ProtoMAX Water Jet Cutter Instructions
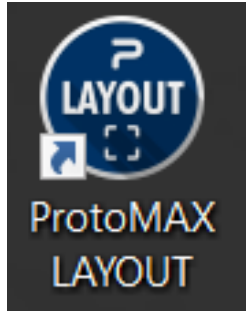
Overview

Document Structure

1. [File prep in ProtoMAX Layout](#)
2. [Machine Pre-check (will introduce ProtoMAX Make)](#)
3. [Making a cut (using ProtoMAX Make)](#)
4. [TA Check-off](#) (then send it!)
5. [Clean-up checklist](#)

File Preparation in ProtoMAX LAYOUT
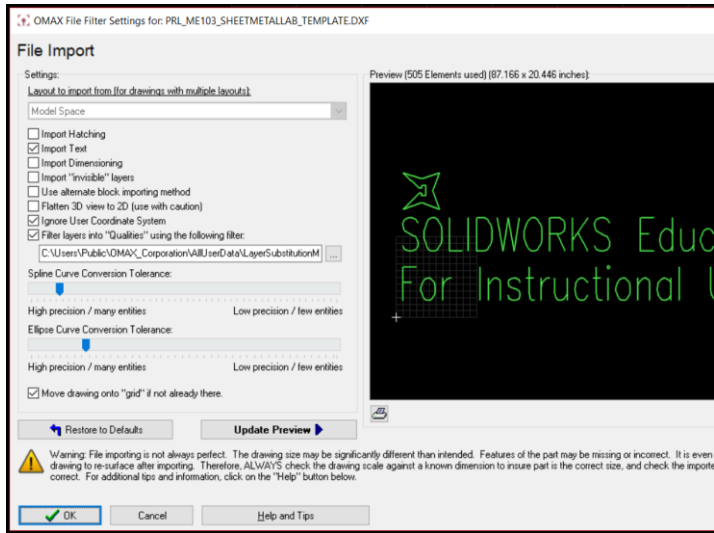
Open LAYOUT

ProtoMAX
LAYOUT

1 Open ProtoMAX LAYOUT from the desktop or taskbar

⚠ Have a *.dxf or *.ai file ready. *.dxf is used in this tutorial

Import a .dxf file (recommended file)

OMAX File Filter Settings for: PRL_ME103_SHEETMETALLAB_TEMPLATE.DXF

File Import

Settings:

Layout to import from (for drawings with multiple layouts):

Model Space

☐ Import Hatching
☑ Import Text
☐ Import Dimensioning
☐ Import "invisible" layers
☐ Use alternate block importing method
☐ Flatten 3D view to 2D (use with caution)
☑ Ignore User Coordinate System
☑ Filter layers into "Qualities" using the following filter:

C:\Users\Public\OMAX_Corporation\AllUserData\LayerSubstitutionM   …

Spline Curve Conversion Tolerance:

High precision / many entities   Low precision / few entities

Ellipse Curve Conversion Tolerance:

High precision / many entities   Low precision / few entities

☑ Move drawing onto "grid" if not already there.

Restore to Defaults   Update Preview ▶

⚠ Warning: File importing is not always perfect. The drawing size may be significantly different than intended. Features of the part may be missing or incorrect. It is even drawing to re-surface after importing. Therefore, ALWAYS check the drawing scale against a known dimension to insure part is the correct size, and check the importe correct. For additional tips and information, click on the "Help" button below.

