# How to Align, Duplicate & Position 2D Vectors in ArtClip3D?

You may need to change vectors position or overall aspect in your design. A new position might become needed, or aligning your objects to a given reference a must. This tutorial demonstrates the actions of the Alignment tools, as well as the Duplication and Positioning tools to perfect your 2D creations.
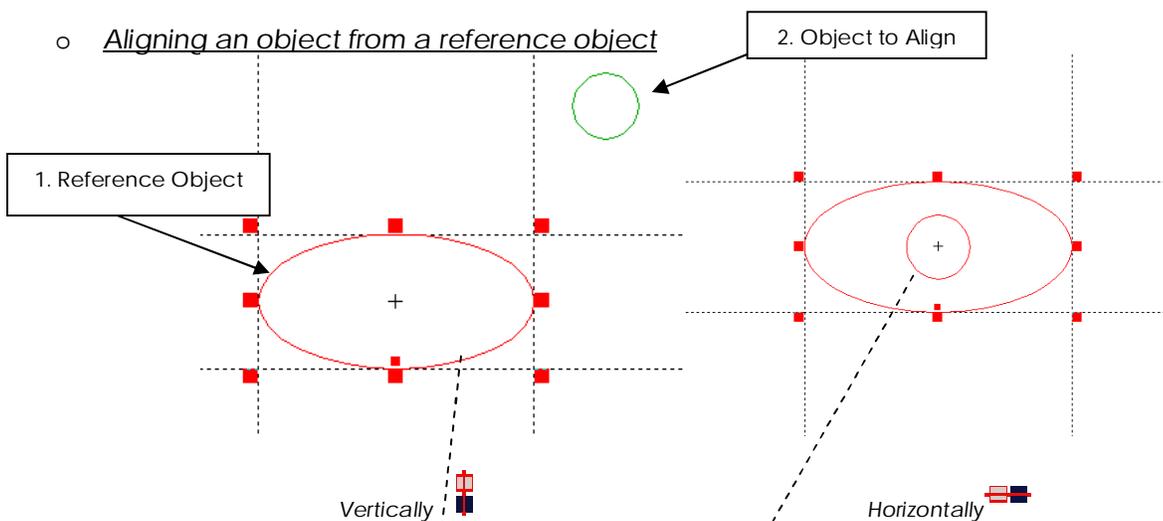
- ## *Aligning Vectors*

The selection of a marker or any 2D objects as reference can be used in ArtClip3D Software so objects can be aligned from defined references. ArtClip3D's Alignment tools center object to object, and/or directly in the center of the working area. Follow examples of the actions possible.

