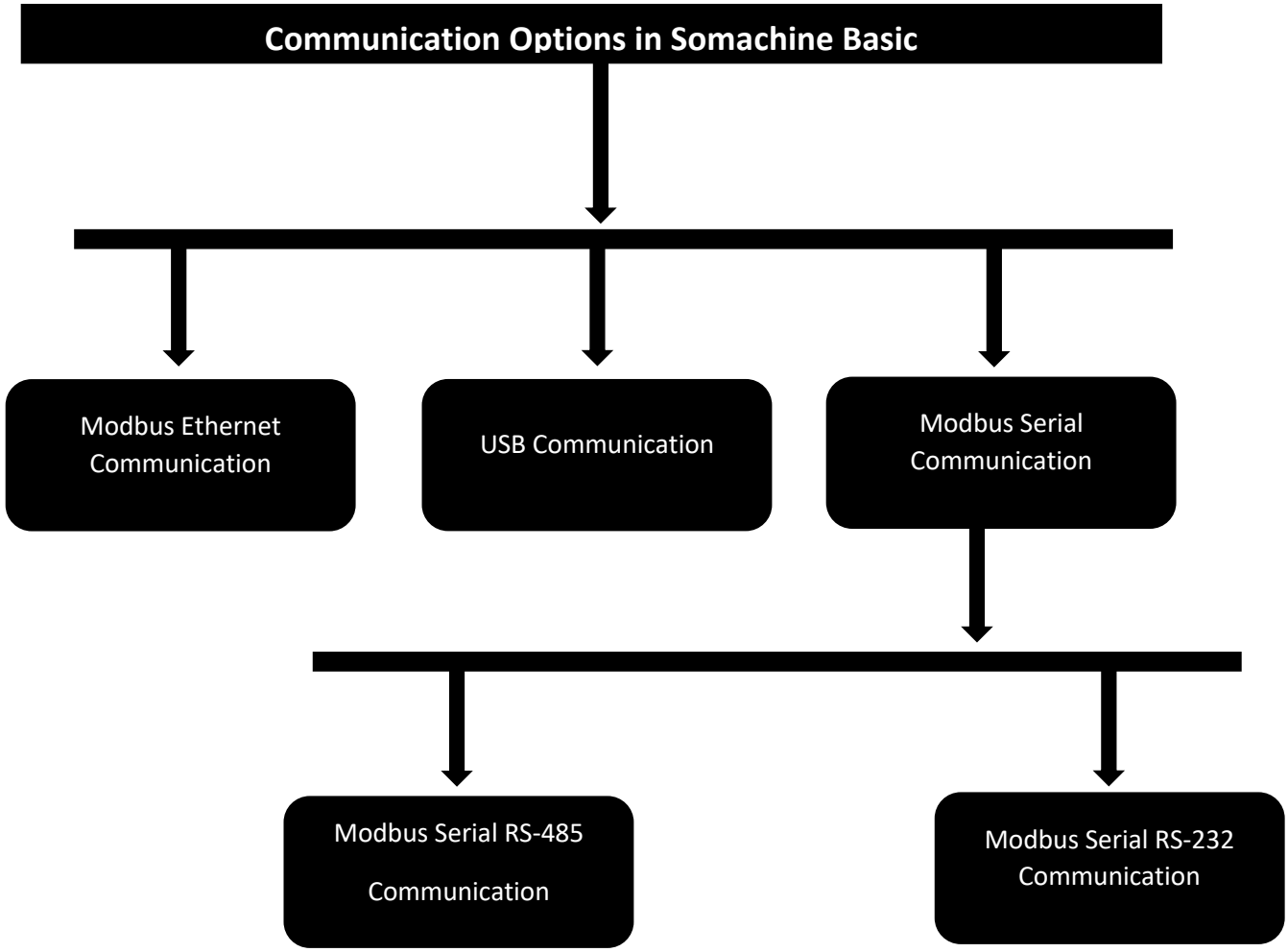
Somachine Basic – Communication Part



Architecture of the Modbus Communication

Somachine Basic – Communication Part

Network Configuration For the PLC Communication

- **There are Three Option for the communication with PLC.**

    1. USB Communication
    2. Ethernet Communication
    3. RS-485 or RS-232 Serial Communication

USB Communication :

