

PowerSpec

POWERED BY WANHAO

INSTRUCTION MANUAL



MODEL NUMBER: DUPLICATOR I3 MINI



PowerSpec

POWERED BY WANHAO

3D Printer Warranty Details

The product is guaranteed to be free from defects in workmanship and mother board for a period of 12 months from the date of purchase. The extruder is guaranteed to be free of defects for 90 days. Printing with materials other than FILAMENTS which require temperatures above 250 °C or which are different from those recommended on the website www.microcenter.com, will result in the immediate loss of the Warranty. Defects that occur within this warranty period, under normal use and care, will be repaired, replaced or refunded at our discretion. In case you purchase from distributor, your warranty shall be covered by distributor's Warranty and honored by distributor too.



Safety Instructions

Before you get started, please read these important safety instructions.

CAUTION: The PowerSpec 3D Printer generates high temperatures and includes moving parts that can cause injury. Never reach inside of the PowerSpec 3D Printer while it is in operation, and allow time for the printer to cool down after operation.



HOT SURFACE



MOVING PARTS



Vapours/fumes may be irritating at operating temperatures. Always use the PowerSpec 3D Printer in an open, well ventilated area.



Do not leave the PowerSpec 3D Printer unattended during operation



Contact with extruded material may cause burns. Wait for printed objects to cool before removing them from the build platform.



Always take care when using the Scraper. Never direct the Scraper towards your fingers.



Only use the PowerSpec 3D Printer in a clear working area.

- The printer must not be exposed to water or rain, or damage will occur.
- The printer is designed to be used with ambient temperature ranging 15°C - 30°C, and humidity ranging 20% - 50%. Operating outside these limits may result in low quality models.
- In case of emergency, turn off the 3D printer at the power outlet.
- It is recommended that you use eye protection when cleaning/sanding printed models to avoid small particles contacting eyes.
- Please read and understand the contents of this installation and user manual carefully. Failure to read the manual to make the most out of the PowerSpec 3D Printer.
- The PowerSpec 3D Printer is not intended for use by persons with reduced physical and / or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning the use of the appliance by a person responsible for their safety.
- Children should be under constant supervision when using the printer.
- Before installation, you should make sure that the PowerSpec 3D Printer is unplugged from the power supply. Only use furniture that can safely support PowerSpec 3D Printer.
- Ensure the mains socket-outlet is near the equipment and is easily accessible.

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Parts List

1 x PowerSpec 3D Printer
1 x Filament Spool Stand
1 x Power Cable
1 x USB Cable
1 x 1GB MicroSD Card
1 x Scraper
1 x PTFE Tube

3x Hex Key Set
2 x Cable Ties
1 x 10m PLA Filament
1 x Spare Print Bed Mats
1 x Instruction Manual
(Not Shown)

1 x Getting Started Guide
(Not Shown)
1 x Warranty Card
(Not Shown)
1 x Levelling Card



Technical Specifications

Printing

Print Technology:	Fused Filament Fabrication (FFF)
Build Volume:	120 x 135 x 100 mm(Width x Depth x Height)
Layer Resolution:	0.1 – 0.4mm
Positioning Accuracy:	X 0.012mm Y 0.012mm Z 0.004mm
Extruder Quantity:	Single Extruder
Nozzle Diameter:	0.4mm
Print Speed:	10mm/s - 70mm/s
Travel Speed:	10mm/s - 70mm/s
Supported Print Materials:	PowerSpec Branded PLA, PLA Wood

Temperature

Ambient Operating Temperature:	15°C – 30°C
Operational Extruder Temperature:	170°C - 260°C

Software

Slicer Software:	Cura PowerSpec Edition
Cura Input Formats:	.STL, .OBJ, .DAE, .AMF
Cura Output Format:	.GCODE
Connectivity:	Micro SD Card, USB port (Firmware updating only)

Electrical

Input Rating:	100-240Vac,50/60Hz,1.0A
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Physical Dimensions

Printer Frame Dimensions:	325 x 240 x 380 mm(Width x Depth x Height)
Weight:	7KG

INTRODUCTION

1.1 What is 3D Printing?

3D Printing is a process whereby a real object is created from a 3D Design. Fused Filament Fabrication (FFF) is one of the most common technologies used by 3D Printers to achieve this. FFF works on an 'additive' principle by laying down material, such as PLA or ABS filament, in layers to create a 3D object.

1.2 From 3D Design to Printed 3D Object

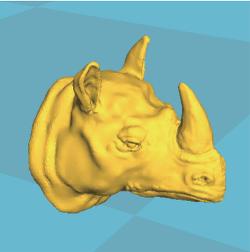
3D Design → Slice to GCODE → Setup PowerSpec 3D Printer
3D Printing Process → 3D Printed Object



3D Design

Having a 3D design is the first step to creating a 3D Object. There are a number of free 3D Designs that can be downloaded and printed for personal use. Websites such as Thingiverse.com, Pinshape.com and YouMagine.com are a good place to start, but there are many more available!

