

Contour Cutting Workflows

Using Adobe, ONYX and Summa

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Preface

Contour cutting is the process of using a specialized cutting device to cut into self-adhesive vinyl along complex or simple paths described by a digital file. This can be done with a simple set of cut lines into a coloured vinyl or for more complex workflows, around pre-printed images on the vinyl.

This document will describe how to set up the workflow for contour cutting around printed images - how to prepare a file in Illustrator with a specialized spot colour which acts as a cut path, how to print and cut the file through ONYX RIP-Queue and ONYX CutServer before sending the file directly to the cutter, or to Summa's own software for advanced workflows, for example automated barcode cutting.



Creating Spot Data - Overview

The first step in the contour cutting workflow is preparing your file. To prepare your file, you must define the cut path in a vector-based drawing program such as Adobe Illustrator. The cut path may be as simple or complex as needed. It can range from a circle around a bitmap image to an outline of script text.

Once you have decided which line or shape is going to become your cut line, you must assign a spot colour to it. This spot colour is the most important part of preparing the file as it informs the rip or the cutter software that this element is to be a cut path, not a printed element. The name you give this spot colour is the trigger to make this happen - the actual visible colour is not important as it will never be printed. The name you assign to this spot colour must have a unique prefix which matches the prefix assigned in ONYX RIP-Queue. In RIP-Queue, the default prefix for the cut path spot color is 'CutContour'.

When RIP-Queue processes and prints the file, the path with this specially named spot color will not be printed with the rest of the image. Instead, RIP-Queue processes the spot color as a cut path and creates a separate cut script file for your cutting device.

This file is sent to CutServer from which you can send it to the cutting device.

Defining the Cut Path in Illustrator:

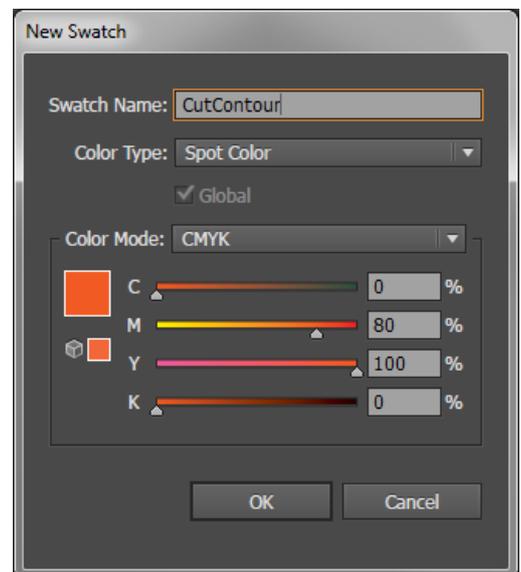
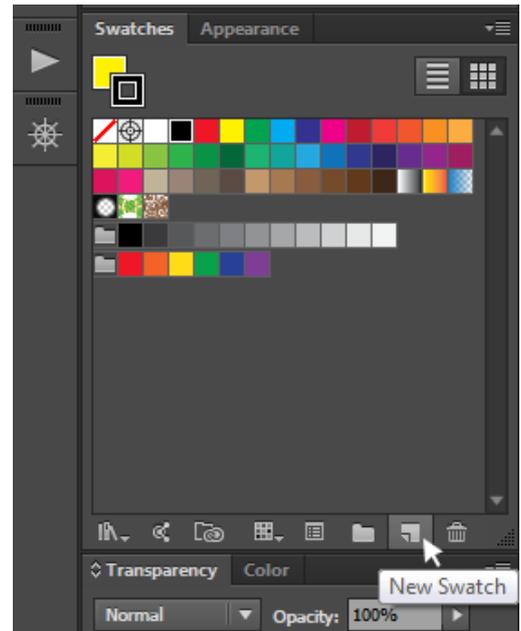
The following steps are specific to Adobe Illustrator, however, most drawing programs use similar steps to achieve the same result. The most important part of creating a cut path is creating a Spot Color named 'CutContour' and applying the spot color to the cut path element.

To define a cut path in Illustrator:

Open the desired file within Adobe Illustrator and draw or select a path in your file that you would like to become a cut path. Make sure that you close all paths because you will assign the spot color either as a fill or as an outline.

Now assign a spot colour to the path as follows:

1. Within Illustrator, open the Swatches palette. If the Swatches palette is not visible, select Swatches from the Window menu.
2. Click the arrow in the upper right-hand corner of the Swatches palette to display a secondary menu and select New Swatch to display the New Swatch dialog, or click the New Swatch icon on the Swatches toolbar.
3. Within the New Swatch Dialog, enter the name for the swatch as 'CutContour'. Note: Later we will discuss adding more automation to this workflow by adding a suffix to this name e.g 'CutContour_kiss'. However, for the rip to recognise the path as a cut path, all you need is 'CutContour'. Suffixes simply help ONYX to further automate cutting in the rip if required. See page 8 for more detail on these more advanced cutting workflows.
4. Select Spot Colour from the Colour Type drop-down menu.
5. Use the slider bars to create a CMYK colour of your choice. Because this colour will not be printed, we recommend you make the colour easily identifiable in your image. Click OK to close the New Swatch dialog.
7. Select your cut path(s) and assign the new swatch colour to them.
8. Save the file as a PDF using the latest version PDF available in the save dialogue.



Note: If you take an element of your file and turn it into a cut path it will no longer be printed. Often you will want the path to be printed and also for the same path to be a cut line. To do this either create a new layer and put the cut path on one and the printed data on another or both print and cut elements can be in the same layer - in either case the layer / data order does not matter the cut line will always be registered in the rip even if you can't see it in the file in Illustrator. If you need a font to become a cut path it must be turned into an outline first before you fill or stroke it with the CutContour spot colour.

RIP-Queue Settings

There are two settings in ONYX that must be selected for contour cutting to work.

