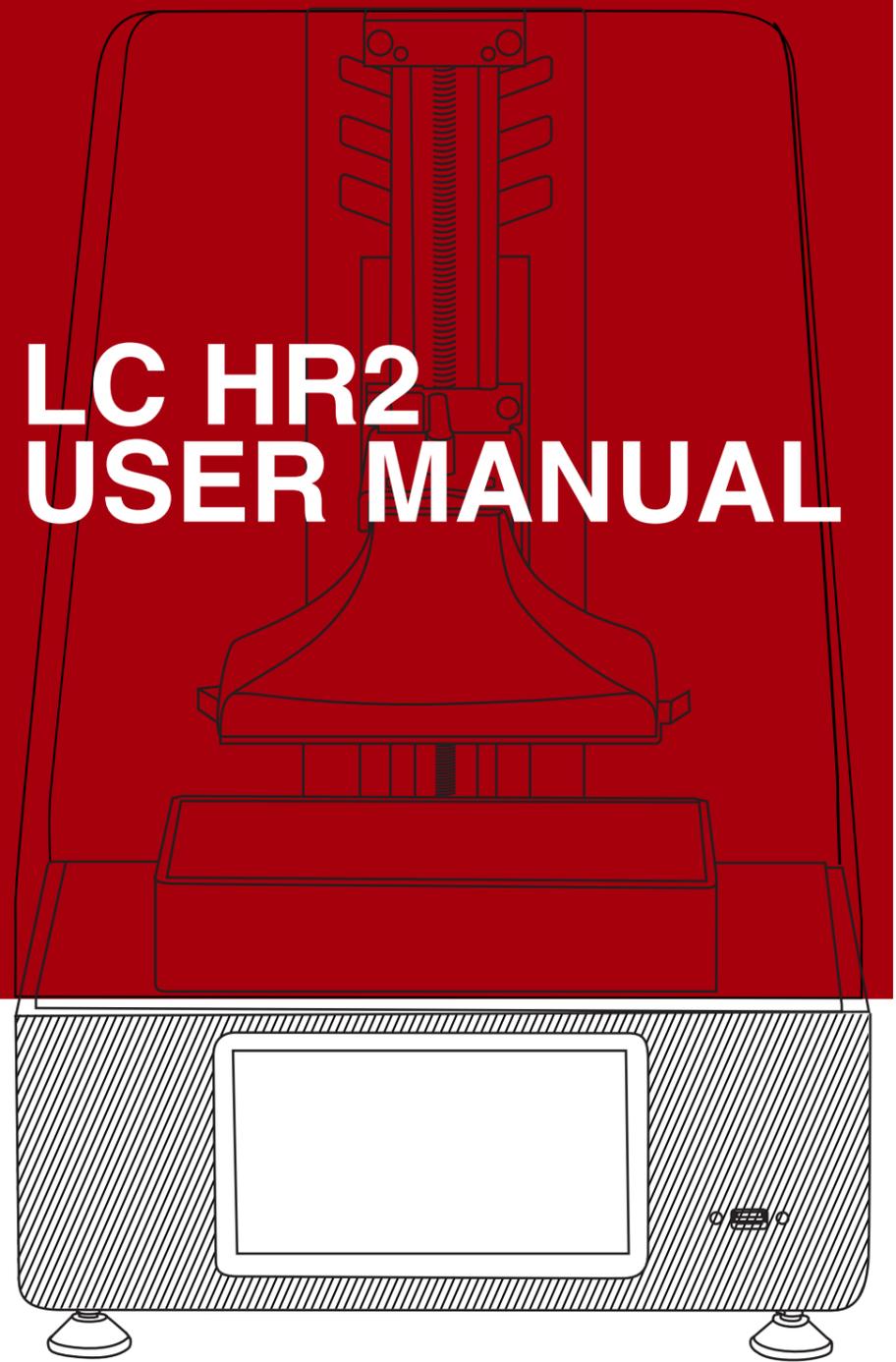


THE NEXT GENERATION
OF 3D PRINTING
IS HERE



LC HR2 USER MANUAL



DISPOSAL INSTRUCTIONS

Do not throw this electronic device into the waste when discarding. To minimize pollution and ensure utmost protection of the global environment, please recycle or return to Photocentric for recycling.

UK
Cambridge House, Oxney Road
Peterborough PE1 5YW UK.
info@photocentric.co.uk
www.photocentricgroup.com

USA
2205 West Parkside Lane, Phoenix,
85027, AZ USA

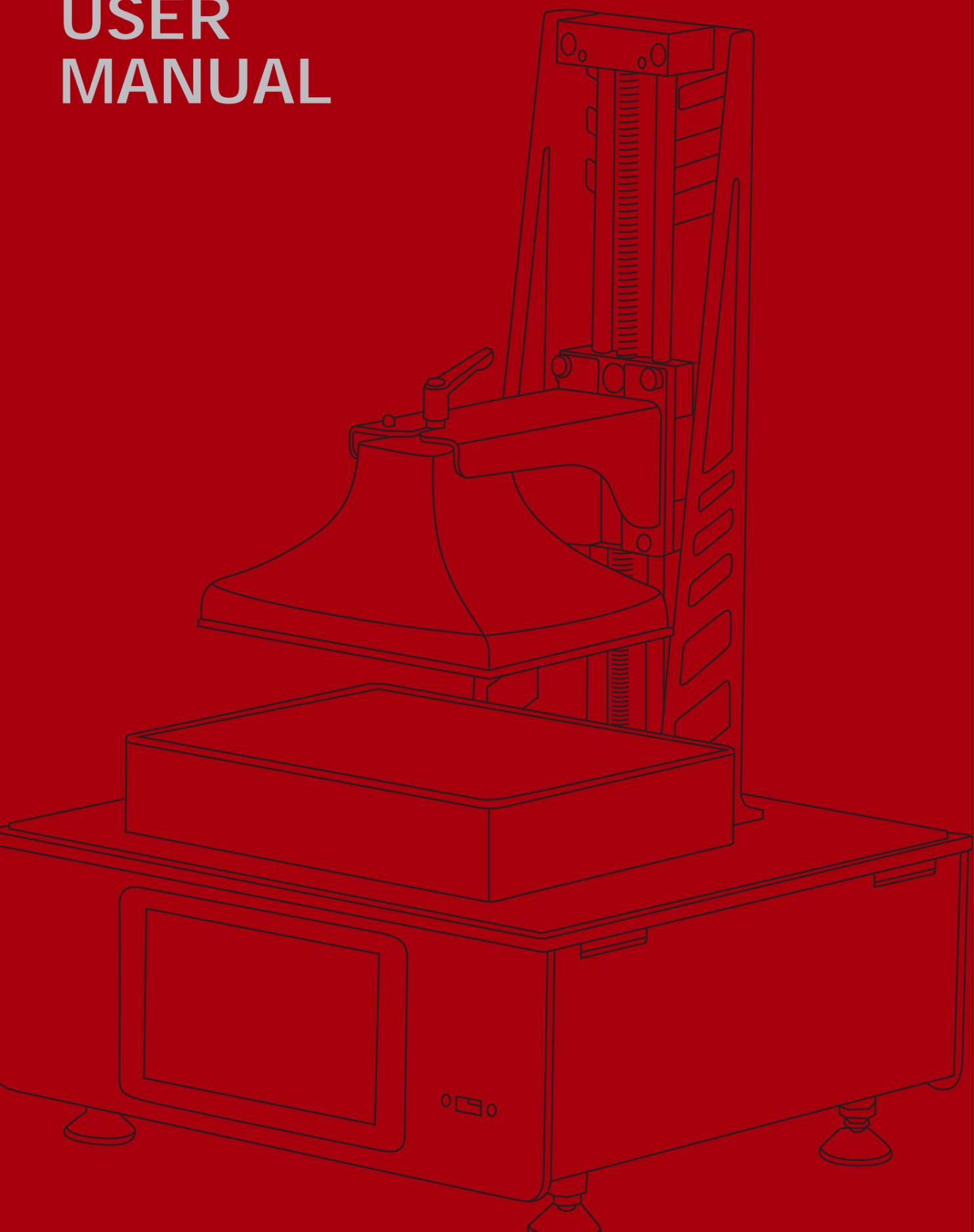
LC HR2 USER MANUAL



Liquid Crystal
HR2

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Liquid Crystal
HR2

EU DECLARATION OF CONFORMITY

LIQUID CRYSTAL 3D-PRINTER

Model: LC HR2

We hereby declare that the product above is in compliance with the essen-

tial requirements of the following:

Low Voltage (LV) Directive 2009/95/EC, 2014/35EU. Electromagnetic Compa-
tibility Directive(EMC), 2004/108/EC,2014/30/EU.

