How to configure Logix Emulate in Studio 5000

This guide shows you how to configure Logix Emulate in Studio 5000, from exploring the emulated ControlLogix rack to testing a ladder logic rung on an emulated controller. You configure the RSLinx Classic Virtual Backplane driver, set up FactoryTalk Linx, create an emulated controller, and download a project from Logix Designer. You then toggle a test input and watch the output respond.

Studio 5000 Logix Emulate is a software tool for learning, programming, testing, and simulating PLC (Programmable Logic Controller) automation projects. You can use it for education and for real-world engineering tasks, such as verifying new or existing PLC logic sequences. It is part of the Studio 5000 suite, which also includes Logix Designer.

Prerequisites

Before you begin, make sure you have the following:

- Studio 5000 Logix Emulate. It is included with the professional-level license of Studio 5000 Logix Designer. You can also purchase it separately for approximately $2,000.
- Studio 5000 Logix Designer.
- RSLinx Classic, which runs alongside Logix Emulate.
- FactoryTalk View Studio with a project that includes a FactoryTalk Linx (RSLinx Enterprise) server, if you want to connect an HMI application to the emulator.

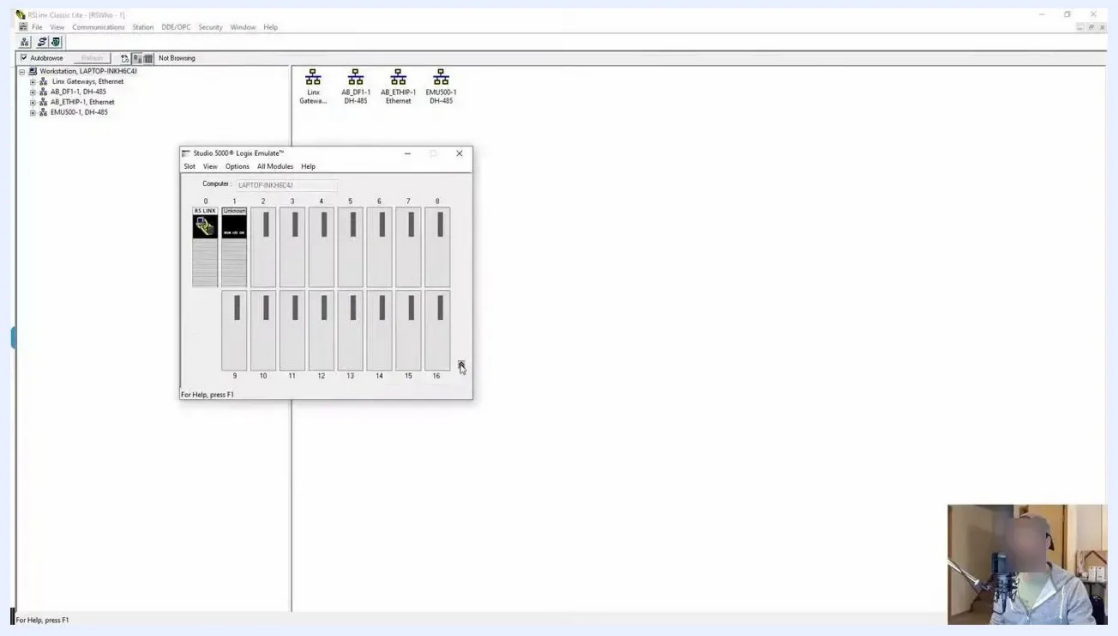
Explore the Logix Emulate rack

Step 1: Examine the rack interface

Logix Emulate visually represents a ControlLogix PLC rack. The rack lets you insert modules into each slot, which simulates the configuration of a real PLC chassis.

- The rack has slots numbered 0 to 16.
- By default, slots 0 to 8 are visible.
- You can expand the window to view all 17 slots (0–16).
- You can resize or minimize the interface as needed.

Expand the rack window to show all available slots.



Studio 5000 Logix Emulate rack interface showing slots 0–16, with RS LINX and Unknown modules in slots 0 and 1

Step 2: Identify the default modules

Two modules are typically present by default when you launch the emulator:

- **Slot 0:** the "RS LINX" module, which connects RSLinx Classic to the emulator rack.
- **Slot 1:** a module labeled "Unknown," which is actually for RSLinx Enterprise (now called FactoryTalk Linx).

Hover over the "Unknown" module to display additional information, such as "(16#0000) unknown" and revision and serial number fields.



Studio 5000 Logix Emulate rack with a tooltip visible for the Unknown module in slot 1

Each module has a distinct purpose:

- The RS LINX module in slot 0 enables communication between RSLinx Classic and the emulator rack. You need this connection to download programs from Logix Designer to the emulated controller and to go online with it.
- The "Unknown" module in slot 1 is for FactoryTalk Linx (formerly RSLinx Enterprise). It handles communications with FactoryTalk View and other Rockwell software.

The "Unknown" module in slot 1 is the communication software inside FactoryTalk View. HMI (Human-Machine Interface) applications use it to communicate with a PLC. You can use it to connect your HMI application directly to Logix Emulate.

Step 3: Select and work with slots

Click any slot to select it. A colored border highlights the selected slot.

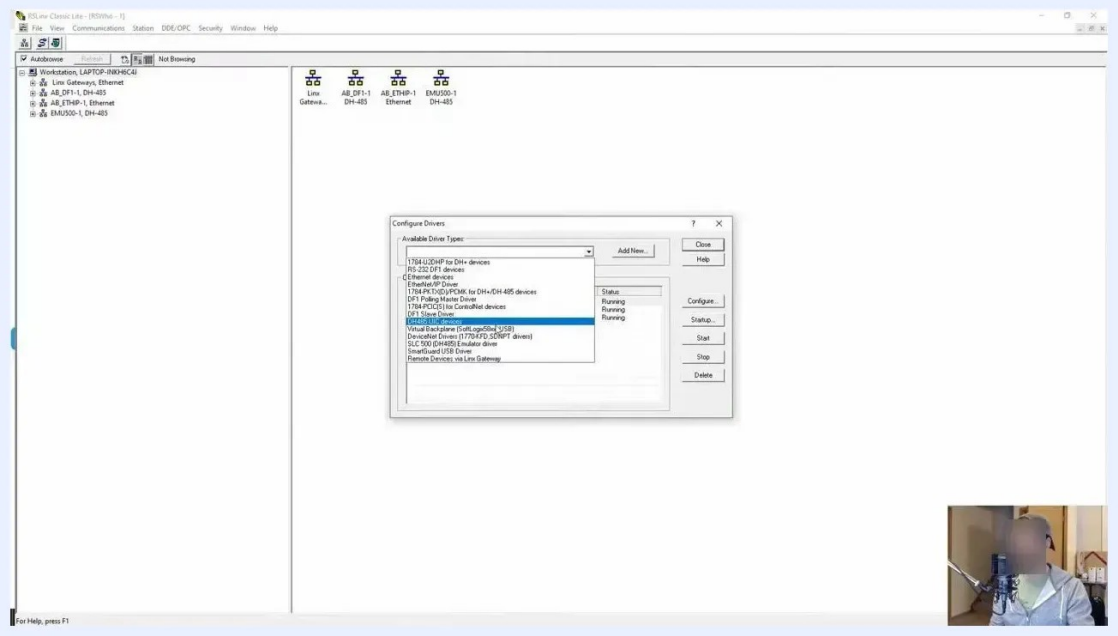
You can right-click a slot or use the menu options to insert or configure modules in it. The following steps cover creating a controller in a slot.

Configure RSLinx Classic for Logix Emulate

By default, the RS LINX and "Unknown" modules occupy slots 0 and 1. Many projects require the controller to be in slot 0, and sometimes another controller in slot 1. Moving the default modules out of the way is therefore often helpful. The next sections move them to higher slots.

Step 4: Open the Configure Drivers dialog in RSLinx Classic

1. Locate the RSLinx Classic window in the background.
2. In the menu bar, click **Communications**.
3. From the drop-down menu, select **Configure Drivers...**.

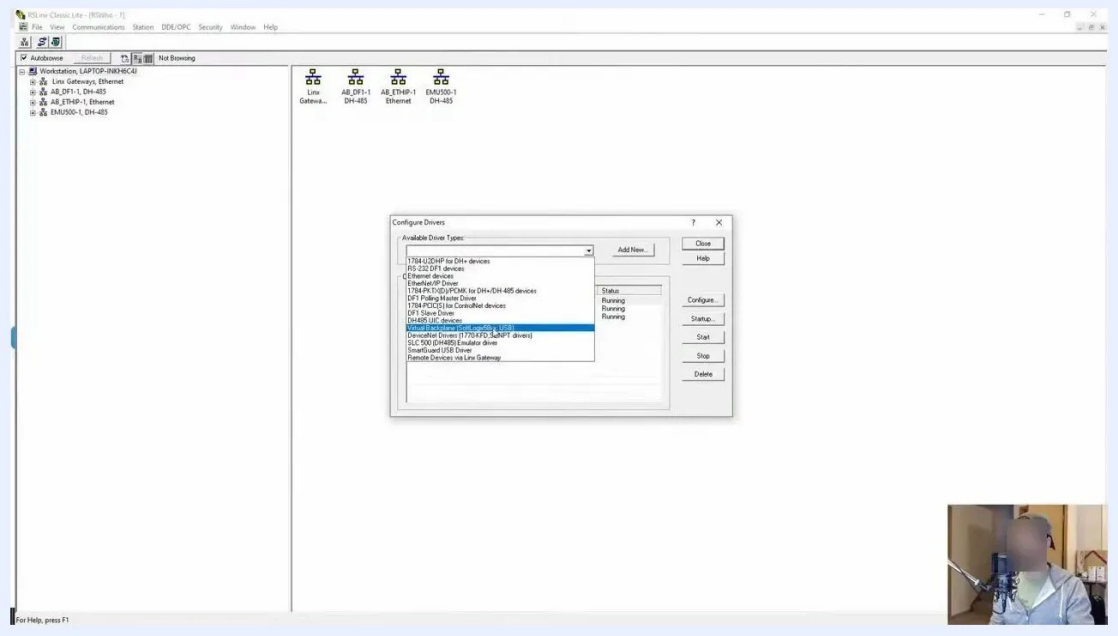


RSLinx Classic window with the Communications menu open and Configure Drivers highlighted

Step 5: Select the Virtual Backplane driver type

1. In the Configure Drivers dialog, find the **Available Driver Types** drop-down menu.
2. Click the drop-down and scroll to select **Virtual Backplane (SoftLogix58xx, USB)**.

You need this driver to communicate with a Logix Emulate controller.

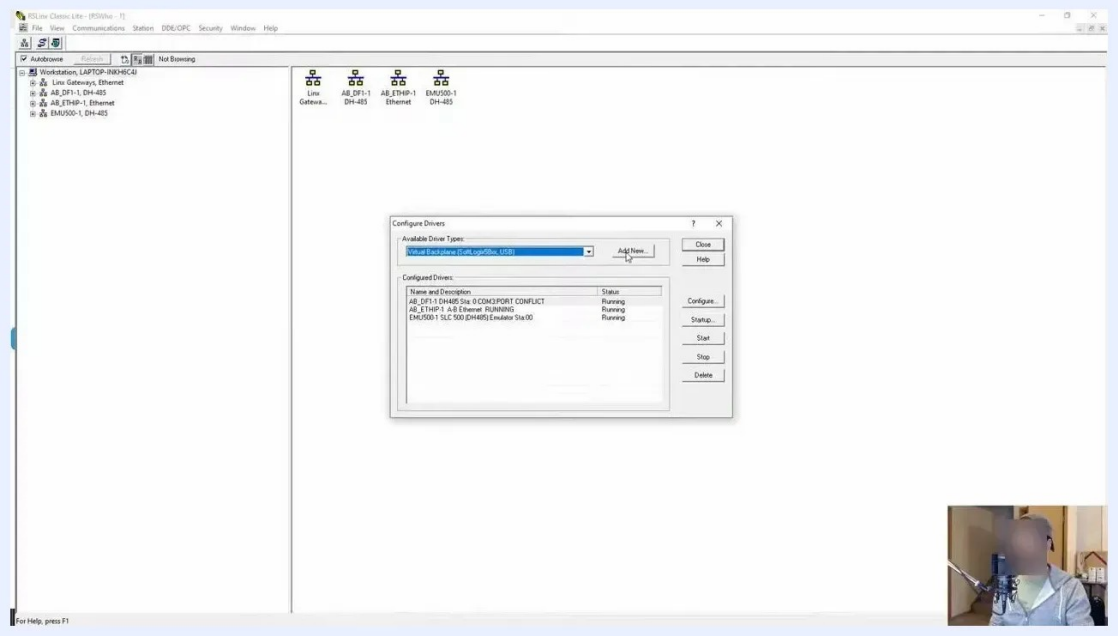


Configure Drivers dialog in RSLinx Classic with Virtual Backplane (SoftLogix58xx, USB) selected in the driver list

Step 6: Add the Virtual Backplane driver

1. Make sure **Virtual Backplane (SoftLogix58xx, USB)** is still selected in the **Available Driver Types** drop-down menu.
2. Click **Add New...**.
3. Accept the default driver name when prompted, unless you have a specific naming convention for your environment.

