# Roland MDX-540

## Machine Specifications
maximum stock dimensions - *14"Lx14"Wx5"H; 6"D x 14"L for rotary attachment*
toolholder collets (diameter) - *1/8", 1/4"*
maximum spindle speed - *12,000 RPM*
maximum cut feed rate - *250 IPM (inches/minute)*
mechanical resolution - *0.00004"*
recommended materials - *wood, plywood, mdf, tooling foam, machinable wax*

## File Preparation
Please prepare a clean RhinoCAM file with MOPS procedures you will use to complete your project. Each MOPS procedure should specify the cutting tool as well as an appropriate feed rate, spindle speed, and cutting depth appropriate for the materials you will be processing. Once your file is ready to go, you may submit it to John Leahy for approval. Please name the file using the format: *(uoregon email id)_ (material).3dm*. After he approves your file, he will make a reservation for you to complete your project.

## Initializing the Roland (for table*)
Turn on the power using the switch on the right side of the console. Press the **ENTER** button on the front of the console to initialize the machine. A green light under **NC** should come on. The **Big Red Button** on the console is an **Emergency Stop** button. Do not hesitate to press it in case of an emergency. Open the **VP_MDX540** controller software on the workstation. Click **OK** to open the **VPanel** window. Click on the **Move Tool** graphic button in the top bar. Remember your right-hand rule and move the cutting table all the way to the front, so that it is positioned close to the front cover. Keep in mind that the gantry arm is fixed, so you will need to click and hold the arrow in the positive Y-axis to move it in the correct direction. Click on the **Attach/Detach** graphic button. Click the **Open Magazine Cover** button. Verify that the tools loaded in the magazine correspond to those listed in the **VPanel** window. If they do not, or if you want to use a different tool, or if your job requires 4 axes and the rotary attachment, please ask John for assistance. Before sending your job, you will need to warm up the spindle bearings if the Roland has not been used in the past hour.

## Job Preparation (for table*)
Please have your material stock cut to size before coming in for your reservation. Secure your stock using either wood screws or clamp blocks and wedges. Use general purpose or sheetrock screws with a length appropriate for securing your stock to the wasteboard. Pilot holes in your material stock and the wasteboard before fastening screws to ensure that your material stock lies flat against the wasteboard.

## Spindle Warm-Up Procedure
Charge the tank on the mobile air compressor. When fully charged, connect the line to the Roland and adjust the regulated pressure to 90psi. Please ask John if you need assistance. If the tools you will be using are loaded and correspond correctly to the **Vpanel Magazine Settings**, you may pick up the first tool you will be using in your MOPS set. To do this, open the **Attach/Detach** window and change the pull down **Stocker No.** to match the tool you would like to pick up, then click the **Replace** button. The Roland will pick up your tool. Open the **Move Tool** window, adjust the **Spindle Rotating Speed** to **3000 RPM** and click **Start Spindle**. After **2 minutes**, adjust the **Spindle Rotating Speed** to **6000 RPM** and let it run for another

**2 minutes**. Continue to adjust the **Spindle Rotating Speed** every **2 minutes** to run at **9000** and **12000 RPM**. When you are finished, click **Stop Spindle**.

### Setting an Origin (for table*)

Before outputting your file, you must first establish an origin for your **Work Coordinate System**. You will use the **G54 Work coordinate System** to offset the origin from the factory set **G53 Machine Coordinate System**. Setting the **G54 Work Coordinate System** origin will allow you to establish a common origin between your material stock location and the virtual stock location you created for your MOPS set in RhinoCAM. It is recommended that you mark your material stock origin to assist with accurately position-ing the tool. In the **VPanel** window, above the X, Y, Z, A coordinates, select **G54** from the pull down menu. Take note that the values listed for the coordinates in the **VPanel** window change. Open **Base Point** and verify that both the **Coordinate System** and the **Set Base Point** pull down menus are set to **G54**. Move the tip of your tool so that it is roughly 2" above the mark on your virtual material. If the machine is moving slowly, you may adjust the speed setting to **High Speed**. For micro adjustments, use the **1**, **10**, **100 Steps** settings. When you have the tool tip location accurately positioned in the X and Y axes, change the **Set Origin here** pull down menu to **XY Origin (HOME)** and click **Apply**. This will zero the values for your X and Y axes in the **VPanel** window. Now you need to zero the Z-axis to the top of your material stock using the **brass Z-Zero Sensor**. First, move the tool tip location in the X and Y axes over a stable and level location over your material stock. Then, locate the **brass Z-Zero Sensor**, which has a hole located in the side of a short brass cylinder attached to a plastic base. In the **Set Base Point** window, look for the **Set Z origin us-ing tool sensor** and click **Start Detection**. A window will open to prompt you to connect the **Z-Zero Sen-sor Cable to the Tool Sensor**. Open the front cover on the Roland and slide it back into a locked position. Connect the **Z-Sensor Cable** into the hole on the **brass Z-Zero Sensor** and place it on your material stock so that the brass surface is up and directly underneath the tool tip. Close the cover carefully and click **OK**. The tool tip will make contact with the brass surface of the **Z-Zero Sensor** and lift away. Open the cover again, remove the **brass Z-Zero Sensor** and put it away. Be sure the **Z-Sensor Cable** is safely away from the table before closing the cover. It can snag on moving parts and become damaged.

### Outputting Files

You are now ready to output your cutting file. Post your MOPS set from RhinoCAM and save it as an *.nc* file to the desktop. Take the time to review the nc code and verify that *positioning values* for the X, Y, and Z axes seem correct. Also, verify that the *cutting feed rate* is appropriate for the material being cut. If un-certain, please consult John before continuing. After you have verified that your *.nc* file is ready to go, click the **Cut** button at the top of the **VPanel** window. Click the **Open File** graphic button at the bottom of the **Cut** window just above the **Pause at Each File** checkbox. Select your *.nc* file and click **Output**. Monitor the values for spindle speed and feed rate using the **VPanel** window. If needed, you can click the **Pause** but-ton. If you are pausing to look closely at something, you must click the **Stop Spindle** button and allow the cutting tool to come to a complete rest before opening the front cover, otherwise your job will be aborted. If needed, you can click the **Stop Cutting** button to cancel the job. In an emergency, hit the **Big Red Button** on the front console. This will immediately cut power to the machine. Never hesistate to use the **Big Red Button**. Having to take the time to restart the machine and your operations is more prudent than potentially damaging the machine, tool, or your material.

### Cleaning Up (for table*)

When you have finished cutting your job, open the front cover, remove your part, and vacuum all swarf and

dust off every surface of the machine thoroughly. Close the front cover carefully, open the **Attach/Detach** window and click the **Return** button to return the held tool to the stocker. Close the **VP_MDX540** controller software and turn off the power to the Roland.

## Checking Out
Total your estimated run time for the MOPS set in RhinoCAM. The operating cost is $0.25/minute. Move all of your files on the desktop into the recycle bin, and see John or a Shop Tech for payment.

*This protocol is for operating the table only. If you need to use the rotary attachment, please speak to John.