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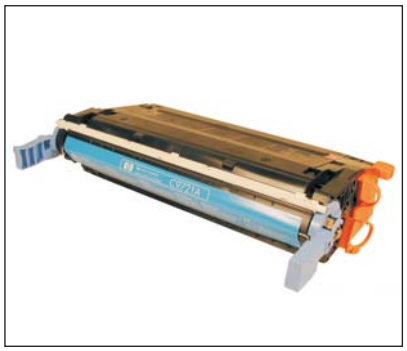
TECHNICAL DOCUMENT

Disassembly Instructions

Remanufacturing the HP-4600 Black and Color Toner Cartridges



First released in June 2002, the HP-4600 series of color laser printers are based on a 17 ppm 600 Dpi engine. (2400 DPI with RET). The 4600 cartridges consist of the toner supply, drum, and waste chamber. They are the first HP color cartridge to be an “All in one” type. Unlike the older 4500/8500 series, these machines use an in-line, or what might be called a single pass system. (The 4500/8500 use a 4 pass system). All four cartridges are stacked on top of one another, each color develops its own image which is transferred to the paper by the transfer belt, This type of system is faster, and allows for a higher quality print.

Unlike traditional cartridge systems, the developer roller in these cartridges actually touches the drum. There are also the PCR and toner charging rollers that in the cleaning process, send any accumulated toner to the drum (see text on theory below). For those reasons, it is highly recommended that the drum and wiper blades be replaced every cycle. Figures 1 & 2 show the shipping lock as installed on the cartridge. This lock keeps the two halves of the cartridge from being damaged.

Figure 1

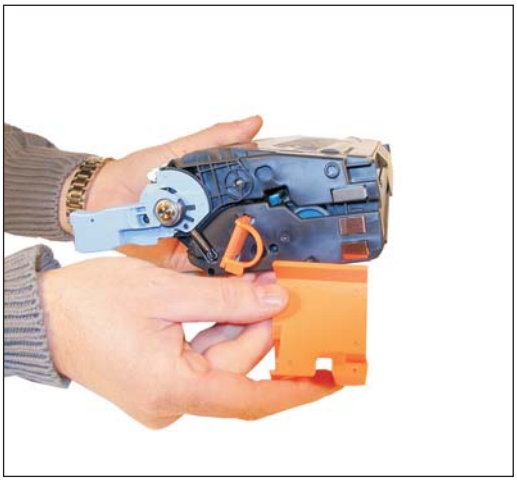


Figure 2

HP-4600 Black and Color Toner Cartridges (Continued)

The printers based on the 4600 engine are the:

HP Color LaserJet 4600
HP Color LaserJet 4600 DN
HP Color LaserJet 4600 DTN
HP Color LaserJet 4600 HDN
HP Color LaserJet 4600 N

The cartridges used in these machines are the:

C9720A (Black)	9,000 pages at 5%	$204.00 List
C9721A (Cyan)	8,000 pages at 5%	$276.00 List
C9722A (Magenta)	8,000 pages at 5%	$276.00 List
C9723A (Yellow)	8,000 pages at 5%	$276.00 List
C9724A (Transfer)	120,000 pages	$238.00 List

As you can see from these prices (Current as of April 2004), these are very profitable cartridges to remanufacture!

Although the ETB (Transfer Belt) is rated for 120,000 pages, that is a variable number. Each time the belt spins up, two cycles or wear units as HP calls them are used. One start and one stop. Each page printed uses one unit. If all small 1 page jobs are run, the wear units will add up quickly. The 120,000 page life was estimated using an average 3 page print job. The max life is 200,000 wear units.

The 4600 color laser engine is an incredibly complicated system. A normal monochrome system (such as the HP-4100) has a few basic components, and the printing process is relatively easy to follow (See Figure 3). Figure 4 shows the 4600 cartridges in relationship to the transfer belt. The paper runs from the bottom to the top, picking up each color on the way. Figure 5 is a detailed look at the cartridge, this will give you the best feel for exactly what is different in each cartridge VS a monochrome cartridge.

Due to the large differences in the actual printing theory between a monochrome cartridge, and the 4600 color printing system, we are covering the color theory here. It's a bit wordy, but if you are going to do these cartridges successfully, it will be necessary to know how they work. *Theory starts on page 8.*

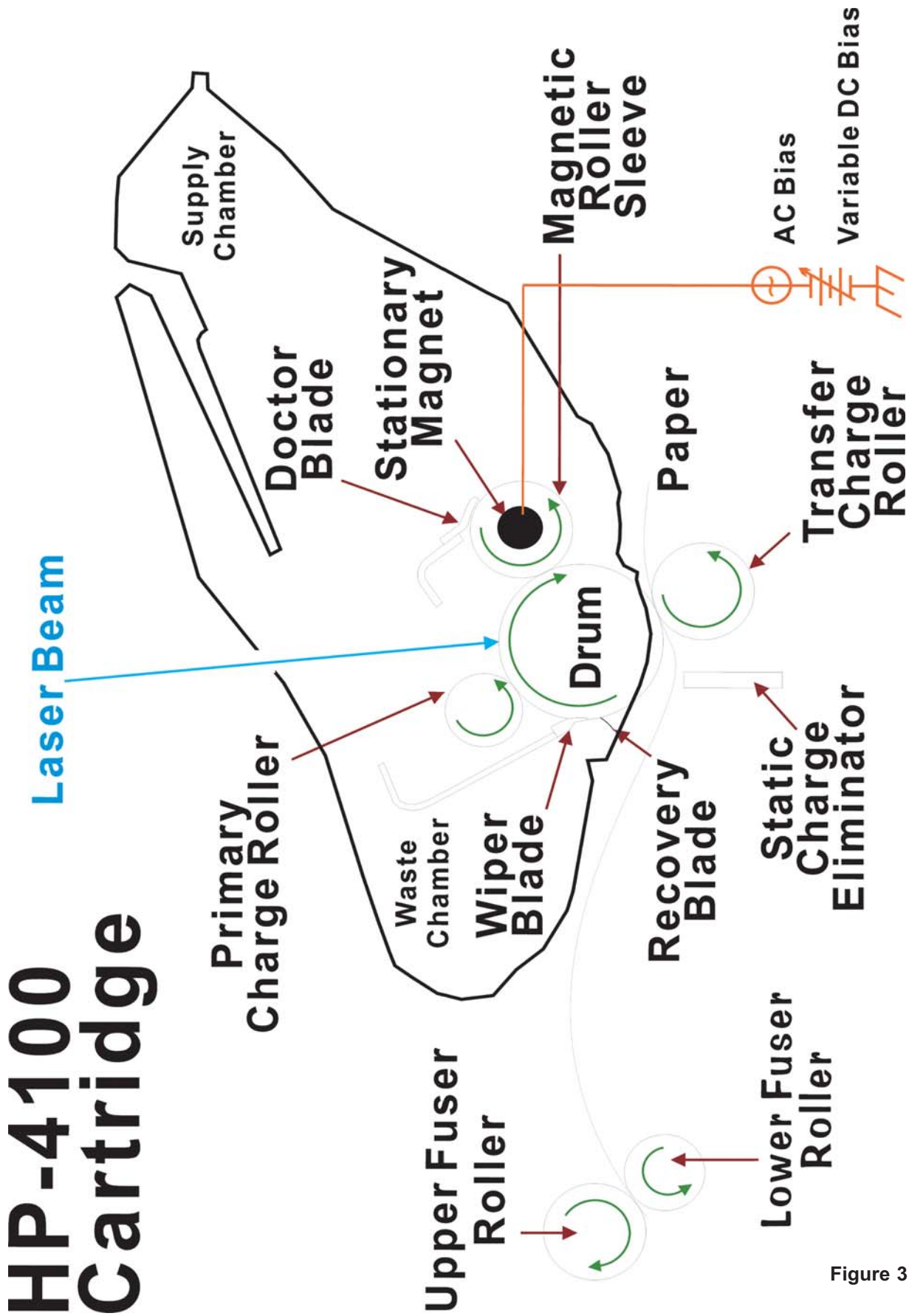

HP-4100 Cartridge
Laser Beam
Supply Chamber
Doctor Blade
Stationary Magnet
Magnetic Roller Sleeve
AC Bias
Variable DC Bias
Paper
Transfer Charge Roller
Primary Charge Roller
Drum
Waste Chamber
Wiper Blade
Recovery Blade
Static Charge Eliminator
Upper Fuser Roller
Lower Fuser Roller

Figure 3

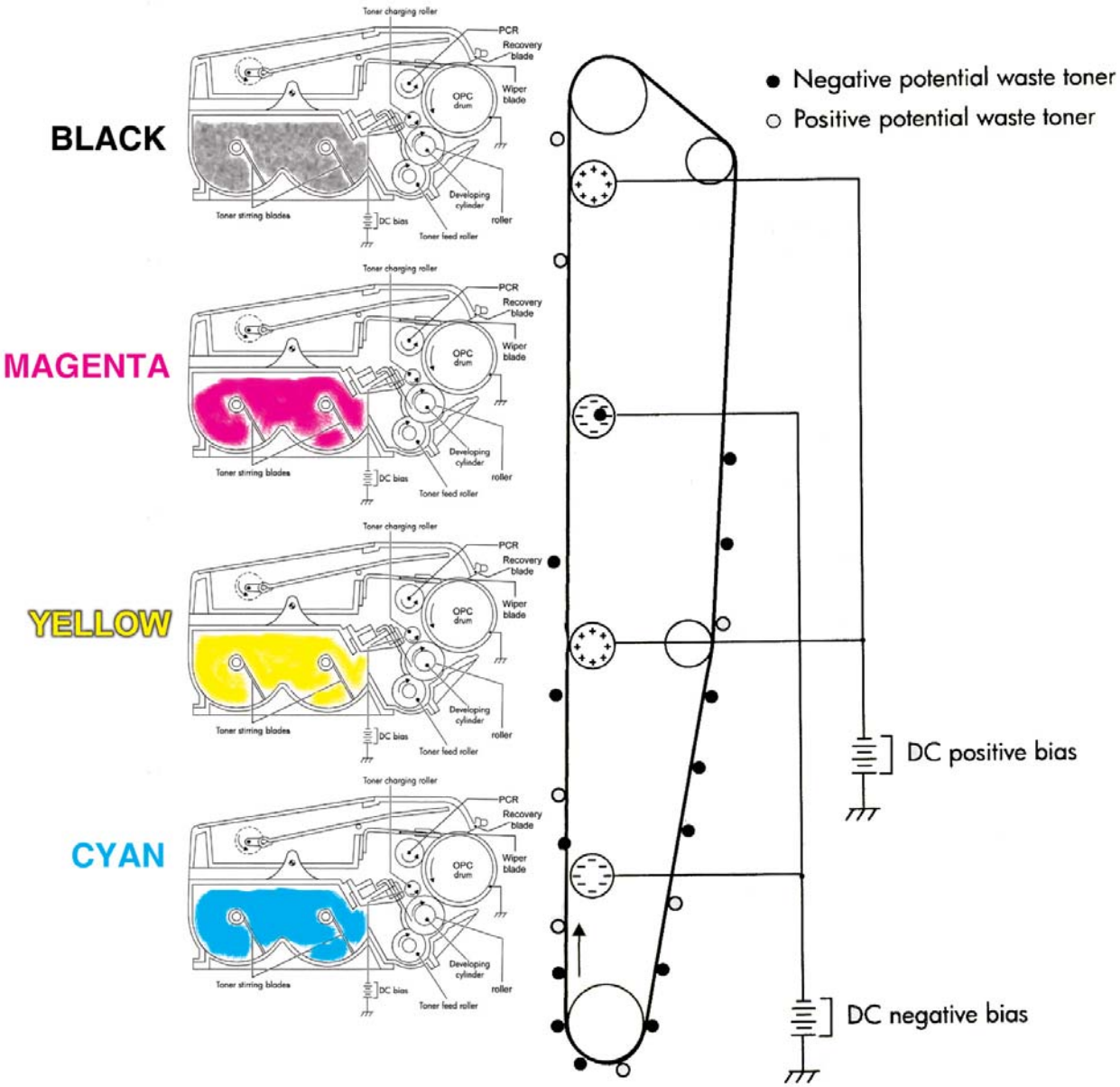

BLACK
MAGENTA
YELLOW
CYAN
Toner charging roller
PCR
Recovery blade
Wiper blade
OPC drum
Developing cylinder
Toner stirring blades
DC bias
Toner feed roller
roller
● Negative potential waste toner
○ Positive potential waste toner
DC positive bias
DC negative bias

Figure 4

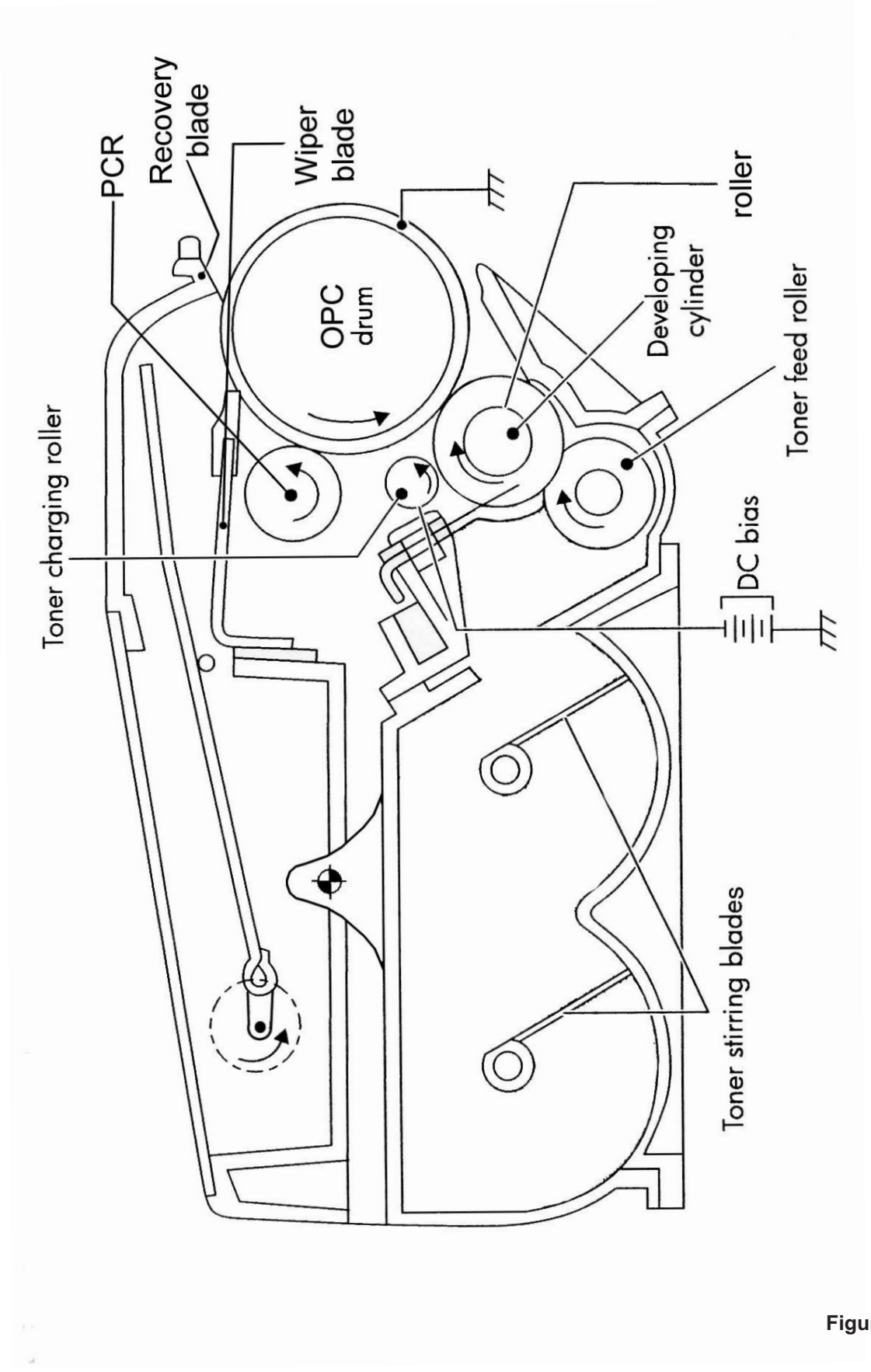

PCR
Recovery blade
Wiper blade
OPC drum
Developing cylinder
roller
Toner feed roller
Toner charging roller
DC bias
Toner stirring blades

