Mach4 Software Setup Guide

*v2021Q1.1*

Mach4 Software Setup Guide

This guide provides step-by-step instructions for installing the Mach4 CNC Control Software and configuring your PC for use with an Avid CNC machine or electronics system.

1. Download and Install Mach4

- Download and install the Avid CNC Mach4 Installer (https://www.avidcnc.com/support/instructions/software/downloads/mach4).
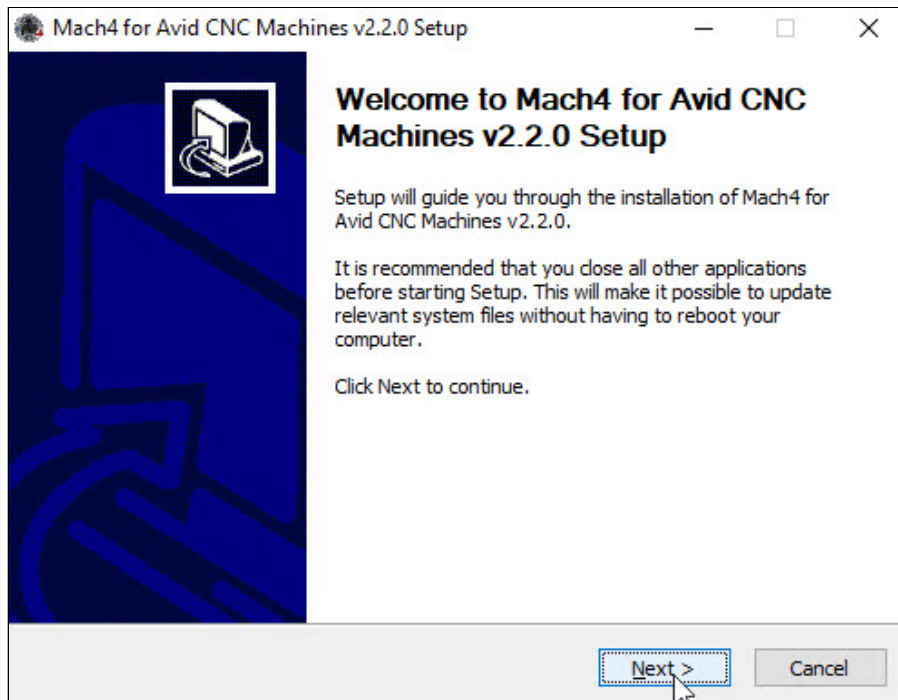
> **ℹ Installation Note**
>
> Our installer provides the correct version of Mach4, customized for use with any of our CNC machines or electronics systems.
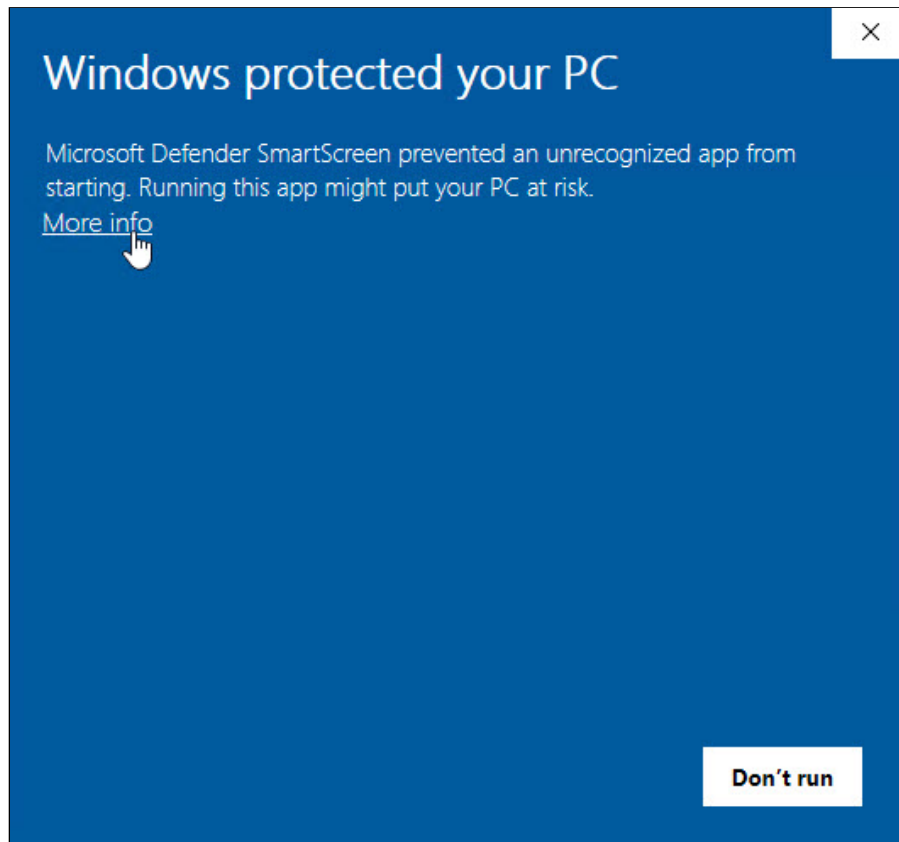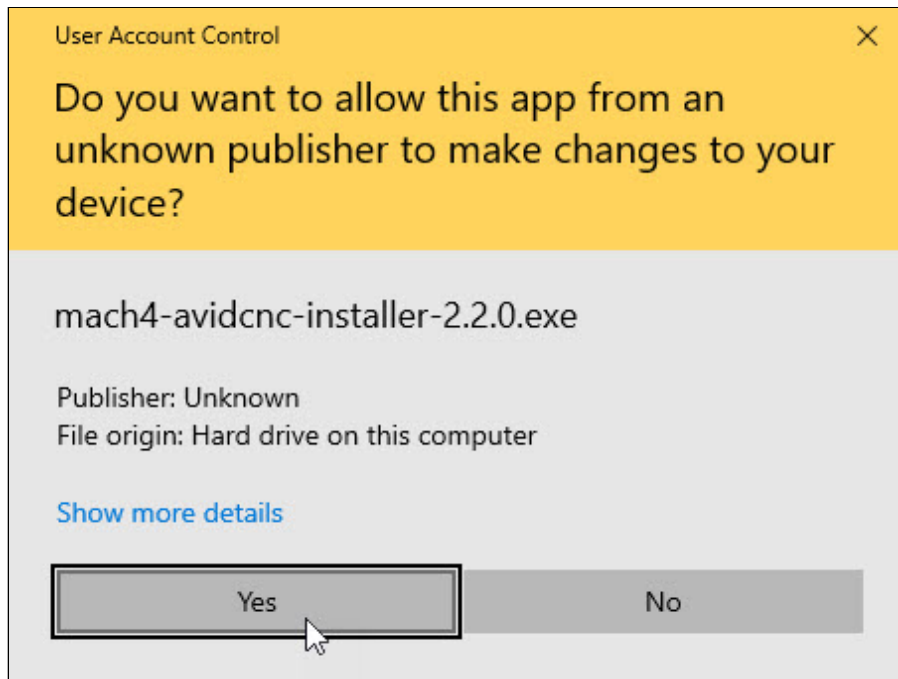