The **Configured Drivers** list now displays the new driver. Confirm that its status is "Running."



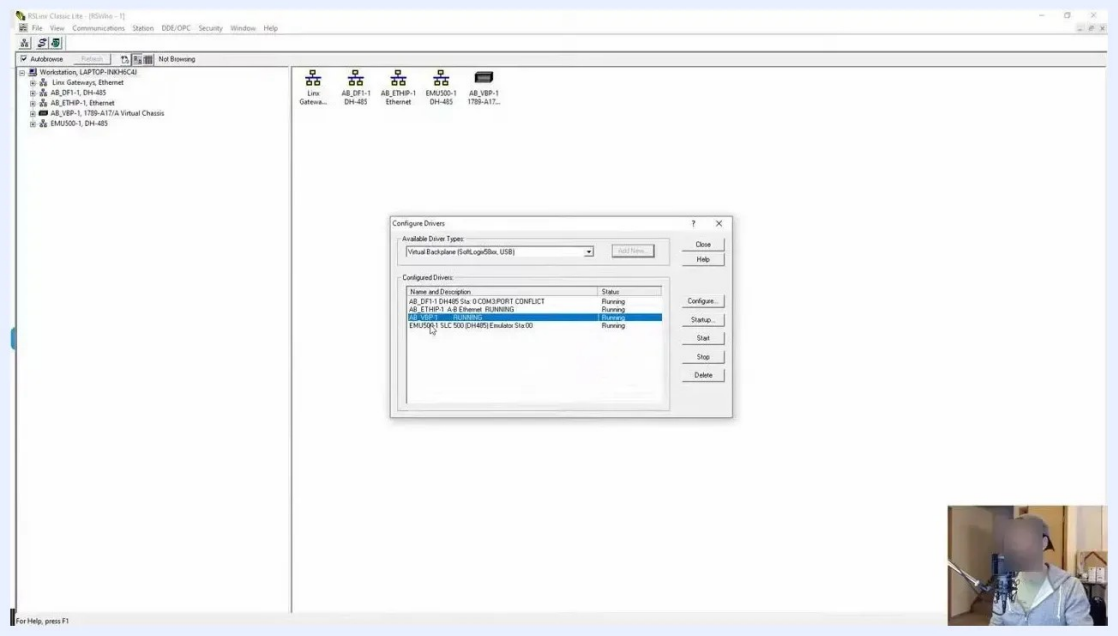
Configure Drivers dialog with Virtual Backplane (SoftLogix58xx, USB) selected and the Add New button being clicked, with the list of configured drivers and their statuses

Step 7: Select the slot number for the Virtual Backplane driver

The Configure VirtualBackplane dialog displays "Device Name: AB_VBP-1."

1. Open the dropdown menu labeled "Slot Number."
2. Select a slot that is well out of the way. This guide uses slot 16.
3. Confirm your selection and click **OK**.

The dropdown in the screenshot shows options 0, 1, 2, and 3. To choose slot 16, you may need to scroll the list or enter the value manually.



Configure VirtualBackplane dialog with the slot number dropdown open, showing options 0, 1, 2, and 3

The Configure Drivers window now shows the new driver in the list. Make sure the status for "AB_VBP-1" is "RUNNING."

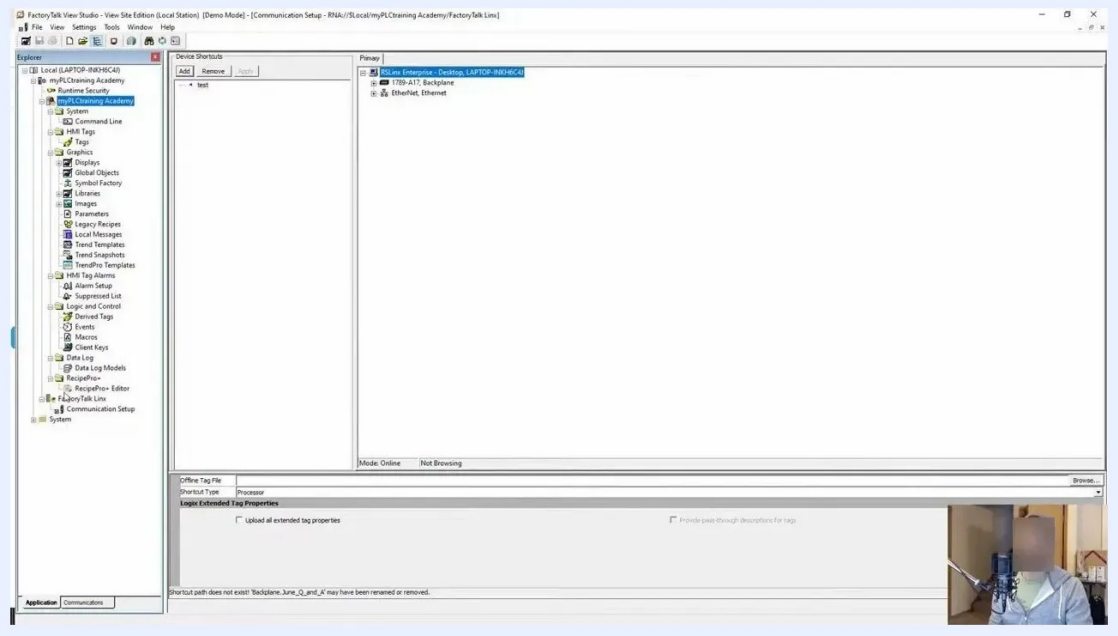
Clearing slot 0 matters because most projects assign the controller to slot 0.

Step 8: Verify the slot assignment in Logix Emulate

Bring up the Studio 5000 Logix Emulate window. The chassis view should now show that slot 0 is cleared and the RS Linx module has moved to the new slot, slot 16.

- Hover over slot 0. It should show as "Unknown" or empty.

- Check that slot 16 displays the RS Linx module.

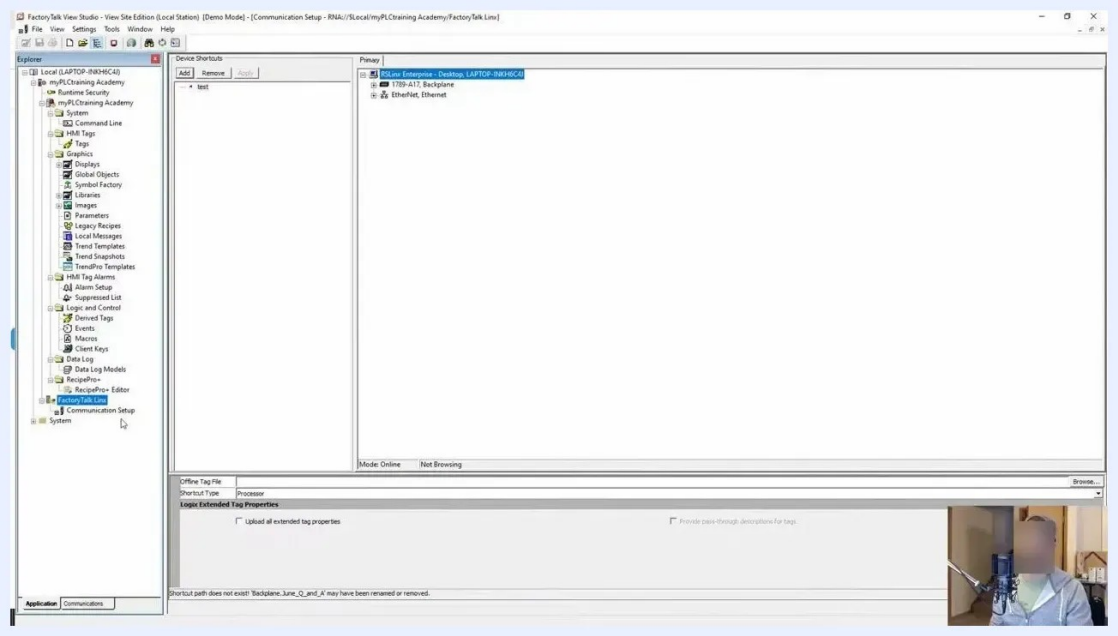


Studio 5000 Logix Emulate window showing slot 0 cleared and the RS Linx module in slot 16

Configure FactoryTalk Linx

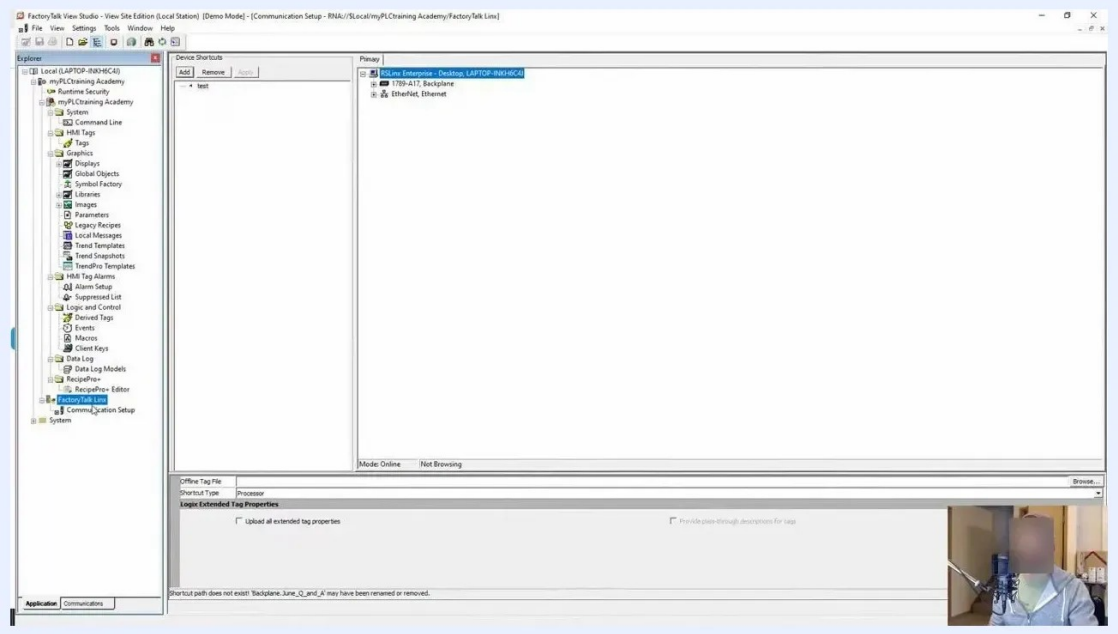
Step 9: Open the FactoryTalk Linx configuration

First, verify that your project includes a FactoryTalk Linx or RSLinx Enterprise server setup. In FactoryTalk View Studio, go to the "Explorer" pane and confirm that "FactoryTalk Linx" or "RSLinx Enterprise" is listed in your project tree.



