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# Soigeneris STDR-4C

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4-Axis Stepper Motor  
Drive System

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Users Manual V1.5

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## A word about safety

We at Soigenetis take pride in providing high quality components for small scale CNC systems. While we make every effort to provide in depth and accurate technical information we cannot make any guarantees about their applicability to your particular application. In reality the only person who can keep you safe is you. We strongly suggest that you avail yourself of all the information available for the components you're putting into your CNC system and understand how they will all interact.

This STDR-4C stepper control system has an Emergency Stop (E-Stop) switch built into it. It should be positioned such that the E-Stop switch can be quickly depressed in an emergency situation without the need to reach past any moving part of the CNC machine.

## Safety Tips

- The STDR-4C will automatically power the spindle when commanded to by your controller (Mach 3). However, it is best to also have a manual interlock switch in-line with your spindle motor to ensure that the spindle cannot accidentally be turned on when you are changing bits.
- Secure all stock to prevent it from becoming a projectile during machining. Nothing can ruin your day faster than having a piece of metal being hurled at you by your machine tool.

## Conventions used

-  Indicates a note for parallel port users.

## Introduction

The Soigeneris STDR-4C stepper drive is a compact, full featured 4-axis stepper drive system. The product of intensive research and development, it is built with a selection of carefully chosen components. The case, which measures about 10" x 10" x 4", houses a Gecko G540 stepper drive with built in optical isolation and a reliable 320W, 48V, MeanWell power supply. A mounting location is provided to seamlessly integrate the Warp9 SmoothStepper motion control board with the Ethernet/USB and Port 2 connections brought out to the rear panel. External connectors are provided for limit switches, VFD spindle control, 110V AC for a spindle motor, and auxiliary relay contacts. There is still room in the case for mounting other components and the front panel was kept sparse to allow for customization with your own buttons and/or lamps or LEDs.

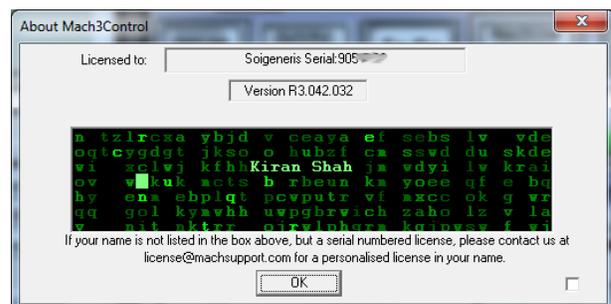
## Software Installation

Embedded links are provided for each downloadable file mentioned; they are also indexed in the appendix. All files can also be downloaded in one zip file from the Soigeneris website [here](#)<sup>1</sup>, please check the links given for any updated files.

We recommend using the version of Mach 3 provided in this file set. We take great care to provide the versions of Mach and the SmoothStepper plug-ins that work best together. For future reference you can look for the latest version of Mach 3 [here](#)<sup>2</sup>. We also recommend using a dedicated PC to control your machine. Follow the standard installation instructions for Mach which can be found [here](#)<sup>3</sup>. When using the SmoothStepper you do not need to install Mach's parallel port driver. Be sure to reboot after the installation is complete.

-  If using the parallel port for control please follow the Mach optimization steps as needed. The Mach optimization guide can be downloaded [here](#)<sup>4</sup>.

Note: Copy your Mach license file and paste it into C:\Mach3. Start Mach and click on Help->About for the dialog box shown here. If you purchased your Mach3 license from Soigeneris or another dealer the dealer's name and a license serial number may be shown. You can email [license@machsupport.com](mailto:license@machsupport.com) to have the license personalized. If you see something else please contact your dealer and the email address above to conform you have a legitimate license.



To allow Mach 3 to recognize and use the SmoothStepper you will need to the SmoothStepper driver and Mach 3 plug-in. The driver and plug-in can be downloaded from Warp9 [here](#)<sup>5</sup> and it is included in the STDR-4C file set. We suggest using the plug-in and driver versions which are included in the file set. Unzip the files, I like to copy them into a new folder named 'SmoothStepper', and copy them to my desktop. Now plug in the USB cable between the STDR-4C and your PC, and then make sure the E-Stop button is pushed in on the STDR-4C and turn on the power switch. When the power switch is turned on the SmoothStepper will be powered up but the E-Stop switch being presses in keeps power removed from the motors.

