

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).

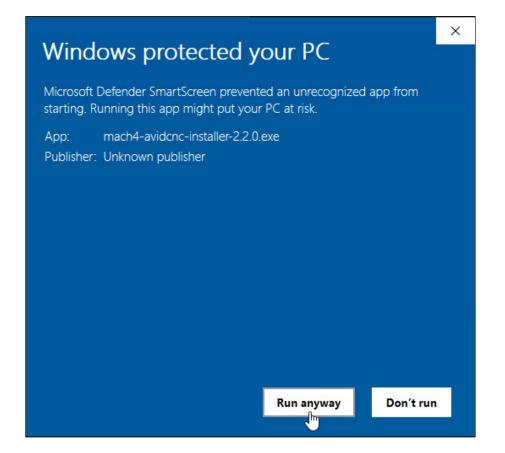
i Installation Note

Our installer provides the correct version of Mach4, customized for use with any of our CNC machines or electronics systems.

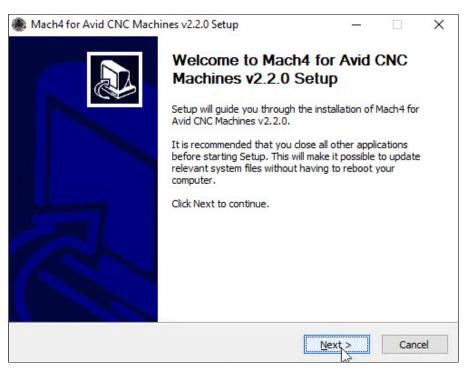
Windows protected your PC	×
Microsoft Defender SmartScreen prevented an unrecognized app from starting. Running this app might put your PC at risk. <u>More info</u>	
Danita	
Don't r	un

• When installing Mach4, if the warning message pictured above appears, click "More info".





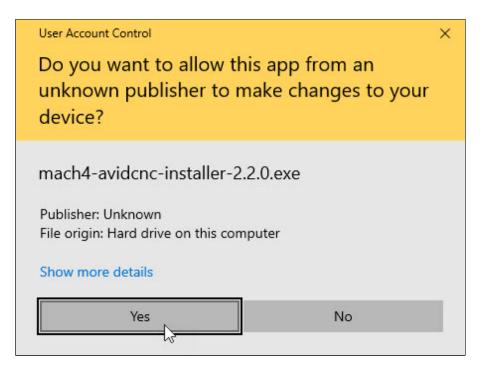
• Verify you are installing the Avid CNC Mach4 installer and click "Run anyway".



• Follow the prompts on the screen to begin installation.



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

🏶 Mach4 for Avid CNC Machin	nes v2.2.0 Setup			×
	Completing Mach4 Machines v2.2.0 Se Mach4 for Avid CNC Machines v your computer. Click Finish to close Setup.	etup		'n
	< <u>B</u> ack	Einish	Cano	el

• 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.

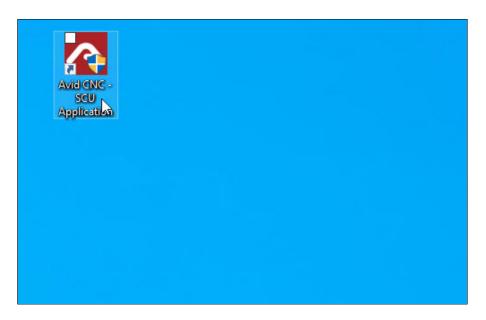
PC Configuration Note

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.

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)

User Account Control Do you want to allow this app from an unknown publisher to make changes to your device?	×
SCU Application.exe Publisher: Unknown File origin: Hard drive on this computer Show more details	
Yes No	

• 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).



SmoothSteppe	r System Configuration Utility v. 2.0.2.0)		-		×
File	Help					
Thank you for purc	hasing an Ethernet SmoothStepper (E	SS)!				
	uration Utility (SCU) will help you insta your Ethernet SmoothStepper (ESS).	all the Mach Software, the ESS Plugin and	then configure your W	/indows	PC to	
2) Hover over bu 3) If you cannot	lashing buttons or text, to help guide y uttons for more information. get any communications from your ES not work with the USB SmoothStepper	S, please check your Ethernet cable and P	ower Cycle the ESS.			
	1: Download Mach (optional)	2: Start PC Configuration	3: Windows Pe	erformar	nce Tunin	9
		v 0				

• Click the "2: Start PC Configuration" button to begin configuring your network settings.



