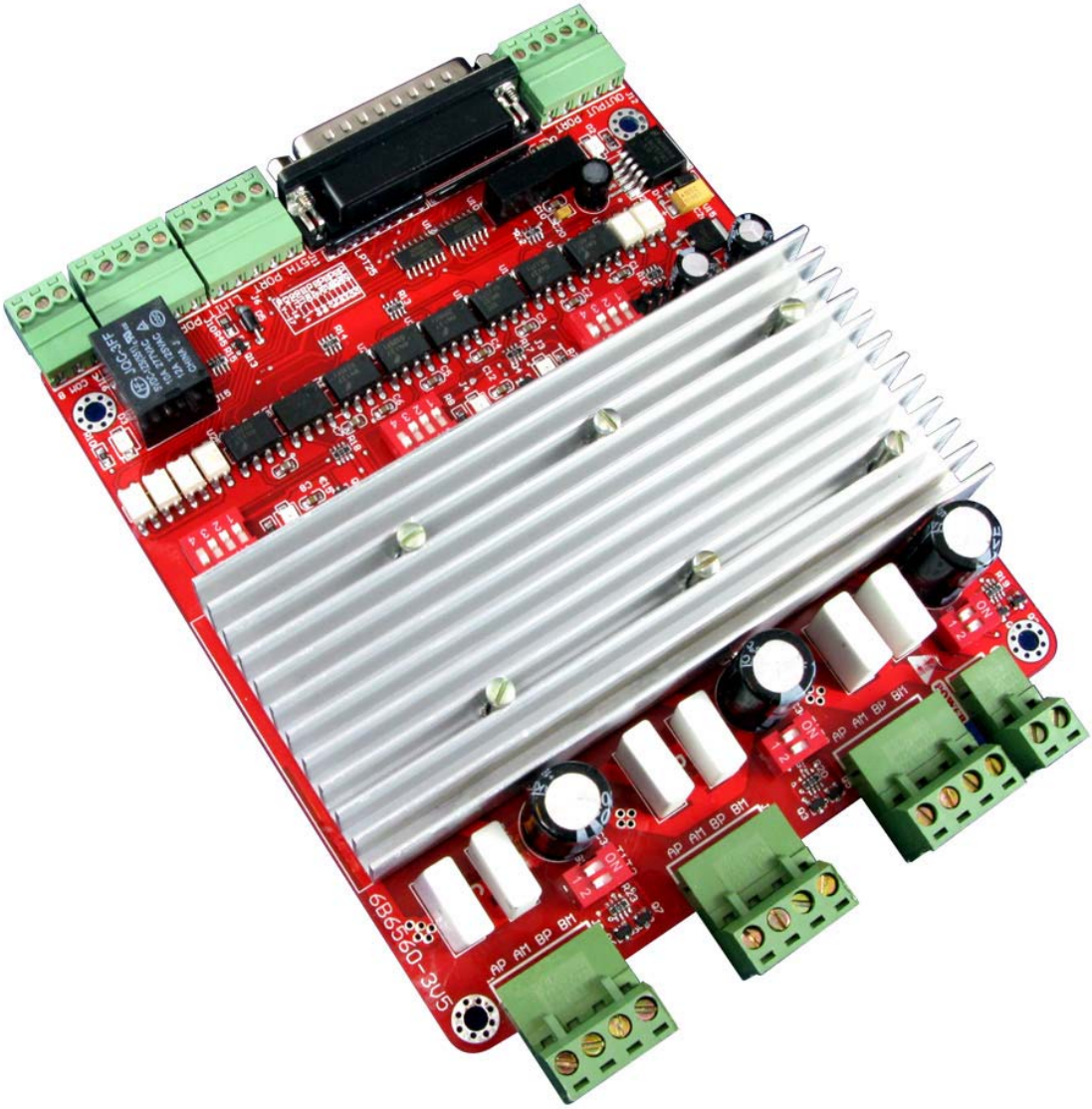
3-Axis Stepping Motor Driver

(Model:TB6560T3V1) Rev1.5 2/23/2010



by

Marco K. Wong

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The TB6560T3V1 is a high performance 3 Axis (X,Y,Z) CNC stepping motor controller/driver. It built-in a spindle relay and all input/output are optical isolated from the external circuit that providing 'noise' free environment. The card support Mach2, Mach3, KCam, EMC2. It can be applied to a CNC machine or upgrade an old CNC machine with this card to take advantage of new technology. It works well for a CO2 laser machine to do cutting (software dependable)

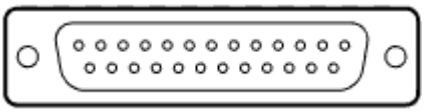
Features:

* Optical isolation for data In/Out
* Relay control for spindle (or laser)
* Four step speed setting
* High current output 3A in average
* Big Heat sink support without heat concern.

Specification:

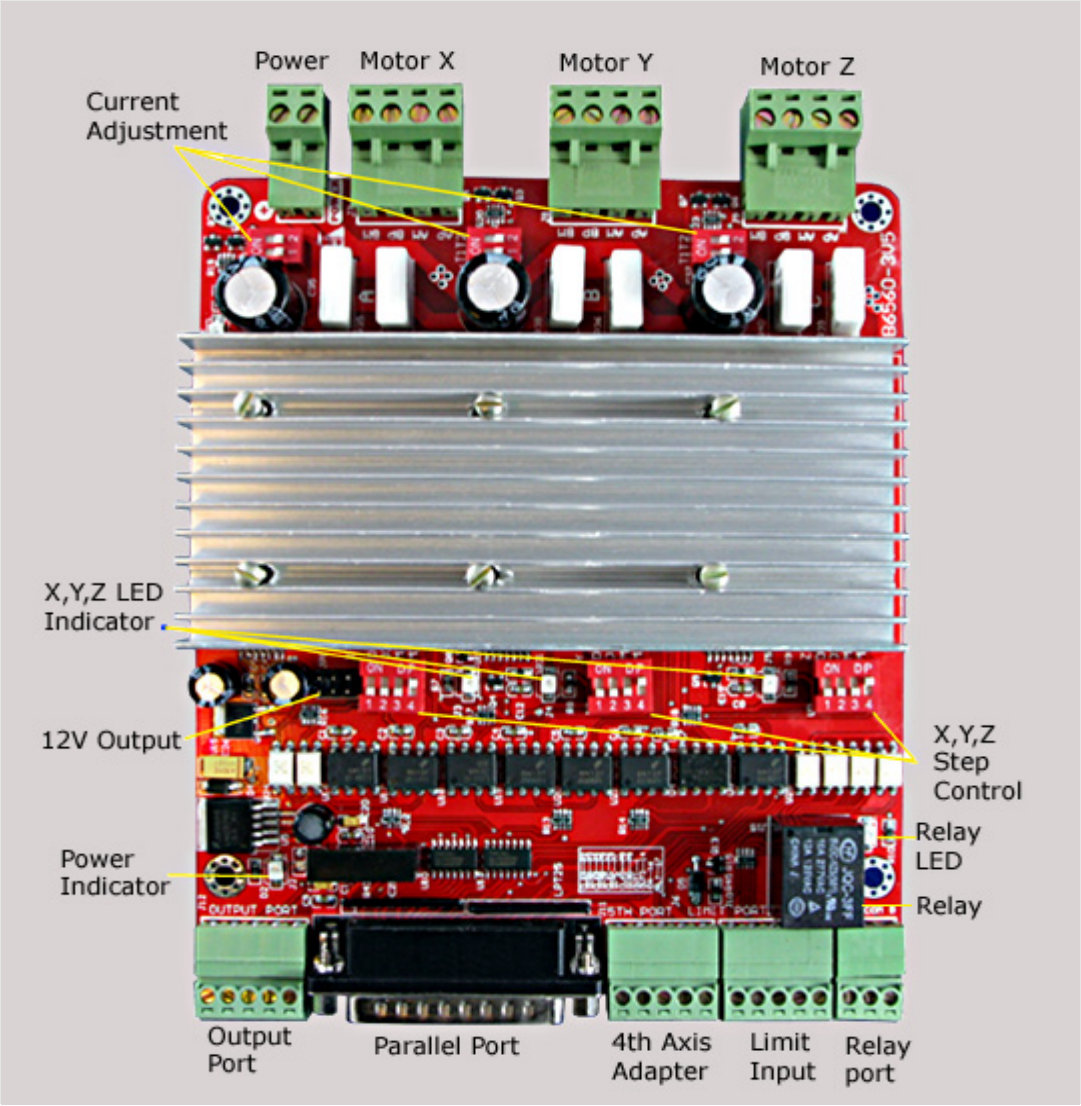
* In/Out Interface port: Parallel
* Built in relay control for spindle
* Support 2/4 phases 4, 6, 8 wires stepping motor
* High speed optical isolation coupling
* Built in No. 4 Axis interface for expansion
* LED indicators for each axis & relay
* Current: 2.5A r.m.s (3.5A max)
* Resolution (speed): 1/16, 1/8, 1/2, 1
* Power: Single DC12 ~ 32V (no separated 5V needed)
* RC7414 auto half bridge current control
* Control port: Wheel control interface
* CAD system support: March2, Mach3, KCam

