smar - SIMULATIONVIEW

USER'S MANUAL

SimulationView

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SimulationView

Version 1

SI MUVI EWME

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INTRODUCTION

This user manual describes the features of the **SimulationView** application.

The **SimulationView** – Strategy Simulator is a software tool developed specifically to simulate control strategies with Foundation™ Fieldbus function blocks and ladder logic IEC 61131-3 standard.

Integrated to SYSTEM302

- It is not necessary to export configurations for simulation;
- Access data directly from **SYSTEM302** database;
- The **SYSTEM302** application tools use the simulation automatically and transparently;

OPC™ Communication

- The simulated data are visible through the **SYSTEM302 OPC™ Server**
- Any supervisory software and SCADA based on OPC™ can benefit from simulation.

SimulationView runs on Microsoft® Windows.

This manual refers to version 1 of **SimulationView** available on **SYSTEM302 version 8.2**.

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Section 1

INSTALLATION AND CONFIGURATION

Installation

SimulationView is installed by the **SYSTEM302** Installation media, along with all the other integrated applications you will use to configure, maintain and supervise your plant.

Please refer to the **SYSTEM302 Installation Guide**, which describes the procedures to install the **SYSTEM302**.

After installing the **SYSTEM302** get the **SimulationView - Strategy Simulator** license.

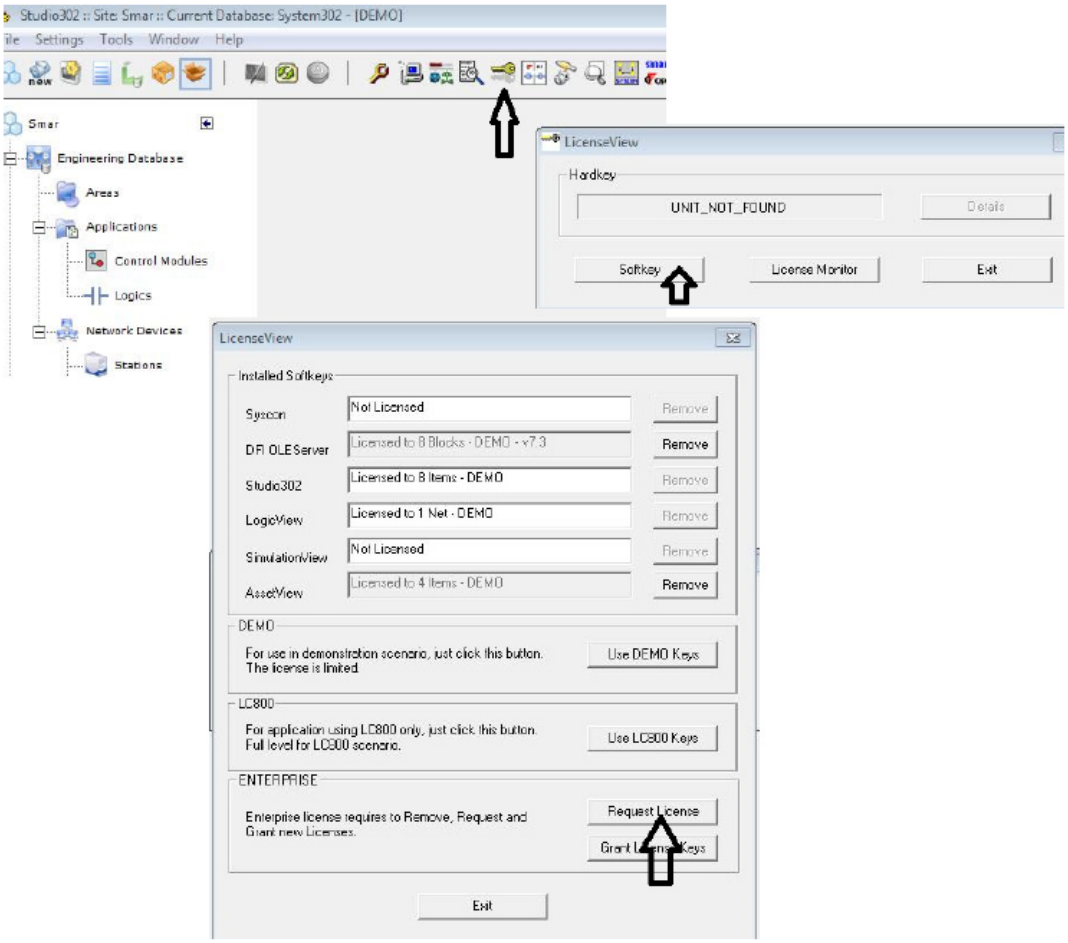
Getting a license

There are two ways to get the **SimulationView** license. One version is protected via Hard Lock (Hard Key) and another via software (Softkey).

When using Hard Key, just connect it in the appropriated computer port (parallel or USB ports).

When using SoftKey, it is necessary to get a License Key through a Smar contact. For this, use the application **LicenseView**, in the **Studio302** interface.

Click **Softkey**, and then, **Request License**.



Fill in the fields correctly, enter the **LN** (License Number) code that was received with the purchase of the product. See this code on the keyring that came with the installation media. A file (.zip) will be generated in the **\Smar\OleServers** folder for the user to send to Smar. Use the email

(techsupport@smar.com.br) or access the Technical Support channel through the website (www.smar.com.br).

After sending the email to Smar, a key will be generated according to the corresponding **LN** level. This key will be returned via the email informed in the previous form. This generation is not automatic and, therefore, you must wait for business hours.

After receiving the email from Smar, launch the **LicenseView** application again, enter the key obtained in the **DFI OLE Server** field and click **Grant License Keys**. If everything is correct, a message will notify you that the license has been accepted.

NOTE
The academic license has some limitations. For the simulation mode, **Syscon** and **LogicView for FFB** tools, included in the package, only can access one local OPC Server. The remote access is blocked to the academic license. Refer to **SYSTEM302 Installation Guide** for further information about licenses.

Starting the SimulationView

To start the simulation, launch the **SimulationView**.

In the **Studio302** toolbar click  - **SimulationView - Strategy Simulator**.

If the button is not activated, check the preferences in **File →Preferences**. Click the **SimulateView** tab and select the **Enable the System302 simulation mode** option.

However, to work with **SimulationView** first create a new network adapter, and configure it. See the next topic.

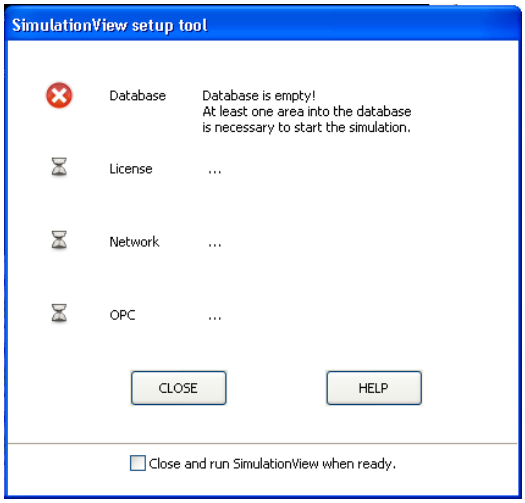
Configuration

SimulationView needs creating a new network adapter to work. This adapter is used exclusively for simulation, being isolated from the control network or corporate network. Or even, allowing you to work on a machine that does not have a network connection. This adapter will be automatically created by the **IP Configurator** tool at the first time that it was run. If there is any error and the interface is not created automatically refer to Appendix A for the manual creation procedure.

Setup tool

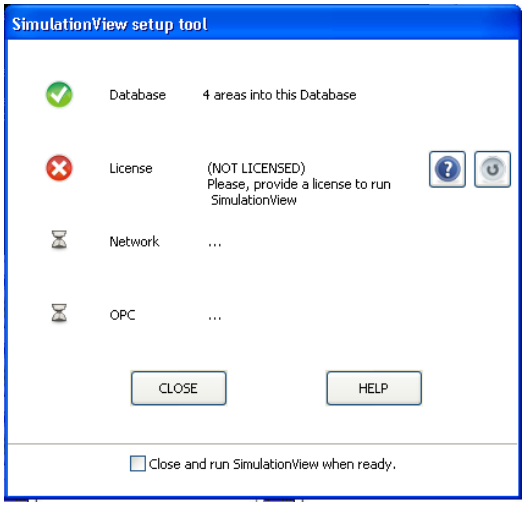
At each **SimulationView** execution the **Setup tool** will perform the configuration checking. They are:

Database checking
The **SimulationView** will run only if the database has at least one area. Otherwise, the following window will appear.



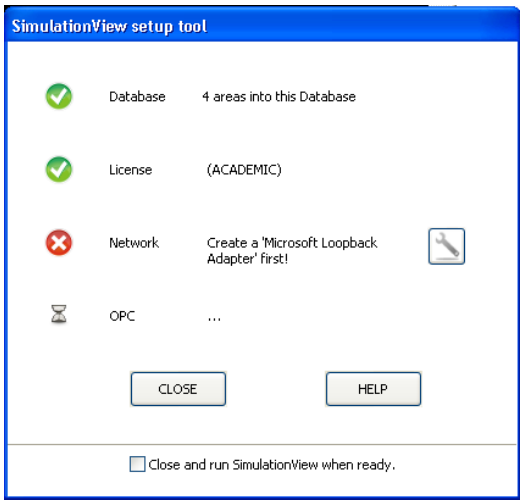
Create an area and try to run the **SimulationView**.

