SAMSUNG® ML-4510 (MLT-R307)
DRUM CARTRIDGE REMANUFACTURING INSTRUCTIONS

SAMSUNG MLT-R307 DRUM CARTRIDGE

REMANUFACTURING THE SAMSUNG ML-4510 DRUM CARTRIDGE

By Mike Josiah and the Technical Staff at UniNet

First released in September 2011, the Samsung ML-4510 series of printers are based on a 45-50ppm (depending on the model), dual-component (toner and developer), 600dpi engine (1200 x 1200 enhanced). The first page out is rated at under seven seconds, and the monthly duty cycle is up to 200,000 pages.

The drum cartridges do not have a drum cover, and come new with a piece of heavy paper with foam glued to it, taped around the cartridge.

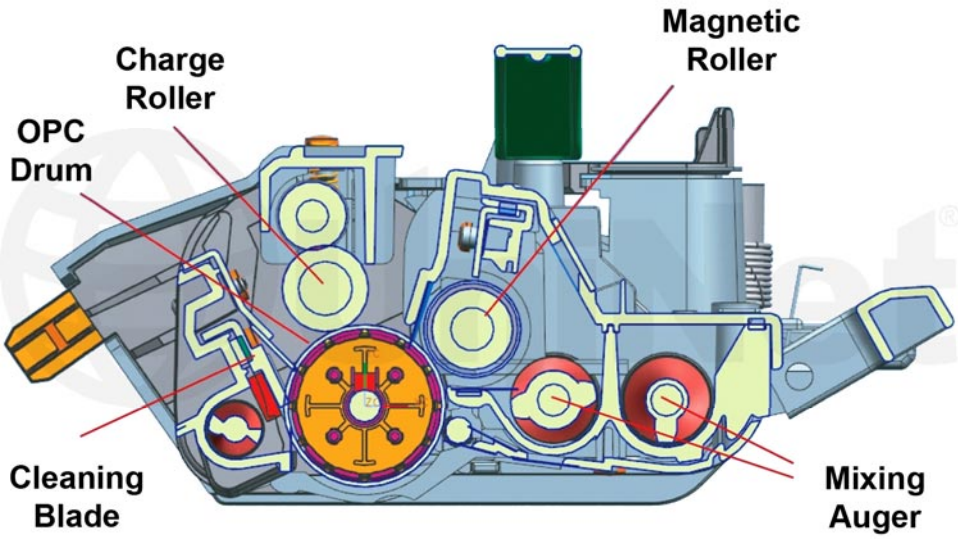
The toner cartridges will be covered in a separate instruction, but there are three different yields available. There are low yield (7,000 pages), high yield (15,000 pages) and extra high yield (20,000 pages) cartridges available. Each version of cartridge has its own specific chip, and there are also different regions.

The chip for the drum unit is a worldwide version, meaning it works in all regions, but some soldering is required. The stated yield for the drum cartridge is 60,000 pages.

The printers that use this engine are listed below...

MLT-R307 (60,000 PAGES)
Samsung ML-4510ND
Samsung ML-4512ND
Samsung ML-5010ND
Samsung ML-5012ND
Samsung ML-5015ND
Samsung ML-5017ND

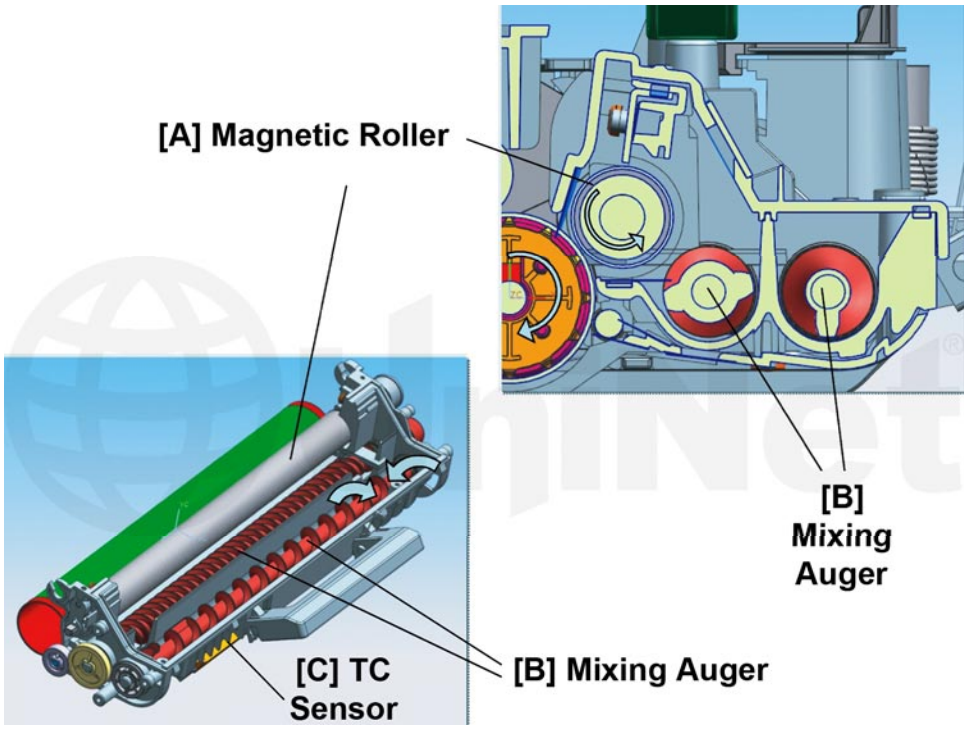
The drum cartridge MLT-R307 (60,000 pages) is listed for USD$166.99*
***As of May 1, 2014. Pricing in U.S. American Dollars.**



CARTRIDGE PRINTING THEORY

This imaging system consists of a toner unit and a drum unit that also contains the developer and magnetic roller. Since this system is different from what we have covered recently, we will cover the printing theory briefly here.

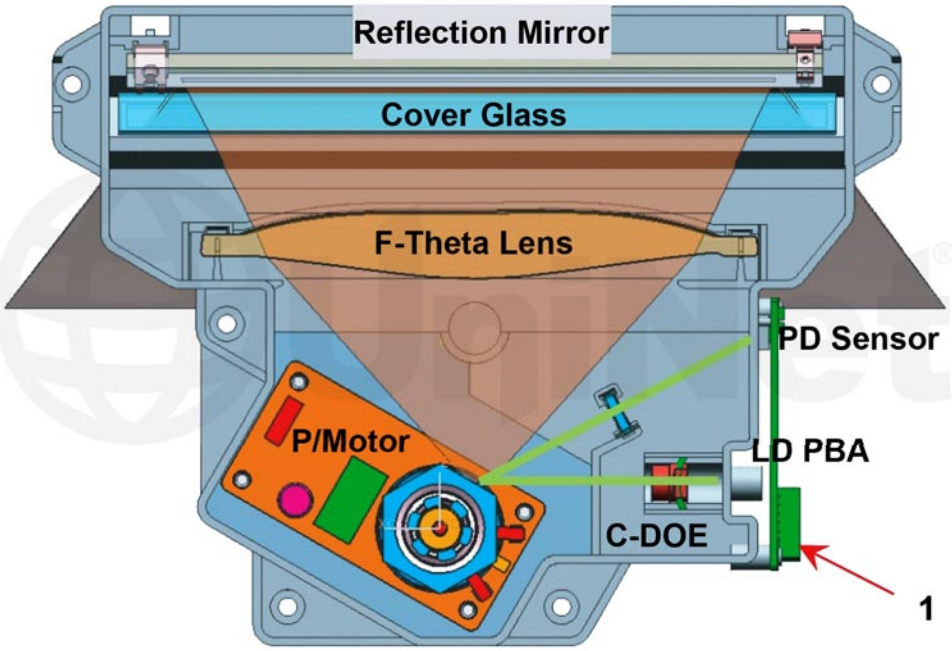
The drum unit consists of the drum, wiper blade, waste chamber, PCR, magnetic roller, doctor blade, two mixing augers, the developer, and a toner concentration sensor.



The toner is fed from the toner cartridge into the developer section and is fed to the magnetic roller by two mixing augers.

The sensor monitors the amount of toner in the system and causes the developer to be circulated back, to pick up more toner when needed. This can happen during print jobs or calibrations.

From here, the printer works pretty much the same as mono-component printers. The PCR charges the OPC drum and the laser writes the image to the charged section of the drum. The toner is attracted to the image on the drum. The transfer roller then pulls the image off the drum and onto the page. The fuser melts the toner into the page. As this is happening, the wiper blade is physically cleaning off the drum, and the PCR is putting an AC voltage on the drum to erase any residual charges left by the prior print job.



Shown here is a nice image of a laser scanner assembly. The laser is fired from a fixed position (1) onto a rotating mirror (scanner), which re-directs the laser beam onto a fixed mirror so that it can cover the width of a page (in case you have ever wondered how that works).

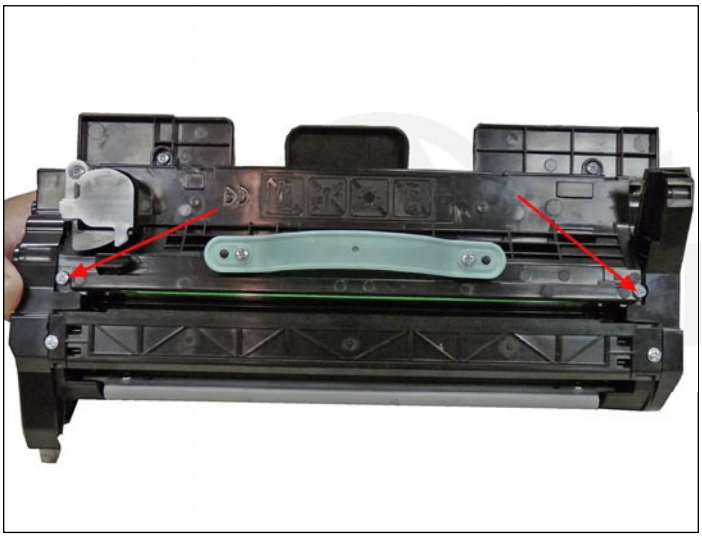
REQUIRED TOOLS

1. Toner approved vacuum
2. A small common screwdriver
3. A Phillips head screwdriver
4. Needle nose pliers
5. Soldering iron
6. Wire cutters
7. Wire strippers

REQUIRED SUPPLIES

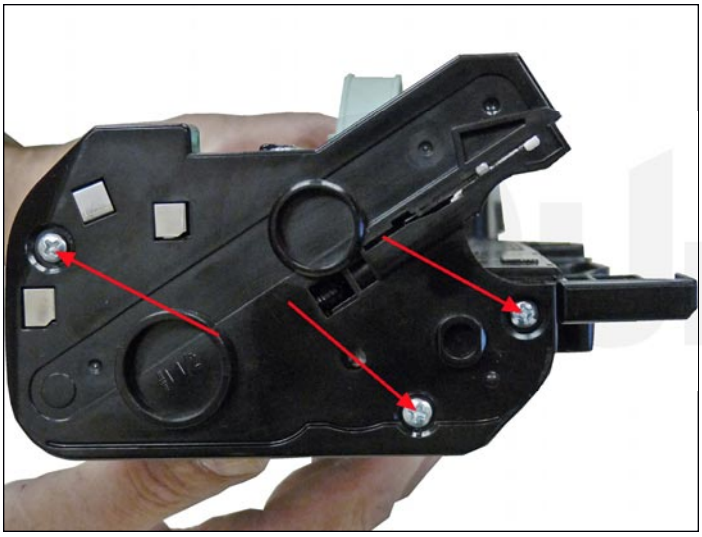
1. Developer for use in the Samsung MLT-R307 drum unit
2. Replacement chip
3. Replacement drum
4. Conductive grease
5. Drum lubricating powder
6. Rosin core solder
7. Liquid flux
8. Cotton swabs
9. Alcohol (to clean the chip board after soldering)

