

OPOS Outline Cutting

Introduction

Summa supports several systems for positioning / aligning media in their cutting machines. These alignment systems are used to do the contour cutting of printed designs. The most accurate and automatic method is called OPOS.

This document describes shortly the principle of the OPOS alignment systems and which support the sign-making software should include.

The second part describes in detail how to implement the OPOS alignment system in the sign-making software. In this document, it is assumed WinPlot is used. This software is compatible with Summa roll cutters, models S Class 2, S One, SummaCut R(L), S Class and SummaSign.

Contour Cutting Problems

Depending on the selected alignment method, the cutters can counterbalance the following irregularities:

Rotated Design

If the printed design is not loaded straight into the unit, the contour can be rotated equally to fit the printed graphic.



Skewed Design

If the X and Y-axes of the printed design are not perpendicular, the contour can be skewed to fit the printed design.



Scaled Design

If the print size is different from the original design in your software due to media expansion or shrinkage, or due to printing inaccuracies, the contour can be scaled to fit the printed graphic.

NOTE: The scaling can only be adjusted by a few percent.

Any combination of the three above irregularities can be handled too.

The parameter “Alignment Mode” in the user configuration menu determines which alignment method is used.

The OPOS Alignment Method

The S One, SummaCut and S Class series roll cutters have an option called **OPOS**. This accurate **O**ptical **P**ositioning **S**ystem guarantees precise contour cutting. The registration markers are read automatically with an optical sensor.

The basic idea for printing and cutting with OPOS is described hereafter in several steps:

Create a design for printing and cutting.

1. Add registration markers to the design. The sign-making software should facilitate this procedure for the user. The software should automatically place the markers at the correct place and with the correct size.
2. Print the design together with the markers.
3. Insert the design in the cutter.

4. Send commands to the cutter, which inform the cutter about the amount, the size and the position of the markers.
5. Start the OPOS load procedure on the cutter; this procedure will register the markers. The software usually initiate this procedure.
6. The next step will be for the user to manually position the optical sensor near the first marker.
7. Finally the software must send the outline of the design to the cutter (in the DM/PL or HP-GL vector language). The cutter will then cut the design precisely and compensate errors from alignment, calibration differences between printer and cutter, rotation of media and skewing.

NOTE : The information that the cutter requires (info about markers (4), starting the OPOS load procedure (5) and the cutting data (7)) can all be sent at once to the cutter after the printed design is inserted in the cutter.

In this document there are several references to the X and Y-axis. With the X-axis is meant the axis in which the media moves, the Y-axis correspond to the movement of the cutting head. This is the same co-ordinate system as for the DM/PL and HP-GL vector language used for the cutting data. The origin of the cutter is at the lower right corner of the media and corresponds to co-ordinate X=0 and Y=0.

Registration Markers

To have full advantage of the OPOS system the placement of the markers should be done fully automatically by the software. The software should have an option that places all the necessary markers for the current design. The software should then also automatically send the info about the markers to the cutter (step 4).

Shape

The markers must be black rectangles, all of the same size.

Size

It is advised to use square markers of 3 mm by 3 mm. This means that the X-size is 3 mm and the Y-size is 3 mm. Do not use markers smaller than 1.5 mm and do not use markers bigger than 5 mm.

Position

Make sure there is a white margin of about 3-4 times the marker size around the marker. If anything is printed within this margin the sensor may have trouble to locate the markers.

The first marker must be positioned at the origin of the drawing, at co-ordinate (0,0). More precisely the lower right corner of the marker must be at co-ordinate (0,0). All cutting data must then be related to the lower right corner of the marker.

Note : Make sure there is at least 1 cm, preferably 2 cm margin between the markers and the edge of the media, on each side and in the front.

Exactly 2 rows of markers along the Y-axis are necessary. The first row includes the origin marker and is placed on the right side of the design along the Y-axis. The Y-co-ordinate of the right side of these markers must be 0 (see illustration 1 - OPOS Markers Layout). The second row is also placed along the Y-axis at position Y-distance at the left side of the picture. The right side of these markers must be at position Y-distance (see illustration 1 - OPOS Markers Layout).

The Y-distance between the markers can go up to 1600 mm. This is the widest media that a cutter from Summa can accommodate.

There are 2 or more markers along the X-axis necessary. The distance between 2 markers along the X-axis (called X-distance) must be the same for all markers. The advised X-distance is 400 mm. Do not go beyond 1000 mm.

