

# THE SAMSUNG CLP-510 TONER CARTRIDGE



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# Remanufacturing the Samsung CLP-510 / Xerox Phaser 6100 Black and Color Toner Cartridges



The Samsung CLP-510 Toner Cartridge

**F**irst introduced in January 2005, the Samsung CLP-510 series of printers is based on a 25ppm black/6ppm, 600DPI color Samsung print engine. The 510 machines are an enhanced version of the CLP-500 machines which are 21ppm black/5ppm color. Unlike the CLP-500 cartridges, chips are used to shut the cartridges down after toner low is reached. In fact, the chips will shut the cartridge down when the max page count is reached regardless of the amount of toner left. If you were to take a starter/low yield cartridge and put in the high yield load of toner, it will shut down at 2,000 pages anyway. To convert a starter/LY cartridge to a high yield, you must either convert the chip with a special reset box, or replace the chip. Reset boxes are now available that can reset the OEM chips, convert LY to HY, and also convert Samsung to Xerox and visa versa.

There are seven user replaceable cartridges in these machines, 4 toner cartridges, a drum unit, Transfer unit and the waste container. The drum and waste collector will be covered in a future article. The toner cartridges are all installed through the left cover (with the display in front of you). The drum unit and transfer belt are installed through the top cover, and the waste container is installed through the front cover. Each cartridge has its own slot. From top to bottom, they are: Black, Yellow, Magenta, and Cyan. Note that unlike the CLP-500 based cartridges, the back tabs are the

same for each color cartridge. The chips identify the correct cartridge. See **Figure 1**

Figure 1



As with the CLP-500 machines, the instructions/sequence on how to replace the toner cartridges are listed on the printer. These instructions must be followed in sequence, or the gear train of the printer will be damaged. Trust me...

The machines that use these cartridges are as follows:

Samsung CLP-510  
Samsung CLP-510N  
Xerox Phaser 6100

Samsung CLP-510 Cartridges

CLP-510D7K Black	7,000 pages at 5%	\$99.99 List*
CLP-510D5C Cyan	5,000 pages at 5%	\$119.99 List*
CLP-510D5M Magenta	5,000 pages at 5%	\$119.99 List*
CLP-510D5Y Yellow	5,000 pages at 5%	\$119.99 List*
CLP-510RB Drum	50,000 Mono/12,500 Color	\$149.99 List*
CLP-510WB Waste Container	12,000 mono/3,000 Color	\$19.99 List*
CLP-510RT Transfer belt	50,000 Mono/12,500 Color	\$149.99 list*

Xerox Phaser 6100 Cartridges

106R00679 Black	3,000 pages at 5%	\$107.00 List*
106R00676 Cyan	2,000 pages at 5%	\$120.00 List*
106R00677 Ma- genta	2,000 pages at 5%	\$120.00 List*
106R00678 Yel- low	2,000 pages at 5%	\$120.00 List*
106R00684 Black	7,000 pages at 5%	\$134.00 List*
106R00680 Cyan	5,000 pages at 5%	\$174.00 List*
106R00681 Ma- genta	5,000 pages at 5%	\$174.00 List*
106R00682 Yel- low	5,000 pages at 5%	\$174.00 List*
106R00593 Drum	50,000 Mono/12,500 Color	\$240.00 List*
106R00683 Waste Container	12,000 mono/3,000 Color	\$27.00 List*
108R00594 Transfer belt	50,000 Mono/12,500 Color	\$267.00 list*

The pricing on all cartridges is current as of April 2006.

As you can see from the pricing above, replacing multiple cartridges can quickly get very costly. Buying these machines may be inexpensive, but using them certainly isn't! Our industries favorite kind of pricing system!

These machines use the single pass print system similar to the HP-4600 and its predecessor the CLP-500. As there are a few differences, we will cover the cartridge theory here also.

Taking test prints, cartridge troubleshooting as well as minor printer troubleshooting will be covered at the end of this article.