These can be selected manually per job but it is preferred to set up a workflow that applies these settings automatically to any job that needs to be contour cut.

Workflows in ONYX are handled by Quick Sets. Ideally you should build a new Quick Set for contour cutting and ensure this workflow is used when opening a new job that requires cutting on the Summa as follows:

To create a new Quick Set for contour cutting:

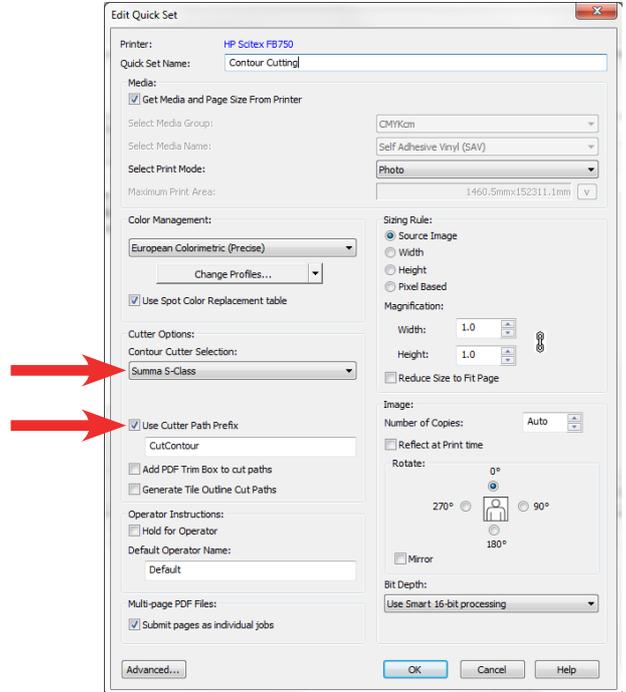
1. In ONYX RIP-Queue, highlight the desired printer and click Configure Printer.

2. Within the Configure Printer dialog, click New on the Quick Set tab and name it appropriately i.e “Contour Cutting” for example.

3. Check the box next to Use Cutter Path Prefix. The text box displays the name of the spot color assigned to your cut data in your design application.

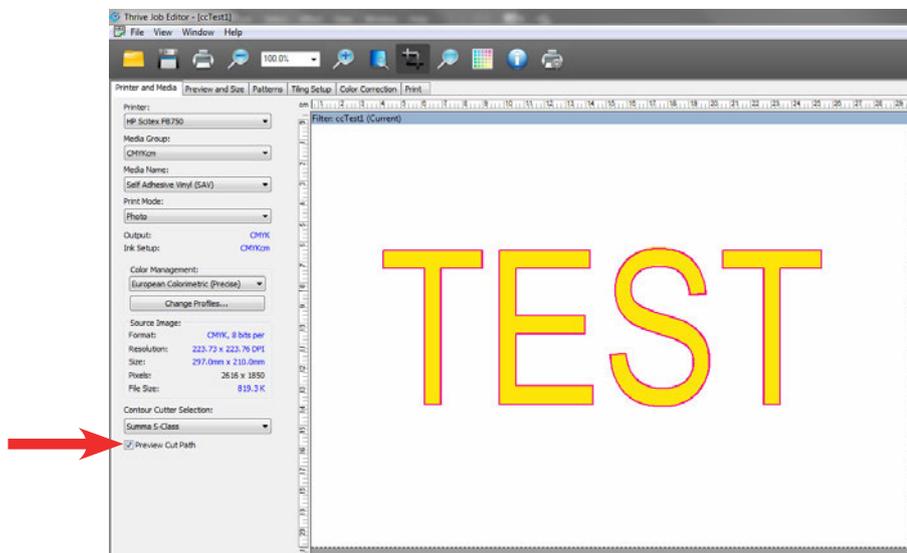
4. Also, select the correct registration marks for your cutter under the Cutter Selection drop-down.

5. Save the Quick Set and when opening a new job in the RIP that needs cutting, ensure this Quick Set is used.



TIP: You can make some changes to the default spacing of the cutters registration marks in RIP-Queue. Go to File - Manage Cutters and select your cutter. Here you can alter the margin and spread of the reg marks, barcodes and other cutter-specific settings.

On opening your file in ONYX, your cut lines will be displayed as a magenta outline in all previews both in the RIP-Queue and Job Editor with the exception of the nesting preview. If there are no magenta outlines where you are expecting to see a cut line something has gone wrong and you need to check your workflow. In Job Editor you can switch the cut line preview on and off to check everything is as expected.



XML cut files

When a job with cut lines and cutter reg marks begins to print, ONYX sends a separate .xml file to ONYX CUTServer containing only the registration marks and cut paths (you can't see the reg marks or barcode in CUTServer only the cut paths) This file contains your cut data and can be found in the ONYX folder:

TIP: If you want to reproduce this .xml cut file for testing purposes but don't want to keep printing the image in order to create a new xml file, just go to RIP-Queue and Configure Printer - Device - Configure Port - highlight Print to File then Configure and save to the desktop. This allows you to 'print' the image multiple times generating multiple cut files in CutServer without any real physical printing taking place thus saving time and media. Don't forget to reconfigure your printer connectivity back to its original setting afterwards or you will not be able to print.

Summa Registration Marks

The Default registration marks for Summa contour cutters are small black squares but there are also other marks printed to help with other parts of the workflow. The default marks in ONYX for the Summa S Class and D Series cutters are known as OposXY. This means that in addition to the square reg marks there is a long solid black line and a large barcode printed in addition just above the line.



The solid black line allows the OPOS sensor on the cutter head to take readings along the horizontal plane of the job to check for any bowing of the print (sometimes seen with HP Latex printers) assuming the software is configured to allow this to happen. If bowing is spotted, the Summa will bow the cut lines so that they match and accuracy is automatically maintained.

