# Plasma Software Setup & Usage Guide

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1. Software Setup

Install Mach3

Follow the CNC Router Parts **CNC Software Setup Guide** to install the correct version of Mach3 and configure your PC for CNC use. Customers who already have Mach3 installed will need to reinstall Mach3 using the installer in the CNC Software Setup Guide listed above. This will install the correct plasma compatible ESS plugin and related TMC3in1 files.

Start Mach3 and select the ESS Plugin
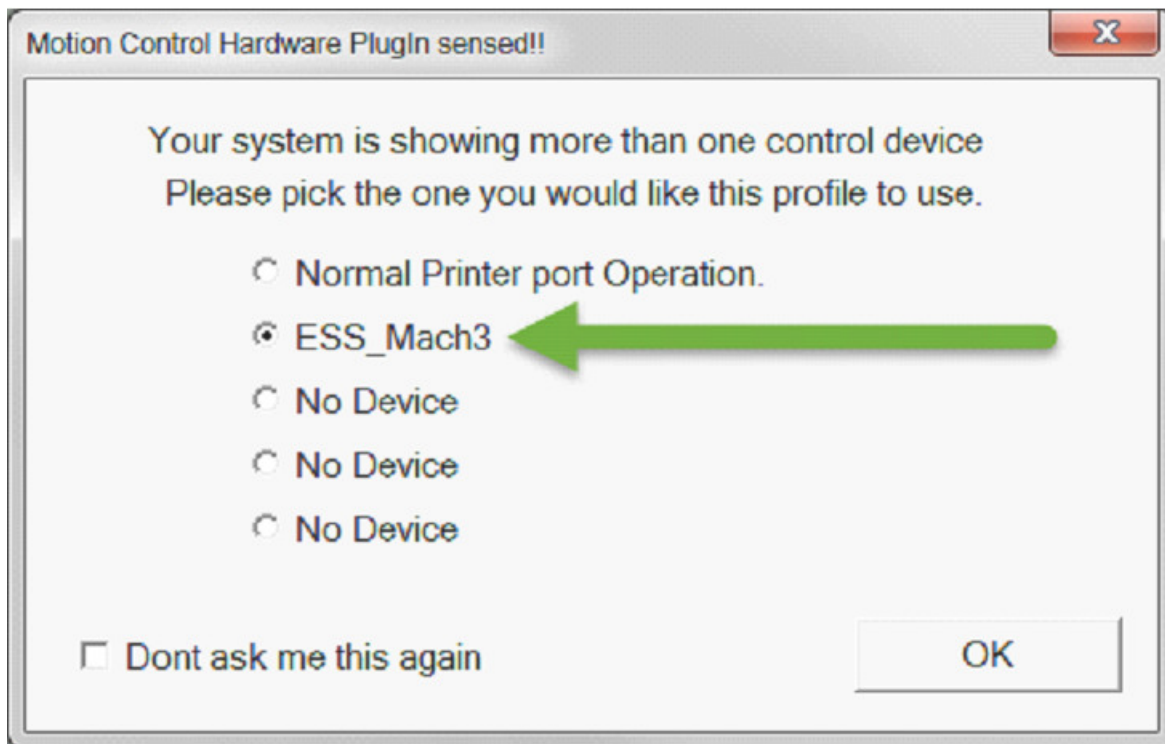
TMC3in1 Firmware Update Screen
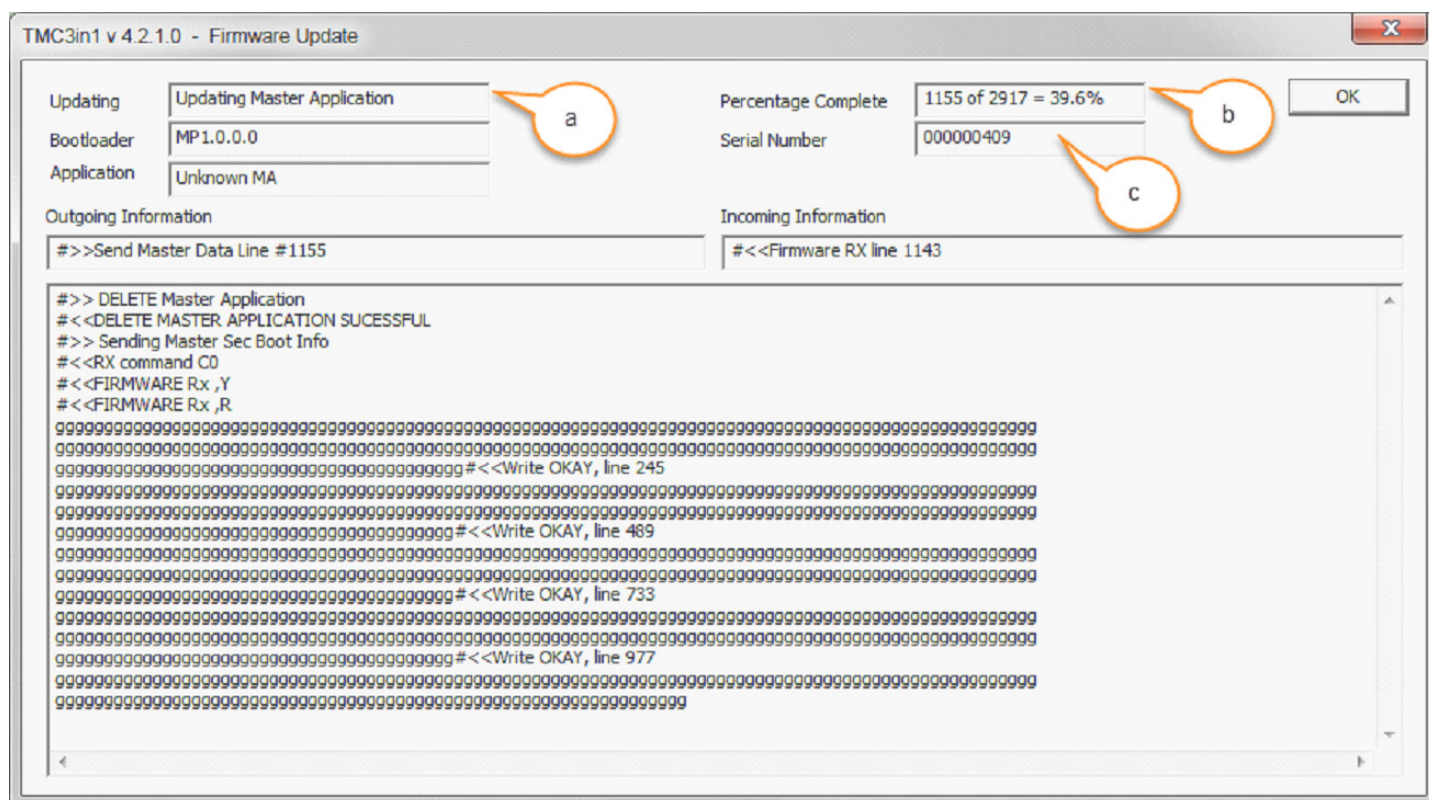
If the firmware in the Master, Spindle and THC processors, on the TMC3in1, is not the same version as required by the TMC3in1 plugin, the plugin will automatically update your firmware. This screen will appear and then go away after the firmware update is complete, on each processor. Depending on which plugin version you were using, when you switch to a new version, you may need to update the firmware on 1, 2, all 3 or none of the processors. Each 'g' represents a good line of data being transmitted. If there is a corrupted data packet, the transmission will be aborted and the restarted. This may take several minutes to update, so it may be best to ignore the computer during that time.

