
Mesa Configuration Tool

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CONTENTS:

1	Installing	2
2	Basic Usage	3
2.1	Machine Tab	3
2.2	Display Tab	3
2.3	Axes Tab	3
2.4	I/O Tab	4
2.5	Spindle Tab	4
2.6	SS Cards Tab	4
2.7	GPIO Tab	4
2.8	Tool Changer Tab	4
2.9	Options Tab	4
2.10	PLC Tab	4
2.11	Pins Tab	4
2.12	PC Tab	5
3	Machine Tab	6
3.1	Menu	7
3.2	Tool Bar	7
3.3	Machine Group	7
3.4	Configuration Setup	8
3.5	Firmware	8
3.6	Backups	8
4	Info Tab	9
5	Display Tab	11
5.1	Display Group	12
5.2	G code Editor Group	12
5.3	Jog Slider Settings	12
5.4	Axis Display Options	12
6	Axes Tab	13
6.1	Axis Group	13
6.2	PID Settings Group	13
6.3	Following Error Group	14
6.4	Homing Group	14
6.5	StepGen Settings Group	15
6.6	Analog Output Group	16
6.7	Encoder Group	17

7	I/O Tab	18
7.1	Inputs	19
7.2	Outputs	19

The Mesa Configuration Tool creates LinuxCNC configuration files for 5i25, 6i25, 7i76e, 7i80db, 7i80hd, 7i92, 7i93, 7i95, 7i96, 7i96S, 7i97 and 7i98.

INSTALLING

Mesa Configuration Tool

Note: Tested on Debian 10, 11, 12, 13 and Linux Mint 20.2 but it should work on other Debian type OS's.

Note: Requires Python 3.6 or newer to work.

Use the Debian deb for installing the Mesa Configuration Tool!!!

Download the [deb](#)

Or use wget from a terminal

```
wget https://github.com/jethornton/mesact/raw/master/mesact_0.7.2_amd64.deb
```

If you get *bash: wget: command not found* you can install it from a terminal with

```
sudo apt install wget
```

Open the File Manager and right click on the file and open with Gdebi then install.

If you don't have Gdebi installed you can install it from a terminal

```
sudo apt install gdebi
```

If the graphical version of gdebi has problems you can run it from a terminal in the directory where you downloaded the deb with:

```
sudo gdebi mesact_0.7.1_amd64.deb
```

If you don't have LinuxCNC installed then the mesact Configuration tool will show up in the Applications > Other menu otherwise it will be in the CNC menu.

If you have problems try running from a terminal with:

```
mesact
```

To flash firmware to the mesact you need to install [mesaflash](#) from the LinuxCNC repository.

To uninstall the mesact Configuration Tool right click on the .deb file and open with Gdebi and select *Remove Package*.

To upgrade the mesact Configuration Tool delete the .deb file and download a fresh copy then right click on the .deb file and open with Gdebi and select *Reinstall Package*

BASIC USAGE

You can left click Check Config at any time to see if there are any errors.

Build Config will check for errors before build the configuration files.

2.1 Machine Tab

1. Enter a Configuration Name
2. Select Linear Units
3. Select Max Linear Velocity
4. Select the Mesa Board
5. Ethernet Boards you must select the IP Address 10.10.10.10 is recommended.
6. Boards like 5i25/6i25, 7i80, 7i92, 7i93, 7i98 to enable the Axes Tab and the I/O Tab you need to select a firmware then select a daughter card.

2.2 Display Tab

1. Select a GUI
2. Select Position Offset
3. Select Position Feedback

2.3 Axes Tab

1. Select Axis
2. Enter Scale, Minimum Limit, Maximum Limit, Maximum Velocity, Maximum Acceleration
3. PID Settings select Default Values
4. Following Error select Default Values
5. For a Step and Direction select your drive or manually enter the Step Time, Step Space, Direction Setup, Direction Hold times
6. For a Servo System select Default Values in Analog Output and enter the Encoder Scale
7. Left Click Check Config to see if there are any errors

2.4 I/O Tab

The selected board will configure the Inputs and Outputs available and if input debounce is available.

