Material Thickness Setup for DICEweb and DICEpress Systems

For printers using Meteor Drive Electronics

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Version 1.0

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Versions

Version	Notes	Personnel	Date
1.0	Initial Release	CAJ	08/02/2022

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Purpose

Many printer applications use multiple materials to create various products. This guide will walk through the steps to set up a printer for a new material with a different thickness.

Summary

The process for setup and calibration for material thickness on DICEweb and DICEpress systems involves several key areas:

1. Setting printhead fly height
2. New Meteor configuration file setup
3. Encoder calibration process
4. Color registration adjustments

These will be described in detail in the sections below, with a streamlined step-by-step process shown at the end.

Procedure

1. Setting Printhead Fly Height

This step involves adding (or subtracting) shims from the printbar compliant balls on the web roller rack.

With a micrometer, measure the thickness of the new material and the current material (material used with the current drive electronic configuration) to determine the amount of height adjustment needed. For example moving from 6mil material to 10mil material represents a 4mil (.004in) change. Adding one 00-14359 shim (4 mils thick) to each compliant ball would raise the printhead the expected amount.

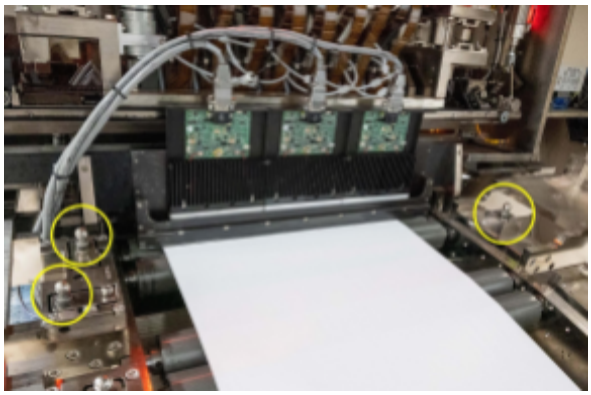
Stainless steel (8mm ID) shims available from PPSI are:

00-28302 .062 in thick
00-28301 .031 in thick
00-28300 .02 in thick
00-30338 .01 in thick

00-14359 .1mm thick (.004 in)
00-11826 .5mm thick (.02 in)
00-11827 1mm thick (.04 in)

Each blade has 3 compliant balls (see circled in image below) so a 4 color system would require 12 additional shims. An existing system may contain a slightly different number of shims to level the printhead across the web or a combination of thinner shims to build up to the target height. It is good practice to document the shim configuration for future reference and returning to a known setting.

Pull the DICEblade out and carefully lift the compliant balls from their mounting holes. Note that installed shims may stick together or to the block with the mounting hole. Add the shim to the existing shims and return the compliant ball to its original position.



Next step is to verify the fly height is correct with the Stamp/Contact Test. This requires webbing up the new material and getting it under proper tension for printing. Once the material is correctly webbed and under tension, stop the press with the material still under proper tension.

At the Print Manager software (Full Blade Control screen), Lower the printheads to the Print position for a moment, then return them to the Raised position. This will allow the printheads to be in the Print position without damaging them. When the heads are Raised, advance the web and inspect the area that was under the print engine. If there is any ink on the material, this is an indication that the fly height is insufficient and additional shims are required. In this instance, pull out the blade and add shims (usually a minimal amount) and repeat the test. If there is no ink on the material, the height is properly set.
(photo of ink on web)