- **Updating** - This indicates which processor is being updated.
- **Percentage Complete** - The current firmware update percentage. Once you reach 100% this window will disappear. (A new window may appear for a different processor's firmware).
- **Serial Number** - The serial number of your TMC3in1.

2. Usage Guide

TMC3in1 Mach3 Screen

There are many changes, mostly additions, to include the THC functions on the Mach screen set. Below is a screenshot of the new TMC3in1 Mach3 screen and below that are definitions of each new function.
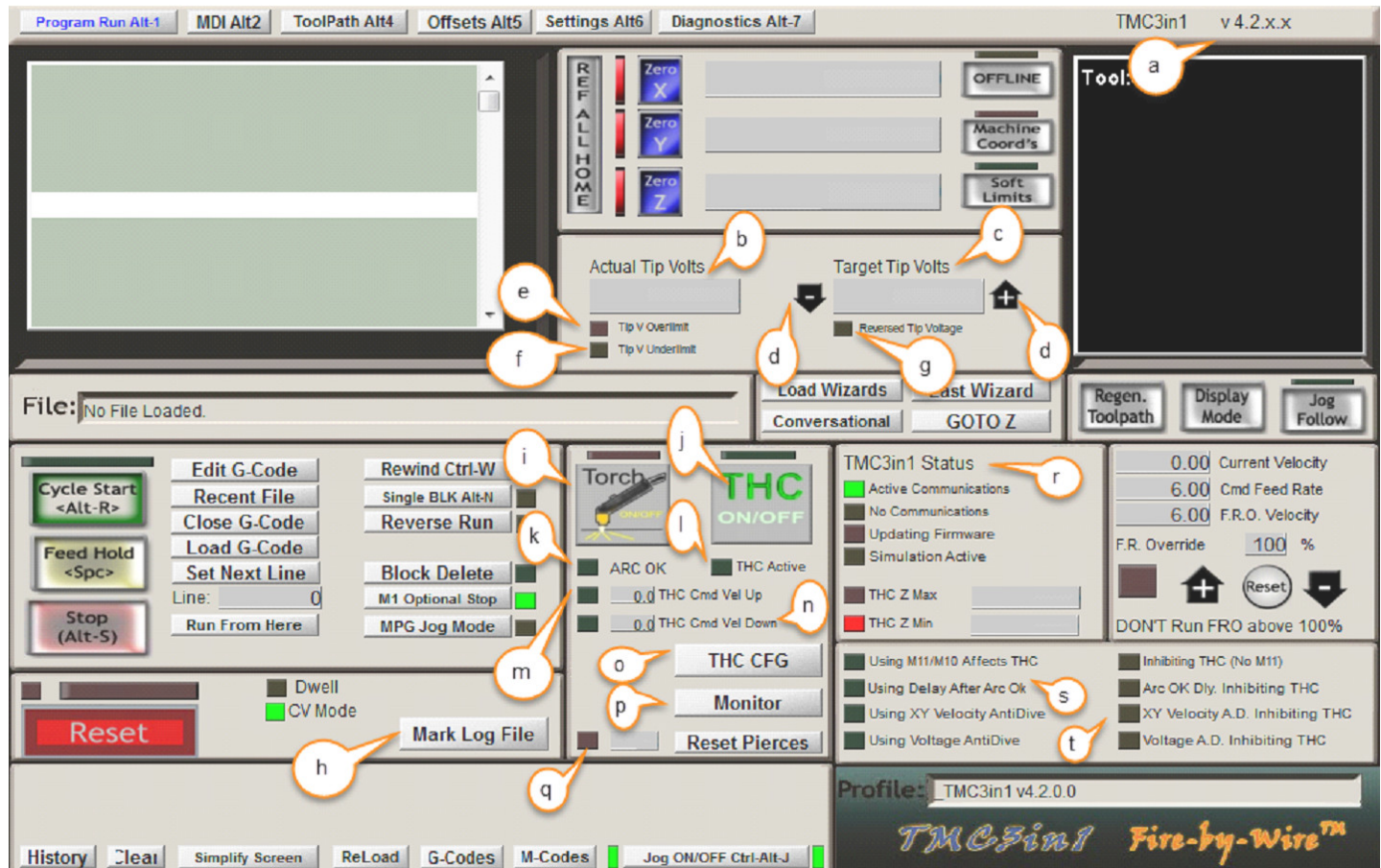
Definition of New TMC3in1 Mach3 Screen Controls and Indicators