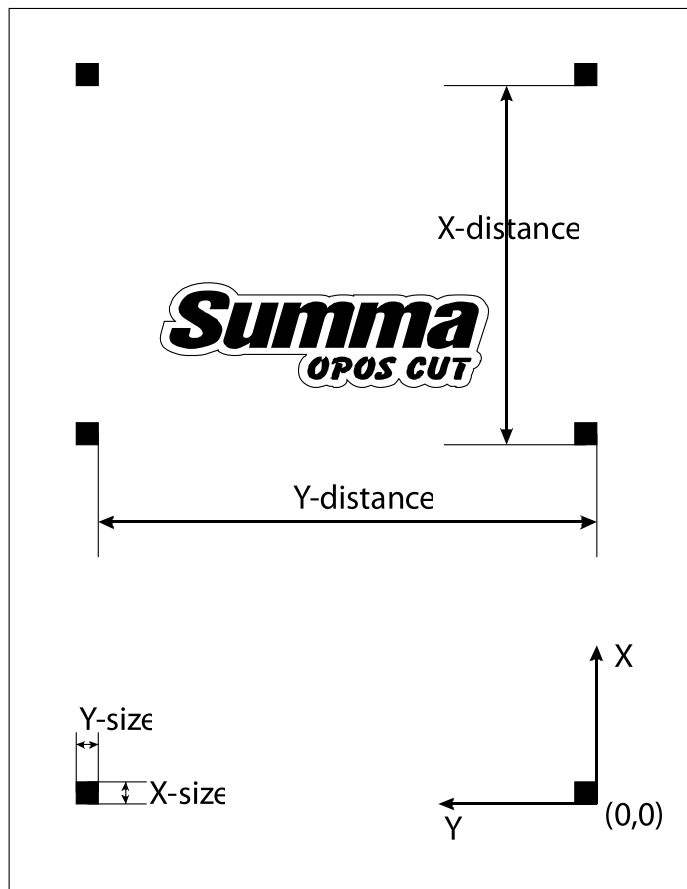
Note : When printing on sheets, make sure that there is a margin of at least 8 cm (3.15") at the end of the sheet

The distance between 2 markers is measured from lower right corner to lower right corner in both X and Y direction as shown in illustration 1.

It is advised to put markers till the end of the drawing (in the X-direction). The last marker however does not have to be past the design. The OPOS system will extrapolate the information as needed.

Note : It can be useful to place a sign somewhere indicating the origin marker. This is useful when the printed design needs to be loaded in the cutter. Also make sure there is enough white space around every marker.

Illustration 1 - OPOS Markers Layout



OPOS XY

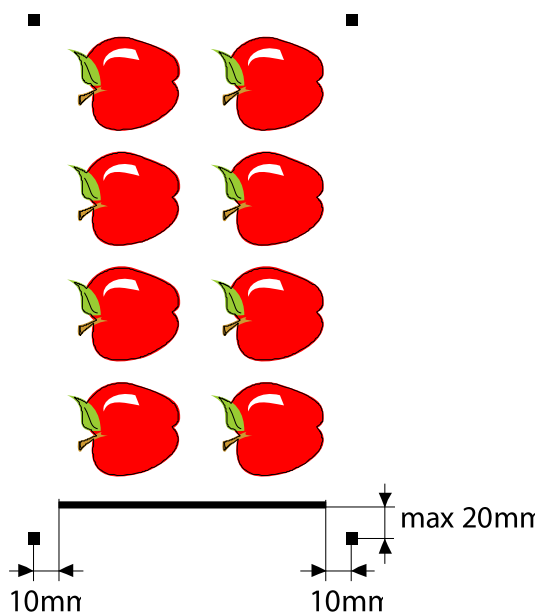
The Summa roll-cutters also support an extra correction along the Y-axis, this feature is called OPOS XY. It will compensate for misalignment between what is printed and what is cut along the Y-axis due for example for curved print-outs along this axis.

In order to do this, a line must be added along the Y-axis between or slightly beyond the first markers. The distance between the center of the markers and the line should not be more than 20mm in X-direction. Usually no shift is used, and the horizontal line is printed in line with the registration markers (this saves some media).

The left and right margin between the line and the markers should be 10 mm for optimal sensing. It may however vary between 10 and 15 mm.

The thickness of the line should be 3mm.

Illustration 2 - OPOS XY

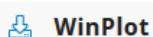


The OPOS-XY is an extra alignment mode. It can be set by means of the front panel, or from the software driving the cutter.

WinPlot

Summa WinPlot can import AI, EPS and PDF file formats containing vector data. It will convert this vector data to commands the cutter understands.