Alternatively, you can create your own 3D Design using 3D Modelling Software. Programs such as Sketchup or Blender allow this, however this can take some practice before successfully modelling your 3D Design. After you've finished your 3D Design, you can export it as an .STL file, to be imported into a 'Slicer' program such as Cura.



Slice to GCODE

A 'Slice' converts a 3D Design (usually an .STL or .AMF format) into individual layers. It then generates the machine code (such as GCODE) that the 3D Printer will use for printing.

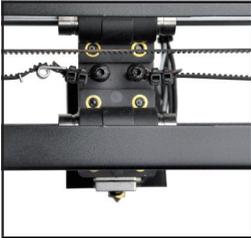
We recommend the program Cura as it uses a simple interface and includes a large amount of support material.

Setup PowerSpec 3D Printer

It's important to check your printer before every print. We've included some steps on page 21 in section **4.2 Good 3D Printing Practices** for you to quickly refer to each time.



INTRODUCTION



3D Printing Process

Now that you've loaded a GCODE file onto the printer, it will commence heating up the Extruder, then start printing. While printing, the nozzle will move along the X and Y axis as each layer is printed. This can take some time, depending on the size of the 3D model, print speed of the 3D printer and resolution of each layer.

Here is an example of how size, infill, and resolution can affect printing time:

		
Dimensions:	62.5 x 25.75 x 67.75mm	70 x 70 x 140mm
Infill:	20%	0%
Resolution:	2mm	2mm
Print Time:	53min	39min
Filament Used:	4m	2.54m
		45m
		45.67m

3D Printed Object

Once the printer has completed all of the layers, you will have a 3D Printed Object. The results are certainly worth it, with 3D models ranging from simple to complex.

Product Overview

2.1 Printer Front View



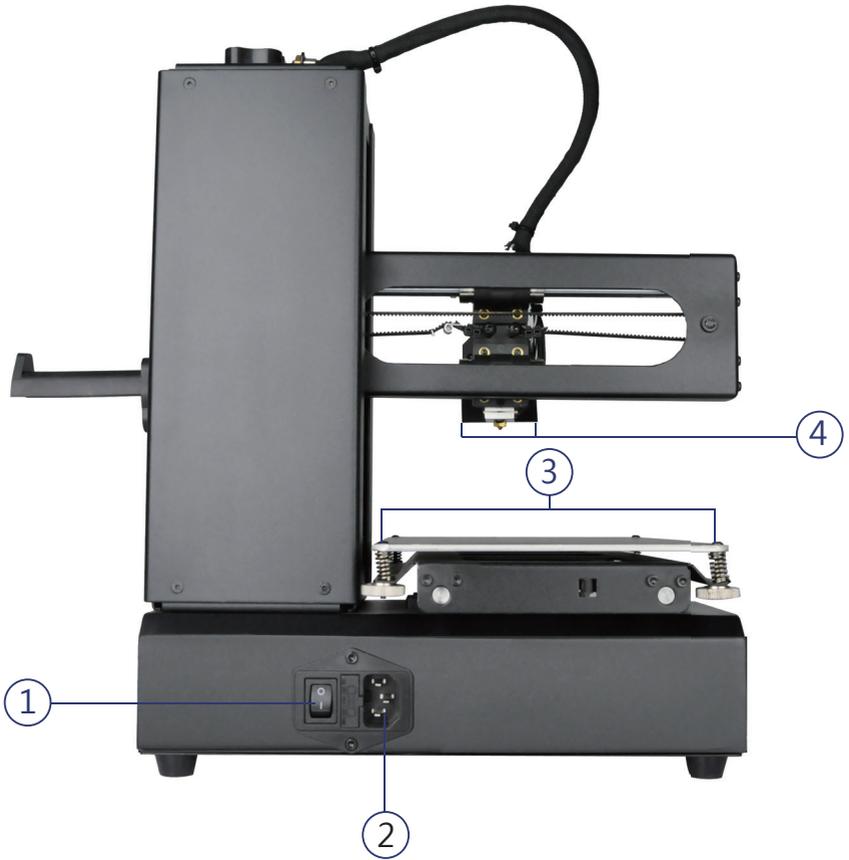
- 1. Filament Tube
- 2. X-Axis Frame
- 3. Cooling Fan
- 4. Nozzle

