ZPRINTER® 450

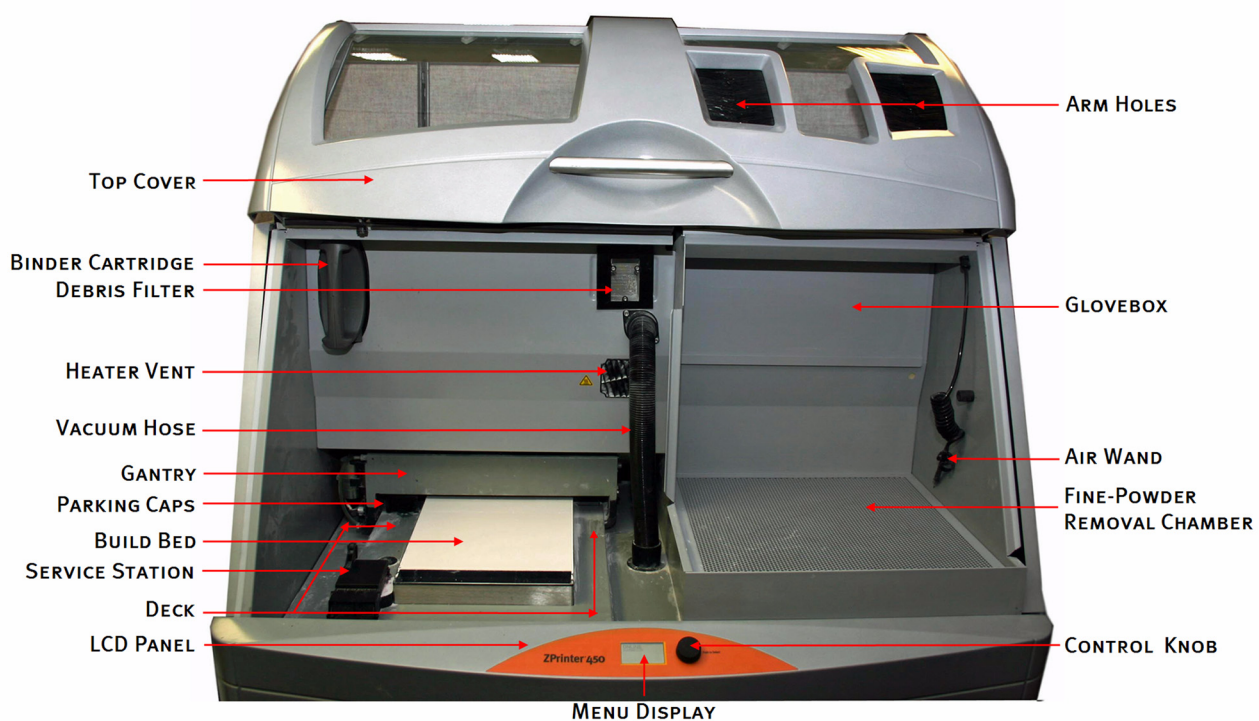
QUICK START GUIDE

Part Number 09569

Z CORPORATION®

Rev. B

ZPrinter 450 Front View

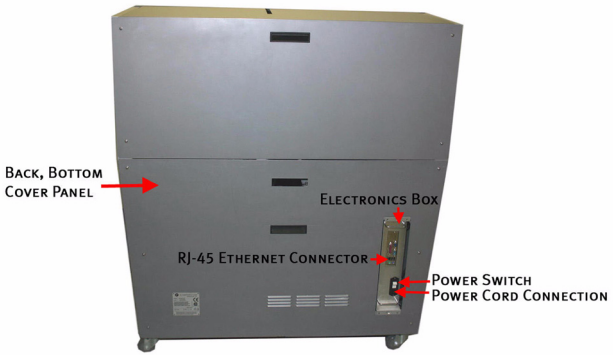


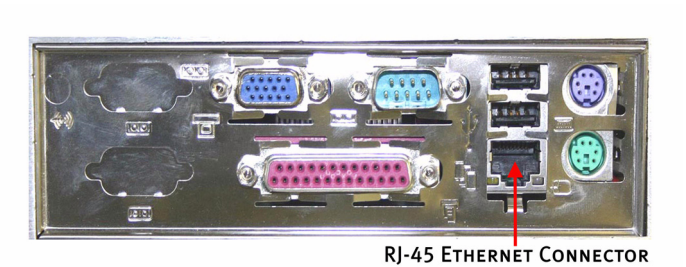
ZPrinter 450 Control Panel, Rear View, And Ethernet Connection

Push the Control Knob once to:

- Bring up the printer menu.
- Select a menu command.
- Start/Stop/Cancel a menu function.

