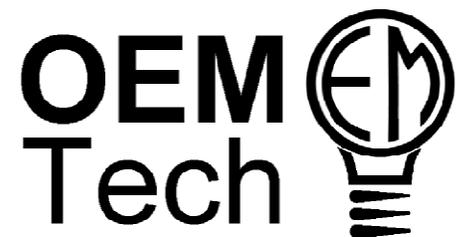


# NcPod

User Manual v2.0



Prepared by: Josh Mitchell  
of  
CORE CNC  
[www.corecnc.com](http://www.corecnc.com)

## Table of Contents

1. Description
2. Pinout
3. Common Connections
4. Mach Interfacing
5. Common Questions
6. Troubleshooting
7. Script example for Z zero
8. Printable Mounting Template

**NOTE:** Although this manual details the NcPod independently, it is written assuming you will interface with Mach CNC control software available from ArtSoft at [www.machsupport.com](http://www.machsupport.com).

**NOTE:** Before you contact either ArtSoft or OEMTech for support, please read this manual. Most of the common issues users have are addressed here. If you are having trouble you should look at the “Common Questions” and “Troubleshooting” sections of this manual.

**NOTE:** If you see an \*\*\* it means that at the time we could not verify functionality or more info was needed. When we receive the necessary information, an updated document will be released.

**NOTE:** Some of the final release NcPod’s are mislabeled on the first row of motor outputs. If you have an NcPod with a sticker of the serial number over the A X Y row label and/or the connectors are back to back, you must follow the connection configuration in this manual regardless of labeling.

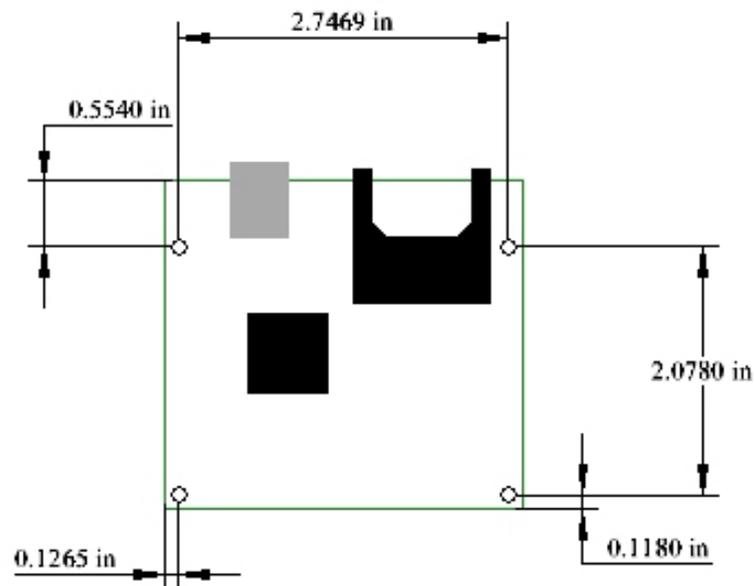
## Section 1: Description

The NcPod is a high performance yet affordable 6 axis motion controller designed to interface you computer to drivers/motors, switches, probes, speed controllers, relays and more.