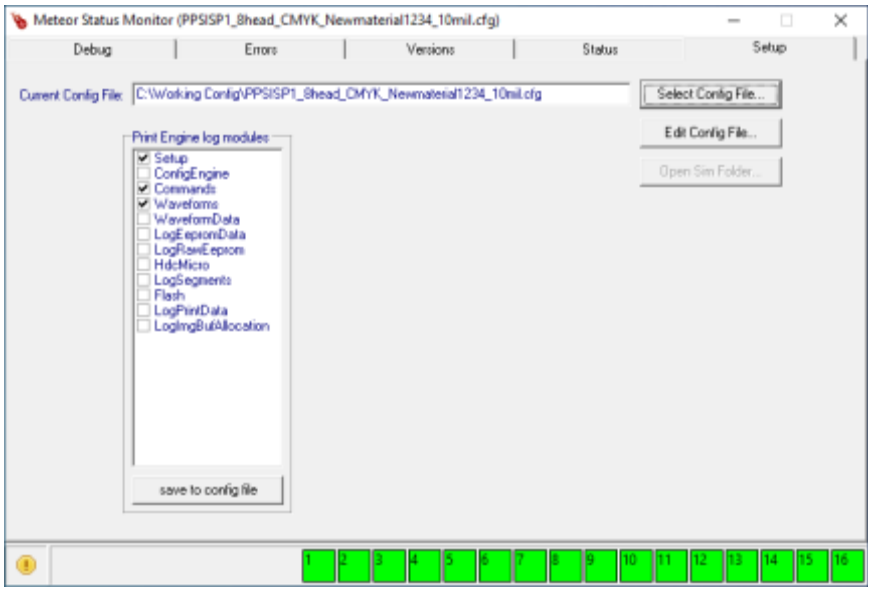
****Note that some materials may have uneven flatness or poor splices that could potentially damage the printheads while printing. In such cases, it is better to increase the fly height to avoid potential damage to the printheads while the material is in motion under the printbar.**

2. New Configuration Setup

As a production operation may require different stocks at different times, it is best to establish drive electronic configuration files for each material thickness. These configurations, once established, can be saved and recalled when material requirements change.

The easiest way to copy the current configuration file and edit the various parameters specific to the new material. Drive electronic configuration files are on the DICE PC system, in the C:\DICE\WorkingConfig folder. Under Windows, copy the existing configuration files within the directory. Rename the new file to match the thickness of characteristic of the new material. Example: Fasson54369_5mil_03312022.cfg would be Newstock1234_10mil_08012022.cfg.

Once the new configuration file is established, load the new config using the Meteor Status Monitor (Status tab, Select Config File button). When loaded (all PCCs green), go to Print Manager, Drive Electronics and right click to reconnect to the new configuration file.



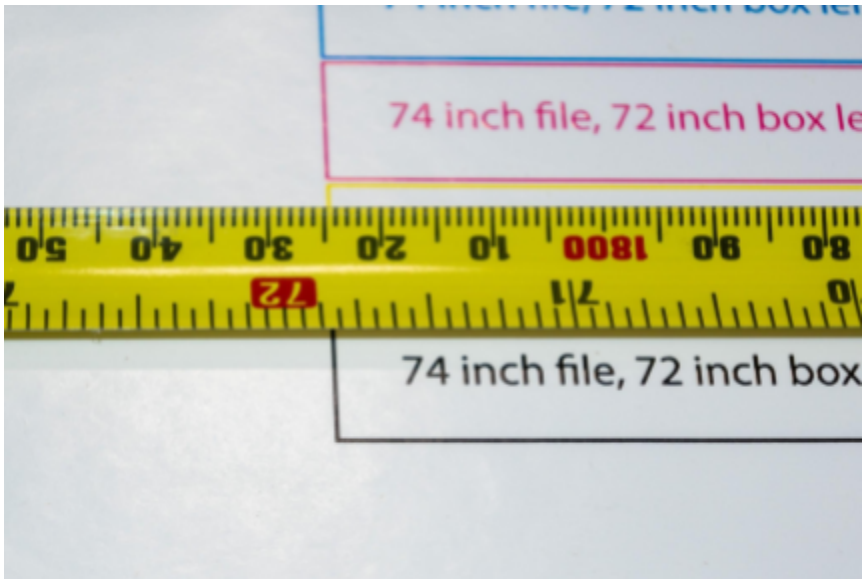
Ensure that the new material is installed and the new configuration file is loaded and ready for printing in the next step: encoder calibration.

3. Encoder Calibration Process

The first step involves printing a reference line on the new stock, measuring the difference between expected and actual values and calculating new encoder values.

Using Print Manager, load from the diagnostic folder the encoder reference file, typically named "72inEncoderCheck…" to the print queue and specify three copies. This job will print a 74 inch long image file with a 72 inch long box or line that can be measured with an accurate tape measure. The concept is to measure a longer reference image to minimize any rounding or measurement errors over the entire length of the image.