**Samsung CLP-510 Color Printing Theory**

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

The first stage in the printing process is the Primary exposure stage. Light from the Eraser lamp strikes the drum. This eliminates any residual charges on the drum surface, and ensures a consistent charge density. In the second stage, the Primary Charge Roller (PCR) places a uniform negative DC voltage on the OPC drum surface. The amount of the negative DC voltage placed on the drum is controlled by the printer's intensity setting. See **Figure 2 & 3**

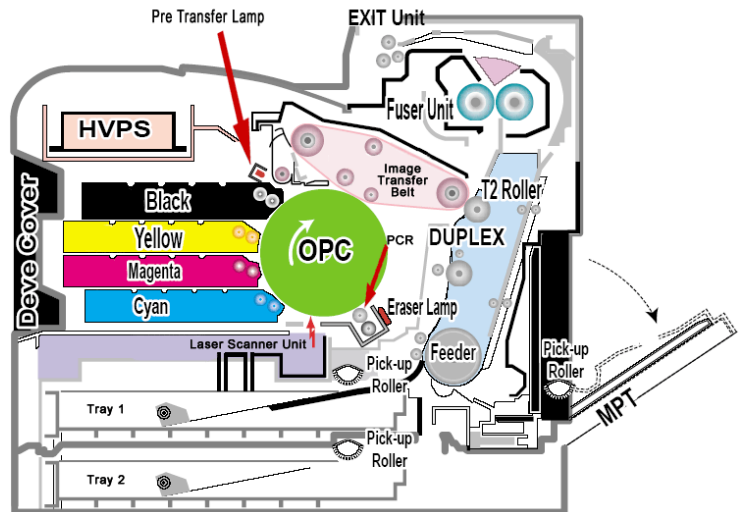
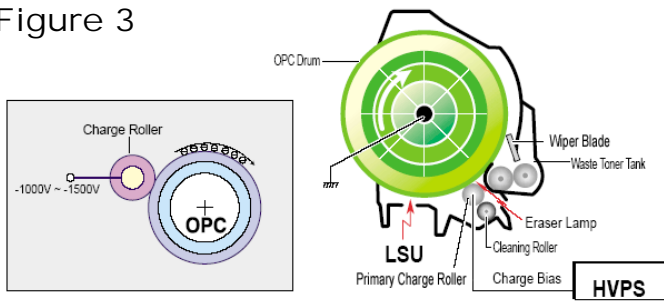


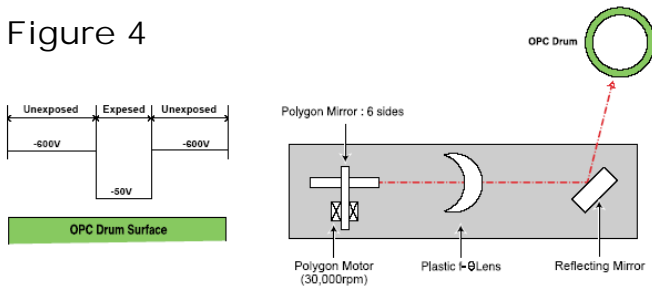
Figure 2

Figure 3



In the third stage, the laser beam is fired onto a rotating mirror (called the scanner). As the mirror rotates, the beam is reflected into a set of focusing lenses. The beam then strikes the drums surface, neutralizing the negative charge and leaving a latent electrostatic image on the drum. The areas where the laser did not strike the drum will retain the negative charge. See **Figure 4**

Figure 4



The fourth or developing stage is where the toner is developed on the drum by the developing section (or supply chamber), which contains the toner particles. The development stage is actually made up of two steps: toner charging, and the actual development. In the toner charging stage, the toner stirring blade turns inside the hopper. As it turns, friction causes a negative potential to develop on the toner. In addition, a toner charging roller also places a negative voltage on the toner. These two charges ensure a uniform charge on the toner. Once the toner is properly charged, the toner will coat the developer roller. The toner will also be held onto the developer roller by another negative DC bias voltage. This voltage is controlled by the printer's intensity setting, and causes either more or less toner to be attracted by the developer roller. This in turn will either increase or decrease the print density. The toner is first fed to the developer roller by the feed mechanism, which in this case is an open-cell foam roller. The amount of toner on the developer roller is controlled by the doctor blade, which uses pressure to keep the amount of toner on the roller constant.