- ○ *Aligning an object from a Marker reference*

2. Object to align

1. Reference Marker

Vertically   *Horizontally*
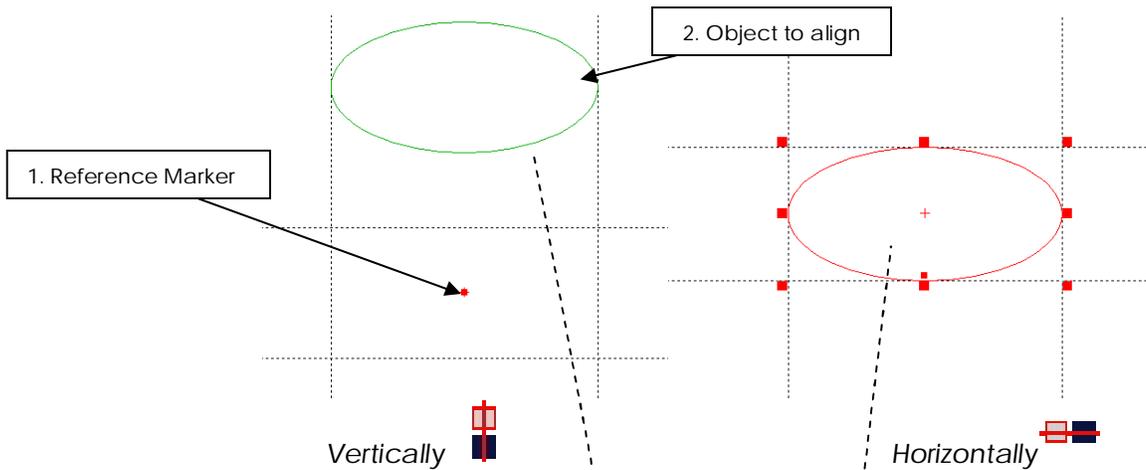
*The marker can be a useful reference object with no dimension at a defined position (Hold **F2** to position it accurately within the working area). The marker can be compared as a point. By selecting first the marker and then the object to align (use **CTRL** key to multi select), the **Vertical Aligning** and **Horizontal Aligning** tools allow the positioning of the center of gravity of the object at the position XY of the marker.*
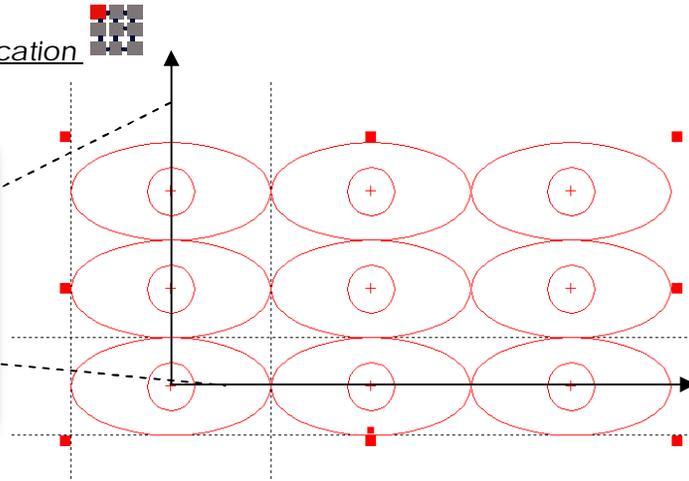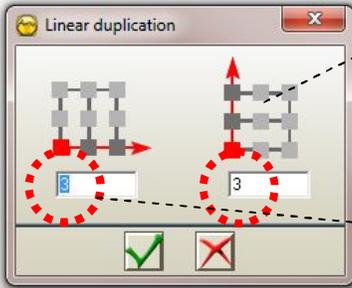
- ○ *Aligning an object from a reference object*

2. Object to Align

1. Reference Object

Vertically   *Horizontally*

Same result as with the marker, the first object selected (here the Ellipse) becomes the reference object on which any other object can align such as here the circle.
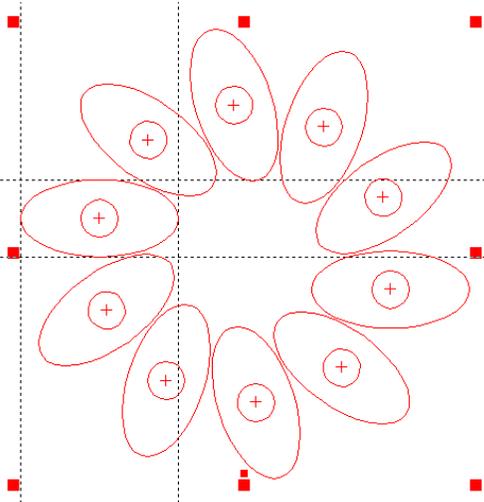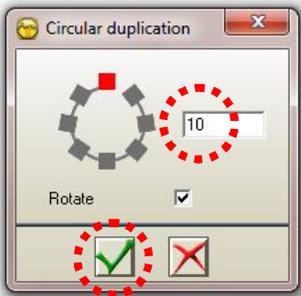
- ***Duplicating Vectors***