- The USB Mini-B Port is the programming port you can use to connect a PC with a USB host port using SoMachine Basic software. Using a typical USB cable, this connection is suitable for quick updates of the program or short duration connections to perform maintenance and inspect data values. It is not suitable for long-term connections such as commissioning or monitoring without the use of specially adapted cables to help minimize electromagnetic interference.

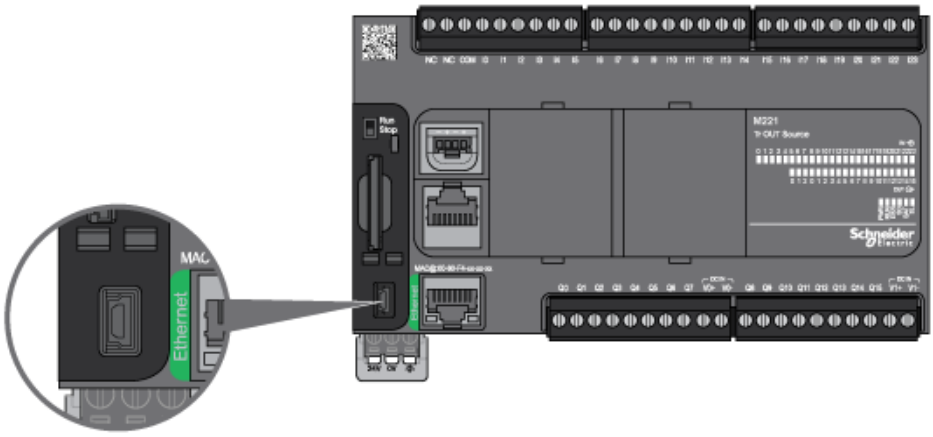
Characteristics

This table describes the characteristics of the USB Mini-B programming port:

Parameter	USB Programming Port
Function	Compatible with USB 2.0
Connector type	Mini-B
Isolation	None
Cable type	Shielded

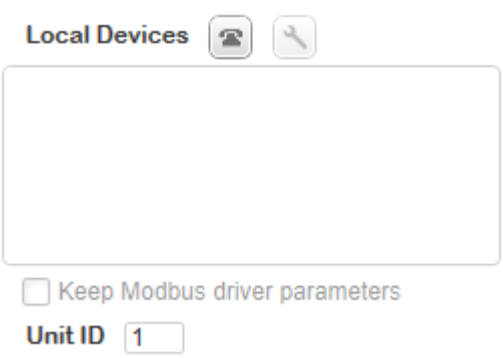
Characteristics of the USB Communication

The following figure shows the location of the USB Mini-B programming port on the TM221C Logic Controller:



USB Mini Port

- **USB Mini cable through connect PLC controller.**



- First you have to connect **USB Mini** cable from PC to Controller.
- After Connecting cable you need to check **USB controller** in Local Devices.
- Double Click on the USB Controller.

- First Click on **Login** Button and see enable button for the **PC to Controller (Download)** and **Controller to PC (Upload)**.
- Now no any controller connected with the Software that way Here all the option getting hide.
- Also have option for the **Start Controller** and **Stop Controller.**

USB is a best option for the connection with the controller.