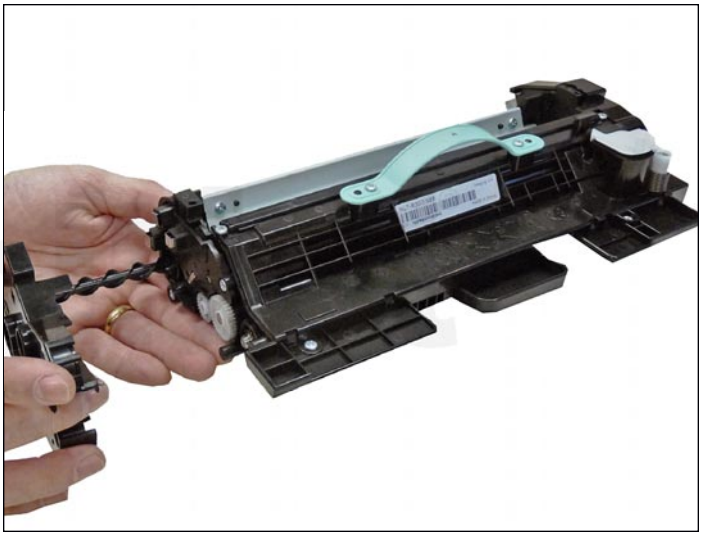
NOTE: All the screws that will be removed in this cartridge are the same size, so they can all be grouped in one place if desired.



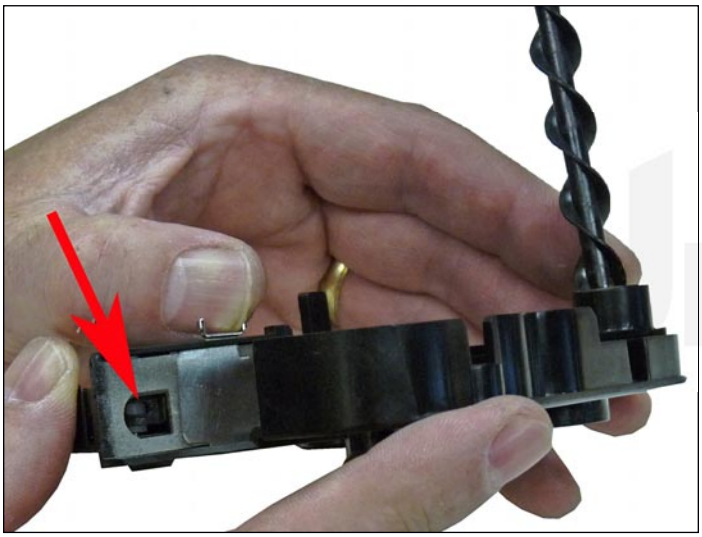
1. Place the cartridge with the handle on top.

Remove the two screws and the PCR assembly.

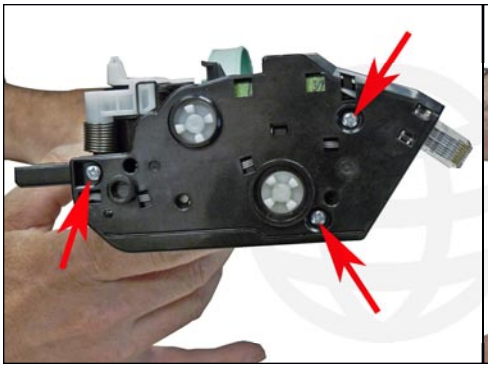


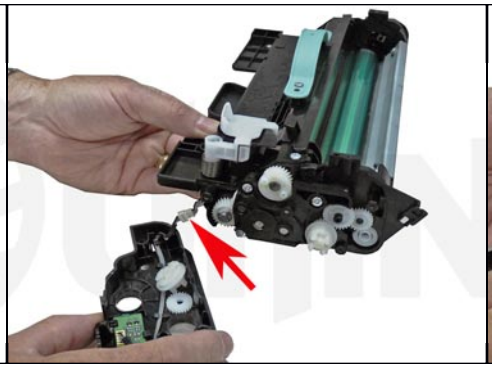


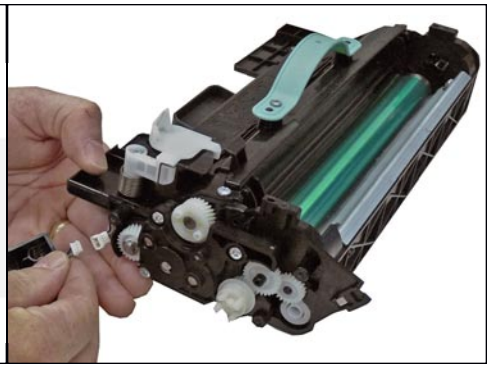
2. On the right (contact) side, remove the three screws. Gently pry off the end cap. The long auger will come off with the end cap. This will be messy, and toner will get all over... Vacuum the auger, and the toner auger port to minimize the mess.



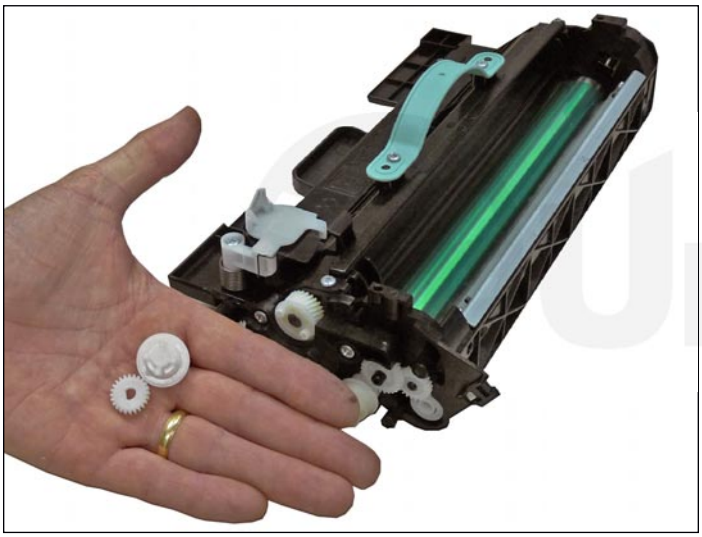
3. Slide the cover open on the end cap and clean out the auger system.



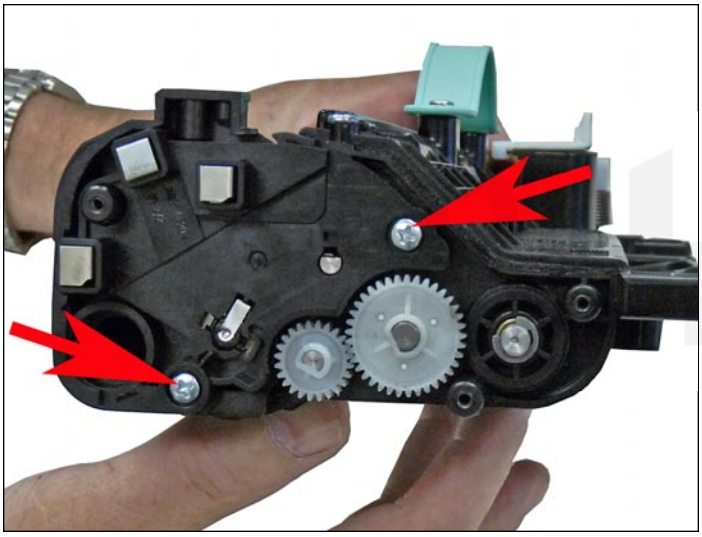


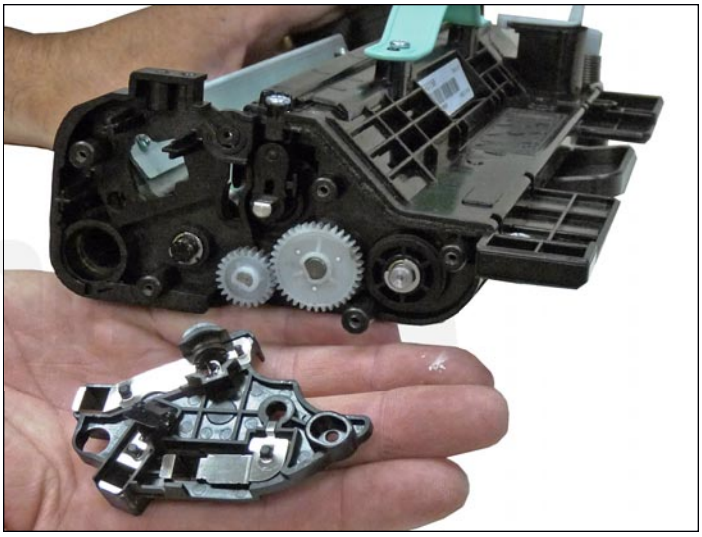


4. On the opposite side of the cartridge (gear side), remove the three screws on the end cap. Gently pry off the end cap. There is a small electrical connector that needs to be separated in order to completely remove the end cap. Separate the connectors.

