
OSE 3D Printer Workbench

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MAIN TOOLBAR

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A FreeCAD workbench for designing 3D printers by [Open Source Ecology](#) for [Distributive Enterprise](#).
For more information on codebase conventions and patterns, see the [OSE Workbench Platform](#).

ADD FRAME

The **Add Frame** tool adds a Frame to the **active** document.

You can use this to begin designing a **D3D Pro** printer of any size or axis configuration.

1.1 Custom Properties

Name	Type	Default Value	Description
Has Corners	Bool	False	Whether the frame has 3d printed corners or not.
Size	Length	304.8 mm	Size or dimension of cubic frame.
Thickness	Length	3.175 mm	Thickness of frame.
Width	Length	38.1 mm	Width of frame.

1.2 Attaching Axes to the Frame

See [Add Axis](#) for details on how to attach axes to the frame.

Warning: In order to attach axes to the frame, the frame must **not** be rotated.

1.3 See Also

- [D3D Frame](#)

ADD AXIS

There are three tools in the main toolbar to add an Axis, or **Universal Axis** object in different orientations to the **active** document:

1. Add X Axis
2. Add Y Axis
3. Add Z Axis

2.1 Custom Properties

Name	Type	Default Value	Description
Carriage Position	Percent	50	Position of carriage relative to available rod.
Length	Length	304.8 mm	Length of axis corresponds to rod length.
Orientation	String	x	Orientation of axis: X, Y, or Z.
Rod Diameter	Length	8.0 mm	Diameter of rod.
Side	String	top	Which side the bottom of the axis faces.

2.2 Attaching Axes to the Frame

You may attach axes to the frame by selecting one of its outer faces, and then clicking a button in the main toolbar to add an axis.

Only certain axes can be attached to certain faces or sides of the frame based on its orientation.

Axis Orientation	Attachable Side(s)
X	Top
Y	Left, Right
Z	Front, Rear

Note: You cannot attach an axis to the **Bottom** face or side of the frame.

The axis-frame attachment logic assumes the frame is **not** rotated, and determines whether the user is attaching the axis to the appropriate side of the frame based on whether the selected face is parallel to the XY, YZ, or XZ plane.

Tip: See the **Report View** for attachment troubleshooting.

ADD HEATED BED

The **Add Heated Bed** tool adds a heated bed to the **active** document.

3.1 Custom Properties

Name	Type	Default Value	Description
Size	Length	203.2 mm	Size or dimension of heated bed.

3.2 Centering Heated Bed to Frame & Elevating to Z Axes

1. Hold-down `Ctrl` key for selecting multiple objects
2. Select one Z axis
3. Select the Frame
4. Click the **Add Heated Bed** button on the main toolbar

3.3 See Also

- [D3D Heated Bed](#)
- [Heated Bed](#)

ADD EXTRUDER

The **Add Extruder** tool adds an extruder to the **active** document.

4.1 Attaching Extruder to X Axis Carriage

An extruder can be attached to the carriage of the top X axis by selecting the top face of the carriage, and then clicking the **Add Extruder** button in the main toolbar.

4.2 See Also

- [D3D Extruder](#)
- [File:Simpleextruderassy.fcstd](#)
- [File:Finalextruder.png](#)

GENERATE CUT LIST

There are two options in the main menu to generate a cut list:

1. Copy Cut List to Clipboard
2. Save Cut List as CSV

Both options generate a cut list with the following:

- **Rods** for axes, heated bed, and spool holder
- **Angled bars** to construct a frame with 3d printable corners

5.1 How it Works

Each option queries the **active** document for Axis objects and the Frame object in order to determine the rods and angled bars for the cut list.

5.1.1 Determining Rod Quantity

- **2** X Axis Rods are added for every X Axis object
- **2** Y Axis Rods are added for every Y Axis object
- **2** Z Axis Rods are added for every Z Axis object
- **3** Spool Holder Rods are added based on the existence of a Frame object
- **2** Heated Bed Rods are added for every pair of Z Axis objects

5.1.2 Determining Rod Length

- X Axis Rod Length is adjusted by **adding 4 inches**
- Y Axis Rod Length corresponds with `Length` of the axis in the document
- Z Axis Rod Length is adjusted by **subtracting 1 inch**
- Length of Heated Bed Rods and **1** Spool Holder Rod are equal to the length of the Frame
- Length of **2** Spool Holder Rods are equal to the length of the Frame **minus 1 inch** (similar to Z axis rods)

