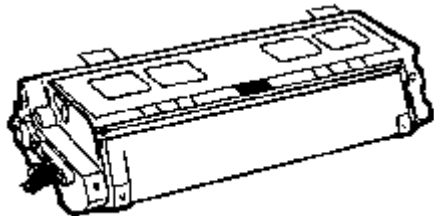


## TECHNICAL DOCUMENT



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## Canon LBP-BX Toner Cartridges

DOC-0204

### OVERVIEW



These instructions cover the disassembly of the EPB (BX style) toner cartridges. The BX Laser engine is a 600 DPI engine that is capable of printing on 11 x 17" paper, and uses a cartridge that looks similar to the LX cartridge only much larger. The HP part number for this cartridge is the C3900A. The most popular printers that use these cartridges are the HP-4V, and the QMS 860 series. The original BX cartridges were considered to be "BX", the new HP version is a "BX2". The only real difference is that the BX2 cartridge has a conductive plastic cap on the contact side of the PCR.

It should be noted that the HP version of this printer has a low power "Sleep Mode" that will activate after 15 minutes, which is the factory default setting. Once in the sleep mode, the three internal fans, and the fuser assembly are turned off. The printer will automatically leave the sleep mode when a command is received from either a computer, or the control panel.

The purpose of this disassembly is to vacuum out toner that will have spilled inside the cartridge during shipping and/or rough handling, to clean the debris cavity and to fill the toner supply housing with new toner. The disassembly can also be used to examine the internal parts of the cartridge for possible damage should the printing of the cartridge be poor and not correctable by other means.

This procedure should be read in it's entirety before proceeding with the actual recycling process.

### REQUIRED TOOLS



The tools needed to successfully and safely recharge toner cartridges are as follows:

- Toner approved vacuum. The ATRIX HCTV shop vac style toner vac, or the ATRIX AAA portable toner.

Some type of approved toner vacuuming system is important because toner consists of very fine particles that will pass right through a normal vacuum filter, and blow out the exhaust, creating a real mess.

- A small screw driver (Common Style)
- A Phillips head screwdriver with removable tips
- Small flush cutting electronic type wire cutters

### REQUIRED SUPPLIES



- BX black toner
- 6" wooden handled cotton swabs (CT-100)

- Toner Magnet cloths
- Lint-free synthetic cotton 4"x 4" pads (PW-96)
- 99% pure Isopropyl Alcohol (FR-8)
- Can of clean compressed air
- Kynar drum padding powder (DPP-K)
- Nu-Finish car polish
- New replacement pins with mushroom type heads (Pin-LX) [optional]
- New replacement recovery blade (RB-BX) [optional]
- New Long Life OPC Drum
- New Wiper Blade
- New Doctor Blade (DB-BX) [Optional]
- New PCR (PCR-BX) [Optional]
- New Magnetic Roller Sleeve (MRS-BX) [Optional]

## PREPARE WORK AREA



1. Before proceeding with the following procedure you should have a work area available with approximately 4' x 3' clear space. It should be covered with some disposable paper since toner will spill on this area. It is recommended that brown craft paper be used and taped to the work area. This will hold the paper in place when trying to vacuum toner from the paper.
2. A garbage can with a strong plastic liner should be adjacent to the work area to empty used toner. It should be at least 2' deep to prevent toner from clouding up and over the top of the bag during disposal.
3. Have a few rags available and some disposable paper towels. TM-1 Toner magnet cloths are ideal for this.
4. The work area should be capable of being ventilated, if by accident toner becomes dispersed into the air. An exhaust fan in one window is recommended for ventilation. If the circulation of air in the workplace is combined with other rooms in the building, toner dust may be carried into the other rooms. A separate and isolated HVAC system is recommended for the work area.

## DISASSEMBLY



1. Vacuum the exterior of the cartridge.
2. Place the cartridge upside down with the 2 pull-tabs towards you, and remove the spring on the right hand side.
3. On each side of the of the cartridge there is a small metal pin that has a 1/16" Diameter and protrudes from the side of the cartridge approximately. 1/16". These pins serve as hinges for the Toner supply chamber.
4. Carefully pry these pins out using a small pair of sharp, flush-cutting electronic type wire cutters. Make sure you pry these pins out. If you try pull them out, you may damage the ends of the pins and they will be much more difficult to remove.
5. Remove the supply Chamber and put aside.