- 5. Print Bed
- 6. Front Thumbwheels
- 7. Control Panel
- 8. Filament Clamp

- 9. Tower Frame
- 10. Spool Holder

Product Overview

2.2 Printer Rear View



- 1. Power Switch
- 2. Plug Socket

- 3. Rear Thumbwheels
- 4. Extruder Assembly

Product Overview

2.3 Control Panel



- 1. MicroSD Card Slot
- 2. Restart Button

- 3. LCD Display Screen
- 4. Dial Button

- 5. USB Port

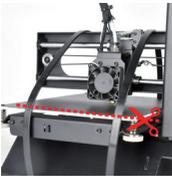
PRODUCT ASSEMBLY & INITIAL SETUP

3.1 Unboxing and Assembly

Your PowerSpec 3D Printer is carefully packed to avoid damage in transit. Take your time unpacking it. The printer is pre-assembled and requires only minimal set up before powering on.



1. Carefully remove the 3D printer from the box and place on a clean, level work space.



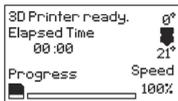
2. Cut the 2 x Cable ties holding the Print Bed to the X-Axis Frame.



3. Unscrew and remove the outer plastic nut from the Filament Spool Holder, then insert the nut into the side slot of the towers. Screw in the Filament Spool Holder into the side of the Printer.



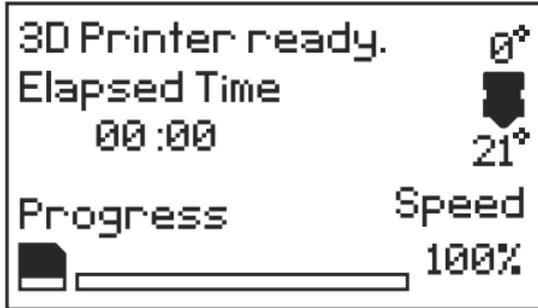
- NOTE:** Ensure the Filament Spool Holder is secure and do not overtighten
4. Ensure the power switch is in the OFF position, and then insert the power supply cable into the back of the 3D Printer. Insert the other end into a nearby mains power outlet. Turn on the power outlet, then turn on the power switch at the back of the 3D Printer.



5. After a few seconds, the LCD display screen will initialize and show the Home Screen.

SETUP

3.2 Home Screen



- * **Printer Status:** Current printer status or memory card status if removed or inserted
- * **Elapsed Time:** Length of time the current model has been printing (if applicable)
- * **Progress:** Displays percentage of model completed (if applicable)
- * **Speed:** Current printing speed - 100 % is full speed

NOTE: The initial printing speed is defined in the GCODE file, not by the printer

- * **Extruder Temperature:** The temperature shown above the  symbol is the set/target temperature. The temperature below the same symbol is the current temperature.

NOTE: When no temperature is set, the extruder will register the current ambient temperature.

3.3 Navigating the Menus

1. To enter the Main Menu, quickly press and release the Dial button
2. To move throughout the menu, turn the Dial Button. Note some menus have options not visible on the screen. Keep turning the dial to see all options available
3. To make a selection, quickly press and release the Dial Button
4. To move to the previous menu or exit, highlight 'back' at the top of each menu and push the Dial Button

SETUP

3.4 Menu Tree

Home Screen

3D Printer ready.	0°
Elapsed Time	21°
00:00	
Progress	Speed
	100%

Main Menu

back	↑
Print File	→
Level bed	→
Quick Settings	→
Advanced	→

Quick Settings

Move	→
Change Filament	→
Disable Steppers	→
Preheat	→
Cooldown	→

Advanced Settings

back	↑
Temperature	→
Save Setting	
Factory Reset	→

SETUP

3.5 Adding Filament

1. Place your roll of filament on the Filament Spool Holder
2. Turn on the 3D Printer with the power switch located at the back of the printer
3. Push the Dial Button to access the main menu and navigate to Quick Settings → Change Filament → Add Filament. The Extruder will automatically raise and preheat; always wait until it has fully preheated
4. After the extruder has preheated, hold the filament clamp open, and push filament through the entire tube until it reaches the extruder.
The filament will start to extrude once the extruder motor can push the filament through
5. Once filament is extruding from the nozzle press back to stop extruding
6. Carefully remove any excess filament from the nozzle using the scraper; Filament is loaded and ready to print



WARNING: The extruder will still be hot and the scraper should be used to remove the filament from the nozzle

3.6 Levelling the bed

Levelling the bed is arguably the most important step in producing successful prints and should be checked before every print. Before levelling the Print Bed check all springs and thumbwheels are in place

3.6.1 The levelling wizard

1. Clean off any excess filament residue from the tip of the nozzle using the scraper
2. Enter the main menu and select level bed
3. After initializing, the level wizard will guide you through levelling all 4 corners of your print bed. Press next to proceed to the next screen/corner
4. On each corner, turn the relevant thumbwheel until you can just slide a piece of copy paper between the nozzle and print bed with slight resistance, about 0.1mm
5. After levelling the last corner you can return to the main menu or restart the levelling wizard. If this is your first time levelling the bed we recommend completing the wizard again to ensure it is level

NOTE: The maximum depth is 135mm on the Y-Axis.