FactoryTalk View Studio with FactoryTalk Linx highlighted in the project tree

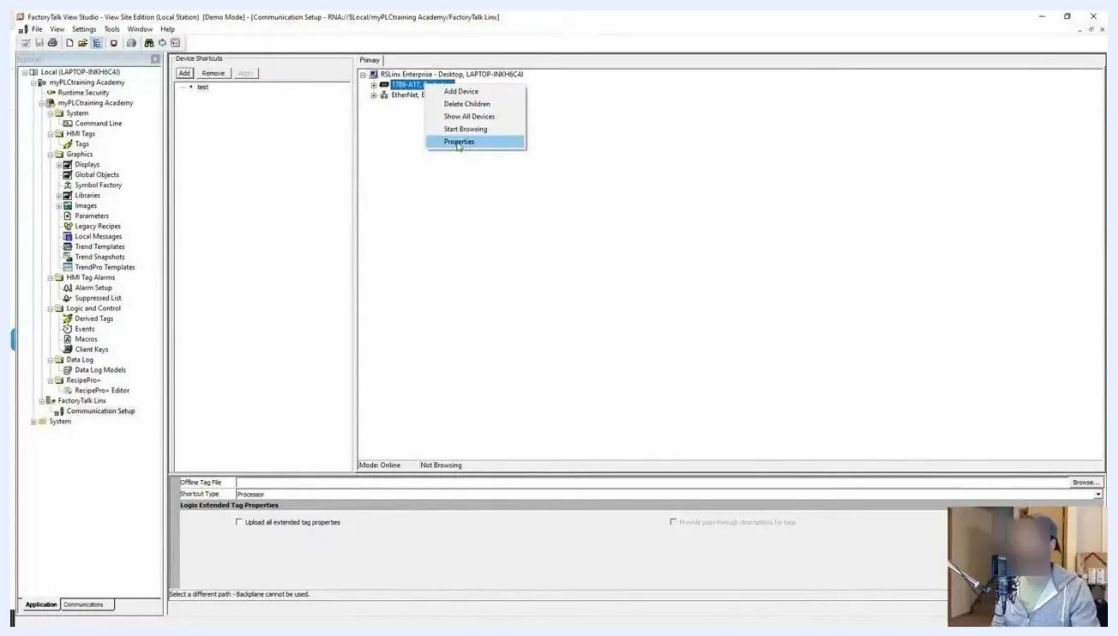
Next, click "FactoryTalk Linx" in the project tree to display the communication setup. The "Device Shortcuts" and "Primary" panels should show the RSLinx Enterprise server and the available backplane and ethernet devices.



FactoryTalk View Studio showing RSLinx Enterprise and the backplane in the Primary panel

Step 10: Open the properties for the backplane driver

The "Primary" panel displays "RSLinx Enterprise – Desktop" with a "1799-A17, Backplane" entry. This entry is the Enterprise (FactoryTalk Linx) version of the Virtual Backplane driver you set up in RSLinx Classic.



FactoryTalk View Studio with RSLinx Enterprise and 1799-A17, Backplane highlighted, ready for a right-click

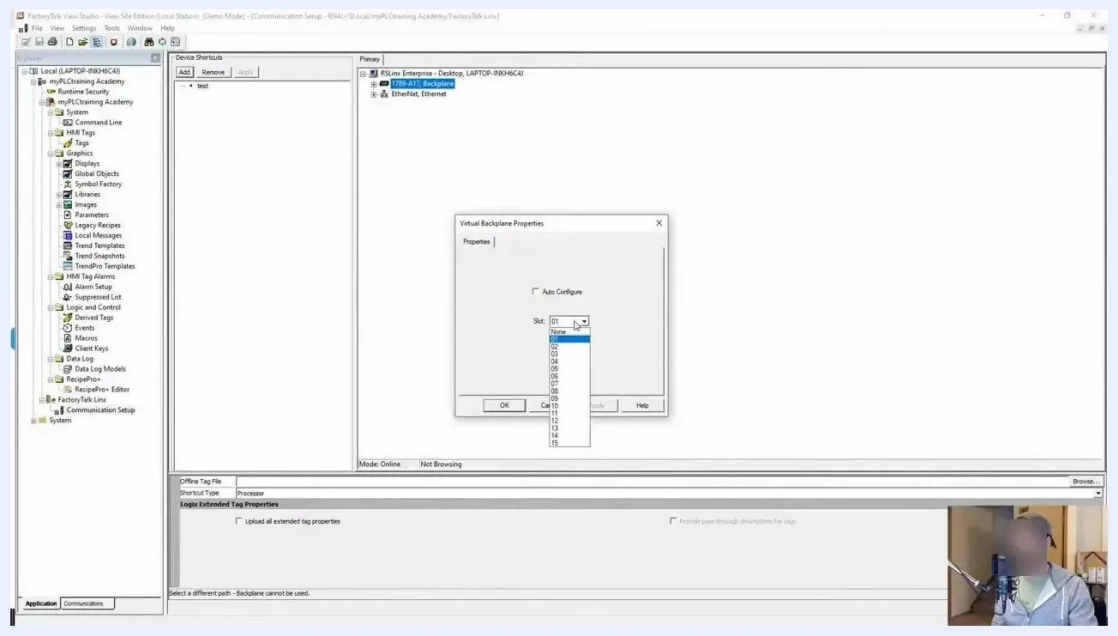
1. Right-click "1799-A17, Backplane" in the Primary panel.
2. In the context menu, select "Properties."

This opens the "Virtual Backplane Properties" dialog.

Step 11: Assign the backplane driver to slot 15

1. In the Virtual Backplane Properties dialog, make sure "Auto Configure" is unchecked.

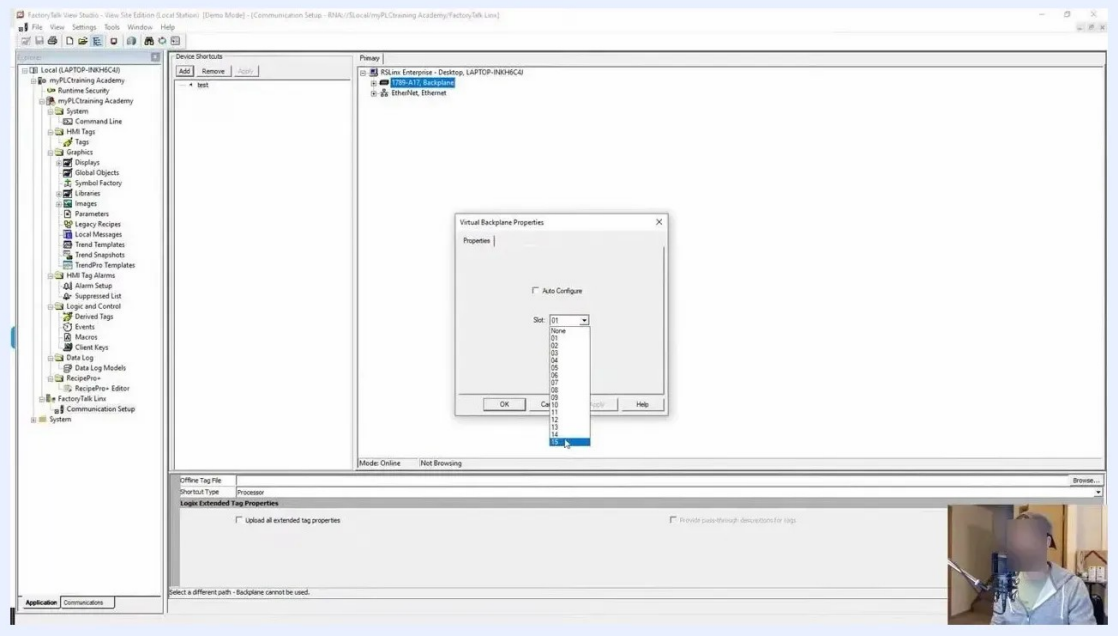
2. Open the dropdown menu labeled "Slot." It displays "None" and options 01 through 15. The current selection is "01."



Virtual Backplane Properties dialog with the slot dropdown open, showing slot options 01–15

3. Select "15" in the slot dropdown.
4. Click "OK" to confirm.

This assigns the Virtual Backplane driver to slot 15.

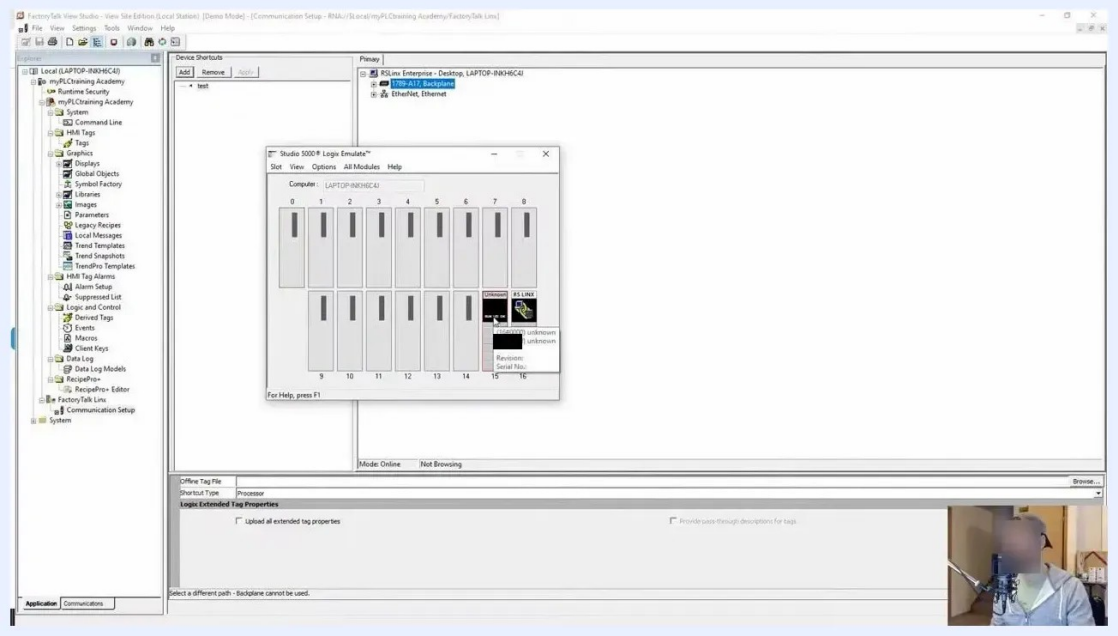


Virtual Backplane Properties dialog with slot 15 selected

Step 12: Verify the FactoryTalk Linx slot in Logix Emulate

1. Open the Studio 5000 Logix Emulate window.
2. Confirm that slot 15 now displays a module. It may show as "Unknown," but it is dedicated to FactoryTalk Linx.

3. Hover over slot 15 to display details: "(1690000) unknown" and "RS LINX."



Studio 5000 Logix Emulate window showing slot 15 with the RS LINX and unknown module

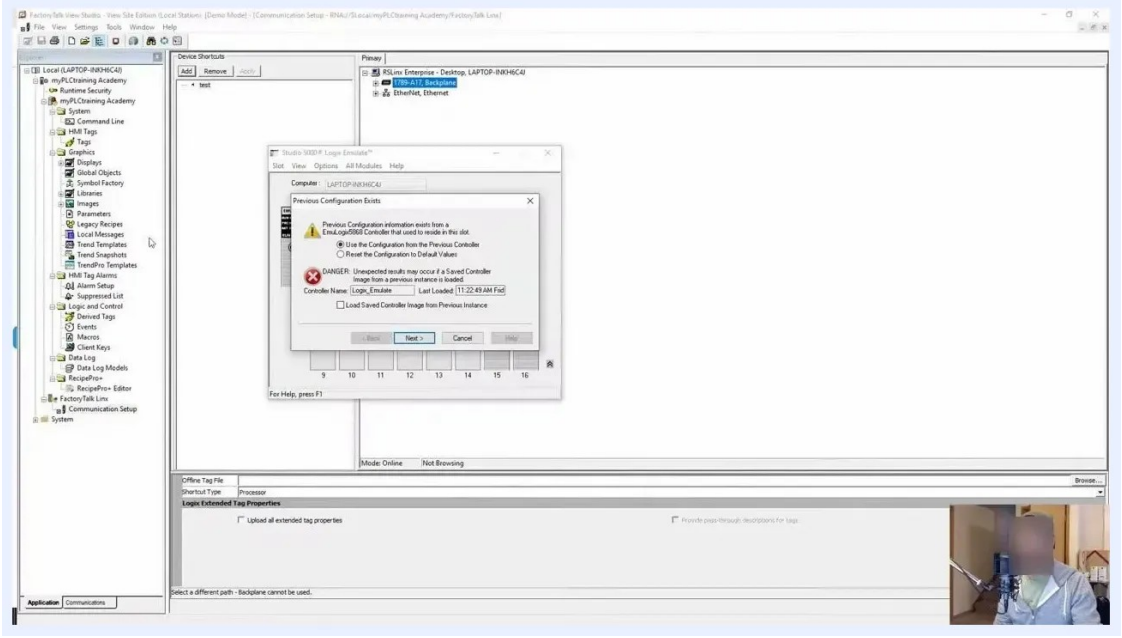
Create a controller in Studio 5000 Logix Emulate

You must add a controller to the rack before you can download a project.

