X1000 3D printer manual

Congratulations on your purchase of your personal

X1000 3D printer

German RepRap

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Rev.Nr. 0.4

The X1000 is a professional 3D printer, especially designed for processing various plastic materials with extra-large work area and optional double extruder. With a layer thickness up to 0.1 mm und a printing surface of 1000x800x600 mm, this 3D printer can produce either big models or several small objects with the highest precision.
A closed switch gear cabinet, an emergency stop switch and an optional CO2 based dual fire protection system ensure that the requirements derived from an industrial work environment are completely satisfied.

1. General information

1.1 specifications

specification	data
working space (X - Y - Z)	1000 x 800 x 600 mm
printing speed	10 - 150 mm/s
traverse speed	10 - 300 mm/s
layer thickness (minimal)	0,1 mm (depending on nozzle)
filament/nozzle diameter (standard)	1,75mm / 0,8 mm
material	PLA, Performance PLA, Laywood, PVA, PET-G, TPU64D
extruder type	DD3 Dual
extruder temperature (max)	290° C
data transfer	LC Touch display, WLAN, Ethernet
software	Simplify3D
power consumption	2500 W
Operating voltage*	three phase AC current 400V (CEE 3L+N+PE)
Ambient temperature	15-26° C
external dimensions (WxDxH)	1725 x 1500 x 1320 mm
weight	400 kg
marking	DIN 10218-2
options	Heating bed, dual extruder CO2 based dual fire protection system
available nozzles	0,4 / 0,6 mm
available nozzle material	brass, hardened steel
printing technology	Fused Filament Fabrication (FFF)

1.2 System requirements

Note that the minimum system requirements listed below are for Simplify3D and Repetier-server only. These applications are provided with the printer.

- Intel Pentium 4 or better
- 2GB Ram or more
- USB 1.1 optional
- Windows XP or newer
- Mac OS X 10.6 or newer
- Ubuntu/Debian Linux
- OpenGL 2.0

Please note that you must use one of the following browsers to establish a connection with your X1000 3D printer.

- Chrome
- Firefox

Microsoft´s Internet Explorer is not supported

1.3 Additional options

In addition to the standard version the following options are available:

- Heating bed
- Dual extruder
- CO2 based dual fire protection system

For an inquiry please contact our s*ales partner from* your region.

2. 2. Operating modes of the X 1000

The X1000 provides various modes that enable you to perform different functions depending on your current task.

2.1 Red/ Stand-by

When the X1000 is connected to the mains you can reach the stand-by mode by turning on the printer using the key. After a short initialization phase the startup screen appears on the LCD display and the red light will light up.

X1000 Standby

In this mode, you can keep the lid of the X1000 open and heat up the extruder heads and let material extrude simultaneously. All other functions (like traversing the axis) are blocked for safety reasons. In addition, the standby mode allows you thread new filaments easily, to clean the nozzle or even to replace it completely. Furthermore, the Repetier server is already booted when operating in standby mode, this means that you can already upload G-codes to the X1000.

Never turn on the heating bed while operating in standby mode!

After some time, the printer will switch into DRY-Run mode, so that you must restart the device if you want to start a new print job

2.2 Green/ work mode

To switch from standby mode to work mode to w After successfully booting the X1000 you must first close its lid. Then you must press the green switch underneath the LCD display.

> When the green switch is light up the lid will be locked automatically and the device is now ready to start a 3D print.

