MachineApp - Path following

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MachineApp Path Following - User Guide

Overview

The following is a comprehensive user guide for the configuration and operation of the Path Following MachineApplication.

In this guide, you will learn how to:

- Define your Path Following Machine based on your MachineLogic configuration
- Upload a GCode File
- Arrange your GCode file(s) within your workspace
- Create a new Path Following Application and augment it with custom behavior
- Run your Path Following Application

Prerequisites

You have configured your machine in the MachineLogic "Configuration" page, e.g.:

° V E N T I O N		Configuration	() Network	do Manual Co			🕤 🦻	auncher C F
controlle								
Controller Settings	Actuators							© Drive Setting
Actuators First	Configuration Checker Status & F	Past Results						
Second	Name	Туре			Motor Size			
Third	First	Enclosed	d Timing Belt	~	Large Servo	~	Gearbox Installed Brake Installed	
Robots	12							Advanced 4
→ Inputs	DRIVES 1.2	Custom	Current		Tuning Profile		Homing Speed	
	č			10 A	Default	~		68 mm/s
→ Outputs		Default Value	c 10				Default Value: 65	
Tool CW Tool CCW				Check Co	nfiguration			
10010011	Name	Туре			Motor Size		Brake Installed	
	Second	Enclosed	d Ball Screw	~	Large Servo	~	brake installed	
								Advanced 4
	DRIVE 3	Custom	Current	10 A	Tuning Profile	~	Homing Speed	68 mm/s
				IU A	Delault	*		60 mm/s
		Default Value	e 10	Check Co	nfiguration		Default Value: 66	
	Name	Туре			Motor Size			
	Third		d Ball Screw	~	Large Servo	~	Brake Installed	
Apply All Configurations					- ange sorre			
	DRIVE 4	Custom	Current		Tuning Profile		Homing Speed	Advanced 4
$\stackrel{_{}_{}_{}_{}_{}}{}_{_{}_{}_{}} \stackrel{_{}_{}_{}_{}}{}_{_{}_{}} \rightarrow \rightarrow$	DRIV			10 A	Default	~		68 mm/s
Add Add Add Add Actuator Robot Input Output		Datasititatis					Data Alabara CC	

- Afterward, navigate to the "Manual Control" tab on the top bar to ensure that your actuators are behaving as expected.
- When everything looks correct, select the MachineApps tab on the top bar to begin the Path Following configuration process.

Available MachineApps Page

When you first enter into the "MachineApps" tab, you will be shown a list of the available MachineApps. Select Start on the "Path Following" option:

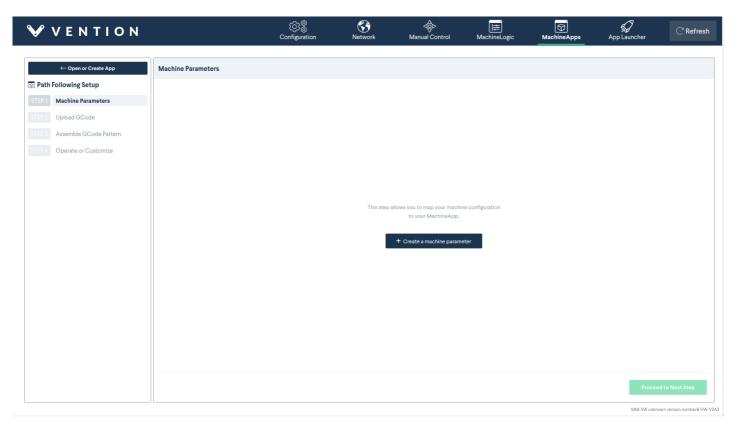
V V E N TION	လြာစ္ထိ Configuration	(Network	do⊳ Manual Control	() MachineApps	App Launcher	C Refresh
	Avail	able Mach	ineApps			
Cobot Palletizer Generate and customize every step of a standard Cobot Palletizing ap	plication.				Start	
Path Following Create a Path Following MachineApp					Start	
						n version number& HW V2A

Machine Parameters

In the Machine Parameters view, you will map your MachineLogic configuration onto your Path Following MachineApp. The reason for this step is as follows:

You will upload files that define some 2D or 3D path. Within a file, you will find commands like G0 X100 Y200 Z300. This tells the Path Following Machine to move to point (100, 200, 300). Unfortunately, we cannot predict which of your actuators corresponds to X, Y, and Z, so we need you to provide us with this information. We will also ask you to provide the dimensions of your workspace.

When you first arrive in the **Machine Parameters** view, you will be greeted by an empty configuration. To begin your Machine Parameters, select **Create a machine parameter** in the center of the page.



A modal window will appear where you will see three inputs. In this step, **map the actuators from the MachineLogic configuration to the axes defined by** your.