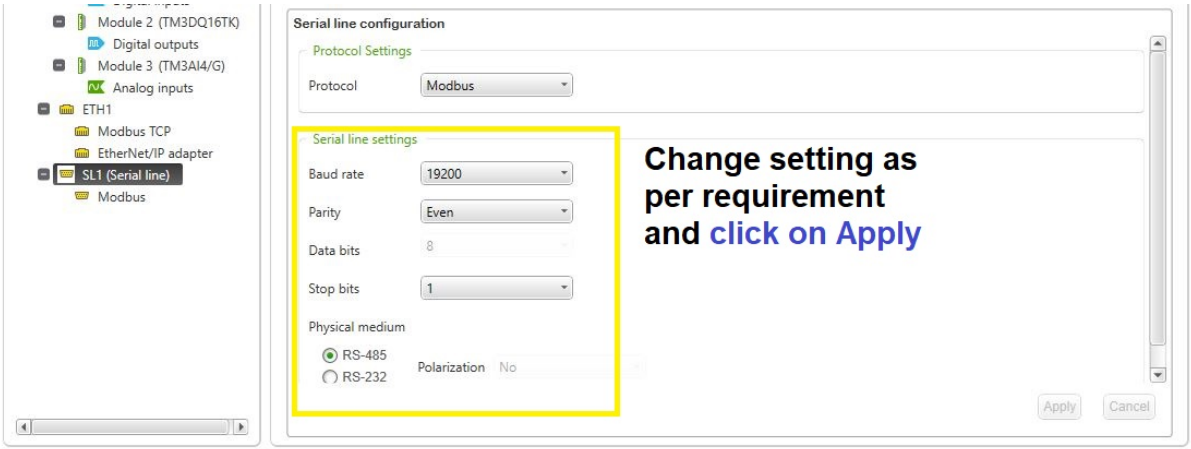
- USB Mini cable though HMI communicate and easily transfer data one to one.
- Various HMI have a various types of the USB cable available.

Example :

1. HMI GXU3512 connected with same USB Mini cable and data transmitted from one to one connection.

Serial line Communication for the Controller Connection :

- Go to the Configuration page and double click on **SL1(Serial Line).**
- After Double Clicking you have to get configuration page for thee serial line communication.



Serial Line configuration Page

- **Change Setting as per requirement :**
- Here I have set the below mention parameters for the communication :
- **Baud rate : 19200**
- **Parity : Even**
- **Data Bit : 8**
- **Stop Bit : 1**
- **Physical Medium : RS-485 or RS-232**

Describe for the Serial line protocol :

- **In controller RS-485 communication port available then you have able to connect controller with serial line protocol.**
- Different Different controller have provide different communication port in same protocol.
- Like : **RJ45** Pin or **Direct connection D+ and D-**.
- All the controllers have different differents Pin diagram for the connection.
- RS-485 and RS-232 have both are different protocols but port are same in PLC Controller.

Pin Diagram for the RS-485 :

The following figure shows the pins of the RJ45 connector:

The table below describes the pin assignment of the RJ45 connector:

Pin	RS232	RS485
1	RxD	N.C.
2	TxD	N.C.
3	RTS	N.C.
4	N.C.	D1
5	N.C.	D0
6	CTS	N.C.
7	N.C.*	5 Vdc
8	Common	Common
* 5 Vdc delivered by the controller. Do not connect.		

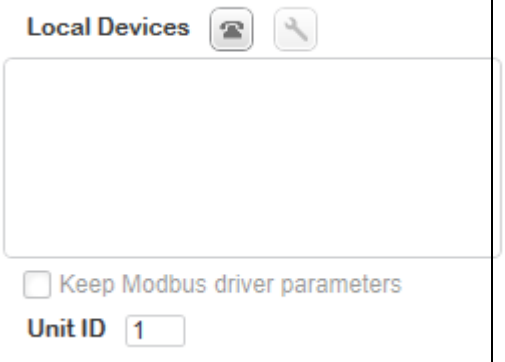
CTS: Clear To Send
N.C.: No Connection
RTS: Ready To Send
RxD: Received Data
TxD: Transmitted Data