- When installing Mach4, if the warning message pictured above appears, click **"More info"**.
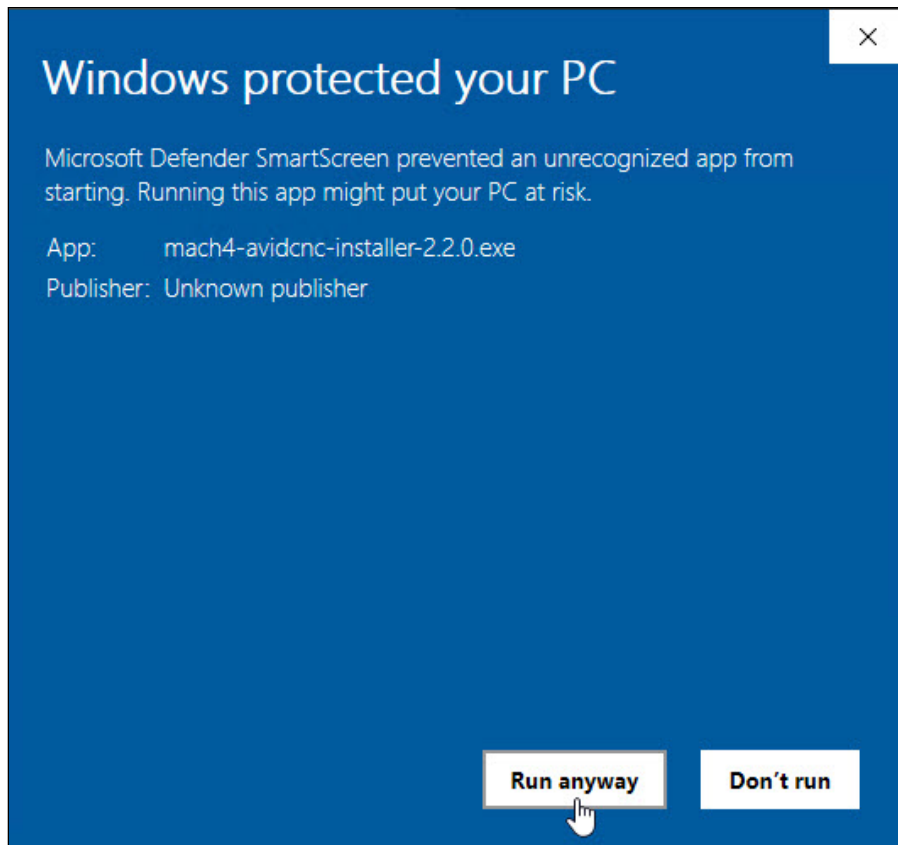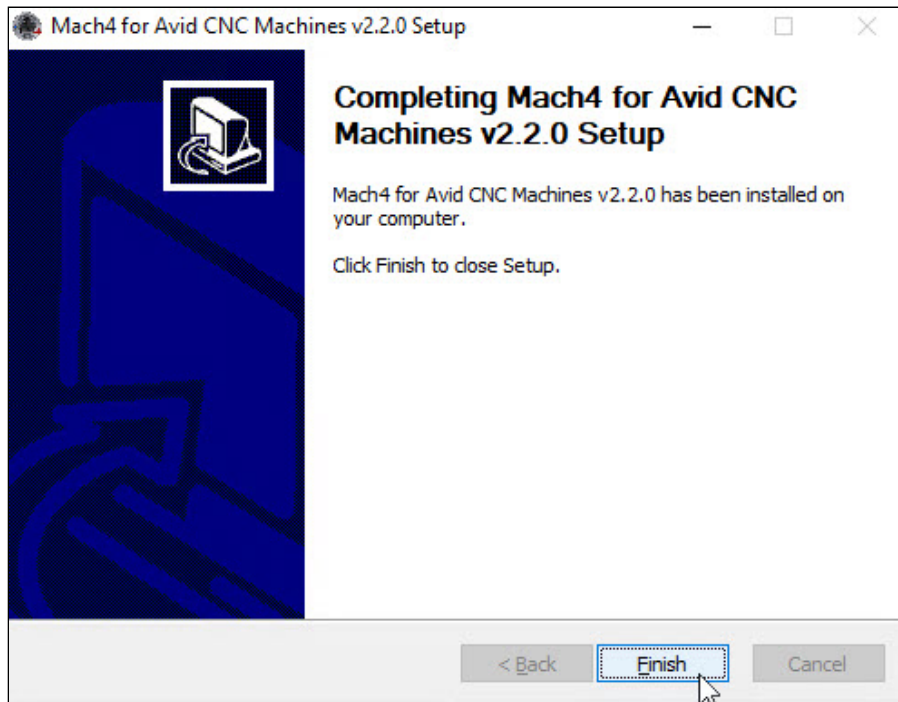
- Verify you are installing the Avid CNC Mach4 installer and click **"Run anyway"**.

- Follow the prompts on the screen to begin installation.

- Windows will ask if you want to make changes to your computer. Click **"Yes"** to allow the necessary changes.

- Installation is now complete, click **"Finish"** to close the installer.

2. Plug in Ethernet Cable

- Plug in your Ethernet cable directly from your PC to the "NET1" Ethernet port on your Plug and Play CNC Control System.
- Power on your Plug and Play CNC Control System.

> ⏱ **Plug and Play CNC Control System Previous Revisions**
>
> If you purchased your Plug and Play CNC Control Systems prior to April 2021, use the "ESS" Ethernet port.

3. Configure Network Settings

The Ethernet SmoothStepper SCU (System Configuration Utility) is the quickest and easiest method to perform the basic configuration step to connect your computer with the SmoothStepper and CNC electronics. Follow the instructions below to run the SCU application.

> ℹ **PC Configuration Note**
>
> It is recommended for the only network connection to be the Ethernet cable from your Plug and Play Electronics connected to your PC. This will make it easier to identify the network this Ethernet cable is connected to. If using a laptop, it is ok to use a wireless connection for internet access during this process.
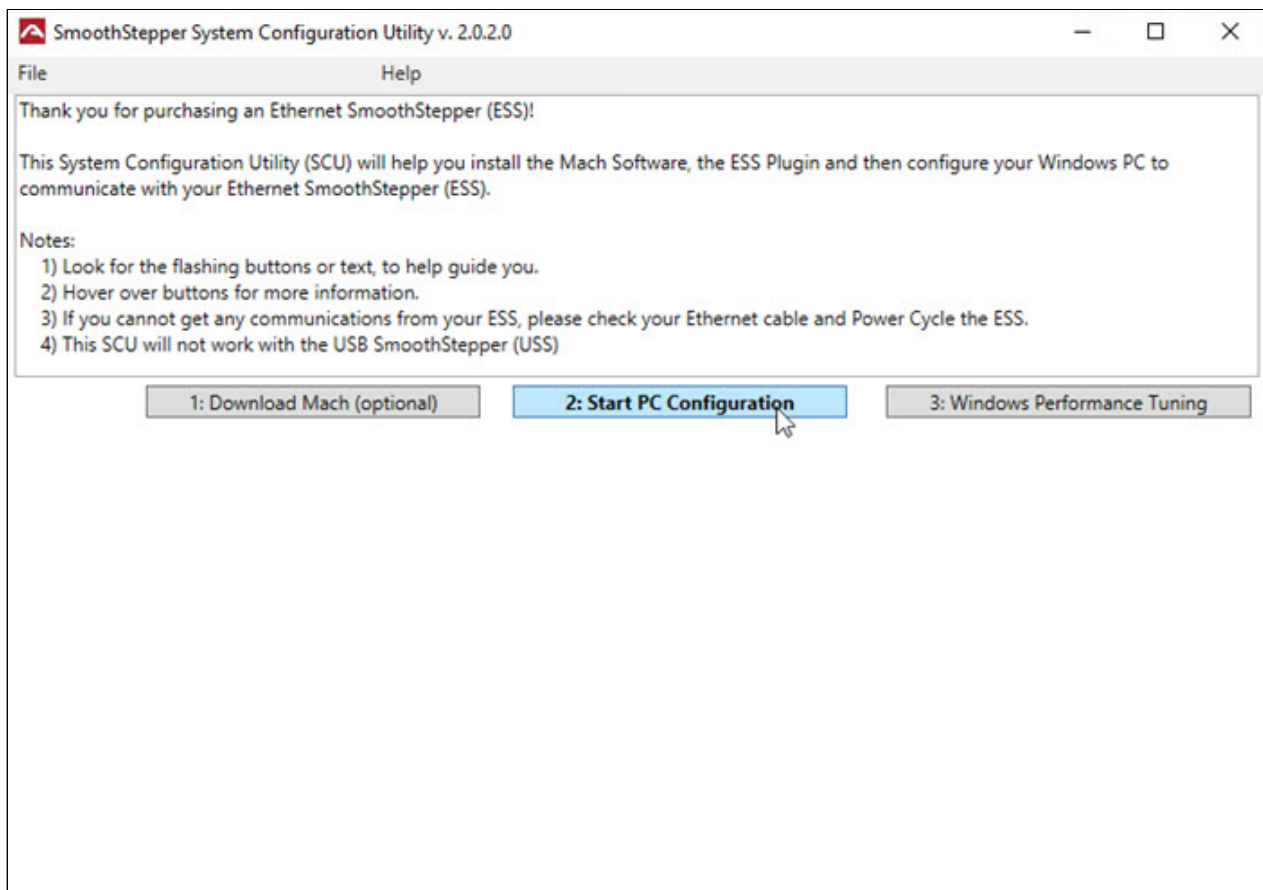
> ℹ **PC Configuration Note**
>
> If you are upgrading from Mach3 and have previously ran the SCU application, it is not necessary to repeat this step.
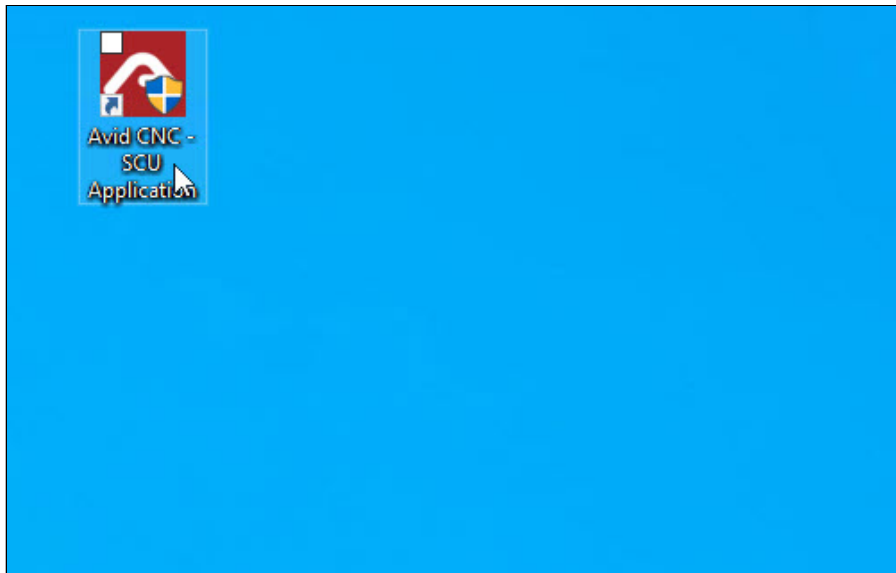
- Double click the **Avid CNC - SCU Application** icon on your desktop to start the SCU application. (This is installed when you run the Avid CNC Mach4 Installer)
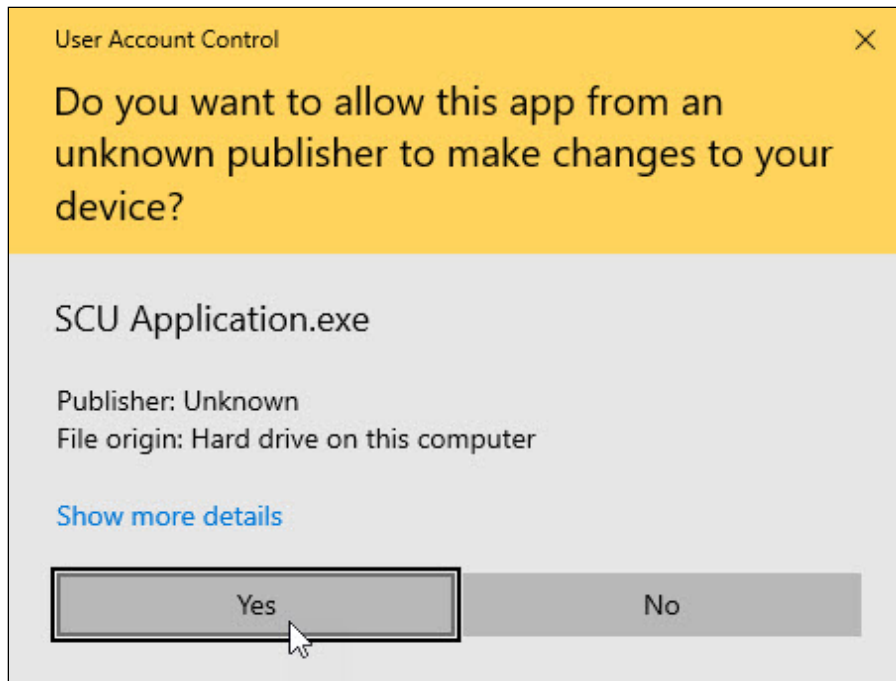
- Click **"Yes"** to allow the SCU to make changes to your computer. The application will modify your Firewall settings to allow Mach4 through, along with changing network adapter settings so it can talk to the Ethernet SmoothStepper (ESS).