Figure 5

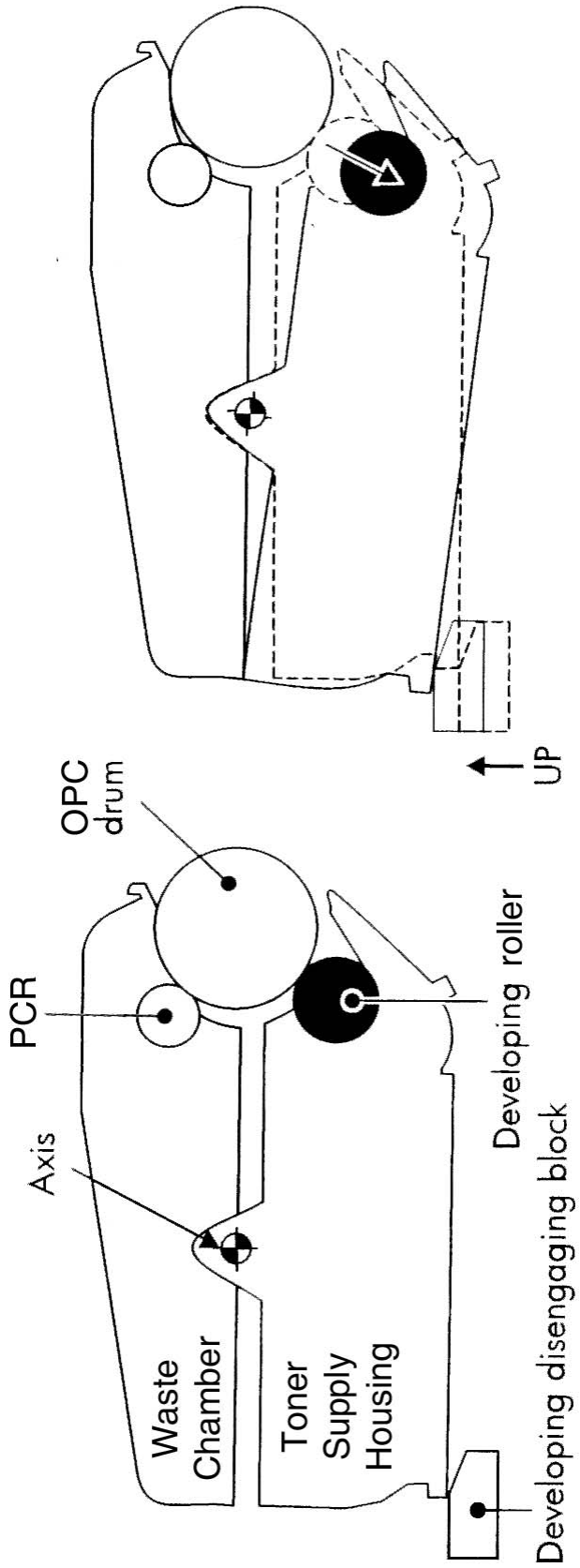
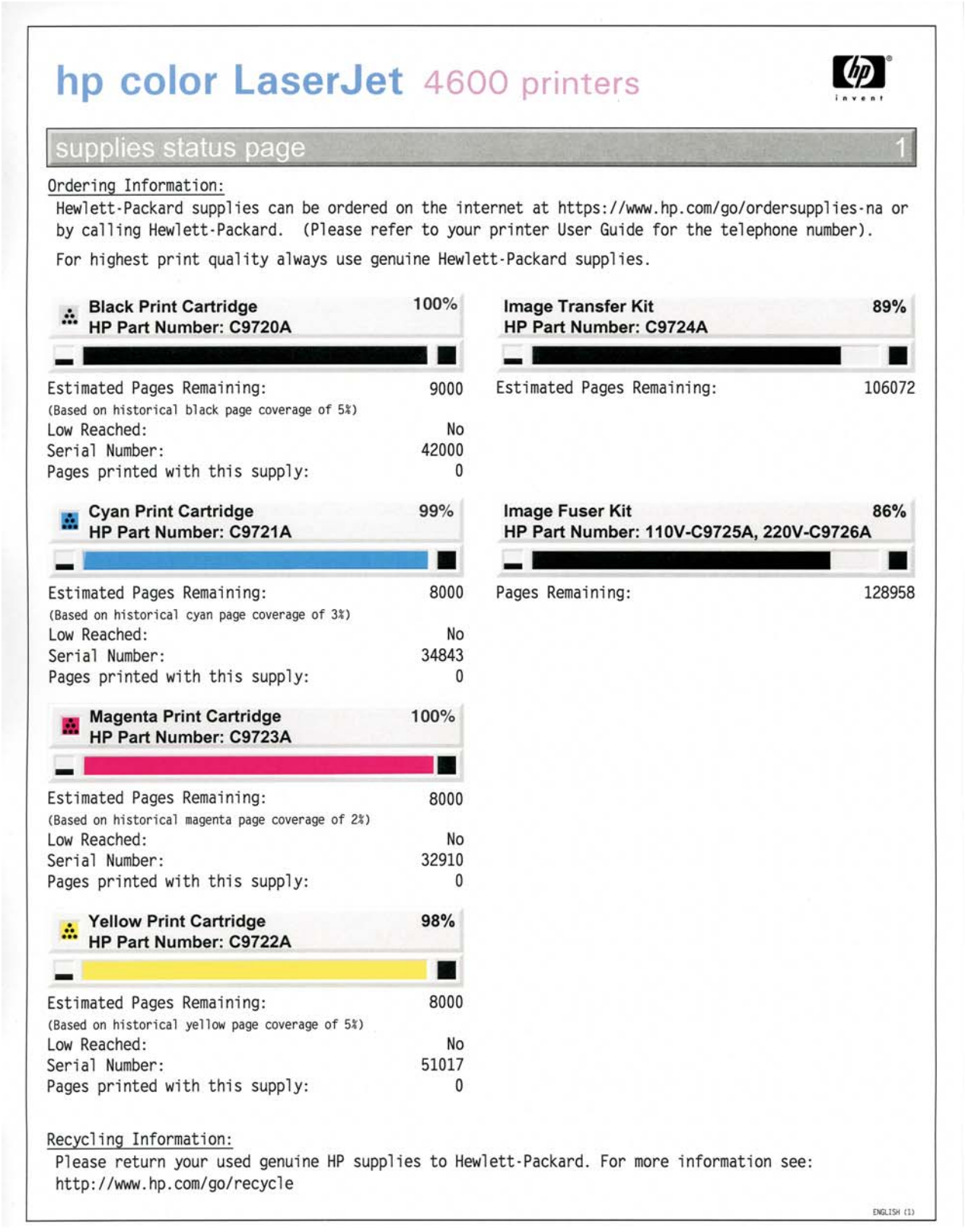

UP
OPC drum
PCR
Axis
Developing roller
Waste Chamber
Toner Supply Housing
Developing disengaging block

Figure 6



hp color LaserJet 4600 printers

supplies status page 1

Ordering Information:

Hewlett-Packard supplies can be ordered on the internet at https://www.hp.com/go/ordersupplies-na or by calling Hewlett-Packard. (Please refer to your printer User Guide for the telephone number).

For highest print quality always use genuine Hewlett-Packard supplies.

Black Print Cartridge 100%
HP Part Number: C9720A

Estimated Pages Remaining:	9000
(Based on historical black page coverage of 5%)	
Low Reached:	No
Serial Number:	42000
Pages printed with this supply:	0

Image Transfer Kit 89%
HP Part Number: C9724A

Estimated Pages Remaining:	106072

Cyan Print Cartridge 99%
HP Part Number: C9721A

Estimated Pages Remaining:	8000
(Based on historical cyan page coverage of 3%)	
Low Reached:	No
Serial Number:	34843
Pages printed with this supply:	0

Image Fuser Kit 86%
HP Part Number: 110V-C9725A, 220V-C9726A

Pages Remaining:	128958

Magenta Print Cartridge 100%
HP Part Number: C9723A

Estimated Pages Remaining:	8000
(Based on historical magenta page coverage of 2%)	
Low Reached:	No
Serial Number:	32910
Pages printed with this supply:	0

Yellow Print Cartridge 98%
HP Part Number: C9722A

Estimated Pages Remaining:	8000
(Based on historical yellow page coverage of 5%)	
Low Reached:	No
Serial Number:	51017
Pages printed with this supply:	0

Recycling Information:

Please return your used genuine HP supplies to Hewlett-Packard. For more information see: http://www.hp.com/go/recycle

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Figure 7

HP-4600 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 Primary Exposure LED (which is located inside the cartridge), 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.

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. Each color cartridge has its own laser and scanner units.

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.
continued on page 10

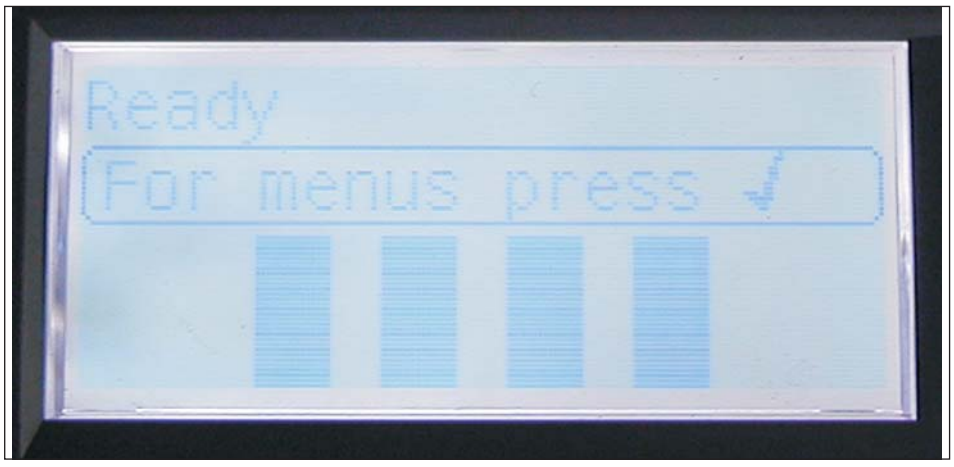
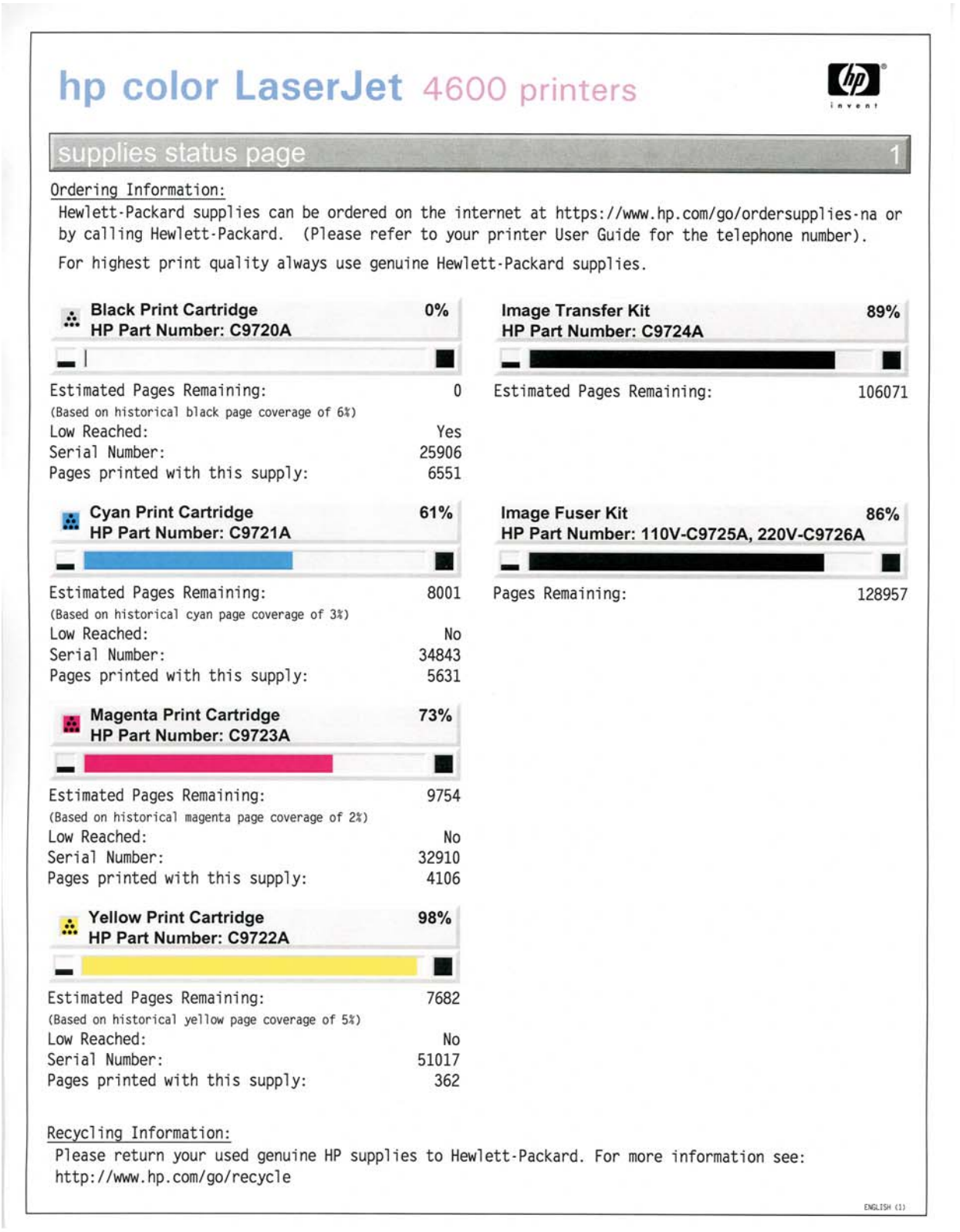


