HP® ENTERPRISE 700 MONOCHROME M712
TONER CARTRIDGE REMANUFACTURING INSTRUCTIONS

HP ENTERPRISE 700 M712 TONER CARTRIDGE

REMANUFACTURING THE HP ENTERPRISE 700 M712 TONER CARTRIDGE

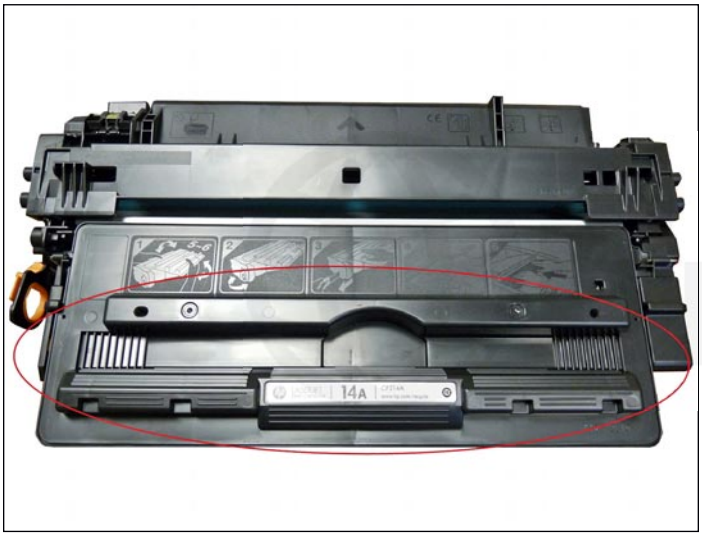
By Mike Josiah and the Technical Staff at UniNet

The HP Enterprise 700 M712 series of printers are based on a 1200 dpi, 40ppm wide format Canon engine. This series replaces the LaserJet M5025 series. As with all the new HP cartridges, these cartridges use a chip to monitor toner-low functions. The cartridges available for the M712 are the CF-214A and X.

The M712 series of printers use an 800 MHz processor and the most basic unit has 512Mb of memory. The entire series has a monthly duty cycle of up to 100,000 pages per month. All models come equipped with HP's ePrint™ and Apple's AirPrint™ mobile print technologies.

The cartridges for these machines are similar to the older HP M5025. New replacement end caps to convert an HP M5025 cartridge to the M712 are now available. Some minor cartridge modifications are needed, but it's all fairly simple. Separate instructions for the conversion are available.

The CF-214A is rated for 10,000 pages and has a list price of $164.99 USD*
The CF-214X is rated for 17,500 pages and has a list price of $181.99 USD*
***Pricing, in U.S. American Dollars, as of January 2013.**



Shown are the differences between the "A" and "X" cartridges.

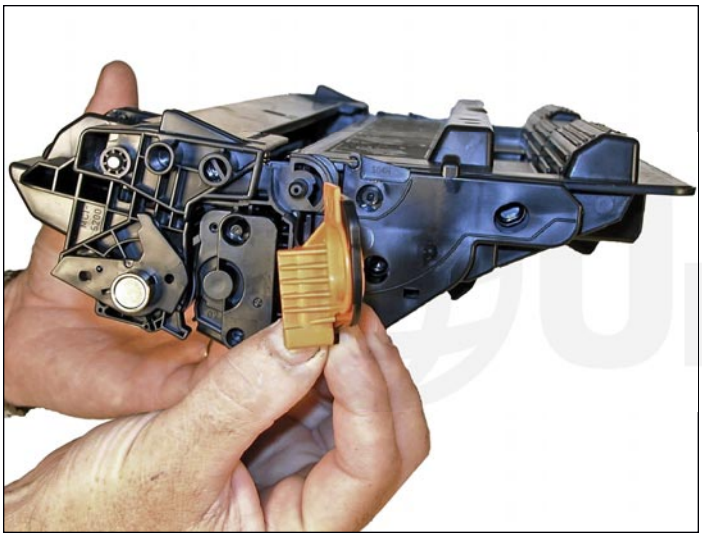
Note that the supply hopper on the "X" is larger.

Because of this, you cannot convert an "A" cartridge to an "X."

Shown are the topside differences between the HP 5200, M5025, and M712 cartridges.

PRINTERS BASED ON THE M712 SERIES SO FAR

HP Enterprise 700 M712/M712dn/M712xh
HP Enterprise 700 M725



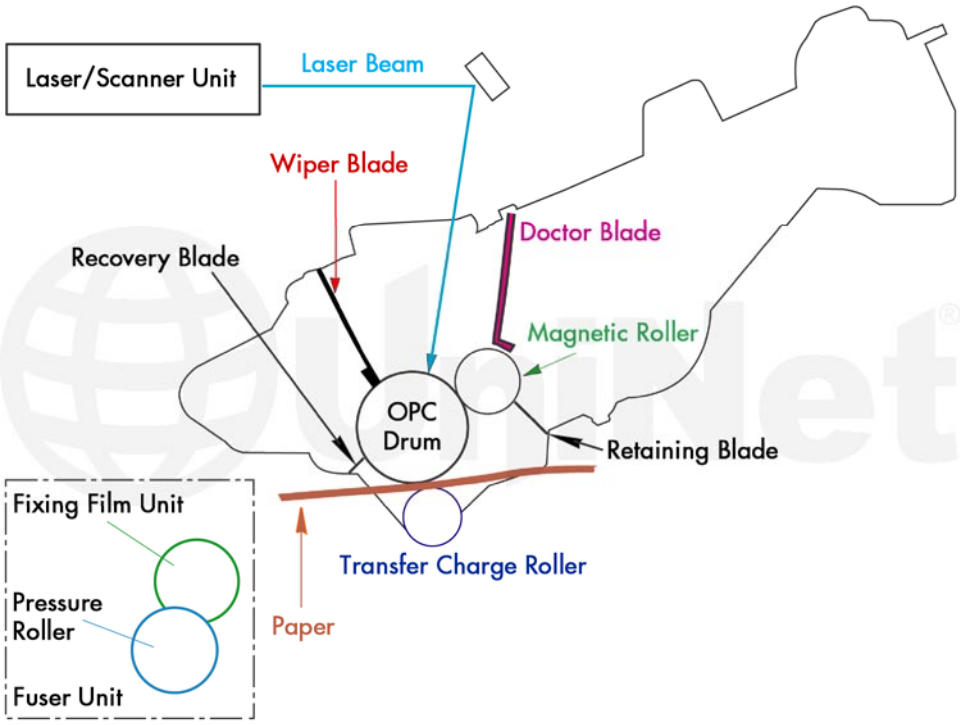
Shown is the pull-tab for the seal. This tab prevents the cartridge from being installed unless the seal has been pulled (unless the tab has been separated from the seal of course).

Shown is a new cartridge as received.

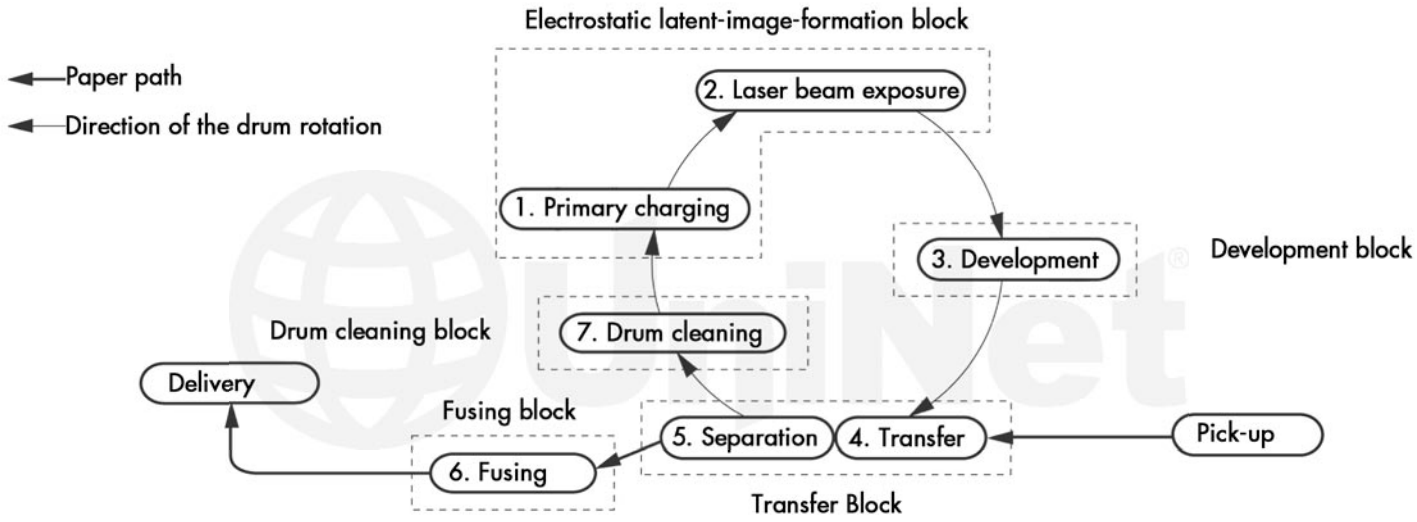
As with the M5025 cartridges, they have eliminated all the screws that hold the supply hopper end caps on, and are now held on by plastic rivets. This is not too much of a problem, but it is a bit inconvenient.

Printing test pages and some simple cartridge troubleshooting is covered at the end of the article. Also covered will be how to convert an HP 5200 and (separately) an HP M5025 into an M712 cartridge. This will be at the very end of the article.

It has been a while since the theory of a normal monochrome HP cartridge has been covered. So we have included it here. There is really nothing new here, but it can be used as a refresher course...

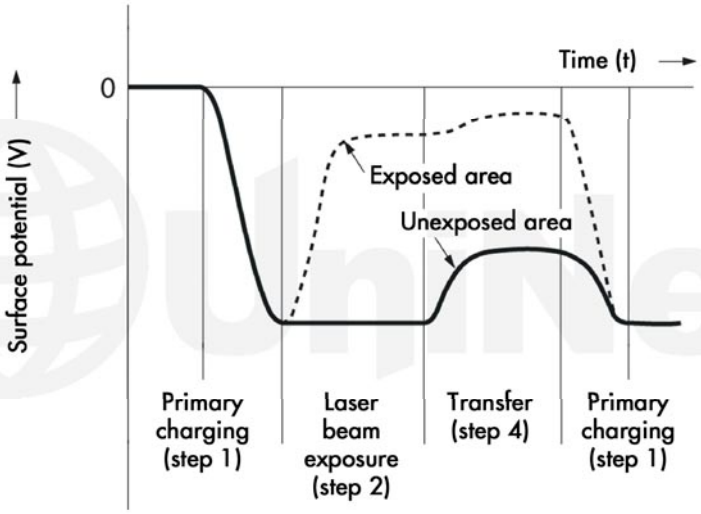


Shown are the various cartridge parts as they relate to each other.