✓ OK   Cancel   Help and Tips

Preview (505 Elements used) (87.166 x 20.446 inches):

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For Instructional U
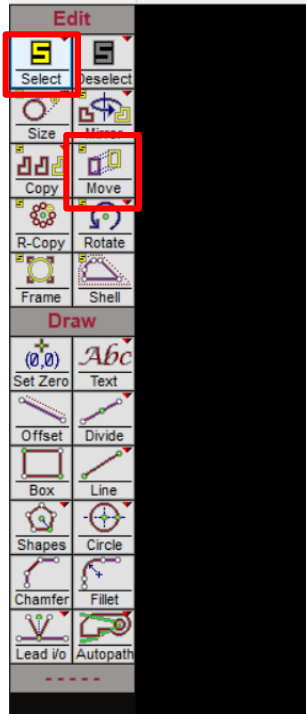
2 File > **Import from Other CAD…**

3 [Find your dxf file] > **Open**

⚠ The default settings are suitable for most applications, you may alter the spline and ellipse tolerances if desired.

Clean up the imported file as needed

On the Edit toolbar (screen left)

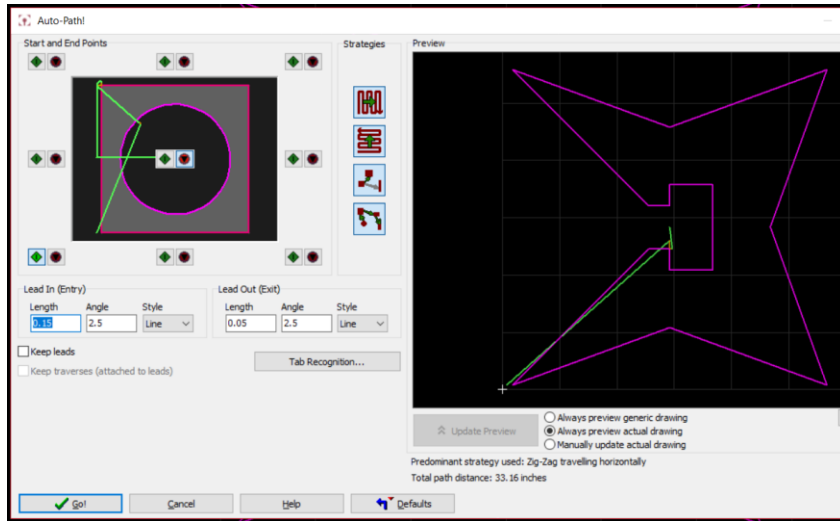**4** Right click **"Select"** > *"Window"* to grab lines or text

Incorrect selections must be deselected with the "**Deselect**" tool.

5 Click **"Move"** to move your layout into the desired workspace location

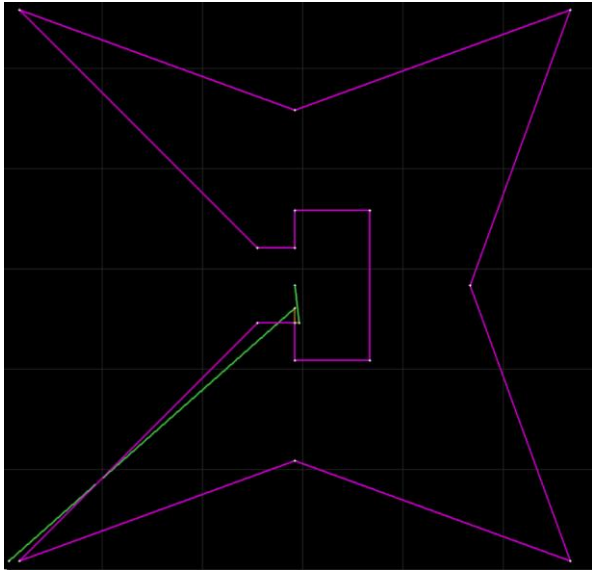# Generate the tool path

On the <u>Draw</u> toolbar (screen left)

6   Right-click **Autopath**> Advanced & Configure

7   Select a green diamond location for the toolpath start point select a red circle location for path end point (different from start point recommended)

