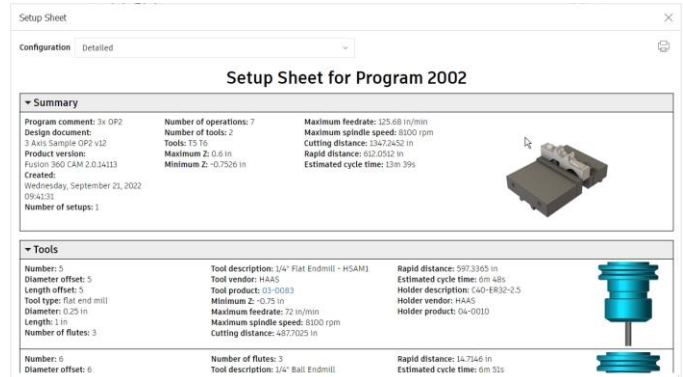


Create a setup sheet

In this module, you'll create an NC program and setup sheet for each set up, then explore the information in the setup sheet.

Learning objectives:

- Create an NC program.
- Produce a setup sheet for each operation.



The completed exercise

1. Continue with the 3 Axis Sample OP2.f3d file from the previous document.

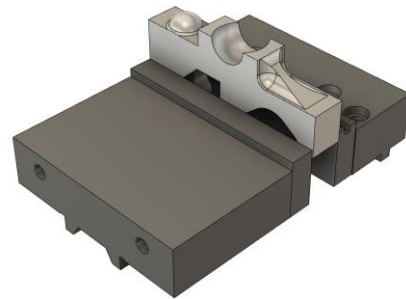
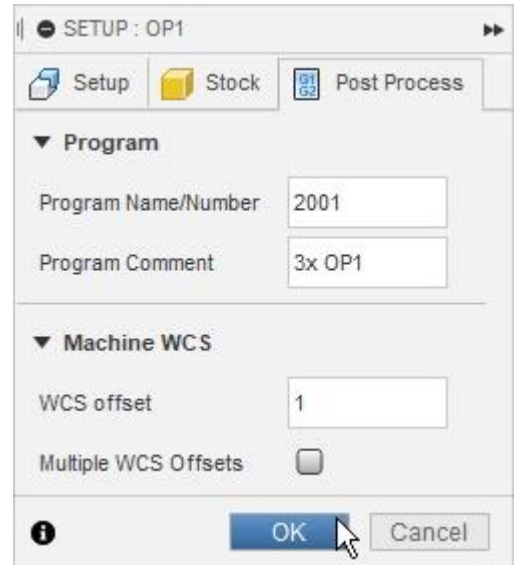


Figure 1. Continue with the file from the previous document

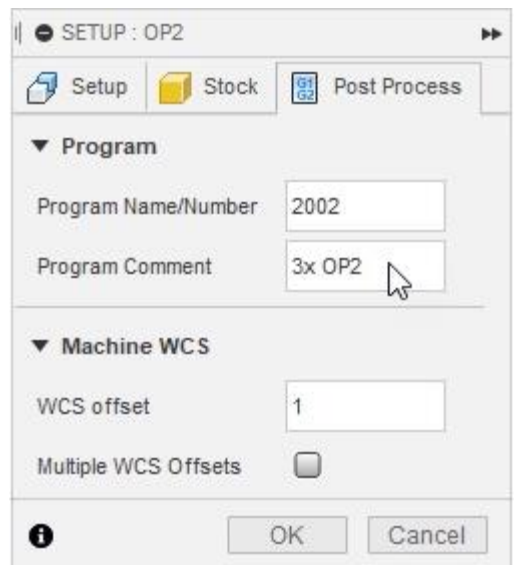
2. In the Browser, edit the OP1 setup. Remind yourself of the information you entered in the Post Process tab, then OK the dialog.



