

MUTOH INDUSTRIES LTD.

# **XPJ-1462UF**

# **Printing Guide**

November 30, 2023

## Table of contents

<b>1</b>	<b>Introduction</b> .....	<b>2</b>
<b>2</b>	<b>Importing print environment</b> .....	<b>2</b>
<b>3</b>	<b>Normal printing with CMYK + White (Wh)</b> .....	<b>4</b>
<b>4</b>	<b>Value-added printing with Varnish (Va) ink</b> .....	<b>8</b>
<b>5</b>	<b>Braille Printing</b> .....	<b>14</b>
<b>6</b>	<b>Fine Line Printing</b> .....	<b>27</b>

## 1 Introduction

This document introduces various printing methods for XPJ-1462UF using MUTOH RIP software VerteLith.

VerteLith has the "Print Environment" feature that you can preset the necessary settings for each media and application and streamline the printing workflow, allowing you to easily perform various printing.

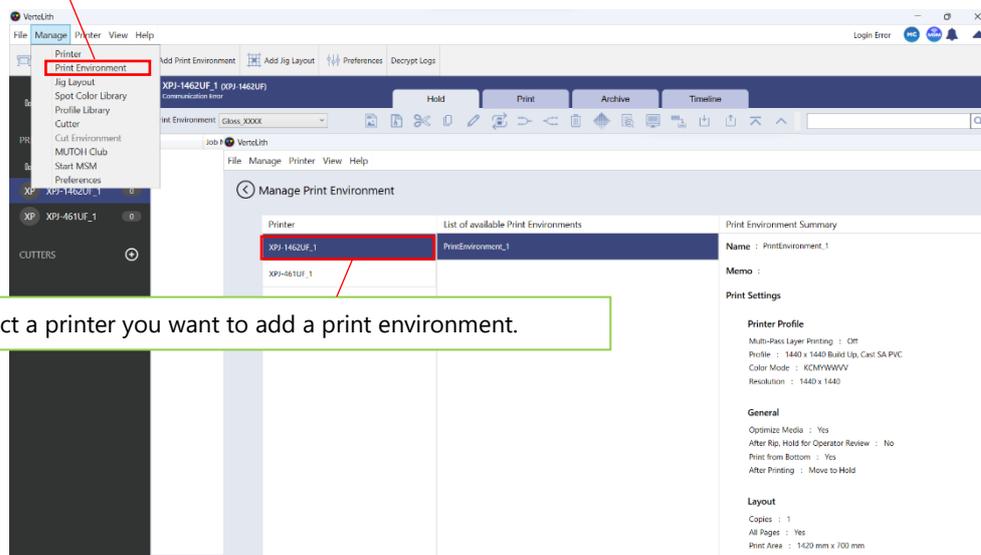
This guide is structured by printing methods. Please refer to and use the appropriate section.

We recommend you not to change the ink volume and the UV lamp settings specified in the print environment. Any changes to these settings may result in different finishing results or color.

## 2 Importing print environment

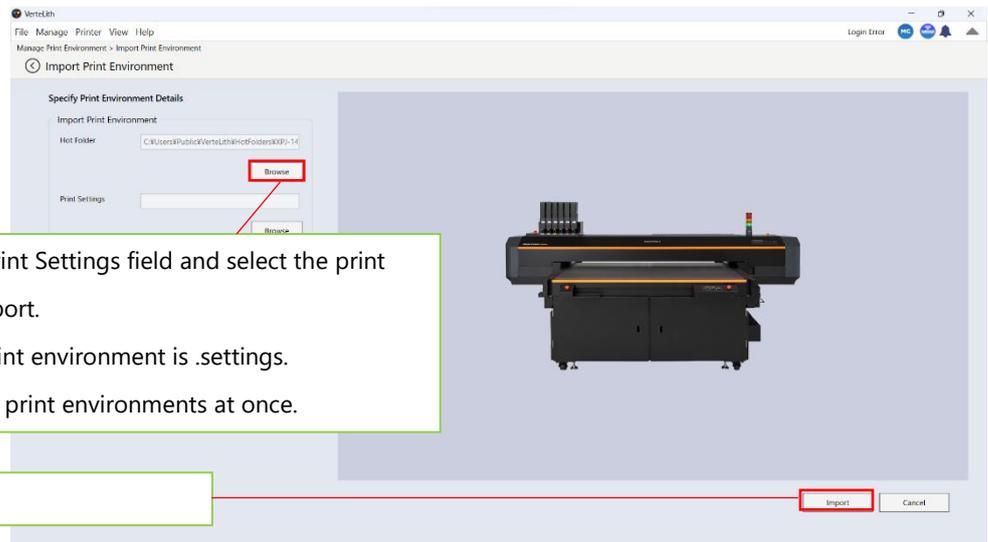
The printing methods described in this document will use the print environments supplied with this document. Follow these steps to import the print environment into VerteLith.

(1) Go to **Manage > Print Environment**.



(2) Select a printer you want to add a print environment.

(3) Click the **Import Print Environment** icon.



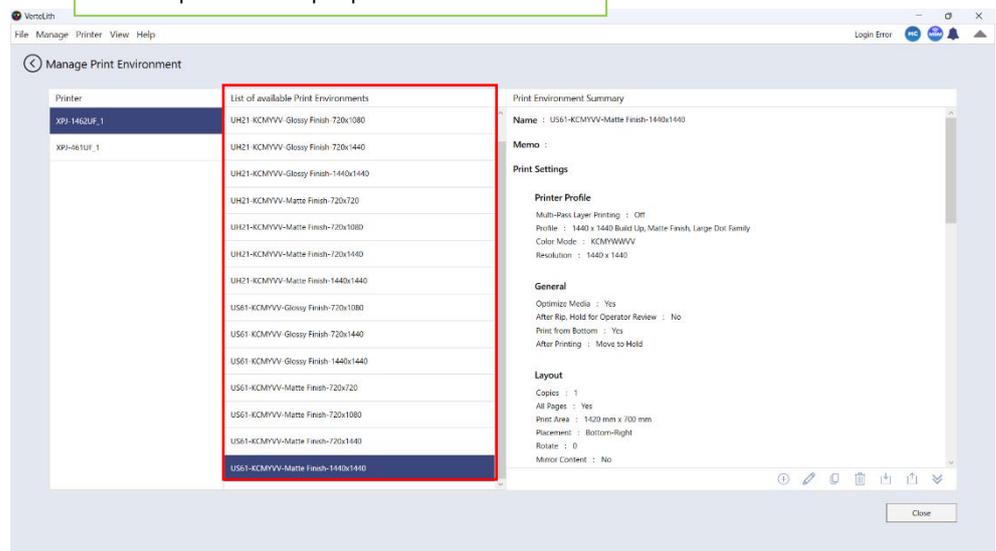
(4) Click **Browse** under the Print Settings field and select the print environment you want to import.

The file extension for print environment is .settings.

\*You can select multiple print environments at once.

(5) Click **Import**.

### When imported multiple print environments



### Note

- Print environment is specific to each ink type. Select an appropriate one for the ink being used.

### 3 Normal printing with CMYK + White (Wh)

By selecting print mode, you can print at the speed and quality shown in the Table 1.

The Table 2 shows the recommended print mode for each application.

The higher resolution is suitable for a print viewed from short distance (like palm-sized object) and an image that fine gradation is required (like skin tone). For POP/POS application which is typically viewed from long distance, high productivity print mode (Production, High speed) is suitable as it has the balance between quality and productivity.

**Table 1. Recommended Print Mode**

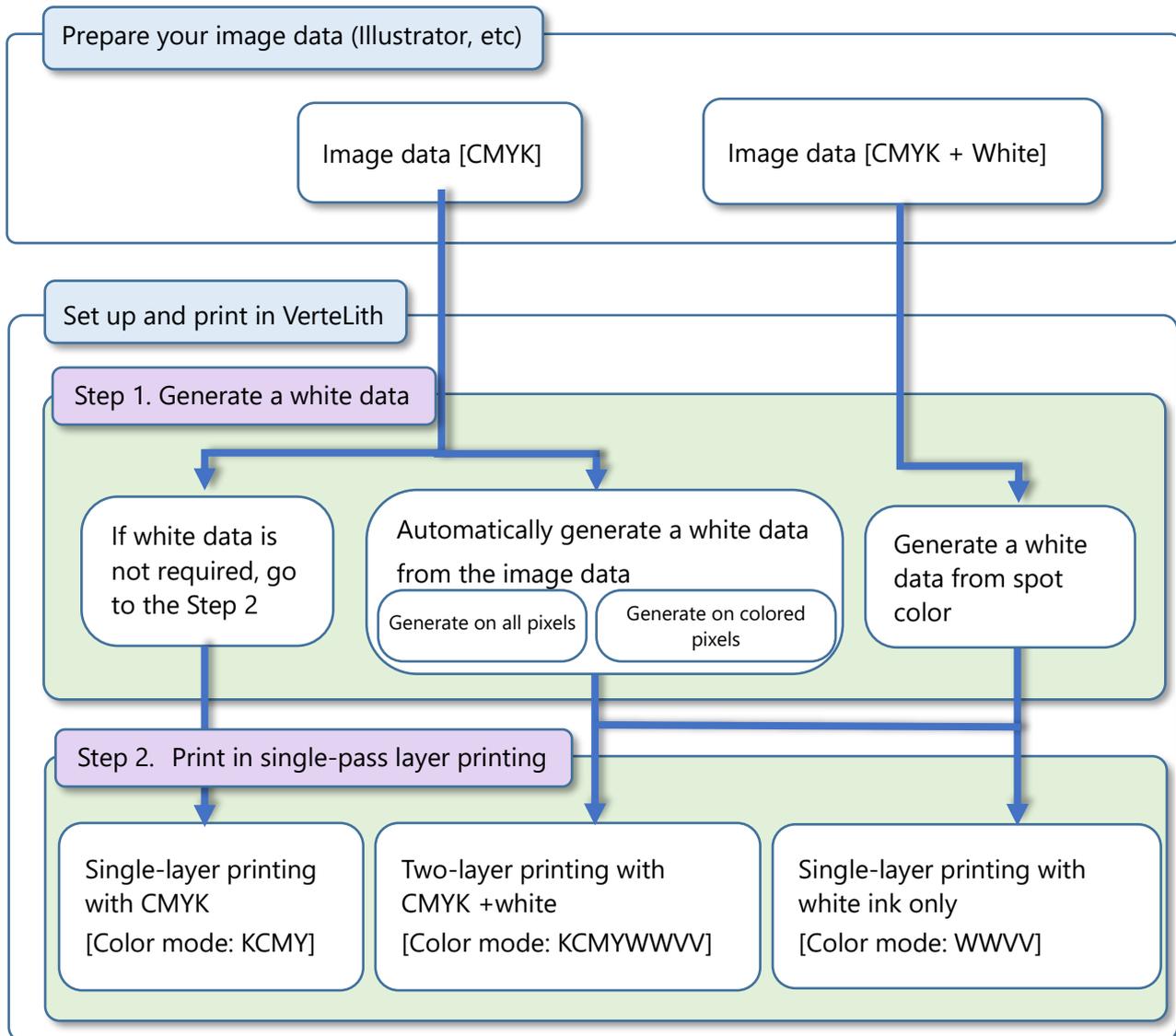
Print mode	Throughput	Print resolution/ Pass	Printing direction	Carriage speed	Effect
Draft	7.75	360x1080dpi/6pass	Bidirectional	400cps	i-Weave UVEx
High speed	5.80	720x720dpi/8pass	Bidirectional	400cps	i-Weave UVEx
Production	3.88	720x1080dpi/12pass	Bidirectional	400cps	i-Weave UVEx
Quality	2.92	720x1440dpi/16pass	Bidirectional	400cps	i-Weave UVEx
Quality(Uni-D)	1.55	720x1440dpi/16pass	Unidirectional	400cps	i-Weave UVEx

**Table 2. Recommended Print Mode by Application**

Application	Card	Trophy	Smartphone case	Welcome board	POP/POS
Print mode					
Draft	Not suitable	Not suitable	Not suitable	Not suitable	Acceptable
High speed	Not suitable	Not suitable	Not suitable	Not suitable	Recommended
Production	Acceptable	Recommended	Recommended	Recommended	Recommended
Quality	Recommended	Recommended	Recommended	Recommended	Acceptable
Quality (Uni-D)	Recommended	Recommended	Acceptable	Acceptable	Not suitable

## 3.1 Normal printing guide

This flow chart shows the process from the design preparation to the operations you will do in VerteLith.