5.1.3 Determining Angled Bar Quantity

- 12 Angled Bars are added based on the existence of a Frame object

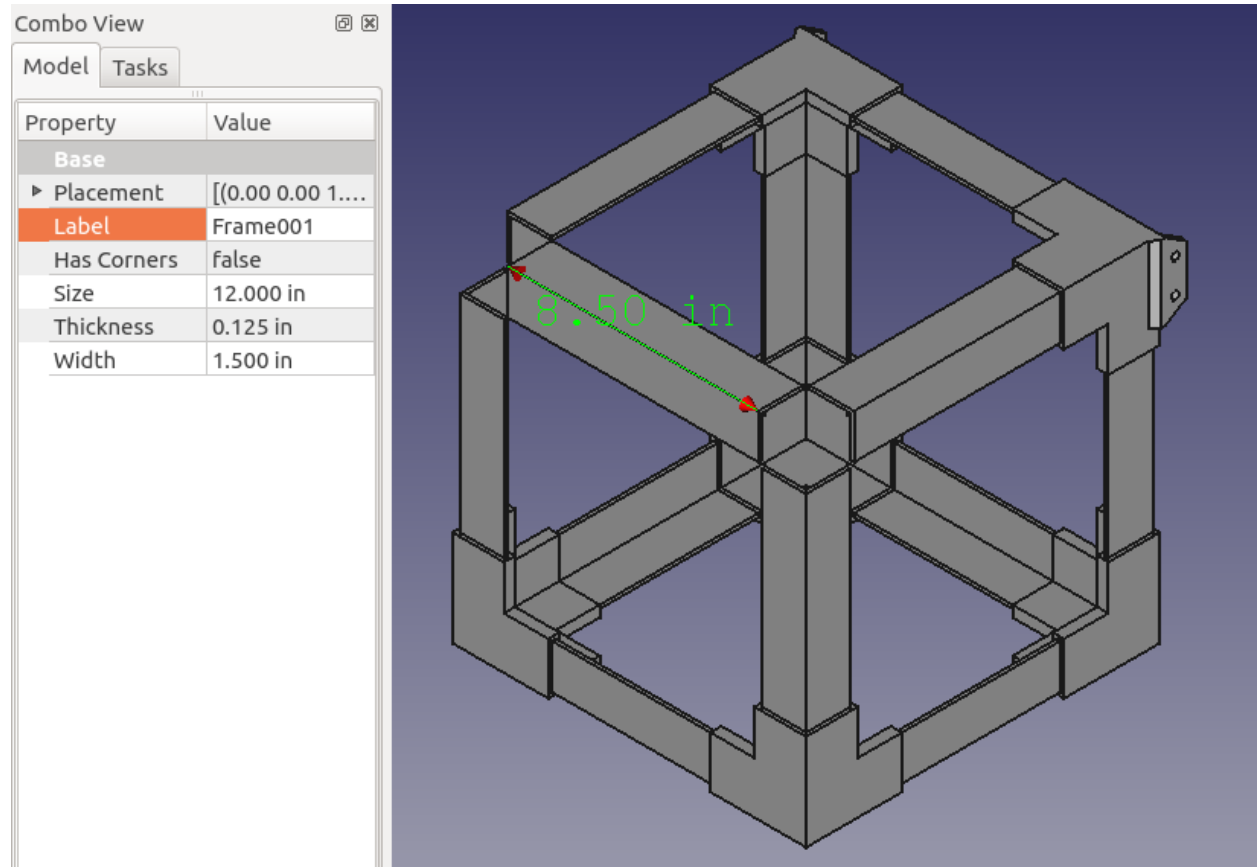
5.1.4 Determining Angled Bar Length

Angled bar length is calculated from the following formula:

$$\text{Frame.Size} - ((\text{Frame.Width} + (\text{Frame.Thickness} * 2)) * 2)$$

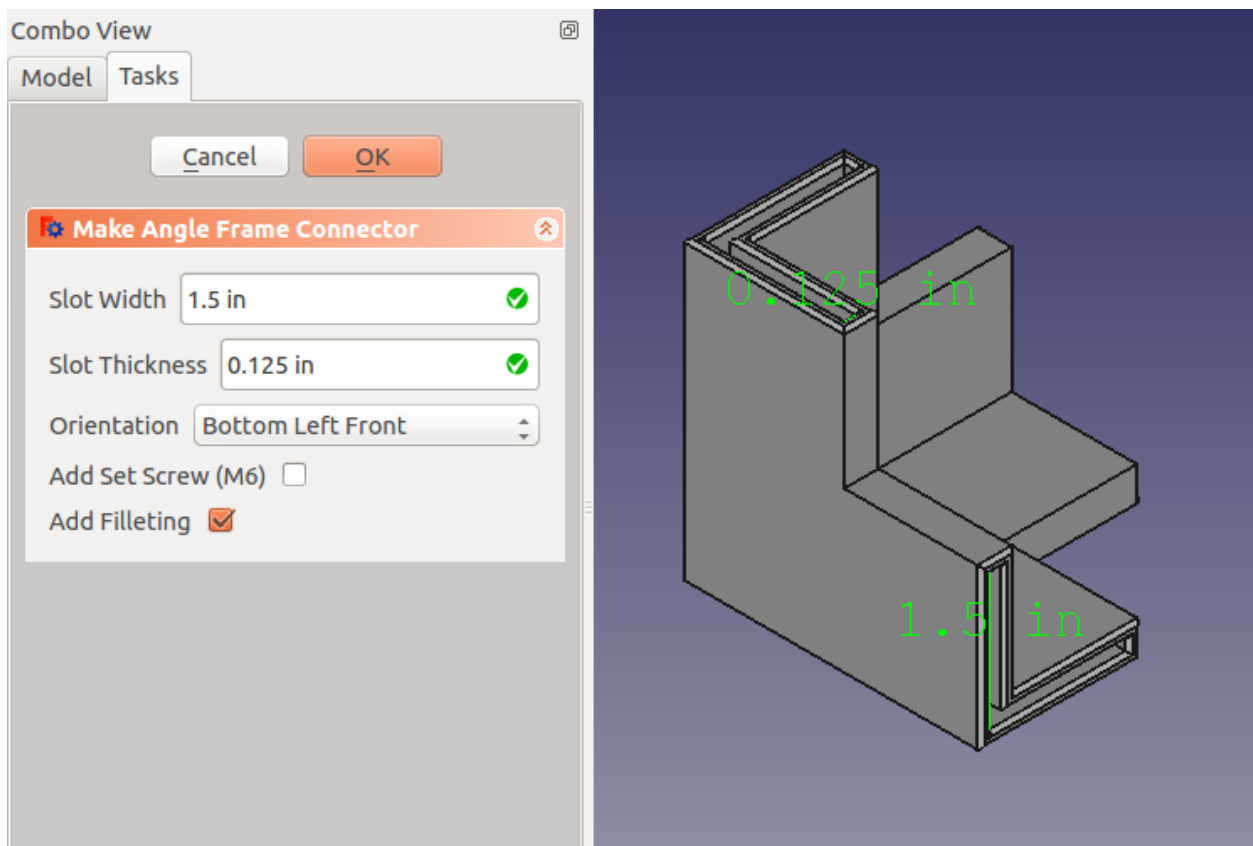
For example, a 12 in frame with a 1.5 in Width and 0.125 in Thickness could have **8.5 in** angled bars.

$$12 \text{ in} - ((1.5 \text{ in} + (0.125 \text{ in} * 2)) * 2) = 8.5 \text{ in}$$



MAKE ANGLE FRAME CONNECTOR

The **Make Angle Frame Connector** tool makes a 3D-printable **Angle Frame Connector** with the specified **parameters** entered from the Task Panel.