The screenshot shows the 'SETUP : OP1' dialog box with the 'Post Process' tab selected. The 'Program' section contains 'Program Name/Number' set to '2001' and 'Program Comment' set to '3x OP1'. The 'Machine WCS' section shows 'WCS offset' set to '1' and 'Multiple WCS Offsets' as an unchecked checkbox. At the bottom, there is an information icon, an 'OK' button with a mouse cursor over it, and a 'Cancel' button.

Figure 2. Inspect OP1's Post Process information

3. Edit the OP2 setup and navigate to the Post Process tab. Notice that the Program Comment box is empty; enter **3x OP2** into this box. OK the dialog.



The screenshot shows the 'SETUP : OP2' dialog box with the 'Post Process' tab selected. The 'Program' section contains 'Program Name/Number' set to '2002' and 'Program Comment' set to '3x OP2', with a mouse cursor over the text box. The 'Machine WCS' section shows 'WCS offset' set to '1' and 'Multiple WCS Offsets' as an unchecked checkbox. At the bottom, there is an information icon, an 'OK' button, and a 'Cancel' button.

Figure 3. Inspect OP2's Post Process information

4. With OP1 selected and activated, click Setup> Create NC Program.



Figure 4. Create an NC program

5. In the dialog's Post menu, select the Choose from Library option.

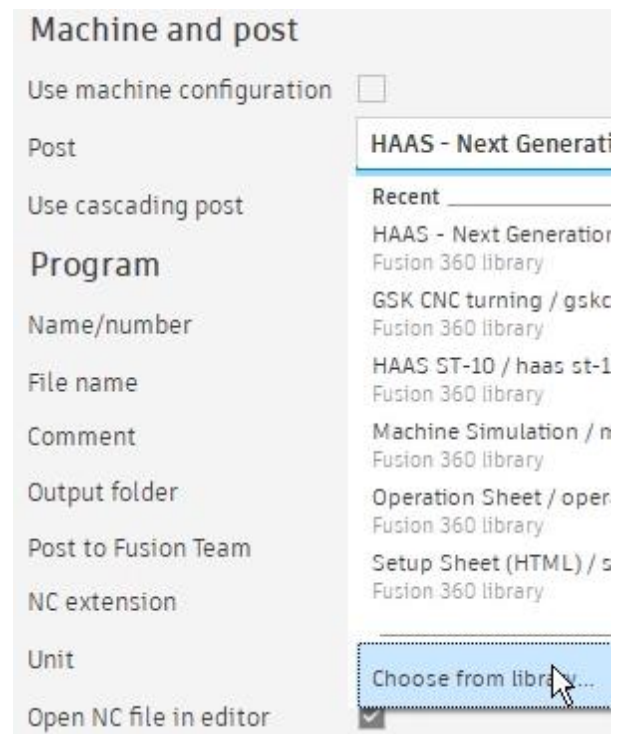


Figure 5. Choose the post

6. In the Post Library dialog, navigate to the Fusion 360 Library.

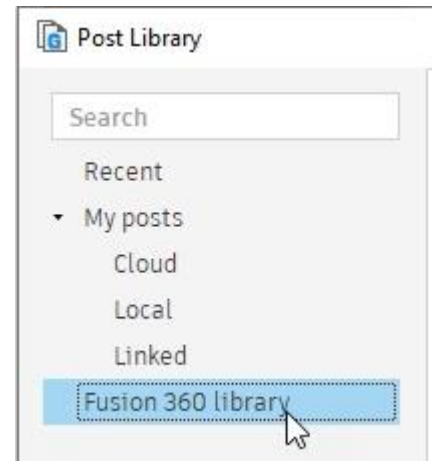


Figure 6. Open the Fusion 360 library

7. Use the options in the Filters tab to filter the available posts.

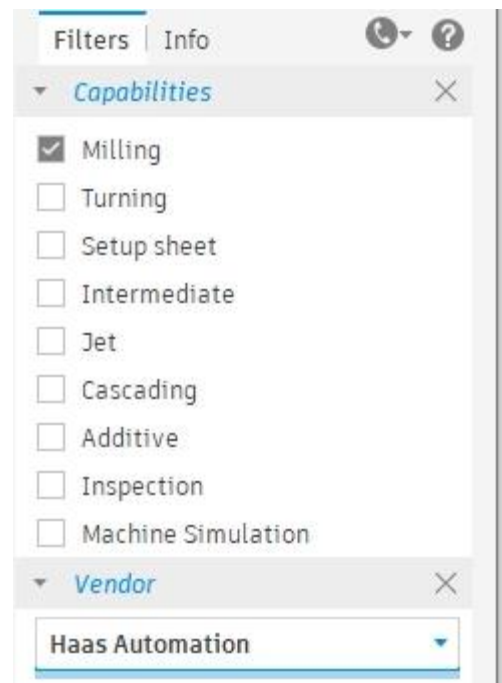


Figure 7. Filter the posts

8. Choose the HAAS - Next-Generation Control option, then click the dialog's Select.

Haas Automation	HAAS - Next Generation Control
Haas Automation	HAAS - Next Generation Control
Haas Automation	HAAS ST-10

Figure 8. Choose the post

9. When a dialog warns you that the post will receive automatic updates, click Use anyway.

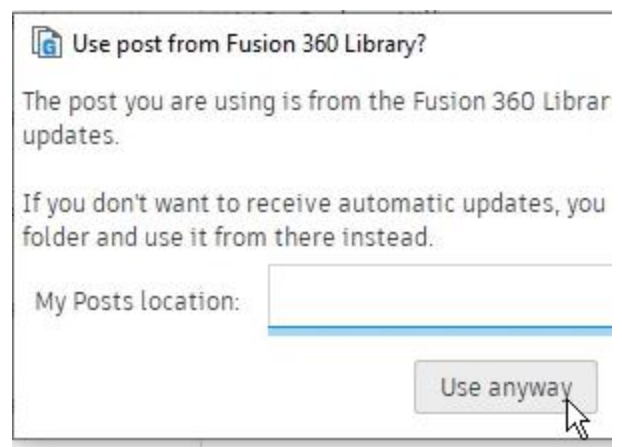
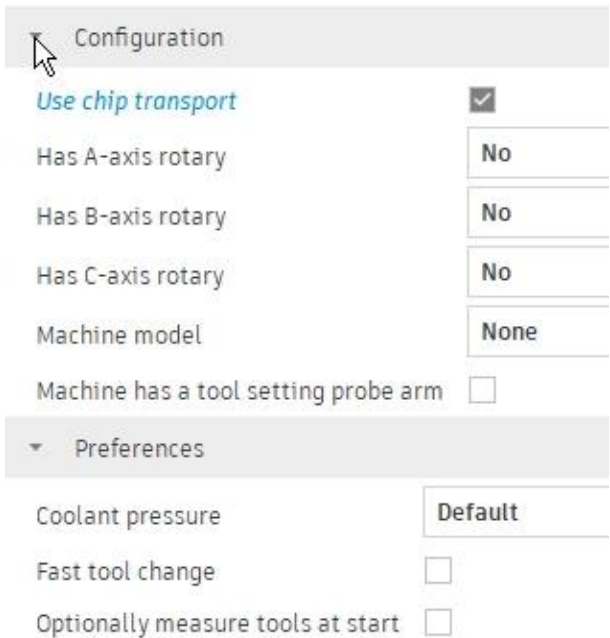


Figure 9. Accept the dialog

- 10.** The options in the Post properties section can be configured to match your machine's capabilities. Explore the options and activate any that you want to use.