Figure 8



hp color LaserJet 4600 printers

supplies status page 1

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Black Print Cartridge 0%
HP Part Number: C9720A

Estimated Pages Remaining: 0
(Based on historical black page coverage of 6%)
Low Reached: Yes
Serial Number: 25906
Pages printed with this supply: 6551

Cyan Print Cartridge 61%
HP Part Number: C9721A

Estimated Pages Remaining: 8001
(Based on historical cyan page coverage of 3%)
Low Reached: No
Serial Number: 34843
Pages printed with this supply: 5631

Magenta Print Cartridge 73%
HP Part Number: C9723A

Estimated Pages Remaining: 9754
(Based on historical magenta page coverage of 2%)
Low Reached: No
Serial Number: 32910
Pages printed with this supply: 4106

Yellow Print Cartridge 98%
HP Part Number: C9722A

Estimated Pages Remaining: 7682
(Based on historical yellow page coverage of 5%)
Low Reached: No
Serial Number: 51017
Pages printed with this supply: 362

Image Transfer Kit 89%
HP Part Number: C9724A

Estimated Pages Remaining: 106071

Image Fuser Kit 86%
HP Part Number: 110V-C9725A, 220V-C9726A

Pages Remaining: 128957

Recycling Information:

Please return your used genuine HP supplies to Hewlett-Packard. For more information see: http://www.hp.com/go/recycle

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Figure 9

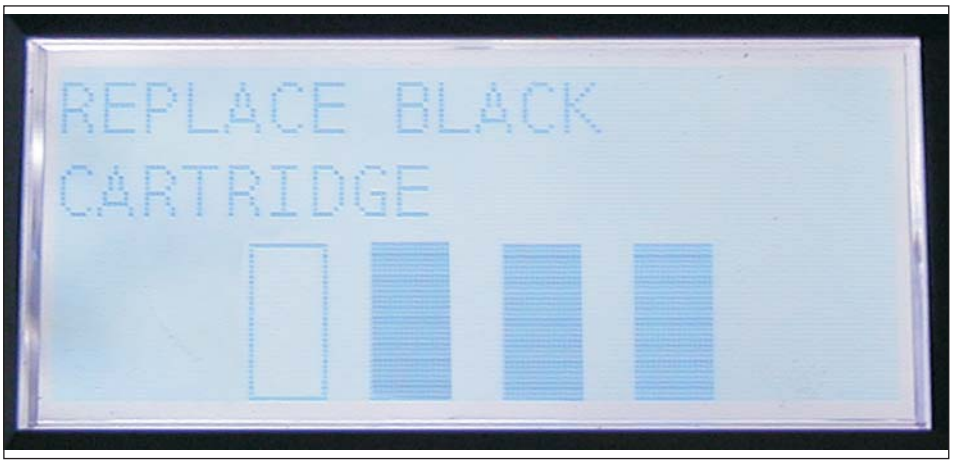


Figure 10

The fifth stage is the “transfer block”. This is where there are some large differences from monochrome printers. The first step in the transfer block is where the attaching roller places a positive charge on the paper. The attaching roller sits just after the paper pick up roller. The attaching roller also pushes the paper up against the electrostatic transfer/transport belt or ETB. A positive DC bias voltage is placed on the transfer charging roller which is located directly opposite the OPC drum, and on the back side of the ETB. Each toner cartridge has a separate transfer charging roller. As the ETB passes the transfer charging roller, the positive charge is picked up, and draws the negatively charged toner off the drum onto the paper. This process is repeated for each color cartridge. As the toner piles onto the paper, the positive charge on the paper weakens as the paper runs through each cartridge. For this reason, the charge is increased on the transfer charging roller for each successive color.

The paper separates from the ETB belt as the belt reaches the top of its path and turns back down to start the process again.

In the sixth stage, the image is then fused onto the paper by the fuser assembly. The fuser Assembly is comprised of the upper heating assembly and lower pressure roller. The lower pressure roller presses the page up into the upper heating assembly which then melts the toner into the paper. The upper heating assembly consists of a flexible sleeve with an induction type heating coil inside. This type of fuser affords “instant on” fusing with little to no wait time, and low power consumption.

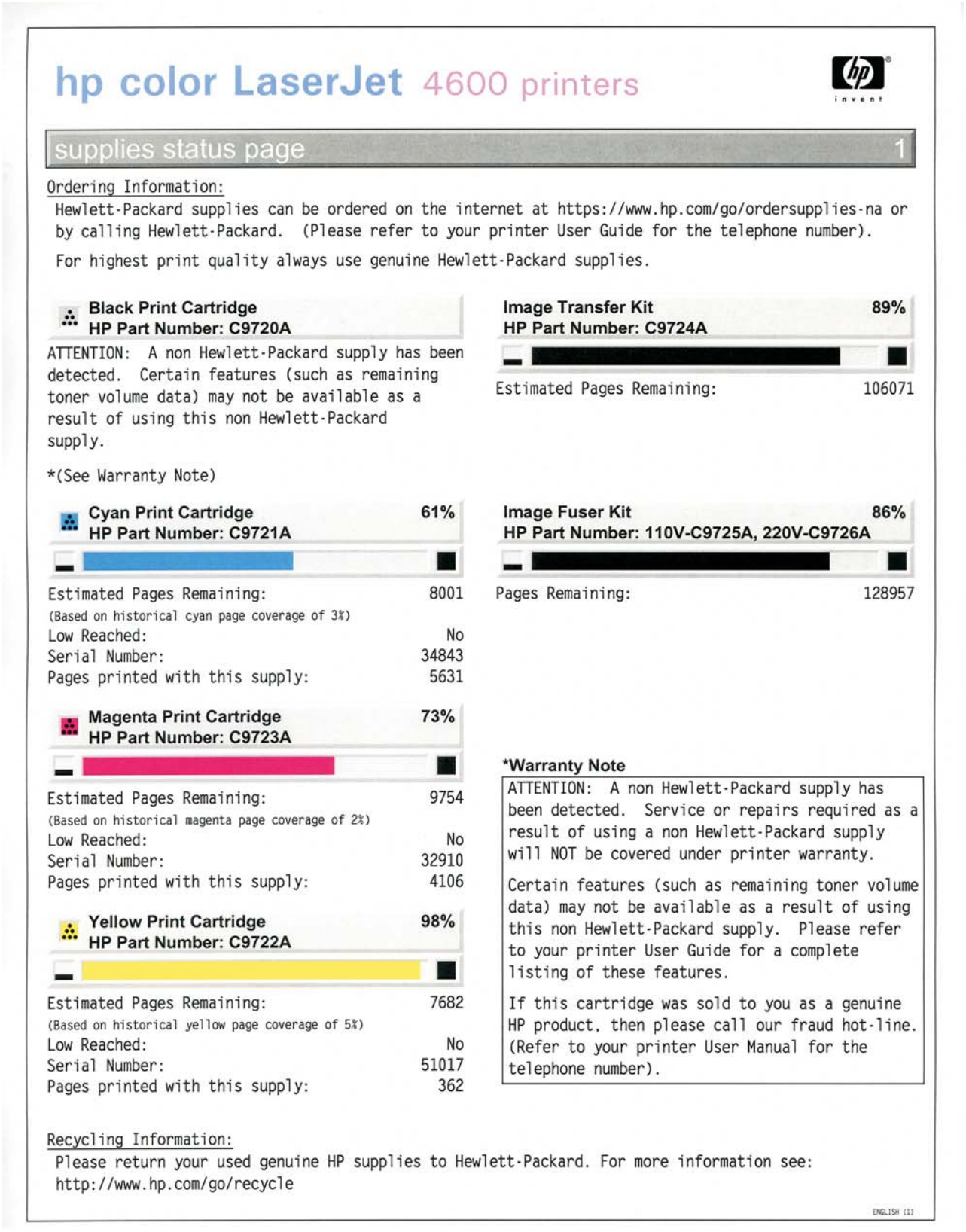
The final stages are where the ETB belt and drum are cleaned.

ETB Cleaning:

The ETB belt is cleaned whenever the printer is turned on, when the printer’s covers are closed, at the start of a print job, and after a specific number of pages. Both positive and negative bias voltages are applied to the transfer charge rollers. These voltages repel any residual toner off the ETB and onto the OPC drum where it is cleaned off by the wiper blade. After a print cycle, there is toner with both a negative potential, as well as toner with a positive potential left on the ETB. This is why both voltages are needed.

Since the developer roller is always in contact with the OPC drum, precautions are needed in order to make sure that the toner supply chambers are not contaminated with old toner. During ETB cleaning as well as pure monochrome printing, the developer roller should not be in contact with the drum. To accomplish this, the bottom half of the cartridge has been designed to pivot so that the developer roller is moved away from the drum. See Figure 6. A small block is located under the back edge of each cartridge that pushes up to disengage the developer roller.

continued on page 12



hp color LaserJet 4600 printers

supplies status page 1

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For highest print quality always use genuine Hewlett-Packard supplies.

Black Print Cartridge
HP Part Number: C9720A

ATTENTION: A non Hewlett-Packard supply has been detected. Certain features (such as remaining toner volume data) may not be available as a result of using this non Hewlett-Packard supply.

*(See Warranty Note)

Image Transfer Kit 89%
HP Part Number: C9724A

Estimated Pages Remaining: 106071

Cyan Print Cartridge 61%
HP Part Number: C9721A

Estimated Pages Remaining: 8001
(Based on historical cyan page coverage of 3%)
Low Reached: No
Serial Number: 34843
Pages printed with this supply: 5631

Image Fuser Kit 86%
HP Part Number: 110V-C9725A, 220V-C9726A

Pages Remaining: 128957

Magenta Print Cartridge 73%
HP Part Number: C9723A

Estimated Pages Remaining: 9754
(Based on historical magenta page coverage of 2%)
Low Reached: No
Serial Number: 32910
Pages printed with this supply: 4106

Yellow Print Cartridge 98%
HP Part Number: C9722A

Estimated Pages Remaining: 7682
(Based on historical yellow page coverage of 5%)
Low Reached: No
Serial Number: 51017
Pages printed with this supply: 362

***Warranty Note**

ATTENTION: A non Hewlett-Packard supply has been detected. Service or repairs required as a result of using a non Hewlett-Packard supply will NOT be covered under printer warranty.

Certain features (such as remaining toner volume data) may not be available as a result of using this non Hewlett-Packard supply. Please refer to your printer User Guide for a complete listing of these features.

If this cartridge was sold to you as a genuine HP product, then please call our fraud hot-line. (Refer to your printer User Manual for the telephone number).

Recycling Information:

Please return your used genuine HP supplies to Hewlett-Packard. For more information see: http://www.hp.com/go/recycle

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Figure 11

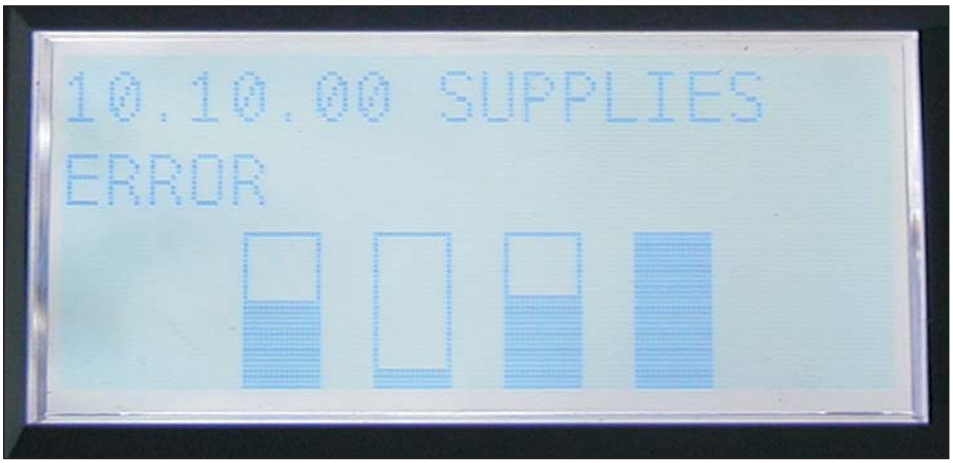

Figure 12

OPC Drum Cleaning:

The drum is cleaned after the image is transferred to the paper by the wiper blade. This part is fairly standard; the wiper blade scrapes the toner off the drum, and the recovery blade guides it into the waste chamber. The waste toner is then moved to the back of the waste chamber by the waste toner transfer plate. The difference here is that other rollers need to be cleaned as well. During normal printing, toner will stick to the PCR and the toner charging roller. Negative DC bias voltages are applied in varying values to both rollers so that the toner moves from the rollers onto the drum, where the wiper blade will remove it. The PCR and toner charging roller cleaning process occurs whenever the printer is turned on, when the printer's covers are closed, at the start of a print job, and after a specific number of pages.

At first glance when you look at the specs of this printer; 17ppm, 600 DPI it is not all that impressive. When you consider all that is happening and the speed it is happening at, these machines are very impressive. I take my hat off to the engineers at HP and Canon. (Or is it Canon and HP?)

Printer Calibration:

At the start of all this is the calibration cycle. The printer will calibrate itself whenever the printer is turned on, when a new toner cartridge is installed, after 8 hours of run time, and at specific page intervals. Calibration consists of a solid block and halftone of each color being printed to the ETB. As the printed areas get to the top of the belt, a sensor will detect them, measure the density, and adjust the printer accordingly.

There are also physical calibrations of the gear train, and various rollers.

Reset Chips:

The Reset chips (or “memory tags” as HP likes to call them), function the same as other HP chips. They control the “Toner Low”, “Toner out”, and “Replace (Color) Cartridge” Messages. Each color cartridge has a specific chip. Be careful not to mix them up. Figure 7 shows the supplies status page with 4 new OEM cartridges. Figure 8 shows the printer display of the same on the printer. Figure 9 shows the Supplies status page with a used chip on the new OEM black cartridge. Figure 10 shows the printer display with the same. The only way to print with a used or missing chip is to disable the Cartridge Check Mode of the printer. This is a *temporary* diagnostic mode only and should not be disabled on any customer’s machine. This mode will disable all toner checks as well as cartridge checks. (It is possible in this mode to run the machine with a cartridge missing). This is especially useful to help find a noisy cartridge. This is a temporary solution because there will not be any toner low or toner out signals. After a cartridge has emptied, and calibration has occurred, errors will show on the display. This is NOT a substitute for not replacing the chip. The Disable cartridge CHECK Mode is reached through the Diagnostics Menu. Only trained knowledgeable technicians should enter this mode.

Figure 11 shows the supplies status page with no chip on the black cartridge, and Figure 12 shows the printer display. The message “Supplies Error 10.1.1.10 will show on the display and the printer will not print.