6.1 Parameters

Slot Width Width of three inner slots.

Slot Thickness Thickness of three inner slots.

Orientation One of eight possible corners of the frame.

Add Set Screw Whether to add a set screw mechanism.

Useful for larger frames when worried about slips or frame mis-alignment.

Attention: Assumes **M6** set-screw and nut.

Add Filletting Whether to round edges of three inner slots.

Tip: Makes inserting angled bars later a little easier.

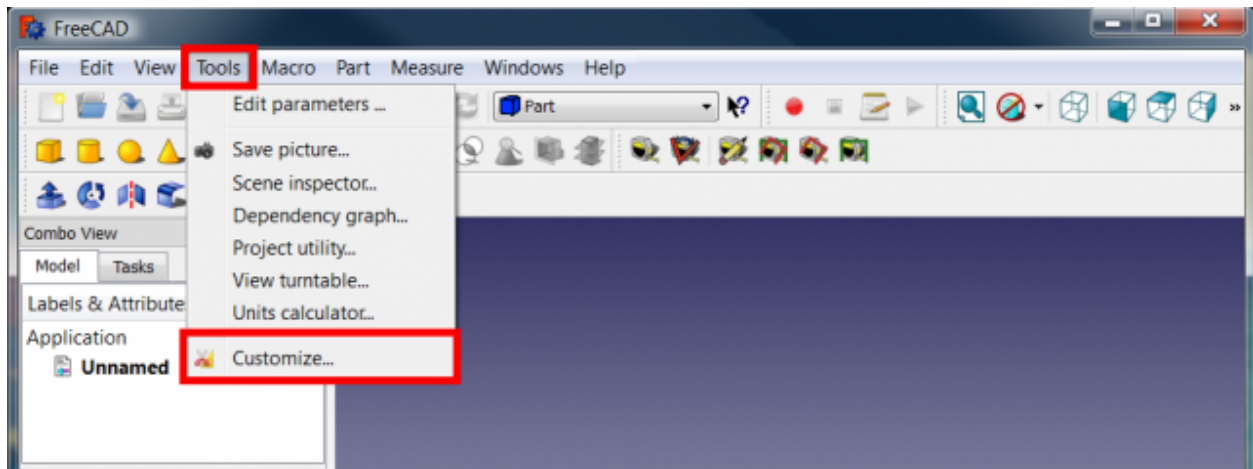
6.2 See Also

- [FreeCAD Wiki - Export to STL or OBJ](#)

