

TECHNICAL GUIDE

THE RECYCLER

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Remanufacturing the HP LaserJet Enterprise Flow MFP M630 toner cartridges



By Mike Josiah and the Technical Staff at Uninet

Remanufacturing the HP LaserJet Enterprise Flow MFP M630 toner cartridges

First introduced in September 2014, the HP LaserJet M630 is based on a 57ppm, 1200dpi engine. All the printers to date in this series come as standard with an 800MHz processor, have a 1.5GB memory (expandable to 2GB) and a first page out in less than 8.5 seconds.

This series of machines are heavy-duty, with double-sided scanning, paper capacity of up to 3,100 pages, a built-in security centre to safeguard your documents, a full colour touchscreen and full MFP capabilities.

These cartridges are the next rendition of the HP 64A/X (P4015) and the HP 90A/X (Enterprise 600 series). They are very similar, and use many of the same parts, but are not interchangeable. Conversion kits are currently in development. Check with your supplier for availability.

Out of the box, they come with a 10,500-page low yield cartridge. The new CF281A and CF281X cartridges are rated for 10,000 and 24,000 pages respectively. Both the 81A and 81X cartridges work in all machines to date. The CF281A has a list price of \$171.99 (€152)*, while the CF281X has a list price of \$282.99 (€250)* (pricing as of 12 January 2015).

The following figures (1-8) show the difference between the two 81A and 81X cartridges.

Figs 1 and 2 - top of 81A, 81X

Figs 3 and 4 - bottom of 81A, 81X

Figs 5 and 6 - right side 81A, 81X

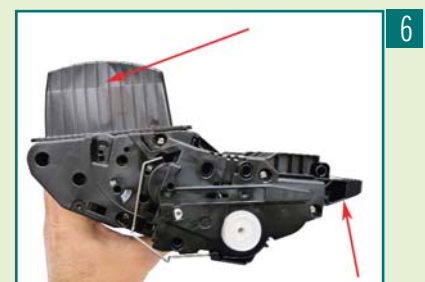
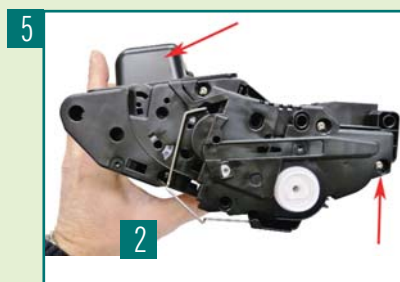
Figs 7 and 8 - left side 81A, 81X

The current machines that use these new cartridges are as follows:

- HP LaserJet Enterprise Flow MFP M630dn
- HP LaserJet Enterprise Flow MFP M630h
- HP LaserJet Enterprise Flow MFP M630f
- HP LaserJet Enterprise Flow MFP M630z

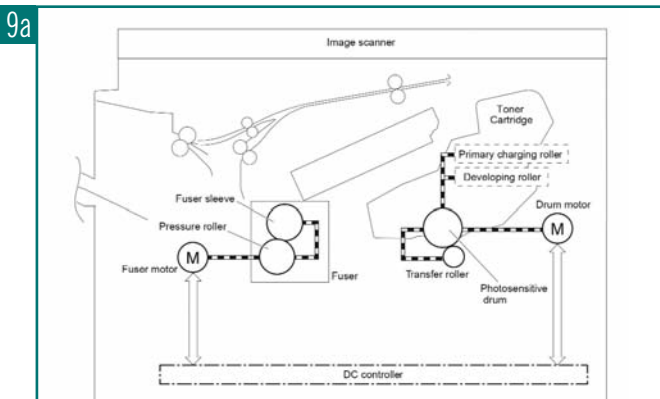
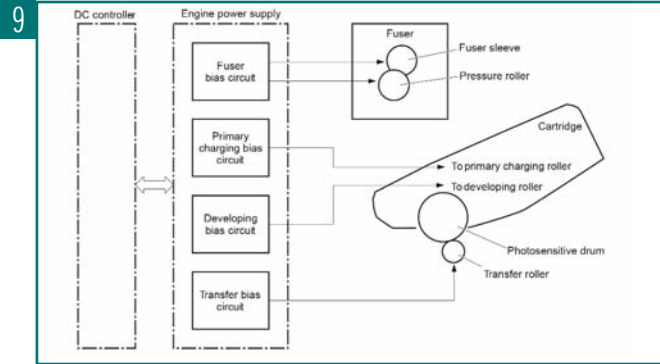
Printer usage, as well as some common printer/cartridge problems, will be covered at the end of this article.

It's been a while since we have covered monochrome printing theory, especially on the faster printers, so we are covering it here. Knowing the theory is very helpful if you run into a print issue and need to troubleshoot what's happening. When you know what each part does and when, you can narrow the issue down much quicker.

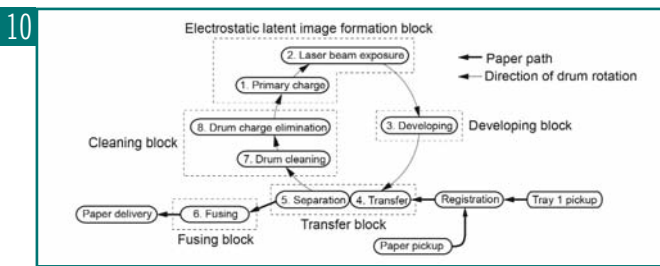


CARTRIDGE THEORY

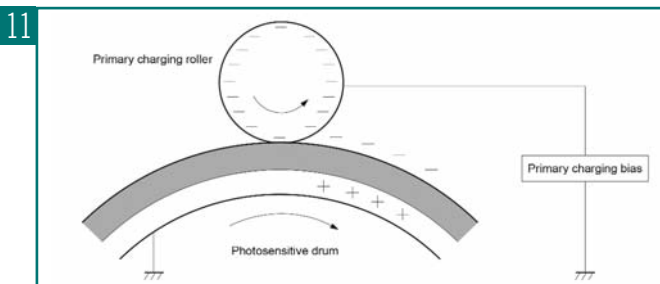
Figures 9 and 9A show the various circuits, signals and motors that come out of the printer, and what they connect to in the cartridge.



