Understanding Thermal Print Head Life

The print head is a very delicate and important portion of your thermal printer. Proper care must be taken with any portion of the printer, but it is especially important with this component. The goal of this document is to show you how to get the most mileage out of that critical component.

There are certain items on a thermal printer which are consumables. We traditionally think of consumables as Label or Ribbon, but there are also wear items which need to be considered as consumables as well. Some of these items would be print heads and platens.

The print head is an item which comes in constant contact with a moving product; this of course being the labels, ribbon and platen roller (roller directly underneath the print head). The quality of the labels and ribbon as well as the proper maintenance and care will have a direct affect on the print heads life.

This is much like the tires on your car, if you don’t periodically rotate, balance and align them you’ll end up replacing them much quicker then someone who does the manufacturers recommended maintenance.
1. Cleaning of the print head.

It is recommended that you clean the print head and platen roller after every ribbon change. Make sure to only clean with either a Sato packaged cleaner or a non-abrasive, lint free cloth and Isopropyl Alcohol. Doing this is the easiest way to get the most mileage out of the print head.

Monitor how dirty the cloth is that you just cleaned the print head with and make adjustments to the length between cleanings. Certain materials and environments may contribute to the residue build up and more cleanings may be required.

Make sure to never touch the print head with your bare hands. The oils or other contaminants on your hands can have a negative affect on print head life.

Both of these print heads have seen the same number of labels, one got regular cleanings and one did not. Both have since been cleaned and the results show one print head broken and the other which still works properly.

2. Choosing the right media.

As previously stated the print head is a wear item and will eventually fail. The big question is: When will it fail?
Not cleaning the print head leads to unwanted residue that builds up on the print head. Although the printer may still be printing, you will have to continue to increase the print head heat to get the same darkness and the quality will start to fade. With the increased heat and increased residue there is more heat trapped at the print head. This residual heat will eventually cause the protective layer to crack and the print head will be damaged.

The amount of residue and how quick it builds up will depend on the Labels, Ribbon and environment, your maintenance and the cleaning frequency.

There is a constant friction between the print head and the ribbon and/or labels. This friction will eventually wear the protective layer of the print head off. Once this protective layer is gone, the printing elements are exposed and will be damaged.

A couple of terms:

**Direct Thermal:** The use of heat sensitive label stock. When the proper amount of heat is transferred in a specific area, the label will change colors.

**Thermal Transfer:** The use of a ribbon and a label. The ribbon is then melted to the top layer of the labels.

**Adhesive Ooze:** The back of the label has an adhesive on it which allows it to stick to the product that you’re labeling. If there is too much adhesive or the roll is wound too tight the adhesive bleeds to the surface around the edges of the label.

**Perforation:** A slotted cut usually at the top of form so it makes the label easy to tear away from the printer after the label has been printed. This is normally done when a printer is away from the primary application of the labels to the product.

When using either method of printing it is important that you chose a good quality product.

When direct thermal labels are being used it is especially important that care be taken in the quality of the labels as this is what is going to come in constant contact with the print head. If the face sheet is of poor quality, if there is excessive adhesive ooze, or if the perforation is cut towards the face of the stock, you will have premature print head failures.

When using thermal transfer it is important to make sure that both the ribbon and labels are of good quality. The back of the ribbon comes in constant contact with the print head, which if is of poor quality or has been exposed to environmental factors outside its specification can leave unwanted deposits on the print head.
It is always recommended that the ribbon be slightly bigger than the label stock so that the label is not exposed to the print head. If the ribbon is of good quality it will protect the print head from the abrasiveness of the label stock.

The ribbon can also build up ESD (Electrostatic Discharge) which can destroy the components of the print head. Make sure to operate the printer with all original parts and that the covers are closed while the printer is in operation.

3. Printer maintenance.

Although cleaning the printer and print head will greatly increase the print head’s life so will proper maintenance and setup.

Use only genuine Sato parts to guarantee warranty and proper printer functionality.

*Print head replacement:*

When the print head does fail it is important that a trained technician replace it as improper print head alignment and balance can affect not only the print quality but also its life. Much like the tire on your car, if it is misaligned, it will wear a groove in one area of the tire while leaving the remainder intact; the same rule applies for our print heads. The problem with both scenarios is that you have an unusable part due to an uneven wear.

A misaligned print head will cause the need for more heat to transfer the image to the paper. The more heat applied to the print head, the higher the chance of premature failure. If this has been adjusted from factory setting during the course of the previous head’s installation it is recommended that it be realigned with the new one.

Use only enough heat necessary to transfer a quality image to the label. There is no need for the excessive heat and more heat can affect the life of the print head.

When maintaining the printer, be sure to take into account ESD (Electrostatic Discharge). ESD can cause component failure, which of course, includes the print head. Make sure that you’re properly grounded any time you replace a part.

4. Environment.

The environment can have an adverse affect on the printer as well as the labels.

If the printer is used outside the printer’s specifications it may have an adverse affect on the life of the print head. If there is possible exposure to water, excessive heat or cold, you may need to consider an enclosure for the printer.
If the labels and ribbon are stored in an environment outside of their storage specification you can damage the labels and ribbon. This can cause unwanted changes to the properties of the label and ribbon, which can in-turn cause unwanted reactions to the print head and/or leave unwanted residue that would not normally have been contaminating the printer if they were stored properly.