SmoothStepper System Configuration Utility v. 2.0.2.0

File   Help

Thank you for purchasing an Ethernet SmoothStepper (ESS)!

This System Configuration Utility (SCU) will help you install the Mach Software, the ESS Plugin and then configure your Windows PC to communicate with your Ethernet SmoothStepper (ESS).

Notes:
   1) Look for the flashing buttons or text, to help guide you.
   2) Hover over buttons for more information.
   3) If you cannot get any communications from your ESS, please check your Ethernet cable and Power Cycle the ESS.
   4) This SCU will not work with the USB SmoothStepper (USS)

[1: Download Mach (optional)]   [2: Start PC Configuration]   [3: Windows Performance Tuning]

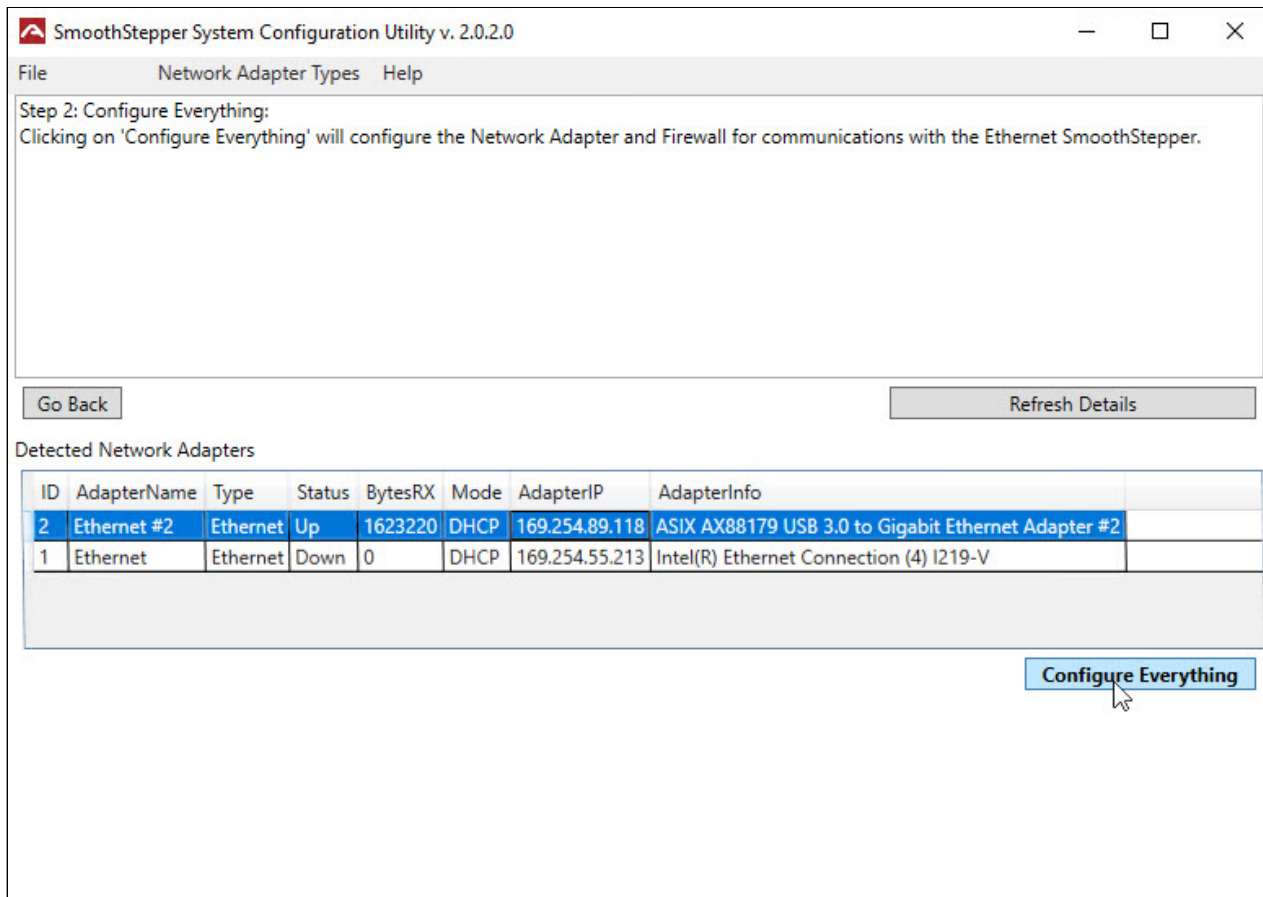- Click the **"2: Start PC Configuration"** button to begin configuring your network settings.
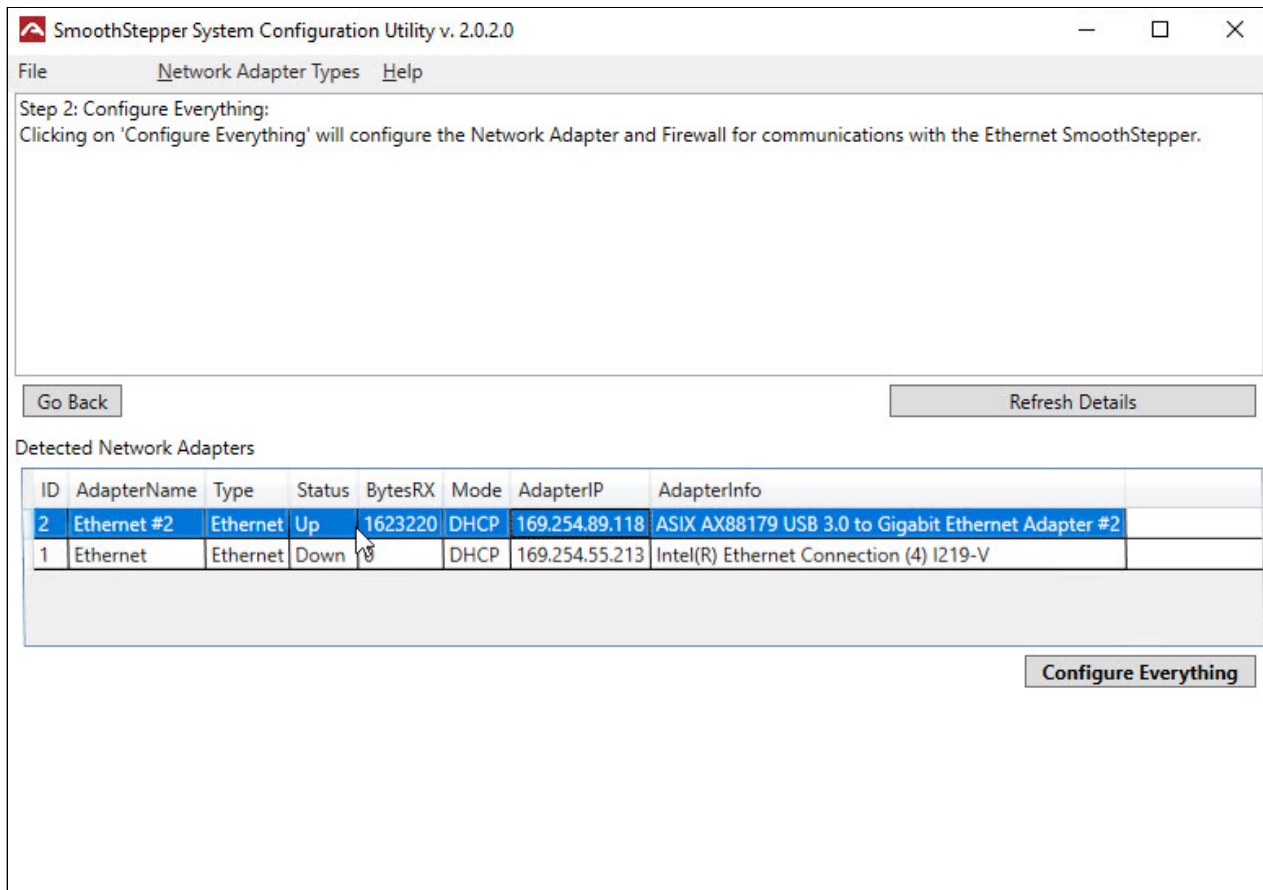
- On the next screen you will see a list of network adapters. Select the Ethernet network adapter that your ESS is connected to.