Generate the *.OMX file for cutting

On <u>Special</u> toolbar (screen right) >

8 Click **Post**

9 Pick the endpoint of the green line at the toolpath start point you set in the earlier step

10 **Save**

Machine Pre-Check

Check to ensure the exterior of the machine is free of obstructions

1 Ensure that electrical plugs are firmly seated into their sockets

2 Ensure that the red and clear hoses drain into the sifting reservoir

3 Ensure that the silver high pressure water line is free of obstructions

Open the water line

Closed

Open

4 Turn the water line handle in-line to open the water line

⚠️ Make sure no water is leaking from the hoses or machine. If water begins leaking at any point, close the valve and inform a CA

Remove old work pieces

5 If there are old work pieces on the bed, remove them prior to proceeding

6 To remove an engaged clamp, apply pressure on the middle of the clamp, and simultaneously pull upward at the clamp shank

7 Ensure that enough slats for your operation are set into the workspace. Consult a CA if there is an inadequate amount of support in the workspace

Refill the garnet hopper

12 Unhook the lid on top of the clear garnet hopper and add scoops of garnet until it is level with the top of the fill line

Home the Machine

13 Turn the red switch on the right to (I) to power up the machine

14 Recheck the cutting head and workbed to ensure the path of travel from the cutting head to the bottom left corner of the workspace is free of obstructions.

Home the Machine

15 Open ProtoMAX MAKE on the desktop or taskbar. **WAIT AT LEAST 45 SECONDS AFTER YOU START THE MACHINE BEFORE LAUNCHING MAKE!**

⚠ If a popup warning prompting the user to home the machine appears, click OK
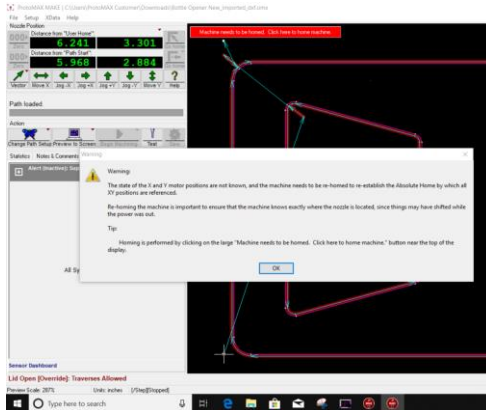
Click the red homing prompt in the upper lefthand corner of the workspace display and proceed with calibration

Perform a Water Line Check

16 Flip up yellow protective cup

17 Jog in X and Y (red) so the cutting head is positioned over open water

18 Unplug the clear garnet hoses at the cutting head and at the garnet hopper

Perform a Garnet Hose Check
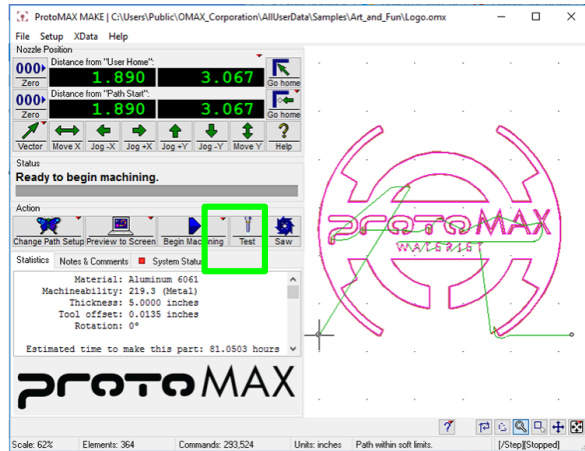
⚠️ Ensure the garnet hose is free of moisture. Inform a CA if there is garnet buildup or water in the garnet hose.

18 Insert the clear garnet hoses at the cutting head and at the garnet hopper

19 Click Test

20 Select Test Cutting Head

21 Start the test

Perform a Garnet Hose Check

Garnet flowing!