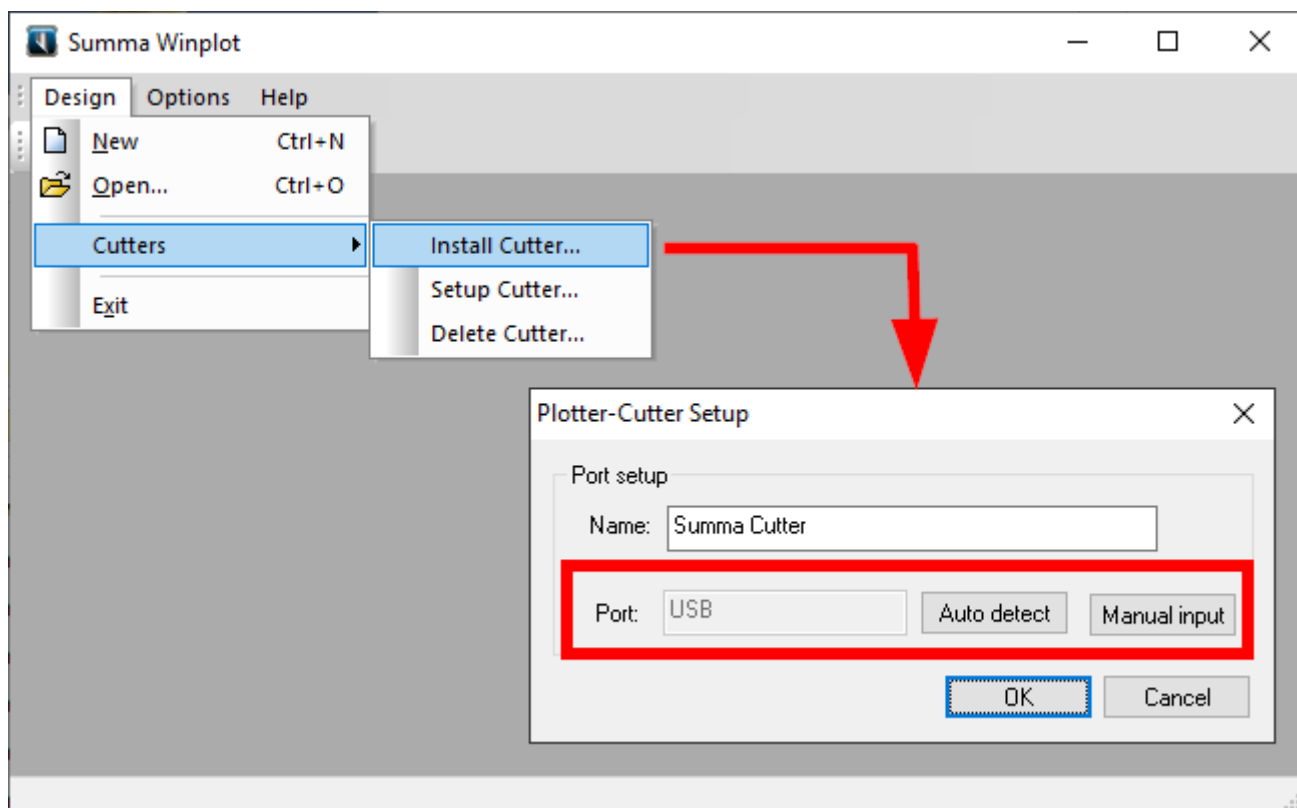
Summa WinPlot is available from the Summa website:



Cutting program that imports EPS, AI and PDF files: positioning, rotating and scaling possibilities. Supports Vista/7/8/10/11 32-bit & 64-bit, and is compatible with all Summa brand cutters.

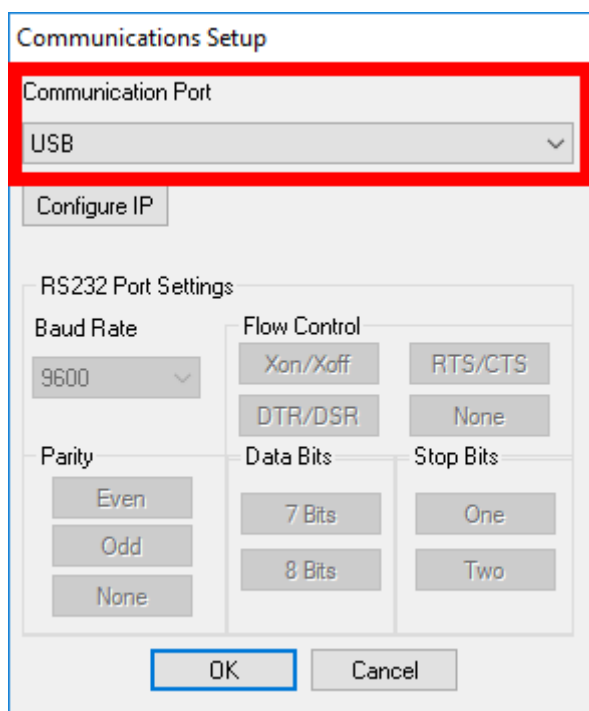
Configuring WinPlot

Click [Design] – [Cutters] – [Install Cutter...].



When the machine is switched on and connected to the computer, the [Auto detect] button can be used to select the communication port.


In case the machine was not yet powered on, or is not yet connected to the computer, then click on [Manual input] and select "USB" (or the interface used on the cutter) from the Communication Port drop down list.



Plug-in

The easiest way to create a graphic to be printed of which the contours need to be cut using a Summa roll-cutter is by using a plug-in, which is able to set the registration marks around the design. The design can be printed using the RIP supplied with the printer. The contours and registration marks can be sent to the cutter by using the software WinPlot, available from the Summa website.

The plug-in is available from the Summa website:

 **Summa Cutter Tools**

Software bundle including all cutting related tools including:

- > **Summa Cutter Control 4.20.0.0**

Software interface for adjusting parameters on Summa legacy cutter, including speed, mode, pressure, blade offset and much more. Supports Vista/Win 7/Win 8/10.
- > **Plug-in for CorelDRAW 12 - 2022 and Adobe Illustrator CS - CC 2022**

Plug-in for CorelDRAW & Illustrator to use with Winplot 6.6 or higher.

When Summa Cutter Tools is started, then the software will search for the installed design software (Illustrator and CorelDraw), and will install the plug-in for the found software.

Plug-in for CorelDRAW

The Toolbar in CorelDRAW contains four icons.



