

# Ultra



***ASIGA***

## USER GUIDE

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## Device Information

Asiga 3D printers build objects from liquid photopolymers by successively hardening the material in fine layers with the aid of light. The design objects are supplied to the printer in the form of digital CAD files. Printed objects can be arbitrary shapes and produced from a variety of biocompatible materials which may be used in medical applications.

Asiga 3D printers are designed to operate within standard room temperatures (10°C/50°F - 40°C/100°F).

Asiga 3D printers are mainly used to build parts for Audiology and Dental devices.

Audiology devices include but are not limited to:

- **Hearing Aid Body:** A customised hollow shell component, designed to fit patient's ear canal for housing electronic components to assist hearing.
- **Hearing Aid Ear Mould:** A solid plug with acoustic vents, customised to fit patient's ear canal for routing sounds generated by a behind-the-ear hearing device to the patient's ear canal.
- **Hearing Aid Flexible Ear Mould:** A solid plug with acoustic vents, made by injecting silicone rubber into a 3D printed casting shell for routing sounds to a patient's ear canal.

Dental devices include but are not limited to:

- **Full Denture:** Comprising of a base and teeth both made on a 3D printer, worn by a patient during the day for eating and removed at night for cleaning.
- **Denture Try-In:** A single use, temporary denture used for less than 60 minutes in patient's mouth to verify denture geometry for comfort and fit.
- **Custom tray:** A single use, custom shaped plate used for less than 15 minutes in patient's mouth for holding dental silicone to obtain an impression of a patient's teeth.
- **Dental Splint:** Mouth guard worn on patient's teeth at night to alleviate bruxism.
- **Indirect Bonding Tray:** A single use flexible holder for holding orthodontic brackets in position while bonding them to a patient's teeth. The device is used for less 60 minutes in patient's mouth.
- **Surgical Guide:** Structure placed on a patient's teeth for mounting cylindrical metal sleeves that guide a dentist's drill when cutting spaces for dental implant screws. The device is for single use only and removed from patient's mouth in less than 60 minutes.

## Intended Purpose

The Asiga 3D Printing System consists of 3D Printers, Resins, and UV Light Curing Lamp, intended to be used in the manufacture of Dental and Audiology devices for transient and short-term use only.

## Indications

Dental: Removable denture prosthetics, functional try-in mock-ups for removable denture prosthetics, impression and functional trays for removable denture products, surgical guides for drill placement during dental surgery, bonding trays for application of orthodontic braces, removal dental night-guards to prevent bruxism.

Audiology: Customised hollow shell components designed to fit patient's ear canal for housing electronic components to assist hearing, customised ear moulds for guiding sound from behind-the-ear amplifiers, casting patterns for audiology ear moulds.

## Contraindications

If the patient is known to be allergic to any of the components.

Audiology: Not suitable for infants below 36 months. Users of active implants must pay attention when using the hearing aid.

## Legal Manufacturer and Australian Sponsor Details

Asiga Pty Ltd  
Unit 2, 19-21 Bourke Road  
Alexandria, NSW 2015  
Australia

# Specifications

Product specification	Ultra 50	Ultra 32
Build Volume X, Y, Z	192 x 108 x 147mm 7.55 x 4.25 x 5.78 in.	121 x 68 x 147mm 4.76 x 2.67 x 5.78 in.
Pixel Resolution	50µm	32µm
Technology	DLP	DLP
LED Wavelength	385nm (high power UV LED) or 405nm	385nm (high power UV LED) or 405nm
Material Compatibility	Asiga materials, 100% Open Material System – use any suitable third party materials	
Software	Asiga Composer software	
File Inputs	STL, SLC, PLY, STM (Asiga Stomp file format)	
Network Compatibility	Wifi, Wireless Direct, Ethernet	
Power Requirements	90-264VAC, 50/60Hz, 600Watts, (100V – 6Amp Max. 240V – 2.5Amp)	
System Sizing	555 x 353 x 441mm / 32.5 kg 21.85 x 13.89 x 17.36 inches / 72 lb	
Packed Sizing	695 x 505 x 625mm / 39 kg 27.31 x 19.88 x 24.60 inches / 85 lb	
Warranty	12 months manufacturer's warranty	
Technical Support	Unlimited lifetime technical support included	
Bundle Includes	3D printer, Composer software, 1kg Asiga material, 1L build tray, Asiga Flash post-curing chamber, calibration toolkit	

## CHAPTER 1 Asiga Ultra at a Glance

These diagrams illustrate the main user controls on the Ultra.



Front



Top



Side



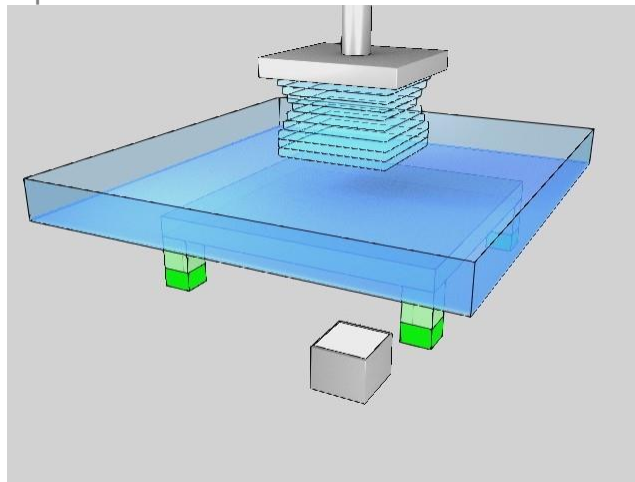
Ortho

## Principle of Operation

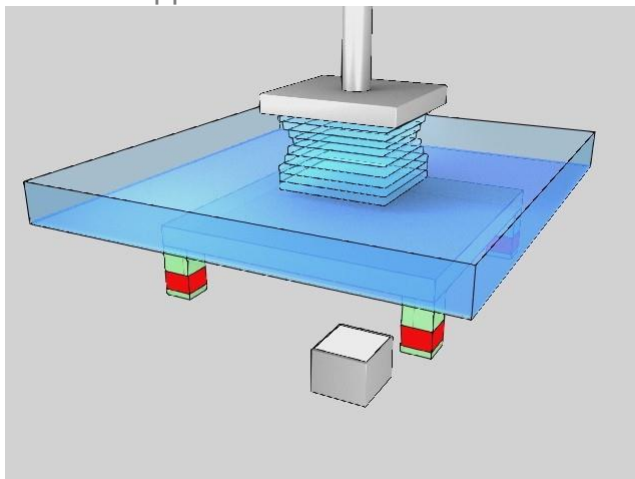
The Ultra is a 3D printer which builds objects from CAD data. The objects are built from photopolymer resins which are liquid chemicals that can be solidified by exposure to light. A physical model is built by solidifying successive layers of photopolymer against each other. This process is called “stereolithography”.

The Ultra build process employs a unique feature which is referred to as the Smart Positioning System (SPS). The SPS utilizes an array of position encoders which detect when a layer of correct thickness is formed. The process works as follows:

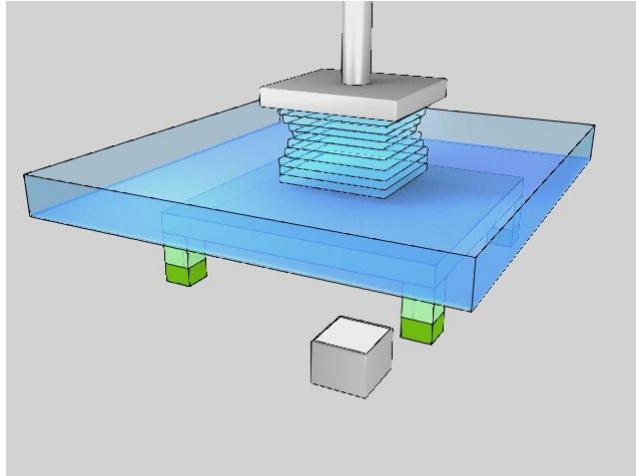
1. The model under construction is positioned above the material of photopolymer. The material bottom is made from a flexible transparent Teflon film which is supported by a glass plate.



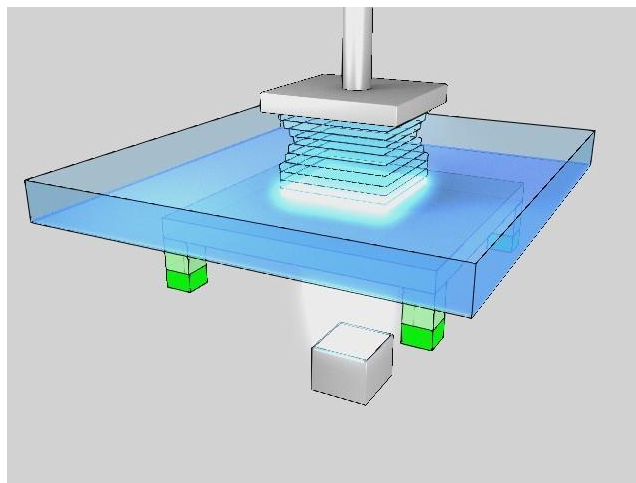
2. The model is moved downwards to one layer-thickness above the bottom of the material. The movement squeezes photopolymer resin out from the gap between the model and the Teflon film. Viscous forces oppose the motion, resulting in mechanical deflection of the apparatus.



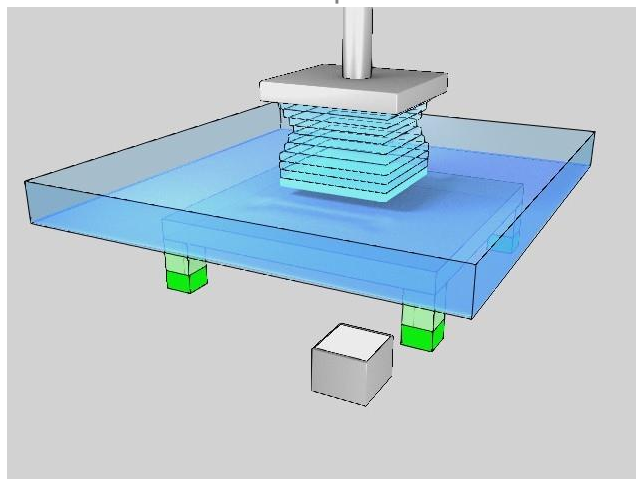
3. Four position encoders at each corner of the glass plate precisely monitor the mechanical deflection between the glass plate and the model under construction. The process monitors the deflection until it is relieved.



4. A cross-sectional image of the object being constructed is projected onto the underside of the material film, causing photopolymer to harden in the shape of the image.



5. The model is lifted out of the material to separate it from the material film.



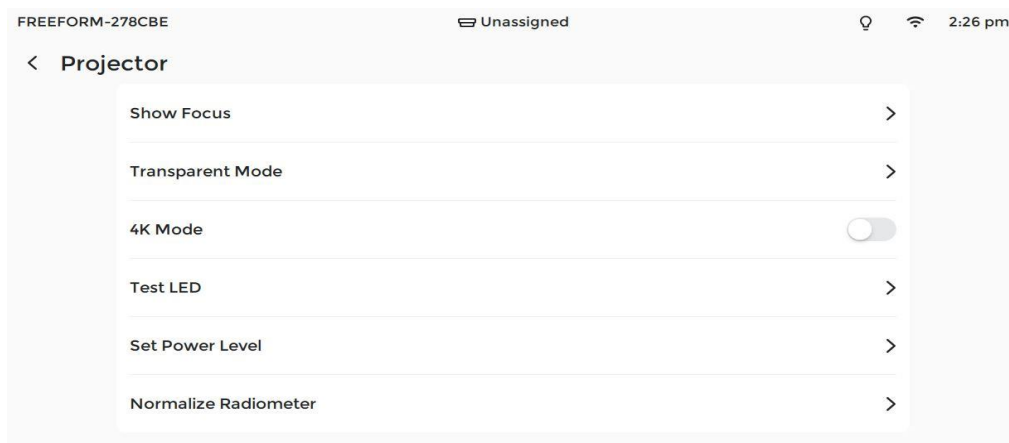
6. The process is repeated until the model has finished building.

The SPS process actively forms layers of precise thickness regardless of the cross-sectional area of the model or the viscous behaviour of the photopolymer resin. As a result, models of high fidelity are produced. The Ultra is ideal for direct manufacturing applications including medical prostheses and jewellery pattern production.

## Native and 4K Resolution

The Ultra light engine is equipped with a DLP imaging chip having a 1920x1080 pixel array. The projected image can be spatially shifted at high frequency by a piezoelectric mechanism to produce a 3840x2160 pixel image. The effect simulates a 4K resolution image. Operating in this mode produces images and consequently 3D parts having smoother edges and resolution than produced in the native mode. However, the native pixel size is larger than the pixels of the 4K image, which means that some control is lost over the rendering process at the edges of the image contours. For this reason, the user has the option to switch off the piezoelectric mechanism and operate the light engine in native resolution mode, producing a 2712-by-1528 image. Note that the native resolution image does not use all the pixels present on the DLP chip.

The Settings > Hardware > Projector menu has a 4K Mode toggle. If the toggle is turned on, the projector operates in 4K mode. If the toggle is off, the projector operates in Native Mode.



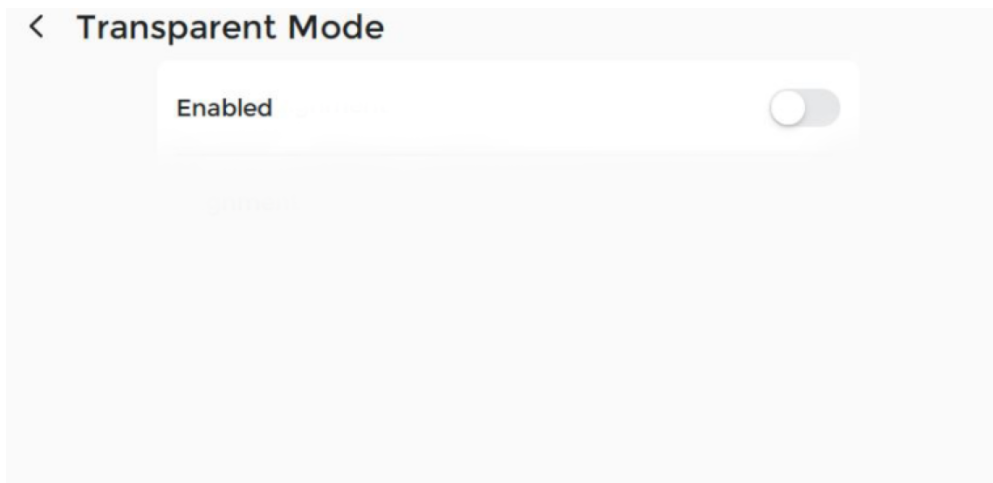
The 4K Mode should be changed, if required, prior to generating the build and sending it to the printer.

## Transparent mode

Transparent mode can improve the part resolution of transparent or water clear materials. This does not affect the immediate curing properties of materials, it may extend printing time. It is advised to use normal printing mode on materials that would not benefit from Transparent mode.

To enable Transparent mode, go to Settings > Hardware > Projector

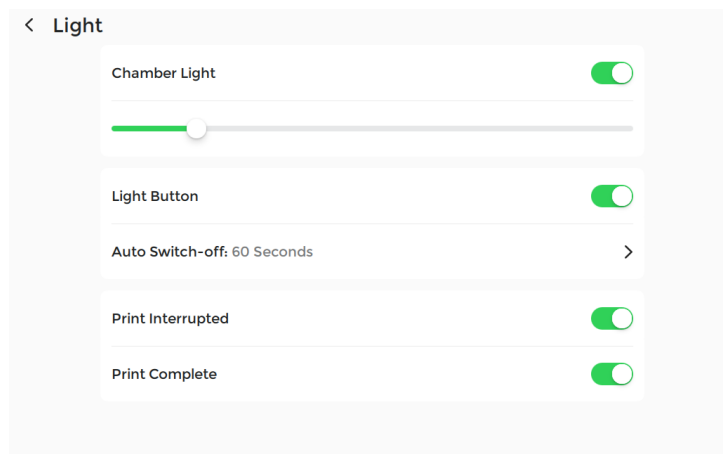
Slide the toggle to enable.



## Chamber light

The Ultra comes standard with chamber lighting installed. These can be configured to your personal preference.

Go to [Settings > Light](#)



The following settings can be adjusted:

- Chamber light on/off
- Intensity
- Light button: displays the shortcut in the status bar
- Auto Switch-off: Change the interval for auto switch off.
- Print interrupted: Activate the Chamber Light when a print gets interrupted
- Print Complete: Activate the Chamber Light when a print is complete.

## CHAPTER 2 Getting Started

### Unpacking

Refer to the Ultra unpacking guide. This is supplied with the machine.



Note this unit weighs approximately 35 Kg (77lbs), two people must be present to lift.

### Location

Ensure your Ultra is placed on level table with access to mains electricity. Avoid direct sunlight as this will degrade material left in the machine. The ground top does not need to be perfectly level. Avoid contact with vibrating surfaces.

### Power On

Plug the power supply cable into the AC power input at the rear of the machine. The power supply is designed for input between 100 – 240V AC single phase.

Turn on the Ultra machine by:

1. Flipping the power switch on the back of the machine to the ON position. You will see Standby Power LEDs on the back of the machine become illuminated.

**IMPORTANT NOTE: TO SHUTDOWN THE MACHINE ALWAYS DO SO VIA THE USER TOUCH SCREEN DISPLAY. NEVER SHUTDOWN USING THE POWER SWITCH. TO POWER OFF YOU CAN USE THE FLIP SWITCH BUT ONLY AFTER THE MACHINE HAS BEEN SHUTDOWN VIA THE USER TOUCH SCREEN DISPLAY.**



2. Press the ON/OFF button at the top right of the machine. The LCD screen at the front of the Ultra will turn on. Within 5 seconds the Asiga logo will light up and the user interface will become active. The user interface is an interactive touch-screen LCD.

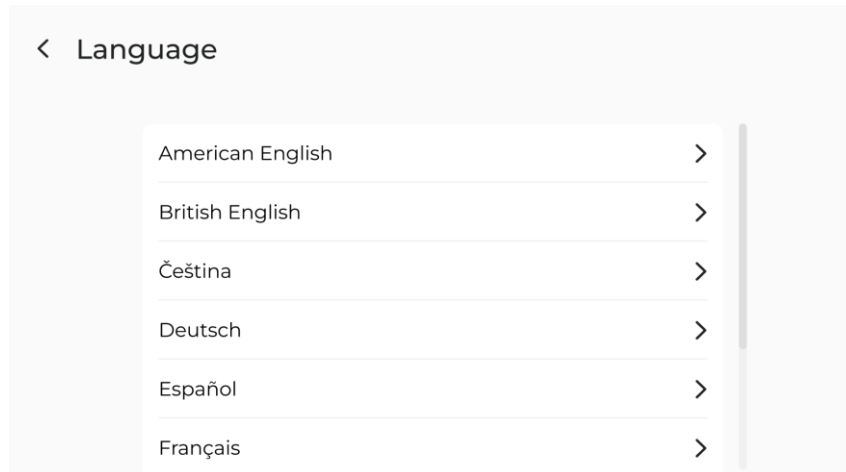
## Onboarding

The Ultra has an intuitive onboarding sequence designed to help setup the printer correctly.

Follow the steps precisely.

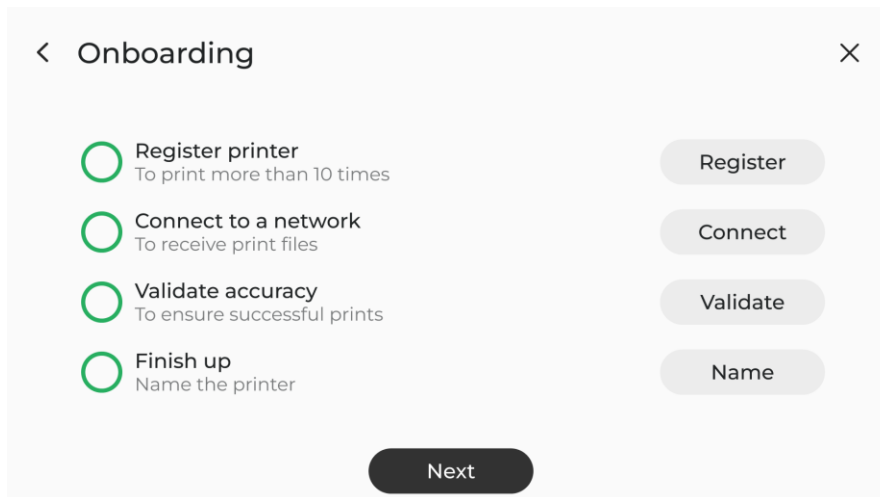
### Choose your Language

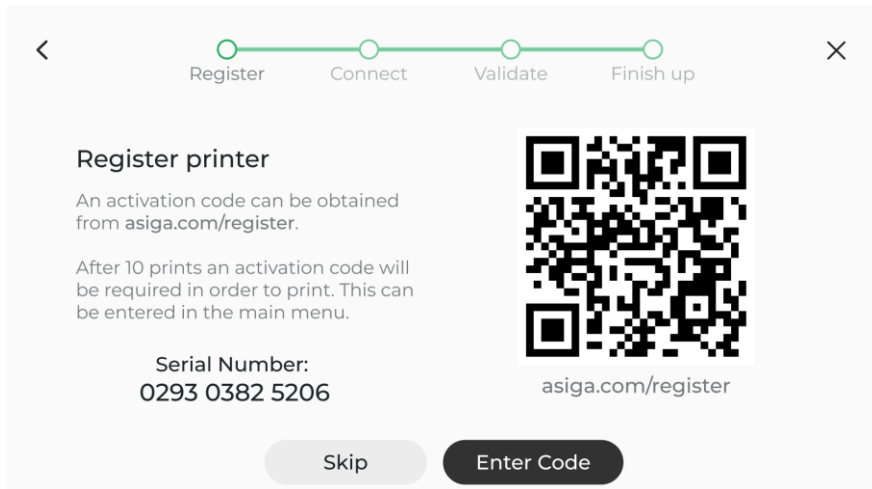
Upon initial start-up you will be given the option to select your language by scrolling through a list presented on the LCD screen.