DB 25 Connector Pin layout

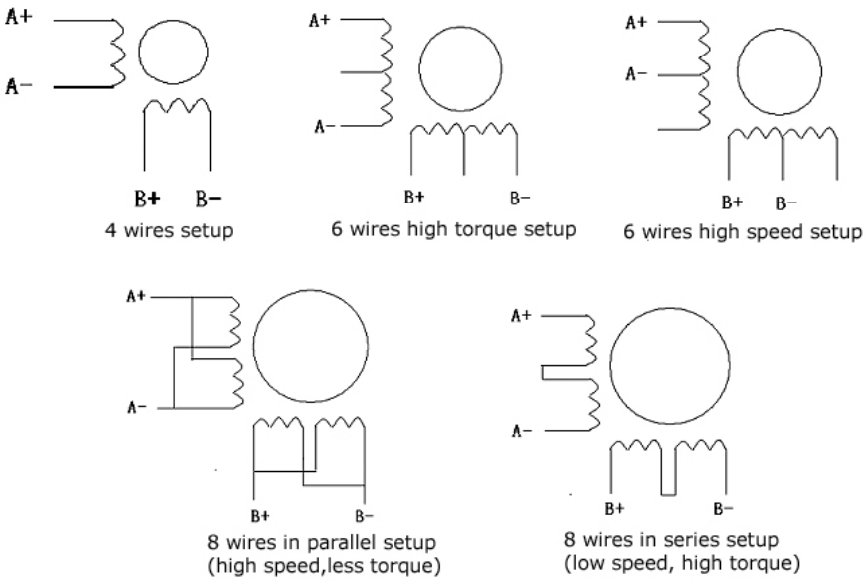


PIN1	PIN2	PIN3	PIN4	PIN5	PIN6	PIN7	PIN8	PIN9	PIN10
CKE	CKX	CWX	CKY	CWY	CKZ	CWZ	CKA	CWA	DIN1
E STEP	X STEP	X DIR	Y STEP	Y DIR	Z STEP	Z DIR	A STEP	A DIR	Limit1
PIN11	**PIN12**	**PIN13**	**PIN14**	**PIN15**	**PIN16**	**PIN17**	**PIN18-25**		
DIN2	DIN3	DIN4	Exp	N/A	EN	RLY	GND		
Limit2	Limit3	Limit4	Expansion	N/A	Enable	Relay	Ground		

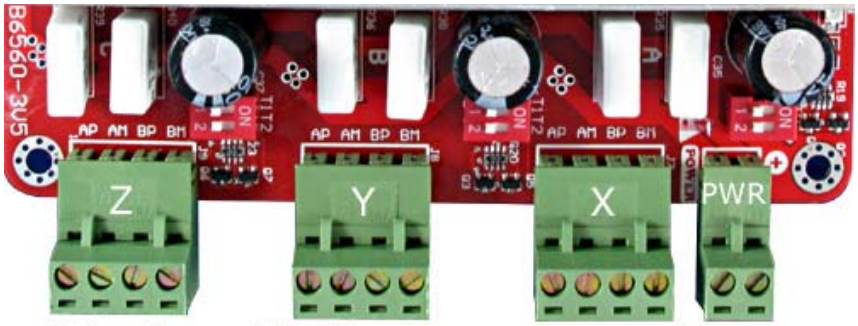
Board layout and motor type



2 phases,4 phases stepping motor connection diagram (current 2A max)



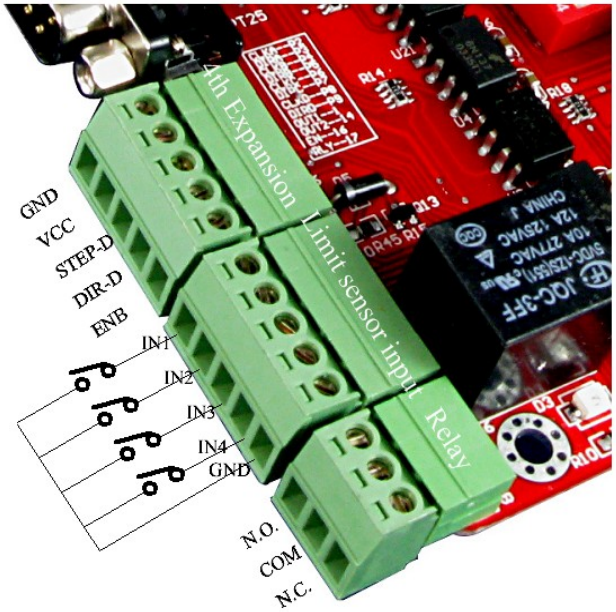
Power Supply
Power for the controller is DC 12~32V. To ensure smooth movement, the power supply should be at least 10A or higher current. DC24V, 15A is recommended.