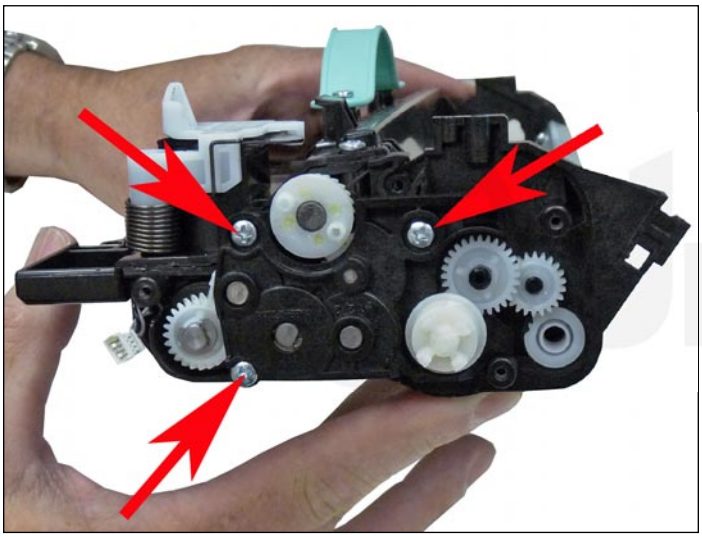


5. Remove the floating drive gear and auger gear so they do not get lost.

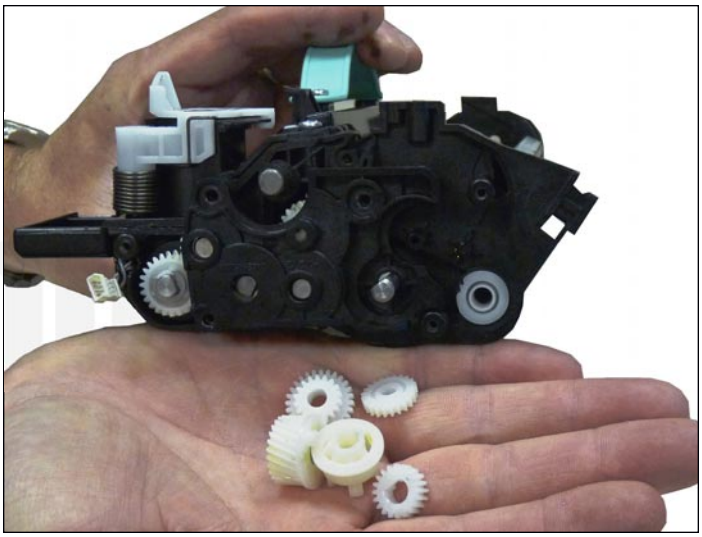




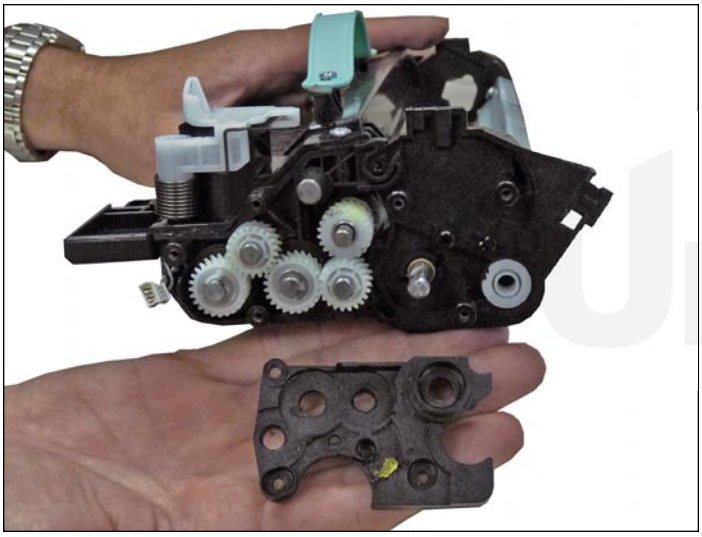
6. On the contact side, remove the two screws and inner end cap.



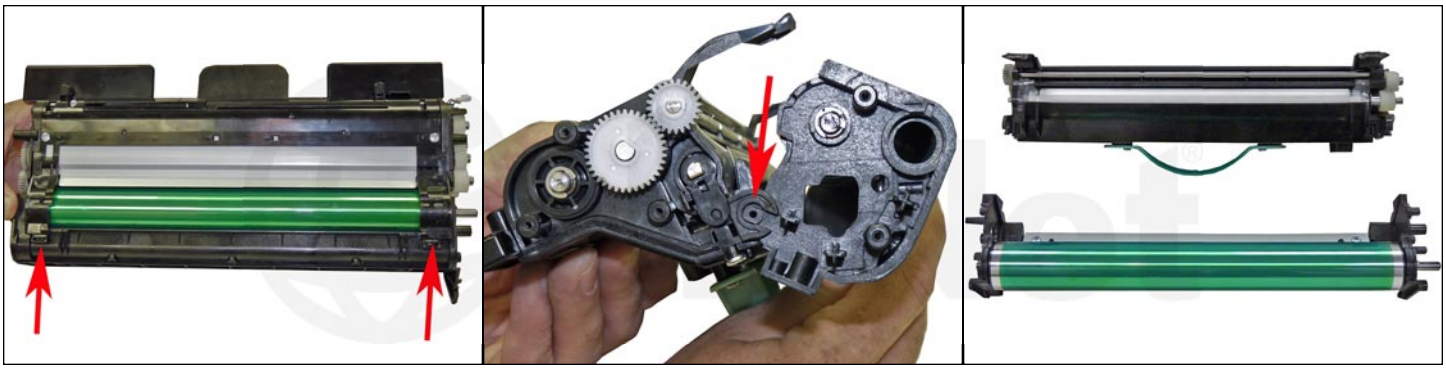
7. On the gear side, remove the three screws on the inner end cap.



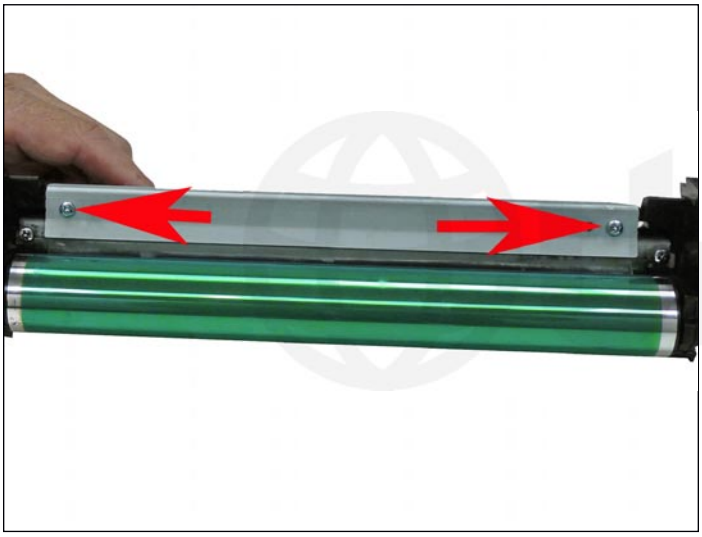
8. Remove the four-point drive gear and the remaining five gears as shown.

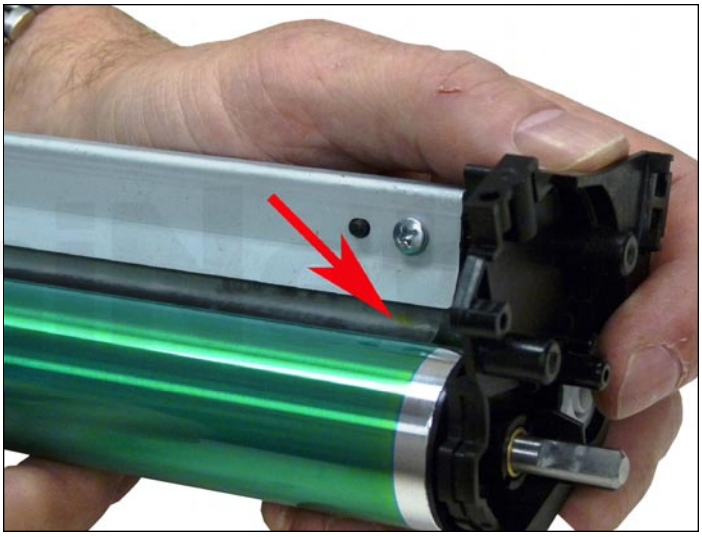


9. Remove the inner end cap.



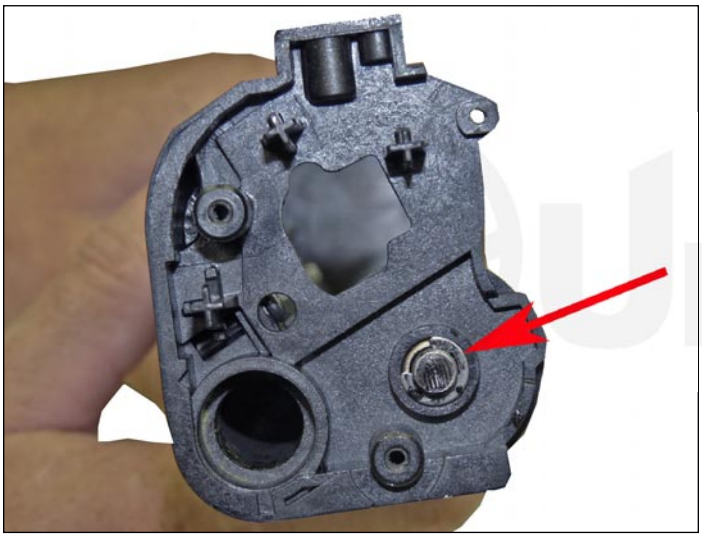
10. Turn the cartridge over and press in on the bottom two tabs, turn up the drum section so the keyed tabs align with their slots and remove the drum section.



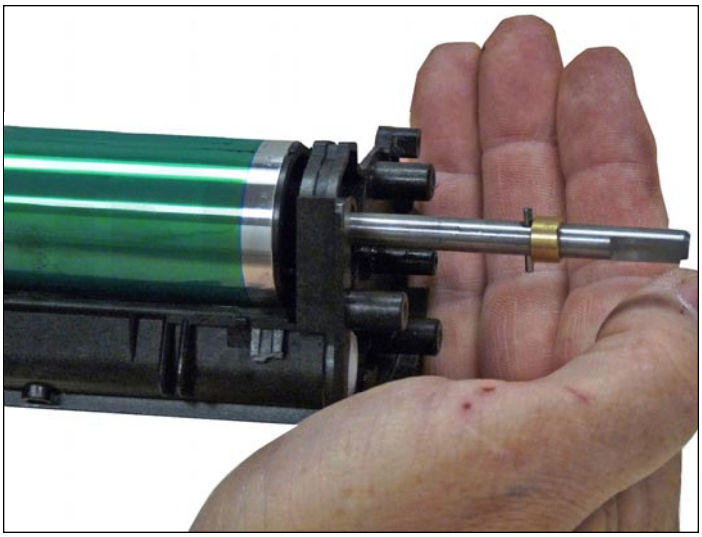


11. One the drum section, remove the two screws and dust blade.

Note how the blade is actually flipped up, this is the correct position.