> ℹ️ **Network Adapter**
>
> The name of your network adapter will likely differ from what is shown in this image.

- After you have selected the correct Ethernet network adapter, click "**Configure Everything**".

SmoothStepper System Configuration Utility v. 2.0.2.0

File   Network Adapter Types   Help

Step 3: Listening for Ethernet SmoothSteppers :

The 'Detected ESS(s)' table (at the bottom of this window) will update every few seconds with any detected ESS(s), but it may take up to a minute for the first ping to show up (if there is an ARP issue).

If your ESS appears choose Windows Performance Tuning from the File menu. If your SmoothStepper does not appear within a minute click on 'I don't see my ESS'

If you see BootP packets coming in, remove the BOOTP (JP1) Jumper from the ESS and power cycle the ESS, otherwise Mach will never be able to connect to the ESS.

[Go Back]   [I don't see the ESS, Help me!]   [Refresh Details]

Detected Network Adapters

ID	AdapterName	Type	Status	BytesRX	Mode	AdapterIP	AdapterInfo
2	SmoothStepper Network 19	Ethernet	Up	1623220	Static	10.9.9.2	ASIX AX88179 USB 3.0 to Gigabit Ethernet Adapter #2
1	Ethernet	Ethernet	Down	0	DHCP	169.254.55.213	Intel(R) Ethernet Connection (4) I219-V

Detected ESS(s): If your ESS appears below, choose Windows Performance Tuning from the File menu.

ID	SmoothStepperMAC	SmoothStepperIP	SmoothStepperInfo	AdapterType	AdapterIP	SuccessfulPings	BootPRxd
1	E8:E7:70:00:55:18	10.9.9.9		Ethernet	10.9.9.2	9	

[I see Pings, open Windows Performance Tuning]

- At the bottom of the screen you will now see a detected ESS. If you see **Listening for SmoothSteppers**, an ESS has not been found yet. Make sure your Plug and Play Electronics control box is powered on and connected with the Ethernet cable to your PC.

SmoothStepper System Configuration Utility v. 2.0.2.0

File   Network Adapter Types   Help

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| Go Back | | I don't see the ESS, Help me! | | Refresh Details |

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1	E8:E7:70:00:55:18	10.9.9.9		Ethernet	10.9.9.2	9	

| I see Pings, open Windows Performance Tuning |

- If you see your SmoothStepper has **Successful Pings** incrementing, that means the ESS in your control box has been found and is actively communication with your PC.

- Click on "**I see Pings, open Windows Performance Tuning**" and continue to the next section in these instructions.

> ℹ **Network Settings TroubleShooting**
>
> If the SCU does not see any "Successful Pings" from the SmoothStepper and have verified your control box is powered on with the Ethernet cable connected to your PC, you can find additional trouble shooting tips on **Warp9td's** website. (www.warp9td.com/index.php/documentation/doc-scu#TroubleShooting)

4. Windows Performance Tuning

The Ethernet SmoothStepper solves, or greatly reduces, most potential Windows-related communication issues by providing a dedicated real-time DSP (digital signal processor) to handle the precise timing of step and direction signals to your CNC electronics.

Using the Windows Performance Tuning feature in the SCU will help to create the most stable environment for Mach4 and further reduce the opportunity for other processes to create delays or otherwise interfere with smooth and uninterrupted communication from Mach4 to the SmoothStepper.