Post properties

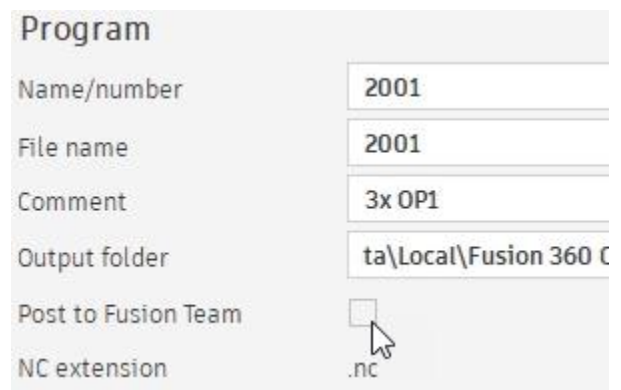


Configuration	
Use chip transport	<input checked="" type="checkbox"/>
Has A-axis rotary	No
Has B-axis rotary	No
Has C-axis rotary	No
Machine model	None
Machine has a tool setting probe arm	<input type="checkbox"/>

Preferences	
Coolant pressure	Default
Fast tool change	<input type="checkbox"/>
Optionally measure tools at start	<input type="checkbox"/>

Figure 10. Explore the Post properties options

- 11.** The Program section has an option that allows you to post the NC program to the Fusion Team hub. Activating this option will allow other team members to see the NC program. Also notice that the program number and comment that you noted in Step 2 are automatically entered into this Program section.



Program	
Name/number	2001
File name	2001
Comment	3x OP1
Output folder	ta\Local\Fusion 360 C
Post to Fusion Team	<input type="checkbox"/>
NC extension	.nc

Figure 11. Explore the Program section's option

- 12.** Continue to the Operations tab and notice that the suppressed operations are included in the OP1 setup.



Figure 12. Notice the suppressed operations

- 13.** Notice that the suppressed operations are not included in the NC program.

Reorder to Minimize Tool Changes ☐

Operation	Instance	Setup
Adaptive1	1/1	OP1
Parallel1	1/1	OP1
Flat1	1/1	OP1

Figure 13. Suppressed operations are not included in the NC program

- 14.** OK the NC Program dialog.