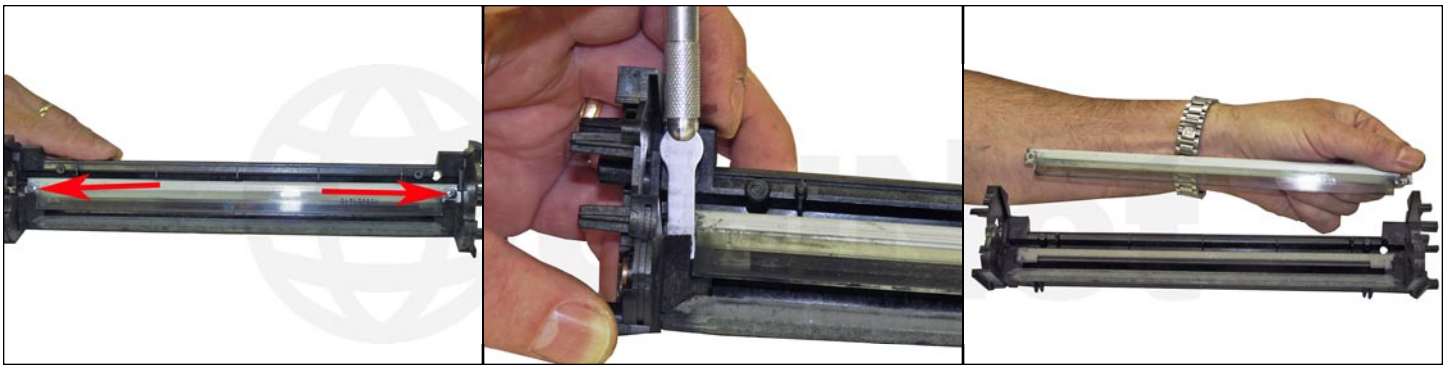


12. Remove the “E” ring on the drum axle shaft.

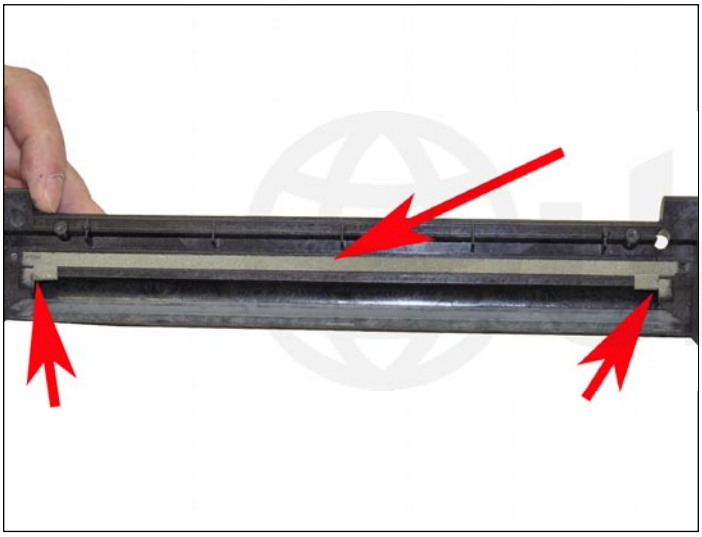


13. Pull out the drum axle shaft from the opposite side, and pull the roll pin from the shaft with a pair of pliers. Slide the brass bushing off the axle.

14. Remove the drum from the waste chamber and pull the axle out from the "E" ring section.

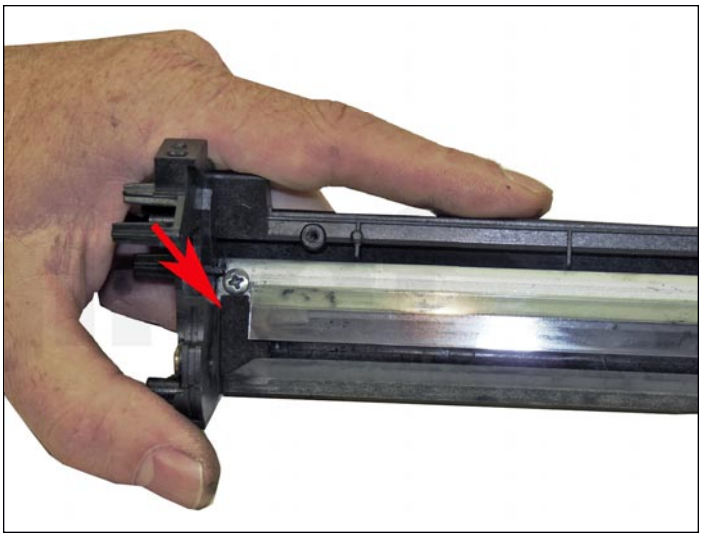


15. Remove the two screws from the wiper blade. Take a razor blade and carefully slice off the sealing felt from each corner of the blade. Remove the felt from the adhesive side so it can be reused. Remove the wiper blade.



16. Clean out any remaining toner from the waste chamber.

Make sure the foam seals are clean.

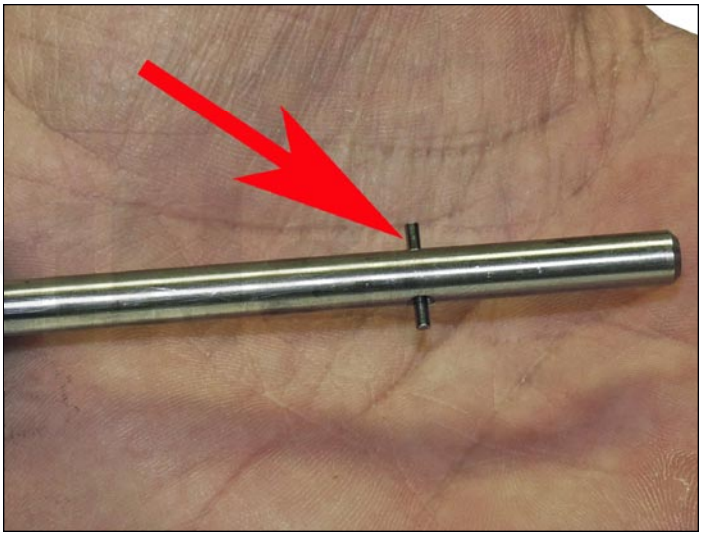


17. Replace the wiper blade and two screws.

Make sure the felt seals adhere to the wiper blade.

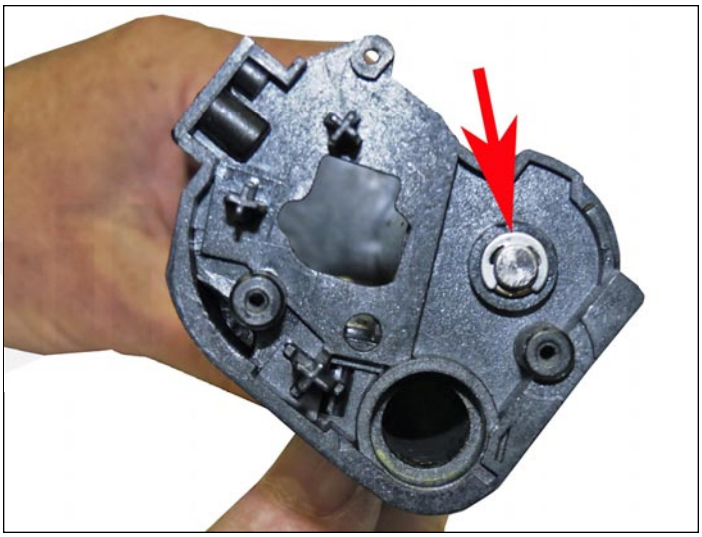
If they are not adhering properly, use a small amount of silicon adhesive (caulk) or double-sided tape to hold them in place.

18. Insert the non-keyed end of the drum axle shaft into the contact (keyed side) hub on the drum.



19. Insert the roll pin into the drum axle shaft.

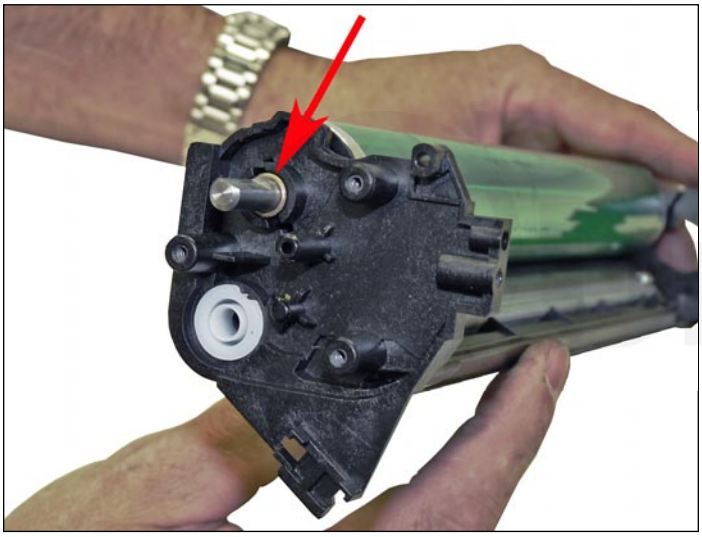
Make sure it's centered.



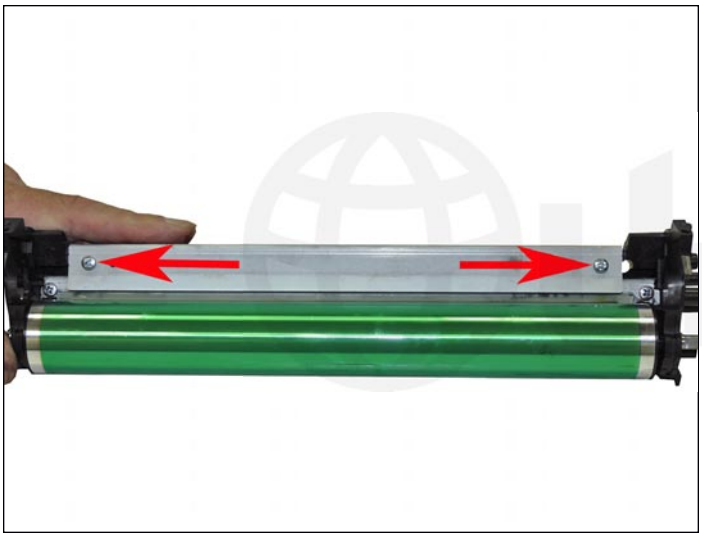
20. Align the roll pin with the slot in the cartridge wall.

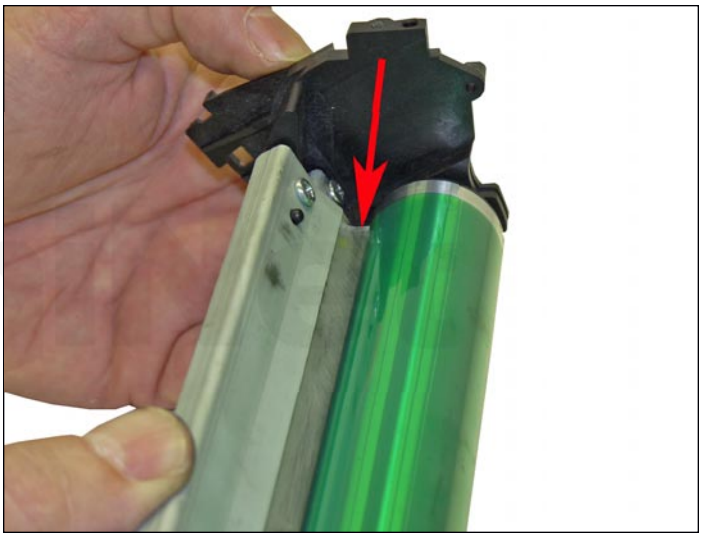
Install the drum and press the drum axle shaft through the opposite side bushing.

Install the “E” ring.