SETUP

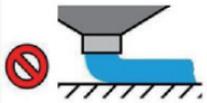
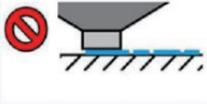
3.6.2 Manually Levelling the Bed

1. Clean off any excess filament residue from the tip of the nozzle using the scraper
2. Enter the main menu and select **Quick Settings** → **Move** → **Home XYZ** to move the nozzle to the home position in the front right corner

NOTE: Immediately turn off the machine if any motors are jamming or forcing against the chassis.

3. Select back ↩ disable steppers to enable movement of the print bed and extruder
4. Manually move the print bed and extruder to each corner or area you would like to level
5. On each corner, turn the relevant thumbwheel until you can just slide a piece of copy paper between the extruder and print bed with slight resistance, about 0.1mm
6. Continue checking points on the print bed until you are satisfied it is level

CHECKING CHART

SIDE VIEW	END VIEW	COMMENTS
		Nozzle Too High: Insufficient contact area resulting in poor adhesion and extrusion skipping.
		OK: Filament pushed into the build surface slightly to maximize surface area contact while still allowing good extrusion flow.
		NOZZLE TOO LOW: Not enough clearance for the filament to be extruded.. this will result in damage to the extruder and/or build surface.

	RAFT	MAGNIFICATION	NOTES
			NOZZLE TOO HIGH: Wavy tracks, or tracks narrower than 1.2mm (use vernier callipers to check)
			
			
			
			
			NOZZLE TOO LOW: Tracks sides pushed over neighbouring tracks.

If you are new to 3D Printing we highly recommend that you visit our website to review our video tutorial on levelling the print bed at <http://powerspec.com>

PRINTING AND REMOVING MODELS

4.1 Printing a file

The I3 MINI only accepts and prints GCODE files. The included microSD Card has sample model GCODE available to get you started. See section **4.9 Creating and Printing your own models** on page 25 to load your own models.

1. Check the print bed has been levelled correctly
2. Insert the included microSD Card into the memory card slot next to the LCD screen with the label facing to the left as shown
3. Enter the main menu and select print file
4. Select the file you would like to print
5. The printer will return to the status screen and display 'Heating...' in the upper left corner of the display. The nozzle temperature will heat until it reaches the target temperature
6. Once the nozzle reaches the target temperature the printer will automatically begin printing the file

NOTE:

- * Micro SD memory cards (up to 32GB) should be formatted to FAT32. If there is no MicroSD card inserted the main menu will display no SD card no files will be available to print
- * If your file is not printing correctly, press the main dial button and select 'Stop print' from the menu. Ensure the extruder is raised prior to removing the print off the print bed
- * Immediately turn off the machine if any of the motors are jamming or forcing against the chassis
- * If you cannot access the print menu, it is likely the microSD card is not mounted properly. Try removing and reinserting the microSD card.

4.1.1 During Print Settings

While printing, some settings can be modified. Push the button to access these settings.

1. **Speed:** Turn the dial to adjust the print speed %. Note the original print speed is determined by GCODE file generated, not the printer
2. **Nozzle:** Modify the temperature of the Nozzle
3. **Pause print:** Pauses the print once the last instruction GCODE instruction has completed (be patient). Tap Resume print to keep printing
4. **Stop print:** Stops the current print

PRINTING AND REMOVING MODELS

4.2 Good 3D Printing Practices

Please refer to these steps during every print to ensure the best quality.

Before Printing

1. Ensure your GCODE file is correctly setup, filament diameter is set to 1.75mm and correct temperature settings for the material you are using. The I3 MINI prints PLA filament. Depending on the type of PLA filament, temperatures can range from 180 to 210°C. If you are unsure, start with 190°C
2. Check all cables and connectors are connected and the printer is on a stable surface
3. Check that Heated Print Bed is level and approximately 0.1mm from the nozzle
4. Check that Heated Print Bed is clean and dust free and nozzle does not have excess material stuck to it



Always check Gcode file settings match filament and printer



Always check Print Mat is clean and there is no residual plastic



Always check Extruder & Print Bed Temperatures are set for correct filament type



Always check all cords are connected



Always check Extruder distance is 0.1mm from Print Mat



Always check Print Bed is level

During Printing

1. Closely monitor the first layer being printed – Most problems, like poor adhesion and warping, will occur in the first layer. If problems occur, stop the 3D Printer in the menu or power off the printer
2. Do not leave the 3D Printer unattended while in operation
3. Keep hands clear while machine is operating

After Printing

1. Wait for the Extruder to cool down
2. Carefully remove 3D Object. Never use Scraper towards your body. Keep Scraper evenly flat when scraping to avoid damage to the Heated Print Bed. Damaged Heated Print Beds/ mats may affect adhesion for future prints
3. Store 3D printer in a clean, dry environment

PRINTING AND REMOVING MODELS

4.3 Removing 3D objects from the bed

Once the I3 MINI has completed printing your 3D printed object follow these steps to remove it from the print bed.