Restriction of the use of certain hazardous substances (RoHS) Directive,
2011/65/EU Commission Regulation (EU) No. 453/2010 and IEC 60950-1 Sa-
fety of ITE

Technical Documentation is stored at the manufacturer's address above.

Date of Issue: 02 December 2016
Place of Issue: Peterborough

Amanda Keating
Director

Manufacturer
Photocentric Ltd
Cambridge House, Oxney Road
Peterborough, PE1 5YW, UK
Year of CE Marking: 2018



Liquid Crystal
HR2

USER MANUAL

NEW DAYLIGHT TECHNOLOGY
HIGH RESOLUTION
3D PRINTER

Congratulations!

You have just purchased a new type of 3D printer using Daylight Polymer Printing (DPP) technology. This is a patent applied-for method of image creation that hardens liquid with the normal visible light emitted from an LCD screen. This revolutionary system is a new method of Additive Manufacturing that uses the same intensity and part of the spectrum that we use to see. This is the energy providing source that initiates the free radical or cationic polymerisation necessary to change the liquid photopolymer resin into your hardened object. The light emitted from the screen is not modified and the images are safe for viewing.





Liquid Crystal
HR2



Liquid Crystal
HR2



SAFETY INFORMATION

Read the instructions carefully. Keep this document for future reference. Follow all warnings and instructions marked on the product. Observe the following guidelines when connecting and disconnecting power to the external power supply unit:

- Install the power supply unit before connecting the power cord to the AC power outlet.
- Unplug the power cord before removing the power supply unit from the printer.
- Operate on a table or flat, stable surface, ensuring that the machine cannot fall and is level.
- Do not operate outdoors.
- Do not allow resin or any liquids to get inside the chassis, wipe up any liquid spills immediately.
- Do not use solvents to clean the printer as they may damage the screen. Use a little detergent and warm water to clean any resin spills.
- Disconnect the printer from AC before storage or when not used for a long period of time. This 3D printer is connected to the electrical network with an input of 110 or 240 V AC, 50/60 Hz, and has an operational voltage of 12 V.
- Do not allow anything to rest on the power cord. Do not locate this product where people will walk on the cord.
- If an extension cord is used with this product, make sure that the total ampere rating of the equipment plugged into the extension cord does not exceed the extension cord ampere rating. Also, make sure that the total rating of all products plugged into the wall outlet does not exceed the fuse rating.
- Use the product only with the supplied power supply cord set. If you need to replace the power cord set, make sure that the new power cord meets the following requirements: detachable type, UL listed/CSA certified, VDE approved or its equivalent, 4.5 meters (15 feet) maximum
- In case of malfunction, disconnect the printer immediately from network.
- Do not attempt to fix this product by yourself, as opening or removing covers may expose

you to dangerous voltage points or other risks. Refer all repairs to qualified service personnel. Please send an email to your national supplier or contact technical service at:

info@photocentric.co.uk

Unplug this product from the wall outlet and refer servicing to a qualified service personnel if:

- The power cord or plug is damaged, cut or frayed.
- Liquid has been spilled in the machine.
- The machine was exposed to rain or water.
- The machine has been dropped or the case has been damaged.
- The machine does not operate normally after following the operating instructions.

DISPOSAL INSTRUCTIONS



Do not throw this electronic device into the waste when discarding. To minimise pollution and ensure protection of the environment, please recycle or return to Photocentric for recycling.

SAFETY GUIDELINES



IRRITANT

- Keep the printer and resins out of the reach of children.
- The resin is an irritant to skin and eyes. Always wear gloves when coming into contact with the liquid resin. Always use in a well ventilated room.
- Resins are classified as irritants, not harmful, but in exceptional circumstances people can be sensitive to the resin and develop a skin irritation or rash. Avoid this possibility by always wearing gloves and avoid breathing fumes.
- The printer should be operated on a stable and level surface, preferably away from direct ambient light.

Please note that the latest instructions will always be available from:

www.photocentricgroup.com/support

CONTENTS

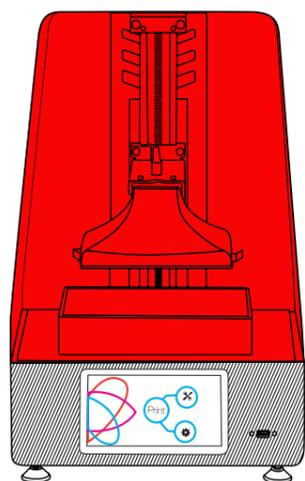
The box contains



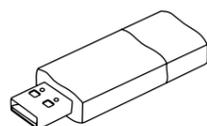
Liquid Crystal
HR2



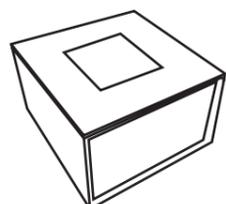
Liquid Crystal
HR2



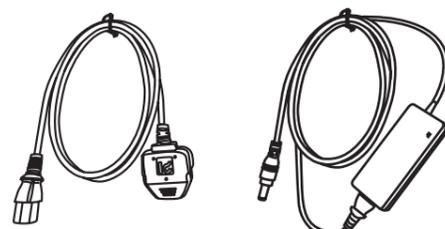
Liquid Crystal
HR2 3D Printer
with red hood



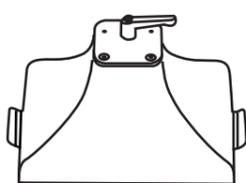
USB with
Photocentric
Studio



Print sample



Power supply
for the printer



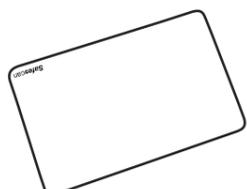
Platform +
Flex plate



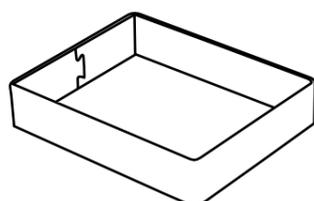
250g of Firm
Cream resin



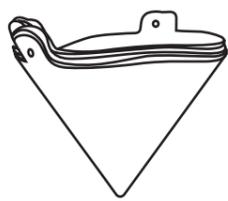
Spray Bottle



Plastic "credit card"
Scraper



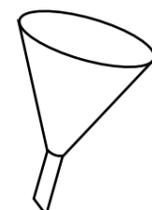
2 x Disposable Vat



Paper resin filters



Allen Key



Funnel



Gloves x2

MINIMUM COMPUTER REQUIREMENTS

- Operating System Windows 7, 8 or 10
- Minimum 2.0 Ghz processor speed 2 cores (recommended 4 cores)
- GPU capable of opening opent version 3.0 or higher.
- _net framework version 4.0
- 64bit system: minimum 2GB of RAM, recommended 4GB

A Photocentric Studio license is included with this printer. Please follow the steps from page 14 to install and activate your software.