When prompted by the 'Found New Hardware' wizard choose the 'Have Disk' option and browse to the driver file you downloaded and select the '\*.inf' file. After the driver has installed double click on the plug-in file and it will be installed into the Mach plug-in folder. Please note that after the plug-in installs it will erase the .m3p file.

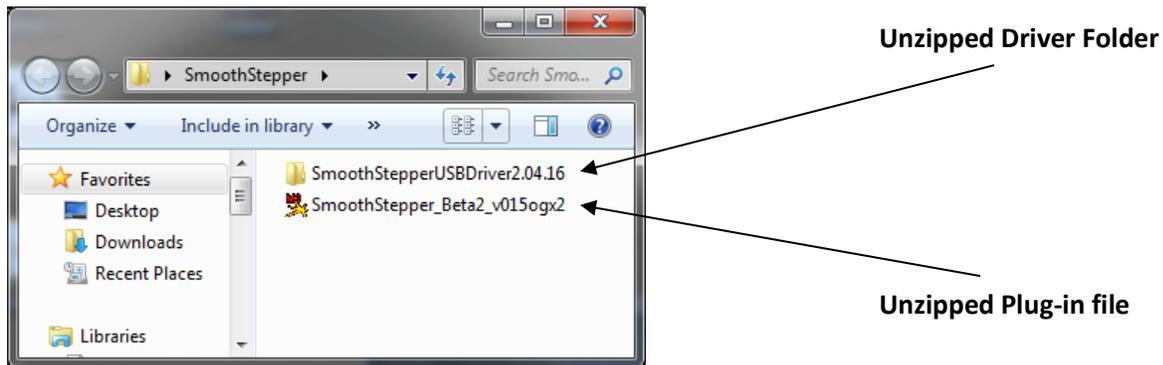


Figure 1

On Windows 7, you will be told that the driver cannot be found. To install the driver you will need to use Device Manager. The easiest way to launch Device Manager is to right click on 'My Computer' or 'Computer' (depending on your OS) and select 'Manage'. You can find 'My Computer' or 'Computer' either on your desktop, by clicking on the Start Menu icon or by pressing the Windows key. This will bring up the 'Computer Management' console from which you can select 'Device Manager'. See Figure 2 below.

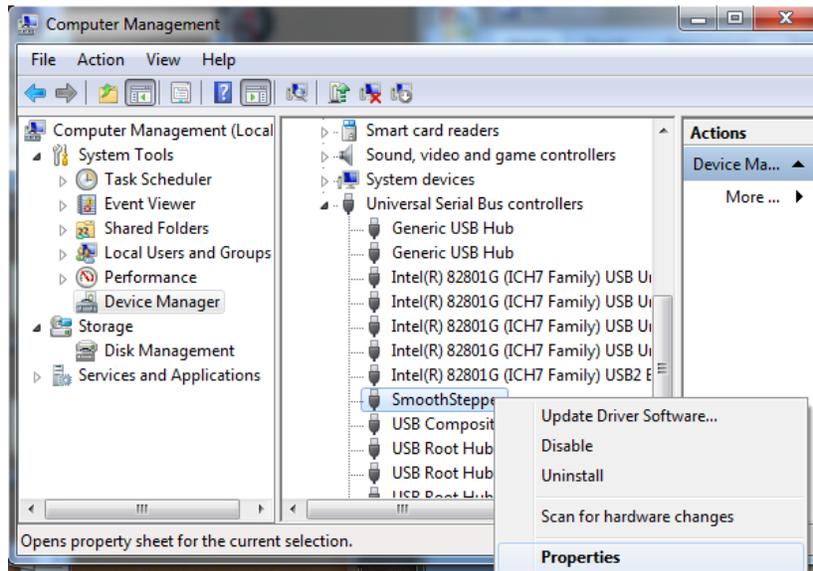


Figure 2

Expand the USB section in Device Manager and then right click on the 'SmoothStepper' entry and select 'Properties' as shown above. The 'SmoothStepper Properties' window will popup, from this window select the 'Driver' tab and then the 'Update Driver' button as shown in Figure 3.

