

# User Service Tips for Laser Printers

*by Christopher Small*

**M**ost laser printers are very reliable machines requiring minimal maintenance, however there are some things that you the operator (or your in-house service tech), can do to keep the machine in optimum working condition and minimize service calls. There are many laser printer engines on the market today

with just as many different service specifications; so rather than offer a generic article that could not be specific, I have chosen to focus on the most widely used engine in the world—the Canon SX. Approximately 75% of all laser printers use a Canon engine, and the SX engine is by far the dominant one. In fact, Hewlett-Packard claims that its

LaserJet II is the world's most popular laser printer (and they don't even make it any more, having replaced it with the improved LaserJet III). Some of the printers that employ the eight-page-per-minute Canon SX engine are: Apple LaserWriter II series, Hewlett-Packard LaserJet series II and III, QMS 800 series, Brother HL-8 series, Canon LBP 8 series and many more. All laser printers will have similar features, so this article will still have some useful information for everybody. However, if your printer does not use the Canon SX engine, I would strongly encourage you to study your operator's manual and/or even better (funds permitting) obtain a service contract for your equipment.

There are seven main areas in your laser printer that should receive attention from the operator. They are:

1. Registration Assembly/Transfer Guide
2. Transfer Corona Assembly
3. Feed Guide Assembly
4. Fusing Assembly
5. Beam to Drum Mirror
6. Primary Corona
7. Ozone Filter

If these names look like they came out of a service technician's manual... that's because they did. Don't worry, though. I'll explain each one so that you will know where to find them in your SX printer, what their purpose is, and how to clean and maintain them properly. Always, make sure that you turn the printer off before attempting to clean it.

### **1. Registration Assembly**

Open your printer (by depressing the top cover release button) and gently push the hinged top cover back until it is at a 90-degree angle to the rest of the printer. Now look straight down inside the body from the front. You should see a lime-green handle-like piece in the middle of an assembly that contains a silver roller and a black rubber roller. This is the transfer area where the paper is registered so that the print will be even on the page. The flat silver strip is the transfer guide. Since paper passes through the rollers and under the transfer guide, they need to be cleaned. Use a damp cloth to wipe them (water should be sufficient). Be sure to lift up the green handle and wipe the backside of it also. If you have a vacuum handy it will prove to be very effective for lifting off dust, toner and paper particles before wiping. As an aside note: "laser paper" leaves far less paper dust (which is abrasive and will cause excessive wear after a higher page count) and produces a slightly sharper image.

### **2. Transfer Corona Assembly**

Right after the transfer guide you will notice a long narrow recessed box with diagonal monofilament lines on top of it. This is the transfer corona assembly. As the page passes over it the corona wire—a hair-thin, conductive wire found inside the assembly—releases an electric charge onto the page that is stronger than the charge on the photoconductive drum, which at this point is carrying the printed message. This stronger charge attracts the toner off of the drum and onto the page. The corona wire does not actually come into physical contact with the page, just the electrical charge from the wire does. Therefore it is very important that the transfer corona assembly be kept clean and free of anything that may reduce the amount of charge onto the page. The wire itself must be clean, but so should the inner walls of the assembly... as they reflect the charge and focus it towards the page.

Carefully wipe the corona wire and the inner walls with a Q-tip. You will find one attached to the fuser cleaning wand that comes with your toner cartridge. Wetting the Q-tip with isopropyl alcohol will greatly help to remove the built-up toner and dirt. With the brush end of the green cleaning brush, found in the printer beside the feed guide assembly, wipe the static teeth. They are the sharp metal jags found in a row on the far side of the transfer corona assembly. Their function is to remove enough static charge left on the page to prevent it from wrapping around the photoelectric drum.

### **3. Feed Guide Assembly**

Following the corona assembly, toward the back of the printer, you will find a black, rounded, almost-flat ribbed piece that ends at the fuser assembly. The feed guide assembly, as the name suggests, guides the printed page to the fuser assembly without disturbing the unfused toner now clinging

to the page. Dirt and toner accumulations on the feed guide or its rollers can become fused to the back of the page. To clean, simply wipe it with a damp cloth.

#### 4. Fusing Assembly

The fusing assembly is a large, rectangular-shaped unit with a green felt-covered top door. It sits inside at the back of the laser printer. **Make certain that the fusing unit has had a chance to cool down (at least 10 minutes) before handling.** Within the fusing assembly are two rollers. The upper roller is a hollow tube that is coated with teflon on the outside; this is to prevent toner from sticking to it (just like your frying pan). Inside the upper roller is a heat lamp that is regulated by a thermistor and a thermoprotector. These two sensors ride on the upper roller at the front end and are actually in physical contact with it. They often are the culprits for scratches and eventual tearing of the teflon coating.