License checking
The **Setup tool** checks if the **SimulationView** is licensed. If noncompatible hard key is found neither a soft key the **Setup tool** does not allow the **SimulationView** execution.



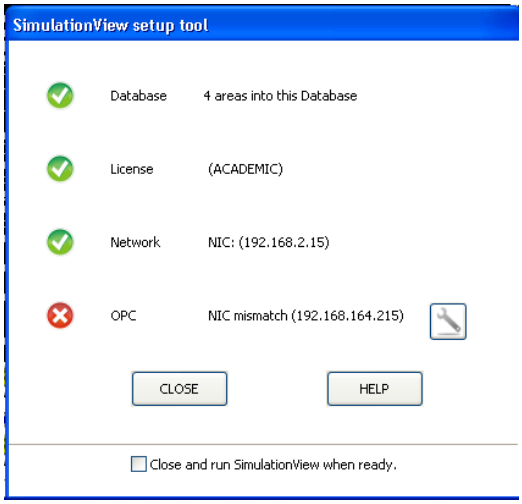
The figure above shows the license checking failure. Connect a *hardkey* or get a *softkey* and click the button  for a new checking. If the **Setup tool** has already closed run again the **SimulationView**. For further information refer to **Getting a license** topic.

Network checking
The **Setup tool** checks if there is a **Microsoft Loopback Adapter** properly installed.

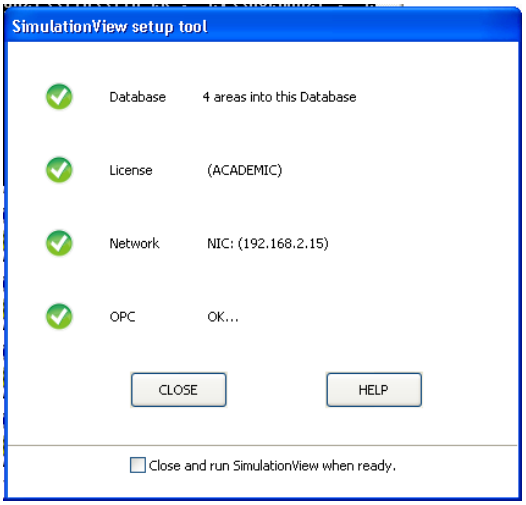


If it was not installed the **Setup tool** will show the detection failure as in the figure above. Click the button  to start the **IP Configurator.** For further details about this tool refer to **IP Configurator** topic.

OPC configuration checking
The **Setup tool** checks the **Smar OPC Server** configuration. This check compares the IP NIC with the one configured as **First IP** in the **IP Configurator** tool.

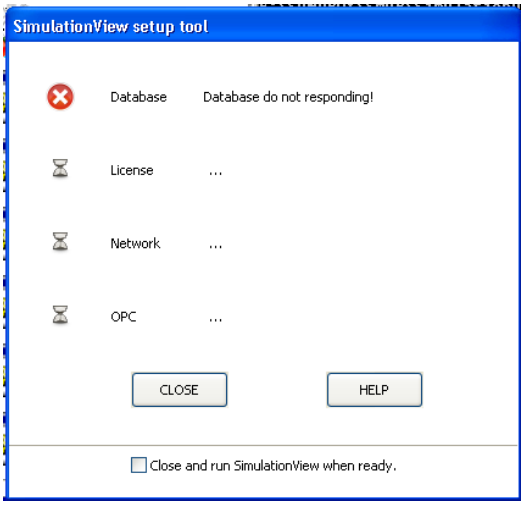


The previous window shows the NIC configured for network adapter different from the one used for simulation. Click the button  and the NIC will be configured with correct IP and the simulator will be ready to run. The **Setup tool** will appear as in the next figure.



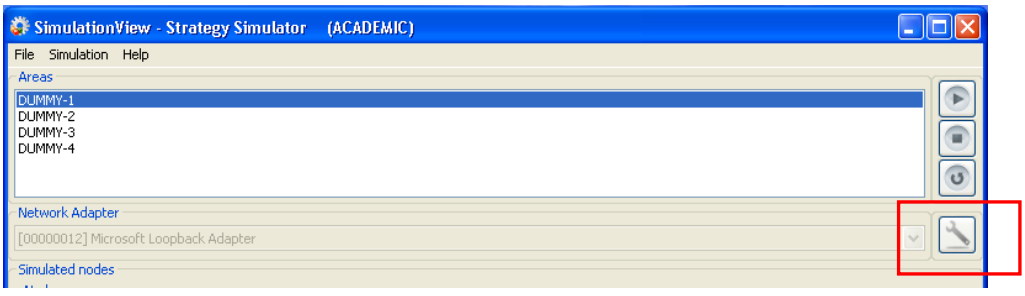
The window above shows the configuration ready to run on **SimulationView**. Select the **Close and run SimulationView when ready** option to run automatically the **SimulationView** if the configuration is correct. Even with this option checked the **Setup tool** will stop running the **SimulationView** when detect any inconsistency.

If there is any problem with the database and it was not detected the following window appears. In this case try restarting the database or restart the computer.

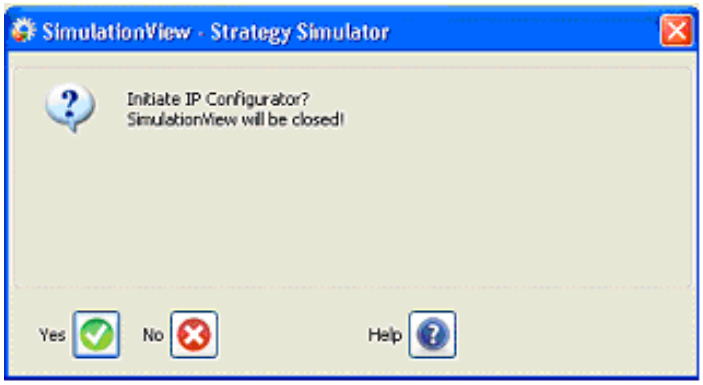


IP Configurator

The **IP configurator** tool is launched by the button  on the **Setup tool** interface or on the main **SimulationView** screen.



The following window will appear confirming that the **SimulationView** will be closed to initiate the **IP Configurator**. Click **Yes**.

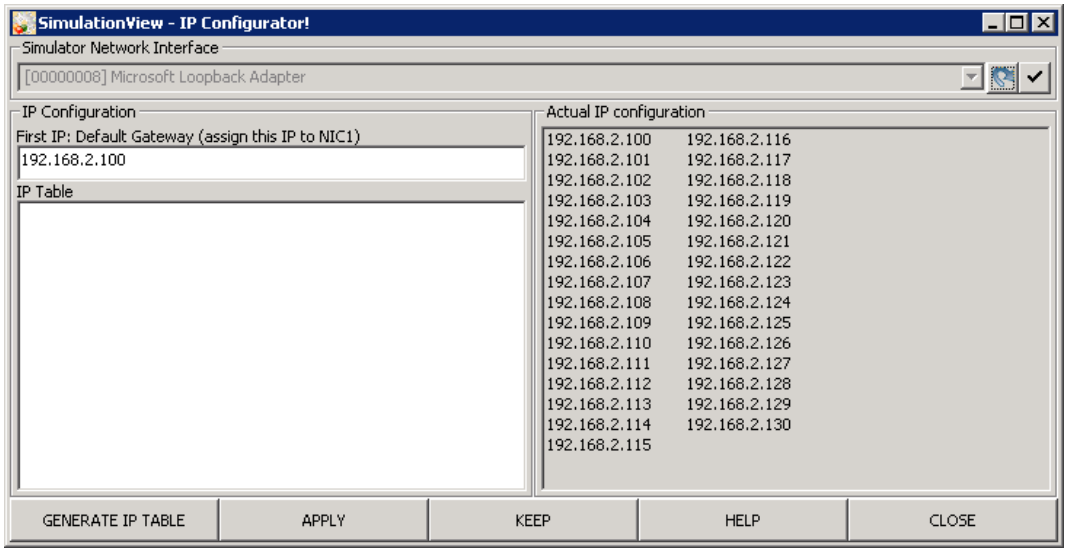


The **IP Configurator** tool is used to configure the IPs that will be used in simulation. Refer to the next topic to configure the Microsoft Loopback Adapter interface.