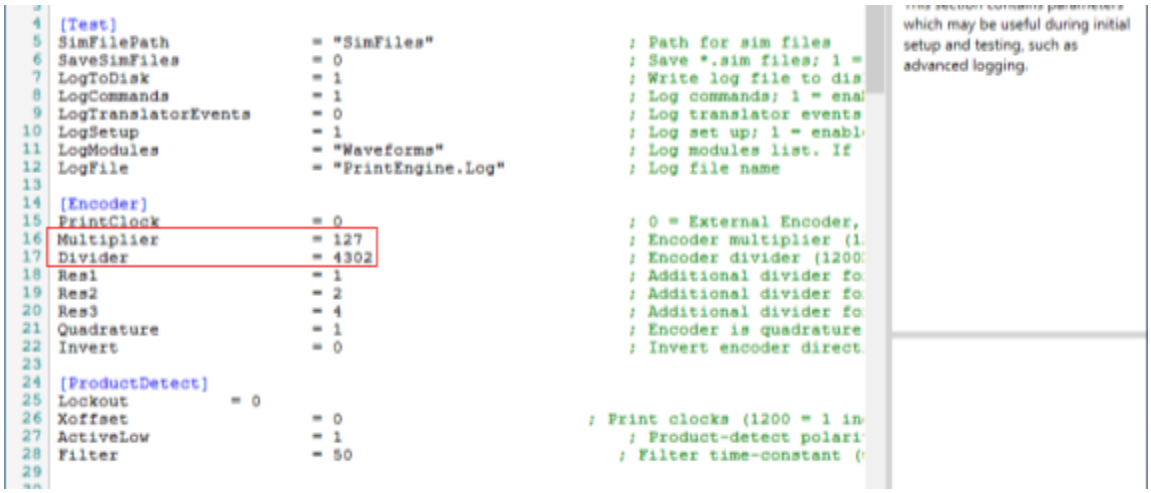
Cut off the last image printed (the first images allow the press to stabilize tension) and spread it out on a flat surface. Measure the distance of the printed line carefully and note how much it deviates from the 72 inch target length.



In the Print Manager menu, select Diagnostics, then Print Queue. Navigate to the “Encoder Calculator” tab, then the “Actual” tab. This will present a dialog box to enter the results of the measured line.

- Current Multiplier
- Current Divisor

These values are found in the current configuration file used to print the 72 encoder check line. In Meteor Status Monitor select Edit Config to open and examine the file. Look for the [Encoder] section to find the Multiplier and Divisor values



Enter these values into the dialog box fields:
Current Multiplier 127 (example)
Current Divisor 4302 (example)

- Desired Line Length (in)

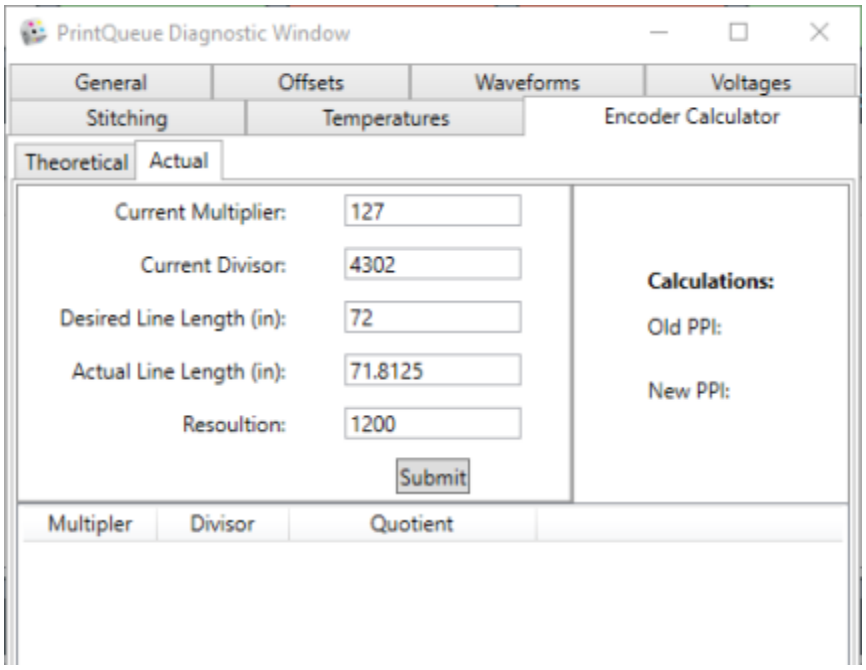
Enter the expected length of the printed reference line:
Desired Line Length (in) 72