RECOMMENDED ITEMS

- Extra gloves.
- Paper towels.
- Access to a sink with hot water to clean the object.
- Liquid soap (detergent) to clean the object.
- Soft brush or sponge to clean the object.
- Glass or clear plastic container to post expose the object in.
- Ultrasonic cleaner (Optional)

1. INSTALLATION & ASSEMBLY INSTRUCTIONS

ASSEMBLY INSTRUCTIONS

1. Using a pair of scissors cut open the packaging surrounding the box. Fold the sides of the box down and remove the red printer hood from the box and place to one side.
2. Untighten the screw on the top of the platform and gently slide it off. Remove the two disposable vats from the box and the underlying packaging. Lift the printer out of the box using the linear drive support brace.

NOTE: Please do not remove the protective film covering the printer screen.

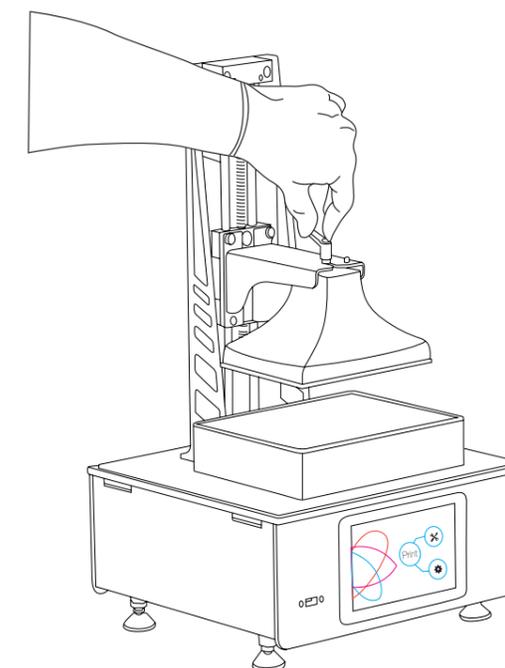
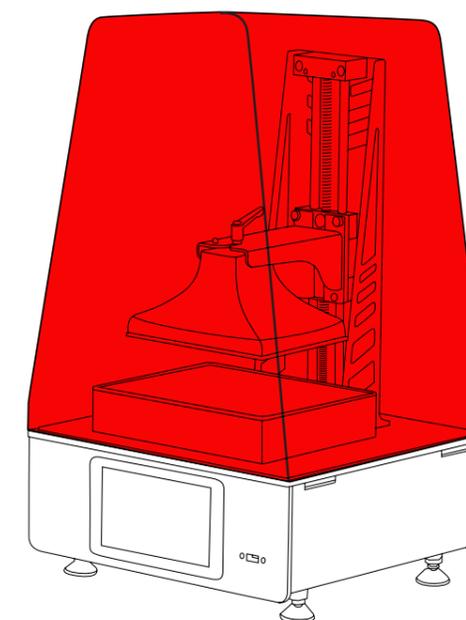
3. Connect the B end of the power supply cable to the power supply and insert into the back of the printer. Turn the printer on using the rocker switch located at the back of the printer. The touchscreen at the front will turn on. The screen will start making a system check and the welcome screen will appear a few seconds later.

4. Slide the platform back onto the linear drive and tighten up the top screw. Open one of the vats from the top side to avoid damaging the vat film and place the vat centrally over the screen. On the touchscreen press **Maintain** then **Home** to home the printer.

NOTE: Ensure that hands and objects are kept clear of the moving platform to avoid injury.

5. Before you fill the resin double check that the platform is parallel with the screen.
6. If you are experiencing difficulties setting up your printer please visit our website:

www.photocentricgroup.com/support.



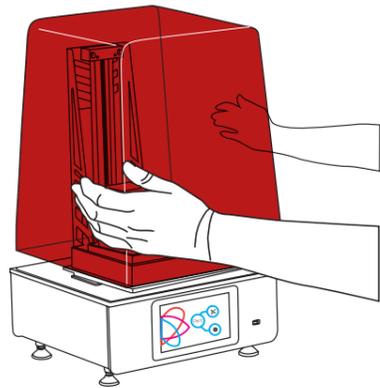
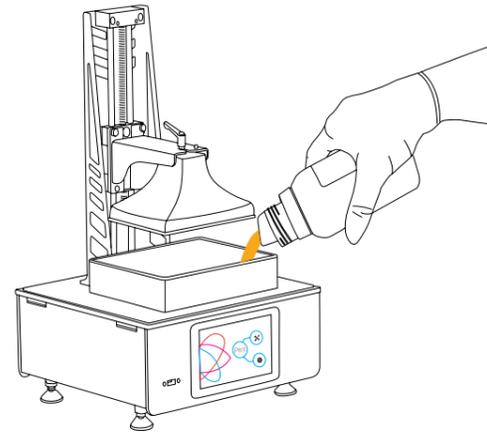


Liquid Crystal
HR2

2. FILLING THE VAT WITH RESIN

1. Once you have the printer assembled and connected then press + 10 and pour your sample resin into the vat. Once poured then press - 10.

2. With the vat filled with resin place the hood onto the printer.



NOTE: You can check the screen is working by pressing the "Show calibration" button located in the "Maintain" tab and a red grid will appear.

NOTE: If you have an object that is 100 cm³ then it will use 115g of resin. Always overfill by at least 20% to ensure consistent resin flow. For most prints, filling the vat to 1/3 full is more than enough. Place the hood back on the printer.

NOTE: Don't remove the hood during the operation or the print will stop.



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HR2

3. STARTING A TEST PRINT

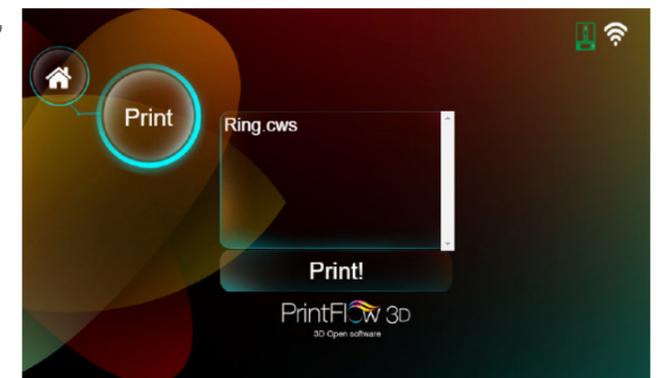
STARTING A PRE-SLICED FILE FROM THE TOUCHSCREEN

Now you have set up your printer lets make your very first print! Your LCHR2 has been shipped with a default test print pre-loaded. For your first print use this print and the sample resin supplied with your printer.