Turn the Control Knob left/right to highlight menu items. When selecting the **Raise/Lower Platform** commands, hold the Control Knob down to raise/lower the platform.



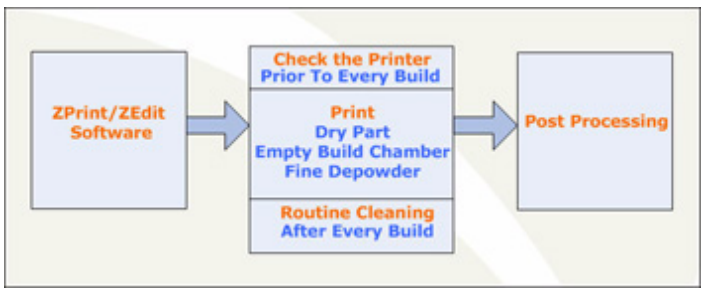


Welcome To The ZPrinter® 450 Quick Start Guide

Congratulations on your 3D Printer purchase! This guide will help you make a simple build and get you familiar with your 3D printer. Please refer to the *ZPrinter® 450 Hardware Manual* for complete information about using your new full-color, automatic 3D Printer.

We encourage all customers to logon to our 3DP User Website at www.3dpuser.com to learn more about 3D printing, materials, Best Practices, and post-processing techniques.

3D Printing Process Diagram

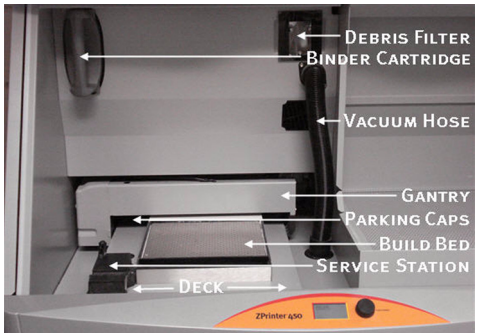


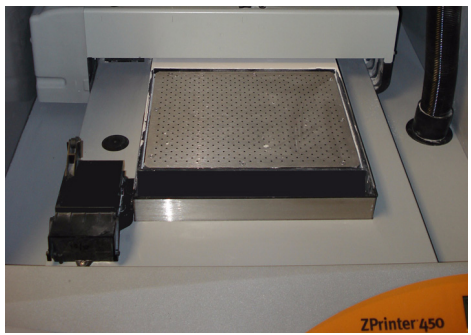
Before You Begin

- Ensure the ZPrinter 450 is properly installed and running.
- Ensure the ZPrint™ Software is installed and running, and the printer is connected to the same network as the computer that is running ZPrint. For ZPrint installation instructions, see the *ZPrint™ Software Manual*.
- Export a solid data file from a 3D modeling software program and open the file in ZPrint. ZPrint is compatible with most 3D modeling software file types.

Proceed In Order With These Steps To Print:

A. Check The Printer





A clean and properly prepared Build Bed with platform raised

1. Open the printer top cover and check for loose powder in or around the Build Bed, Gantry, and Deck. There should be no powder in these areas prior to printing. If you need to vacuum, do the following. If not, proceed with *Step 2*.