As the laser exposed areas of the OPC Drum approach the developer roller, the toner particles are attracted to

the drum's surface due to the opposite voltage potentials of the toner, and laser exposed areas of the OPC drum. See **Figure 5**

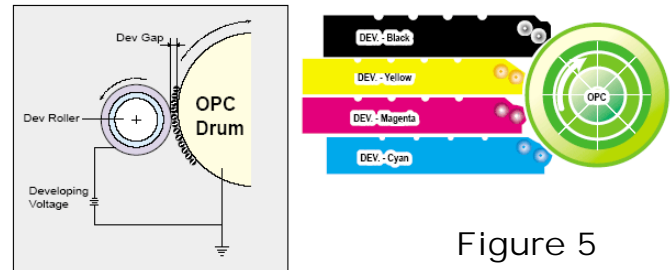


Figure 5

The fifth stage is the transfer stage. This is where there are some large differences from monochrome printers. A pre transfer lamp illuminates and reduces the adhesion of the toner to the OPC drum and allows a better transfer to the Image transfer belt or ITB. The different color latent images are then transferred from each toner cartridge to the ITB in a specific sequence. First the yellow is transferred, then the magenta is built up on top of the yellow followed by the cyan and black. The full image on the ITB is then transferred to the paper using the T2 transfer roller. See **Figure 6**

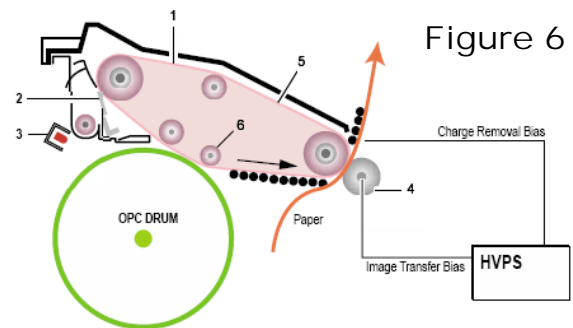


Figure 6

In the sixth stage, the image is then fused onto the paper by the fuser assembly. The fuser Assembly is comprised of 2 heat rollers. This is a bit different from other systems. There is a fixed upper heat roller with a 500W lamp inside, and a spring loaded lower heat roller with a 300W lamp inside. This system ensures proper fusing in all print conditions. (Remember, these machines come with built in duplex). See **Figure 7**

The final stages are where the ITB belt and drum are cleaned.

The OPC drum is cleaned after every complete image has been transferred to the ITB, and the ITB is cleaned after every complete image has been transferred to the paper. A cleaning solenoid activates and a cleaning blade removes the waste toner from the ITB. The waste toner is transferred to the waste toner tank



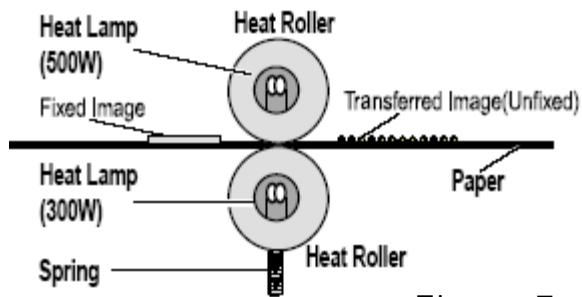


Figure 7

The waste tank has one section that brakes a sensor signal to show it is installed, and also has a section that when it fills up, blocks a sensor and triggers a waste toner full message. See **Figures 8, 9 & 10.**

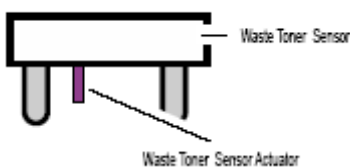


Figure 8

Figure 9

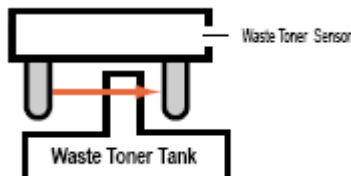


Figure 10

### Required Tools

- Toner approved vacuum or toner approved dust collector system
- A small screw driver (Common Style)
- Phillips head screwdriver
- Needle Nose Pliers
- Jewelers screwdriver set
- Samsung reset box, and appropriate cable

### Supplies Required

- CLP-510 Dedicated Color Toner
- Samsung reset box, or new replacement chips
- Lint free Cloths
- Conductive grease

1) Remove the three screws from the top cover. See **Figure 11**



Figure 11

2) With the handle facing you, remove the screw from the left side. See **Figure 12**

Figure 12



3) Pry the cover away from the 2 tabs on the left side and lift the left side up slightly. See **Figure 13**



