

# Ultimaker 2 Extended 3D Printer

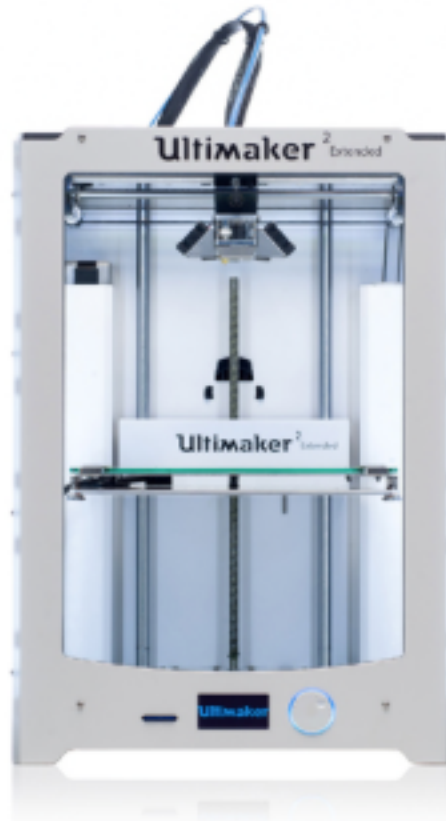
## Training Manual

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### Introduction

The Ultimaker and the MakerBot are two types of 3D printers within the design studio. 3D printers are really useful for rapid prototyping.



## Comparison of Design Studio 3D Printers

	Ultimaker 2	MakerBot Replicator 2	MakerBot Replicator 2X
Build Volume	223 x 223 x 305 mm 8.8 x 8 x 9 in	28.5 x 15.3 x 15.5 cm (11.2 x 6.0 x 6.1 in)	24.6 x 16.3 x 15.5 cm (9.7 x 6.4 x 6.1 in)
Speed	30 – 300 mm/s	50 – 120 mm/s	50 – 120 mm/s
Nozzle Temperature	180–260° C	180–230°C	180–230°C
Heated bed temperature	50–100° C	N/A	N/A
Print resolution	20 microns	100 microns	100 microns
Nozzle Diameter	400 microns	400 microns	400 microns
Supported materials	ABS and PLA Some other materials	PLA	ABS

## Safety

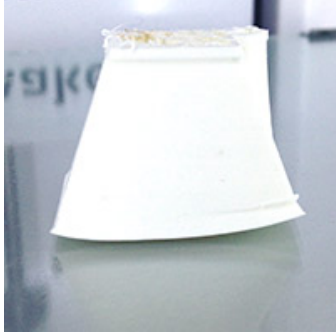


Always **unplug the Ultimaker before performing maintenance or modifications.**





**Do not reach into the printer while it is printing.** The print head nozzle can heat up to 260°C and cause burns. Let the printer cool down for 30 minutes before performing maintenance or modifications.


**Use printer in a well-ventilated area.** Styrene vapor can be released while printing ABS. Symptoms of styrene inhalation are headaches, dizziness, fatigue, and confusion.

**Only use safe and approved filaments.**

## Common Issues / Troubleshooting

<p><b>Warping</b></p> <p>When the plastic cools and contracts the corners of the print can detach and lift up from the platform.</p>		<p>Possible solutions:</p> <ul style="list-style-type: none"> <li>• Make sure you using the correct bed temperature for your material. ABS requires a higher bed temperature than PLA.</li> <li>• Use the Ultimaker glue stick. Spread a thin layer of glue on the platform. Use a moistened rag to spread the glue consistently.</li> <li>• Use a brim in your design. A brim is a single layer feature at the bottom of your print that helps hold it to the platform. It looks like a hat brim.</li> <li>• Make sure the platform surface is clean.</li> </ul>
<p><b>Leaning or Shifted layers</b></p> <p>Occurs when the print head moves too short of a distance. It can occur because of friction or misalignment in the print head pulleys/stepper motor. It also occurs when your print is moved during the printing process.</p>		<ul style="list-style-type: none"> <li>• Make sure that nothing is obstructing the print head</li> <li>• Make sure that the stepper motor belts and pulleys are not rubbing against anything</li> <li>• Make sure the pulleys are properly secured to their axes</li> <li>• Check the alignment of the rods. Move the head to the far side of the machine and check that the distance between the sliding blocks and pulleys are equal.</li> </ul>
<p><b>Pillowing</b></p> <p>When not properly cooled, thin plastic can curl, making a bumpy or bubble-like appearance.</p>		<ul style="list-style-type: none"> <li>• Make sure that the fans are on high when printing the top layers.</li> <li>• Use a thicker top surface layer. You should have at least six top layers. Use more layers for thinner layer thickness.</li> <li>• Use an infill patter &gt;25%.</li> </ul>

<p><b>Elephant's foot</b></p> <p>The bottom of the print may bulge due to bed temperature or part design.</p>		<ul style="list-style-type: none"> <li>• Add a small chamfer to the bottom of your print. Try a 45° 0.5 mm chamfer.</li> <li>• Reduce the bed temperature slightly (works better for smaller prints).</li> <li>• Level the bed so that the nozzle is further away from the bed.</li> </ul>
<p><b>Noncircular Circles/ Lines not Touching.</b></p> <p>Often caused by slack stepper motor belts.</p>		<ul style="list-style-type: none"> <li>• Tighten the stepper motor belts.</li> <li>• Make sure the rods are lubricated.</li> <li>• Make sure the pulley screws are tightened.</li> </ul>
<p><b>Stringing</b></p> <p>Unwanted plastic can ooze out of the head as it moves between print sections if you don't use the right settings.</p>		<ul style="list-style-type: none"> <li>• Enable retraction or try a different retraction length.</li> <li>• Increase travel speed.</li> <li>• Use a lower nozzle temperature.</li> <li>• Try a different filament. So colors string more.</li> </ul>
<p><b>Ringing</b></p> <p>Wave or ripples can occur around sharp edges because of the speed or acceleration of the head.</p>		<ul style="list-style-type: none"> <li>• Decrease print speed.</li> <li>• Decrease acceleration (in Motion settings).</li> <li>• Print thicker outer walls. Use at least 2 outer shells.</li> <li>• Lower the nozzle temperature.</li> <li>• Rotate your design and part by 45°.</li> </ul>

<p><b>Overhangs and Broken/Fragile Parts</b></p> <p>If the part is too thin it may break or bend under its own weight as additional layers are added.</p>		<ul style="list-style-type: none"><li>• Design your prints so that all layers will be properly supported</li><li>• Use a thicker layer height.</li><li>• Make sure the cooling fans are on high.</li><li>• Use a slower print speed.</li><li>• Reduce nozzle and/or bed temperature.</li></ul>
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For more information and advice on how to deal with common issues please see:

The **3DVERKSTAN Visual Ultimaker Troubleshooting Guide:**

<http://support.3dverkstan.se/article/23-a-visual-ultimaker-troubleshooting-guide>