As	moothStepper S	ystem Cor	nfigurati	on Utility	v. 2.0.2.()			<u> </u>		×
File	<u>N</u> etw	ork Adapt	ter Types	s <u>H</u> elp							
	2: Configure Eve ng on 'Configur		ng' will o	configure t	he Netv	vork Adapter and	d Firewall for communicatio	ons with the Ethern	et Smooth	Stepper.	
	Back ted Network Ad	apters						Refr	esh Detail	5	
ID	AdapterName	•	Status	BytesRX	Mode	AdapterIP	AdapterInfo				
2	Ethernet #2	Ethernet	Up	1623220	DHCP	169.254.89.118	ASIX AX88179 USB 3.0 to (Gigabit Ethernet Ac	lapter #2		
1	Ethernet	Ethernet	Down	เช้	DHCP	169.254.55.213	Intel(R) Ethernet Connection	on (4) I219-V			
1									Configure	Everyth	ing

• On the next screen you will see a list of network adapters. Select the Ethernet network adapter that your ESS is connected to.

i Network Adapter

The name of your network adapter will likely differ from what is shown in this image.



<u>A</u>	moothStepper S	ystem Co	nfigurati	ion Utility	v. 2.0.2.()			<u></u>		×
File	Netw	ork Adapt	ter Types	s Help							
	2: Configure Eve ing on 'Configur		ng' will c	configure 1	the Netv	vork Adapter an	d Firewall for communic	cations with the E	thernet Smooth	Stepper.	
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ID	AdapterName	Туре	Status	BytesRX	Mode	AdapterIP	AdapterInfo				
2	Ethernet #2	Ethernet	Up	1623220	DHCP	169.254.89.118	ASIX AX88179 USB 3.0	to Gigabit Etherr	net Adapter #2		
1	Ethernet	Ethernet	Down	0	DHCP	169.254.55.213	Intel(R) Ethernet Conn	ection (4) I219-V			
									Configure		ning

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



A	SmoothStepper System	Configuration Ut	ility v. 2	.0.2.0					-	<u>24</u>		×
File	Network Ad	apter Types <u>H</u> e	lp									
Step	3: Listening for Etherne	t SmoothSteppe	rs :									
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-	our ESS appears choose \ on't see my ESS'	Windows Perform	nance Ti	uning fron	n the F	ile menu. If yo	ur SmoothS	itepper does not a	appear withi	n a m	inute cli	ck on
	ou see BootP packets cor onnect to the ESS.	ming in, remove t	the BOC)TP (JP1) J	umper	from the ESS	and power	cycle the ESS, oth	erwise Mach	will r	never be	able
G	o Back				don't	see the ESS,	Help me!		Refresh [Details	5	
Dete	cted Network Adapters						100.00					
10		Туре	Status	BytesRX	Mode	AdapterIP	Adapte	erInfo				
2	SmoothStepper Netwo		Up	1623220	Static	10.9.9.2		X88179 USB 3.0 to	Gigabit Eth	ernet	Adapte	r #2
1	Ethernet	Ethernet	Down	0	DHCP	169.254.55.	213 Intel(R)	Ethernet Connec	tion (4) 1219	-V		
Dete	ected ESS(s): If your ESS	S appears below	, choos	e Windov	vs Per	formance Tun	ing from t	he File menu.				
ID	SmoothStepperMAC		P Smo	othSteppe	rInfo	AdapterType		SuccessfulPings	BootP <u>R</u> xd			
1	E8:E7:70:00:55:18	10.9.9.9				Ethernet	10.9.9.2	9				
							l see	Pings, open Win	dows Perfo	rman	ce Tuni	ng

• 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.