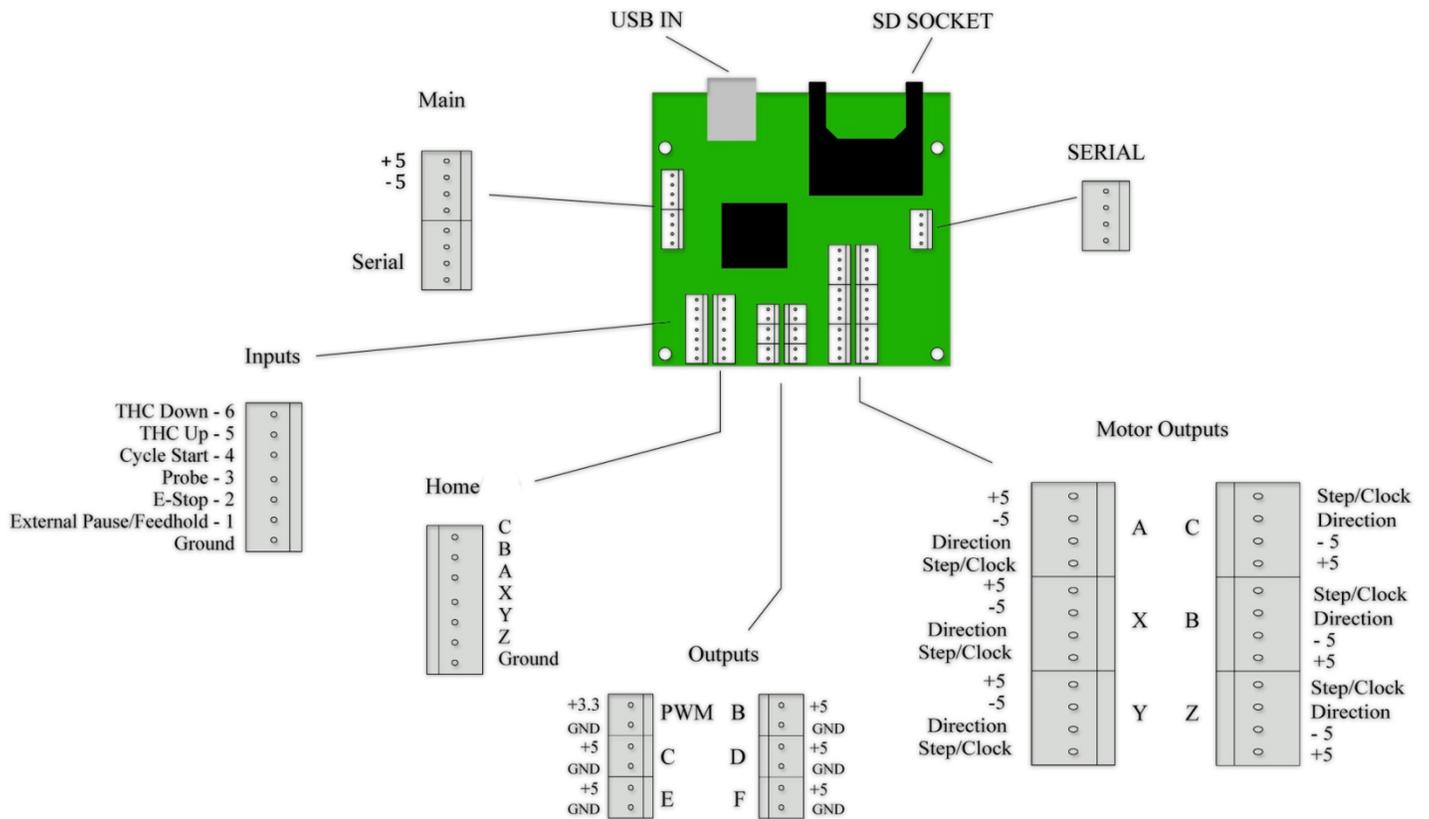
The NcPod's standard hardware features are;

- USB 2.0 Com Interface
- Supports Common Positive or Common Negative Drivers
- 6 Axis Step/Direction Output
- 5 General Purpose Outputs
- 1 PWM Output for Spindle Speed Control
- 6 Home Inputs
- 6 General Purpose Inputs
- Status LED's
- Up to 75000 Steps/Second
- Individual MTA Connectors for each axis (+5v, Gnd, Step, Dir) and Output (Gnd, +5v)
- Small Size (2.75 x 3.00 inches).
- Complete Part Files stored on inexpensive Secure Digital media (**currently not sported by Mach software**)
- Part is completed even if host computer loses communications (**currently not sported by Mach software**)
- Capable of supporting any combination of Constant Vector Velocity, Continuous Motion Contouring, or High Speed Machining trajectories

Mounting Diagram



## Section 2: Pinout



**NOTE:** If you have an original beta version, the A, X and Y will be reversed (instead of +5, Gnd, D, S it will be S, D, Gnd, +5). The beta release had all connectors facing the same direction.

### Section 3: Common Connections

The NcPod uses MTA connector. You can use a very small screwdriver to push the wire into the connector as shown in figure 3.1 but the preferred method is to obtain an inexpensive tool from Mouser or Digikey as shown in figure 3.2.



**FIGURE 3.1 SCREWDRIVER METHOD**



**Figure 3.2 MTA 100 CONNECTOR TOOL**

It's been my experience that using either stranded or solid cat5 wire (with the outer bundle jacket removed) makes connecting to the NcPod a little easier; especially if you don't have access to the MTA tool.