RS-485 and RS-232 communication pin diagram

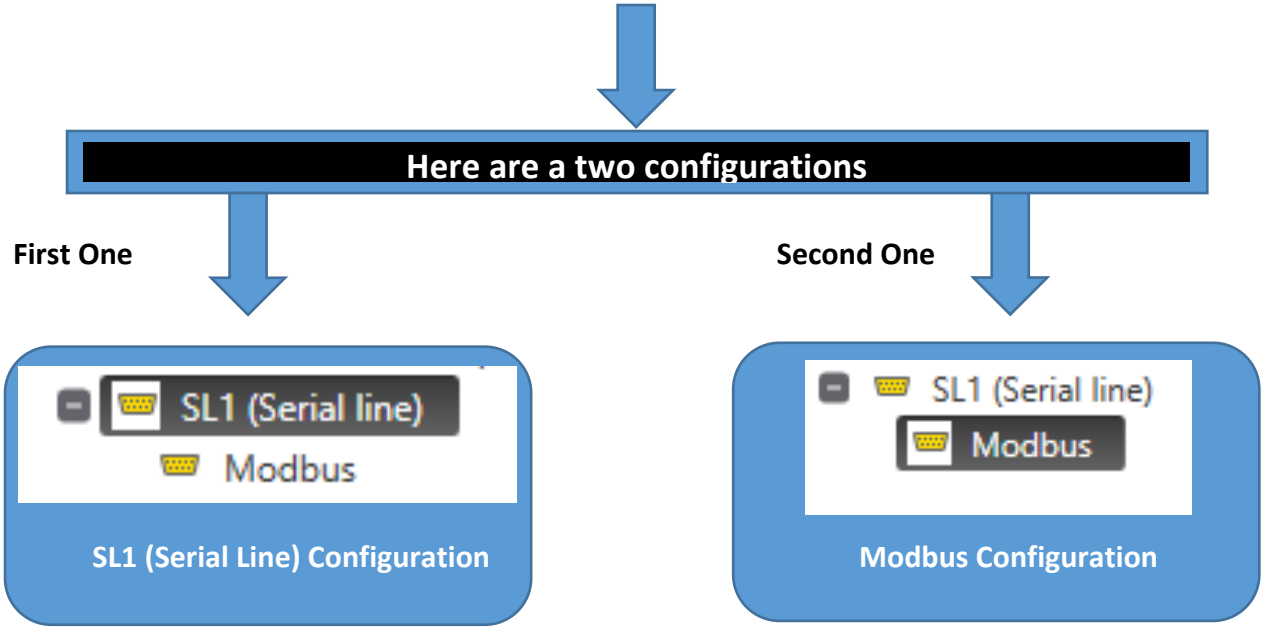
- As per image make cable for the communication.
- Also you have require **U-Port** for for the connection with PLC to PC.
- **In this image U-pot have connected with the Null Connecter.**
- Connect cables as per Pin Diagram of the RS-232 or RS-485 with the Null connector and also connect USB port of the U-port cable with PC.
- After connecting U-port with PC, Open Device manager.
- Configure U-port in **Device manager** as per communication of the RS-485 or RS-232.

- Connect Cable with the controller and check controller Name have showing in Communication Tab.

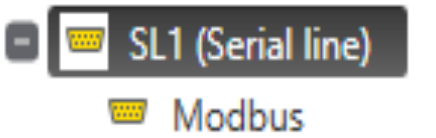
- Check controller name in the local devices box. Double click on showing controller name and do same procedure like USB Communication.



MODBUS Serial Configuration for the Slaves Devices :



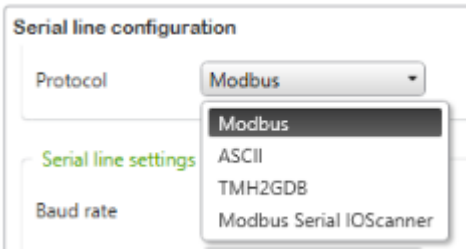
SL1 (Serial Line) Configuration



- Click on **SL1 (Serial Line)** Configuration
- Then you have an option for the **MODBUS, ASCII, TMH2GDB and Modbus Serial IO Scanner.**
- Choose what you have configure in Serial Connection.