#. Click Select for the I/O you want to use and select what you want it to be used as.

2.5 Spindle Tab

Used to configure an Analog PWM or Stepper Spindle. For Digital Run, CW and CCW type spindles use outputs.

2.6 SS Cards Tab

If you have a Smart Serial Card attached you can configure it here.

#. Select the Smart Serial Card and the page changes to that card where you can make selections for that card

2.7 GPIO Tab

Under Construction ATM, going to be where you could use the GPIO of a pin directly. For example if you have an unused GPIO you could make it either an input or output and use it.

2.8 Tool Changer Tab

Yet to come

2.9 Options Tab

Here you can select various options for your configuration and whether to check for Mesaflash at startup or not.

2.10 PLC Tab

If you are going to be using the Classicladder PLC you can set number of items created for each type of bit.

2.11 Pins Tab

Displays the Terminal Block and pins for the selected card.

On most cards the Raw Output clicking Get Card Pinout will get a list of pins.

2.12 PC Tab

You can get information about the PC CPU and NIC on the PC Info Tab.

If your using a Mesa Ethernet card you can test your NIC speed and get the Packet Time and compare that to Threshold to see if your NIC and CPU are fast enough at the current Servo Period.

MACHINE TAB

The screenshot shows the Mesa Configuration Tool Version 0.4.4 interface. The 'Machine' tab is selected, displaying configuration options for the machine. The 'Configuration Setup' section includes fields for Configuration Name, File Path, Linear Units (a dropdown menu), Max Linear Velocity (a numeric input field), and Coordinates (a text input field). There is a checkbox for 'Load this Configuration at Startup'. The 'Firmware' section includes a dropdown menu and buttons for Read PD, Read HMID, Flash, Reload, Verify, and Copy. The 'Backups' section includes a checkbox for 'Enable Backups'. The 'Machine Tab' section contains a list of error messages: 'A configuration name must be entered', 'Linear Units must be selected', 'A Board must be selected', 'A GUI must be selected', 'A Position Offset must be selected', 'A Position Feedback must be selected', and 'At least one Joint must be configured starting with Joint 0'. The 'Display Tab' section contains a list of error messages: 'A GUI must be selected', 'A Position Offset must be selected', and 'A Position Feedback must be selected'. The 'Cards, Card 0 Tab' section contains a list of error messages: 'At least one Joint must be configured starting with Joint 0'. The 'Press F1 for help on current tab' message is displayed at the bottom.

Mesa Configuration Tool Version 0.4.4

File Tools Language Help

Open .ini File Check Config Build Config Documents

Machine Info Display Axes I/O GPIO SS Cards Spindle Tool Changer Options PLC Pins PC

Machine

Configuration Name

File Path

Linear Units

Max Linear Velocity

Coordinates ☐ Load this Configuration at Startup

Configuration Setup

Board Options

Board

IP Address

Daughter Card

Daughter Card

Firmware

Read PD Read HMID Flash Reload Verify Copy

Backups

☐ Enable Backups

Machine Tab:

- A configuration name must be entered
- Linear Units must be selected
- A Board must be selected

Display Tab:

- A GUI must be selected
- A Position Offset must be selected
- A Position Feedback must be selected

Cards, Card 0 Tab:

- At least one Joint must be configured starting with Joint 0

Press F1 for help on current tab

3.1 Menu

3.1.1 File

- *Open .ini File* - Opens a file selector so you can pick an ini file to load, same as the Tool Bar button

3.1.2 Tools

- *Check Config* - Checks the Configuration for errors
- *Build Config* - Builds the Configuration after checking for errors

3.1.3 Language

Select the language to use, currently German is mostly translated.