a. **Mach Screen Versoin** - "4.2.x.x" indicates that this screen is required for any TMC3in1 plugin version of 4.2.x.x or possibly higher.

b. **Actual Tip Volts** - This is the actual plasma arc tip voltage received after being multiplied by the divider ratio selected in the THC Config plugin. When active, the TMC3in1 will try to bring the Z axis (torch) arc to match the Target Tip Volts.

c. **Target Tip Volts** - This is the target voltage set by the operator that the TMC3in1 will adjust the Z axis (torch) to while cutting. To change the number, click in the box and type in the target voltage and press the "Enter" key.

d. **Increment / Decrement Arrows** - Clicking on either of these arrows will increment or decrement the Target Tip Voltage by 1 volt. This can be done when cutting is active to fine tune cut height.

e. **Tip Voltage Overlimit** - The overlimit indicator will turn **Red** when the Actual Tip Voltage exceeds the measurable voltage range for your divider ratio. The overlimit indicator may turn on when a torch is fired for piercing, but should disappear once Arc Ok is detected. The overlimit indicator may also turn on and stay on if the system is miswired or misconfigured.

f. **Tip Voltage Underlimit** - The underlimit indicator will turn **Yellow** when the Actual Tip Voltage is lower than the allowed voltage. This will usually turn on if your plasma unit is turned off. This indicator should turn off as soon as your torch fires.

g. **V In Reversed** - This indicator will turn **Yellow** when the Divided Tip Voltage wires are Reversed, based on your "Tip Voltage Source" selection in THC Configuration. Please correct your wiring. This may turn on if your plasma unit is turned off.
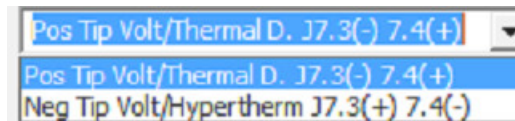
h. **Mark Log File** - This button is pressed when the user sees a possible failure occurring. It puts a special mark in the log file to help specify where a problem occurs in the log.

i. **Torch Button** - This will turn the torch On or Off manually. The Red LED above it will indicate torch activity.

j. **THC ON/OFF Button** - This will Enable/Disable Torch Height Control for your system. If the Green LED above it will not turn on, then you are likely in demo mode. You must have Mach3 licensed for this to turn on. If it is not on, your Z axis will not respond to simulation mode or actual commands to move the Z axis while cutting.

k. **ARC OK** - This Green LED will illuminate when the Arc Okay signal is being received.

l. **THC Active** - This indicator reflects when the THC is actively running in the TMC3in1. There are various reasons that the TMC3in1 will shut off THC control (M11, no Arc Okay, stopping Z axis THC response or Delay after Arc Okay).

m. **THC Up Indicator** - This indicator shows the presence of a Torch Up signal sent to Mach3 from the TMC3in1. The box to the right indicates the commanded Z velocity issued by the TMC3in1. The ESS and Mach3 will not honor the commanded Z velocity if THC ON/OFF is not lit or if the THC Z Max value has been exceeded.

n. **THC Down Indicator** - This indicator shows the presence of a Torch Down signal sent to Mach3 from the TMC3in1. The box to the right indicates the commanded Z velocity issued by the TMC3in1. The ESS and Mach3 will not honor the commanded Z velocity if THC ON/OFF is not lit or if the THC Z Min value has been exceeded.

o. **THC Config** - Clicking this button will open the THC Config window to make temporary changes to the THC Configuration. To

make permanent changes, you will need to go Menu -> Config-> Config Plugins, and click on the Yellow Config in the TMC3in1's row.

p. **Monitor** - Clicking this button will display the Monitor screen. These are extra indicators showing more detailed THC function and is mostly used when debugging and installation.

q. **Pierce Count** - Every time the torch is fired, this indicator increments by 1 showing total number of pierces. The indicator will turn **Red** to show the operator that this number is at or past the limit set by the operator in the THC Config. No action is taken by the TMC3in1 on this indicator. It is for operator display only and has no effect on plasma operations. Clicking on the Reset Pierce Count button to the right will reset the Pierce counter.

r. **TMC3in1 Status**

- **Active Communications - GREEN** - These 2 indicators (Green/Yellow) reflect the operational status of the TMC3in1. The **Green** LED indicates that the TMC3in1 Hardware and the TMC3in1 Mach3 plugin are communicating correctly.

- **No Communications - YELLOW** - The **Yellow** LED indicates that the TMC3in1 hardware and the TMC3in1 Mach3 plugin are not currently communicating. Releasing Mach3 from Reset or changing the target voltage (see numbers 3 and 4) should start the TMC3in1, and turn the status LED **Green**.