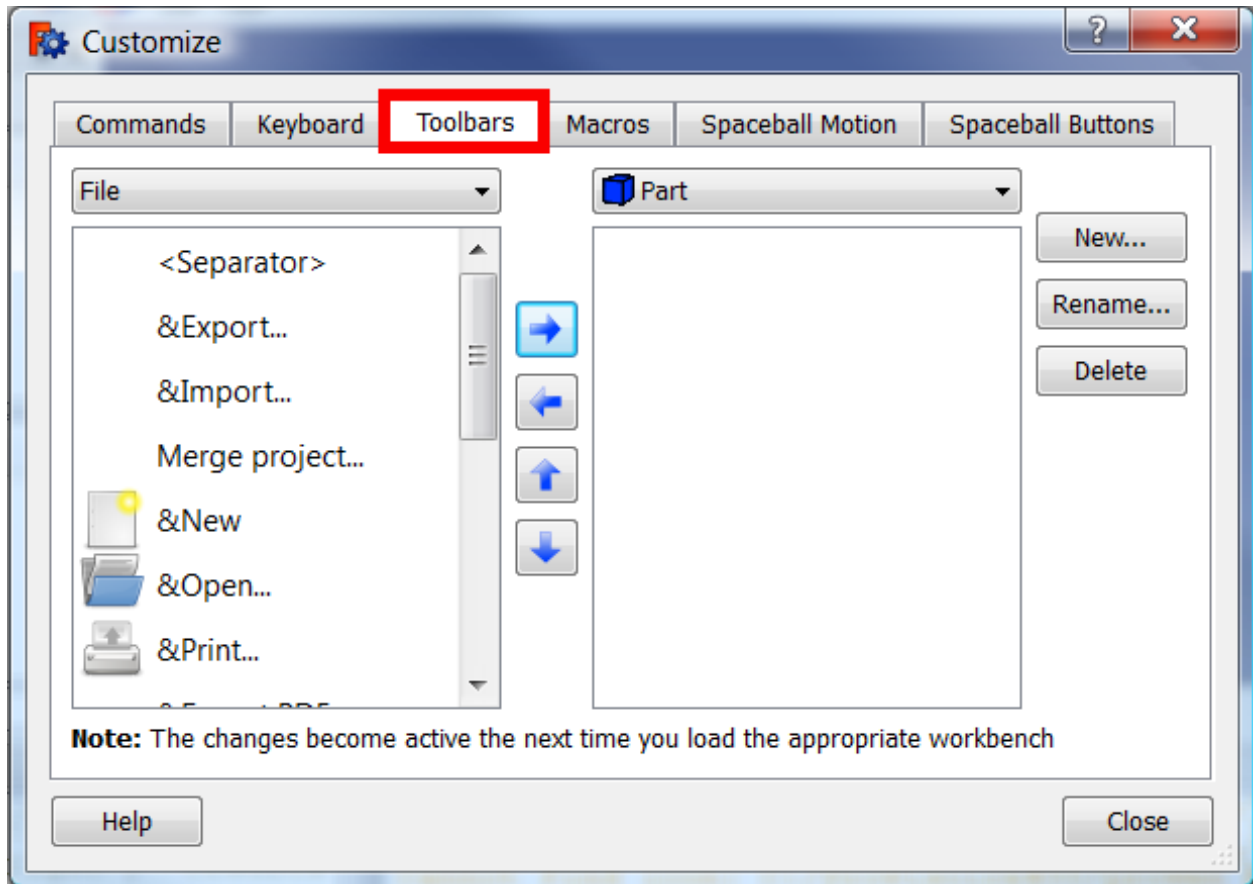
INCLUDING MOVE AND ROTATE TOOLS

This document covers how to include the **Move** and **Rotate** functions of the **Draft Workbench**.

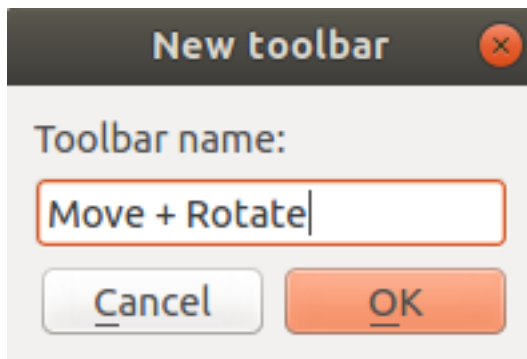
1. Load the Draft Workbench by selecting it from the workbench dropdown.
2. Select **Tools**, and then **Customize** from the Main menu.



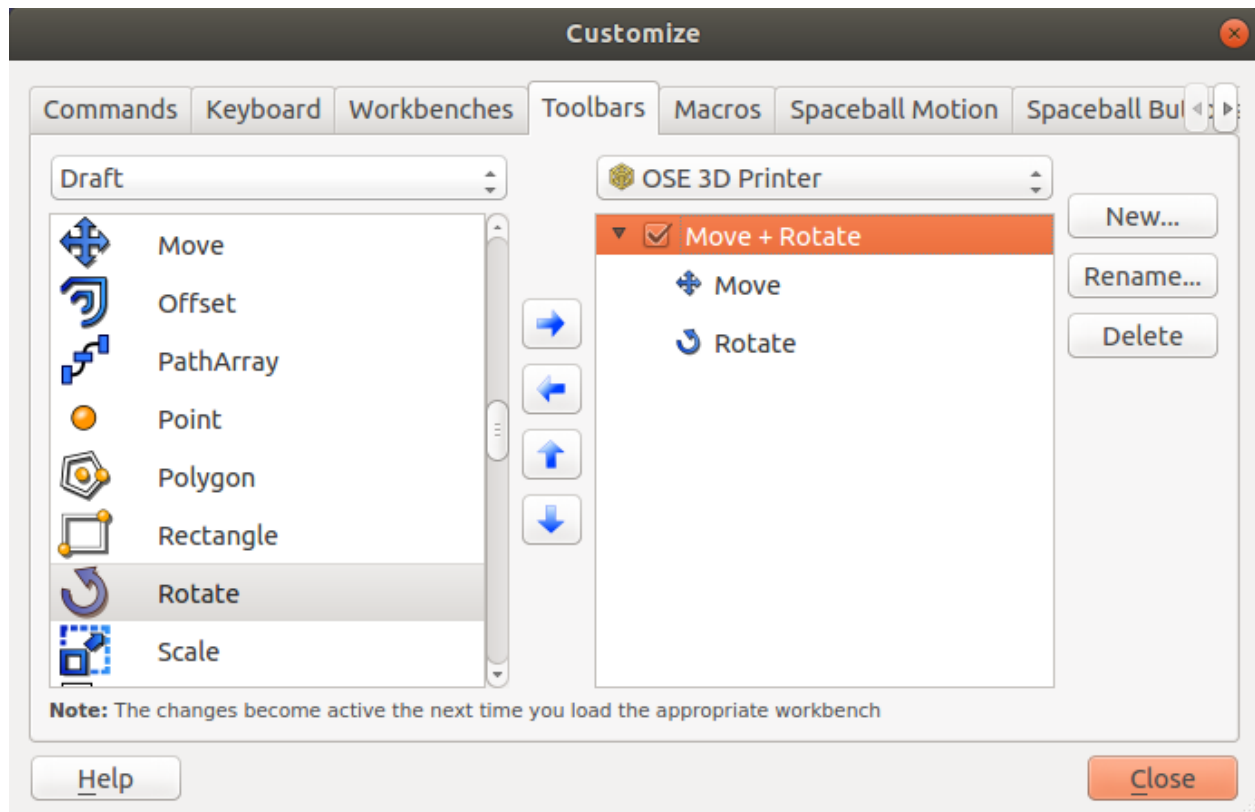
3. Next, select the **Toolbars** tab.



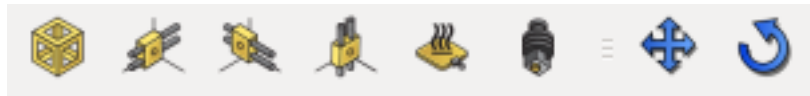
4. Select **OSE 3D Printer** from the dropdown in the right pane.
5. Click the **New...** button.
6. Name the toolbar **Move + Rotate**, and click **OK**.



7. Select the **Draft** workbench from the dropdown in the left pane.
8. Find the **Move** and **Rotate** tools and use the **Move right** button, or right arrow to add them to the **Move + Rotate** toolbar.



9. You should now have the **Move** and **Rotate** tools alongside the OSE 3D Printer tools.



See Also

[Customize Toolbars on the FreeCAD Wiki.](#)

OSE3DPRINTER

ose3dprinter library package containing code related to the geometry parts.