  o *Linear Duplication*

  *The linear Duplication tool allows a definition of the columns and rows defining within a matrix the number of duplications needed. The **F2** key after validating the window can also help to define gaps between the objects if needed.*
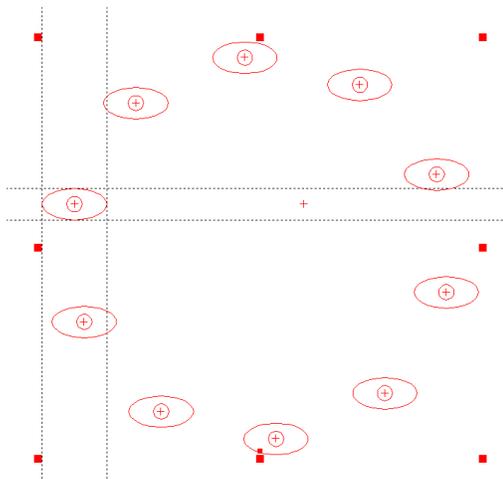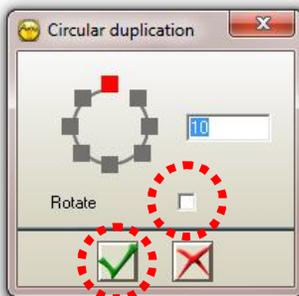
  o *Circular Duplication with Rotation of the object on itself*

  Any object can also circularly be duplicated. Select the object(s) you want to duplicate and click the icon. Enter your desired number of duplication and validate. Click and hold then the screen to display the distribution of the duplication, move to adjust it.

  ***NB**: The **F4** key allows previewing what is selected while you apply the duplication; a simple hold on the key will transform the view from bounding box selection to the vector selection helping to position the objects.*

 o *Circular Duplication with no Rotation of the object*

  Un-checking the Rotate option allows the duplication without rotation of the object(s) on themselves, keeping them in their original state of orientation.
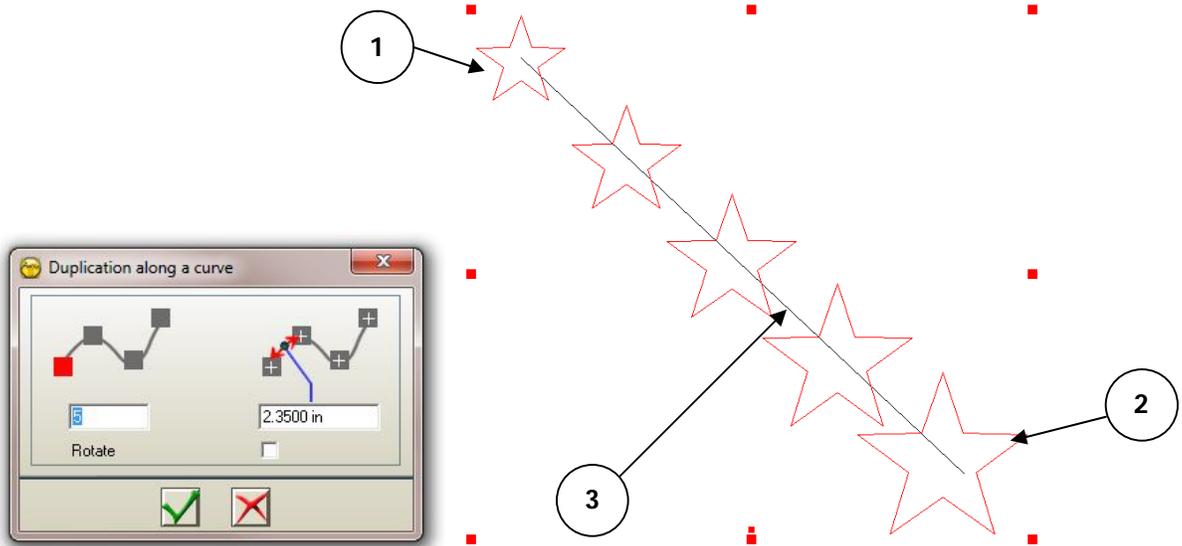
o _Duplication on a curve_

(Group all your vector objects so they can be duplicated all at the same time on the base line)
Select the vector(s) to duplicate + the path on which to duplicate, click then **Duplication on a curve** _tool_ .