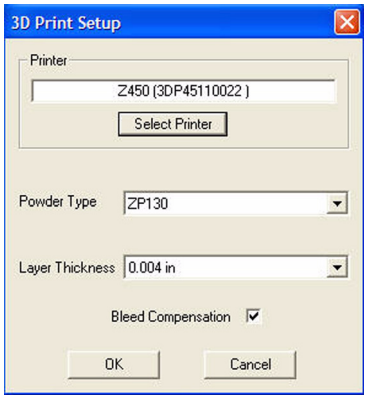
   - Push the Control Knob once to bring up the LCD menu.
   - Highlight **Vacuum** on the menu and push the Control Knob once to start (or stop) the vacuum.
   - Take the vacuum hose out of its stand and vacuum any loose powder in or around the Build Bed and Deck.
   - Pull the Gantry forward and vacuum the top.
   - Return the vacuum hose to its stand and push the Gantry back to its original position.

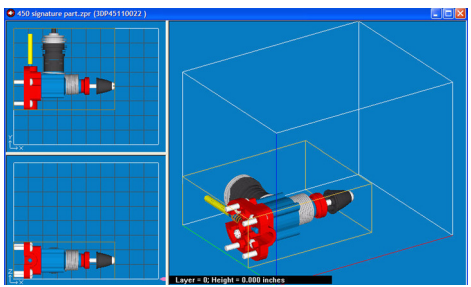
2. Check that the Parking Caps, the Service Station, and the Debris Filter are clean. (See Section **E** of this guide for instructions on how to clean these printer components.)

3. Close the printer top cover. The Gantry reparks and the printer goes Online.

4. Select **Prep Build Chamber > Continue** on the LCD menu to properly position the Build Bed platform.

B. ZPrint - Setup Your Build And Print





1. If you have not already done so, start ZPrint and select **File > Open**. Choose a file to print.

2. Check your printer settings.

   - Select **File > 3D Print Setup**, or click  on the Toolbar to open the **3D Print Setup** dialog.

   - Check your **Printer Selection**, the **Powder Type** (zp130) and **Layer Thickness** setting (0.004”). Leave the **Bleed Compensation** option checked.

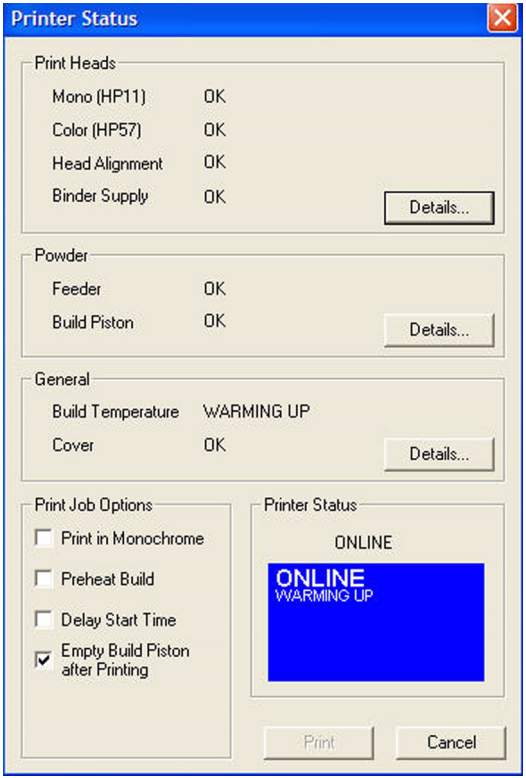
   - Click **OK**.

3. ZPrint orients the part in the Build Bed for the fastest print time. If you need to transform the part prior to printing, you have a couple of options, otherwise proceed with *Step 3*.

   - In the Top or Side views of ZPrint, select the part (left-click on the part), then drag and drop it to a new position.

   - In any ZPrint view, select the part and use the **Justify**  , **Rotate**  , or **Scale**  features to change the orientation, or scale of the part.

4. Select **File > 3D Print**, or click  on the Toolbar, to open the **Printer Status** dialog.



5. ZPrint checks each item in the **Print Heads**, **Powder**, and **General** sections of the **Printer Status** dialog prior to printing to ensure there are enough materials to complete the build.

   - See Section **G** of this guide for instructions if you see a message to add powder, add binder, or change the print heads.