2.3 Two-hand circuit/removal position

After successfully completing a large 3d print you can lift the printing bed up to access is more easily using the two-hand circuit.
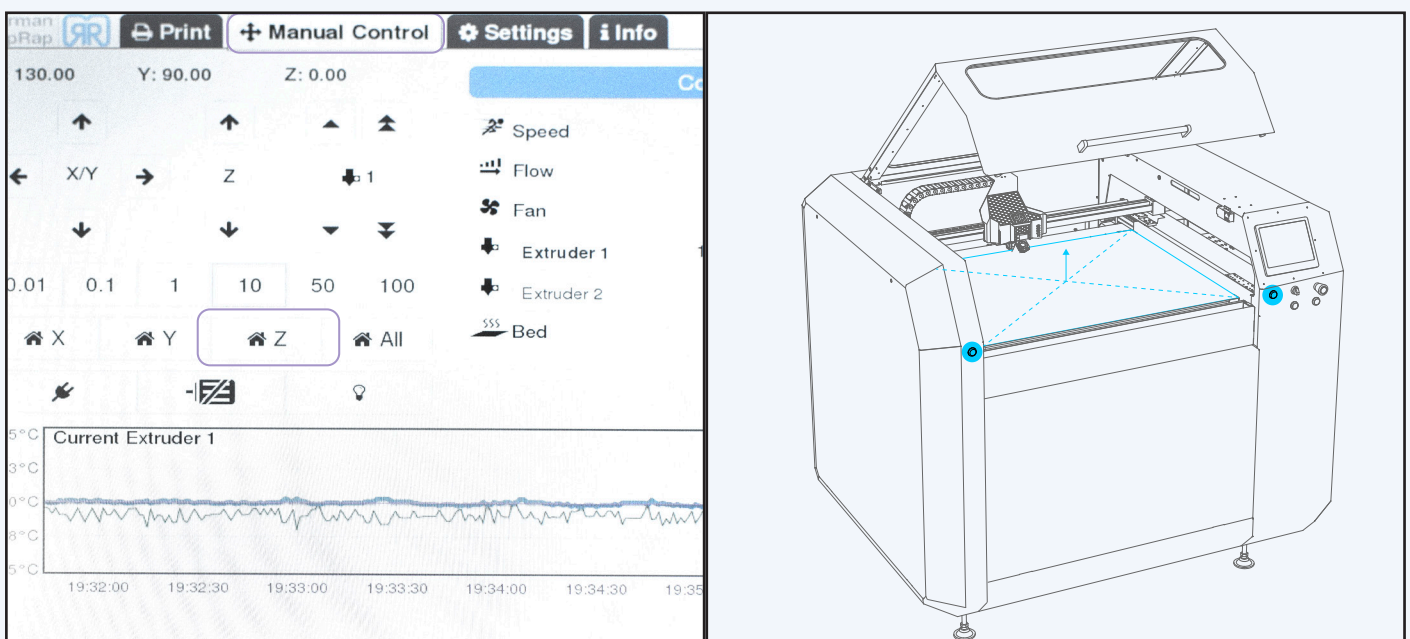
LCD menu, manual control

two-hand circuit

To do this, proceed as follows:

- Switch into standby mode by pressing the red button
- Open the maintenance lid
- Execute the order "home z" via LCD display or web browser
- The device will stand completely still
- Now press the two blue buttons shown on the picture above simultaneously
- The axes will traverse as long as both buttons are pushed, but not further than the machine zero

> Allow the building platform to cool down, the object will be much easier to remove.

> The X1000 has two machine zeros. Besides the actual one the other one is located half way up the building platform. When operating the two-hand circuit this prevent pushing the printed object into the maintenance lid.

2.4 Emergency stop

If you press the emergency stop, the printer will shut down immediately.

> Warning: RISK OF BURN:
>
> The heating bed as well as the extruder heads will remain hot even some time after an emergency shut down!

2.5 Maintenance mode

When operating in maintenance mode, it is possible to work with an open maintenance lid. This mode is intended for repair and maintenance work only!

> The maintenance mode must be set up by a trained professional only!

3. Network and printer set up

To establish a connection with the X1000 you must first check your computer´s network settings and adapt them, if necessary. The you can launch the setup routine and put the printer into operation.

3.1 Connection via router

> If necessary, contact your network administrator about integrating the X1000 into your network.

If your network settings are DHCP based, the X1000 is automatically assigned an IP address. If this is the case the X100 just has to be connected through a patch cable to your network.
Then you can see the printer´s assigned IP address as well as the MAC address on the LCD display.