21. Install the brass bushing into the keyed end of the drum.

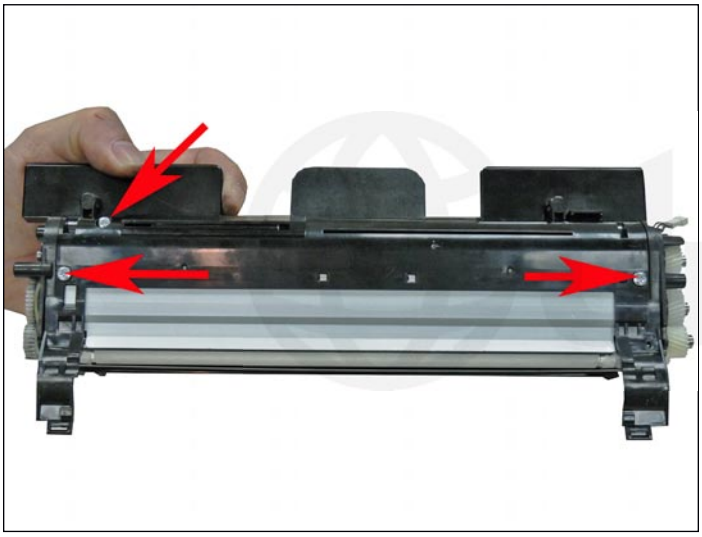




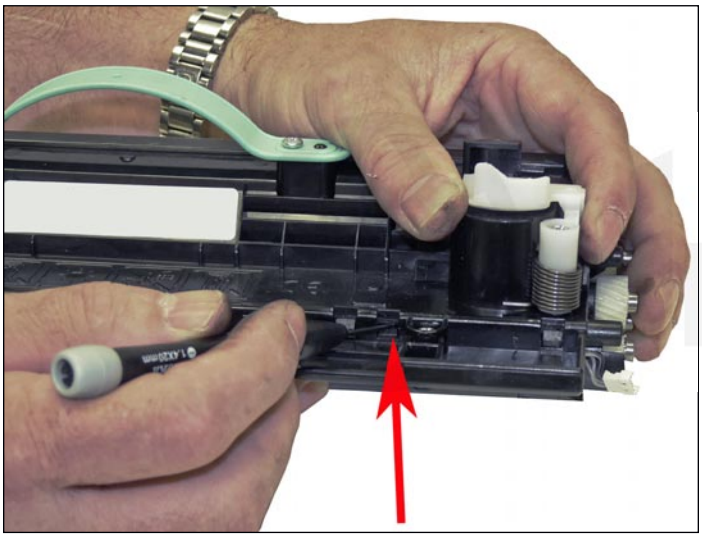
22. Install the dust blade and two screws.

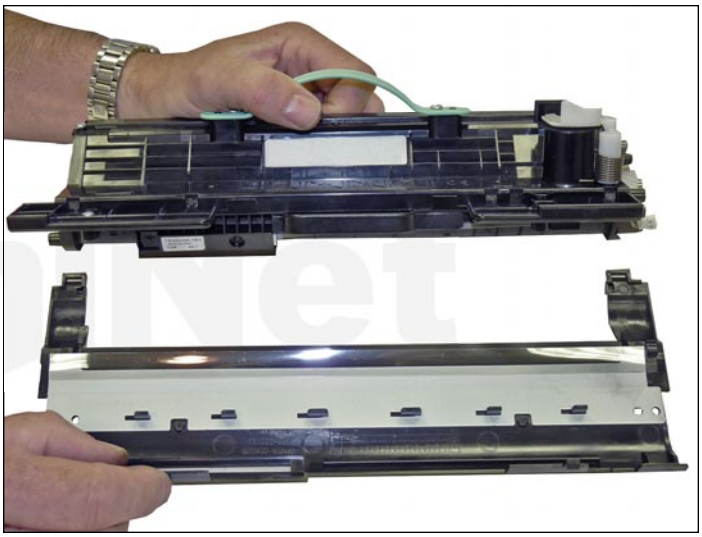
Make sure the blade is flipped up!

This acts as a dust retainer.

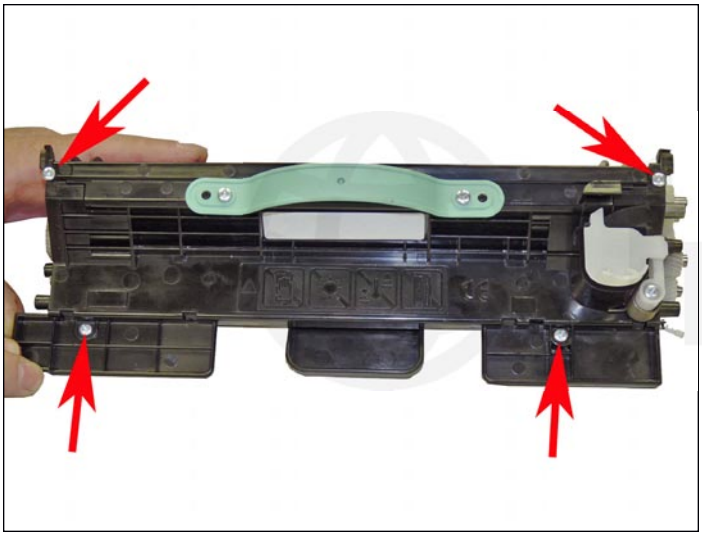


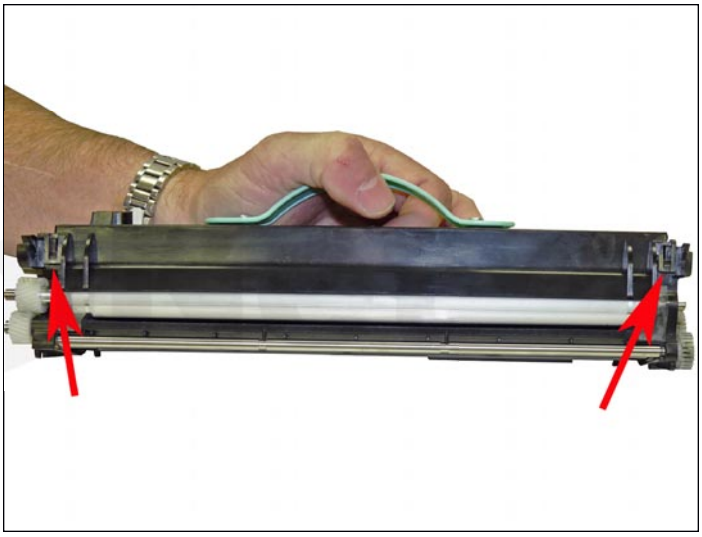
23. On the supply hopper, remove the three screws on the bottom cover.



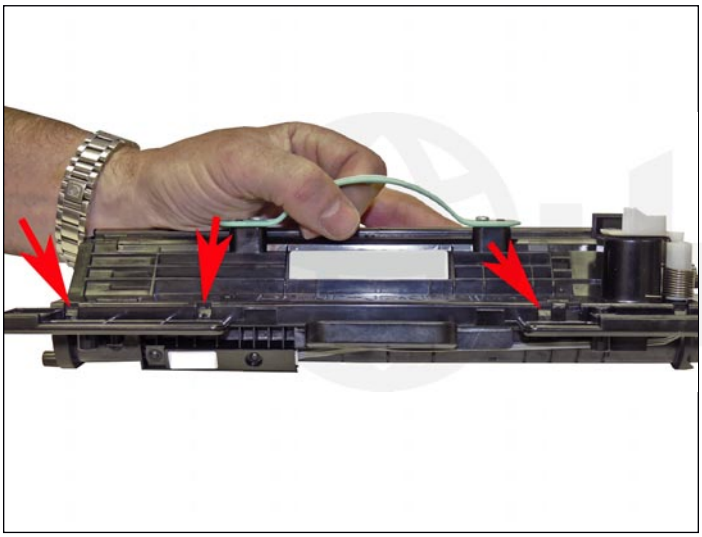


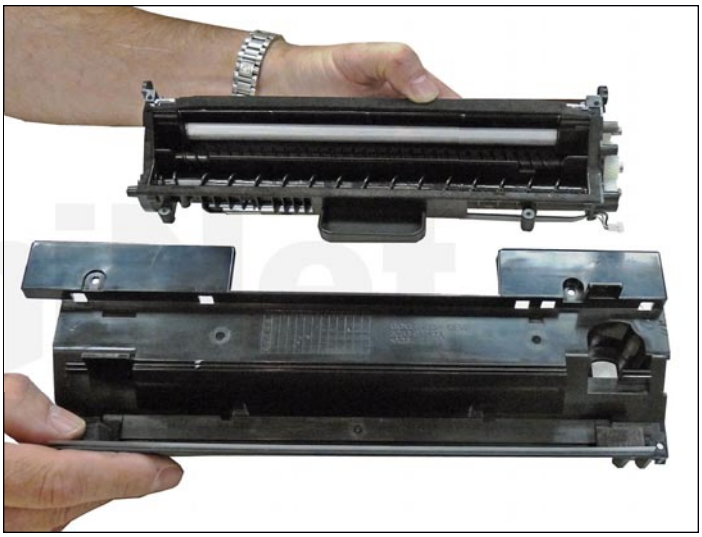
24. Press in on the tab and remove the bottom cover.





25. On the top of the chamber, remove the four screws and carefully pry up the top two tabs on the top cover.

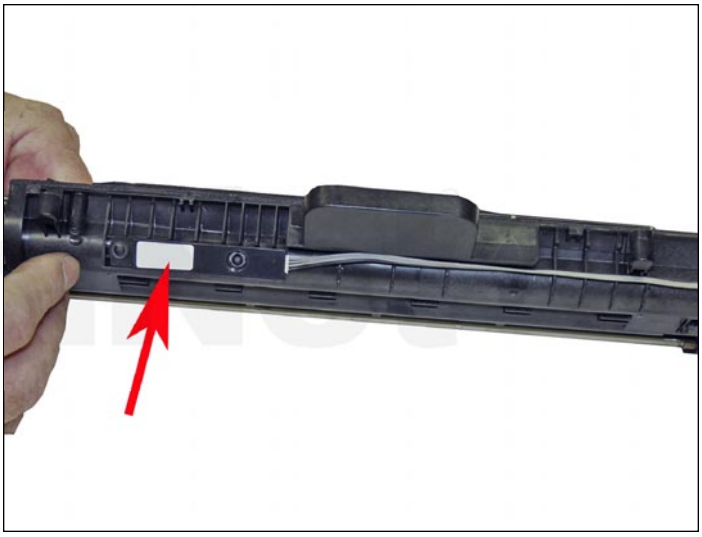




26. Pry up the three tabs on the back of the top cover

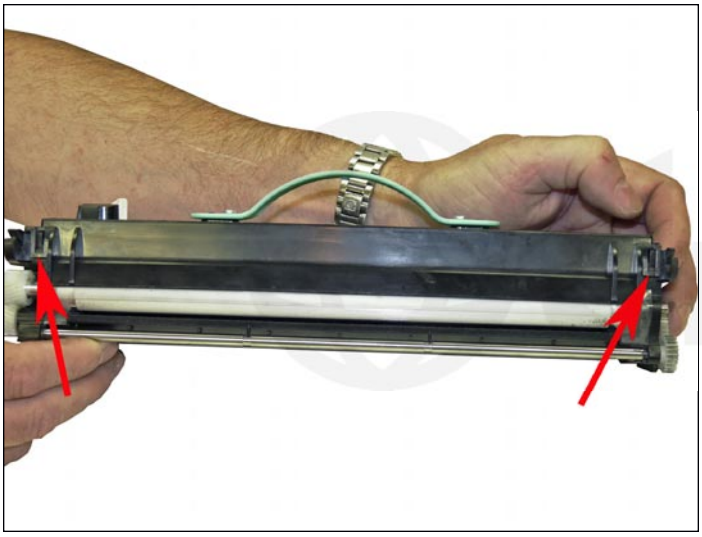
Pry the cover up as you press in on the tabs.