The large barcode is known as a PostNet barcode. This type of barcode can be read by the OPOS sensor on the cutter head and can be used in an advanced workflow that allows the cutter to automatically find and cut an indefinite number of different files in one action. This is used to cut entire rolls of different files without intervention by an operator and this is discussed in page 12. If you have any other type of barcode this automated cutting workflow is unavailable.

ONYX CutServer

CutServer is the ONYX module used to send the cut file to the cutter or to other software. To begin, the cutter must be selected in CutServer and configured with the correct connectivity settings. Open CutServer and you will be prompted to select your cutting device from a drop-down menu. Once the correct cutter is selected your new cutter queue will appear in CutServer.

To connect to the cutter, select Manage Cutters, highlight the cutter and click Configure. If you have a second generation Summa S Class you can connect to it using TCPIP ethernet. In Port Settings select TCPIP and select Setup. Here enter the TCPIP address and ensure you set the Port Number to 9100 and test the connection - you should see a green disc. Earlier generations of S Class cutters could be configured for wireless TCPIP. However we suggest this is not implemented due to connectivity issues across wireless networks.

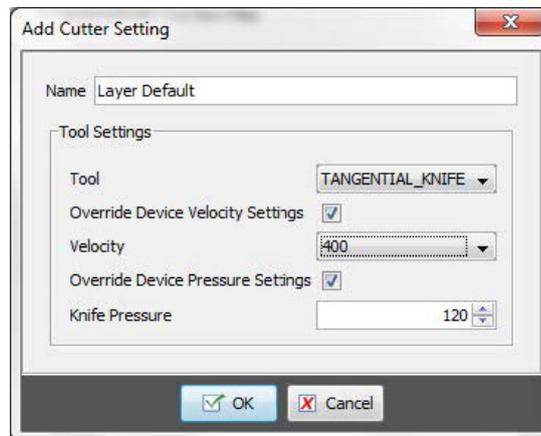
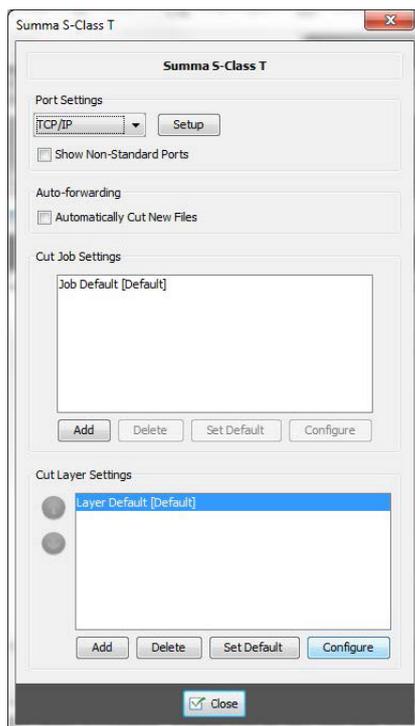
All other modern Summa cutters use USB connectivity - for these in Port Settings use Summa USB and Configure to select one of the four available USB ports for Summa cutters. Up to four Summas can be connected by USB - it may take some testing to discover which USB port is in use although Port USB1 should be the default with one cutter. If you have an older Summa cutter which uses a Serial connection please select the COM port.

Configuring the cutting workflow in ONYX CutServer

In this simple workflow the file has a cut path named CutContour and on the right hand side you can choose to use the cutters' own settings for knife pressure, velocity etc by selecting Manual/Device Settings. Alternatively you can ask ONYX to choose these settings and override what is set on the cutter by selecting Layer Default.



It is usually preferred to control the settings in ONYX rather than on the cutter - after running tests on the cutter to determine the best pressures and velocity for your substrate, these can be entered into ONYX as above by selecting Manage Cutters - Configure to bring up the cutter configuration window. In here you can highlight the Layer Default and Configure it according to your pressure and velocity requirements.



Once these are set you can press the Cut button at the bottom of CutServer and the data will be sent to the cutter. On the cutter there will be arrows with which you can direct the knife to the first reg mark and apply to begin your cut job. If your job is inserted upside down in the cutter you can simply turn the cut file 180 degrees to match using the Rotation drop down in CutServer.

TIP: Although this document describes the workflow for cutting pre-printed images, ONYX CutServer is also able to handle files with no print data that just require sending to the cutter eg for cutting coloured vinyl. To do this save your file from the design application as an .svg file extension. Then in CutServer select Open in the top left corner and browse to the .svg file. Open the file into CutServer and proceed as normal.

Advanced Cutting Workflows:

To add efficiency and automation to your workflow, you can complete jobs more quickly with less user interaction.