<p style="text-align:center">Start Windows Performance Tuning</p>
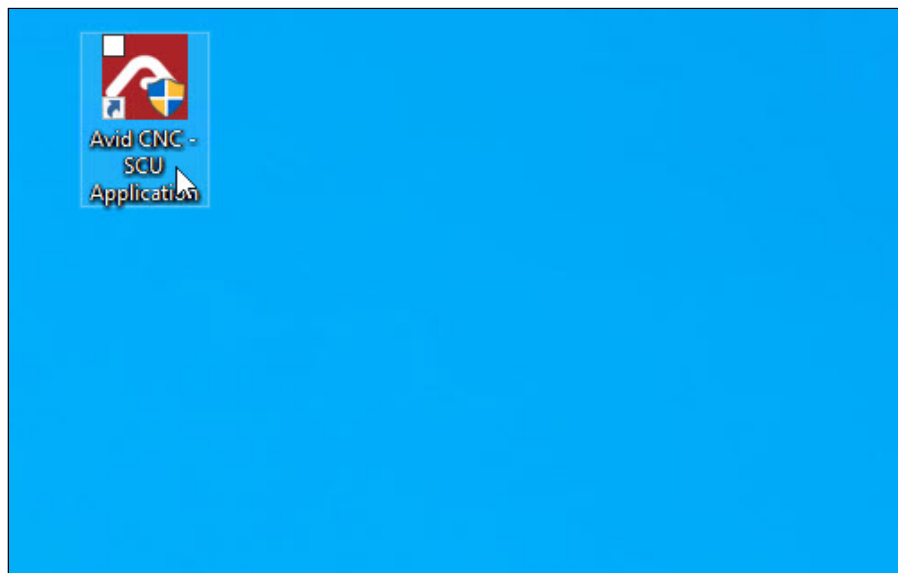
- If you have not already opened Windows Performance Tuning in the previous section, double click the **Avid CNC - SCU Application** icon on your desktop to start the SCU application. (This is installed when you run the Avid CNC Mach4 Installer)
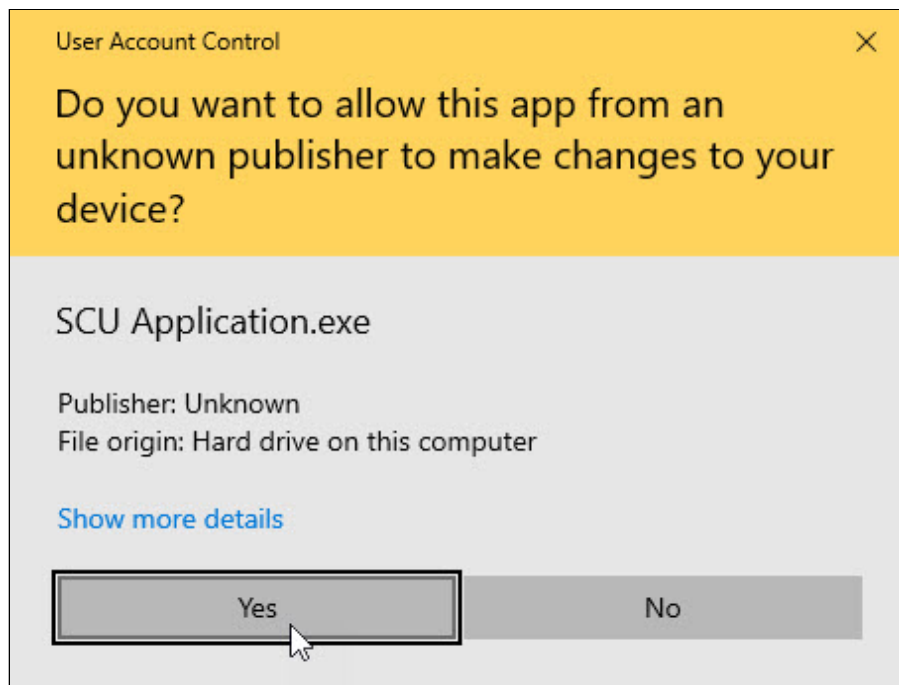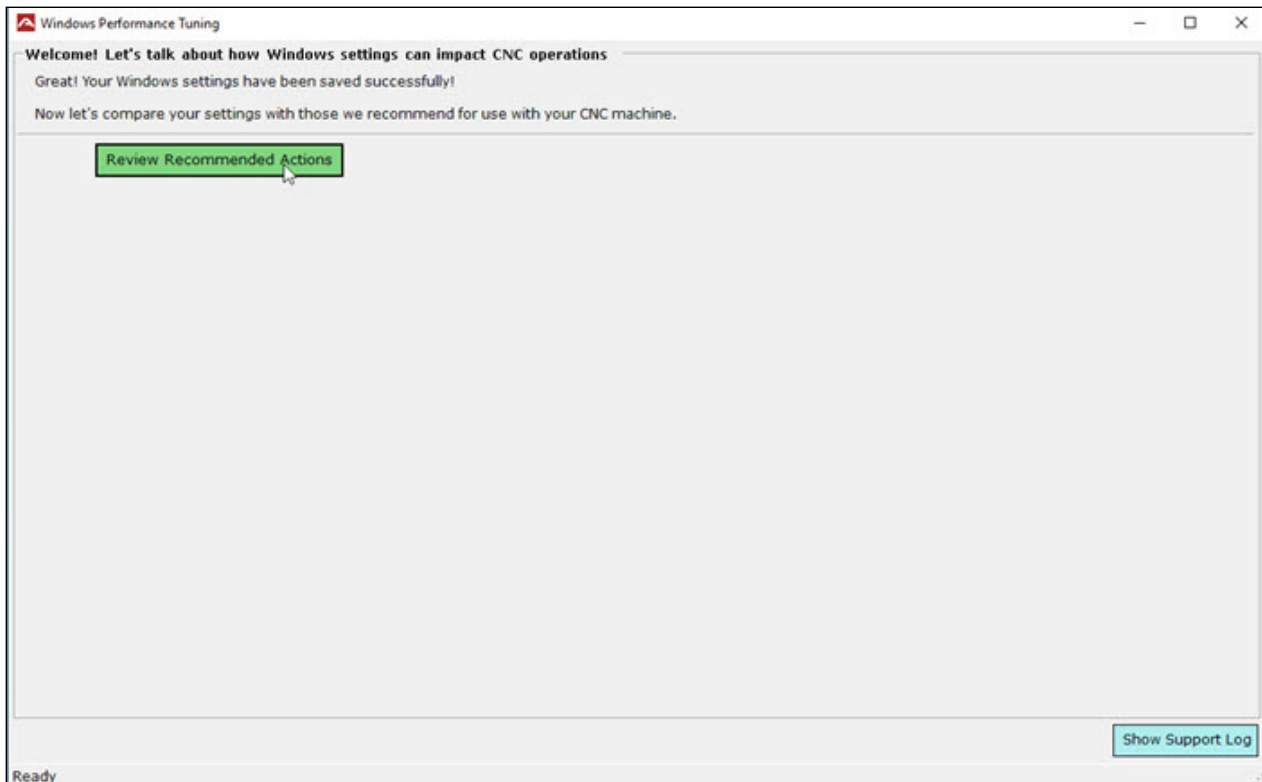
- Click **"Yes"** to allow the SCU to make changes to your computer.
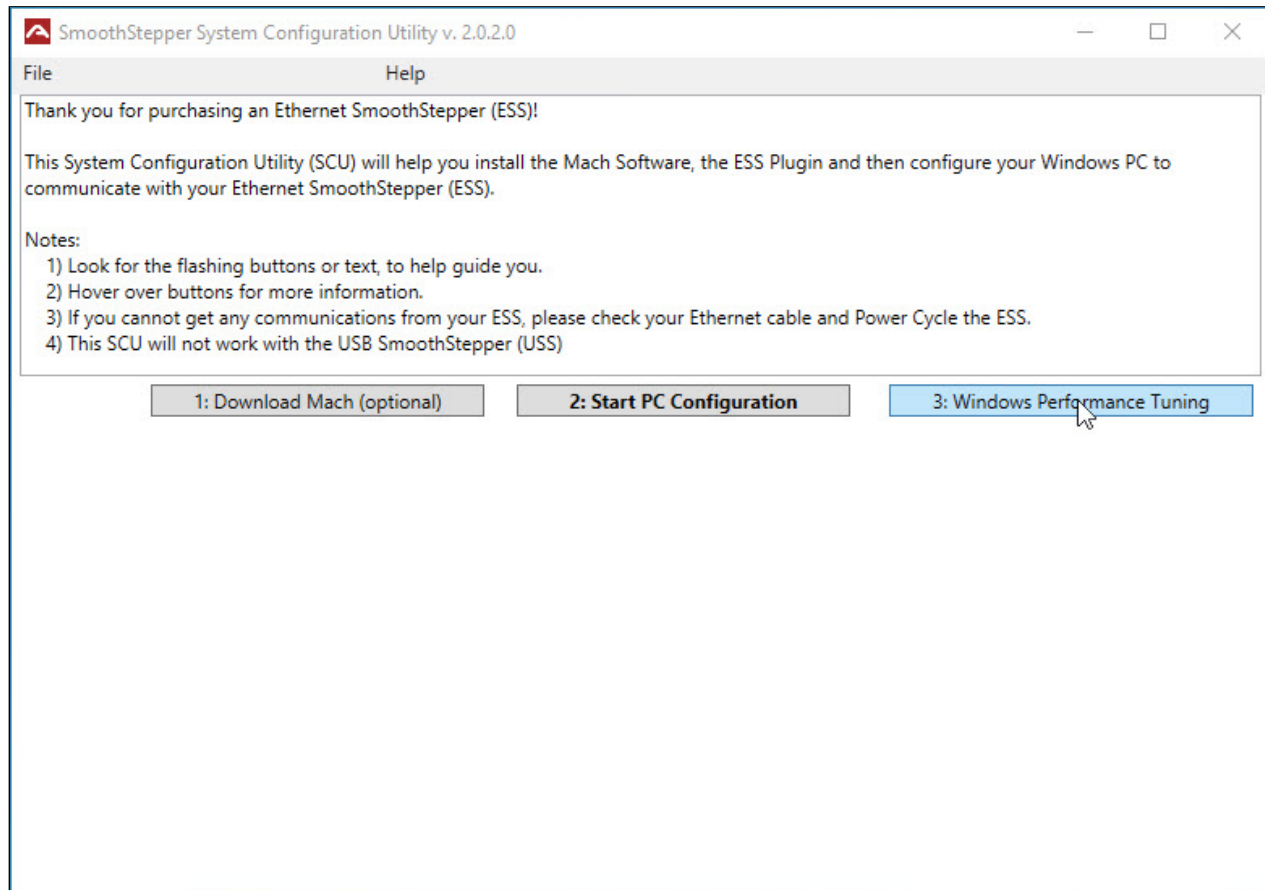
- Click **"3. Windows Performance Tuning"**.
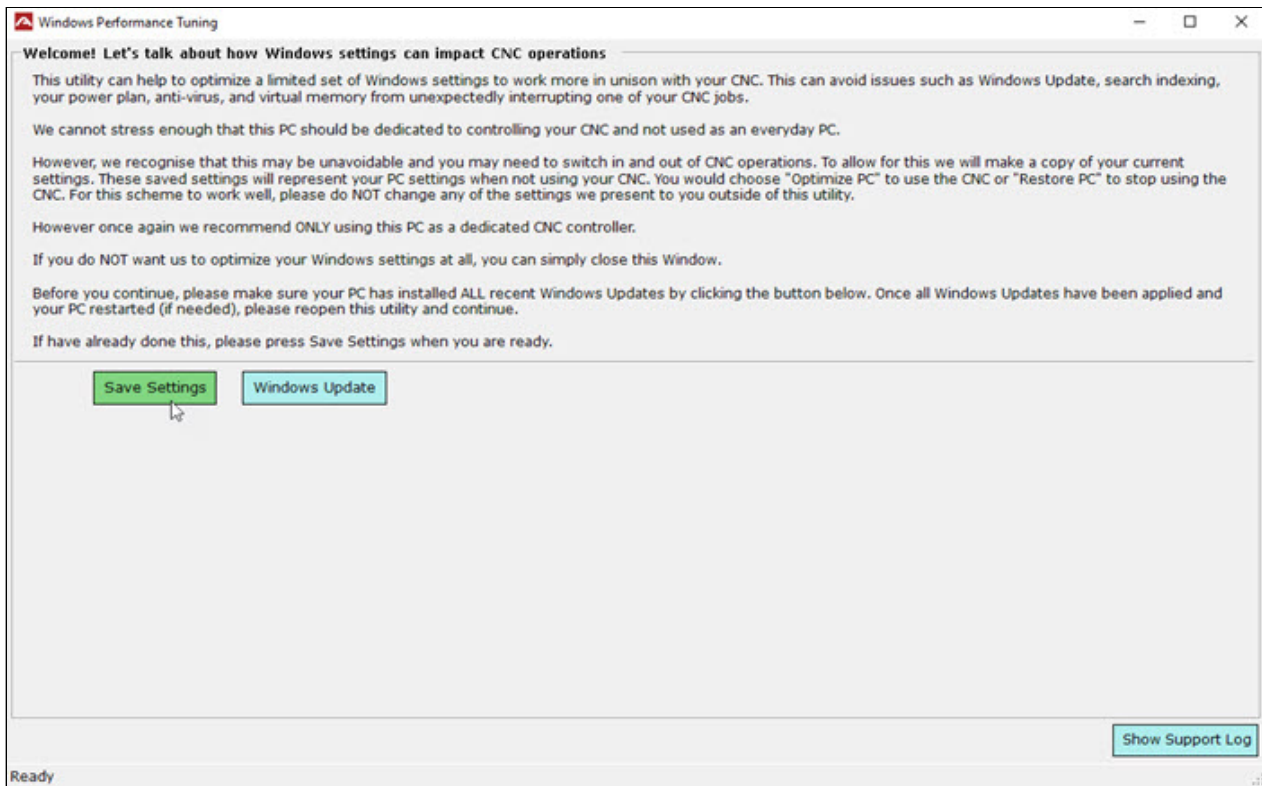
- If this is the first time using Windows Performance Tuning, it is very important to first read through the information shown in this first dialog. Once you are ready to proceed, click **"Save Settings"**.
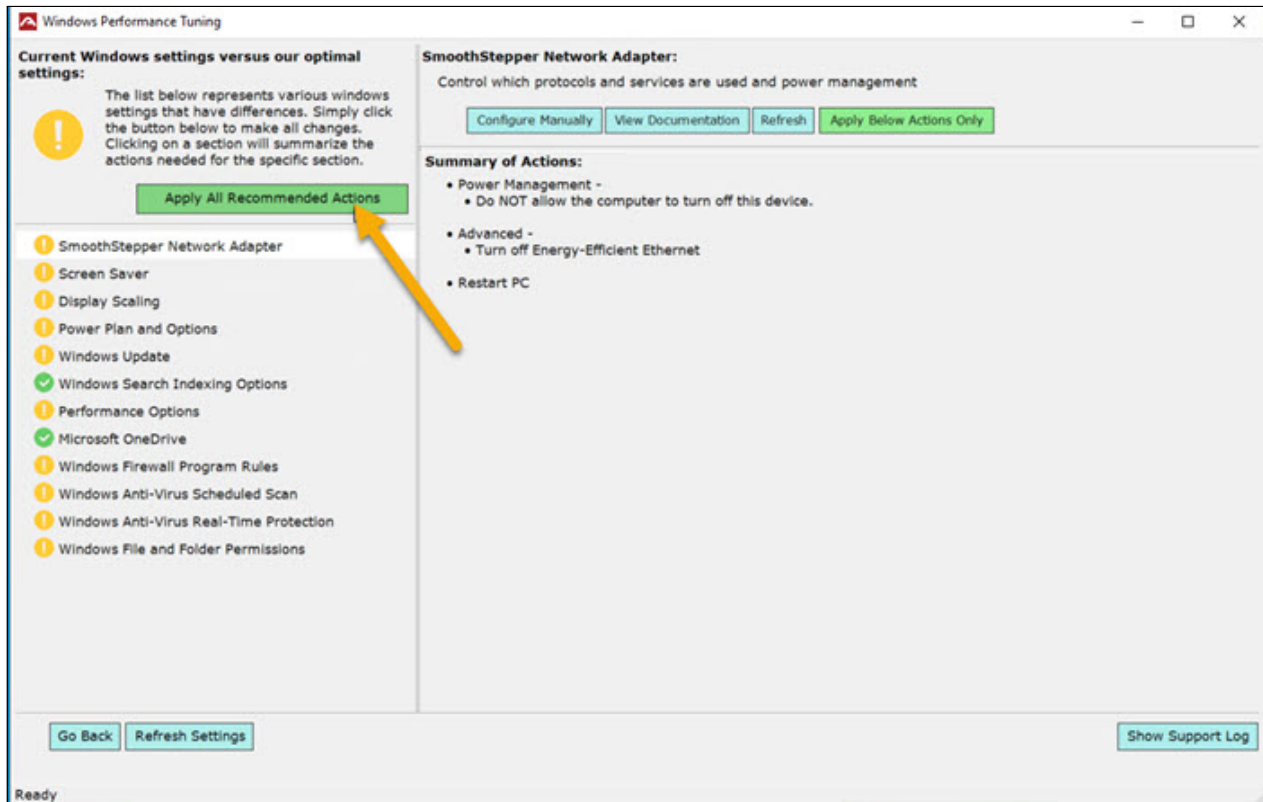