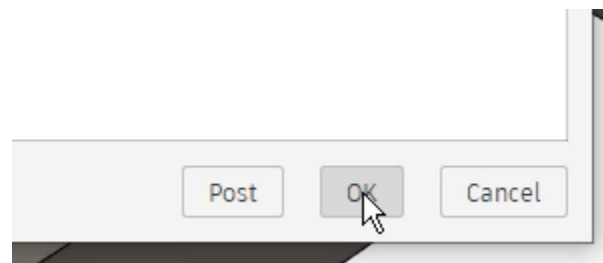


Figure 14. OK the dialog

15. Notice that NC Program1 is added to the NC Programs folder. Rename the new program as **NC OP1**.

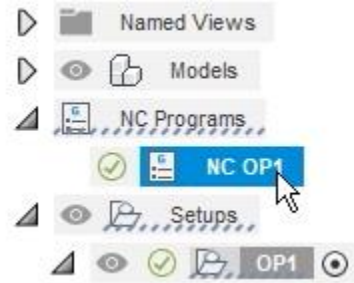


Figure 15. Rename the new NC program

16. Right-click the NC OP1 program, then choose Simulate from the menu.

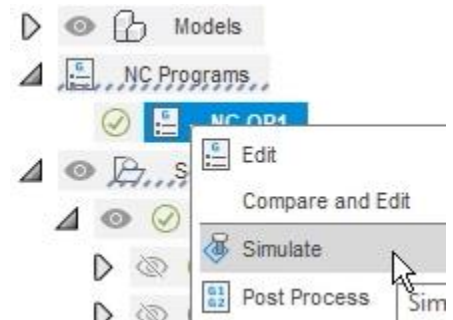


Figure 16. Simulate the NC program

17. Press Play and notice that the suppressed toolpaths are not simulated. Click the dialog's Exit Simulation.

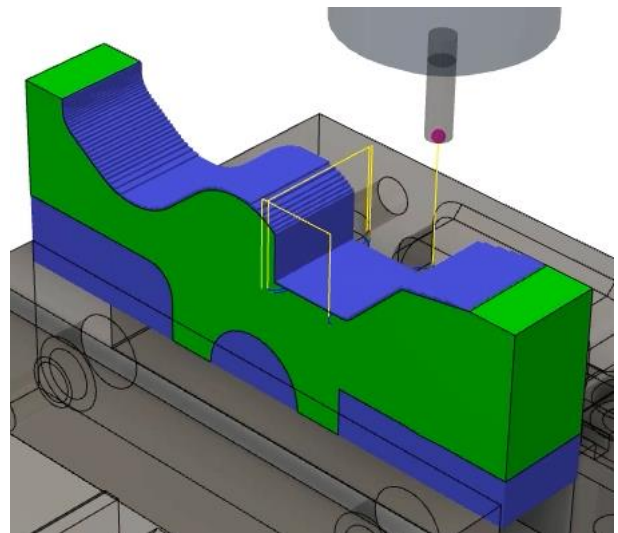


Figure 17. Watch the simulation

- 18.** Select and activate the OP2 setup, then click Setup> Create NC Program to create a new NC program. Continue to the Operations tab and notice the option to reorder the toolpaths. Toolpaths that use the same tool can be grouped together to reduce the number of tool changes and reduce the machining time. OK the NC Program dialog to create the second NC program.

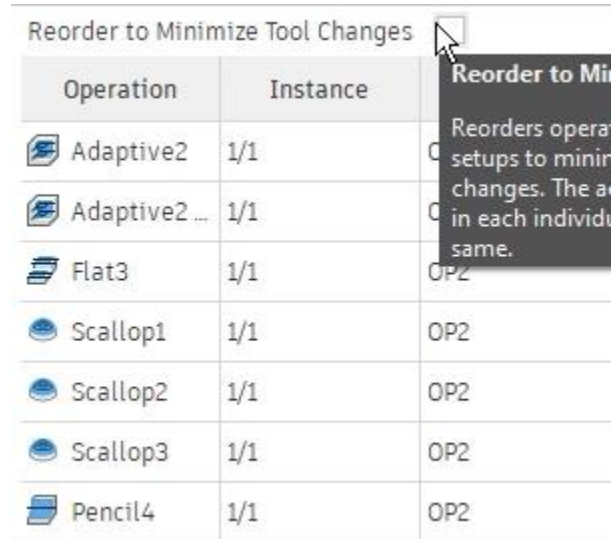


Figure 18. Notice the option to reorder the toolpaths

- 19.** Rename the new NC program as **NC OP2**.

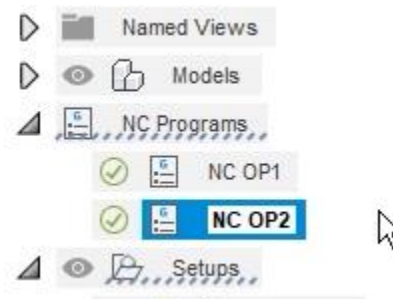


Figure 19. Rename the new NC program

20. Right-click the NC OP1 program and choose Setup Sheet from the menu.

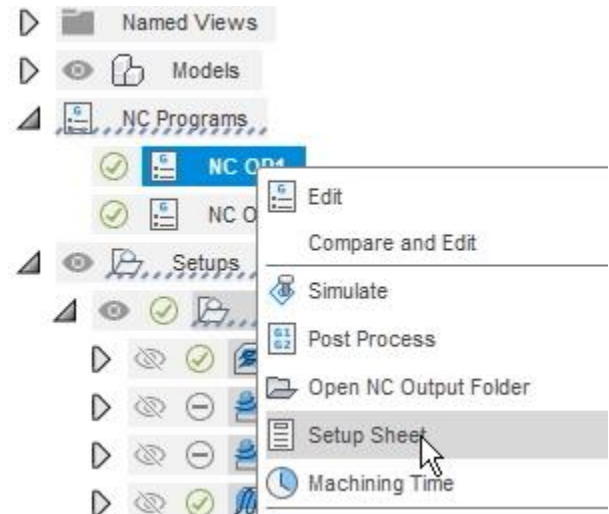


Figure 20. Create a setup sheet for OP1

21. Choose the setup sheet's name and save location, then click the dialog's Save.

Name:

2001

Location:

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Figure 21. Save the setup sheet

22. The new setup sheet will open in a separate window.

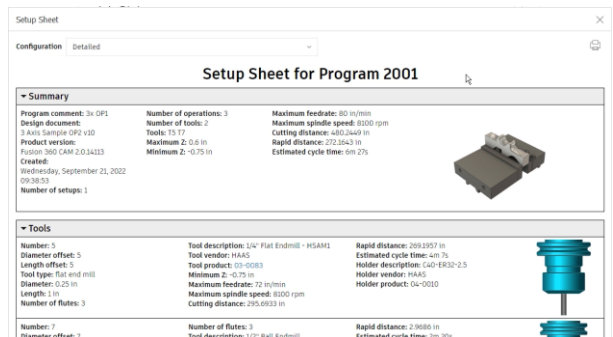


Figure 22. Inspect the new setup sheet

- 23.** Notice the printer icon allows you to print a PDF or hard copy of the setup sheet.

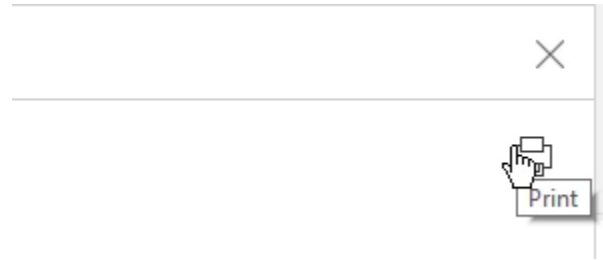


Figure 23. Notice the printer icon

- 24.** Notice that the Configuration menu at the top of the setup sheet allows you to customize the information displayed inside the sheet. Choose the Detailed option.

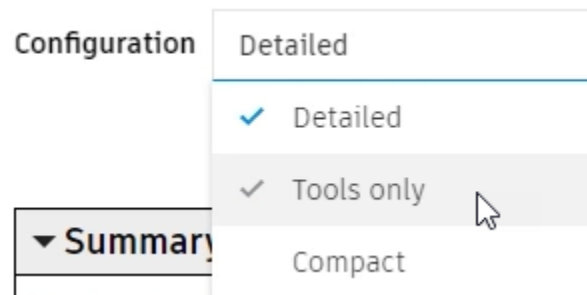


Figure 24. Note the options in the Configuration menu

- 25.** The information in the Summary section describes the file's name, number of setups, number of tools, minimum and maximum Z axis distance, cycle time, and much more.

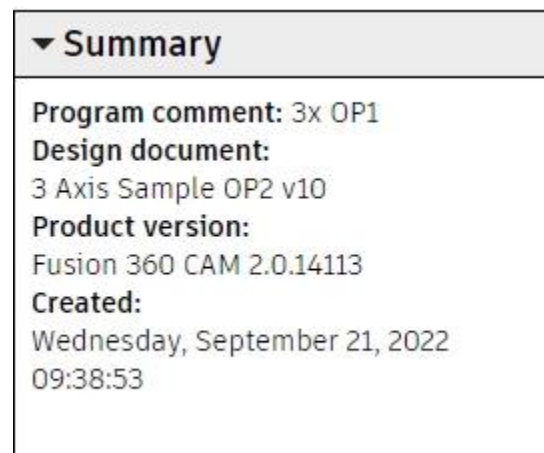


Figure 25. Explore the Summary section

26. Continue to the Tools section and notice that each tool's information is described in depth. All the information a machine operator needs to set up each tool is included in the section.

▼ Tools
Number: 5 Diameter offset: 5 Length offset: 5 Tool type: flat end mill Diameter: 0.25 in
Number: 7 Diameter offset: 7 Length offset: 7 Tool type: ball end mill Diameter: 0.5 in

Figure 26. Explore the Tools section

27. If you included links to a manufacturer's website when you set up your tools, these links will be active inside the setup sheet.