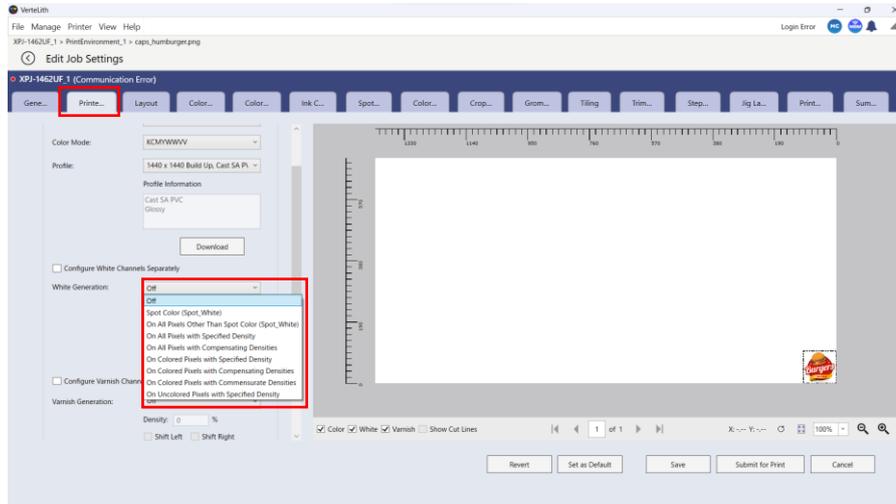


### Note

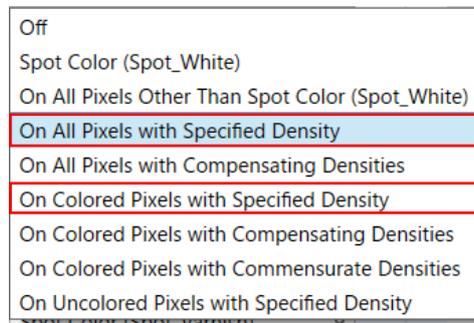
- For multi-pass layer printing, see the section "Layer printing" of Advanced Operations in the XPJ-1462UF operation manual.

## Step 1. Generate a white data

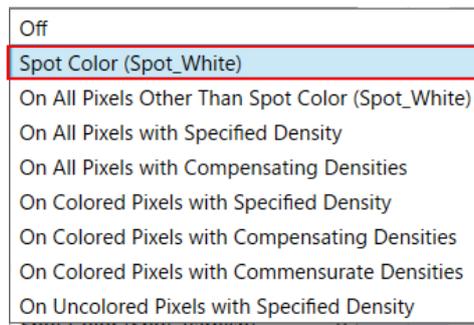
Go to **Edit Job Settings** > **Printer Profile** tab and select an appropriate method from the White Generation dropdown list.



- If a white data is not required:  
Select **Off**.
- To automatically generate a white data from an image data:  
Select **On All Pixels with Specified Density** or **On Colored Pixels with Specified Density**.



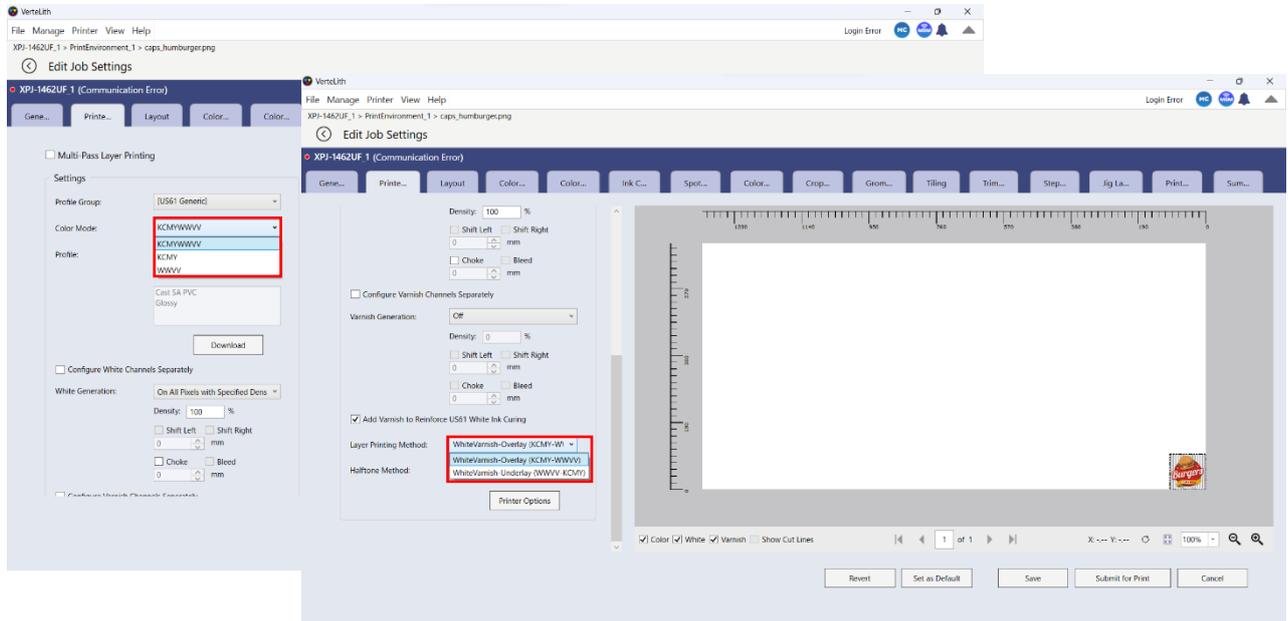
- To generate a white data from spot colors  
Select **Spot Color (Spot\_White)**.



## Step 2. Print in single-pass layer printing

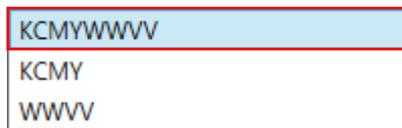
Select an appropriate option from the Color Mode dropdown list in the Printer Profile tab.

To perform two-layer printing with CMYK + white inks, select an appropriate option from the Layer Printing Method dropdown list.



- For CMYK single-layer printing

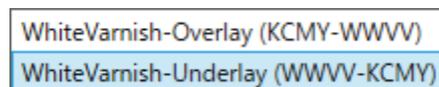
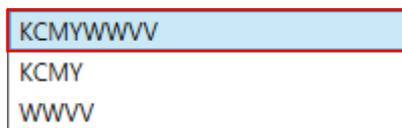
Select **KCMYWWVV** from the Color Mode dropdown list.



- For two-layer printing with CMYK + white inks

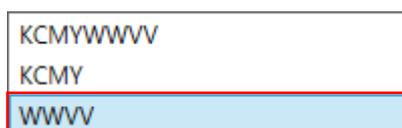
Select **KCMYWWVV** from the Color Mode dropdown list.

Select the Overlay/Underlay option from the Layer Printing Method dropdown list as needed.



- For single-layer printing with white ink only (WWVV)

Select **WWVV** from the Color Mode dropdown list.



## 4 Value-added printing with Varnish (Va) ink

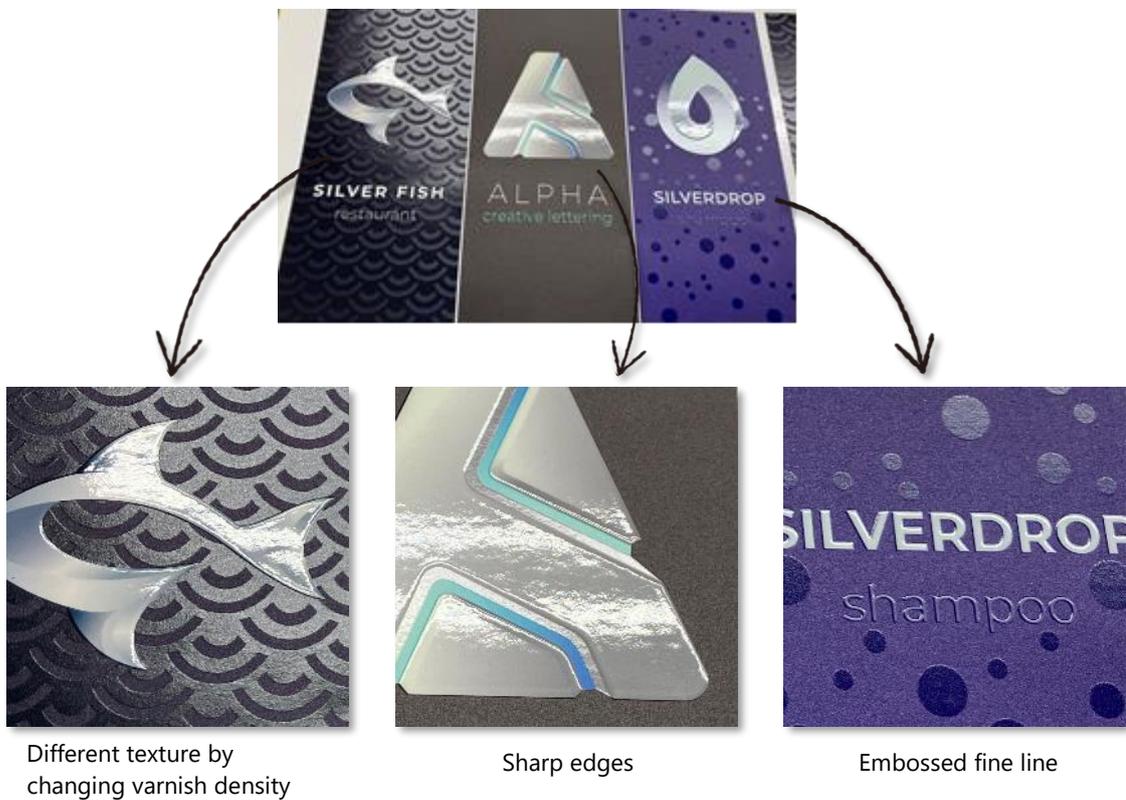
Varnish ink can add various finishing effects to your prints by using different UV irradiation method.