- After your settings have finished saving, click **"Review Recommended Actions"**.
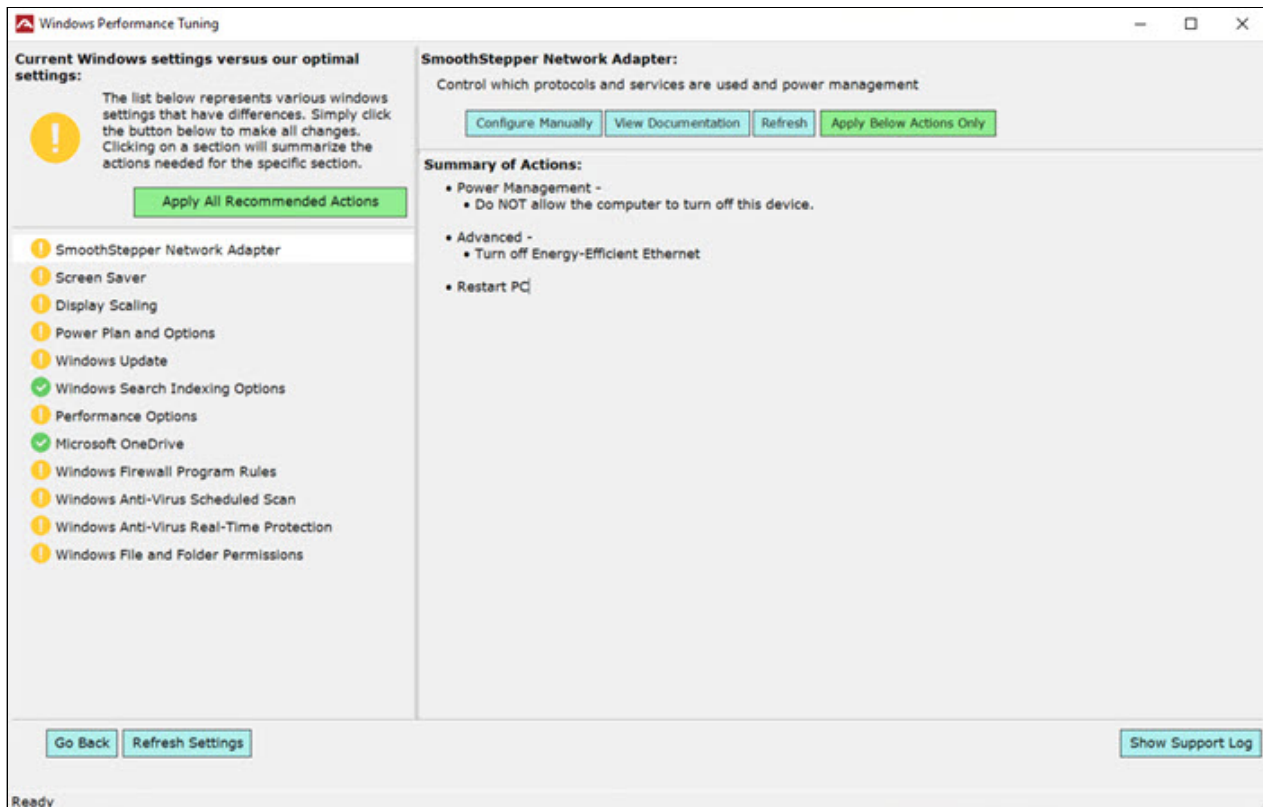
- You will now see a list of recommended actions that will optimize your PC for use as a CNC controller.
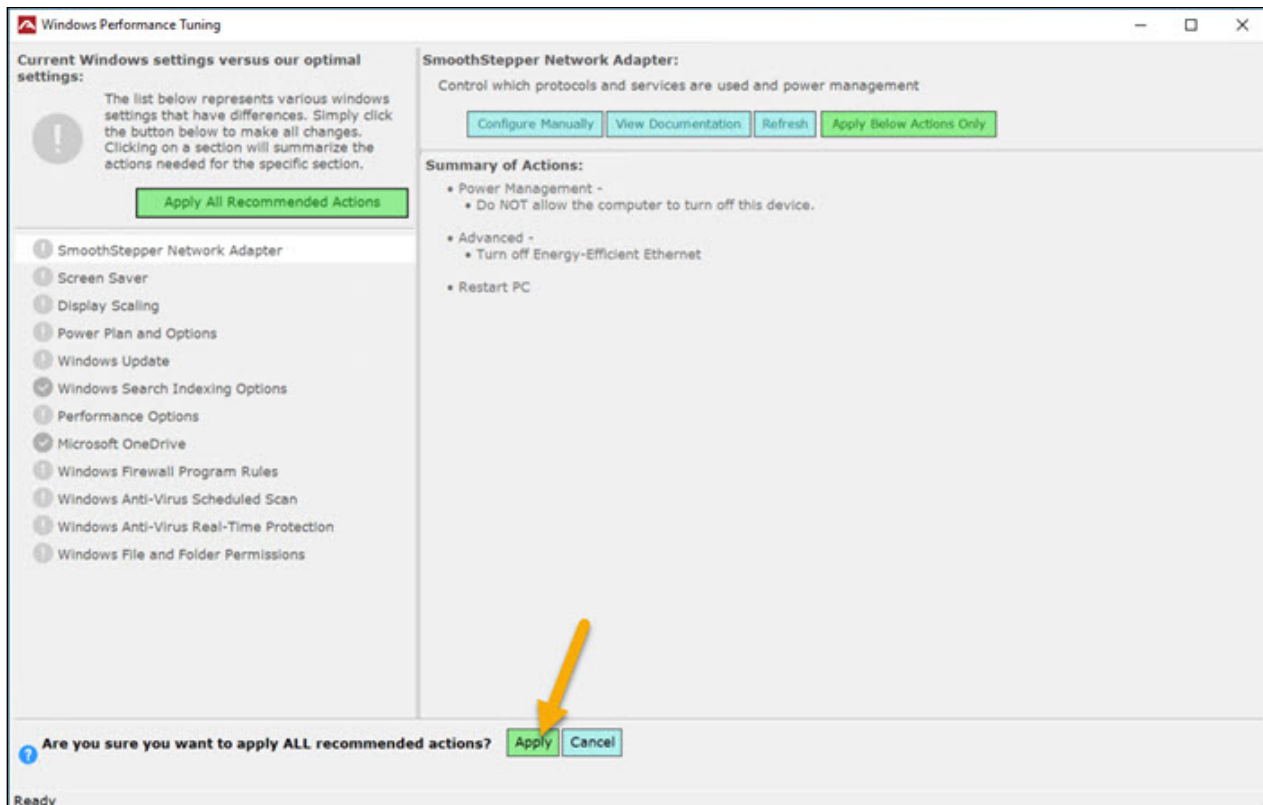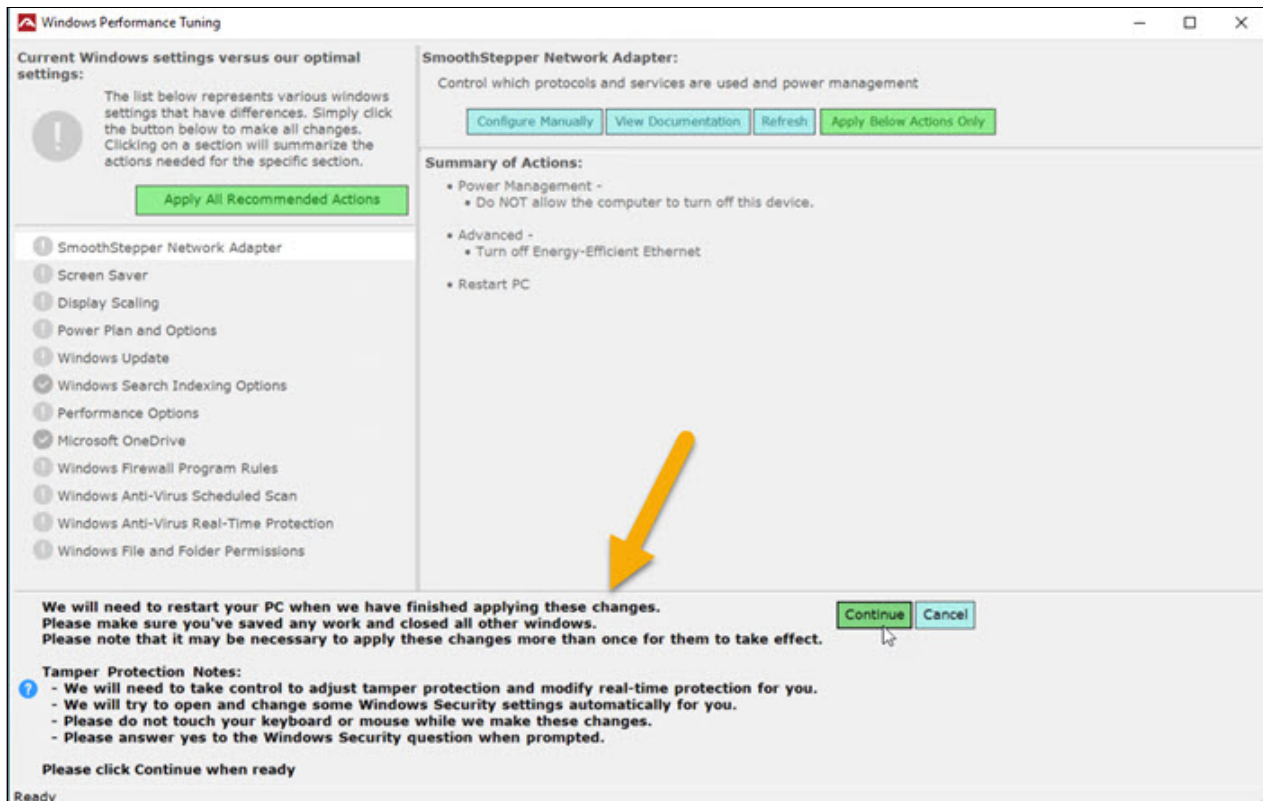
- It is recommended to apply all available Windows Performance Tuning actions. Click "**Apply All Recommended Actions**".

