OMRON

Power PMAC Simulator

User Manual

O056-E-02

To report errors or inconsistencies, email:
Omron Delta Tau Data Systems, Inc. Technical Support
Email: **odt-support@omron.com**
Website: **https://www.omron.com/global/en/business/industrial_automation/**

REVISION HISTORY				
REV.	**DESCRIPTION**	**DATE**	**CHG**	**APPVD**
1	FIRST RELEASE v1.2.0	02/18/25	PY	DG
2	Updated device image v1.2.1	12/05/25	PY	DG

Introduction

Thank you for using the Power PMAC Simulator.
This manual contains information that is necessary for using the simulator.
Please read this manual and make sure you understand the functions and capabilities before you attempt to use it in a control system.
Keep this manual in a safe place where it will be available for reference during operation.

Intended Audience

This manual is intended for the following personnel:

- Personnel in charge of introducing motion control systems.
- Personnel in charge of designing motion control systems.
- Personnel in charge of installing and maintaining motion control systems.
- Personnel in charge of managing motion control systems and facilities.

Applicable Products

This manual covers the following products:

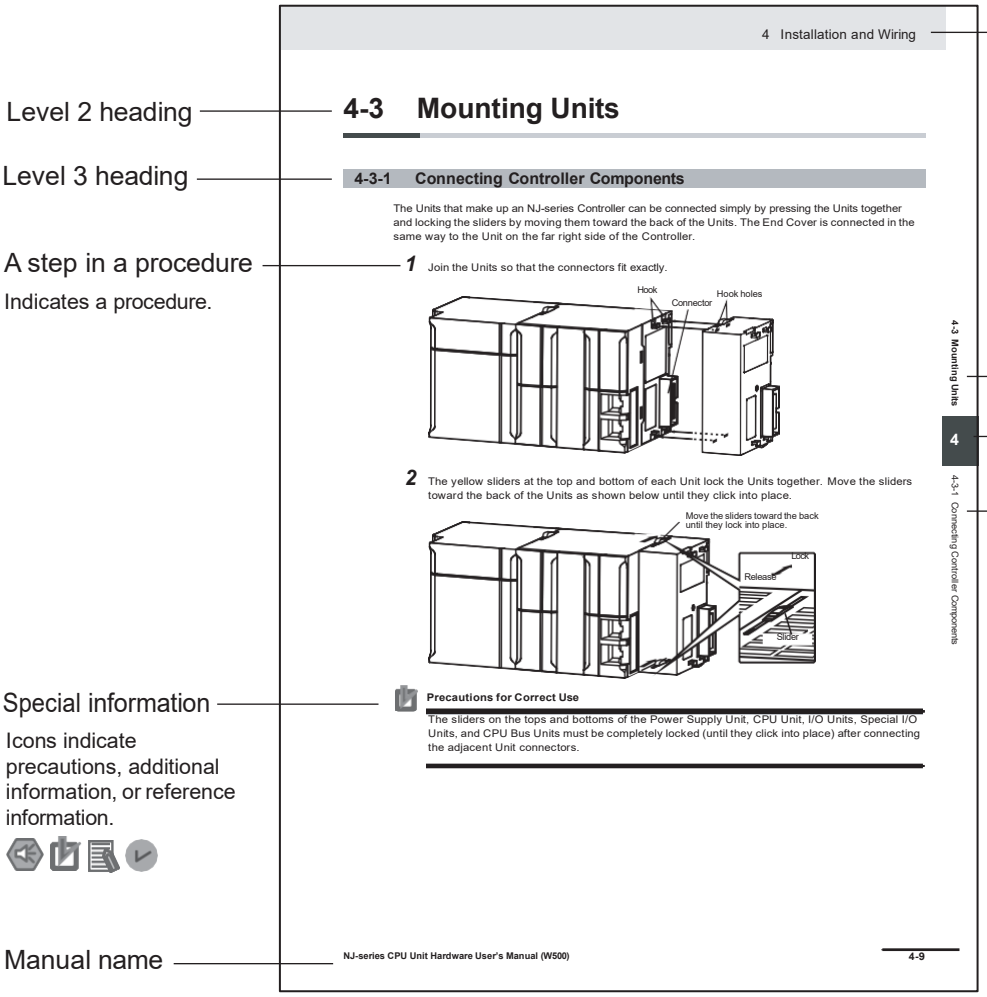
- Power PMAC Simulator.

Parts of the specifications and restrictions for each product may be listed in other manuals. Please refer to *Related Manuals*.

Manual Structure

Page Structure

The following page structure is used in this manual.



Note : This page is a sample for the purpose of describing the page structure. It differs in its actual content.

Icons

The icons used in this manual have the following meanings.

Precautions for Safe Use

Precautions on what to do and what to avoid doing to ensure the safe use of the product.

Precautions for Correct Use

Precautions on what to do and what to avoid doing to ensure proper operation and performance.

Additional Information

Additional information to read as required.
This information is provided to increase understanding or make operation easier.

Version Information

Information on differences in specifications and functionality for Product with different product versions is given.

