Straight-Through Paper Path

A Handbook for Users

Introduction

This handbook is a collection of techniques and recommendations for achieving best output using the Straight-Through Paper Path (STPP) on the ColorSpan Legacy Solvent and UV-Cure printers. It does not cover the features of the DisplayMaker Esprit, which has more limited STPP capabilities.

General Recommendations

Hardware Setup

• Ensure that the printer stand is firmly assembled and has been stabilized using the supplied leveling feet. The stand legs should be level from front to back. The platen should be level from left to right.

• Ensure that the media support tables are level from left to right.

• The input table should be set so that the table rollers are the same height as the grit rollers. This is approximately 1/64" higher than the surface of the platen.

• The output table should be set so that the table rollers are the same height as the platen.

• Additional media tables are strongly recommended for handling media lengths greater than four feet.

• For UV printers, the table stabilizer system adds rigidity by locking the tables to the printer. This system is standard on the UVX printer; it is not required for UVR but may be beneficial if printing on heavy materials.

• For UV printers, the fence system greatly improves performance with heavy materials or media that lacks perpendicular edges. The fence system is standard on the UVX printer and is available for purchase for UVR. The fence system must be used in conjunction with the table stabilizer system to be useful. The fence system is *not* required nor recommended for lighter-weight materials.

Media Properties

• Store media flat, in a clean environment with the same or similar temperature and humidity as the printer.

• For best results, individual sheets of media should be flat. Curves in either axis of the media (left to right, or front to back) can lead to headstrikes of the carriage on the media. Accuracy of dot placement can also be affected by non-flat media.

• For best results, media should have parallel opposite edges with 90° corners. Media that is not square with itself will require extra attention when loading.

• Media may be a maximum thickness of 3/16" for the 72SR, 1/4" for the 98sx, 72 & 98SI and 72UVR, and 1/2" for the 72 & 98UVX.

Using the Straight-Through Media Path

Loading Media

1. Unload any roll-fed media from the printer.

2. Move the media support tables into place at the printer. You may wish to leave the output (front side) table away from the printer until you have adjusted the carriage head height for the new media.

3. On the printer's control panel, select "Load New Media".

4. A list of predefined media entries appears. This is the Media Wizard, which assists you in configuring the printer to work best with individual media properties.

5. Select the Media Wizard entry that most closely matches your media. If the printer settings need to be changed to better fit your specific media, you can make those changes later.

6. The printer will display whatever settings are associated with the media you chose in step 5. If you want to make changes to these settings now, press the button labeled "Media Settings". Note: if the media you chose in step 5 is a "factory" media (the media name will be followed by an asterisk ["*"] if it is a factory media) you will be prompted to save your changes under a new name. These changes will be saved under a new name in the Media Wizard that you can use again in the future.

7. When settings are complete, press Proceed.

8. The printer will prompt you to enter the length of the media. You must enter a value here. The printer will make further computations based on the length of the media, so it is recommended to enter the length accurately.

9. The printer will prompt you to place the media on the printer and set the pinch rollers to the tension setting specified in the Media Wizard. For most rigid media, this will be in the range of 1-4. See the following section on Precise Media Alignment for additional information on positioning media on the platen.

10. The printer will ask if you want to change the head height. If the thickness of the new media is different from the previous media, you should answer Yes. The UVX printer will prompt you for additional steps if the media thickness is greater than 1/4".

11. Insert the two blue-handled hex wrenches straight down into the holes at the top of the carriage until you feel them engage the bolts inside the cover. The access holes are labeled with a white circular label. Turn both handles simultaneously in the clockwise direction to raise the carriage to its maximum height.

12. Once the carriage is at its maximum height, press Proceed on the control panel to move the carriage out onto the media.

13. Place the head-height gauge next to the carriage.

14. Use the blue-handled hex wrench to turn one of the head height adjustment screws counterclockwise until the end of the gauge will not fit under the carriage.

Caution: Do not allow any part of the gauge to touch the printheads, and do not leave the gauge on the media or platen after setting the head height. If the gauge is allowed to touch or strike the printheads, the printheads could be damaged permanently and require replacement. The printer has a protective frame around the printheads to reduce the chance of anything striking them.

15. Turn the head height adjustment screw clockwise, just until the end of the gauge slides under the carriage. Be sure to measure from the bottom of the carriage itself, not the camera housing (solvent printers) or UV lamps (UV printers).