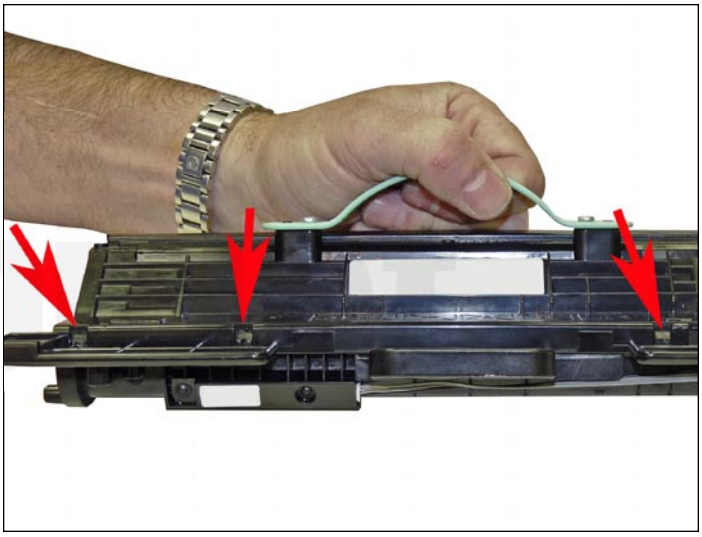
Remove the cover. Some tabs may stick!



27. Remove all the old developer. Be very careful when cleaning this chamber of the old developer. The toner mixture sensor is mounted to the hopper and in low humidity conditions. Excess static charges can destroy the sensor.

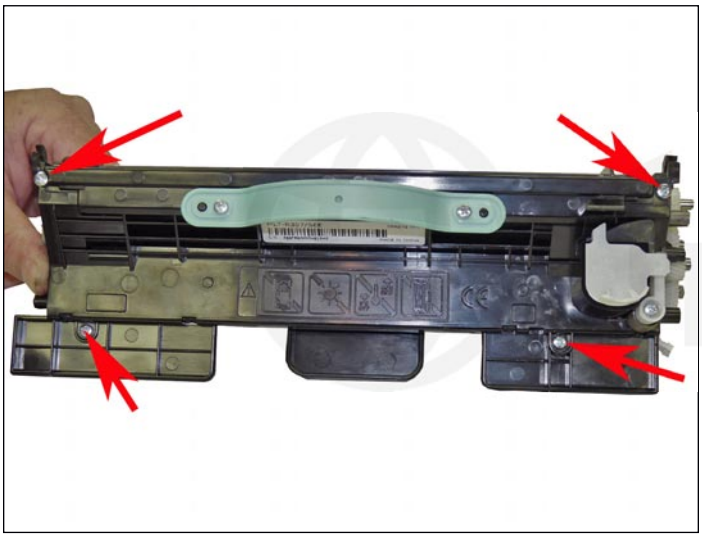
28. Pour in the new developer.



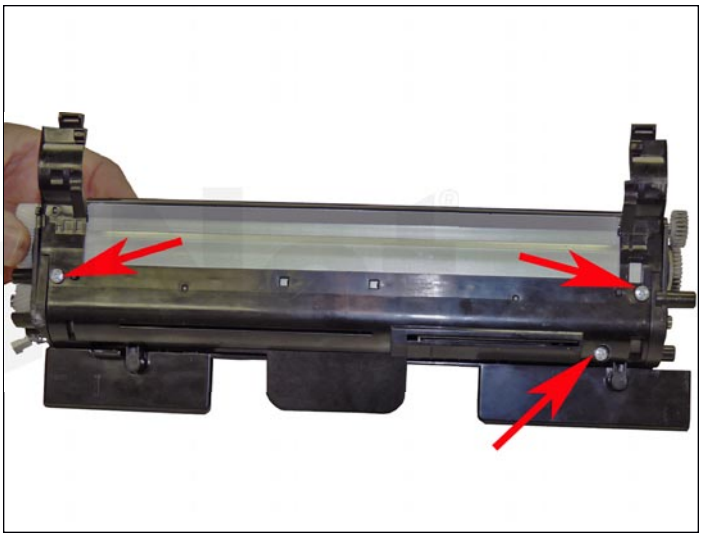


29. Install the top cover.

Make sure all five tabs (two top and three bottom) all lock in place!

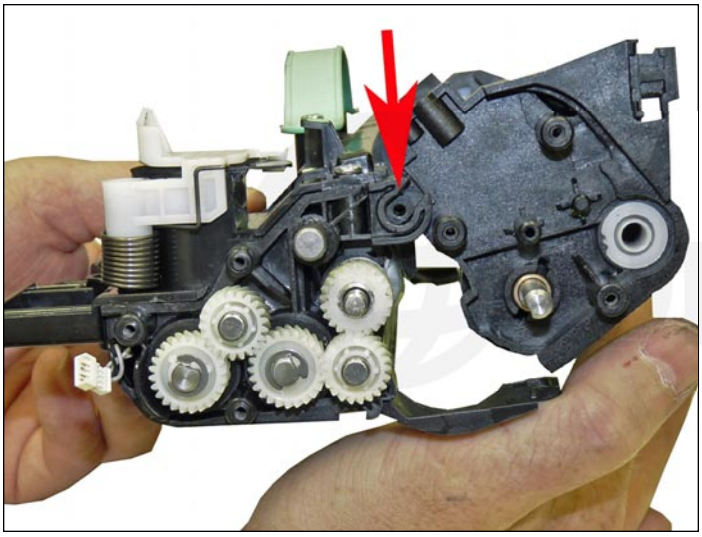


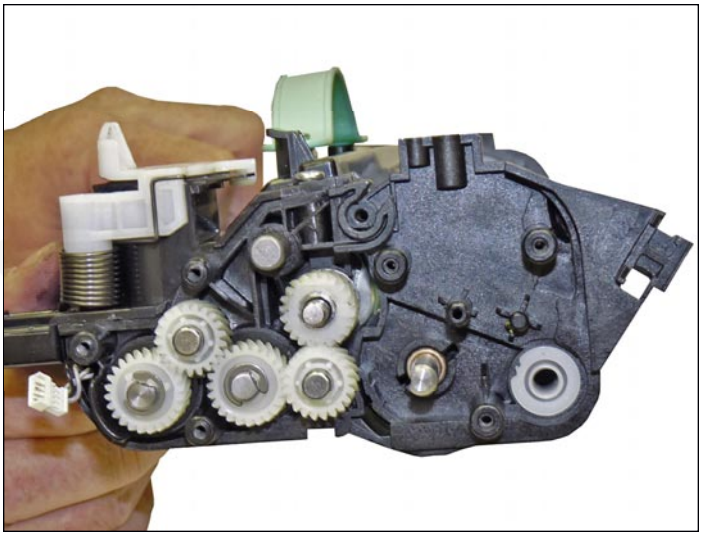
30. Install the top four screws.



31. Install the bottom cover and three screws.

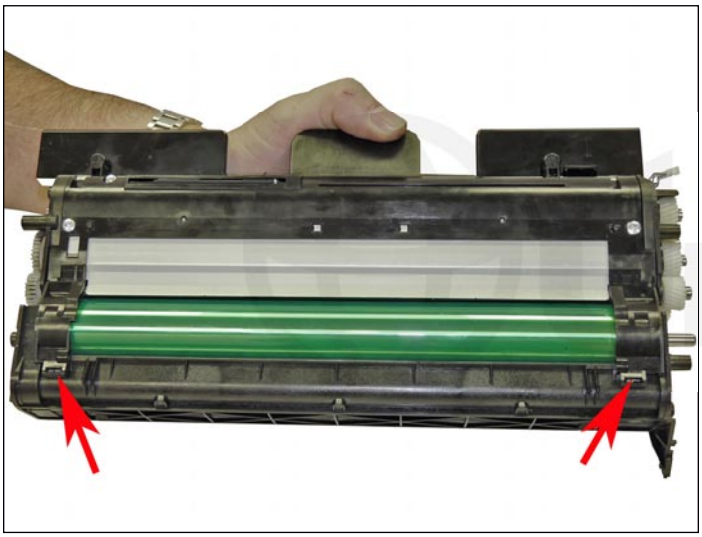
Be careful not to pinch the sensor wires!



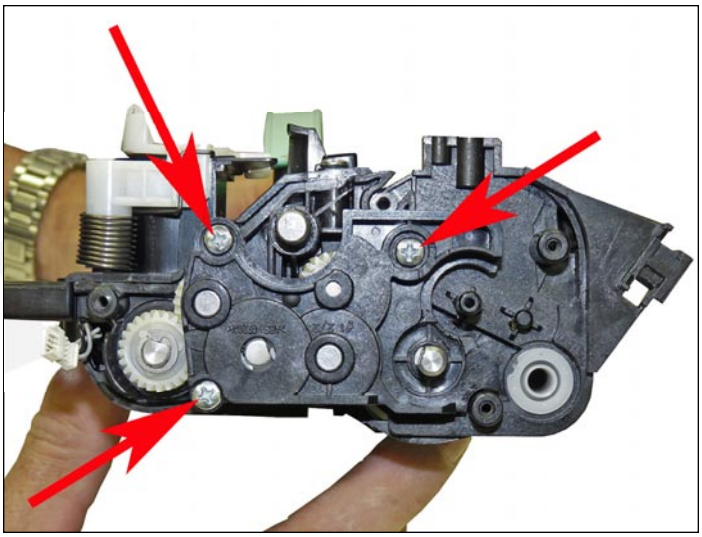


32. Install the drum section into the supply hopper.

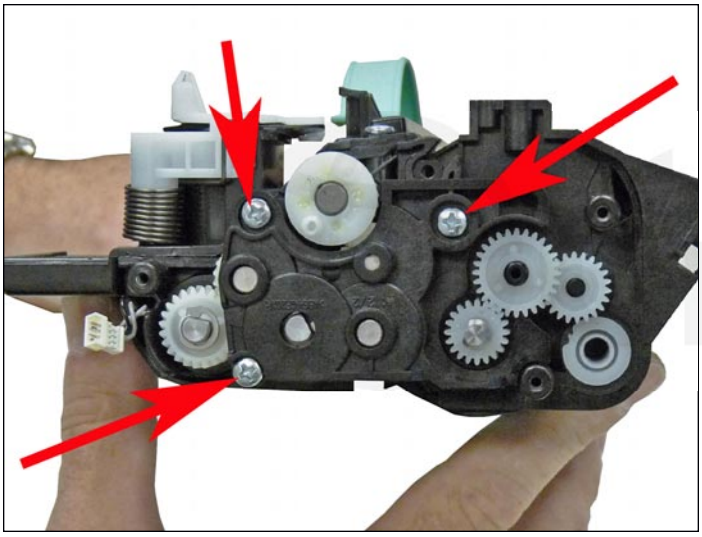
Align the two keyed ends into the slots and rotate down.



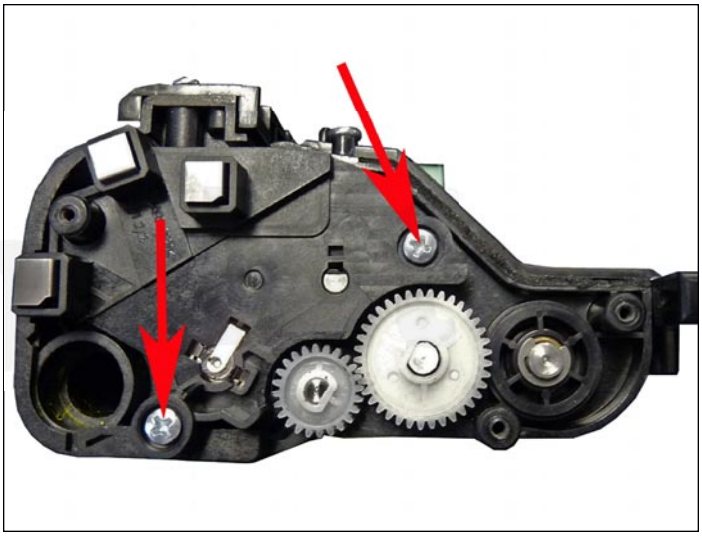
33. Make sure the two bottom tabs lock in place.