### Register the printer

On first start up you will be presented with a screen to enter the warranty code.

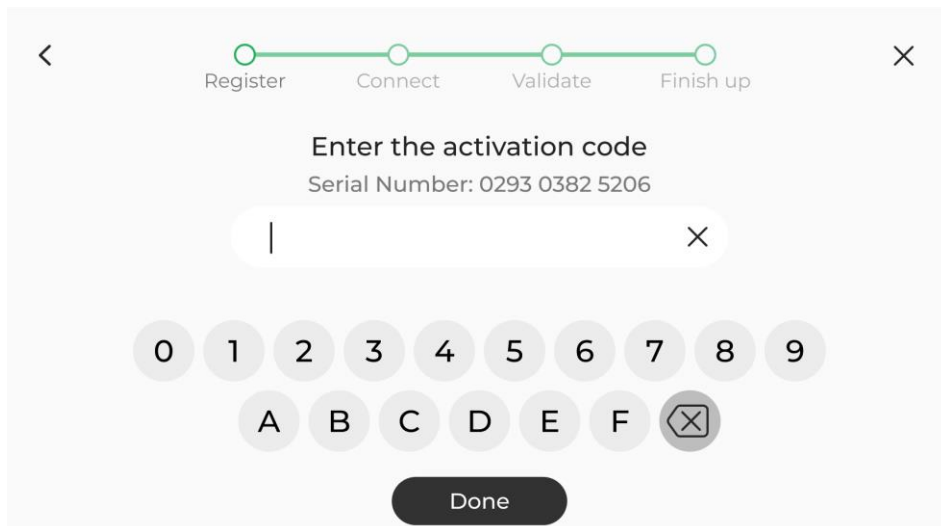




You can obtain your warranty code by visiting:

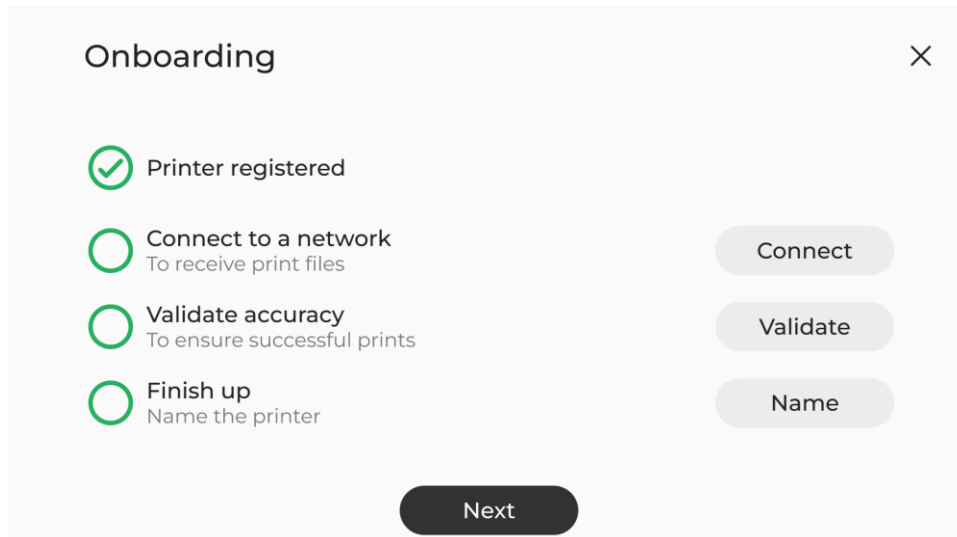
**[www.asiga.com/register](http://www.asiga.com/register)**

You will be requested to register an account. Once your account has been activated, you will be directed to a screen where you can enter the serial number of your machine. The warranty code registers your machine with Asiga and commences the one-year warranty on your system. Alternatively, your reseller may provide you with the warranty code.



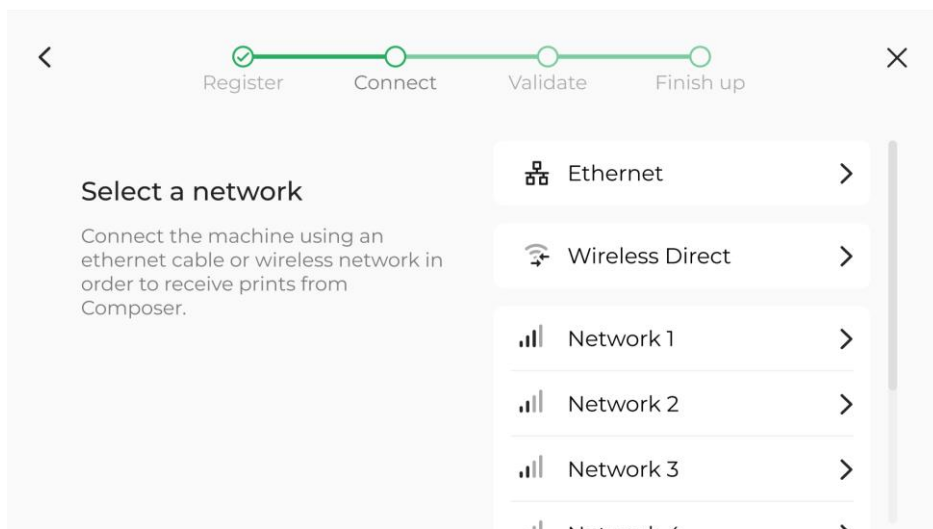
You can operate the Ultra without entering the warranty code. However, you can only complete a maximum of ten builds. After this the warranty code needs to be entered to continue printing with the Ultra.

## Connect to a network



Select your preferred network method:

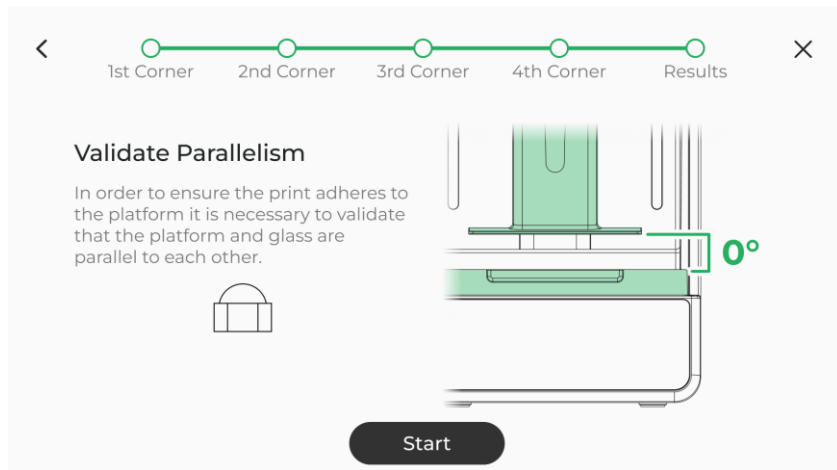
- Ethernet
- Wireless Direct
- Wireless



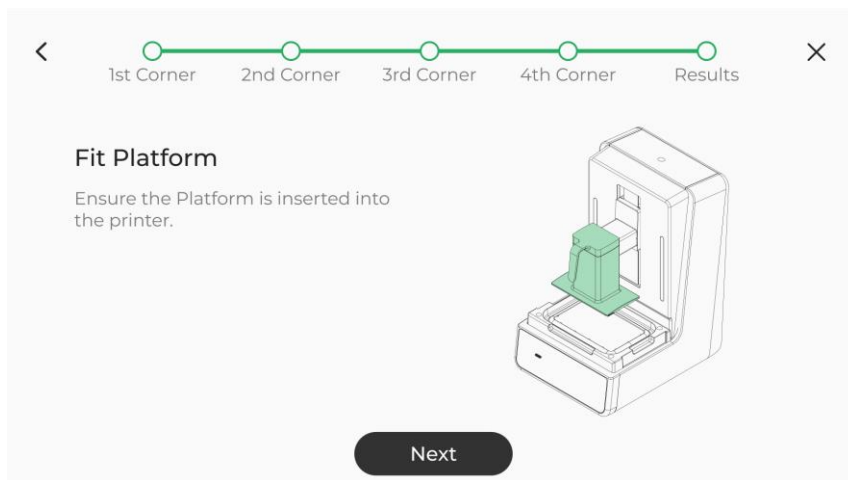
## Validate Parallelism

The Parallelism must be validated before printing is possible. This allows the printer to ensure the glass and platform are perfectly parallel.

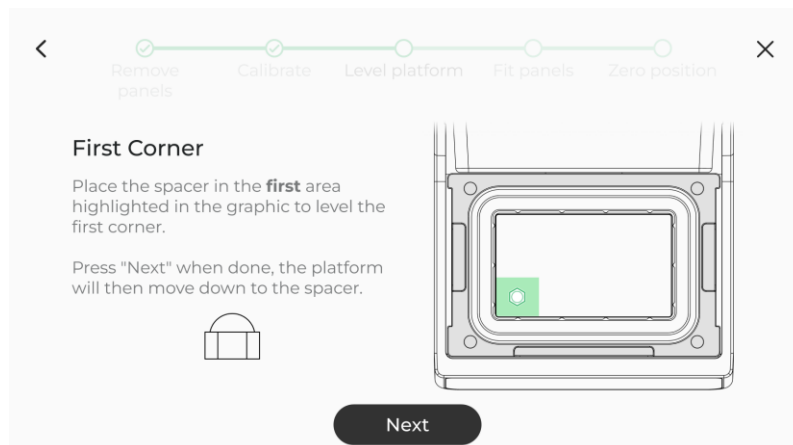
Four corners will be tested with the dome nut that is delivered with your printer.



To commence, press “Start”

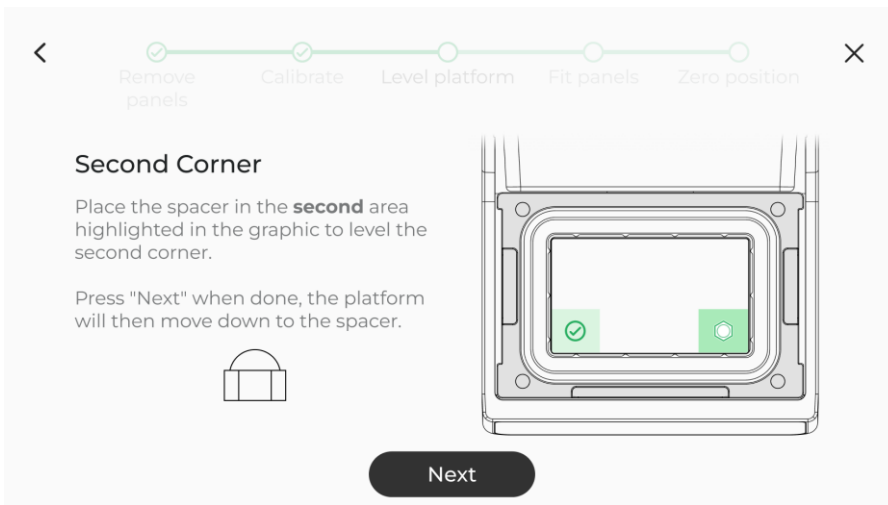
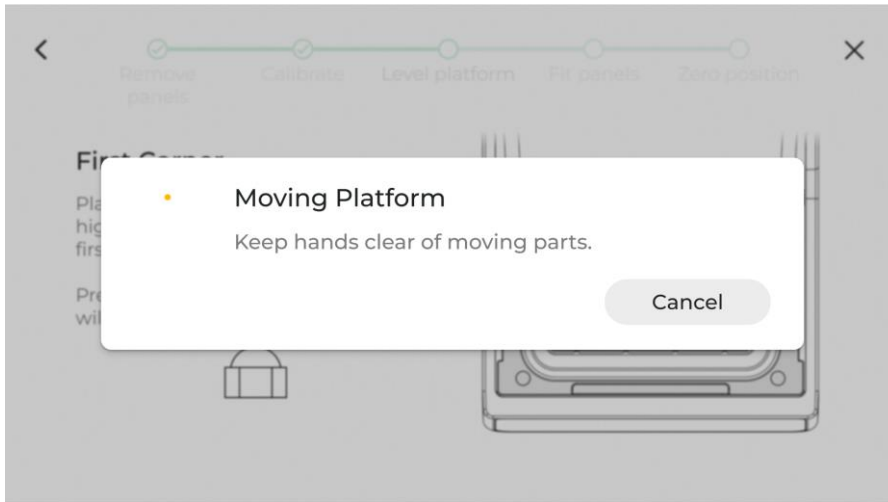


First corner



Press “Next”

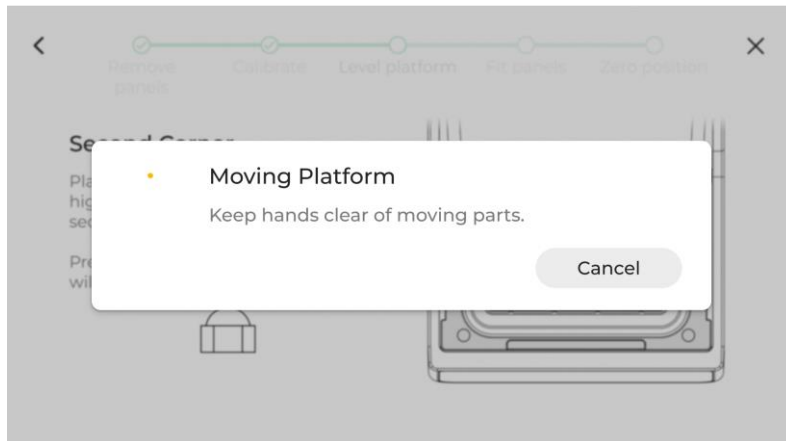
**The platform will automatically move.  
Ensure there is no debris and keep hands clear of all moving parts!**

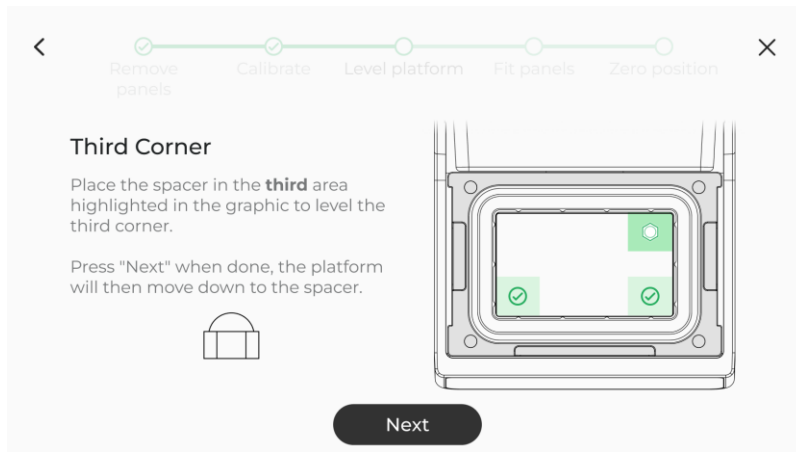


Press "Next"

The platform will automatically move.

Ensure there is no debris and keep hands clear of all moving parts!

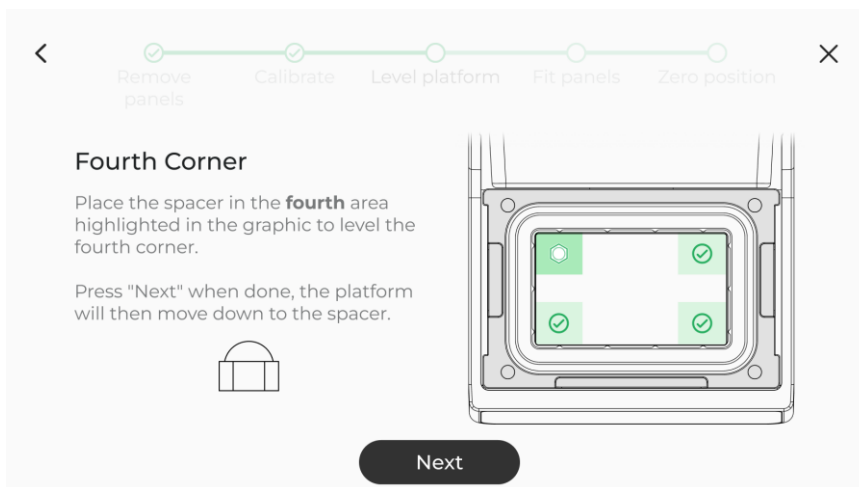
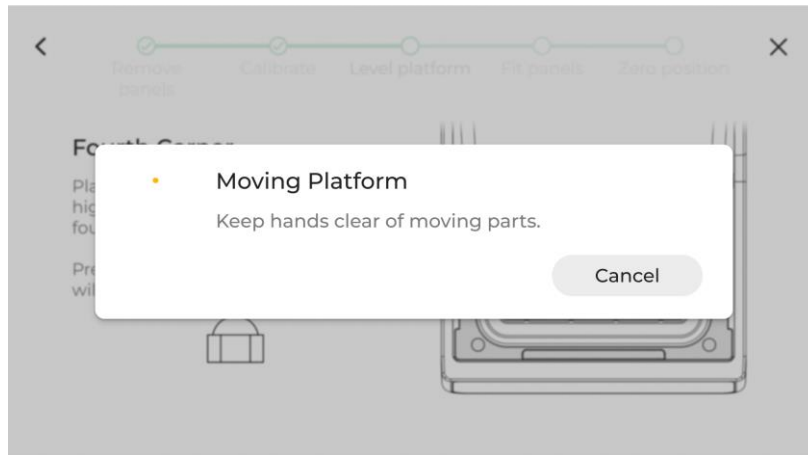


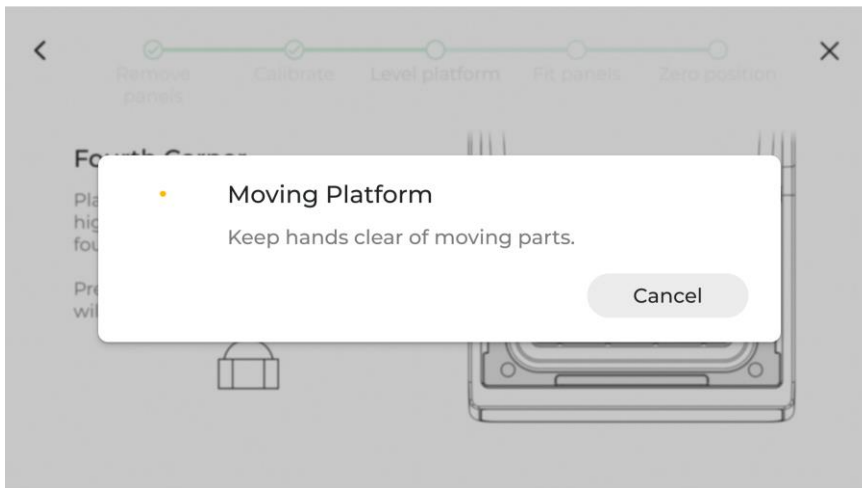


Press "Next"

The platform will automatically move.

Ensure there is no debris and keep hands clear of all moving parts!



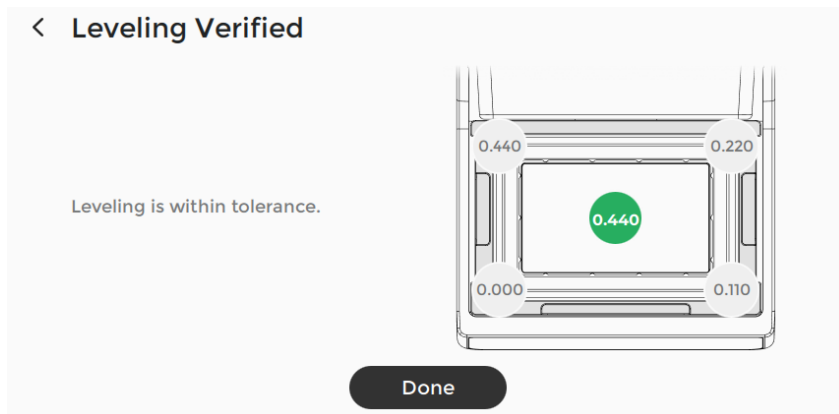


Press “Next”

The platform will automatically move.

Ensure there is no debris and keep hands clear of all moving parts!