Figure 13

4) Pry the cover away from the two tabs on the right side. Lift the cover up and away from the cartridge. See **Figures 14 & 15**



Figure 14

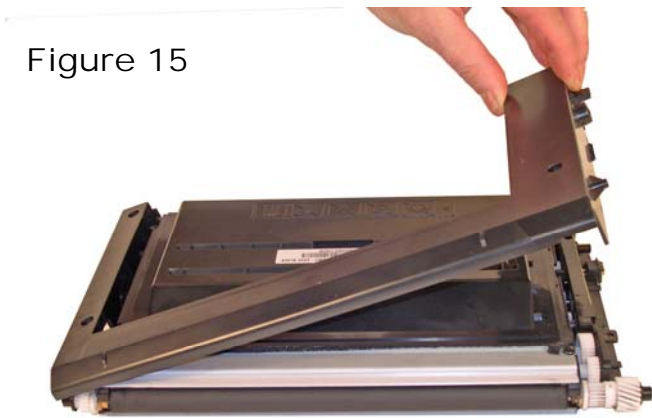


Figure 15

5) Carefully remove the fill plug. Do not insert a small screwdriver down the side of the fill plug as the fill plug wall is very easily damaged. Instead, insert a flat head screwdriver under the lip of the plug, and work the plug out. See **Figures 16 & 17**



Figure 16



Figure 17

6) Remove the fill plug, and dump out any remaining toner. Vacuum/blow out any remaining toner from the cartridge.

7) Remove the two screws from the top cover over the developer roller. See **Figure 18**



Figure 18

8) With the flat head screw driver, pry off the black end cap off the developer roller shaft on the small gear side of the cartridge. Remove the black washer, developer roller drive gear, and the two small gears next to it. Remove the white plastic bushing. See **Figures 19, 20, & 21**



Figure 19





Figure 20

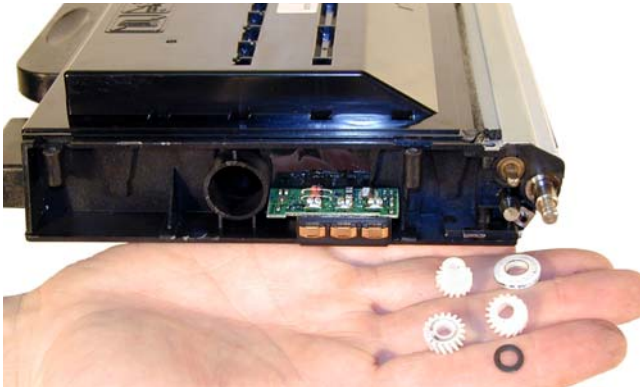


Figure 21

9) On the large gear side, remove the three screws and contact from the Circuit board (PCB). See Fig 22 & 23.



Figure 22

Figure 23



10) Remove the PCB. See Figure 24.

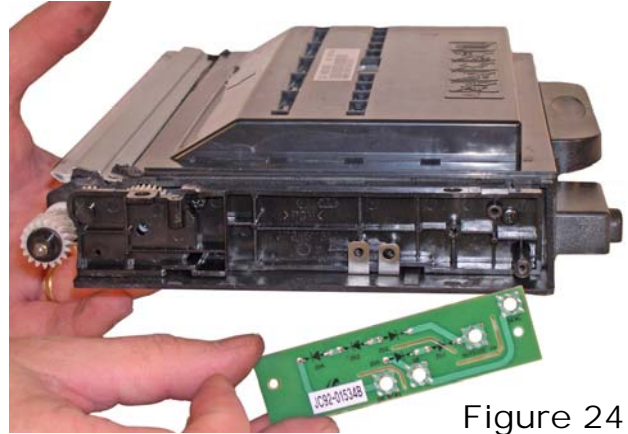


Figure 24

11) Remove the two screws from the gear cover. Remove the cover by lifting up and away from the cartridge. See Figure 25