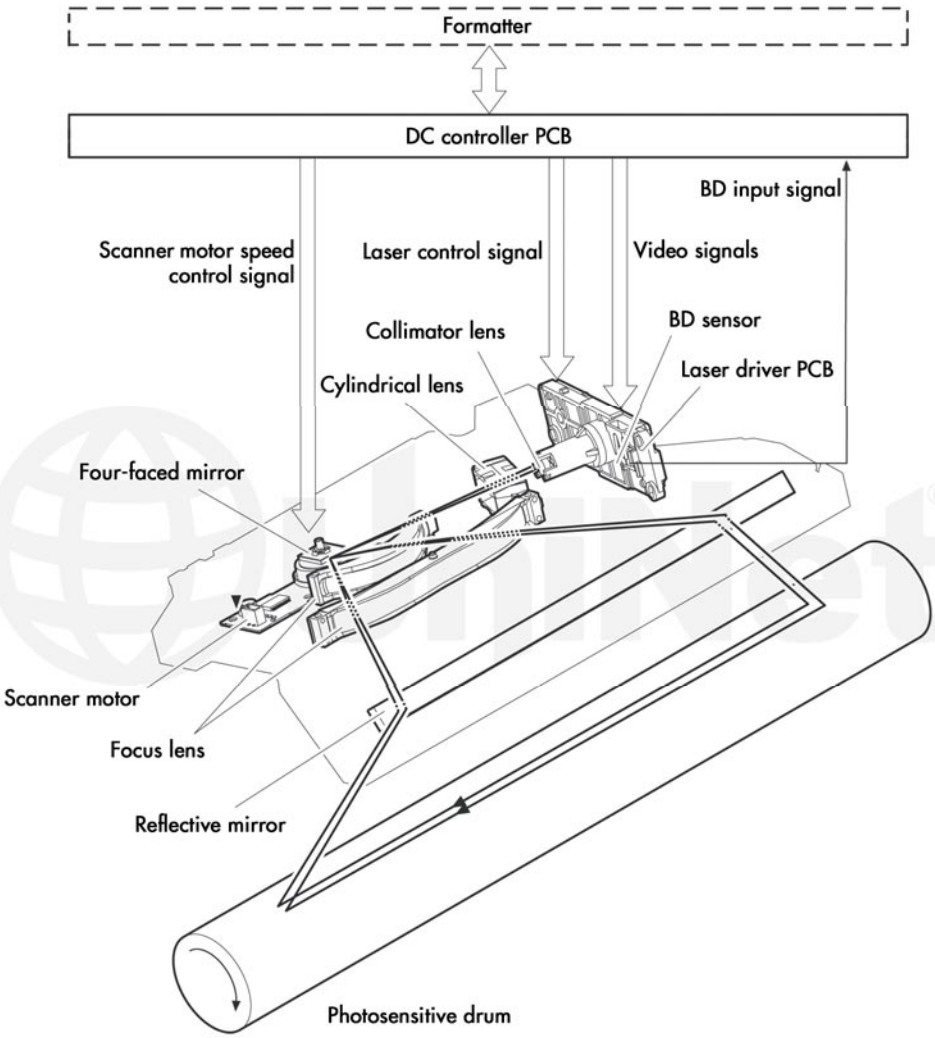


Shown is a block diagram of the entire printing process.

The toner cartridge printing process is best explained as a series of steps or stages.

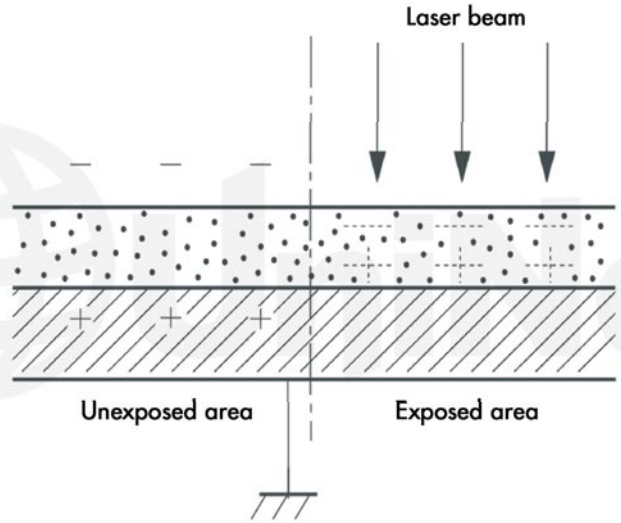


In the **first** stage, the Primary Charge Roller (PCR) places a uniform negative DC bias voltage on the OPC drum surface. The amount of the negative DC bias placed on the drum is controlled by the printer's intensity setting. This process is called "conditioning."



In the **second** stage, the laser beam is fired onto a rotating mirror (scanner).

As the mirror rotates, the beam reflects into a set of focusing lens.

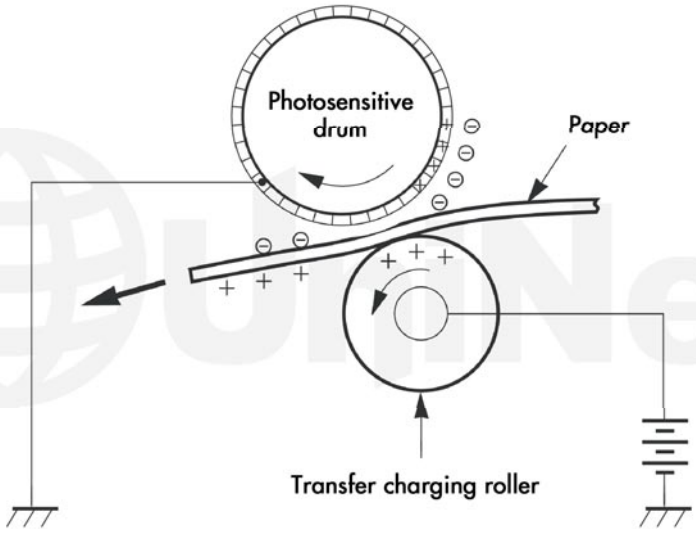


The beam then strikes the OPC's surface, leaving a latent electrostatic image on the drum.

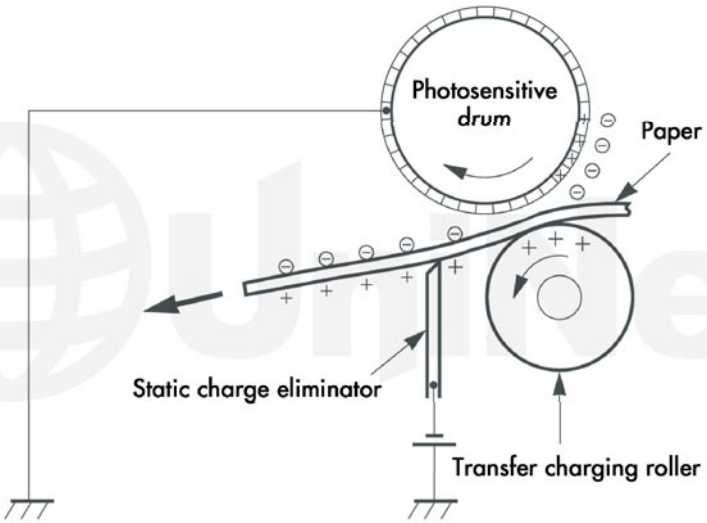
The **third** or developing stage is where the toner image is developed on the drum by the supply chamber, which contains the toner particles. The toner is held to the magnetic roller sleeve by the stationary magnet inside the sleeve, and a DC bias voltage supplied by the high voltage power supply. This DC bias voltage is controlled by the printer's intensity 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 intensity setting. The amount of toner on the magnetic roller sleeve is 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.

At the same time an AC signal is also placed on the magnetic roller sleeve. This signal decreases the attraction of the toner to the magnetic roller sleeve, and increases the repelling action of toner against the areas of the drum that was not exposed to the laser beam. This AC potential improves the density, and contrast of the toner on the printed page.

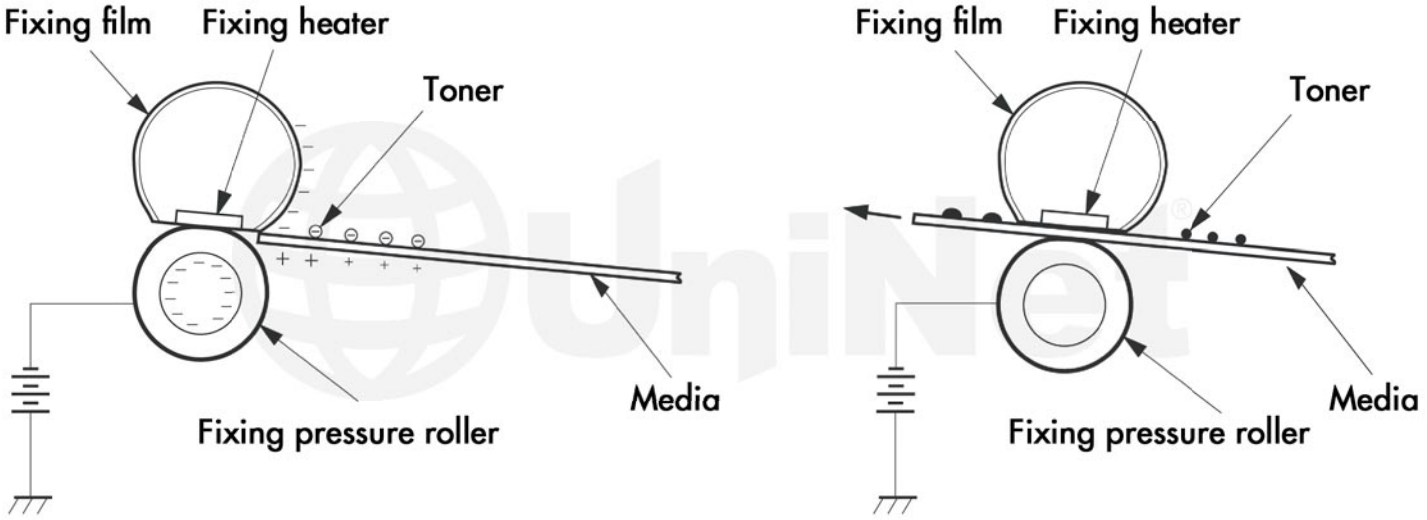
As the laser-exposed areas of the OPC drum approach the magnetic roller, the toner particles are attracted to the drum's surface due to the opposite voltage potentials of the toner, and laser-exposed surface of the OPC drum.



In the **fourth** or transfer stage 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.



In the **fifth** stage (separation) 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.



In the **sixth** or fusing stage, the image is then fused on to the paper by the fuser assembly, which is comprised of the upper and lower fuser rollers. The paper passes between a heated ceramic fusing element and a soft lower rubber roller that presses the page up into the upper heating element. The upper heated element then melts the toner into the paper.

In the **seventh** (drum cleaning) stage, the OPC drum is cleaned. On average, approximately 95% of the toner is transferred to the paper during the print cycle. As the drum rotates during printing, the remaining 5% 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.

Once the print cycle has been completed, the primary charge roller will then place an AC voltage across the drum surface that erases any residual charges left on the drum surface. The OPC drum is now ready to be conditioned by the primary charge roller using the negative DC bias voltage, and start the print cycle again.