Configuring the "Microsoft Loopback Adapter" interface

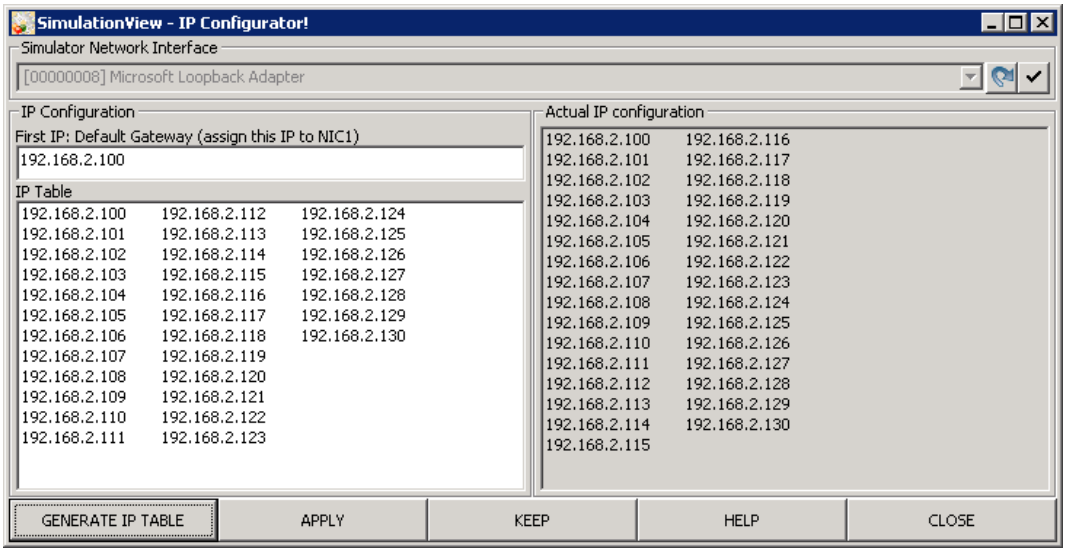
Now that we have a network adapter, we will configure it to use the **SimulationView**. The simulator uses network IPs the same way as the real equipment, so we need to configure 32 valid and not repeated IPs more one IP to be used by the Server.

1. In the **IP configurator** on the first **Simulator network interface** section the **Microsoft Loopback Adapter** interface should appear selected. If no interface is selected redo the step titled **Creating a Microsoft Loopback Adapter type network interface**. Refer to Appendixx A for further information.



2. In the section **IP Configuration** enter an IP number in the **First IP** field. Note that this first IP address must be used as address of OPC Server, and must not be used for any other purpose. This IP is of the **Microsoft Loopback Adapter** interface**.**

3. Click the **GENERATE IP TABLE** button to create a table with 32 IPs in sequence generated from the **First IP** that was chosen earlier. The IP sequence will appear in the **IP Table** field. See the following figure.



4. Click **APPLY** if you agree with the generated configuration. Otherwise, return to step 2 to generate another IP sequence.

5. If the **Actual IP Configuration** section has the correct IPs, click **KEEP** to maintain the configuration. Confirm the operation and click **CLOSE** to exit from the **IP Configurator**.

6. A confirmation message appears to confirm the IPs change. In case you confirm, the new configuration will be applied to the selected interface. In the **Actual IP configuration** section the current IPs are shown.

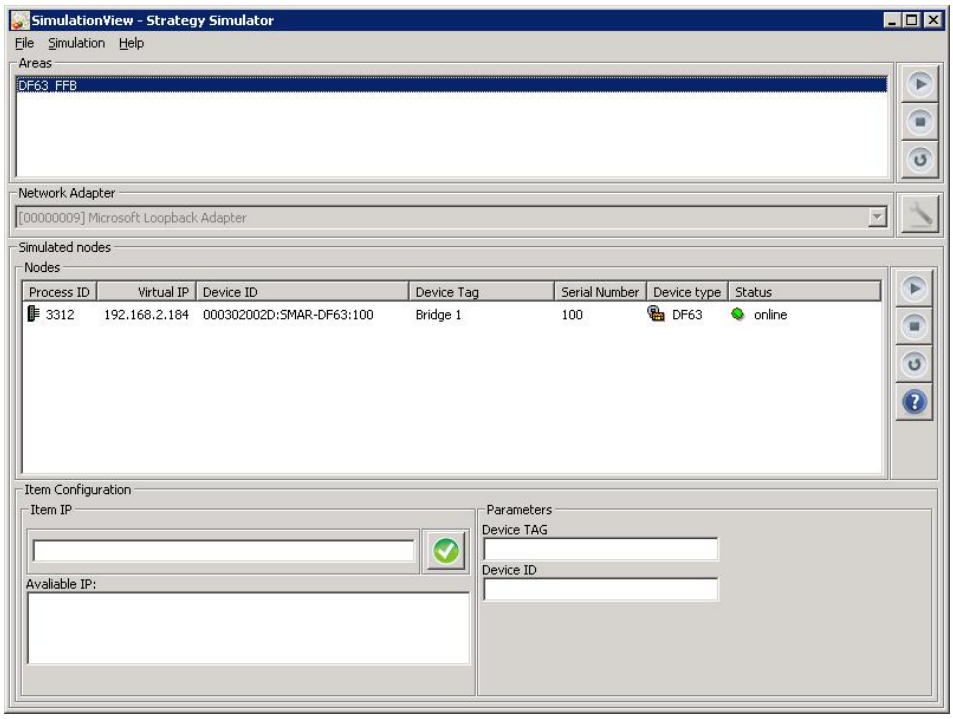
7. A success message appears indicating that the process finished.

8. Close the **IP configurator** and execute again the **SimulationView**.

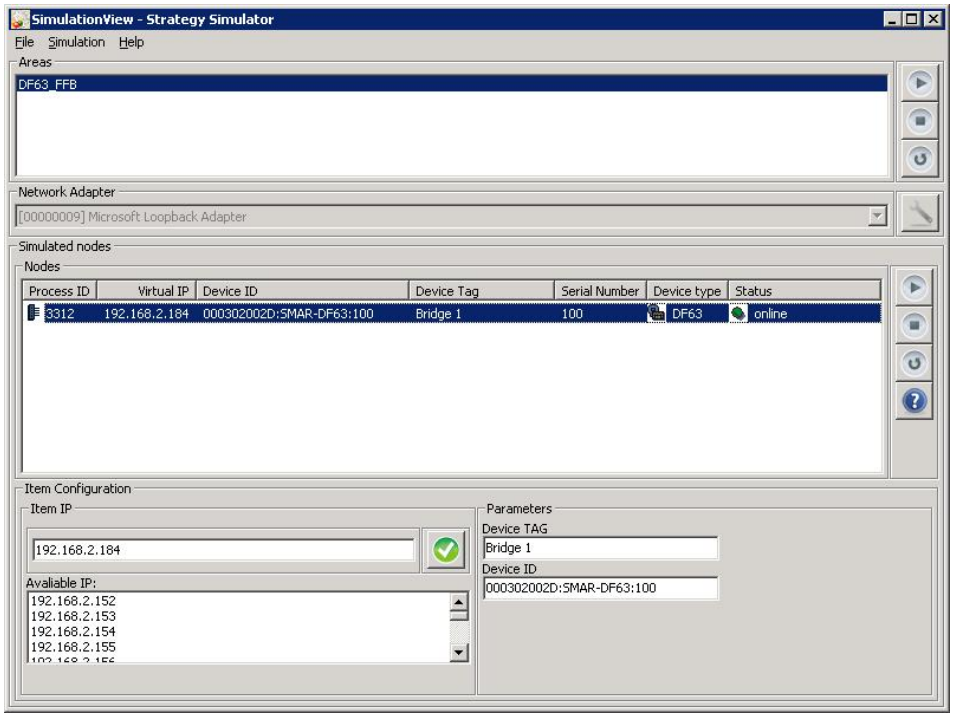
Configuring the IPs of the plant HSE devices

This procedure is optional on **SimulationView** because the IPs for all HSE devices in the plant are automatically configured.

In the main **SimulationView** window select one area in the **Areas** section. All areas of the **Studio302** database are listed here.



In the **Simulated nodes** section select the first item of the list.



In the **Item configuration** section**,** in the **Available IP** field, select the IP that will be assigned to the item, and double-click it.

Select the remaining items and proceed as described above for all HSE devices of all configurations.

NOTE
Remember do not select an IP that is assigned to the Server NIC in the **System302 ServerManager**.

Adjusting the System302 ServerManager to work with simulation

This procedure is optional on **SimulationView**, because the **Setup tool** always gives the option to configure the OPC. If the user needs to modify the configuration manually, follow the steps described in this section.

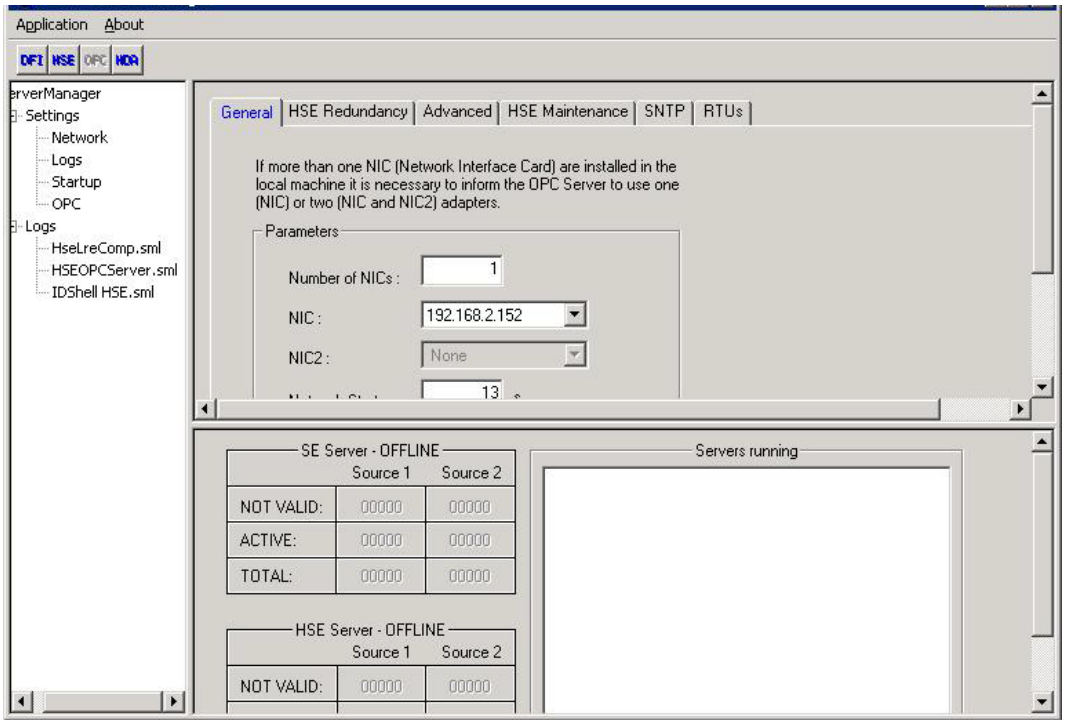
The simulation works with its own virtual network, so the user needs to inform the **SYSTEM302** that this network will be used, and not the automation network. If you are using an academic license the simulator only runs on this virtual network, and this configuration is not necessary.