- Actual Line Length (in)

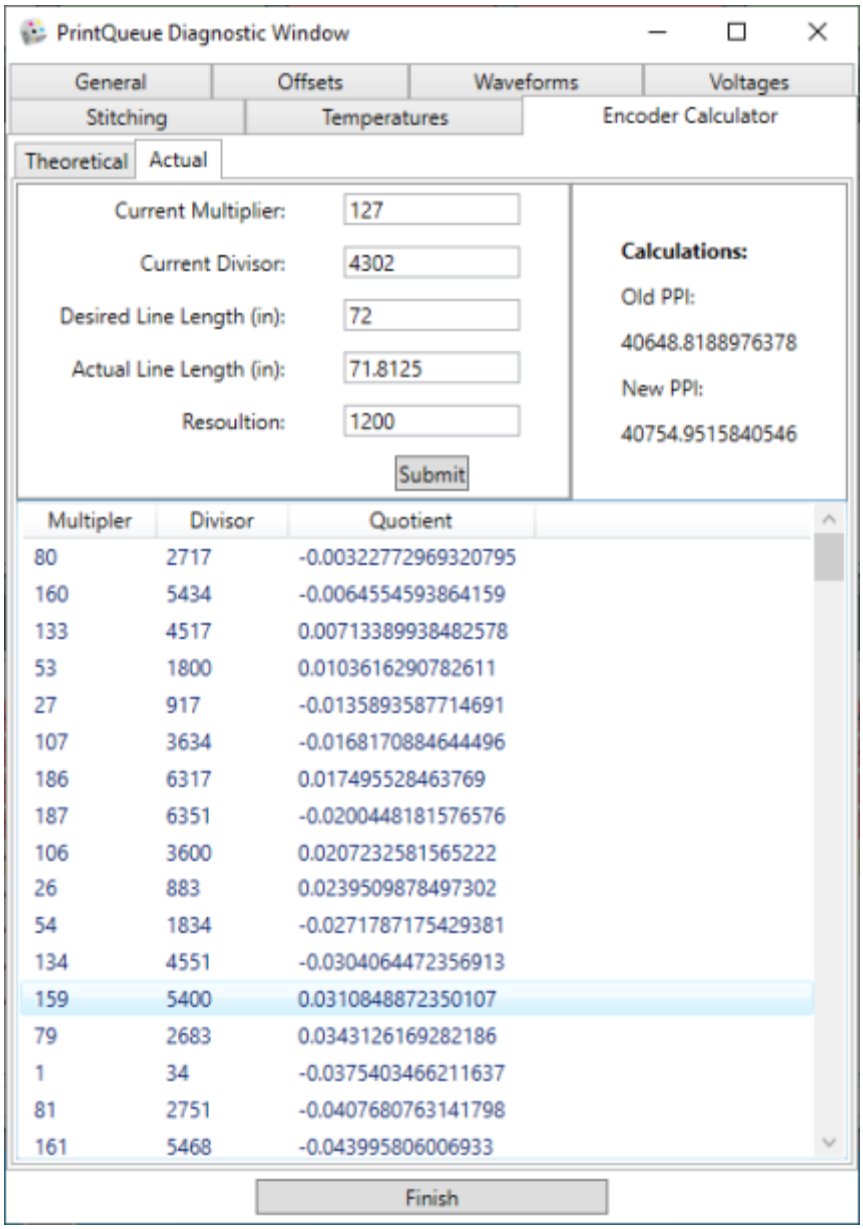
Enter the measure value of the reference line on the new material. As we are going for a thicker material the actual length will be less than the expected length. Note that fractional values are converted to decimal values e.g. 3/16 in is .1875 inches so the the line length would be 71.8125 inches
Actual Line Length (in) 71.8125 (example)