With Rotation of the selected vector(s)   **Without Rotation**
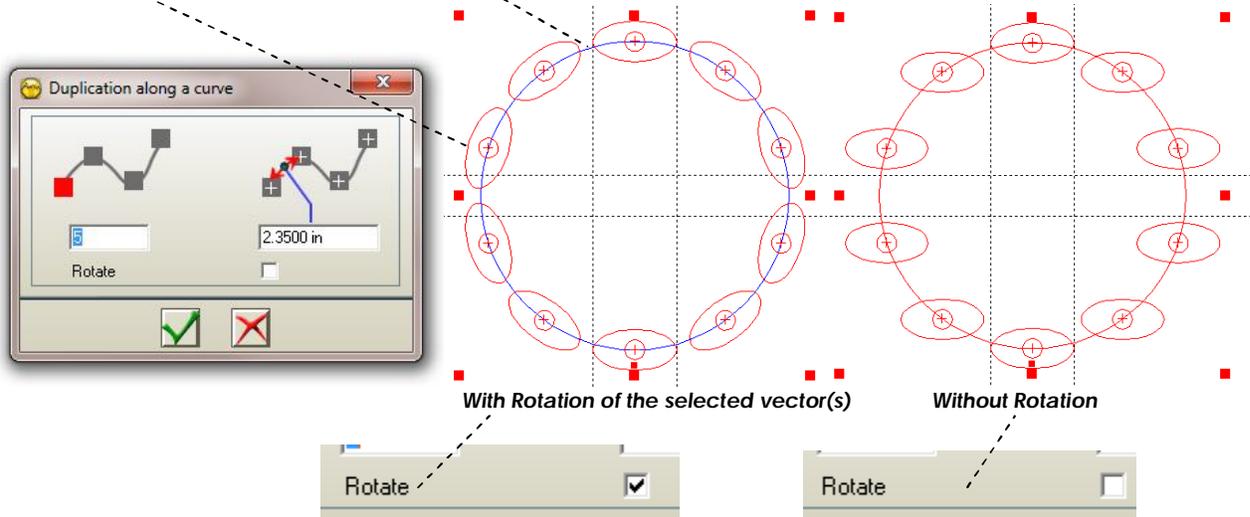
o _Duplication along a curve with a progressive size increase of the object_

1

2

3

ArtClip3D _can also create a morphing transition within the duplications. For this, duplicate the first_ **(1)** _object at the end of the path and increase its size using the control handles_ **(2)**. _Then select the first object_ **(1)** _and the copied one you made bigger_ **(2)**, _select then the path on which you want to see the duplication made_

**(3)** _and click the_ **Duplication along a curve** _tool_ .

- ***Mirroring Vectors*** ***(Transformation Tools)***

*The mirror tools of ArtClip3D can be combined with **SHIFT** and **CTRL** keys actions. **SHIFT** giving the copy of the original object and **CTRL** the motion within an extreme (Right direction or underneath) allowing the transformation of the original object.*
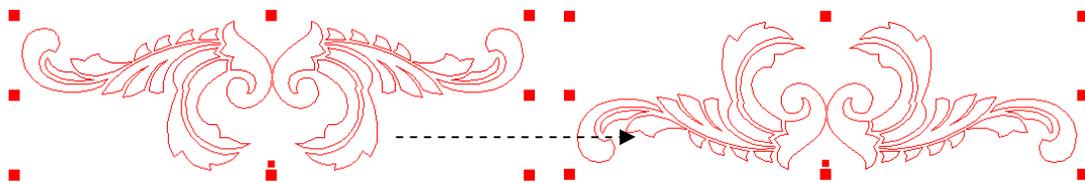

Original object imported from the 2D library
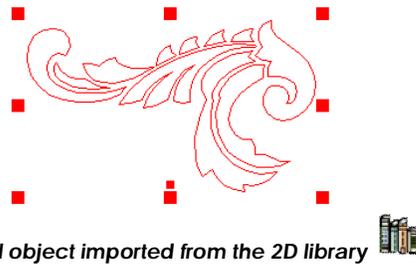
- o *Vertical Mirror*