3.1.4 Help

- *Tab Help* - Displays help information for the current tab, same as F1

3.2 Tool Bar

- *Open .ini File* - Opens a file selector so you can pick an ini file to load
- *Check Config* - Checks the Configuration for errors
- *Build Config* - Builds the Configuration after checking for errors
- *Documents* - Opens the PDF Documents

3.3 Machine Group

- *Configuration Name* - Any letter or number or underscore. Spaces are replaced by an underscore.
- *File Path* - Displays the full path to the configuration.
- *Linear Units* - Select base units for the configuration.
- *Max Linear Velocity* - Set the Maximum Linear Velocity for all axes combined in Linear Units per second.
- *Coordinates* - Displays the current configuration Coordinates by Axis

3.4 Configuration Setup

- *Board Tab*
- *Board* - Select the main board being used.
- *IP Address* - If the main board is an Ethernet Board select the IP address of the board.
- *Daughter Card* - After selecting the firmware you can select a daughter card for which header you're using. The header numbers are added to the Daughter Card when a board is selected. At this time only one daughter card is supported.
- *Options Tab*

After selecting a *Firmware* the Options are populated. Select a lower amount to free up GPIO on some boards.

- *Step Generators*
- *PWM Generators*
- *Encoders*

3.5 Firmware

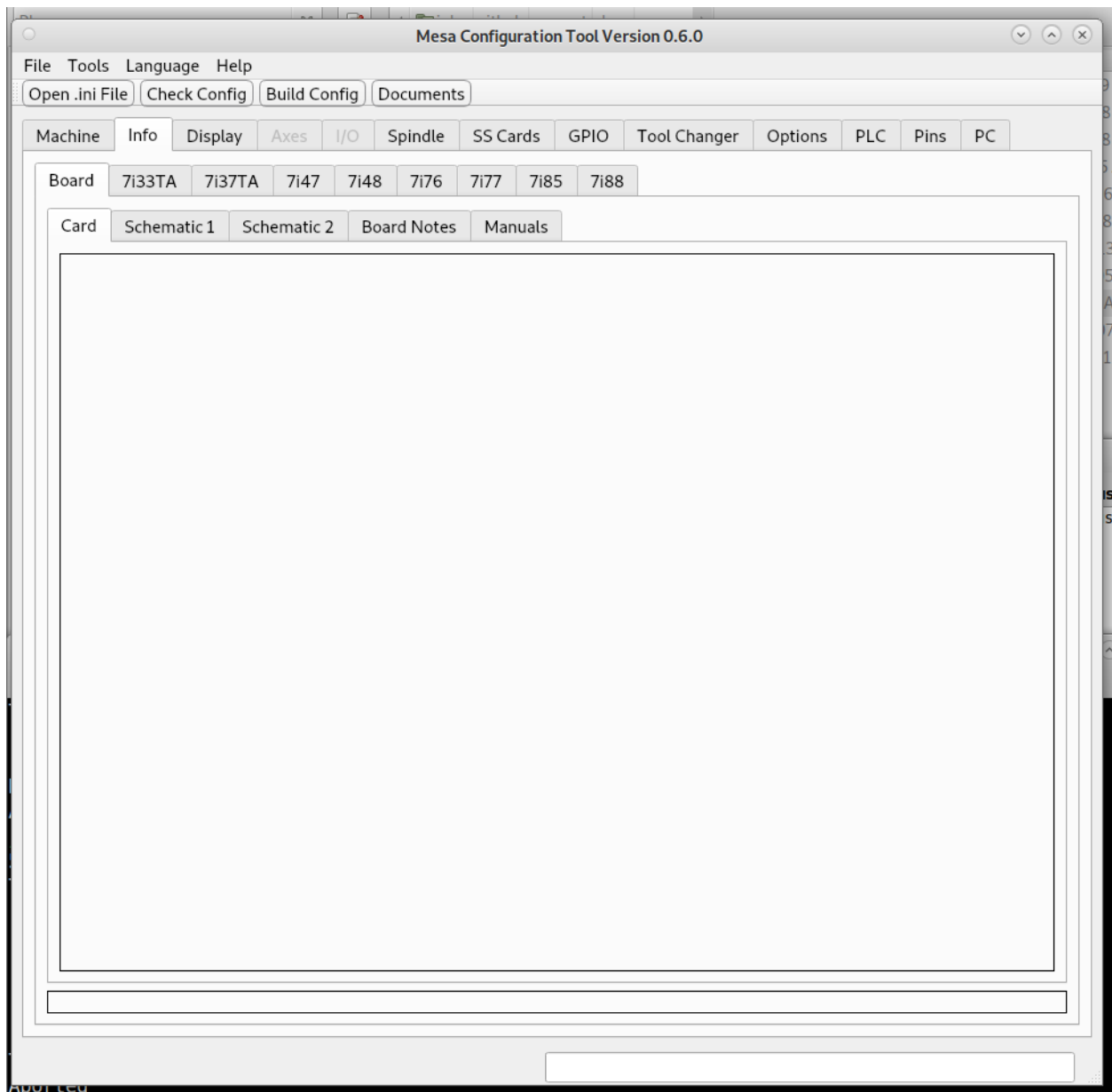
After selecting a board the Firmware combobox is populated with firmware for that board.