- **Updating Firmware - Flashing RED** - This indicator reflects the TMC3in1 is updating its firmware, and is accompanied by a log window showing the update progress. Updates should only happen when changing to a different version of the TMC3in1 plugin. The user should wait until updating is finished and the TMC3in1 Status light (letter h) is Green indicating TMC3in1 is running.

- **Simulation Active** - This indicator shows when the TMC3in1 is in Simulator Mode. More about this later in this document. THC CFG – Clicking this button will display the THC Configuration screen. Details of the THC CFG screen will be explained later in this document. Any changes to the configuration will be used for this instance of Mach and not stored in the XML. To store in the XML for later use, go to Mach Config > Config Plugins > Config beside the TMC3in1 plugin. Information on what is displayed is later in this document.

- **THC Z MAX** - This will illuminate when you have exceeded your Z Max elevation, and will prevent the Z axis from going any higher via THC. The value is controlled in the box to the right.

- **THC Z MIN** - This will illuminate when you have exceeded your Z Min elevation, and will prevent the Z axis from going any lower via THC. The value is controlled in the box to the right

s. **Using Mode Indicators** - These LEDs will illuminate when you are using the corresponding Mode in the THC Config:

- **Using M11/M10 Affects THC** - This indicator shows when the M11/M10 functions are enabled (but not necessarily active) in the THC Configuration.

- **Using Delay after Arc OK** - This indicator shows when the THC Delay after Arc Ok has been enabled (but not necessarily active) in the THC Configuration.

- **Using X-Y Velocity Affects THC** - This indicator shows when the THC Configuration has enabled the Anti-Dive feature of "% Cutout Mode".

- **Using Voltage Mode AntiDive** - This indicator shows when the Voltage Mode AntiDive has been enabled (but not necessarily active) in the THC Configuration.

t. **Inhibiting Indicators** - These LEDs will light up when the corresponding mode is actively INHIBITING Torch Height Control.

Configuring the TMC3in1 Plugin

To configure the TMC3in1 Plugin, navigate to the *Plugin Control and Activation* window from the Config menu (Config > Config Plugins). Press CONFIG in the yellow area next to "TMC3in1-Plugin."

This is the *TMC3in1 Config* window. These configuration values will be saved to the XML when you press OK, **only when you get here from the Plugin Control and Activation window.**

Click on "THC CFG" to open the THC Configuration window. These parameters are used to determine the operation of the TMC3in1. Below, each parameter is marked with a number and below that are short and detailed definitions.

TMC3in1 v 4.1.0.0 - Config   ✕

a   ☑ Pressing 'RESET' on Mach Screen turns off TMC3in1 Hardware

b   50:1   ▼ | Tip Voltage Divider

c   Pos Tip Volt/Thermal D. J7.3(-) 7.4(+)   ▼ | Tip Voltage Source

d   300   Number of pierces before warning light turns on

e   [   ]   Target Tip Volts

f   0.25   Target Band (Volts)

g   20.1   Linear Response Band (Volts)

h   0.000   THC Offset (Volts)

i   ☐ Mode: Run Simulator

j   ☐ Mode: M11 Enables, M10 Disables THC

k   ☐ Mode: Delay After Arc Okay Before THC   1.1

Velocity Based AntiDive Mode

L   ☑ Stop THC response when X-Y velocity less than   97   %

Tip Voltage based Antidive Mode

m ☑ Enable Antidive Mode based on Averaged Tip Volts

n   128   ATV (Average Tip Volt) data points [1 to 128]

o   4   % change in ATV, Before Anti Dive Engages

p   0   %THC Response, when ATV Anti Dive is Active

q   Disable THC When   20.0000   Volts Above Target Tip Volts

r   Disable THC When   20.0000   Volts Below Target Tip Volts

s   Open Logs | C:\Mach3\TMC3in1\Logs\

t   'Cancel' will discard all changes. 'OK' will use the changes right away. Changes will NOT be saved to the XML. To save changes to the XML use: Menu -> Config -> Config Plugins ->TMC3in1 CONFIG

[Cancel]   [OK]

Short Description of THC Configuration Parameters:

a. **'Reset' Turns Off TMC3in1** - TMC3in1 state controlled by "Reset" button on Mach3 screen.

b. **Tip Volt Divider** - This is the divider ratio matching the one set in the plasma power supply.

c. **Tip Voltage Source** - The TMC3in1 has two tip voltage polarities. Choose "Positive Tip Volts" or "Negative Tip Volts" based upon your plasma system.

d. **Pierce Count Limit** - Threshold of pierce counts before the red pierce count exceeded warning light comes on.

e. **Target Tip Volts** - This is the default set by the user and displays on the Mach screen.

f. **Target Band** - This is the +/- voltage band that no THC action occurs within.

g. **Linear Response Band** - This is the +/- voltage band that uses proportionally reduces the Z axis commanded velocity response.

h. **THC Offset** - Used to "trim" THC tip volts to better match with cut height. This is normally not needed.

i. **Mode: Run Simulator** - This will cause the TMC3in1 to simulate up and down motion 30 times with the Z axis. It is used to make sure your configuration settings will allow the ESS and Mach3 to respond to THC commands from the hardware and also to make sure your Z axis is responding smoothly.

j. **Mode: M11/M10** - When enabled, the TMC3in1 will need to receive a M11 commands in G-Code before THC response is allowed and an M10 command will disable THC response.

k. **Mode: Delay After Arc Ok** - Enabling delay after Arc Ok received. The field to the right is the length of delay in seconds after Arc Okay is received before THC control start, when 'k' is enabled.