Close the lid. You will run the test for 10 seconds before stopping checking to make sure garnet is flowing through the tube. It can be helpful to remove the black cover under the garnet hopper and check for flowing garnet by looking up, through the garnet hose

Making a Cut

Load your file
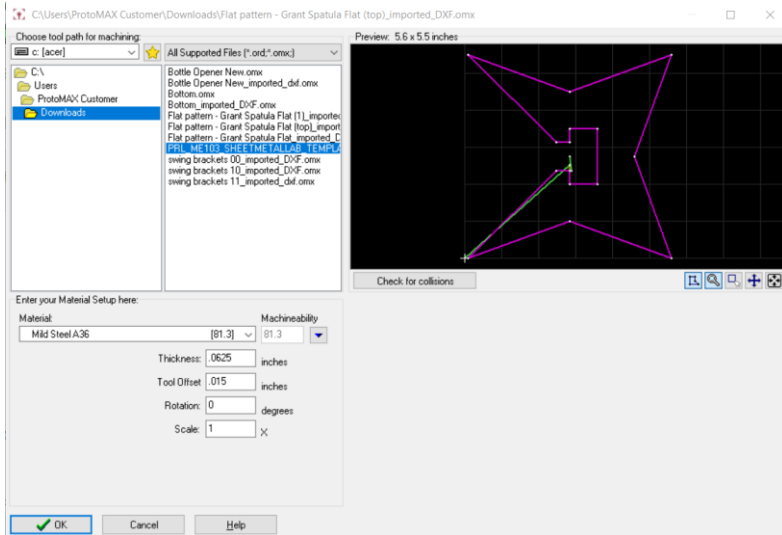
File > **Open**

1 Open the .OMX you generated from ProtoMAX LAYOUT

OK

Change Tool Path Setup
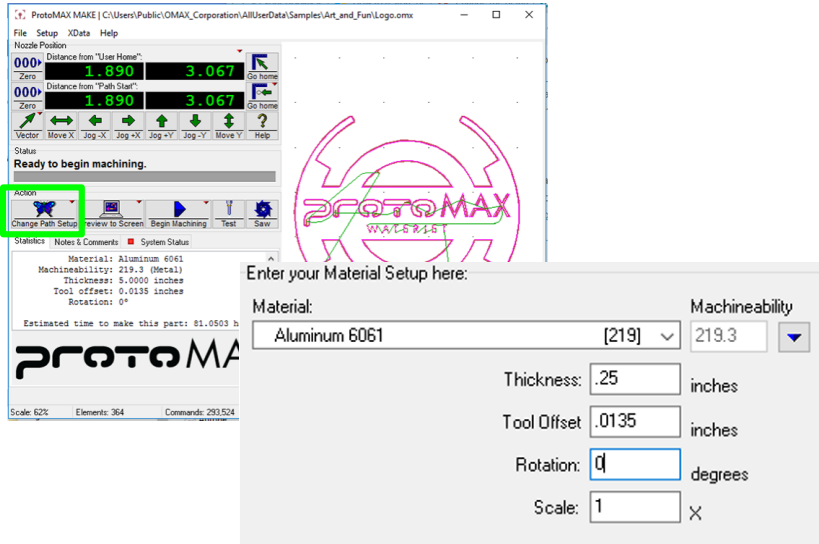
2 Select change path setup (green)

3 Enter your desired cut parameters:
-Material: Choose from the list of approved materials
-Thickness: Use calipers to measure the thickness of your material. Material thickness should not vary by >1/16"
-Tool Offset/Rotation/Scale: Default settings are best. Consult the OMAX Knowledge Base for advanced details