Figures 7-12 are located on pages 7-12

Toner Low Detection:

The last thing that needs to be discussed before getting to the actual remanufacturing, is the toner level detection. The 4600 printers determine cartridge life by a number of different ways. It measures the number of OPC drum rotations, the number of developer roller rotations, and actual amount of toner left. Each of these measurements is written to the chip. When the supplies status page is run, the lowest remaining percent is the number that is reported. In other words if you run very low coverage per page, the amount of toner left in the supply chamber will be higher than the reported percent left because of the high revolution count on the drum and developer rollers.

NOTE: 1 Due to the nature of color toner, it is not recommended that the initial color of a cartridge be changed. It is virtually impossible to get all the toner out of a cartridge, and if two colors are mixed, the color output will be affected. Another reason not to try and interchange is that there are tabs in one location for black cartridges, and in another for color. These tabs are what the disengage block uses to move the developer roller away from the drum.

NOTE: 2 While the actual remanufacturing method for these cartridges is fixed, this is actually a preliminary instruction in as far as what can be used to clean the rollers, or what should be replaced each cycle. At the time of this writing, quality toner has not been around long enough to run any degree of component tests.

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

Required Tools

1) Toner approved vacuum.
2) A small screw driver (Common Style)
3) A Phillips head screwdriver
4) Needle Nose Pliers
5) Spring Hook
6) Small hammer
7) Small punch

Supplies Required

4600 Dedicated Color Toner
New replacement chip (Separate chips for each color)
New Long Life 4600 Drum
New Wiper Blade
New toner feed roller
New PCR [Optional]
New Doctor Blade [Optional]
Shipping Lock
Lint free Cloths
Conductive grease

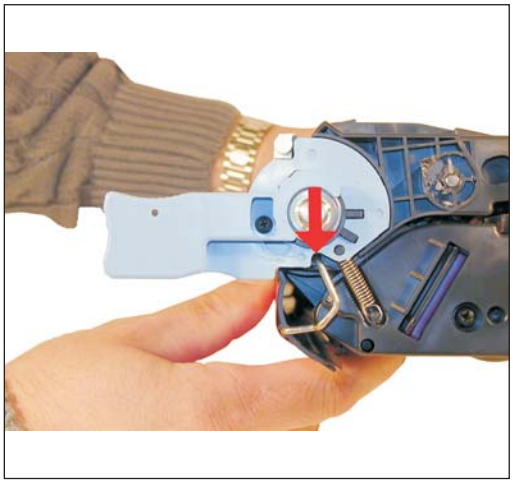

Figure 13

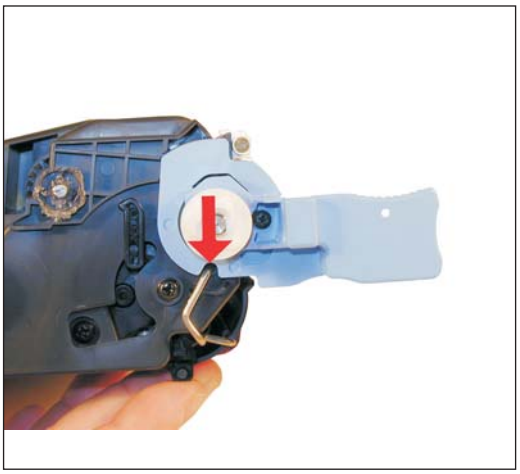

Figure 14

1) Open the drum cover, and remove both sides of the metal hinge bar from the cartridge. See Figures 13 & 14

Figure 15

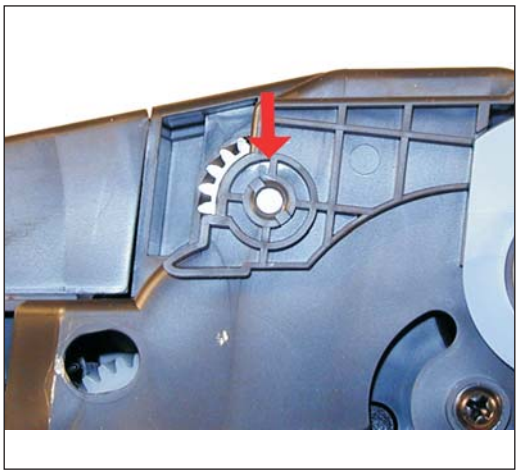

Figure 16

2) Remove the drum cover from the spring loaded arm. Place the cover aside. See Figure 15

3) With either a sharp knife or a Dremel tool with a grinding bit, remove the inner plastic ridges from around both sides of the hinge pins. Figure 16 shows an un-cut section, and Figure 17 shows a cut section.

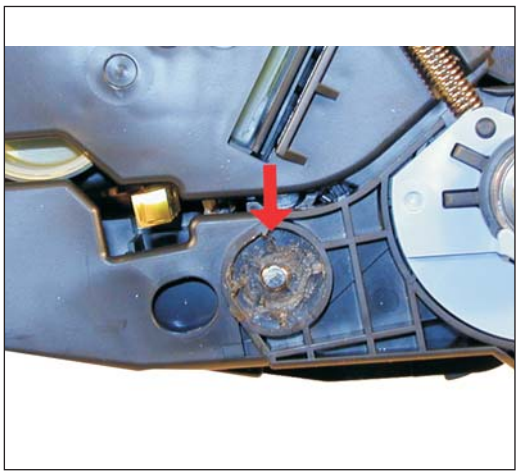

Figure 17

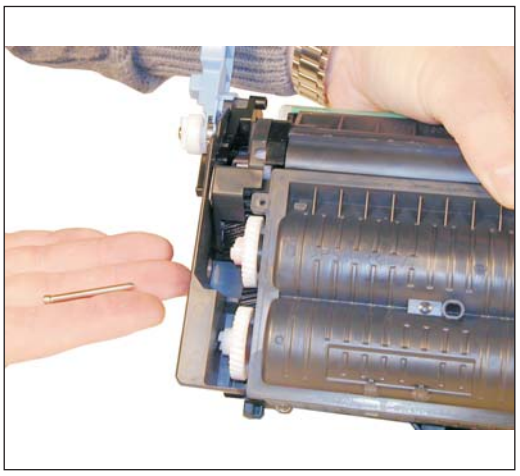

Figure 18

4) Remove the two pins. Note that the larger pin is from the gear side of the cartridge. See Figures 18 & 19

Figure 19

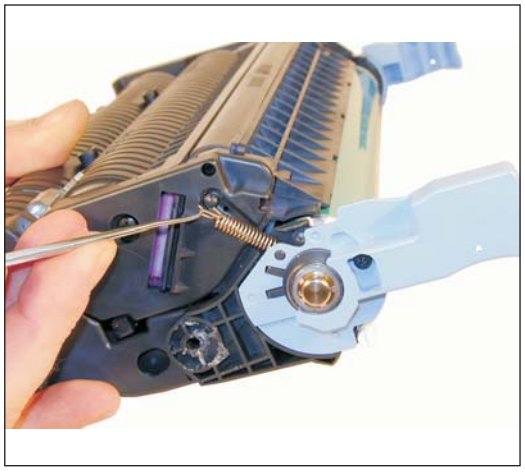

Figure 20

5) With the spring hook, remove the spring from the non-gear side of the toner hopper. See Figure 20

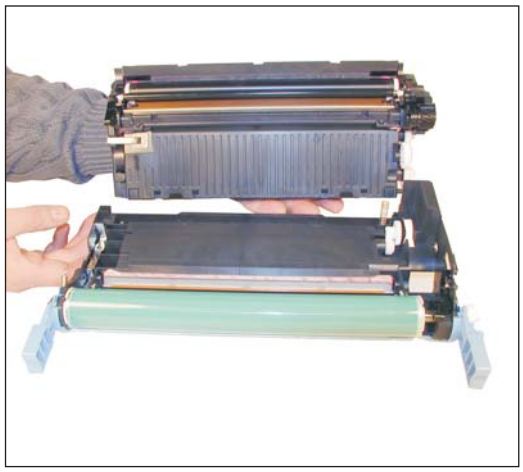

Figure 21

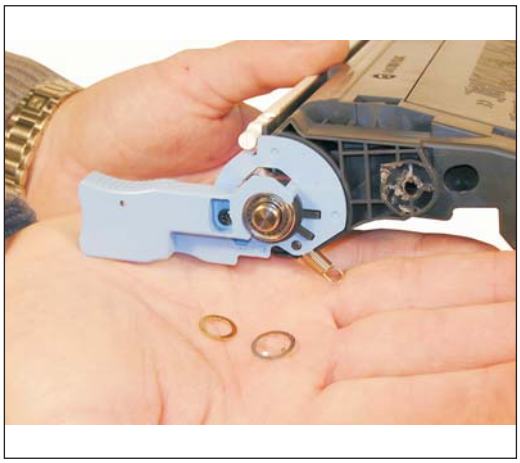

Figure 22

6) Separate the two halves. See Figure 21

7) On the right side of the waste chamber, remove the retaining ring and the metal washer. See Figure 22

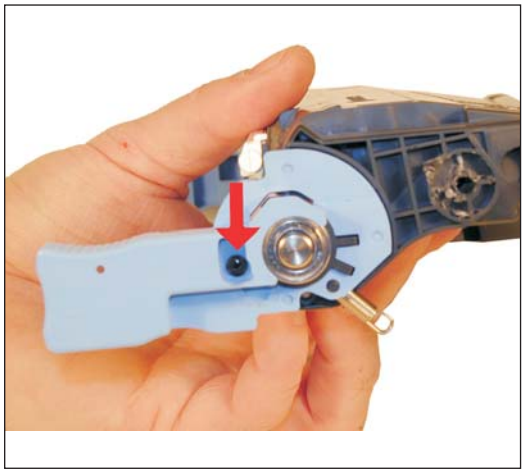

Figure 23

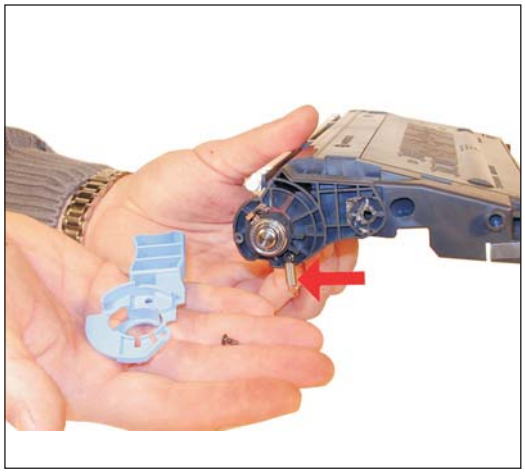

Figure 24

8) Remove the screw on the handle, the handle, and the spring. See Figures 23 & 24

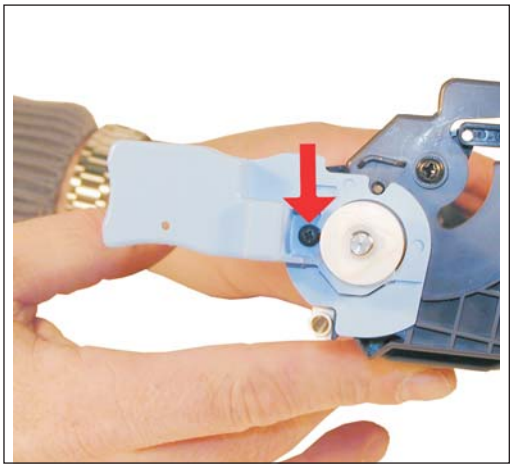

Figure 25

Figure 26

9) On the opposite side of the cartridge, remove the screw from the cartridge handle. See Figure 25

10) Pull the drum axle out by the handle. You will probably have to tap the opposite side of the axle to get it moving. See Figures 26 & 27.

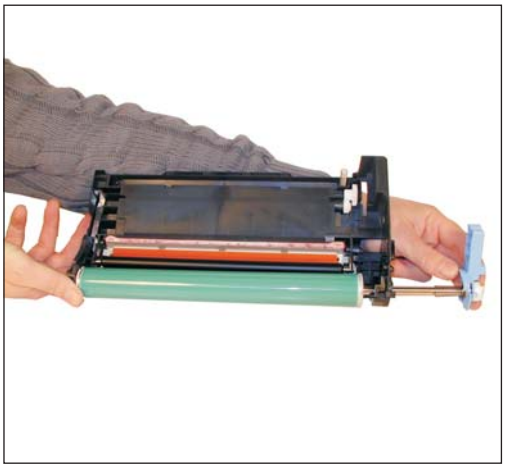

Figure 27

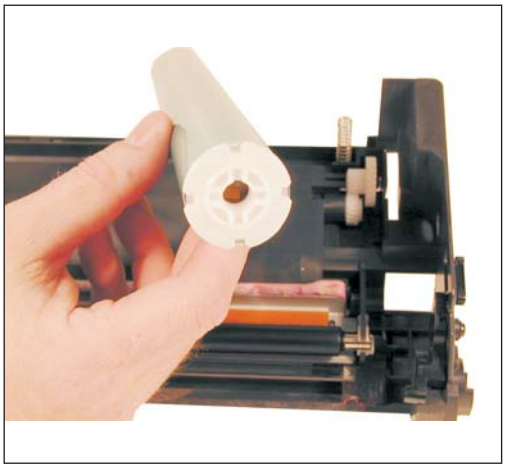

Figure 28

11) Remove the drum. Note that there are different hubs for each side. The Hub with the cross section goes to the gear side of the cartridge. See Figures 28 & 29

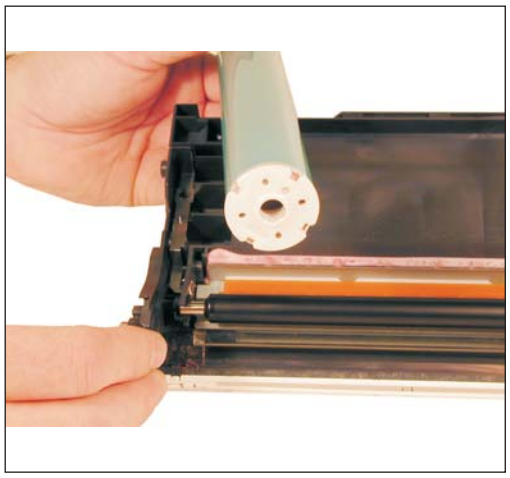

Figure 29

Figure 30

12) Remove the PCR. See Figure 30

13) Carefully cut the foam seal away from the back edge of the wiper blade. See Figure 31