Step 13: Start creating a controller in slot 0

1. In the Logix Emulate window, right-click slot 0, which is currently empty.

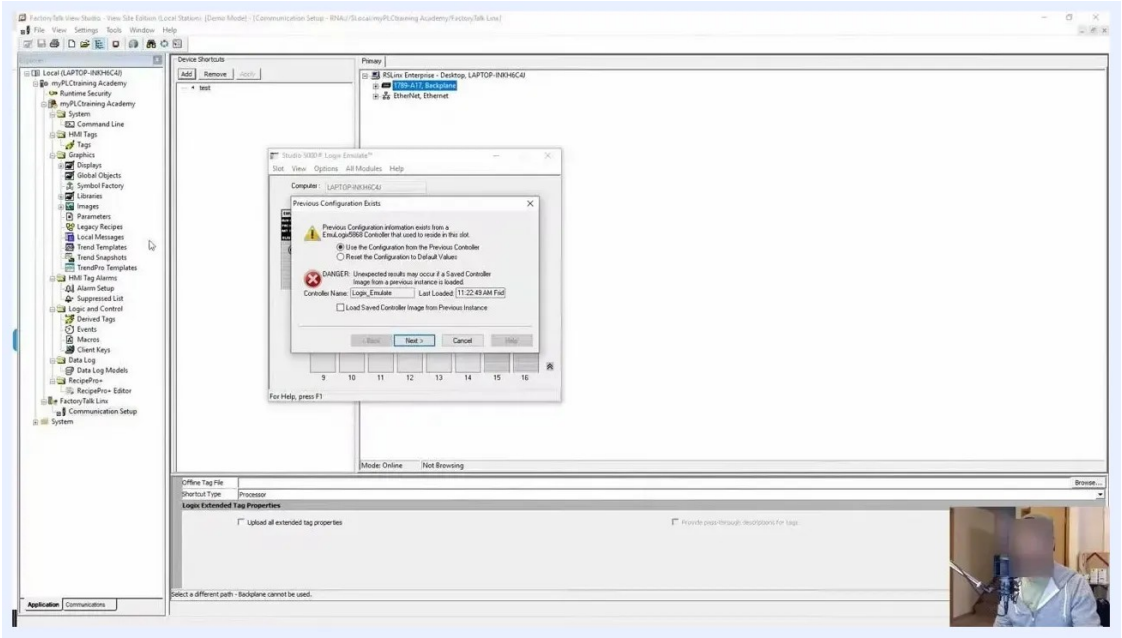
2. Select "Create" to begin adding a controller module.



Studio 5000 Logix Emulate window with slot 0 highlighted for controller creation

Step 14: Choose the controller module type

After you click "Create" on slot 0, a dialog appears for selecting the module type. The default selection is typically appropriate. Keep it and click "Next."



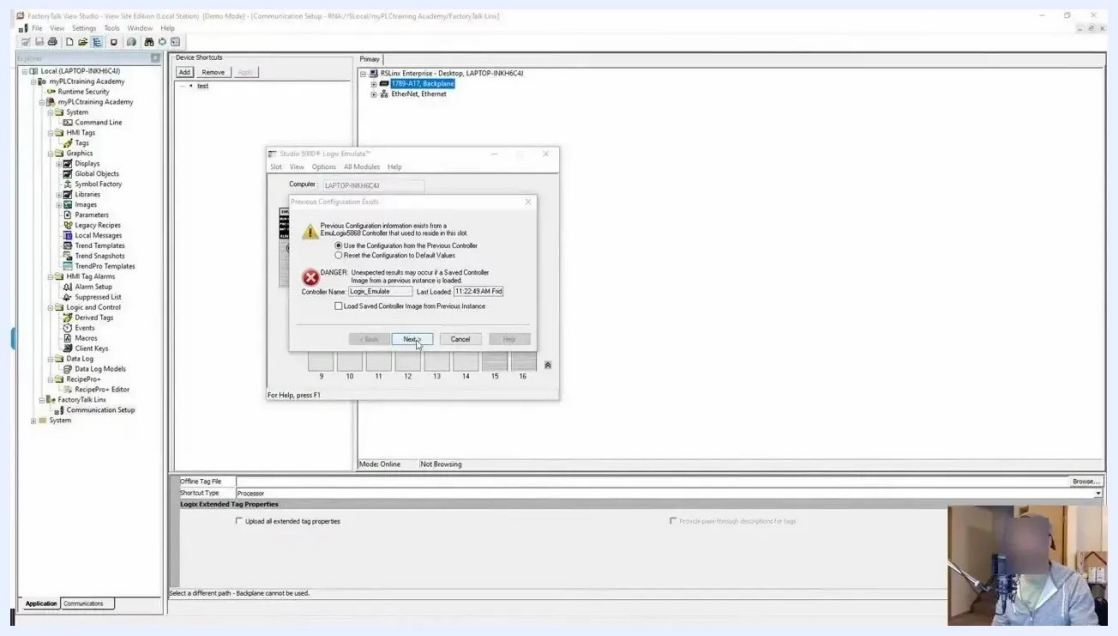
Studio 5000 Logix Emulate controller creation dialog with the Next button highlighted

Step 15: Accept the default controller configuration

The "Previous Configuration Exists" dialog offers these options:

- "Use the Configuration from the Previous Controller"
- "Reset the Configuration to Default Values"
- "Load Saved Controller Image from Previous Instance" (unchecked)

The controller name is "Logix_Emulate." Click "Next" to proceed with the default settings.

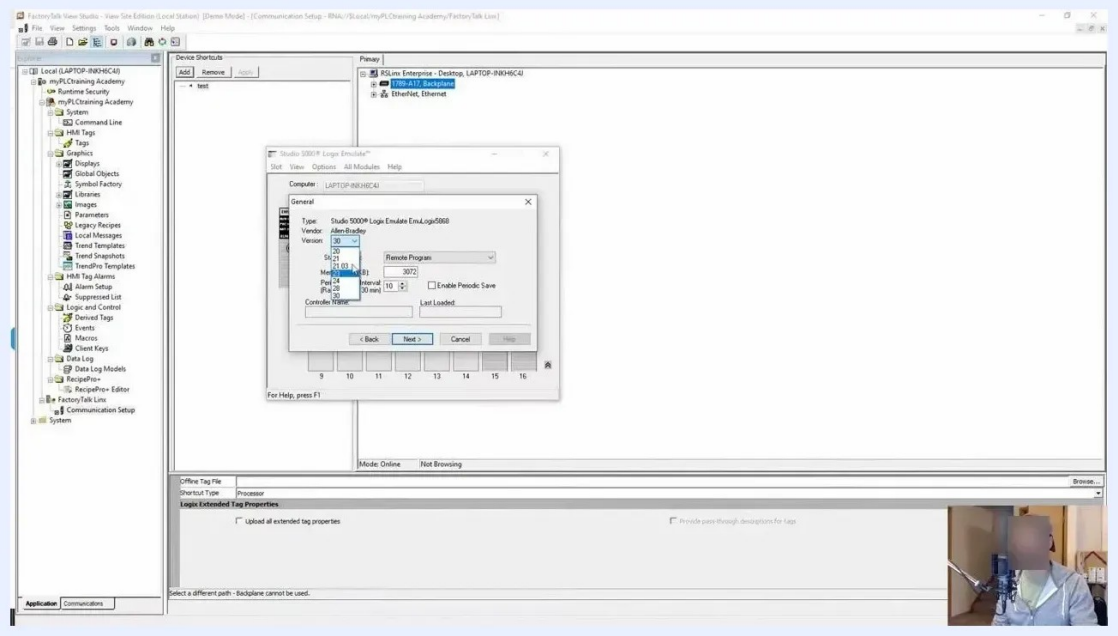


Previous Configuration Exists dialog with the Next button highlighted

Step 16: Select the controller firmware version for Logix Emulate

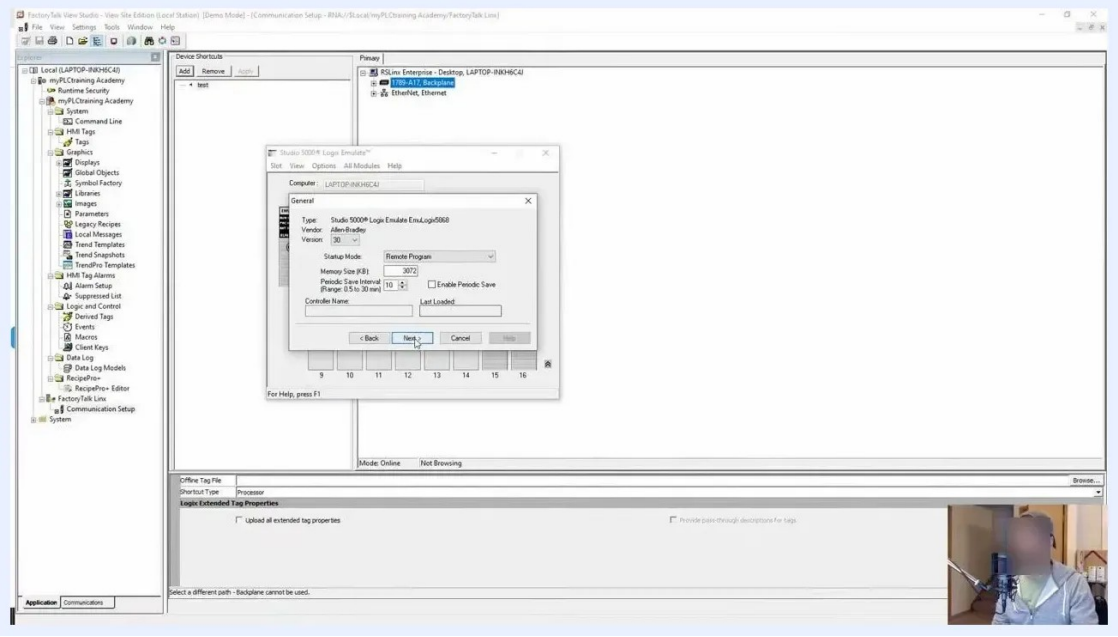
1. In the "Studio 5000 Logix Emulate" dialog, find the "Version" dropdown menu.
2. Expand the dropdown and review the available versions: 21, 23, 24, 28, and 30.
3. Select the version that matches your project. This guide uses version 30.

4. Make sure the other fields are set as needed. In this example, Startup Mode is Remote Program, Memory Size is 3072 KB, Periodic Save Interval is 10 min, and Enable Periodic Save is unchecked.