The first icon is used to set OPOS marks around objects, and is intended to be used with a cutter having the standard OPOS-X sensor. If the icon is clicked, then following things happen:

- A new layer called 'Regmark' is created
- All objects in all visible unlocked layers are selected.
- OPOS marks of 3mm are put around them and an OPOS XY line is added at the bottom.
- The Regmark layer is locked.

If the second icon is clicked, then following things happen:

- The Regmark layer (if it exists) is temporarily unlocked (just for exporting).
- All objects in unlocked layers and in layers where the printing/exporting is not disabled are selected.
- All selected objects are exported to a temporarily file and this file is opened in WinPlot.
- The Regmark layer (if it exists) is locked.

If the third icon is clicked, then following things happen:

- The selected objects are exported to a temporarily file and this file is opened in WinPlot.

If the fourth icon is clicked, then following things happen:

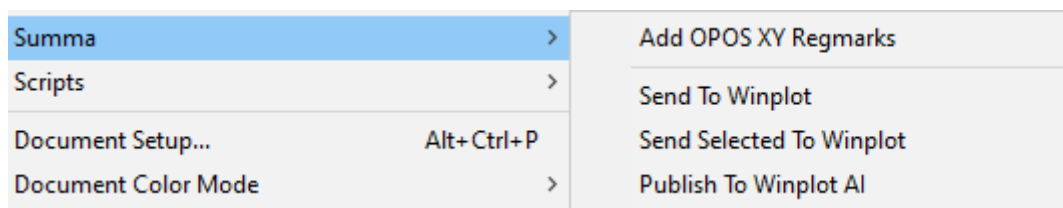
- The objects are handled the same way as if the second icon is clicked, but instead of exporting the objects to WinPlot, they are saved in a file ready to be opened by WinPlot (file type will be AI).

Plug-in for Illustrator

When the plug-in is installed then a script is installed to open WinPlot automatically and import the selected objects into it.

Click on [File], then on [Summa]. Then choose the script to run.

The extra menu under file has four sub menu's.



The first sub menu is used to set OPOS marks around objects, and is intended to be used with a

cutter having the standard OPOS-X sensor. If the icon is clicked, then following things happen:

- A new layer called 'Regmark' is created
- All objects in all visible unlocked layers are selected.
- OPOS marks of 3mm are put around them and an OPOS XY line is added at the bottom.
- The Regmark layer is locked.

If the second icon is clicked, then following things happen:

- A check will occur in order to verify if all changes are saved in the drawing up to the moment where the script is started. If not, the file will be saved automatically. If the file has never been saved, then Illustrator will prompt the user for a file name.
- The Regmark layer is temporarily unlocked (just for saving).
- All objects in all visible layers are selected.
- All selected objects are saved to a temporarily file and this file is opened in WinPlot.
- The Regmark layer (if it exists) is locked.

If the third icon is clicked, then following things happen:

- A check will occur in order to verify if all changes are saved in the drawing up to the moment where the script is started. If not, the file will be saved automatically. If the file has never been saved, then Illustrator will prompt the user for a file name.
- The selected objects are exported to a temporarily file and this file is opened in WinPlot.

If the fourth icon is clicked, then following things happen:

- The objects are handled the same way as if the second icon is clicked, but instead of exporting the objects to WinPlot, they are saved in a file ready to be opened by WinPlot (file type will be AI).

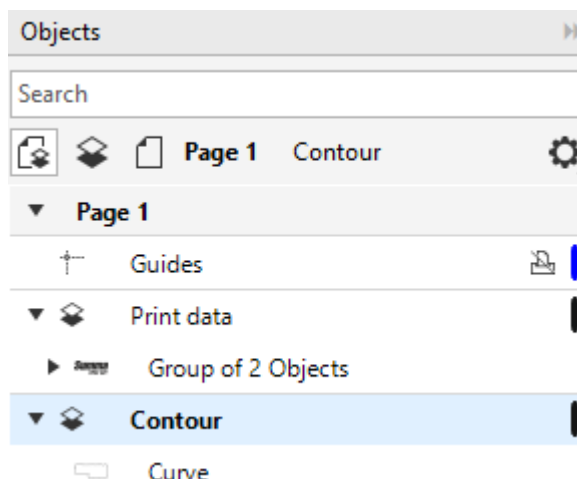
Using the Plug-in with CorelDRAW

Creating the Graphic

1. Use the design software to create the graphic that needs to be print and cut. It is recommended to work with layers so that the print data is in one layer and the cut lines are in another layer.
2. Activate the “Print data” layer, and create the design in this layer.
3. Activate the “Contour” layer, and create the contours around the design.