Figure 25

12) Pry the Black end cap off the developer roller shaft. See Figure 26

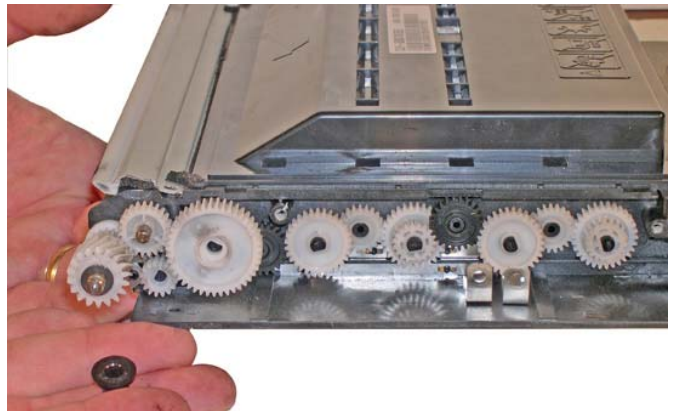


Figure 26

13) Remove the large developer roller gear See **Fig. 27**

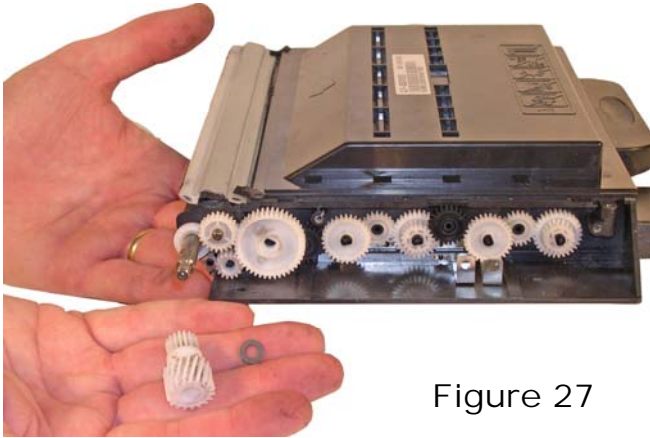


Figure 27

14) Remove the feed roller drive gear, flat washer and bushing from the cartridge. See **Figures 28 & 29**

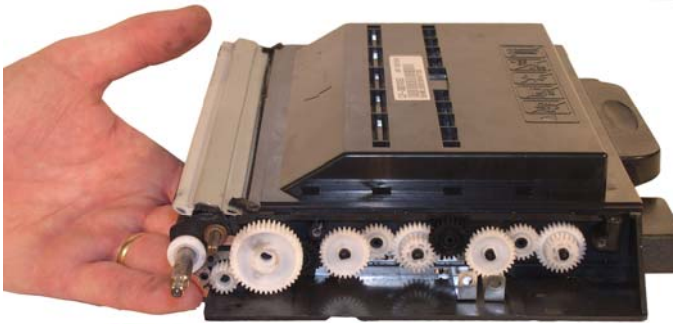


Figure 28

15) On the small gear side, remove the E-ring from the developer roller shaft, and pry off the metal bushing. See **Figures 30 & 31**

Figure 29

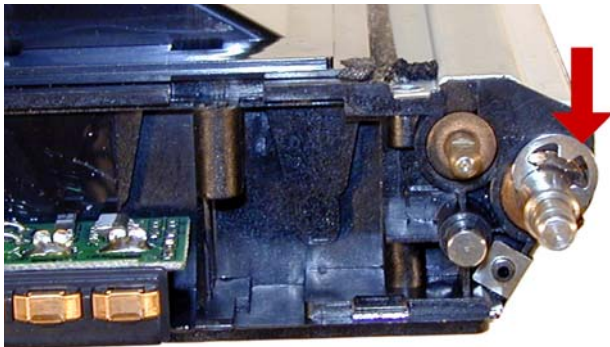
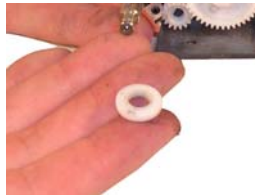


Figure 30

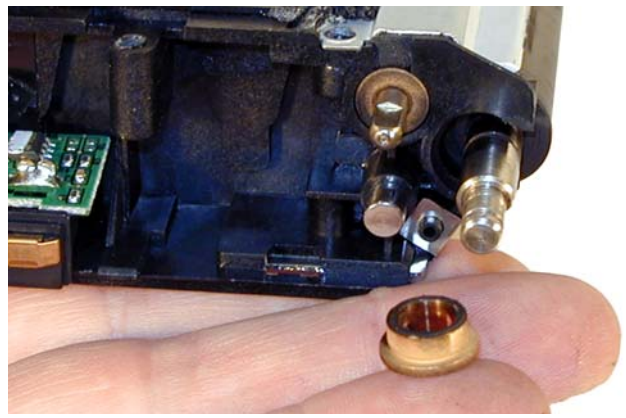


Figure 31

16) Remove the developer roller. The metal bushing on the opposite side is locked in place by a metal contact plate. See **Figures 32 & 33**