Sections in this Manual

Table of Contents

Terms and Conditions Agreement

Warranty, Limitations of Liability

Warranties

- **Exclusive Warranty**

  Omron's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Omron (or such other period expressed in writing by Omron). Omron disclaims all other warranties, express or implied.

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  Omron further disclaims all warranties and responsibility of any type for claims or expenses based on infringement by the Products or otherwise of any intellectual property right.

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  Omron's sole obligation hereunder shall be, at Omron's election, to (i) replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product, (ii) repair the non-complying Product, or (iii) repay or credit Buyer an amount equal to the purchase price of the non-complying Product; provided that in no event shall Omron be responsible for warranty, repair, indemnity or any other claims or expenses regarding the Products unless Omron's analysis confirms that the Products were properly handled, stored, installed and maintained and not subject to contamination, abuse, misuse or inappropriate modification. Return of any Products by Buyer must be approved in writing by Omron before shipment. Omron Companies shall not be liable for the suitability or unsuitability or the results from the use of Products in combination with any electrical or electronic components, circuits, system assemblies or any other materials or substances or environments. Any advice, recommendations or information given orally or in writing, are not to be construed as an amendment or addition to the above warranty.

  See http://www.omron.com/global/ or contact your Omron representative for published information.

Limitation of Liability; Etc.

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ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY.

Further, in no event shall liability of Omron Companies exceed the individual price of the Product on which liability is asserted.

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Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases.

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY OR IN LARGE QUANTITIES WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT(S) IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

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Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.

Disclaimers

Performance Data

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Change in Specifications

Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the

Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.

Errors and Omissions

Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.

Security Measures

Anti-virus protection
Install the latest commercial-quality antivirus software on the computer connected to the control system and maintain to keep the software up-to-date.

Security measures to prevent unauthorized access
Take the following measures to prevent unauthorized access to our products.

- Install physical controls so that only authorized personnel can access control systems and equipment.
- Reduce connections to control systems and equipment via networks to prevent access from untrusted devices.
- Install firewalls to shut down unused communications ports and limit communications hosts and isolate control systems and equipment from the IT network.
- Use a virtual private network (VPN) for remote access to control systems and equipment.
- Adopt multifactor authentication to devices with remote access to control systems and equipment.
- Set strong passwords and change them frequently.
- Scan virus to ensure safety of USB drives or other external storages before connecting them to control systems and equipment.

Data input and output protection
Validate backups and ranges to cope with unintentional modification of input/ output data to control systems and equipment.

- Checking the scope of data
- Checking validity of backups and preparing data for restore in case of falsification and abnormalities
- Safety design, such as emergency shutdown and fail-soft operation in case of data tampering and abnormalities

Data recovery
Backup data and keep the data up-to-date periodically to prepare for data loss.

When using an intranet environment through a global address, connecting to a SCADA or an unauthorized terminal such as an HMI or to an unauthorized server may result in network security issues such as spoofing and tampering. You must take sufficient measures such as restricting access to the terminal, using a terminal equipped with a secure function, and locking the installation area by yourself.

When constructing an intranet, communication failure may occur due to cable disconnection or the influence of unauthorized network equipment. Take adequate measures, such as restricting physical access to network devices, by means such as locking the installation area.

When using a device equipped with the SD Memory Card function, there is a security risk that a third party may acquire, alter, or replace the files and data in the removable media by removing the removable media or unmounting the removable media. Please take sufficient measures, such as restricting physical access to the Controller or taking appropriate management measures for removable media, by means of locking the installation area, entrance management, etc., by yourself.

Software

To prevent computer viruses, install antivirus software on a computer where you use this software. Make sure to keep the antivirus software updated.

Keep your computer's OS updated to avoid security risks caused by a vulnerability in the OS.

Always use the highest version of this software to add new features, increase operability, and enhance security.

Manage usernames and passwords for this software carefully to protect them from unauthorized uses.

Set up a firewall (E.g., disabling unused communication ports, limiting communication hosts, etc.) on a network for a control system and devices to separate them from other IT networks. Make sure to connect to the control system inside the firewall.

Use a virtual private network (VPN) for remote access to a control system and devices from this software.

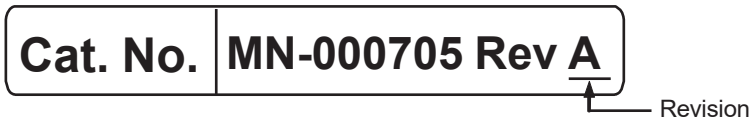
Related Manuals

The following manual is related to this manual. Use this manual for reference.

Name of Manual	Cat. No.	Model	Usage	Description
Power PMAC IDE User Manual	O055-E-17	Power PMAC IDE	When you want to know the product specifications and basic settings for Power PMAC IDE.	Specifications, getting started, explanation of settings, command parameters.

Revision History

A manual revision appears as a suffix to the catalog number on the front and back covers of the manual.



Revision code	Date	Revised content
A	January 2025	First publication.

1

Introduction

The Power PMAC Simulator is an integrated environment to emulate a device virtually. Users can set up a virtual motor to simulate different real-time conditions or analyze data without actually using hardware, among other potential uses.