To adjust the **System302 ServerManager** execute it. Click the **System302 ServerManager - OPC Server Management** icon in the **Studio302** toolbar.

The next window will appear:

Choose **Network**.

In the NIC option choose the first IP generated by **SimulationView - IP Configurator**, and click **Apply**. This IP is of the **Microsoft Loopback Adapter.**



Now the system is already configured to use the virtual network adapter.

Operation

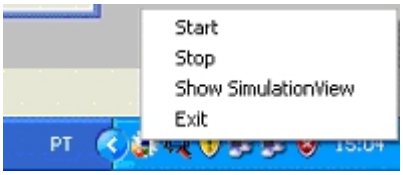
Start/Stop simulation through the notification icon

When the **SimulationView** is running the user can start, or stop the simulation through the icon that is on the **Windows Notification Area**.

Simulation stopped:

Simulation running:

To start or stop the simulation, access the contextual menu by right-clicking the **SimulationView** icon:



Select **Stop** to stop all areas in execution.

Select **Start** to start all database areas (areas properly configured).

To check if the simulation is running or not, besides the color of the icon, a notification message is also displayed when the mouse moves over it.

Simulation running:

Simulation stopped:

NOTES
• Starting or stopping the simulation by the notification bar, the **SYSTEM302** continues in simulation mode. Only the ladder and blocks processing stop. • Whenever the simulation is stopped and then restarted a configuration download via **Syscon** must be done. • The status of all TAGs of the OPC Server in the simulation mode are reported with "Local Override" substatus.

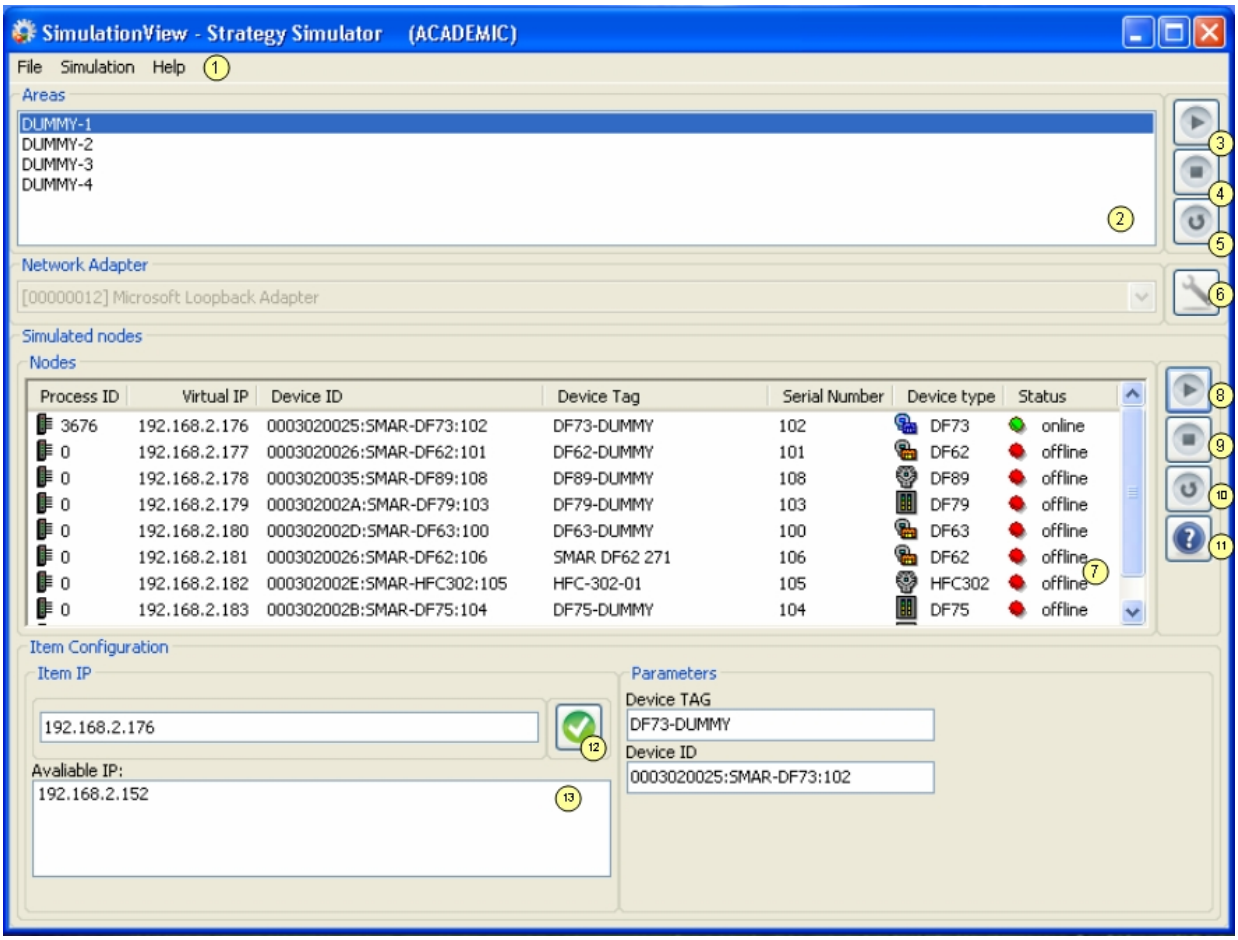
SimulationView Limits

Table of limits:

Maximum number of HSE devices per database	32
Maximum number of function blocks per simulation session	11264

NOTE
Depending on application, to use the maximum number of blocks and HSE equipment may cause loss of system performance, requiring that the computer configuration that runs the simulation is higher than that recommended by Smar to run **SYSTEM302** without simulation.

Understanding the main SimulationView screen



Here are the component parts of the main **SimulationView** screen.

1. **Main Menu**.

File

- *Exit*: Finishes the **SimulationView** stopping all simulation that is in progress.

Simulation

- *Launch the simulation*: Starts the simulation of all database areas.
- *Refresh*: Updates the areas list to be used when a new area is added to the database while the **SimulationView** is running.
- *Stop the Simulation*: Stops the current simulation.
- *Show simulation report*: Shows a summary of the number of devices in simulation. Only the HSE devices are represented in the simulation, all function blocks of devices connected to the bridge channels are simulated on the proper bridge.

Help

- *Content*: Opens the software's help.
- *About*: Shows the software version.

2. Areas

It lists all areas of the current database. This list is obtained directly from the **SYSTEM302** database.

3. Button 
It starts the simulation of all devices of this area.

4. Button 
It stops the simulation of all devices of this area.

5. Button 
It updates the list of areas. It is used when a new area is added to the database while the **SimulationView** is running.

6. Button 
It launches the network configurator. This tool is used to configure the network adapter that is used by **SimulationView**. See the **Configuring the "Microsoft Loopback Adapter" interface** topic.

7. Nodes
It lists the devices simulated of the area selected in 2. It lists the devices connected to HSE channel. Only the HSE devices are represented in the simulation, all function blocks of devices connected to the bridges' channels are simulated on the own bridge.

8. Button 
It starts the simulation for the device selected in 7.

9. Button 
It stops the simulation for the device selected in 7.

10. Button 
It updates the device list for the area selected in 2, and looks for processes that are running on background.

