

Technical Information

Epson Engineering Europe S.A. – Advanced Product Support PRO-Graphics

- H/W SUPPORT S/W,F/W SUPPORT
- MANUAL/STK AS-TOOL
- GENERAL SPARE PART

Authorized by / **MP**
 Approved by / **OP**
 Issued by / **AM**

<<**URGENT**>> Please take immediate action with highest priority

<<**IMPORTANT**>> Please make sure all necessary actions are taken care of

<<**CONFIDENTIALITY RANK**>> Rank I (ESC/Internal only) Rank E (External Partners) Rank G (CIC) Rank F (Public)

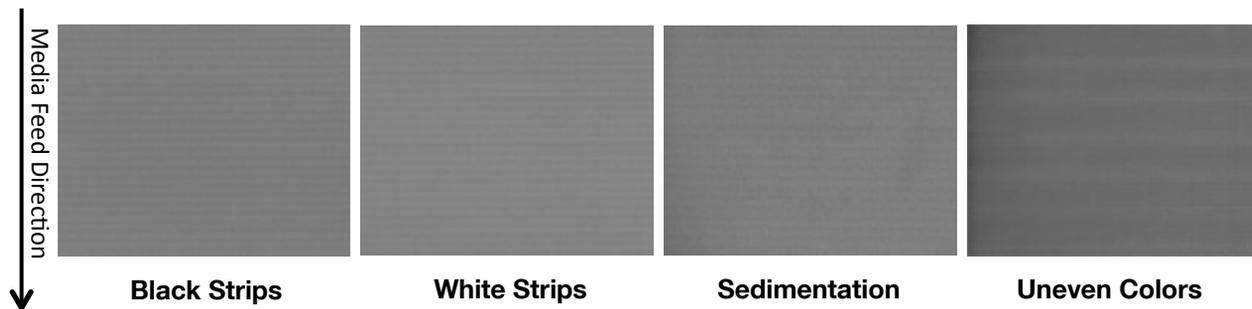
Model: **Epson SC-S series**
 Subject: **How to reduce horizontal banding**

[Rev B: various modifications & improvements. Now opened to external partners.](#)

I. Background

This TI has been designed to help you to understand and recognize, then to learn how to reduce the horizontal banding you are facing at a customer site. As the horizontal banding is a phenomena that affects all inkjet based technology and can be related to many different factors, we designed here a methodology you should follow in order to eliminate this phenomena and keep the printer printing within specifications. Please follow the below list of operations. We offer here 2 alternatives: one consists in following a process step by step, the other one consists in comparing the faulty samples with the one from this TI.

Even if the different type of banding often looks similar from a far distance, the causes can be various:



Examples of horizontal banding

Features from all printers are continuously improved thanks to firmware updates. **We assume here that the latest firmware* available is used or has to be updated before following the below list of operations.** We assume here also that all other factory adjustments have been done correctly even if the printer has been serviced. We also won't describe banding linked to missing nozzles as nozzle check is supposed to be ok.

*Since end of August, Epson released new FW with many improvements related to banding. Please check TechExchange or Epson website.

The following method describes how to reduce the banding when using custom media, i.e. the RIP is set to use "control panel settings", head alignment has been performed and nozzle check is okay.

II. How to recognize horizontal banding

After looking at each samples more close, we can easily differentiate each type of banding and so find the right and efficient fix. Compare you printouts with the below pictures and find what kind of banding you're facing. Definition of pictures is enough for zooming up to 400%.