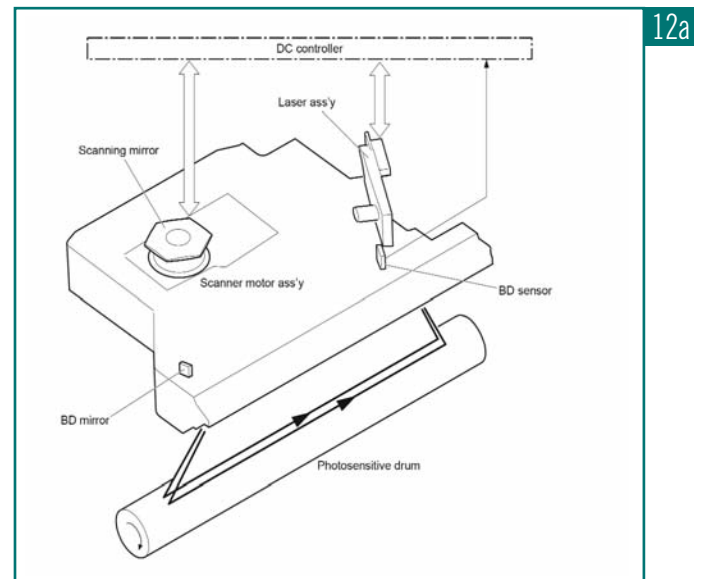
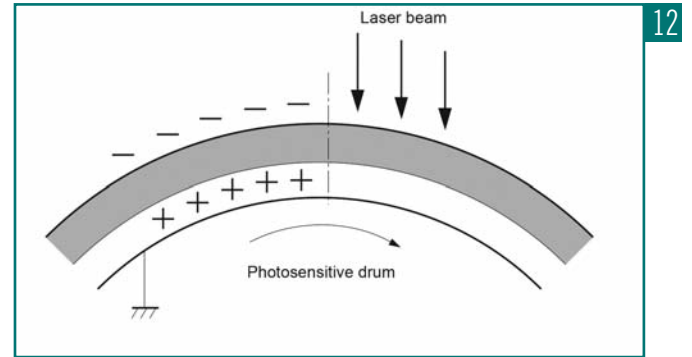
The image formation process consists of eight steps, which are split up into five functional blocks (see Figure 10).



In the first step, the primary charge roller (PCR) places a uniform negative DC bias voltage on the OPC drum surface. The amount of the negative DC bias placed on the drum is controlled by the printer's intensity setting. This process sets the drum for the laser (see Figure 11).

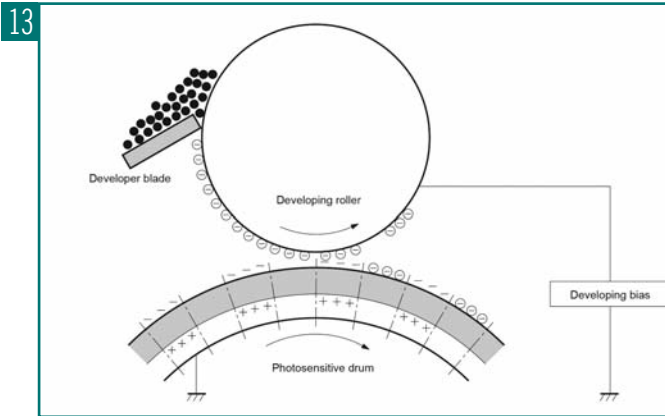


In the second step, two laser beams are fired onto a rotating mirror (called the scanner). As the mirror rotates, the beam reflects into a set of focusing lens. The beam then strikes the OPC's surface, which neutralises the negative charge, and leaves a latent electrostatic image on the drum. Two beams are used for faster printing (see Figures 12 and 12A).

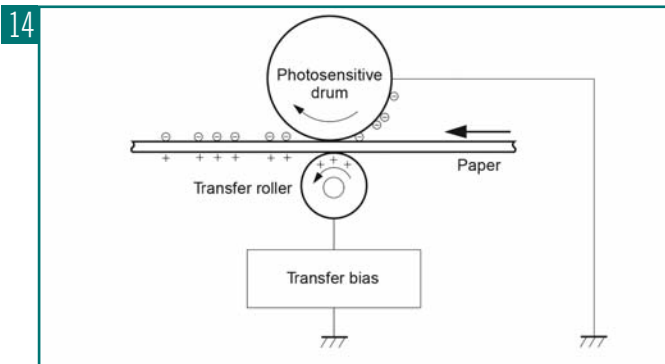


The third step (developing block) is where the toner image is developed on the drum by the developing section (or supply chamber), which contains the toner particles. The toner is held to the magnetic roller sleeve by the stationary magnet inside the sleeve, and a DC bias voltage supplied by the high voltage power supply. This DC bias voltage is controlled by the printer's density setting, and causes either more or less toner to be attracted to the drum. This in turn will either increase or decrease the print density. Both the primary charge roller and magnetic roller DC bias voltages are controlled by the printer's density setting. The amount of toner on the magnetic roller sleeve is also controlled by the rubber doctor blade, which uses pressure to keep the amount of toner on the magnetic roller sleeve constant. This blade also causes a static charge to build up on the toner, which helps keep the coating of toner even, and allows easy transfer to the OPC drum.

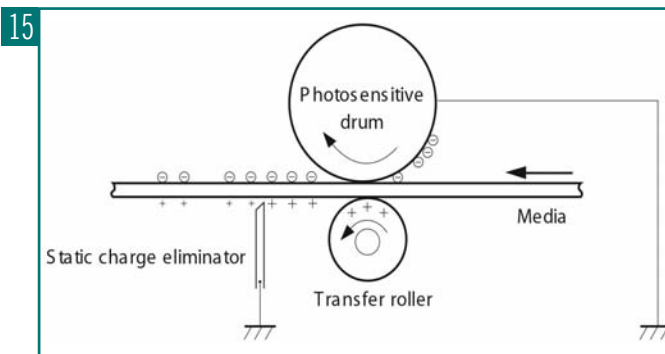
There is a lot going on here, and you can see where print density issues can be caused by more than one part or setting (see Figure 13).