16. Remove the gauge and repeat steps 14 through 16 at the other side of the carriage.

17. Verify the heights at both sides of the carriage and adjust if necessary. Be aware that even a small tilt to the left or right can greatly increase the possibility of a head strike on the media.

18. When the head height is set correctly, press Proceed to send the carriage home.

19. The printer will measure the width of the media. If the printer's image sensor is unable to measure the media, as may occur with clear or highly reflective media, you will be prompted to manually locate the edges of the media by moving the carriage. See the following section on Precise Media Alignment for additional information on media measurements.

20. Once the media width has been determined, the printer will show the current margin settings. The default margin settings are 0.25" front, left, and right, and 6.50" back. The 6.50" back is a minimum requirement necessary to feed the printable area of the media through the printer. See the following section on Extending the Printable Length for additional information on margins.
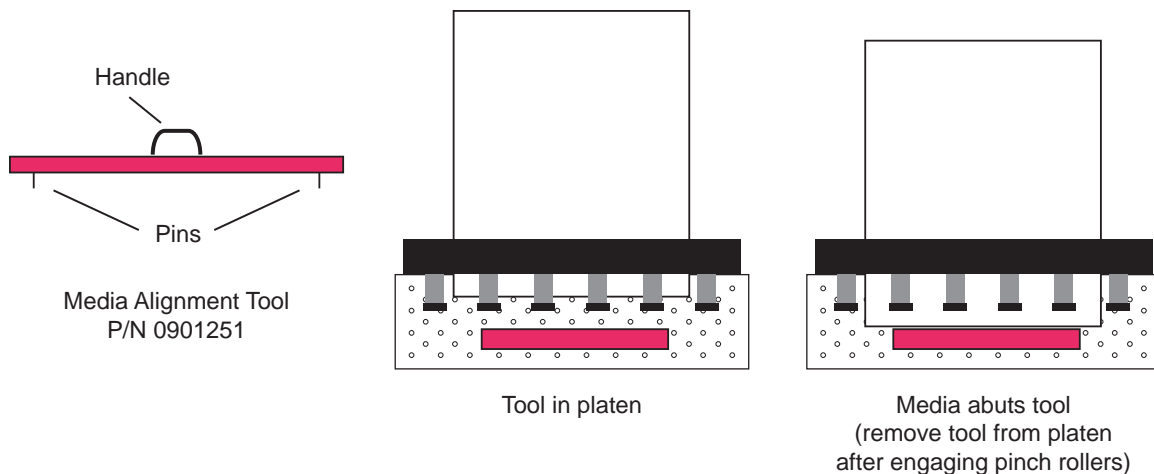
21. Press Proceed to complete the media load process.

Precise Media Alignment

• If not using the fence system, position the media on the platen so that it is centered under the pinch rollers. In other words, place the media so that the distance from the left edge of the media to the first left pinch roller is the same distance as from the right edge of the media to the first right pinch roller. See the illustration below.

CORRECT   **INCORRECT**
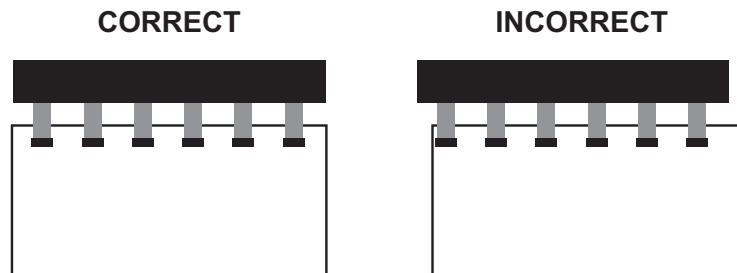
Note: depending on the size of the media, this positioning may cause the media-out sensor on the back of the printer to fail to detect the media. If so, the media sensor may be disabled through the Media Wizard or the Printer Settings menu. If you do disable the media-out sensor, ensure that you accurately enter the length of the media sheet and monitor the print so that the end of the media does not pass all the way out from the pinch rollers, creating the possibility of a damaging head strike.

Loading media so that it is square to the platen and pinch rollers is on of the most crucial elements. When not using the fence system, use the supplied Media Alignment Bar. The Media Alignment Bar is a straight-edge with pins that lock into the platen surface. With the alignment tool in place, media can be pushed in from the back so that the leading edge cleanly abuts the tool. This ensures that the media is loaded without skew. (The tool does not compensate for unevenly trimmed media, which can cause output that appears skewed on the media.)