Banding linked to a wrong Paper Feed adjustment

SC-S30600

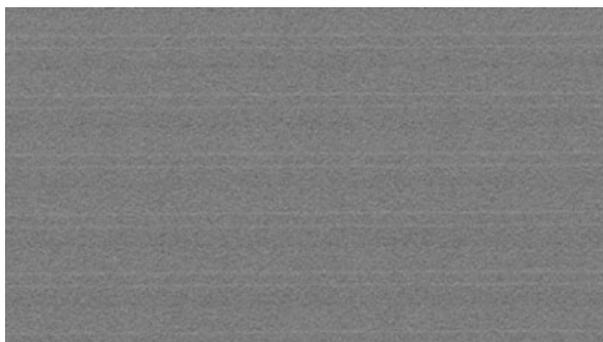


White Strips → PF value too high



Black Strips → PF value too low

SC-S50600/70600



White Strips → PF value too high



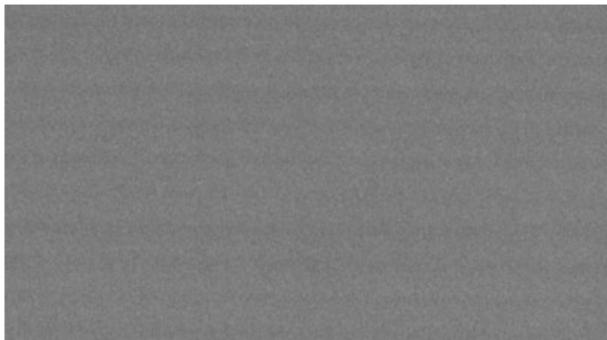
Black Strips → PF value too low

If you notice this type of banding please Go to **#2 Execute paper feed adjustment** and follow instructions

TIPS

- In addition to black/white lines, the printout looks grainy when PF value is out
- Measure the length of your printout and check the following:
 - With PF value is too high, print length should be higher than expected
 - With PF value is too low, print length should be lower than expected
- Try to increase/decrease paper feed value on the fly during printing using “Feed Print” button then using Up/Down arrow of the control panel. If you feel the results are better, that means PF has to be re-adjusted

Banding linked to sedimentation of ink



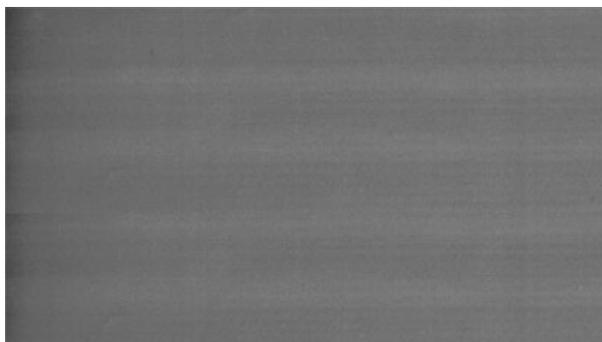
Sedimentation (Ink particles settling to the bottom of the cartridge and ink tubes). This type of problems may occur inside the printer after a long period of inactivity.

If you notice this type of banding please Go to **#3 Execute heavy cleaning** and follow instructions

TIPS

- If you didn't use your printer for extended period of time, there's a possibility that you are facing banding linked to sedimentation as described above.
- As printing alone isn't enough to remove or agitate the settled ink, heavy cleaning is recommended.
- This kind of banding is often visible on solid areas, especially tertiary colors and dark tones

Banding linked to ink drying time differences, microweave level, halftoning



From time to time, some types of artwork could benefit from printing in a Uni-directional print mode.

One such time is when printing lots of ink on large expanses of solid color.

When printing bi-directionally ink is 'overlapped' or 'jetted' using a form of micro weaving technology. While printing on the home position side jetted ink goes on top of dry ink. When ink is 'overlapped' on the opposite side of the printer it goes on top of 'wet' ink. This difference in printed characteristic can cause tonal variance from one side of the printer to the other.

If you notice this type of banding, please Go to **#4 Check ink drying time using Uni-directional print mode** and follow instructions

TIPS

- This kind of strips often look like one strip lighter, one strip darker, etc
- The size of the strips often look bigger than other banding types

III. I'm not able to recognize what kind of banding I'm facing

If you are not able to recognize the type of banding you are facing, please try to follow the procedure below. If banding is not reduced after step 1, go to step 2, etc.