The print environments supplied with this guide are designed for appropriate finishing effect.

The table below shows the combination of print mode and dot family that can achieve matte or glossy finish.

**Table 3. Recommended Print Mode**

Print mode	Print resolution/ Pass	Dot family	Effect	Matte	Gloss
Draft	360x1080dpi/6pass	Large	i-Weave UVEx	✓	Not available
High speed	720x720dpi/8pass	Large	i-Weave UVEx	✓	Not available
Production	720x1080dpi/12pass	Medium	i-Weave UVEx	✓	✓
Quality	720x1440dpi/16pass	Medium	i-Weave UVEx	✓	✓
Build up	1440x1440dpi/32pass	Medium	i-Weave UVEx	✓	✓



#### 4.1 Print environment

The print environments listed in the Table 4 will be used in this section.

**Table 4. List of Print Environments**

<For UH21 ink>

Print environment	Finish effects	Print mode
UH21-KCMYVV-Glossy Finish-720x1080	Gloss	Production (720x1080dpi)
UH21-KCMYVV-Glossy Finish-720x1440	Gloss	Quality (720x1440dpi)
UH21-KCMYVV-Glossy Finish-1440x1440	Gloss	Build Up (1440x1440dpi)
UH21-KCMYVV-Matte Finish-360x1080	Matte	Draft (360x1080dpi)
UH21-KCMYVV-Matte Finish-720x720	Matte	High Speed (720x720dpi)
UH21-KCMYVV-Matte Finish-720x1080	Matte	Production (720x1080dpi)
UH21-KCMYVV-Matte Finish-720x1440	Matte	Quality (720x1440dpi)
UH21-KCMYVV-Matte Finish-1440x1440	Matte	Build Up (1440x1440dpi)

< For US61 ink >

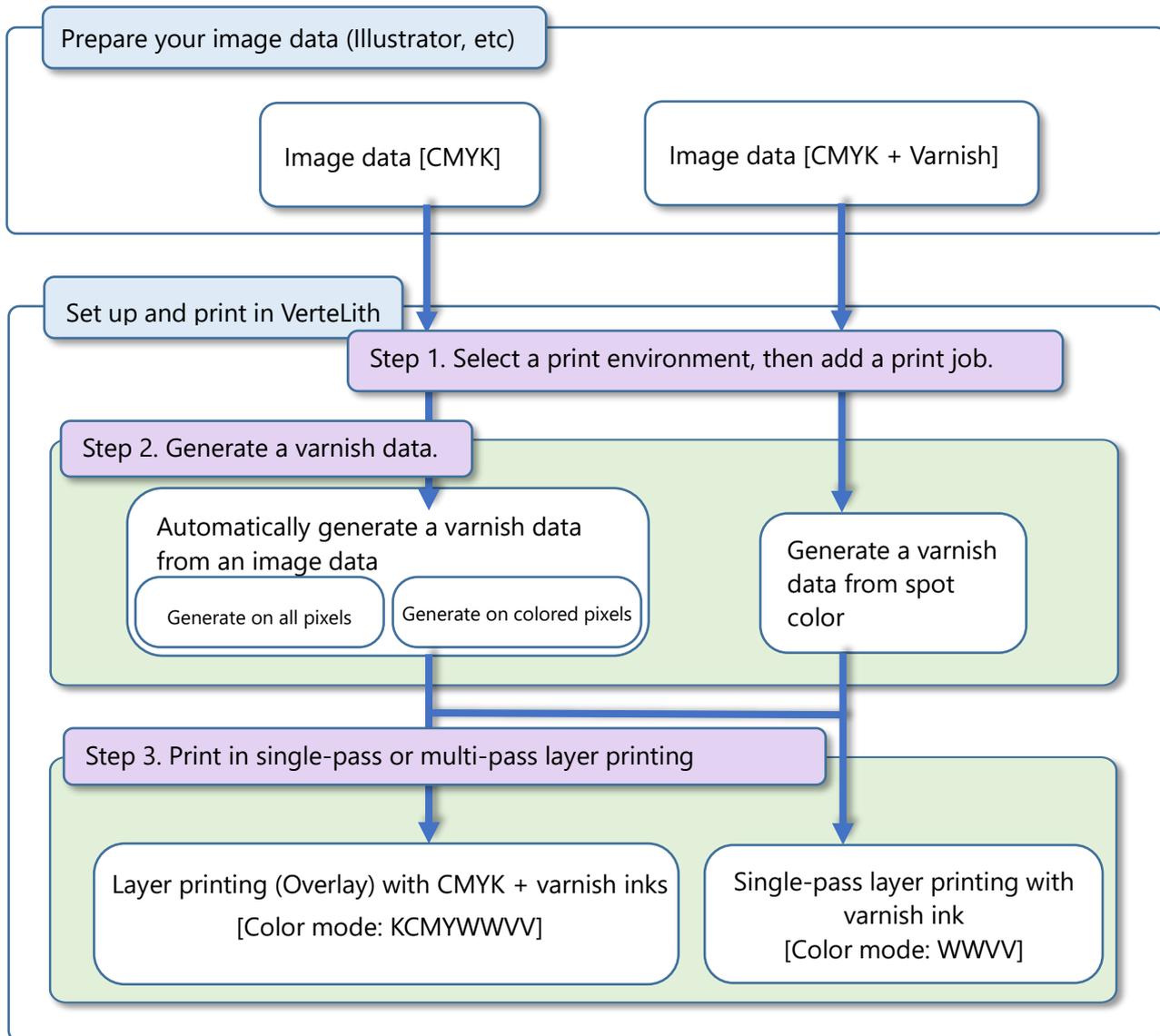
Print environment	Finish effects	Print mode
US61-KCMYVV-Glossy Finish-720x1080	Gloss	Production (720x1080dpi)
US61-KCMYVV-Glossy Finish-720x1440	Gloss	Quality (720x1440dpi)
US61-KCMYVV-Glossy Finish-1440x1440	Gloss	Build Up (1440x1440dpi)
US61-KCMYVV-Matte Finish-360x1080	Matte	Draft (360x1080dpi)
US61-KCMYVV-Matte Finish-720x720	Matte	High Speed (720x720dpi)
US61-KCMYVV-Matte Finish-720x1080	Matte	Production (720x1080dpi)
US61-KCMYVV-Matte Finish-720x1440	Matte	Quality (720x1440dpi)
US61-KCMYVV-Matte Finish-1440x1440	Matte	Build Up (1440x1440dpi)

**Note**

- Print environment is specific to each ink type. Select an appropriate one for the ink being used.
- The print environment for Glossy Finish gives a glossy effect to your print using varnish ink.
- The print environment for Matte Finish gives a matte effect to your print using varnish ink.

## 4.2 Varnish ink value-added printing guide (Matte/Gloss)

This flow chart shows the process from the design preparation to the operations you will do in VerteLith



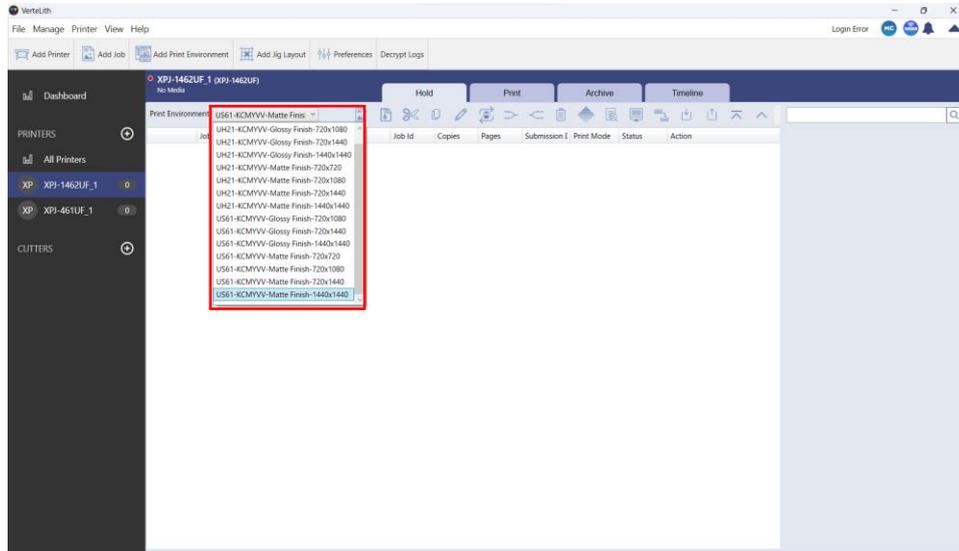
### Note

- If you want to print a gradation image with glossy finish using UH21 varnish ink, make sure to do a test print in advance to see how it looks.
- XPJ-1462UF cannot print matte and gloss concurrently in a single pass using UH21 varnish ink. To print matte and gloss on the same print, send a matte and a gloss data separately and print them in multi-pass layer printing.
- When performing multi-pass layer printing with CMYK layer and Varnish layer, make sure to select the same print resolution for each layer. Layer shifting may occur if the print resolution is different.
- For how to perform multi-pass layer printing, refer to the section "Layer printing" of Advanced Operations in the XPJ-1462UF operation manual.

## Step 1. Select a print environment

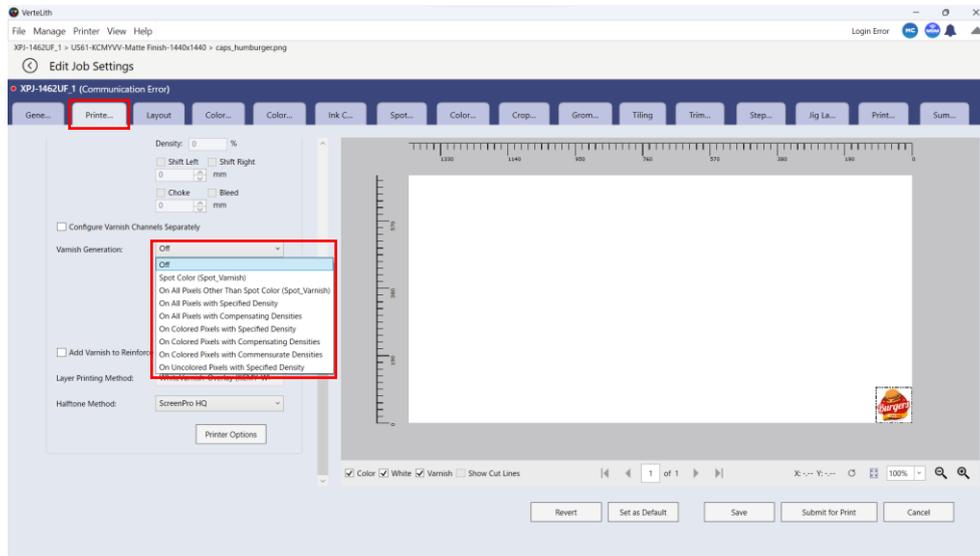
From the dropdown list, select an appropriate print environment.