Handle

Pins

Media Alignment Tool
P/N 0901251

Tool in platen

Media abuts tool
(remove tool from platen
after engaging pinch rollers)

The media alignment tool cannot be used on the 72s/sr/sru printers because of a different platen design. See Appendix A of this document for an alternative technique without the tool.

• If you instead wish to use the fence system, please consult document 0706375, *Media Fences User Instructions*, for detailed instruction on their use.

Media Measurement Options

The printer can automatically measure the media in three different ways: Standard, Maximal, and Minimal. This option is set on the printer's control panel under "Menu -> Printer Settings -> Media Measurement".

• Standard — measures the width of the media once, and finds the right and left front edges to estimate skew. This is the factory default and is recommended for most applications.

• Maximal — measures the width of the media in two places, and finds the right and left front edges to estimate skew and detect non-rectangular sheets. This adds a few additional seconds to the media load process but facilitates the most accurate media placement.

• Minimal — measures the width of the media once, and finds the front right edge only. This method is fastest but does not provide any feedback regarding possible media skew.

When the printer is unable to automatically measure the media (as may occur with transparent or highly reflective media), the printer will prompt you to measure the media width manually. Follow the control-panel prompts to place the left edge of the carriage first at the right edge of the media, then the left edge of the media. The printer will calculate the location on the platen and the width of the media based on these positions. See the two illustrations below.
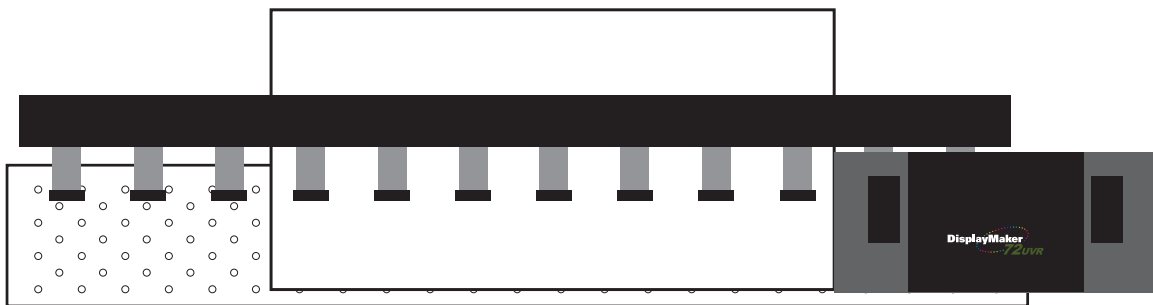
Locating the Right Edge of the Media with the Left Edge of the Carriage
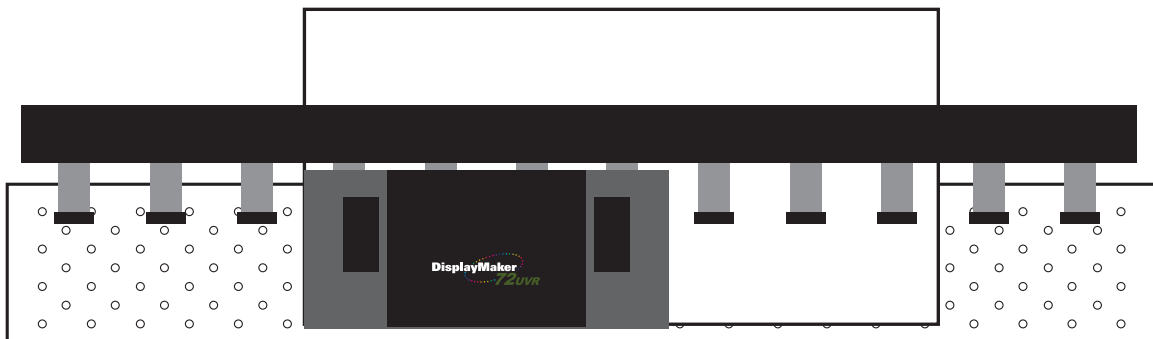
Locating the Left Edge of the Media with the Left Edge of the Carriage

The manual-measurement method may also be specified in the Media Wizard entry when it is known that the automatic method will fail.

If exact image placement is not important (such as for a quick initial test of a media), you may opt not to measure the media by pressing Cancel. You will then be prompted to enter the width of the media at the printer's control panel. The printer will assume that the media is at the nominal right-most position on the platen and will begin its printing from that location. If the media is not close to nominal, then some ink may be sprayed on the platen. Note also that there is no skew detection with either of the manual measurement methods.