- *Read PD* - Read Pin Descriptions, gives more information than Read HMID
- *Read HMID* - Shows General Configuration Information
- *Flash* - After selecting a firmware this will flash the board
- *Reload* - After flashing firmware this will reload the new firmware
- *Verify* - After the board boots up this will verify the selected firmware
- *Copy* - Copies the contents of display window to the clipboard

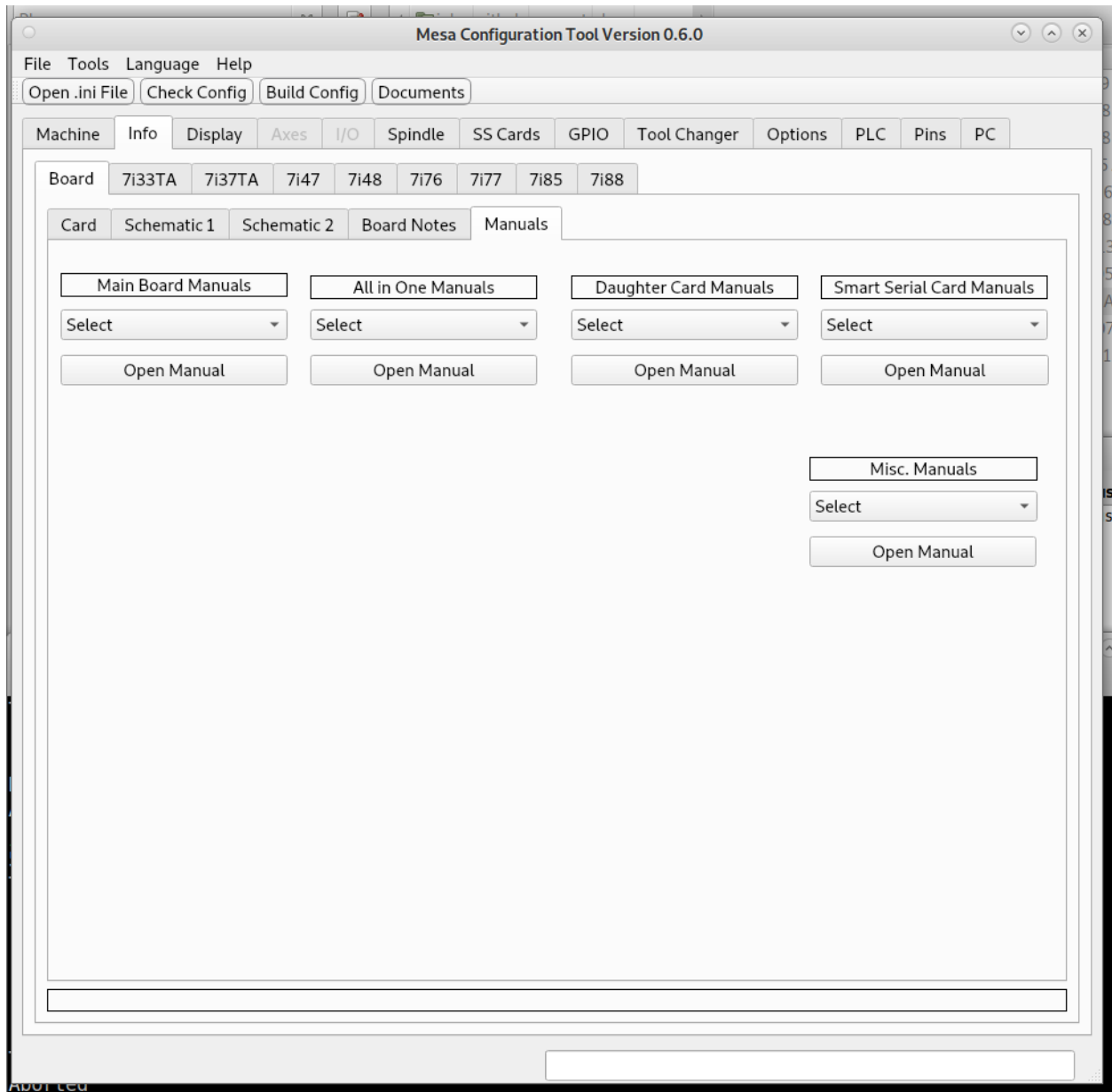
3.6 Backups

- *Enable Backups* - When this is checked a backup copy is saved to a .zip file in the backups directory before building a new configuration. The backup file is named with the date and time of the save.