#1 Make sure paper holding plates are well set

If paper holding plates aren't well set

Release lever then set paper holding plates again

#2 Execute Paper feed Adjustment

Paper Feed Adjustment is one of the key setting to reduce banding

If necessary, do it once again

#3 Execute heavy cleaning

Sedimentation has began in the printer

Execute 1 or 2 heavy cleaning if necessary

#4 Check ink drying time using Uni-directional print mode

Check if the drying time between two pass is ok or not

If necessary, determine optimal heater temperature settings

#5 Change M/W level to recommended level

Depending on the print mode, different level of M/W can be selected

Following the table, please choose a recommended print mode

#6 Change to Epson Halftoning

Depending on the RIP used, different Haftoning can be selected

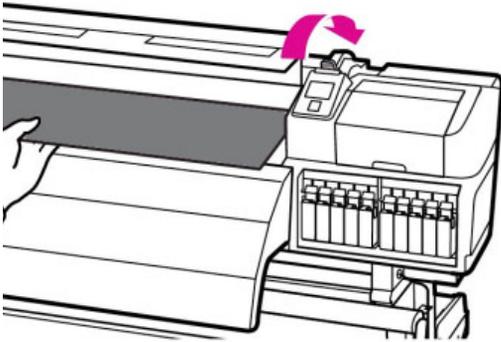
Check you are using Epson Halftoning

#7 Change to higher quality print mode

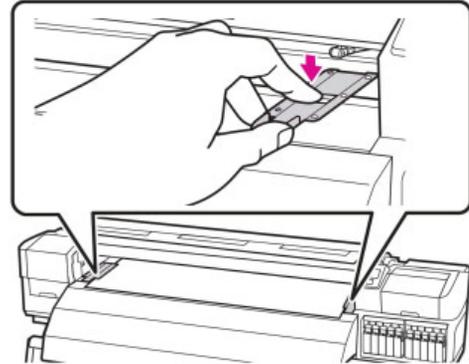
Check the section "What can my printer do" from Technical Guide

1 Make sure paper holding plates are well set

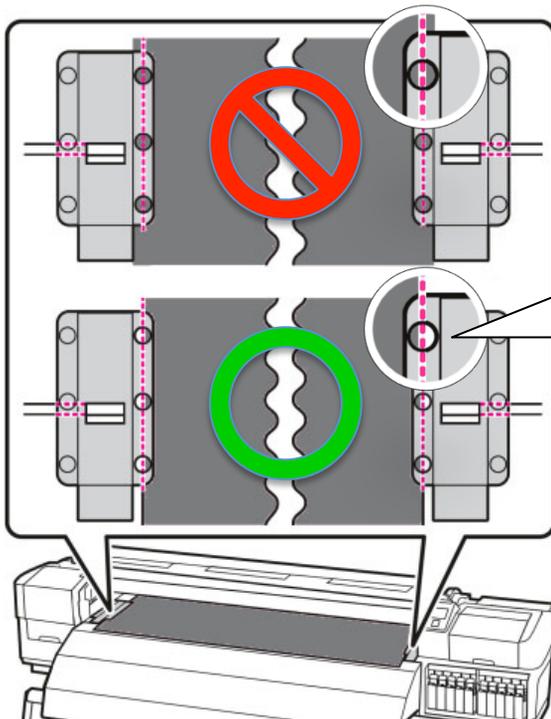
1. Release the paper pressing lever



2. Clip the paper pressing plate



3. Place the paper pressing plate



The edge of the roll should end in the middle of the hole.
By this way it's easy to see if the paper is skewing or not.