l. **Enable Velocity Based Anti-Dive Mode** - This is a velocity based Antidive feature to prevent the torch from diving due to slow velocities at the beginning of a cut, the end of a cut, and in corners. The field to the right allows you to specify the lower end velocity % at which point THC will be inhibited if 'i' is enabled.

m. **Enable Voltage Based Anti-Dive** - Enable the "anti-dive" parameters in this group.

n. **Average Tip Volts** - Average (1 to 128) tip voltage data points.

o. **% Change in ATV** - % change in ATV before anti-die engages.

p. **% THC Response** - % THC response rate when anti-ive active.

q. **Volts Above Target Tip Volts** - voltage point above target tip volts when THC is inhibited.

r. **Volts Below Target Tip Volts** - voltage point below target tip volts when THC is inhibited.

s. **Open Logs** - Opens log folder specified by path shown.

t. **When Changes are Stored** - Shows when changes are stored in XML and when not.

Detailed Description of THC Configuration Parameters:

1. Selecting the Tip Voltage Divider Ratio

   Note: All Hypertherm Powermax units use a 50:1 ratio by default

   While you are still in the *TMC3in1 Config* window: For the Arc Voltage Divider, select whichever one your machine uses:


   The Voltage Divider Ratio is used to provide the arc voltage to the THC in a form that is not dangerous. The raw tip volts can be anywhere from 100v to over 300v in some models. This voltage can be very dangerous. The voltage divider circuit divides this voltage per a ratio provided by the plasma manufacturer. The output is directly proportional to the raw tip voltage but at a reduced level to provide safe voltages at the THC. It is very important that the divider selection in the THC Configuration window matches that chosen at the plasma cutter so the THC can operate properly.

   If your machine allows you to choose a value based on jumper or switch settings, we would recommend using them in this order of preference:

   - 50:1
   - 40:1
   - 30:1
   - 20:1
   - 16.67:1
   - 15:1
   - **DO NOT USE STRAIGHT (RAW) TIP VOLTS, IT WILL DAMAGE THE TMC3in1.**

2. Selecting the Tip Voltage Source

   The Tip Voltage is polarized. Installing reversed may cause damage to the TMC3in1 or your plasma unit. Please make sure you select the appropriate Tip Voltage Source in the THC Config window.
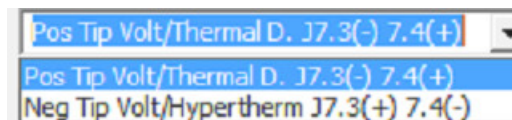
3. Selecting the Desired Pierce Count

   The Pierce Count feature counts a pierce every time Arc Ok is established. Many users want to know how many pierces have occurred since the plasma tip and/or electrode was last changed. This helps them determine when next to change the tip/electrode instead of having it "blow out" during a cut because of extended use.

   While you are still in the *TMC3in1 Config* window: The Desired Pierces section is optional, but will keep track of the number of pierces performed. This will help with maintenance of consumables.

   The left box lets you set the desired number of pierces to perform before the warning light turns on, flashing Red on the

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main Mach3 Screen like this:


The Reset Pierces button will allow you to reset your current pierces count to 0.

4. Selecting the Default Target Tip Volts

While you are still in the *TMC3in1 Config* window: Target Tip Volts is the tip voltage you want to cut at. This is material and speed dependent. Setting the Default Tip Volts here will cause it to show this setting each time you start Mach3. However, the tip volts can be set or changed on the Mach3 screen by selecting the Target Tip Volts, entering a number, and pressing Enter.

As stated above, the Target Tip Volts can also be specified on the main Mach screen.
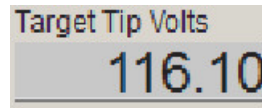
5. Selecting the Target Band Volts

While you are still in the *TMC3in1 Config* window: Target Band (Volts) is the voltage band you want to stay within, above your Target Tip Volts or Below Your Target Tip Volts. 0.25V is the recommended value to use, but you may modify it. Example: 0.25 is plus and minus 0.25 for total band width of 0.5 volts. This means that the THC will try and keep the tip voltage at the desired Target Tip Volts, but will give leeway within this band. If the THC did not have this band, it's possible that the THC would ALWAYS be giving the Z axis commands and "see-sawing" or oscillating.

When you are within the target band, the TMC3in1 will not issue any THC UP or THC DOWN signals.

Changing the Target Band Volts Parameter:

- The default and minimum value is 0.25 V
- Larger values may cause the Z axis not to respond as quickly to changes in material height (i.e. warping). Also you may have rougher cuts
- Larger values may cause the Z axis not to respond as quickly to changes in material height (i.e. warping). Also you may have rougher cuts

6. Selecting the Linear Response Band Volts

While you are still in the *TMC3in1 Config* window: The Linear Response Band (Volts) is the area that the THC UP and THC DOWN signals will be generated at less than full strength. One way to think of this is as the nudging region. When you are only a little bit away from your Target Band, you just want to nudge the voltage back. If you are farther away, you move a little harder. If you are outside of the Linear Response Band, you push with full force.

Example: A setting of "20.1" is plus and minus 20.1 volts for total bandwidth of 40.2 volts.