1. On the homepage, press the "Print" button, which will display the following screen.

2. Click the test file Ring.cws to highlight it and press "Print!". The print will then start.

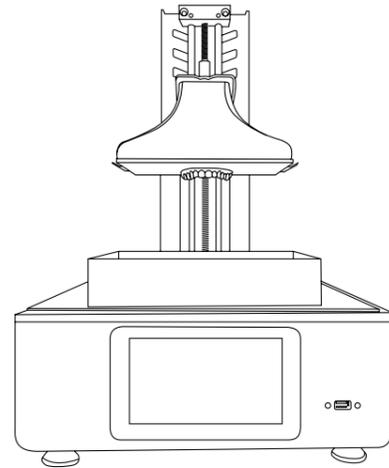




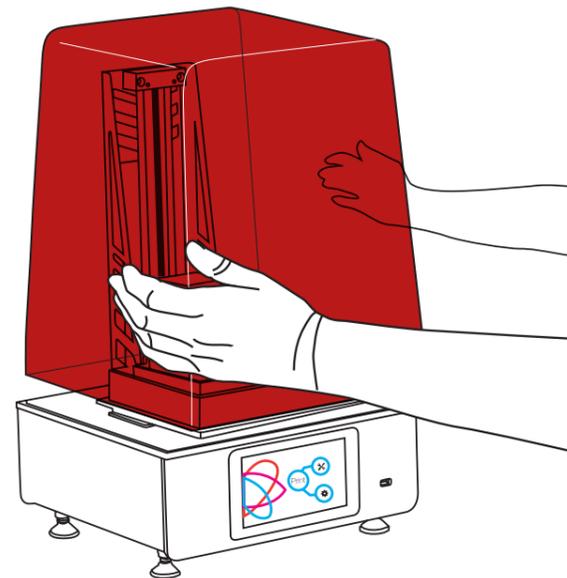
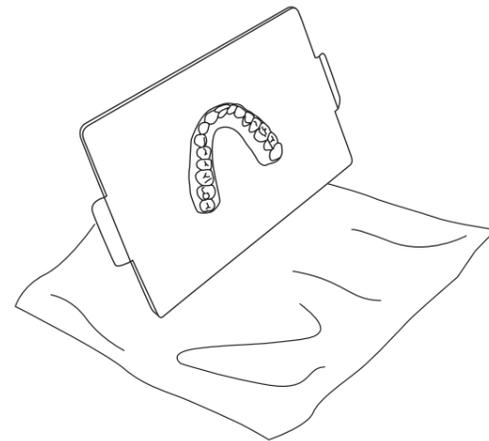
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HR2

4. WASHING

1. When your print has finished, press the '+50' button and the platform will rise to above the level of the vat.

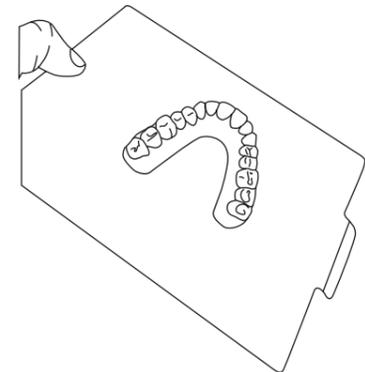


2. Remove the hood again and with absorbent paper under it, remove the flex plate or build platform and set it down on the paper. Place the hood back on to protect the resin in the vat from light.



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3. Gently remove any excess polymer with absorbent paper. The fastest way to clean it and achieve a dry surface is by removing the flex plate and spraying or immersing it in IPA. Alternatively, you can wash it in hot water and detergent. Hold the flex plate under running hot water and gently clean the part with a soft brush or sponge and liquid detergent. Then remove the object by twisting the flex plate and cut off the supports. Take care not to damage it, it will not achieve full hardness until after post exposing in light. An ultrasonic cleaner is useful to clean delicate objects.



5. HARDENING

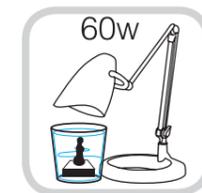
1. When clean of residual resin, place in water of Aprox. 60° and leave under UV unit for ideally 2 hours. For optimum post-cure results, replace the water with hot water as needed. Longer may be needed if using Daylight not UV. Remove from water and dry.



120 mins
post exposure

NOTE

If you're printing dental prints, something delicate or you wish for your print to stay in its constructed shape, you will need to complete the post exposure in water whilst the print is still attached to the platform.

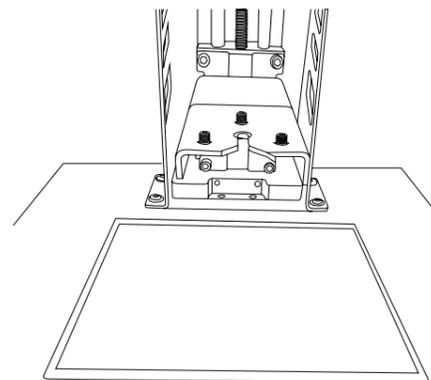
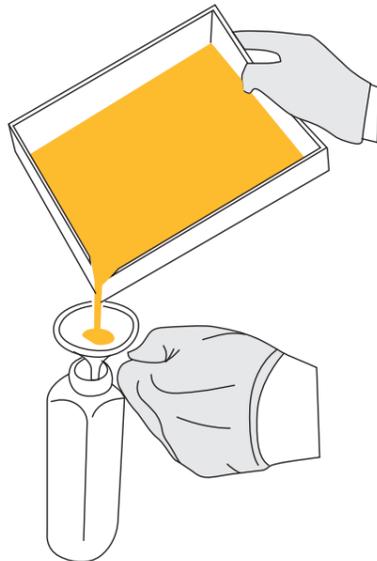




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6. PREPARING FOR THE NEXT PRINT

1. Chip off any cured resin and clean the flex plate and platform with hot water and liquid detergent. Dry it thoroughly before inserting back into printer. Ensure the build platform is placed on the printer with the Serial Number sticker to the rear. Also, make sure the flex plate is placed back on the platform with the wings extending upwards.
2. Empty the vat and clean it after every print in case you have any solid pieces on the bottom as these would prevent the platform from homing correctly. Lift the vat from the printer; pour the resin back into the bottle through the filter paper into the funnel provided.
3. If you have a leak on the screen mop up the liquid resin immediately using absorbent paper. Clean off with a damp cloth with detergent. Hardened resin can be removed by chipping off with a credit card or plastic scraper. Metal scrapers should only be used with extreme care to avoid scratching the screen.
4. The build platform is labelled with the Serial # of the printer that it was supplied with. If you are using more than one printer, it is important to ensure that the correct build platform is placed back on the corresponding printer. The homing of the platform is performed during factory production, however, if re-homing is necessary, follow the instructions below.
5. To re-home. With the build platform completely removed, press the maintain button then press the home button.



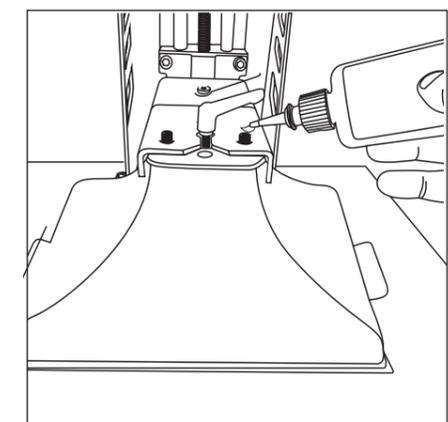
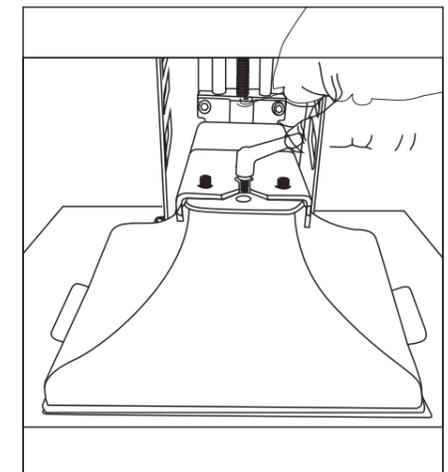
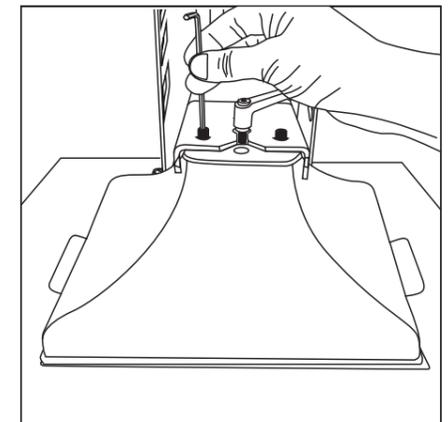
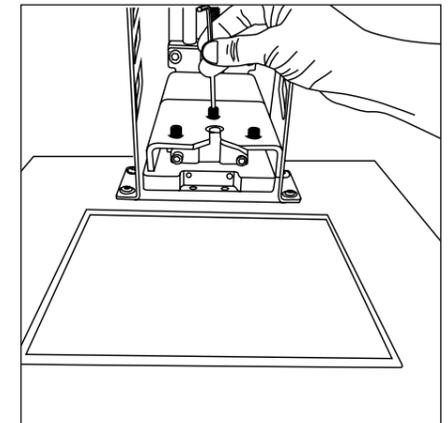
6. Loosen the three adjustment screws on top of the print arm with an allen key.