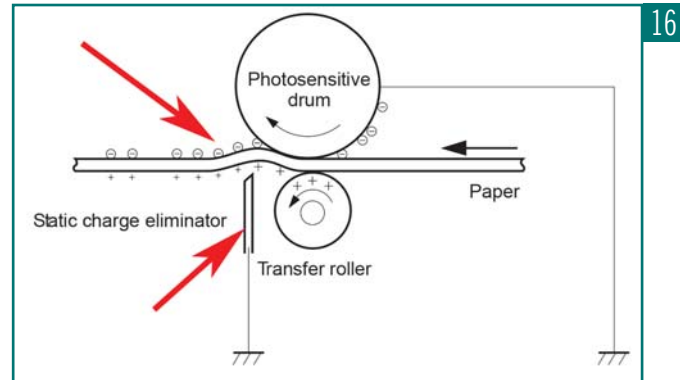
As the laser-exposed areas of the OPC drum approach the magnetic roller, the toner particles are attracted to the drum's surface, due to the opposite voltage potentials of the toner and laser-exposed surface of the OPC drum (see Figure 14).



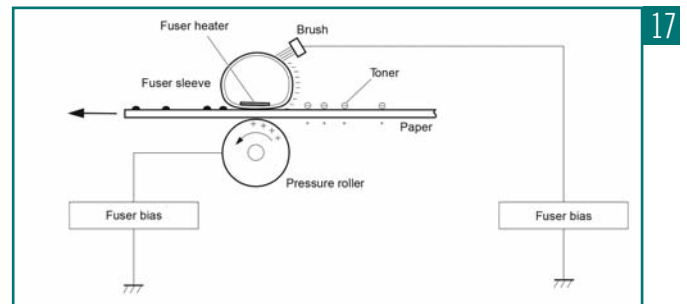
In the fourth step, the toner image is then transferred to the paper as it passes below the drum by the transfer charge roller, which places a positive charge on the back of the paper. This positive charge causes the negatively-charged toner on the drum's surface to be attracted to the page. The small diameter of the drum, combined with the stiffness of the paper, causes the paper to peel away from the drum (see Figure 15).



In the fifth step, the paper separates from the drum. The static charge eliminator weakens the attractive forces between the negatively-charged drum surface and the positively-charged paper. This prevents toner dropouts onto the paper at low temperatures and humidity, and also prevents paper from wrapping around the drum (see Figure 16).

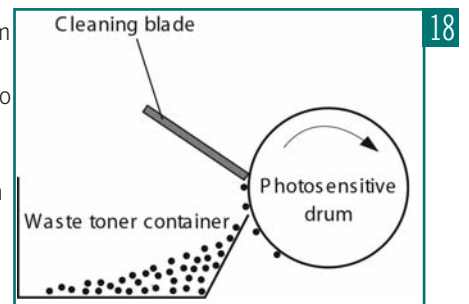


In the sixth step, the image is then fused on to the paper by the fuser assembly, which is comprised of the upper fixing film assembly and the lower fuser roller. The paper passes between a heated upper fixing film assembly and a soft lower rubber roller. The upper heated element then melts the toner into the paper. The fixing film assembly consists of a Teflon sleeve with a ceramic heating element inside. These fusers are a bit different in that they have a brush which has a DC bias charge on it to help keep the film clean (see Figure 17).

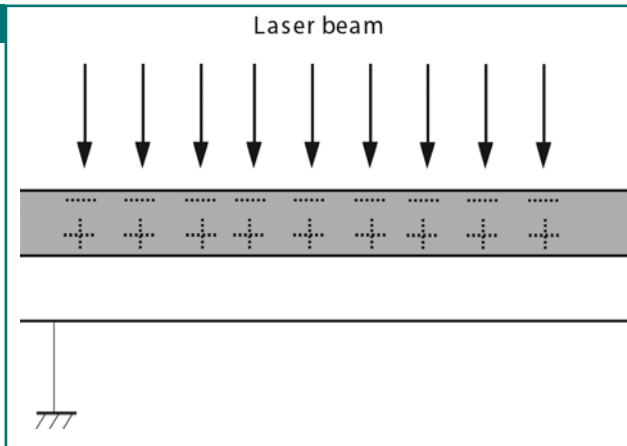


In the seventh step, the OPC drum is cleaned. On average, approximately 95 percent of the toner is transferred to the paper during the print cycle. As the drum rotates during printing, the remaining five percent of the toner that is on the OPC drum is cleaned off the drum by the wiper blade.

It is then guided into the waste chamber by the recovery blade, and stored in the waste chamber (see Figure 18).



19



Step eight is where the residual charge is eliminated. An AC signal is placed on the PCR, which eliminates any residual charges from the drum, and prepares the drum to be charged (also by the PCR). The AC erase and DC charge voltages are applied to the drum almost simultaneously (see Figure 19).

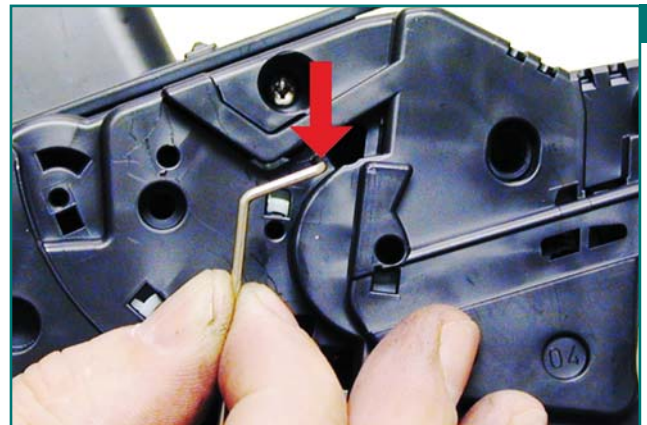
REQUIRED TOOLS:

- 1 Toner for use in the HP M651/M680 series
- 2 Toner-approved vacuum
- 3 A small common screwdriver
- 4 A Phillips head screwdriver
- 5 Needle nose pliers