- Resolution

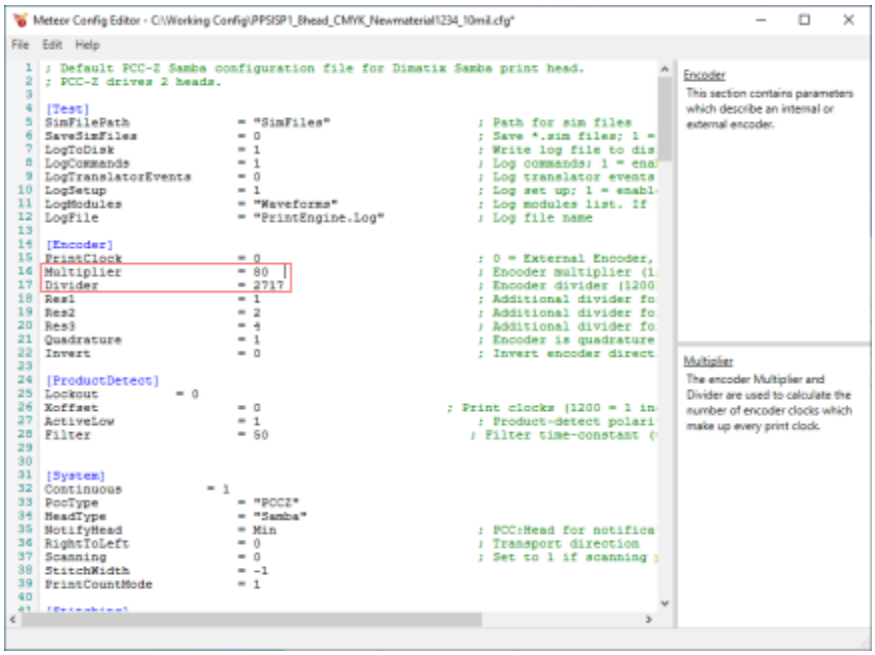
Enter the printhead resolution for the system e.g. 1200, 400 etc.
Resolution 1200


PrintQueue Diagnostic Window
General
Offsets
Waveforms
Voltages
Stitching
Temperatures
Encoder Calculator
Theoretical
Actual
Current Multiplier:
127
Current Divisor:
4302
Desired Line Length (in):
72
Actual Line Length (in):
71.8125
Resoultion:
1200
Submit
Calculations:
Old PPI:
New PPI:
Multipler
Divisor
Quotient

Press the Submit button. This will perform the calculation based on the dialog input and return a sorted list of potential Multiplier and Divisor values. The most accurate values have the Quotient closest to zero in this calculation. Note that this value CAN be negative.



In Meteor Status Monitor (loaded with the new configuration) use Edit Config to locate the [Encoder] section and replace the existing Multiplier and Divisor values with the calculated values. Save the configuration changes. Meteor Status Monitor will recognize the changes and initial the drive electronics with the new settings. Following that use PrintManager- Drive Electronics and right click to reconnect to the updated configuration.



It is recommended to reprint the encoder line and remeasure to verify the results are correct. If these values are not correct, the process can be repeated to generate a new set of Multiplier and Divisor values.