Length: 1 in Number of flutes: 3 Tool description: 1/4" Flat Endmill Tool vendor: HAAS Tool product: 03-0083
--

Figure 27. Notice the active link

- 28.** Continue to the Setup section and notice that this section describes the setup's name, WCS location, stock dimensions, and more.

▼ Setup	
Description: OP1	Stock:
WCS: 1	x: 6 in
	y: 1 in
	z: 2 in
	Part:
	x: 6 in
	y: 1 in
	z: 2 in

Figure 28. Explore the Setup section

- 29.** Continue to the Operations section and notice that each operation is described in depth. This section describes the spindle speed, feedrates, cycle time, tool, and more. Close the Setup Sheet window after you finish exploring all of its information. Also close the Job Status dialog.

▼ Operations	
Operation 1/3	
Description: Adaptive1	
Strategy: Adaptive	
WCS: 1	
Tolerance: 0.004 in	
Stock to leave: 0.02 in	
Maximum stepdown: 0.25 in	
Optimal load: 0.1 in	
Load deviation: 0.01 in	
Operation 2/3	
Description: Parallel1	

Figure 29. Explore the Operations section

30. Activate the OP1 setup.



Figure 30. Activate the OP1 setup

31. The view that is currently visible in the Canvas area is the view that will be added to the setup sheet's Setup section.

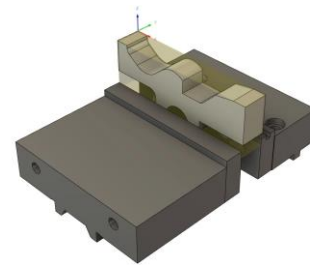


Figure 31. Notice the view in the Canvas area

32. Create a new setup sheet and notice that the current view is added to the Setup section. Choosing a logical view will help the machine operator understand their task. Close the setup sheet.

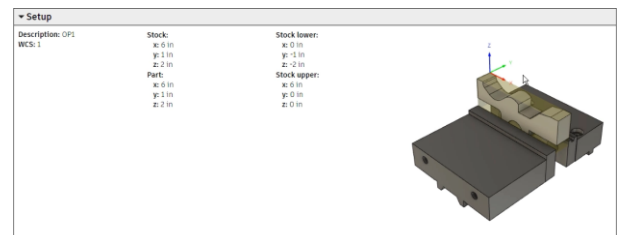


Figure 32. Notice the Setup section

33. Create a setup sheet for OP2. Close the setup sheet and Job Status dialog, then continue to the next document.

Setup Sheet for Program 2002

Summary

Program comment: 3x OP2	Number of operations: 7	Maximum feedrate: 125.00 in/min
Design document: 3 Axis Sample OP2 v12	Number of tools: 2	Maximum spindle speed: 8000 rpm
Product version: Fusion 360 CAM 2.0.14113	Tools: TS T6	Cutting distance: 1347.2453 in
Created: Wednesday, September 21, 2022 09:41:31	Maximum Z: -0.5 in	Rapid distance: 632.0552 in
Number of setups: 1	Minimum Z: -0.7526 in	Estimated cycle time: 13m 39s

Tools

Number: 5	Tool description: 1/4" Flat Endmill - HSSM1	Rapid distance: 597.3365 in
Diameter offset: 5	Tool vendor: HAAS	Estimated cycle time: 6m 48s
Length offset: 5	Tool product: 01-0083	Holder description: CAD-ER32-2.5
Tool type: flat end mill	Minimum Z: -0.75 in	Holder vendor: HAAS
Diameter: 0.25 in	Maximum feedrate: 72 in/min	Holder product: 04-0033
Length: 1 in	Maximum spindle speed: 8000 rpm	
Number of flutes: 3	Cutting distance: 487.7025 in	
Number: 6	Number of flutes: 3	Rapid distance: 14.7546 in
Diameter offset: 6	Tool description: 1/4" Ball Endmill	Estimated cycle time: 6m 52s

Figure 33. Create a setup sheet for OP2