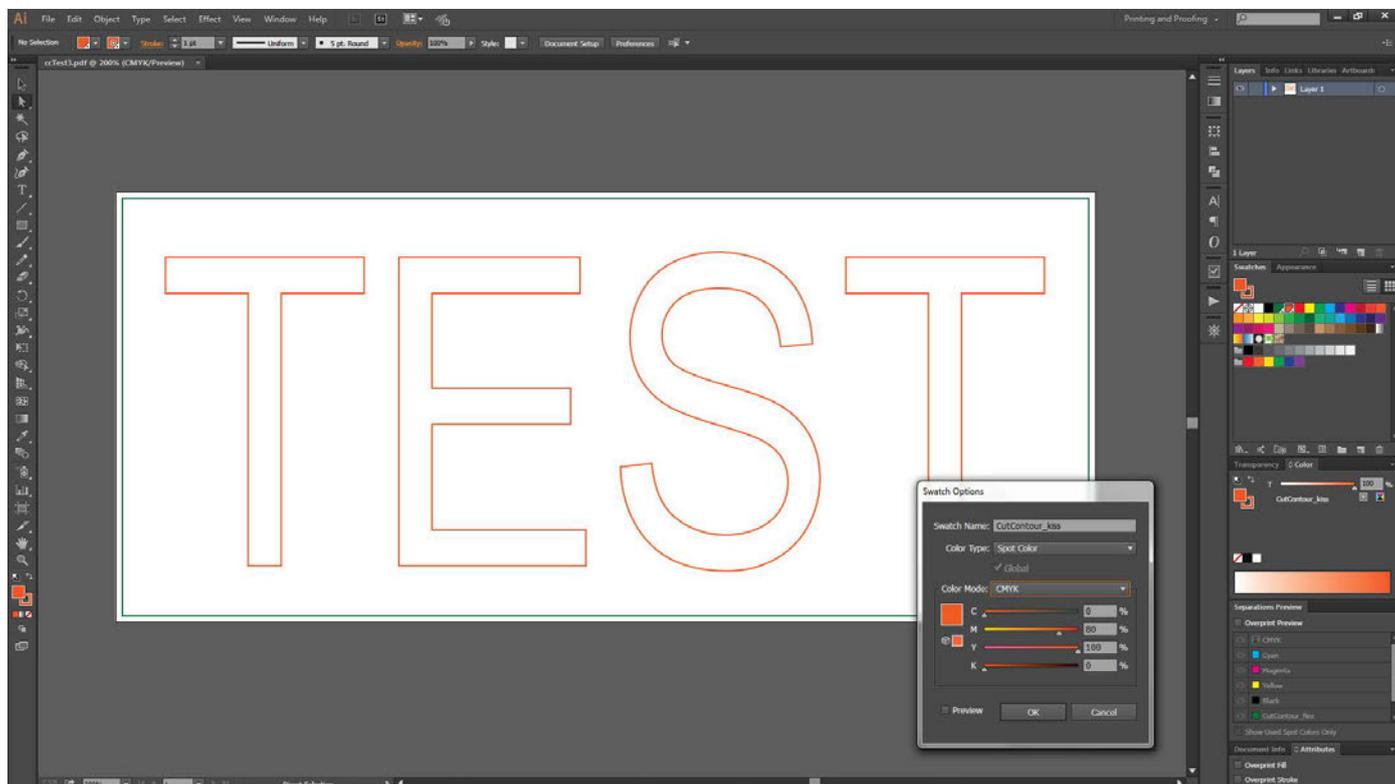
Multi-Layer Cutting

For example, you can set up a file in Illustrator which has instructions for ONYX to use different settings and cut actions for different paths in your file - these instructions are then automatically applied to the correct cut layers in CutServer and then sent to the cutter which will cut with different actions on the same job e.g one cut file can have both kiss cut and perforated cut on the same file and the cutter will do both cuts without interruption or reloading the media.

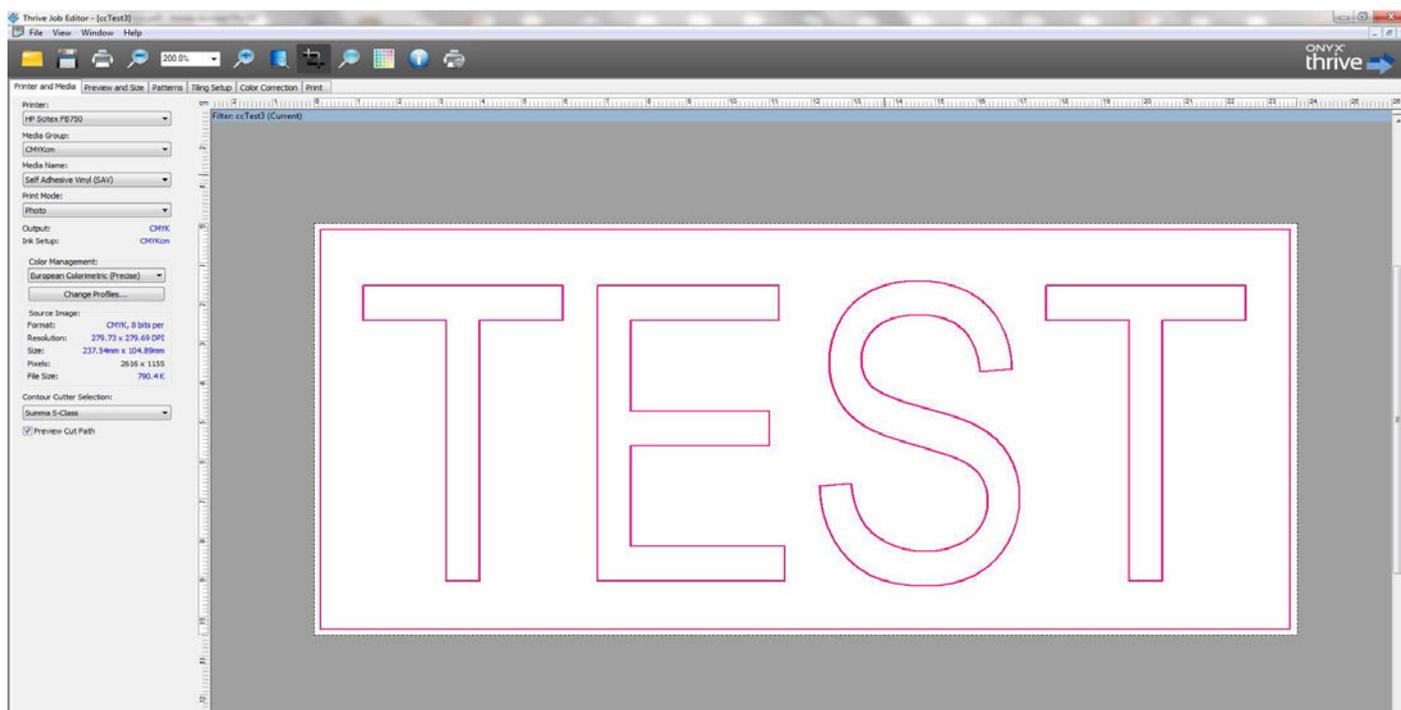
To achieve this you need to create more than one spot colour in Illustrator. As long as the new name begins with CutContour all subsequent suffixes are there to remind you what needs to be set for the path in question. eg you may have some paths that need kiss cutting and some that need perforated cutting (Often referred to as “flex” cutting) so you will build one spot colour named “CutContour_kiss” and a second named “CutContour_flex”. Then apply these spot colours to the appropriate paths in Illustrator.