Graphic to be printed and cut



Usage of layers

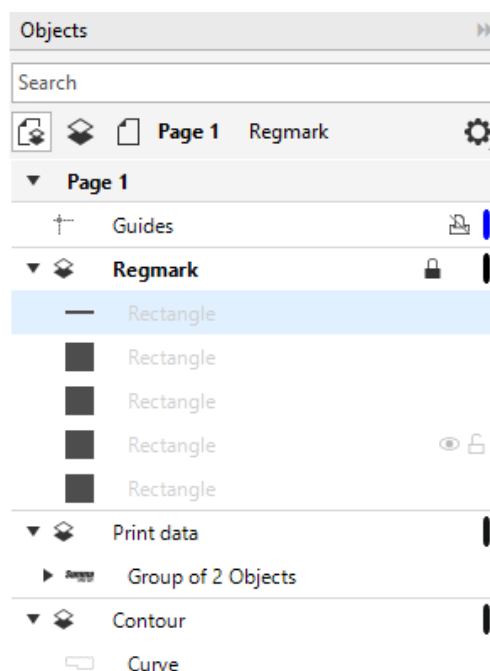
4. Insert OPOS registration marks around the graphic using the plug-in. Click on the “Add OPOS Regmark” icon.



Inserting marks



Graphic with OPOS marks

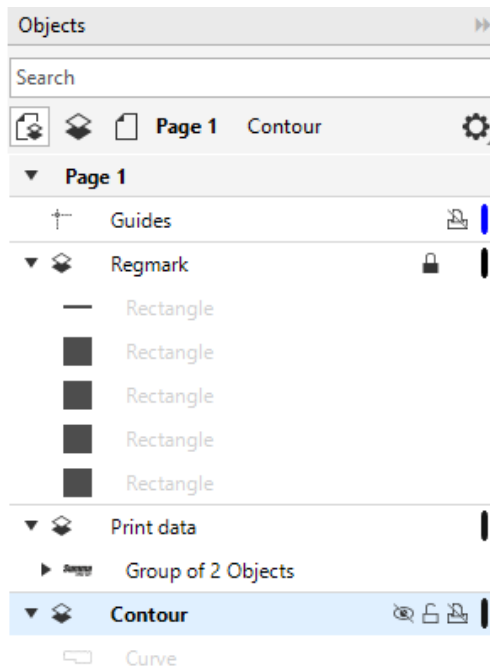


Usage of layers

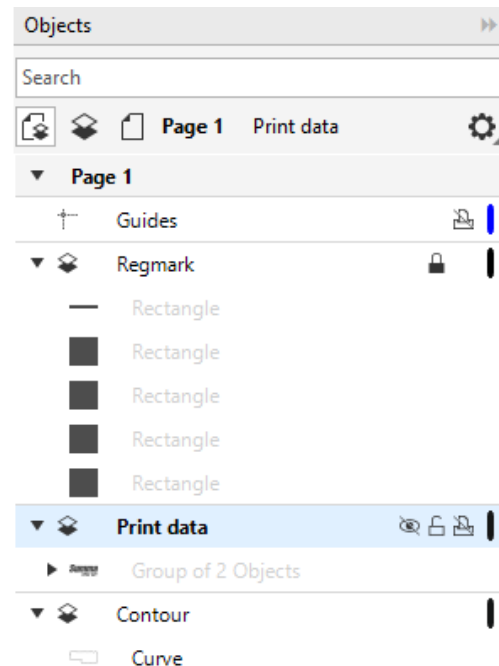
Printing the graphic

1. Disable the layer(s) with the cut data (Contour in above sample) for exporting or printing (it is recommended to hide it also. This way a visual check can be done).
2. Export to an eps/pdf file that can be imported into the RIP.
3. Make sure there is at least a 1 cm (0.4in) margin beyond each of the graphic's four OPOS marks. A 2cm (0.8in) margin is preferable.
4. Leave a margin of at least 4 cm (1.57in) following the print when using sheets or when cutting the print off a roll.

5. Print the graphic.



Setting up layers to export for printing



Setting up layers for cutting

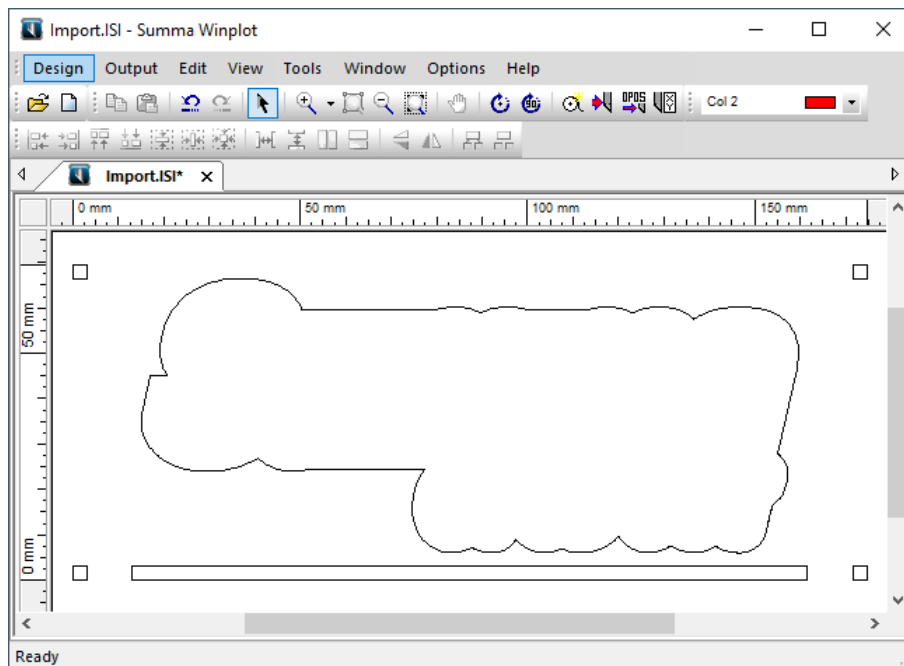
Contour Cutting the graphic

1. Disable the layer with the print data for exporting or printing (it is recommended to hide it also. This way a visual check can be done).
2. Enable the layer(s) with the cut data (Contour). Make them visible in case they were set invisible.
3. Click on the [Send To WinPlot] icon.