The ose3dprinter package is:

- Independent of the `freecad.ose3dprinter` package
- Must not know about the FreeCAD GUI (i.e. `FreeCADGui` or `Gui`)
- Executable from a server and command-line context

8.1 ose3dprinter.attachment

Attachment functions to make 3D Printer parts appear attached to each other.

Name	Description
<code>get_axis_frame_attachment_kwargs</code>	Get a dictionary describing how to attach an axis to a frame.
<code>get_default_axis_creation_kwargs</code>	Get default kwargs to create an axis with when not attaching to a frame.
<code>get_extruder_axis_attachment_kwargs</code>	Get a dictionary describing how to attach an extruder to an axis.
<code>get_heated_bed_frame_axis_attachment_kwargs</code>	Get a dictionary describing how to attach a heated bed to a frame and axis.

get_axis_frame_attachment_kwargs (*frame, selected_frame_face, axis_orientation*)

Get a dictionary describing how to attach an axis to a frame.

Keys include length, placement, and origin translation offset for making an axis object appear attached to a selected frame face.

Parameters

- **frame** – Frame object to attach axis to.
- **selected_frame_face** (*Part.Face*) – Selected face of frame to attach axis to.
- **axis_orientation** (*str*) – Orientation of axis.

Returns Dictionary describing how to attach an axis to a frame.

Return type `dict`

get_default_axis_creation_kwargs (*axis_orientation*)

Get default kwargs to create an axis with when not attaching to a frame.

Parameters `axis_orientation` (*str*) – Orientation of axis.

Returns Default kwargs to create an axis with when not attaching to a frame.

Return type `dict`

`get_extruder_axis_attachment_kwargs` (*axis, selected_axis_face*)

Get a dictionary describing how to attach an extruder to an axis.

Parameters

- **axis** – Axis object to attach extruder to.
- **selected_axis_face** (*Part.Face*) – Selected face of axis to attach extruder to.

Returns Dictionary describing how to attach an extruder to an axis.

Return type `dict`

`get_heated_bed_frame_axis_attachment_kwargs` (*frame, axis*)

Get a dictionary describing how to attach a heated bed to a frame and axis.

Parameters

- **frame** – Frame object to attach heated bed to.
- **axis** – Axis object to attach heated bed to.

Returns Dictionary describing how to attach a heated bed to a frame and axis.

Return type `dict`

8.2 ose3dprinter.model

Models for 3D Printer parts.

Name	Description
<i>AxisModel</i>	Encapsulates the data (i.e. topography and shape) for a Axis,
<i>ExtruderModel</i>	Encapsulates the data (i.e. topography and shape) for a Extruder,
<i>FrameModel</i>	Encapsulates the data (i.e. topography and shape) for a Frame,
<i>HeatedBedModel</i>	Encapsulates the data (i.e. topography and shape) for a Heated Bed,

```
class AxisModel (obj, length=304.8, carriage_position=50, orientation='x', side='top',
                 placement=Placement [Pos=(0,0,0), Yaw-Pitch-Roll=(0,0,0)], ori-
                 gin_translation_offset=Vector (0.0, 0.0, 0.0))
```

Bases: `osecore.app.model.Model`

Encapsulates the data (i.e. topography and shape) for a Axis, and is separate from the “view” or GUI representation.

Name	Type	Default Value	Description
Carriage Position	Percent	50	Position of carriage relative to available rod.
Length	Length	304.8 mm	Length of axis corresponds to rod length.
Orientation	String	x	Orientation of axis: X, Y, or Z.
Rod Diameter	Length	8.0 mm	Diameter of rod.
Side	String	top	Which side the bottom of the axis faces.

Type = 'OSEAxis'

calculate_carriage_box_x()

calculate_top_of_carriage_box_for_z_axis()

execute (*obj*)

Execute on document recompute.

is_x()

Return whether or not this axis is a X axis.

This assumes the axis is parallel to the XY, YZ, or XZ planes, and not rotated in a weird diagonal or skewed way.

Returns Whether this axis is a X axis.

Return type `bool`

is_y()

Return whether or not this axis is a Y axis.

This assumes the axis is parallel to the XY, YZ, or XZ planes, and not rotated in a weird diagonal or skewed way.

Returns Whether this axis is a Y axis.

Return type `bool`

is_z()

Return whether or not this axis is a Z axis.

This assumes the axis is parallel to the XY, YZ, or XZ planes, and not rotated in a weird diagonal or skewed way.

Returns Whether this axis is a Z axis.

Return type `bool`

class ExtruderModel (*obj*, *placement=Placement [Pos=(0,0,0), Yaw-Pitch-Roll=(0,0,0)], origin_translation_offset=Vector (0.0, 0.0, 0.0)*)

Bases: `osecore.app.model.Model`

Encapsulates the data (i.e. topography and shape) for a Extruder, and is separate from the “view” or GUI representation.

Based on: <https://wiki.opensourceecology.org/wiki/File:Simpleextruderassy.fcstd>

See: <https://wiki.opensourceecology.org/wiki/File:Finalextruder.png>

Name	Type	Default Value	Description
------	------	---------------	-------------

Type = 'OSEExtruder'

execute (*obj*)

Execute on document recompute.

class FrameModel (*obj*, *size=304.8, width=38.1, thickness=3.175, has_corners=False, placement=Placement [Pos=(0,0,0), Yaw-Pitch-Roll=(0,0,0)], origin_translation_offset=Vector (0.0, 0.0, 0.0)*)

Bases: `osecore.app.model.Model`

Encapsulates the data (i.e. topography and shape) for a Frame, and is separate from the “view” or GUI representation.