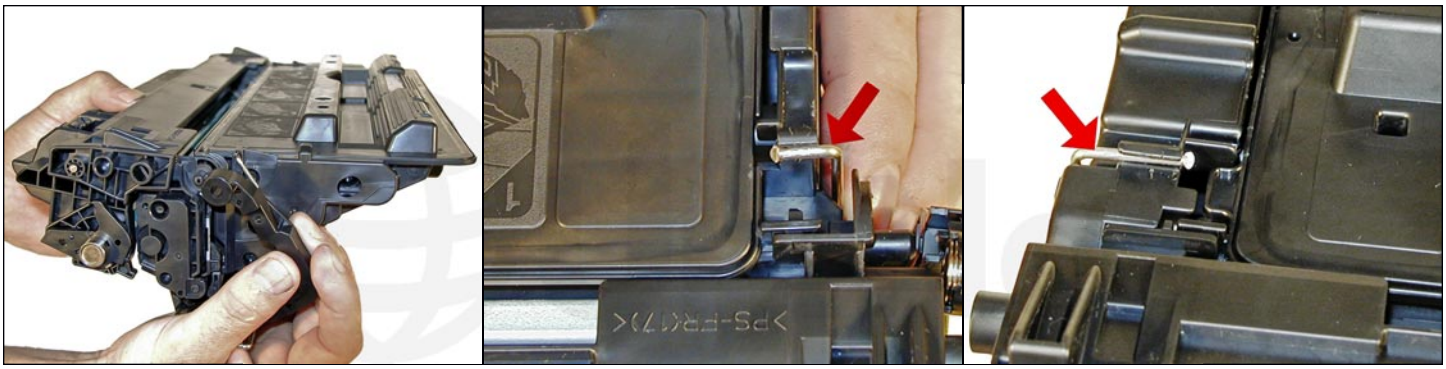
In older systems, a primary corona wire, and a transfer corona wire are used instead of the PCR and transfer roller. These wires do the same job, but demand much more power to do it. The advantages of the primary charge roller systems are that they operate at a lower voltage than the old style corona wire, do not generate ozone, and they also replace the erase lamps that were present in the older style laser printers.

REQUIRED TOOLS

1. Toner approved vacuum
2. A small common screwdriver
3. A Phillips head screwdriver
4. Needle nose pliers
5. Flush cutting wire cutters
6. Dremmel tool with side cutting bit (hobby rotary saw) - see picture in article
7. Xacto knife with flat chisel blade

REQUIRED SUPPLIES

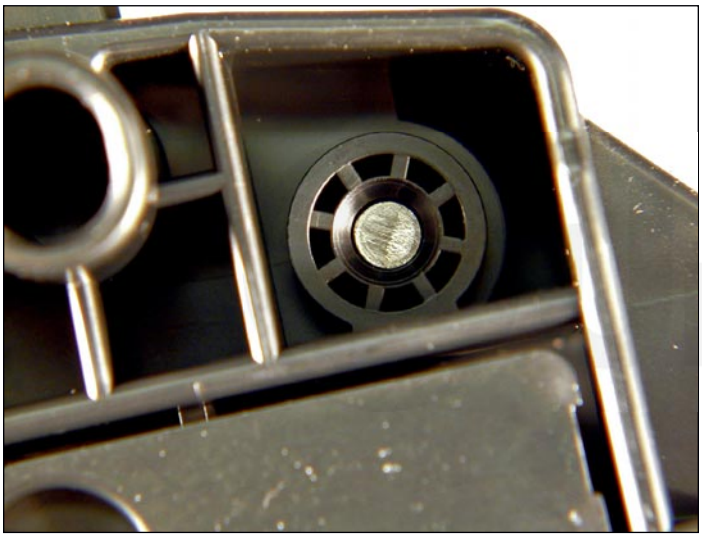
1. Toner for use in the HP Enterprise 700 M712/725 series
2. New OPC drum
3. New wiper blade
4. New replacement chip
5. New PCR (optional)
6. New magnetic roller (optional)
7. New doctor blade (optional)
8. 99% isopropyl alcohol
9. Magnetic roller cleaner
10. Drum lubricant
11. Conductive grease
12. White Lithium grease



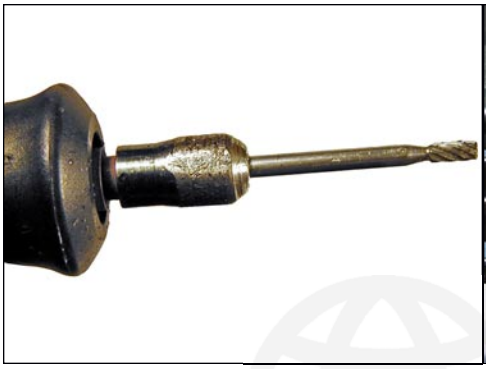
1. Remove the drum cover by prying the spring-loaded arm, and then carefully pry off the two metal bars out of their holders.

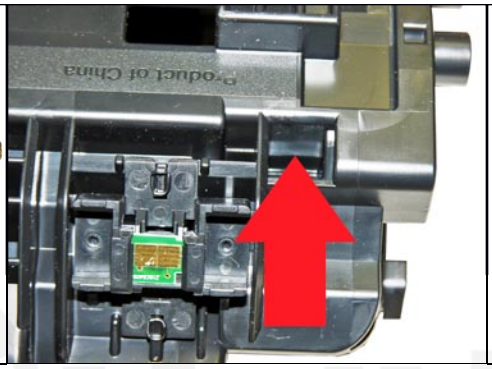
The cover must be in the closed position in order to pry off the spring-loaded arm. Be careful not to lose the spring!

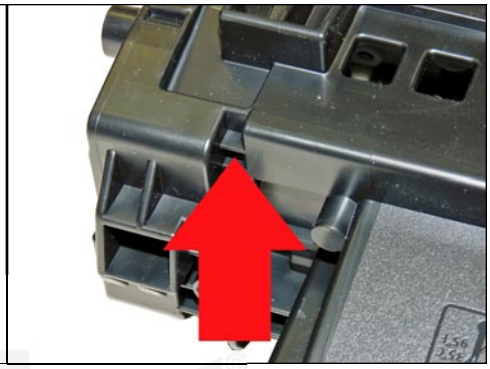
Both of the metal bars should be removed from the front, not the end.

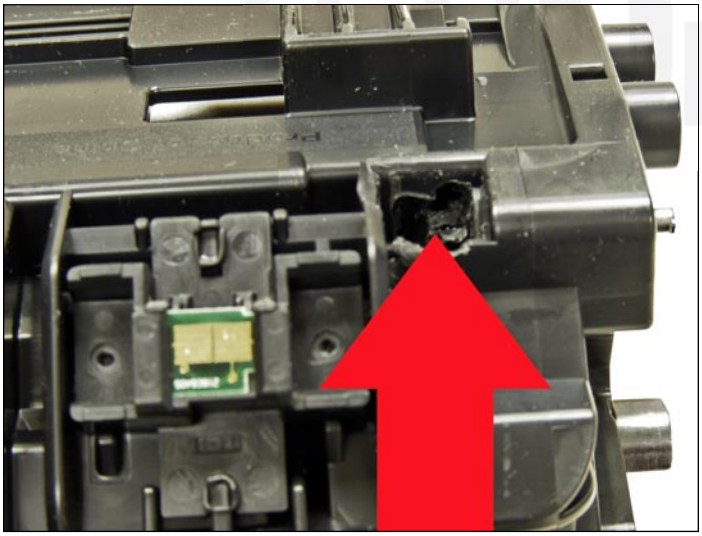


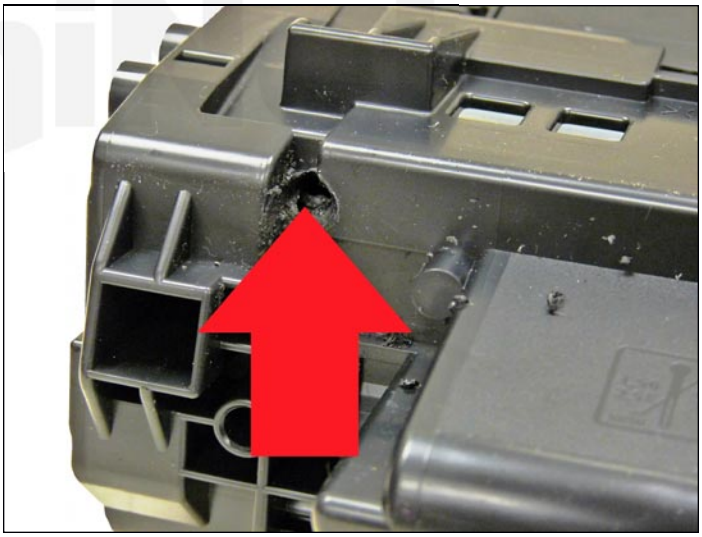
2. Note on each end of the cartridge there are small silver pins. To separate the two halves these pins must be removed. Like the 96A/10A cartridges, these pins cannot be pulled out, or pushed in from the outside of the cartridge (the pins have heads on them). The only way to disassemble the cartridge without damaging it is to push the pins out from the inside.