Create Machine Paramete	ers X
Machine Parameters Name Machine Parameters	Actuator Mapping
Reset Machine Parameters	
Actuators	X Axis (Fixed Axis) Not Present ~
Workspace	Y Axis (Translates on X Axis) Not Present ~
	Z Axis (Vertical Axis) Not Present ~
	\rightarrow Next

maximum of 3. If you are only doing 2D path following, you would map only X and Y, leaving Z as "Not Present". In our example, we will map all 3 axes:

Create Machine Param	sters	×
Machine Parameters Name Machine Parameters Beset Machine Parameters 50%	Actuator Mapping	
Actuators Workspace	X Axis (Fixed Axis) First Y Axis (Translates on X Axis) Second	
	Z Axis (Vertical Axis) Third	
		\rightarrow Next

Once satisfied with your selection, select Jog axes to test that you've mapped the correct actuators to the correct X, Y, and Z axes.

Create Machine Parameters		×
Machine Parameters Name Machine Parameters	Actuator Mapping	
Reset Machine Parameters	× Jog Axes	
Actuators	Jog Increment 10 mm X Axis (mm) - Home Axis + Max Speed	
Workspace	20 mm/s Max Acceleration Y Axis (mm) Home Axis +	
	20 mm/s² Z Axis (mm) - Home Axis +	
	Stop	
		→ Next

When satisfied, close the Jog Axes modal if it is still open and select Next in the bottom right-hand corner of the screen.

In the following step, you will define your Workspace Dimensions. The "workspace" is defined as the maximum travel distance along each axis.

TIP: A great way to find this value is to go to the Manual Control tab. For each axis, send the axis to home and then to end. Record the current position of the axis. That value should be entered in this screen.

Machine Parameters Name		Workspace Dimensions	
Machine Parameters			
Reset Machine Parameters			
Actuators	Workspace Width (X Axis)		
	750 mm		
Workspace	Workspace Length (Y Axis)	200 Z (mm) 100	
	500 mm	0	
	Height (Z Axis)	200 200	
	200 mm	400 X (mm) 600 400 Y (mm)	
		+ -	
		A CONTRACT OF THE OWNER	ש ע א ג Fit To View
	Back	-	Done

As you update the value in the textbox, you will see the 3D view of your workspace adjust accordingly on the right-hand side of the screen.

TIP: This 3D view can be rotated with the left mouse button, panned with the right mouse button + drag, and zoomed with the mouse wheel. At any point ir time, you can select Fit To View to refocus your camera to the center of the screen.

When you are satisfied with your workspace dimensions, select **Done**. The modal will close, and you will be greeted with the following overview of your Machine Parameters:

V E N T I O N		လြာစို့ Configuration	() Network	do⊳ Manual Control	MachineLogic	Machine Apps	App Launcher	\bigcirc Refresh
Open or Create App Path Following Setup STEP1 Machine Parameters	Machine Parameters Actuator Mapping			Edit	orkspace Dimensions			Edit
STEP 2 Upload GCode STEP3 Assemble GCode Pattern STEP4 Operate or Customize	X Axis (Fixed Axis): First Y Axis (Translates on X Axis): Second Z Axis (Vertical Axis): Not Present			Wo	orkspace Width (X Axis): 750mm orkspace Length (Y Axis): 500mm light (Z Axis): Not Present			
				Proceed to Next St	tep			
	·						MM: SW unknow	wn version number& HW V2A3

You may select **Edit** on either of these steps to modify them again. However, if you are satisfied, you can select **Proceed to Next Step** to begin uploading a file.

Upload

In this step, you will Upload a File. It is assumed that you already have a file that you wish to run.

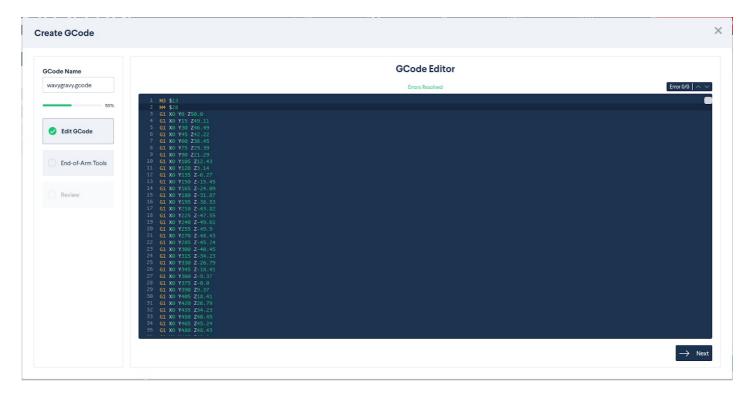
When you enter the step, you will be greeted by this screen:

V E N T I O N		င်္လာနို့ Configuration	() Network	do Manual Control	HachineLogic	Machine Apps	App Launcher	C Refresh
← Open or Create App	Upload GCode							
Path Following Setup								
STEP 1 Stachine Parameters								
STEP 2 Upload GCode								
STEP 3 Assemble GCode Pattern								
STEP 4 Operate or Customize								
				paded to be used later in this ere you can reuse and modif				
			1000 111	oro you curriculo una moun	y chon ducu.			
				+ Upload GCode file				
	Previous Step						Proceed	to Next Step
							MM: SW unknow	/// version number& HW V2A3

Select Upload file to get started. A file selector should appear:

← Open or Create App	Upload GCode					
Path Following Setup						
STEP1 Machine Parameters	wavygravy.gcode				Edit Dupli	licate
STEP 2 Vpload GCode						
STEP 3 Stemble GCode Pattern			+ Upload GCode file			
STEP 4 Generated Applications						
	🚱 Ouvrir					×
	← → • ↑ 🖡 > 0	Ce PC » Téléchargements » Gcode		ٽ ~	\mathcal{P} Rechercher dans : 0	Gcode
	Organiser • Nouvea	au dossier				•
	S Ce PC	Nom	Modifié le	Туре	Taille	
	E. Bureau	Path1.gcode	5/23/2023 3:06 PM	Fichier GCODE	1 Ko	
	Documents	Path2.gcode	5/23/2023 3:06 PM	Fichier GCODE	1 Ko	
	🔚 Images	Path3.gcode	5/23/2023 3:06 PM	Fichier GCODE	1,267 Ko	
	b Musique	Path4.gcode	5/23/2023 3:06 PM	Fichier GCODE	4,681 Ko	
	Objets 3D	Path5.gcode	5/23/2023 3:06 PM	Fichier GCODE	121 Ko	
	Téléchargements	wavygravy.gcode	5/23/2023 3:06 PM	Fichier GCODE	1 Ko	
		,				
	Norr	n du fichier : wavygravy.gcode		~	Tous les fichiers	~
					Ouvrir Ar	nnuler
						.::
	Previous Step				Proceed to	Next Step

If you cancel at this point or upload an unparseable file, nothing will happen. However, if you upload a valid file, you will be greeted with a text editor. As an example, I will upload "wavygravy."



In this screen, you can modify the to your liking. If for some reason your contains a syntax error, you will be notified like so:

0% 1 M3 \$1.3 2 M4 \$2.8 3 G. X. V12 Z5.0.0 Error 4 G. X. V12 Z5.4.49 6 G. X. V12 Z5.4.49 6 G. X. V12 Z5.4.3 7 G. X. V12 Z5.3.3 9 G. X. V12 Z5.4.3 8 G. X. V12 Z5.4.3 9 G. X. V12 Z5.4.3 10 G. X. V12 Z5.4.5 11 G. X. V12 Z5.4.7 12 G. X. V12 Z5.4.7 13 G. X. V12 Z5.4.7 14 G. X. V12 Z5.4.7 15 G. X. V12 Z5.4.7 16 K. V12 Z5.4.7 17 G. X. V12 Z5.4.7 18 G. X. V12 Z5.4.7 19 G. X. V12 Z5.4.7 10 G. X. V12 Z5.4.7 11 G. X. V12 Z5.4.7 12 G. X. V12 Z5.4.7 13 G. X. V12 Z5.4.7 14 G. X. V12 Z5.4.7 15 G. X. V12 Z5.4.7 16 G. X. V12 Z5.4.7 17 G. X. V12 Z5.4.7 18 G. X. V12 Z5.4.7	Code Name		GCode Editor	
2 W \$28 6 3 Cl X0 Y15 Z9.0.11 6 Cl X0 Y15 Z9.0.11 7 Cl X0 Y15 Z9.0.11 6 Cl X0 Y15 Z9.0.11 7 Cl X0 Y15 Z9.0.13 8 Cl X0 Y15 Z9.0.13 9 Cl X0 Y15 Z9.0.14 10 Cl X0 Y15 Z9.0.3 11 Cl X0 Y15 Z9.0.3 12 Cl X0 Y15 Z9.0.3 13 Cl X0 Y15 Z9.0.3 14 Cl X0 Y15 Z9.0.45 15 Cl X0 Y15 Z9.0.45 16 Cl X0 Y15 Z9.0.45 17 Cl X0 Y15 Z9.0.45 18 Cl X0 Y15 Z9.0.45 19 Cl X0 Y15 Z9.0.45 10 Cl X0 Y15 Z9.0.45 17 Cl X0 Y15 Z9.0.45 19 Cl X0 Y15 Z9.0.45 21 Cl X0 Y15 Z9.0.45 22 Cl X0 Y15 Z9.0.45 21 Cl X0 Y15 Z9.0.45 22 Cl X0 Y15 Z9.0.45 23 Cl X0 Y15 Z9.0.45 24 Cl X0 Y15 Z9.0.45 25 Cl X0 Y15 Z9.0.45 26 X0 Y15 Z9.0.45	wavygravy.gcode		Total 2 errors detected	Error 1/2 ^ \
Edit GCode 5 3 3 10	0%			
Edit GCode 4 6 10 1/15 24.04 1/15	0.0			
Edit GCode 6 6 7 40 745 22 End-of-Arm Tools 7 61 80 75 23 93 93 80 80 95 92 93 <		4 G1 X0 Y15 Z49.11		
a a k0 h7 c2 c2 b a k0 h7 c2 c2 c k0 h7 c2 k0 k2 c k0 h7 c2 k0 k1 c k0 h7 k2 k2 k0 c k0 h7 k2 k2 k0 c k0 h7 k2 k2 k0 c k0 h7 k2 k1 k1 c	Edit GCode			
End-of-Arm Tools 8 6 X0 Y75 273.39 End-of-Arm Tools 9 6 X0 Y105 212.43 10 6 X0 Y120 23.14 12 6 X0 Y155 2-15.45 13 61 X0 Y155 2-15.45 14 61 X0 Y155 2-15.45 15 61 X0 Y150 2-15.45 16 61 X0 Y150 2-15.45 18 61 X0 Y105 2-15.45 18 61 X0 Y105 2-15.45 18 61 X0 Y210 2-43.82 18 61 X0 Y210 2-43.82 20 61 X0 Y270 2-44.43 22 61 X0 Y270 2-44.43 22 61 X0 Y30 2-6.07 23 61 X0 Y30 <				
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110 of win 1005 11 of x0 1/120 25.14 2 of x0 1/150 25.14 13 of x0 1/155 25.4.09 13 of x0 1/156 25.4.09 15 of x0 1/156 25.4.09 15 of x0 1/156 25.4.09 15 of x0 1/156 25.4.09 16 of x0 1/156 25.4.09 15 of x0 1/156 25.4.09 17 of x0 1/156 25.4.09 16 of x0 1/156 25.4.09 18 of x0 1/156 25.4.09 16 of x0 1/156 25.4.09 19 of x0 1/156 25.4.09 16 of x0 1/156 25.4.09 20 of x0 1/156 25.4.09 16 of x0 1/156 25.4.09 21 of x0 1/156 25.4.09 16 of x0 1/156 25.4.09 22 of x0 1/255 24.9.3 16 of x0 1/156 25.4.03 23 of x0 1/255 24.9.3 16 of x0 1/156 25.4.03 24 of x0 1/157 25.4.23 16 of x0 1/156 25.4.23 25 of x0 1/157 25.4.23 16 of x0 1/156 25.4.23 26 of x0 1/157 25.4.23 16 of x0 1/156 25.4.23 27 of x0 1/157 25.4.23 16 of x0 1/156 27.9.37 28 of x0 1/157 25.4.23 16 of x0 1/156 25.4.23 29 of x0 1/157 25.4.23 16 of x0 1/157 25.4.23 21 of x0 1/157 25.4.23 16 of x0 1/157 25.4.23 22 of x0 1/157 25.4.23 16 of x0 1/157 25.4.23 23 of x0 1/157 25.4.23 16 of x0 1/157 25.4.23 24 of x0 26.6.79 16		9 G1 X0 Y90 Z21.29 Another error		
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Review 14 61 K0 Y165 2-24.09 15 61 K0 Y180 2-31.87 16 61 K0 Y195 2-38.53 17 61 K0 Y195 2-38.53 18 61 K0 Y225 2-47.55 18 61 K0 Y225 2-43.61 20 61 K0 Y270 2-48.43 22 61 K0 Y235 2-48.43 23 61 K0 Y235 2-48.43 24 61 K0 Y305 2-45.79 26 61 K0 Y305 2-46.79 26 61 K0 Y305 2-50.37 28 61 K0 Y305 2-67.79 29 61 K0 Y305 2-67.79 28 61 K0 Y405 244.73 29 61 K0 Y305 2-47.93 <				
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24 61 N0 Y315 2-34,23 25 61 N0 Y305 2-6,79 26 61 N0 Y455 2-18,41 27 61 N0 Y505 2-3,37 28 61 N0 Y505 2-3,37 29 61 N0 Y505 2-3,37 30 61 N0 Y405 Z18,41 31 61 N0 Y405 Z18,41 31 61 N0 Y405 Z16,79 32 61 N0 Y450 Z26,79 32 61 N0 Y450 Z26,79 32 61 N0 Y450 Z46,79 32 61 N0 Y450 Z46,74				
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27 G1 X0 Y360 Z-9.37 28 G1 X0 Y357 Z-0.0 29 G1 X0 Y395 Z9.37 30 G1 X0 Y450 Z26.79 31 G1 X0 Y450 Z26.79 32 G1 X0 Y450 Z26.45				
28 61 X0 Y375 2-0.0 29 61 X0 Y390 23.37 30 61 X0 Y405 218.41 31 61 X0 Y420 226.79 32 61 X0 Y435 234.23 33 61 X0 Y455 234.45				
29 G1 X0 Y590 29.37 30 G1 X0 Y495 Z18.41 31 G1 X0 Y420 Z26.79 32 G1 X0 Y435 Z24.23 33 G1 X0 Y450 Z40.45				
30 G1 N0 1405 Z18.41 31 G1 N0 1420 Z26.79 32 G1 N0 1435 Z24.23 33 G1 N0 1455 Z40.45				
32 G1 K0 1435 254.23 3 G1 K0 1455 250.45				
33 G1 X0 Y450 Z40.45				
		34 G1 X0 Y465 Z45.24		
35 c1 X0 ¥460 Z461.43		35 G1 X0 Y480 Z48,43		
			You have errors in your GCode file	

You will be unable to proceed to the next step while the errors exist. You can cycle between the errors using the **Up and down arrows** on the top right corner of the modal.

After all the errors have been resolved, select Next in the bottom right corner of the screen.