Example:

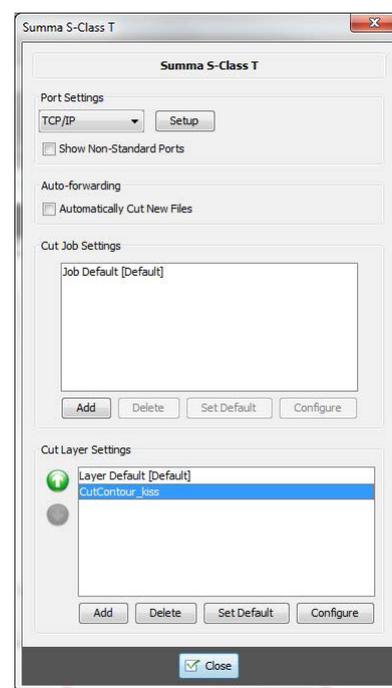
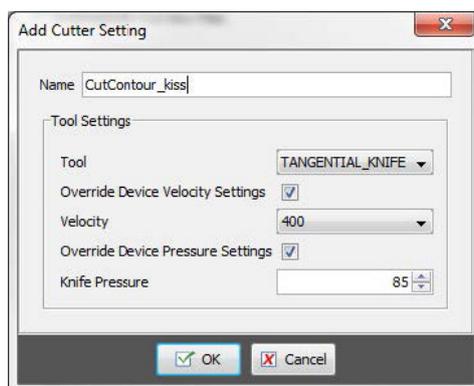
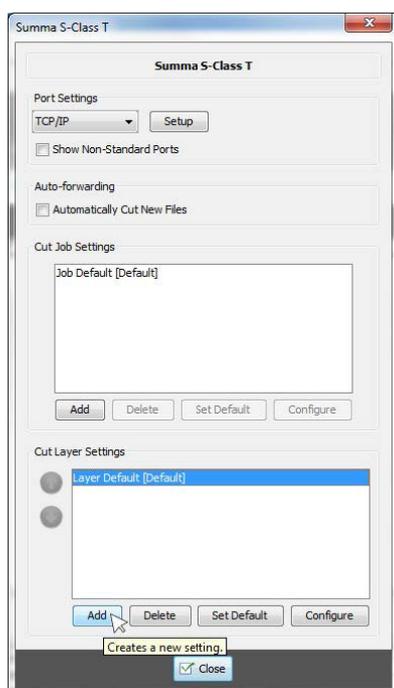
In Illustrator we have a file below with two spot colour cut paths - we have named the spot colour for the orange path “CutContour_kiss” and the green path “CutContour_flex”. As long as the name begins with “CutContour” everything else we name a spot colour cut path is to help us and ONYX to differentiate between the different actions we want to perform during the cutting:



After saving from Illustrator as a PDF using the latest PDF file version available, the file is opened in ONYX. Either in ONYX RIPQueue or Job Editor we can see both cut paths highlighted but there is no visible distinction between the two displayed in this part of the RIP as shown below:

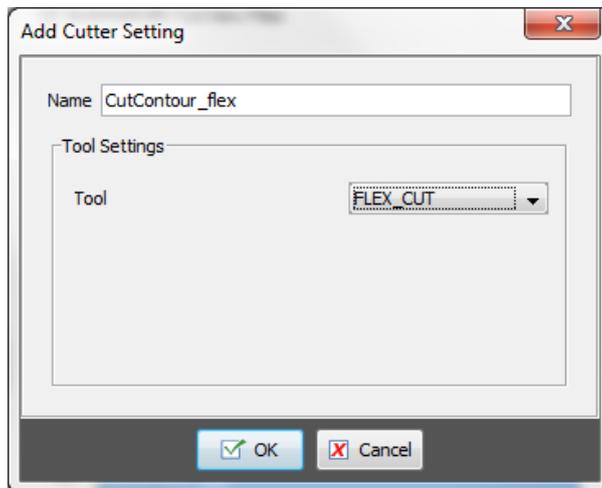


It is in ONYX CutServer where we are able to distinguish between the two different types of cutting we need to do on this file. To achieve this we need to create new Cutting Layers that have the **same name** as the spot colours in our file. By doing this each cut path will be automatically attributed with the correct cutter settings (If the names don't match you will have to manually select the correct layer from the drop downs on the right hand side of the screen) For each cut path layer set the required pressures as below:



TIP: The Cut Layer order is important - the Summa will cut the top layer first. Thus ensure that at the top of the list in the Cut Layer Settings window is the kiss cut layer and the flex layer is second so that it is cut by the Summa after the kiss cuts have completed.