3.2 Direct connection

To establish a direct connection between the X1000 and your computer you must proceed as follows:

- In the computer´s control panel navigate to network settings
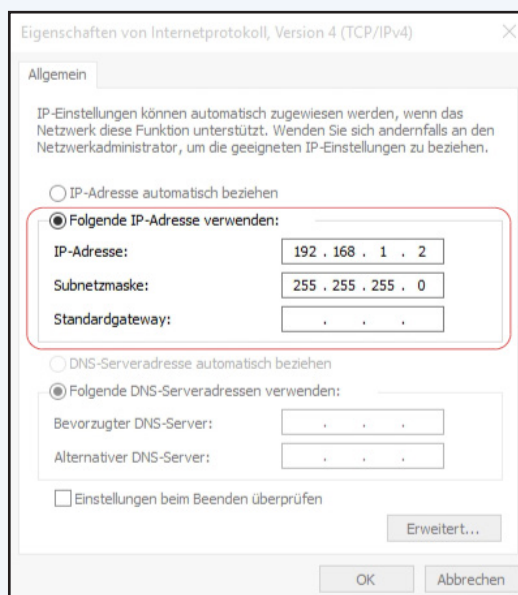- Click on the network adapter the X1000 is connected to
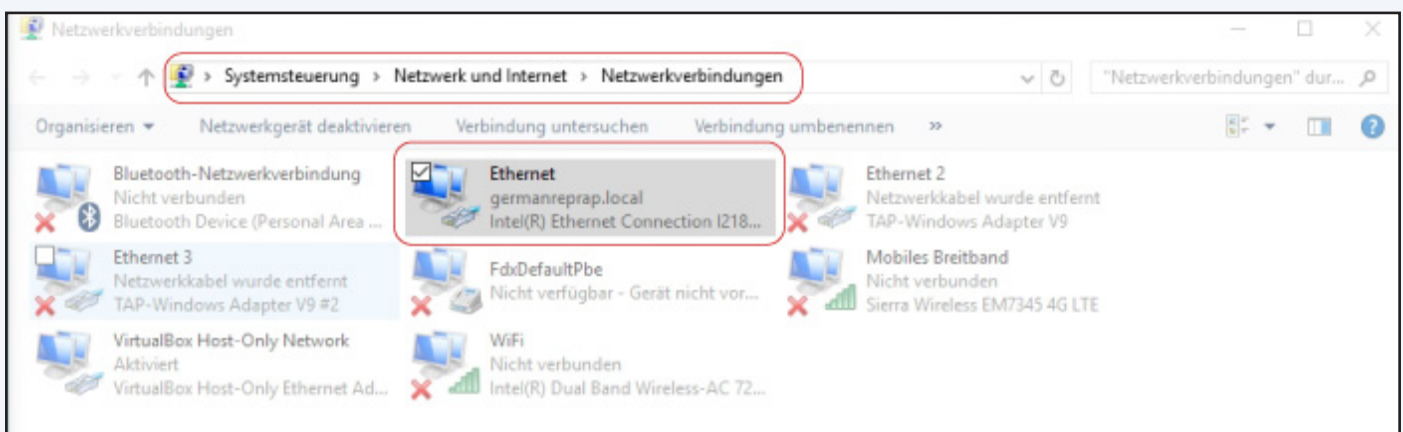
Choosing network adapter