A	SmoothStepper System	Configura	tion Uti	lity v. 2	.0.2.0							<u></u>		×
File	Network Ad	lapter Type	es <u>H</u> e	lp										
Step	3: Listening for Etherne	t SmoothS	Stepper	s:										
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G	o Back					l don'	t see the ESS,	Help me	!		Refresh	Detail	s	
Dete	cted Network Adapters													
10	AdapterName	Ту	pe	Status	BytesRX	Mod	e AdapterIP	Ada	pterInfo	5				
2	SmoothStepper Netw	ork 19 Eth	nernet	Up	1623220	Statio	10.9.9.2	ASIX	AX881	79 USB 3.0 to	o Gigabit Etł	nernet	t Adapte	r #2
1	Ethernet	Eth	nernet	Down	0	DHC	P 169.254.55.	213 Intel	(R) Ethe	ernet Connec	tion (4) 1219)-V		
Dete	cted ESS(s): If your ES	S appears	below,	, choos	e Windo	ws Per	formance Tur	ning fron	n the Fi	ile menu.				
ID	SmoothStepperMAC	SmoothSt	epperlF	Smo	othSteppe	erInfo	AdapterType	Adapter	IP Suc	cessfulPings	BootP <u>R</u> xd			
1	E8:E7:70:00:55:18	10.9.9.9					Ethernet	10.9.9.2	9					
								ls	ee Ping	js, open Win	dows Perfo	orman	nce Tuni	ng

• 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.



A 9	SmoothStepper System	Configuratio	on Utility v	2.0.2.0					-	<u>s</u> §		×
File	Network Ac	dapter Types	<u>H</u> elp									
Step	3: Listening for Etherne	et SmoothSte	eppers :									
	Detected ESS(s)' table ite for the first ping to	•			update	e every <mark>f</mark> ew se	conds with	any detected ESS(s), but it may	/ take u	p to a	
-	ur ESS appears choose n't see my ESS'	Windows Per	rformance	Tuning fror	n the F	ile menu. If yo	our Smooth	Stepper does not a	appear withir	n a minu	ute clic	:k on
-	u see BootP packets co onnect to the ESS.	ming in, rem	ove the BC	OOTP (JP1) J	umper	from the ESS	and power	cycle the ESS, oth	erwise Mach	will nev	ver be	able
Go	Back				l don't	see the ESS,	Help me!		Refresh D)etails		
)eter	ted Network Adapters											
ID	The second second second	Туре	Statu	s BytesRX	Mode	e AdapterIP	Adapt	erInfo				
2	SmoothStepper Netw		met Up	1623220		and here and the second		X88179 USB 3.0 to	o Gigabit Eth	ernet A	dapter	#2
1	Ethernet		rnet Dowr	-	DHCP) Ethernet Connec				
)ete	cted ESS(s): If your ES	S annears h	elow cho	ose Window	us Per	formance Tur	aing from t	the File menu				
ID	SmoothStepperMAC						-	SuccessfulPings	BootPRvd		∕	
1	E8:E7:70:00:55:18	10.9.9.9	perir on		1999	Ethernet	10.9.9.2	9			-	
										1		
							Lea	Pings, open Win	dows Perfor		Tunin	10

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

Network Settings TroubleShooting

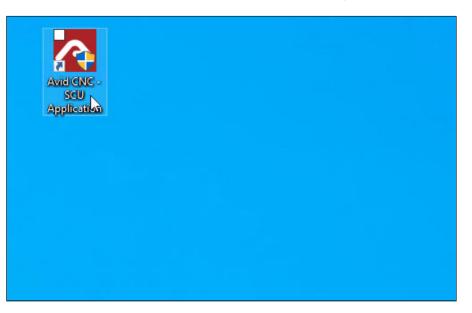
If the SCU does not see any "Successful Pings" from the SmoothStepper and have verified your control box is powered on with the Ethernet cable connected to your PC, you can find additional trouble shooting tips on Warp9td's website. (www.warp9td.com/index.php/documentation/doc-scu#TroubleShooting)



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.

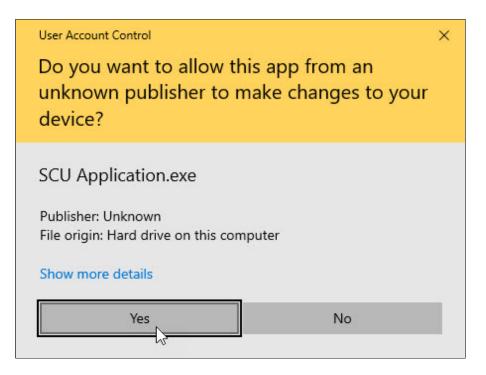
Using the Windows Performance Tuning feature in the SCU will help to create the most stable environment for Mach4 and further reduce the opportunity for other processes to create delays or otherwise interfere with smooth and uninterrupted communication from Mach4 to the SmoothStepper.