A little trick that I use to clean them, when I'm not actually disassembling the unit, is to take a clean sheet of paper and carefully push it down from the top along the upper roller (front side) and between the sensors and the roller. Ensure that the paper is flat, not wrinkled, and move it around so as to rub against these sensors. When you pull the paper out, examine how much dirt is on it. If there appears to be a lot, repeat this process.

The other culprits for scratches are the four separation pawls, or claws. They can be located by pushing the back hinged section open, toward the back of the printer. These claws ride along the roller and guide the paper out to the exit rollers. Dirt and toner accumulations tend to build up on the end of the claws, because of the heat from the fuser, and can dig into the roller. Clean them with your damp cloth. You should be cleaning the upper roller every time that you change the EP-S cartridge.

The fuser cleaning wand has a felt tip on one end of the wand. Place this tip on the teflon roller and stroke it back and forth a couple of times. This not only cleans the roller, but oils present in the felt tip lubricate the roller too.

#### 5. Beam to Drum Mirror

Remove the EP-S cartridge from the top cover assembly. Near the top of the cover you will notice a black metal assembly with a long, narrow, rectangular window. This is the mirror shutter. Carefully grasp it and move it to the right and upward. Behind the shutter you can now see the mirror. This polished mirror reflects the laser beam from the laser scanner assembly to the photoelectric drum. Unless there is condensation, smoke, fingerprints or some other accumulations, do not touch or mar the mirror in any way. It may be carefully wiped with a clean lint-free wipe, dampened only with a fluid approved for a camera lens.

#### 6. Primary Corona

The primary corona (in the EP-S cartridge) conditions the photoelectric drum by applying a uniform negative charge across the surface of the drum. Hold the cartridge in one hand and notice two long shutters on the top side of the cartridge. Between the two shutters you will see a long black soft plastic flap. The primary corona wire is just underneath this flap. Take the green cleaning brush, found in the printer beside the transfer guide, and insert the felt end through the flap. Slide the brush back and forth a few times to clean the corona wire. **Be careful not to break the wire.** If you have ever seen a 1/4" thick black streak running down the right side of your page (referred to as Right Side Streak, or RSS), this is caused by a weakness in the primary corona attracting excess toner onto itself which interferes with the negative charge. Now here is a plug for recharging your toner cartridges: when your cartridge is recharged the technician inserts a magnetic strip that eliminates this problem (if your recharger doesn't do this, find another one).

#### 7. Ozone Filter

The ozone filter is found in the housing on the right side near the back, just before the fan. It is contained in a black plastic case with a pull-latch door. Just pull the top tab with a finger or fingernail. The door should flip down, exposing a clear plastic tab that is attached to a black foam-wrapped filter. Pull it out. Note: if your laser printer was manufactured prior to 1989, the ozone filter will not be accessible without removing the main body cover. Call a qualified technician! Ozone gas is generated during the printing process and must be filtered through carbon before entering your breathing space (it can be toxic and in high concentrations can cause things like headaches, nausea, coughing, chest pain, and even premature aging of the skin) The Hewlett-Packard service technician's manual recommends replacement every 50,000 pages under normal operating conditions. The following conditions may necessitate changing the ozone filter more often:

- multiple laser printers and/or copiers in a confined area
- a very dusty operating environment
- printer exhaust port directed at the face of personnel
- poor room ventilation
- persons with asthma or bronchial problems working in same area
- extremely low relative humidity
- Long continuous printing combined with any of the above.

In addition to health concerns, you should be aware that excess ozone trapped in the printer (from not changing the filter) can break down the delicate photoactive layers on the OPC drum in the EP-S

cartridge, resulting in blurred images. It is a good idea to vacuum the filter when you clean the rest of the printer, but cleaning should not be done instead of replacement. A clean filter can still be worn out! Ozone filters may be purchased from most toner cartridge suppliers or service companies.

There are two types of replacement ozone filters available. The OEM type, manufactured by Canon, which is what was shipped with the printer when it was purchased. They have a honeycomb-like look with straight-through air flow. The alternative is what looks like a square foam impregnated

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with carbon. The airflow is not straight through, therefore, in my opinion this filter is much more susceptible to plugging. On the positive side, it is cheaper to purchase.

To sum up, with common sense and regular maintenance you can extend the life of your printer and prevent unnecessary problems from occurring. These cleaning steps are not to be done in place of regular service but as a complement to it. Without regular cleaning you may need a service call by a trained technician as often as every 40,000 to 50,000 pages. With regular cleaning you should easily be able to extend service calls to every 100,000 pages.

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