Edge-to-Edge Printing

Edge-to-Edge printing is automatically enabled when the left and right margins are set to zero. (Menu -> Printer Settings -> Margins). In this context, we discuss only the left-to-right edges of the media. See the following section on Extending the Printable Length for printing front-to-back as well as edge-to-edge.

Loading Media for Edge-to-Edge Printing

The procedures for loading media for Edge-to-Edge printing are the same for any other media, but the additional considerations should be made:

• "Centered" print position should be used. The Print Position is set on the printer's control panel under "Menu -> Printer Settings -> Print Position".

• The "Maximal" media measurement method is recommended, or "Standard" may be used if the media is square.

As noted above, the left and right margins are set to zero for edge-to-edge printing. With the Standard or Maximal media measurement method, the printer will report if the media appears to be skewed and therefore will not feed straight through the print zone.

Overprinting

Because most media sheets are not precisely the same width from start to finish, and to accommodate any slight media drift that may occur, the printer can be configured for a variable amount of overprinting.

In this context, "overprinting" indicates how wide of a print job beyond the initial measured width of the media the printer will accept. Ordinarily (i.e., without overprinting) the printer will reject any job sent from the print server that exceeds the printable area of the media. When an Overprinting area is specified, the printer will accept a print job that is the width of the media plus the overprinting amount.

The printer does not make any changes to the job; i.e., the printer does not automatically enlarge the job or add extra pixels to create the overprint. To take advantage of the overprint area, the job must be prepared prior to sending it through the RIP. In most cases, this preparation will consist of one of the following:

• Size the job slightly larger than the media width. For example, if the media is 32" wide, set an overprint area of 0.125" and size the job to 32.25". In most cases will have a negligible effect on the rest of the image.

• Create the job for "full bleed" so that the background, as designed, extends beyond the page boundary.

• For images where there is a special detail at the edge of the page, for example a border line, make the border line thicker than usual to extend off the page.

• To prevent a build-up of ink on the platen, place tape under the left and right edges of the media. Use a dark-colored tape so that the printer will still see the contrast between light media and dark platen when it measures media width automatically.
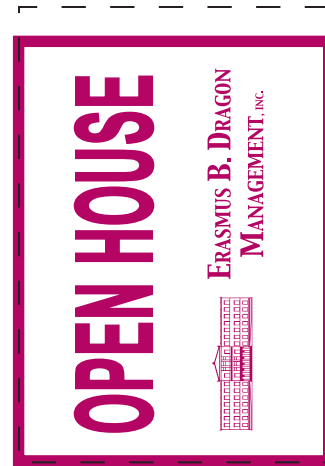
See the following illustrations for examples of each configuration.

Entire image slightly enlarged
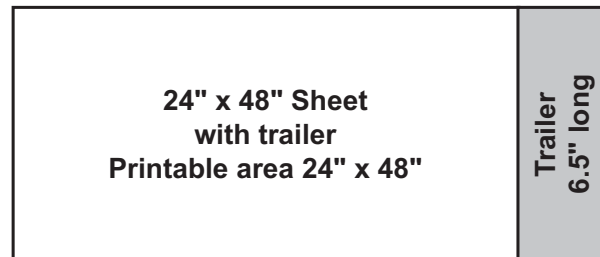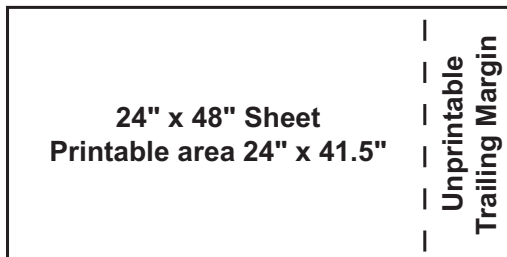

Source file created for full bleed

Edge detail enlaged in source file

Extending the Printable Length of Cut Sheets

The minimum allowable trailing edge margin permitted by the printer is 6.50". This trailing amount is used by the printer's media advance system (the grit rollers and pinch rollers) to grip the media and propel it through the print zone. A leading margin of zero is permitted by the printer software.

If you wish to print from the front (leading) edge to the back (trailing) edge of a single sheet, you must attach a trailer to the end of the media sheet. The printer will then use this trailer to finish propelling the actual sheet through the print zone.

24" x 48" Sheet
Printable area 24" x 41.5"

Unprintable
Trailing Margin

24" x 48" Sheet
with trailer
Printable area 24" x 48"

Trailer
6.5" long

For best results, construct the trailer from the same material as the actual print media. This will ensure that the inter-face between the media advance system remains constant when the print media transitions to the trailer material. The trailer should be at least 6.50" long, or slightly more for additional margin of error. Attach the trailer to the bottom surface of the print media, using the minimum tape necessary (extra tape material may change how the grit rollers interact with the media, resulting in print anomalies from a change in feed rate.