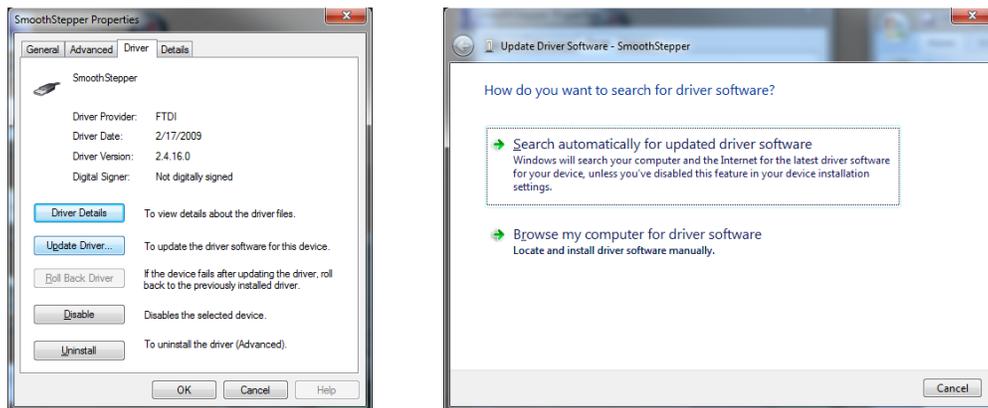


Figure 3

We want to choose the 'manual' option for updating the driver by selecting the 'Browse my computer...' option. Navigate to SmoothStepperUSBDriver2.08.24 folder and select the '\*.inf' file and then Click OK. See Figure 4 below.

Finally, click the 'Next' button to install the updated driver. If you get a screen that says 'This driver cannot be verified...' go ahead and select OK to continue.

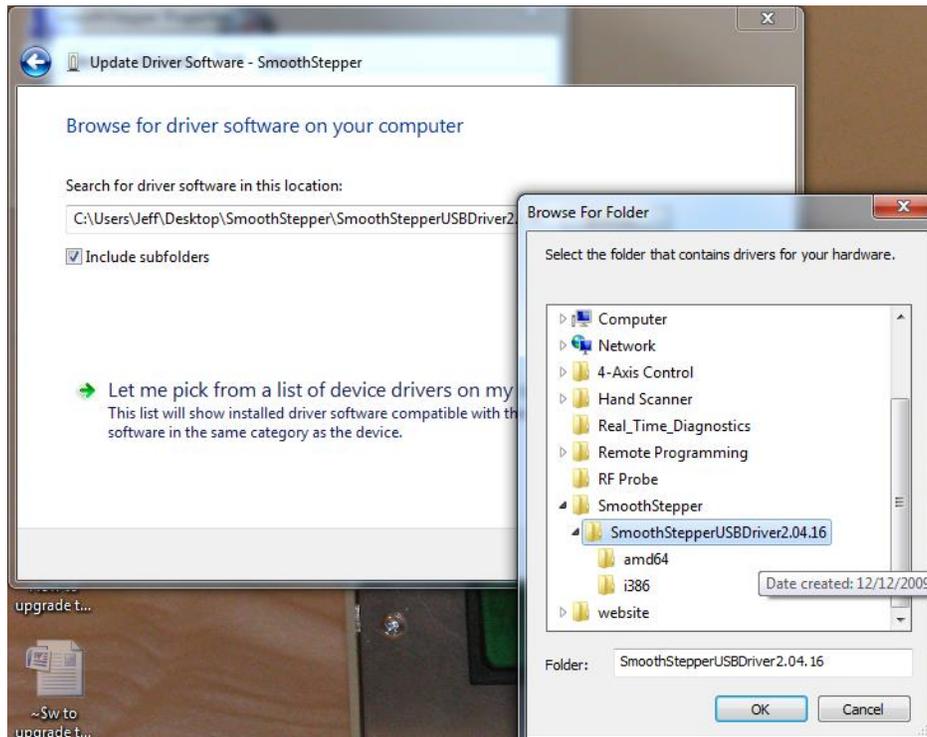


Figure 4

One other thing that needs done it to tell Window's that it cannot remove power from your USB ports. For Windows XP or Vista you do this by using 'Device Manager'. The easiest way to get to 'Device Manager' is to right click on 'My Computer' (or 'Computer' in Vista), and select 'Manage'. This will open the 'Computer Management' console. Select the 'Device Manager' from the list on the left hand side and then expand the 'Universal Serial Bus controllers' section. See Figure 5 below.