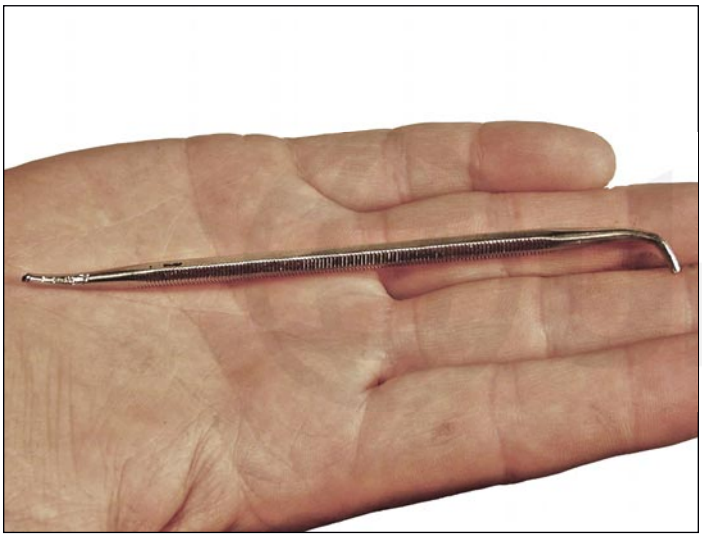


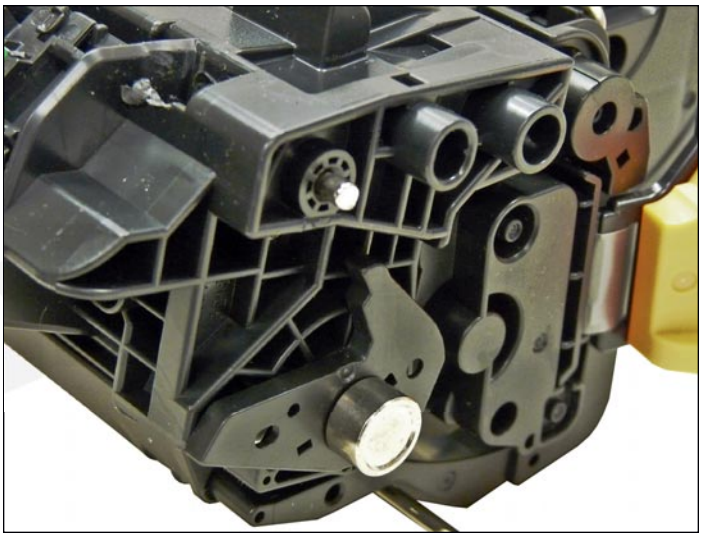


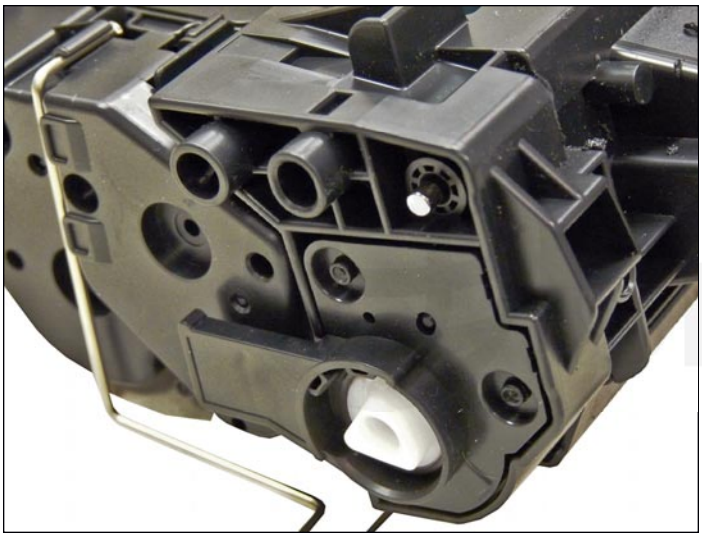


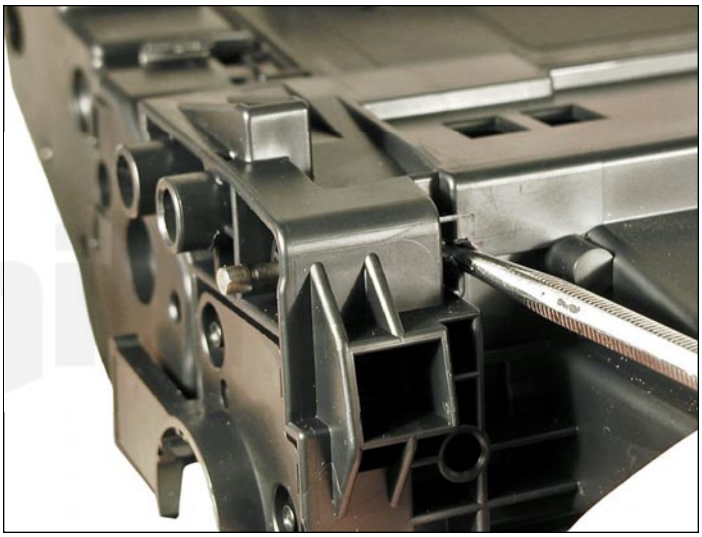
3. To remove the pins, two small holes must be cut.

Cut the holes with the Dremmel tool, and a side-cutting bit.



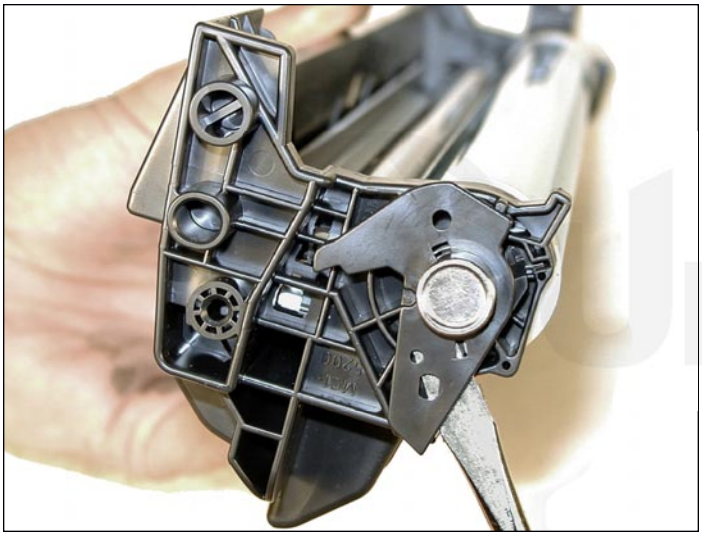






4. Push the pins out with either a jeweler's screwdriver, or a modified spring hook.

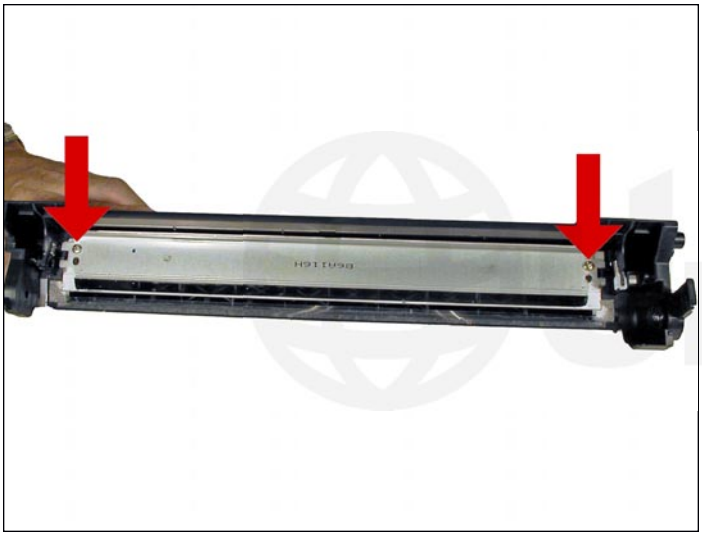
5. Separate the two halves.



6. On the waste section, take a common screwdriver and remove the metal axle pin/spring-loaded cover, located on the right side of the cartridge. This is the same type of drum axle pin that the 2400 series uses. It comes out easily enough, but be careful, as it seems somewhat fragile.

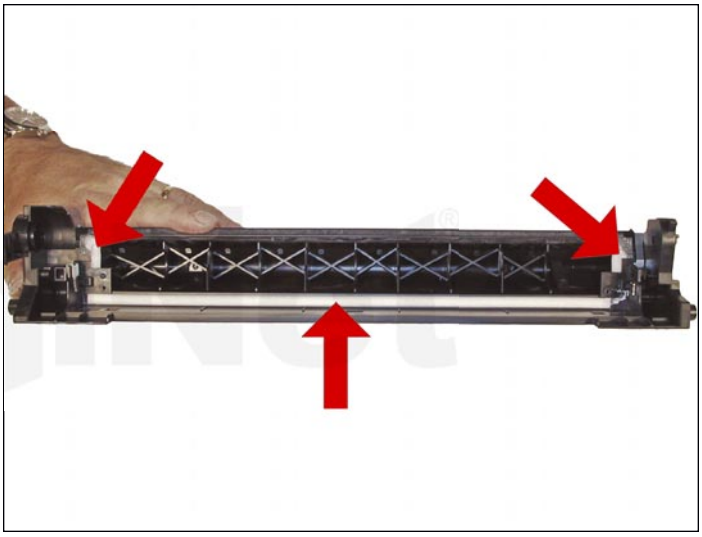
7. Remove the photoconductive drum.

8. Remove the primary charge roller (PCR), by prying it out of the clips on either end. Clean the PCR with your preferred cleaner and place the aside.

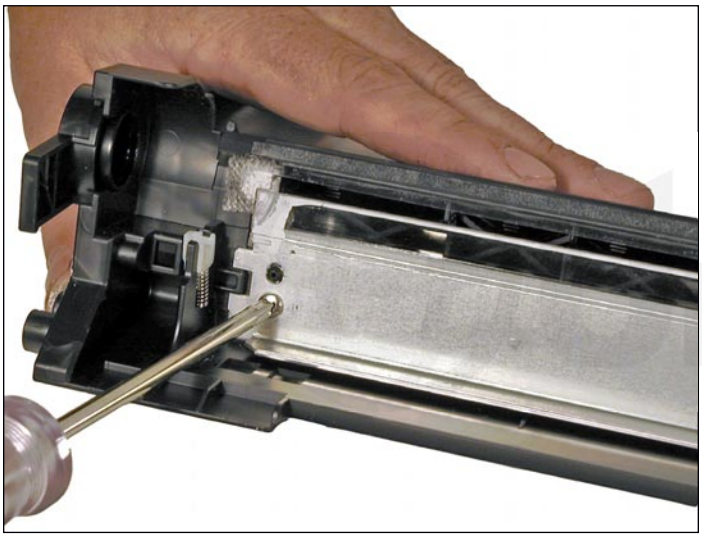


9. Remove the wiper blade and two screws.

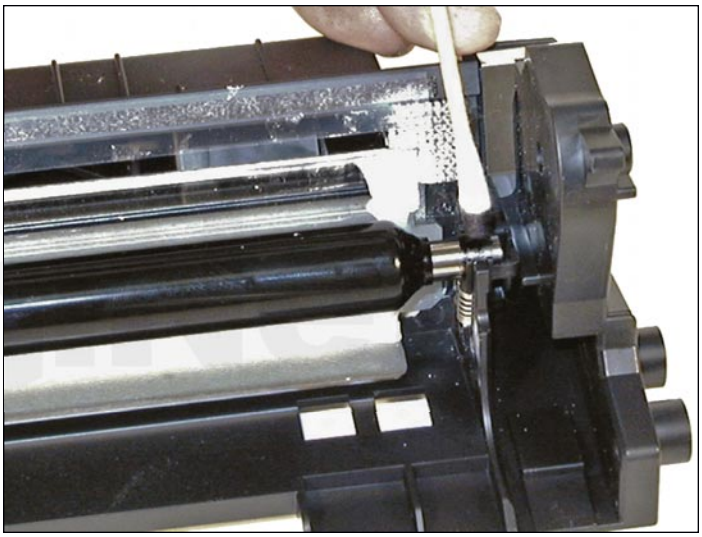
NOTE: Be very careful not to damage or distort the thin Mylar recovery blade next to the wiper blade. If this blade is bent or damaged in any way, it should be replaced.



10. Clean out any remaining waste toner. Make sure the foam seals under the wiper blade are clean and not damaged.



11. Due to the aggressive nature of the toner used in these cartridges, we recommend that the wiper blade be replaced each cycle. Lightly coat the new blade with your preferred lubricant. Replace the wiper blade and two screws into the cartridge.



12. Clean the two PCR holders, and place a small amount of conductive grease on the black PCR holder, install the PCR.

NOTE: If you are re-using the OEM drum, proceed on to step #13.

DRUM GEAR REPLACEMENT

If you are replacing the drum, the gears will need to be changed over from the OEM to the new.

There are two methods of removing the gears from OPC drums. The first and easiest method is to place the drum in a metal vice approximately 2" back from the gear, and slowly tighten the vice. The gear should pop out easily. This is the only method you can use on the OPC drums, which have a weighted slug in the center. If you use this method go on to Step #3 of this section.

The other method is as follows...

REQUIRED TOOLS AND MATERIALS

1. A 1/4" x 15" metal rod
2. A 1" x 15" wooden dowel
3. A tube of super glue
4. A small piece of Emory-cloth or sand paper

Step #1: Removal of the drive gear:
The drive gear is the gear that has no metal electrical contacts in it. These gears are usually larger than the contact gear.