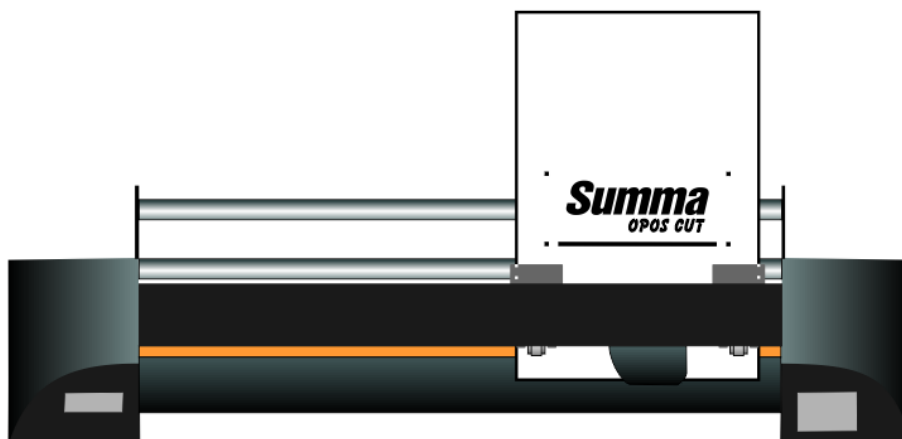



Send to WinPlot

4. The design will open in WinPlot.

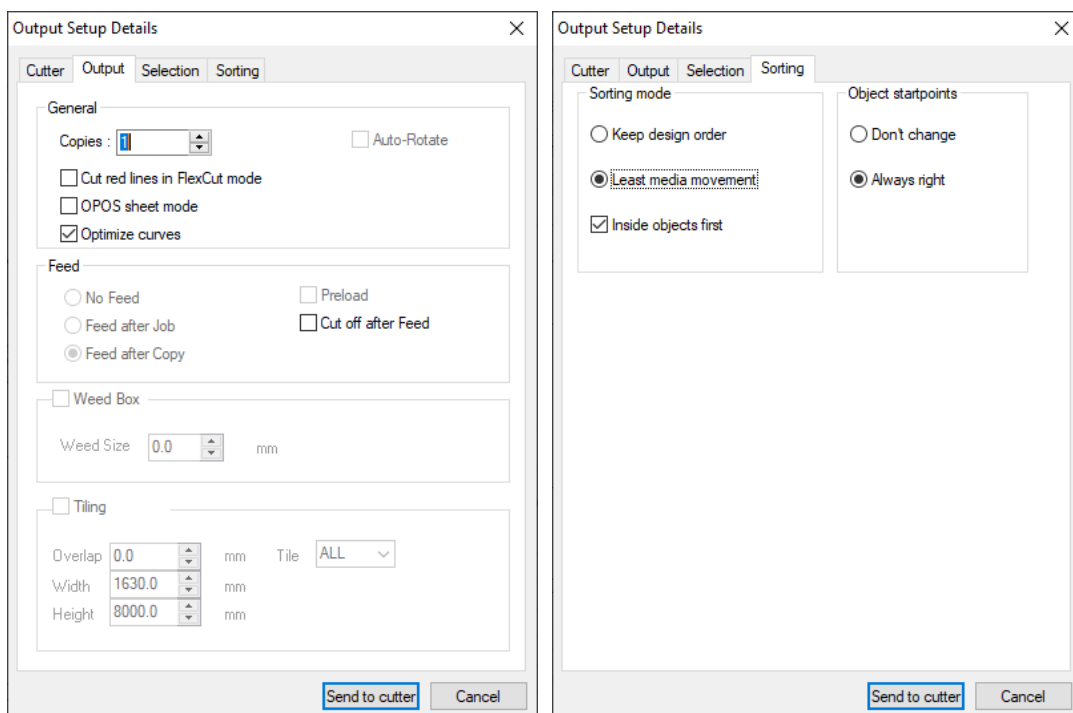


5. Load the printed graphic into the cutter.



6. In WinPlot, click  to send the graphic to the cutter.

7. Change the output options if necessary, then click on [Send to cutter].



8. The cutter's LCD displays "Set knife above first marker". Using the cutter's four navigation keys positions the knife above the graphic's origin marker (the marker at the bottom right-hand corner of the graphic).
9. Press the cutter's "Enter" key.

The cutter will register the OPOS marks and then cut out the graphic.