If your Parallelism is within range, you should see the following screen:

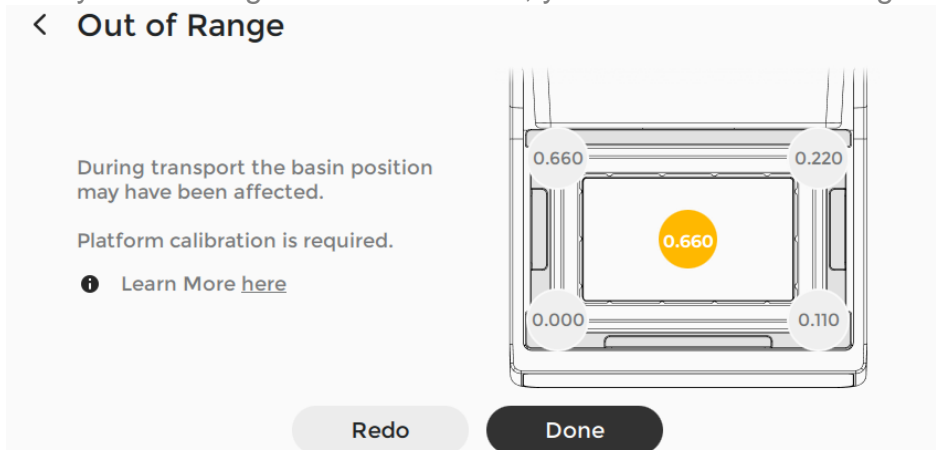


**\*Remember to remove the spacer before continuing!**

As a final step, Detect Zero Position is required.

Follow the on screen prompts or [see here for more detailed information.](#)

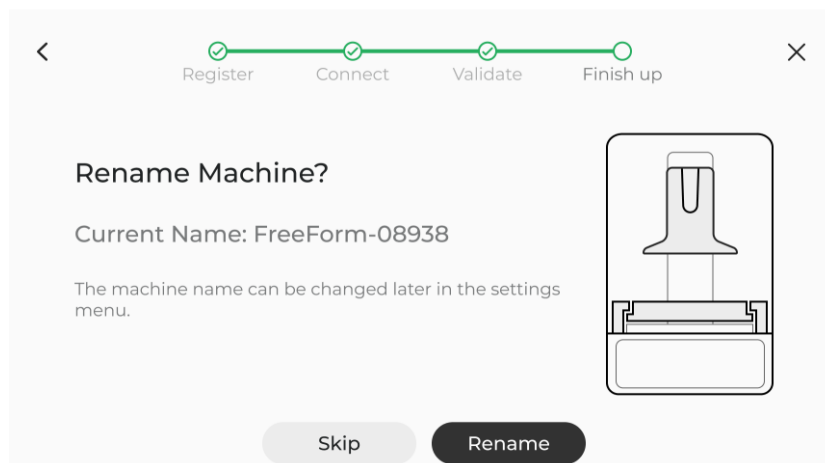
If your levelling is out of tolerance, you will see the following:



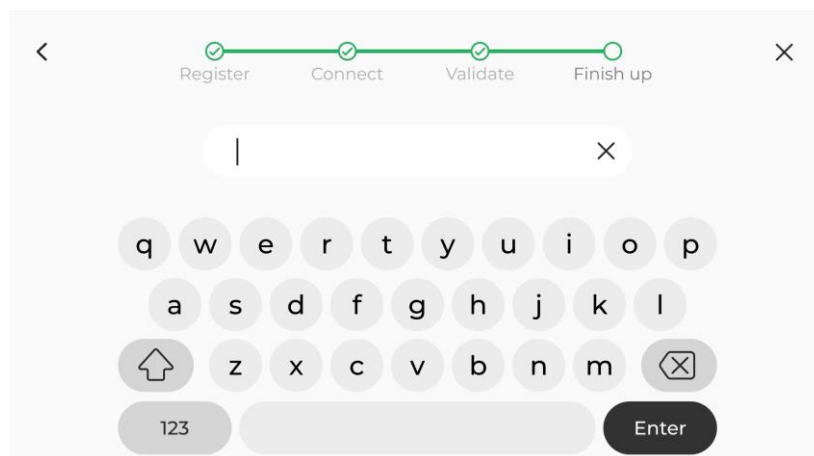
For more information on Platform calibration, [see here](#)

## Name the printer

If you want to rename your printer, this is the final step in the onboarding process.



Press “Rename” or Skip if you wish to retain the factory name.



Press “Enter” when finished.

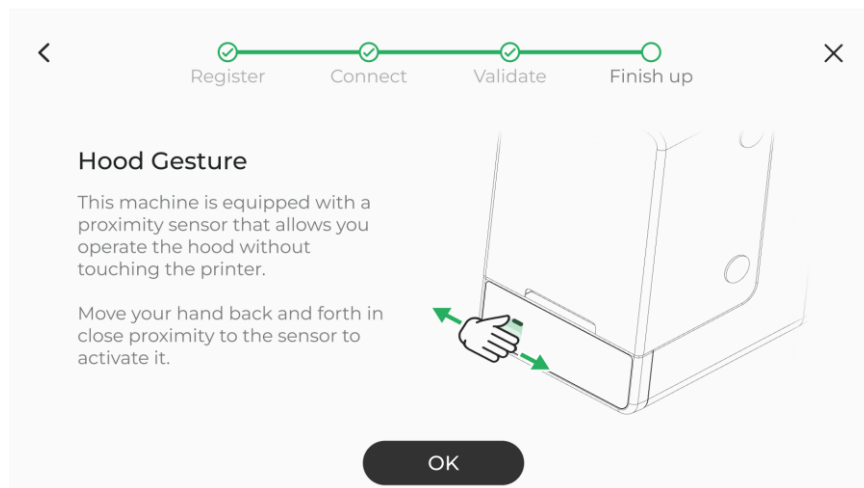
## Hood Gesture

The Ultra comes equipped with a proximity sensor.

This allows for touchless open and closing of the hood.

Simply move your hand back and forth within 1 second to activate the hood.

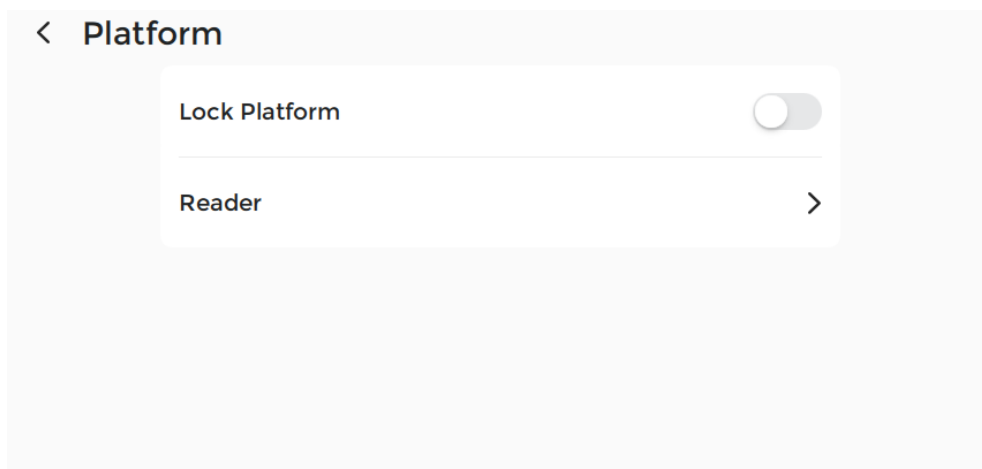
**The automatic hood will only work if the hood is in a final state (fully open or fully closed). Attempting to use the gesture while in an undefined state (for example, halfway open) will trigger an error message.**



## Installing Platform

The Ultra vertical axis has an electromagnet for holding the Platform. The Platform is automatically locked when a print is initiated.

To insert the Platform, slide the back onto the holder and navigate to 'Settings > Hardware > Platform > Lock Platform.



## Platform reader

Every Platform is equipped with a unique QR code. Upon installation of a Platform, the Ultra reads this QR code and perform Detect Zero Position.



Each Platform can have a unique name.  
After initial installation, Platforms can easily be swapped without Detect Zero Position.

### Detect Zero Position

*Note: a video demonstration of the zero position calibration procedure is included on the USB stick which ships with your machine.*

Correct operation of the Ultra requires:

1. The build platform to be parallel to the glass window; and
2. The build platform to be in contact with the glass window when the vertical axis position is set to zero.

This is accomplished by performing the Detect Zero Position procedure.

Detect Zero Position is done in the factory before the machine is shipped.  
However, upon first installation it is recommended to confirm it did not shift during shipping.

This procedure is completed during Onboarding.

This procedure does not need to be repeated regularly on the Ultra.

1. Install the build platform onto the vertical axis bracket.
2. Go to menu item Settings > Tools > Jog Controls > Detect Zero Position

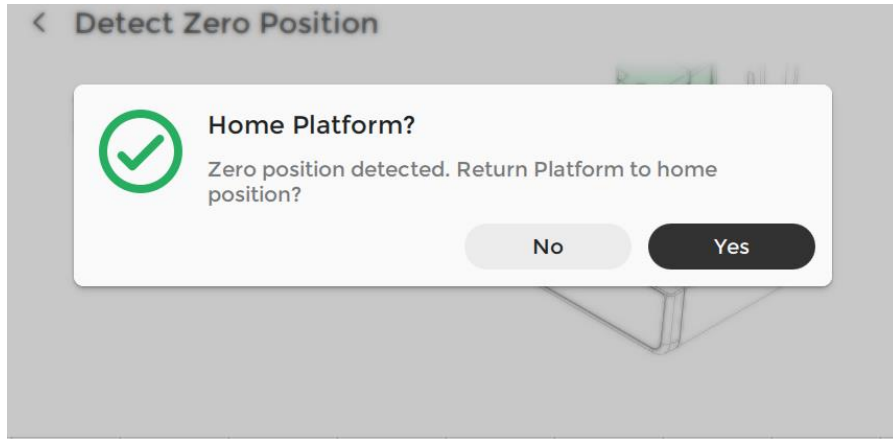


3. The Ultra will start the procedure automatically

**The platform will automatically move.**

**Ensure there is no debris and keep hands clear of all moving parts!**

4. When complete, you will see the following message.



### Platform Calibration

If your Parallelism test fails, Platform Calibration will be required.

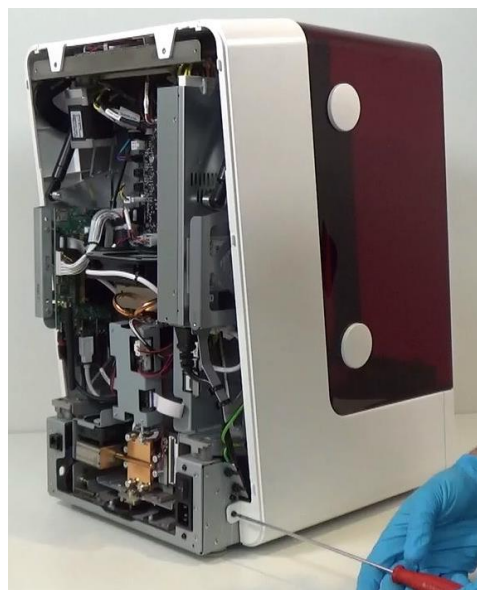
To enable this, “Service Mode” will need to be on, see Chapter 7.

Follow the below steps.

Before starting, shut down the printer and remove the rear and side covers using a T10 Torx screwdriver.

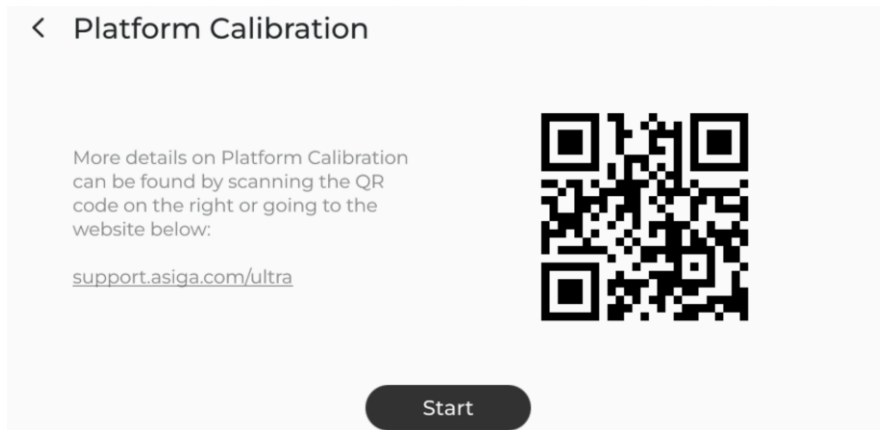


Remove Rear Cover

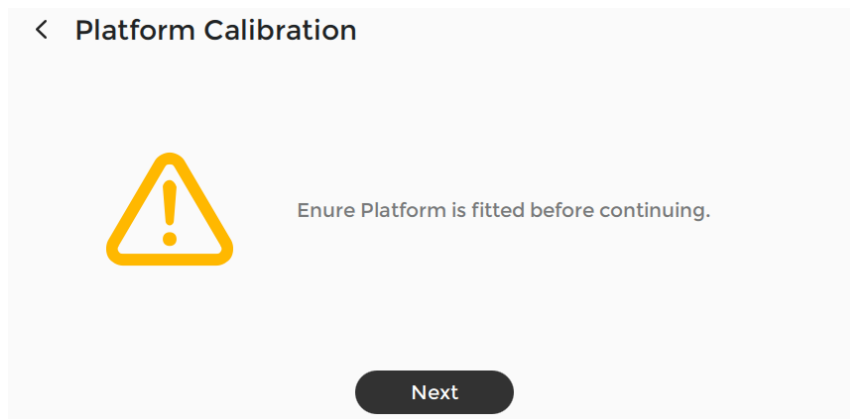


Remove Side Covers

- 1) Turn the printer on, go to Settings > Hardware > Smart Positioning System (SPS) > Platform Calibration



Press 'Start'



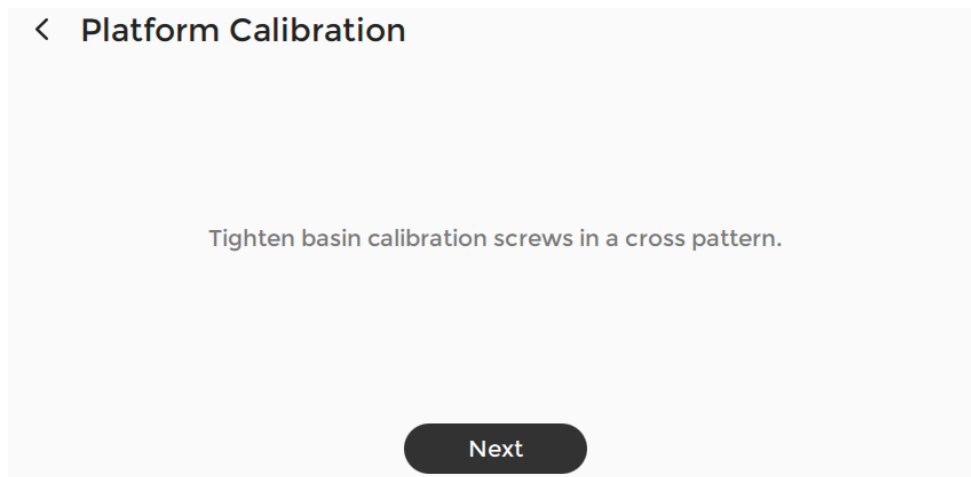
- 2) Ensure Platform is fitted to the machine.
- 3) On either side of the basin, loosen the screws marked in red (8 in total), enabling it to move freely on springs.



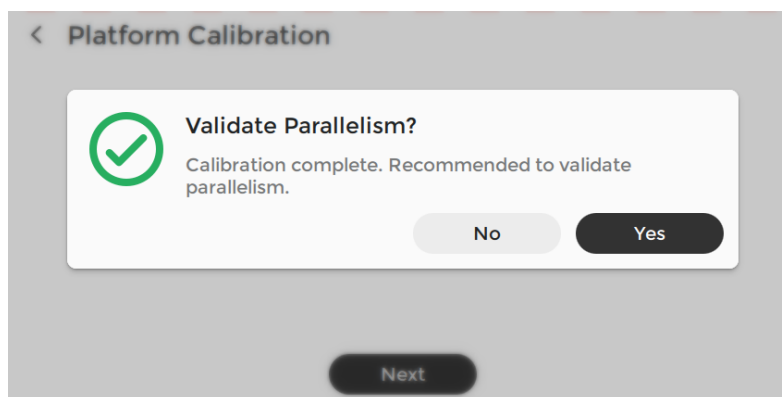
- 4) Press "Next", Platform will automatically move.

**The platform will automatically move.  
Ensure there is no debris and keep hands clear of all moving parts!**

- 5) The platform should now be pressing down on the glass.



- 6) Retighten the 8 screws in cross pattern.
- 7) Press 'Next' to Detect Zero Position



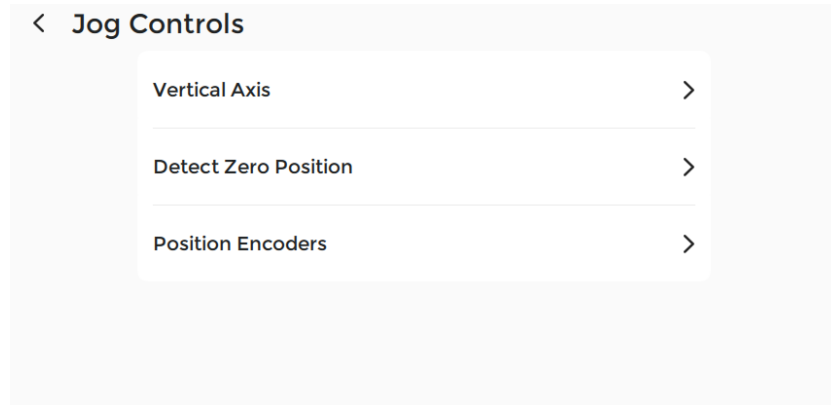
- 8) Complete [Validate Parallelism](#)
- 9) Shut down the printer and reattach side and rear covers
- 10) Calibration complete.

## Zero Position Encoders

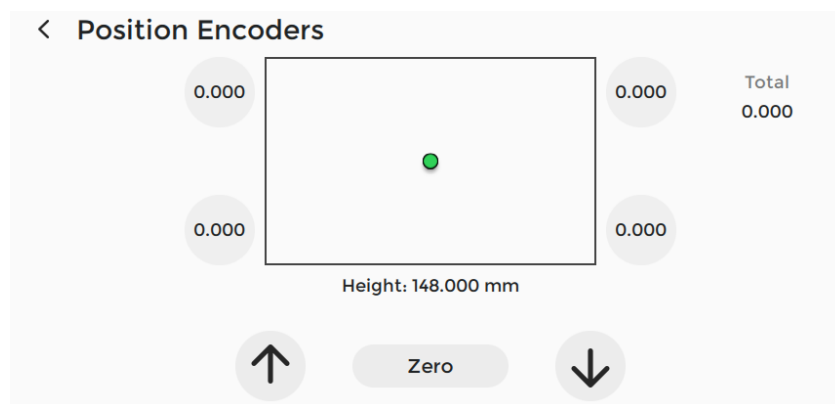
The Ultra is equipped with four position encoders built into the corners of the glass base-plate. The position encoders allow microscopic deflections in the mechanical structure to be measured during the formation of a model layer. This allows layers having precise thickness to be formed.

The position encoders should be zeroed after transporting the machine. In addition, the position encoders may drift so they should also be zeroed from time-to-time by the user. The procedure takes less than 30 seconds. The procedure for zeroing the position encoders is as follows:

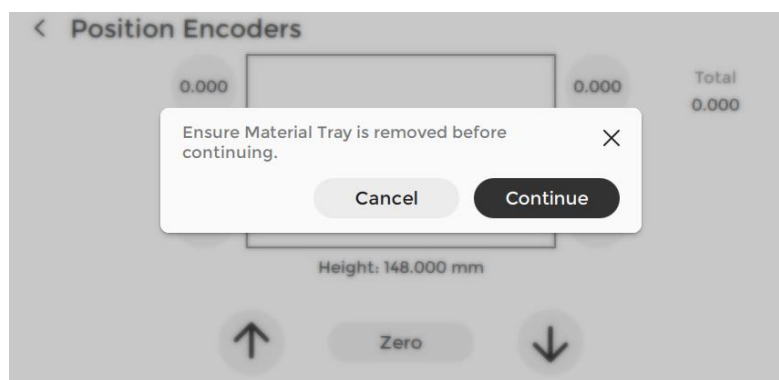
1. Go to the menu item Settings > Tools > Jog Controls > Position Encoders.