Start Windows Performance Tuning

 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.

A SmoothSte	pper System Configuration Utility v. 2.0.2.0					\times
File	Help					
Thank you for p	ourchasing an Ethernet SmoothStepper (ES	S)!				
	nfiguration Utility (SCU) will help you insta vith your Ethernet SmoothStepper (ESS).	ll the Mach Software, the ESS Plugin and th	en configure your V	Vindows	PC to	
2) Hover ove 3) If you can	he flashing buttons or text, to help guide y r buttons for more information. not get any communications from your ES vill not work with the USB SmoothStepper	S, please check your Ethernet cable and Pow	ver Cycle the ESS.			
[1: Download Mach (optional)	2: Start PC Configuration	3: Windows Pe	erforman	ce Tunin	g

• Click "3. Windows Performance Tuning".



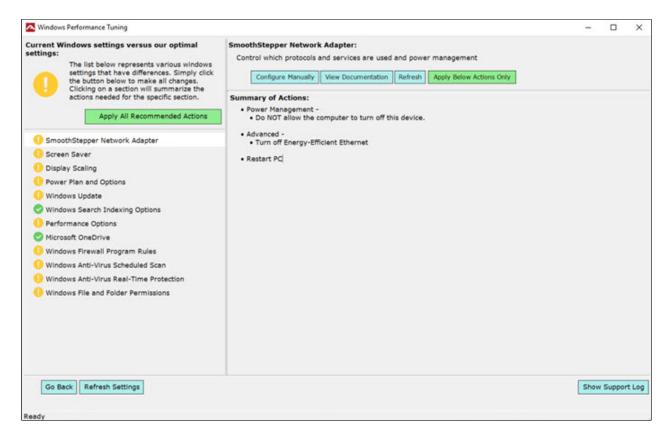
Windows Performance Tuning	-		×
Welcome! Let's talk about how Windows settings can impact CNC operations			
This utility can help to optimize a limited set of Windows settings to work more in unison with your CNC. This can avoid issues such as Windows U your power plan, anti-virus, and virtual memory from unexpectedly interrupting one of your CNC jobs.	lpdate, search	indexi	ng,
We cannot stress enough that this PC should be dedicated to controlling your CNC and not used as an everyday PC.			
However, we recognise that this may be unavoidable and you may need to switch in and out of CNC operations. To allow for this we will make a co settings. These saved settings will represent your PC settings when not using your CNC. You would choose "Optimize PC" to use the CNC or "Rest CNC. For this scheme to work well, please do NOT change any of the settings we present to you outside of this utility.			the
However once again we recommend ONLY using this PC as a dedicated CNC controller.			
If you do NOT want us to optimize your Windows settings at all, you can simply close this Window.			
Before you continue, please make sure your PC has installed ALL recent Windows Updates by clicking the button below. Once all Windows Update your PC restarted (if needed), please reopen this utility and continue.	s have been a	pplied a	and
If have already done this, please press Save Settings when you are ready.			
Save Settings Windows Update			
	Sho	w Supp	ort Log
Ready			

• 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".

Kindows Performance Tuning	-		×
Welcome! Let's talk about how Windows settings can impact CNC operations			-
Great! Your Windows settings have been saved successfully!			
Now let's compare your settings with those we recommend for use with your CNC machine.			
Review Recommended Actions			
	-		_
	Show 9	Support	Log
Ready			64

• 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.



Full PC Configuration

Current Windows settings versus our optimal settings: The list below represents various windows settings thave differences. Simply click the buton below to make all changes. Clicking on a section will summarize the actions medded for the specific section. Apply All Recommended Actions OsmoothStepper Network Adapter OsmoothStepper Network Adapter Objalay Scaling Power Plan and Options Owindows Update Windows Sectin Indexing Options Performance Options Microsoft OnDrive Structure To Management - O Display Scaling Performance Options Performance Options Performance Options Performance Options Performance Options Performance Options Performance Options
Windows Firewall Program Rules Windows Anti-Virus Scheduled Scan Windows Anti-Virus Real-Time Protection Windows File and Folder Permissions

• It is recommended to apply all available Windows Performance Tuning actions. Click "Apply All Recommended Actions".