7. Replace the build platform ensuring the Serial Number sticker is to the rear and that the flex plate is fitted. Do not tighten the central lever yet. Tighten each adjustment screw until resistance is met, do not over tighten.

8. Now tighten the central lever. Use the control panel to raise the platform, ensuring it lifts evenly. If it does not, repeat the homing procedure.

9. Apply lockite threadlocker to the three screws.

It is necessary to follow the homing set-up if a new build platform is being used or if an existing platform is to be used on a different printer. It is also, recommended that re-homing is completed after 100 prints approximately.





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7. RE-SKINNING THE VAT (OPTIONAL)

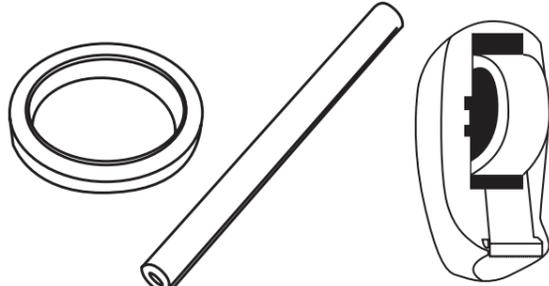
Please read carefully.

A loose vat can have creases which create ridges in the base of the object.



TOOLS REQUIRED

Scissors
Craft knife
Pallet knife



MATERIALS REQUIRED

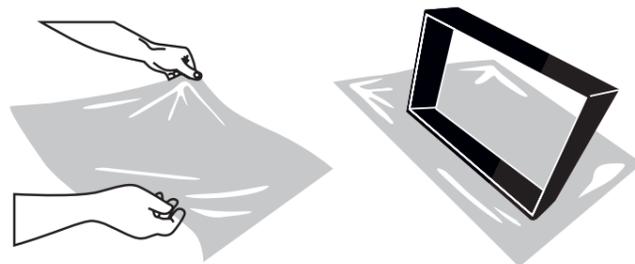
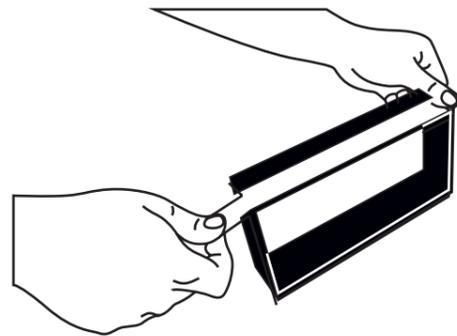
Photocentric vat film replacement pack, single sided sticky tape, double sided tape and paper towel.

Re-skinning the vat is a simple process but care and attention must be paid to cleanliness and removing cured bits of resin. Make sure at each stage of the process that the work surface, vat, and your hands are very clean and free from debris that may cause holes in the film.

1. Remove the film currently taped to the vat and dispose of it. It may be possible to use the double-sided tape again if it has no resin on it. If the tape cannot be reused, remove it completely and replace on the lower edge of the vat.

2. Wipe the vat clean and wash all parts with soap and water. Pay attention to the underside of the vat, resin may have cured here. Remove any hard bits of resin as they may make a hole when tightening the new film over it.

3. Place double sided tape at the top of all four sides of the vat. Check the new vat film isn't pierced or dented and place it over the protective brown paper, on a flat work surface. Place one edge of the vat along the edge of vat film.



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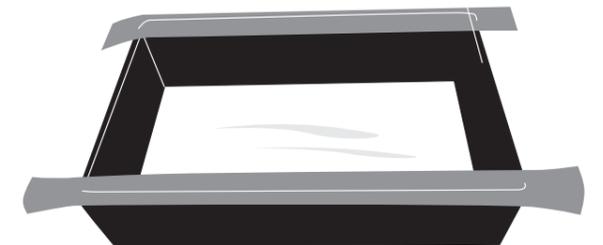
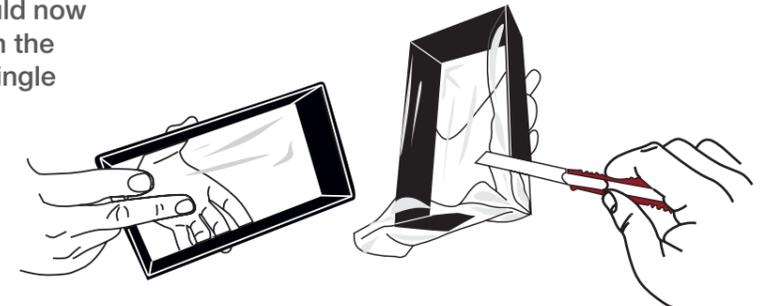
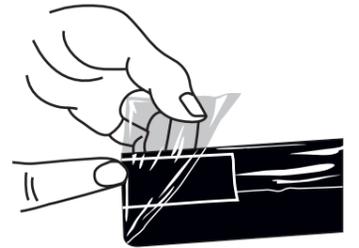
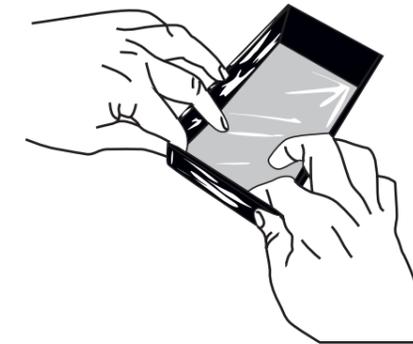
4. Fold over the other side of the film and pulling it firmly tight in the middle stretch the edges out so there are no creases.

5. Pull each side of the film up and onto the sides of the vat.

6. Apply single sided tape at the corners over the folds to keep the film tight. The vat should now be tensioned. Trim excess edges off. On the short sides of the vat place a piece of single sided tape.

7. Finally, fill with water and leave on absorbent paper to check for leaks. Drain and dry with paper towel before use.

If you are unsure of the process and need a video guide, then please visit the Support section of our website.





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8. PHOTOCENTRIC STUDIO

Photocentric Studio software installation files can be found on the USB supplied with the printer. Insert the USB into your computer and run the 'photocentric studio' windows installer file.

MINIMUM COMPUTER REQUIREMENTS

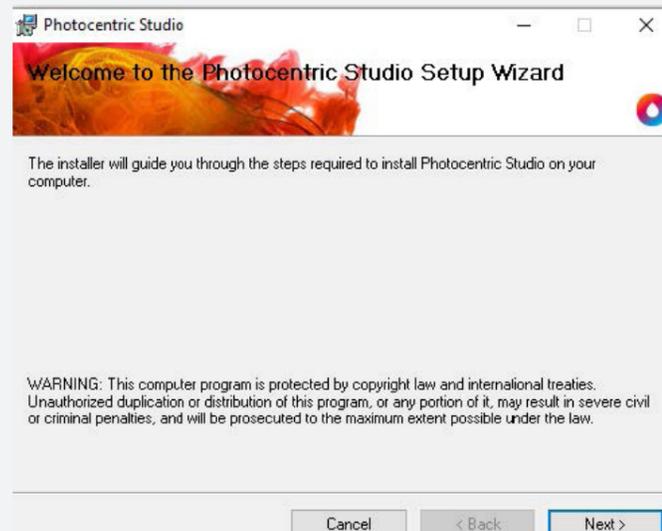
- Operating System Windows 7, 8 or 10
- Minimum 2.0 Ghz processor speed 2 cores. Recommended 4 cores
- GPU capable of opening opengl version 3.0 or higher
- .net framework version 4.0
- 64bit system: minimum 2GB of RAM, recommended 4GB
- 32bit system: minimum 1GB of RAM, recommended 2GB

8.1 INSTALLATION

1 If Windows Defender prevents the installation from starting simply click More Info then Run Anyway to begin the installation process.