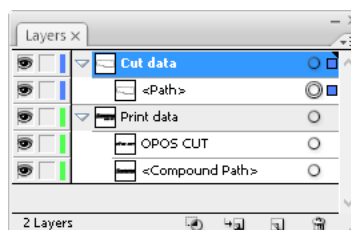
Using OPOS plug-in With Illustrator

Creating the graphic

1. Use your design software to create the graphic that you want to print and cut. It is recommended to work with layers so that the print data is in one layer and the cut lines are in another layer.

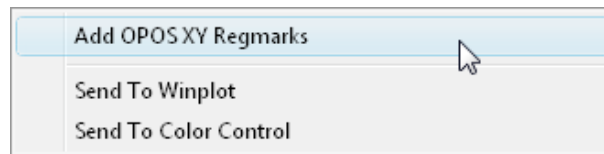


Graphic to be printed and cut



Usage of layers

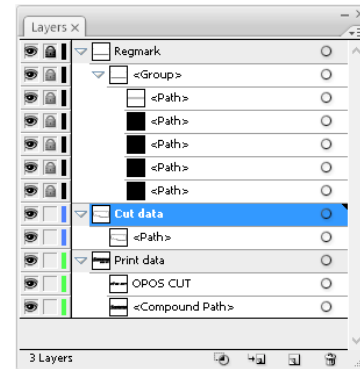
2. Insert OPOS registration marks around the graphic using the plug-in. Click on [File] then on [Summa] and then on [Add OPOS Regmarks].



Inserting marks in Illustrator



Graphic with OPOS marks

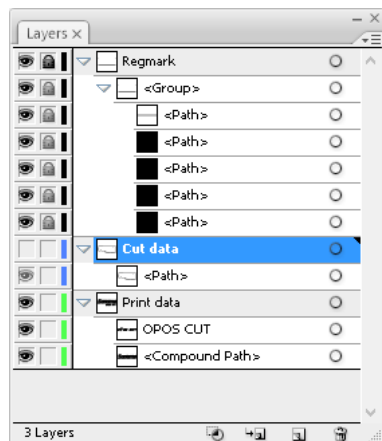


Usage of layers

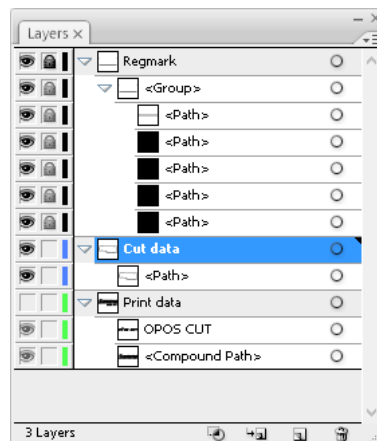
Printing a graphic with Illustrator

1. Disable the visibility of the cut data layer.
2. Save as an eps file that can be imported into the RIP.
3. Make sure there is at least a 1 cm (0.4in) margin beyond each of the graphic's four OPOS marks. A 2cm (0.8in) margin is preferable.
4. Leave a margin of at least 4 cm (1.57in) following the print when using sheets or when cutting the print off a roll.

5. Print the graphic.



Setting up layers to export for printing



Setting up layers for cutting

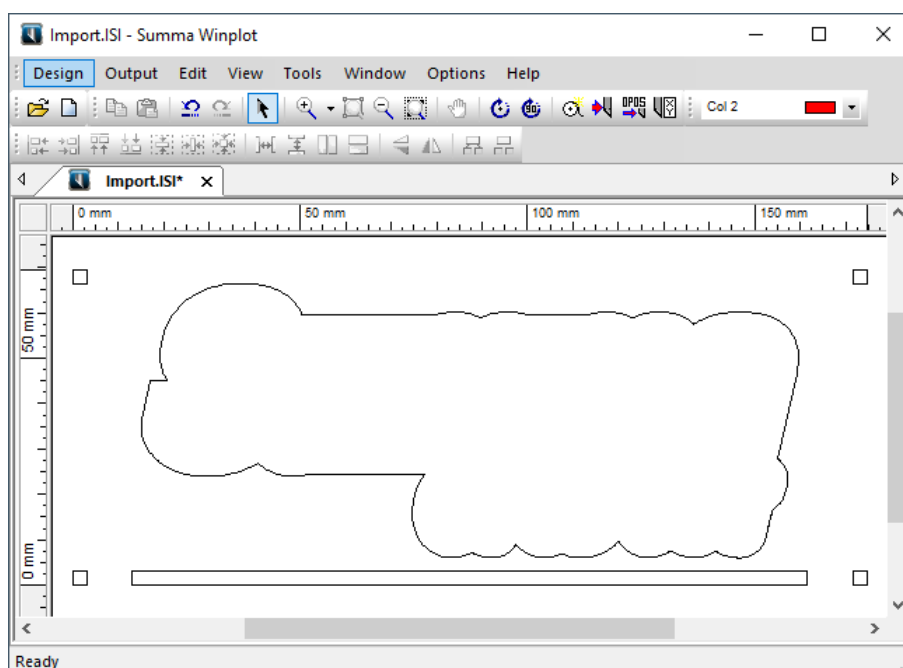
Contour Cutting the graphic

1. Toggle the visibility of the layer with the printing data, making it invisible. Set the cut data layer visible. Check if that is the correct data that needs to be send to the cutter.
2. Click on [File], then on [Summa], and then on [Send to WinPlot].