Once the print media is prepared with a trailer, load it into the printer as described elsewhere in this document. When you enter the length, include the combined length of the print media plus the trailer. This will ensure that the printable area includes the total length of the print media, and will ensure that the skew measurement (if any) accurately accounts for the trailer.

Double-Sided Printing

The printer automatically finds the media position from left to right (except in the special cases noted earlier), so positioning on the platen is not particularly difficult. Using the techniques for front-edge alignment described elsewhere in this document will also make front-to-back alignment reliable.

The success of double-sided printing depends largely on the qualities of the media. The printer uses friction to propel the media through the print zone (the grit rollers press into the bottom surface of the media to grip it and push it through), so good adhesion of the ink to the media on side one is necessary to survive the printing on the second side.

If the adhesion of ink to the first side does not withstand the bite of the grit rollers, you may apply a protective covering such as transfer tape (as used in the vinyl sign industry) to protect the first printed side. Note that this new surface will usually change the media advance rate somewhat, so you should calibrate and determine the Media Feed Number (MFN) for both the raw material and the material with the transfer tape applied. Save these MFNs and input them directly at the control panel at the appropriate time when loading media.

When reloading the same sheet to print on the second side, avoid sliding the printed material over the grit rollers, as would occur if attempting to reload from the front. While stationary, the grit rollers could easily abrade the printed ink as it slides over their surface. For best results, reload from the rear of the printer, so that only the minimum amount of printed media must pass over the stationary grit rollers.

Preparing Image for Double-Sided Printing

In most situations, such as signage, the image for the second side will be rotated 180°. Using all of the recommended practices described previously in this document, the two sides will print with alignment suitable to the application.

For some applications, such as images that will be die-cut to a custom shape, the image should be flipped in the Y-axis (top to bottom) and the media sheet also flipped in the Y-axis. To accommodate this, you must prepare the image to have at least the 6.50" margin at both the top and the bottom of the image. (You may use the information in "Extending the Printable Length" to accommodate this additional material, but in the discussion at hand we will not consider attaching trailers to the media). This method will achieve the greatest accuracy of alignment on the left and right edges. See the illustration below.

SIDE ONE SIDE TWO

Typical Double-Sided Application
Image rotated 180°

SIDE ONE SIDE TWO

Die-Cut Application
Image Flipped in the Y-axis

Printmode Selection

Many cut-sheet media will work well in Production Mode. Some media, because of their weight or other physical properties, may give the best output in High Quality mode. Depending on the application requirements (viewing distance, image content, etc.), Billboard mode may be satisfactory as well. Plan for some amount of experimentation the first time a media type is used.

board mode may be satisfactory as well. Plan for some amount of experimentation the first time a media type is used.

As noted above, media that is not flat may show some output anomalies from inaccurate dot placement. This inaccuracy stems from the bidirectional print method, which requires a flat surface in order to place dots in the same place when printing on both directions. The typical visible defect is a grainy appearance. For these cases, the printer has Unidirectional print modes that apply ink only in one direction. This slows the overall throughput of the printer, but may allow you to use media that would otherwise be unworkable.

Static Electricity

Static electricity is often a problem when working with cut sheets, particularly of synthetic materials. The media materials are often nonconductive, so static charges cannot dissipate on their own. Besides minor personal discomfort from static shocks, static attracts foreign particles to the media surface that prevent ink from adhering where expected. Static can also attract ink droplets to areas of the media surface that were supposed to remain unprinted. Low humidity levels in the printer and media storage environment can exacerbate the issue.

A number of active and passive methods can be employed to minimize static:

- Maintain a humidity level of 40-60% in the printer area and media storage areas.

- Drape copper tinsel over the media stacks and attach the tinsel to a grounding point. This will help discharge the static from each sheet as it is removed from the stack.

- Wipe down the media surface with isopropyl alcohol (IPA) prior to printing. This will remove any foreign particles that were attracted to the media by static.

- For extreme static problems, careful use of an antistatic spray may be warranted. We have found K2r Static Stopper to provide good results. Alberto-Culver Static Guard may also be used. Lightly spray and do not allow the antistatic spray to pool on the media. Note that the ink-adhesion properties of some media may be negatively affected by the spray, so use the minimum amount necessary to achieve results. Adhesion decreases were typically around 10% and typically occurred on media that already had poorer adhesion properties without the spray.