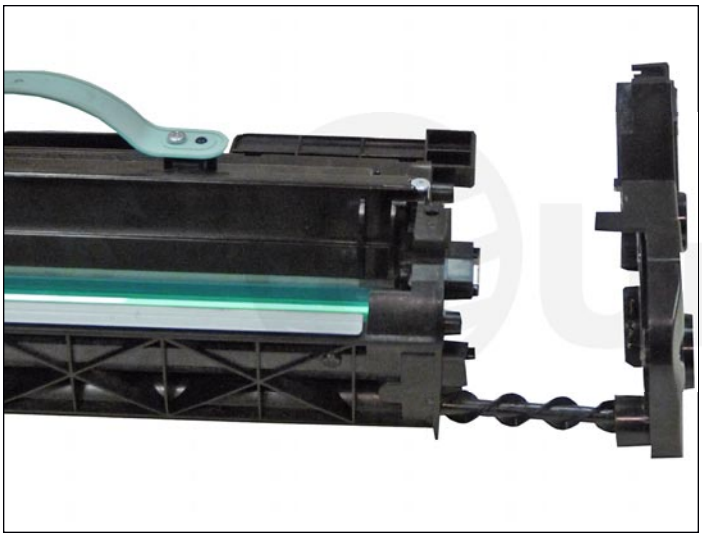
34. On the gear side, install the inner end cap and three screws.

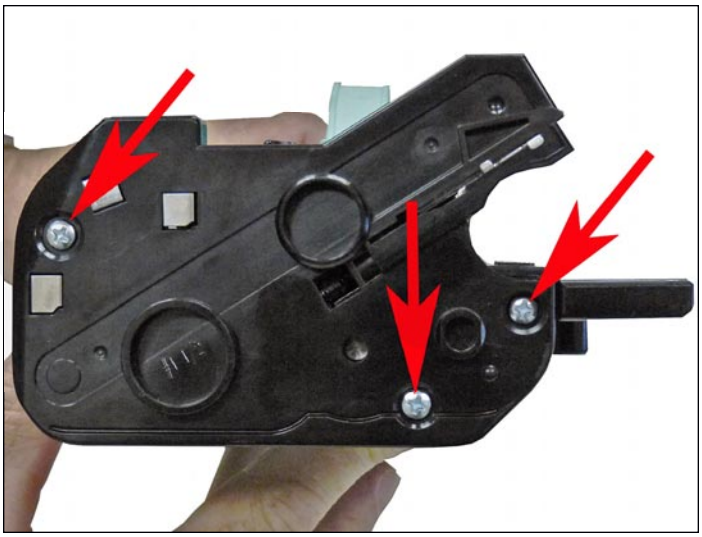


35. Install the four right-side gears as shown.



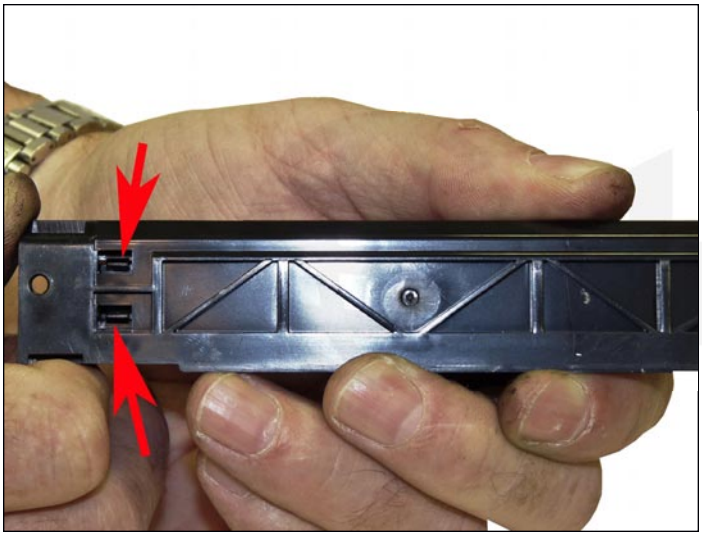
36. Install the contact side inner end cap and two screws.





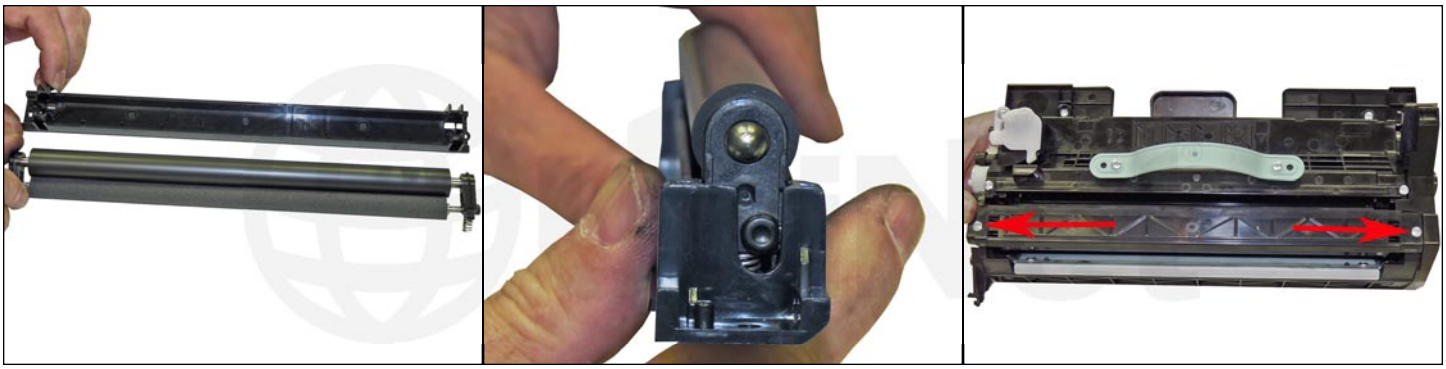
37. Slide the long auger into the housing and press the outer end cap in place.

Install the three screws.

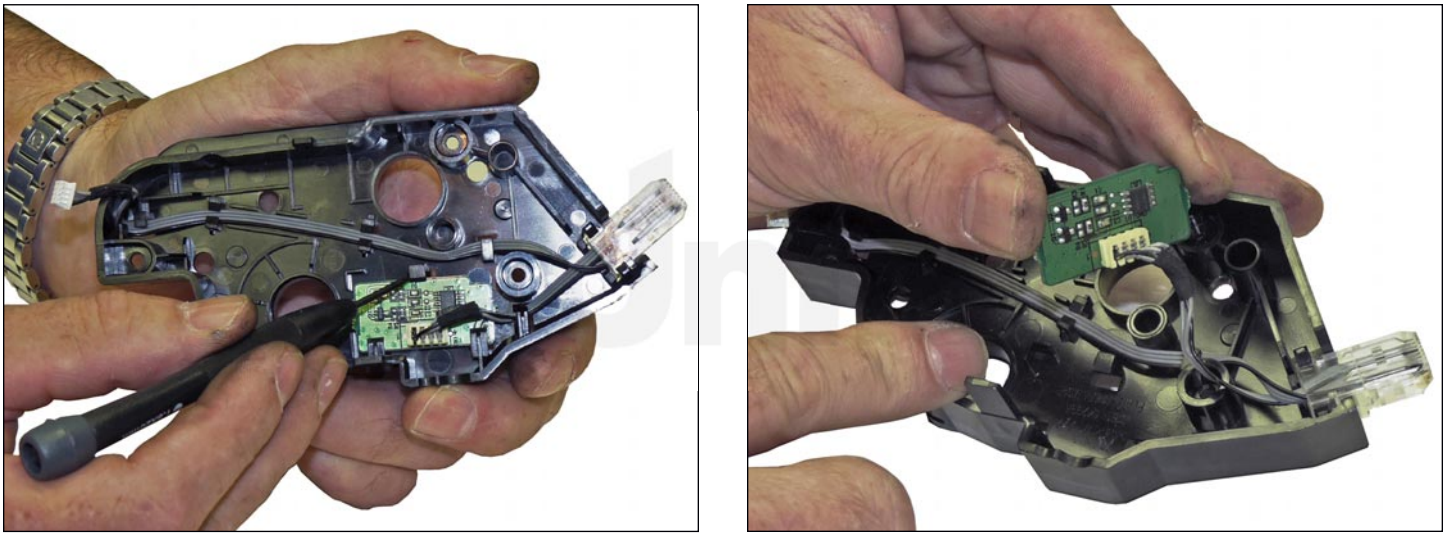


38. Pull the PCR assembly apart.

Press in on the bottom tabs.

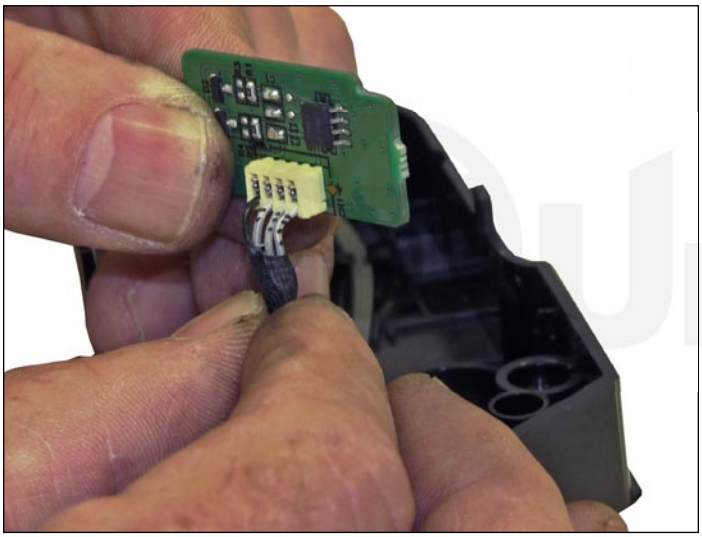


39. Blow off the PCR cleaner and wipe the PCR with a lint free cloth. Put it back together and install the PCR assembly into the cartridge. There are alignment tabs that prevent the assembly from being installed the wrong way. Install the two screws.