Then add a print job to VerteLith.



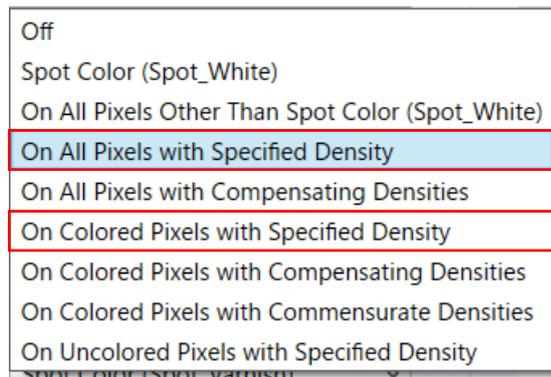
## Step 2. Generate a varnish data

Go to **Edit Job Settings** > **Printer Profile** tab, select an appropriate option from the Varnish Generation dropdown list.



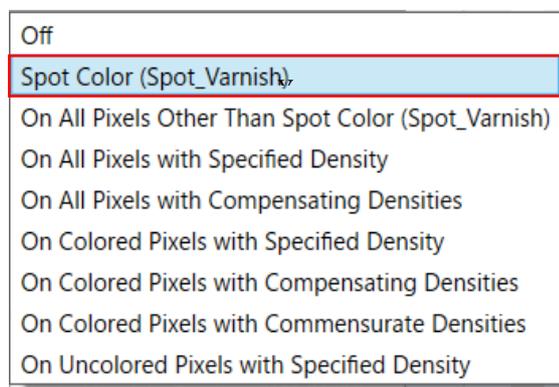
- To generate a varnish data from an image data

Select **On All Pixels with Specified Density** or **On Colored Pixels with Specified Density**.



- To generate a varnish data from spot color

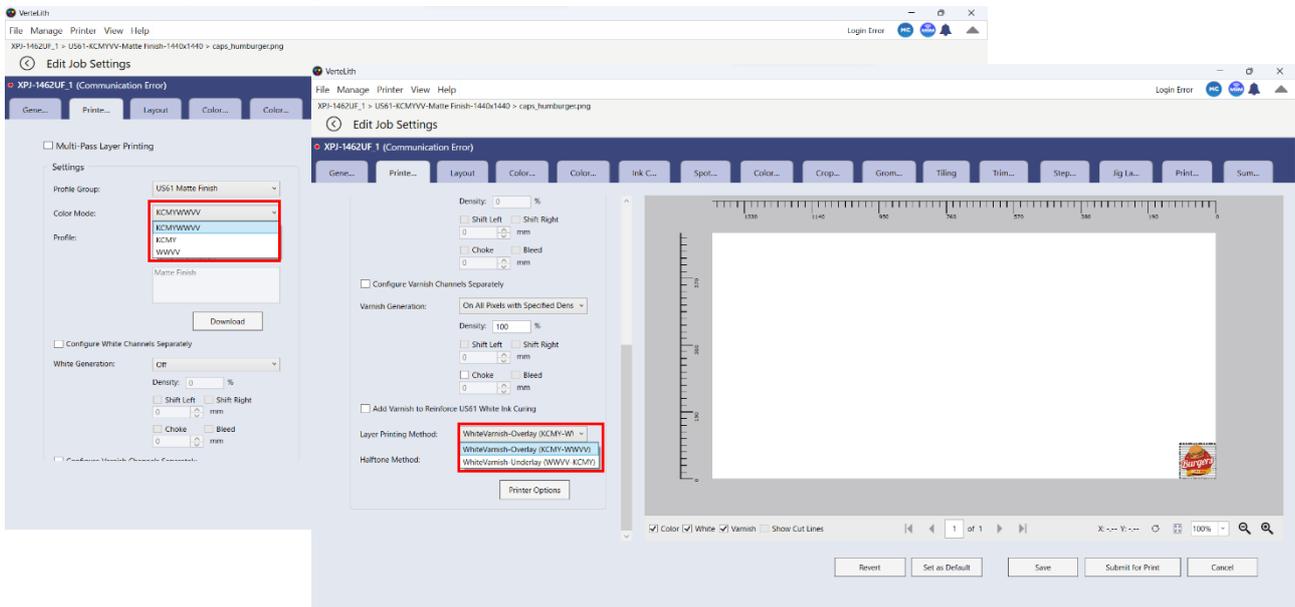
Select **Spot Color (Spot\_Varnish)**.



### Step 3. Print in single-pass layer printing

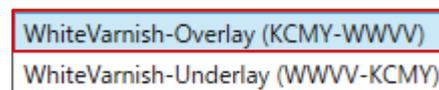
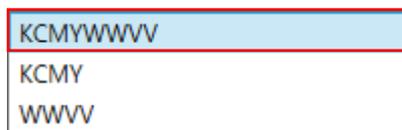
Select an appropriate option from the Color Mode dropdown list in the Printer Profile tab.

To perform two-layer printing with CMYK + varnish inks, select an appropriate option from the Layer Printing Method dropdown list.



- To print varnish over CMYK (KCMYWWVV)

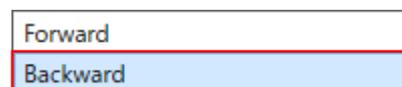
Select **KCMYWWVV** from the Color Mode dropdown list, then select **WhiteVarnish-Overlay** from the Layer Printing Method dropdown list.



- To print a varnish data only (WWVV)

Select **WWVV** from the Color Mode dropdown list.

To provide glossy finish, you should select **Backward** from the Printing Direction dropdown list.



#### Note

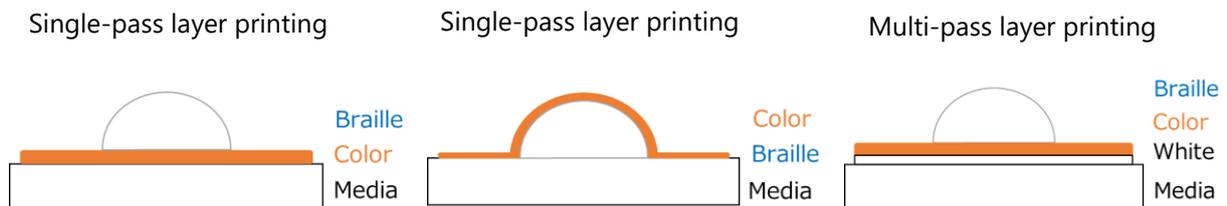
- Especially when using US61 ink, printing a varnish-only data with the Forward setting could cause uneven ink curing. Make sure to set the Printing Direction to "Backward".

## 5 Braille Printing

This guide provides the method for printing raised braille dots by specifying the “print count” option for white and varnish.

XPJ-1462UF can print a CMYK image and braille dots in a single pass (single-pass layer printing).

In addition, by using multi-pass layer printing, you can print a white and CMYK layers in a single pass and print braille dots on top of the CMYK layer.



### 5.1 Preparations before printing on XPJ-1462UF

Braille dots are printed by building up layers of white and varnish, so you need to print it with the print head height considering the thickness of buildup layers.

To print properly, you will do a calibration with this print head height considering this thickness and save the adjustment value in the user type.

Type1: Configure the setting to print with the print head height based on media thickness

Type2: Configure the setting to print with the print head height based on media thickness plus thickness of buildup layer

### Configure the user type settings

To create a user type for each printing purpose, you will do the following three settings:

- (1) Media height
- (2) Print head calibration
- (3) Bidirectional printing calibration

(1) Media height

1	Setup > User Type > Type1 & Type2
2	Type1: Media Setting 1 Set Media >1: Media Setting Height >1: Height: Auto >1: PG Offset: 0.0mm
	Type2: Media Setting 1 Set Media >2: Media Setting Height >2: Height: Auto >2: PG Offset: Select from the Table 5 depending on the height of braille dots

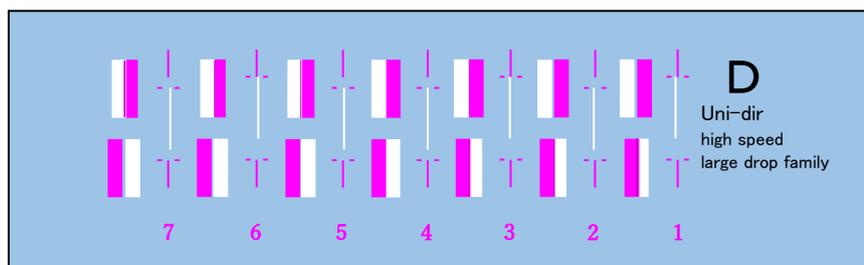
**Table 5. PG Offset**

Height of braille dots	PG Offset setting
0.4 mm, 0.6 mm	0.6 mm
0.8 mm(ADA)	1.0 mm

(2) Print head calibration

For the calibration method, refer to the XPJ-1462UF operation manual (Various Settings > Print settings menu > Adjust Layer Print > Head Fine Adjust calibration procedure).

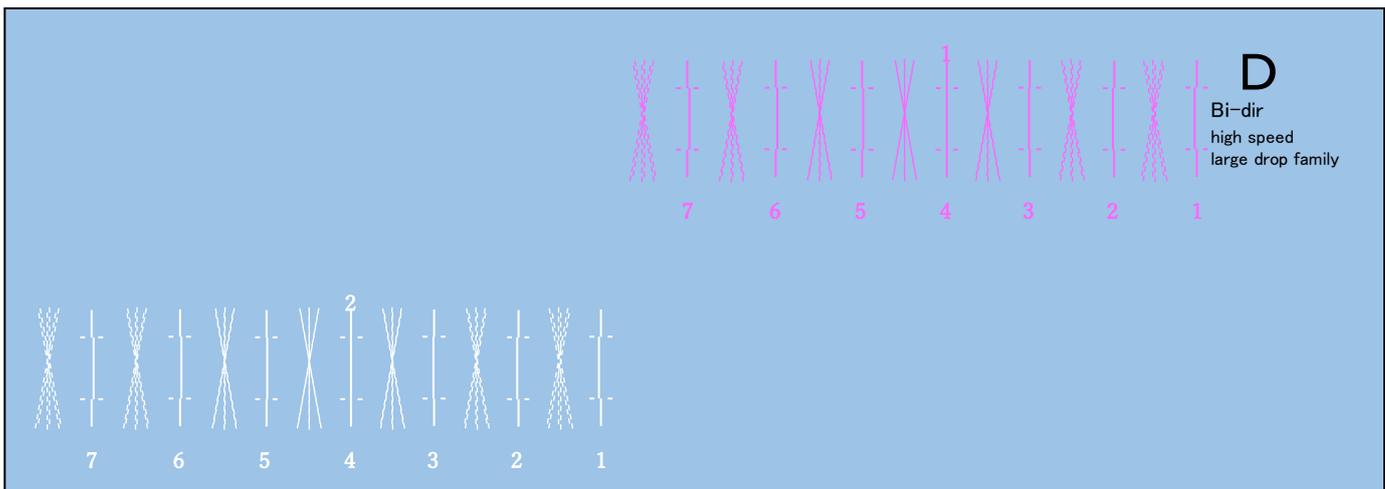
1	Setup > User Type > Type2
	Menu1 Setup >Setup1 User Type >User Type: Type2
2	Menu1 Setup > User Type > Type2 > Type2:3 Adj. Layer Prn > Adj. Layer Prn.1 Head Fine Adjust > Head Fine Adjust 5 Fine Pattern D > Enter an adjustment value (Enter the number of the most aligned pattern).