This manual thoroughly explains how to use the simulator and how to set up the simulator software.

2

System Requirements

2-1 Operating System

The Power PMAC Simulator is an application that runs on Microsoft Windows™. It runs on the following versions of Microsoft Windows:

- Windows 10
- Windows 11

The Power PMAC Simulator requires .NET Framework 4.6 and above.

2-2 Hardware

- 1.6 GHz or faster processor
- 4 GB of RAM (2 GB if running on a virtual machine)
- 2 GB of available hard disk space
- 5400 RPM hard disk drive or faster

Note

The performance is directly dependent on the processor speed and RAM. Systems with more powerful hardware will be able to achieve better performance.

3

Simulator User Interface

3-1 Power PMAC Simulator Behavior

There are some behaviors about the Power PMAC Simulator that are worth noting. For one, once the user instructs their simulated PMAC to run, users will be locked out of accessing the “Advanced” menu. They will *not* be locked out of changing the CPU Selection drop-down, however changing this will have no effect. Similarly, once the simulated PMAC has booted, the Simulator will display the IP Address of the PMAC—however, this will not update if the IP Address of the virtual PMAC is changed until the Simulator is instructed to “Stop” and then “Run” again.

Only one instance of the Power PMAC Simulator (and so only one simulated PMAC) may run at a time. The Power PMAC Simulator can be minimized to the system tray, from which users can open the Power PMAC Simulator with a single left click, or they can directly “Run” a simulated PMAC, “Stop” a simulated PMAC, or “Exit” the Power PMAC Simulator by right-clicking the icon.

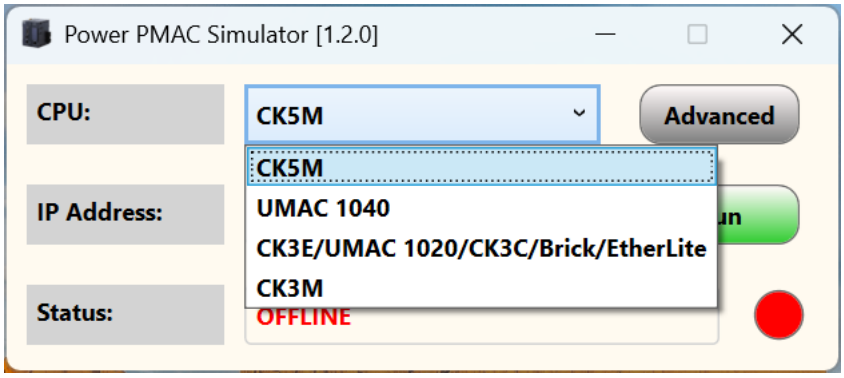
The Power PMAC Simulator will remember the last-used settings. This means that if you enable a feature such as the Emulated Serial Port, it will automatically appear the next time you run the simulated PMAC, even if this happens automatically at boot because you *also* enabled the “Auto-Run” mode. Similarly, the Power PMAC Simulator will remember which CPU was selected last to make sure that the correct PMAC boots.

3-2 Power PMAC Simulator Main Screen

3-2-1 CPU Selection

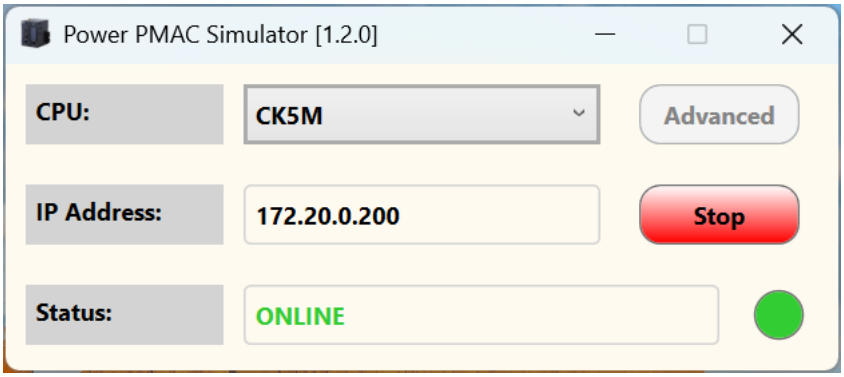
The Power PMAC Simulator can select from four different groups of Power PMAC controllers to simulate:

- CK5M
- UMAC 1040
- CK3E / UMAC 1020 / CK3C / Brick / EtherLite
- CK3M



3-2-2 IP Address

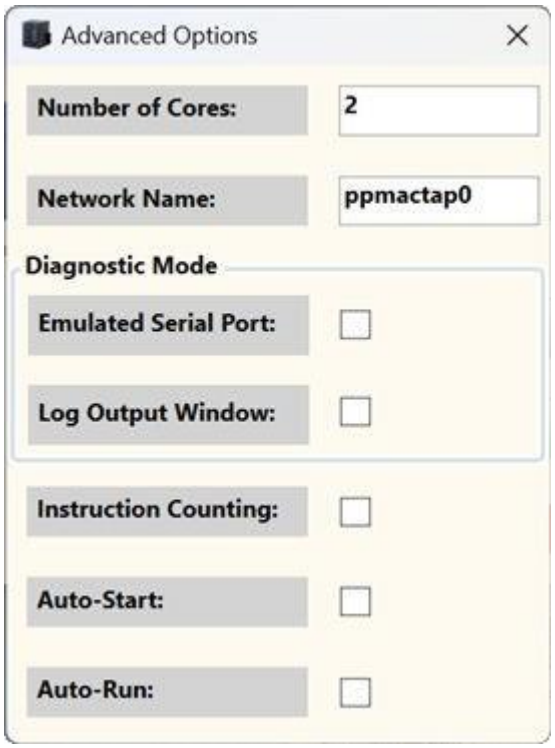
When the Power PMAC Simulator is running and simulating a Power PMAC controller, this field will display the IP Address of the simulated controller. Otherwise, it will display “Not Connected”.



3-2-3 Status

This field provides a quick “at a glance” view of the status of the Power PMAC Simulator, displaying messages such as “Offline” when it is not actively simulating a controller, “Online” when it is simulating one, or a number of possible status messages as it starts a simulated controller.

3-3 Advanced Options

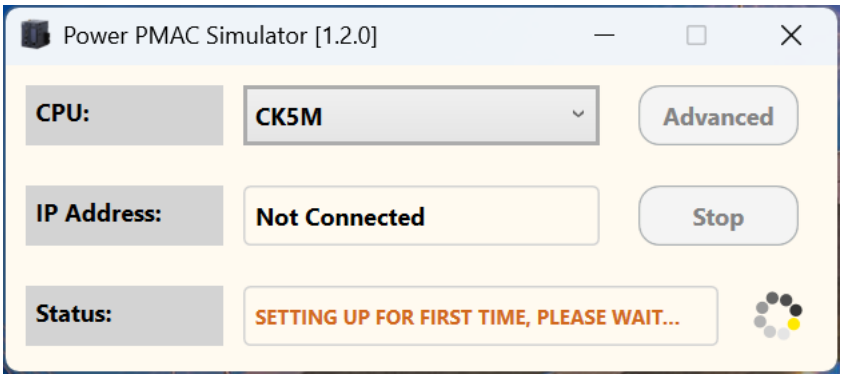


The Advanced menu has the following options:

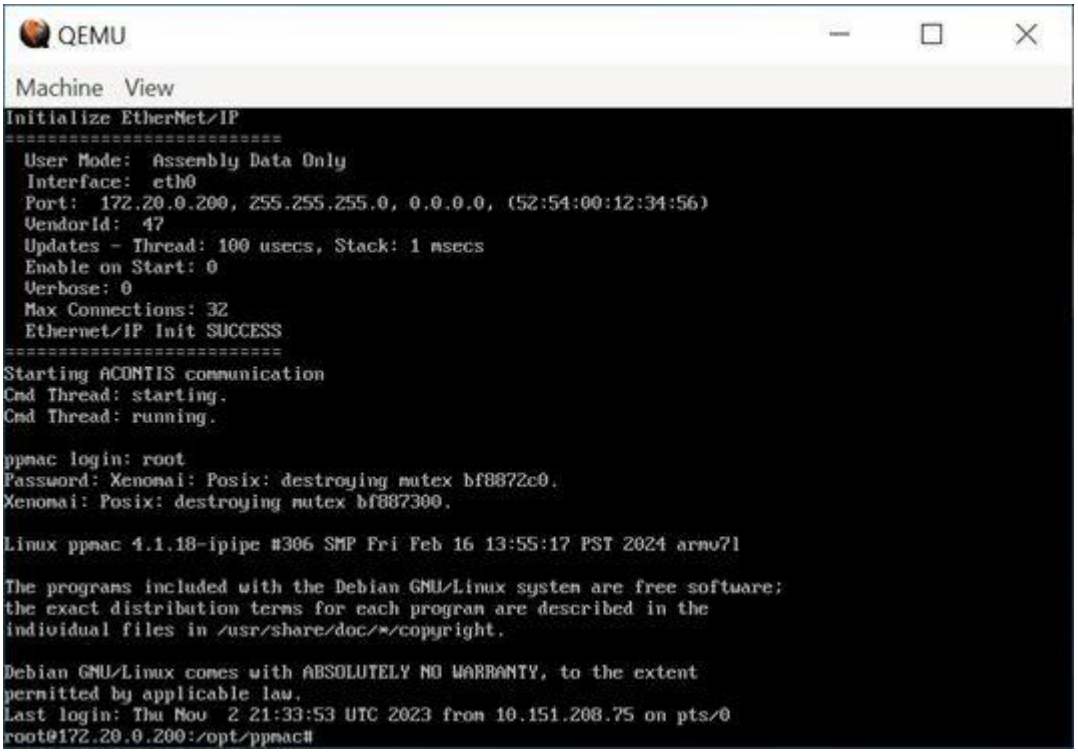
Number of Cores – This setting specifies how many cores the Power PMAC Simulator will create in the virtual PMAC. While the default value is 2, users wishing to more closely emulate a quad core CPU may wish to change this to 4. However, this will become very resource-intensive and as such is not recommended for most systems.