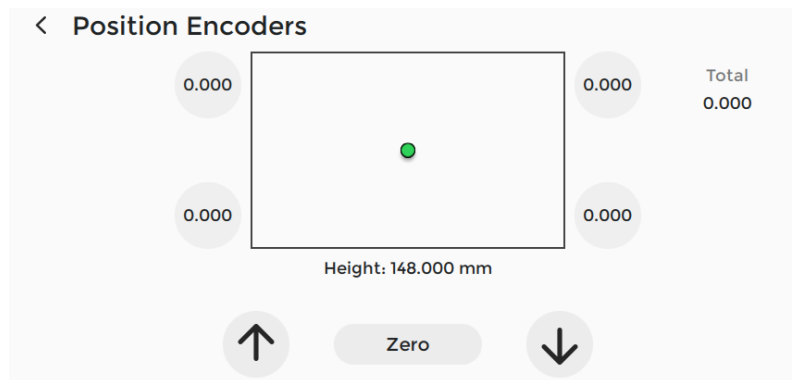
2. Press "Zero"



3. The empty square region shows a two-dimensional deflection map of the build envelope with a blue dot at the zero centre. Pressing the up and down arrows will move the vertical axis up and down. The current height in mm above the zero position is shown between the arrows.
4. Pressing the "Zero" button will show the following prompt:



5. Remove the build tray from the machine. **There should be no objects in the build tray area or anything pressing on the machine.** The machine should be on a level surface in a low vibration area. Press "Cancel" to abort the process, otherwise, when ready, click "Continue" to record the zero position.



6. The process is complete. The green dot should be in the centre of the square.

## Network Connection

Build jobs for the Ultra are prepared on a personal computer and sent to the Ultra via a network connection. The Ultra has two networking options:

1. Ethernet 10/100 port on the rear of the machine
2. Wireless
3. Wireless Direct

## Ethernet Setup

Plug one end of the included network cable (RJ45 connector at both ends) into the Ethernet port at the rear of your Ultra machine. Plug the other end into a hub/switch/router on the same network as your computer. Alternatively, if there is no network, you can plug it directly into your computer.

The default network setting is Automatic Configuration, which allows your network to automatically assign an IP address to the Ultra machine if there is a DHCP server present. If there is no DHCP server present, the Ultra will fall back to Automatic IP Addressing to assign an unused address in range 169.254.1.0 to 169.254.254.255 with a subnet mask of 255.255.0.0.

If you wish to assign a fixed IP address to the Ultra machine for Ethernet:

1. Go to Settings > General > Connectivity > Ethernet
2. Toggle off Automatic Configuration
3. Select IP Address, enter the IP address and select Save
4. Select Subnet Mask, enter the subnet mask and select Save
5. Setting the Gateway, Primary DNS and Secondary DNS is optional and may be left blank

## Wireless Setup

1. Go to Settings > General > Connectivity > Wireless
2. Select Network Name
3. Select the desired wireless network from the list. Wireless networks that require a password will have a lock icon shown.

4. If required, enter the password and select Connect. The password will be remembered so that the printer can reconnect again if the wireless connection is interrupted, the printer is restarted or the printer is turned off and on.
5. A spinning circle animation will be shown while the printer is connecting to the network. If the printer has connected successfully, a tick icon will be shown.

If your wireless network does not have a DHCP server present, you may need to assign a fixed IP address as detailed in the Ethernet Setup section.

## Wireless Direct Setup

Wireless Direct allows the printer to act as a wireless access point for connecting to the printer wirelessly. This may be useful if you do not have a wireless access pointer or router that the printer can connect to. Note that enabling Wireless Direct will prevent connecting to an existing wireless network using Wireless Setup.

1. Go to Settings > General > Connectivity > Wireless Direct
2. Toggle on Enabled

By default, the printer will create a wireless network with the name set to the printer's name and the password will be randomly generated. You can select Network Name or Password to change them.

The printer will have an IP address of 172.27.10.1 with subnet mask 255.255.255.0. It will also act as a DHCP server and assign IP addresses in the range 172.27.10.2 to 172.27.10.254 to wireless devices that connect to it. The IP address and subnet mask of the printer cannot be changed when using Wireless Direct.

## Install Composer Software

Build jobs for the Ultra are prepared on a personal computer using Asiga Composer™ software. Asiga Composer™ software is provided on the USB stick included with your Ultra or can be downloaded from the Asiga website. Asiga Composer™ runs on Windows, Mac and Linux.

To install Composer:

1. Insert the USB stick into a USB port of your computer.
2. Browse to the folder "Composer Software".
  - a. For Windows click "composer-XXXX-win32.exe" or "composer-XXXX-win64.exe" depending on whether your operating system is 32-bit or 64-bit respectively.
  - b. For Mac click "composer-XXXX-x86\_64.dmg".
  - c. For Linux click "composer-XXXX-i686.tar.xz" or "composer-XXXX-x86\_64.tar.xz" depending on whether your operating system is 32-bit or 64-bit respectively.

## Infrared heating

The Ultra comes equipped with 4 IR Heaters. These are located in each corner of the Build Envelope. The IR Heaters heat the Build chamber to 70°C (158°F).

The idle IR temperature settings are accessed via the menu **Settings > Hardware > Heating**.

Setting the IR temperature during a print is controlled via Composer, for more information see the Composer User Guide.



## CHAPTER 3 **Preparing a Build**

*Build jobs for the Ultra are prepared on a personal computer using Asiga Composer™ software. Refer to the Composer User Guide for more information.*

## CHAPTER 4 **Starting a Build**

### **Installing the Material Tray**

Open the hood of the machine.

1. Insert the tray with the material sensor sticker located towards the back of the machine.



- Slide the material latches to the front of the machine so they grip over the lugs on the sides of the material.



### Add Resin to the Material Tray

Asiga recommends filling the Material Tray to the 'MAX' level. This level can be found on the inside of each Material Tray.

#### Warning

UV light will be emitted. Avoid direct exposure of eyes and skin. Close the machine hood, or wear the UV safety glasses at all times.



### Clean the Material Tray

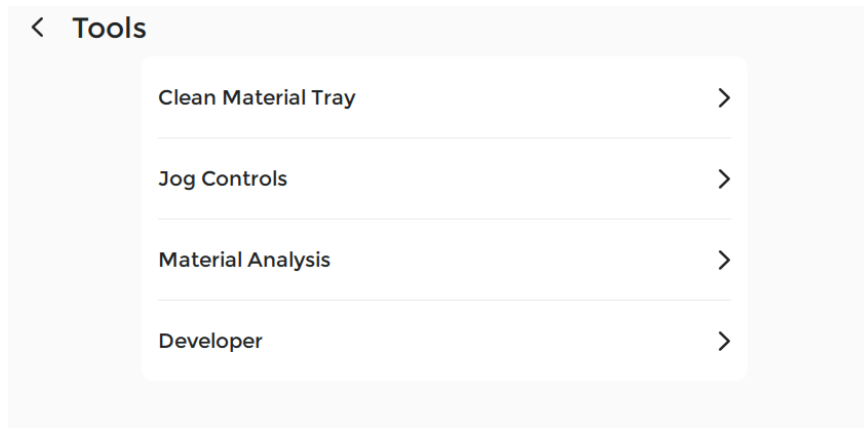
Commencing a build when there is solid debris in the material can cause damage to the material film. Debris can result whenever:

- A part has failed to print correctly.
- A model breaks during fabrication.
- Resin in the material is exposed to light.

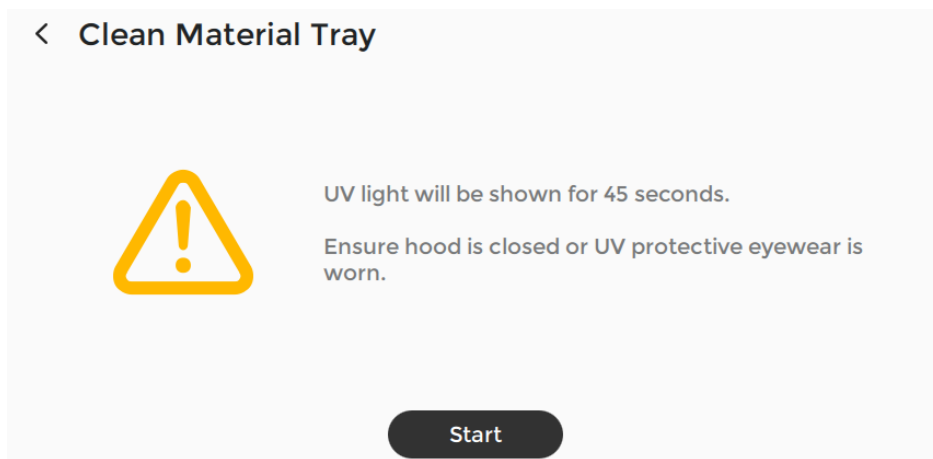
It is prudent to check the material bottom for any solid debris before every print. Do this by wiping resin away from the bottom of the material with a piece of cardboard (a business card is ideal). Any cured debris can be aggregated by blanket exposing the build envelope with UV light from the projector.

The following procedure should be used:

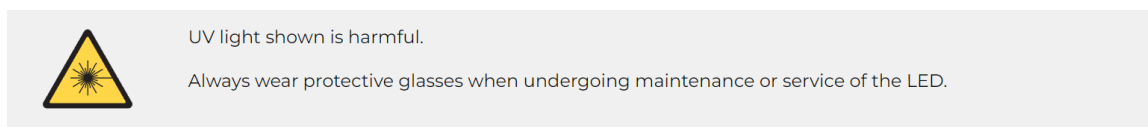
- Go to Tools > Clean Material Tray



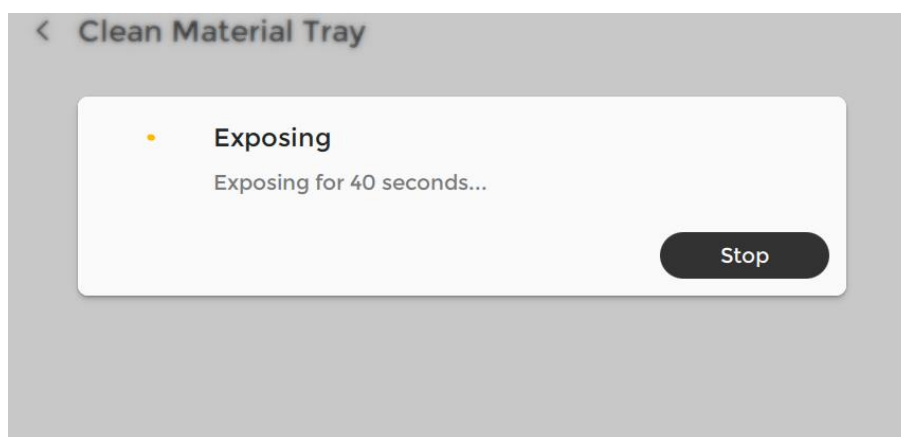
2. This will automatically show the UV light for 45 seconds, curing a rectangle shaped part.



3. Press 'Start' to commence.



4. A countdown is shown while the machine is exposing.

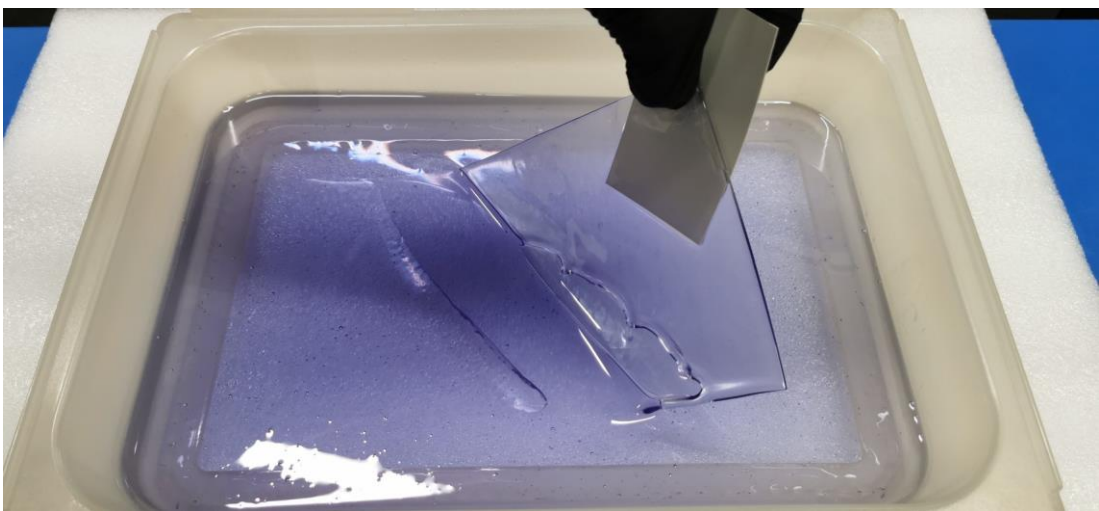


5. When the procedure is finished, the machine will return to the previous menu.

6. Remove the Material Tray from the machine.



7. Place a finger on the underside of the material film at a corner of the cured rectangle. Your finger will provide support for the next step.
8. Use a piece of cardboard or plastic film to slide under the edge of the cured rectangle and lift it off the film.



9. Remove the cured rectangle in one piece and dispose of it.

## Set the Chamber Temperature

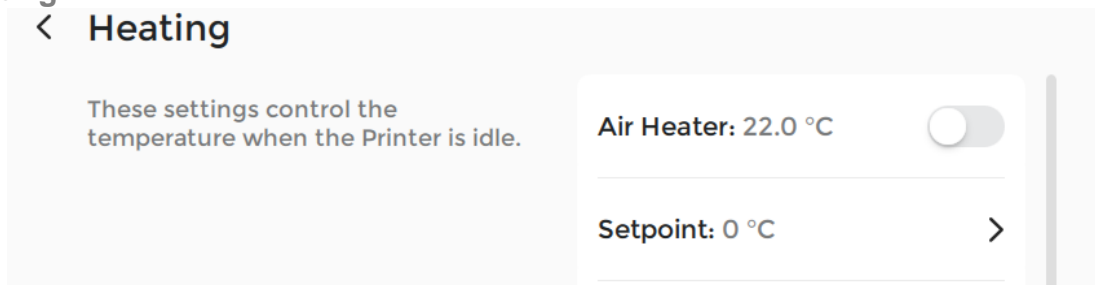
The Ultra is equipped with two separate internal temperature controllers which regulate the temperature of the build chamber. Temperature control is useful when building with some materials to control their viscosity, reactivity and solidification.

The chamber temperature can be set for when:

1. The machine is idle (i.e. not building any parts)
2. The machine is building a part.

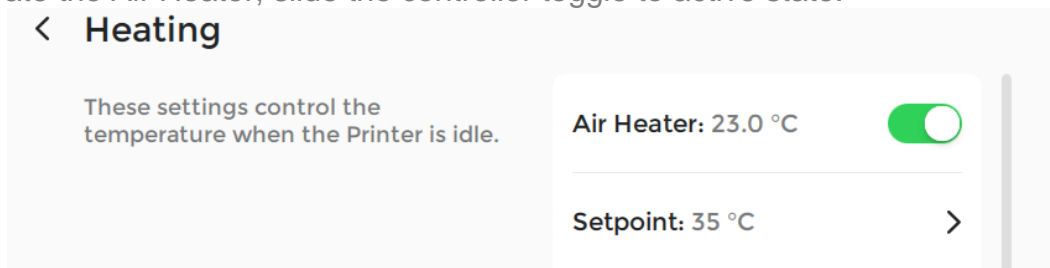
## Air Heater

The idle chamber temperature settings are accessed via the menu **Settings > Hardware > Heating**.



The Setpoint sub-menu allows the setpoint temperature to be entered.

To activate the Air Heater, slide the controller toggle to active state.



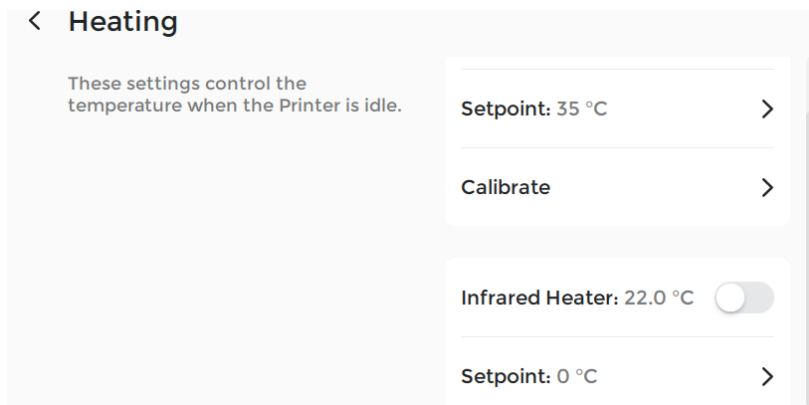
Note that the controller and setpoint settings under this menu are only employed while the machine is idle. Use this menu to control the temperature of the material while the machine is not building parts. When the machine is building a part, the build temperature setpoint set in the Asiga Composer Build Wizard is applied.

The Air Heater will heat the Build Chamber to approximately 15°C (59°F) above ambient temperature. The maximum temperature for the Air Heater is 50°C (122°F).

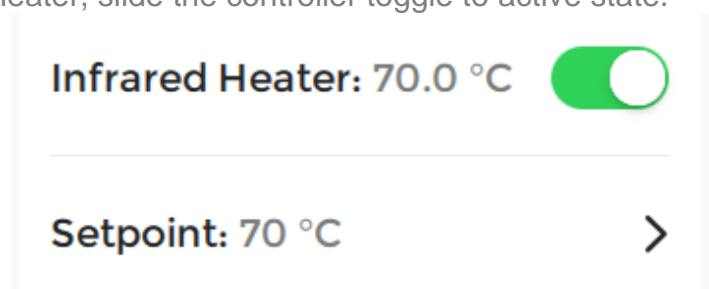
## Infrared (IR) Heater

The Ultra comes equipped with 4 IR Heaters. These are located in each corner of the Build Envelope.

The idle IR temperature settings are accessed via the menu **Settings > Hardware > Heating**.



The Setpoint sub-menu allows the setpoint temperature to be entered. To activate the IR Heater, slide the controller toggle to active state.



Note that the controller and setpoint settings under this menu are only employed while the machine is idle. Use this menu to control the temperature of the material while the machine is not building parts. When the machine is building a part, the build temperature setpoint set in the Asiga Composer Build Wizard is applied.

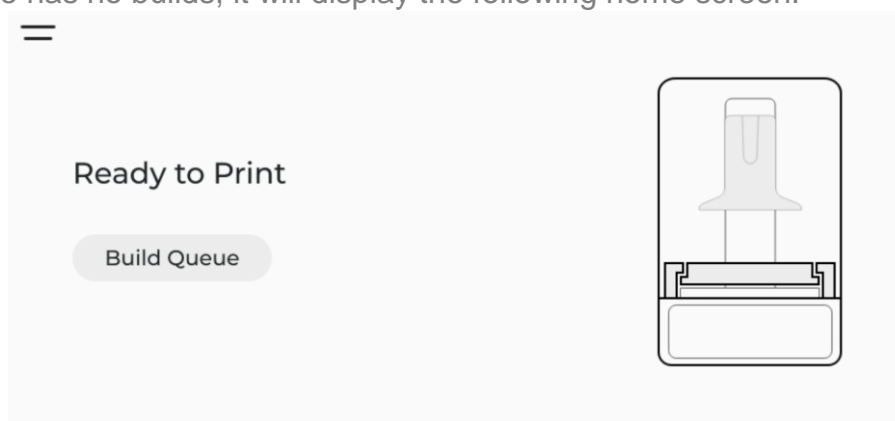
The Infrared Heater will heat the Build Chamber to approximately 70°C (158°F).

**Note: Glass may be warm after printing.**

**Exercise caution when removing tray and handling machine.**

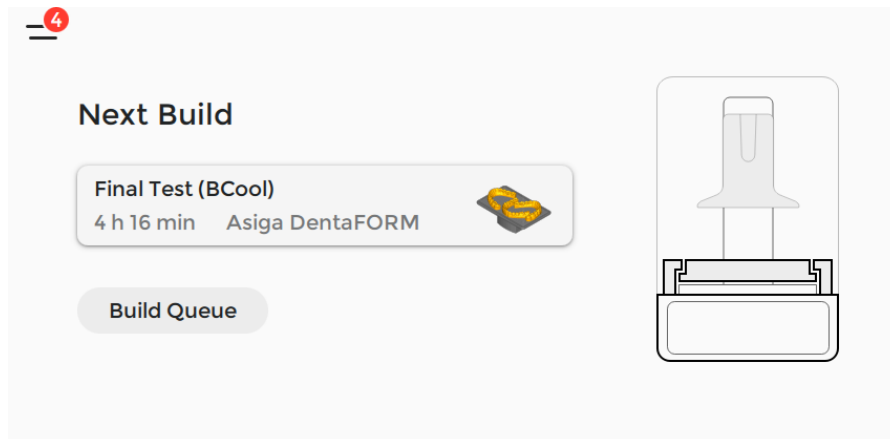
## Starting the Build

Start the build on the Ultra's LCD screen with Build Queue menu. If the machine has no builds, it will display the following home screen:



To get started, please submit a build through Composer.

If the machine has a build queued, the following screen will be displayed:



Note: The Menu Icon will display number of queued builds.  
To start the Next Build, select it from the home screen.  
To start another Build, select the 'Build Queue'

## Next Build

Builds are displayed in chronological order on the Ultra.

To start the Next Build, select it from the home screen.



The Preview screen displays relevant Build information.