Changing the Linear Response Band Parameter:

- 20V is the default value

- If your system responds too aggressively or begins to oscillate, increase this value.
- If your system does not follow close enough to the target voltage, decrease this value. Not tracking the target voltage may also be related to Z axis acceleration settings

Examples of various voltage settings:

- Voltage Band Example A:
  - Target Tip Volts = 120.0
  - Target Band (Volts) = 0.25
  - Linear Response Band (Volts) = 20.1
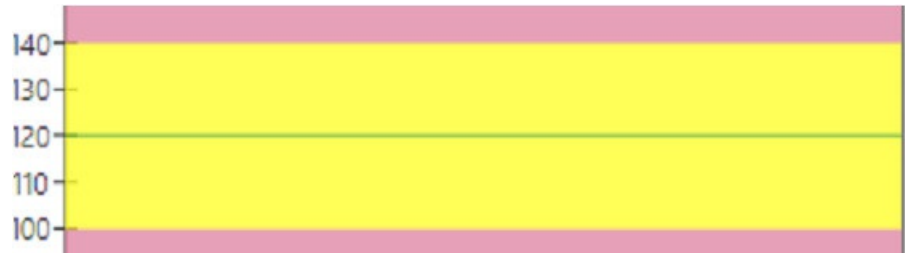
Voltage Band Example A

- Voltage Band Example B:
  - Target Tip Volts = 120.0
  - Target Band (Volts) = 2.0
  - Linear Response Band (Volts) = 5

Voltage Band Example B

In these images, the green line represents the Target Band (Volts) above and below our Target Tip Volts. There will be NO THC UP or DOWN signals generated when our Actual Tip Volts is in this region.

The yellow areas represent the Linear Response Band (Volts). When the Actual Tip Volts is near the green line, (but in the yellow area), the THC UP or DOWN signals will just start turning on, weak signals at first. As the Actual Tip Volts moves farther away from the green line, the THC UP or DOWN signals will be stronger. As the Actual Tip Volts approaches the red area (but while it is still in the yellow area), the THC UP or DOWN signals will be very strong.

Once the Actual Tip Volts is outside of the yellow area and in the red area, the THC UP or DOWN signals will be fully on.

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7. Selecting the THC Offset Volts

While you are still in the *TMC3in1 Config* window: THC Offset. This provides an offset adjust for the Actual Tip Voltage. In testing, measurements, and operation, it is not needed, which is why we set it to 0.001 V (1 mV). It is provided merely as a courtesy. The most common usage is to "match" the plasma manufacture user guide on tip voltage/cut height.

8. Selecting the Mode Run Simulator

While you are still in the *TMC3in1 Config* window: Mode Run Simulator will allow you to test your TMC3in1 Hardware to see if the THC Up and THC Down signals are being received and processed by Mach and the ESS correctly. Your Z axis should respond to the movement they request. If there are any issues with the movement of your Z axis, please adjust your Z Velocity and Z Acceleration settings in Mach's Motor Tuning. If there is no response whatsoever, then there is likely a problem with your configuration of THC Up, THC Down and THC On pins in Mach3's Menu -> Ports and Pins -> Inputs.

You will need to:

- Make sure Mach is released from Reset
- In the THC Config window, check in the Run Simulator box, and press OK to close the Config window to start the Simulator Mode.
- Make sure your equipment can move up and down at least 2 inches in each direction
- Have all of your other settings properly configured.
- Press Ok to start the simulator
- Simulator Mode will exit automatically after it completes its simulation

9. Selecting the M11/M10 Mode

While you are still in the *TMC3in1 Config* window: Using M11 to Enable THC Up/Down signals from the TMC3in1 and using M10 to Disable THC Up/Down signals from the TMC3in1.

In your G-Code file you would then use the commands **M11P3** or **M10P3** (P3 is for port 3) followed by a move command (G0, G1 etc…).

10. Selecting the Delay THC Active after Arc Ok Mode

While you are still in the *TMC3in1 Config* window: Delay THC output signals from the TMC3in1 for X.Y seconds after the Arc Ok is received. This will allow your torch time to move away from the pierce location before THC Up or THC Down signals are generated. This helps to prevent head crashes and to resolve other pierce related issues. The parameter is measured in seconds. (i.e. 0.6 seconds or 600 milliseconds)
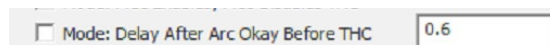
If you are using Anti-Dive correctly, you will most likely not need this delay function, but it may prove helpful when cutting very thin materials at high speed.

11. Selecting the RESET TMC3in1 Off Mode

While you are still in the *TMC3in1 Config* window: Reset Turns off the TMC3in1. This is typically the desired mode.

12. Selecting the Velocity Based Anti-Dive Mode

While you are still in the *TMC3in1 Config* window: This is the simplest Anti-dive mode, and a very good starting value to use is 97%.

This means that if the requested Feedrate is 100 ipm and the current velocity is less than 97 ipm, then there will be no THC Up and THC Down signals generated. While the current velocity is 97 ipm or greater, then THC Up and THC Down signals would be generated.
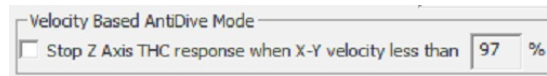
13. Selecting the Anti-Dive Mode based on Average Tip Volts Settings

While you are still in the *TMC3in1 Config* window: This is the more advanced Anti-dive mode. To select and use any of the Voltage Based Anti-Dive features, you must check this box.
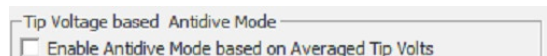
14. Selecting the ATV Data Points

While you are still in the *TMC3in1 Config* window: Using the ATV (Average Tip Volts) is a method of smoothing out short spikes in the Arc Voltage readings that can make the torch seem to dive unnecessarily. The "smoothing" takes an average of the rolling number of samples from 1 to 128, averages them and uses that number for the Arc Voltage sample. A smaller number (2 or more) will smooth very narrow spikes where a larger number (64 or more) will smooth wider spikes. Since the original sampling is performed hundreds of times a second, no significant response will be lost.