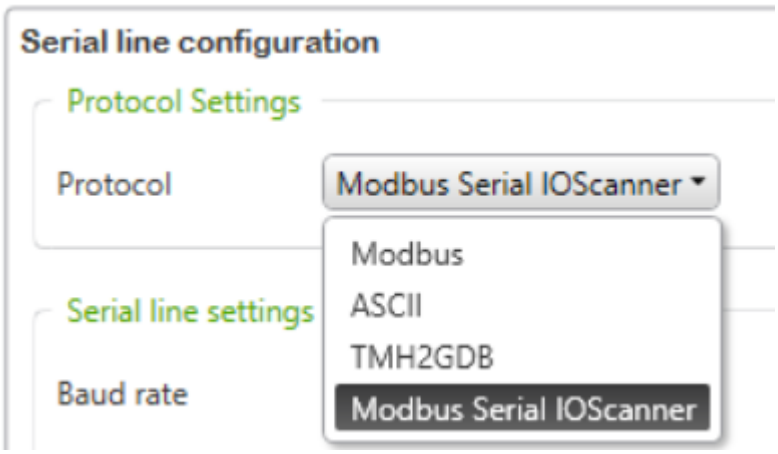
Modbus Serial line Configuration

- You can select as you have require and configure based on selection of communication.
- On all the option you have require to configure some basic options :
    1. **Baud Rate**
    2. **Parity**
    3. **Data Bits**
    4. **Stop Bit**
    5. **Physical Medium**



IO Scanner Configuration

- Select the **IO Scanner in Serial line** as per below attached image.



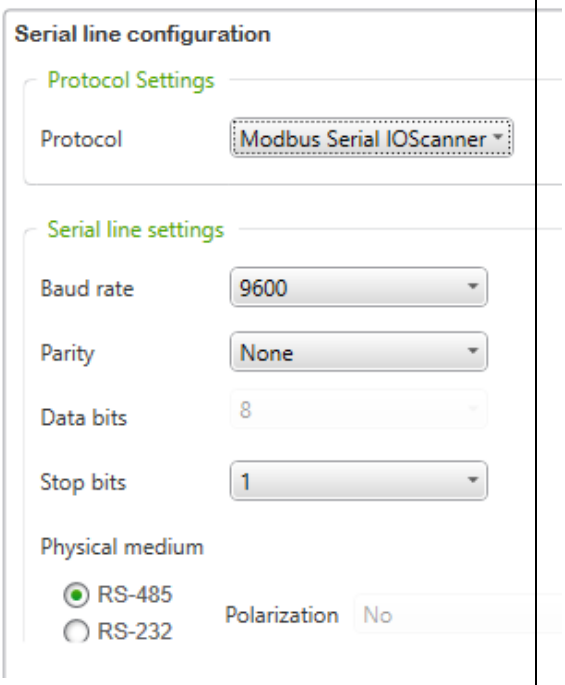
- Select Modbus Serial IOScanner In Protocol Settings.
- Change Serial line Settings as per requirements.

Serial Line Configuration

- Here, Standard settings are done,

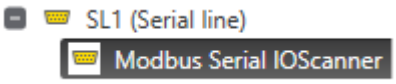
1. Baud rate : **9600**
2. Parity : **None**
3. Data bits : **8**
4. Stop Bit : **1**
5. Physical Medium : **RS-485**

- **APPLY** Changes.