INFO TAB

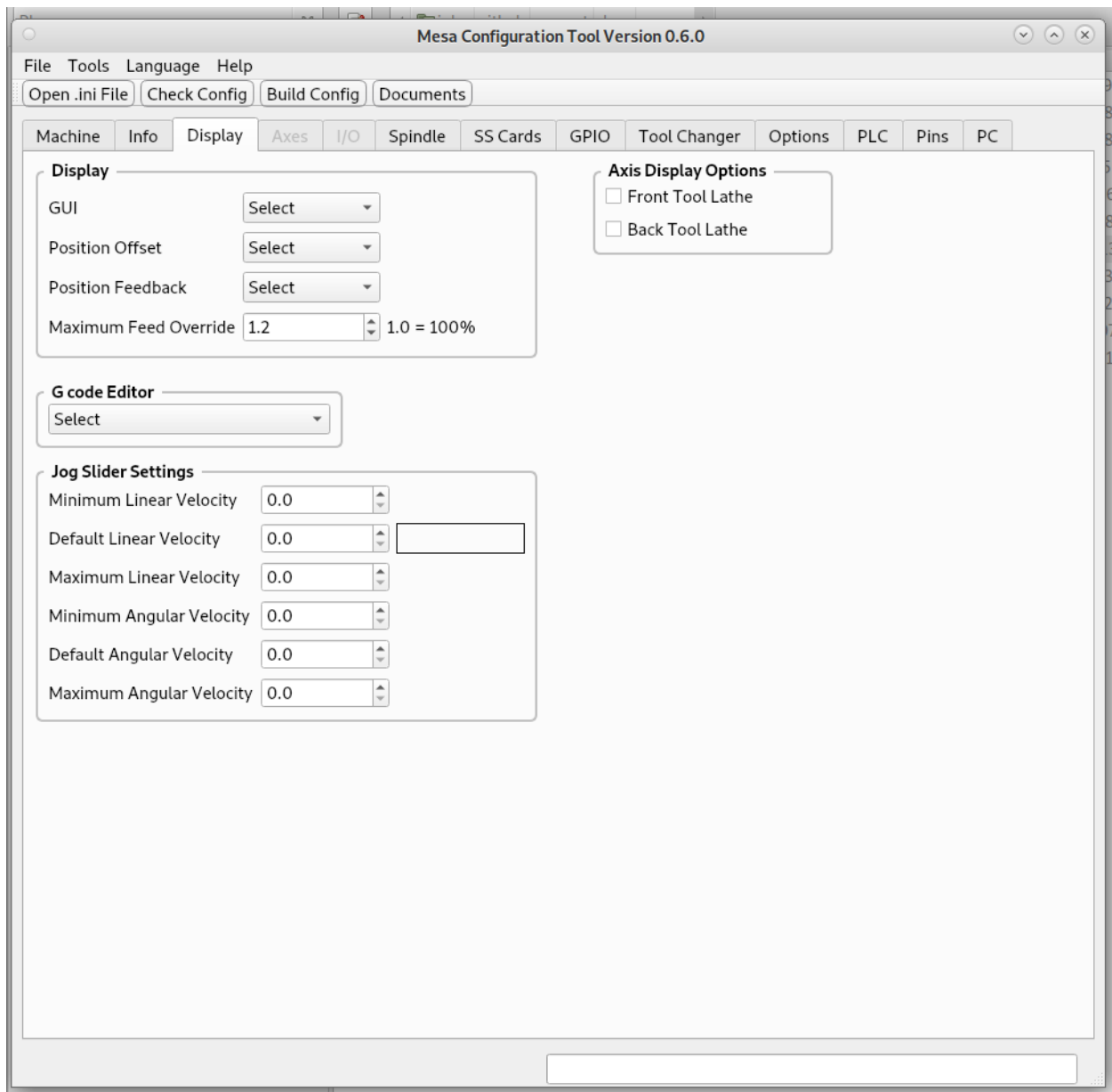


The Info Tab will have a diagram of the current board selected and may have connection schematics and board notes. Also there are diagrams of most daughter cards.



Mesa PDF manuals can be opened on the Manuals tab

DISPLAY TAB



5.1 Display Group

- *GUI* - Select the GUI you want to use
- *Position Offset* - Typically Relative is selected which includes any offsets
- *Position Feedback* - Typically Commanded is selected, a servo system when Actual is selected may bounce around and make the feedback change a lot.
- *Maximum Feed Override* - Typically 1.2 is used

5.2 G code Editor Group

- *G code Editor* - Select from the installed editors

5.3 Jog Slider Settings

- *Minimum Linear Velocity* - The approximate lowest value the jog slider
- *Default Linear Velocity* - The default velocity for linear jogs, in , machine units per second
- *Maximum Linear Velocity* - The maximum velocity for linear jogs, in machine units per second
- *Minimum Angular Velocity* - The approximate lowest value the angular jog slider
- *Default Angular Velocity* - The default velocity for angular jogs, in machine units per second
- *Maximum Angular Velocity* - The maximum velocity for angular jogs, in machine units per second

5.4 Axis Display Options

- *Front Tool Lathe* - Normally a lathe is Front Tool that is when the tool holder is on the users side of the spindle
- *Back Tool Lathe* - A Back Tool Lathe the tool holder is on the opposite side of the spindle from the user side.

AXES TAB

6.1 Axis Group

1. Select the type of Axis
2. Enter the Scale which is the number of pulses to move one user unit. (user unit is either inch or mm)
3. Enter the Minimum Limit for the Axis (usually 0 for X or Y and the amount of travel for the Z axis as a negative number)
4. Enter the Maximum Limit for the Axis (usually max travel for X or Y and 0 for Z)
5. Enter the Maximum Velocity in user units per second
6. Enter the Maximum Acceleration in user units per second per second
7. If the direction is backwards after testing check Reverse Direction

6.2 PID Settings Group

- Usually the Default Values are correct
- If you change the Tread Period in the Options tab generate the PID settings again.

The physical meaning of $P=1/\text{servo_period}$ (1000 for a 1 ms servo period) is that any position errors are corrected before the next servo thread invocation.

Anything greater than $P=1/\text{Servo_period}$ means you will over-correct.

Anything less than $P=1/\text{Servo_period}$ means you will under-correct.

Anything greater than $P=2/\text{Servo_period}$ means you will have oscillations.