Figure 32

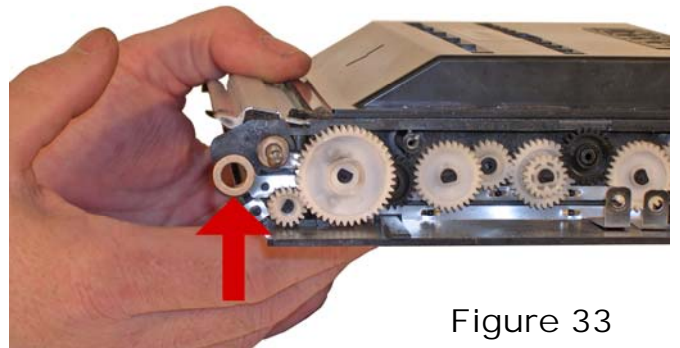


Figure 33

17) Clean the doctor blade and feed roller. Do not use any chemicals on the DB as they will damage the feed roller, and may react with the replacement toner. If there is a build up on the DB, carefully take the wood side of a cotton swan and rub it along the edge of the blade. Be very careful not to damage or bend the blade. See **Figure 34**

18) Wipe the developer roller down with a clean lint free cloth. It is also not advisable to use any chemicals here either. The residue from the chemicals may react with





Figure 34

the replacement toner. Check with your vendor before using anything other than a clean cloth to clean these parts.

19) Install the developer roller, long shaft side to the large gear or PCB side. See **Figure 35**



Figure 35

20) On the small gear side, install the metal bushing and E-ring. You may have to tap the bushing in place to get access to the E-ring slot. See **Figures 36 & 37**



Figure 36

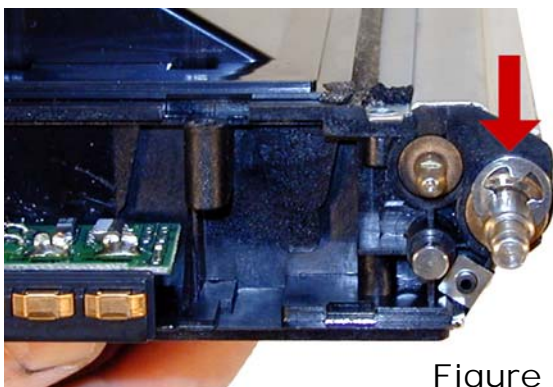


Figure 37

21) Install the plastic bushing, three gears, black washer, and black end cap. See **Figure 38**

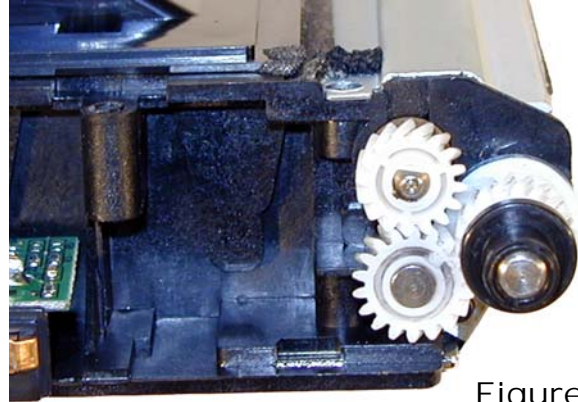


Figure 38

22) Install the two screws on the metal developer roller cover. See **Figure 39**



Figure 39

23) On the large gear side, make sure the metal bushing is still in place. If not press it back in. Install the plastic bushing. See **Figures 40 & 41**

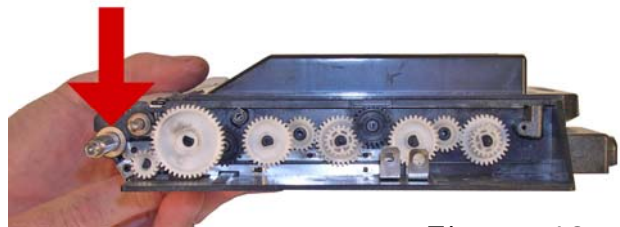


Figure 40



Figure 41

24) Install the feed roller drive gear, spacer side towards the cartridge. See **Figure 42**