### (3) Bidirectional printing calibration

For the calibration method, refer to the XPJ-1462UF operation manual (Setup > Setting up your printer > Perform print head and bidirectional calibrations).

1	Setup > User Type > Type2
	Menu1 Setup >Setup1 User Type >User Type: Type2
2	Menu1 Setup > User Type > Type2 >Type2:2 Adjust Print > Adjust Print2 Custom > Custom 5 Rough Pattern D > Enter an adjustment value for print head 1 and print head 2
	>Type2:2 Adjust Print >Adjust Print2 Custom > Custom10 Fine Pattern D > Enter an adjustment value for print head 1 and print head 2



#### Note

- For user type, please select two user types between Type 1 and Type 15.
- For an adjustment pattern for Type 2 (build up), please select pattern D.
- After performing "Adjust Head" calibration, make sure to perform "Adjust Print" calibration as well.
- Before doing calibration, make sure to specify the media height. For the print head and bidirectional calibrations, refer to the XPJ-1462UF operation manual (Setup > Setting up your printer > Perform print head and bidirectional calibrations) as well.

## 5.2 Recommended Conditions and Print Environments for Braille Printing

### Recommended Conditions

Depending on the amount of white and varnish inks to be used, it gives different finish for braille dots.

The print environments supplied with this guide are optimized for purpose.

The Table 6 shows the recommended printing conditions for braille printing.

**Table 6. Recommended Printing Conditions**

Print mode	Resolution/ pass	White	Varnish	Print count	Effect
Build up	1440x1440dpi/32pass	100%	100%	2	i-Weave UVEx
Build up	1440x1440dpi/32pass	0%	100%	4	i-Weave UVEx

### Print Environment

The print environments listed in the Table 7 will be used in this section.

**Table 7. Print Environment**

<For UH21 ink>

Print environment	Braille dots	Height of Braille dots
UH21-KCMYWWV-Braille(ADA)White	White	Build Up (1440x1440dpi)
UH21-KCMYVV-Braille(ADA)Clear	Varnish	Build Up (1440x1440dpi)

<For US61ink>

Print environment	Braille dots	Height of Braille dots
US61-KCMYWWV-Braille White 0.4mm	White	0.4mm
US61-KCMYWWV-Braille White 0.6mm	White	0.6mm
US61-KCMYWWV-Braille White 0.8mm	White	0.8mm
US61-KCMYVV-Braille Clear 0.4mm	Varnish	0.4mm
US61-KCMYVV-Braille Clear 0.6mm	Varnish	0.6mm
US61-KCMYVV-Braille Clear 0.8mm	Varnish	0.8mm

### Note

- The Braille White print environment prints in white braille dots using white and varnish inks.
- The Braille Clear print environment prints in clear braille dots using varnish ink.

The Table 8 shows the approximate height of the braille dots printed with the ink volume and print count settings. When creating your design, please refer to this table to determine ink density for spot color.

**Table 8. Height of braille dots**

<For UH21 ink>

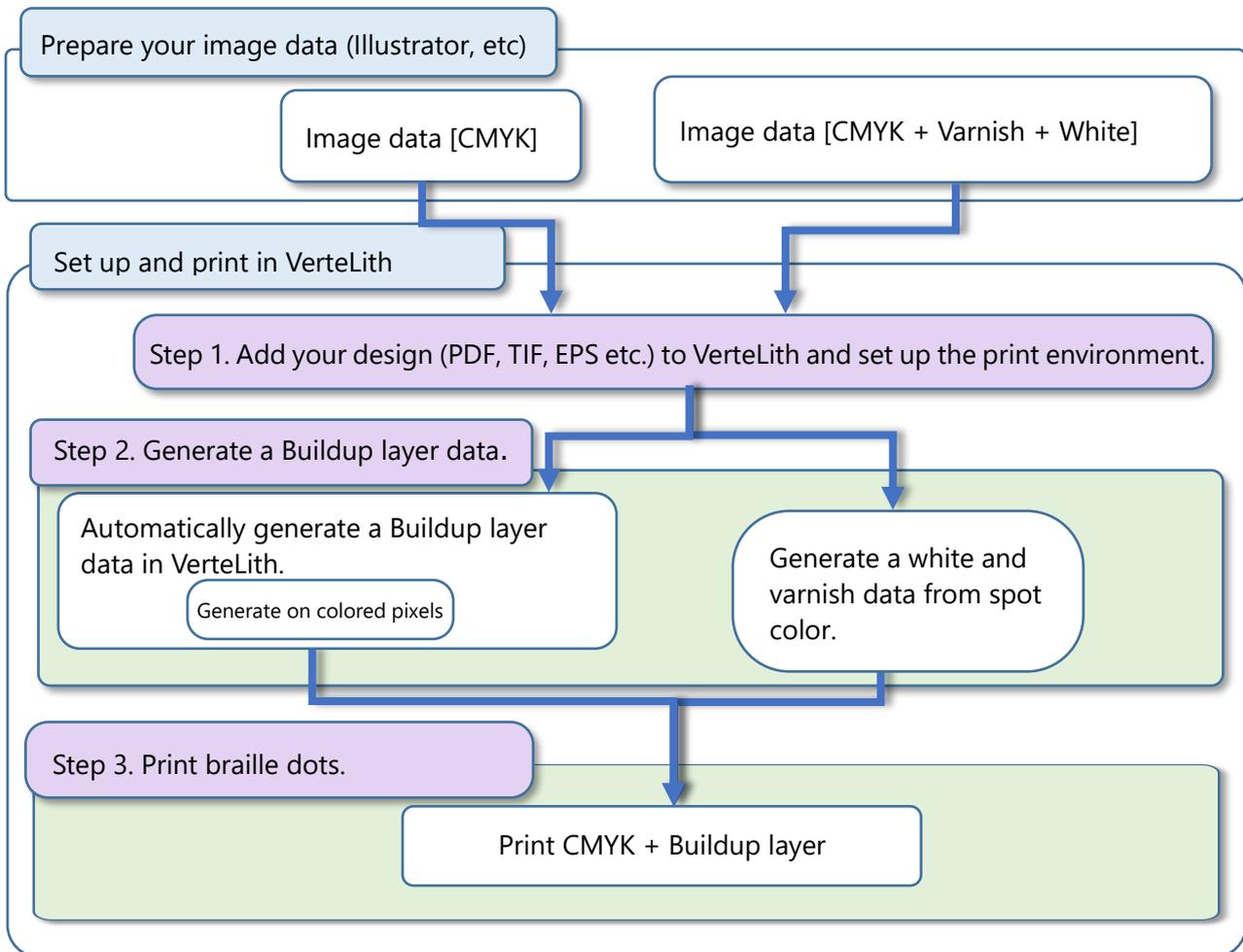
Print mode	Ink volume	Print count	Approximate height of braille dots (mm)
Build Up	White 100%, Varnish 100%	2	0.75
Build Up	White 70%, Varnish 70%	3	0.77
Build Up	White 75%, Varnish 75%	3	0.80
Build Up	White 0%, Varnish 100%	3	0.67
Build Up	White 0%, Varnish 100%	4	0.89

<For US61 ink>

Print mode	Ink volume	Print count	Approximate height of braille dots (mm)
Quality	White100%,Varnish 100%	2	0.4
Quality	White100%,Varnish 100%	3	0.6
Build Up	White100%,Varnish 100%	2	0.8
Quality	White0%,Varnish 100%	4	0.4
Quality	White0%,Varnish 100%	6	0.6
Build Up	White0%,Varnish 100%	4	0.8

## 5.3 Braille printing guide

This flow chart shows the process from the design preparation to the operations you will do in VerteLith

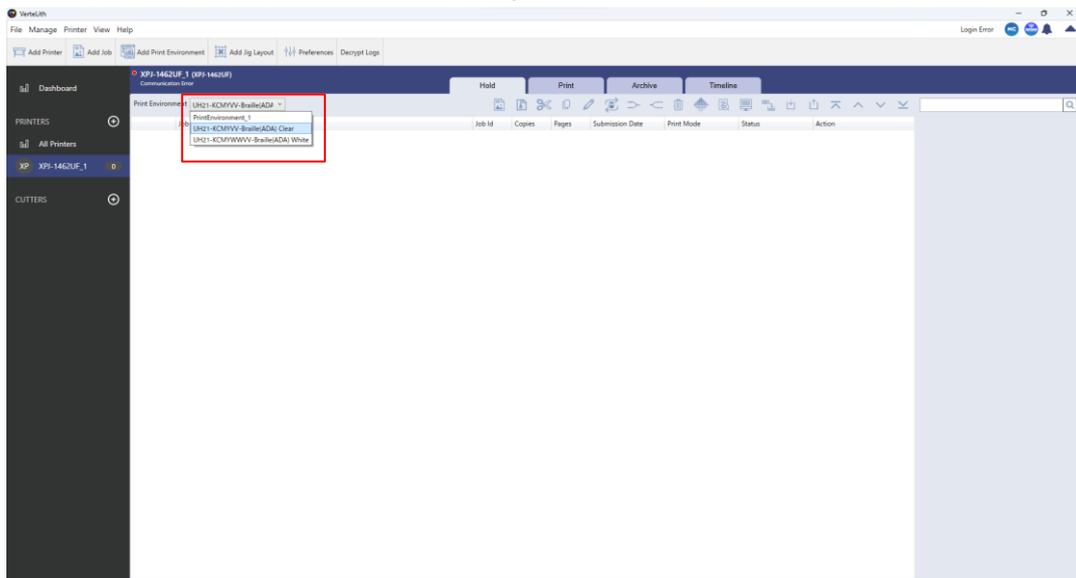


### Note

- If you want to print a color on top of Buildup layer, you should adjust the print head height after printing the Buildup layer and then print the color on top in bidirectional printing. Unidirectional printing is not recommended as it may not print the side of braille dots. Make sure to do a test print in advance to see how it prints.

## Step 1. Select a print environment

Select a print environment, then add a print job.



## Step 2. Generate a BuildUp layer data

Go to **Edit Job Settings > Printer Profile** tab, select **KCMYWWVV** from the Color Mode dropdown list.

From the White Generation and Varnish Generation dropdown lists, select a data generation method.



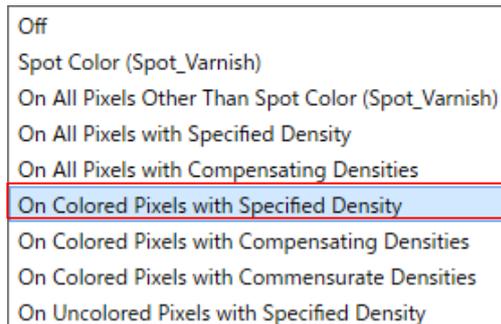
• To automatically generate a BuildUp layer data

Select **On Colored Pixels with Specified Density**.