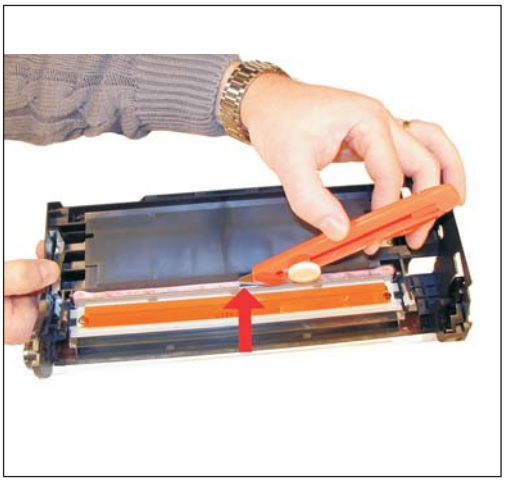

Figure 31

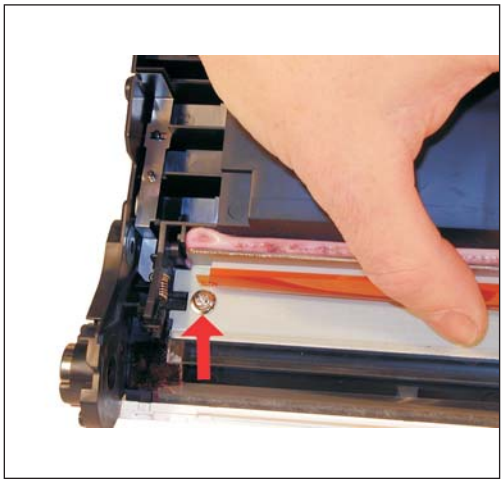

Figure 32

14) Remove both wiper blade screws. Note that the black self tapping screw is on the left, and the silver machine thread screw is on the right. See Figures 32 & 33

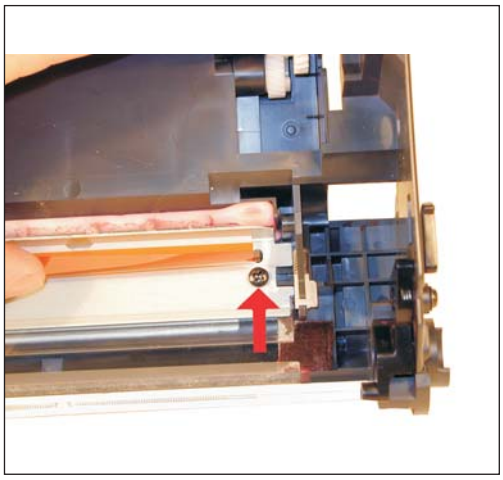

Figure 33

Figure 34

15) Remove the wiper blade. We have found OEM cartridges with all sizes of shims under the wiper blade. Some cartridges have none. If the cartridge has shims, be very careful to keep the left side shim for the left side, and the right to the right. There are different thickness shims sometimes on each side. The machine screw side may also have a metal washer. See Figures 34 & 35

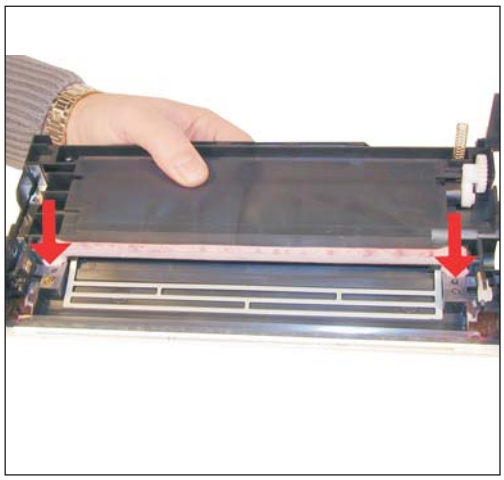

Figure 35

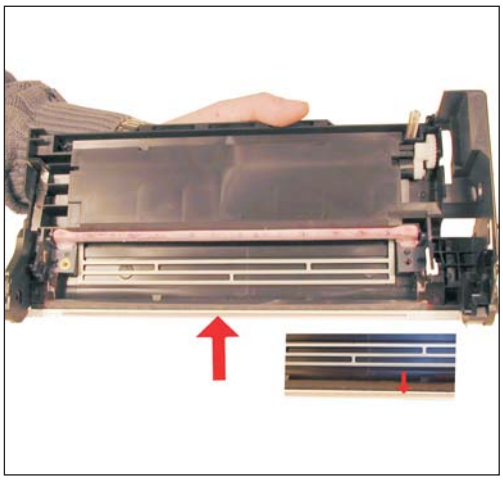

Figure 36

16) Clean out all the waste toner from the hopper. Wipe the hopper down with a clean cloth to remove all the toner dust that is sticking to the shell. As stated in the beginning of this article, these cartridges definitely need to be blown out. Vacuuming will cause severe static charges to build up, and will make it almost impossible to remove all the toner dust. These charges may also affect the print quality.

NOTE: Be very careful not to bend or otherwise damage the small thin recovery blade located next to the Wiper Blade when vacuuming. If this blade is bent down lower than the height of the wiper blade, toner will accumulate on top of the blade and spill into the printer. If the blade does get bent, it should be replaced

17). Make sure that the white bar on the edge of the waste chamber is clean. This bar houses the Primary exposure LED's. This is an array of LED's that start the printing process, preconditioning the drum so that the PCR can charge it evenly. See Figure 36

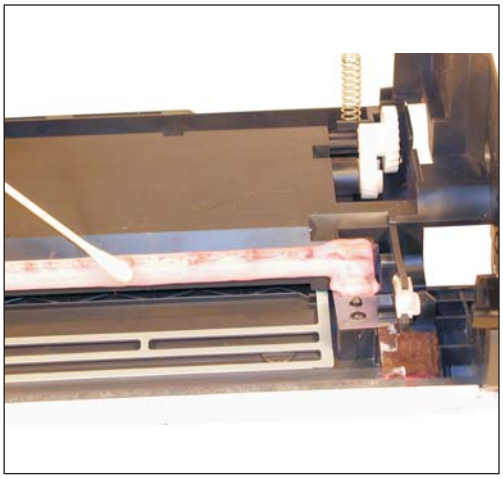

Figure 37

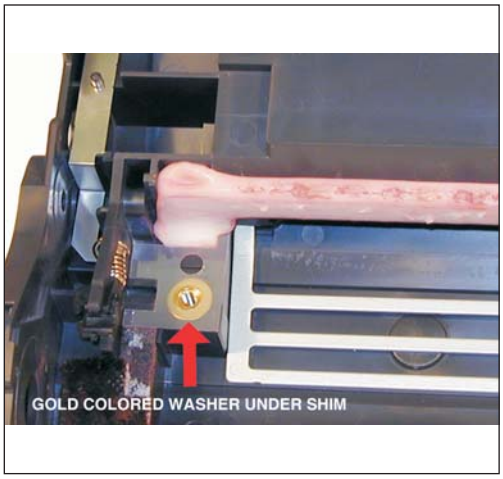

Figure 38

18) If the wiper blade foam seal is intact with no cuts, it can be re-used. Clean the foam with alcohol to remove any toner dust. This should make it sticky again. See Figure 37

19) Install the shims and washer (if present), in their correct places. Make sure the tab of the shim is touching the foam so that a good seal is made. See Figure 38

Figure 39

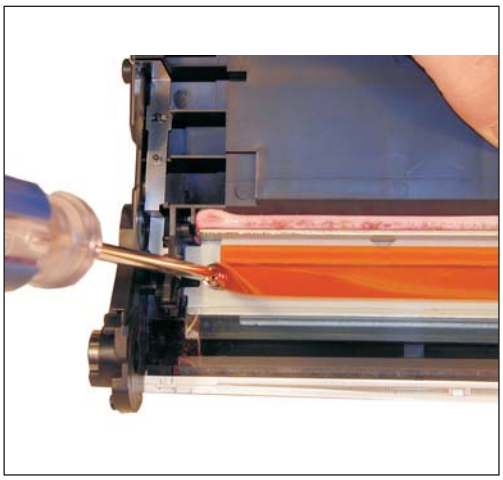

Figure 40

20) Install the new wiper blade and two screws. Make sure the silver screw is on the threaded side, and the black self tapping screw is in the plastic side. See Figures 39, 40 & 41

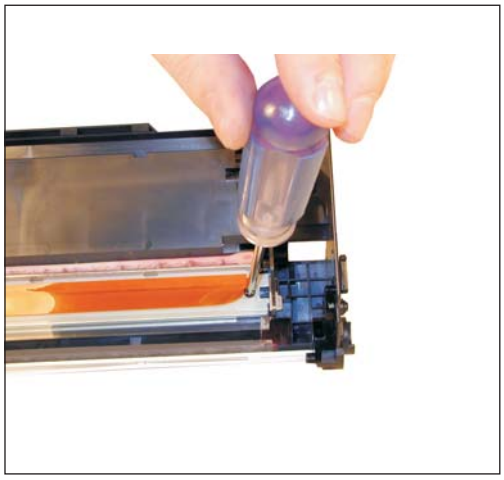

Figure 41

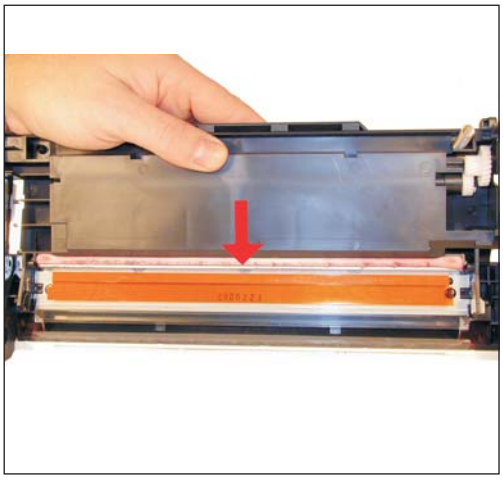

Figure 42

21) If necessary, run a thin bead of silicon caulk across the back edge of the wiper blade. This will ensure that there are no leaks. See Figure 42

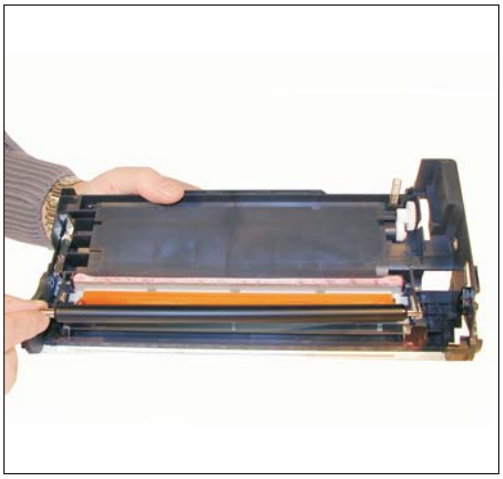

Figure 43

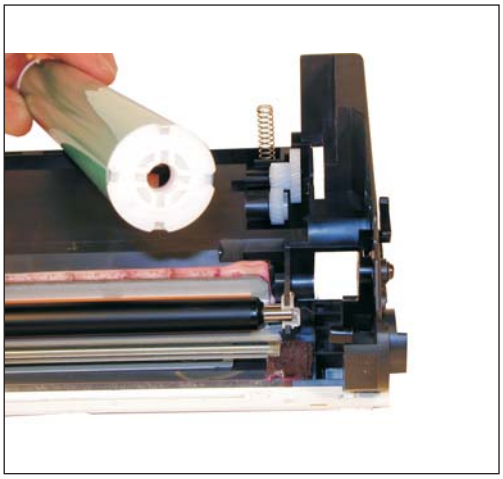

Figure 44

22) Wipe the PCR with a clean, dry, lint-free cloth and install it. Because the PCR also has a self cleaning mode in addition to the actual drum charging, we do not recommend that and chemicals be used to clean them. See Figure 43

23) Install the new drum. Make sure that the hub side with the cross section in it is facing the gear side of the cartridge. See Figure 44

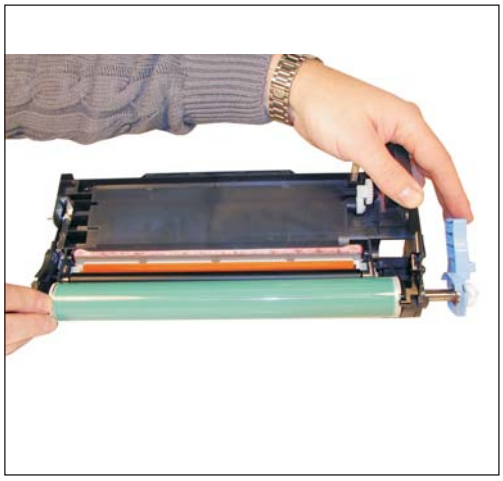

Figure 45

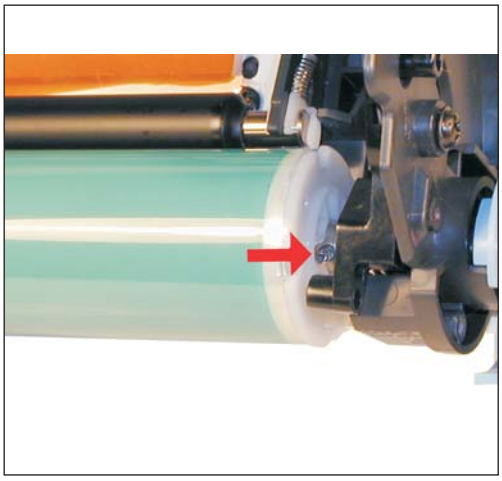

Figure 46

24) Install the drum axle shaft. See Figure 45

25) Make sure that the pins in the axle shaft fit into the cross section of the drum hub correctly. Fit the handle so that it sits flush with the cartridge, and install the screw. See Figures 46, 47, & 48

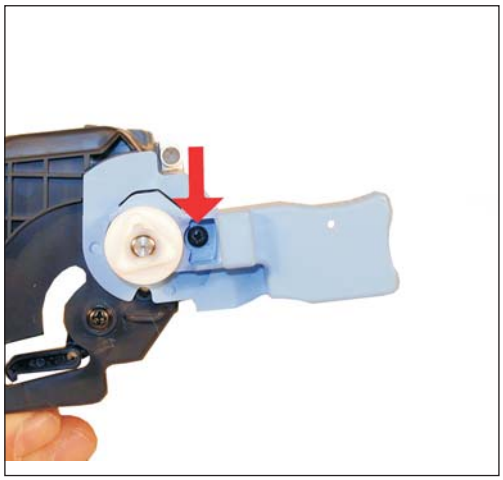

Figure 47

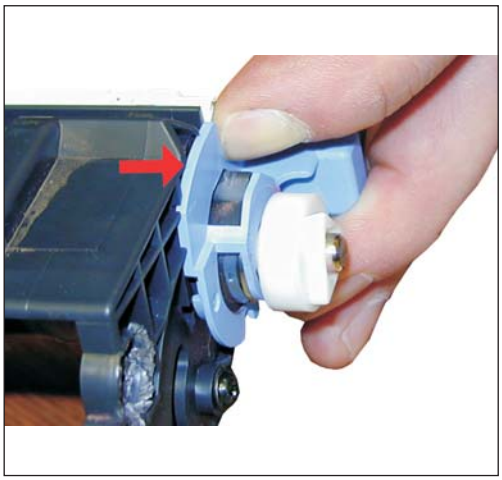

Figure 48

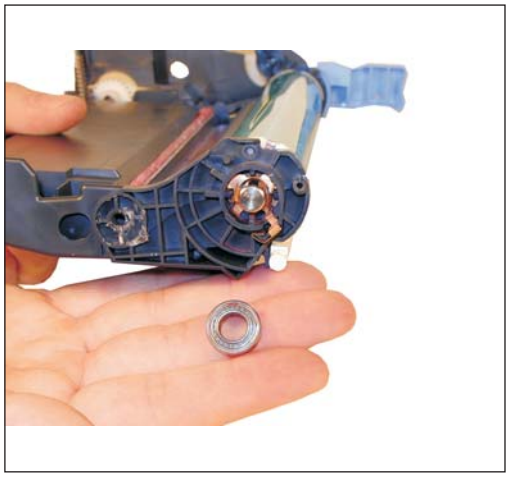

Figure 49

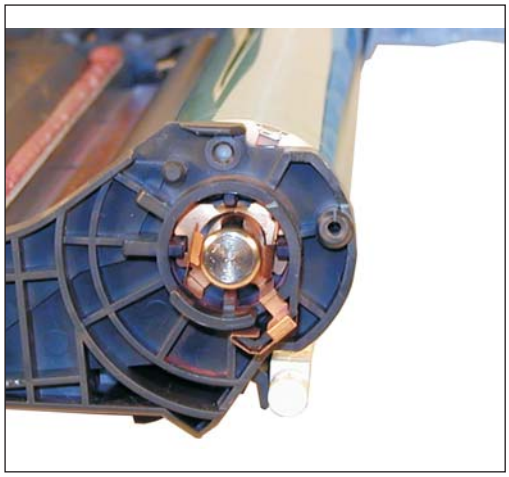

Figure 50

26) When the axle shaft was installed, the bearing on the opposite side will have come loose. If it has not completely fallen off, remove it now. Clean the contacts behind the bushing with alcohol. Re-install the bushing. See Figures 49 & 50