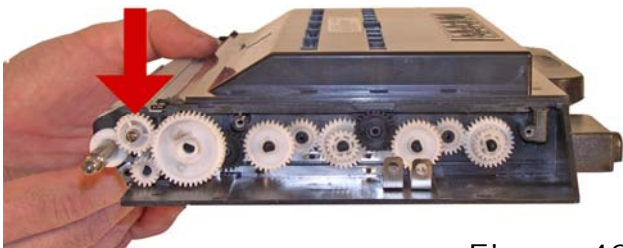


Figure 42

25) Install the gear train cover and two screws. See **Figure 43**

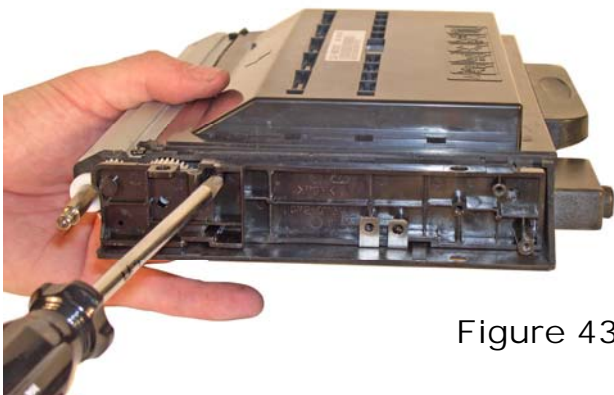


Figure 43

26) Install the large drive gear, flat washer, and black end cap. See **Figure 44**



Figure 44

27) Install the PCB three screws and contact. See **Figure 45**



Figure 45

28) Fill with the appropriate toner, and replace the fill cap. Remember, it is not a good idea to change the color of a cartridge. See **Figure 46**



Figure 46

29) Reset or replace the chip. Reset boxes are available that can reset the OEM, Convert LY to HY, and also convert Samsung to Xerox or visa versa. See **Figure 47**

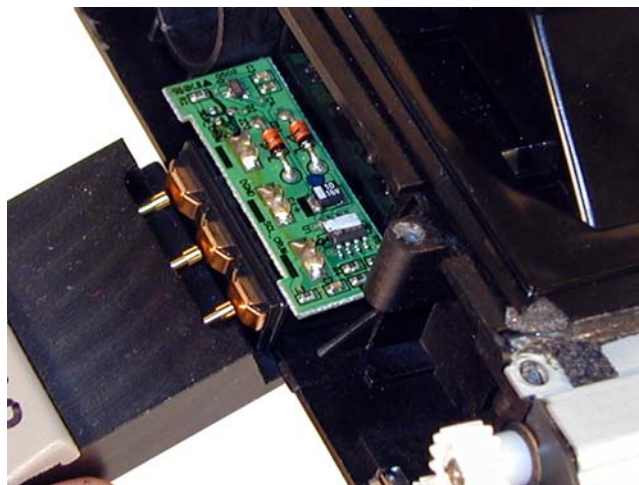


Figure 47

30) Snap the top cover in place make sure the four tabs are locked in. See **Figure 48**





Figure 48

Press the “Enter” button when “Configuration” appears on the bottom of the display.

The Configuration page will print out.

**Printer Error Messages:**

These machines have text error messages that appear on the display. There is no need to list them here. A few messages that may not be clear are LSU, and ITB error messages. LSU stands for Laser Scanning Unit, ITB Stands for Image Transfer Belt.

31) Install the three top screws and one side screw. See **Figure 49**



Figure 49

**Taking Test Prints**

**Demo Page**

With the printer ready, press the “Menu” button until you see Information on the bottom of the display.

Press the “Enter” (asterisk) button to access the menu.

Press the “Enter” button when “Demo” appears on the bottom of the display.

The Demo page will print out. (This is a duplexed page)

**Configuration Page**

With the printer ready, press the “Menu” button until you see Information on the bottom of the display.

Press the “Enter” (asterisk) button to access the menu.