Network Name – In order to communicate with the Power PMAC virtual device, the Simulator application will create a kernel virtual network device. The user may change the name of this adapter if needeed.

If the network driver is not installed when the user runs a simulated controller, the simulator software will attempt to install the driver before the start of the simulation. The driver is installed with a default network device name, i.e. “ppmactap0”, as shown in above image, unless the user specifies a custom name.

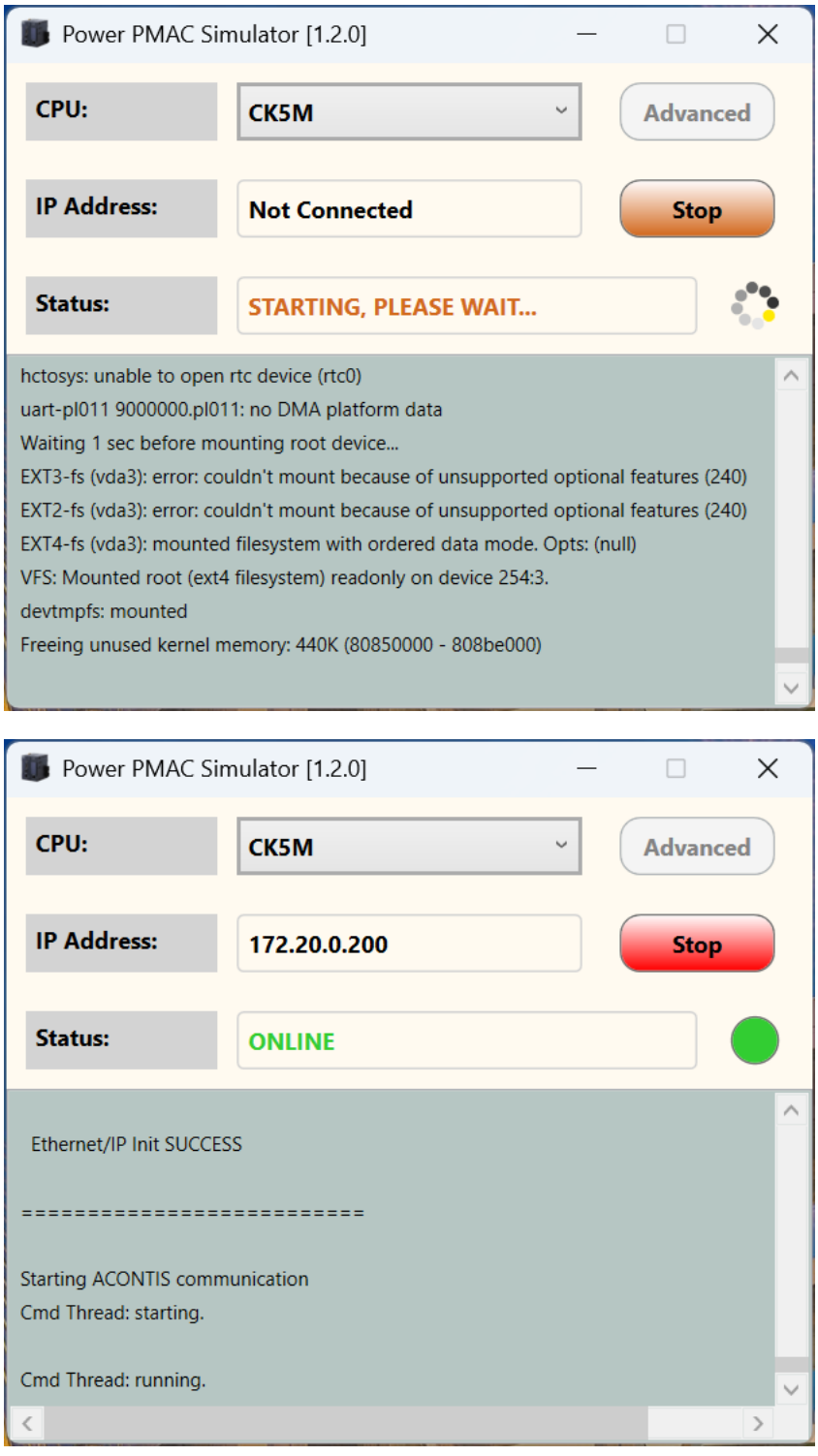


Emulated Serial Port – In this mode, a QEMU output window is visible to the user. This window establishes a serial communication channel with the simulated PMAC before boot, such that a full boot can be observed. Once the PMAC has finished booting, users can log in and communicate with the simulated PMAC as if it were a serial communication window communicating with any “real” PMAC.



It is worth considering that when this option is selected, it will divert some communication channels that the Power PMAC Simulator normally uses. Most notably, this means that closing the “QEMU” window will immediately shut down the simulated PMAC. Additionally, the IP Address Display, Status Display, and Status Indicator on the main window will all be disabled. This option is mutually exclusive with “Log Output Window” and selecting this will de-select the “Log Output Window” option.

Log Output Window – This shows a display-only device log to verify what commands are being issued by the simulated PMAC and whether or not it is running successfully.