With SHIFT held **(keeps original)**
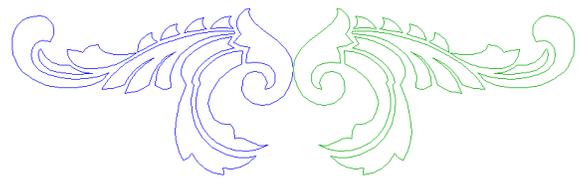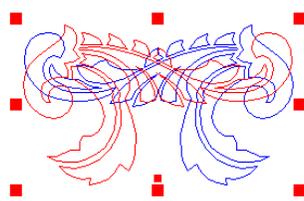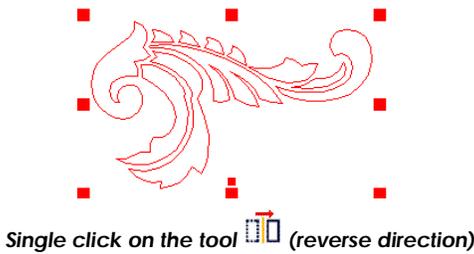
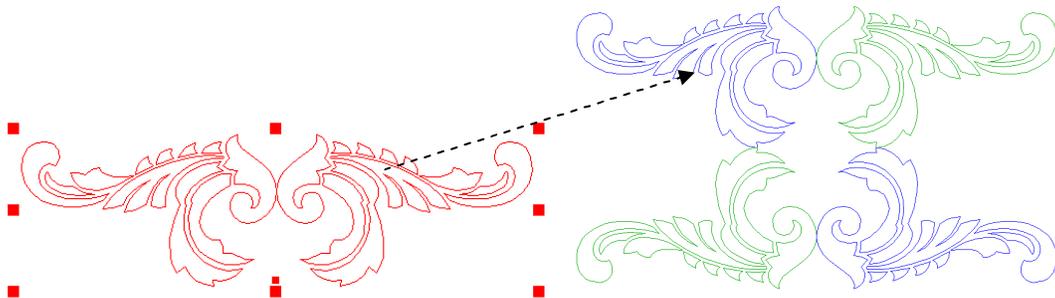**Single click on the tool** **(reverse direction)**   **With SHIFT+CTRL held** **(copy on the right edge)**