- In the pop up window chose "details"
- In the shown list mark "internet protocol, version 4 (TCP/IP)" and click on properties
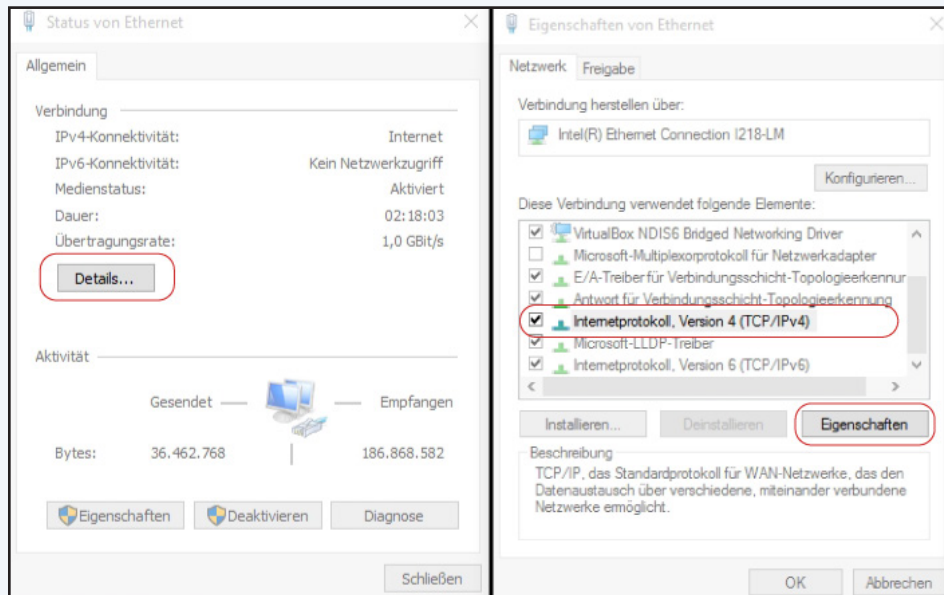
Network adapter properties

- Enter the following ip address to establish a connection to the 3d printer:
  192.168.1.2

Entering static IP address

Info:

By using this method you assign a static ip address in the same name space as your 3D printer to your computer
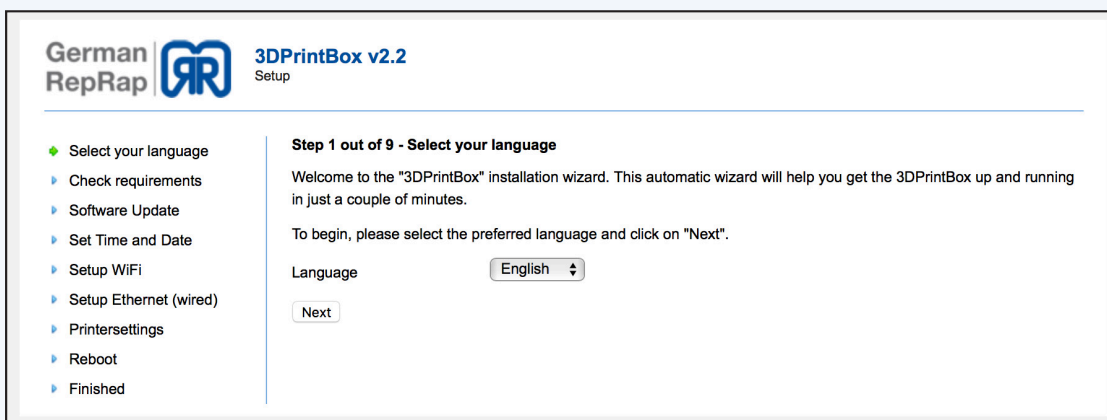
3.3 Setup routine

To configure your 3d printer afterwards you must launch the setup routine. Enter the pre-assigned ip address of your 3d printer into your browser to establish a connection. The first step of the set up routine will appear thereafter :

- 192.168.1.1/setup.php

> If you already assigned an ip address to your printer and you want to restart the setup routine, you must use your new ip to establish a connection XXX.XXX.X.X/setup.php .

