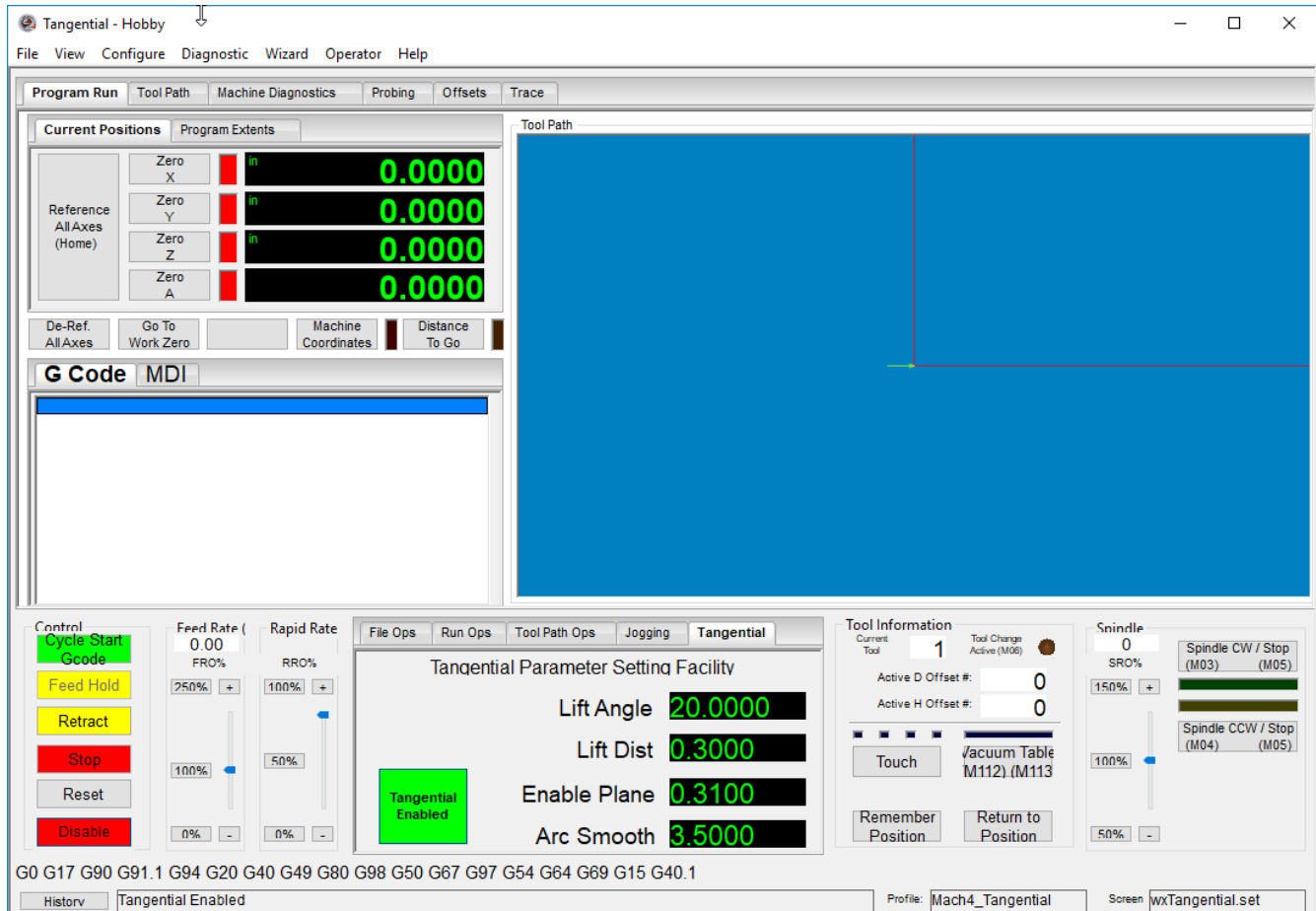


MACH4 TANGENTIAL

The Tangential Profile is intended to operate machinery equipped with a rotational axis independent of, but usually associated with the Z axis direction. Machines include, but are not limited to, drag knife, oscillating knife, water jet, and crease rollers.