In the next step, you will **map your MachineLogic outputs to your tools**. As you may know, the M3 and M4 commands can be used to define your tools. You can then select these tools using the T command. In this step, we will ask you to map these tools that you defined in your to tools that you defined in your MachineLogic configuration:

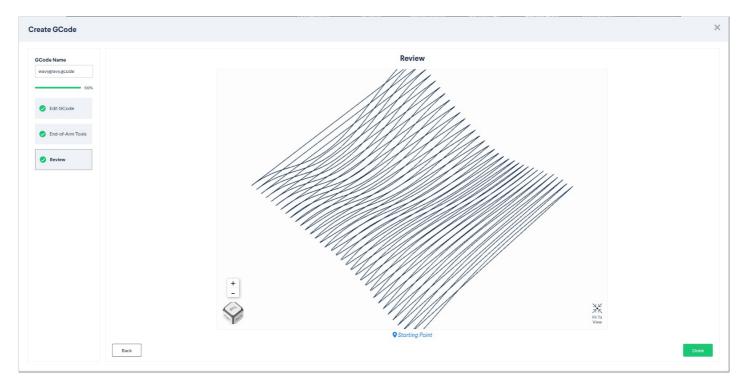
Create GCode						×		
GCode Name wavygravy.gcode	Define End-of-Arm Tool(s) Choose the outputs required for controlling your end of arm tool.							
50% Edit GCode		Associated Output Select ~	Tool number ③	Direction ⑦ Clockwise (M3)	Active State ② Select ~			
End-of-Arm Tools		Associated Output Select	Tool number (?) 28	Direction ⑦ Counterclockwise (M4)	Active State ⑦ Select ~			
Review								
	Back				ightarrow Ne	ĸt		

• The Associated Output will be the output defined in your MachineLogic configuration.

• The Active State will define what value must be written to the output for the output to be ON. Some outputs are "On" when we set it high; others are "On" when we set it low. This is something to test on the "Manual Control" page if you are unsure.

Once you have associated an output to each tool and defined the active state for each tool, you can select Next to proceed to the Review step.

In the Review step, you will have a 3D rendering of your file:



This is simply a visualization to confirm that you uploaded the correct file. The **Starting Point Indicator** defines the origin of the . When you are satisfied, select **Done** to complete your file upload.

After you select **Done**, the modal will disappear and you should see your in the list:

V 1	VENTION		ကြွေဖို့ Configuration	(Network	do Manual Control	() MachineLogic	() MachineApps	App Launcher	\bigcirc Refresh
	← Open or Create App	Upload GCode						Q. Search	
💿 Path F	Following Setup								
STEP 1	Machine Parameters	wavygravy.gcode						Edit	uplicate
STEP 2	🔮 Upload GCode								
STEP 3	Assemble GCode Pattern				+ Upload GCode file				
STEP 4	Operate or Customize								
		Previous Step						Proceed	I to Next Step
								MM: SW unknow	vn version number& HW V2A

At this point, you may upload another file if you wish, or you may select Proceed to Next Step to continue.

Assemble G-code Pattern

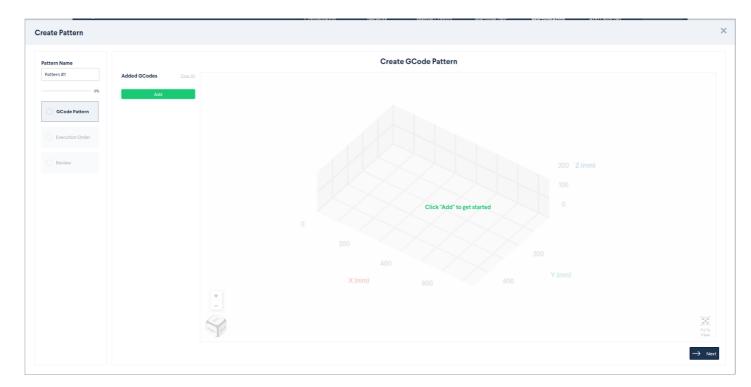
In the Assembler G-code Pattern step, you will arrange the G-code files that you uploaded in the previous step within your workspace. This workflow is especially useful if you plan to run multiple G-codes back-to-back.

When you first arrive at this step, you will see the following screen:

V	νεντιον		ැටාමී Configuration	() Network	do Manual Control	HachineLogic	Machine Apps	App Launcher	C Refresh
	← Open or Create App	Assemble GCode Pattern							
😨 Path	Following Setup								
STEP 1	Machine Parameters								
STEP 2	Upload GCode								
STEP 3	Assemble GCode Pattern								
STEP 4	Operate or Customize								
				Assemble and orient	your GCode(s) to create a pa	ittern within your defined			
				wo	rkspace by clicking the butto	n below.			
					+ Create Pattern				
		Previous Step						Proceed	to Next Step
L		۱۱							

Select the Create Pattern button to begin a new pattern.