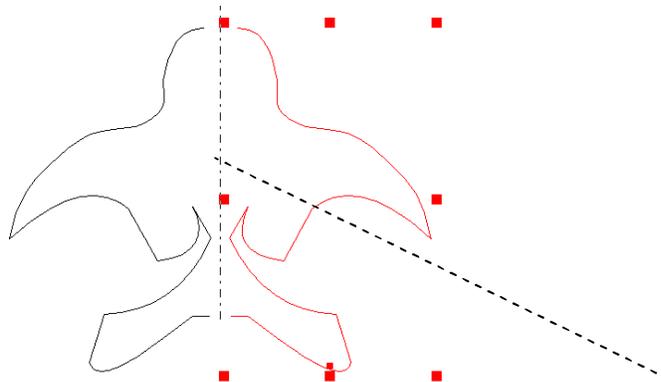- o *Horizontal Mirror*

Single click on the tool **(Flip Horizontally)**

Holding SHIFT+CTRL **(Flip Horizontally & Duplicate underneath)**
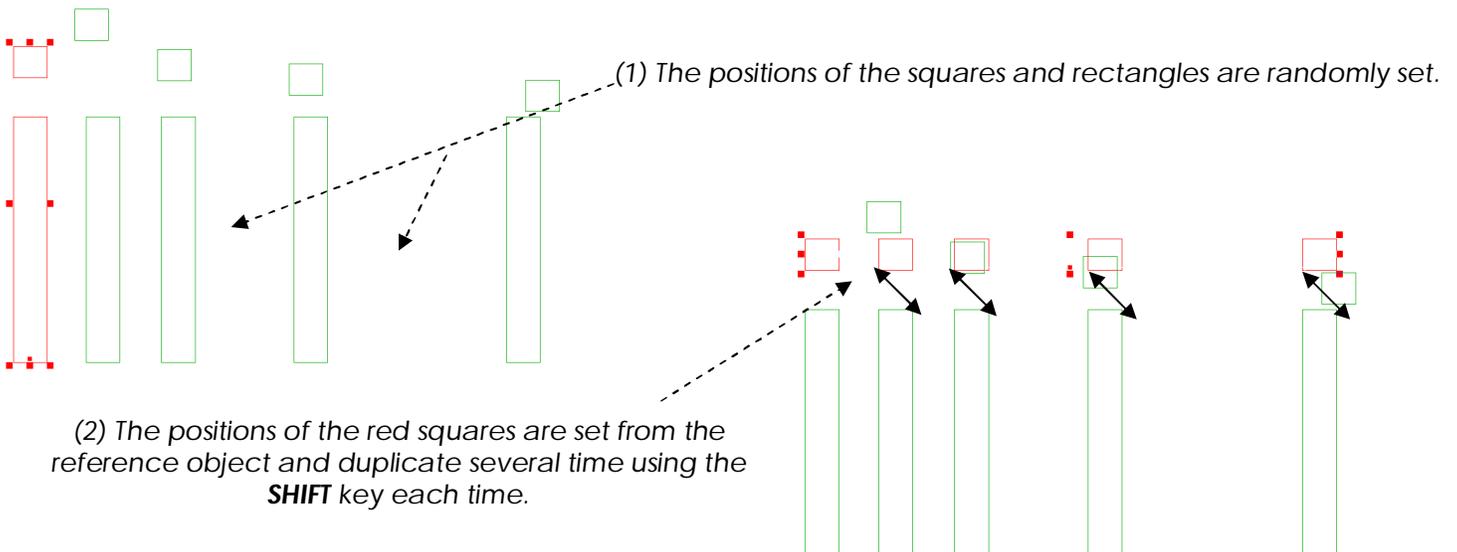
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o   *Mirror along Axis*

*The **SHIFT** key allows the copy of the original object on the other side of the selected axis.*

- **Positioning Vectors** *(Transformation Tools)*

o   *Move object*

The move object tool allows keeping a distance between 2 elements that can be snapped.
On the figure below, in red is shown a rectangle and a square set at a defined distance from each other.
*The other elements in green look a like, except that the distances and alignments are all different. By selecting the original square with the **Move object** tool you can keep the distance with an extreme point from the rectangle below. The **Snap up** mode **F3** allows snapping the control point (corner point of the rectangle) and to assign a distance to keep as well as an alignment. You move the object by copying it to the next rectangle keeping distance and alignment the same while holding the **SHIFT** key.*

(1) The positions of the squares and rectangles are randomly set.

*(2) The positions of the red squares are set from the reference object and duplicate several time using the **SHIFT** key each time.*

This tool needs a repetition of the move for each object to position. When the first object is copied then you have to repeat the action on the one you just moved and so on.
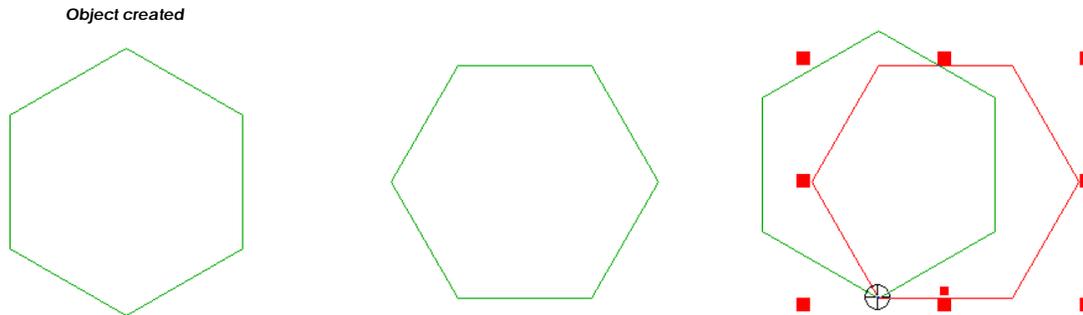
o   *Rotate object*