A. Carefully insert the 1/4" metal rod into the center of the gear that has the contacts, or the contact gear.

B. Angle the rod so that the rod presses against the edge of the opposite gear. The rod should be touching both the inside of the OPC Drum and the edge of the gear.

C. Tap the end of the rod with a hammer, working the rod around the entire edge of the gear, until the gear comes loose.

NOTE: Gently heating the ends of the drum with a hair dryer or heat gun on low-heat, may cause the glue to soften and ease in the removal process. Just be careful not to use too much heat and melt the gear!

Step #2: Removal of the "contact" gear:
A. Insert the 1" wooden dowel into the gearless end of the drum.

B. Tap the dowel with a hammer until the gear comes loose.

Step #3: Remove any old adhesive from the gears, and straighten out any damage done to the contact gears' metal contacts:
Removing the adhesive can be done with a small sharp common screwdriver. The glue comes off easily.

Step #4: Install the Gears on the new drum:
A. Inspect the metal contacts on the contact gear. Make sure that the contacts will make proper contact with the inside of the OPC drum.

B. Locate the side of the drum on which you are going to place the contact gear.
On some OPC drums, this is critical - see individual instructions for more information.

C. Lightly sand the INSIDE of the OPC where the metal parts of the contact gear will meet.
This will insure a good electrical contact.

D. "Dry fit" the contact gear in the OPC drum and check for a good contact with an Ohmmeter. The reading should be a direct short, or no more than 1 or 2 Ohms.

NOTE: When checking the contact, place one lead on the drum axle contact and the other on the edge of the drum. This way, you will not have to pierce the coating that is on the OPC surface. A Radio Shack store carries inexpensive Ohmmeters for less than $10.00 USD, and the sales people will normally be glad to show you how to use it.

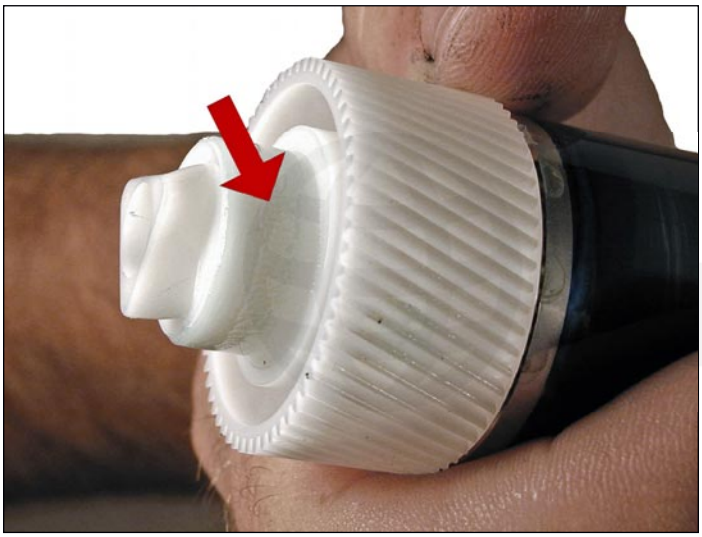
E. Using the super glue, place a few (3-4) small drops of glue strategically around the inside edge of the OPC drum. Make sure you leave a blank area for the metal contacts!

F. Insert the contact gear.

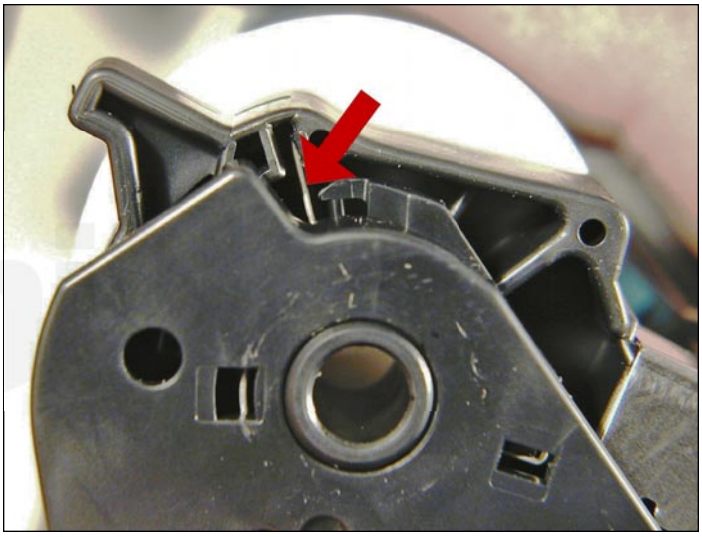
G. Check for continuity again with the Ohmmeter.

H. Repeat steps E and F for the drive gear.

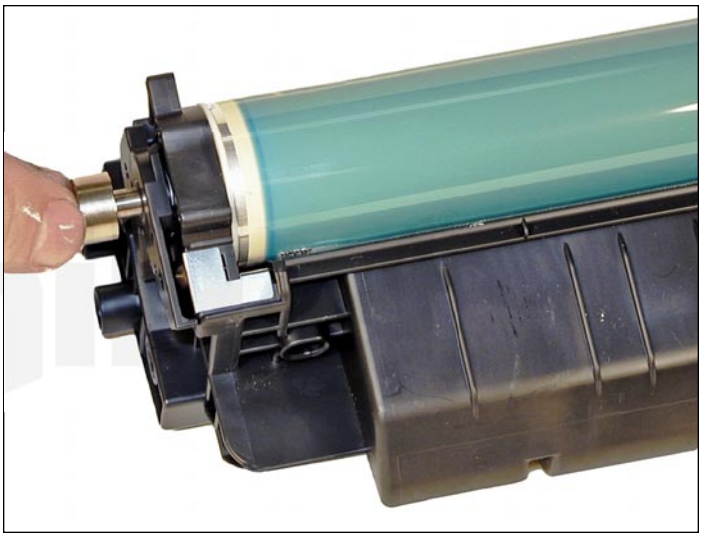
NOTE: Be very careful not to place the metal contacts in direct contact with the glue, as this will interfere with the proper grounding of the drum, and the cartridge will not print properly, (solid black pages). It is also very important to NOT put any glue on the gear, as the chances of it dripping out onto the drum surface and ruining it are high. Placing the glue inside the drum tube works much better.



13. If you are re-using the drum, check to make sure the grease on the drum drive gear and hub is clean. If not, remove it and replace. White lithium grease can be used here. Install the drum.

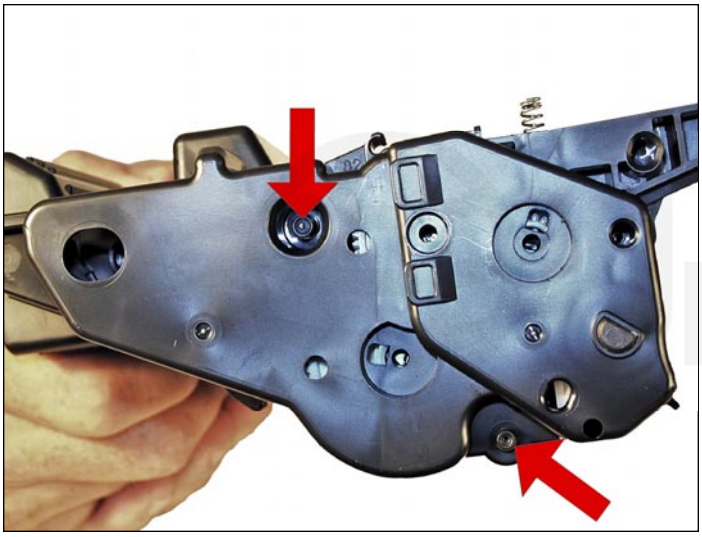


14. Install the spring in the holder as shown, install on the cartridge and set the tail of the spring so it drops into its slot.

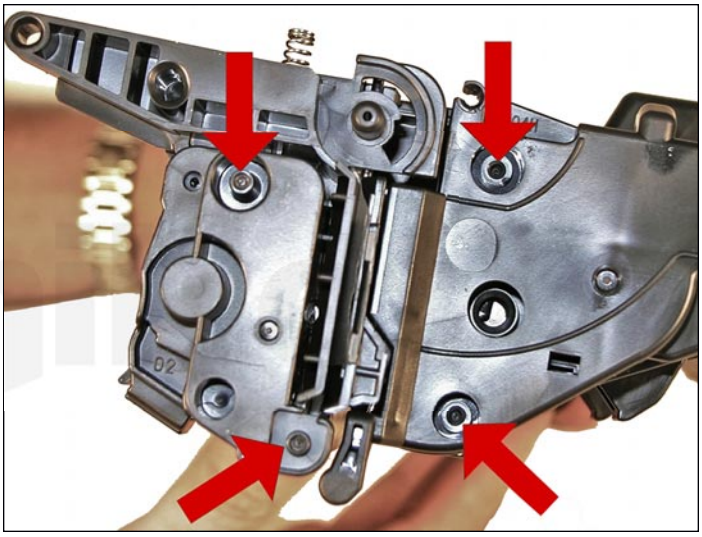


15. Replace the conductive grease on the end of the drum axle tip, and install it on the cartridge.

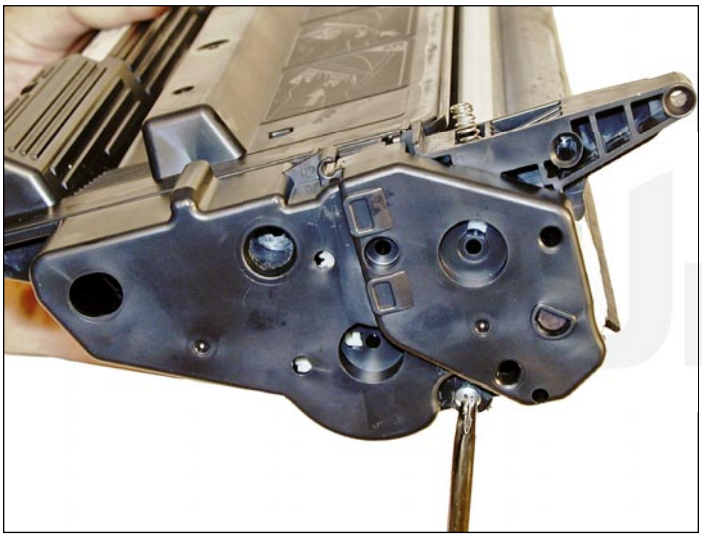
16. Place the waste chamber aside.



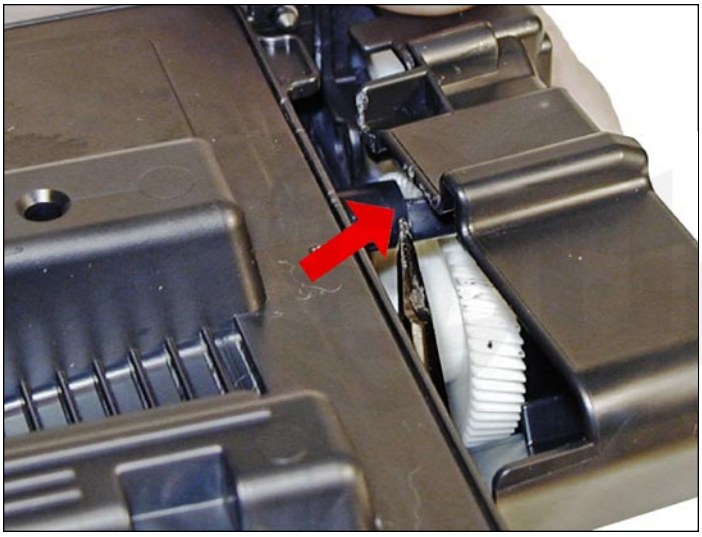
17. On the supply section, the end caps are held in place by a series of plastic rivets. They need to be cut off in order to gain access to the hopper. Only the gear side needs to have the rivets cut.