You will be greeted by the following modal:



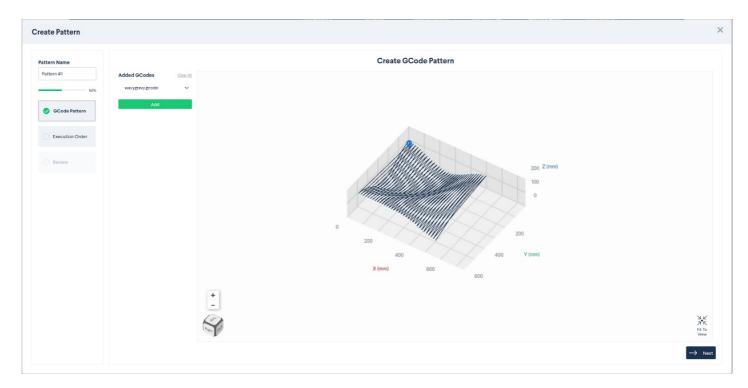
In the Pattern step, you will add and arrange your s within your workspace. First, select the Add button in the top left corner of the screen:

Create Pattern							×
Pattern Name			Crea	ate GCode Pattern			
Pattern #1	Added GCodes	Clear All	Add GCode to w	orkspace		×	
GCode Pattern		wavygravy.gcode			Preview Add		
		S.					
							\rightarrow Next

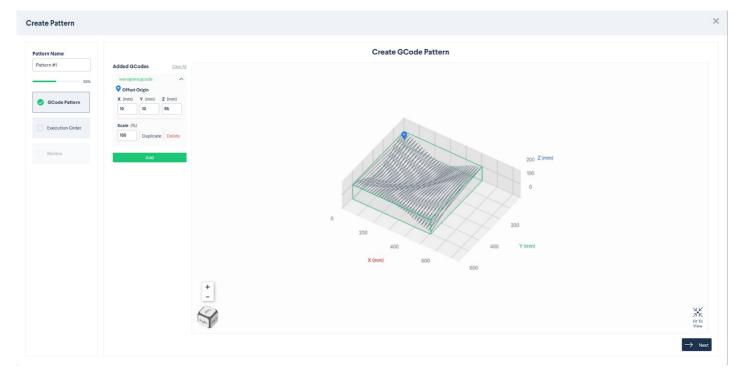
A modal will appear containing a list of the files that you've uploaded:

You can click the **Preview button** if you want to view the 3D render of that file.

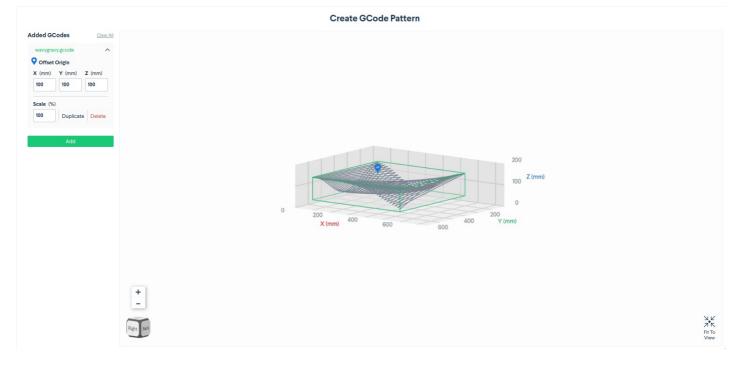
When you want to add the file to your pattern, select the Add button. After you click the Add button, the modal will close and you will see the pattern rendered in the 3D scene:



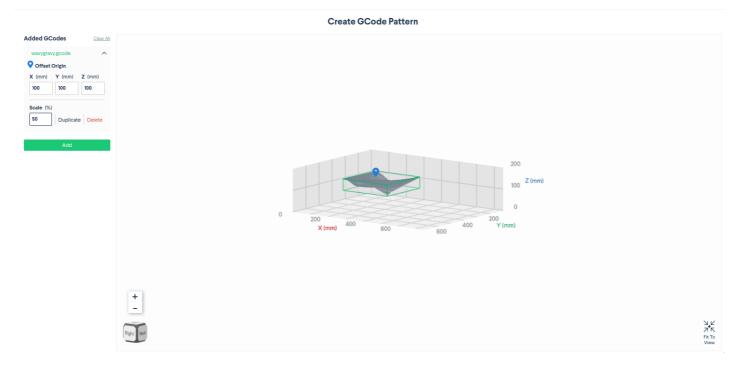
Select your file name on the left-hand side of the screen (e.g. wavygravy. in this example). The options will expand down from the name:



You can use the X, Y, and Z inputs to translate the file in 3D space:



You can scale the using the scale option:

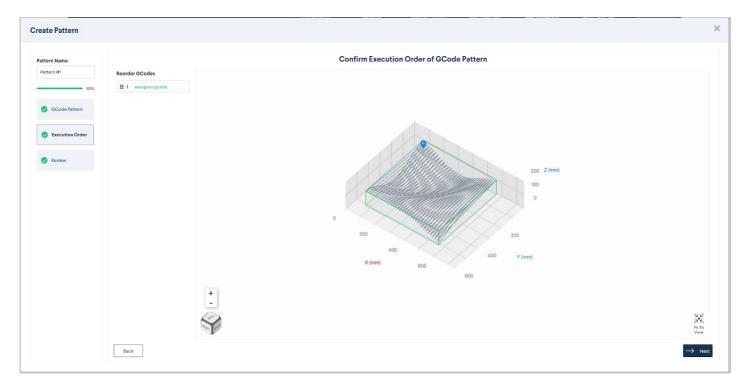


You can also duplicate or delete the file.