11. Button 
It opens the software help pointing to the "**Configuring the IPs of the HSE devices**" topic.

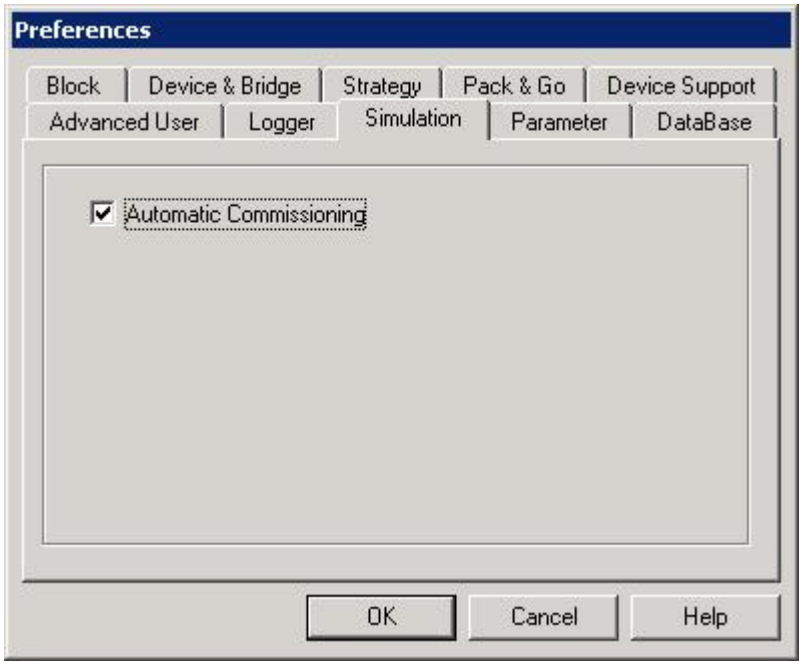
12. Button 
It assigns the IP selected in 13 to the device selected in 7.

13. Available IP
It lists the network adapter IPs used for simulation.

Viewing the simulation

To view the area simulation, click  - **SimulationView - Strategy Simulator** in the **Studio302** toolbar.

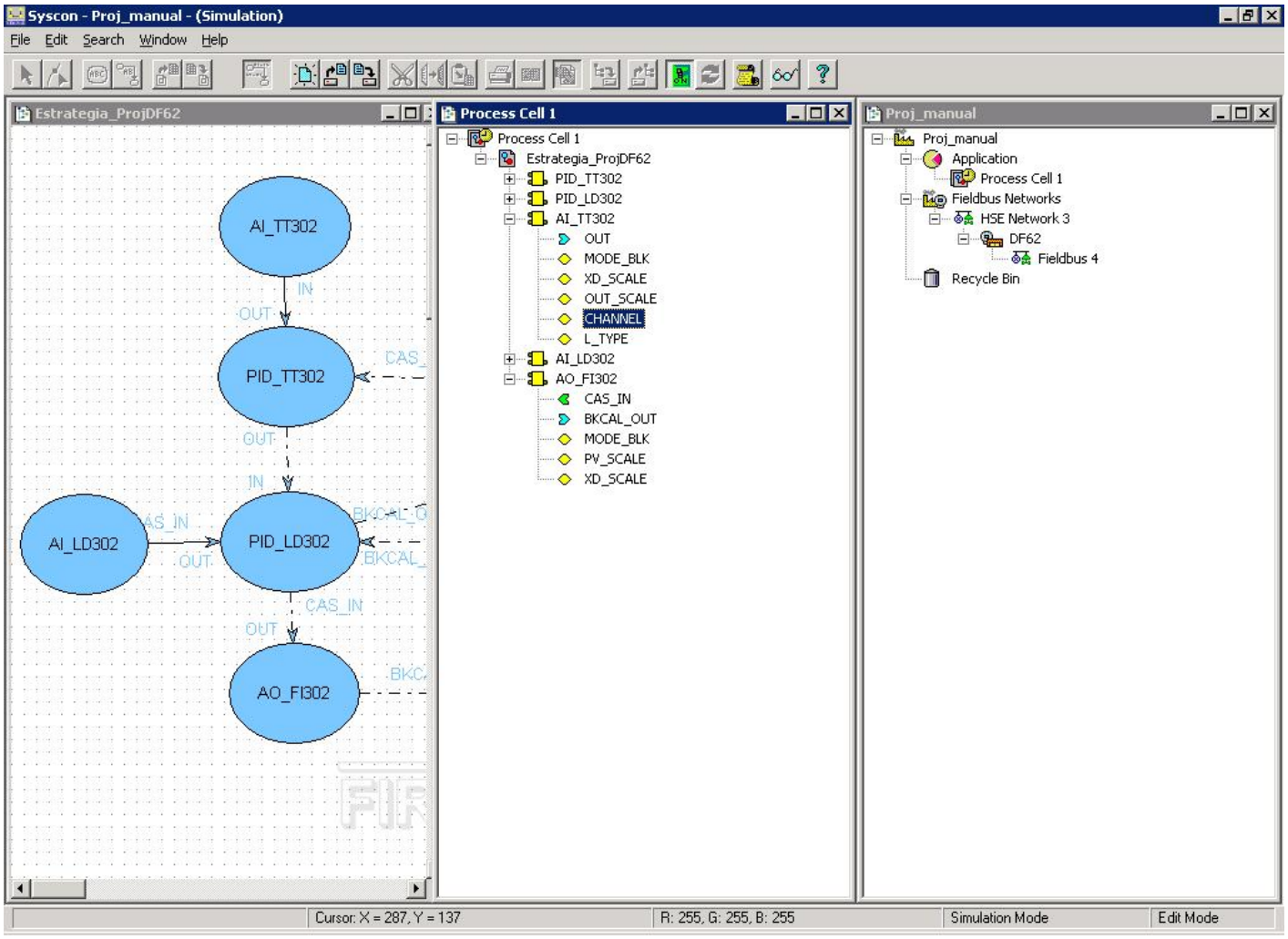
Run the **Syscon** by clicking  in the **Studio302** toolbar. Check if the automatic commissioning option is selected in the **Syscon**. Select **File →Preferences** on the main menu. Click the **Simulation** tab, and the following window will appear:



By default, the **Automatic Commissioning** option is already selected. Keep selected if you do not want to do the commissioning manually.

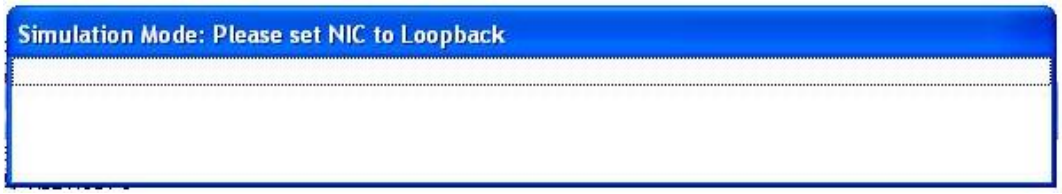
IMPORTANT
The commissioning process does the correlation between the actual and configuration devices and must be performed every time the plant is set on online. This procedure is optional for simulation; it can be used to train operators for this procedure.

Open the area that will be simulated in the **Studio302** interface. The file will open in **Syscon.** Then, active the **Online** mode by clicking  on the **Syscon** toolbar. A window similar to the following will appear.



The **Simulation** mode is indicated in the title bar by the text **(Simulation)** beside the area name. It is also indicated at the bottom of the window by Simulation Mode. Work normally as if in a real environment. For further details, please refer to **Syscon** manual.

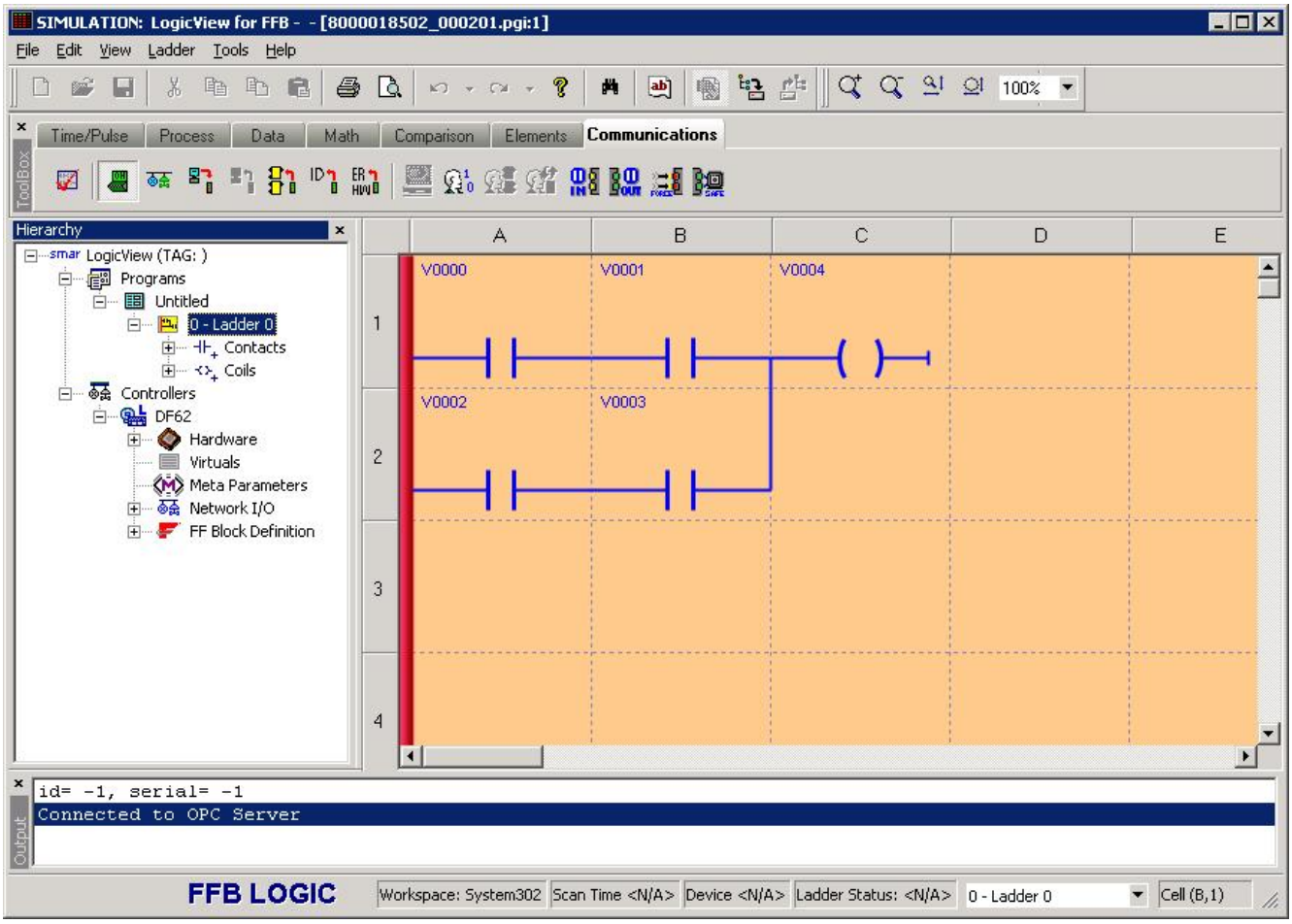
If the IP address configured in the simulation is different from the NIC the following error message appears immediately after the **Syscon** is set on **Online Mode**:



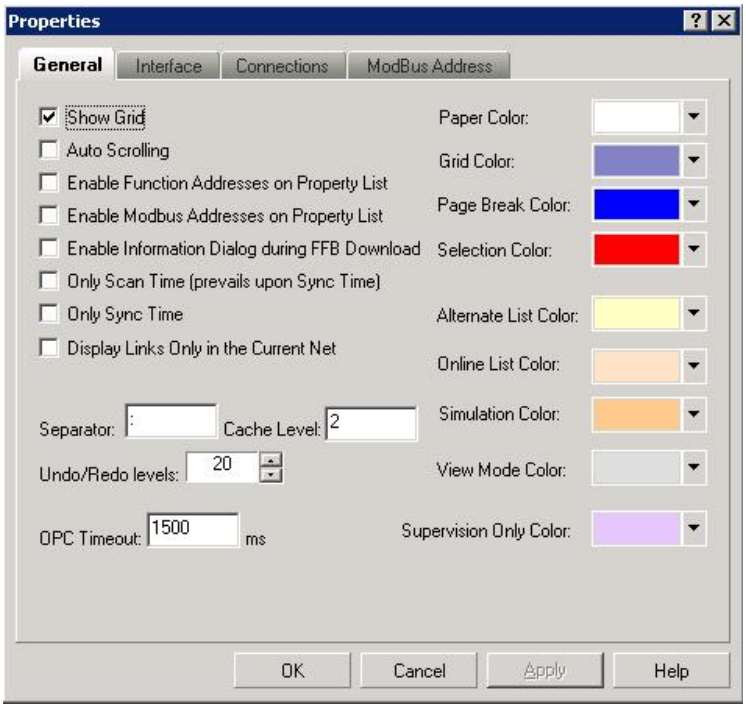
Stop the simulation, run the **System302 ServerManager** and configure correctly the IP of **Microsoft Loopback Adapter** interface.

The control logic also can be simulated in the **LogicView for FFB**. Edit the logic from the **Syscon** that should already be in simulation mode. Both **Syscon** and **LogicView for FFB** must be in **Online** mode.

A window similar to the following will appear.



The simulation mode is indicated in the title bar by the text **SIMULATION**. It is also indicated by the background color of the work area. This color can be changed in **Tools →Options**. The following window will appear:



In the **Simulation Color** option change the background color.
If the license is academic, when **LogicView for FFB** is set on online mode the remote server connection is disabled.

Work normally as if in a real environment. For further details, please refer to **LogicView for FFB** manual.

IMPORTANT
If the user wants to simulate a control strategy that is not configured for this, the user must quit the simulation mode, and only then, to configure the new area.

TROUBLESHOOTING

If you are experiencing difficulties with the simulator, the following Q & A topics may help you:

1. **I started the SimulationView and received the following message:**
"There is no loopback ethernet interface configured! The SimulationView Network configurator will be executed. Note that SimulationView will be closed and must be reinitiated after the configuration."
This message indicates that no network "**Microsoft Loopback Adapter**" was configured. Follow the instructions on **Creating a network interface "Microsoft Loopback Adapter"** topic to solve the problem. And then, launch the **SimulationView** again.

2. **I started the SimulationView and received the following message:**
"There are unconfigured equipments\n\nPlease Access SimulationView and configure IP for those equipments:"
This same message shows a device list (PD Tags). This message indicates that there are devices without IPs assigned. Follow the instructions on **Configuring the IPs of plant HSE devices** topic to solve the problem.

3. **The simulation is performing, but on Syscon all devices are without communication.**
Check on the Windows notification area if the **SimulationView** icon is present.
Moving the mouse over this icon it should display the message *SimulationView (running)*. If the message *SimulationView (stopped)* appears follow the instructions on **Start/Stop simulation through the notification icon** topic.

4. **I started the SimulationView and received the following message:**
Title "*Fail configuring IP!"* and the message "*There are no free IP to use! The selected network adapter doesn't have the number of IP necessary to simulate your entire database. Or you are trying to simulate more than 32 equipments at the same time."*

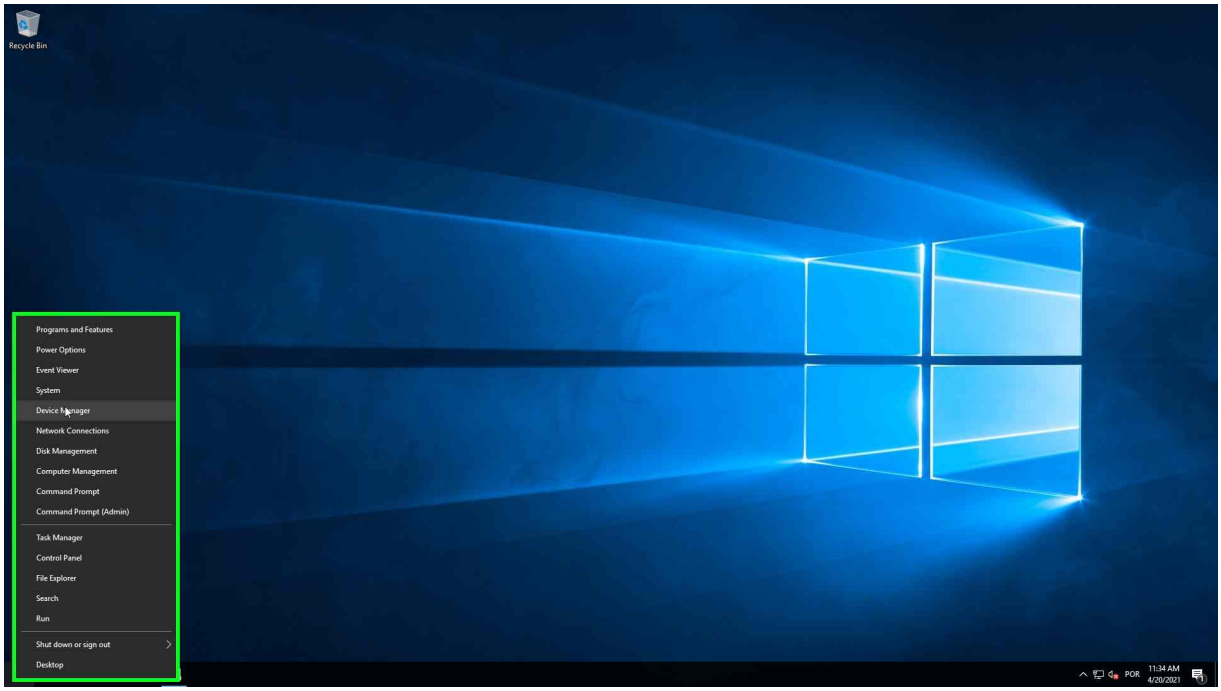
First hypothesis: You have selected various areas to be simulated and the total number of HSE devices exceeded 32. See the **SimulationView Limits** topic.

Solution: Exit from **SimulationView**, and on **Studio302** select only the configurations that are necessary at this moment. Try starting the **SimulationView** again.