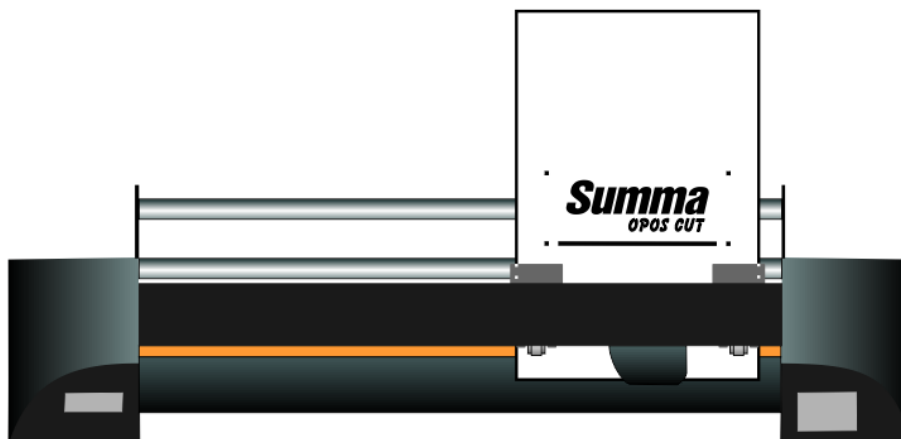
Send To Winplot


Send to WinPlot

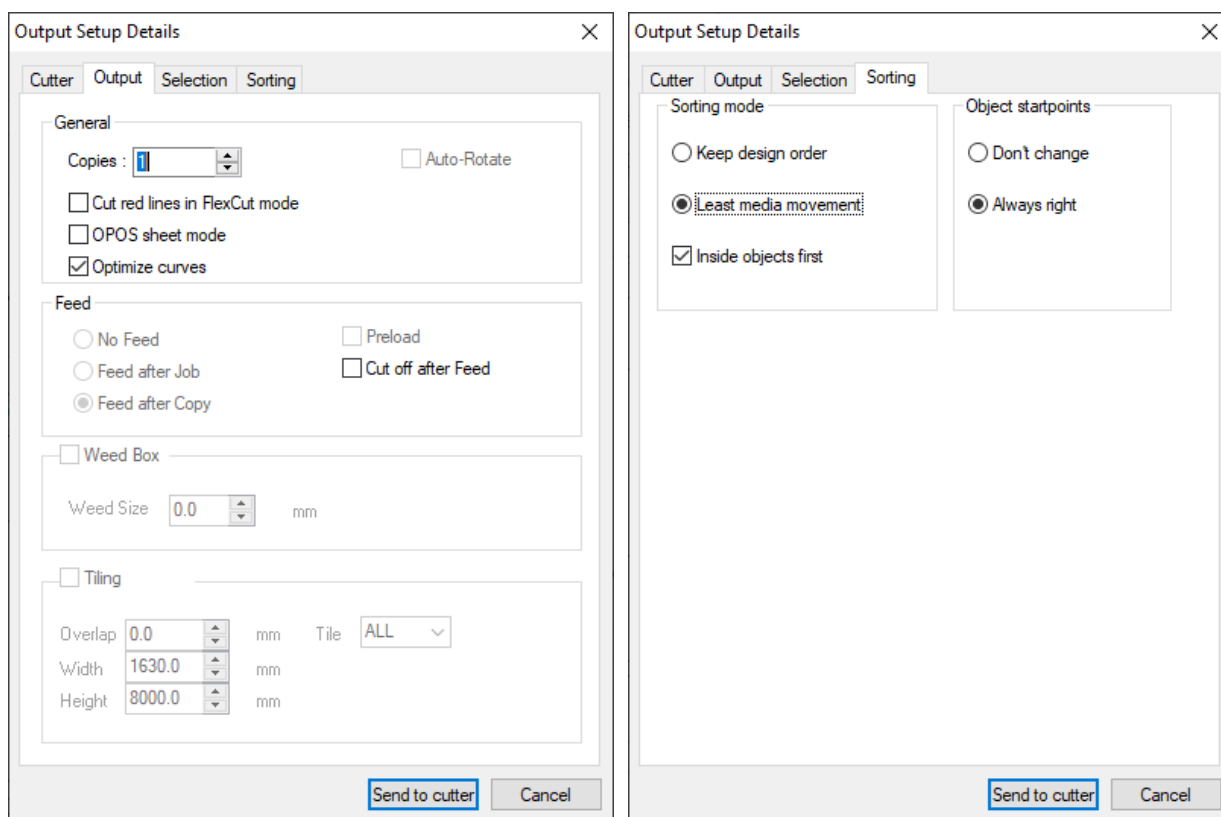
3. The design will open in WinPlot.



4. Load the printed graphic into the cutter.



5. In WinPlot, click  to send the graphic to the cutter.
6. Change the output options if necessary, then click on [Send to cutter].



7. The cutter's LCD displays "Set knife above first marker". Using the cutter's four navigation keys positions the knife above the graphic's origin marker (the marker at the bottom right-hand corner of the graphic).
8. Press the cutter's "Enter" key.

The cutter will register the OPOS marks and then cut out the graphic.

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