Home Limit and Emergency Stop Input
Note: All Limit Input are Active Low *

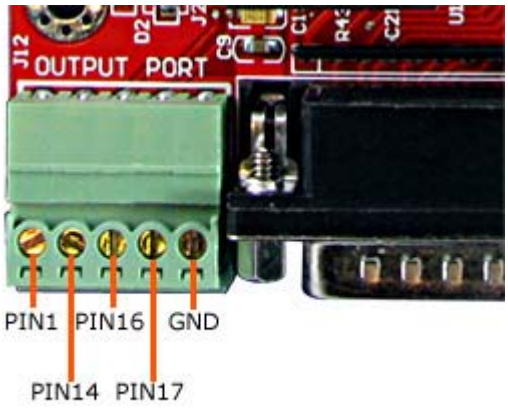
IN1 = Emergency Stop
IN2 = X limit trigger
IN3 = Y limit trigger
IN4 = Z limit trigger
GND= Ground

Relay
N.O. = Normally Open
N.C. = Normally Closed

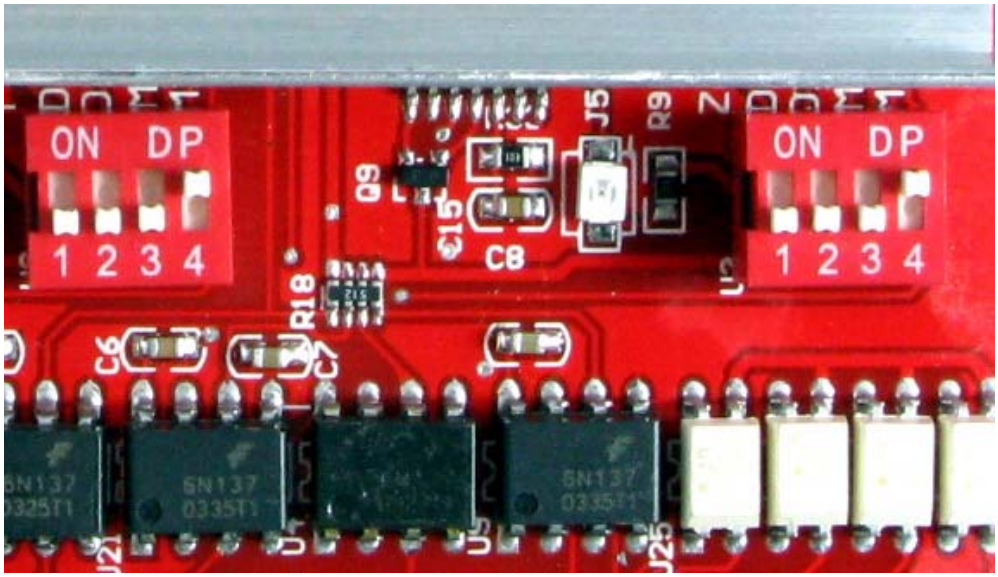


Auxiliary Output port

This port is dedicated to all outputs and it is controllable by Mach3. The pin# is corresponding to the pin number on the parallel port.



Resolution/ Speed Setting for X,Y,Z Stepping Motor
Note: D1=1, D2=2, M1=3, M2=4



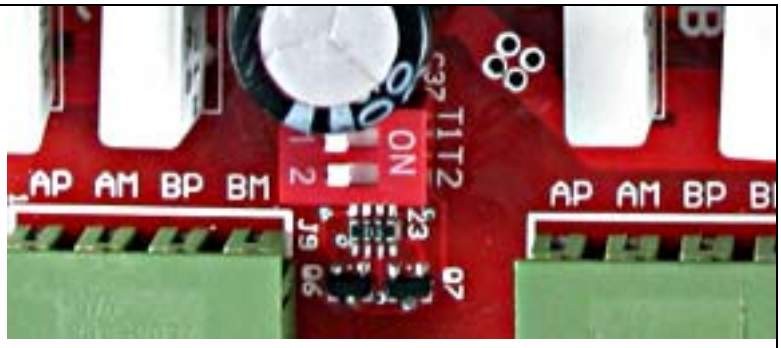
Current Attenuation and Resolution
Current attenuation setting is used to adjust overshoot or undershoot level for a motor

D1	D2	Attenuation Level		M1	M2	Resolution
DIP #1	DIP #2			DIP #3	DIP #4	
ON	ON	100%		ON	Off	1/16
OFF	ON	50%		OFF	OFF	1/8
ON	OFF	25%		OFF	ON	½
OFF	OFF	0%		ON	ON	1

Current Adjustment:

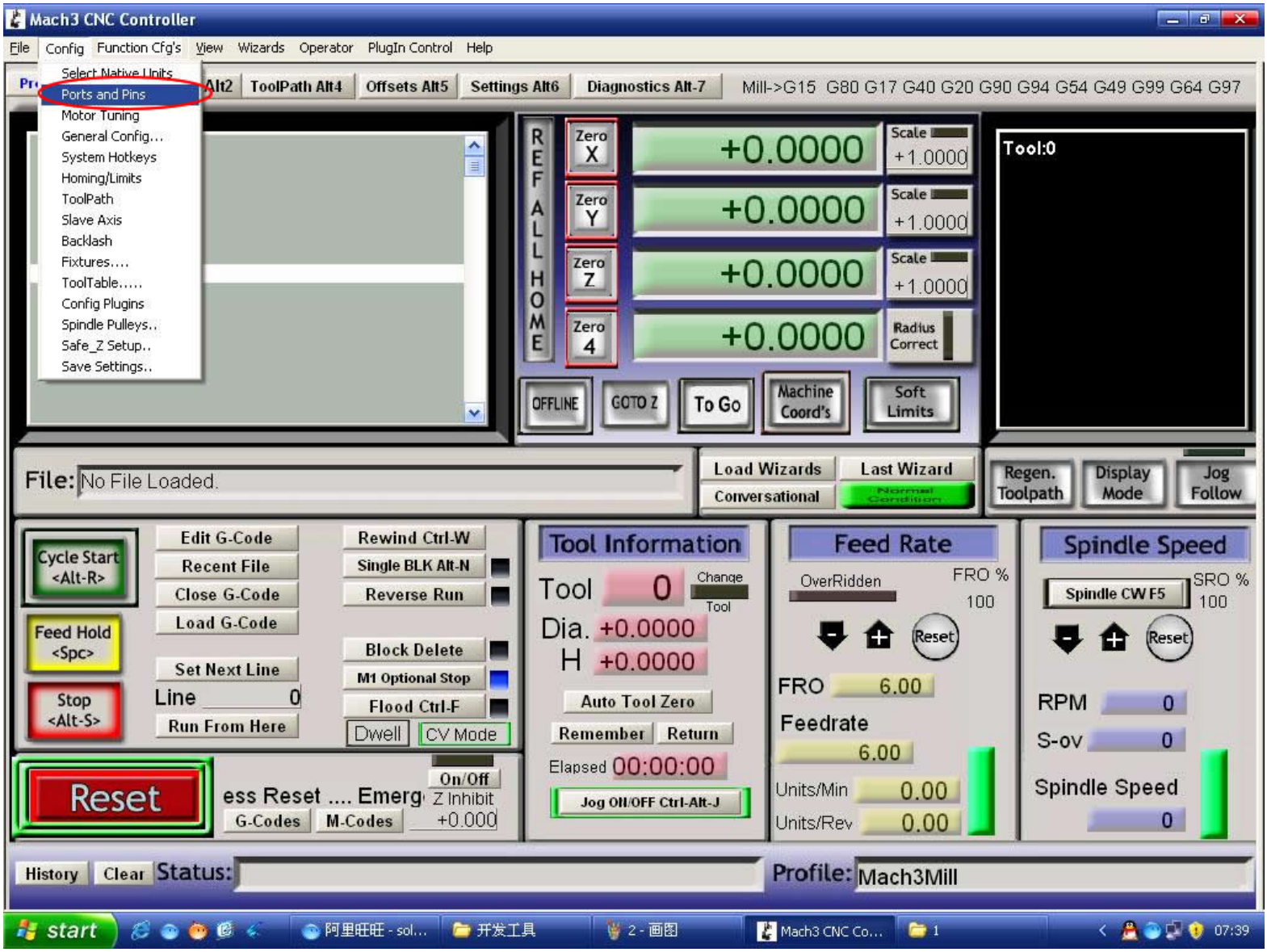
T1	T2	Current
Off	Off	2.5A~3A
On	Off	1.8A~2.25A
On	On	1.25A~ 1.5A
Off	On	0.65A~0.75A