REQUIRED SUPPLIES

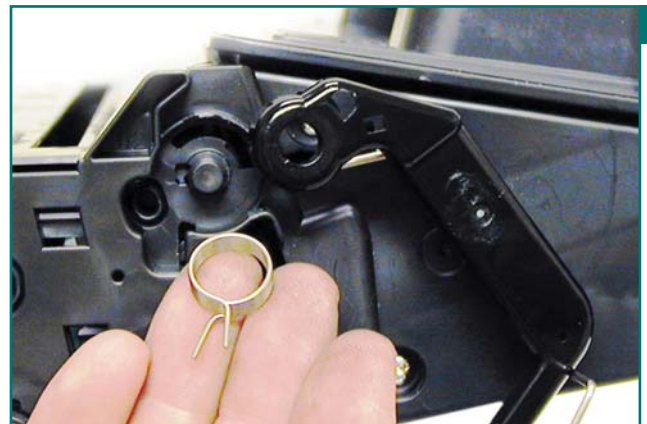
- Toner for use in the HP M630 series of printers (STD or HY load)
- Replacement drum
- Replacement wiper blade
- Replacement doctor blade
- Replacement PCR
- Replacement magnetic roller sleeve
- New replacement smartchip
- Conductive grease
- Drum lubrication
- Hot glue gun (see text)

- 2 Open the drum cover towards the back of the cartridge. Remove the right side metal bar by prying it out of its holder (see Figure 20).



20

- 3 On the opposite side of the cartridge, carefully pry off the drum cover plastic arm. The spring will probably pop off - take care not to lose it. We will go over the installation at the end of this article. Remove the drum cover assembly (see Figure 21).



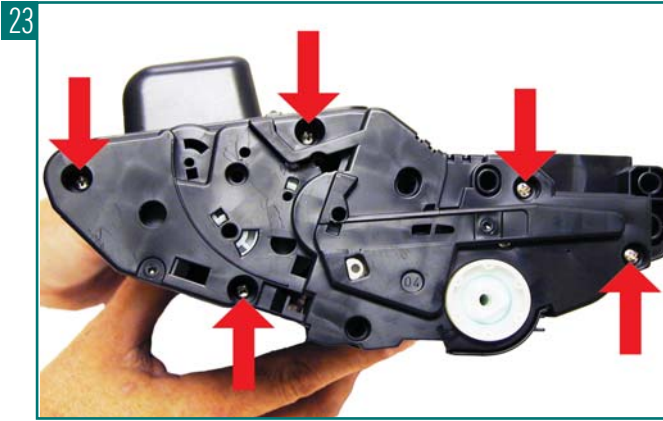
21

- 4 Remove the metal bar from the left side, and remove the entire drum cover assembly. Make sure you put the spring in a safe place (see Figure 22).

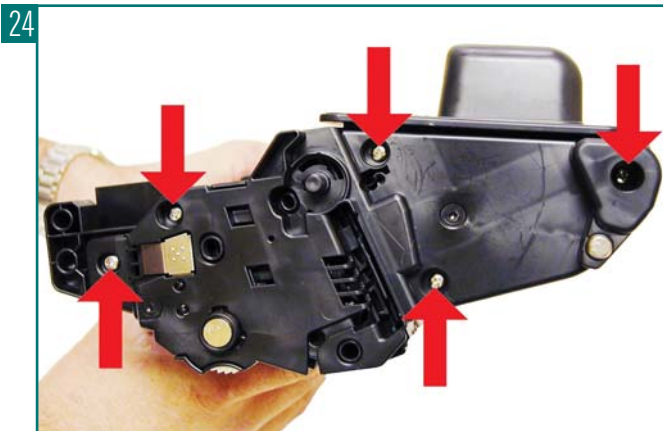


22

5 Remove the five screws on the right-side end cap (see Figure 23).



6 Remove the five screws from the left end cap (see Figure 24).



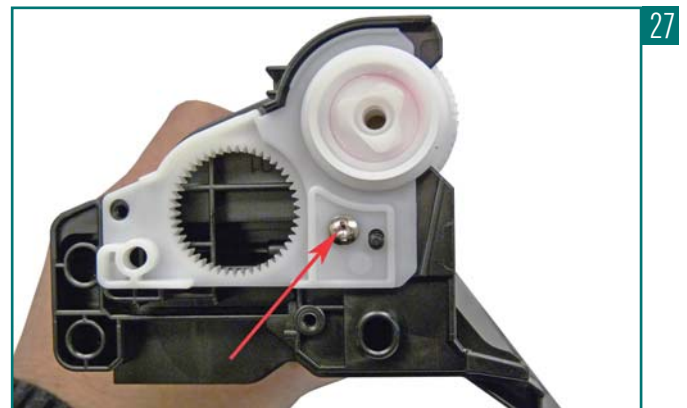
7 Remove the right and left-side end caps from the cartridge. Note that the gears do not come off the gear (right) end cap (see Figure 25).



8 Separate the toner hopper and waste chamber (see Figure 26).



9 On the large gear side of the waste chamber, remove the screw and white plastic drum bushing (see Figure 27).



10 Remove the drum (see Figure 28).



11 Remove the PCR (see Figure 29).



12 Remove the two screws from the wiper blade (see Figure 30).



13 Remove the wiper blade from the cartridge, and clean out the waste toner (see Figure 31).



14 Due to the high speed and page counts of these cartridges, we recommend that the wiper blades be replaced. Make sure that the wiper blade foam seals are clean (see Figure 32).



15 Install the new wiper blade and two screws (see Figure 33).



16 Clean the PCR with your standard PCR cleaner.

17 Install the cleaned PCR. Place a small amount of conductive grease on the black PCR saddle. Remember, when using conductive grease, more is not better (see Figure 34).