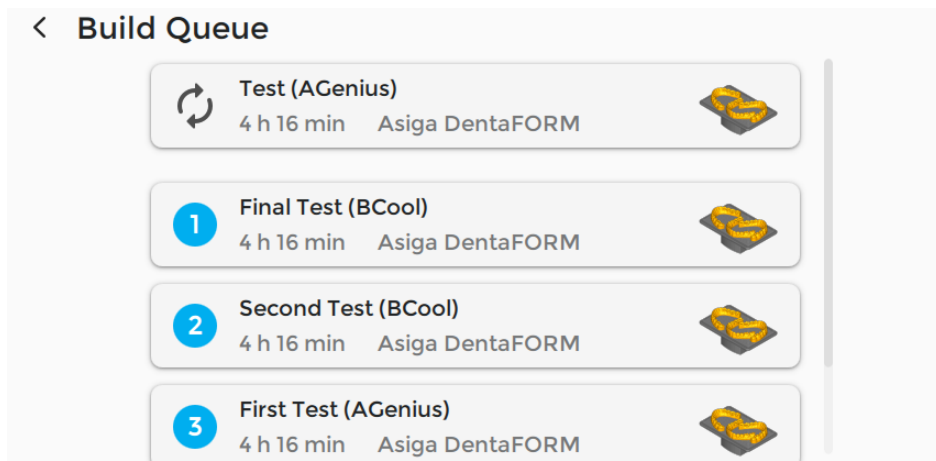
To start, select 'Print'.

## Build Queue

The Build Queue shows all currently queued Builds.

The first entry is the previous Build.

The next entries are queued in chronological order.



Select the desired Build to continue.

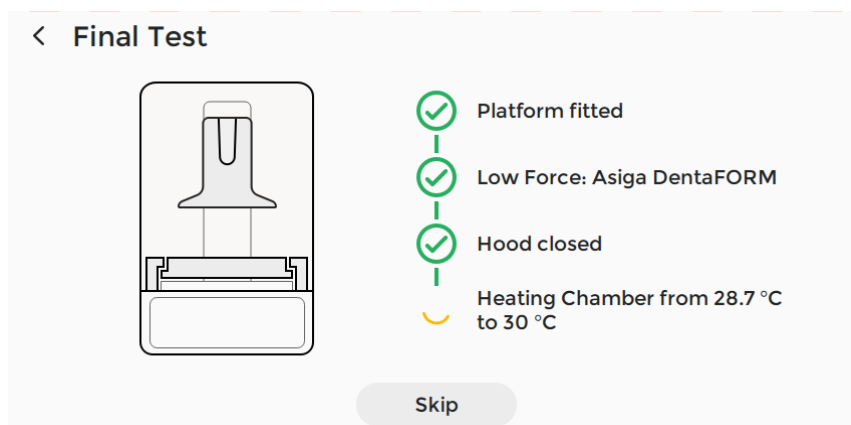
### Build checklist

The Ultra will run through a pre-inspection checklist. The machine will confirm the following settings:

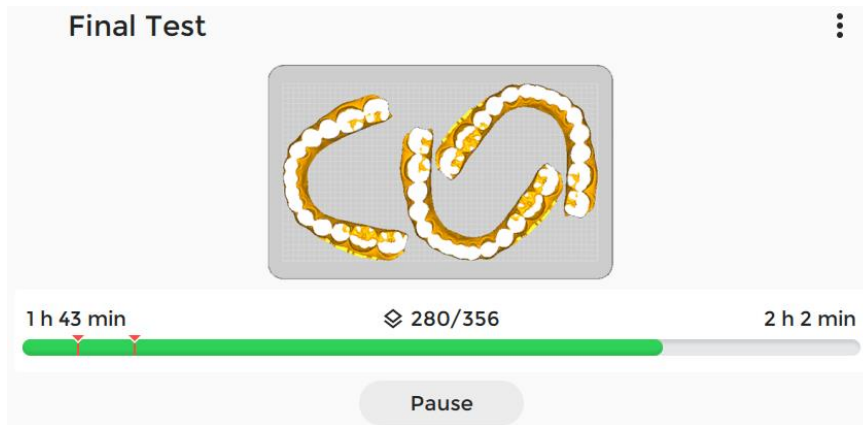
- Platform fitted
- Correct Material Tray fitted
- Hood state: open/closed
- Heaters enabled/disabled. \*

\*Note: This can be skipped at any time.

When the pre-inspection is complete, the print will start automatically.



## Build screen



The following items are shown on the build screen by default.

- Job name
- Layer preview image
- Time elapsed
- Estimated time remaining
- Current layer
- Total layers
- Skipped layers

Optional settings include:

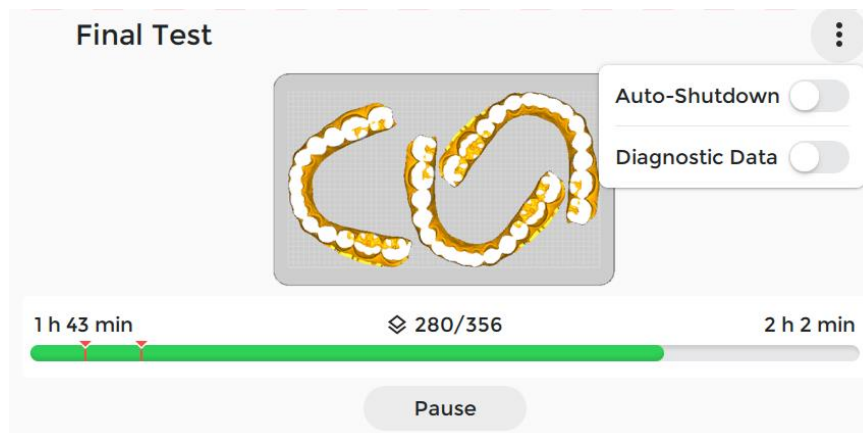
- Auto-shutdown
- Diagnostic Data (SPS)

### Auto-shutdown

Auto-shutdown will shut down the machine after printing is complete. This can be engaged in two different ways.

### One-time event

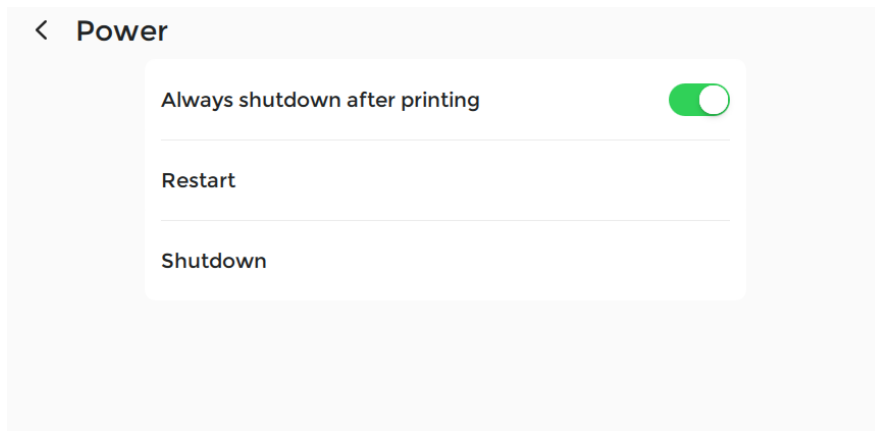
To enable auto-shutdown once, select the 'more' icon (three dots) in the top right section of the Build screen.



Slide the icon to 'Engaged'.

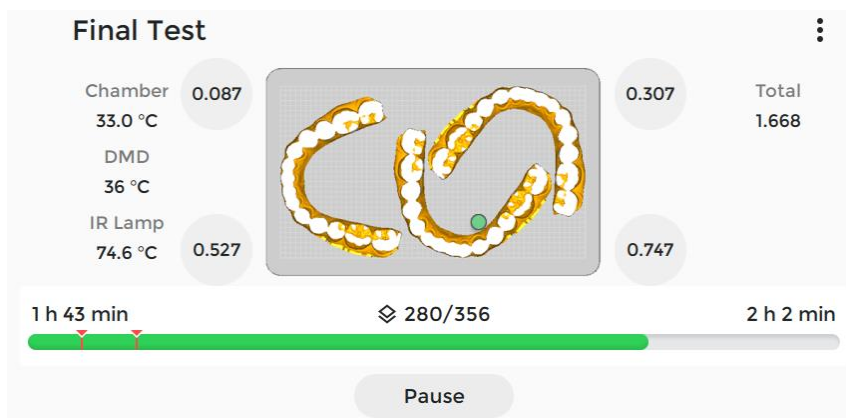
## Permanent auto-shutdown

Auto shutdown can be enabled as default behaviour in the menu. Go to Settings > Power and select “Always shutdown after printing”



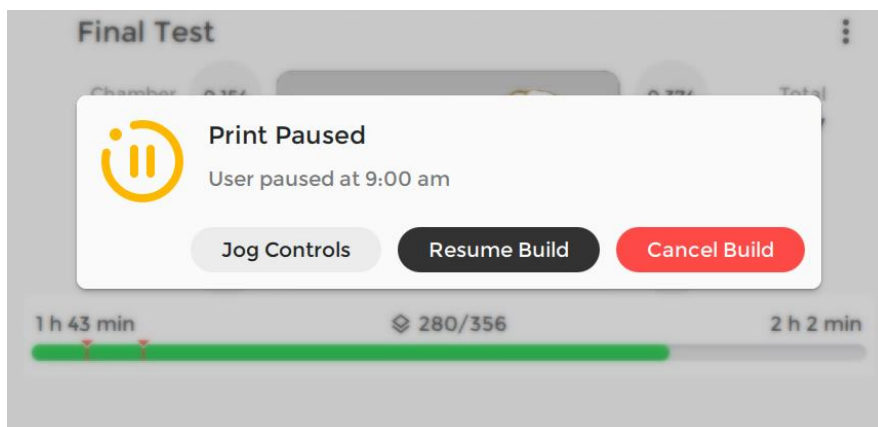
## Diagnostic Data

Diagnostic data will display printer telemetry such as chamber temperature, SPS data, IR lamp heaters etc. This can be used for troubleshooting.



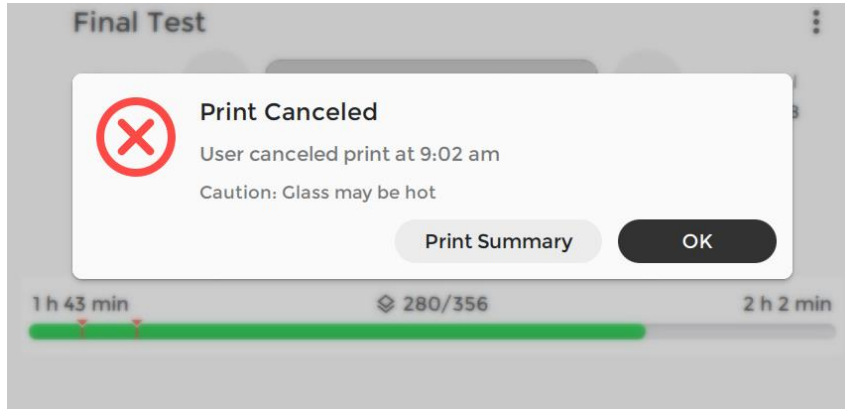
## Stopping and Pausing the Build

A build can be paused by pressing the pause button



When the build is paused you can raise or lower the build using the jog controls. You can continue the build with the Resume button or abort the build with the Cancel button.

Cancelled builds can be continued with the **Build Queue** menu item.



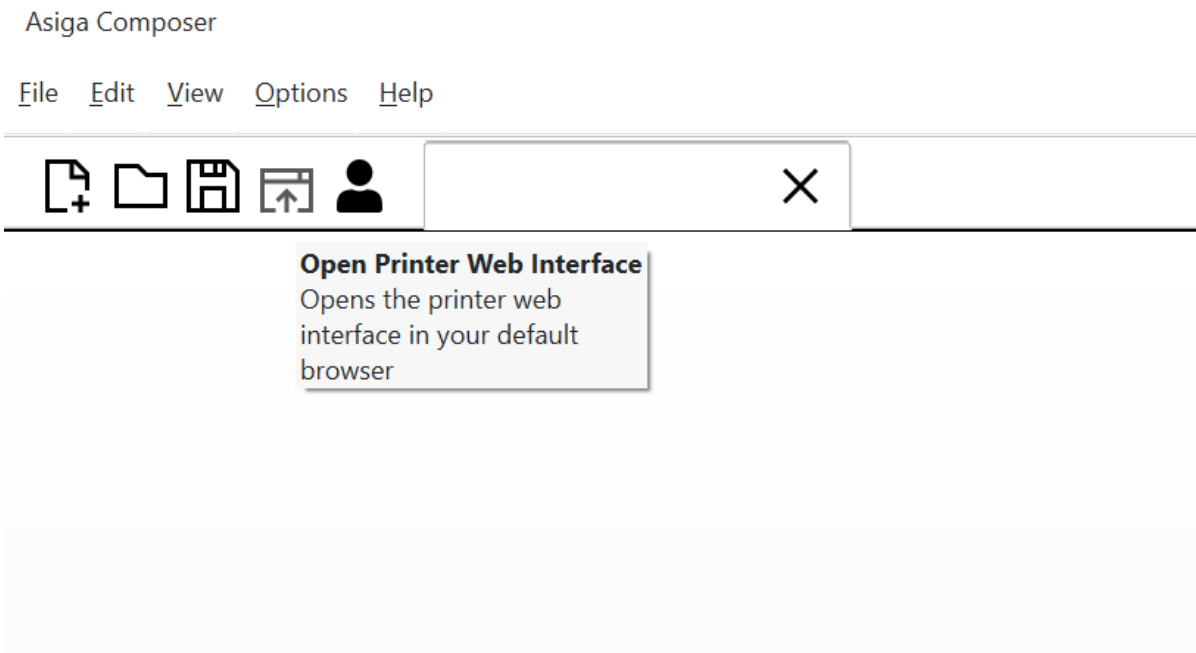
## CHAPTER 5 Web Interface

The Ultra runs an internal web server which is visible to web browsers on the same network. This Web Interface presents important control screens for interacting with the Ultra.

### Accessing the Web Interface

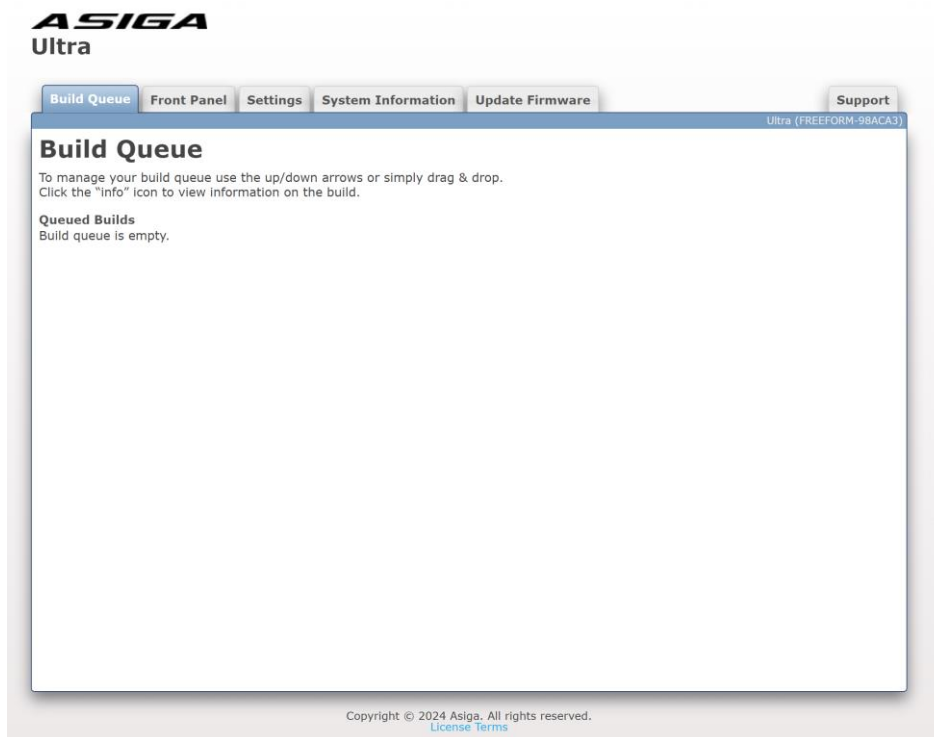
There are two ways of accessing the web interface:

1. Click on the “Web Interface” button in the Composer toolbar.



2. Open a web browser and type into the navigation bar “http://” followed by either the name of your printer or the IP address or printer, e.g.:
  - a. `http://FREEFORM-D06D10`
  - b. `http://192.168.1.53`
3. Press Enter.

There are 6 tabs in the Web Interface: Build Queue, Front Panel, Settings, System Information, Update Firmware and Support.



## Build Queue Tab

The build queue allows you to view information about the current build and queued builds.

The Current Build field shows the last build that was started. Selecting Print > Repeat Build will run this job again.

The Queued Builds list shows the list of jobs that have been submitted to the printer in order of receipt. Selecting Print > Next Build from the front panel will print the first build in the Queued Builds list. Selecting Print > Select Build from the front panel will allow you to choose any builds from the queued builds list.

Further columns indicate data about the builds:

Build Time – Estimated time for printing

Computer – Name of the computer that uploaded the build

Username – Name of the user that uploaded the build

Added – Date/time the build was uploaded

Queued builds may be reordered by clicking the up/down arrows ▼▲ next to the build name or by dragging and dropping. A build can be deleted by clicking the Delete icon ✖.

You can click the information icon ⓘ next to a build to view additional information about the build in a popup window. The following information is available:

Parts List – List of parts in the build and their dimensions

Thumbnail – A screen capture of the 3D view in Composer at the time the build wizard was started. You can click on this thumbnail image or the “Show Full-Size Image” link to show the full size image.

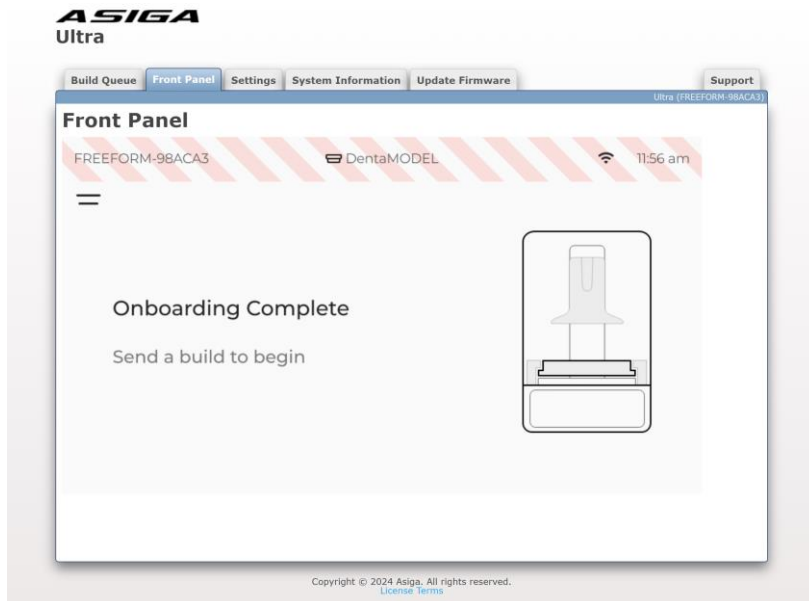
Download Build – Downloads a ZIP file containing the build parameters and the images displayed by the projector during exposure.

View Build Parameters – Shows the build parameters used for printing such as material name, temperature setpoint, burn-in range, separation velocity/distance, approach velocity, exposure times, etc.

Print View – Print the information shown in the window (build time, computer, username, added, parts list and thumbnail)

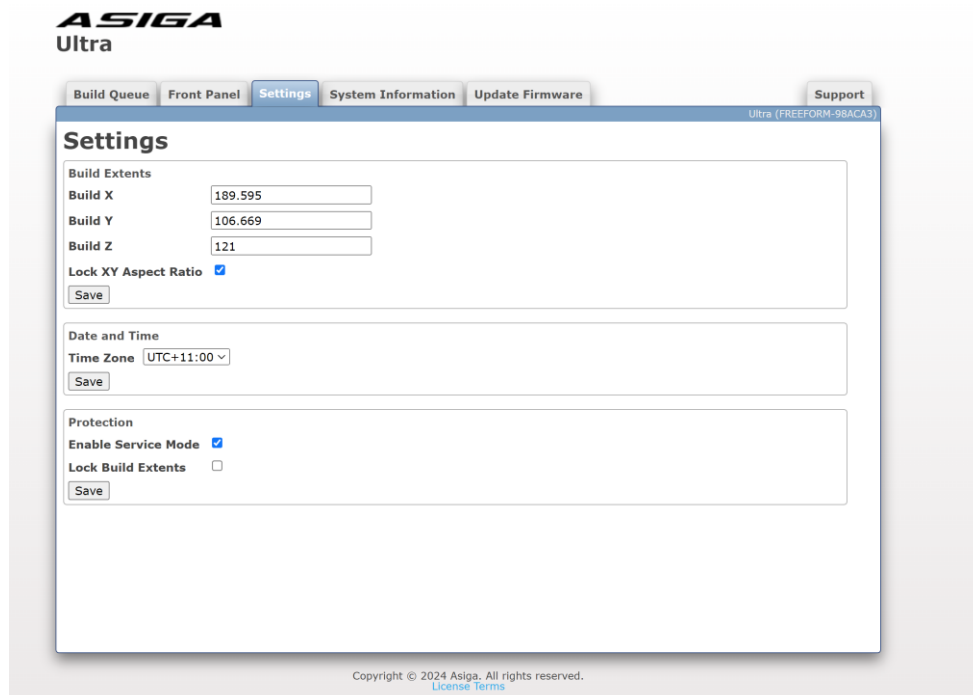
## Front Panel Tab

The Front Panel tab allows you to see and remotely interact with the printer's touch screen from a web browser running on your computer, tablet or phone. You can interact with the front panel by pressing, releasing and dragging with a mouse on the touch screen image.