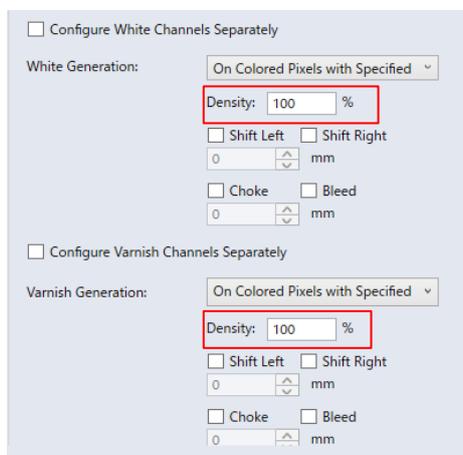
White



Varnish



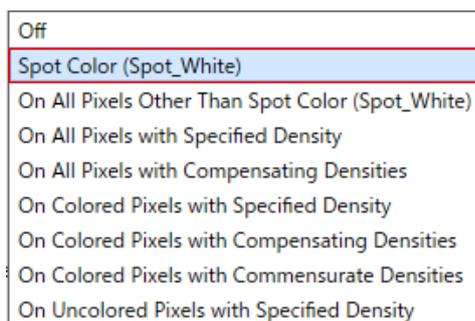
Refer to the Table 8. Height of braille dots to specify ink density.



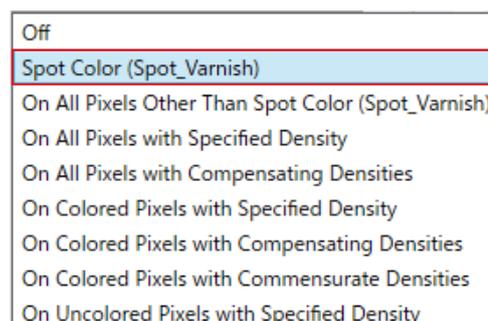
• To generate a Buildup layer data from spot color

Select **Spot Color (Spot\_White)** and **Spot Color (Spot\_Varnish)**.

White



Varnish



### Step 3. Print braille dots

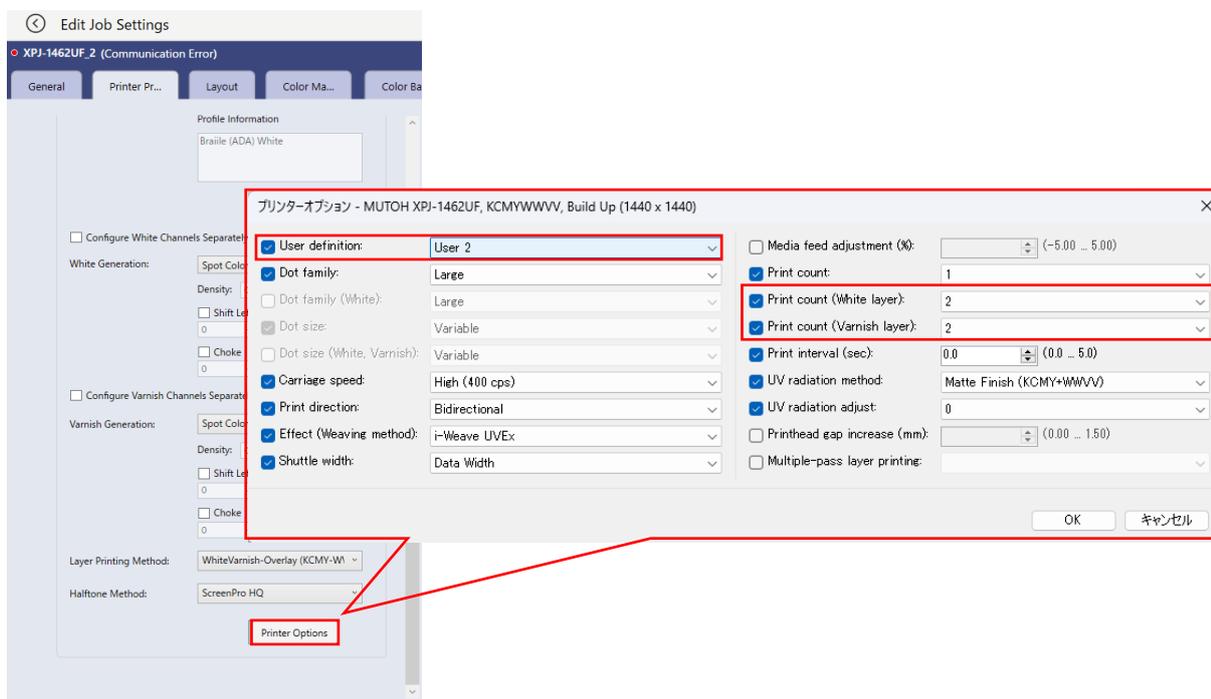
#### Print CMYK + Buildup layer

In Layer Printing Method, the WhiteVarnish-Overlay option prints braille dots in white or clear and the WhiteVarnish-Underlay option prints braille dots in color. Select one as needed.

WhiteVarnish-Overlay (KCMY-WWVV)  
 WhiteVarnish-Underlay (WWVV-KCMY)

Go to **Printer Options** and select **User 2 (PG offset 1.0mm or 0.6mm)** from the User Definition dropdown list.

Refer to the Table 8. Height of braille dots and select the print count for white layer and varnish layer from the dropdown list respectively.



#### Note

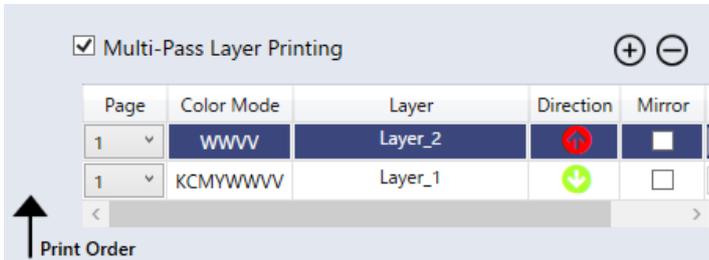
- Select an appropriate user type in the User definition dropdown list.
- If the height of braille dots is too low, refer to the Table 8. Height of braille dots to adjust ink density of white and varnish and increase the print count.
- If braille dots and color image are shifted, refer to the XPJ-1462UF operation manual (Various Settings > Print settings menu > Adjust Layer Print > Head Fine Adjust calibration procedure) to adjust dot placement position.

<Reference> To print the braille dots and an image in multi-pass layer printing

•Print CMYK + Buildup layer in multi-pass layer printing [KCMYWWVV]

Layer 1: KCMYWWVV, Layer 2: WWVV

Braille dots will be printed in white or clear.

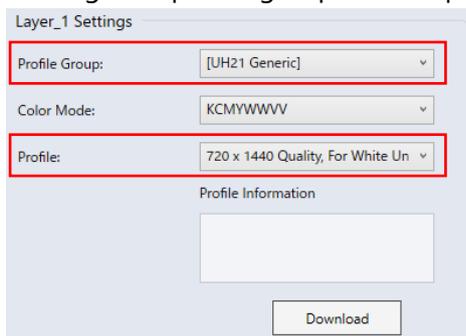


**Table 9. Layer Settings**

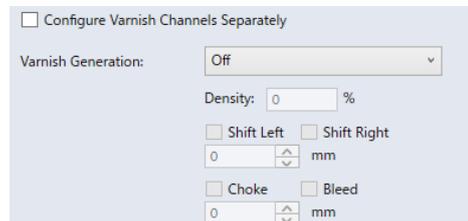
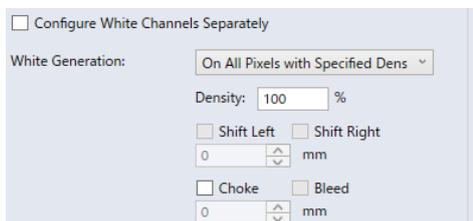
Layer	Color mode	Layer Printing Method/ Printing Direction
Layer 2	WWVV	Forward
Layer 1	KCMYWWVV	WhiteVarnish-Underlay

•Layer 1

Change the profile group and the profile for Layer 1 as needed.

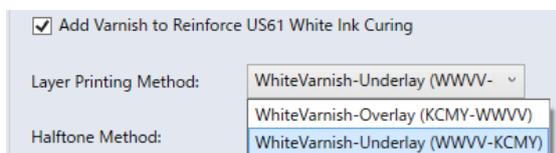


Select **On All Pixels with Specified Density** from the White Generation dropdown list and **Off** from the Varnish Generation dropdown list.



Select **WhiteVarnish-Underlay** from the Layer Printing Method dropdown list.

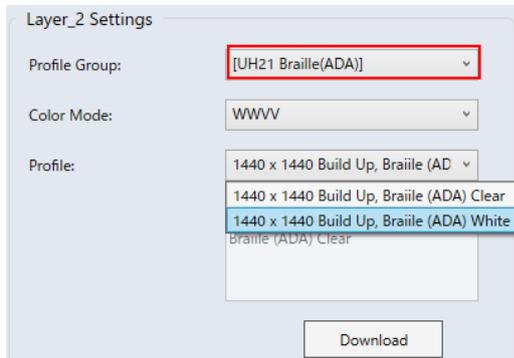
For US61 ink, enable the **"Add Varnish to Reinforce US61 White Ink Curing"** checkbox.



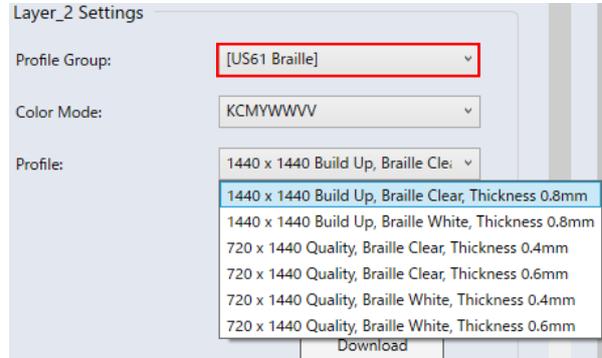
•Layer 2

From the Profile Group dropdown list, select **UH21 Braille(ADA)** for UH21 ink and **US61 Braille** for US61 ink.

<UH21>



<US61>



**Note**

- The Braille White profile prints in white braille dots using white and varnish inks.
- The Braille Clear profile prints in clear braille dots using varnish ink.
- For white/varnish data generation method, refer to the Step 2.

Select **Forward** from the Printing Direction dropdown list.