See D3D Frame on the Open Source Ecology Wiki: https://wiki.opensourceecology.org/wiki/D3D_Frame

Name	Type	Default Value	Description
Has Corners	Bool	False	Whether the frame has 3d printed corners or not.
Size	Length	304.8 mm	Size or dimension of cubic frame.
Thickness	Length	3.175 mm	Thickness of frame.
Width	Length	38.1 mm	Width of frame.

Type = 'OSEFrame'

property XMax

property XMin

property YMax

property YMin

property ZMax

property ZMin

property distance_between_axis_side_mount_holes

execute (*obj*)

Execute on document recompute.

get_face_side (*face*, *axis_orientation*)

Get the side of a frame corresponding to a given face and axis orientation.

Parameters

- **face** (*Part.Face*) – Face of frame to get the corresponding side for.
- **axis_orientation** (*str*) – Orientation of axis.

Returns Side of frame for the given *face* and *axis_orientation*.

Return type *str*

get_faces_for_side (*side*)

Get a list of face objects for a given side of the frame.

Parameters **side** (*str*) – Side of frame to get the faces for.

Returns List of faces objects corresponding to *side*.

Return type List[Part.Face]

get_outer_faces ()

Get a list of face objects corresponding to the outer-most faces of the frame.

Returns List of outer frame face objects.

Return type List[Part.Face]

class HeatedBedModel (*obj*, *placement=Placement [Pos=(0,0,0), Yaw-Pitch-Roll=(0,0,0)], origin_translation_offset=Vector (0.0, 0.0, 0.0)*)

Bases: `osecore.app.model.Model`

Encapsulates the data (i.e. topography and shape) for a Heated Bed, and is separate from the “view” or GUI representation.

Name	Type	Default Value	Description
Size	Length	203.2 mm	Size or dimension of heated bed.

```
Type = 'OSEHeatedBed'
```

```
execute (obj)
```

```
Execute on document recompute.
```

8.3 ose3dprinter.part

Parts for 3D Printer.

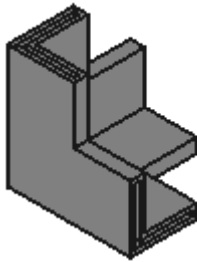
Name	Description
<i>AngleFrameConnector</i>	Connects angled bars together in a cubic frame.
<i>AngledBarFrame</i>	Frame made from 12 angled bars connected by angle frame connectors.
<i>Axis</i>	Modular and scalable CNC axis for creating cartesian CNC machines.
<i>CNCCutFrame</i>	Frame made from flat sheets cut by a CNC machine.
<i>Extruder</i>	Extruder for extruding heated-plastic.
<i>HeatedBed</i>	Heated bed to help prevent warping of prints.

class AngleFrameConnector

Bases: `object`

Connects angled bars together in a cubic frame.

An angle frame connector is made up of three brackets.



```
axis_side_mount_length = 27.75
```

```
axis_side_mount_width = 5
```

```
classmethod calculate_bracket_length (width, thickness)
```

Calculate the length of the bracket.

Parameters

- **width** (*float*) – Width of the angled frame.
- **thickness** (*float*) – Thickness of the angled frame.

Returns Length of one of the three brackets that make up an angle frame connector.

Return type `float`

```
classmethod calculate_y_axis_overhang_distance ()
```

Calculate distance of y axis over-hang.

Returns Distance of y axis over-hang.

Return type `float`

classmethod distance_between_axis_side_mount_holes_and_frame()

Calculate distance between the axis side mount holes and frame.

Returns Distance between the axis side mount holes and frame.

Return type float

classmethod make (*width=38.1, thickness=3.175, corner='bottom_left_front', with_set_screw=False, with_filleting=False*)

Make an angle frame connector.

Parameters

- **width** (*float*) – Width of the angled frame.
- **thickness** (*float*) – Thickness of the angled frame.
- **corner** (*str*) – Which corner to orient the angle frame connector to. Defaults to bottom left front corner.
- **with_set_screw** (*bool*) – Whether to include set screw mechanism.
- **with_filleting** (*bool*) – Whether to include filleting.

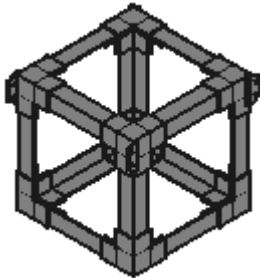
Returns Angle frame connector object.

Return type Part.Solid

class AngledBarFrame

Bases: object

Frame made from 12 angled bars connected by angle frame connectors.



static make (*side=304.8, width=38.1, thickness=3.175*)

Make a frame from from 12 angled bars connected by angle frame connectors.

No welding or epoxy required, and the frame can be disassembled.

Parameters

- **side** (*float*) – Side or dimension of frame from one corner to the opposite corner.
- **width** (*float*) – Width of angled bar.
- **thickness** (*float*) – Thickness of each angled bar.

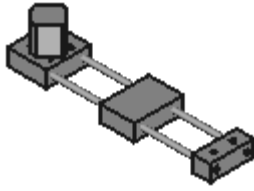
Returns A frame made up of angled bars, connected by angle frame connectors.