Visual Glossary of Terms

The illustrations below show the various media load and media feed issues described in this document.
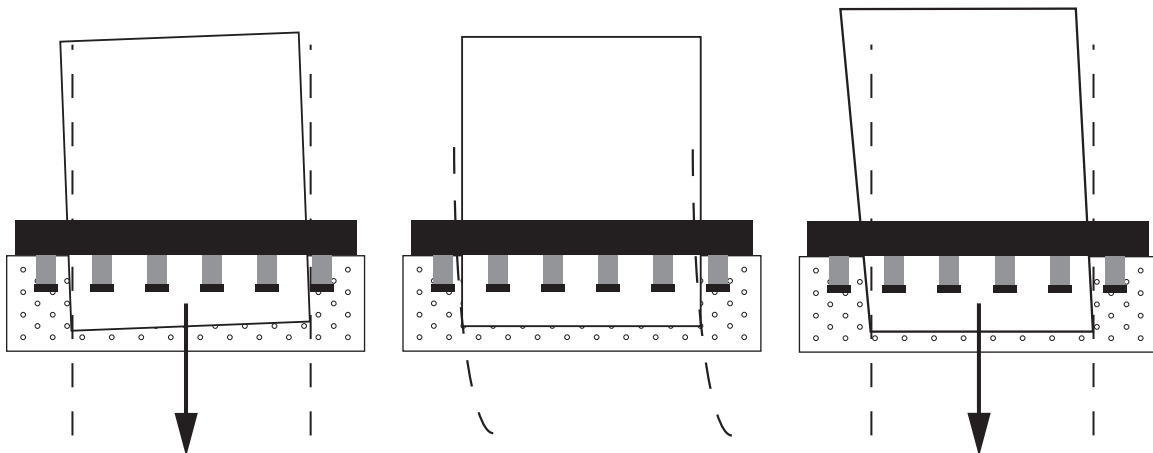
| Media is loaded skewed. Image will fall off one edge of the sheet (right side in this example) | Media steers in one direction. Banding will be apparent where the turn radius is longer (left side in this example) | Non-square media. Media feeds through straight but image falls of the edge (right side in this example) |

Appendix A

Loading Media without the Media Alignment Tool

The media alignment tool described elsewhere in this document cannot be used on the DisplayMaker 72s, 72sR, or 72sRU printers because the arrangement of platen holes in these printers is different. An alternative technique using two small screwdrivers can accomplish the same end.

1. Locate two objects, such as small screwdrivers, with a diameter of 1/8". This is the diameter of each hole in the platen.

2. Place one of the 1/8" objects in one of the platen holes toward the front left corner of the media. Place the other 1/8" object in a platen hole toward the front right corner of the media. Be sure both holes are in the same row.

3. Push the media up against these objects so that the front edge of the media is now parallel to the front edge of the platen. See the illustration below.

**Alignment Tools
in Platen**　　　　　　**Media Aligned**　　　　　**Media not Aligned**
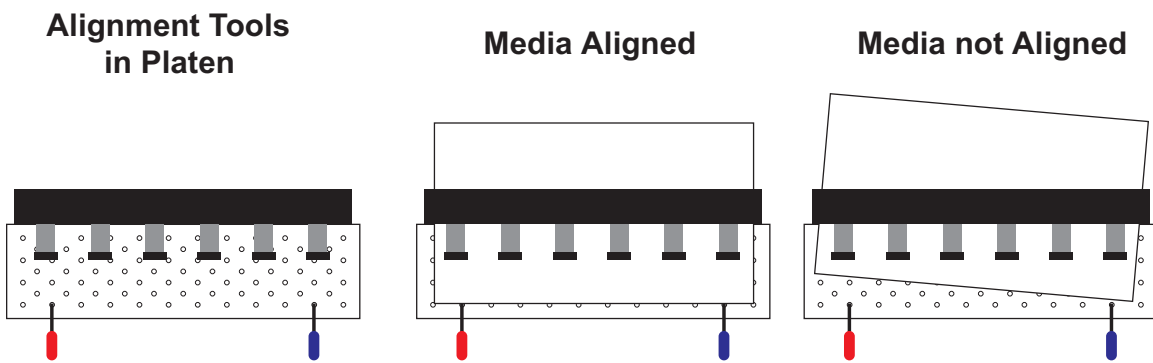
4. Once the media is aligned, engage the pinch rollers and remove your alignment tools from the platen.

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