Studio 5000 Logix Emulate dialog with the Version dropdown open, version 30 selected, and the other configuration fields visible

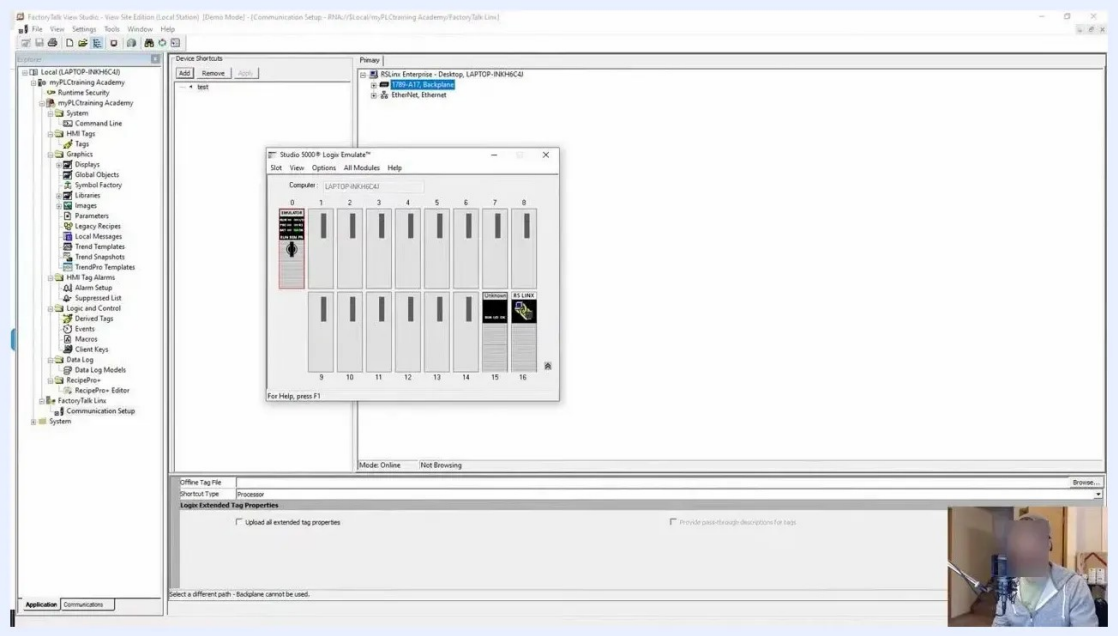
Click "Next >" in the configuration dialog to proceed.



Studio 5000 Logix Emulate dialog with the cursor on the Next button

Step 17: Wait for the controller to load

Watch the Logix Emulate window as the controller loads into slot 0. The slot displays "EMULOGIX" and a progress indicator while the controller initializes. Loading can take a little while.



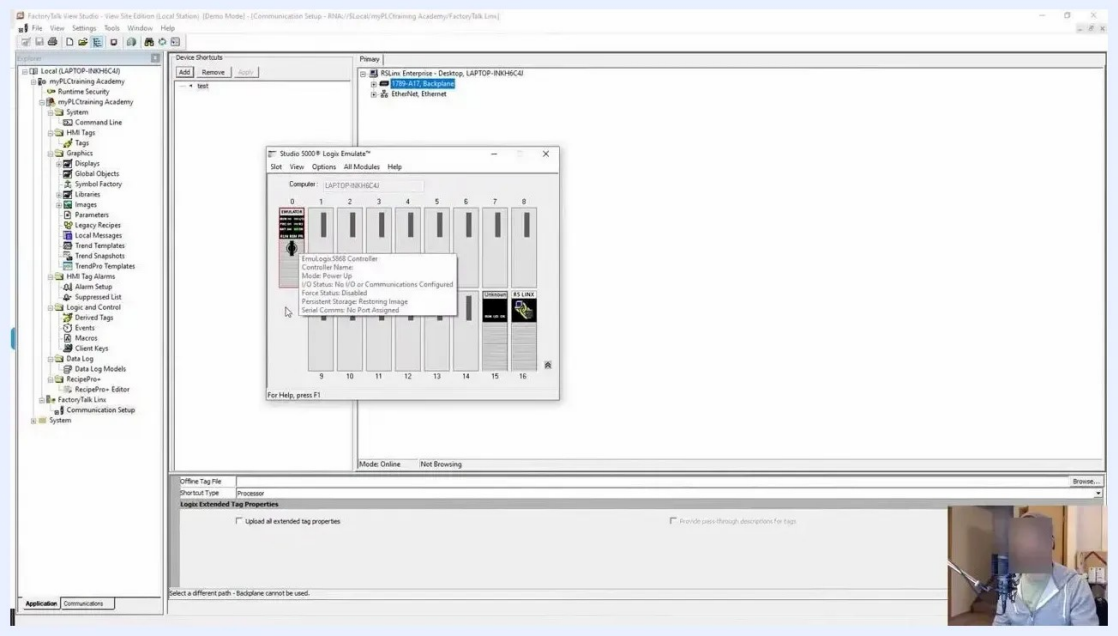
Studio 5000 Logix Emulate rack showing the EMULOGIX controller loading in slot 0 and RS LINX in slot 15

Step 18: Verify the controller status

Hover over slot 0 to view the controller tooltip. Confirm the following details:

- Controller: EmuLogix5868 Controller
- Mode: Power Up
- I/O Status: No I/O or Communications Configured
- Force Status: Disabled
- Persistent Storage: Restoring Image
- Serial Comms: No Port Assigned

The controller can still be in power up mode at this point. You can see it in Logix Designer shortly.

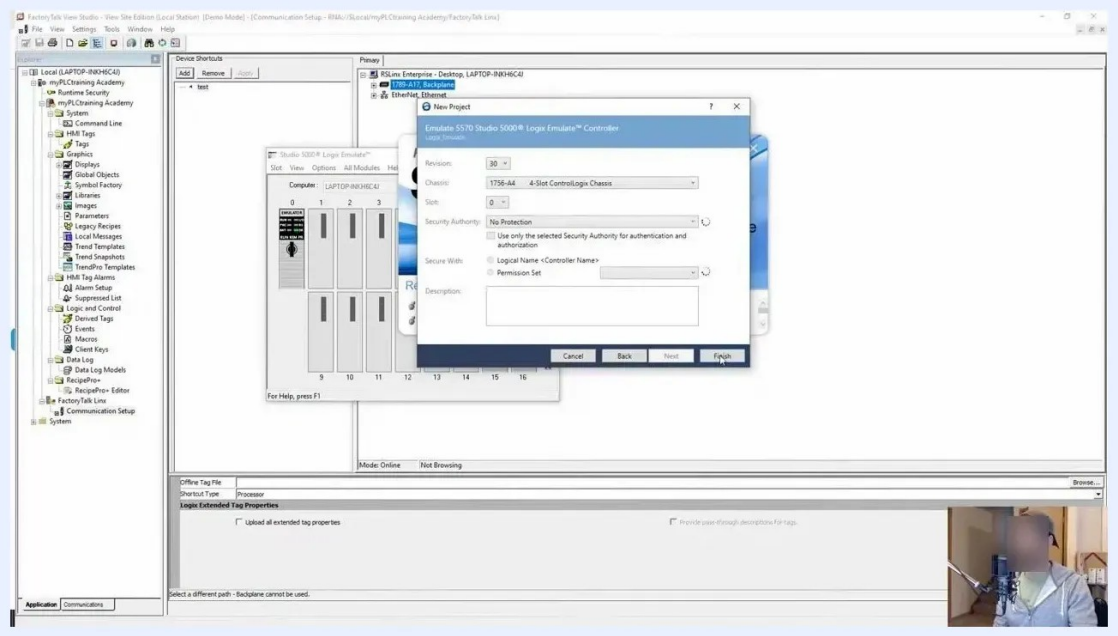


Studio 5000 Logix Emulate rack with a tooltip showing EmuLogix5868 Controller details for slot 0

Create a Logix Designer project for the emulated controller

Step 19: Launch Logix Designer

Open Logix Designer (Studio 5000). Keep the Emulate rack open and visible for reference.



Studio 5000 Logix Emulate rack open while Logix Designer launches with the New Project dialog visible

Step 20: Complete the New Project setup

In the "New Project" dialog, verify the following values:

- Controller: Emulate 5570 Studio 5000 Logix Emulate Controller
- Revision: 30
- Chassis: 1756-A4 – 4-Slot ControlLogix Chassis
- Slot: 0
- Security Authority: No Protection
- Description: leave blank or enter as needed

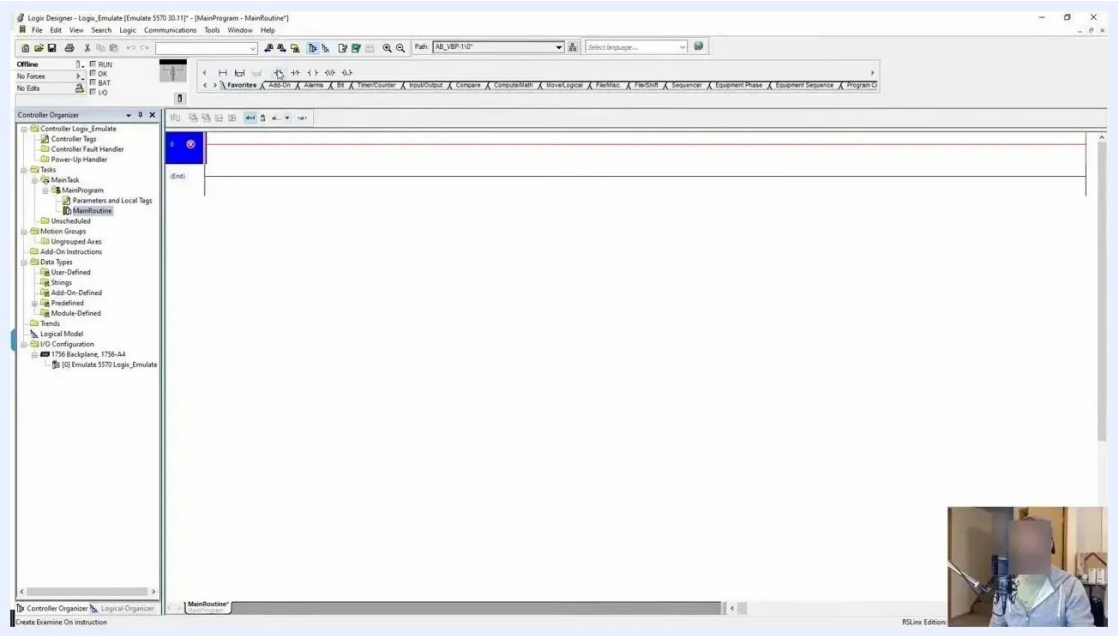
Click "Finish" to create the project and open the main routine.

Step 21: Open the main routine

1. Once the project loads, go to the Controller Organizer panel.
2. Expand "MainTask."

3. Select "MainRoutine" under "MainProgram."

The main routine ladder logic editor opens, ready for programming.

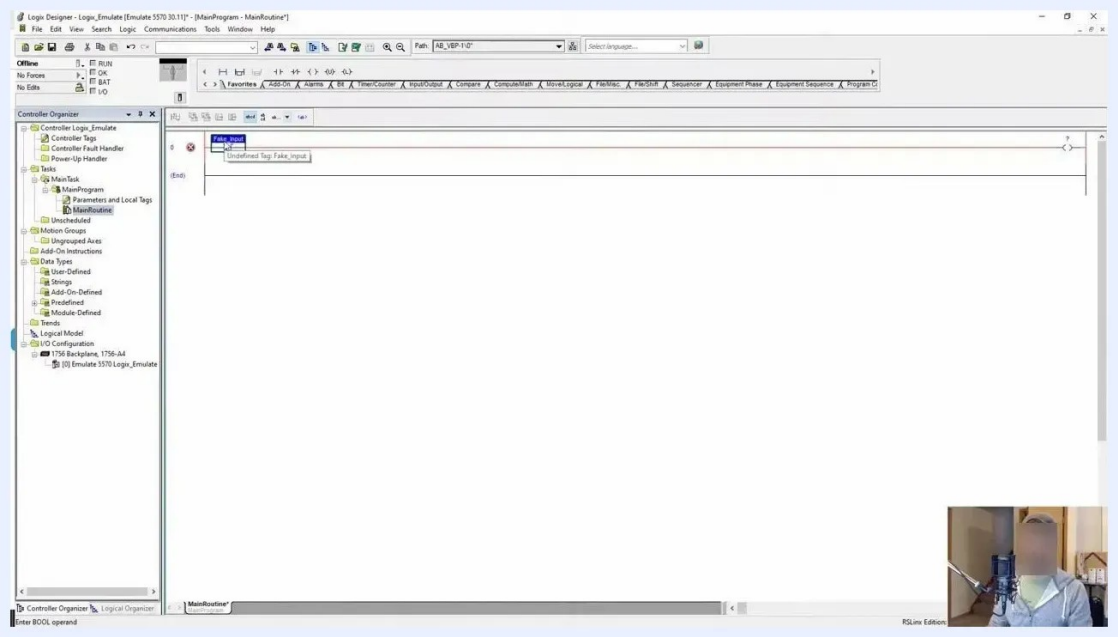


Logix Designer window with MainRoutine open, ready for ladder logic programming

Create test tags in Logix Designer

Step 22: Create a fake input tag

In the MainRoutine ladder logic editor, add a new tag named Fake_Input. Place it as an input condition in the rung. The tag appears as Fake_Input with a blue highlight, which indicates it is undefined.