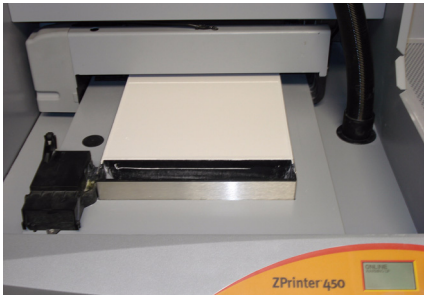
   - Click the **Details** button to view usage information for each print head, the binder, and the powder.

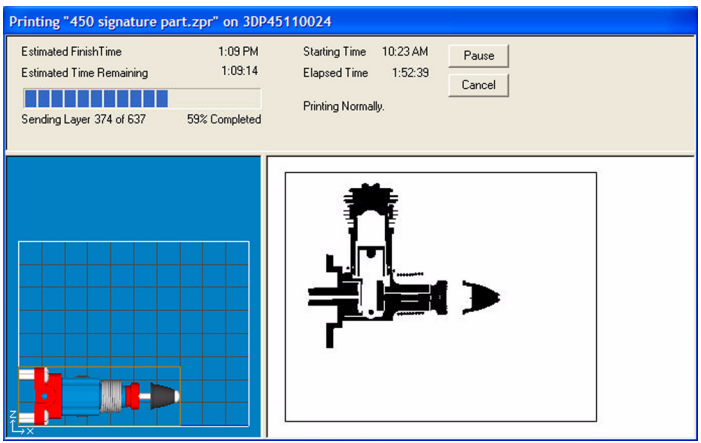
6. Check or uncheck your **Print Job Options** for the current build.

   Important: The **Empty Build Piston after Printing** option is checked by default. When checked, the printer automatically evacuates (and recycles) the bulk of the powder out of the Build Bed after the part is printed and dried.

   If you are printing a part with especially delicate features, uncheck this option.

7. If all the **Print Heads**, **Powder**, and **General** items display **OK**, the **Print** button is enabled. Click **Print** to start your build.





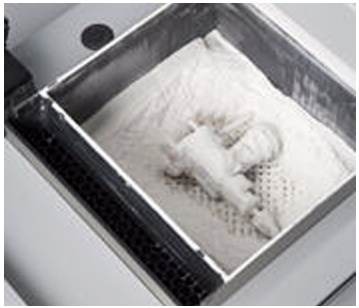
NOTE: Before starting the build, the printer will:

- service the print heads
- fill the Build Bed with powder and then spread one layer to make the Build Bed surface smooth

8. The **Printing** dialog opens and reports the status of the print job for the duration of the build. This dialog details:

   - Estimated print finish time
   - Estimated remaining print time
   - Actual print start time
   - Actual print elapsed time
   - The layer that is currently printing and the % completed
   - The **Pause** button. Click to pause the current print job, Click again to resume printing.

C. Automatic Powder Removal



When the build is finished, the printer starts an automatic drying cycle. A counter on the printer LCD counts down the time remaining before the part is dry.

After the drying cycle completes, the printer automatically removes excess powder around the part through the bottom of the Build Bed and recycles the powder back into the Feeder.

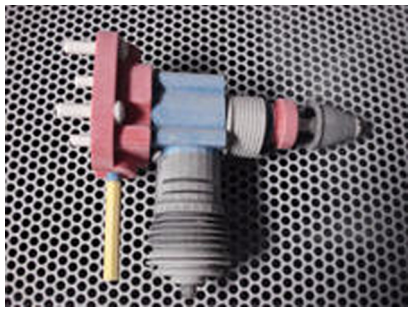
- If you unchecked the **Empty Build Piston After Printing** option in the ZPrint **Printer Status** dialog. (See Section **B** - *Step 5*), manually excavate the excess powder away from the part using the vacuum, or choose to run an Automatic Powder Removal cycle that you can control at the printer by selecting **Build Chamber > Empty Build Chamber**.

1. Open the printer top cover and gently move the part from the Build Bed to the Fine Powder Removal Chamber.

   - For easier part removal, select **Build Chamber > Raise Platform** on the LCD menu. Hold down the Control Knob to raise the platform to the top of the Build Bed.

2. Close the printer top cover.

D. Fine Powder Removal



1. With your part in the Fine-Powder Removal Chamber, select **Depowder** on the LCD menu to start the air compressor.

   - Slide your arms into the chamber through the arm holes and remove the Air Wand from its clip.