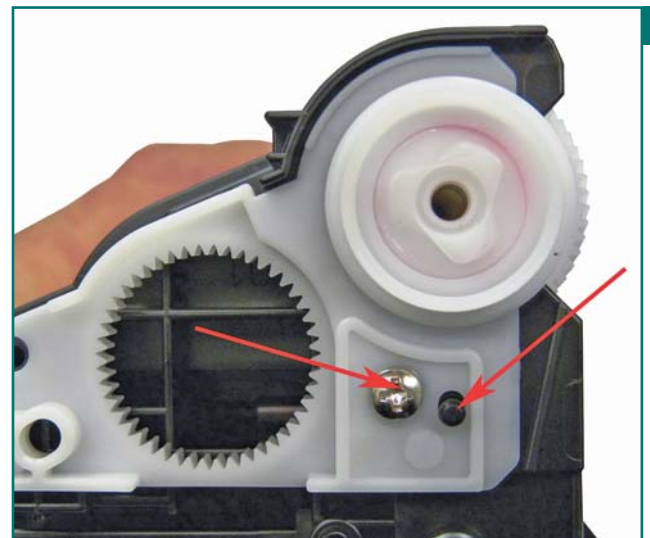


18 On the drum axle pin, clean off the old conductive grease and replace with new (see Figure 35).

19 Install the drum small gear-side first onto the drum axle pin (see Figure 36).



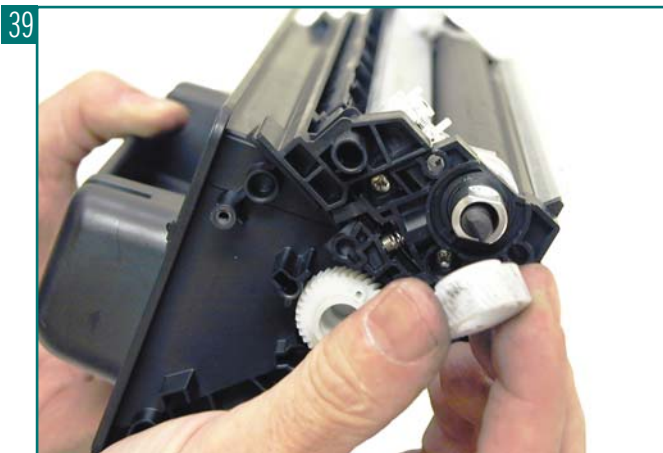
20 Install the white plastic drum bushing and screw. If the OEM drum grease is dirty, clean it off with alcohol, and replace with white lithium grease (see Figure 37).



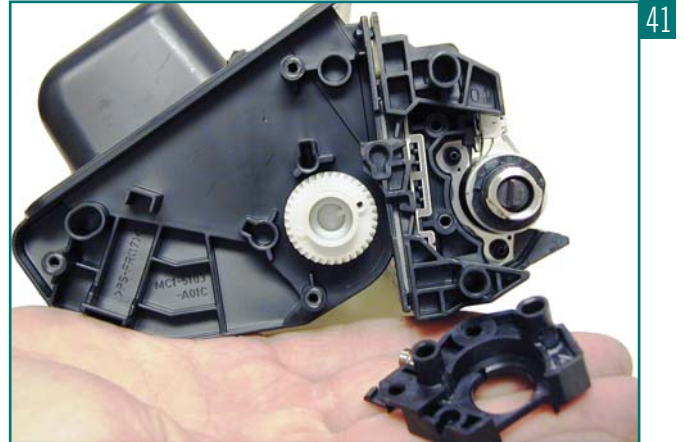
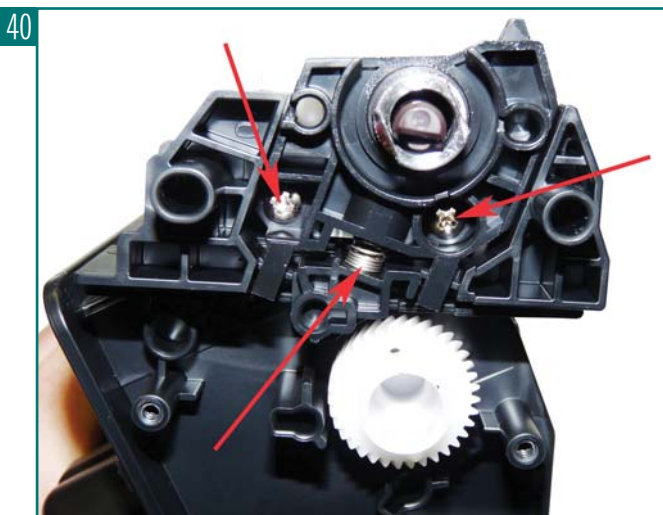
21 On the supply chamber, carefully pry off the magnetic roller (MRS) cover and remove (see Figure 38).



22 Remove the MRS drive gear (see Figure 39).



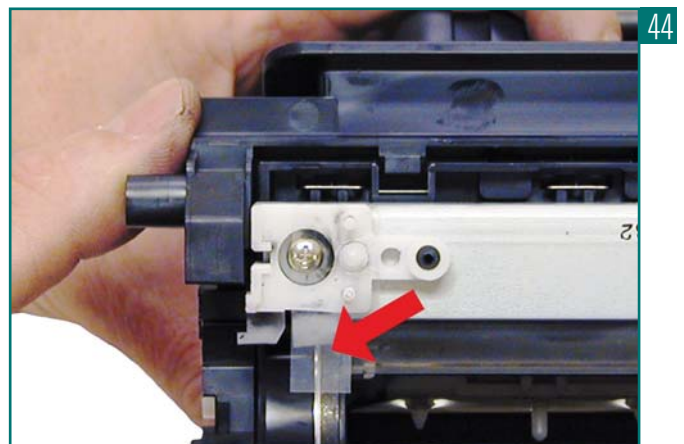
23 Note the location of the spring that sits between the MRS holder and the hopper. Remove the two screws, spring and the holder (see Figures 40 and 41).



24 Remove the MRS assembly (see Figure 42).



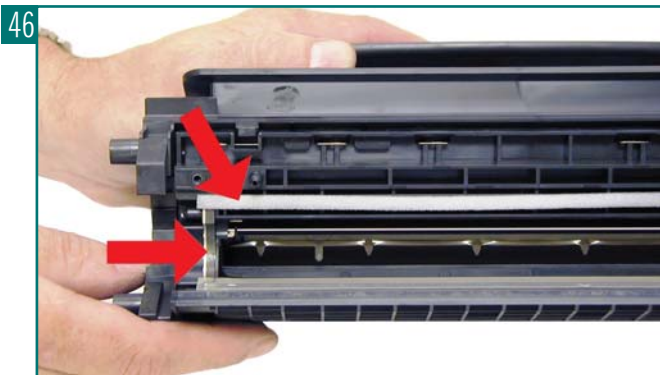
25 Remove the two doctor blade screws and the doctor blade. Note the clear plastic strip that covers the doctor blade screws. Slide the screwdriver under the strip. Be careful not to damage the strip (see Figures 43 and 44).