> **ⓘ Custom Configuration**
>
> If you want to selectively review and apply different Windows Performance Tuning actions, review the Custom PC Configuration section below.

- Confirm you want to apply all actions by clicking "**Apply**".

- At the bottom of the screen you will see additional information about changes that will be made to your PC. Once you have read these and are ready to proceed, click **"Continue"**.
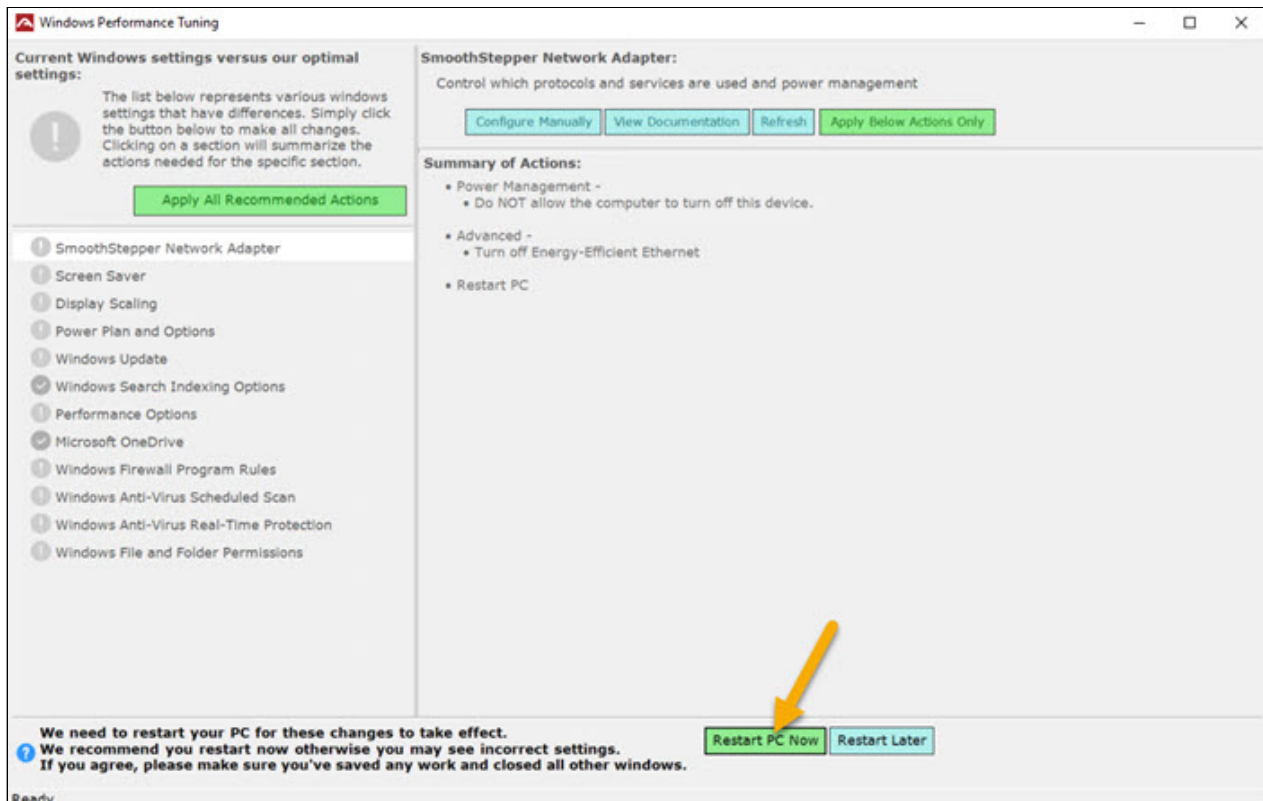
- When the changes are complete, you may need to restart your PC for the changes to take effect. If this is the case, you will be prompted to do so and can click "**Restart PC**".
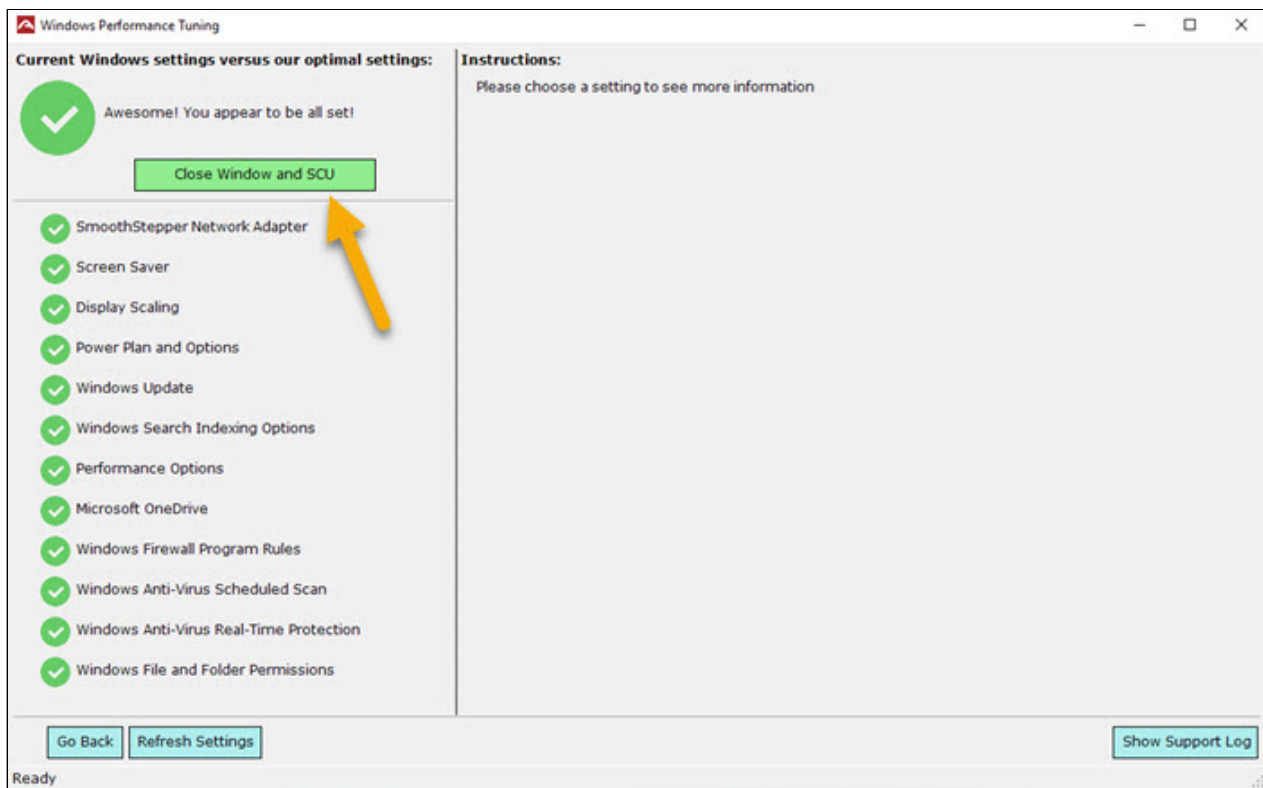
- After your PC has restarted, the SCU Windows Performance Tuning window will open and you should now see the changes have been applied and there are no recommended actions. Click **"Close Window and SCU"** to exit the application.