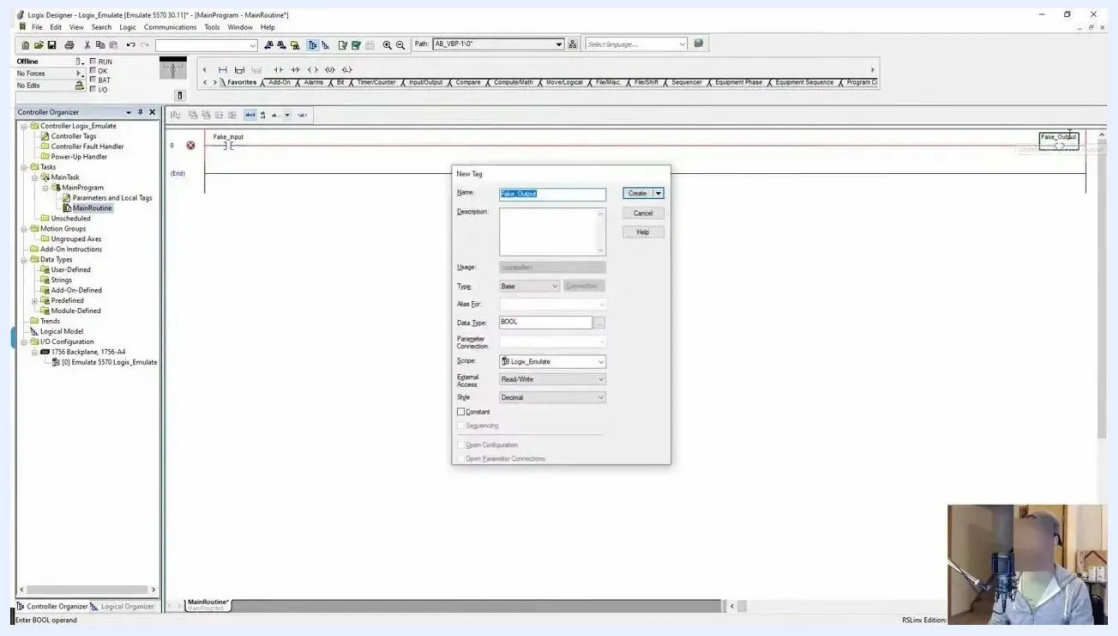
MainRoutine ladder logic editor with the Fake_Input tag added as an input condition and highlighted in blue to show it is undefined

Step 23: Create a fake output tag

In the same rung, add a new tag named Fake_Output as the output coil. When prompted, fill in the tag creation dialog:

- **Name:** Fake_Output
- **Type:** Base
- **Data Type:** BOOL
- **Scope:** Logix_Emulate
- **External Access:** Read/Write

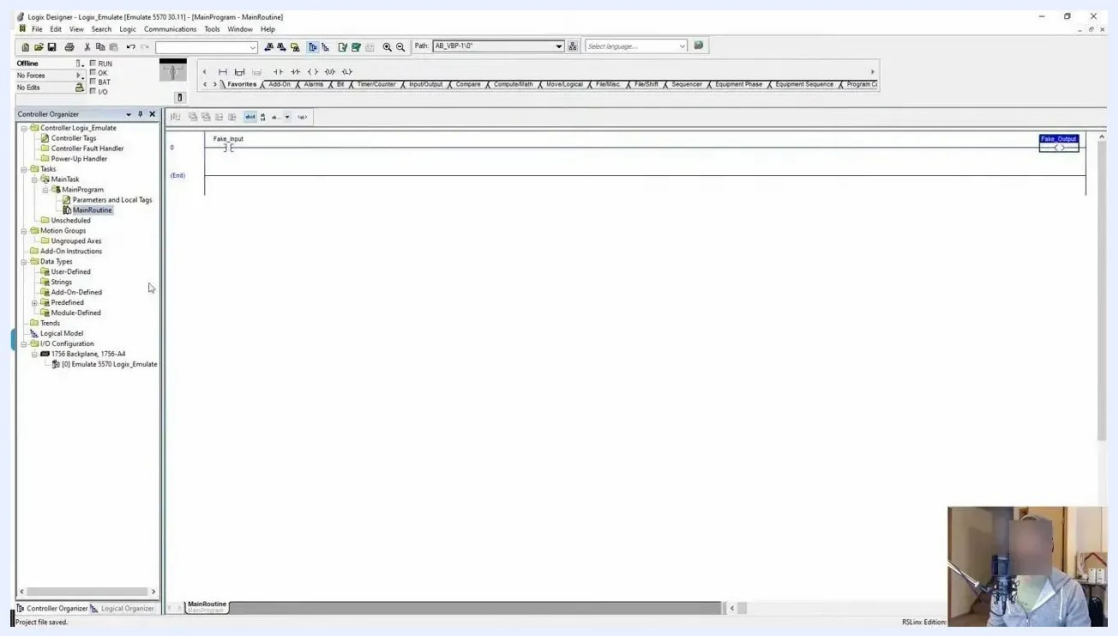
Leave the other fields at their default values, then click Create.



Tag creation dialog with Name set to Fake_Output, Data Type set to BOOL, Scope set to Logix_Emulate, and other default settings, with the rung showing Fake_Input and Fake_Output

Step 24: Save the project

Click the Save icon or use the menu to save your project file. Confirm that the rung displays both Fake_Input and Fake_Output with no errors or undefined tags.

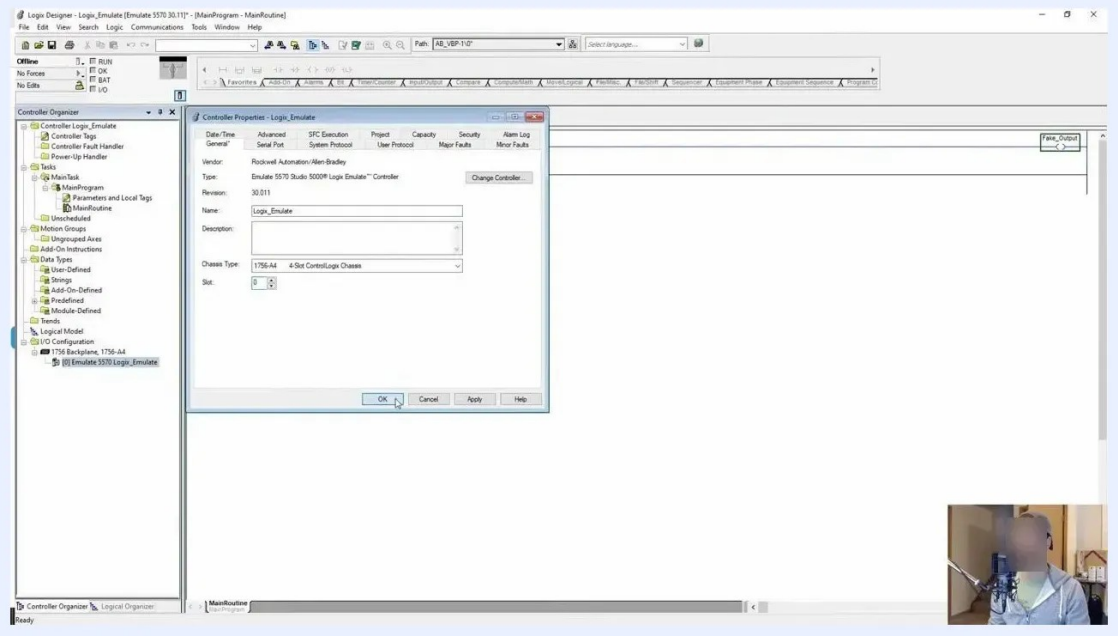


MainRoutine rung with both Fake_Input and Fake_Output tags defined, and the Controller Organizer visible

Step 25: Verify the controller properties before download

1. In the Controller Organizer, select the controller (Emulate 5570 Logix_Emulate).
2. Open the Controller Properties dialog.
3. Confirm that **Chassis Type** is 1756-A4 - 4 Slot ControlLogix Chassis.
4. Confirm that **Slot** is 0 (the default).

5. Click OK.

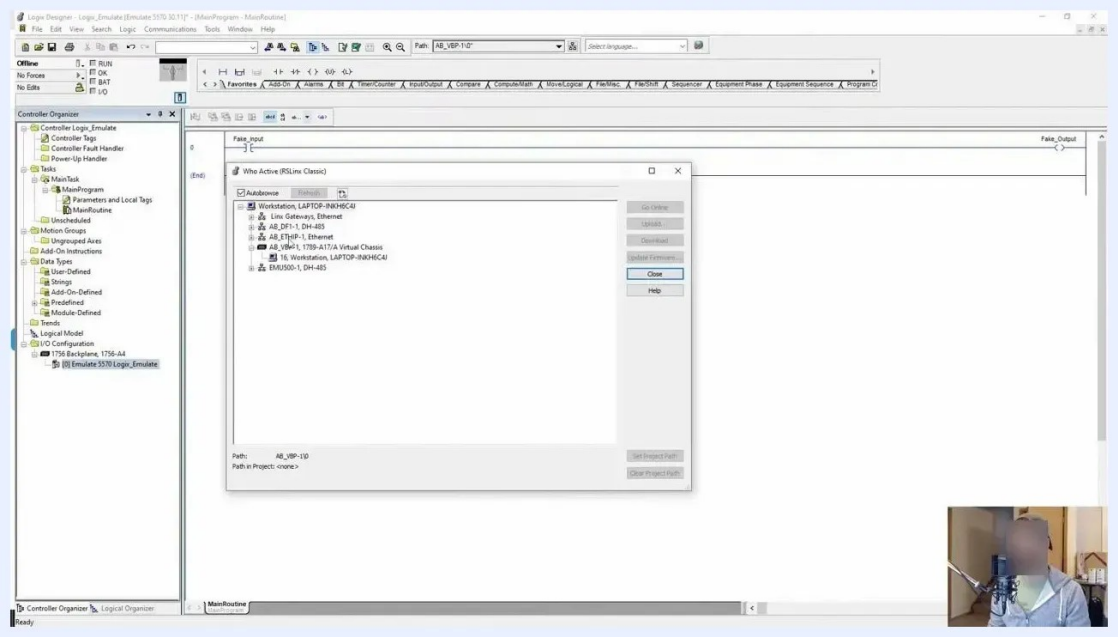


Controller Properties dialog showing Chassis Type set to 1756-A4 and Slot set to 0, with the OK button highlighted

Download the project to the emulated controller

Step 26: Start the download

With the controller properties verified, download the project to the Logix Emulate controller. The software opens the "Who Active" window (RSLinx Classic).