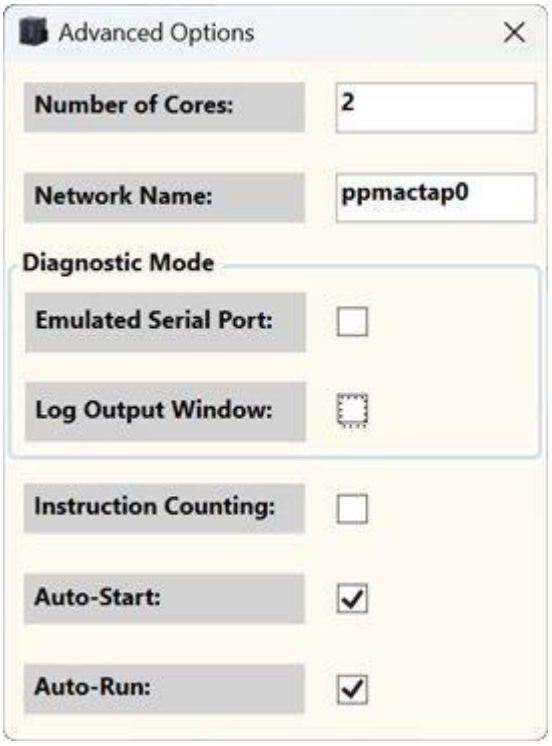


This option is mutually exclusive with “Emulated Serial Port” and selecting it will de-select the “Emulated Serial Port” option.

Instruction Counting – This feature improves synchronization between the simulated PMAC and real-time systems. This negatively impacts system performance due to increased load and should be disabled in most cases.

Auto-Start – The user can select this option to start the simulation at Windows startup. This action will only start the simulation application itself.

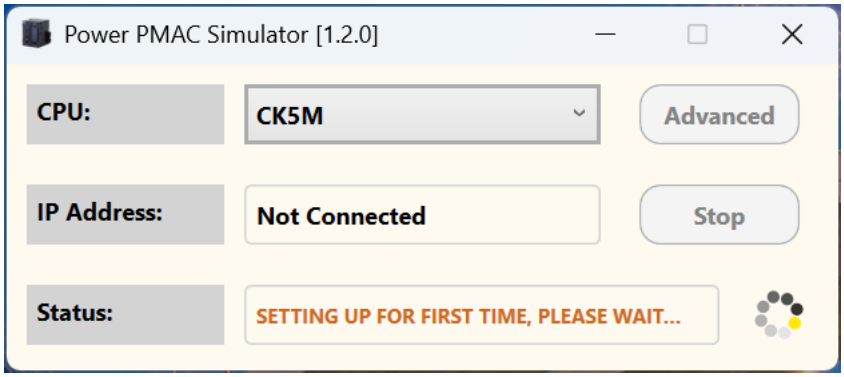
Auto-Run – The user can select this option to run a simulated PMAC at Windows startup. When the user selects this option, "Start Simulator at Windows Startup" will automatically be selected. This action will start the simulation application itself and also run a simulated PMAC.



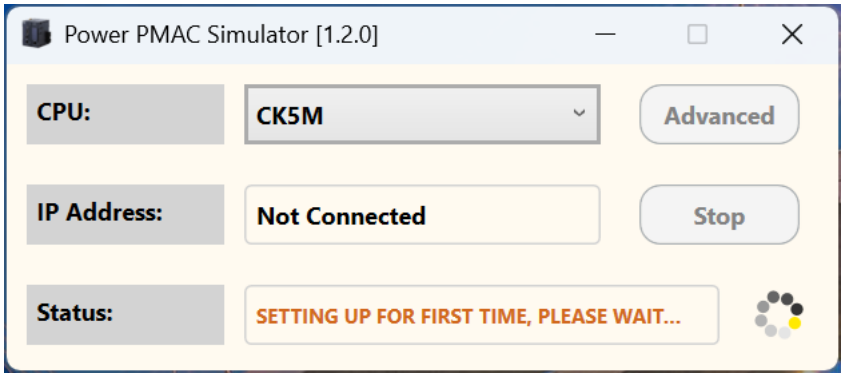
3-4 Start Simulation

The user can start the simulation with the "Start" button. The following is the sequence performed by the application each time it starts a simulated PMAC.