Add your workpiece

4 Use the slats and clamps to place your workpiece anywhere onto the 12" x 12" workbed

5 Add work holding clamps in areas of your part out of the way of the tool path

Set Path Start Home
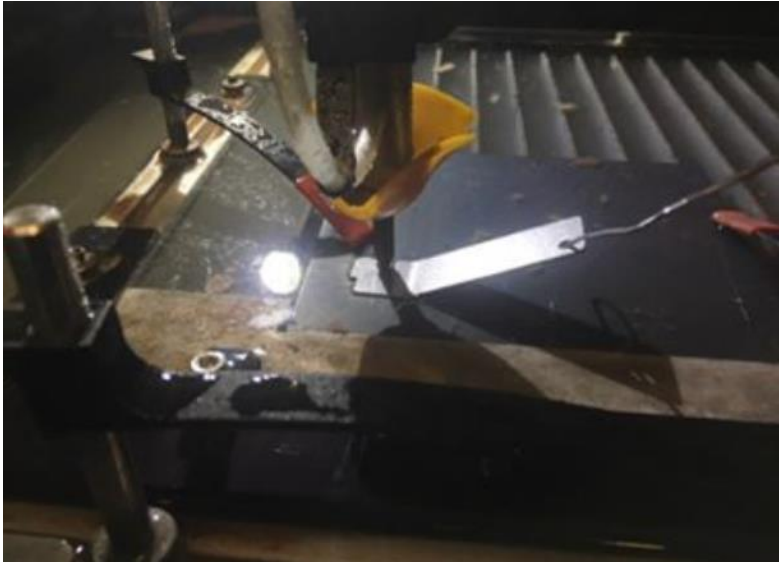
11 Use the black knob to adjust the height of the cutting head to clear the 0.060" feeler gauge when it is pressed on the workpiece

Set Path Start Home
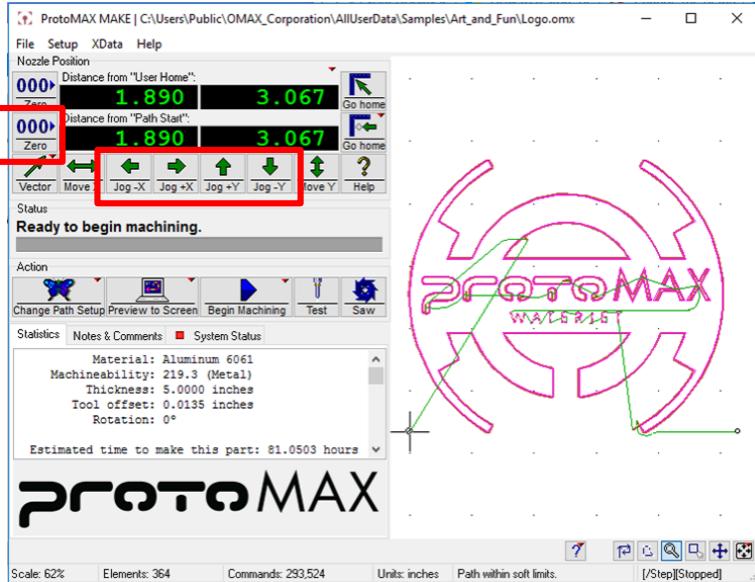
6 Jog in X and Y to go to the desired path start home for your tool path

7 Zero your Distance from Path Start (Green). This will ensure you start your cut from the same point later

Add water to the work tank above the
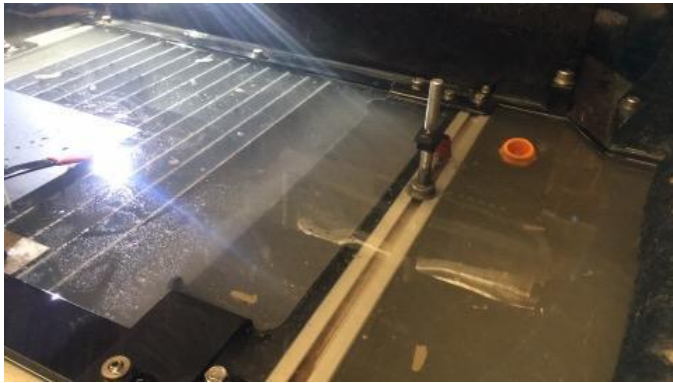
8 Pivot the lock line hose well clear of the water surface. Remove the sifting sponge