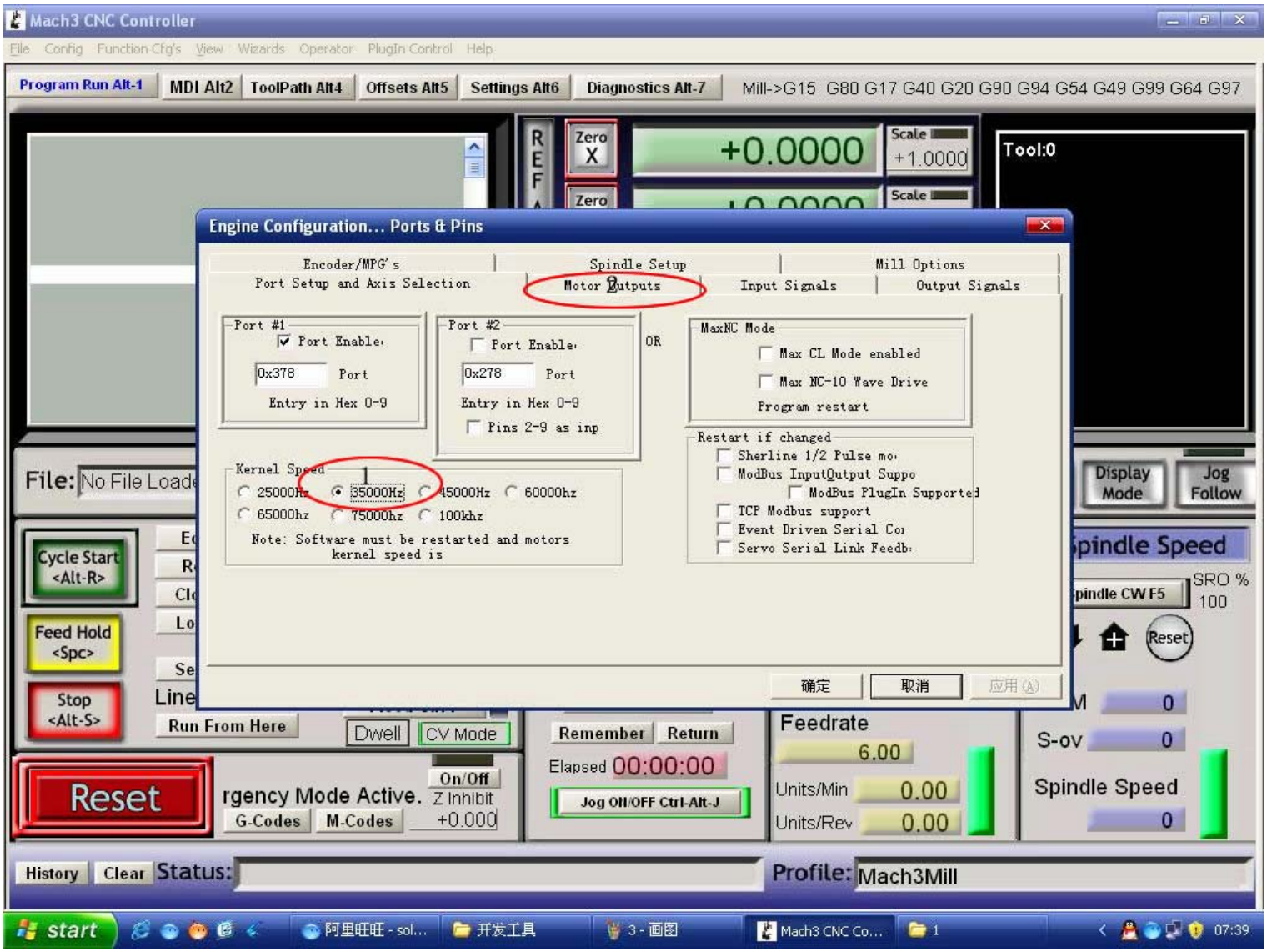
Note: there are three DIP switches, one per axis, dedicated for motor current adjustment.