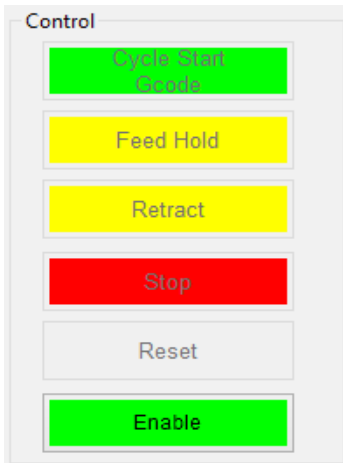
Unlike a milling machine or a router, a tangential machine interprets g code a bit differently. Operating in Tangential Mode, an axis (usually A) will rotate to interpolate G02 and G03 (arc moves), while a mill/router will interpolate arcs using the X and Y.



Tangential-Specific Features:

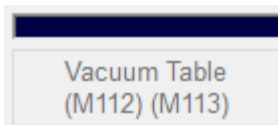
Retract Button -

Although this is a standard function in Mach4 Router, while in Tangential Mode, users will not need to turn on the spindle before continuing the g code file with the Cycle Start Button. The Retract Button is found in the Control Group.



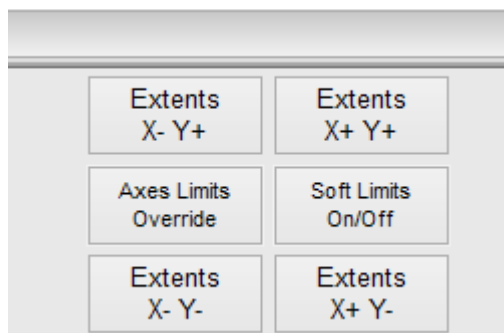
Vacuum Table-

Standard Mach4 Vacuum On/Off toggle, which is also associated with M112 and M113 macros for on/off.



G Code Extents Buttons -

The Extents buttons can be found in the Jogging Tab. Users can click on any of the Extents buttons and the machine will travel to the farthest points of the current g code file in relations to the current work coordinates. **Use extreme caution.** There are no Z moves. These buttons are intended for use with nesting checks and maximum material usage.



Tangential Tab-

This tab is a facility to set Parameters that control tangential operation as well as an Enabled/Disabled button.



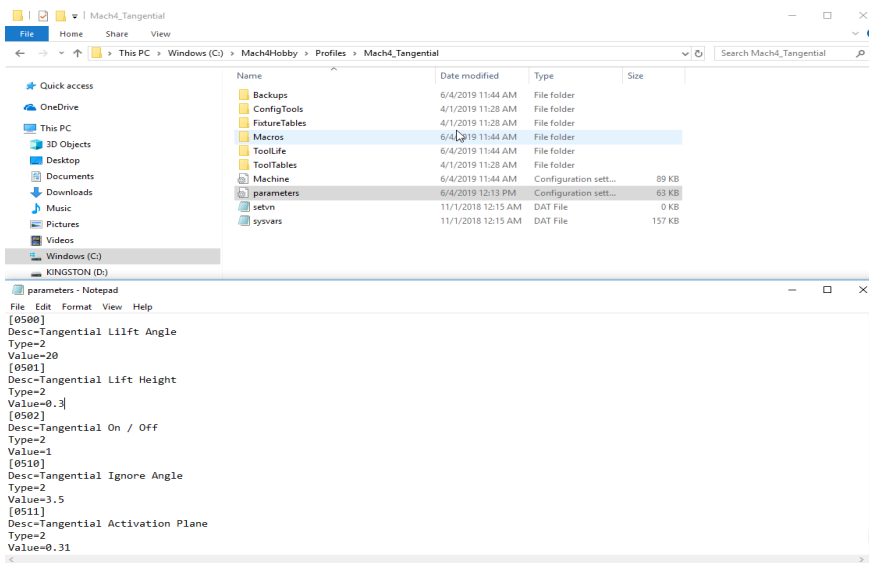
Lift Angle DRO -

This is a user input DRO for setting the max angle to enable knife lift to complete direction changes. These can include arcs and/or linear moves. When Mach4 interprets that the lift angle will be exceeded, motion in X and Y will stop and the knife will "exit," or lift out of the material (controlled by Lift Distance). The A axis will rotate and knife will re-enter the material to complete the move.