Serial Line Setting

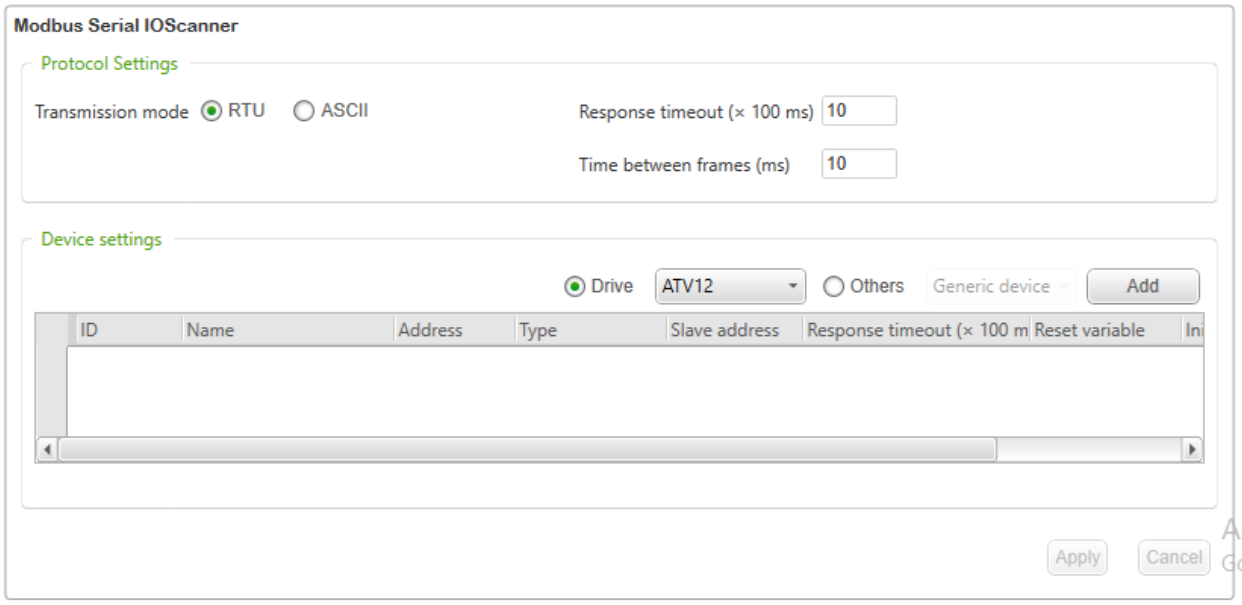
IO Scanner Configuration



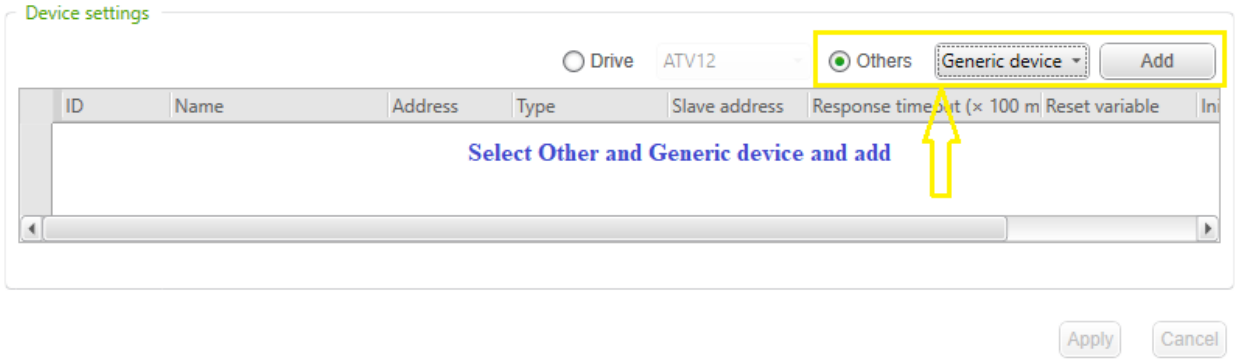
- Click on **Modbus Serial IO Scanner**

Modbus Serial IOScaner

- As per attached image you have get a one page for the Adding Slave devices in IO Scanner.