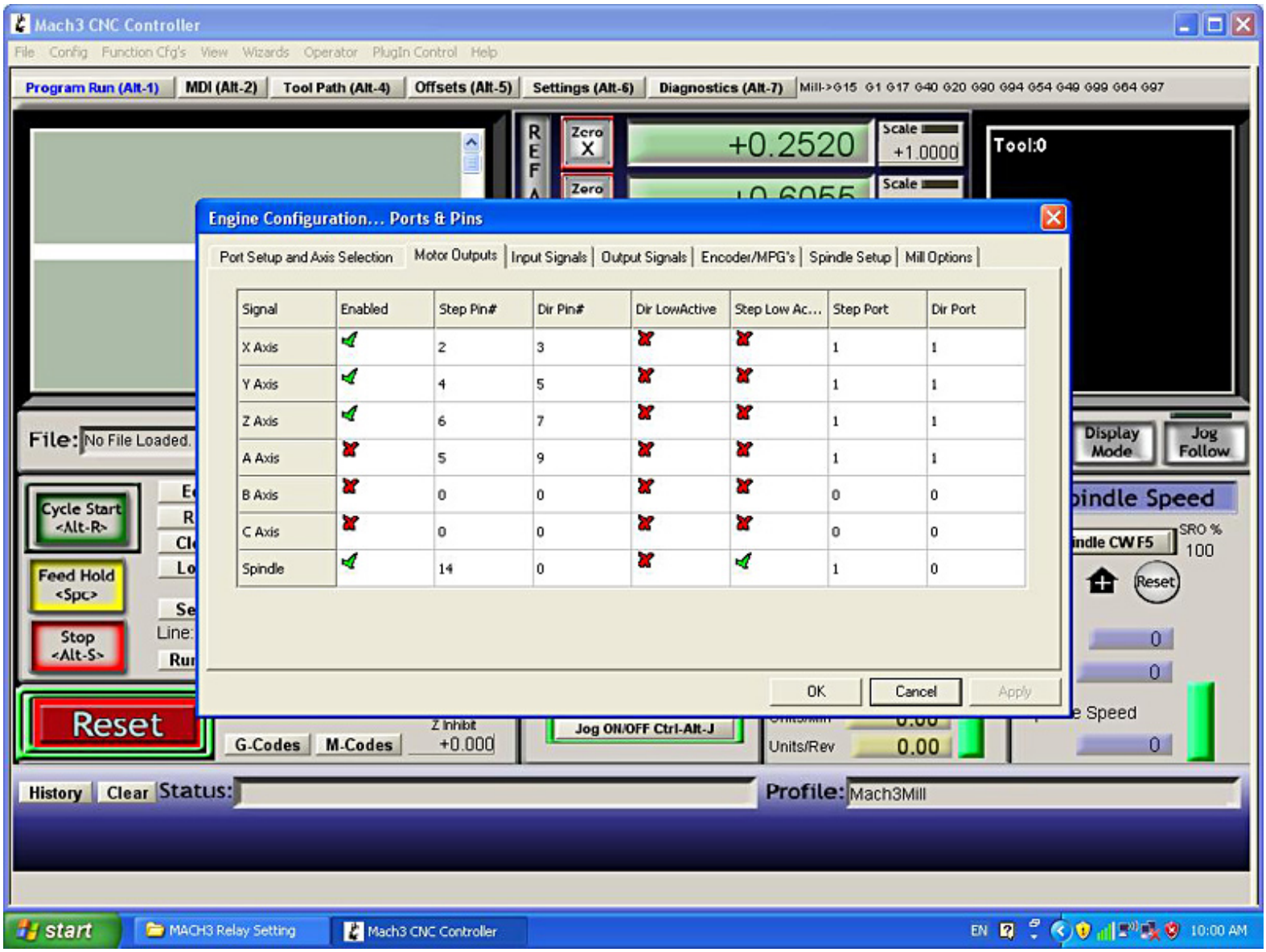


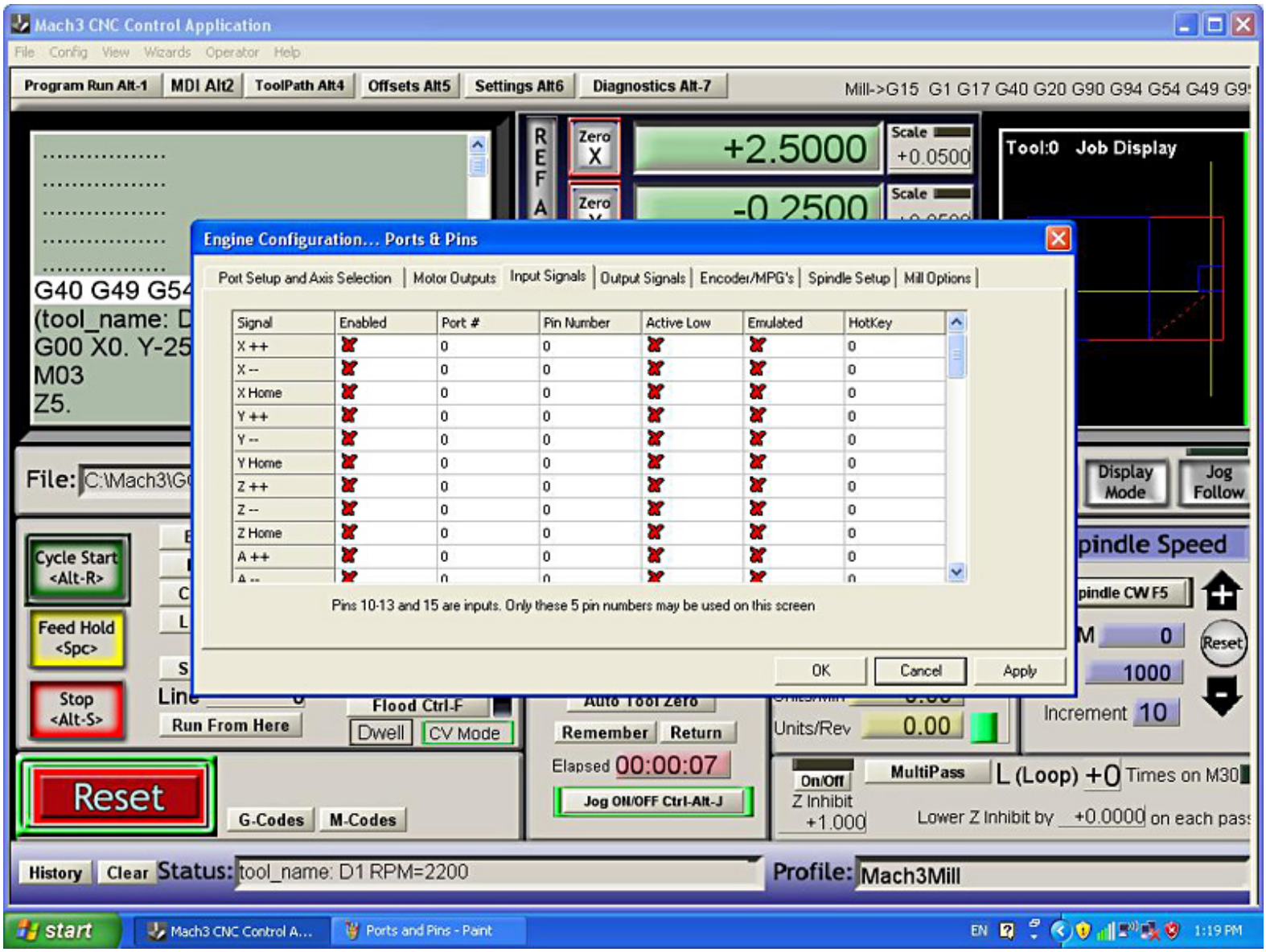
Basic MACH3 Setup