***NOTE: A common pin header connector like those found on computer case LED's, single row type for ribbon cable of the same spacing and some PC fan style connectors will also work and are easy to obtain and build.***

When connecting the NcPod to Drivers such as the US Digital MD2S-P, you simply pick the appropriate axis and connect the motor output from it to the input on the driver. When using a driver such as Geckos, You will need to pick either the + or – from the axis voltage output that matches your version. For example, with a G202 you will connect only the positive; with a G340 you will connect the negative.

Please see below for a full connection example using Z zero (*you can a large download a high resolution version from [www.corecnc.com/podDiag.pdf](http://www.corecnc.com/podDiag.pdf)*).

USB 2.0  
to PC

5V  
1/2 Amp  
Supply

Aluminium  
Contact  
Plate

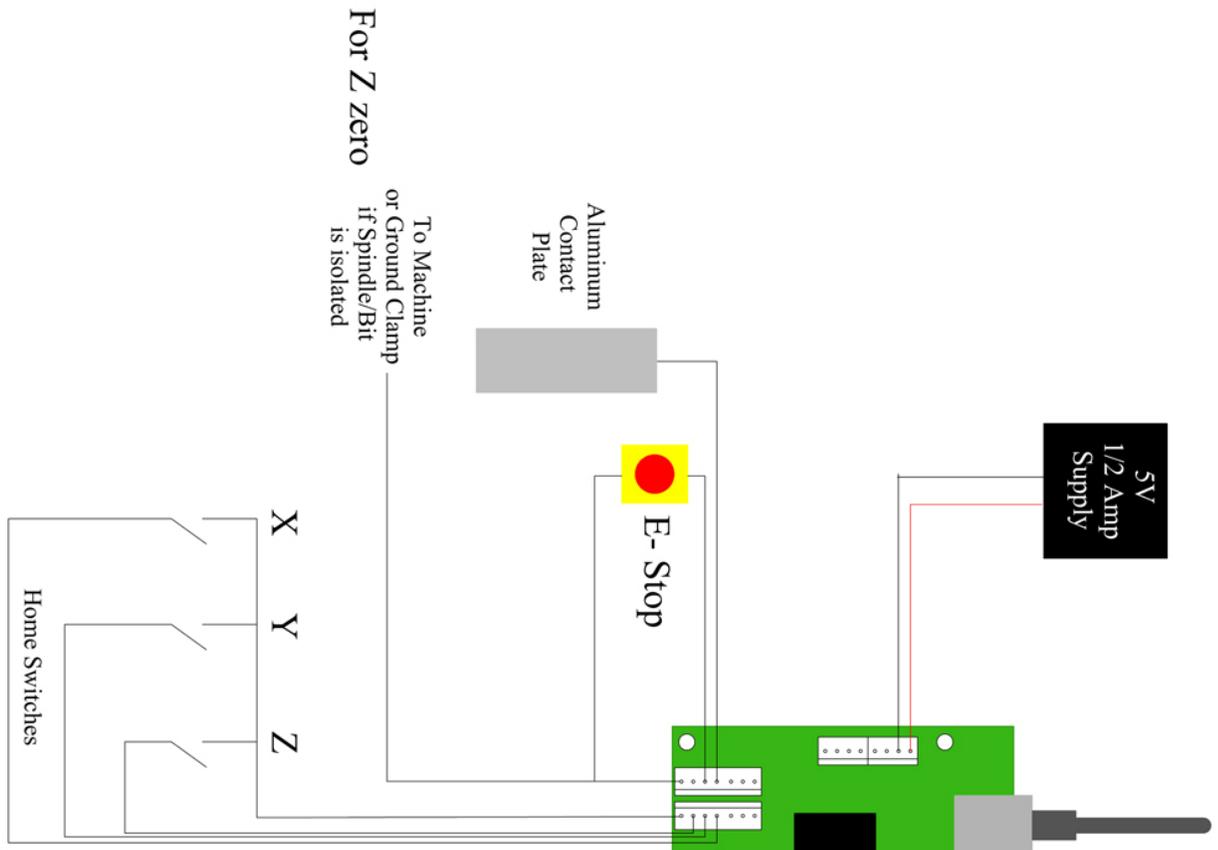
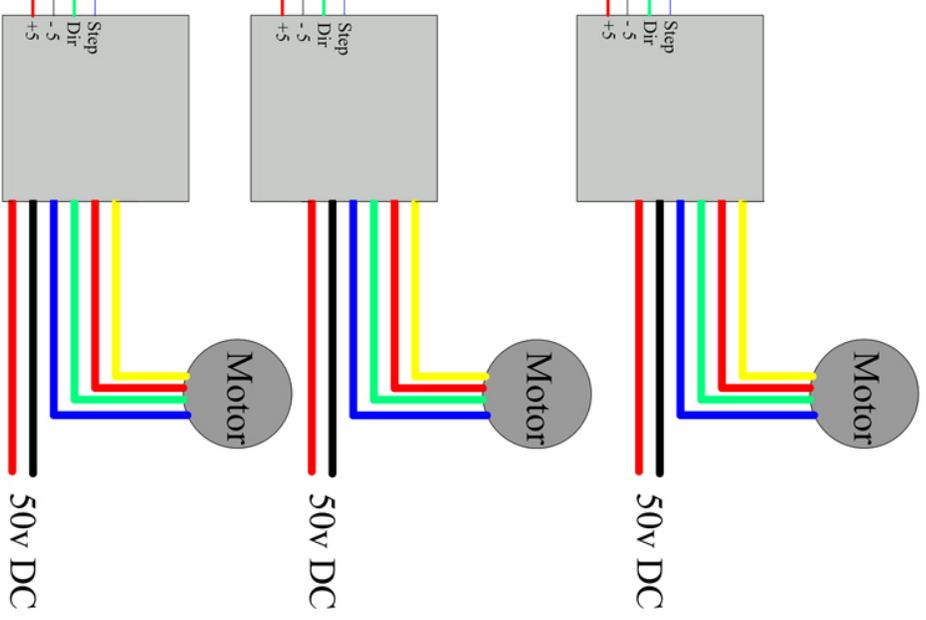
E-Stop