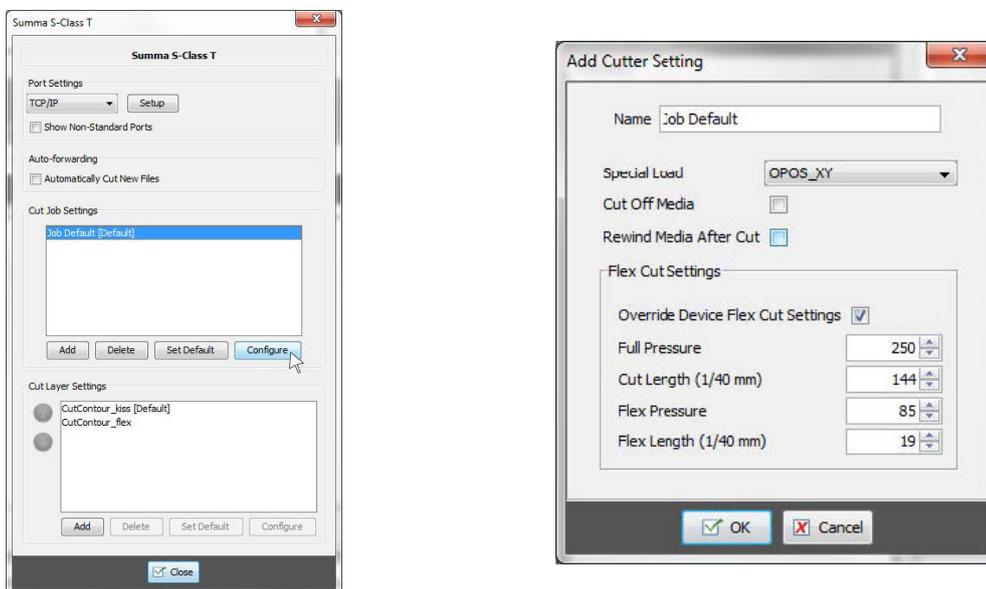
After you have created your first layer you can add more layers as required - in this case we need to add a flex cut layer. Add it as above, but this time in the Tool setting, instead of Tangential_knife tool you need to select Flex_Cut from the drop down and note there are no other settings you can change in this dialogue box.



To fully set up flex cutting to create perforations, you need to configure Cut Job Settings in the window just above the layer window in the same dialogue box

Be sure to select OPOS_XY if you want the cutter to check along the black OPOSXY line mentioned earlier to ensure any image bowing caused by the printer is accounted for.

In Flex Cut Settings override the device settings and enter your own perforation settings:



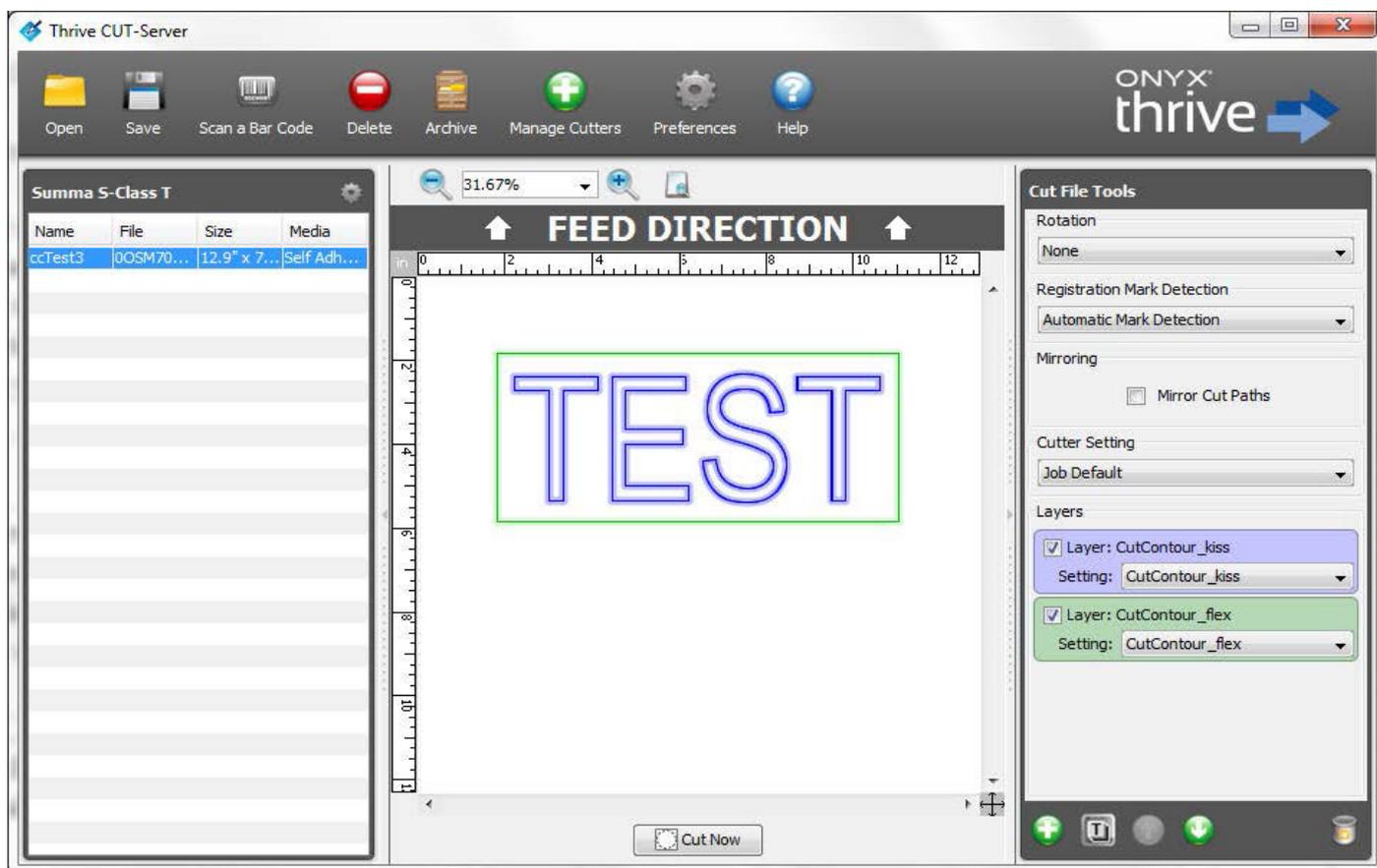
To create perforations, the cutter will cut all the way through the vinyl and its backing and then, for a much shorter distance only, cut through the vinyl leaving a small paper tab before plunging back all the way through the backing again and so on.