26 Remove the fill plug and clean out all the remaining toner in the supply hopper (see Figure 45).



27 Note the magnetic seals on the MRS and the doctor blade sealing foam. Make sure both are clean (see Figure 46).



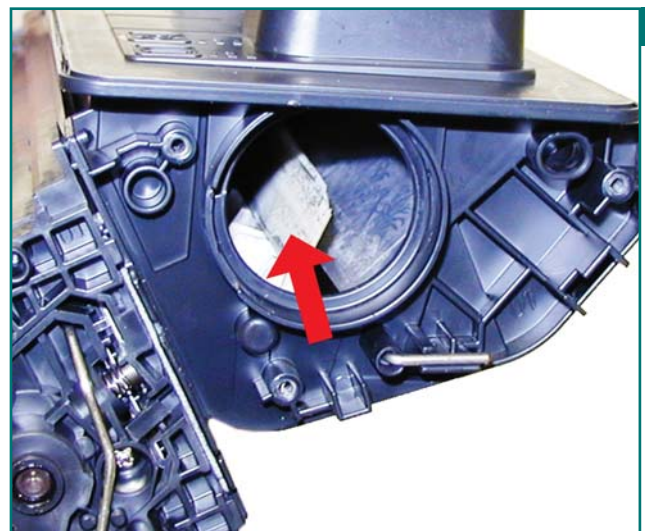
28 Note also the new heavy-duty style magnetic roller contact. This, when combined with the new larger diameter of the roller, allows the cartridge to run at the higher speeds that these machines are capable of (see Figure 47).



29 There are magnetic roller bushings on each side of the roller. While these are holding up well in our initial tests, this may be an area where wear will cause banding. One will stay in the hopper, and one comes off with the 'mag' roller assembly (see Figures 48 and 49).



30 These cartridges just use one large mixing blade inside the toner hopper: make sure it turns freely after cleaning or you will get invalid cartridge errors, motor errors or paper jams (see Figure 50).

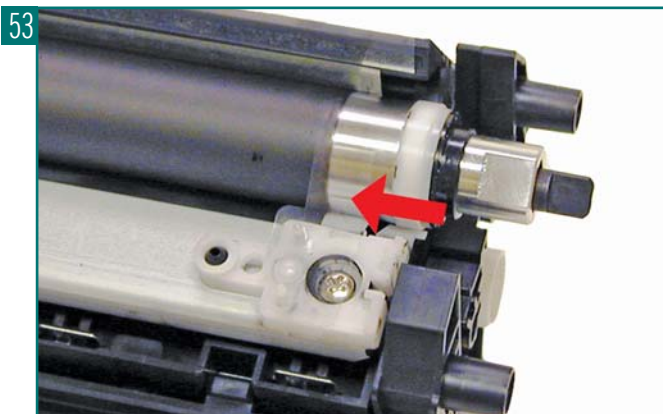


31 The upper magnetic roller section of the toner hopper “floats” on a series of foam seals. The upper half can be removed from the hopper, but some of the seals will be destroyed. The foam isolates the magnetic roller from the vibrations of the mixing augers, and allows smoother prints.

32 Install the doctor blade and two screws (make sure that the clear strips are not damaged!) (see **Figure 51**).



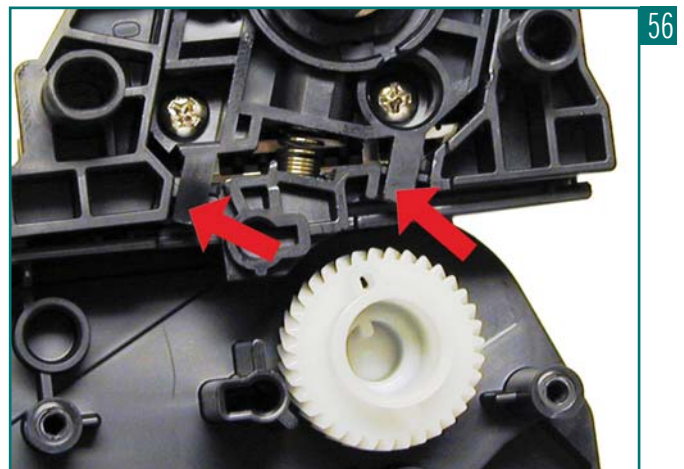
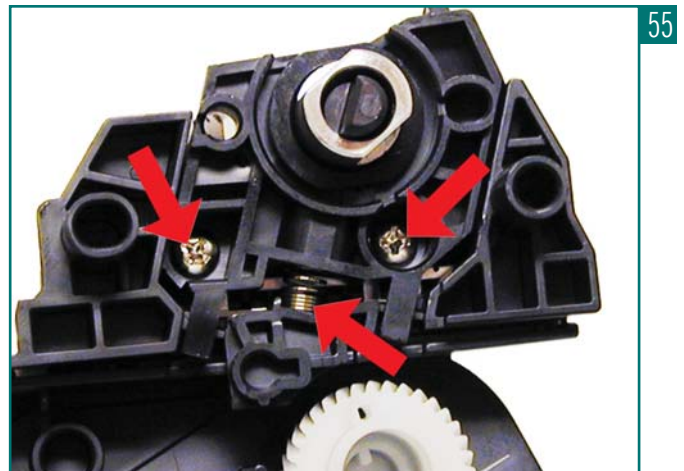
33 Install the MRS assembly. Make sure the clear strips from the doctor blade ride on top of the magnetic roller (see **Figures 52 and 53**).