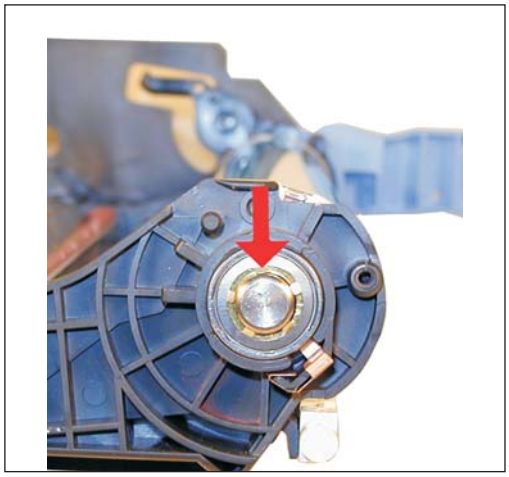

Figure 51

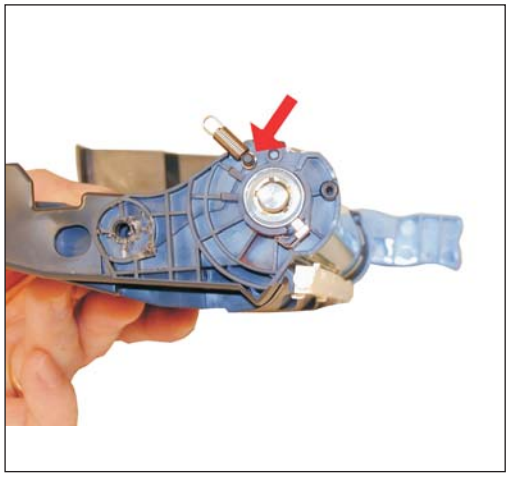

Figure 52

27) Install the metal washer and the retaining ring. See Figure 51

28) Install the small spring onto the post, install the handle and screw. Place the completed waste chamber aside. See Figures 52 & 53

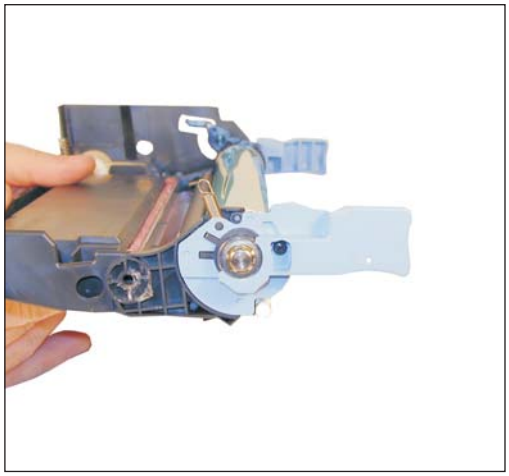

Figure 53

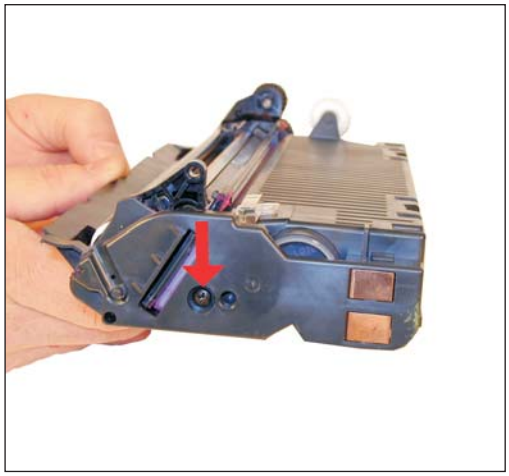

Figure 54

29) On the toner supply hopper, remove the screw on the left (non-gear) side end cap. See Figure 54

Figure 55

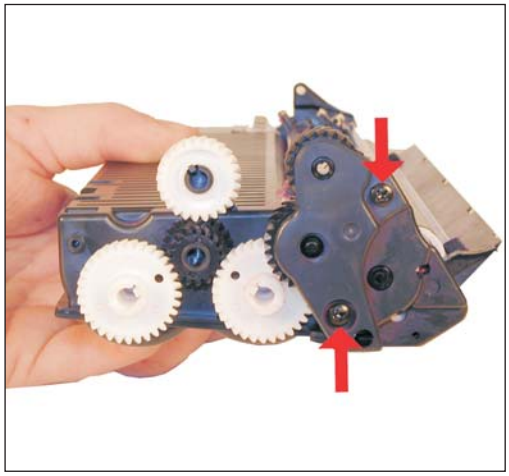

Figure 56

30) On the front edge of the end cap, there is a small locking tab. Press the tab in to release the end cap. See Figure 55

31) On the opposite side, remove the two screws on the gear end cap. Remove the end cap. See Figure 56

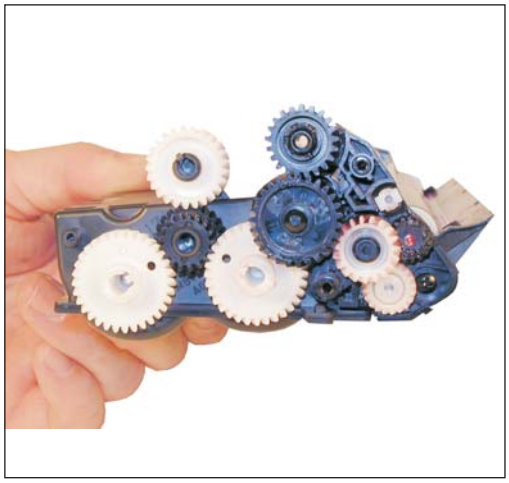

Figure 57

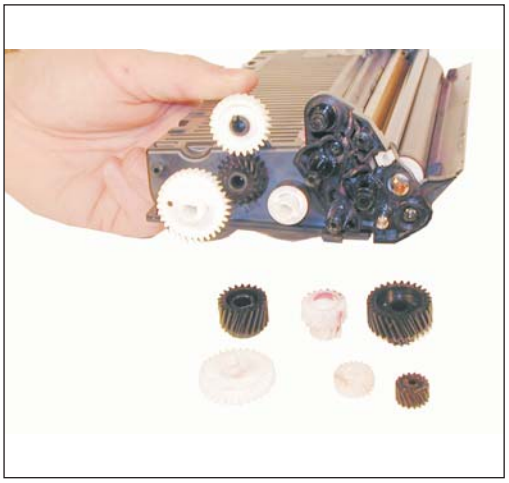

Figure 58

32) Remove the indicated gears from the cartridge. See Figures 57 & 58

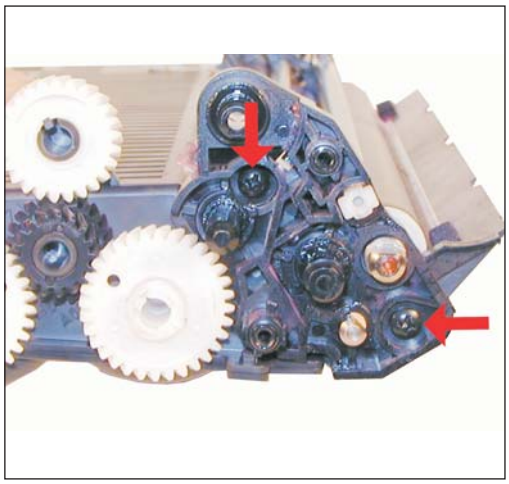

Figure 59

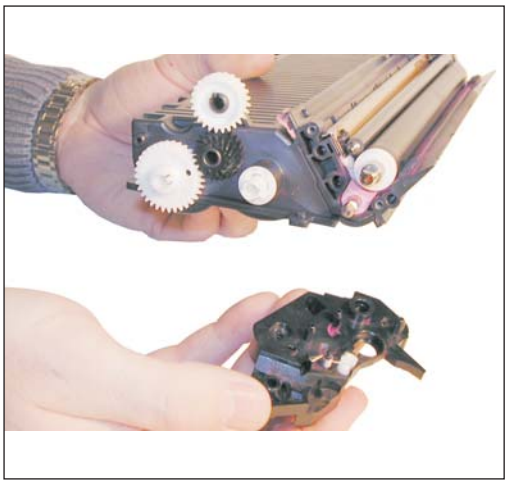

Figure 60

33) While still on the gear side, remove the two screws on the inner gear plate. See Figure 59

34) Remove the inner gear plate. See Figure 60

Figure 61

Figure 62

35) Remove the toner charging roller. See Figure 61

36) Remove the developer roller. Be careful not to loose the two white spacers. See Figure 62

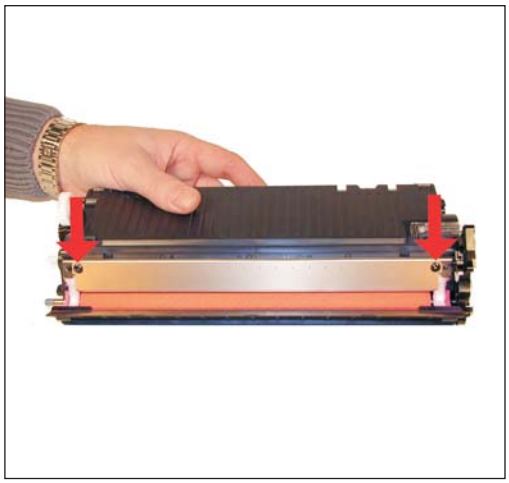

Figure 63

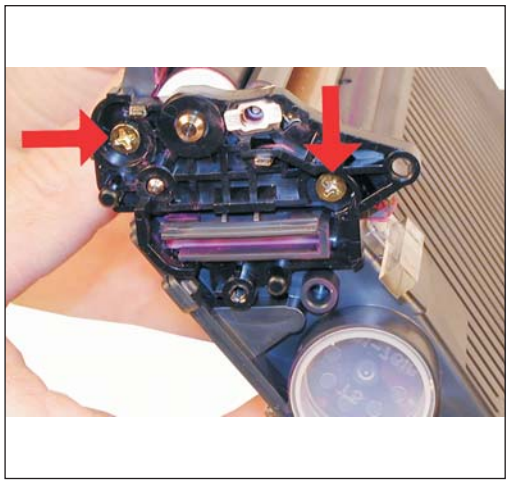

Figure 64

37) Remove the two screws and doctor blade. There is a long tab on the non gear side, pick up the blade from the gear side, and work loose. See Figure 63

38) Remove the two screws on the fill plug side end plate. Note that these two screws are different from other screws in this cartridge. See Figures 64 & 65

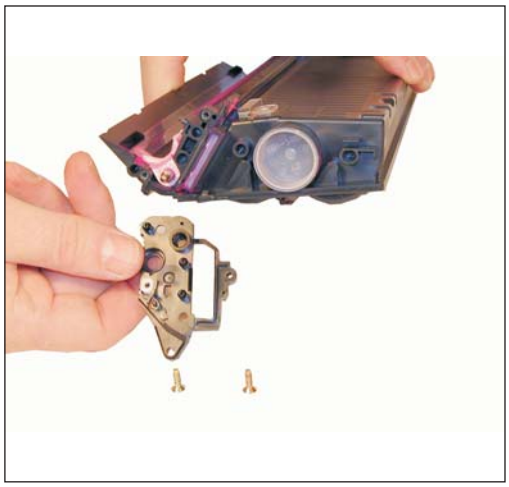

Figure 65

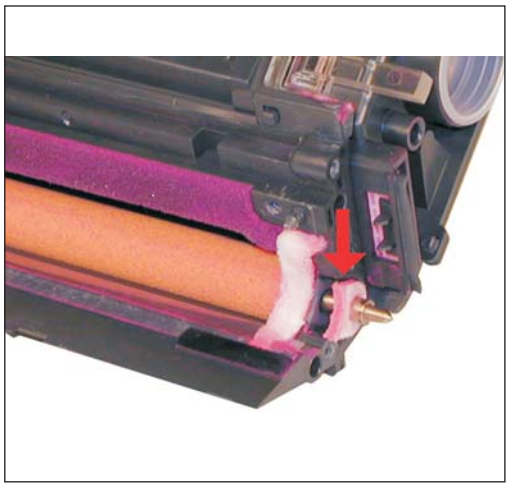

Figure 66

39) Remove the foam seals on both sides of the toner feed roller. See Figure 66

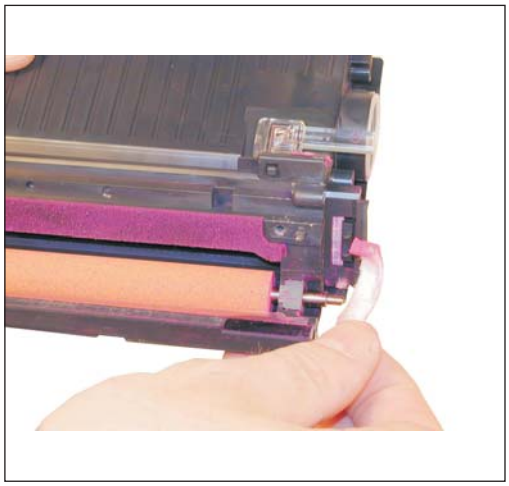

Figure 67

Figure 68

40) Carefully pry up the developer roller seal. Remove and place aside so that the toner does not contaminate the glue. See Figure 67

41) With a small common screwdriver, remove the small bushing. See Figure 68

Figure 69

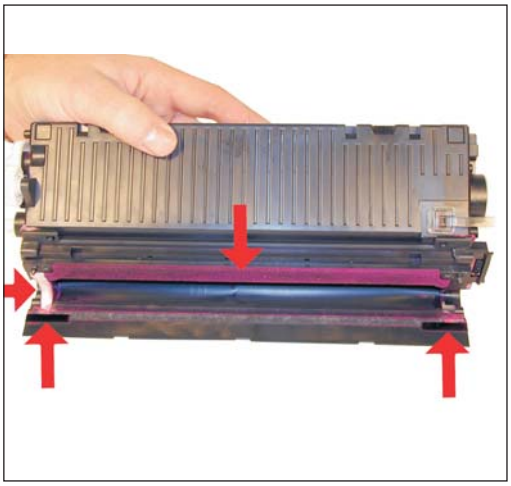

Figure 70

42) Remove the toner feed roller. See Figure 69

43) Clean out all remaining toner from the supply housing. Make sure all the felt and foam seals are clean. See Figure 70

Figure 71

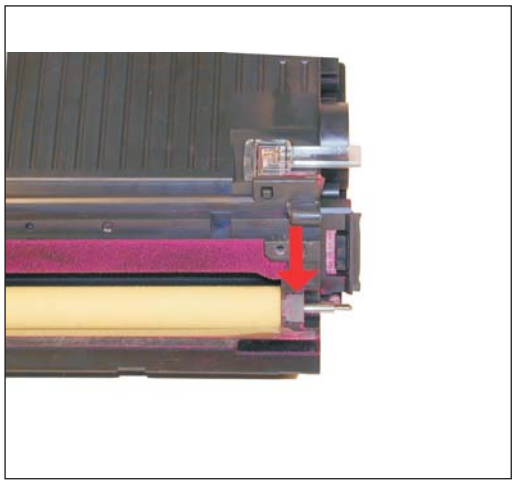

Figure 72

NOTE: If you are going to seal the cartridge, this is where you would start the sealing process. New seals are now becoming available, but a reliable easy way to open the hopper up is not. The hoppers are very easily damaged when prying them apart. We will release an update when we have worked out a good method.