1. Once the print is completed, wait for the extruder to cool and then turn off your 3D printer
2. Using the supplied scraper, carefully 'wedge' under one of the edges of the 3D object. Take care to keep the scraper flat with the bed to prevent damage to the print mat
3. As one edge begins to lift, gently maneuver the scraper forward to continue to 'wedge' between the 3D object and print bed
4. Once the 3D object has fully separated from the print bed, it is safe to remove

NOTE:

- * Always take care when using the scraper. Never use excessive force, or scrape towards your hand.
Scrape away from the body and keep hands clear to prevent injury
- * Always keep the scraper as level as possible. Scraping can damage the print mat if not used correctly
- * Removing a 3D object, particularly one with a large surface size, can be a long process. Never rush when removing a 3D printed object

TIP: If you are persistently having trouble removing 3D printed objects, try the following:

- * Use a layer of blue masking tape (designed to not leave behind residue) on the print bed. Be sure to remove and replace after each print
- * Check if the printing mat is damaged and replace if needed
- * Replacement mats can be purchased at <https://www.microcenter.com>

4.4 Removing Filament

Follow these steps to remove filament

NOTE: You do not have to remove filament after each print, however if you do not intend to print for long periods of time we recommend removing and storing filament in a resealable air tight bag

1. Turn on the 3D printer with the power switch located at the back of the printer
2. Push the dial button to access the main menu and navigate to Quick setting ➡ Change filament ➡ Remove filament. The extruder will automatically raise and preheat; Always wait until it has fully preheated
3. After the extruder has preheated, hold the filament clamp on the top of the tower and push the filament so a small amount begins to extrude
4. Once filament is extruding from the nozzle, while holding the filament clamp, quickly pull the filament out of the extruder and tube
5. Store the filament in a resealable bag to protect it from moisture



PRINTING AND REMOVING MODELS

4.5 Quick settings

To access the quick settings, press the dial button and select quick settings in the main menu

Move:

- * **Move X,Y,Z:** Manually move the X,Y,Z axes by 1mm increments
- * **Extruder:** Manually extrude or retract filament by 1mm increments

IMPORTANT NOTE: You must preheat the extruder to 180 C minimum, to extrude or retract filament

- * **Home XYZ:** Return to the home position is the front right corner

Change filament:

- * **Add filament:** On screen guide to to Add filament if no filament is currently inserted
- * **Remove filament:** On screen guide to remove filament if currently inserted
- * **Preheat:** Preheat the nozzle
- * **Raise extruder 10mm:** Raises the extruder by 10mm

Disable steppers: Disables all motors so you can manually move the bed and extruder position in the X and Y directions

Preheat: Preheat the nozzle

Cooldown: Cools the nozzle

4.6 Advanced settings

To access the Advanced settings, press the dial button and select advanced in the main menu. Unless you are an experienced user we do not recommend adjusting settings in the advanced menus.

Temperature:

- * **Nozzle:** Set the current temperature of the nozzle (0-250°C)
- * **PID-P:** Proportional Response
- * **PID-I:** Integral Response
- * **PID-D:** Derivate Response
- * **Preheat PLA conf:** Adjusts the default PLA heating temperature

Save setting: Save the current settings

NOTE: You must save settings after every change. Unsaved settings will be lost after restarting

Factory Reset: Restores default factory settings

SETUP

4.7 Filament

The PowerSpec Duplicator I3 MINI is designed to be only used with PLA(Polylactic Acid BioPlastic) filament. Only use genuine PowerSpec filaments as using generic filaments may damage your 3D printer and may void your warranty.

4.7.1 PLA filament

Extruder Temp:	215°C
Official Name:	Polyactic Acid
Printing Level:	Basic
Advantages:	<ul style="list-style-type: none">* Bioplastic* Non-Toxic* Less warping issues* Hard or soft/flexible variants* High print speed
Disadvantages:	<ul style="list-style-type: none">* Low heat resistance* Easier break than ABS* Requires thicker walls than ABS
Finishing:	<ul style="list-style-type: none">* Sanding possible* Limited gluing

SETUP

4.8 Storage

PLA filaments are sensitive to moisture. If stored in a humid environment, the quality of the filament can deteriorate, with a tendency to bubble and spurt from the nozzle tip. This will affect print quality, so when storing PLA or other material for an extended period of time, follow these tips.