**NOTE: For Ethernet SmoothStepper systems please refer to the separate document "Installing\_and\_Configuring\_the\_Ethernet\_SmoothStepper.pdf" for directions. You can skip the USB section of this manual.**

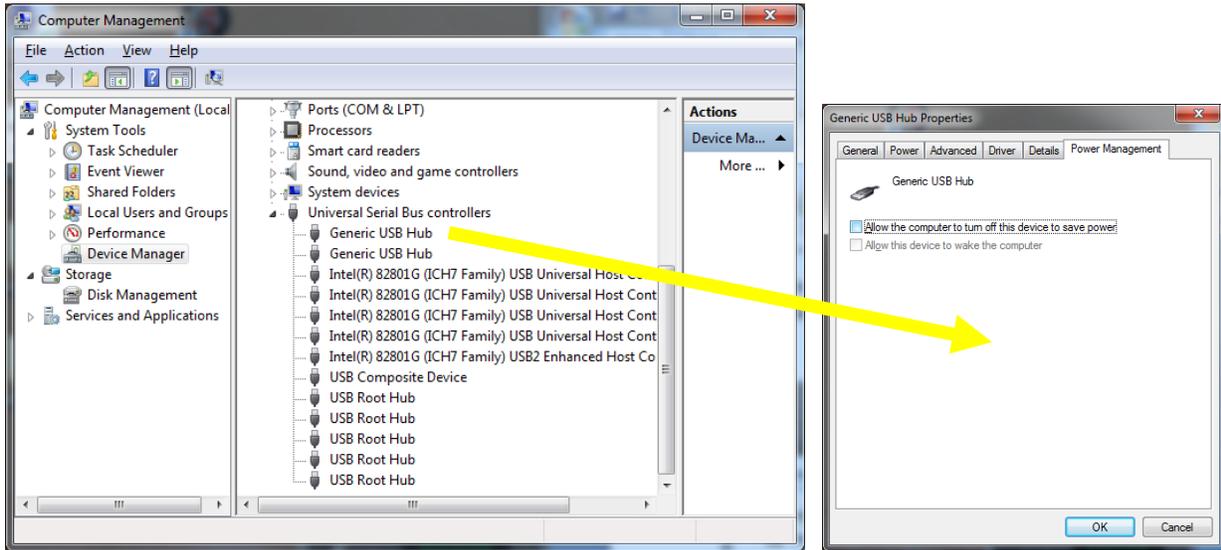


Figure 5

Right click on each entry in the list and select 'Properties' and look for a 'Power Management' tab. Click on the 'Power management' tab and unselect the 'Allow the computer to turn off this device to save power' box. This will keep your SmoothStepper powered up all times and prevent problems.

On Windows 7 you do all of this through the power settings. Open up the Control Panel and type "Power Options" in the search bar as shown in Figure 6. Then select Change power savings settings.

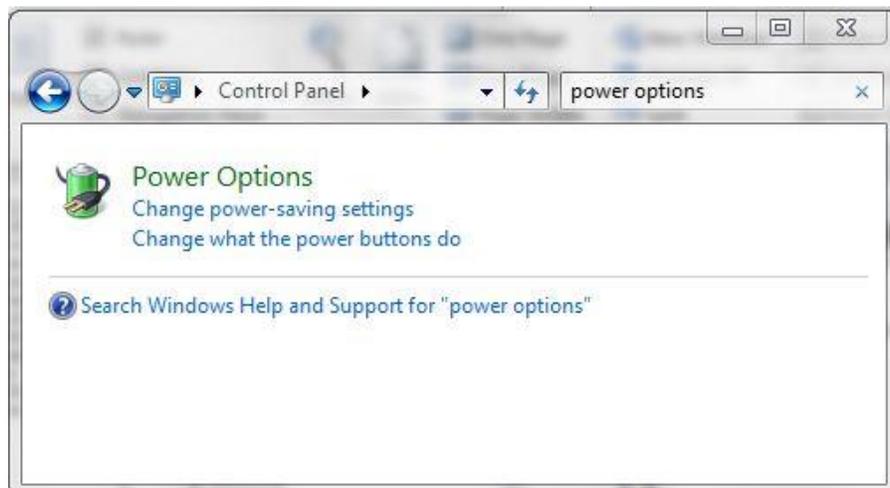


Figure 6

You will see the screen shown in Figure 7. Click 'Show additional plans' and select the High Performance plan then click on Change plan settings.