To Machine  
or Ground Clamp  
if Spindle/Bit  
is isolated

X  
Y  
Z

Home Switches

SD  
CARD



## Section 4: Mach Interfacing

Interfacing with mach will require you to download the driver and plug-in for the NcPod from [www.machsupport.com](http://www.machsupport.com). Make sure that you are also running the latest firmware for the NcPod from [www.oemtech.com](http://www.oemtech.com).

Under the “Ports and Pins” setup in Mach, you will need to make sure that you select “Port #1” on the IO’s you intend to use. The following will give you the proper pin setting for Mach.

(All of the pins will be described from looking at the top of the NcPod and the SD slot/USB port at the top as pictured in section 2 of this manual)

Input Pins (bottom right 6 pin connector)

NcPod	Mach Pin#
6 – THC Down ( <i>currently not enabled in Mach</i> )	NA
5 - THC Up ( <i>currently not enabled in Mach</i> )	NA
4 – Cycle Start ( <i>for standalone operation</i> )	NA
3 – Probe / Z zero	Pin 3
2 – Emergency Stop Button	Pin 2
1 - External Pulse/Feed-Hold (should not be used in Mach)	NA
GND – Ground	

Home (bottom and right of the input header)

6 – C	Handled By NcPod
5 – B	Handled By NcPod
4 – A	Handled By NcPod
3 – X	Handled By NcPod
2 – Y	Handled By NcPod
1 – Z	Handled By NcPod
GND	

Output (the 12 pins in blocks of 2 from left to right order – block 1-2, 3-4, 5-6)

Output	Mach Pin #
<b>PWM</b> <i>Gnd</i>	NA Just enable in Mach
<b>C</b> <i>Gnd</i>	***
<b>E</b> <i>Gnd</i>	1

Output	Mach Pin#
<b>B</b> <i>Gnd</i>	3
<b>D</b> <i>Gnd</i>	2
<b>F</b> <i>Gnd</i>	4

You can select any output/enable you like in the “Ports and Pins”, “Output Signals” menu and set the “Port#” to 1 with the “Pin Number” matching the output you wish to use. For example; if I want to use “F” as output # 3, from the main menu in Mach I would select “Config”, “Ports and Pins”, “Outputs” tab and check “Output #3. For the “Port#” setting I would enter “1” and for the “Pin Number” enter “4”.