   - Test the air flow against your hand and adjust as needed. Turn the Control Knob *left* to decrease pressure, or *right* to increase pressure.

   Important: For thin-walled or delicate parts, start with light air pressure.

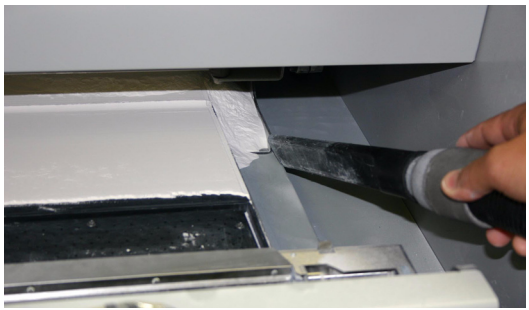
2. Using the Air Wand, remove all remaining powder on the part.

   Important: When finished, use the Air Wand to clean the Fine-Powder Removal Chamber of any remaining powder, including the backside of the printer top cover.

3. Push the Control Knob once to turn the air compressor off. Return the Air Wand to its clip.

4. Allow the part to dry longer in the Fine-Powder Removal Chamber, or move the part to a post-processing area.

E. Routine Cleaning After Every Build



After every build, it is important to routinely clean your printer to keep it in optimal running condition. These tasks take only a few minutes to complete and result in maximum print head life and strong, accurate printed parts.

Routine cleaning includes:

- Vacuuming up excess powder
- Emptying the Debris Filter
- Cleaning the Parking Caps
- Cleaning the Service Station

E1. Vacuum Up Excess Powder

Vacuum the Build Bed, the top of the Gantry, and the Deck.

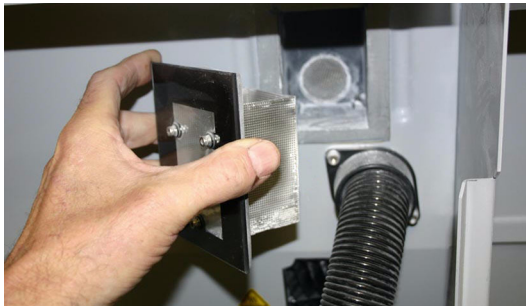
1. Select **Vacuum** on the LCD menu.

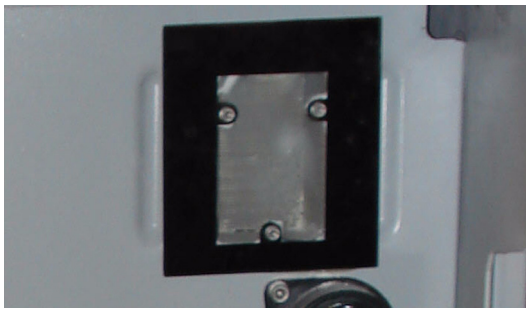
2. Open the printer top cover and remove the vacuum hose from its stand.

3. Vacuum all powder from the Build Bed (but not the Feeder side), the Gantry, and the Deck.

4. Select **Prep Build Chamber > Continue** on the LCD menu to properly position the platform at the top of the Build Bed.

E2. Empty The Debris Filter





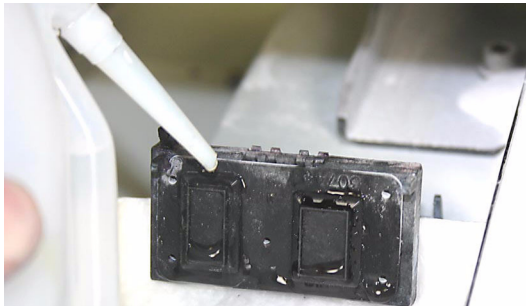
The purpose of the Debris Filter is to keep any large particles from going back into the Feeder during vacuuming.

1. Pull the Debris Filter out of its holder on the printer.

2. Empty the contents into a trash receptacle.

3. Return the empty Debris Filter to its holder. Be sure to push the filter flush against the holder for a secure fit.

E3. Clean the Parking Caps



The Parking Caps keep the print heads from drying out between print jobs. Cleaning the Parking Caps after every build results in longer lasting print heads and precise accuracy during printing.