- * Store in a sealed, air tight bag/container. We recommend a vacuum seal bag
- * Store with a silica gel (moisture absorber) pack. One is included with each filament spool

4.9 Creating and Printing your own Models

4.9.1 Saving files to MicroSD Card

- * Format new MicroSD Cards up to 32GB to FAT32
- * Save files only in the root directory on the MicroSD Card. The I3 MINI will not read files in folders.
- * Ensure your models are saved as GCODE files. STL and other 3D file formats should be converted or 'sliced' into GCODE before loading them on the MicroSD Card. See the section Creating a GCODE file using Cura for information on creating GCODE files

4.9.2 Creating a GCODE file using Cura

A GCODE file provides the essential temperature settings and movement information for your PowerSpec I3 MINI. A number of 'Slicer' software programs exist which convert a 3D model file into a series of 3D printable layers. Cura is free open source slicer software released on the AGPLv3 license. It is available on MacOS X and windows.

4.9.3 Installing Cura

1. Install the file located on your included MicroSD Card or download Cura from **Provide specific URL (i.e. powerspec.com/downloads or use generic web url: <https://ultimaker.com/en/products/cura-software>)**
2. Select a destination folder for the install, then press 'Next'
3. Select the components to install, then press 'Install'
4. Once complete, press 'Finish'
5. Refer to your computer manual of further instructions on the above steps if required

SETUP

4.9.4 Adding your Duplicator I3 MINI to Cura

On first launch,Cura will ask you to add a 3D printer from the list provided.Alternatively,you can add a 3D printer by selecting **Machine** → **Machine settings** → **Add new Machine**

1. Select **Other**
2. Select **Custom...**
3. Enter Machine name as '**Duplicator I3 MINI**, or your desired name
4. Input Machine width as **120mm**
5. Input Machine depth as **135mm**
6. Input Machine height as **100mm**
7. Change Nozzle size to **0.4mm**
8. Ensure heated print bed is **Not ticked**
9. Select '**Finish**'

For the latest optimized/recommended Cura settings for your Duplicator I3MINI.Visit <http://powerspec.com>

4.9.5 Loading a 3D design into Cura

1. Clear the platform using **File** → **clear platform...**
2. Then, load your 3D design file onto the platform using **File** → **Load model file...**
3. Load any file with the following extensions: **.STL, .OBJ, .DAE,.AMF**

TIP : You can load more than one file onto the platform.Cura will automatically move the additional files to fit

NOTE: Files in grey are outside of the print area and need to be moved or scaled to fit.

SERVICING

5.1 Servicing your Duplicator I3 MINI

5.1.1 Replacing the print mat

The Duplicator I3 MINI includes 2 x extra print mats. Additional print mats are available for purchase from <https://www.microcenter.com>

1. Remove the current print mat by slowly peeling from one corner
2. Using rubbing alcohol and a microfiber towel, carefully remove any residual adhesive left in the print bed
3. Peel the 3M backing from the new print mat
4. Gently place the new print mat onto the print bed, making sure to align with each edge. It is recommended to start at a corner to ensure no bubbles become present
5. Use the scraper to apply pressure on the new print mat, ensuring strong adhesion. Keep the scraper level as it can damage the print mat

5.1.2 Nozzle cleaning

TIP: You can also use masking tape in lieu of a print mat. Blue painters tape is recommended.

If your Extruder nozzle becomes blocked, follow these steps to clean the nozzle.

1. Remove the existing filament using the steps in **Quick settings** → **Change filament** → **Remove filament**
2. Using a clean 0.4mm drill bit, insert the drill bit into the nozzle by hand, twisting while inserting
3. Remove the drill bit from the nozzle, twisting while removing
4. Repeat steps '2' and '3' three times, then follow the steps in **Quick settings** → **Change filament** → **Add filament**

SERVICING

5.1.3 Routine Component Check

Motor Connectors

Loose motor connections could cause a 3D print to fail. It's a good habit to routinely check for any damage to the connectors or the black cables.

Axis Lubrication

Regular lubrication of the X and Y Axis rods is important for the longevity and smooth running of your printer. The rods can be lubricated with machine oil or synthetic grease. We recommend using bearing grease and to apply liberally to both the X Axis and Y Axis rods.

Nuts and Bolts

Loose nuts and bolts could affect the geometry of the Duplicator I3 MINI. Check that all nuts and bolts remain firmly tightened. If required, re-tighten using the hex wrench.