Return type Part.Shape

class Axis

Bases: object

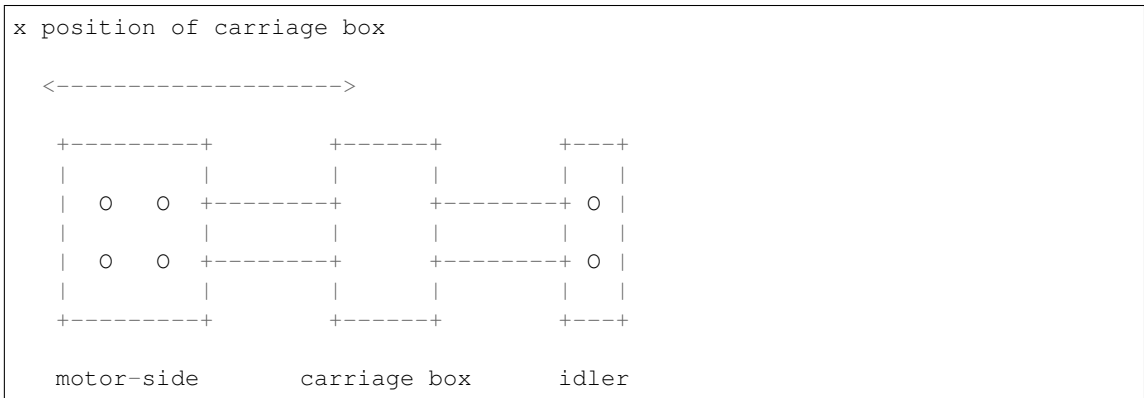
Modular and scalable CNC axis for creating cartesian CNC machines.



classmethod `calculate_carriage_box_x` (*rod_length*, *carriage_position*)

Calculate x position of carriage box.

Below is an ASCII depiction of a top-side view of an axis.



Parameters

- `rod_length` (*float*) – Length of axis rods.
- `carriage_position` (*int*) – Position of carriage (0 - 100).

Returns X position of carriage box.

Return type `float`

`carriage_box_width = 52`

`distance_between_hole_and_inner_motor_side = 12.59`

`distance_between_holes = 22.44`

classmethod `distance_between_idler_side_holes_and_outer_edge` ()

Calculate distance between idler side holes and outer edge.

Below is an ASCII depiction of a top-side view of the idler-side of an axis.



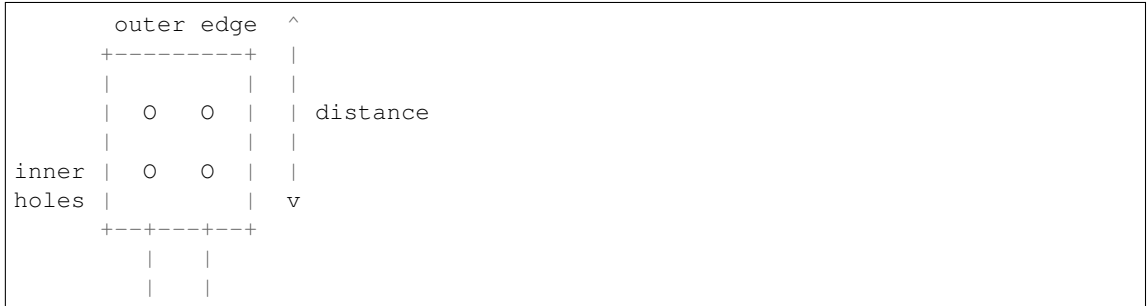
Returns Distance between idler side holes and outer edge.

Return type float

classmethod distance_between_inner_motor_side_holes_and_outer_edge()

Calculate distance between inner motor side holes and outer edge.

Below is an ASCII depiction of a top-side view of the motor-side of an axis.



Returns Distance between inner motor side holes and outer edge.

Return type float

hole_radius = 3.39

idler_box_length = 66

idler_box_width = 26

classmethod make (*rod_length=304.8, rod_radius=4.0, carriage_position=50, orientation='x', side='top', initial_placement=Placement [Pos=(0,0,0), Yaw-Pitch-Roll=(0,0,0)], origin_translation_offset=Vector (0.0, 0.0, 0.0)*)

Make a universal CNC axis.

Parameters

- **rod_length** (*float*) – Length of rods.
- **rod_radius** (*float*) – Radius of rods.
- **carriage_position** (*int*) – Position of carriage as percentage (0 - 100).
- **orientation** (*str*) – Default orientation of axis (x, y, or z).
- **side** (*str*) – Default side axis faces.
- **initial_placement** (*Base.Placement*) – Initial placement for part.
- **origin_translation_offset** (*Base.Vector*) – Offset part from origin.

Returns Axis object.

Return type Part.Compound

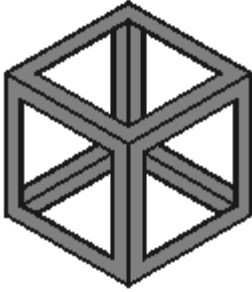
motor_box_width = 59.5

x_distance_between_holes = 23.36

class CNCCutFrame

Bases: object

Frame made from flat sheets cut by a CNC machine.



static make (*side=304.8, width=38.1, sheet_thickness=3.175*)

Make a frame from flat sheets cut by a CNC machine.

These flat sheets are then welded or epoxied together.

This approach works best with welding.

See Also: https://wiki.opensourceecology.org/wiki/D3D_Frame

Parameters

- **side** (*float*) – Dimension of one side of a cubic sheet.
- **width** (*float*) – Width of outer sheet, after an inner sheet is cut out of the center.
- **sheet_thickness** (*float*) – Thickness of each sheet.

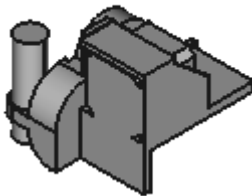
Returns A frame “welded” together from eight CNC cut sheets.

Return type Part.Shape

class Extruder

Bases: `object`

Extruder for extruding heated-plastic.



static make (*initial_placement=Placement [Pos=(0,0,0), Yaw-Pitch-Roll=(0,0,0)], ori-
gin_translation_offset=Vector (0.0, 0.0, 0.0)*)

Make an extruder.

Parameters

- **initial_placement** (*Base.Placement*) – Initial placement for part.
- **origin_translation_offset** (*Base.Vector*) – Offset part from origin.

Returns Extruder object.

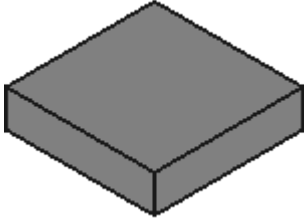
class HeatedBed

Bases: `object`

Heated bed to help prevent warping of prints.