2 Execute Paper feed Adjustment

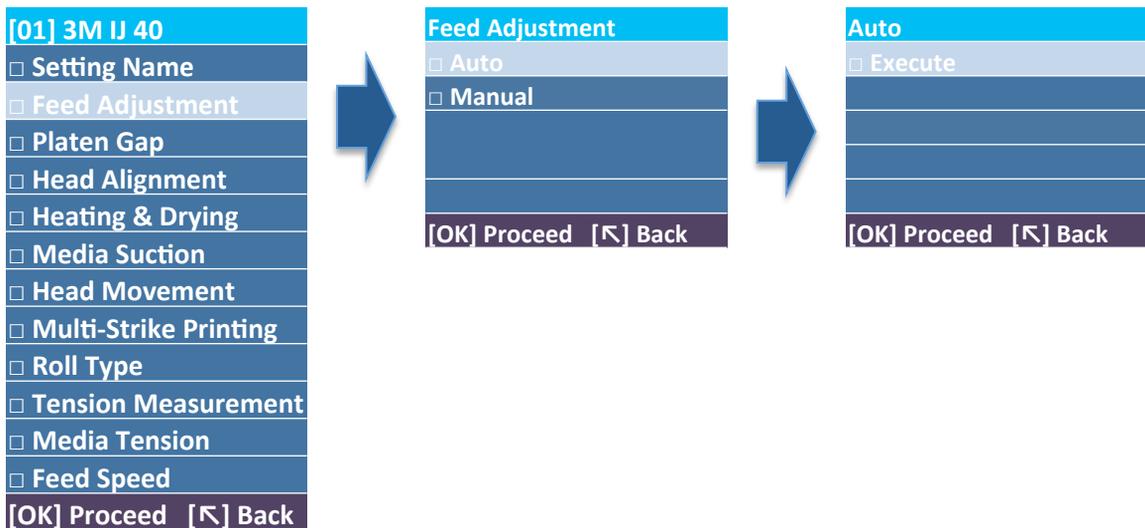
The paper feed has to be adjusted for each custom paper separately. If you use the same media with different width, paper feed has to be adjusted separately.

The paper feed is influenced by the media tension and the paper suction, so if you modify one of these parameters, please do the paper feed adjustment again.

When using the take-up reel unit, the paper feed adjustment has to be done while the media is attached to the core of the take-up.

The printer offers 2 possibilities:

1. AUTOMATIC Paper Feed Adjustment*



*Please use latest FW version (at least xx005D8) when using Auto Paper Feed Adjustment feature

Auto Paper Feed Adjustment cannot be performed properly if:

- Media is transparent, colored or highly textured
- The printer is exposed to direct sunlight (front cover opened)
- Platen Gap is set to 2.5mm
- Nozzles are clogged

In this case please perform Manual Paper Feed Adjustment as described below.

1. MANUAL Paper Feed Adjustment

[01] 3M IJ 40

- Setting Name
- Feed Adjustment
- Platen Gap
- Head Alignment
- Heating & Drying
- Media Suction
- Head Movement
- Multi-Strike Printing
- Roll Type
- Tension Measurement
- Media Tension
- Feed Speed

[OK] Proceed [↶] Back



Feed Adjustment

- Auto
- Manual

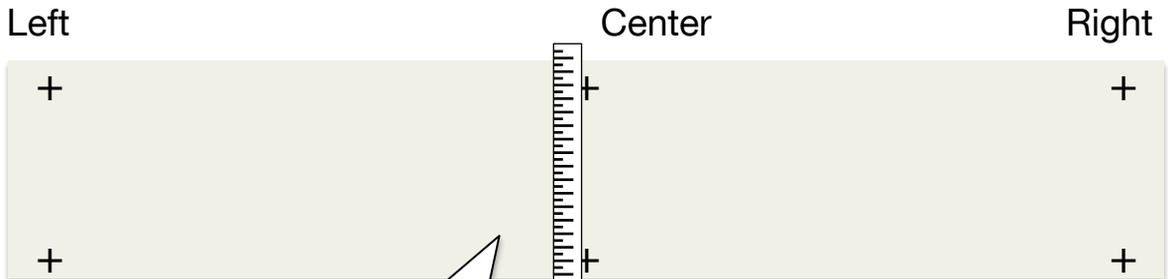
[OK] Proceed [↶] Back



Manual

- 100mm Pattern
- 250mm Pattern
- 500mm Pattern

[OK] Proceed [↶] Back



Cut the sheet and measure the center pattern. Measure the length between the two crosses as much precise as possible (use a magnifier if needed), then enter the value measured in the control panel.