Full pressure relates to how much pressure in grams is required to cut all the way through the vinyl and its backing. Flex Pressure is the “kiss cut” setting - i.e. the pressure required to just cut through the top layer of vinyl. Both these numbers can only be discovered by testing your particular substrate on the cutter itself beforehand.

Note: There is an opportunity for confusion here with the term "flex cutting". Summa refers to flex cutting in its marketing as the overall action of producing a perforated cut. Many people like to name the spot colour cut path in Illustrator CutContour_flex in the same way - to ensure that path gets the appropriate perforated flex cut layer associated with it in CutServer.

However in both Summa Cutter Control software and in the ONYX CutServer Add Cutter Setting dialogue above, the wording used may confuse as they both use the Flex Pressure /Flex Length phrase to refer only to the kiss cut "tab" portion of the perforation rather than the whole operation but once we understand this difference in phrasing the set up can be completed successfully. e.g. the Cut Length refers to the length of the cut that goes all the way through the paper backing - the Flex Length refers to the size of the paper tab that is left between these longer cuts.

The correct flex cut settings can only be discovered by trial and error and may differ depending on media (thus you can create many Cut Job Settings in this window for each type of vinyl you want to cut.) Often the defaults work OK on many vinyls but if the perforations fail and the job is falling out of the roll during cutting you may need to make your tabs longer and vice-versa if the job is too difficult to pop out after cutting has completed.



When the layers and job settings have been created, a file can be printed and the corresponding cut file will appear in CutServer as above. The Layer names now match the spot colour names and each cut path will be automatically assigned to the correct layer and already has the correct cutter pressures etc applied. All the operator needs to do is press the CUT button at the bottom. In this way much of the work to set up a file for correct dual layer cutting is done automatically.

The cutter will show the head motion arrows and you can direct the knife over the first reg mark The cutter will then cut the layer that is at the top of the list in CutServer first (shown in purple above) in this example a kiss cut of the lettering, followed automatically and with no user intervention, with the next layer in the list (here a flex cut perforated border in green)

Automatic Multi-job Barcode Cutting (Optional)

The Postnet Barcode printed by ONYX at the start and end of each job (or nest of jobs) allows the OPOS sensor on the head to discover which job it is and thus to cut it without further operator intervention. This optional step is built into all current Summa cutters and requires a rip capable of supporting PostNet barcode printing working in tandem with Summa's own cutter software.

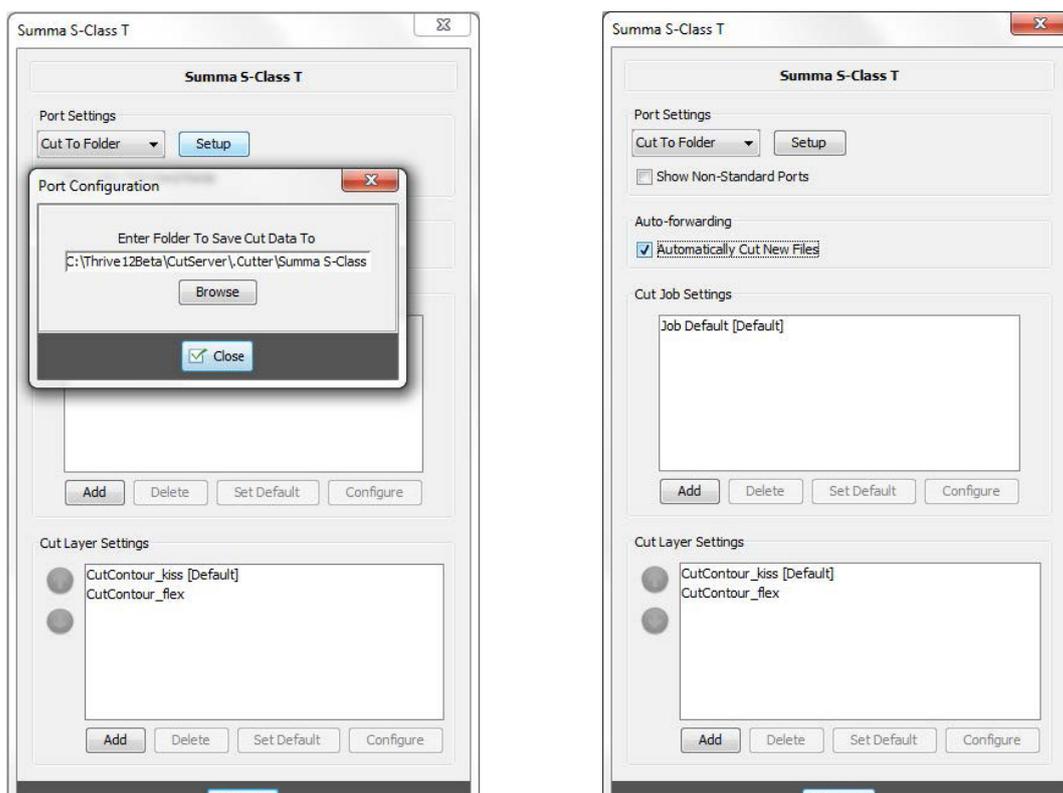
The cutter also forwards the media after cutting and will find the next job and so on until a whole roll of vinyl containing different individual jobs has been cut with no user intervention at all.

Tip: some Summa cutters have a roll take up fitted as an option - this is recommended for roll to roll cutting applications.

Both drag and tangential Summa cutters can perform this operation in conjunction with all versions of ONYX that have CutServer. However, ONYX cannot complete this task alone - it requires software provided with the cutter from Summa to run the barcode queue and control the cutter.