*Following are the 3 main ways to rotate your objects in **ArtClip3D**:*

- *The Rotation handle located at the bottom middle of your selection box allows the direct rotation from the center of gravity of the object.*

- *The **F2** Key can set the accurate rotation angle desired.*

- *The **Rotate object** tool which performs a rotation from a marker position.*
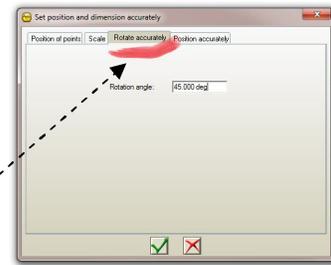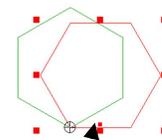
Rotation also from a marker point with
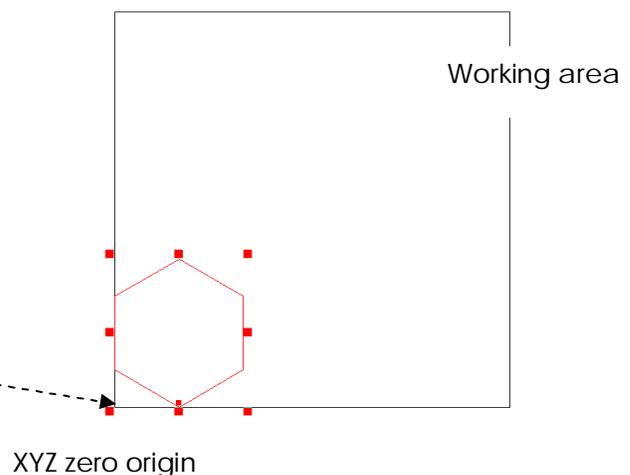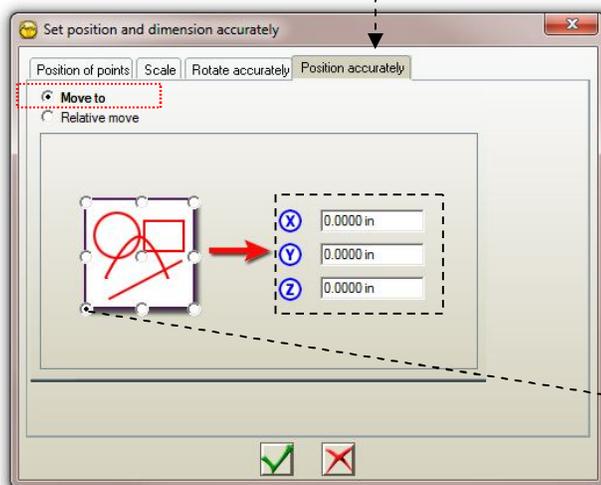
Object created

Rotation can be assigned with the selection of the object and F2 key

The marker can be moved at any location: control point snapped, in the object area or outside as needed.

o   *F2 Key*

*In term of **Positioning**, **Scaling** and **Rotating** the **F2** key is actually the condensed power of actions.*
*By selecting your object and holding the **F2** key all those actions are available from the Tabs shown at the top of the window.*

*You can for instance **Position accurately** using the **Move to** option and set the point of reference from the bounding box and assign the XYZ position from the coordinate fields.*

Working area

XYZ zero origin

*The original object created is moved from its lower left extreme position to the lower left position of the working area at XYZ = 0. **ArtClip3D** can manage up to 16 digits precision if needed to accurately position your objects at the right position within the working area, and by extension on your CNC machine.*