You may add as many files as you like to your pattern. The Clear All button at the top will delete all of the s in the pattern.

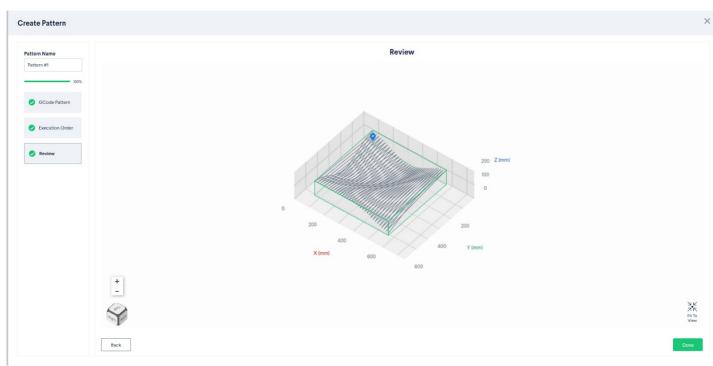
Once you are satisfied with your pattern, select Next at the bottom of the screen to proceed to the Execution Order step.

In the **Execution order step**, you will arrange the order in which your files will be run. For example, if you want to run a circle and then a square back-to-back, you can select which one runs first here.



NOTE: If you have a single file, you can safely skip this step.

When you are satisfied with the order of your files, select Next to get to the Review step.



In the review step, you will simply see a 3D render of your pattern:

When you are satisfied with how it looks, select **Done** to complete your pattern.

After selecting **Done**, the modal will close and you will see your pattern in the list of patterns:

V E N T I O N		လြဲနို့ Configuration	(S) Network	do Manual Control	∏ MachineLogic	Machine Apps	App Launcher	\mathbb{C} Refresh
Copen or Create App Copen or	Assemble GCode Pattern Pattern #1	€G3⊗ Configuration	Network	Manual Control	L 运 MachineLogic	Machine Appa	App Launcher	C Refresh
	Previous Step						Proceed	to Next Step

At this point, you can either elect to create another pattern using the **Create pattern button**, or you can **Proceed to Next Step** to begin customizing your application.

Operate or Customize

In this step, you will create an **Application Instance** that can be used to run any one of the patterns that you assembled in the previous step. Conveniently, we provide you with hooks within your Path Following Application in which you can safely execute custom behavior. The 3 hooks are:

- Application Start: Run this MachineLogic code *before* anything else in the Path Following application.
- Between G-codes: Run this MachineLogic code between each one of your G-code paths.
- Application End: Run this MachineLogic code after you run everything else in the application.

V E N T I O N		လြဲနို့ Configuration	Network	dor Manual Control	MachineLogic	MachineApps	App Launcher	\bigcirc Refresh
Copen or Create App Path Following Setup Creation of the Parameters Creation of the	Previous Step							

Select New Instance to create a new Path Following Application.

TIP: Unless you are doing something very specific, you will only ever need a single instance.

℃ V E N T I O N		(ြ) မို့ Configuration	Network	do Do Manual Control	HachineLogic	MachineApps	App Launcher	C Refresh
Copen or Creste App CP Path Following Setup STEPP Image: Machine Parameters STEP2 Upload GCode STEP3 Image: Assemble GCode Pattern STEP4 Generated Applications	New Instance	Path following #1 (1)						
	Previous Step		♀ Continue to App	Launcher Step via the Navigation	n Bar to Play an Application Ins	itance	MM: SW unkno	wn version number& HW V2A3

After you create it, select the card of the instance that you've created (e.g. "Path Following #1" in our example).

You will be brought to a highly-modified MachineLogic program view:

V V E N T I O N		ැටා දී Configuration	(Network	⊲o⊳ Manual Control	HachineLogic	MachineApps	App Launcher	C Refresh
Path Following #1 (1)	Name: Main Sequence							
Tree View Warnings Im Path Following #1 (1) Image: Warnings #1 (1) Image: Warnings Warnings #1 (1) Image: Warnings #1 (1)	1 Execution ① 子 Execute In Series	~	Sequence Name		~			
↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	2 Execution ⑦ Fxecute In Series	~	Sequence Name Between GCodes		~			
 ^g Execute In Series ^g Execute In Series 	3 Execution ⑦ Z Execute In Series		Sequence Name		~			
Image: First constant Image: First constant Image: First constant Image: First constant Image: First constant Image: First constant								
∉ Application End 🔒								
Ad Sequence								Operate

As described previously, you can modify the **Application Start**, **Between s**, or **Application End** sequences to insert custom behavior at those points. You may also add variables, functions, new child sequences, and whatever else you like. However, the **Main Sequence** is completely unmodifiable, as this contains the core of the Path Following Application.

TIP: This step is entirely optional.