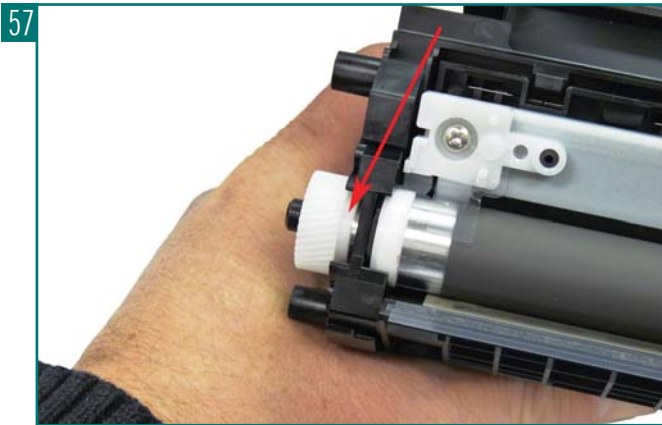
34 Remove the right-side small bushing from the magnetic roller sleeve, and install it onto the holder. Make sure the tab on the bushing aligns with the slot in the holder (see **Figure 54**).



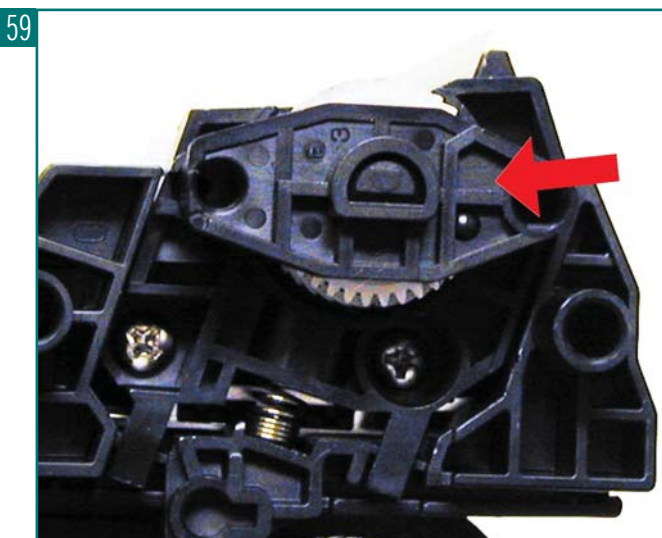
35 Install the holder, two screws and spring. Make sure the screw holes line up, and that the two locking tabs on the bottom of the holder are in the correct place. This can be tricky to get in place until you’ve done it a few times. Take your time and don’t force the fit (see **Figures 55 and 56**).



36 Install the magnetic roller drive gear. Make sure the bushing part of the gear faces into the cartridge (see Figures 57 and 58).



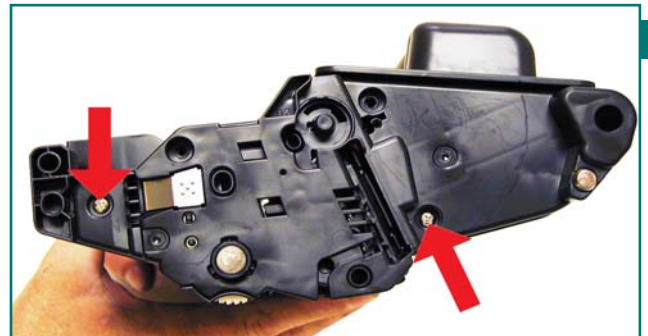
37 Install the keyed MRS cover. Make sure that the keyed hole in the cover matches the keyed end of the magnet in the MRS assembly. (See Figure 59).



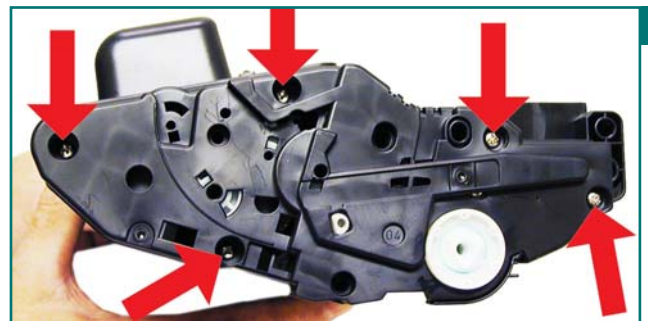
38 Fill with appropriate amount of toner for use in the M630 series, and install the fill plug (see Figure 60).



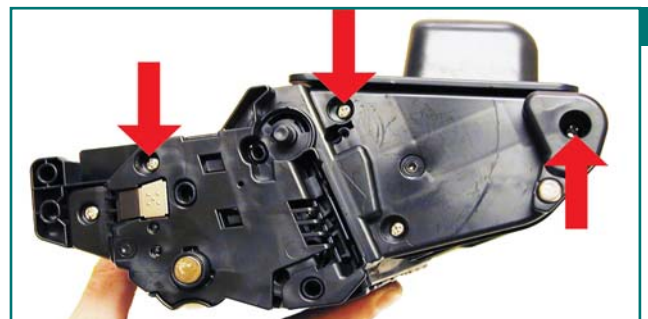
39 Hold the two sections of the cartridge together, and install the left (contact side) end cap. Install a screw in the waste and supply sections to hold everything together (see Figure 61).



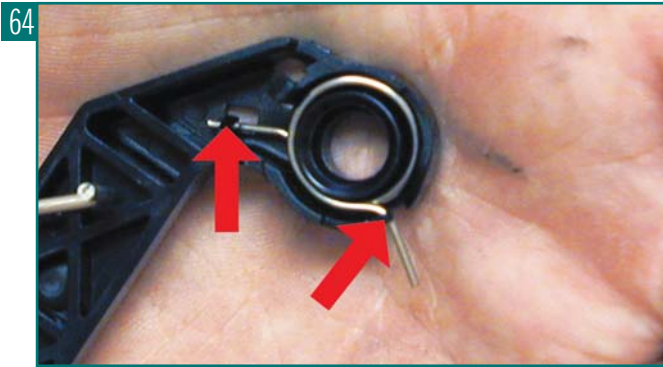
40 Install the right-side end cap and five screws (see Figure 52).