Lift angle is represented by Parameter 500.

Found in C Drive> Mach4> Profiles>Mach4_Tangential> parameters

Parameters can be set via G Code as well



EX: Set Parameter 500 to 20.000

G10 L50 (L50 Specifies Parameter Setting Mode)

N500 R20 (N Specifies the Parameter number, R Specifies the new Parameter Value.)

G11 (Ends the G10 Sequence)

Lift Angle 20.0000

Lift Distance DRO -

This is user input DRO that will control the distance the knife will “exit” or lift out of the material when lift angle has forced the lift for rotation.

Lift Distance is represented by Parameter 501.

Parameters can be set via G Code as well

EX: Set Parameter 501 to -32.000

G10 L50 (L50 Specifies Parameter Setting Mode)

N501 R-32.000 (N Specifies the Parameter number, R Specifies the new Parameter Value.)

G11 (Ends the G10 Sequence)

Lift Dist 0.3000

Arc Smoothing DRO-

Arc Smoothing is a user input angular value for setting the resolution tolerance in arc-to-arc transitions. This value should be treated as a motor tuning constant. The value will also differ from machine to machine depending on, but not limited to, steps per unit, motor type, and drive and/or motor resolution.

Obtaining an Arc Smoothing value is similar to X, Y, and Z motor tuning.

Once a value has been achieved that eliminates “jerky” motion when cutting ellipses and large continuous arcs, that value will become a constant and will remain a constant until changed by the user.

Arc Smoothing is represented by Parameter 510.

Parameters can be set via G Code as well

EX: Set Parameter 510 to 5.000

G10 L50 (L50 Specifies Parameter Setting Mode)

N510 R5.000 (N Specifies the Parameter number, R Specifies the new Parameter Value.)

G11 (Ends the G10 Sequence)

Arc Smooth 3.5000

Enable Plane DRO-

Arc Smoothing is a user input that will set the value at which Tangential rotation is enabled or disabled during operation.

Config 1)

If the top of the material to be processed is Z zero in the current work coordinate system,

zero would be entered for the Enable Plane. During operations, anytime Z travels below zero (negative values), Tangential rotation will be enabled.

Config 2)

If the machine table is Z zero in the current work coordinate system and the material to be processed has a thickness of .500, .500 would be entered in the Enable Plane DRO. During operations, anytime Z travels below .500 (positive values), Tangential rotation will be enabled.

Config 3)

If Tangential rotation needs to stay enabled all of the time, a value larger than needed or that represents the actual travel of the Z axis can be entered to accomplish this.

Enable Plane is represented by Parameter 511.
Parameters can be set via G Code as well

EX: Set Parameter 511 to .500
G10 L50 (L50 Specifies Parameter Setting Mode)
N511 R.500 (N Specifies the Parameter number, R Specifies the new Parameter Value.)
G11 (Ends the G10 Sequence)



*****!!THE NEXT SECTION IS EXTREMELY IMPORTANT!!*****

Tangential Enabled Button -

The Tangential Enabled/Disabled Button will toggle Mach4 in and out of tangential mode. Users can take advantage of this feature when a milling head is also installed on the machine or if tangential moments need to be disabled for any operations at all.

Tangential Enabled/Disabled is represented by Parameter 502.
Parameters can be set via G Code as well

EX: Set Parameter 502 to 0
G10 L50 (L50 Specifies Parameter Setting Mode)
N502 R0 (N Specifies the Parameter number, R Specifies the new Parameter Value.)
G11 (Ends the G10 Sequence)

Tangential should not be disabled, unless users have full understanding of what the results will be.



Tool Information-

Tool Information

Current Tool

1

Tool Change Active (M06)

Active D Offset #:

0

Active H Offset #:

0

■ ■ ■ ■

Touch

Vacuum Table
M112) (M113

Remember Position

Return to Position

Current Tool -

Displays the current tool.

Current Tool

1

Active Offset -

This DRO will display the active length offset (if active; G43 Hxx) number for the current tool in use.

Active D Offset #:

0

Active H Offset #:

0