15. Selecting the % Change in ATV before Anti-Dive Engages

This number is the percentage change from the ATV number that must occur before the Anti-Dive action engages.

16. Selecting the % THC Response when ATV Anti-Dive is Active

This number (when less than 100), is the percentage of the X/Y motion that the Z axis will move when the ATV Anti-Dive is active. Look at it as THC Rate when Anti-Dive is active. Typically you would set this to 0.0 in order to prevent the tip from crashing.
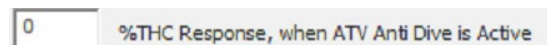

17. Selecting the Ceiling above the Target Volts to Disable THC

The "Ceiling" is a voltage level ABOVE the target volts that, when crossed, will disable the THC. For example, if the target voltage is 115v and the ceiling is 20v, then if a Tip Volts spike occurs that is 135v (115v + 20v) then the THC will become inactive until the Tip Volts comes below the 135v level, then THC will be active again.

18. Selecting the Floor below the Target Volts to Disable THC

The "Floor" is a voltage level BELOW the target volts that, when crossed, will disable the THC. For example, if the target voltage is 115v and the floor is 20v, then if a Tip Volts instantaneous drop occurs that is 95v (115v - 20v) then the THC will become inactive until the Tip Volts comes back above the 95v level, then THC will be active again.
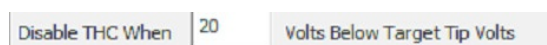
19. Open Logs

The "Open Logs" button is used to open the folder (specified by the path in the box to the right of the button) that contains the logs for the operation of the THC during a Mach3 run. Though the log is in an Excel "csv" format, it is difficult to examine by the normal user. Special Analyzing software is used by the support people (either the OEM manufacturer or Texas MicroCircuits) to analyze the log and provide insight into any problems reported by the user. A log is produced from the time Arc Ok is acknowledged until the end of the g-code run or Stop has been pressed, even if there are no problems cutting. In the future, we expect the logs will give us predictive information about the operation so that potential problems can be trended before they happen.

Open Logs | C:\Mach3\TMC3in1\Logs\

20. Explanation of When Changes are Stored and When they are not

Though the explanation below may be obvious to some, a little more detail will help. When the THC Config screen is invoked by pressing the "THC CFG" button below the "THC On/Off" button on the Mach3 screen, any changes will ONLY be used for that invocation of Mach3. Once Mach3 is closed, those changes will disappear.

However, is the THC Config screen is invoked via the Mach3 Menu->Config->Config Plugins->TMC3in1 CONFIG selection; any changes will be stored to the profile (XML) and will be available next time Mach3 is started.

'Cancel' will discard all changes. 'OK' will use the changes right away.
Changes will NOT be saved to the XML. To save changes to the XML
use: Menu -> Config -> Config Plugins ->TMC3in1 CONFIG

TMC3in1 Monitor Screen

The TMC3in1 Monitor Screen is invoked by pressing the "Monitor" button on the Mach3 screen just below the "THC CFG" button. The screen above will pop up. This screen gives more data to the user when Mach3 is in operation.

a. **TMC3in1 Status Indicator** - This is a multipurpose LED, with the following color codes:

- Black - No Communications are present with the TMC3in1

- Red - The voltage is currently Overlimit

- Yellow - The Input TIp Voltage is Reversed

- Green - The TMC3in1 is 'Active' and communicating properly with none of the above exceptions.

b. **THC Active** - This is Green when THC (Torch Height Control) is allowed, and Grey when THC is not allowed by the TMC3in1.

c. **Torch On** - Black when the Torch relay is Off and Green when the Torch Relay is On

d. **Arc OK** - This indicator is Green when Arc Ok is received from the plasma cutter showing that the arc has transferred to the material being cut and Black otherwise.

e. **Up** - This indicator is Green when the command to move the z axis Up has been issued. If there is no THC Upward commanded movement, the indicator will be Grey. The commanded upward velocity is shown just to the right of the Up indicator. If this indicator flashes Red, then that means that the THC Z MAX value has been reached (or exceeded) on the Screenset.

f. **Down** - This indicator is Green when the command to move the z axis Down has been issued. If there is no THC downward commanded movement, the indicator will be Grey. The commanded downward velocity is shown just to the right of the Down indicator. If this indicator flashes Red, then that means that the THC Z MIN value has been reached (or exceeded) on the Screenset.

g. **Actual Tip Volts** - This is the calculated Tip Voltage being measured by the TMC3in1.

h. **Actual Tip Counts** - This is the raw numerical Tip Voltage being measured by the TMC3in1 (used for debugging).

i. **Mode M11/M10** - When Green, M11/M10 mode is enabled, but THC is allowed. When Yellow, M10 is actively inhibiting the THC on the TMC3in1.

j. **Mode Delay After Arc Ok** - When Green, Delay After Arc Ok mode is enabled, but THC is allowed. When Yellow, the commanded length of delay after an Arc Okay is actively inhibiting the THC on the TMC3in1.

k. **Mode Velocity Based AntiDive** - When Green, Velocity Based Antidive Mode is enabled, but THC is allowed. When Yellow, the X-Y velocity is below the specified percentage of the commanded feedrate and is actively inhibiting the THC on the TMC3in1.

l. **Mode Voltage Based AntiDive** - When Green, Voltage Based Antidive Mode is enabled, but THC is allowed. When Yellow, the settings are causing the TMC3in1 to actively inhibit THC.

m. **Advanced Monitor Button** - This opens the advanced monitor window, which is only needed for advanced support reasons.