9 Add water using the spray hose until the water level is just above the workpiece

10 Pivot the lock line hose to just above the target water level and refixture the sifting sponge

Perform an Airpass
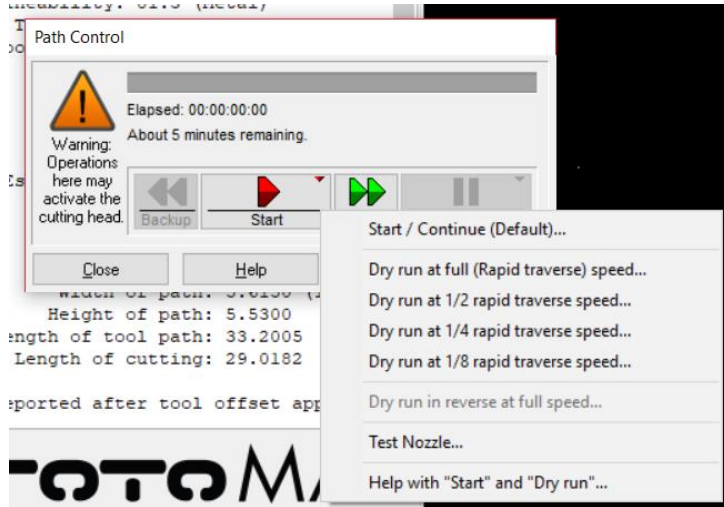
13 Click **Begin Machining**

14 Right click "start" and select "Dry Run at Full Speed"

⚠ Watch to make sure that the cutting head remains on the workpiece and remains free of any clamps or workholding

IMPORTANT: Monitor your cut

- Before you begin your cut, do the following:
  - Bring up the Sensor Dashboard:
    - Select the System Status Tab
    - Click "Sensor Dashboard"
    - The sensor Dashboard will come up. Pay attention to:
      - **Pump Outlet Pressure** (should be ~30 ksi +/- 10%)
      - **Pump Motor Speed** (should be ~1500-1600 RPM +/- 10%)

IMPORTANT: Monitor your cut

- Launch the Task Manager (CTRL + ALT + DELETE)
  - Ensure that values for CPU, Memory and Disk are within acceptable ranges. This means that the cells displaying usage info should be yellow, never red.
- Monitor the Task manager and Sensor dashboard during your cut!

Get a CA for check off

- ❏ Verify that student is an approved user

- ❏ Verify that student performed hose checks

- ❏ Verify that student did airpass

- ❏ Verify that work is properly held in place and clear of the head

- ❏ Verify that student is cutting approved material, and water and garnet levels seem appropriate

- ❏ Verify that student is monitoring cut (Task Manager & Sensor Dashboard)

- ❏ Pay and update Payment Log

- ❏ Jog to home

Send it!

15 Flip cup down and close the lid

Click Begin Machining > Run

⚠ You must sit and watch the entire duration of your cut.

⚠ In the event of an emergency stop, click the pause prompt on the screen

⚠ **Do not use the computer while the waterjet is cutting! This may overload the PC and may interrupt your cut**

Monitor your cut!

Use the **Sensor Dashboard** and **Task Manager** to monitor your cut, as explained in the above slides. Do not use the computer while cutting. Your screen should look similar to the screenshot on the right:

Clean Up

- ❏ Pull up cutting head
- ❏ Flip up protective yellow cup
- ❏ Remove part and workpiece
- ❏ Lower the water lockline
- ❏ Spray down the .aluminum surface
- ❏ Clean garnet trays (see next slide)
- ❏ Leave the water jet cutter open
- ❏ Close water line
- ❏ Turn off machine
- ❏ Get a machine check from a CA on duty

How to clean the garnet residue trays

1 Finger loosen but do not remove the two thumb nuts which secure each garnet residue tray to the left and right of the workbed

2 Slide and lift the garnet residue trays out of the water. Carefully pour as much water as you can out of the tray and into the tank

3 Dump the remaining water/residue mix into the designated residue bin, use the provided spatula.

4 Reinstall the garnet residue trays