Custom PC Configuration

The Windows Performance Tuning application allows custom configuration by allowing the user to select which changes they want applied.
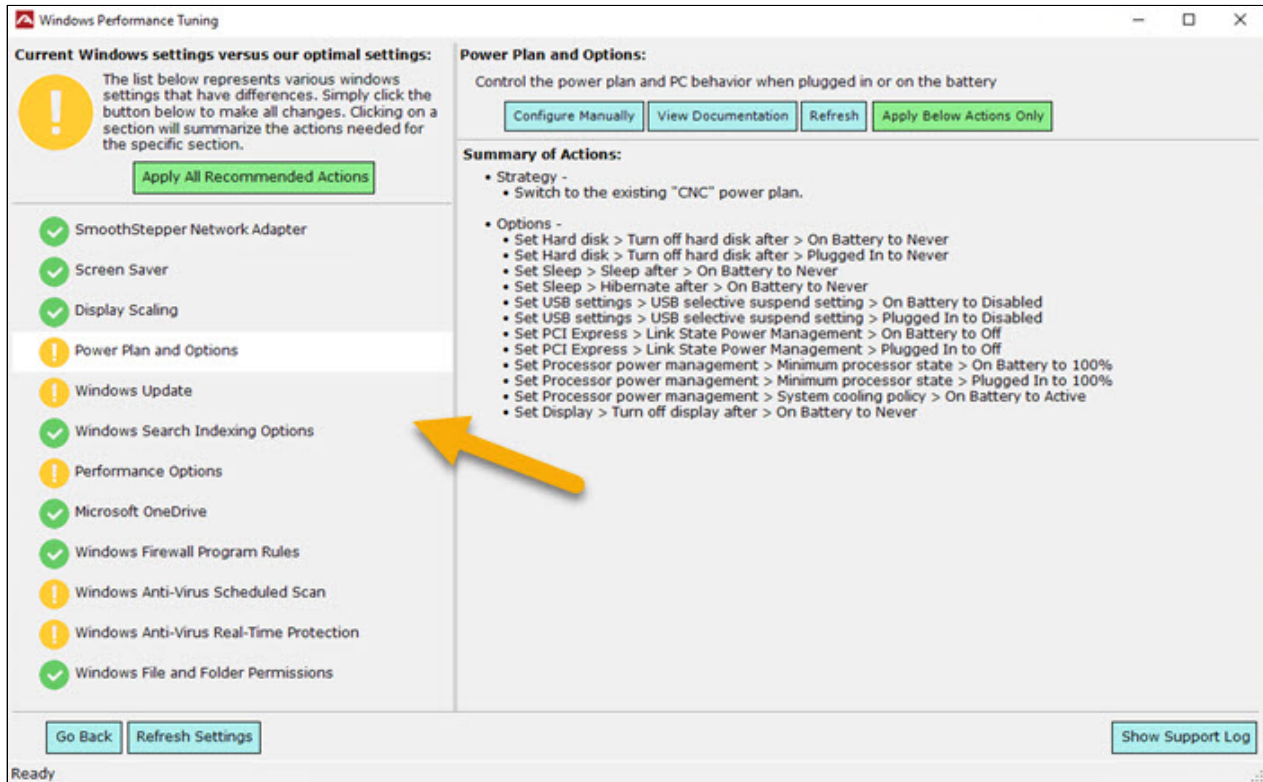
- Select one of the items on the left side to view the recommended actions for that item.
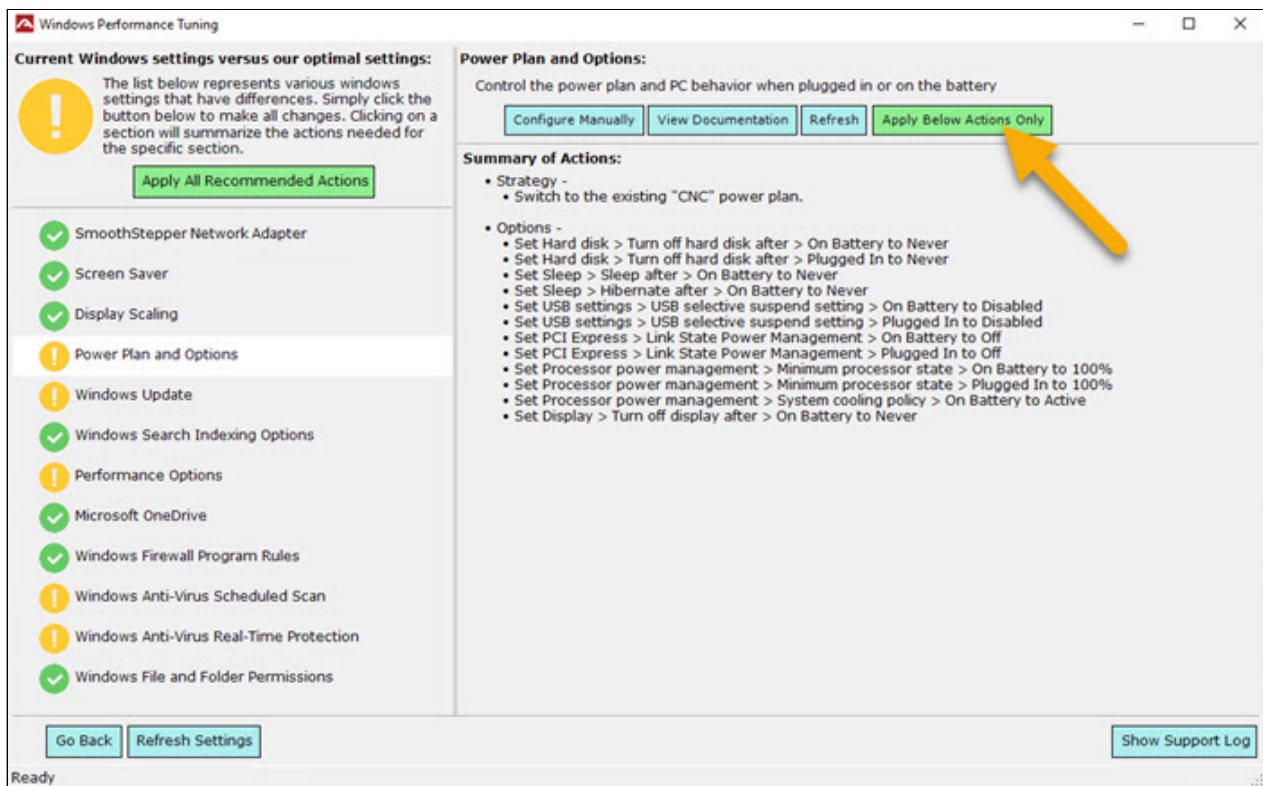
- To apply on the actions for that item, click **"Apply Below Actions Only"**.

5. Best Practices for CNC Operation

- Always turn off or disable all other network connections (i.e. Wifi) when running a CNC program in Mach4.