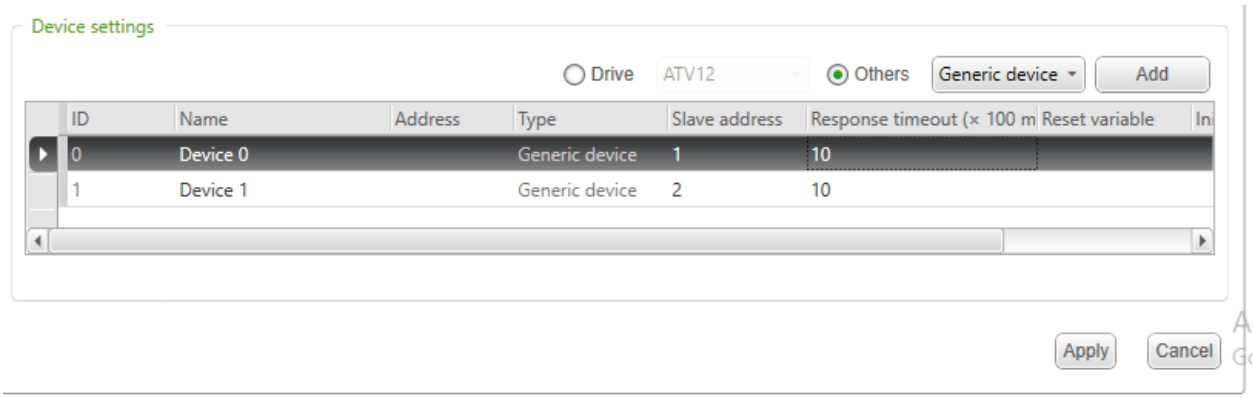


Modbus Serial IO Scanner



Device Settings

- As per attached image simply click on Add button and give a slave ID of the Slave device.



Slave Devices Added in Device Settings

- **Simply add slave devices in IO Scanner with the particular slave ID and Apply changes.**
- You can connected **147 Slaves** devices without any repeater.
- Also you have to give a name of the devices for the easily troubleshoot devices.
- **This same things you are doing in the Modbus TCP connection.**

Ethernet Communication for the Controller Connection :

- While you have a Fresh controller without configuration of communication Parameters, then you need to convert your Mac ID into Ethernet IP.
- Note Down your Mac Address and follow below instruction :

What is default IP address of a M221 PLC?

Published date: 24 January 2018

The IP address by default is 10.10.x.x.
The last 2 fields in the default IP address are composed of the decimal equivalent of the last 2 hexadecimal bytes of the MAC address of the port.
The MAC address of the port can be retrieved on the label placed on the front side of the controller.
The default subnet mask is Default Class A Subnet Mask of 255.0.0.0.

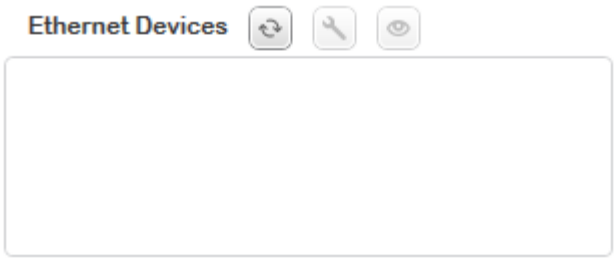
Default IP Address of the TM221 Controler

1. Note Down Your controller Mac Address,
2. Your default IP Address is 10.10.X.X format.
3. Convert last two digits of the Mac Address hexa decimal to decimal format.
4. Now you got IP Address of the controller, Like : **10.10.14.101**

Configure IP Address in the PC :

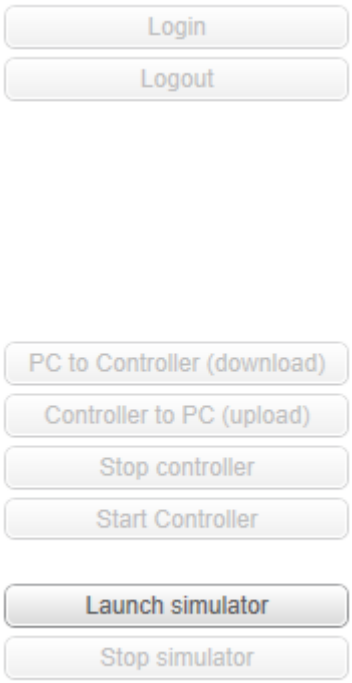
- You have require to configure your **PC IP Address** for the communication with the Controller.