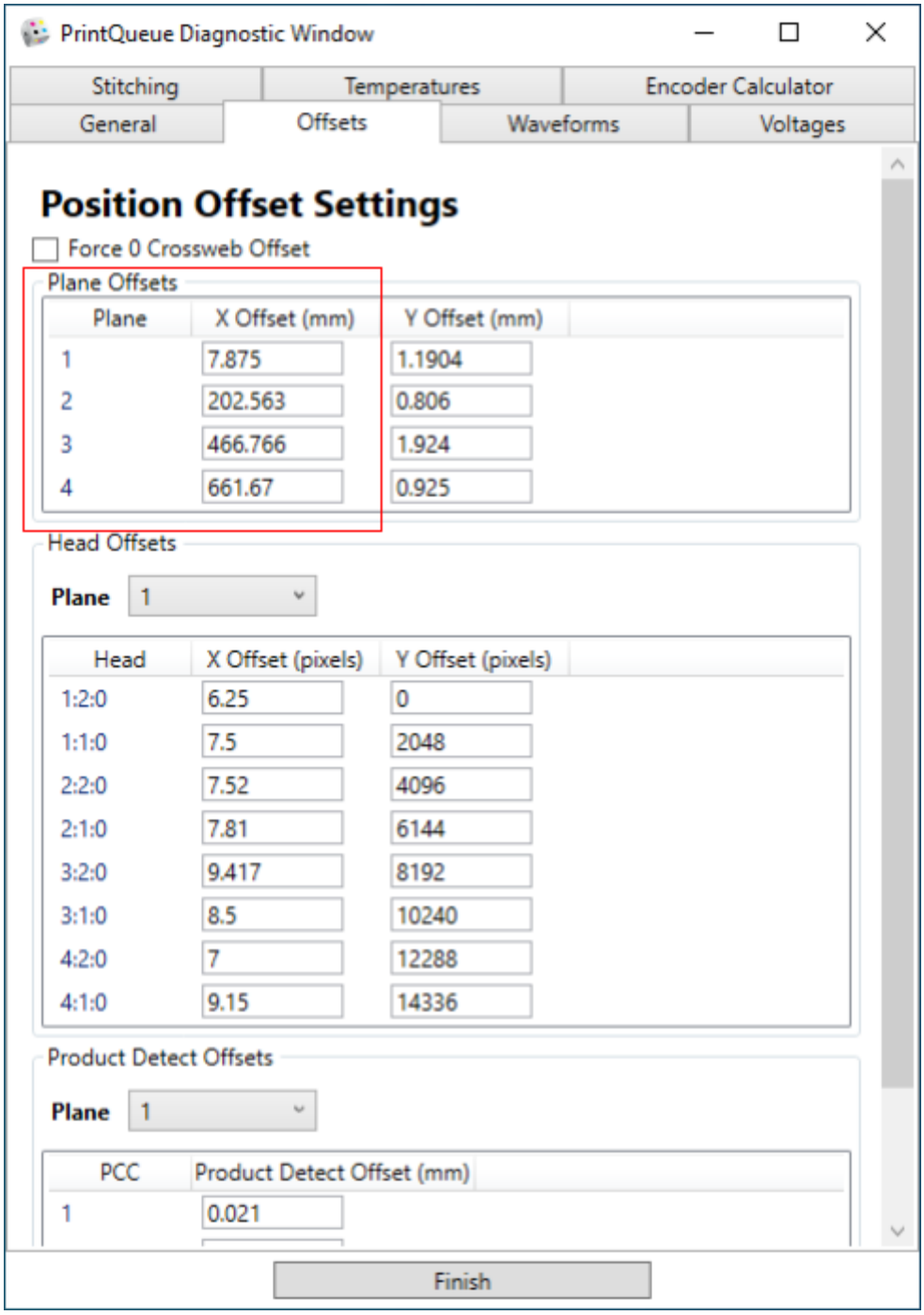
4. Color registration adjustments

As the drive electronics have been calibrated to reflect a more accurate encoder values for the new material, it will likely be necessary to adjust the color plane offset values to re-register the individual colors. In most cases this is done by printing the color registration pattern and determining the amount of adjustment for each color plane.

To print the color alignment pattern, in Print Manager- Load Jobs and from the Diagnostic tab select "ColorAlignment…." pattern and queue up multiple copies to print on the new material.