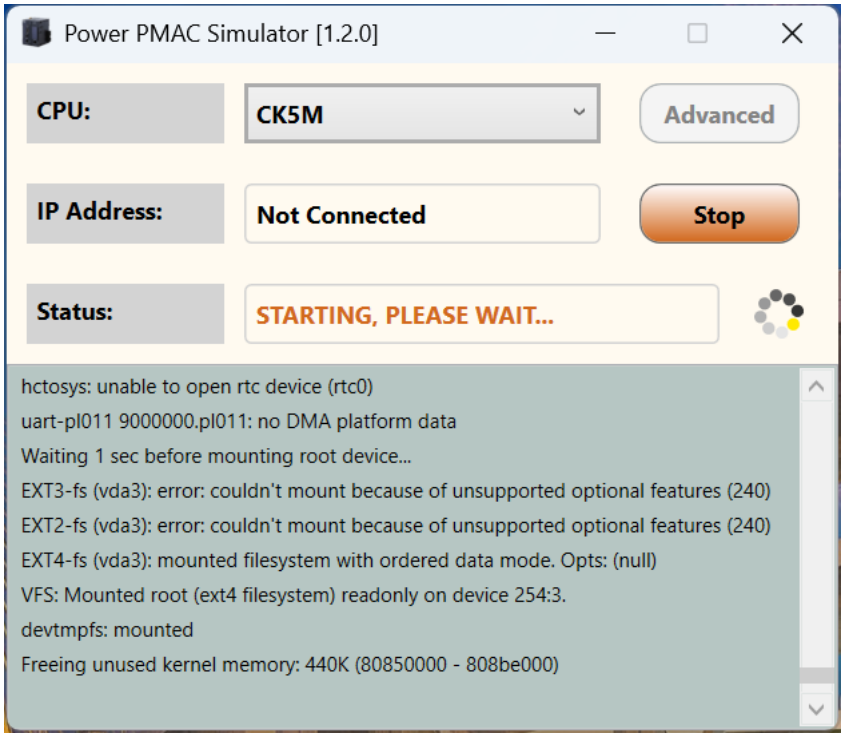
First, the application will check whether the network device interface is installed on the system. If it is not installed, the application will attempt to install the network device. This process will only be required once after software installation for most systems.



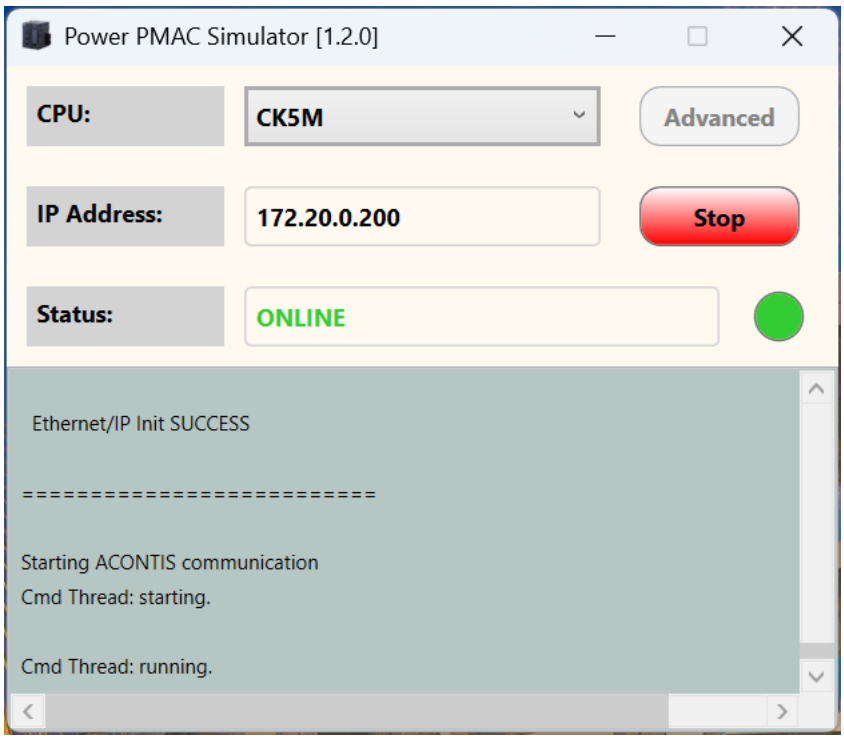
The next step is to check if the selected CPU is prepared to run or not. If it is the user's first time running a given CPU, the application must first extract and prepare an image of it. This process will only be required once per CPU selection after software installation for most systems.