## Settings Tab

The Settings tab is used to define the physical build extents and protection options of the Ultra machine.



## Build Extents

Build X – Width of the projected image (mm)

Build Y – Height of the projected image (mm)

Build Z – Depth of the build volume (mm)

Lock XY Aspect Ratio – Ticking this box locks the aspect ratio of the projected image to that of the imaging chip. It forces the pixels to be square.

**Changing any of these settings will severely impact the quality of your machines. Asiga does not recommend changing any settings unless under supervision of trained technicians!**

## Time zone

You can set the time zone in the Settings tab.

This will be reflected on the printer.

## Service mode

Service mode will allow Service Technicians to access printer sensitive settings.

Service mode will automatically disable when shutting down the unit.

**Asiga does not recommend engaging service mode unless under supervision of trained technicians or at the direction of Asiga staff.**

## System Information Tab

The System Information tab shows useful information about the printer.

**ASIGA**  
Ultra

Build Queue Front Panel Settings **System Information** Update Firmware Support

Ultra (FREEFORM-98ACA3)

### System Information

Model Type: Ultra  
Serial Number: 0ED36A98ACA3  
Firmware Version: 2024-02-19

Printer Name: FREEFORM-98ACA3  
Local IP Address: 10.138.1.59  
Remote IP Address: 10.138.1.19  
Uptime: 2 hours 2 minutes 49 seconds  
CPU Usage: 1.52% (0%, 9.09%, 0%, 0%, 0%, 0%)  
Used Memory: 542 MiB  
Free Memory: 3316 MiB  
Total Memory: 3858 MiB

Printer System Time: Tuesday, February 20, 2024 11:57 AM ([Update](#))

[Debug Information](#) | [Error Log](#) | [View BuildLog.ini](#) | [View printer.ini](#)

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[License Terms](#)

Model Type – This will be “Ultra” for a Ultra printer. If the LED output is 385nm wavelength the suffix “UV385” is added, otherwise the LED is 405nm wavelength.

Serial Number – This will be 12 hexadecimal characters (0-9, A-F). The MAC address of the wired Ethernet interface of the printer will be the same as the serial number. (e.g. a serial number of 0123456789AB corresponds to a MAC address of 01:23:45:67:89:AB).

Firmware Version – This will be the date the firmware was created (e.g. 2020-03-14) in the format YYYY-MM-DD

Printer Name – The name of the printer as visible in Composer's New Build dialog and on Windows networks. By default it is set to FREEFORM-XXXXXX where XXXXXX is the last 6 characters of the serial number.

Local IP Address – The IP address of the printer whose web interface you are accessing.

Remote IP Address – The IP address of the computer where the web browser is running.

Uptime – The amount of time the printer has been running.

CPU Usage – Estimate of the percentage of the printer's CPU utilized. A combined usage and a usage for each CPU core is shown.

Used Memory – Amount of printer's RAM currently in use.

Free Memory – Amount of printer's RAM remaining.

Total Memory – Amount of printer's RAM installed.

Printer System Time – Current date/time on the printer. The printer's clock runs in Coordinated Universal Time (UTC). For display purposes, a time zone offset can be set in Settings > Time Zone to show the clock in your desired time zone. Clicking the Update link will synchronize the printer's UTC date/time with the UTC date/time on your computer.

Debug Information – Shows a log of diagnostic messages since the printer was turned on (including error messages). The address bar of your web browser will show a URL ending in /debug. You can customize the behavior by adding some parameters to the end of the URL:

- /debug?n=100 will show only the last 100 lines
- /debug?n=20&f=1 will show only the last 20 lines and show additional lines added in realtime. Note that many web browsers will stop showing additional lines if there is no new lines after a certain amount of time. If you are using Firefox you can enter “about:config” into the address bar and change the network.http.response.timeout preference from 300 to 0 so it doesn't stop monitoring if there are no new lines after 5 minutes (300 seconds).

Error Log – Shows a log of error messages since the printer was turned on. The address bar of your web browser will show a URL ending in /errorlog. You can customize the behavior by adding some parameters to the end of the URL:

- /errorlog?n=100 will show only the last 100 lines

View BuildLog.ini – Shows a log of builds started/canceled and information about each build

View printer.ini – Shows the printer's current configuration

## Update Firmware Tab

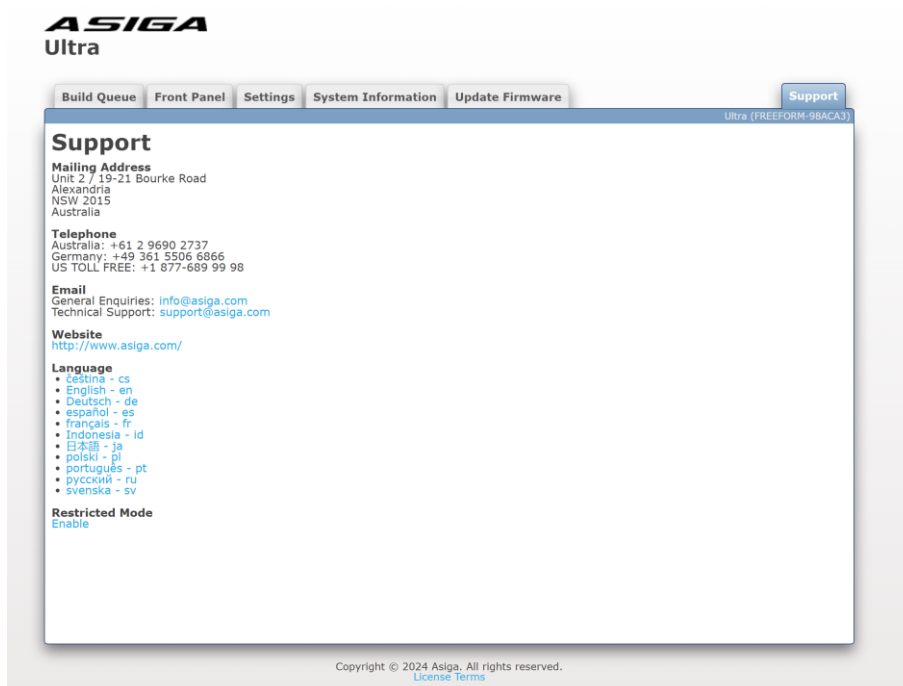
The Update Firmware tab allows you to upload a new firmware file onto the printer.



Firmware files have the file extension “.fw”. You can click Browse to select a firmware file and then click Upload to upload it. The printer will verify the firmware is valid and if it is, it will be added to the list of firmware in the System > Firmware Version menu on the front panel. You can then select the desired firmware from the Firmware Version menu to update to the selected version. The printer will keep the 5 most recently uploaded firmware files.

## Support Tab

The Support tab provides contact details for obtaining support from Asiga for the printer and also provides an option to change the language of the web interface.



The selected language is stored in a cookie in the web browser. If no language has been selected or the web browser cookie is not present, the web browser's default language will be used if available.

The support tab also allows you to enable or disable Restricted Mode.

## Restricted Mode

Restricted Mode allows you to set a password to make the Front Panel tab read-only, hide the Settings tab and disable updating the Printer system Time. This may be useful to lock down the printer to prevent users from modifying critical settings.

**Restricted Mode**  
[Enable](#)

Clicking the Enable link will pop-up a dialog prompting you to set a password by typing it twice and clicking OK. If the passwords don't match, the OK button will not be disabled and you will not be able to continue.

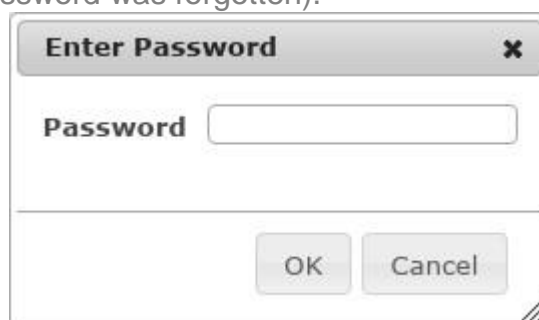


A dialog box titled "Set Password" with a close button (X) in the top right corner. It contains two text input fields: "New Password" and "Confirm Password". Below the fields are two buttons: "OK" and "Cancel".

After clicking OK, the Enable link changes to Disable.

**Restricted Mode**  
[Disable](#)

Clicking on the Disable link will prompt for the password. You can proceed with disabling Restricted Mode by either entering the password you set to enable Restricted Mode or entering the activation code from [www.asiga.com/register](http://www.asiga.com/register) that was used to register the printer (in case the password was forgotten).



A dialog box titled "Enter Password" with a close button (X) in the top right corner. It contains one text input field labeled "Password". Below the field are two buttons: "OK" and "Cancel".

## Policy Editor

The Front Panel of the printer can be customised using the policy editor. For example, menu options can be disabled or hidden in order to prevent settings changes by operators in a production environment. By default, no policy is configured, so all menu items are accessible as normal. The policy editor can be accessed by clicking on the Build Queue tab of the web interface and then replacing /queue in the web address with /policy.



The policy can be typed into the text box and applied by clicking Save. It will be applied immediately. If a text box and Save button is not shown, you need to disable Restricted Mode.

Here is an example policy that can be copied and pasted into the text box:

```
; Policy for Front Panel

;[Policy]
; This setting can be set to FALSE to disable the entire policy instead of
clearing the policy Enabled="TRUE"

[Front Panel]
; Hide the Restart menu item
Restart/Visible="FALSE"
; Disable toggling the Hood sensor
Maintenance/Sensors/Hood/Enabled="FALSE"
; Disable changing the printer name and time zone
Settings/Printer Name/Enabled="FALSE"
Settings/Time Zone/Enabled="FALSE"
; Hide the language
Settings/Language/Visible="FALSE"

; Comment lines start with a semi-colon and can contain any text
; Additional comments
; More comments
```

Lines starting with a semi-colon are comments that are ignored and can be located anywhere in the policy. You can add/remove them as desired.

You can add/remove lines from the [Front Panel] section of the example policy to do further customization.

Lines are of the format Path/Option=Value.

- Path – the path to menu item. This can be found by setting the language to “American English” and then noting down the names of the menu items you need to press to get to the item. For example to get to Time Zone you need to press “Settings”, followed by “Time Zone”. You join them together with the “/” character to get “Settings/Time Zone” which is the path. If the menu item has a colon, everything from the colon onward is excluded when forming the path (e.g. the path for “Settings/Language: American English” is “Settings/Language”).
- Option – this can be either “Enabled” or “Visible”
  - Enabled – controls whether the menu item can be pressed or modified
  - Visible – controls whether the menu item is visible
- Value – this can be either “TRUE” or “FALSE” (be double to include the double quotes when entering it into the policy)

## CHAPTER 6 Post-processing Parts

Parts build on the Ultra need to be removed from the build platform, washed and post cured.

### Removing Parts from the Build Platform

Use a metal scraper or razor blade to remove parts from the build platform. Wash the parts in the dirty bath. This removes the majority of the resin residue.



### Washing Parts

Resin residue remaining on printed parts can be removed by washing in isopropanol. Best practice for efficient use of isopropanol is to maintain two baths: a “dirty bath” and a “clean bath”.

First wash the parts in the dirty bath. This removes the majority of the resin residue.



Then move the parts to the clean bath. This removes the residual resin.



Compressed air may be used to dry the part.



## Post-Curing Parts

Parts printed on the Ultra will not be fully cured and will consequently lack their full strength. Full strength is attained when the parts are fully cured. Asiga recommends using Asiga Cure, a UV light based post curing system for measurable delivery of optical dose, temperature and vacuum – significantly reducing user time and delivering repeatable and consistent results.



Asiga Cure comes in two sizes, 1.5L and 2.5L, has oxygen free curing, immersive 360° LED curing, Intelligent Dose Curing, chamber heating to 80°C and Nitrogen connectivity.

Your computer will connect to Cure and Composer will automatically upload builds and cure programs.

The parts may still be tacky on the surface due to atmospheric oxygen inhibiting the photo-curing reaction. Full surface cure can be obtained by immersing the parts in a liquid to displace the oxygen and irradiating the immersed parts. Suitable liquids include oil, water and glycerol.

## CHAPTER 7 Maintenance and Calibration

The Maintenance screen provides options for performing calibration and maintenance of your Ultra system.

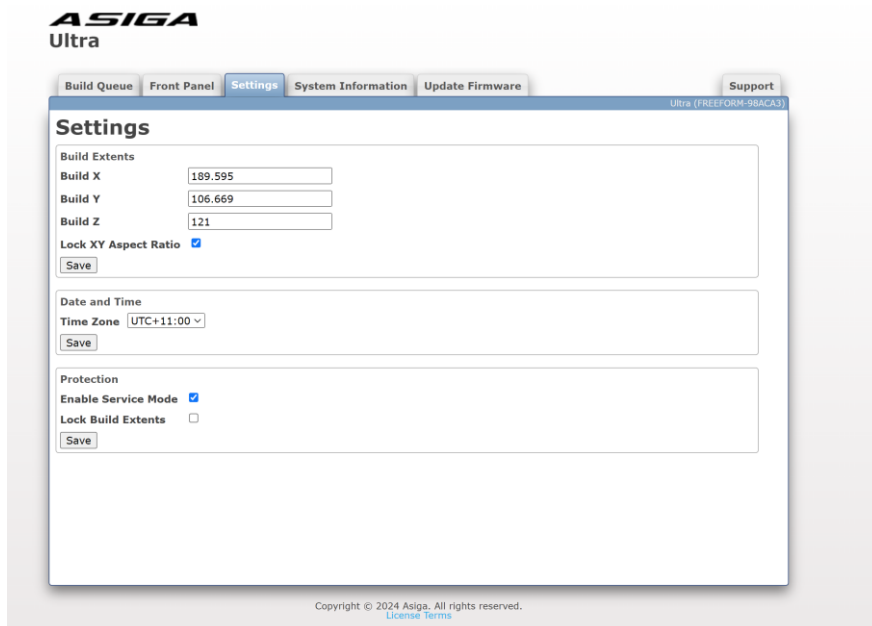
### Service Mode

Service Mode shows all calibration and maintenance settings.

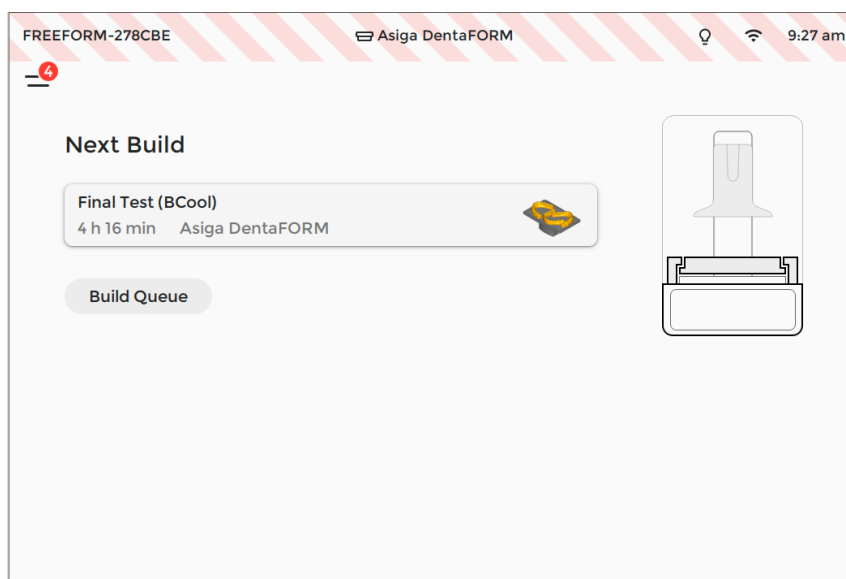
By default, items such as projector calibration are hidden from users.

Enabling Service Mode is completed through the **web interface**, see Chapter 5.

To enable Service Mode, select the option in the web interface of your printer. Go to Settings > Protection > Enable Service Mode.



The Ultra will indicate being in Service Mode by showing a red/white banner in the Status bar.



Service Mode will be automatically disabled when the machine is shutdown or restarted.

## Platform [Calibration](#)

Please refer to the section on Platform [Calibration](#) in CHAPTER 2.

### Warning

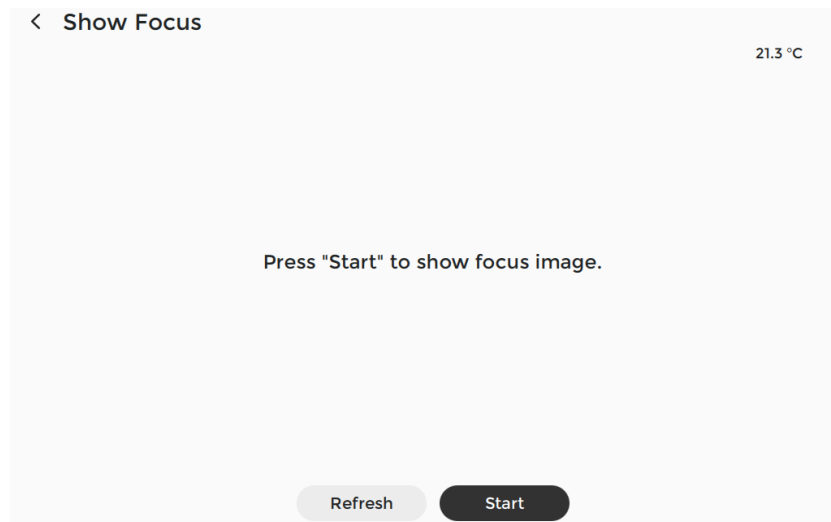
UV light will be emitted. Avoid direct exposure of eyes and skin.  
Close the machine hood, or wear the UV safety glasses at all times.



## Focus

To focus the Ultra projection system:

1. Wear UV blocking safety goggles during this procedure.
2. Remove the material from the machine.
3. Place the Focus Plate onto the window glass with the film facing downwards.
4. Go to Settings > Hardware > Projector > Show Focus



5. Press the “Start” button to show the focus grid.

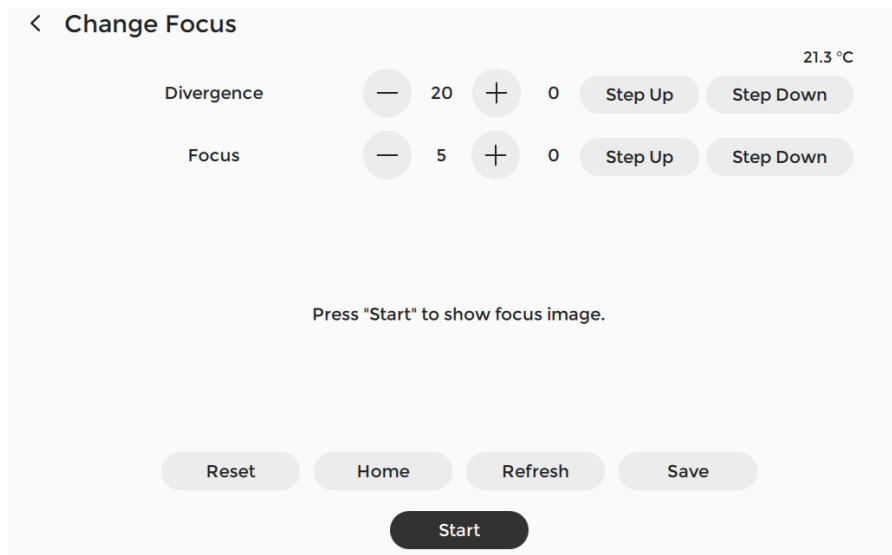


6. Press the “Refresh” button. This will home the motors for the divergence and focus lens groups and then move lens back to their last saved position. This removes any positional changes resulting from transporting the printer.