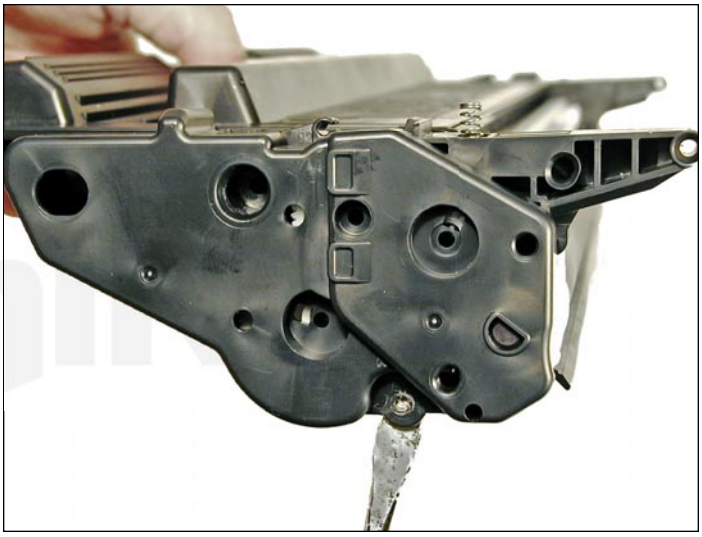


Here, you see there are more rivets that would need to be removed, and in our preliminary tests, proper re-alignment of the end caps on that side is difficult to do.

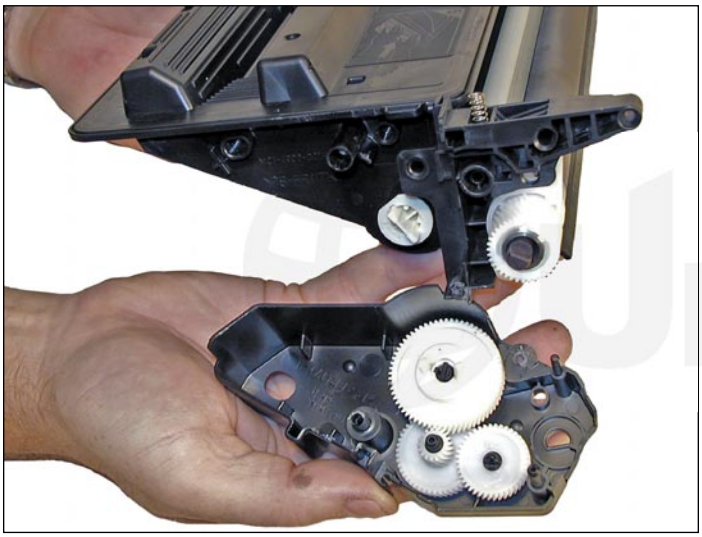


18. On the gear side only, take the Xacto knife with the chisel blade, and cut the small plastic rivet off. Insert a small self-tapping screw to keep the end cap alignment properly set. Remove the screw.





19. Take the Dremmel tool again and cut away the recessed plastic rivet. Do not grind through the end cap! To separate the end cap from the cartridge, take a common screwdriver, pry up the end cap and slide the screwdriver against the shoulder. Press the screwdriver against the shoulder until it snaps free. Do the same for the small rivet.



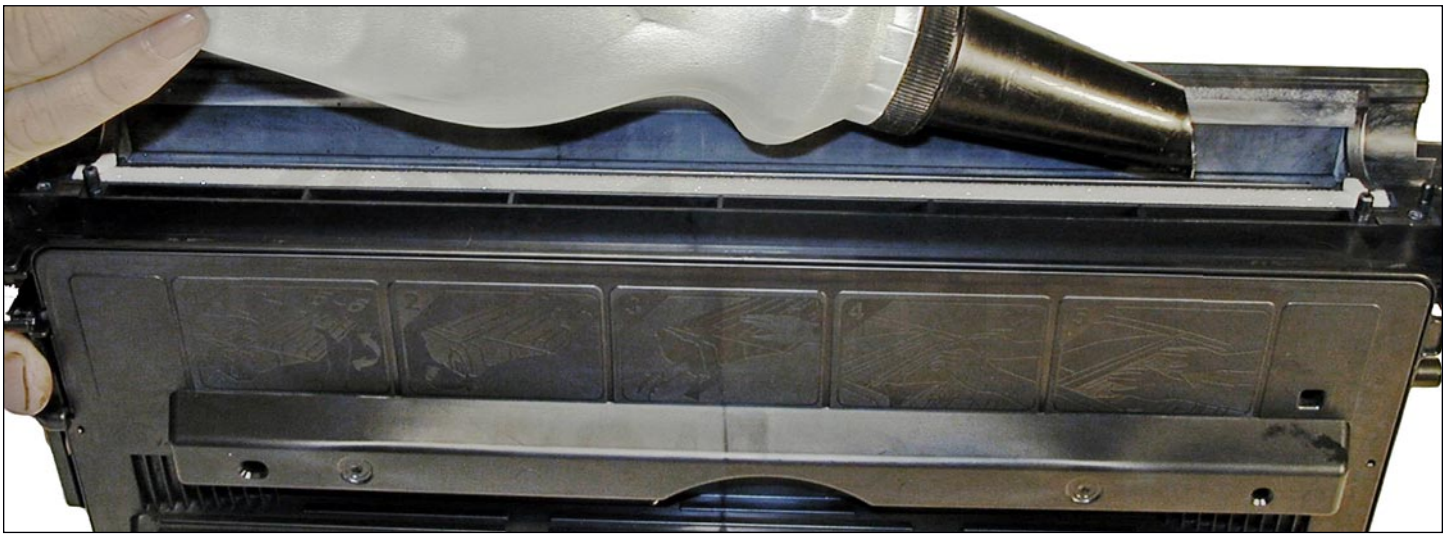
20. Remove the end cap.

Note that the gears stay with it.

21. Remove the magnetic roller assembly from the cartridge.

22. Remove the two screws and doctor blade.

23. Clean out any remaining toner.



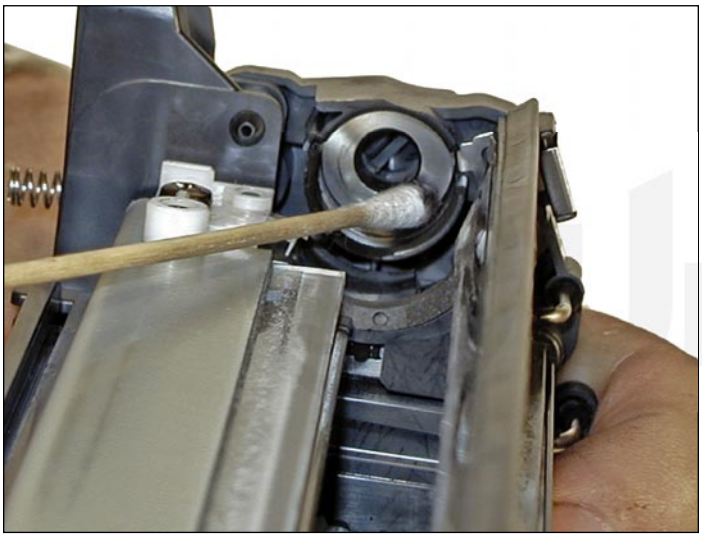
24. There is no fill hole in these cartridges so it must be filled through the doctor blade slot.

Fill the cartridge with toner for use in the M712 cartridge.

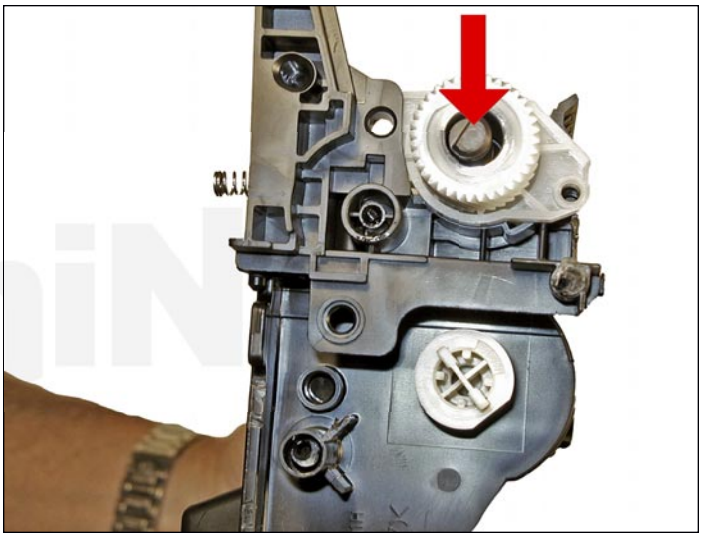
25. If you want to seal the toner hopper, use your preferred sealing method and install the seal now.

26. Make sure the doctor blade seals are clean.

Install the doctor blade and two screws.

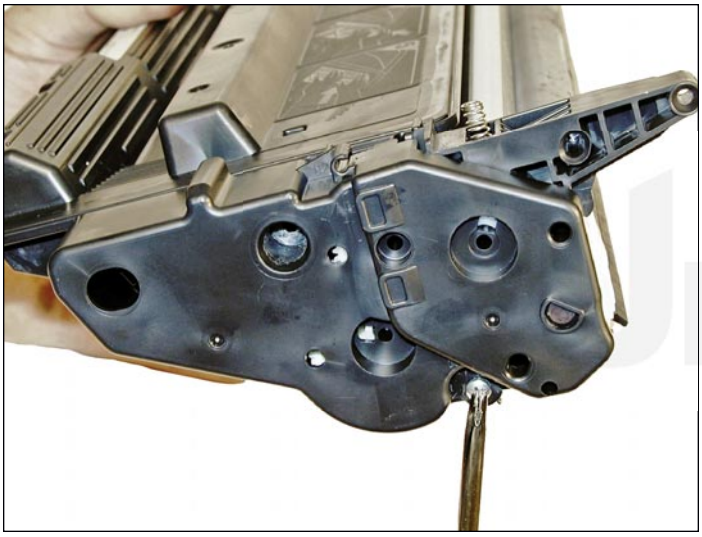


27. Clean the magnetic roller contact plate on the end cap that is still on the cartridge. Replace the conductive grease.