## SEPARATE DEBRIS CAVITY AND DRUM



1. Remove the Phillips Head screw, and the white plastic drum axle pin with the metal in the center.
2. Remove the OPC Drum being extremely careful not to scratch it. Vacuum any toner and debris from drum being careful not to let the vacuum hose come in contact with the drum surface. Do not polish or wipe the drum with a dry cloth since this may scratch the drum. Blow off any remaining dust from the Drum using compressed clean air. If there is any matter on the drum that must be cleaned off, use 99% pure Isopropyl alcohol (FR-8 Film Remover) and a soft lint free cotton pad (PW-96) to lightly wipe the drum surface, then blow off the Drum using compressed clean air.

**CAUTION:** Be very careful not to tilt or shake the can while spraying, as the propellant may spray out and possibly ruin the drum.

Always handle the OPC Drum with the utmost caution, since if damaged it is costly to replace.

3. Place the OPC Drum in a soft lint free cloth and then into a dark colored bag or cover from bright light by some other suitable means. Again, do not rub or wipe the OPC Drum with a dry cloth as this may scratch its surface.

## CLEANING THE DEBRIS CAVITY



The storage area of the debris cavity is the entire area under the imprinted plastic.

1. Carefully remove the Primary Charge Roller (PCR) located next to the Wiper Blade. This is a small rubber roller with metal contacts on both ends. If this cartridge is the BX2 version, there will be a small black plastic cap on the end of the PCR. This cap is easily lost so be careful! When replacing the PCR, make sure that the Plastic cap is on the contact side.

**WARNING:** Do not clean this roller with alcohol, as this will remove the conductive coating on the roller. This roller takes the place of the corona wire assembly and it is recommended that it be cleaned with Nu-Finish car polish.

2. To clean the roller with the Nu-Finish car polish, apply a small amount, and buff with a clean lint free cloth until the roller is clean and shines. After the roller has been cleaned, clean the metal ends with alcohol. be careful not to get any of the alcohol on the rubber surface. For best results, we recommend that the roller be allowed to dry overnight before using. Place the PCR in a holder to dry. (A piece of wood with a hole drilled in it works fine). If the PCR is damaged or worn, replace with a new PCR-BX.
3. Remove the 2 Philips Head screws and wiper blade, vacuum clean.

**WARNING:** Be very careful not to bend or otherwise damage the small thin Recovery Blade located next to the Wiper Blade. 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 may be possible to carefully bend the blade up equal to or slightly higher than the Wiper Blade. Make sure that the edge of this blade is even across its entire length. If the blade cannot be repaired, replace it with our part # (RB-BX).

4. Clean the rubber wiper blade using a lint free cloth (PW-96) or a (TM-1) Toner Magnet This blade removes excess toner from the drum and must be free of any foreign matter. Be careful not to damage this blade. Lightly coat this blade with Kynar Drum Padding Powder model (DPP-K). Do not use plain DPP (Zinc Sterate) as this will stick to the charge roller and cause print defects, ( Small white voids in printed areas).
5. Replace the wiper blade and screws. If the Wiper Blade is damaged in any way it should be replaced with our part # (WB-BX). This blade should also be replaced automatically if you are going to use a new long life drum.

## CLEANING THE TONER SUPPLY HOUSING



The toner supply housing consists of the toner supply, magnetic roller and doctor blade which mounts directly next to the magnetic roller. The doctor blade consists of a metal bar that sits next to the Magnetic roller sleeve, with a rubber blade attached to it that rides under the roller. It is the pressure of this rubber blade against the magnetic roller that controls the amount of toner on the magnetic roller.

Before cleaning the toner supply, first rotate the magnetic roller by hand and observe the layer of toner applied to the magnetic roller. The toner should form an even consistent layer of toner with no clumps or lumps showing. Should the layer of toner be thicker in some areas the magnetic roller should be cleaned using our Magnetic Roller Cleaner (MRC-16) or 99% pure Isopropyl alcohol. Always remove the roller for cleaning and make sure it is completely dry before re-installing it. If there are small areas without toner on the Magnetic roller sleeve that show up as circular lines, the Doctor Blade (DB-BX) is worn out and should be replaced. If the sleeve is worn - replace it with a new MRS-BX.

