

DIRECT THERMAL PRINTING PROBLEM SOLVER

Print quality problems can be caused by a multitude of sources or combination of sources. Below is a list of parameters which affect the thermal printing process:

1. Speed of printer.
2. Characteristics of the print head.
3. Characteristics of the substrate.
4. Contact force of the print head.
5. Type of print head.
6. Cohesion and adhesive forces.

PROBLEMS

Because of the simple technology utilized in the printer design, there are only two mechanical components that may cause print quality problems...the print head and the drive roller. Make sure you clean these components per the manufacturer's guidelines. Properly matching the heat and speed settings to the media, as well as media itself are the sources of most problems.

We have listed a number of typical print problems, their probable cause, and possible solution:

- Poor print quality, image is too light.
- The bar codes look good, but when scanned they fail or read poorly.
- The horizontal bar codes on the label scan satisfactorily, but the perpendicular bar codes do not.
- Poor edge definition.
- Images looked smeared.
- Bar code elements have the incorrect width. The bars within a bar code may be too thick or too thin resulting in poor scan results.
- The image is grayish or translucent, but characters are full.
- The printed image has void areas.
- There are streaks or dead spots in the printed image.
- There is excessive noise during printing.
- Die cut labels continue to feed without calibrating.
- The printer stalls or will not print.
- There is premature print head failure.

Problem: Poor print quality, image is too light

- Potential cause: Incorrect darkness setting for the substrate being used.
Solution: Increase the printer heat setting.
- Potential cause: The print speed is too fast for the substrate being used.
Solution: Slow the printer speed.
- Potential cause: The print head and/or drive roller is dirty.
Solution: Clean the print head and/or drive roller.
- Potential cause: The substrate coating is defective, old, dirty, or pitted.
Solution: Replace stock.

- Potential cause: The substrate is not properly matched to the printer and/or application.
Solution: Try a substrate with a higher sensitivity.
- Potential cause: The print head is defective.
Solution: Replace print head.
- Potential cause: The drive roller is damaged or pitted.
Solution: Replace/repair/clean drive roller.

Problem: The bar codes look good, but when scanned they fail or read poorly

- Potential cause: Incorrect darkness setting for the substrate being used. Increasing print darkness does not always improve print quality. Labels that look good and dark to the eye may actually be too dark for the scanner. Excessive print darkness can cause bars to widen (bloom), causing unreliable scanning. Also, increasing print darkness setting does not always increase the actual print darkness. At the point of maximum activation, the print does not get any darker, though the heat may cause the edges to bloom. This will make the bars wider and may therefore appear to be darker.
Solution: If your labels have good contrast but do not scan well, reduce darkness by reducing the heat setting.
- Potential cause: The print contrast ratio is incorrect. The substrate is too dark to provide an adequate contrast to the printed image. This may be caused by the color of the stock or the color of ink that may have been preprinted under the imaged text.
Solution: Change to a substrate with a lighter color or change preprinted ink colors to lighter colors.

Problem: Horizontal bar codes on the label scan satisfactorily, but the perpendicular bar codes do not

- Potential cause: Print orientation. In all but the most recently released printers, print orientations of 90 or 270 degrees can result in feathering or bleeding edges of characters or bars within bar codes. Bar code bars in picket fence orientation (codes that have bars perpendicular to the print head) tend to bleed together less, thus will print and scan more reliably. You can print reliable ladder orientation codes (codes that have bars parallel to the print head); if your printer is correctly set up and you are using good print substrate. If the problem persists and a vertical bar code is the only alternative, try one or all of the following:
Solution: Re-orient the text or code to 0 or 180-degree orientation.
Solution #1: Reduce the print speed to the slowest setting. Scan/test the printed bar code.
Solution #2: Adjust the print speed/heat combination.
Solution #3: Use different substrate.
Solution #4: Print the bar code with a larger bar size and/or ratio.

Problem: Poor edge definition. This is primarily an issue with bar codes

- Potential cause: The print speed is too fast
Solution: Reduce print speed

Problem: Images looked smeared. This is primarily a concern with bar codes

- Potential cause: Print head heat levels are too high
Solution: Reduce the energy/heat setting of the printer.
- Potential cause: Print speed is too high.
Solution: Reduce print speed.

- Potential cause: Print orientation. In all but the most recently released printers, print orientations of 90 or 270 degrees can result in feathering or bleeding edges of characters or bars within bar codes.
Solution: Re-orient the text or code to 0 or 180-degree orientation (i.e. picket fence orientation for bar codes).