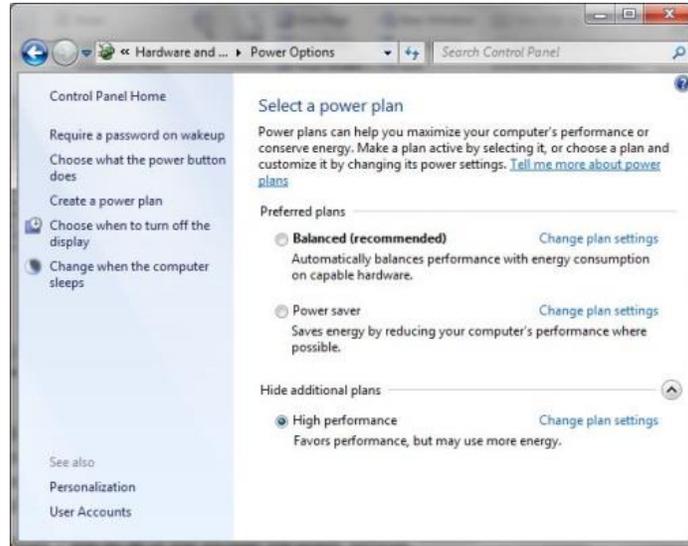
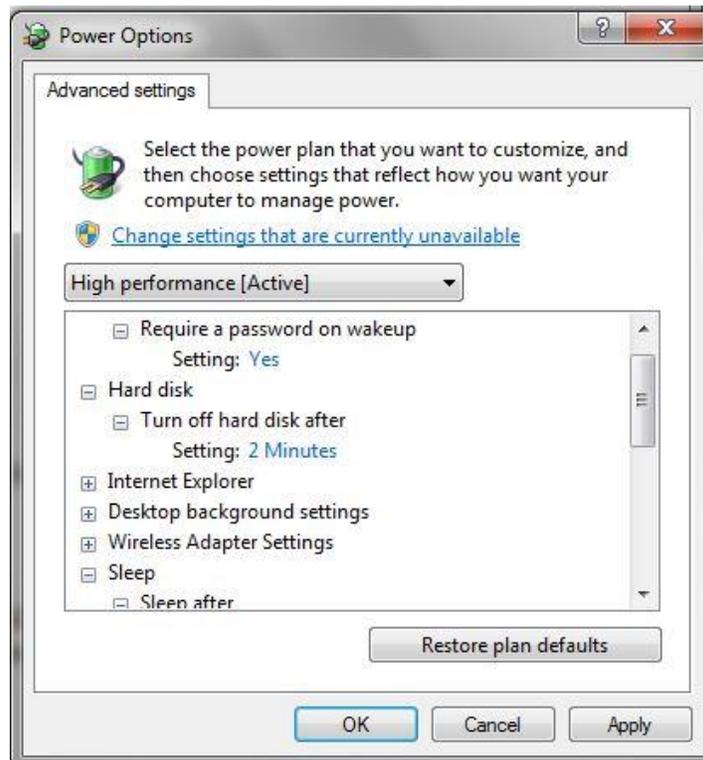
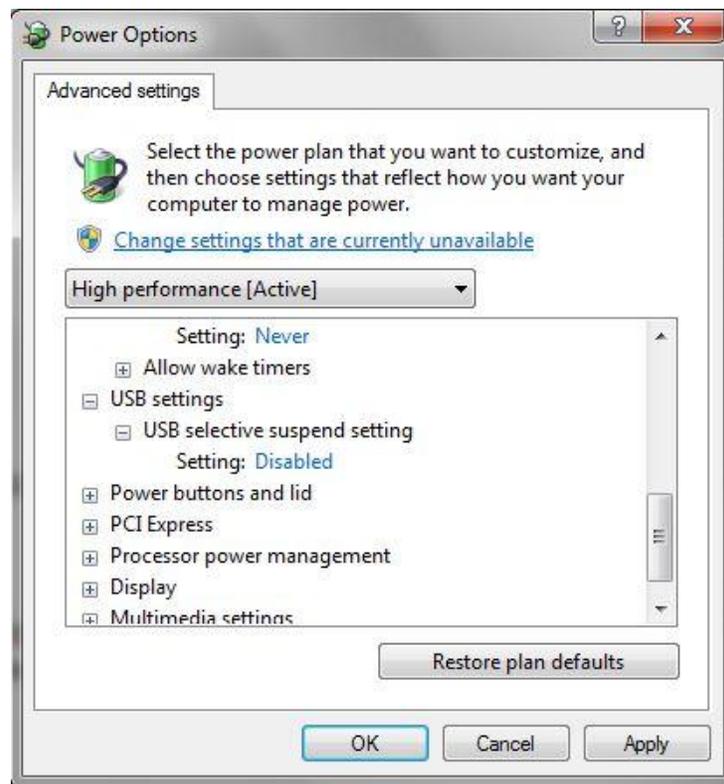
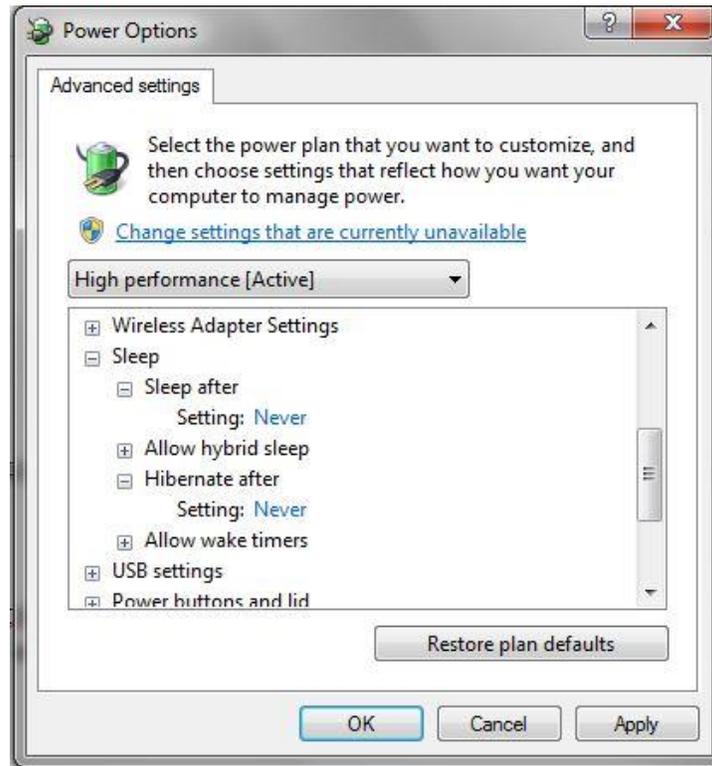