**NOTE:** The magnetic roller is keyed on both sides, not just one as in all the other cartridges.

1. Remove the 1 1/4" fill plug on the end of the Toner Supply Housing. This housing contains the magnetic metal roller and the toner supply area. Dump the toner out of this housing and save or discard as desired. Vacuum the outside of the housing and the magnetic roller. Turn the metal roller a few times to vacuum all sides of the roller. Inserting the vacuum end up to the 1 1/4" fill hole while turning the magnetic roller aids in complete toner removal.

At this point, if you are going to ship the cartridge, the sealing strip must be inserted. The only seal available is the OEM style SS-BXO. For proper installation, please refer to the individual SS-LXO/BXO instructions.

Make sure that the metal bar located under the Magnetic Roller is clean. This bar is the Toner Low sensing bar and tends to have toner buildups, which may cause false toner low indications. It is also a good idea to remove the right side end cap. The sensing bar has a contact point there that is equally important to be clean.

2. Fill the supply with new toner and replace the fill cap

## RE-ASSEMBLE TONER SUPPLY HOUSING, PHOTOCONDUCTIVE DRUM AND DEBRIS CAVITY



1. Coat the OPC Drum with the Kynar (DPP-K), and replace the OPC Drum. Replace the drum into the debris cavity being extremely careful not to scratch or damage the drum. Insert the drum axle pin and Phillips head screws. Be certain the gears between the drum and cavity are meshed properly.
2. Manually turn the OPC Drum by the large gear towards the drum cover, until the Powder has been cleaned off the OPC Drum.
3. Carefully remove the OPC drum.
4. Clean and replace the Primary charge roller. Remember, if the PCR has a plastic cap on one end, it should be placed on the contact side of the PCR Holder.

**NOTE:** Proper care of this roller entails cleaning with Nu-Finish car polish. Clean the silver contact ends along with the U-shaped contacts with the Isopropyl Alcohol. These are electrical contacts and must be clean in order for the cartridge to print correctly. Clean the Plastic end cap with alcohol also, (if present).

5. Re-install the OPC drum in the cartridge. The cartridge should be assembled in this manner so that the PCR roller does not become contaminated with the (DPP-K) from the OPC drum.
6. Re-assemble the Cartridge by replacing the toner supply housing, inserting the small metal pins, and replacing the spring.

**NOTE:** When replacing the small metal pins, be careful not to push them in too far, or you won't be able to remove them again. Approximately 1/16" should be left exposed. Replacement pins (PIN-LX) are available which have a mushroom type head and are much easier to remove.

7. When transporting the cartridge without a seal it is best to keep the toner supply area facing up and the debris cavity facing down to avoid toner spillage. Felt wands are not used in this laser engine.

## TAKING TEST PRINTS AND TROUBLE SHOOTING



Before taking any test prints, there are a few items in the printer that should be checked to ensure optimum print quality. If these items are not maintained, they could cause print defects that may be incorrectly blamed on the toner cartridge.

Located in the base of the front lid, is the Transfer Charge Roller. This is a foam roller that must be kept clean. Be very careful not to touch this roller with any part of your skin. The oils naturally present in your skin, paper dust, and/or toner dust, can contaminate the roller, causing light print and/or small white voids in the text. This roller should have no cuts, or areas of missing foam, and should be a medium gray color. If the roller appears dirty, it should be vacuumed clean. If the roller is damaged it should be replaced.

The anti-static teeth are located just next to the Transfer Charge Roller. These teeth dissipate the static charge applied by the transfer charge roller to the paper. This helps prevent the paper from sticking to any of the rollers and causing a paper jam. If these teeth are dirty they should be vacuumed clean, or carefully blown off with a can of clean compressed air. Unlike most other printers, these printers do not come equipped with a brush to clean the teeth.