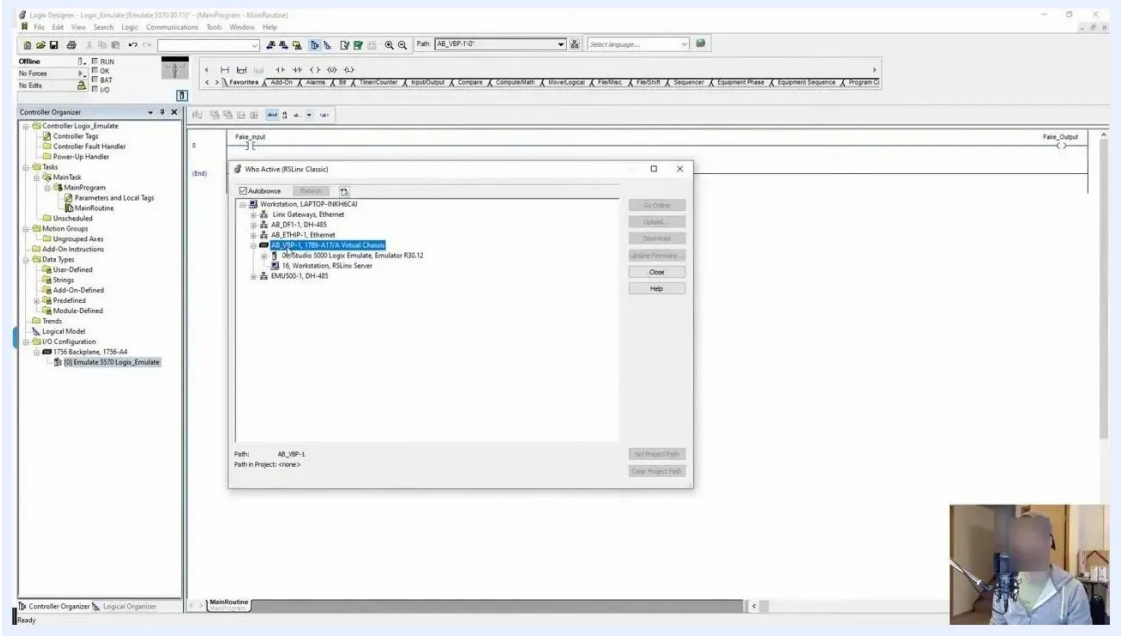


Who Active (RSLinx Classic) window displaying available communication paths and devices, with the MainRoutine rung in the background

Step 27: Select the Virtual Backplane driver and controller

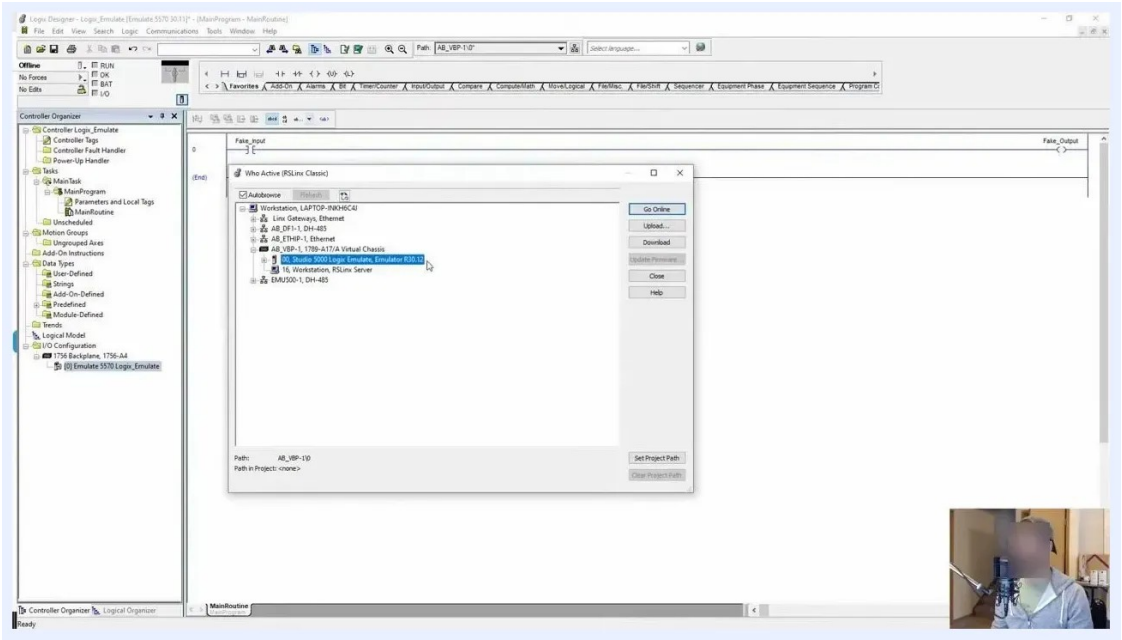
1. In the Who Active window, locate and expand the AB_VBP-1, 1789-A17/A Virtual Chassis entry.
2. Select the 00, Studio 5000 Logix Emulate, Emulator R30.12 device under the virtual chassis.

This device corresponds to the Logix Emulate controller you configured.



Who Active window with AB_VBP-1, 1789-A17/A Virtual Chassis expanded and Studio 5000 Logix Emulate, Emulator R30.12 selected

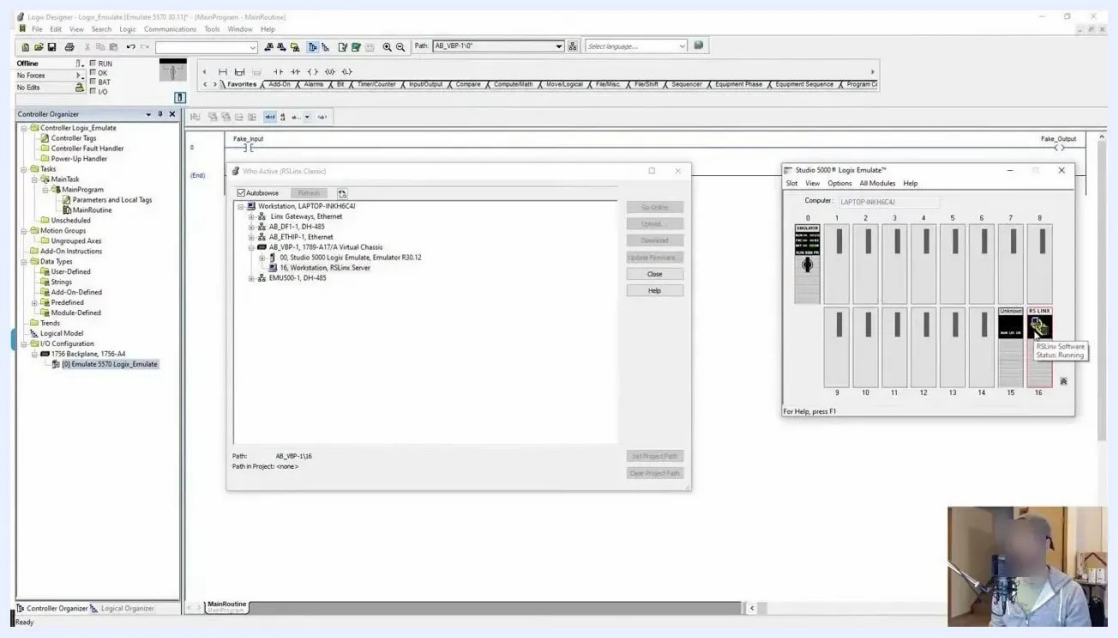
The 30 in Emulator R30.12 indicates the controller firmware version. Make sure you target the correct version for your project.



Who Active window with Studio 5000 Logix Emulate, Emulator R30.12 highlighted to show the controller version

Step 28: Confirm and start the download

Click the Download button on the right side of the Who Active window to begin downloading to the selected controller.

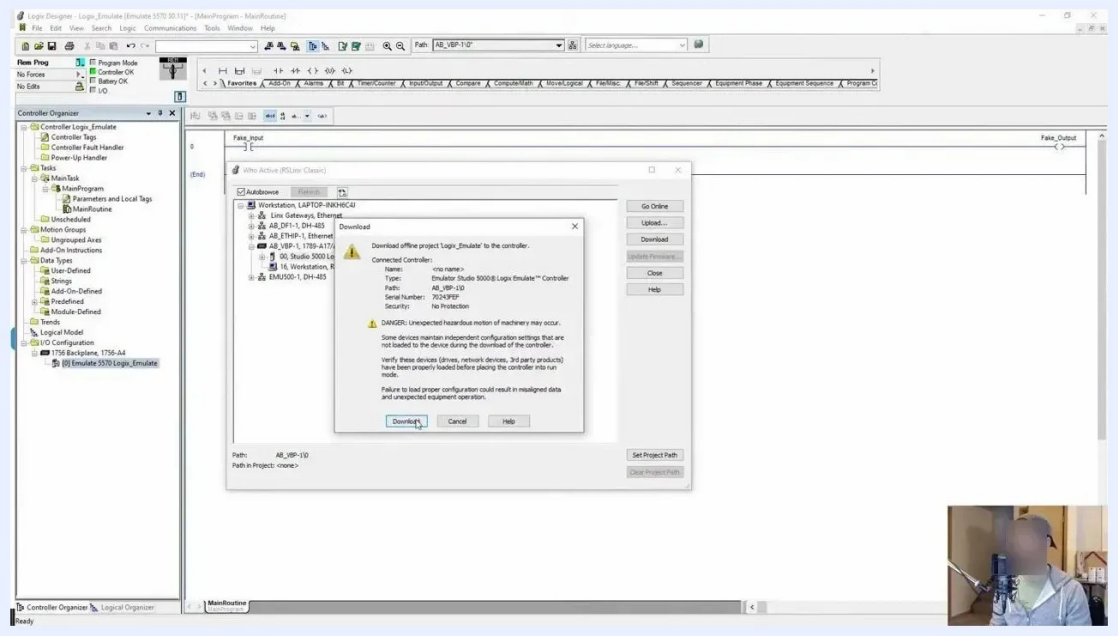


Who Active window with the controller selected and the Download button ready to click

When the Download confirmation dialog appears, review the details:

- **Connected Controller:** Emulator Studio 5000 Logix Emulate Controller
- **Path:** AB_VBP-1\0
- **Serial Number:** 70347FEF
- **Security:** No Protection

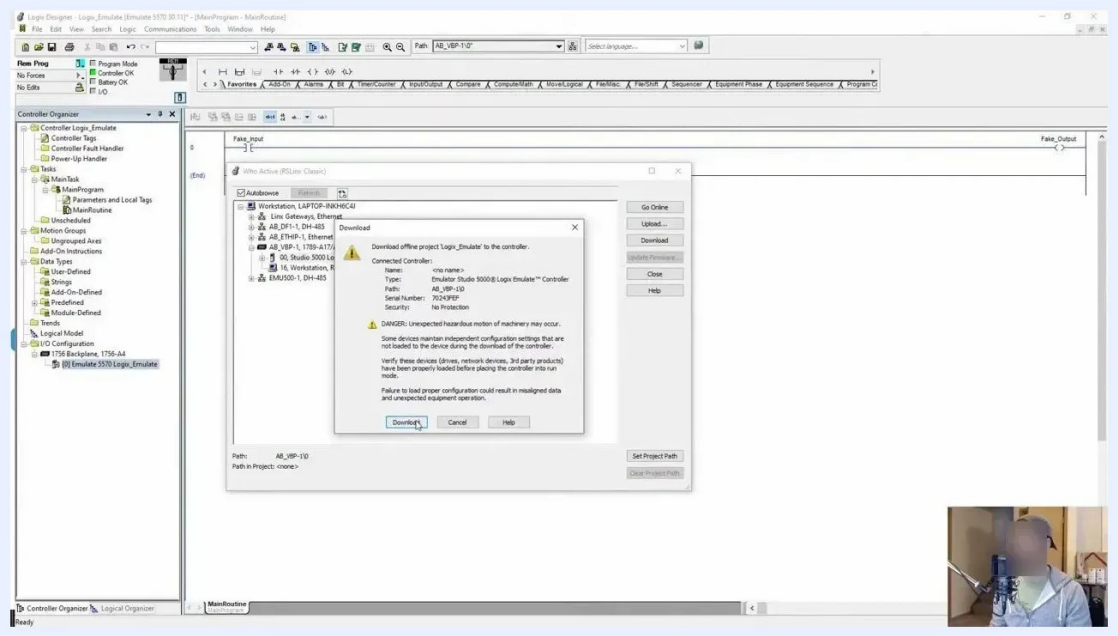
Read the warnings regarding hazardous motion and configuration, then click Download in the dialog.