Figure 7

Go through the advanced options and make sure things are set as follows, and then click 'Apply'.





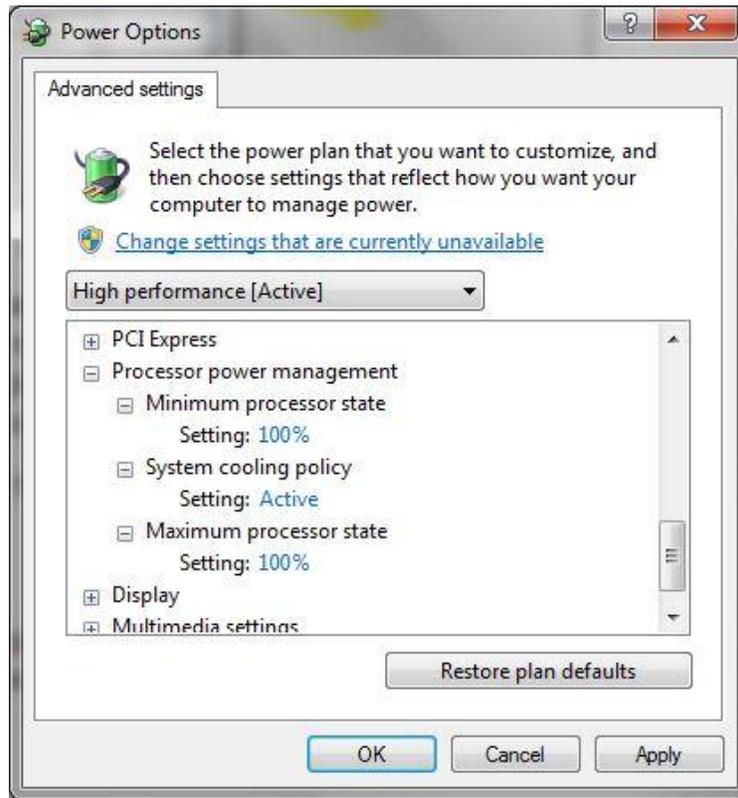


Figure 8

To use the SmoothStepper with Mach 3 you need tell Mach to use it as the motion control device. Since Mach saves all your settings in 'Profiles' you just need to create or modify a profile. We have created a custom profile for Mach 3 that has the settings needed for the STDR-4C. Copy the 'STDR-4C\_USB.xml' file from the file set provided and save it to your Mach installation directory. If you're curious we created this by using the standard G540 profile and resetting the motion control device to the SmoothStepper.

Note: There is also a profile included for use with the Taig mill. If you are using a Taig mill please use the "STDR-4C\_Taig.xml" file.

-  If using the parallel port for control please use the 'STDR-4C\_LPT.xml'.