28. Clean the magnetic roller sleeve with a dedicated magnetic roller cleaner.

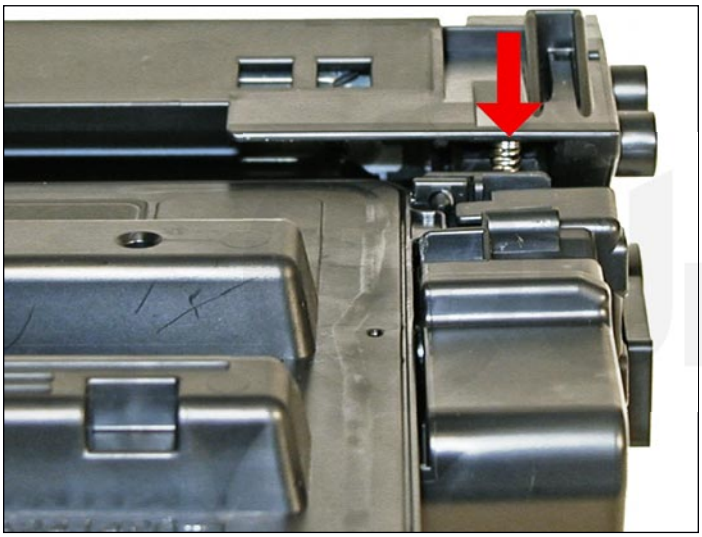
29. Install the magnetic roller. Turn the stationary magnet so that the keyed end will fit into the end cap.

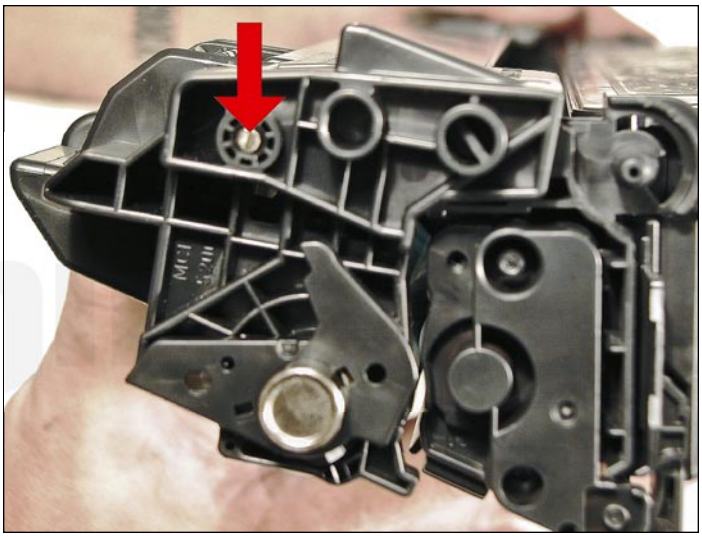


30. Install the end cap. Hold it in place with the small self-tapping screw used earlier.

Drill a hole in the recessed rivet, and install a screw that is approximately 1/2” long.

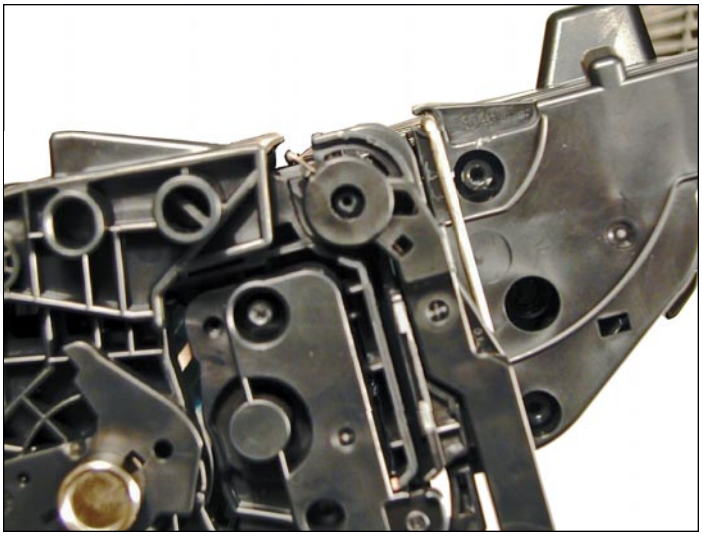
Make sure the screw size matches the drill size. We like to use a #29 drill bit and #8 self-tapping screws.





31. Place the two halves together.

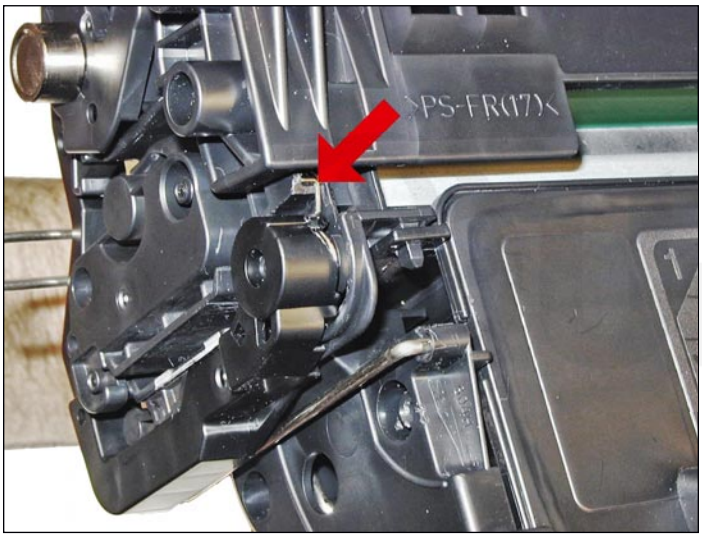
Make sure the springs are set, and install the two pins.



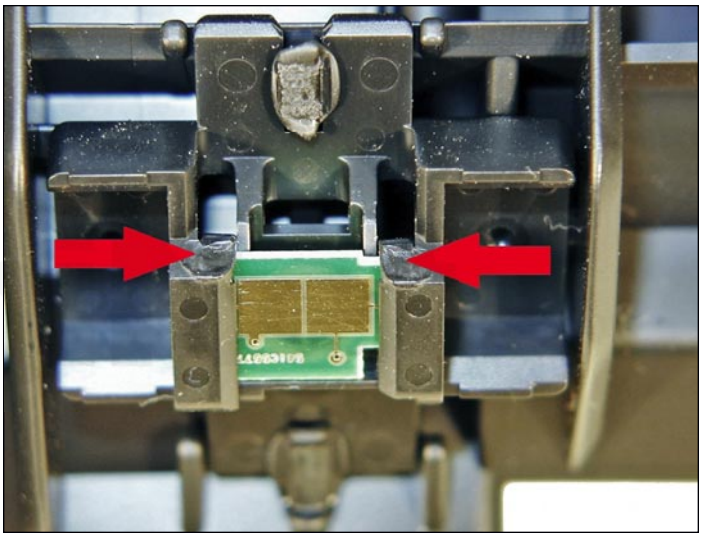
32. Install the spring in the drum cover arm as shown.

Install the metal bar into the hole and slot.

Install the arm.



33. Release the tail of the spring so that the cover closes.



34. Cut the small melted plastic tabs off both sides of the chip. Remove the old chip and replace with a new one. If the chip does not fit tightly you can place a drop of hot glue on each corner to hold it tight.

PRINTING TEST PAGES

There are a number of test pages that can be run from the menu:

1. Administration Menu Map
2. Configuration Page
3. Supplies Status Page
4. Current Settings Page
5. PCL or PS Font List

1. PRESS the HOME button to open the menus.
2. OPEN the Administration menu.
3. OPEN the Reports menu.
4. SELECT the name of the report you wish to print and scroll up to the Print option.
5. PRESS OK.

CARTRIDGE TROUBLESHOOTING

Repetitive defect chart:

94 mm:	**Drum**
58 mm:	**Magnetic roller**
44 mm:	**PCR**

CONVERTING AN HP M5025 TO AN M712 CARTRIDGE

CARTRIDGE CORE CONVERSION

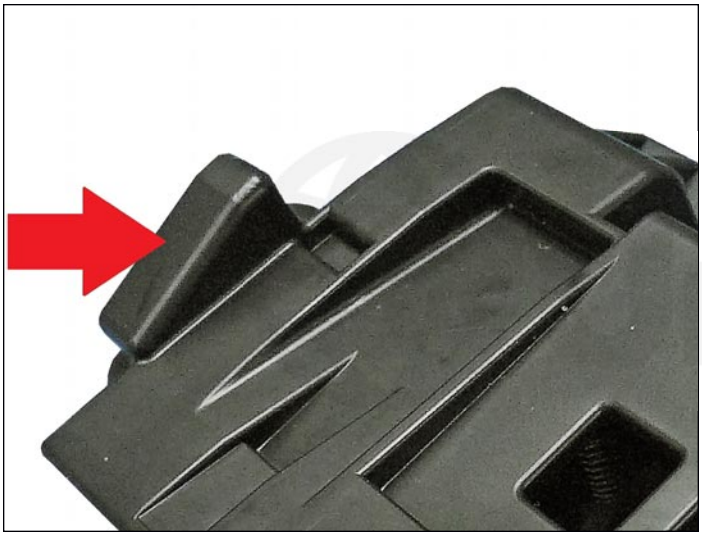
Cartridge conversion is a fairly simple process. The conversion process entails physically modifying the cartridge by removing some plastic ribs and changing over a drum plate. The process is similar whether converting an HP 5200 or M5025 core, but the actual pieces cut are different. The conversion drum bearing plate is the same for both. The HP 5200 cores also need a trigger arm. Both parts come with the conversion kit. Please read through the instructions below and make sure proper safety procedures are in place and followed.