5.1.4 Storing

Always store your Duplicator I3 MINI in a cool, dry location that is free from dust.

FINISHING

6.1 Finishing Techniques

6.1.1 Useful Tools/Equipment

- Safety Goggles
- Mask
- Long-nose Pliers
- Wire cutters
- Sandpaper (100,200,300,400,500,600 Grit)
- Medium, fine and extra fine sanding sponges
- Acrylic based primer spray paint
- Acrylic based spray paint (colour of your choice)
- Acrylic based varnish spray paint

NOTE: Different paint types are also compatible with PLA. Consult your local paint supplier for the best compatibility for your intended purpose.

6.1.2 Removing support Material

Even after support material is removed by hand, residual material will remain.

1. Ensure that safety goggles and a mask are worn for protection
2. Remove most of the support material by hand, taking care not to damage the 3D object
3. Using the long-nose pliers, carefully grasp some of the remaining material, then twist to remove. Repeat until no more material can be removed.
4. Using the wire cutters, cut away any excess filament.



6.1.3 Sanding

Though fused filament fabrication(FFF)is capable of producing high quality objects straight out of the machine,the layer lines will be visible.Sanding will reduce these 'step'marks in the model.

1. Ensure that safety goggles and a mask are worn of protection
2. Starting with 100 grit sand paper,carefully sand your 3D object using small,circular motions

NOTE: PLA is less resistant to high temperatures caused by sanding. Take your time sanding your 3D object to avoid damage.

3. Using the medium sanding sponge,sand difficult to reach areas of your 3D object
4. Gradually increase the sandpaper grit until the 3D print is smooth

TIP: Spraying a primer filler also helps to reduce the layer lines on the 3D object.This can then be sanded away and repeated,until the desired smoothness is achieved

FINISHING

6.1.4 Surface Coating

Finally, to make your models more presentable, follow these steps;

1. Ensure that safety goggles and a mask are worn for protection
2. Ensure that your 3D object is clean and free from dust
3. Spray your model using an acrylic based primer, following the directions of your primer
4. Allow appropriate time to dry before applying additional coats
5. Spray your model using an acrylic based paint of your colour. Allow appropriate time to dry
6. Spray your model using an acrylic based varnish, following the directions of your varnish
Allow appropriate time to dry before applying additional coats.

NOTE: Different paint types are also compatible with PLA. Consult your local paint supplier for the best compatibility for your intended purpose.

Congratulations! Your 3D object now looks like a professionally finished product!

MAINTENANCE

The maintenance of Duplicator I3 MINI should be conducted by skilled person only. Always unplug the printer before doing maintenance or modifications. In order to have a smoothly working Duplicator I3 MINI it is important to maintain it correctly. Please follow the safety/deterioration checks during maintenance:

- * Check condition of all rubber belts
- * Oil the lead screws with light machine oil (sewing machine oil)
- * Check the condition of the power cable. Make sure there are no cracks in the sheath
- * Check the condition of the wiring on the printer to ensure nothing is pinched or damaged
- * Check the fans are operational during print
- * Check the chassis is secure. Tighten any screws if there is flex in the frame

DISPOSAL OF PACKAGING

This product has been packaged to protect it against transportation damage. Unpack the appliance and keep the original packaging carton and materials in a safe place. It will help prevent any damage if the product needs to be transported in the future, and you can use it to store the appliance when it is not in use.

In the event, it is to be disposed of, please recycle all packaging material where possible. Wrapping can be a suffocation hazard for babies and young children, so ensure all packaging materials are out of their reach and disposed of safely. Observe any local regulations regarding the disposal of packaging and dispose of it appropriately for recycling. Contact your local authorities for advice on recycling facilities in your area.

DISPOSAL OF PRODUCT

Observe any local regulations regarding the disposal of waste products. Contact your local authorities for advice on recycling facilities in your area.

At the end of its working life, do not throw this product out with your household rubbish. Electrical and electronic products contain substances that can have a detrimental effect on the environment and human health if disposed of inappropriately. Observe any local regulations regarding the disposal of electrical consumer goods and dispose of it appropriately for recycling. Contact your local authorities for advice on recycling facilities in your area.

TROUBLESHOOTING

10.1 Troubleshooting

If having any troubles when using the Duplicator I3 MINI please refer to the troubleshooting guide below

10.1.1 Printing Problems

Clicking sound from one of the stepper motors

One of your stepper motors may not be connected properly. Check each connection and then inspect the cable routing for any faults

File not printing

Remove the Micro SD Card and insert into your Computer. Open the GCODE file using a text editor (eg. Notepad), and inspect if GCODE is readable or not. If file consists of multiple 'ÿÿÿÿ' symbol, then file has been corrupted. Try reformatting your Micro SD Card and reloading the GCODE file.