If you are retrofitting an existing machine you can use Mach Loader to clone your existing profile. Use Mach Loader to start up Mach with your newly cloned profile and then click on the Function Cfg's menu and select 'Reset Dev Sel...'. Now, shut down

Mach and restart using your new profile. When Mach starts it will ask you to choose a motion control device, select the SmoothStepper. REMEMBER – you will have to change the 'Ports&Pins' settings and select the 'Keep Charge Pump on during E-Stop' check box in 'General Config' screen to match the G540.

Please refer to the Gecko 540 manual for instructions on wiring up the stepper motors. For your convenience the pin out page is included in this manual as well.

## Hardware Installation

The STDR-4C should be mounted in a location where chips from the machining process cannot fall into the vented case. The unit draws cool air in through the bottom vents and warm air is exhausted through the top vents. Care should be taken to not block the vents and provide adequate airflow to and from the case.

The STDR-4C only requires a USB cable to connect it to your PC. It is best to use as short a cable as possible. We carry cables of various lengths for your convenience.

-  *If you are using the parallel port you will need a straight through parallel port cable. It is best to use as short a cable as possible. We carry various lengths of parallel cables for your convenience.*

Install the stepper motors on your machine, connect the stepper extension cables, plug all of the extension cables into the G540 and secure with the connectors screws. NOTE – Never plug or unplug a stepper motor while the drive is powered. Serious damage to the G540 could result.

If you are employing limit switches you can wire them to the included DE9 connector which plugs into the rear panel of the STDR-4C.

The AC spindle output port can be used with the cable provided to power a small spindle motor (0.25 HP or less). For a larger motor you can use this output to drive an appropriate 110V relay. It is highly recommended that a line filter be used to prevent electrical noise generated by spindle motors and/or coolant pump motors. Soigeneris offers 10A line filters [here](#)<sup>6</sup>. The AC spindle output is triggered by Output 1.

The auxiliary relay contacts are rated for up to 10 amps AC. The auxiliary relay contacts are triggered by Output 2.

## Use



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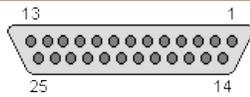
To use the STDR-4C plug make sure you have all cables plugged in securely and then flip the power switch to 'ON'. The power switch will illuminate when power is on. The red E-Stop removes power to the DC power supply and the spindle output. This will also cause Mach to go into E-Stop mode. To release the E-Stop simply twist the knob clockwise. Next press the Reset button in Mach to the put drive put in run mode.

Please refer to the Mach 3 user's [guide](#)<sup>3</sup> for instructions on using Mach 3.

## The Rear Panel

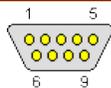


### 1 SmoothStepper Port 2 DB25



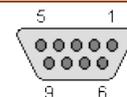
Pins 1:	Outputs
Pins 2-9:	Inputs or Outputs
Pins 10-13 & 15:	Inputs
Pins 14, 16 & 17:	Outputs
Pins 18-25:	DC Common (Gnd)

### 2 Limit Switch Connector (Male)



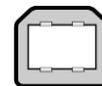
Pin	G540 Pin	Function
1	1	Input 1 (X)
2	2	Input 2 (Y)
3	3	Input 3 (Z)
4	4	Input 4 (A)
5		+12V @300ma
6-9		DC Common

### 3 VFD Connector (Female)



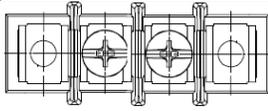
Pin	G540 Pin	Function
1	9	+10VDC
2	8	VFD Out
3	7	DC Common
4-9		open

### 4 USB Connector



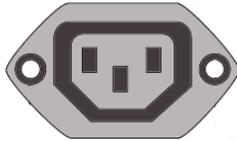
USB 'B' Style connector connects SmoothStepper to PC. Use as short a cable as possible

## 5 Auxiliary Relay



Pin	Function
1	Relay contact 1
2	Relay Contact 2

## 6 Spindle Output



5A max

6' cord included

It is recommended that a line filter be use on all AC motors or other electrically noisy loads.