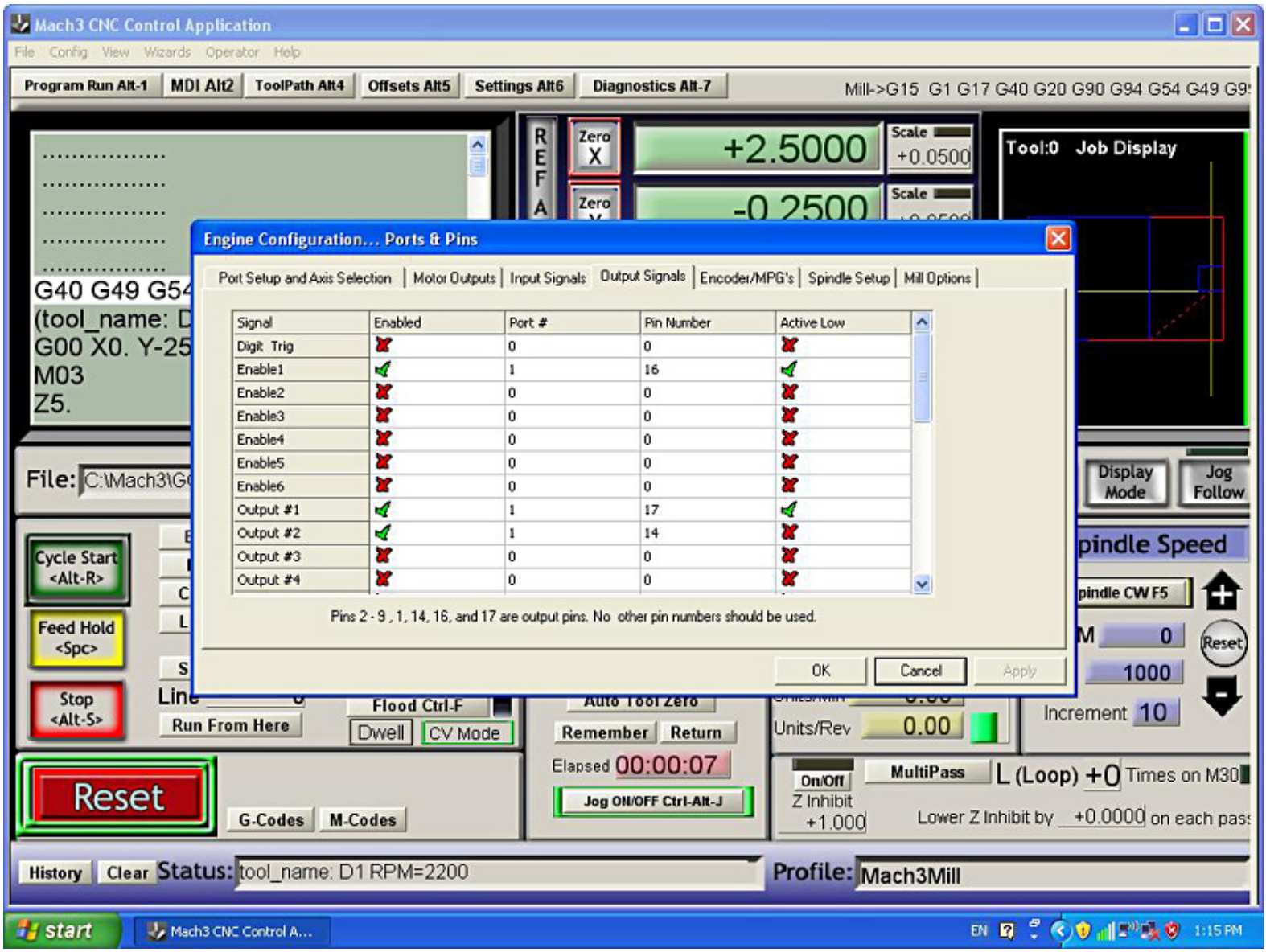
Note: some parameters are in default setting without affecting the output