Since the most important part of the toner cartridge is the OPC drum, special attention should be taken with this part. To help determine the condition of the OPC Drum, a test print should be taken with the printer's intensity set to the darkest setting. This is with the green dial set towards the front of the machine, or set towards the thick end of the wedge shaped scale. Having the intensity set to the darkest setting will help to show up any OPC drum flaws that may not show up with the intensity set to the normal mid scale.

To run a test print, you must first turn the printer Off-Line. Press the Menu button 8 Times until TEST MENU appears on the display. Press the ITEM button 4 times until PCL DEMO PAGE appears on the display. Press the enter button. At this point the demo page will print out.

Although there are other test pages that can be run, we prefer the demo page because it combines both text and graphics.

We recommend that 2-3 pages be run so that any defect patterns that exist will be visible. Notice that the paper is ejected sideways from the printer, which matches how the paper is stored in the paper tray. For this reason, any marks on the paper in the direction of paper travel will appear sideways from left to right.

Once you have the print out's, they need to be examined to determine possible cartridge defects. In general, any marks on the paper that shouldn't be there indicate a problem. You should also examine print areas for abnormalities such as light print, poor black fills and print inconsistencies. This printer can print using 11 x 17", or 8 1/2 x 11 paper. When using 8 1/2 x 11" paper the paper is fed sideways, so that what normally would be vertical marks will actually be horizontal in the printout.

Some of the more common toner cartridge problems are:

A Dirty Primary Charge Roller (PCR); The primary charge roller is located Inside the cartridge, and if dirty will show on the test print as gray streaks across the page in the direction of paper travel, or as a gray background throughout the page.

A Dirty PCR Connection will result in dark black horizontal bars down the page, or as shading throughout the page. These bars will be opposite the direction of the paper travel

A Scratched Drum will show up as a very thin, perfectly straight line that runs across the test page.

A Chipped Drum will result in a dot or series of dots that repeat 2 or 3 times per page. Any drum defects will repeat 2 or 3 times per page based on the drum circumference of 3.7", and a page size of 8 1/2 x 11". It is for this type of defect that we recommend

you run 2 or 3 pages for each test print. Due to the drum circumference of 3.7", a chip may show up on one page 2 times and on the next, 3 times. It depends where the damaged section of the drum is when the print cycle starts.

A Light Damaged Drum will show up as a shaded area on the test print that should be white. Again this will repeat 2-3 times per page.

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

A Bad Drum Axle Pin will show up as a solid or almost solid black page. The metal pin inside the plastic axle pin has shifted, and the drum has lost its ground connection

## CARTRIDGE THEORY



The toner cartridge printing process is best explained as a series of steps, or stages. (See the following diagram). In the first stage, the Primary Charge roller (PCR) places a uniform negative DC Bias voltage on the OPC drum surface. The amount of the negative DC Bias placed on the drum is controlled by the printers intensity setting. This process is called conditioning.

In the second stage, (also called the imaging section), the laser beam will discharge this DC voltage to ground wherever it strikes the OPC's surface, leaving a latent electrostatic image on the drum. The OPC drum's circumference is 3.7" or approximately 1/3 of a page and therefore makes three revolutions for each 11" printed page.