CREATING A "MICROSOFT LOOPBACK ADAPTER" TYPE NETWORK INTERFACE

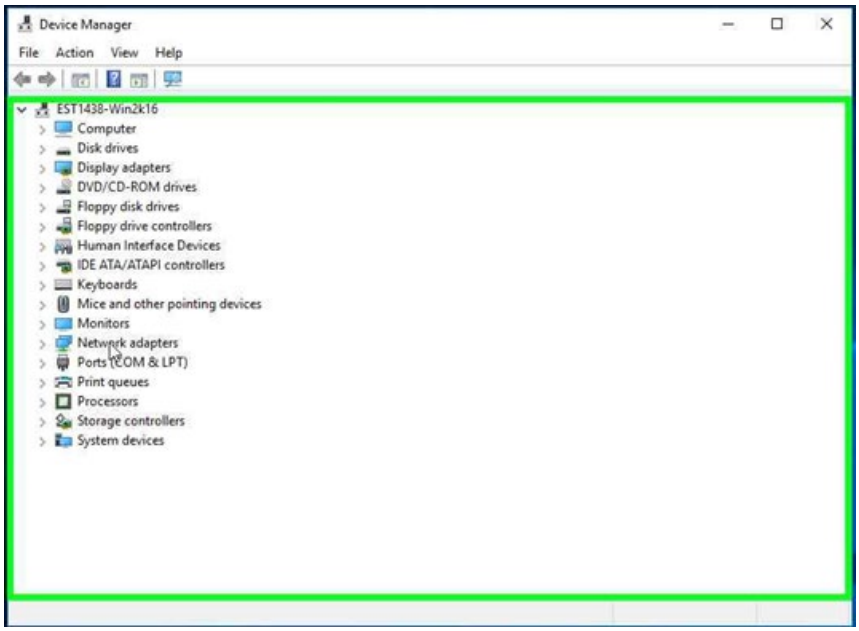
Follow the steps bellow to create a network interface Microsoft Loopback Adapter, using the Windows 10 operating system.

Step 1 – Right-click the **Start** button, and the following window will appear:



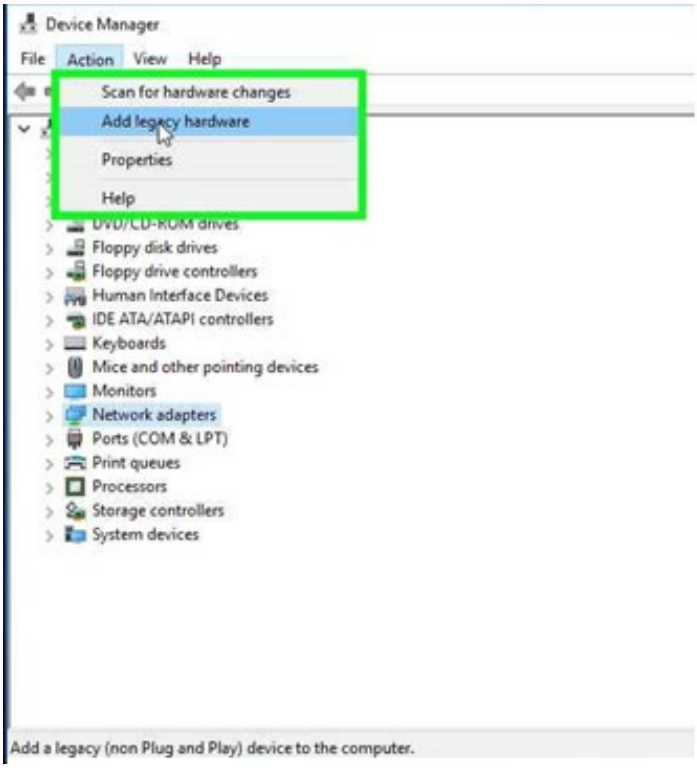
Step 2 - Select **Device Manager**.

Step 3 – In the **Device Manager** window, select **Network Adapter**. See the next figure.

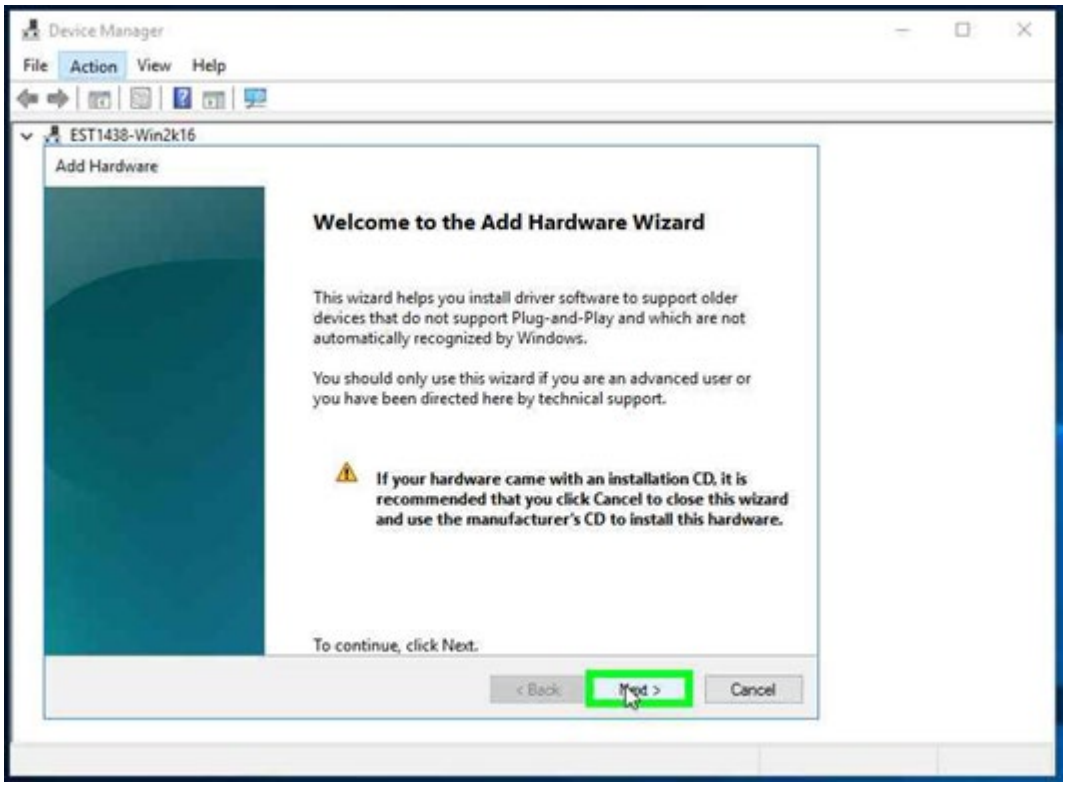


Step 4 – Click the **Action** option in the menu of **Device Manager** window.

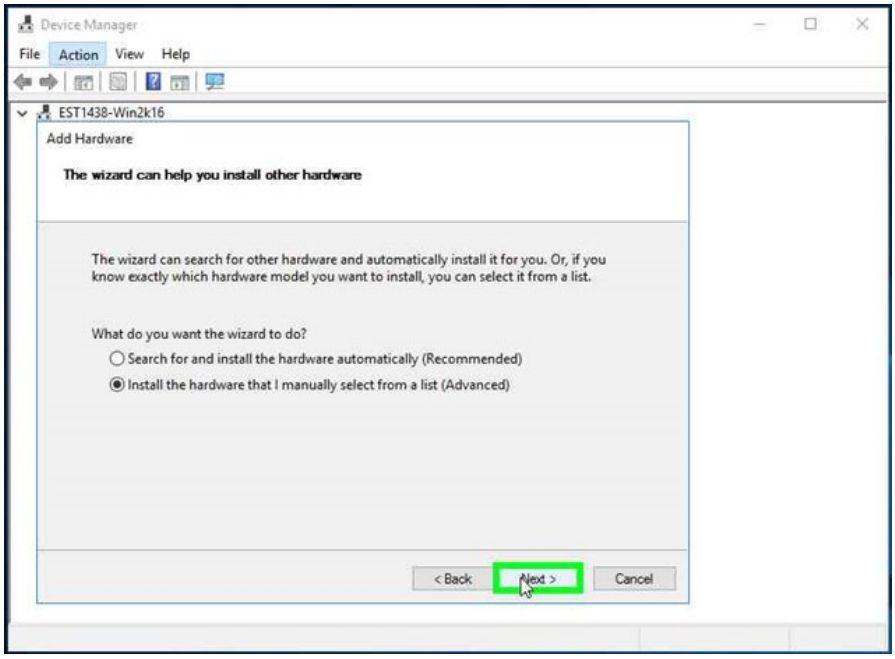
Step 5 – Select **Add legacy hardware**. See the next figure:



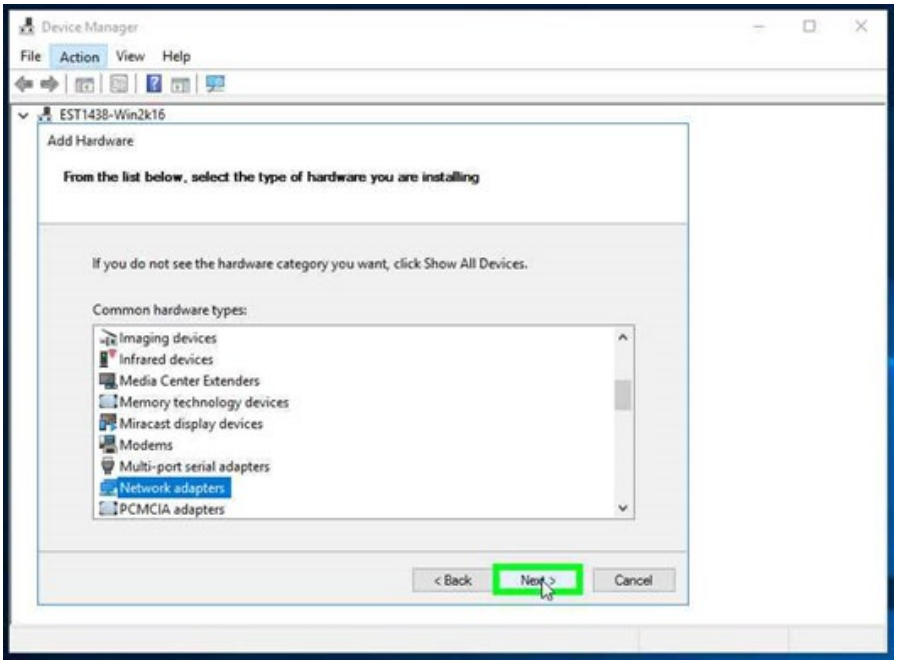
Step 6 – In the window that will appear, click **Next**.