44) Replace the cleaned or new toner feed roller (preferred) into the housing, keyed end to the gear side. See Figure 71

45) Install the toner feed roller bushing. See Figure 72

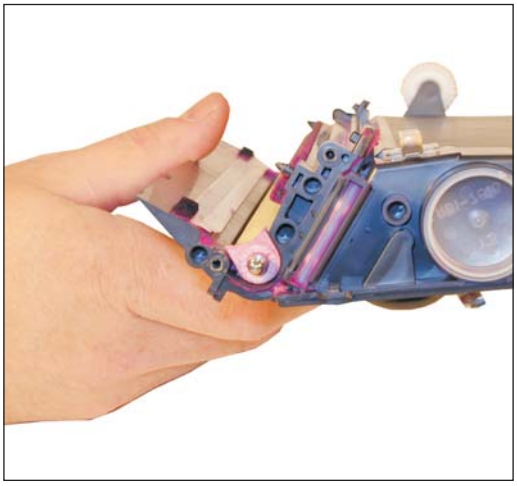

Figure 73

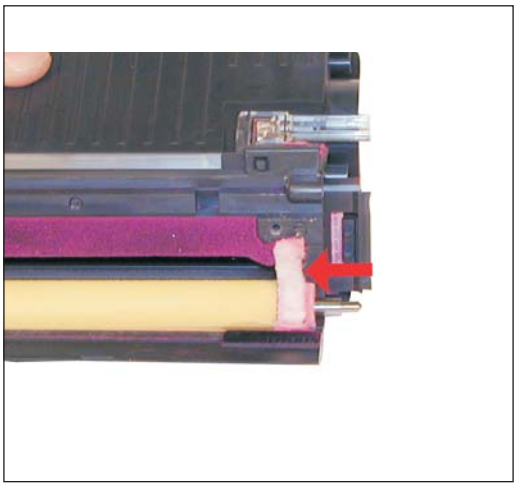

Figure 74

46) Install the feed roller foam seals on both sides of the cartridge. When new replacement seal are available, these should be replaced. See Figure 73

47) Replace the developer roller seal, clean if necessary. When new replacement seal are available, these should also be replaced. See Figure 74

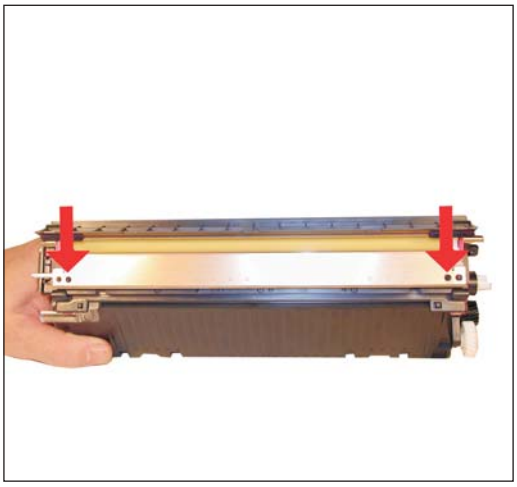

Figure 75

Figure 76

48) Install the doctor blade and two screws. Make sure that the metal tab is on the non-gear side. See Figures 75 & 76

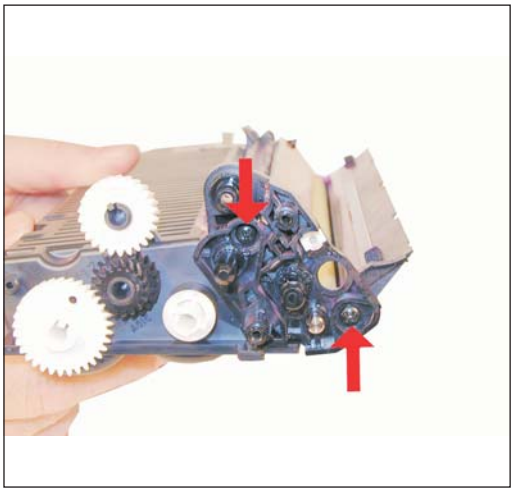

Figure 77

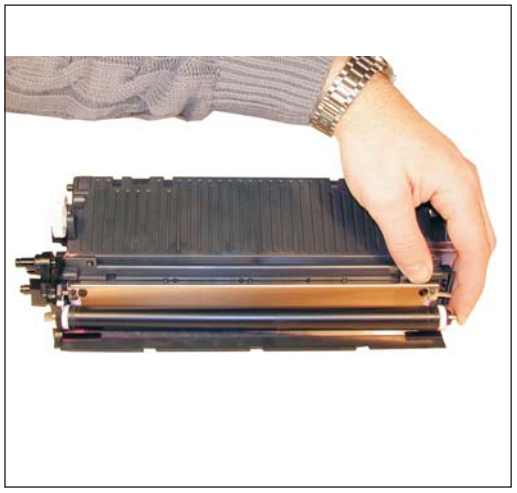

Figure 78

49) On the gear side of the housing, install the inner gear plate and two screws. See Figure 77

50) Wipe the developer roller down with a clean lint free cloth. Make sure the white spacers are clean. Install in the toner housing, keyed end to the gear side. See Figures 78 & 79

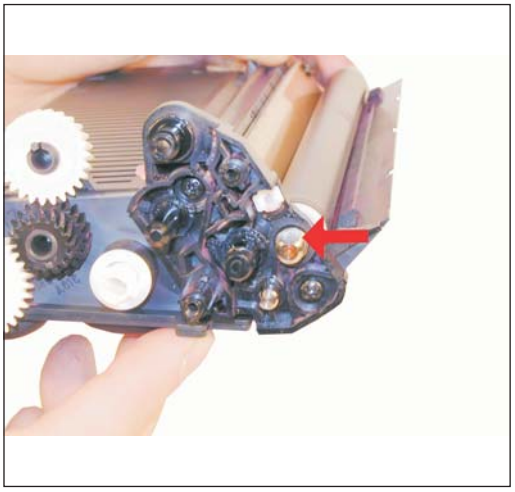

Figure 79

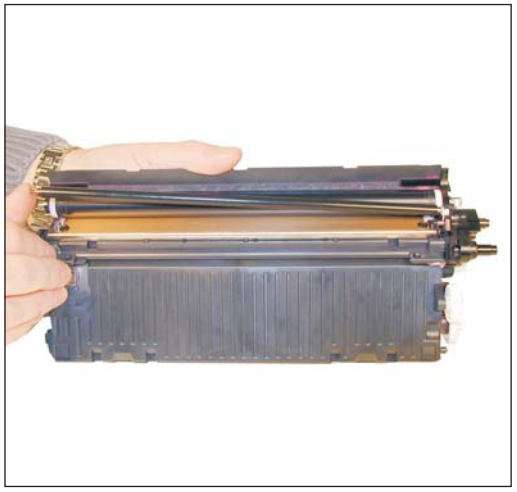

Figure 80

51) Wipe the toner charging roller down with a clean lint free cloth. Install it into the small white bushing. Make sure the spring is in the slot on the bushing. We have colorized the spring to show its position better. See Figures 80 & 81

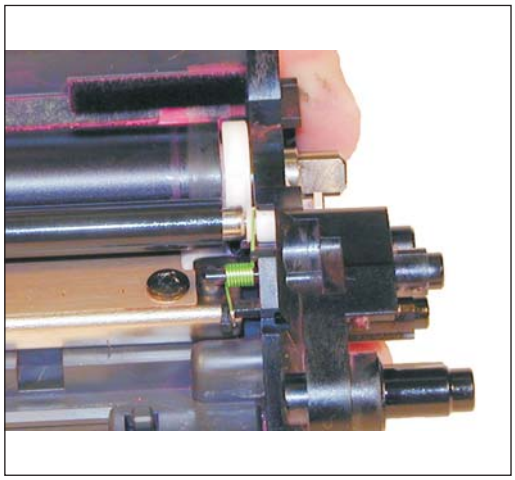

Figure 81

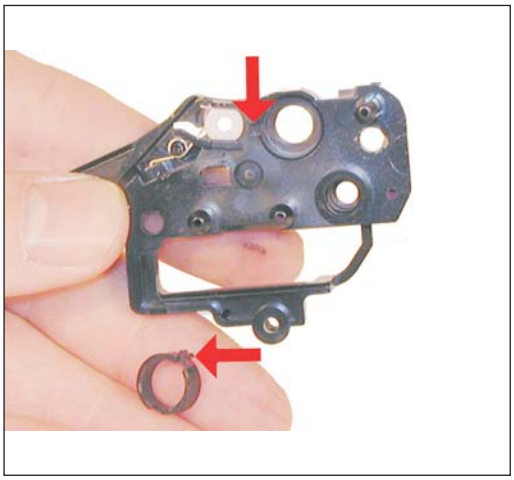

Figure 82

52) On the opposite side end cap, there is a small keyed developer roller bushing. Make sure it is in its slot, and is flush with the inside of the end cap. See Figure 82

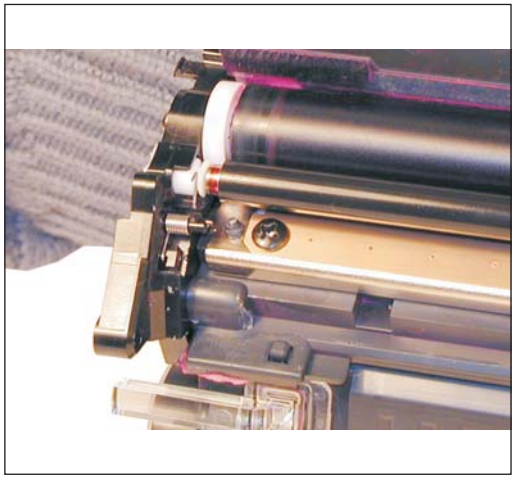

Figure 83

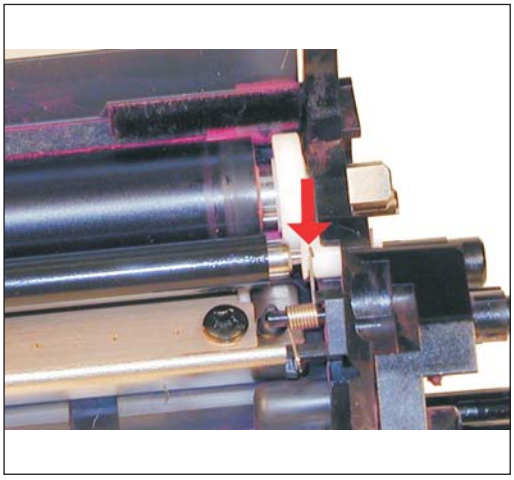

Figure 84

53) Install the remaining end cap. Watch to make sure the white bushing on the opposite side does not fall off when fitting the remaining end cap on. If it does, lift up the spring and press the bushing back in. Make sure the toner charge roller fits properly. Use the two gold colored screws. See Figures 83, 84 & 85

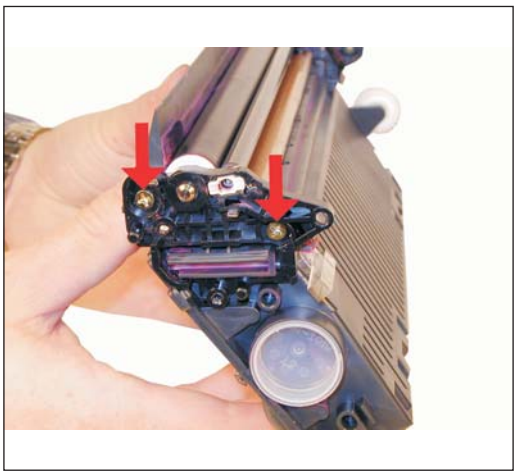

Figure 85

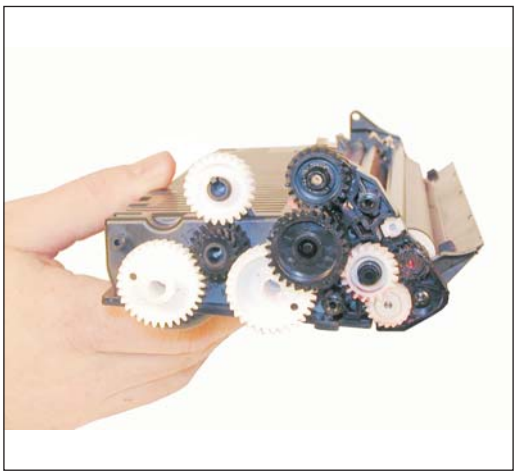

Figure 86

54) Install the drive gears as shown. See Figure 86

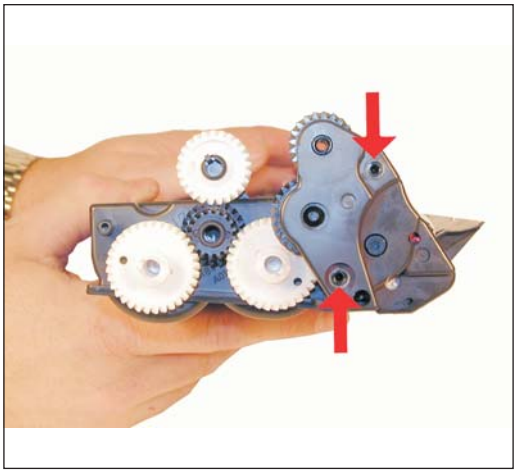

Figure 87

Figure 88

55) Install the drive gear end cap. See Figure 87

56) Fill the supply with the appropriate color toner. As stated in the beginning of this article, it is NOT a good idea to change the color of a cartridge. See Figure 88