Step 1:

In the first step, you chose the language of the installation assistant
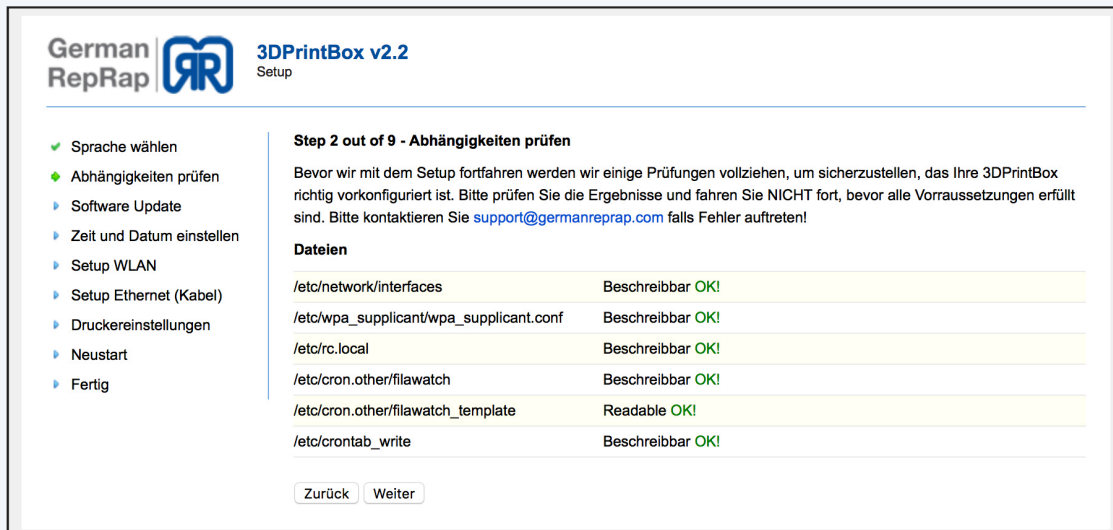

Setup routine step one

Step 2:

Please contact the support if an error message occurs during the second step or if not all bullet points are checked with the result "OK".

https://www.germanreprap.com/support/

Setup routine step two

Step 3:

Attention!
Please perform software updates only after consultation with the
support. Unauthorized updates can damage the device!

Setup routine step three

Step 4:

In the fourth step, you set the time and the date. You can get them set automatically over the internet. If you do not have an internet connection, you can also set them both manually.

For some devices, there is a real-time module available. For an inquiry
please contact the support via:
https://www.germanreprap.com/support/
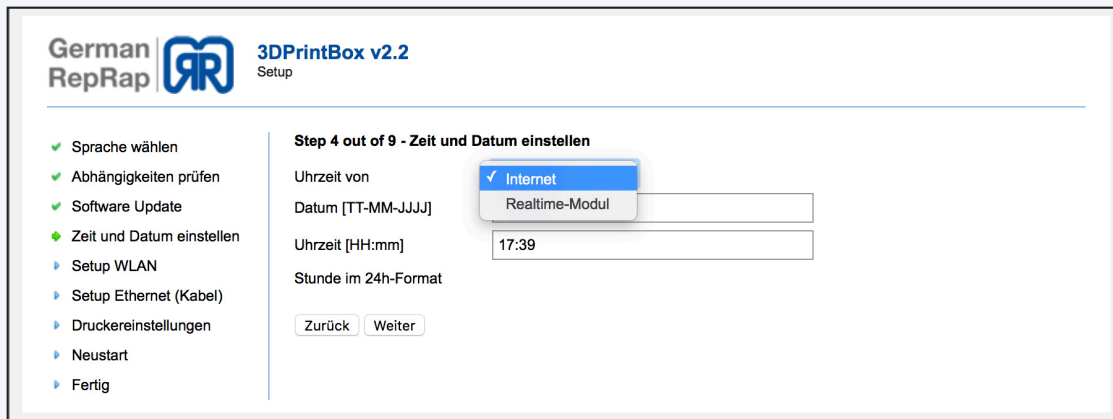
Setup routine step four

Step 5:

Here you can connect your printer to a WLAN. Please press the button "Scan Wifi" to have all available wireless networks displayed. Here you can also choose between a static ip address or the use of DHCP.
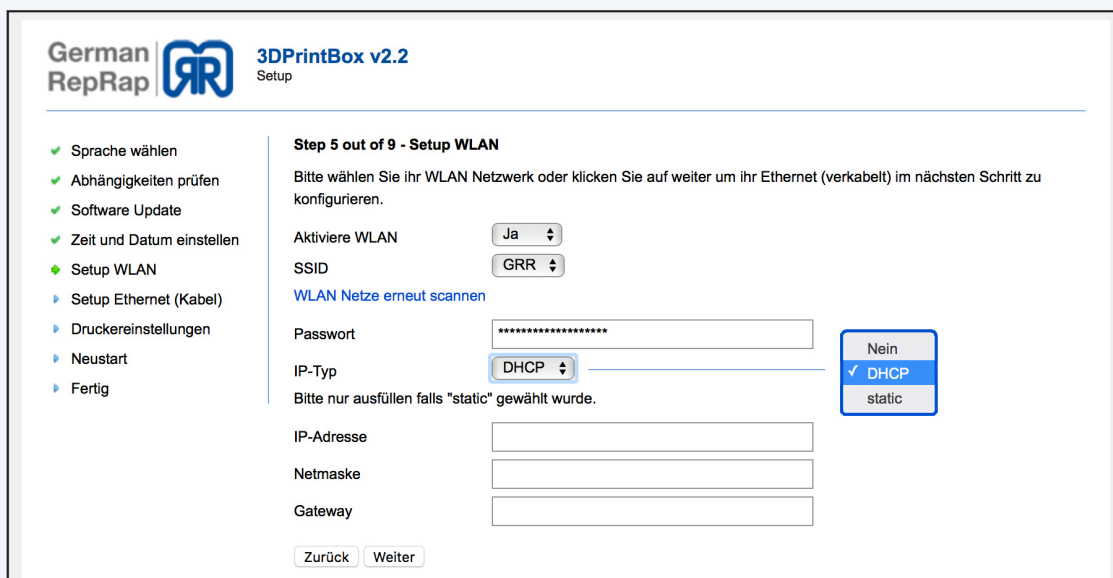
Setup routine step five

Tip:

Create a screenshot of these settings for later reference.

![German RepRap logo]

Step 6:

In the sixth step you will define the settings of your network connection. If you assign a static ip address, the fallback (192.168.1.2) will be overwritten.

> Please consult your IT department about the possible setting opportunities.

Setup routine step six

> If you enter incorrect data into this windows it might be impossible to reconnect to the printer without the help of our support.

Step 7:

Here you can activate the checkboxes at "Grafische Oberfläche" and "Filamentüberwachung", depending on your configuration, for single - or double extruder.

Setup routine step seven

After performing a software update with a new image the printer´s display will remain black. You must restart the setup routine to reactivate the "Grafische Oberfläche".

Step 8:

Confirm these settings by clicking on "weiter". Your print box will reboot afterwards.
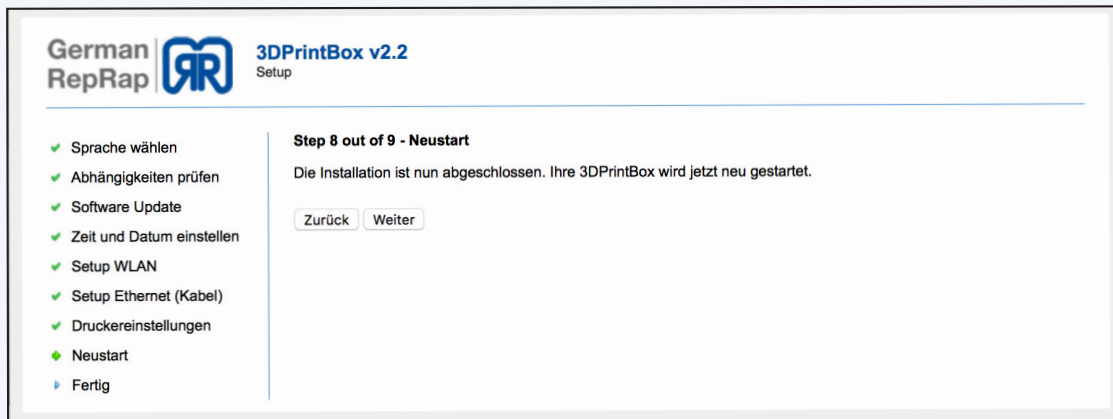
Setup routine step eight

Step 9:

Important:
After successfully completing the setup routine, you must restart the device twice to make sure that all changes have been correctly initialized.