500mm Pattern

▲

498,6 mm

▼

Input Distance.

Range: 450.0-550.0 mm

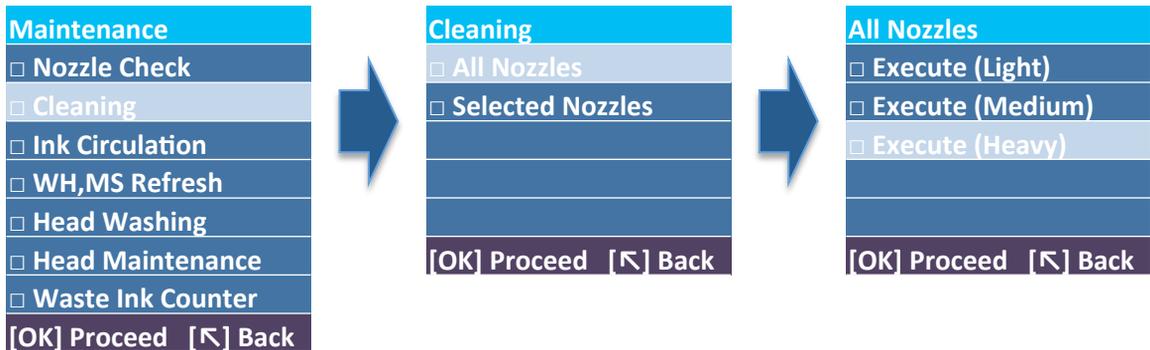
[OK] Done [↶] Back

3 Execute heavy cleaning

After a certain period of non use, pigments contained in the ink can settled inside the printer. Consequences can be horizontal banding and/or missing nozzles. By doing heavy cleanings, you'll remove the settled ink from the printer.

We recommend to shake vigorously all cartridges once a week, ideally before starting the printer after the weekend or after 2/3 days of non-use.

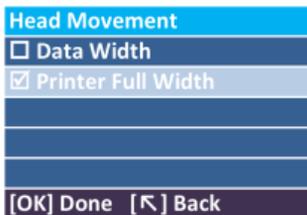
Execute 1 heavy cleaning then check the results. If necessary do it once again.



4 Check banding level using Uni-directional print mode

If the banding level is not reduced after following the steps above, it's necessary to check the ink drying time between two pass.

1. Select "Printer Full Width" in Media Setup / Customize settings / Head Movement
2. Print a sample using Uni-directional print mode and check the results.
3. If results are getting better, print now using Bidirectional print mode and increase from 5°C to 10°C the pre/platen/after heaters temperature.
4. If results are still better, that means ink drying time between two pass is too short. Go back to the original heaters settings, then increase temperature step by step to find the optimal values keeping in mind that too high temperature can cause new troubles (head strikes due to cockling for example)



5 Change to recommended Micro Weave level (M/W)

Depending on the resolution and the print mode selected, different level of M/W can be selected. Please find the list of recommended print modes for SC-S series printers. These print modes are also implemented in the Epson HTM2:

SC-S30600/610				
Media type	Quality	Resolution	Pass	M/W
Vinyl	High Speed	720x720	2	Level 0
	Production2	720x720	4	Level 3
	Production1	720x1440	6	Level 1
	High Quality	720x1440	8	Level 4
Banner	High Speed	720x720	2	Level 0
	Production	720x720	4	Level 3

Note: Some print modes are available in RIP that are not mentioned here

SC-S50600/610						
Media type	Wh ink?	Print Method	Quality	Resolution	Pass	M/W
Vinyl	No	Normal print	Speed	720x720	2	Level 0
			Production1	720x720	4	Level 5**
			Production2	720x1440	6	Level 0
			Quality	720x1440	8	Level 3
Banner	No	Normal Print	Speed	720x720	2	Level 0
			Production	720x720	4	Level 4**
			Quality	720x1440	6	Level 0
Transparent media	Yes	Surface print*	Production	720x1440	18	Level 0
			Quality	720x1440	36	Level 1
		Reverse print*	Production	720x1440	18	Level 0
			Quality	720x1440	36	Level 1