i Custom Configuration

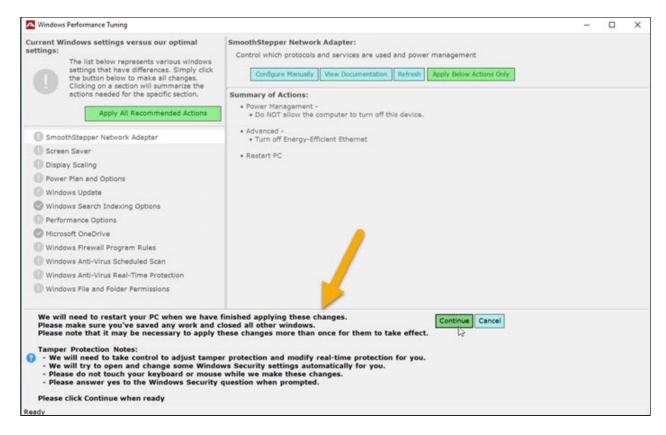
If you want to selectively review and apply different Windows Performance Tuning actions, review the Custom PC Configuration section below.





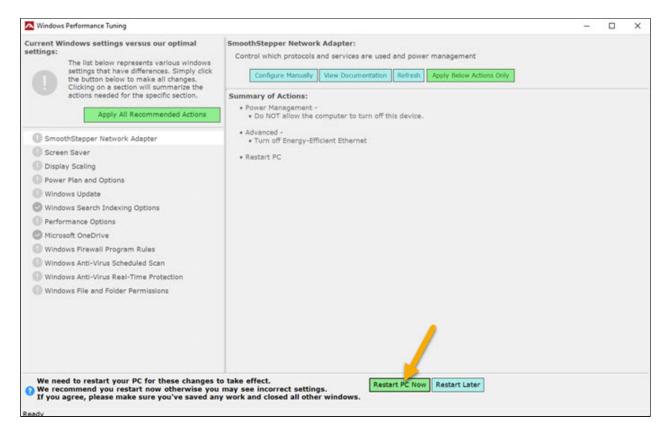
• Confirm you want to apply all actions by clicking "Apply".





• 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**".



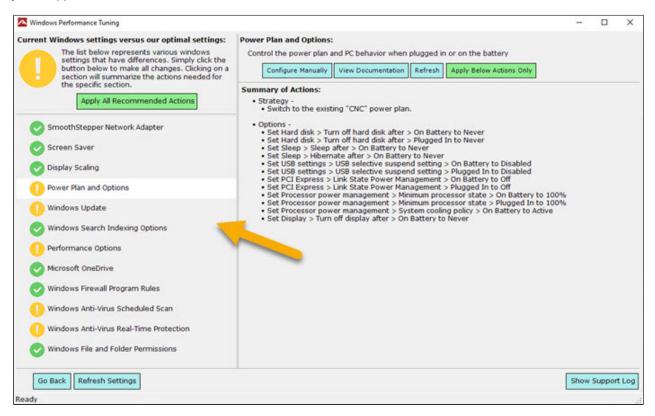
A Windows Performance Tuning		-	- 0	×
Current Windows settings versus our optimal settings: Awesome! You appear to be all set! Close Window and SCU SmoothStepper Network Adapter Screen Saver Screen Saver	Instructions: Please choose a setting to see more information			
Go Back Refresh Settings		Sh	now Suppor	rt Log

• 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.



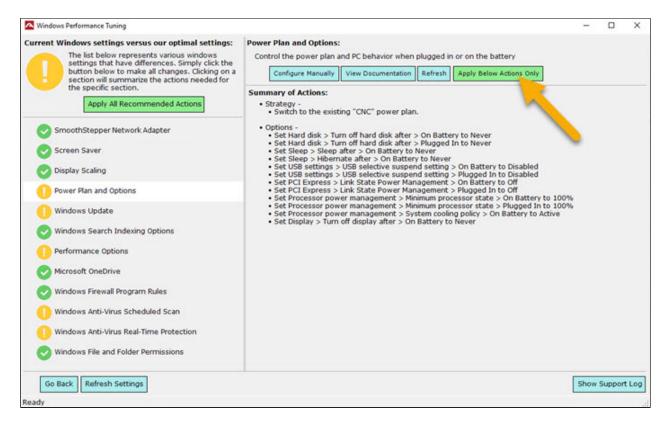
Custom PC Configuration

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.