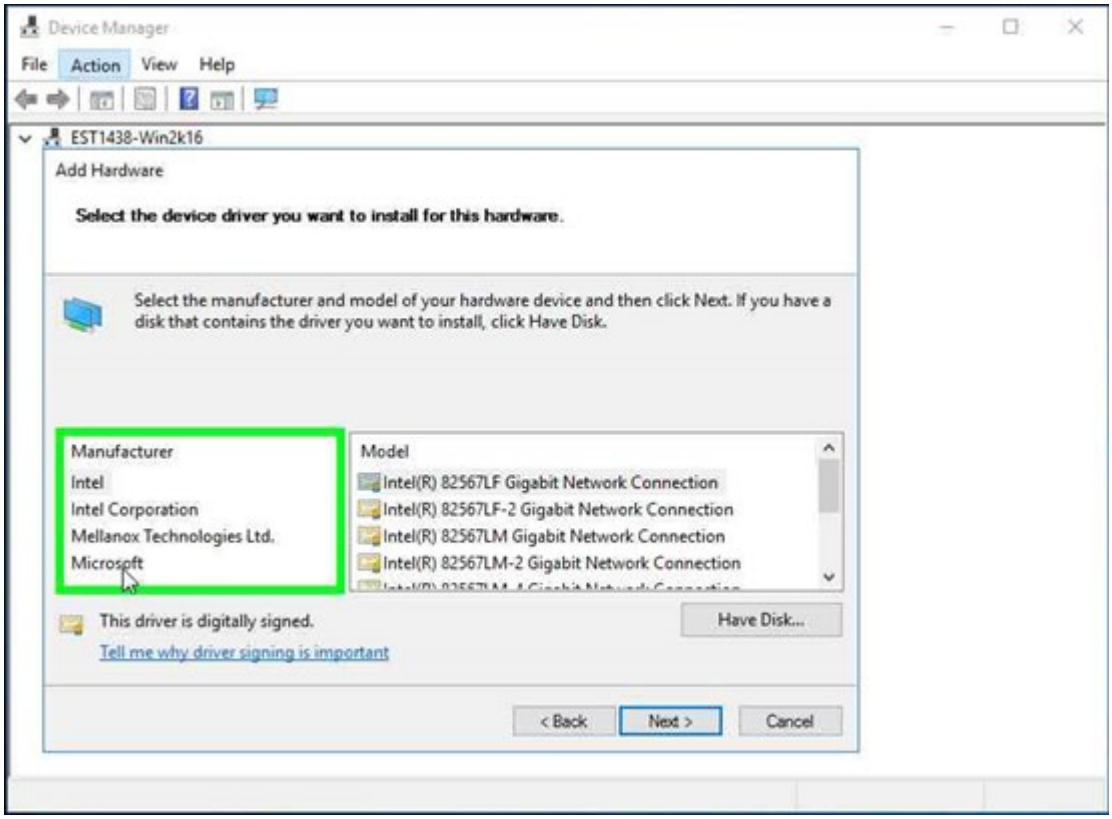
Step 7 – Select the option **Install the hardware that I manually select from a list (Advanced)**, and then, click **Next.**



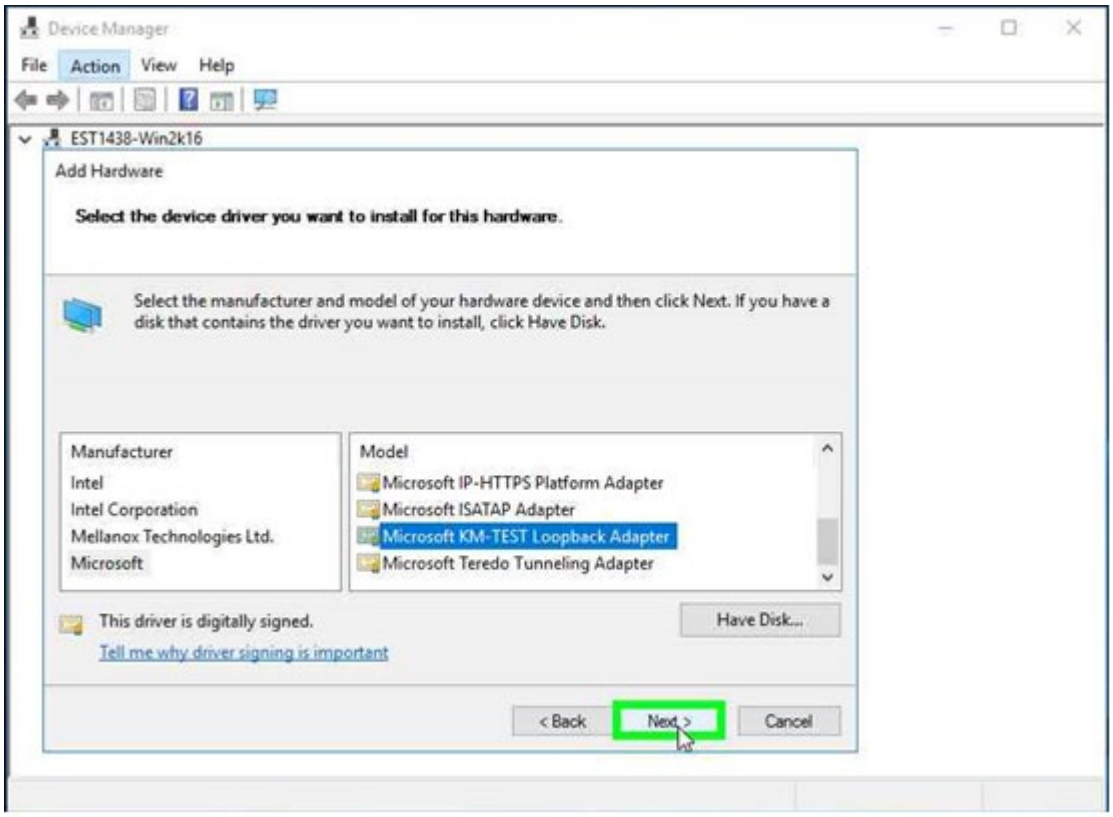
Step 8 – Select **Network Adapters** in the list, and then, click **Next**.



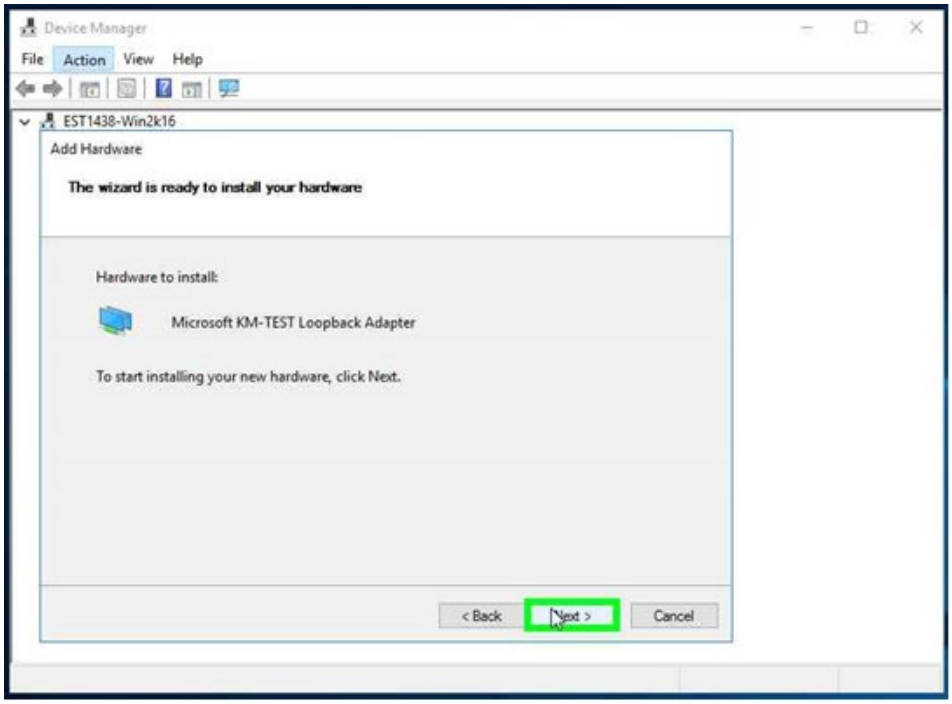
Step 9 – Select **Microsoft** in the manufacturers list.



Step 10 – Select **Microsoft KM-TEST Loopback Adapter** from the Model list, and then, click **Next**.



Step 11 – To start installing the new hardware, click **Next** again.



Step 12 – The installation is complete. Click **Finish** to close the wizard.