If you are using PID feedback for a stepgen $P=1/\text{Servo_period}$ is pretty much necessary. PID is still used with stepgens without encoders as it has advantages over the built-in position mode

In addition you can use a bit of FF2 (FF2= seconds between position read and new velocity write) usually about 0.0001 for Ethernet cards

6.3 Following Error Group

1. Usually the Default Values are correct

6.4 Homing Group

All entries are optional with the exception of a gantry configuration with two or more axes with the same Axis Letter. In this case you must enter the Home Sequence for all Joints used by the gantry.

1. Home is usually 0
2. Home Offset can be used to move the joint off of a home switch
3. Home Search Velocity is the “fast” speed to find the home switch
4. Home Latch Velocity is the “slow” speed to get an accurate location of the home switch
5. Home Final Velocity is the speed that joint moves to home position, if left blank the a rapid move is used
6. Home Sequence defines the order that the axes home, it must start 1 or 0 and is negative in the case of a gantry

Step and Direction Drives

Mesa Configuration Tool Version 0.4.0

File Tools Language Help

Open .ini File Check Config Build Config

Machine Info Display Axes I/O SS Cards Spindle Tool Changer Options PLC Pins PC

7i76e Card 1

Joint 0 Joint 1 Joint 2 Joint 3 Joint 4 Joint 5

Axis

Axis Axis Type Scale Minimum Limit Maximum Limit Maximum Velocity Maximum Acceleration Select Units Machine Tab

Select ☐ Reverse Dir

PID Settings

P Deadband

I Bias

D Max Output

FF0 Max Error

FF1

FF2 Default Values

Following Error

Min Max Default Values

Homing

Home

Home Offset

Home Search Velocity

Home Latch Velocity

Home Final Velocity

Home Sequence

☐ Home Ignore Limits

☐ Home Use Index

☐ Home Switch is Shared

StepGen Settings

Step Time ns ☐ Invert Step

Step Space ns

Direction Setup ns ☐ Invert Direction

Direction Hold ns Custom

Joint Information

Time to accelerate to max speed

Distance to accelerate to max speed

Step rate at max speed

6.5 StepGen Settings Group

Either enter in the values for your drive or select your drive from the combo box. The Custom can be changed for your drive name if desired.

Analog Drives

john@ceve11: /github/mesact/mesact#

Mesa Configuration Tool Version 0.6.0

File Tools Language Help

Open .ini File Check Config Build Config Documents

Machine Info Display Axes I/O Spindle SS Cards GPIO Tool Changer Options PLC Pins PC

7197 Card 1

Joint 0 Joint 1 Joint 2 Joint 3 Joint 4 Joint 5

Axis

Axis	Axis Type	Scale	Minimum Limit	Maximum Limit	Maximum Velocity	Maximum Acceleration	Select Units Machine Tab
Select							<input type="checkbox"/> Reverse Dir

PID Settings

P		Deadband	
I		Bias	
D		Max Output	
FF0		Max Error	
FF1			
FF2			

Default Values

Following Error

Min		Max	
-----	--	-----	--

Default Values

Analog Output

Analog Min Limit		Analog Max Limit	
Analog Scale Max			

Default Values

Homing

Home	
Home Offset	
Home Search Velocity	
Home Latch Velocity	
Home Final Velocity	
Home Sequence	

☐ Home Ignore Limits

☐ Home Use Index

☐ Home Switch is Shared

Encoder

Encoder Scale	
---------------	--

Joint Information

Time to accelerate to max speed	
Distance to accelerate to max speed	
Step rate at max speed	

Original exception was:

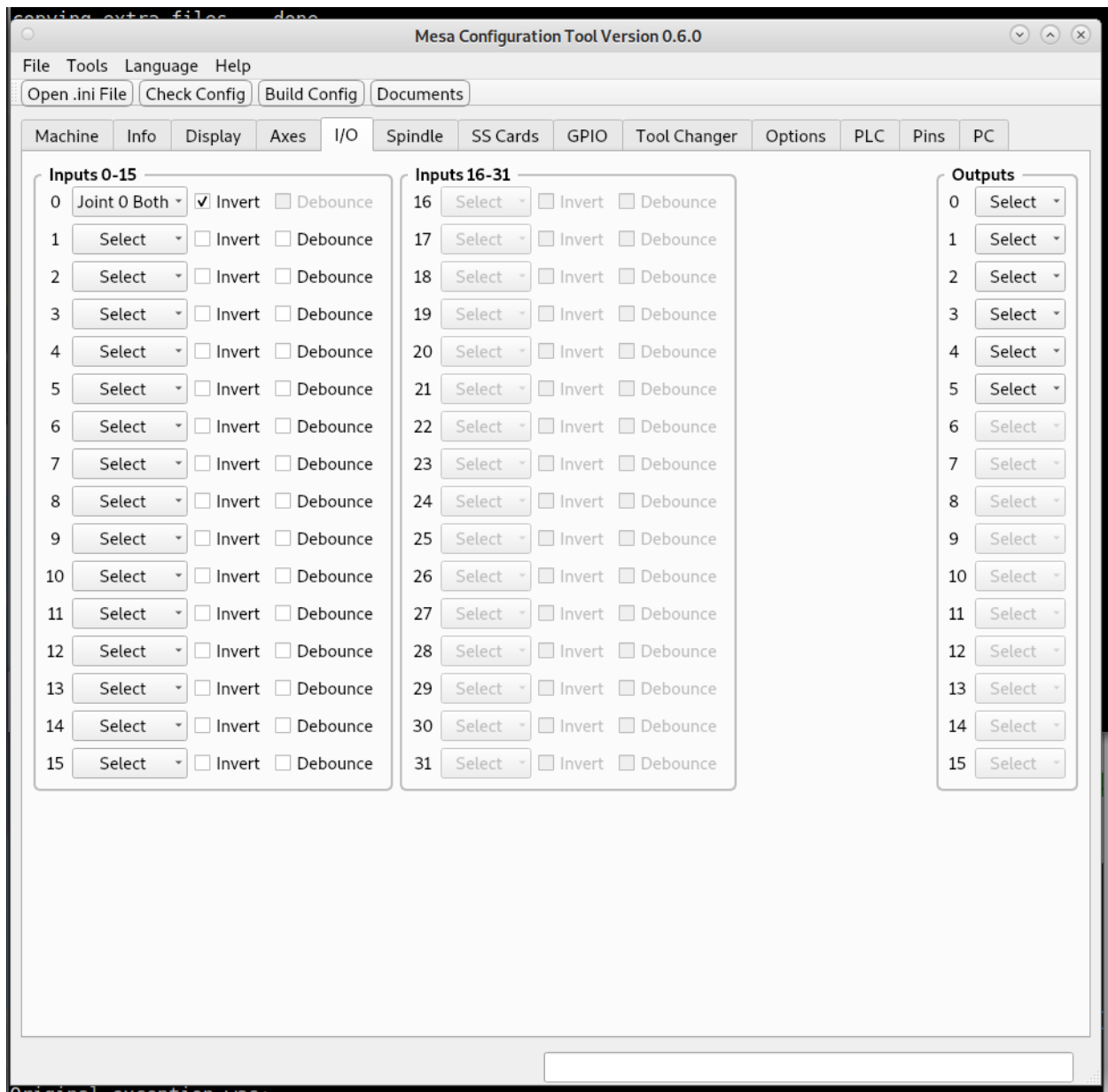
6.6 Analog Output Group

Usually the Default Values are correct

6.7 Encoder Group

Enter the scale for your encoder for one user unit

I/O TAB



7.1 Inputs

Select the input function from the combo box. To deselect pick Select from Not Used.

If you need to invert the sense of the input check Invert.

Some cards have a built in debounce function. If you check Debounce then Invert is not available and the same goes if you check Invert then Debounce is not available.

Inputs are enabled based on the board in the case of an all in one board or the daughter card.

7.2 Outputs

Select the output function from the combo box. To deselect pick Select from Not Used.