When automated barcode cutting is set up in ONYX, the CutServer software will no longer be cutting directly to the cutter but instead it will send the cut files into a folder.

To do this configure the cutter as before but this time change the Port Settings to "Cut to Folder". The default folder selected is in the ONYX directory but can be changed to one on your desktop for convenience if required - please note the location as you will need to enter this folder location into the Summa software.



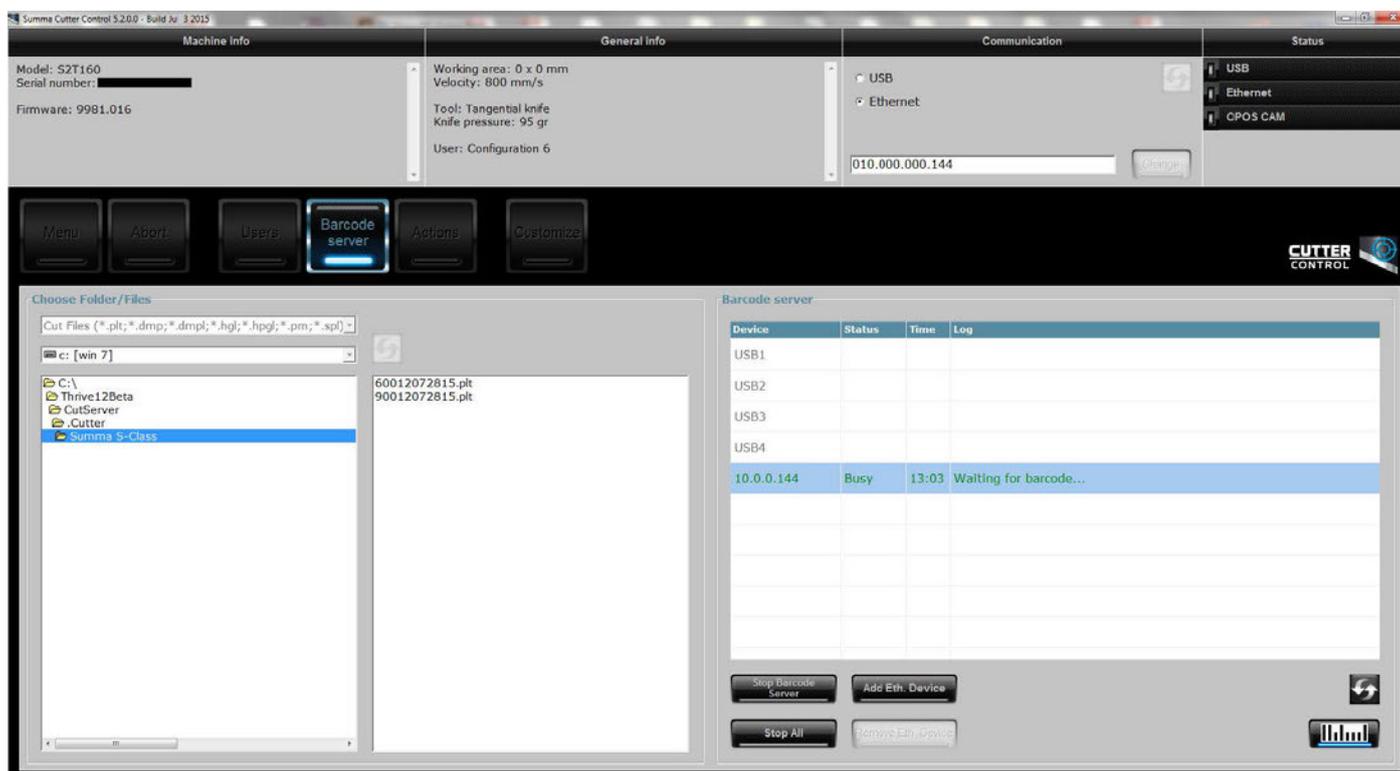
Note: You can also add an extra level of automation. In the same dialogue you can also ask ONYX CutServer cut any job for a particular cutter automatically. Thus when a job is printed, the file appears in CutServer briefly, picks up and applies the correct layer settings to the correct cut paths in the file (assuming you have named them the same as above) and then cuts the job into the appropriate folder before finally removing the job from CutServer. All this happens in under a second and thus often this automation is not used by default as the operator wants to view the job in CutServer to check all is OK before cutting to the folder.

From this point on the rest of the barcode workflow is handled by Summa's own software. All Summas come with Summa Cutter Control software which can be downloaded free from the Summa website. The current version is v5 but earlier versions work in the same way.

In Summa Cutter Control, after connecting the cutter, select Barcode Server and on the left select the same folder that ONYX CutServer is sending the cut jobs into. The refresh button will reveal new jobs that ONYX has recently sent.

Tip: ONYX prints a different barcode at each end of the same job. It also produces two cut files automatically when a job leaves CutServer. This is because the print may be placed into the cutter the opposite way up to how it was printed. To avoid the cutter cutting the job upside down, there are two different barcodes with different serial numbers and two distinct cut files produced on every job - one rotated 180 degrees. The two cut files produced per job will have the same number apart from one digit changed from a 6 to a 9. Thus when the cutter reads a barcode the corresponding and correctly rotated cut file is chosen - you no longer have to worry about rotation issues.

When you are ready, start the Barcode Server using the button in the bottom centre of the screen and, on the cutter, place the knife a few cm's below the centre of the first barcode. Then select the start button on the far bottom right (in the shape of a barcode) to begin scanning and cutting.



After the first job is completed, the cutter will forward the vinyl for a maximum of 50cm looking for the next barcode. Assuming it finds one, it will read the code, select the correct job from the queue and search for the reg marks and then begin to cut again and so on until the whole roll is completed with no further operator intervention.