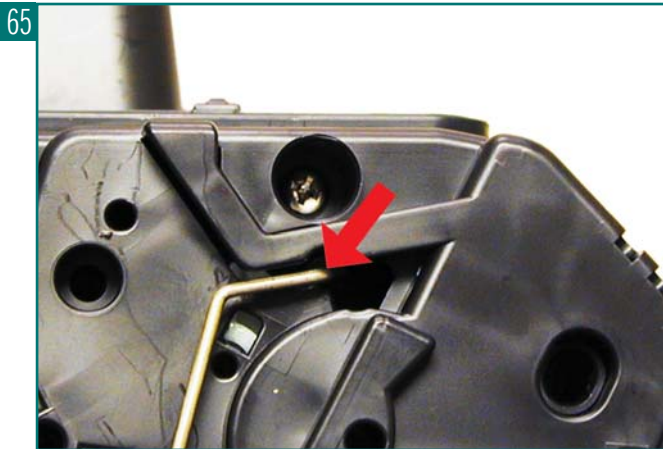
41 Install the remaining three screws on the left end cap (see Figure 63).



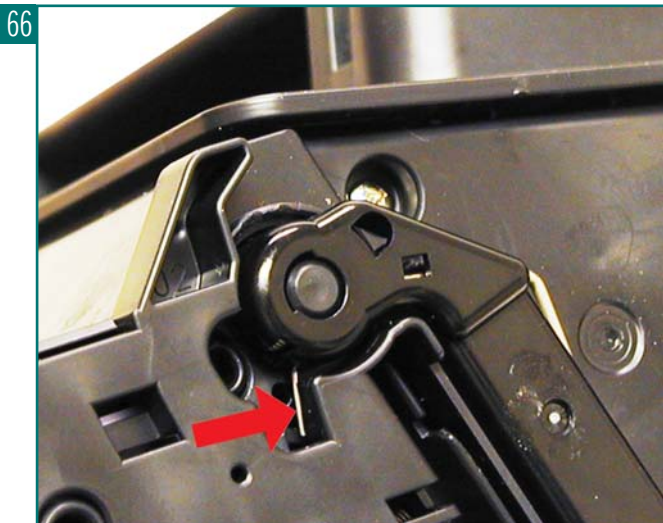
- 42** Install the spring into the drum cover arm as shown. Pull the upper tail of the spring until it fits into the notch in the arm hub (see **Figure 64**).



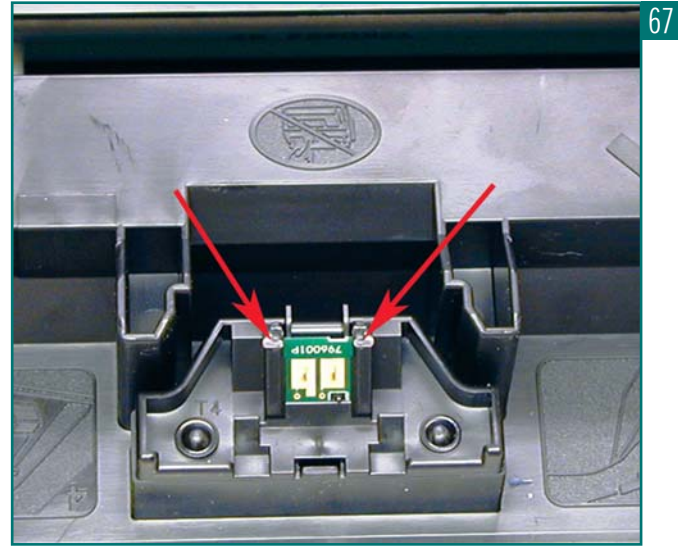
- 43** Install the metal bars from the drum cover on both sides of the cartridge (see **Figure 65**).



- 44** Install the arm onto the cartridge. Pull the arm fully back to release the spring from the notch. Check to make sure the drum cover operates properly (see **Figure 66**).



- 45** Remove the old chip from the top of the cartridge by slicing the melted plastic off with a sharp Xacto knife. Replace the chip; lock the chip in place with a small dab of glue from a hot glue gun. Replacing this chip will enable the toner low functions of both the cartridge and the machine again (see **Figure 67**).



- 46** If available, insert the shipping lock into the cartridge. This lock separates the two halves of the cartridge preventing damage to the internal rollers (see **Figure 68**).



Repetitive defect chart:

NOTE: Bolded items are in the toner cartridge

OPC drum:	94mm
Upper fuser sleeve:	94mm
Lower fuser pressure roller:	94mm
Tray 2 - separation roller:	79mm
Tray 2 - pickup roller:	79mm
Tray 2 - feed roller:	79mm
Tray 1 - separation roller:	79mm
Tray 1 - feed roller:	79mm
Tray 1 - pickup roller:	63mm
Magnetic roller:	63mm
Feed roller:	50mm
Pre-registration roller:	50mm
Transfer roller:	47mm
PCR:	38mm

Running the cleaning page

1. From the Home screen on the product control panel, scroll to and touch the “Device Maintenance” button.
2. Touch “Calibration/Cleaning”, touch “Cleaning Page”, and then touch “Print” to print the page.

A cleaning message displays on the product control panel. The cleaning process takes a few minutes to complete.

Do not turn the product off until the cleaning process has finished. When it is finished, discard the printed page.

Running test pages:

From the Home screen on the product control panel, scroll to and touch the “Supplies” button.

The status of all supply items is listed on the screen.

To print or view a report of the status of all supply items, touch the “Manage Supplies” button. Touch the “Supplies Status” button, and then touch either the Print or View button.

Printer error codes

Most of the error codes are self-explanatory, but there are a few that are part-text, and part-number. It is those codes that we will list here:

10.10.00 Supply Memory Error: Bad chip

10. XX.YY Supply Memory Error: An error has occurred in one or more of the printer’s supplies

10.00.00 = Memory is defective

10.00.10 = Memory is missing

Error 50.WX.YX: These are fuser error codes

W=1 or 2: Low fuser temperature

W=3: High fuser temperature

W=4: Drive circuit fault

W=7: Fuser pressure release mechanism failure

W=8: Low fuser temperature

W=9: High fuser temperature

Error 51.00.10: Beam detect error

Error 51.00.19/20: These codes are laser/scanner errors