Start the device using the key and wait until it is completely booted. Then shut it down and repeat the procedure.
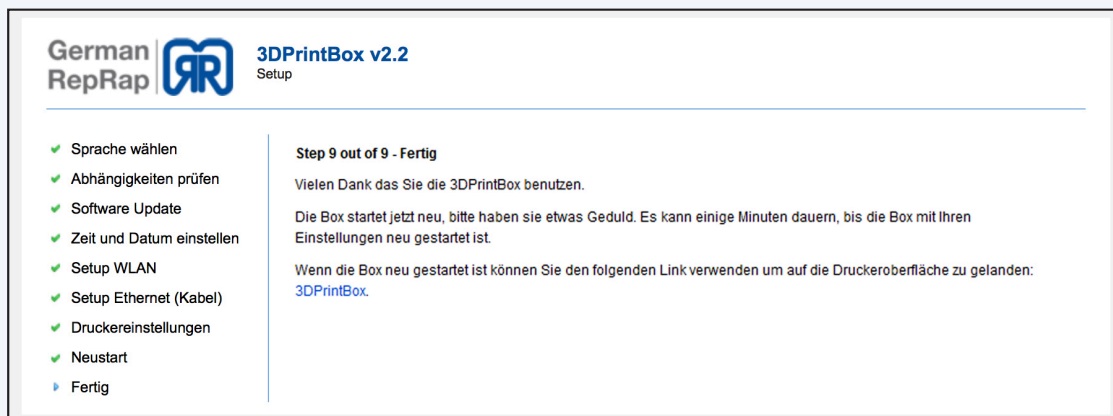
Setup routine step nine

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3.4 How to activate the printer and establish a connection

After customizing the network settings and completing the setup routine you are now ready to establish the connection to the X 1000 3D printer.
To do this enter the printer´s ip address in your browser (e.g. 192.168.1.2)
You will be presented the start screen (dashboard) of the Repetier-Server.
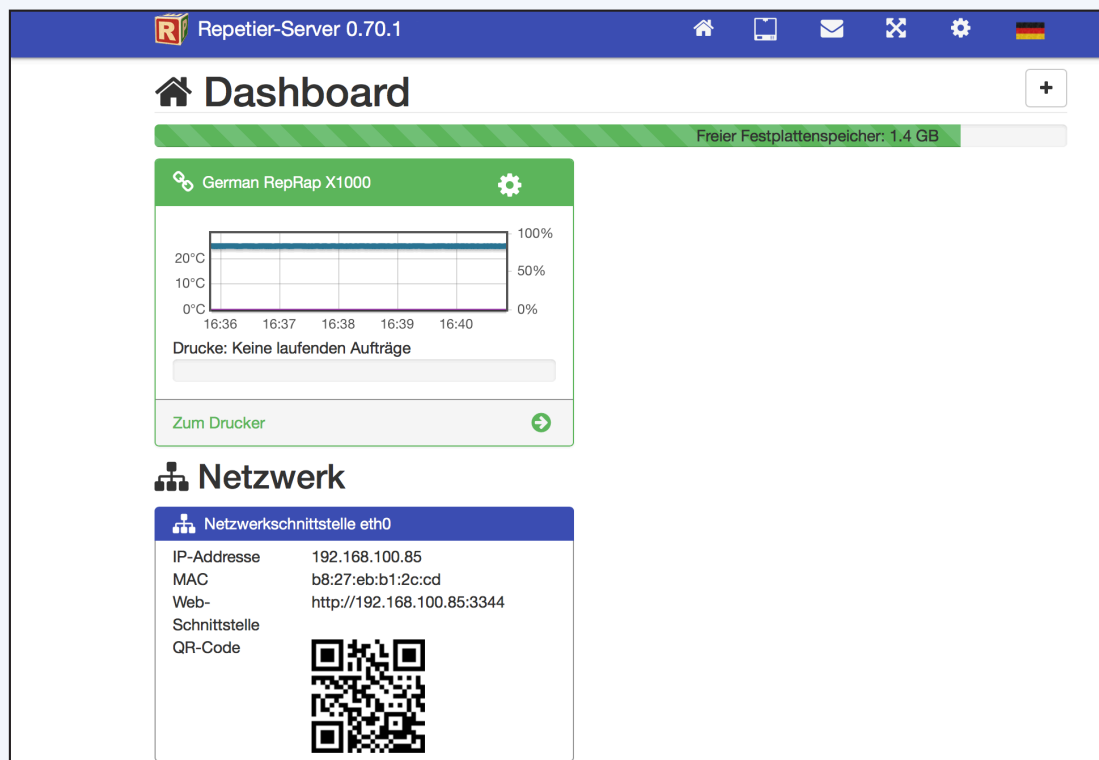
Repetier-Server Dashboard