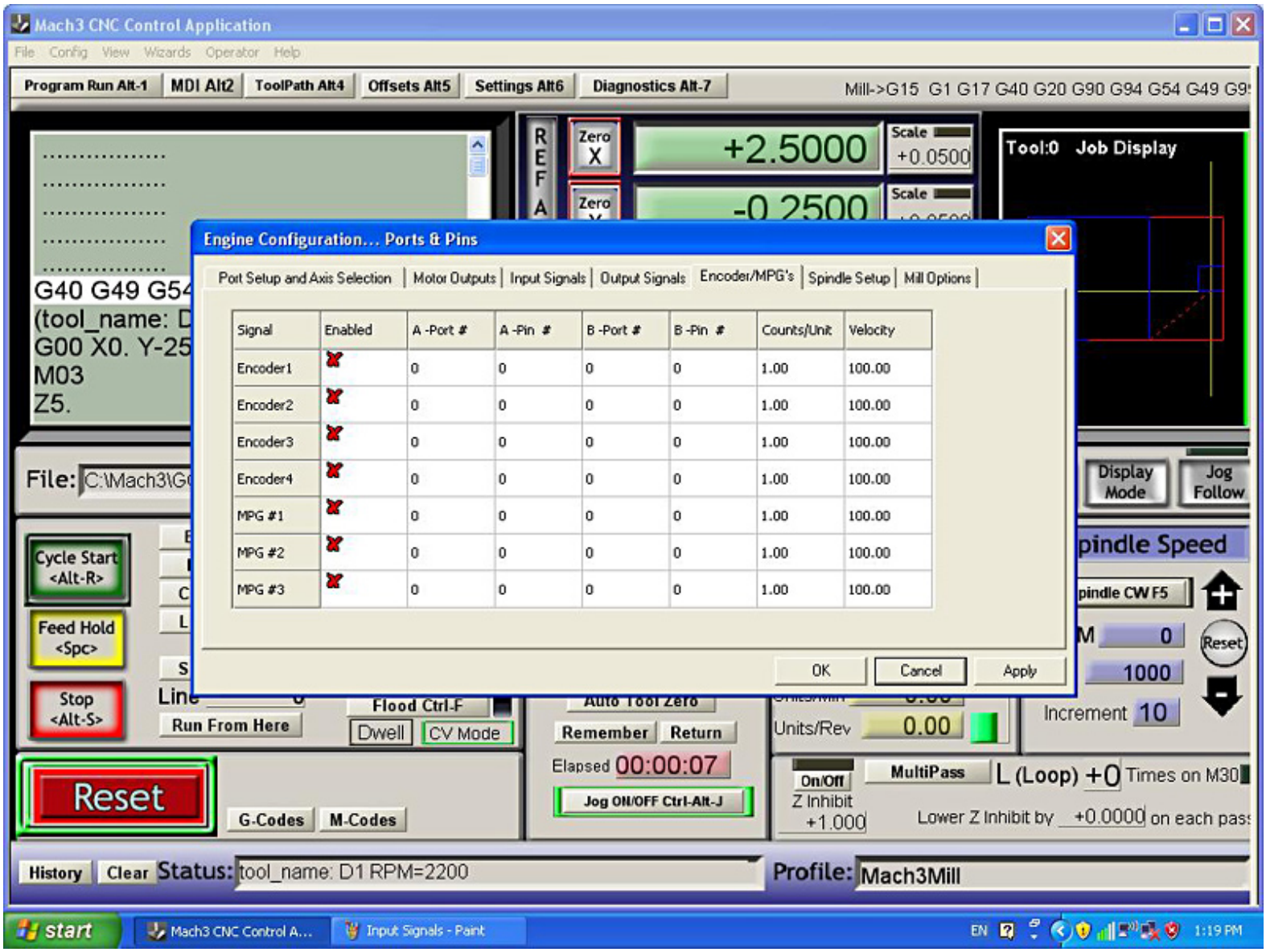



Mach3 CNC Controller
File Config Function Cfg's View Wizards Operator PlugIn Control Help
Program Run Alt-1
MDI Alt2
ToolPath Alt4
Offsets Alt5
Settings Alt6
Diagnostics Alt-7
Mill->G15 G80 G17 G40 G20 G90 G94 G54 G49 G99 G64 G97
Zero X
+0.0000
Scale
+1.0000
Tool:0
Engine Configuration... Ports & Pins
Encoder/MPG's
Port Setup and Axis Selection
Spindle Setup
Motor Outputs
Mill Options
Input Signals
Output Signals
Port #1
Port Enable
0x378
Port
Entry in Hex 0-9
Port #2
Port Enable
0x278
Port
Entry in Hex 0-9
Pins 2-9 as inp
OR
MaxNC Mode
Max CL Mode enabled
Max NC-10 Wave Drive
Program restart
Restart if changed
Sherline 1/2 Pulse mo
ModBus InputOutput Suppo
ModBus PlugIn Supported
TCP Modbus support
Event Driven Serial Co
Servo Serial Link Feedb
Kernel Speed
25000Hz
35000Hz
45000Hz
60000hz
65000hz
75000hz
100khz
Note: Software must be restarted and motors
kernel speed is
确定
取消
应用 (A)
File: No File Loade
Display Mode
Jog Follow
Cycle Start <Alt-R>
Feed Hold <Spc>
Stop <Alt-S>
Spindle Speed
SRO %
100
Reset
Run From Here
Dwell
CV Mode
Remember
Return
Elapsed 00:00:00
Jog ON/OFF Ctrl-Alt-J
Feedrate
6.00
Units/Min 0.00
Units/Rev 0.00
S-ov 0
Spindle Speed 0
Reset
On/Off
Z Inhibit
+0.000
G-Codes
M-Codes
History
Clear
Status:
Profile: Mach3Mill
start
07:39

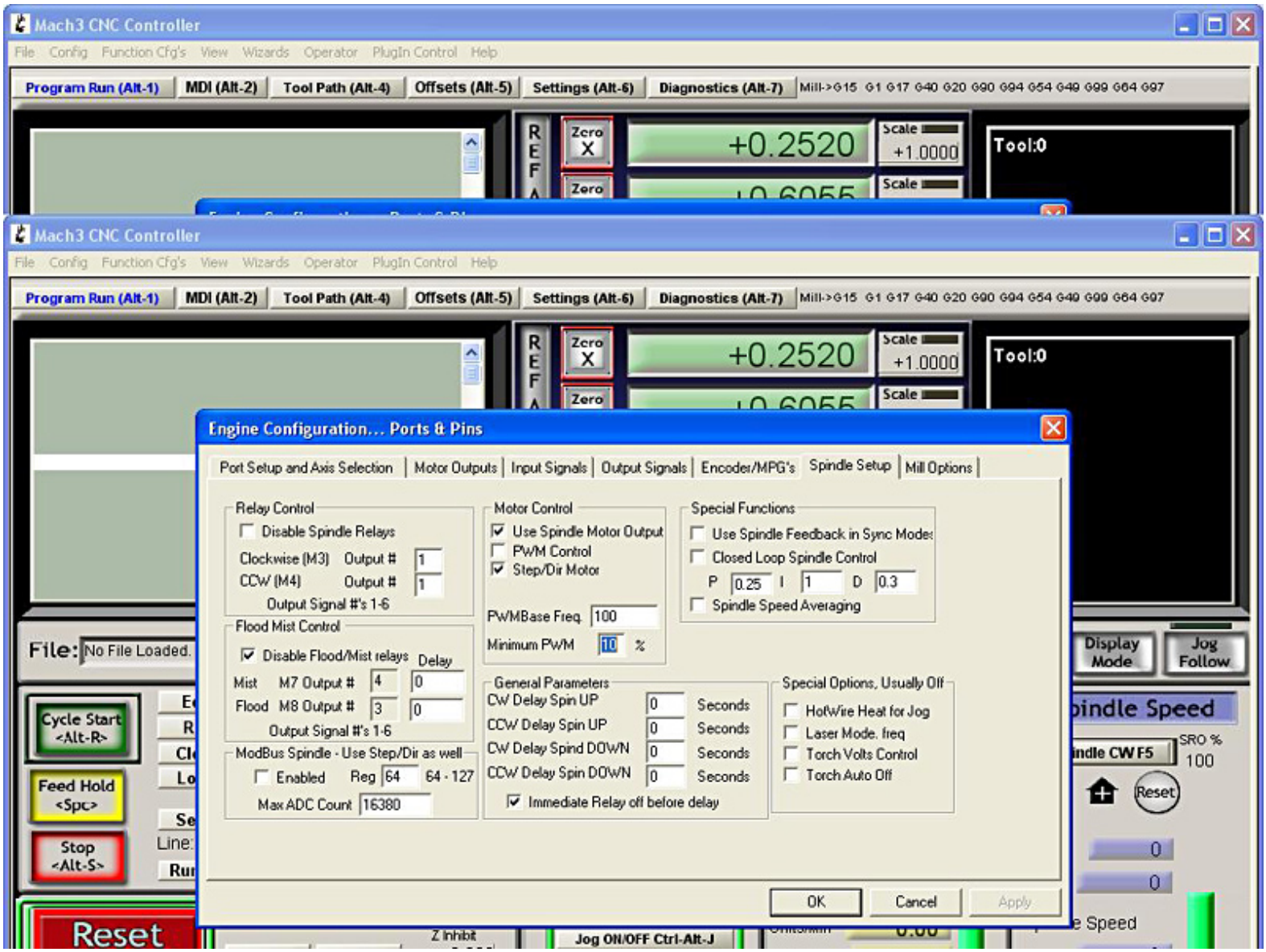

Mach3 CNC Controller
File Config Function Cfg's View Wizards Operator PlugIn Control Help
Program Run (Alt-1) MDI (Alt-2) Tool Path (Alt-4) Offsets (Alt-5) Settings (Alt-6) Diagnostics (Alt-7)
Engine Configuration... Ports & Pins
Port Setup and Axis Selection Motor Outputs Input Signals Output Signals Encoder/MPG's Spindle Setup Mill Options
Signal Enabled Step Pin# Dir Pin# Dir LowActive Step Low Ac... Step Port Dir Port
X Axis 2 3 1 1
Y Axis 4 5 1 1
Z Axis 6 7 1 1
A Axis 5 9 1 1
B Axis 0 0 0 0
C Axis 0 0 0 0
Spindle 14 0 1 0
OK Cancel Apply
+0.2520
Tool:0
File: No File Loaded.
Cycle Start <Alt-R>
Feed Hold <Spc>
Stop <Alt-S>
Reset
G-Codes M-Codes
Jog ON/OFF Ctrl-Alt-J
Units/Rev 0.00
History Clear Status:
Profile: Mach3Mill
start MACH3 Relay Setting Mach3 CNC Controller 10:00 AM