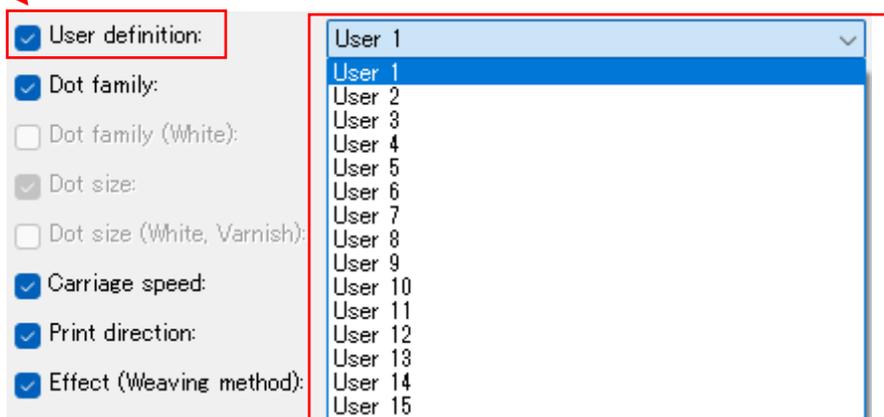
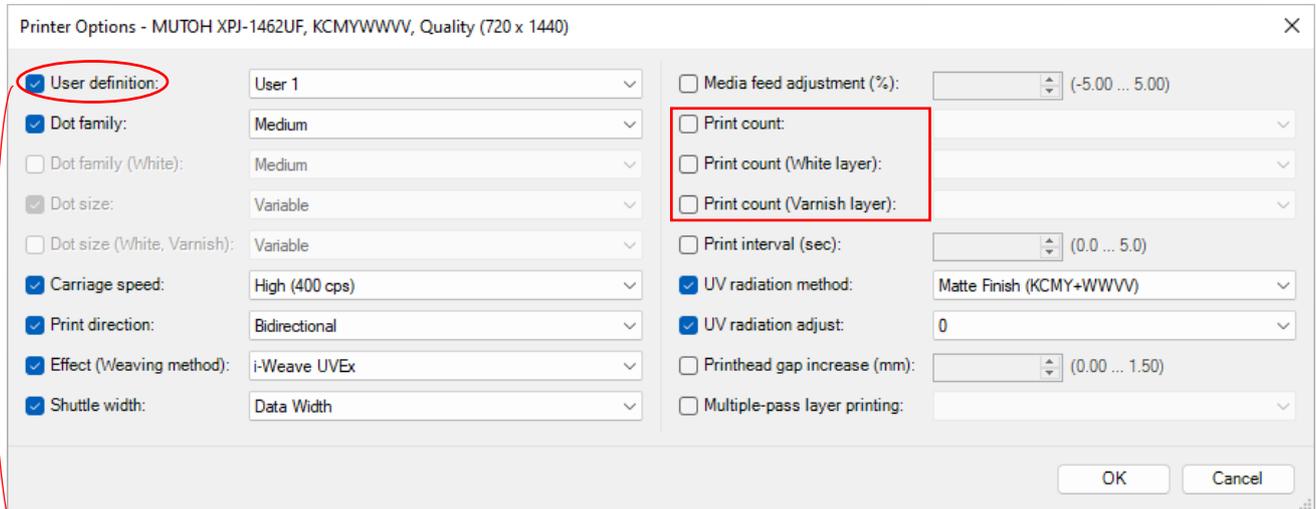


Change the settings in Printer Options for each layer as follows.

• Layer 1 Printer Options

User definition: Select **User 1 (PG offset 0.0mm)**.

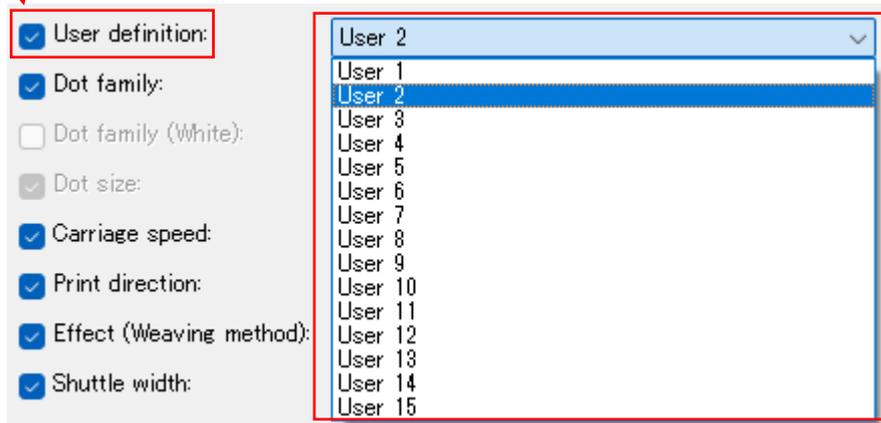
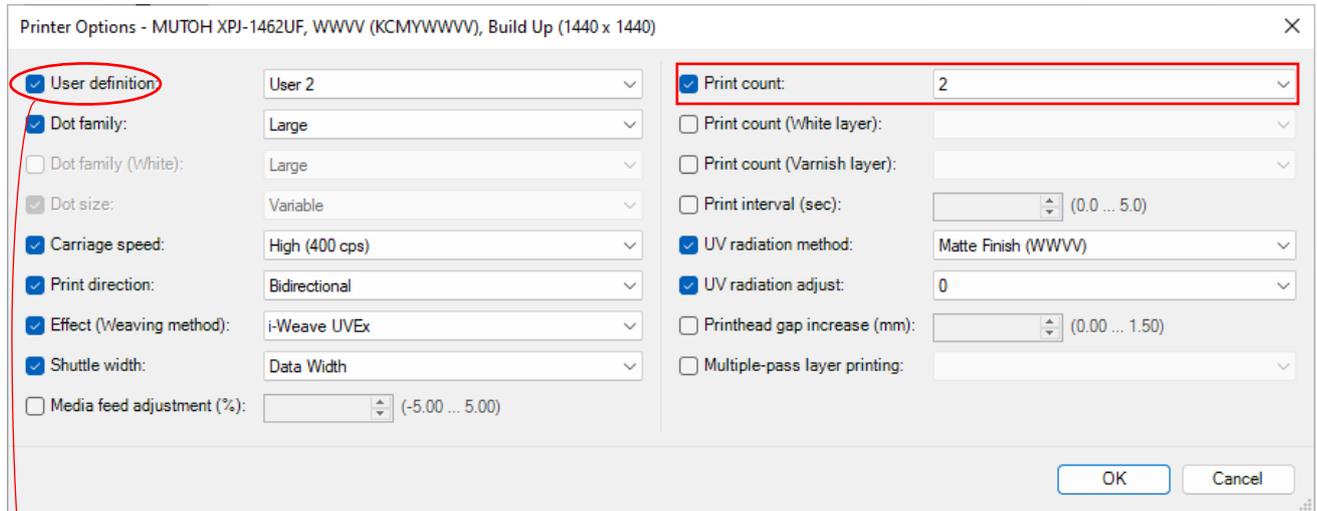
Print count: Disable all three checkboxes.



• Layer 2 Printer Options

User definition: Select **User 2 (PG offset 1.0 mm or 0.6mm)**.

Print count: Select **2**.



**Note**

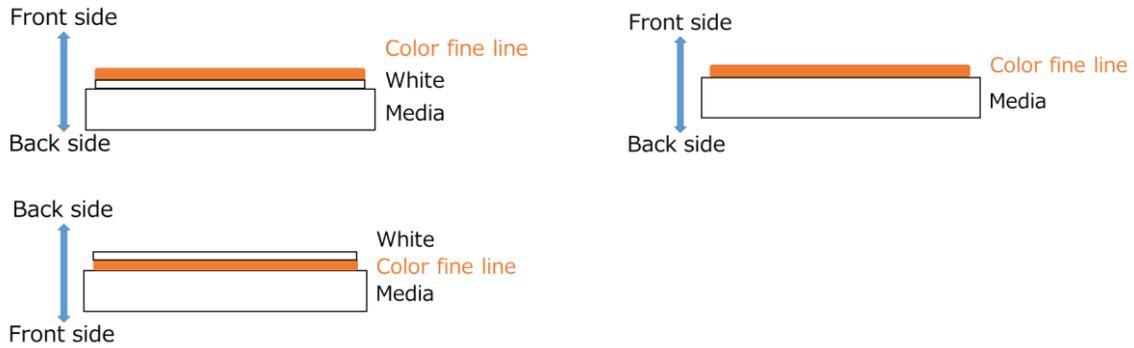
- Select an appropriate user type from the User definition dropdown list.
- If the height of braille dots is too low, refer to the Table 8. Height of braille dots to adjust ink density of white and varnish and increase the print count.
- To print more than three layers in multi-pass layer printing, change the media height setting in the user type to "Manual" and specify the media height with the thickness of each layer in mind.
- When using media that the printer is unable to detect correctly (such as transparent media), you may not be able to get good print quality. In such cases, you should select "Manual" in the media height setting.
- If Layer 1 and Layer 2 are shifted, refer to the XPJ-1462UF operation manual (Various Settings > Print settings menu > Adjust Layer Print) to calibrate it.

## 6 Fine Line Printing

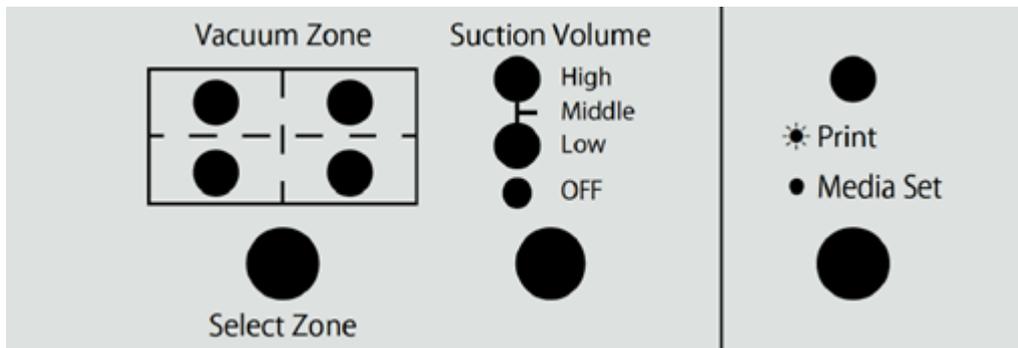
This section provides the printing method specialized for fine lines.

Using the dedicated print environment, you can print fine lines in the bidirectional printing mode.

In this guide, we will show you how to print colored fine lines.



Very fine text like below can be printed.



### Note

- The print environment supplied with this guide does not support white fine lines. In this guide, white ink is used to print underbase.

## 6.1 Print Environment and Print Mode

By performing a bidirectional calibration, you can print fine lines in the bidirectional printing mode. The print environments supplied with this guide are designed for bidirectional printing. Printing time varies between bidirectional and unidirectional printing as shown in the Table 10.

**Table 10. Print Mode**

Print mode	Print resolution/ Pass	Printing direction	Throughput	Carriage speed	Effect
Quality	720x1440dpi/16pass	Bidirectional	2.92 m <sup>2</sup> /h	400cps	i-Weave UVEx
Quality	720x1440dpi/16pass	Unidirectional	1.55 m <sup>2</sup> /h	400cps	i-Weave UVEx

The print environments listed in the Table 11 will be used in this section. Select an appropriate one for your design.