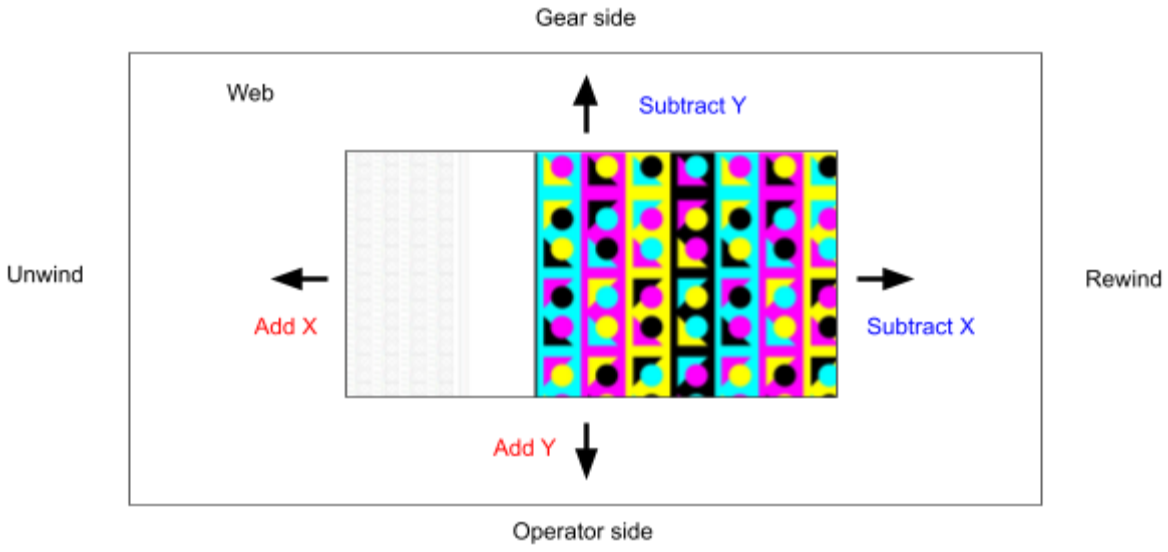
Inspect the output to determine the amount of adjustment needed.
(magnified view of alignment pattern)

To adjust the color alignment values, use Print Manager to go to Diagnostics, then Print Queue and select the Offsets tab.



Generally, there is only a need to adjust the Plane Offsets–specifically the X Offsets (downweb direction)--which are affected by the new encoder value. The Y Offsets (crossweb direction) do not require changes. Note that Plane Offsets are in millimeters. The key is to determine how much to move a specific color plane and which direction to move.

Generally Black (K) is used as a reference color and CMY X Offsets are adjusted to register to Black. So adjustment values (the difference between the individual color and black) are measured/noted. These adjustment values are added to or subtracted from the existing plane X Offset values. The following chart illustrates how entered values affect the movement of the image relative to the web and direction of print



Once amount of movement and direction are determined, use the Print Manager Offsets dialog box to update the values.

Once the offset values are determined, reprinting the aligment pattern is necessary to ensure that the inter-color registration for the new material is correctly set.

Two additional notes are relevant to encoder changes and color registration:
1) In some instances there may not be enough 'head room' to adjust values down. An example of this is usually Cyan, the first blade in the sequence, may have a low X Offset value but requires a negative offset value to match Black. Negative offset values are not recommended so it is easier to adjust MYK to Cyan in this instance.

2) In circumstances where the encoder values have changed significantly, it may be necessary to adjust the individual head offsets to properly align the printheads within a specific color plane. This situation may be common to print bars that use staggered printhead arrangements. It is key to examine all printheads within the array to determine if these adjustments are needed. Individual head offsets are shown on the same Print Manager Offsets tab and expressed in pixels (not millimeters!).

Outline/Recap

1. Estimate the amount of shim adjustment needed, round up shims required
2. Pull out each blade to add or subtract shims required for new material
3. Web up new material insure proper alignment and tension
4. Lower printhead to the Print position then raise to stationary web
5. Advance web to determine if heads are contacting material
6. Add more shims if needed and repeat the Stamp/Contact Test
7. Copy existing drive electronic config file and rename for new material
8. Load new config with Meteor Status Monitor and reconnect to Print Manager
9. Print encoder check line
10. Measure encoder check line
11. Use Print Manager to calculate new Multiplier/Divisor values
12. Enter new values using Meteor config editor
13. Save and reinitialize drive electronics reconnect Print Manager
14. Verify encoder values by reprinting encoder check line
15. Print color alignment pattern
16. Measure adjustment values for color planes to be added or subtracted
17. Use Print Manager Offset tab to update X Offset values
18. Verify color registration by reprinting alignment pattern

Appendix A:

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Appendix B: Parts

00-28302	.062 in thick (1.575mm)
00-28301	.031 in thick (0.787mm)
00-28300	.020 in thick (0.500mm)
00-30338	.010 in thick (0.254mm)
00-14359	0.1mm thick (.004 in)
00-11826	0.5mm thick (.020 in)
00-11827	1.0mm thick (.040 in)

Appendix C: Contact Information

Please address any comments or questions to:

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