## Changing Focus

**This is a service mode only option.**

1. Go to Settings > Hardware > Projector > Change Focus



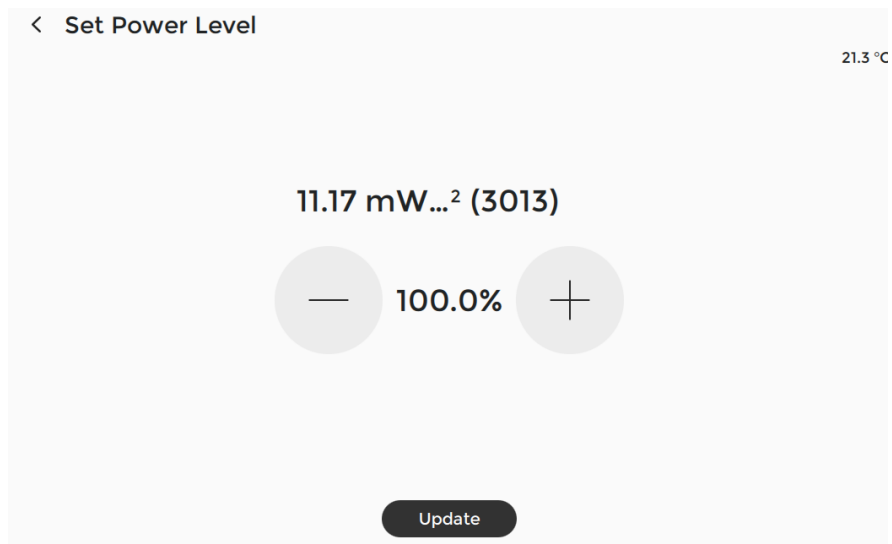
2. Press the “Step Up” and “Step Down” buttons for “Focus” to adjust until best focus is achieved. The – and + buttons can be used to change the number of steps the motor will move for each button press. The minimum number of steps for the Divergence motor is 1 step. The minimum number of steps for the Focus motor is 5 steps.
3. Press the “Save” button to save the new motor positions for the divergence and focus lens groups.
4. Press the “Refresh” button. This is to verify the saved positions are correct. Confirm the focus is the same.

## Power level

**This is a service mode only option.**

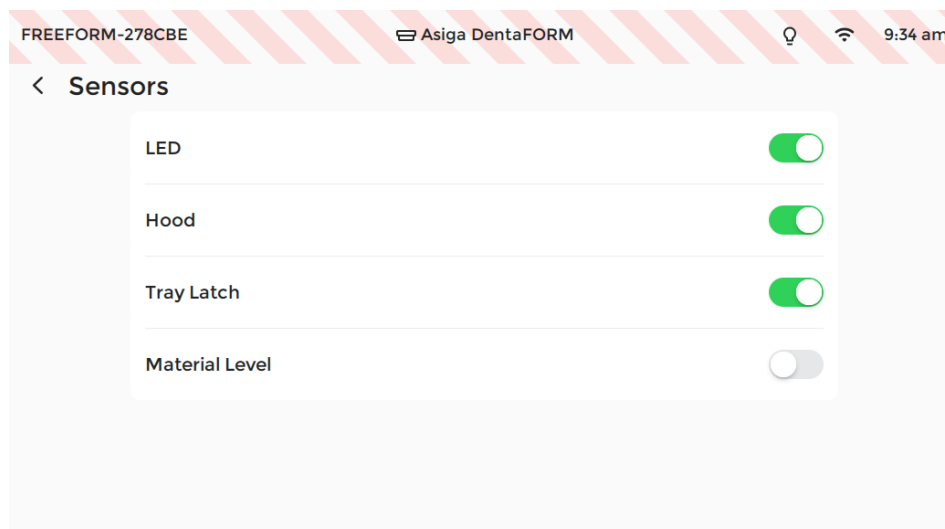
The menu item Settings > Hardware > Projector > Set power level contains options for:

1. **Power Level:** Sets the Power Level of the LED.



## Sensors

The Ultra Sensors screen is reached in the menu Settings > Hardware > Sensors. The Sensors screen shows toggles for the Hood, LED, Tray Latch and Material Level.



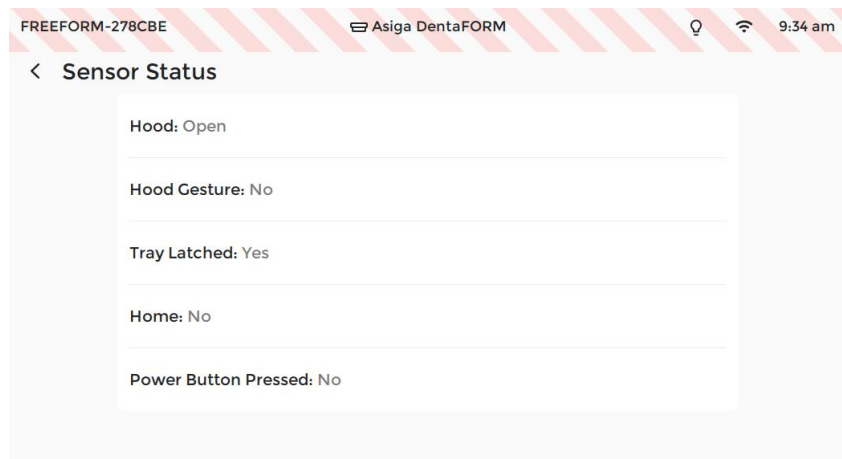
When the hood sensor is activated, jobs will not build if the hood is open.

LED intensity is checked every build layer. The build will halt if the LED intensity drops more than 50% below the starting intensity. This feature can be disabled by disabling the LED sensor.

The material level is checked every build layer. The material weight is calculated by subtracting the tray weight from the total weight and then checked against a minimum weight. If the material weight is less than the minimum weight, the build will be paused and the message “Material level is too low” will be displayed.

## Sensor Status

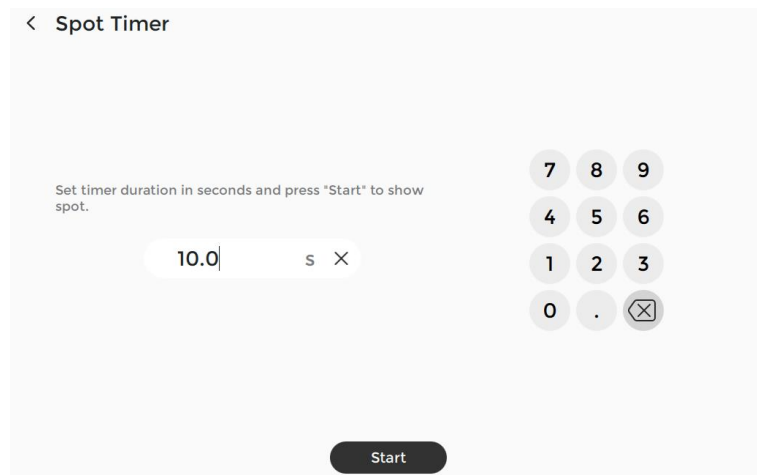
The sensor Status screen is accessed via Settings > Hardware > Sensor Status. This screen shows a status block for every optical sensor in the Ultra machine. When the sensor is tripped the state is changed to ‘Yes’. When the sensor is not tripped the state is changed to ‘No’



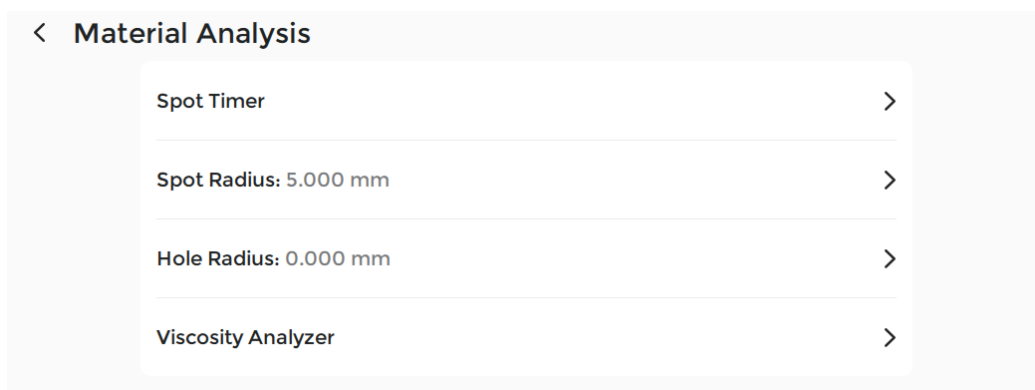
## Material Analysis

The Spot Timer menu item is accessed via Settings > Tools > Material Analysis.

The Spot Timer is used to display a spot image for a controlled time. The Spot Timer can be used for material exposure testing.



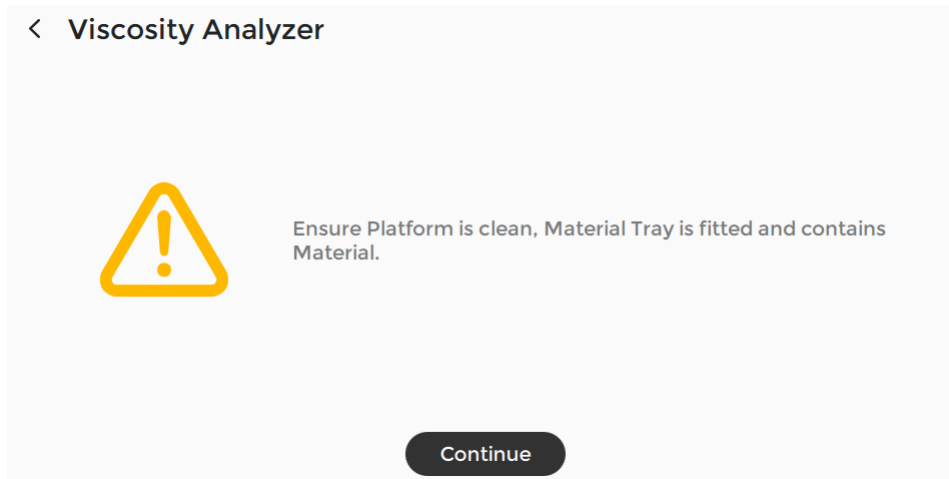
If additional control is needed over the spot image, the Material Test menu also has an option to control the spot radius and, if needed, the hole radius which allows changing the spot into an annulus.



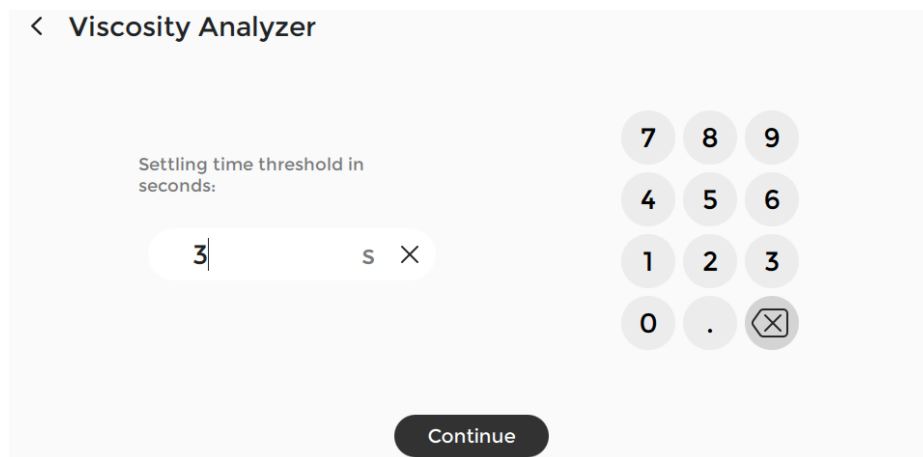
## Viscosity Analyser

The Viscosity Analyser menu item may be used to determine the Viscosity Range of a material. The Viscosity Range parameter quantifies how viscous a material is. Its units are in millimetres. In practical terms, it measures the distance at which a surface exerts pressure against a target plate when moved towards it.

1. Go to Settings > Tools > Material Analysis > Viscosity Analyser



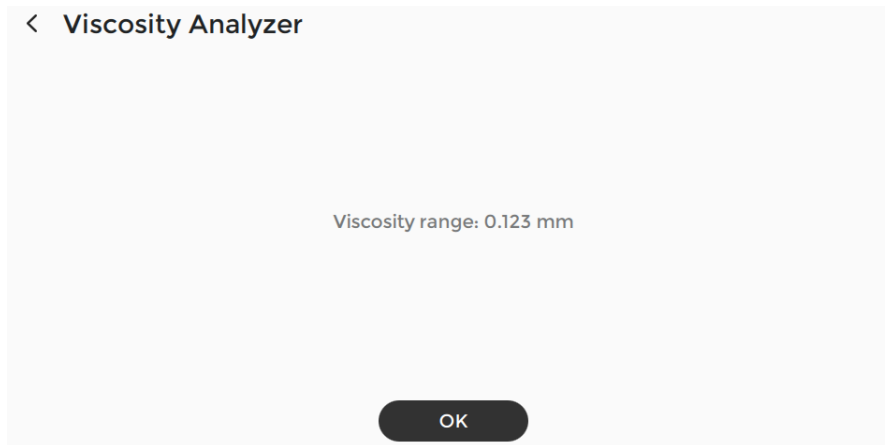
2. Install a clean build platform into the machine.
3. Install the resin material into the machine with the desired material.
4. Define the settling time threshold. This can usually be left at the default value of 3 seconds.



5. Press "Continue".
6. The platform will move down to a starting position 2 mm above the material film in the material. It will then move down 0.1 mm and wait until the material settles (i.e. when there is no force exerted on the material), recording the distance above the material film and the time it takes to settle. It will repeat this until the settle time is

above the settling time threshold and then interpolate the distance above the material film which corresponds to the settling time threshold. The distance is then displayed as the viscosity range.

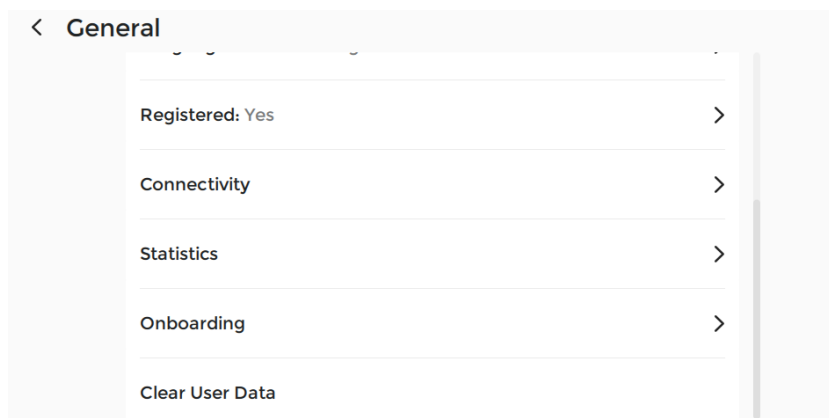
Materials with higher viscosity will have a higher viscosity range. The determined viscosity range gives an approximation of the ideal value for the Viscosity Range parameter included in the Advanced Parameters section of the Build Wizard in Asiga Composer.



The data recorded that is used to determine the viscosity range is logged to "Debug Information" which may be accessed through the "System Information" tab of the web interface.

## Clear User Data

The Clear User Data menu item deletes all pending jobs in the build queue and the current build. It also clears the BuildLog.ini file which records the attributes of recent jobs built on the machine.



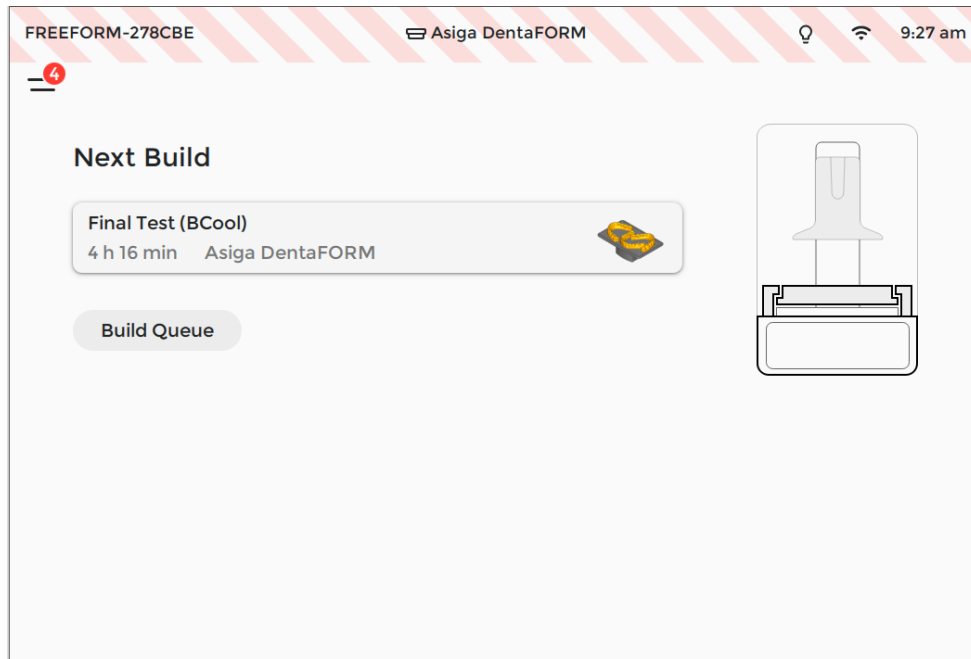
This function may be used when the machine is sold or confidential build jobs are on the machine.

## CHAPTER 8 Service

### Service Mode

Service Mode shows all calibration and maintenance settings. By default items such as projector calibration are hidden from users.

The Ultra will indicate being in Service Mode by showing a red/white banner in the Status bar.

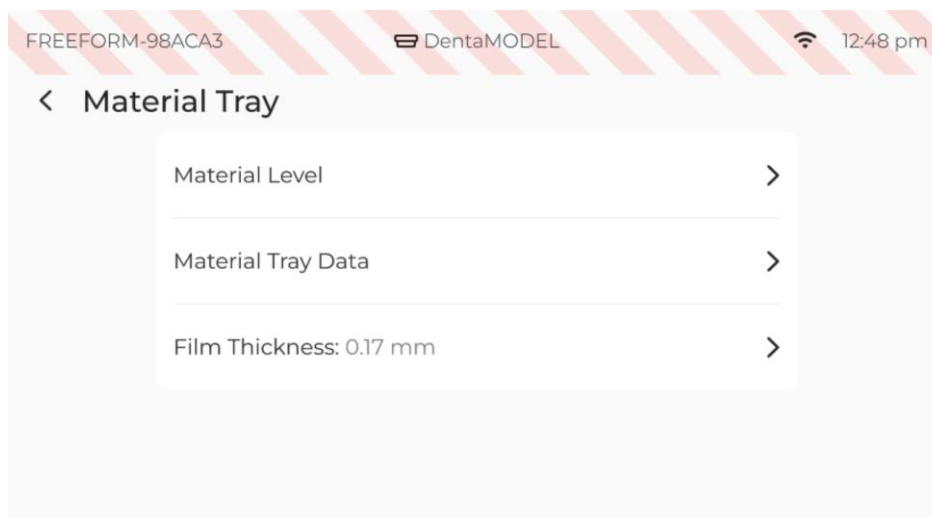


Service Mode will be automatically disabled when the machine is shutdown or restarted. Enabling Service Mode is completed through the web interface.

### Film Thickness

**This is a service mode only option.**

The menu item Settings > Hardware > Material Tray sets the material film thickness. Default material Film Thickness is 0.17 mm



Calibration of the internal radiometer requires an external reference radiometer sensitive to light wavelengths in the range 350 nm to 450 nm. The image below shows a 3D printer system and an International Light ILT2400 Optical Meter. The person performing the calibration should wear UV safety glasses.

**Warning**

**UV light will be emitted. Avoid direct exposure of eyes and skin. Close the machine hood, or wear the UV safety glasses at all times.**

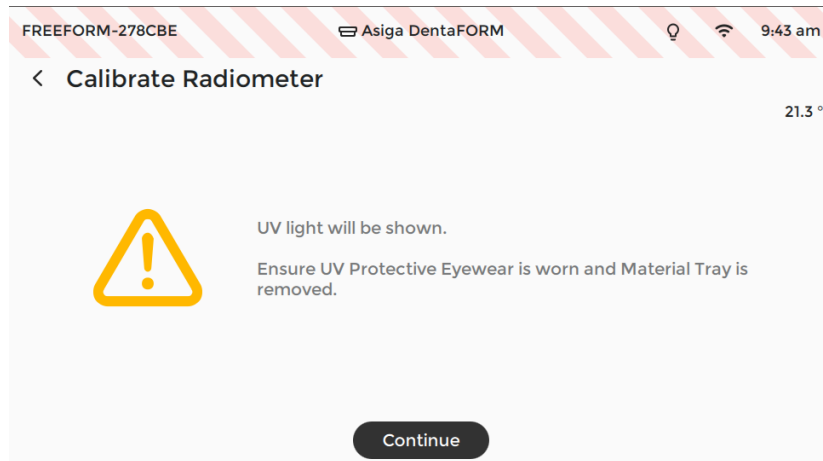


## Calibrate Radiometer

This is a service mode only option.

To calibrate the Ultra internal radiometer:

1. Go to menu item Settings > Hardware > Projector > Calibrate Radiometer. Click “Continue” at the warning screen.



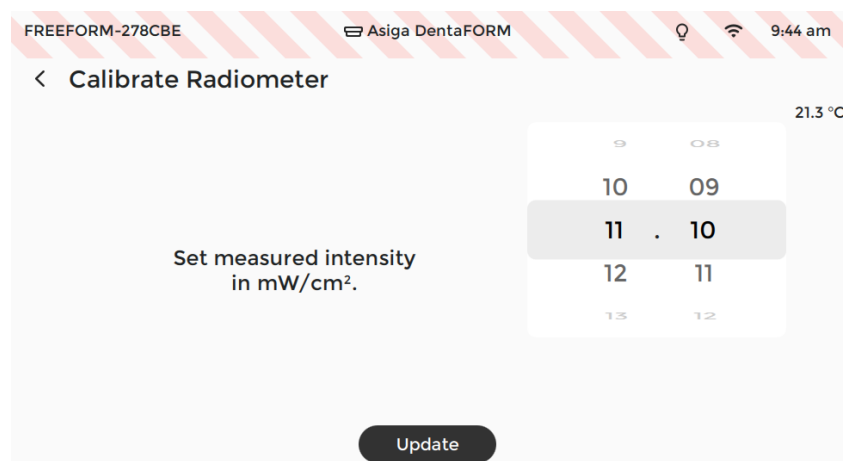
2. Hold the radiometer head over the build aperture so that the sensor is in the build area.