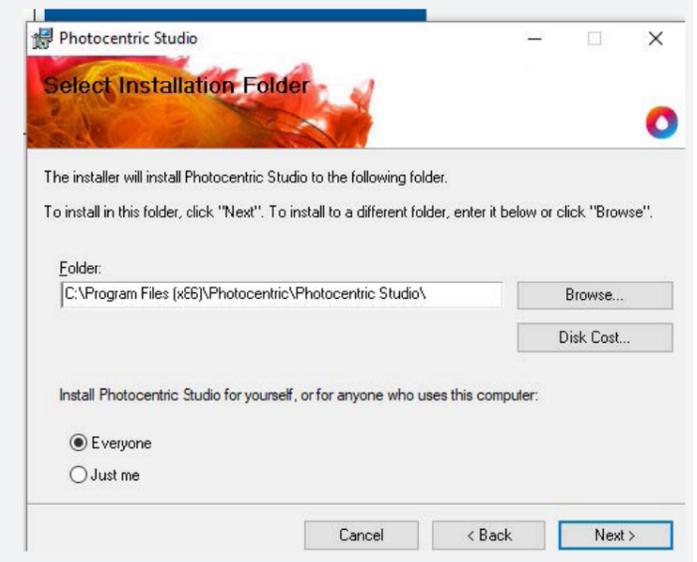


2 The set up wizard will then load on your screen. To proceed with the installation simply click Next.

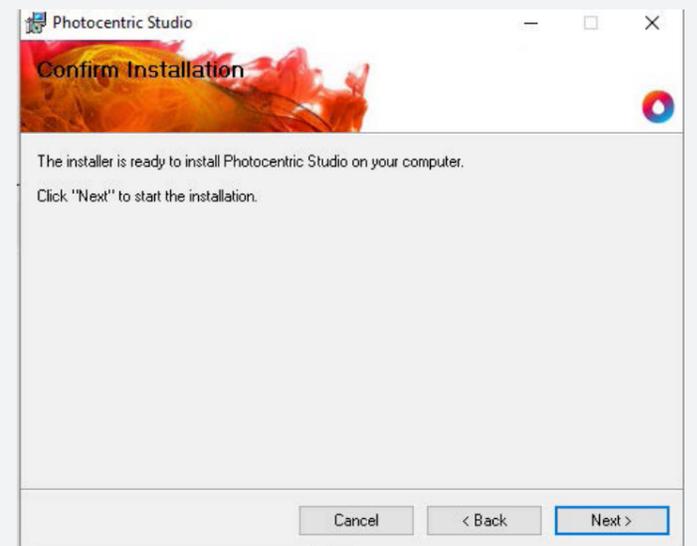


Liquid Crystal
HR2

3 Now select the location for your installation to be saved to. If you wish to change the location simply click Browse and select a new location of your choice. Once the location has been selected click Next.



4 Once you have selected the location of the installation click Next to begin the installation of the software.





Liquid Crystal
HR2



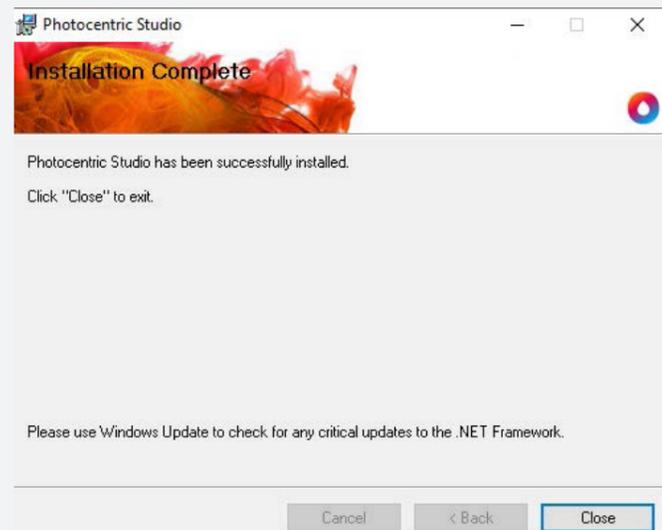
Liquid Crystal
HR2

5

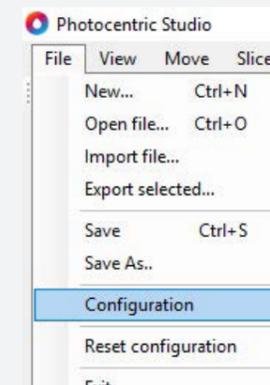
Installation has now completed, click Close and you can now open the software. When opening the software you will see a section to enter your license number, click on this section and enter your license number provided into the field as shown.

NOTE

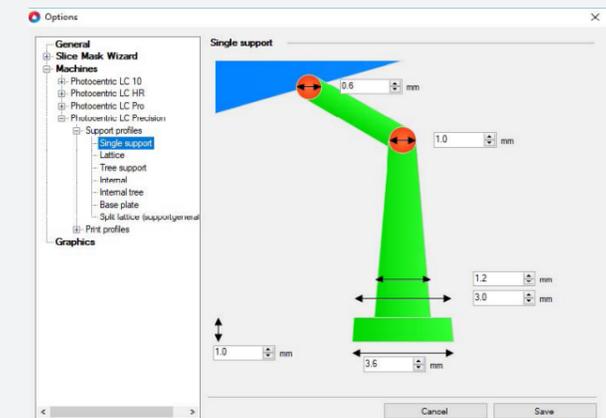
The software comes with a 14 day trial. If you wish to use the trial before activating your license simply click 'Continue Evaluation'.



2

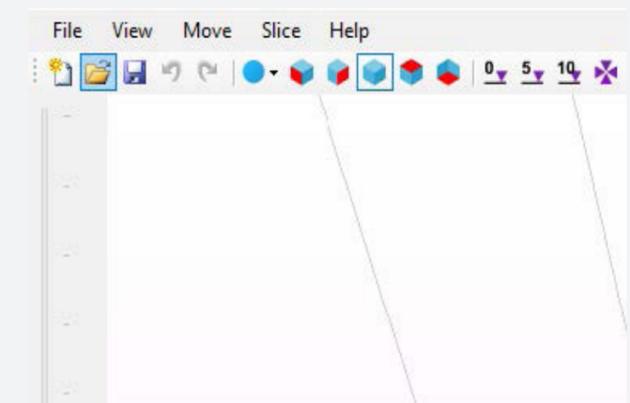


To configure general settings, machine and print settings, press File and then select Configuration. You can change support settings in the dropdown Support Profiles.



3

Press the selected button to open your file.



4

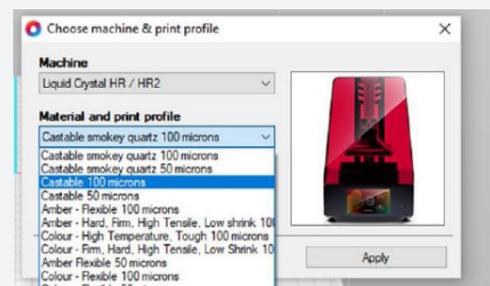
Use the highlighted buttons to change views, copy, move and for scaling.