Problem: Bar code elements have the incorrect width. The bars within a bar code may be too thick or too thin resulting in poor scan results

- Potential cause: Printer energy/heat is too high resulting in over burn (blooming or thicker bars).
Solution #1: Reduce the energy/heat setting of the printer.
Solution #2: Switch to a stock with a lower sensitivity.
- Potential cause: Printer energy/heat is too low resulting in under-imaged or bars that are too thin.
Solution #1: Increase the printer energy/heat setting.
Solution #2: Switch to a stock with a higher sensitivity.
- Potential cause: Printer speed is too high.
Solution: Slow printer speed.

Problem: The image is grayish or translucent, but characters are full

- Potential cause: The print head energy level is set too high.
Solution: Reduce the print head energy.
- Potential cause: The print head pressure is too high.
Solution: Reduce the print head pressure.

Problem: The printed image has void areas

- Potential cause: Dust on the substrate.
Solution #1: Clean the substrate. Compressed air.
Solution #2: Place static discharge device (tinsel) across the substrate web.
- Potential cause: The surface of the substrate is not level or has coating streaks/voids.
Solution: Replace or choose another facstock compatible with thermal printing.
- Potential cause: The print head elements are dirty or obstructed (NOTE: 74% of premature print head failure is due to overheating caused by a buildup of residue on print heads).
Solution: Clean the print head with a pre-saturated cleaning card or soft-stemmed cotton swab and isopropyl alcohol.
- Potential cause: The print head elements are burned out (NOTE: 74% of premature print head failure is due to overheating caused by a buildup of residue on print heads).
Solution: Replace the print head.
- Potential cause: The print head is misaligned.
Solution: Check alignment using media well known for consistent performance. If necessary, realign the print head.

Problem: There are streaks or dead spots in the printed image

- Potential cause: Poor coating quality on the substrate.
Solution: Replace substrate.
- Potential cause: The print head elements are dirty or obstructed.
Solution: Clean the print head with a pre-saturated cleaning card or soft-stemmed cotton swab with rubbing alcohol.

- Potential cause: The preprinted ink is picking.
Solution: Replace the media stock. Have preprinted media printed with heat resistant ink.
- Potential cause: Some pins in the print head are not functioning causing white lines through the bar codes, numbers, and/or letters. Bars and spaces that have incorrect widths cause the bar code to be nonscannable.
Solution: Clean the print head. If this does not solve the problem, you may have to replace the print head.

Problem: There is excessive noise during printing

- Potential cause: The print head energy setting is too high.
Solution: Reduce the print head energy setting.
- Potential cause: The strip plate on the printer is not adjusted properly.
Solution: Lower the strip plate.

Problem: Die cut labels continue to feed without calibrating

- Potential cause: The label sensor is dirty or obstructed.
Solution: Clean the sensor with a soft-stemmed cotton swab with rubbing alcohol or compressed air.
- Potential cause: The printer is set in continuous mode.
Solution: Change the printer setting to "label" mode in label software.
- Potential cause: The die cut label length is less than the minimum length for the specific printer model.
Solution: Change to a two-up format.
- Potential cause: The label sensor may not be aligned properly with gap between the die cut labels.
Solution: Realign the label sensor.

Problem: The printer stalls or will not print

- Potential cause: The substrate isn't loaded properly.
Solution: Reload the substrate, making sure it passes under the sensors.
- Potential cause: The media is too opaque to be seen by the label gap sensor.
Solution: Consult your printer manual on calibrating the sensor, or contact your media supplier for liner alternatives.
- Potential cause: The printer is in label mode and you are running continuous material.
Solution: Change the substrate type to continuous on the printer or in the label software.

Problem: There is premature print head failure

- Potential cause: Excessive thermal stress.
Solution: Make sure the print head energy is set as low as possible while still printing an acceptable image.
- Potential cause: The print head pressure is too high.
Solution: Choose thinner gauge media or reduce the print head pressure.
- Potential cause: Insufficient print head maintenance.
Solution: Print heads must be cleaned after every ribbon or media roll change. Use a pre-saturated cleaning card or a soft-stemmed cotton swab with rubbing alcohol. The inside of the printer, including parts along the media feed path must also be wiped down using a slightly

damp cloth to eliminate dust which is drawn to the print head while the printer is running and can fuse to the print head surface causing elements to burn out.

- Potential cause: The rewind tension is too high.
Solution: Reduce the rewind tension.
- Potential cause: The substrate surface is uneven.
Solution: Without redesigning or changing the substrate, the edges of the raised area will abrade the print head more quickly than the rest of the media surface will.