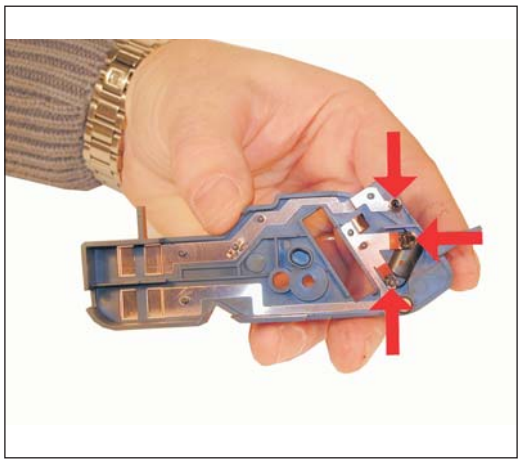

Figure 89

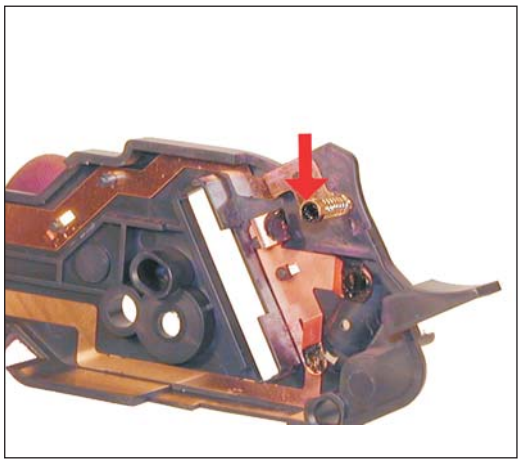

Figure 90

57) On the remaining end cap, clean off all the old conductive grease from the contacts and the small spring. Replace with small amounts of new conductive grease. See Figures 89 & 90

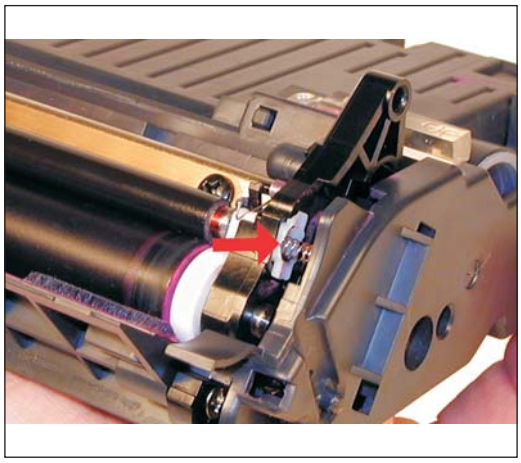

Figure 91

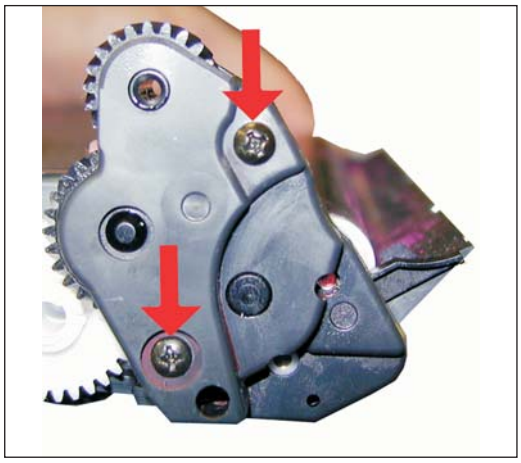

Figure 92

58) Install the end cap and screw. Make sure the small spring fits into the toner charge roller bushing. See Figures 91 & 92

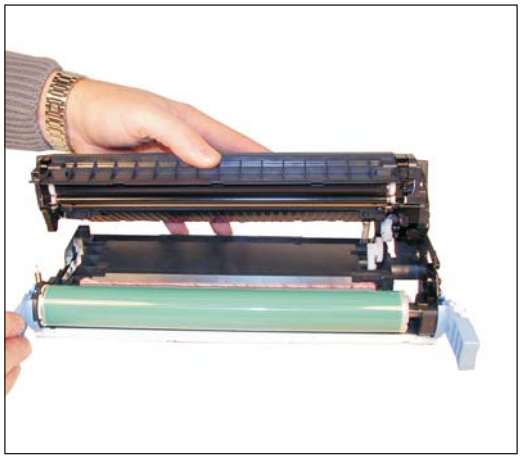

Figure 93

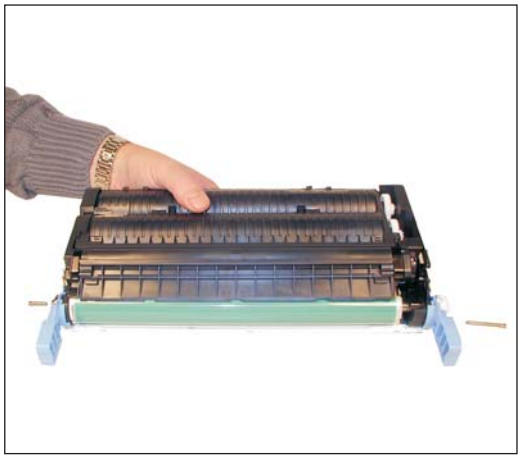

Figure 94

59) Place both of the halves of the cartridge together. Make sure the large spring fits into its slot. Insert the large pin into the gear side, smaller pin to the other. New replacement pins are now available that afford easier removal than the OEM. See Figures 93 & 94

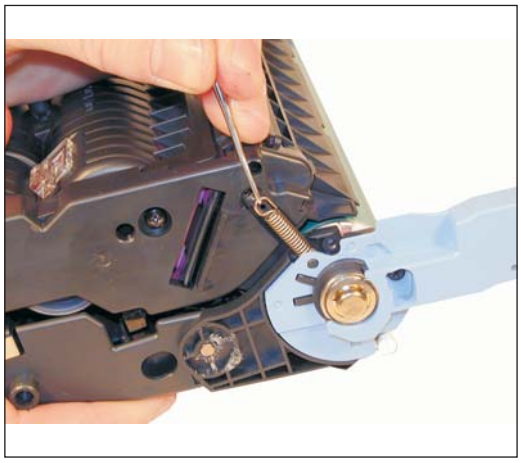

Figure 95

Figure 96

60) Install the small spring from under the handle to the post on the supply chamber. See Figure 95

61) Install the drum cover plastic pin into the spring loaded arm. See Figure 96

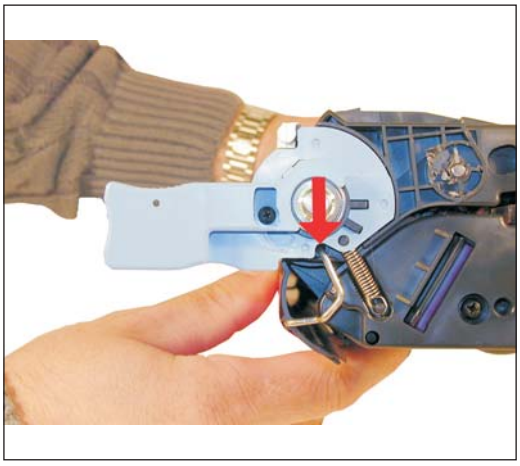

Figure 97

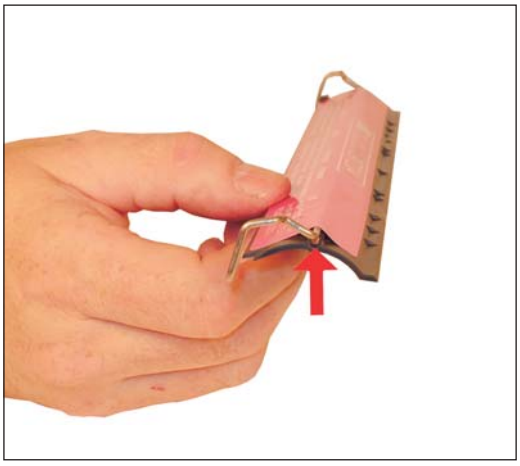

Figure 98

62) Install both sides of the metal arm of the drum cover into their respective holes on each side of the cartridge. Check to see that the cover operates freely. If the cover does not move freely, make sure that the bar is snapped into the cover properly. See Figures 97 & 98

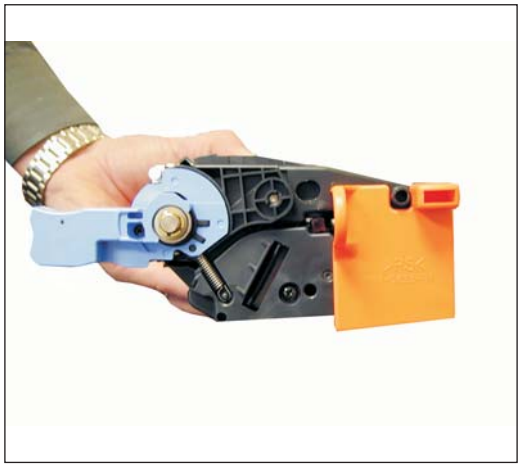

Figure 99

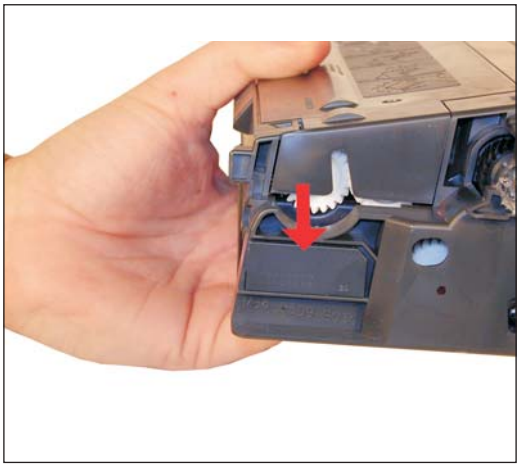

Figure 100

63) Install the shipping lock onto the cartridge. The flat tab fits into the slot in the cartridge, and the notch in the lock fits around the round post on the cartridge. See Figure 99

63) Replace the chip on the cartridge. Be sure to use the correct color chip for your cartridge. See Figure 100

Taking Test Prints

Configuration Page

Press the “Check” or “Select” button to enter the Menus

Press the “Down Arrow” button to highlight INFORMATION

Press “SELECT”

Press the “Down Arrow” button to highlight PRINT CONFIGURATION

Press “SELECT”.

Supplies Status Page

Press the “Check” or “Select” button to enter the Menus

Press the “Down Arrow” button to highlight INFORMATION

Press “SELECT”

Press the “Down Arrow” button to highlight PRINT SUPPLIES STATUS

Press “SELECT”.

Usage Page

Press the “Check” or “Select” button to enter the Menus

Press the “Down Arrow” button to highlight INFORMATION

Press “SELECT”

Press the “Down Arrow” button to highlight PRINT USAGE

After pressing SELECT the final time, the chosen page will print out. The Configuration page contains all printer information, and color bars. The Supplies Status page contains information about all the consumables. The Usage page contains information about printer identification, usage totals, and percent coverage by color

Repetitive Defect Chart:

Toner Charging Roller	14mm
Developer Roller	33mm
Primary Charge Roller	38mm
Media Attaching Roller	38mm
Toner feed Roller	39mm
Fuser Pressure Roller	63mm
Transfer Rollers	75mm
OPC Drum	94mm
Fuser Sleeve	107mm

Cartridge Troubleshooting

There is some concern on the drum drive gear assembly where it fits around the metal pins on the drum axle. In high use cartridges, this plastic may crack, causing the drum not to turn.

Primary Charge Roller (PCR); The primary charge roller if dirty will show on the test print as vertical gray streaks down the page, or as a gray background throughout the page. If there is any physical damage, it will repeat at intervals of 38mm.

A Dirty PCR Connection will result in dark black horizontal bars across the page, or as shading throughout the page**.**

A Scratched Drum will show up as a very thin, perfectly straight line that runs from the top to the bottom of the test page.

A Chipped Drum will result in a dot or series of dots that repeat at 94mm intervals**.**

A Damaged Developer Roller will either leave a mark or a blank spot (depending on the type of damage) at intervals of 33mm.

A Light Damaged Drum will show up as a shaded area on the test print that should be white**.** Again this will repeat at intervals of 94mm.

A Bad Wiper Blade will result in vertical gray lines down the page, or as shading across the entire page. In either case there will be a film of toner on the drum surface.

Some of the more common Printer Error Messages

10.XX.YY Supplies Error:

For XX = 00 Bad Chip

For XX = 10 Missing chip

For YY = 00 Black cartridge

For YY = 01 Cyan cartridge

For YY = 02 Magenta cartridge

For YY = 03 Yellow cartridge

13.XX.YY Misc. Paper jams

50.X Fuser Error

For X = 1 Low Fuser Temp.

For X = 2 Fuser Warm-up Service

For X = 3 High Fuser Temp.

For X = 4 Bad Fuser

For X = 5 Inconsistent Fuser

For X = 6 Open Fuser

51.XY Printer Error

For X = 1 Beam Detect Error

For X = 2 Laser Error

For Y = 0 No Color

For Y = K Black

For Y = C Cyan

For Y = M Magenta

52.XY Printer Error

For X = 1 Scanner Error
For X = 2 Scanner Startup Error
For X = 2 Scanner Rotation Error

For Y = 0 No Color
For Y = K Black
For Y = C Cyan
For Y = M Magenta
For Y = Y Yellow

54.X Printer Error

For X = 1 Temperature
For X = 3 Image Density Sensor
For X = 5 Color Plane Registration Sensor
For X = 6 Image Density Sensor
For X = 7 Yellow Drum Home Position Sensor
For X = 8 Magenta Drum Home Position Sensor
For X = 9 Cyan Drum Home Position Sensor
For X = 10 Black Drum Home Position Sensor
For X = 11 Black Density Sensor
For X = 12 Cyan Density Sensor
For X = 13 Magenta Density Sensor
For X = 14 Yellow Density Sensor
For X = 19 ETB Speed Control Sensor
For X = 20 Color Plane Registration Sensor
For X = 21-24 Toner Level Sensors

Calibrate Now

If you are experiencing problems with color in OEM cartridges, The “Calibrate Now” feature can be run. This forces a calibration cycle to run. This procedure does not always fix the issue, but it can.

Go in to the Menus until “CONFIGURE DEVICE” “PRINT QUALITY” shows on the display.

Press the Green “SELECT” Button

Scroll through the menus again until “PRINT QUALITY” shows on the display.

Press the Green “SELECT” Button

Scroll through the menus again until “CALIBRATE NOW” shows on the display.

Press the Green “SELECT” Button

The calibration cycle will begin