3. Note the value the external radiometer is reading. Ensure the wavelength setting of the radiometer corresponds to the LED wavelength of your Ultra.

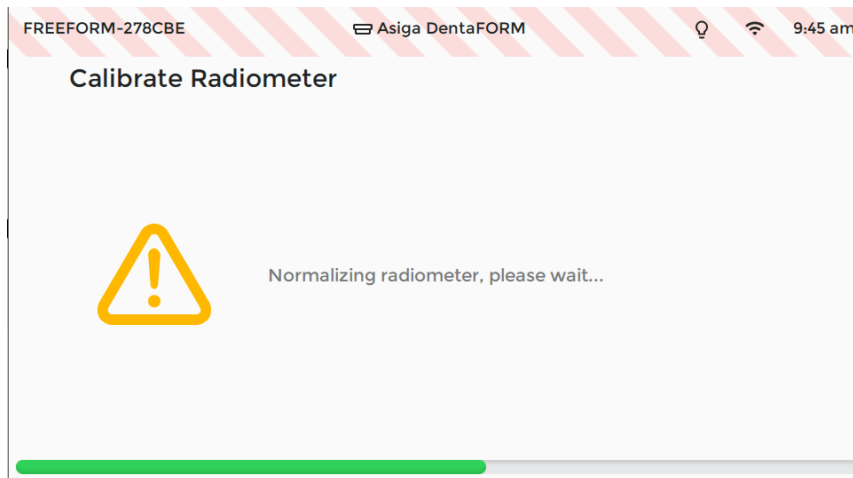


4. Enter the value the external radiometer is reading in the menu and press “Next”.



5. Press Update to confirm the measured intensity.

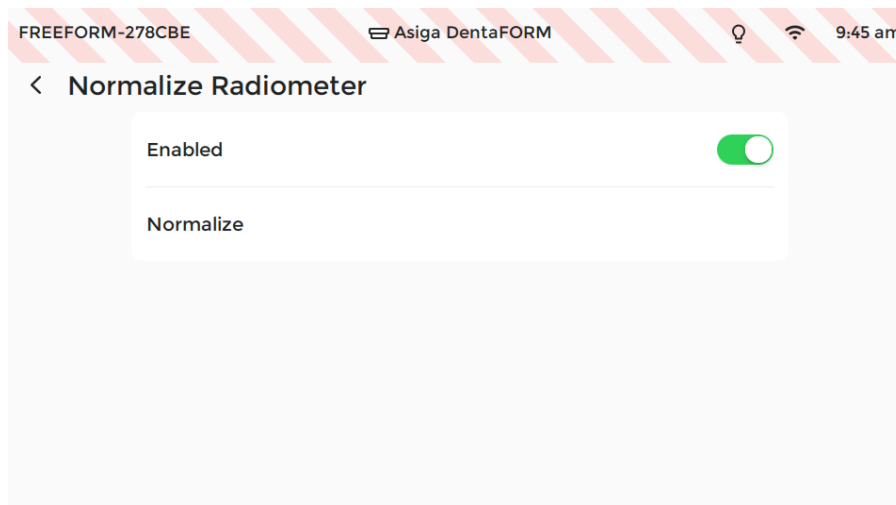
- The internal radiometer will automatically be normalized to improve the radiometer response across the image area by illuminating different areas and measuring the change in radiometer readings. This will take less than 8 seconds to complete.



## Normalize Radiometer

This is a service mode only option.

The Normalize Radiometer menu can be accessed by going to Maintenance > Service > Normalize Radiometer and is used to configure radiometer normalization.



The Enabled toggle controls whether to use previously recorded normalization readings to improve the radiometer response across the image area. This does not need to be changed at all. It will be automatically enabled after performing the radiometer normalization process either automatically after Calibrate Radiometer is completed or manually normalizing by clicking Normalize.

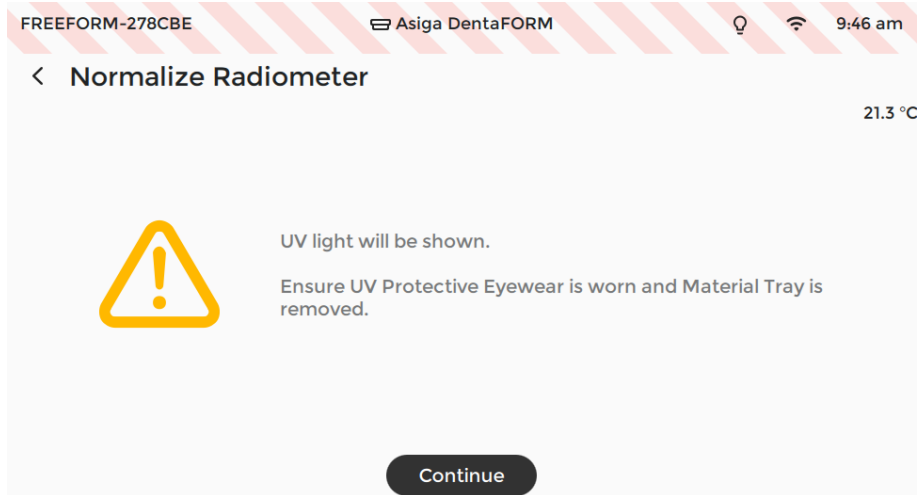
### Warning

UV light will be emitted. Avoid direct exposure of eyes and skin. Close the machine hood, or wear the UV safety glasses at all times.



To perform radiometer normalization:

1. Press Normalize
2. Ensure UV protective eyewear is worn and the build tray is removed.



Press “Continue”.

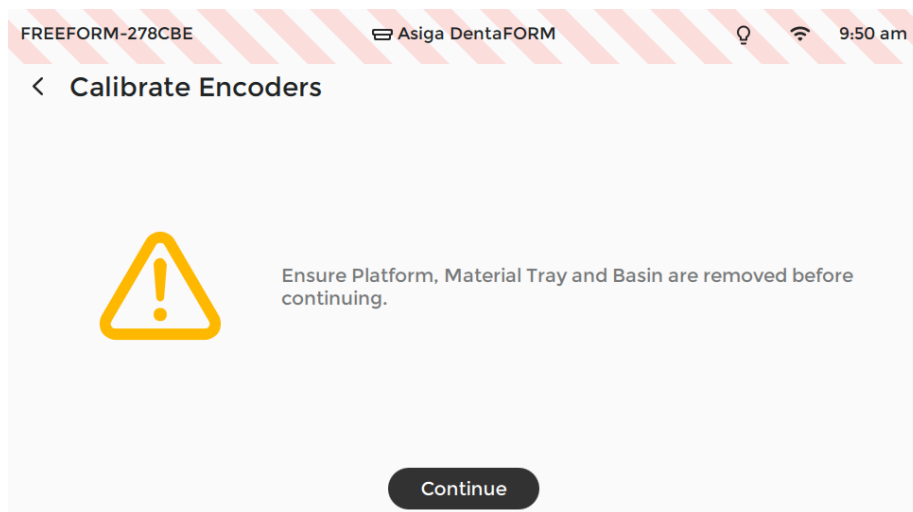
3. The internal radiometer will automatically be normalized to improve the radiometer response across the image area by illuminating different areas and measuring the change in radiometer readings. This will take less than 8 seconds to complete.

## Calibrate Position Encoders

**This is a service mode only option.**

The Ultra uses four position encoders to measure pressure. These are calibrated at the factory and should not need to be recalibrated unless a position encoder been replaced.

1. Go to menu item Settings > Hardware > Smart Positioning System (SPS) > Calibrate Encoders



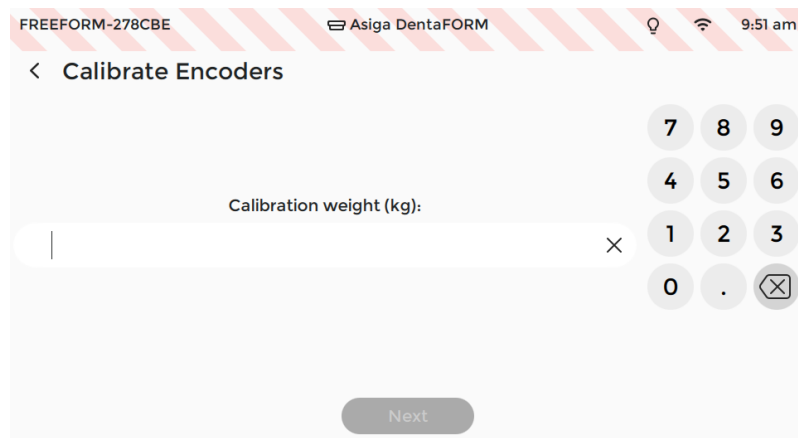
2. Remove four grommets located in each corner of the Basin.



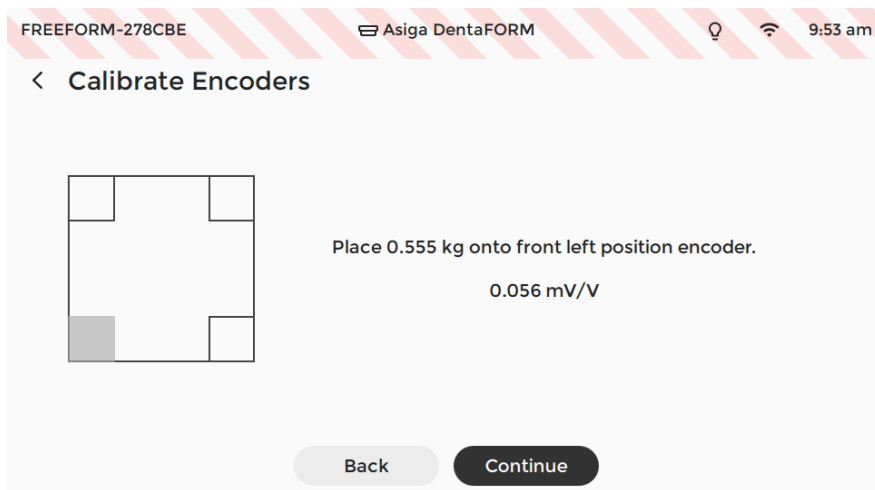
3. Remove the 4 black screws which hold the basin in place.
4. Remove the basin by lifting it with both hands and place it aside.

Press “Continue”.

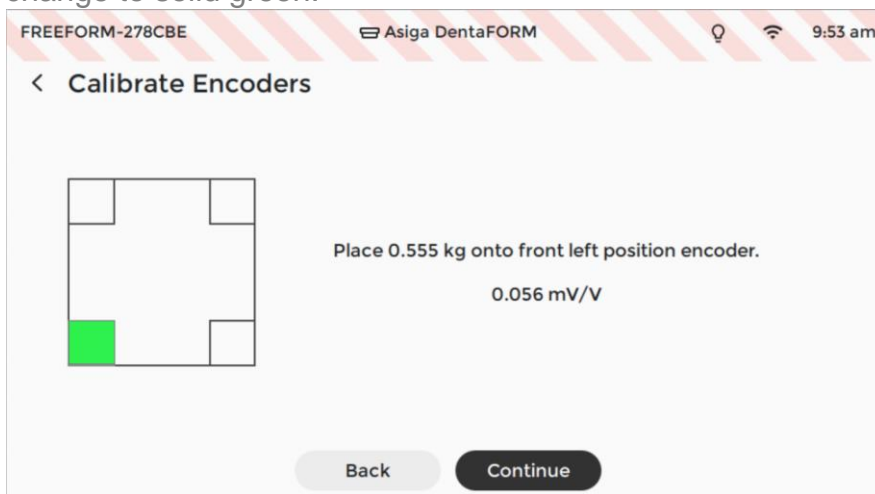
1. Enter weight of the calibration object in kg and press “Next”.



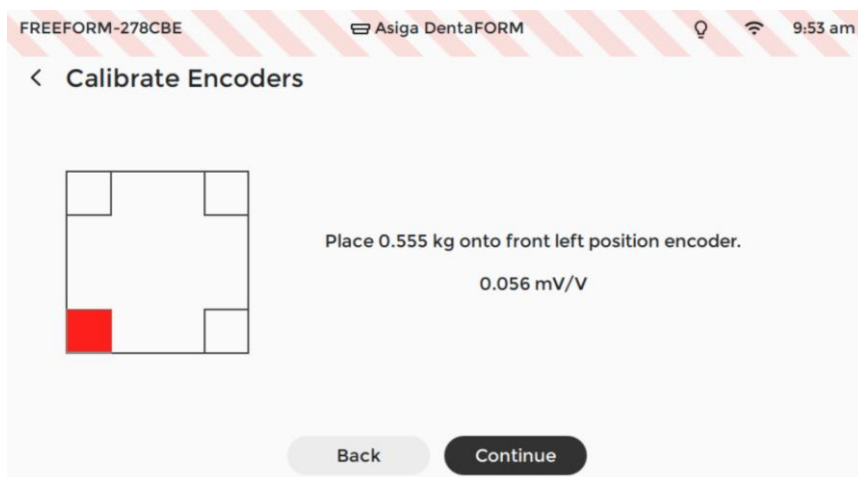
2. Place the calibration weight onto the front left position encoder (the calibration weight should only be touching the position encoder and not any other part of the machine). A square indicator is shown on the display for each position encoder. The indicator for the current position encoder will flash white.



Once the calibration weight has been placed on the position encoder, the indicator should change to solid green.



If the mV/V value has not increased enough, it will stay flashing white and pressing Continue will change the indicator to solid red to indicate the calibration for the position encoder has failed. Press Continue.

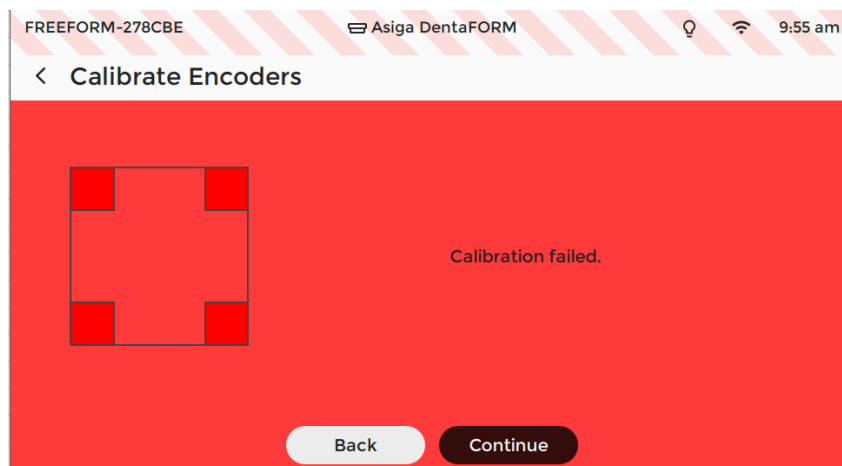


3. Move the calibration weight to the other encoders until all four are green.

4. If all of the position encoders were successfully calibrated, all indicators will be green and you can proceed to reattach basin and tighten the 4 black screws which hold the basin in place. Do not insert the build tray. Press “Finish”.



If calibration of one or more position encoders failed, then the screen will flash red with the indicators for the failed position encoders in red



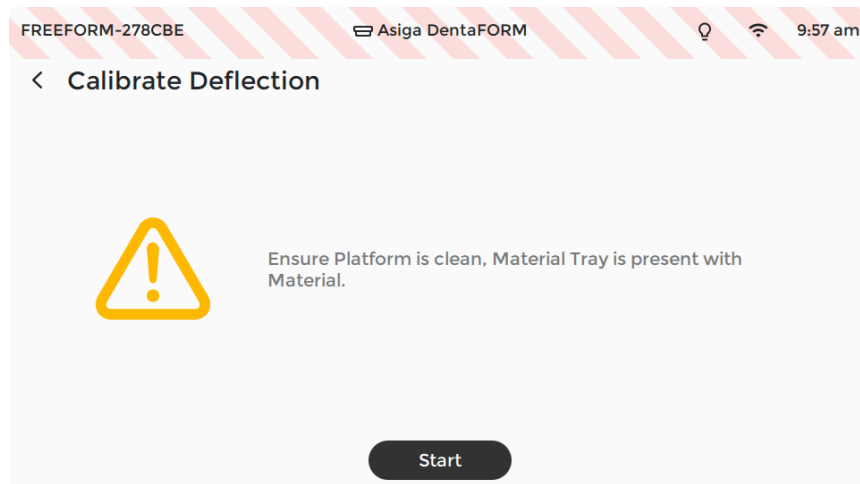
Press Back to go back to the previous screen or press the back arrow to go back to the menu. You may press Continue but the machine will not function correctly. After pressing Continue, reattach the basin and tighten the 4 black screws which hold the basin in place. Do not insert the build tray. Press “Finish”.

## Calibrate Deflection

**This is a service mode only option.**

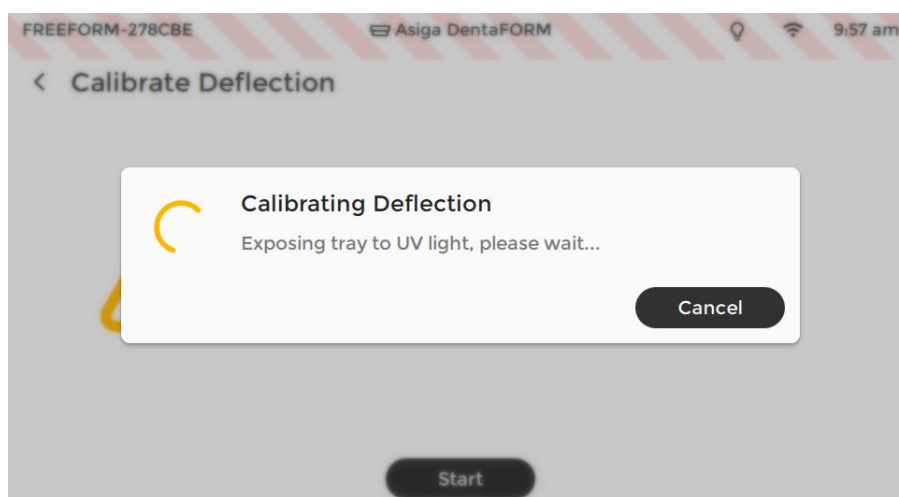
The Ultra uses four position encoders to measure deflection of the glass window. The deflection is calibrated as follows:

1. Go to menu item Settings > Hardware > Smart Positioning System (SPS\_ > Calibrate Deflection.

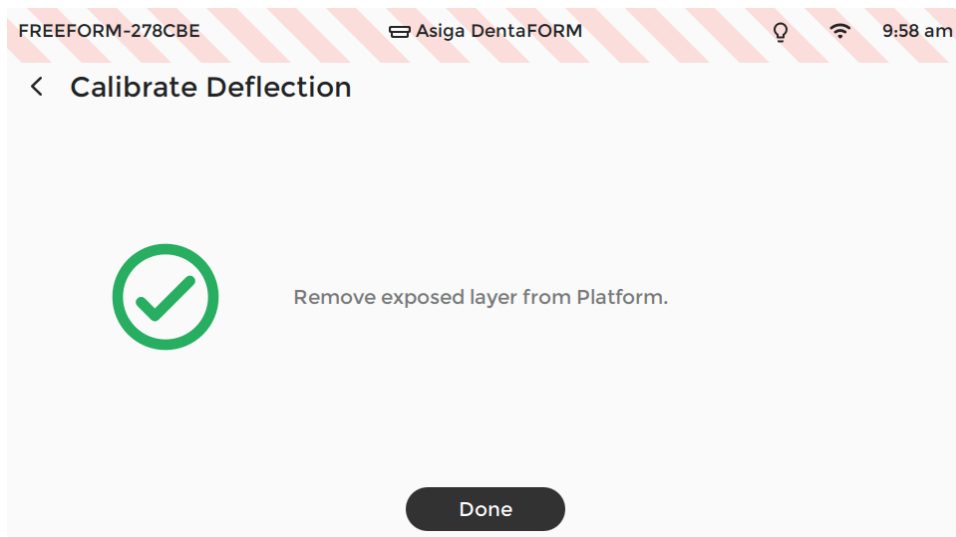


2. Install a clean build platform into the machine.
3. Install the resin material with material into the machine.
4. Press “Continue”.

The build platform will lower down into the material until a 0.1 mm gap is achieved and then show the LED for 60 seconds. The exposure will fill the gap between the platform and the tray film with solid resin. The build platform will then be pushed downward to measure the deflection.



5. The process can be cancelled at any time by pressing the “Cancel” button.
6. When the process is finished, you will be prompted to remove exposed layer from build platform.



Remove the exposed layer from build platform and press OK when finished.