Once you are satisfied with your custom behavior, select the **Main Sequence** and thenselect the **Operate button** in the bottom right corner of the screen. This will take you to the Operator UI.

Operation

When you select Operate, you will be brought to the App Launcher tab at the top of the page. You will be greeted with the following screen:

₩ VENTION		{ဂ်}}်န္တိ Configuration	S) Network	do Manual Control	HachineLogic	(Constraint) MachineApps	App Launcher	C' Refresh
Available Apps	UI						Path F	ollowing #1 (1)
Path Following #1 (1) last modified:	Operator UI Job Configuration							
				Apply a path				
		Visualize	•			Information Consc	le	
				Apply a path to access vis	ualization			

If not already selected, please select the Path Following Application in the left-hand pane that you previously created in the Operate or Customize step.

At the top, you will see the **Job Configuration box**. This box will allow you to select a pattern that you assembled in the **Assembler Pattern step** and play it on this Path Following Application.

Job Configuration	
Appiy a pattern	

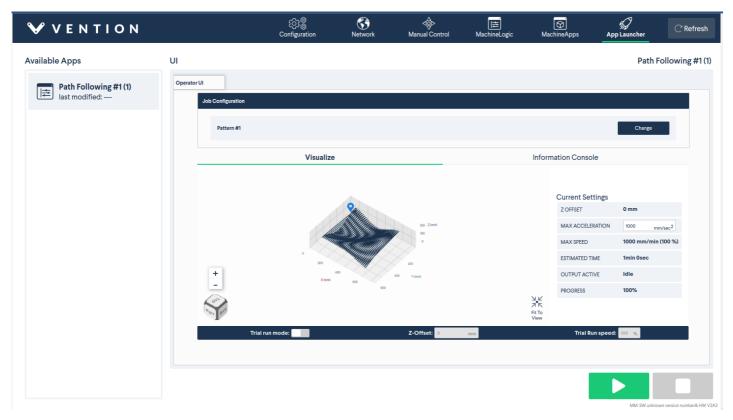
If you select Apply a pattern, you will see the following modal:

			:
	Apply Patte	ern	
Pattern #1		Preview	Apply

You can preview the pattern using the Preview button if you like.

If you would like to run that pattern, select Apply.

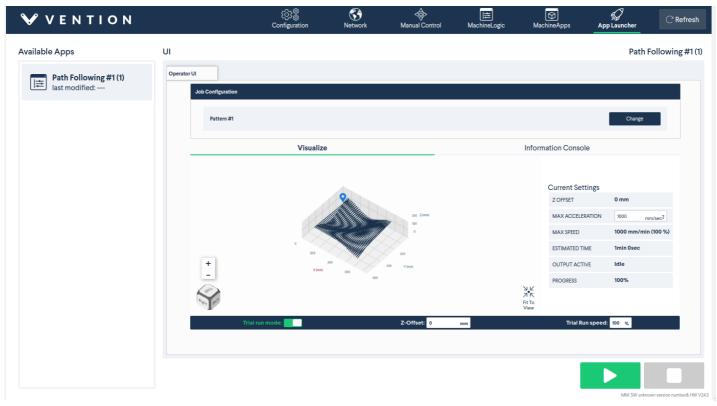
After applying the pattern to the application, the UI will populate:



On the left side, you will see the 3D render of your pattern. This is just for inspection purposes. On the right side, you will see your **Current Settings**. In this section will be: **Z Offset**: The Offset in Z that your file will operate at. This can ONLY be set when in trial mode.

- Max Acceleration Input: You can enter a number in this input to set the max acceleration for your pattern.
- Max Speed: This is the maximum speed in mm/min discovered from the files that are in your pattern.
- Estimated Time: This is an estimate of how long it will take to run the file given your current settings
- Output Active: If an output is currently triggered, this will be true, otherwise it will be false.
- Progress: A percentage of how many lines you have completed.

At the bottom of the page, you will see the **Trial Run Panel**. You can select **Trial run mode** to enter trial run mode. In this mode, you can enter a Z offset and a speed percentage at which you would like your pattern to operate:



TIP: Trial run mode is only useful for debugging purposes.

To play your application, select the big green **Play button** at the bottom right of the screen. As your Path Following Application runs, you should see the 3D render being updated in real-time, and the **Progress indicator** increasing over time.

Below is a quick overview of the operations that will happen when you click play:

- 1. Application Start custom behavior will execute
- 2. Your actuators will home in the order Z, Y, X
- 3. The machine will perform a move relative combined in XY to get to above your first start position
- 4. If Z is present, the machine will descend in Z
- 5. The first file in the pattern will begin
- 6. When the file finishes, the Between s custom behavior will run
- 7. The machine will then move to the starting position of the next file in the pattern. WARNING: This is a direct move! If you expect that you might run into something, please HOME the Z-AXIS using custom behavior beforehand
- 8. Repeat steps 5, 6, and 7 until all files in the pattern have been run
- 9. When all files in the pattern have been run, execute the Application End custom behavior
- 10. Finish

To stop your application, select the big blue Stop button at the bottom right of the screen.