- Right Click on yellow indicated box and click on **Open Network & Internet Setting**.
- Select Ethernet and Change adapter setting.
- Change your Ethernet IP Address series in 10.10.14.101 network.
- After changing, Connect Ethernet cable with your controller and ping your controller IP Address.
- After Pinging, you have get your controller IP Address in Ethernet Devices Box.
- Double Click on the IP Address and login your controller as per below instruction.



Ethernet Devices Box

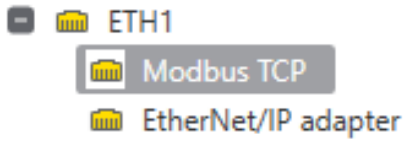
Controller Login or Connection :



- First Click on **Login** Button and see enable button for the **PC to Controller (Download)** and **Controller to PC (Upload)**.
- Now no any controller connected with the Software that way Here all the option getting hide.
- Also have option for the **Start Controller** and **Stop Controller.**

Controller Configuration for the Slaves Devices :

- Here, You have doing same thing of the Modbus Serial connection.
- You have adding multiple slaves devices in the MODBUS TCP Communication and that's a connected based on IP Addresses.
- Configured IP Address in your slaves devices and also configure in the Controller for the communication.

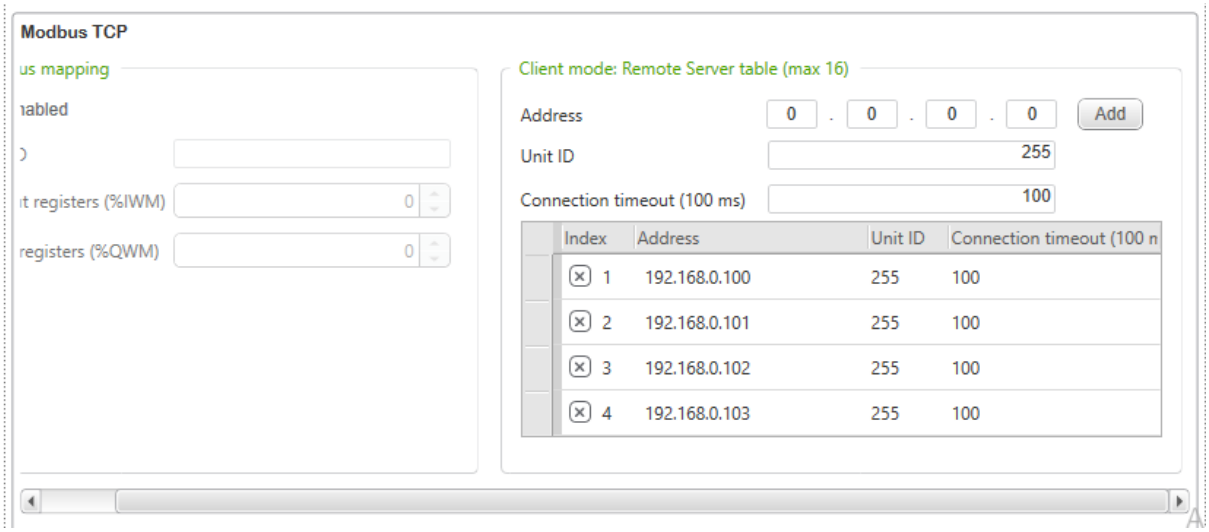


- **Click on Modbus TCP for the configuration of the Slave devices.**

Modbus TCP communication

MODBUS TCP Configuration :

- **Configuration of the Modbus TCP**



Modbus TCP Settings

- As per attached images you have require to type **IP Address** of the Slave device and Simply Click on **ADD** button.
- In this image in the totall4 slave devices configured.
  1. **192.168.0.100**
  2. **192.168.0.101**
  3. **192.168.0.102**
  4. **192.168.0.103**

- **First you have require to configure slave devices IP Address as per your controller IP Address series.**