Note: All print modes can be performed with the Repetitive Layer Mode

*One Pass Layer Mode

**New M/W level implemented recently. Check your RIP version.

Some print modes are available in RIP that are not mentioned here

SC-S70600/610								
Media type	Colors	Wh ink?	MS Ink?	Print Method	Quality	Resolution	Pass	M/W
Vinyl	8C	--	--	Normal print	Speed	720x720	4	Level 0
					Production	720x720	8	Level 5
					Quality	720x1440	16	Level 0
	7C	--	--	Normal print	Draft	360x720	2	Level 0
					Speed	720x720	4	Level 0
					Production	720x720	8	Level 5
					Quality	720x1440	16	Level 0
	--	--	Yes	Normal print	Speed	720x1440	20	Level 1
8C	--	Yes	Surface print*	Speed	720x1440	44	Level 1	
Banner	7C	--	--	Normal print	Speed	720x720	4	Level 0
					Production	720x720	6	Level 2
Transparent	8C	--	--	Normal print	Production	720x720	8	Level 5
					Quality	720x1440	16	Level 0
					High Quality	1440x1440	36	Level 0
	7C	--	--	Normal print	Production	720x720	8	Level 5
					Quality	720x1440	16	Level 0
	--	Yes			Quality	720x1440	16	Level 0
	8C	Yes	--	Surface print*	Quality	720x1440	36	Level 0
				Reverse print*				
	--	Yes		High quality	1440x1440	76	Level 0	
8C	--	Yes		High Quality	1440x1440	76	Level 0	

Note: **7C:** C, M, Y, K, Lc, Lm, Lk **8C:** C, M, Y, K, Lc, Lm, Lk, Or

All print modes can be performed with the Repetitive Layer Mode

*One Pass Layer Mode

Some print modes are available in RIP that are not mentioned here

6 Change to Epson HalfToning (Epson HTM) in the RIP

The Epson HTM (HalfTone Module) is made up of look up tables that determine dot selection, screening and ink limiting instead of those from the RIP vendor. Here is an exhaustive list of benefits to use it:

- Reduction of visible banding
- Reduction of graininess that leads to sharper, photo realistic output from the printer
- Simplistic profile creation (light/dark ink transition and ink limitation included)
- Built in tolerance for mechanical variations

All major RIP vendors have already implemented our Epson HalfToning Module, but depending on the RIP the naming and the way to select it can be difficult to recognize. Use the following table to help recognize if you are using a print mode that uses our Epson HTM:

Company	Software name	Version	Epson HTM2	How to recognize (example)
Ergosoft AG	PosterPrint / TexPrint	14.1.5	●	When installing driver (only S30600), choose HTM2 (Epson screening) version
Onyx Graphics, inc	ProductionHouse Thrive, PosterShop RIPCenter, GamaPrint	10.2.5	●	When creating a new profile in the media manager: Ink Configuration → CMYKxxx Accuphoto GSX Print mode's resolution → 720- CT (Contone)
Colorgate	Production Server	7.0	●	When installing a new printer, select -HTM version
Din.a.x	Mirage	2.0	●	No proprietary halftoning, Epson HTM only
GMG Color	Production Suite	1.1.5	●	No proprietary halftoning, Epson HTM only
EFI	Fiery XF	4.5.8	●	When installing a new printer, select -CT version
Cadlink	Digital Factory / Signlab Print and Cut	3.0	●	When installing a new printer, select HTM version
SA International	Flexi Cloud and PhotoPRINT Cloud	Cloud	●	In the "Job Properties" menu, use Color Mode → CMYK(8bit)
Caldera Graphics	VisualRIP / VisualRIP+	9.2	●	In the driver window, choose Mode → CMYK8

7 Change to higher quality print mode

If after trying all the steps above you are still not satisfied by the results, your expectations are maybe out of specifications. Please check what the printer can do in the section "What can I expect from my printer" from the Technical Guide or contact your Epson local reseller.