Download confirmation dialog showing controller details and warnings, with the Download button highlighted

Step 29: Monitor the download progress

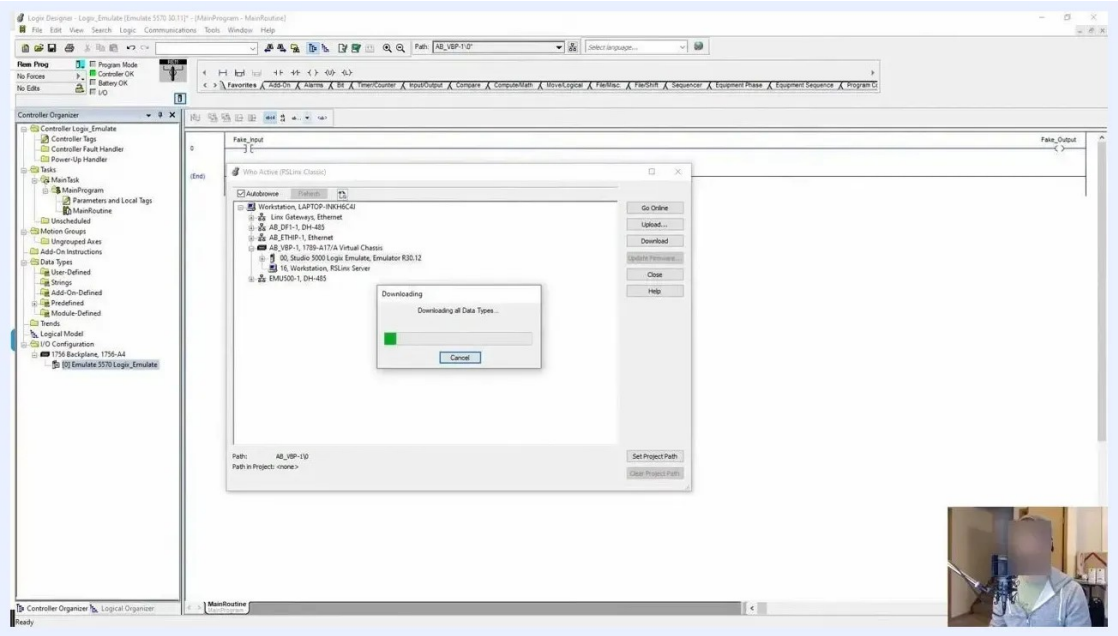
Watch the progress bar as the software downloads all data types and links the MainRoutine of the MainProgram. Wait for the download to complete before you continue.



Download progress dialog showing "Downloading all Data Types..." and "Linking routine 'MainRoutine' of program 'MainProgram'" with a progress bar

Step 30: Confirm the controller is in Run Mode

After the download completes, verify that the controller is in Run Mode. The Logix Designer status bar and the controller status indicators should display "Run Mode" and "Controller OK." The MainRoutine ladder logic is now online and ready for testing.



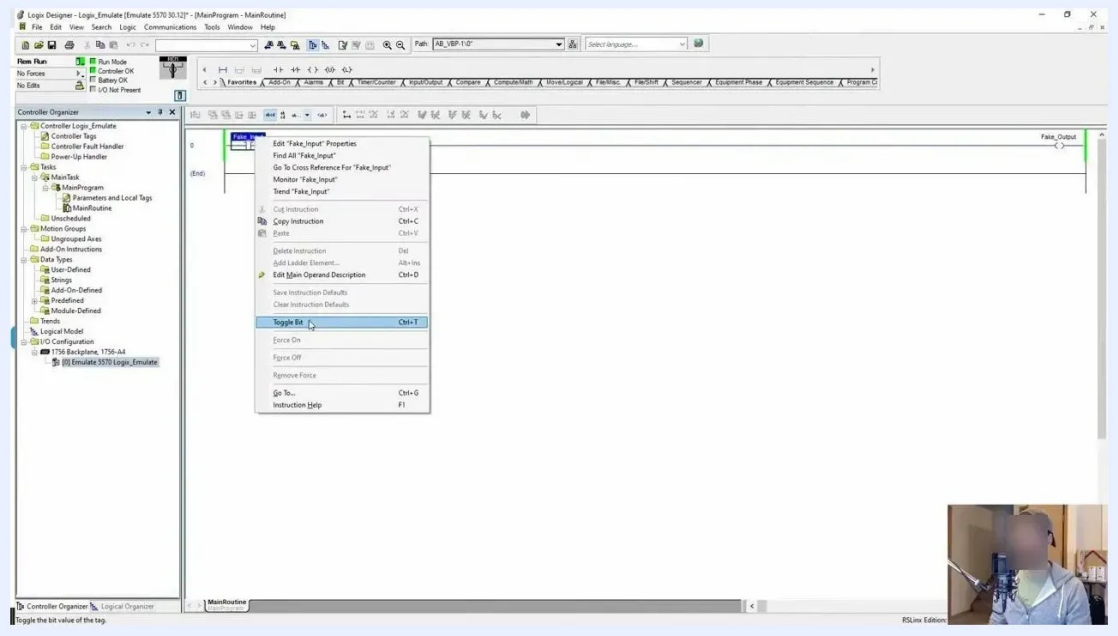
Logix Designer showing MainRoutine with Fake_Input and Fake_Output, the controller in Run Mode, and status indicators showing Controller OK

Test the logic in the emulated environment

Step 31: Toggle the fake input bit on

1. Right-click the Fake_Input contact in the MainRoutine ladder logic.
2. In the context menu, select Toggle Bit (or press Ctrl+T) to change the value of the Fake_Input tag.

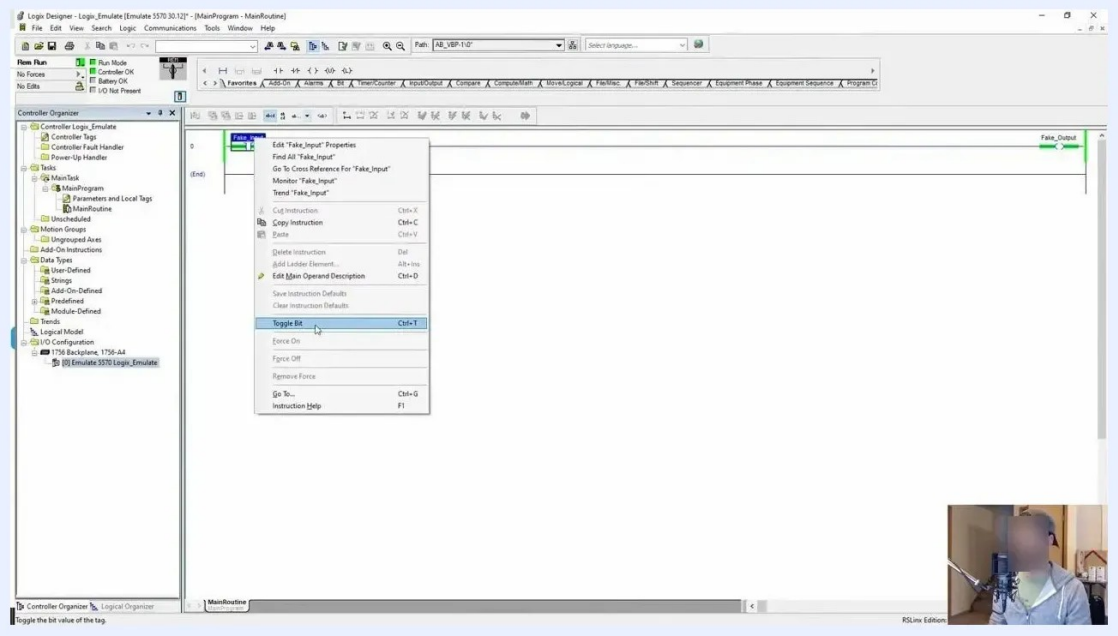
This simulates activating the input in the emulated environment.



Context menu open on the Fake_Input contact with the Toggle Bit option highlighted

Step 32: Toggle the fake input bit off and observe the result

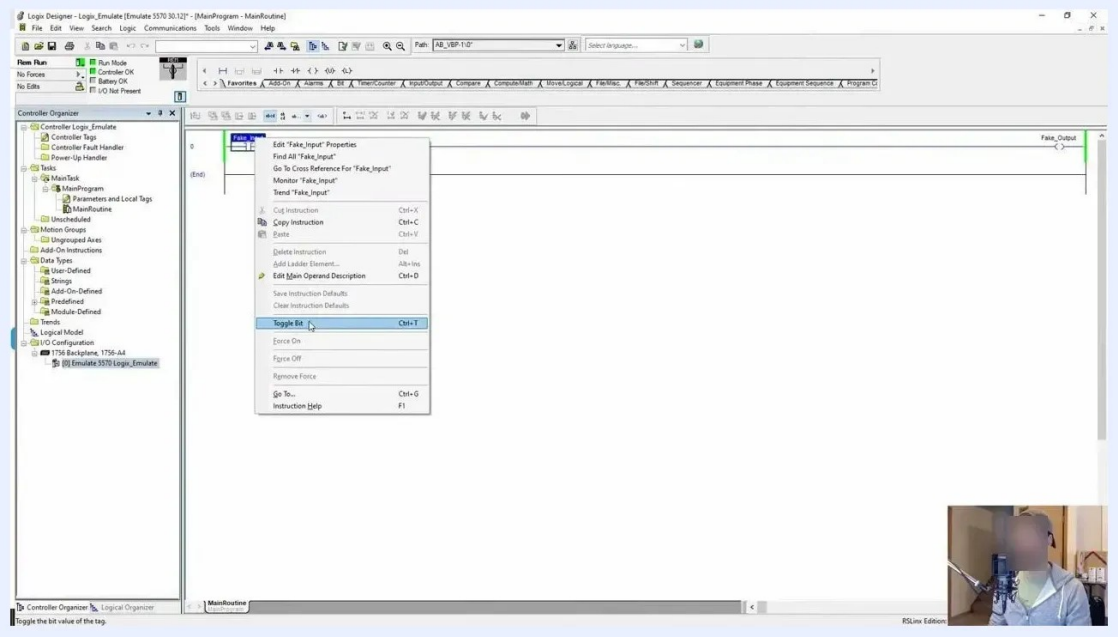
Right-click the Fake_Input contact again and select Toggle Bit to turn the input off. The Fake_Output coil responds according to the rung logic.



Context menu open on the Fake_Input contact with the Toggle Bit option highlighted, ready to toggle the bit off

Watch the MainRoutine rung as you toggle the tag:

- When Fake_Input is ON, its value changes to 1 and the Fake_Output coil is energized (highlighted).
- When Fake_Input is OFF, its value returns to 0 and Fake_Output de-energizes.



MainRoutine ladder logic showing Fake_Input with a value of 1 and Fake_Output energized, with the Controller Organizer and status indicators visible

Summary

You now know how to configure Logix Emulate in Studio 5000. You added the Virtual Backplane driver in RSLinx Classic and moved it to slot 16 to clear slot 0. You assigned the FactoryTalk Linx backplane to slot 15 and created an emulated controller in slot 0 at firmware version 30. You then created a Logix Designer project, downloaded it, switched to Run Mode, and verified the logic by toggling the fake input and watching the output.

This process lets you test and validate PLC logic in a simulated environment before you deploy to real hardware.

What's next

With the main routine open and the emulated controller running, you can add ladder logic instructions such as XIC (Examine If Closed) and OTE

(Output Energize). You can also connect your HMI application to the emulator through the FactoryTalk Linx module in slot 15.