Mach3 CNC Control Application
File Config View Wizards Operator Help
Program Run Alt-1
MDI Alt2
ToolPath Alt4
Offsets Alt5
Settings Alt6
Diagnostics Alt-7
Mill->G15 G1 G17 G40 G20 G90 G94 G54 G49 G9
Zero X
+2.5000
Scale
+0.0500
Tool:0 Job Display
Engine Configuration... Ports & Pins
Port Setup and Axis Selection
Motor Outputs
Input Signals
Output Signals
Encoder/MPG's
Spindle Setup
Mill Options
Signal
Enabled
Port #
Pin Number
Active Low
Emulated
HotKey
X ++
X --
X Home
Y ++
Y --
Y Home
Z ++
Z --
Z Home
A ++
Pins 10-13 and 15 are inputs. Only these 5 pin numbers may be used on this screen
OK
Cancel
Apply
G40 G49 G54
(tool_name: D
G00 X0. Y-25
M03
Z5.
File: C:\Mach3\G
Display Mode
Jog Follow
Cycle Start <Alt-R>
Feed Hold <Spc>
Stop <Alt-S>
Run From Here
Flood Ctrl-F
Dwell
CV Mode
Auto Tool Zero
Remember
Return
Elapsed 00:00:07
Jog ON/OFF Ctrl-Alt-J
Units/Rev 0.00
Increment 10
Reset
G-Codes
M-Codes
On/Off
Z Inhibit +1.000
MultiPass
L (Loop) +0
Times on M30
Lower Z Inhibit by +0.0000 on each pass
History
Clear
Status: tool_name: D1 RPM=2200
Profile: Mach3Mill
start
Mach3 CNC Control A...
Ports and Pins - Paint
1:19 PM


Mach3 CNC Control Application
File Config View Wizards Operator Help
Program Run Alt-1
MDI Alt2
ToolPath Alt4
Offsets Alt5
Settings Alt6
Diagnostics Alt-7
Mill->G15 G1 G17 G40 G20 G90 G94 G54 G49 G9
Zero X
+2.5000
Scale
+0.0500
Tool:0 Job Display
Engine Configuration... Ports & Pins
Port Setup and Axis Selection
Motor Outputs
Input Signals
Output Signals
Encoder/MPG's
Spindle Setup
Mill Options
Signal | Enabled | Port # | Pin Number | Active Low
Digit Trig | 0 | 0
Enable1 | 1 | 16
Enable2 | 0 | 0
Enable3 | 0 | 0
Enable4 | 0 | 0
Enable5 | 0 | 0
Enable6 | 0 | 0
Output #1 | 1 | 17
Output #2 | 1 | 14
Output #3 | 0 | 0
Output #4 | 0 | 0
Pins 2 - 9 , 1, 14, 16, and 17 are output pins. No other pin numbers should be used.
OK
Cancel
Apply
G40 G49 G54
(tool_name: D
G00 X0. Y-25
M03
Z5.
File: C:\Mach3\G
Display Mode
Jog Follow
Cycle Start <Alt-R>
Feed Hold <Spc>
Stop <Alt-S>
Run From Here
Flood Ctrl-F
Dwell
CV Mode
Auto Tool Zero
Remember
Return
Elapsed 00:00:07
Jog ON/OFF Ctrl-Alt-J
Units/Rev 0.00
Increment 10
Reset
G-Codes
M-Codes
On/Off
Z Inhibit +1.000
MultiPass
L (Loop) +0
Times on M30
Lower Z Inhibit by +0.0000 on each pass
History
Clear
Status: tool_name: D1 RPM=2200
Profile: Mach3Mill
start
Mach3 CNC Control A...
1:15 PM



Note: this is a default setting.



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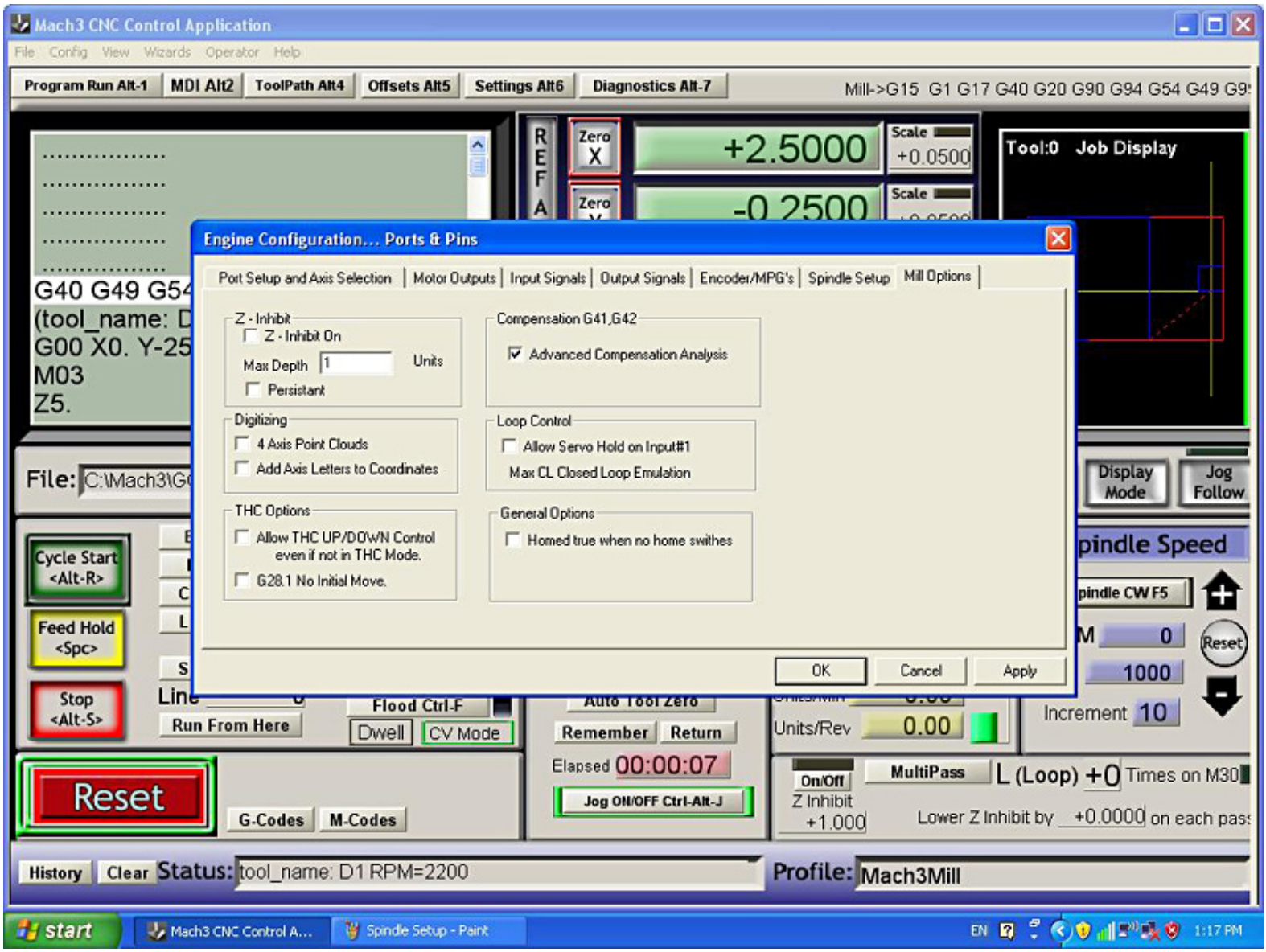

Note: this is a default setting.

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www.LightObject.com