## Section 5: Common Questions

**Q. Can I use the parallel output at the same time as the NcPod for additional IO or control?**

**A. No. Mach will not allow this. You can use Modbus though and the next version of the plug-in (above 1.0.0.1) may enable unused homes to be used as general inputs (depending on many factors). This manual will be modified to reflect that change if that happens.**

**Q. How do I reverse the direction of an Axis since the “Active Low” setting in Mach has no effect?**

**A. You simply go to “Homing and Limits” from the main menu and check “reversed” for the axis you want.**

**Q. Does the serial function?**

**A. Yes but it is not yet supported by Mach or the SDK – this is reserved for possible future use.**

**Q. Does the SD Card need to be present even though Mach doesn’t use it?**

**A. No. Older versions required it but now it isn’t necessary.**

**Q. Will Mach ever support the SD feature?**

**A. Possibly – you can check the Mach forums or support group for updated information**

**Q. Will TCH be enabled?**

**A. Once again, possibly.**

**Q. How do I use the PWM to control spindle speed. I only have an analog 0 to 10 V (or similar).**

**A. You can easily build or purchase a PWM to analog converter. They are inexpensive and work reliably. Try a Google for PWM to DC and/or PWM to Analog or go to <http://www.homanndesigns.com/> for a solution.**

**Q. I need limit switches, what can I do?**

**A. One of two things; you can get Modbus for additional I/O or in the next release of the plug-in (above 1.0.0.1), “home to limits” currently works and “limit to home” may be enabled once again depending on many factors.**

**Q. Is there a way to disable motor output for safety?**

**A. If you use a driver with a disable input such as the US Digital MD2S-P, you can use one of the outputs as an enable trigger under ‘Ports and Pins’, “Outputs”. You may have to toggle “Active low” depending on the driver.**

## Section 6: Troubleshooting

Problem	Possible Solution
Motors not working	<p>Check header connections</p> <p>Insure motor is connected properly</p> <p>Make sure Mach is configured properly</p>

Input or output not working	<p>Check connection</p> <p>Check Mach Port and Pin configuration</p> <p>Reboot NcPod and Mach</p>
-----------------------------	---

Problem	Possible Solution
Motor only spins in one direction no matter what direction I tell it to move	<p>Check that connection to Step, Dir and power are making full contact</p> <p>Check Mach configuration</p>

<p>Mach doesn't detect my NcPod</p> <p>Or</p> <p>I lost communication with the Pod and Mach won't reset →</p>	<p>Make sure you have installed the driver, plug-in and installed the latest firmware</p> <p>Make sure the NcPod is powered on</p> <p>Reboot Mach</p>
---	---

## Section 7: Script Example for Z zero

To use simply open Mach and click "Operator", "Edit Button Script" and click "Auto Tool Zero" Button. When the VB Editor appears simply paste the contents below into your editor, save and close.

```
'AUTOMATIC Z ZERO
```

```
'By: Josh Mitchell - www.corecnc.com
```

```
Zmov = -10.5 'Max Z travel looking for contact - edit for proper value
```

```
Zpos = GetDRO(2) 'Gets the current Z position
```

```
Zplate = .1253 'Sets your plate thickness - edit for proper value
```

```
HomePos= 1.253 'Sets your home position - edit for proper value
```

```
ZOffset = GetVar (1000) 'Gets current Z offset amount
```

```
PngRte = 100 'Sets your plunge rate
```

```
SafePnt = -7.54 'Sets your Error point – edit for proper value
```

```
If Zpos < SafePnt Then
```

```
SetDRO(2,0)
```

```
Response = MsgBox ("Reset you Z to 0 because the DRO said it was more than the Z you have", 0, "Reset")
```

```
End If
```

```
code "g 20 g31 z" & Zmov & "f" & PngRte
```

```
code "g4 p1"
```

```
While IsMoving()
```

```
Wend
```

```
Zpos2=GetDRO(2)
```

```
If Zpos2 < SafePnt Then
```

```
Response = MsgBox ("There was no contact with the Z-zero plate - Please check your settings and try again", 0, "Error!")
```

```
Stop
```

```
End If
```

```
code "G4 p0.5"
```

```
code "G92Z" & Zplate
```

```
code"g90 g00 z" & HomePos & "f200"
```

```
Response = MsgBox ("Your Z is zeroed from a " & Zplate & " thick plate", 0, "OK")
```

```
End
```

# Printable Mounting Template

**Be sure to print at 100%, no scaling!**