**Table 11. Print Environment**

<For UH21 ink>

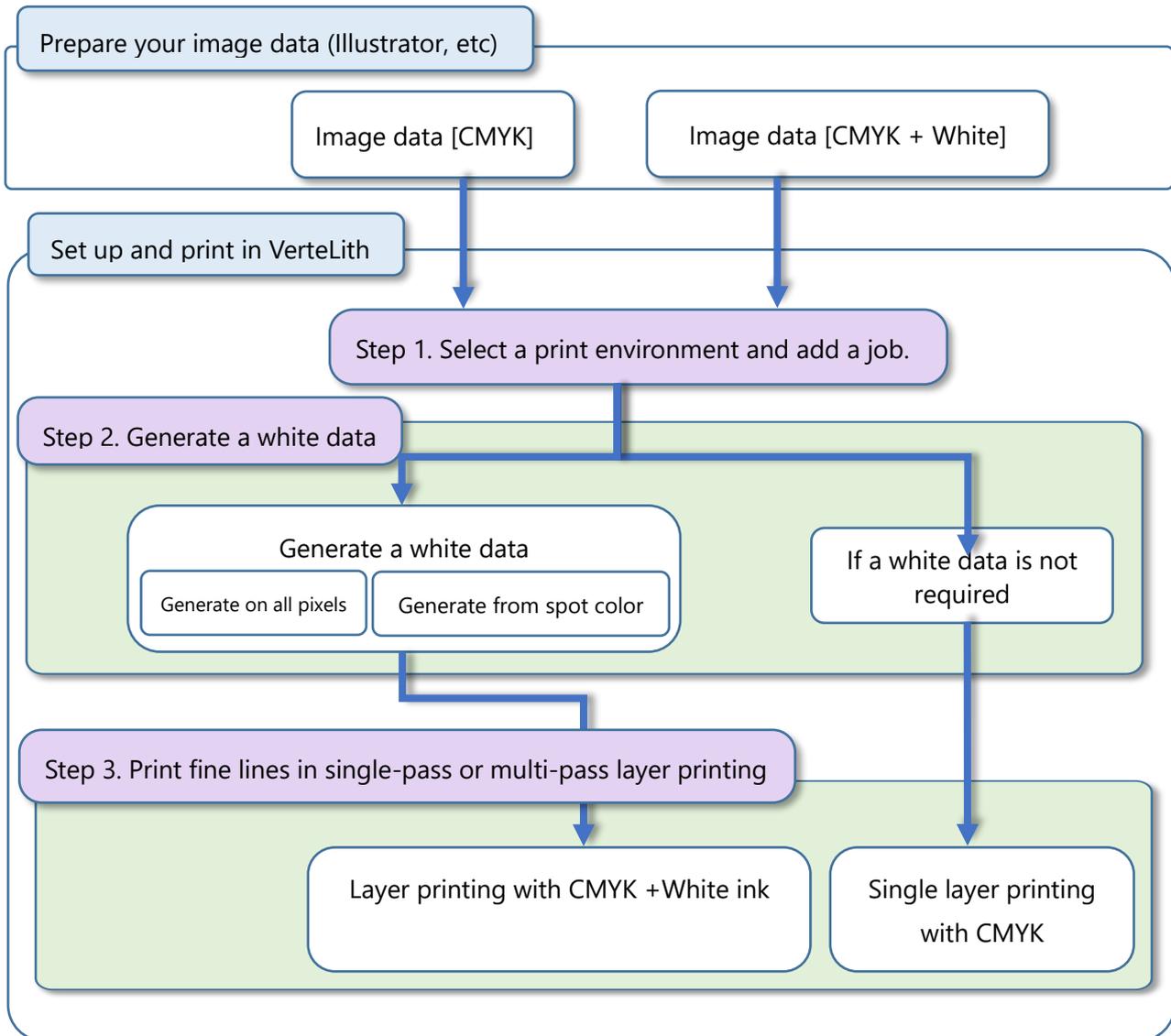
Print environment	Print mode	Purpose
UH21-KCMYWWVV-For Fine Line Printing (White Overlay)-720x1440	Quality	Print on the second surface of transparent media.
UH21-KCMYWWVV-For Fine Line Printing (White Underlay)-720x1440	Quality	Print white underbase. Print with CMYK only

<For US61 ink>

Print environment	Print mode	Purpose
US61-KCMYWWVV-For Fine Line Printing (White Overlay)-720x1440	Quality	Print on the second surface of transparent media.
US61-KCMYWWVV-For Fine Line Printing (White Underlay)-720x1440	Quality	Print white underbase. Print with CMYK only

## 6.2 Printing guide

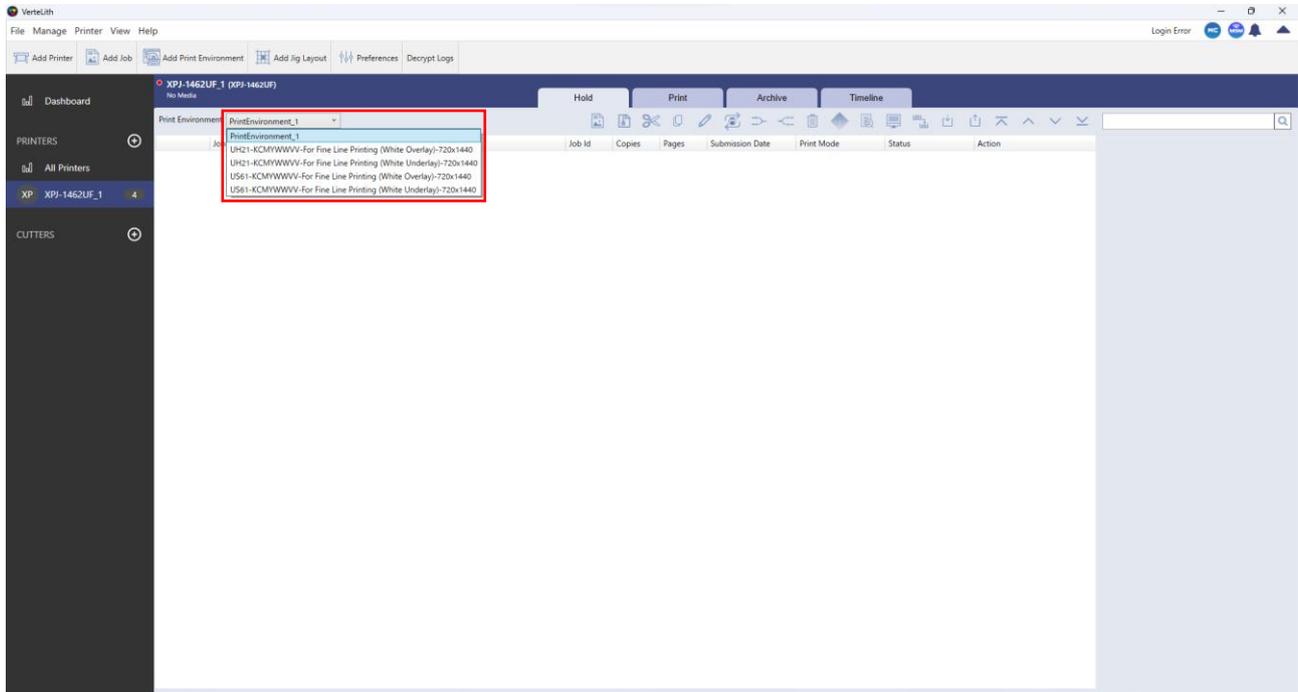
This flow chart shows the process from the design preparation to the operations you will do in VerteLith.



## Step 1. Select a print environment and add a print job

From the dropdown list, select an appropriate print environment.

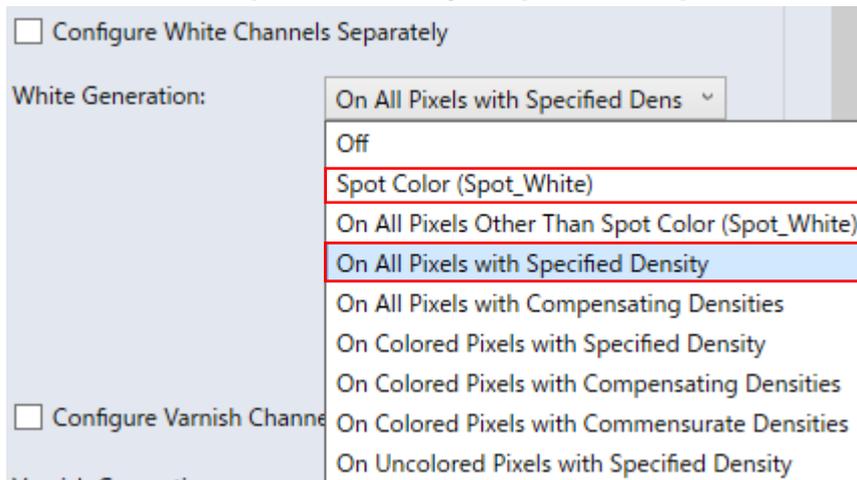
Then add a print job to VerteLith.



## Step 2. Generate a white data

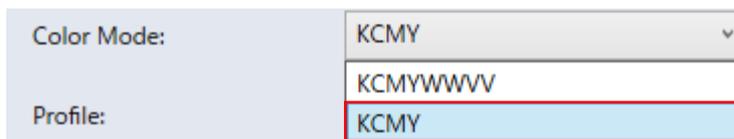
• To generate a white data

Select **On All Pixels with Specified Density** or **Spot Color (Spot\_White)**.



• If a white data is not required:

Select **KCMY** from the Color Mode dropdown list.



### Note

- For the print environment for White-Overlay, the Mirror option is still enabled even if the color mode is changed to KCMY.

### Step 3. Print fine lines in single-pass or multi-pass layer printing

• If you select a print environment for White-Overlay

Select **WhiteVarnish-Overlay** from the Layer Printing Method dropdown list.

Layer Printing Method:	WhiteVarnish-Overlay (KCMY-W) ▾
	WhiteVarnish-Overlay (KCMY-WWVV)
Halftone Method:	WhiteVarnish-Underlay (WWVV-KCMY)

• If you select a print environment for White-Underlay

Select **WhiteVarnish-Underlay** from the Layer Printing Method dropdown list.

Layer Printing Method:	WhiteVarnish-Underlay (WWVV) ▾
	WhiteVarnish-Overlay (KCMY-WWVV)
Halftone Method:	WhiteVarnish-Underlay (WWVV-KCMY)

• If a white data is not required, your design will be printed in single-layer printing with CMYK.

#### Note

- If your design is not printed correctly, do a bidirectional calibration. For the calibration method, refer to the XPJ-1462UF operation manual (Setup > Setting up your printer > Perform print head and bidirectional calibrations > "Adjust Print" calibration).
- Print environments for fine line printing do not support the WWVV color mode. To print in multi-pass layer printing, select the WWVV color mode from any profile for white underbase.
- If you want to print finer lines, please use unidirectional printing. Printing speed will be slower, but it will produce finer lines.

<Reference>

- Switch between unidirectional and bidirectional printing

Printing direction can be changed from Printer Options.