NOTE: Reformatting will delete all files on your SD card

Not extruding when starting to print

Ensure that the nozzle temperature has been set to match your material

Not sticking to the bed

- Ensure that the bed is clean and free from dust
- Check that the bed is level and set to a distance of approximately 0.1mm-**see 3.6 Levelling the bed**
- If there are defects / deep scratches in the printing mat, it may need to be changed. Change the mat or use blue painters masking tape
- Add a brim or raft to your file
- Ensure nozzle to bed gap is not bigger than 0.1mm. Material will solidify if gap is large

Models Warping/Curling

- Check the infill % of your GCODE. The higher the infill, the more likely to warp
- Add a brim or raft to your file

Model appears very 'stringy'

- Ensure that the filament diameter is set to match your filament spool (1.75mm), then try creating a new GCODE before printing again
- Check you are using the correct temperature for the filament used

Print stopped halfway

- Check that the GCODE file is complete and not corrupt
- Check the original model file

The motor does not stop at the end of axis

Check that the stop micro switches are aligned with the motor mount and registering.

The print head/bed does not move

Check the part can be moved by hand when stepper motor is disabled. Clear anything that is blocking the path

10.1.2 Connectivity Problems

My 3D Printer isn't turning on

Check that you have correctly inserted the power cable into the rear of the Control Box, the power cord is plugged into the mains outlet and that the Control Box power switch is on.

Micro SD Card not shown

- Please ensure your MicroSD Card is 32GB or less
- Please ensure your MicroSD Card is formatted as FAT32
- Navigate SD Card, select Unmount SD Card, then select Mount SD Card. Your MicroSD Card should now appear in the menu.

TROUBLESHOOTING

10.1.3 Other Problems

Filament stuck when removing

Where can I buy more filament?

If you require more filament, visit our online store, www.microcenter.com to purchase various colours and types.

What brand of filament should I buy?

We recommend using only PowerSpec branded filament. Lower quality generic filaments can damage your 3D Printer and potentially void your warranty.

What types of filament can my 3D Printer Print?

The PowerSpec 3D Printer accepts various types of filaments including PLA and specialty filaments such as wood, flexible, luminous and conductive. For our full range of filaments visit www.microcenter.com

TROUBLESHOOTING

10.2 Useful Terms

Display

Provides the main interface for operating the 3D Printer

Firmware

Software that is programmed into the electronic board

GCODE

Code that is produced using the slicing process. Describes the movements and temperature settings of your 3D printer

Nozzle

Opening at the bottom of the print head where filament is pushed through

Extruder Assembly

The section filament is pushed through encompassing the hot end and nozzle

Micro SD Card

Secure Digital memory card. This is where your GCODE files can be stored and accessed by the 3D Printer

PLA Filament

Commonly used plastic filament with low environmental impact

Brim/Raft

Types of printed foundations that help models adhere to the print bed

Slicing

Process that turns a 3D Design into a code that can be used by 3D Printers

Spool

Filaments of PLA and ABS are wrapped, creating a spool

Stepper Motor

DC motors that move in discrete steps. This allows for precise positioning and/or speed control

.stl

A common file format for 3D Designs/Models

USB Cable

This cable allows communication between the PowerSpec 3D Printer and a computer, using the USB port of the computer

Appendix

References

Some of the 3D Models used in this manual and other included materials were sourced from the below:

**Cute Dragon - more easy printing
by Sebastian_v650**

Published on June 13, 2016
www.thingiverse.com/thing:1624412



Creative Commons - Attribution

Unicorn Head by kellesabelle

Published on February 5, 2012
www.thingiverse.com/thing:17090



Creative Commons - Attribution - Share
Alike

**Another Fidget Cube by
mistertech**

Published on September 4, 2016
www.thingiverse.com/thing:1752508



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**Twisted 6-sided Vase Basic by
MaakMijnIdee**

Published on March 7, 2012
www.thingiverse.com/thing:18672



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3D Printer

Repair and Refurbished Goods or Parts Notice

Unfortunately, from time to time, faulty products are manufactured which need to be returned to the Supplier for repair.

Please be aware that if your product is capable of retaining user-generated data (such as files stored on a computer hard drive, telephone numbers stored on a mobile telephone, songs stored on a portable media player, games saved on a games console or files stored on a USB memory stick) during the process of repair, some or all of your stored data may be lost.

We recommend you save this data elsewhere prior to sending the product for repair.

You should also be aware that rather than repairing goods, we may replace them with refurbished goods of the same type or use refurbished parts in the repair process.

Please be assured though, refurbished parts or replacements are only used where they meet stringent quality specifications.



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