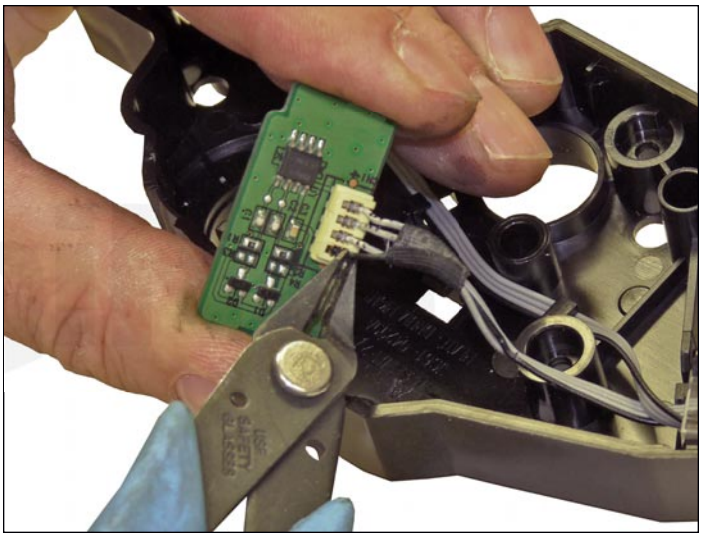
40. Remove the old chip by lifting up on the top tab slightly.

Slide the chip out of the holder.

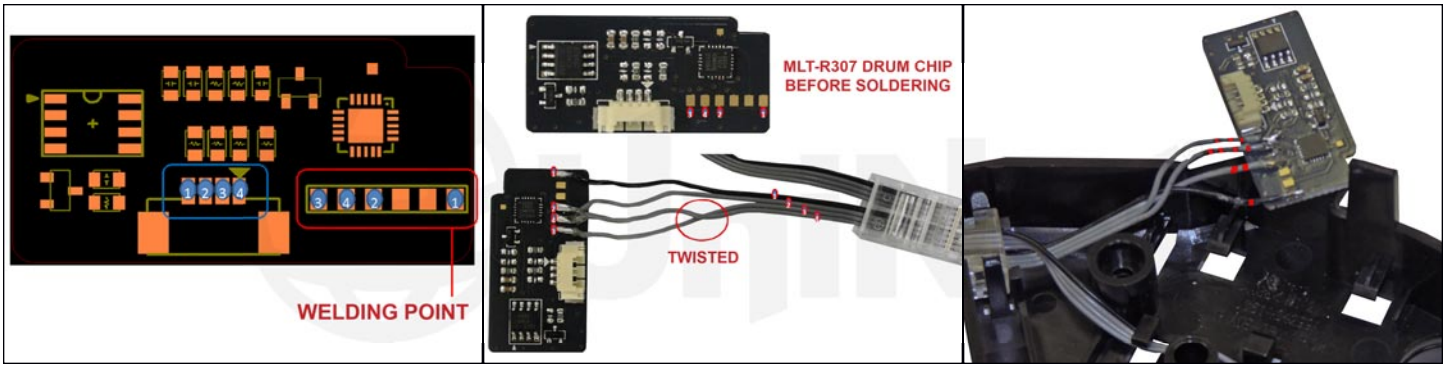


41. The four wires attached to the chip need to be removed from the old board. Before doing this, mark the four wires with slash marks using a permanent marker as **1**, **2**, **3** and **4**.

When marking the wires, leave room to strip off 1/6" of the insulation so you have bare wire ends for soldering.



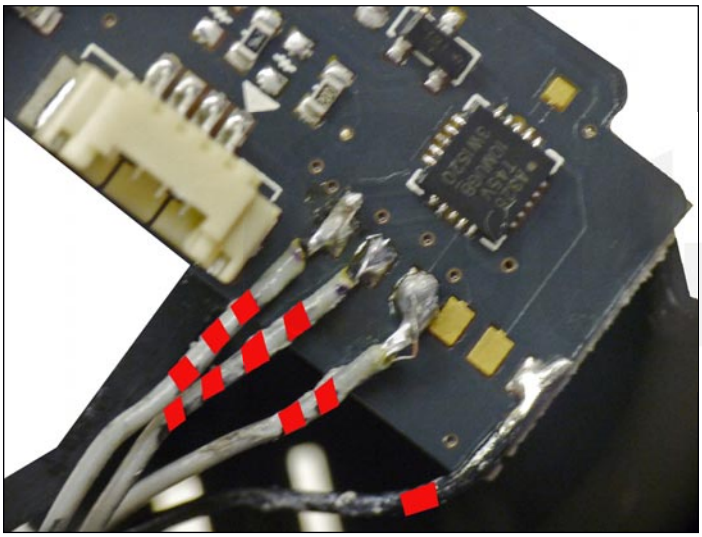
42. Cut the wires as close to the old connector as you can.



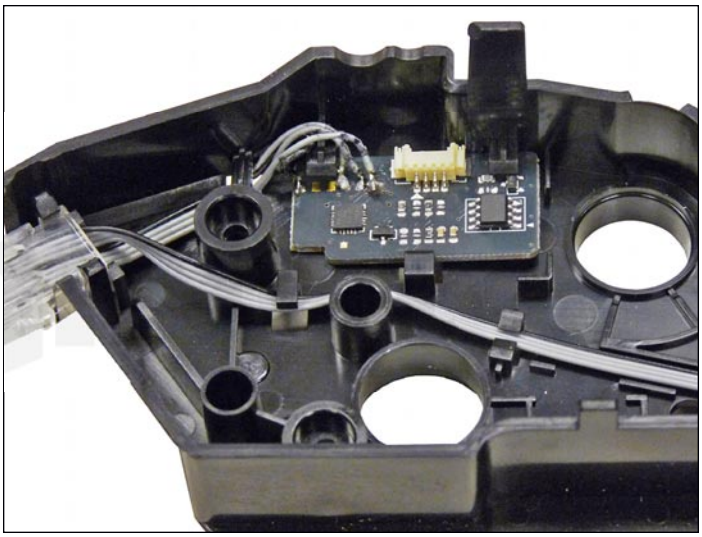
43. Solder the wires onto the new board pads in the order shown.

Using small amounts of liquid flux will aid in the soldering process

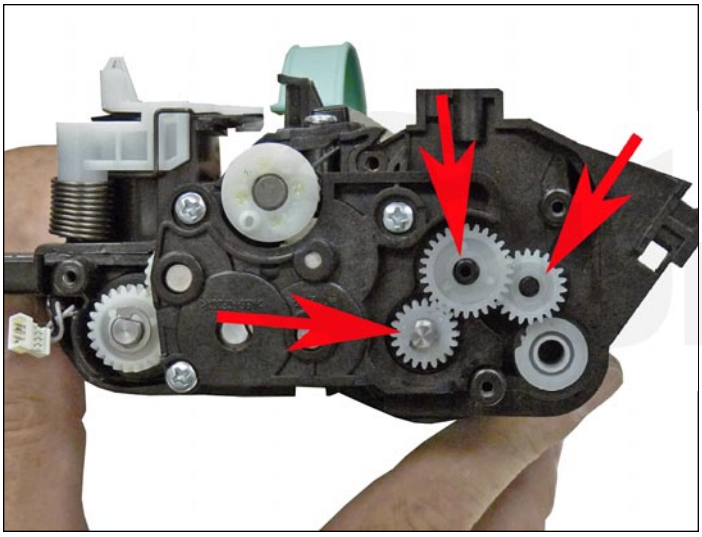
Note that wires **3** and **4** are reversed when soldered onto the pads.



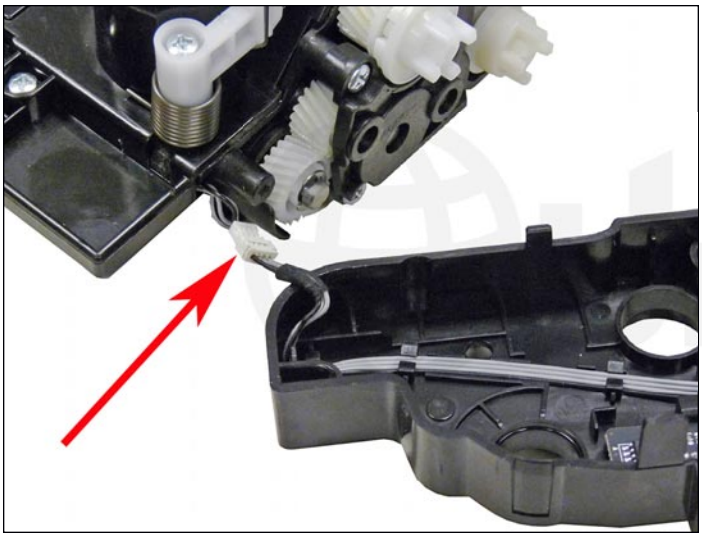
Shown are enhanced hash marks on the wires.

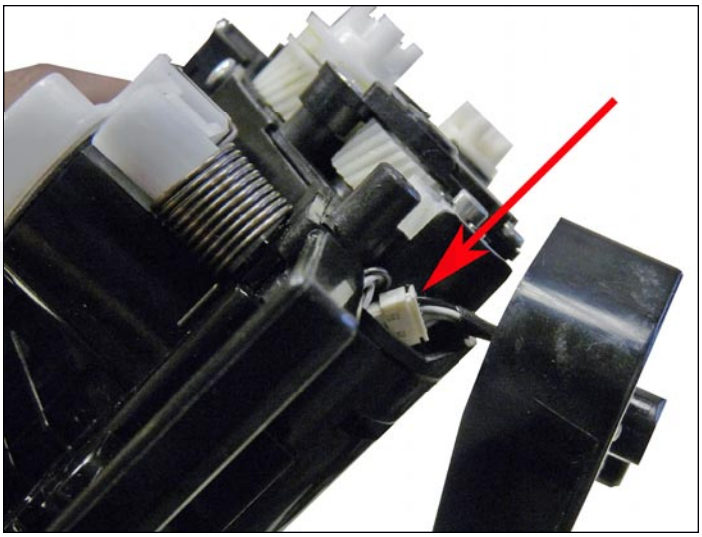


44. Slide the chip back into the holder.



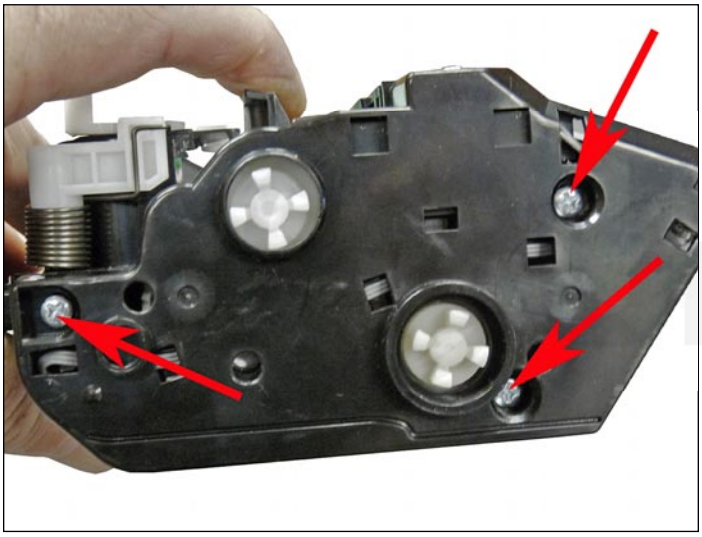
45. Install the three remaining gears.





46. Connect the chip wire assembly into the cartridge connector.

Tuck the connector out of the way, and install the end cap.



47. Install the three end cap screws.

48. If available, cover the cartridge with the OEM paper/foam drum cover.

REPETITIVE DEFECT CHART

Part	Period
OPC drum:	**94.2 mm**
Transfer roller:	**56.5 mm**
PCR:	**44.0 mm**
Magnetic roller:	**56.5 mm**