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

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

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

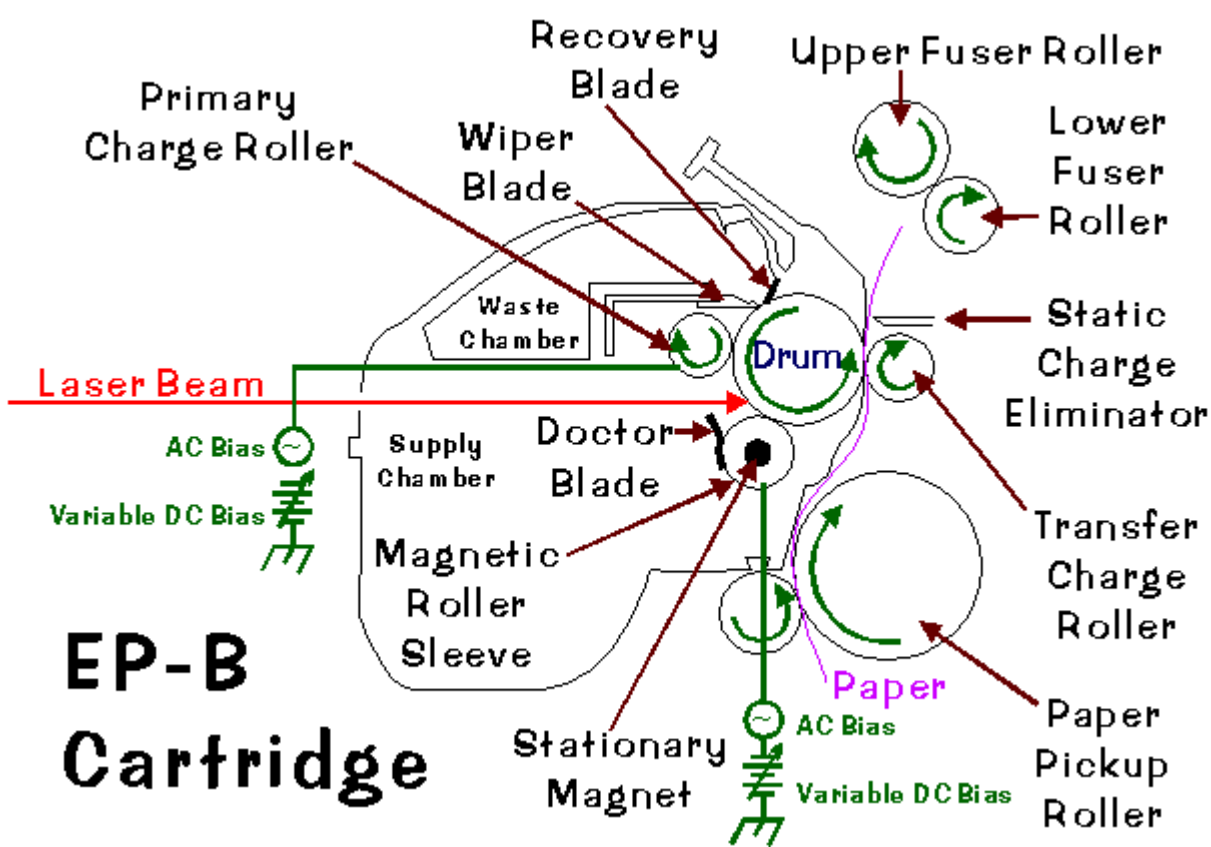
This image is then transferred to the paper as it passes below the drum by the transfer charge roller, which places a positive charge on the back of the paper. This positive charge causes the negatively charged toner on the drum's surface to be attracted to the page. The small diameter of the drum, combined with the stiffness of the paper causes the paper to peel away from the drum. The static charge eliminator weakens the attractive forces between the negatively charged drum surface, and the positively charged paper. Without this help, thin paper may wrap itself around the drum.

The image is then fused on to the paper by the fuser assembly, which is comprised of the upper and lower fuser rollers. The lower rubber roller presses the page up into the upper roller which then melts the toner into the paper. The upper roller is a hard Teflon coated, heated roller, which when printing has a temperature of about 180 Degrees C.

The fourth stage is where the OPC drum is cleaned. On average, approximately 90% of the toner is transferred to the paper during the print cycle. The remaining 10% remains on the OPC drum and is cleaned off the Drum by the wiper blade, guided into the waste chamber by the recovery blade, and stored in the waste chamber.

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

The advantages of the Primary Charge Roller are that it operates at a lower voltage than the old style corona wire, does not generate ozone, and it replaces the erase lamps that were present in the older style laser printers. The draw back to this technology is that if this roller becomes dirty, or contaminated in any way, the printed pages will have the problems as previously shown on the test pages. Since the Primary Charge Roller is not accessible from the outside of the cartridge, it cannot be cleaned by the user as the Primary Corona Wires can in older style cartridges.



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**RECOMMENDED SUPPLIES**



Microsoft OLE DB Provider for ODBC Drivers error '80004005'

[Microsoft][ODBC Microsoft Access Driver]General error Unable to open registry key 'Temporary (volatile) Jet DSN for process 0x3464 Thread 0x231c DBC 0x8437024 Jet'.

/script/catSearch.asp, line 58