8.2 GETTING STARTED

1

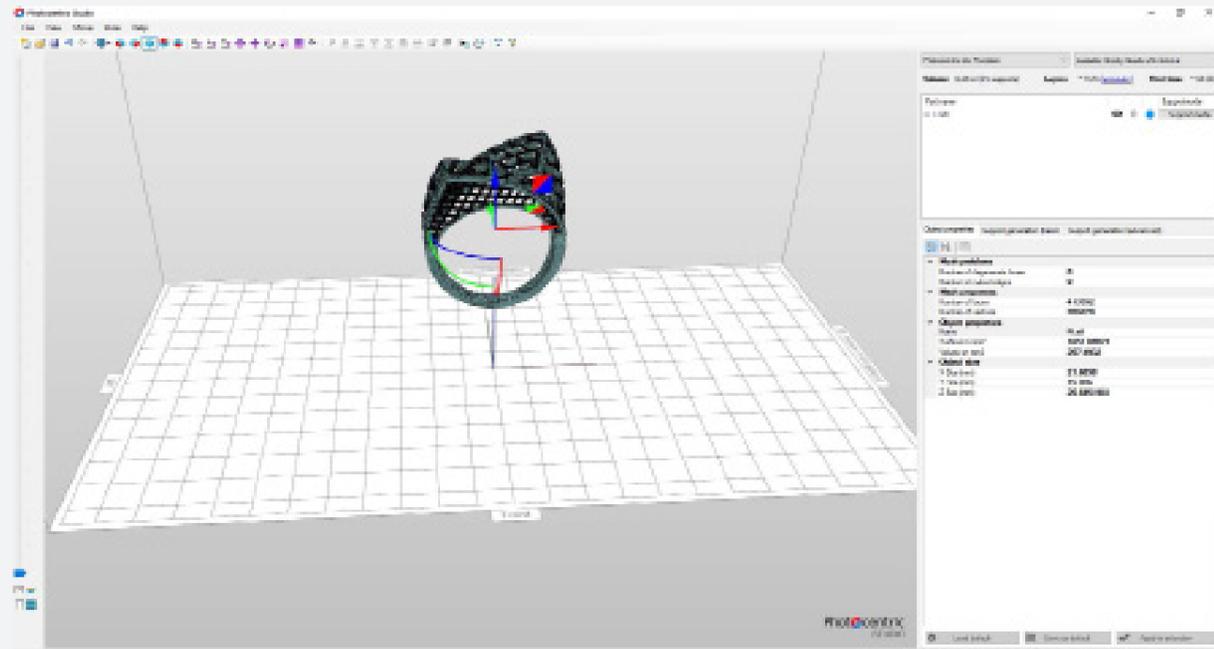
Select the printer and the resin profile, then press Apply.





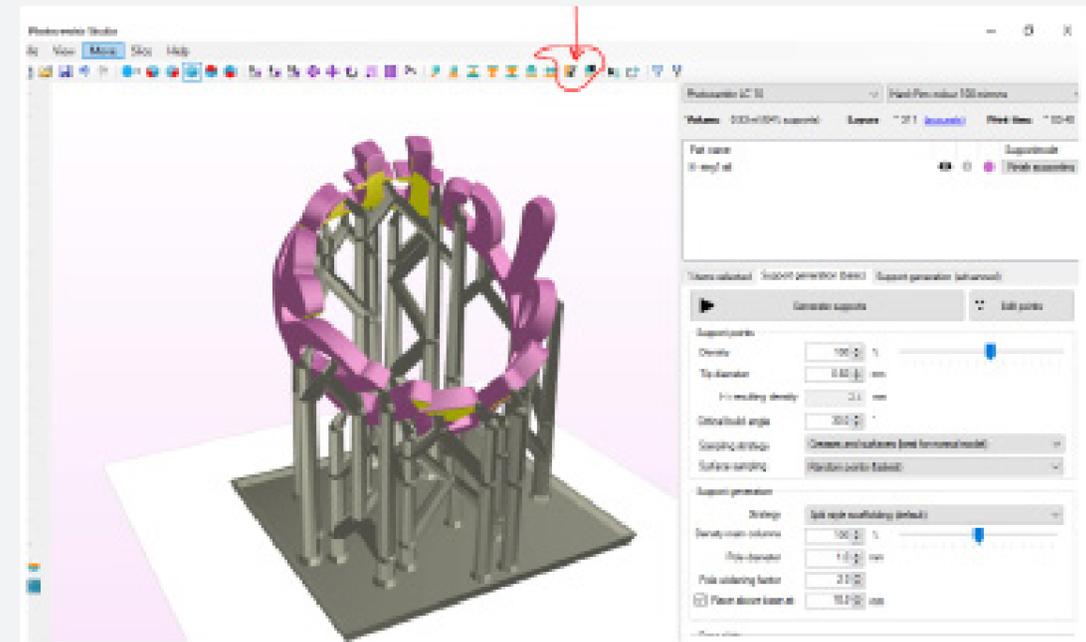
Support

For support you need to activate support mode by going to Help on the top menu, Help documentation, Supporting.



6

The two circled buttons allow you to flatten supports. This solves the problem of lattice supports becoming slow, this can happen when very detailed supports are used. Typically this would be used once you have finished with an object, allowing you to easily handle 20 objects.

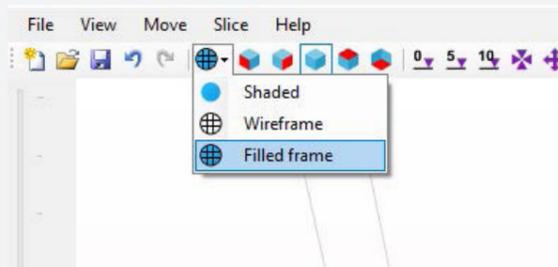


5

Some stl models have a very shiny surface which is difficult to see when adding supports. To solve this issue you can change the view to Filled Frame.

NOTE

To help further you can also change the colour of the object surface in configuration mode.



5.1

For designing different variations of manual supports, adding and deleting supports use the 8 buttons shown.

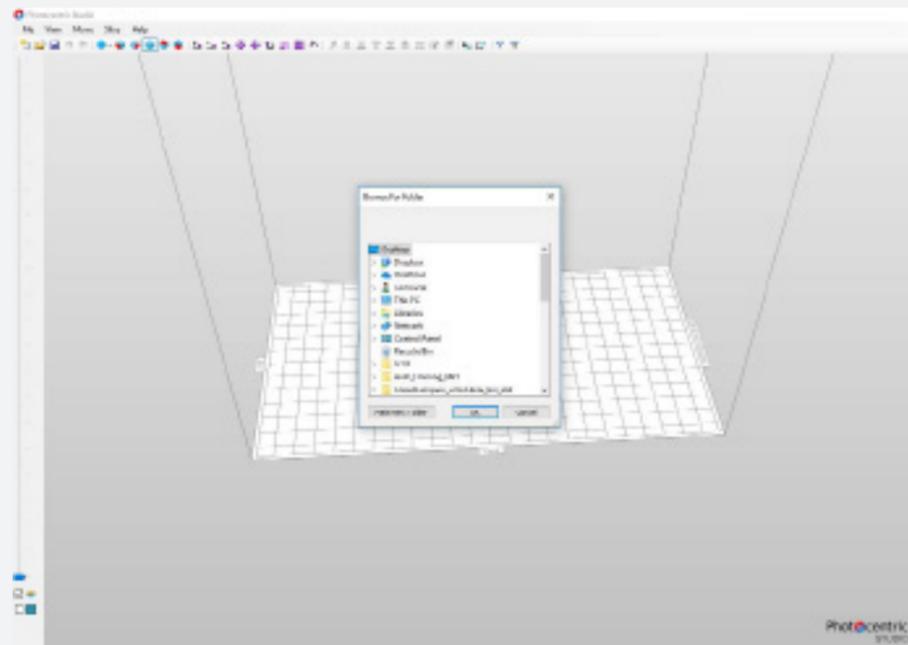
There is also the option to choose different variations of supports in the automatic menu.