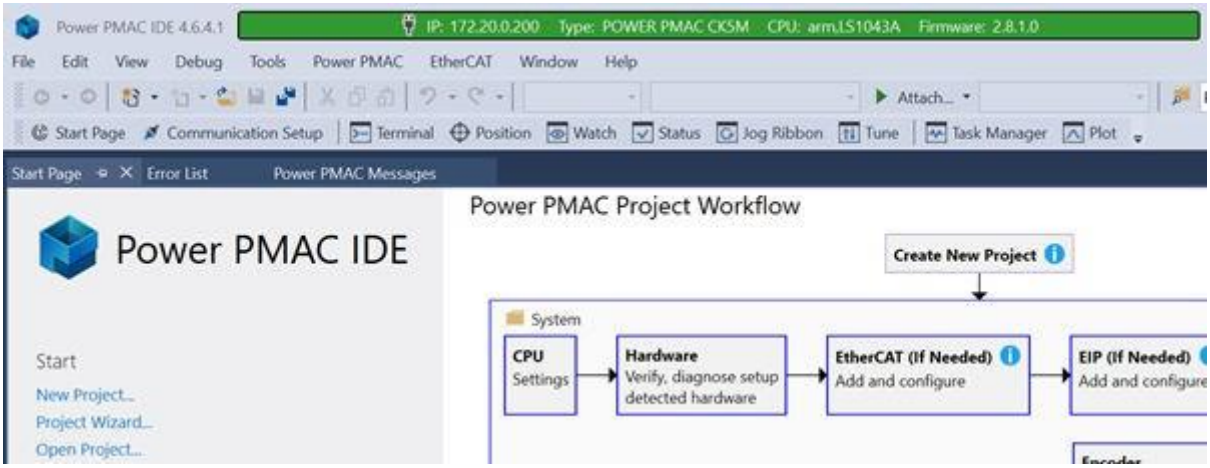


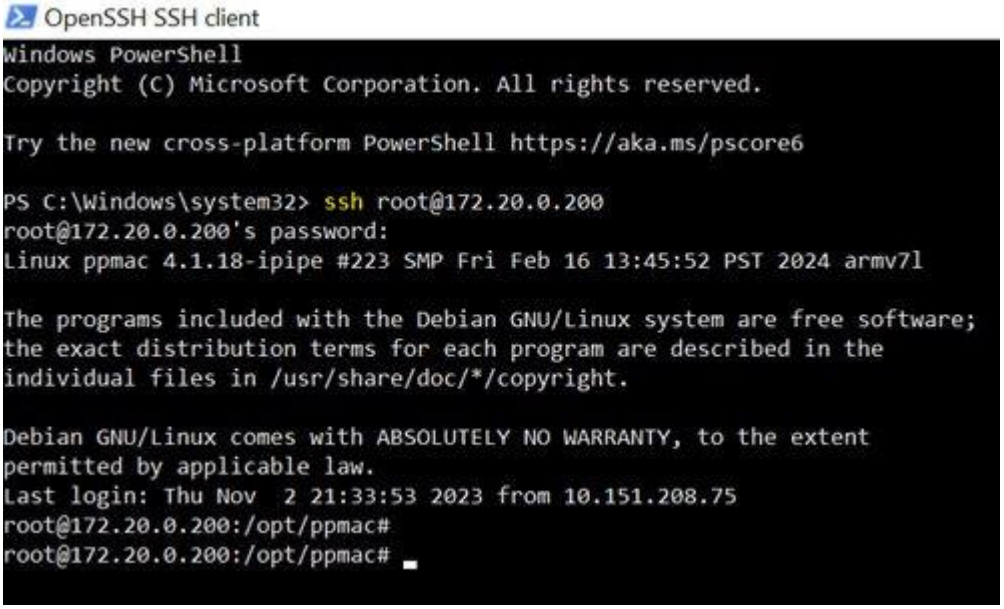
When both the network adapter and CPU image are prepared, the application will then start the simulated PMAC device.



After the device successfully completes its boot process, the user can connect to it by using software such as the Power PMAC IDE or other SSH clients.

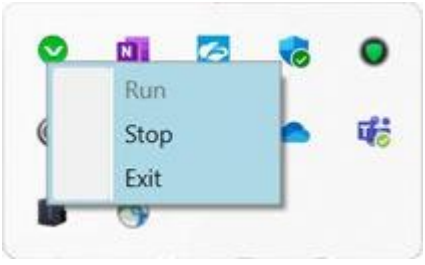


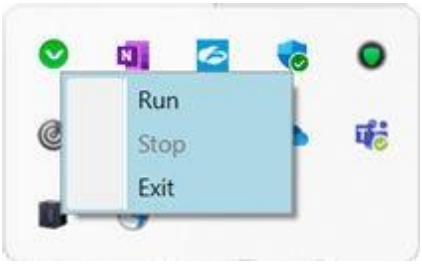

Power PMAC IDE 4.6.4.1
IP: 172.20.0.200 Type: POWER PMAC CK5M CPU: arm.LS1043A Firmware: 2.8.1.0
File Edit View Debug Tools Power PMAC EtherCAT Window Help
Attach...
Start Page Communication Setup Terminal Position Watch Status Jog Ribbon Tune Task Manager Plot
Start Page Error List Power PMAC Messages
Power PMAC IDE
Start
New Project...
Project Wizard...
Open Project...
Power PMAC Project Workflow
Create New Project
System
CPU
Settings
Hardware
Verify, diagnose setup
detected hardware
EtherCAT (If Needed)
Add and configure
EIP (If Needed)
Add and configure


OpenSSH SSH client
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.
Try the new cross-platform PowerShell https://aka.ms/pscore6
PS C:\Windows\system32> ssh root@172.20.0.200
root@172.20.0.200's password:
Linux ppmac 4.1.18-ipipe #223 SMP Fri Feb 16 13:45:52 PST 2024 armv7l
The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Thu Nov 2 21:33:53 2023 from 10.151.208.75
root@172.20.0.200:/opt/ppmac#
root@172.20.0.200:/opt/ppmac#

3-5 Tray Icon

If the user closes the main Power PMAC Simulator window, it will be minimized to the system tray. The tray icon will show the status of the simulation. Additionally, the user can also perform some simulation actions like Start and Stop from the tray icon.





If the user selects “Exit” from the tray icon menu, it will stop any running simulated PMAC devices and fully close the Simulator application. This is the easiest way to close the application.

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