SheetCam Post Processor Setup

This guide will not go into full detail of how to use SheetCam. For more information please see the SheetCam Manual (https://www.sheetcam.com/Download/SheetCam%20TNG%20Manual_A4.pdf)
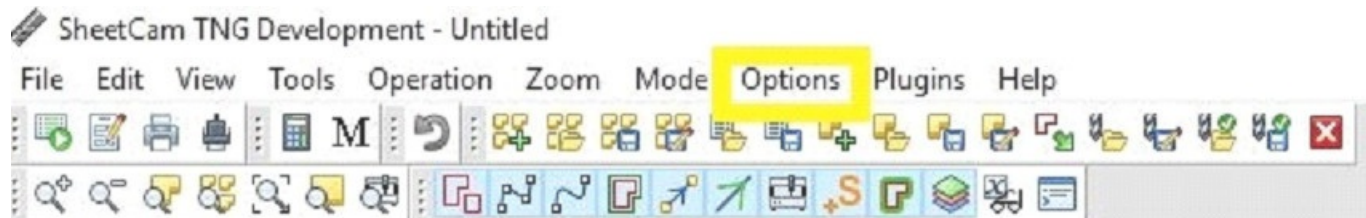
To select the correct SheetCam Post Processor, click "Options" and select "Machine."
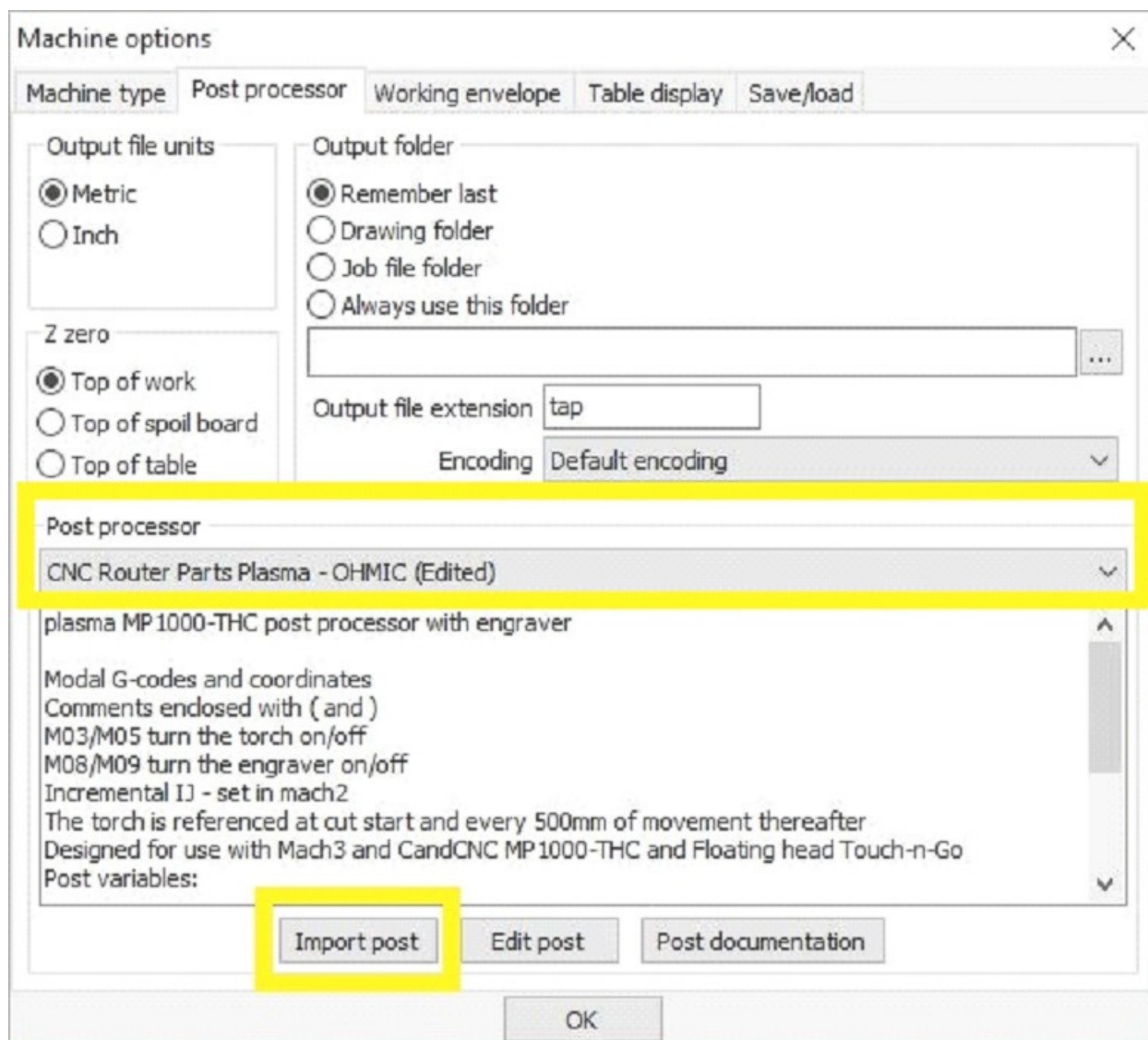
Navigate to the "Post Processor" tab. Click the "Import post" button and navigate to the location of the CNC Router Parts Post Processor file which can be downloaded from the CNC Router Parts plasma documentation page. Select the CNC Router Parts Post Processor you would like to use from the indicated drop down menu.

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& Usage Guide