The red circled buttons will show you the skeleton of supports or point of support contact to the 3D model, here you can modify the joints and positions.



7

To slice file, use the red circled button shown, then choose the location to save file and press OK.

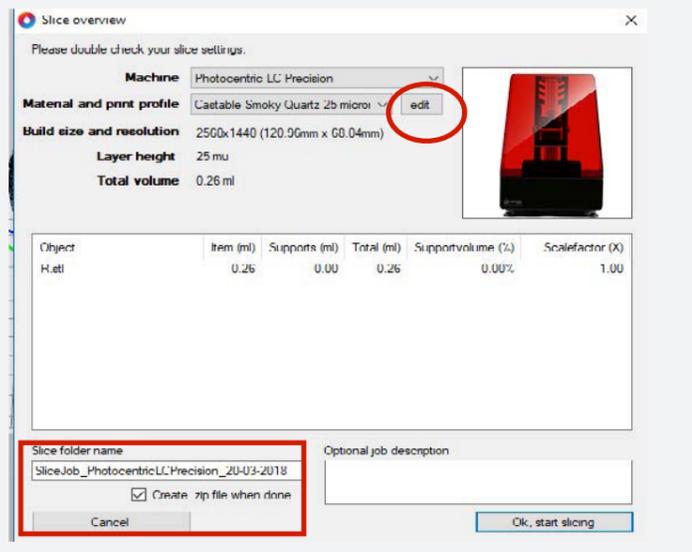




8

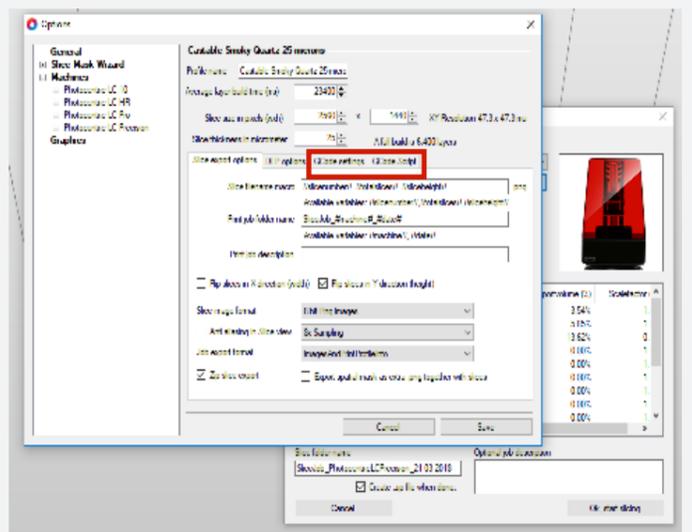
Before slicing you can check your machine and print settings in Edit. In Edit you can also change your file name under Slice folder name. After your settings have been checked you can then begin slicing by pressing OK, start slicing.

Note: Do not use any symbols in your file name. (@, !, £ etc)



Print settings in Edit mode give you access to the advanced print settings option. We do not recommend changing anything in the first two tabs. In the tab GCode Settings you have access to the print time and motor parameters which can be modified.

In the tab GCode Script you have access to the GCode script modification.

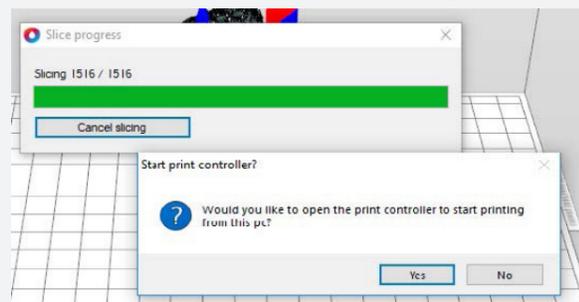


9

Once slicing has finished press no and copy the sliced file to USB stick and upload to the printer

NOTE

For LCHR you do not need to use printer controller. You can transfer the sliced file to a USB stick and then start your print with LCHR. For all other printers you will need to use printer controller.

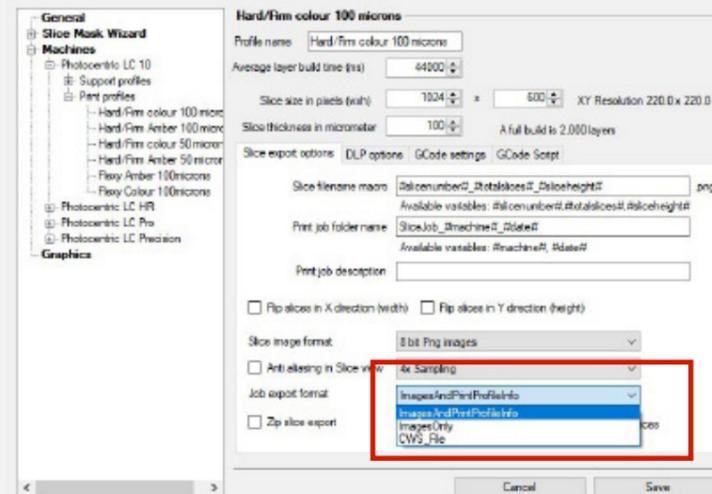


10

Use the red circled option for choosing desired file format.

NOTE

Printers which do not need a direct connection with computer will recognise .cws. and .zip. file format. For printers which are connected directly and need to be used with print controller please use zip file format.



11

If you would like to save your file but still have the option to modify, for example supports, go to File then Save as type: and choose p3d format.

If you save your file in the .stl format you will not have the option to modify all of the objects.





9 SENDING PRINTABLE FILE TO THE PRINTER

Now you have your printer installed and configured.

There are 2 ways to start a print:

1. Save to USB Save the file as .zip format on a USB stick and insert it in the front socket. Then wait for 10 seconds and press Print to refresh and the printable files will show on the screen. Select your file and press 'Print'.
2. Print from your web browser on your PC. These instructions are described below.

Please read these software instructions to help you start printing.

9.1. SETTING UP A NETWORK CONNECTION

The LCHR2 supports two different types of network connection: Ethernet and WiFi.

To set up ethernet, simply plug the ethernet cable into the back of the printer and connect it to your router.

Steps to set-up Wifi:

1. Power on the printer with the rocker switch at the back of the printer.
2. Click "Settings" on the touchscreen on the front of the printer.
3. Once booted click "Wifi Settings".
4. Wait until your desired Wifi network shows.



5. Select the desired network and press the button "Setup Network".



6. Enter your Wifi Password and press "Accept".
7. Finish by pressing "Save".
8. Press "Home" to get back to the main screen.
9. When done reboot the printer.



9.2 STARTING A PRINT FROM THE TOUCHSCREEN

To start a print from a touchscreen you can either use print files already loaded on the printer or you can upload pre-sliced .CWS files from a USB stick. To upload files from the USB stick, simply insert the USB in the front of the printer, go to the homepage and wait. After a few seconds, press the Print button and all of the files should be uploaded to the printables and be available to print.



9.3 REMOVE A FILE FROM THE TOUCHSCREEN

1. From the home page press “Print”.



2. Select the printable you want to remove and click the red button with the X on the right.



3. Click “Yes” to delete the file.

