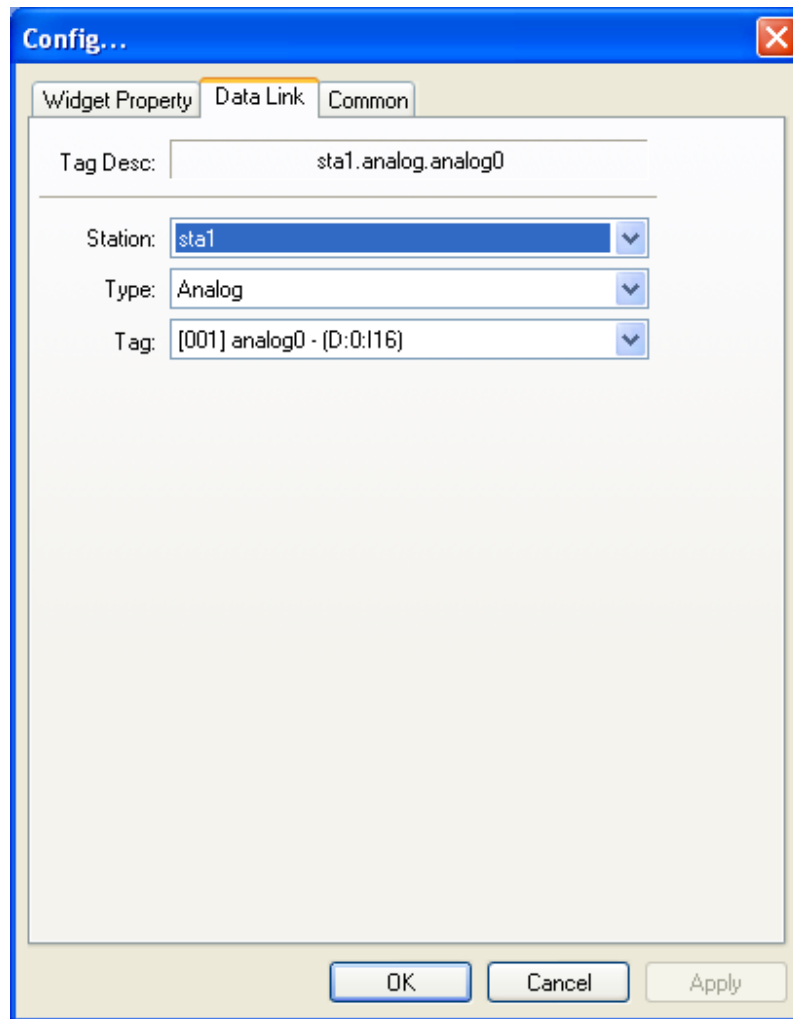


3.3.5 Make Drawings



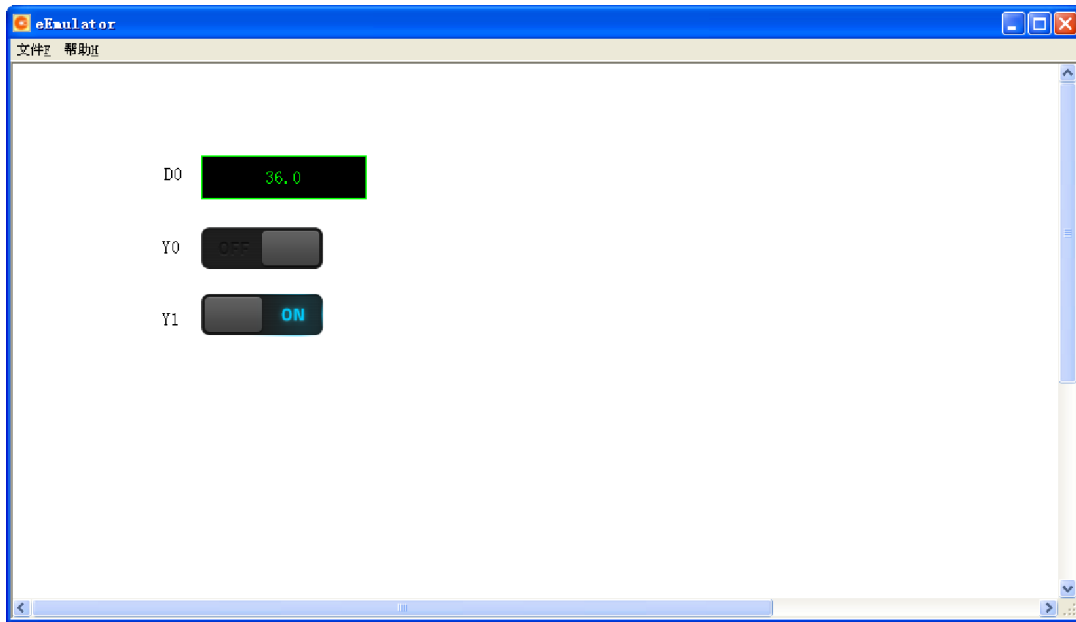
Double click the widget to set its properties:





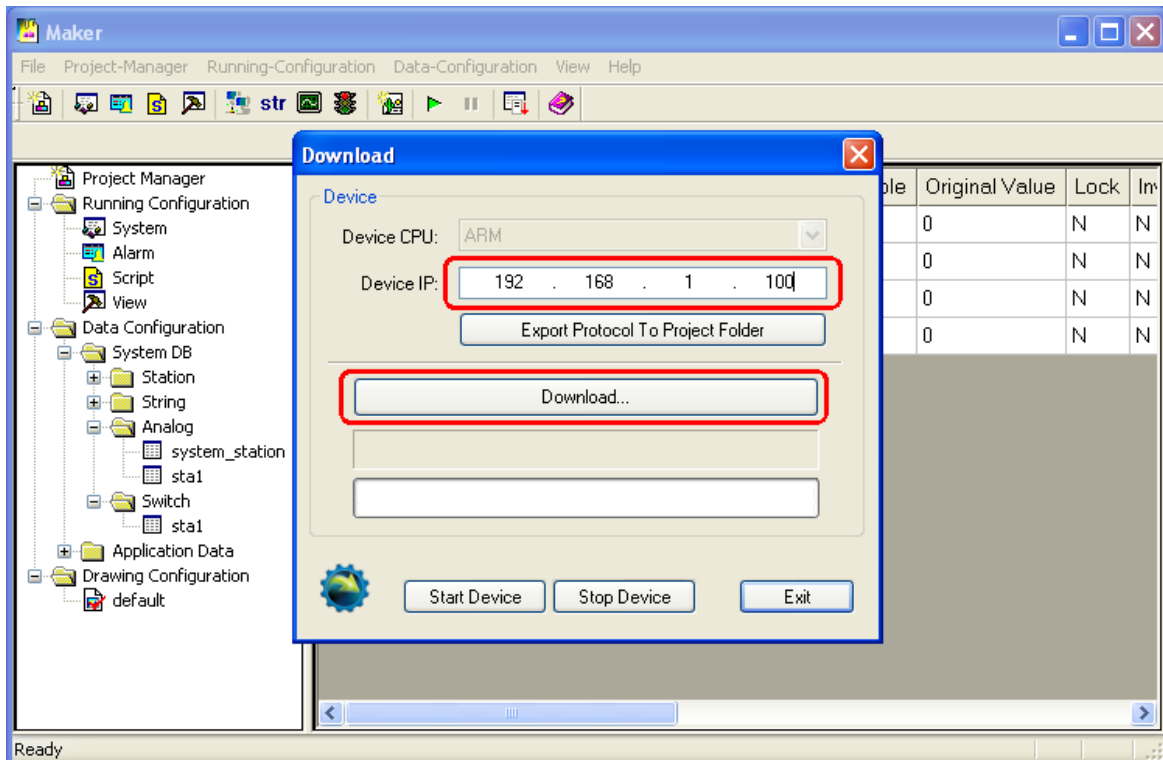
3.3.6 Run Emulator

Note: first close all other connections to the PLC, also including program software.



3.3.7 Download Project

Note: the xArrow SCADA should already started in the android phone.



3.4 Running

Note: first close all other connections to the PLC, also including program software.