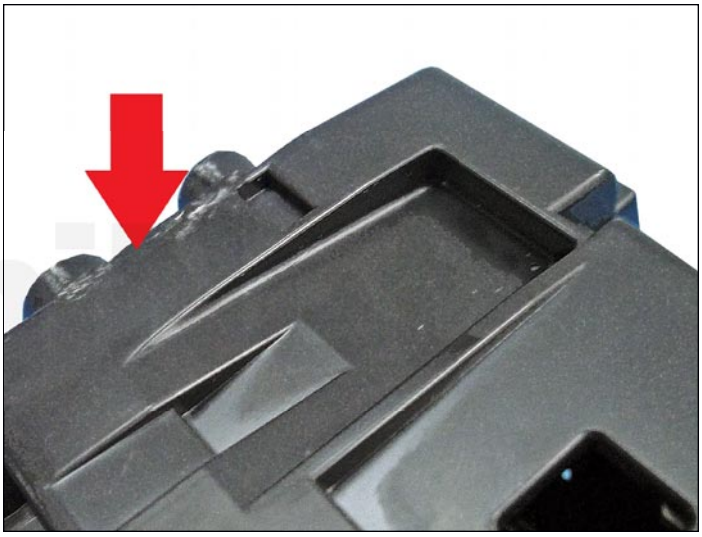
REQUIRED SUPPLIES

1. Conversion bearing plate

REQUIRED TOOLS

1. Dremel type tool or sturdy razor knife
2. Good metric ruler

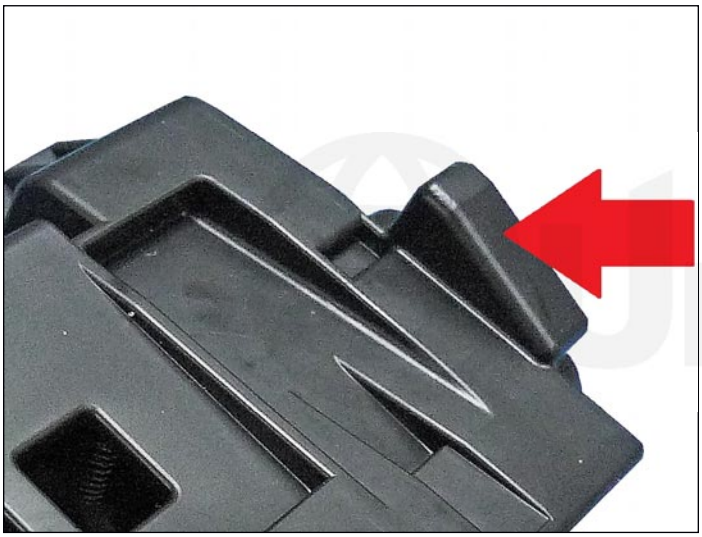


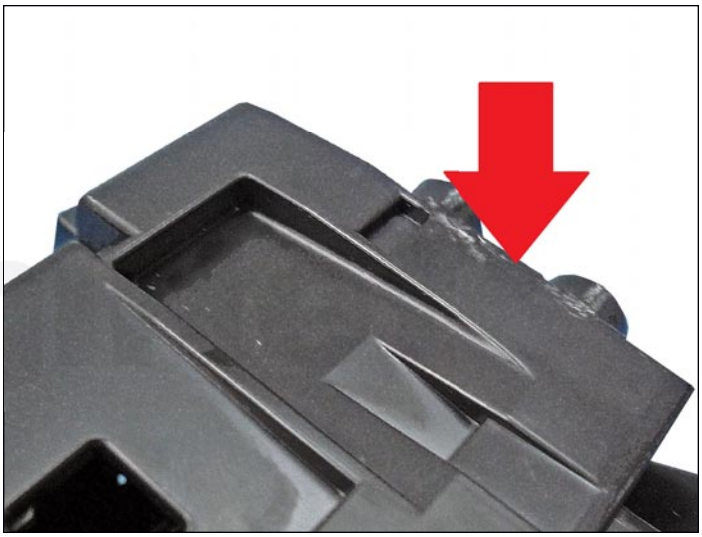


1. Slice off the plastic on the left side as shown.

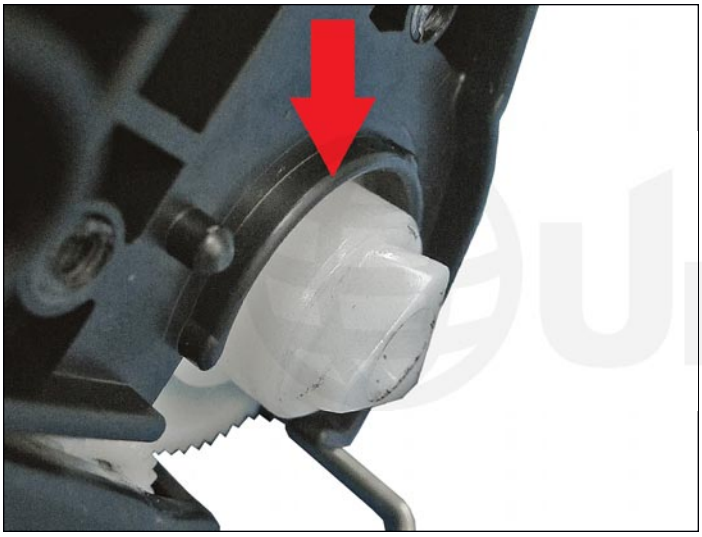
NOTE: You can use a Dremel type tool or a sturdy razor knife for this process.

Just be sure to always cut away from yourself and wear protection on your hands!





2. Slice off the plastic on the right side as shown.



3. Cut down the height of the drum bearing-plate rib (indicated by the red arrow) from 2.5mm to 1.7mm.

4. Replace the drum bearing-plate with the new conversion plate.

5. The trigger arm (shown) is not needed when converting an M5025 core, only when converting a 5200 core (see below).

6. Follow the remanufacturing instructions above.

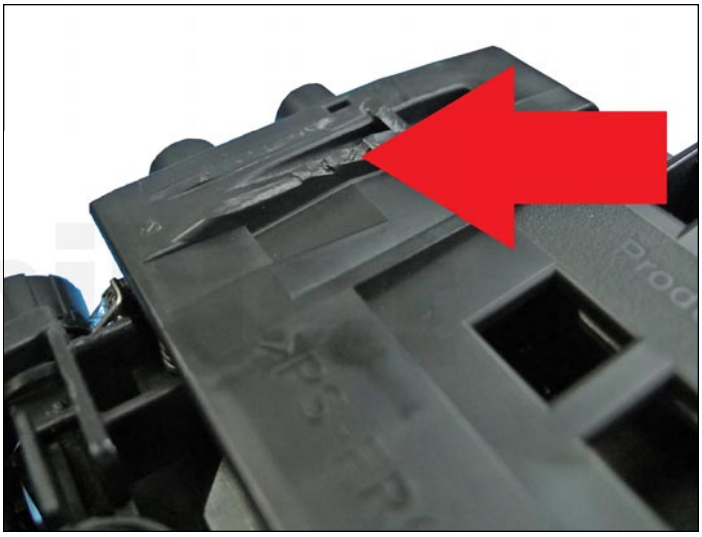
CONVERTING AN HP 5200 TO AN M712 CARTRIDGE

REQUIRED SUPPLIES

1. Conversion bearing plate

REQUIRED TOOLS

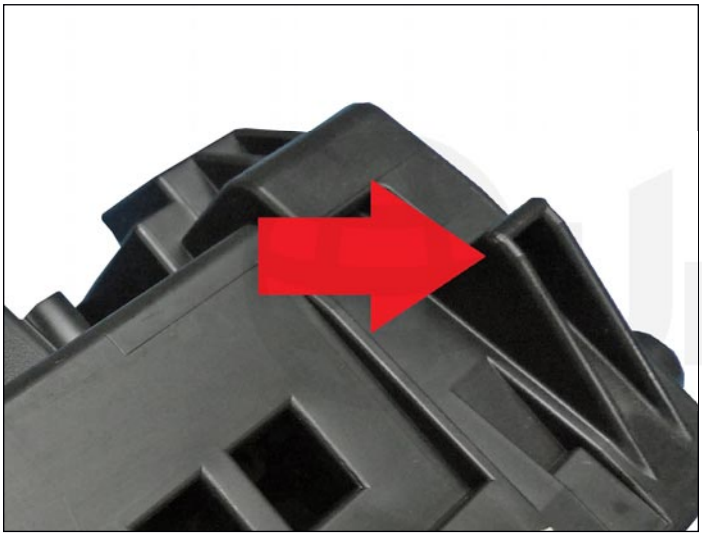
1. Dremel type tool or sturdy razor knife
2. Good metric ruler

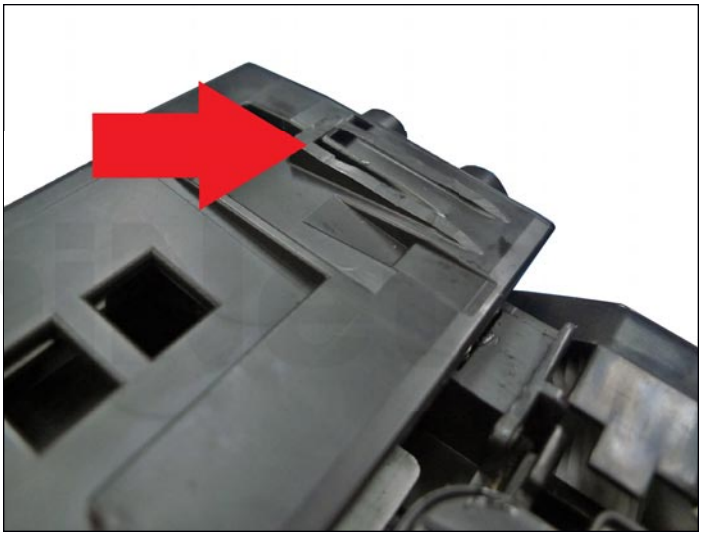


1. Slice off the plastic on the left side as shown.

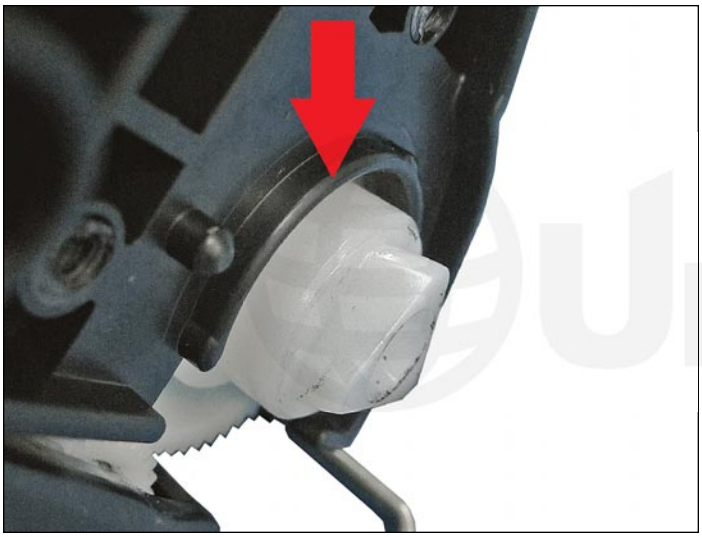
NOTE: You can use a Dremel type tool or a sturdy razor knife for this process.

Just be sure to always cut away from yourself and wear protection on your hands!



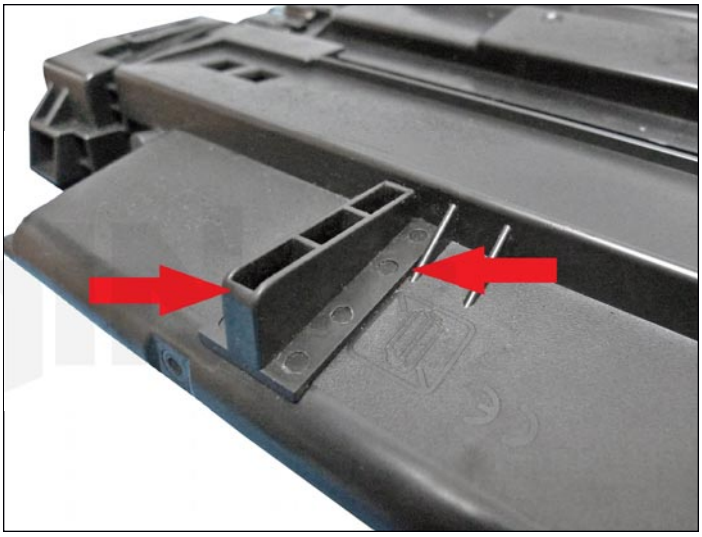


2. Slice off the plastic on the right side as shown.



3. Cut down the height of the drum bearing plate rib (shown by the red arrow) from 2.5mm to 1.7mm.

4. Replace the drum bearing plate with the new conversion plate.



5. Install the trigger arm that came with the conversion kit so that the arm and not the base plate is 58mm from the top edge of the waste chamber (next to the small rib as shown).

This arm is present on the M5025 and M712 cores, but not the 5200.

6. Follow the remanufacturing instructions above.