## 7 AC In

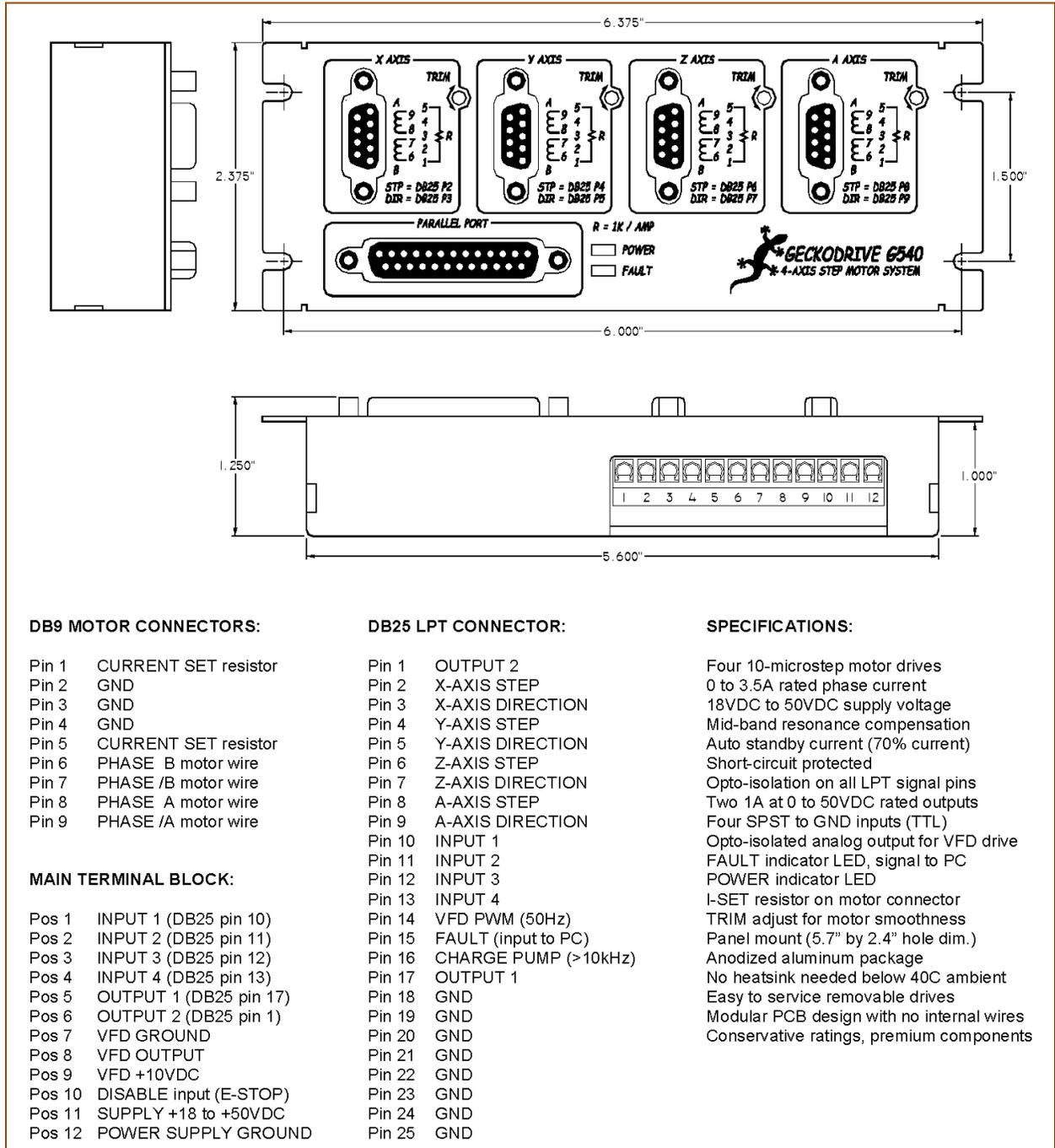


10A Max

6' Cord Included

It is recommended that a dedicated outlet be used to power your control and CNC machine.

## 8 The Gecko G540





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#### Links

- 1) [http://www.soigenetis.com/document/STDR-4C\\_File\\_Set.zip](http://www.soigenetis.com/document/STDR-4C_File_Set.zip)
- 2) <http://www.soigenetis.com/Document/Mach3Version3.042.040.exe>
- 3) [http://www.soigenetis.com/Document/Mach3Mill\\_Install\\_Config.pdf](http://www.soigenetis.com/Document/Mach3Mill_Install_Config.pdf)
- 4) [http://www.machsupport.com/downloads/XP\\_Optimization.txt](http://www.machsupport.com/downloads/XP_Optimization.txt)
- 5) <http://warp9td.com/downloads.htm>
- 6) [http://www.soigenetis.com/10A\\_Line\\_Filter\\_Kit-details.aspx](http://www.soigenetis.com/10A_Line_Filter_Kit-details.aspx)