The Parking Caps are located on the left, back side of the Deck.

Before you begin:

- Get several dry paper towels.
- Get the squirt bottle included in your Accessories Kit.
- Fill the squirt bottle with distilled water.

1. Lift the Parking Cap cover to a horizontal position and place a dry paper towel underneath.

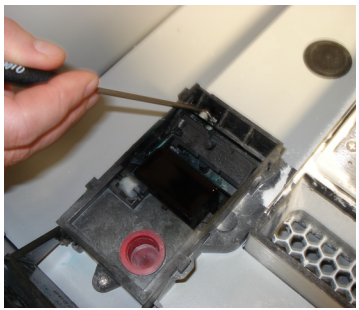
2. Squirt the distilled water onto the caps. Do not squirt water into the powder.

3. Use a dry paper towel to wipe the caps clean.

4. Remove the paper towel and wipe up any excess water on the deck.

5. Be sure the Parking Caps are completely dry before starting your next build.

E4. Clean The Service Station



Clean the Service Station after every build to remove residue buildup and to ensure the printer runs optimally for your next print job. Before you begin:

- Get several dry paper towels and a cotton swab.
- Get the squirt bottle filled with distilled water.
- Get the Pick from the Accessories Kit

1. Open the printer top cover and the Service Station cover.

2. Pull the Service Station wiper lever all the way forward until the rubber squeegees are fully exposed. Hold the lever in this position to properly clean the squeegees.

3. Position the squirt bottle close to the station and squirt water on and around the squeegees.

4. Take the cotton swab and wipe the front and back of the squeegees. Use the Pick to scrape excess powder off of the area in front of the squeegees.

5. Wipe up any excess water and thoroughly wipe the Service Station clean.

6. Push the wiper lever back to its original position.

7. Wipe up any water that may have spilled onto the Deck.

8. Close the Service Station cover and close the top cover.

F. Post-Processing With Z-Bond

Post-processing using the dipping method

This section describes post-processing a part using Z-Bond™ 101 and the dipping method. For parts with delicate features, smaller bottles of Z-Bond are available for drizzling onto a part.

Please visit our website at www.3dpuser.com for complete information regarding post-processing materials, techniques, Best Practices, and material storage guidelines.

To prepare a work area for post-processing:

- It is recommended that you wear a lab coat or smock, safety glasses, and one or two pairs of gloves for working with Z-Bond.
- Work in a well-ventilated area.
- Place a piece of cardboard down in your work area and place a piece of wax paper over the cardboard for the part to dry on.
- Use a container large enough to fully dip your part.
- Have paper towels ready for absorbing excess fluid.
- Ensure the part is completely dry before applying Z-Bond.

Post-processing using the drizzle method

1. Place the wax paper near the container and pour enough Z-Bond into the container to completely submerge the part.

2. Gently submerge your part into the liquid.

   - Look for bubbles rising. If you don’t see any, let the part sit submerged for ~10 seconds and then remove from the liquid.

   - If you see bubbles rising, wait until you don’t see any and then remove.

3. Keep the part moving in your hands so it does not stick to your gloves.

4. Quickly and thoroughly wipe any excess liquid off the part with the paper towels and place on the wax paper.

   - Do not let excess liquid pool on the part as this may cause its texture to change.

   - If you see liquid pool under the part after placing it on the wax paper, move the part so it will not adhere to the paper.

5. Let the part dry at least 30 minutes before handling.

6. Return any unused Z-Bond to its bottle for reuse.

G. Additional Printer Operations

G1. Add Powder

ZPrint evaluates the geometry of the part to determine if there is enough powder in the Feeder to complete the build. If not, ZPrint displays ADD POWDER in the **Printer Status** dialog. You cannot start the build until you add powder to the Feeder.

Important: Do not add powder to the Feeder unless you are prompted to in the ZPrint **Printer Status** dialog.