See Also:

- https://wiki.opensourceecology.org/wiki/Heated_Bed
- https://reprap.org/wiki/Heated_Bed



static make (*size=203.2*, *initial_placement=Placement [Pos=(0,0,0), Yaw-Pitch-Roll=(0,0,0)]*, *origin_translation_offset=Vector (0.0, 0.0, 0.0)*)
Make heated bed.

Parameters

- **size** (*float*) – [description]
- **initial_placement** (*Base.Placement*) – Initial placement for part.
- **origin_translation_offset** (*Base.Vector*) – Offset part from origin.

Returns Heated bed object.

Return type Part.Compound

FREECAD.OSE3DPRINTER

9.1 freecad.ose3dprinter.command

Commands users can perform in FreeCAD's GUI.

Name	Description
<i>AddExtruderCommand</i>	Command to add extruder object.
<i>AddFrameCommand</i>	Command to add Frame object.
<i>AddHeatedBedCommand</i>	Command to add Heated Bed object.
<i>AddXAxisCommand</i>	Command to add X Axis object.
<i>AddYAxisCommand</i>	Command to add Y Axis object.
<i>AddZAxisCommand</i>	Command to add Z Axis object.
<i>CopyCutListToClipboardCommand</i>	Command to copy cut-list to clipboard.
<i>MakeAngleFrameConnectorCommand</i>	Command to make an Angle Frame Connector.
<i>SaveCutListAsCsvCommand</i>	Command to save cut-list as a CSV file.

class AddExtruderCommand

Bases: `object`

Command to add extruder object.

Activated()

GetResources()

IsActive()

NAME = 'AddExtruder'

class AddFrameCommand

Bases: `object`

Command to add Frame object.

Activated()

GetResources()

IsActive()

NAME = 'AddFrame'

class AddHeatedBedCommand

Bases: `object`

Command to add Heated Bed object.

```

    Activated()
    GetResources()
    IsActive()
    NAME = 'AddHeatedBed'
class AddXAxisCommand
    Bases: object
    Command to add X Axis object.
    Activated()
    GetResources()
    IsActive()
    NAME = 'AddXAxis'
class AddYAxisCommand
    Bases: object
    Command to add Y Axis object.
    Activated()
    GetResources()
    IsActive()
    NAME = 'AddYAxis'
class AddZAxisCommand
    Bases: object
    Command to add Z Axis object.
    Activated()
    GetResources()
    IsActive()
    NAME = 'AddZAxis'
class CopyCutListToClipboardCommand
    Bases: object
    Command to copy cut-list to clipboard.
    Activated()
    GetResources()
    IsActive()
    NAME = 'CopyCutListToClipboard'
class MakeAngleFrameConnectorCommand
    Bases: object
    Command to make an Angle Frame Connector.
    Activated()
    GetResources()
    IsActive()

```

```

    NAME = 'MakeAngleFrameConnector'
class SaveCutListAsCsvCommand
    Bases: object
    Command to save cut-list as a CSV file.
    Activated()
    GetResources()
    IsActive()
    NAME = 'SaveCutListAsCsv'

```

9.2 freecad.ose3dprinter.icon

Package containing icons.

Name	Description
<code>get_icon_path</code>	Get the path to a given icon.

9.2.1 Icons

Icon	Filename
	Extruder.svg
	Frame.svg
	HeatedBed.svg
	Std_CoordinateSystem.svg
	XAxis.svg
	YAxis.svg
	ZAxis.svg
	document-save-as.svg
	edit-copy.svg

`get_icon_path` (*icon_filename*)

Get the path to a given icon.

Parameters `icon_filename` (*str*) – icon filename (e.g. Box.svg)

Returns Path to icon file.

Return type `str`

9.3 freecad.ose3dprinter.part_feature

Exposes functions to create `Part::FeaturePython` objects.

Minimally, these objects are custom, parameteric, and have a `Shape` for viewing in three dimensions.

See Also: https://wiki.freecadweb.org/FeaturePython_Objects https://wiki.freecadweb.org/Creating_a_FeaturePython_Box,_Part_II https://wiki.freecadweb.org/Scripted_objects

Additionally, they may have a `ViewProvider` class for providing additional customization to their 3d representation, and how they respond to certain graphical interactions such as selection.

See Also: <https://wiki.freecadweb.org/Viewprovider>

Name	Description
<code>create_axis</code>	Creates a axis object with the given name,
<code>create_extruder</code>	Creates a extruder object with the given name,
<code>create_frame</code>	Creates a frame object with the given name,
<code>create_heated_bed</code>	Creates a heated bed object with the given name,

create_axis (*document, name, length=304.8, carriage_position=50, orientation='x', side='top', placement=Placement [Pos=(0,0,0), Yaw-Pitch-Roll=(0,0,0)], origin_translation_offset=Vector (0.0, 0.0, 0.0)*)

Creates a axis object with the given name, and adds it to the document.

create_extruder (*document, name, placement=Placement [Pos=(0,0,0), Yaw-Pitch-Roll=(0,0,0)], origin_translation_offset=Vector (0.0, 0.0, 0.0)*)

Creates a extruder object with the given name, and adds it to the document.

create_frame (*document, name*)

Creates a frame object with the given name, and adds it to the document.

create_heated_bed (*document, name, placement=Placement [Pos=(0,0,0), Yaw-Pitch-Roll=(0,0,0)], origin_translation_offset=Vector (0.0, 0.0, 0.0)*)

Creates a heated bed object with the given name, and adds it to the document.

9.4 OSE_3D_Printer

Command Registry Module

Name	Description
<code>register_commands</code>	Register all workbench commands,

register_commands ()

Register all workbench commands, and associate them to toolbars, menus, sub-menus, and context menu.

9.5 init_gui

Imported when FreeCAD starts up to add workbench to GUI.

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