- ***Moving object with the Arrow keys***

The arrows keys of your keyboard allow motion of your selected object. Holding CTRL key will also open the Arrow move Value field so you can set the increment of the motion.
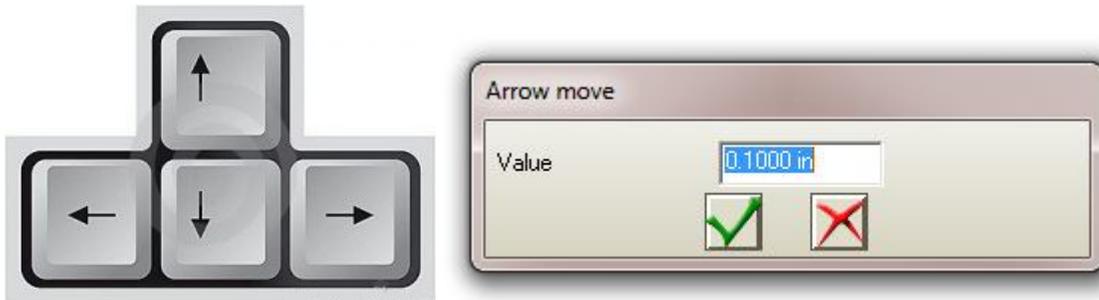

Frequently Asked Questions

"I am not sure how the objects are actually defining their alignment when the Vertical Aligning and Horizontal Aligning tools are used. How do I know if I am off or really centered?"

*The way **ArtClip3D** Software aligns object together is based on the edge definition of the bounding box. This bounding box is shown at several places within the Software:*

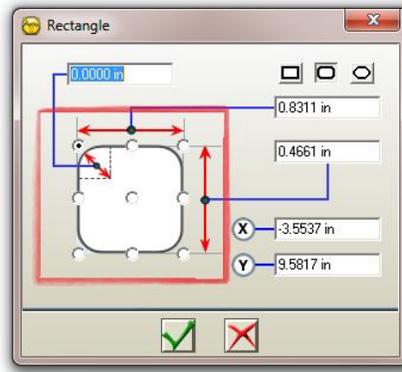- o *When you select: The red control handles ■ defines the limits of the bounding box.*
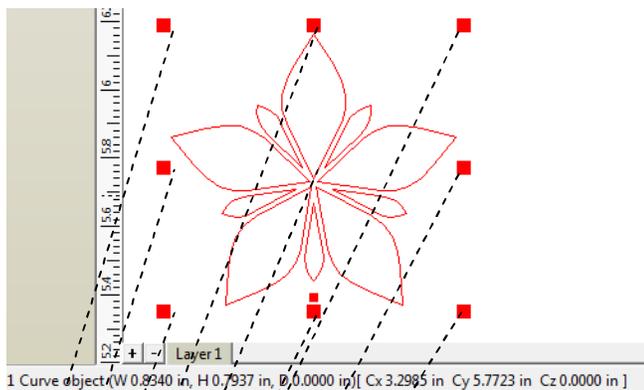
1 Curve object (W 0.8340 in, H 0.7937 in, D 0.0000 in) [Cx 3.2985 in Cy 5.7723 in Cz 0.0000 in]   *The size is also displayed at the bottom Dialog line.*

- o *When you use **F2** and the **Position accurately** tab.*
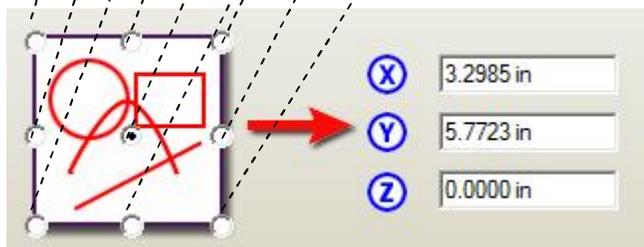
o *When you design Geometrical Shapes using **F2** such as the Rectangle:*

The bounding box is the reference edge of an object. It can be compared to a box showing the limits of an area constraining the 2D vectors. When aligning center in ArtClip3D, it means the center of the bounding box is positioned in the center of either another object or of the working area.