1. Open the printer top cover and place a powder bucket in the Fine Powder Removal Chamber.

2. Insert the vacuum hose into the hose fitting located on top of the bucket.

3. Select **Vacuum** on the LCD menu. The vacuum automatically shuts off when the Feeder is full, or the bucket is empty. When the Feeder is full, the LCD displays **Feeder full**.

   TIP: To check that powder is getting into the Feeder, look at the Debris Filter. You will see powder moving through the window when the vacuum is running.

4. Remove the powder bucket and return the vacuum hose to its stand.

G2. Add Binder

ZPrint evaluates the geometry of a part and determines if there is enough binder to complete the job. If not, ZPrint displays ADD BINDER in the **Printer Status** dialog. You cannot start the build until you add binder to the printer.

Important: There is no need to add binder unless you are prompted to in the ZPrint **Printer Status** dialog.

1. Pull the empty binder cartridge out of its housing on the printer.

2. Get a new binder cartridge and check the cartridge label for the correct orientation.

3. Insert the cartridge into its housing. Ensure the cartridge is pushed all the way in. You should feel it gently snap into place.

    - If the cartridge does not snap into place, *do not force it*. Check the orientation on the label and try again.

G3. Change the Print Head(s)

The printer checks the status of the print heads before every build. *Do not change the print heads unless prompted to in the ZPrint* ***Printer Status*** *dialog.*

NOTE: After changing the print heads and before the next build, the printer will automatically:

- run a purge cycle (on new HP11 print heads only)
- run an auto-alignment pattern

1. Select **Print Heads > Change Print Heads** on the LCD menu. The gantry moves to the service position.

2. Open the printer top cover and the carriage cover.

3. Lift both print heads out of their slots and properly dispose of any empty cartridge(s).

4. Open an alcohol swab (included with your Startup Kit), and squeeze the tube to saturate the swab.

5. Wipe off all the pogo pins (inside the carriage) for both print heads with the alcohol swab.

6. Wet a paper towel with distilled water and wipe off the underneath of the carriage. When finished, press **Continue** on the LCD.

7. Remove all new cartridge packaging. *Be sure to pull the tape tab off of the new cartridge.*

8. Re-insert each cartridge. Press down firmly on the side of the pogo pins to securely fit a cartridge into its slot.

9. Close the carriage cover by pressing down until you hear it click shut.

10. Close the printer top cover and then press **Continue > Exit** on the LCD.

    - The gantry reparks and the printer goes Online. The printer runs an auto-alignment pattern before the next print job to properly align the print heads.

H. Where To Go For More Information

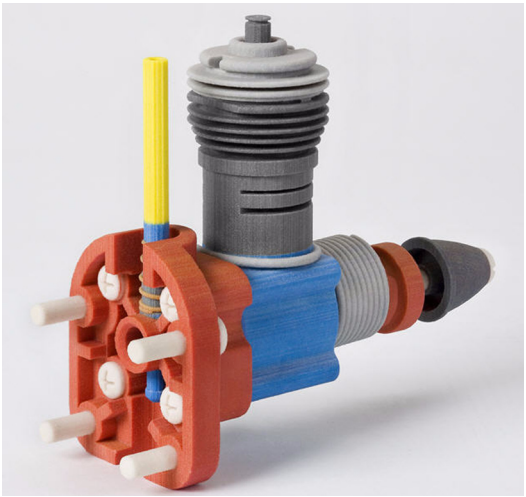
If you need an additional copy of the Quick Start Guide, please visit our website at www.3dpuser.com to view or print the PDF format.

For additional information, consult the *ZPrinter® 450 Hardware Manual* or the *ZPrint™ Software Manual*, which are available in PDF format on the website.

Learn more about the different post-processing products that are available to use with your printer on our website at www.3dpuser.com.

To order consumables/materials, visit ZShop on our website at www.3dpuser.com. If you are an international customer, you can order consumables/materials directly from your local service provider or reseller.

Do you have questions, comments, observations? Logon to the 3DP User Group website at www.3dpuser.com to access a community message board, a searchable knowledge base, and to connect, learn, and share information with hundreds of customers regarding 3D printing and its many applications.



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Acknowledgements:

Part and Model Samples