To ensure that everything has been installed correctly click on your 3D printer and then on the right bar on "Druckereinstellungen".
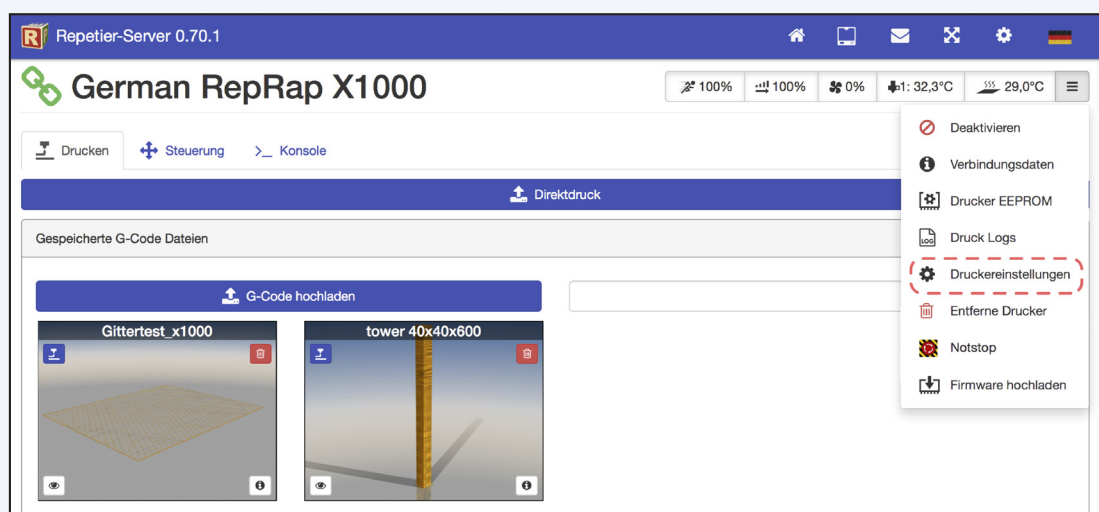
Printer settings, Repetier-Server

General printer settings X1000

Under the tab "Verbindung" chose /dev/serial/by-id/usb-FTID form the "Geräte/Port" dropdown menu.
Also, ensure that the baud rate is set to 15200 and the "Communication-timeout" is enabled.

Attention: Wir empfehlen einen Wert von 160, dieser kann bei bestimmten Geometrien jedoch abweichen.
Gerne berät Sie hierbei einer unserer Fachhändler.

4. 4   Workflow and operation

The following steps are required for a successful 3D print:

- Creation of a 3D CAD model
- Export of the CAD model into the STL format
- STL check and, if necessary STl repair
- Generation of a G-Code using a coding software like Simplify3D
- Starting the G Code. Either directly via a PC, a SD card or over a network connection
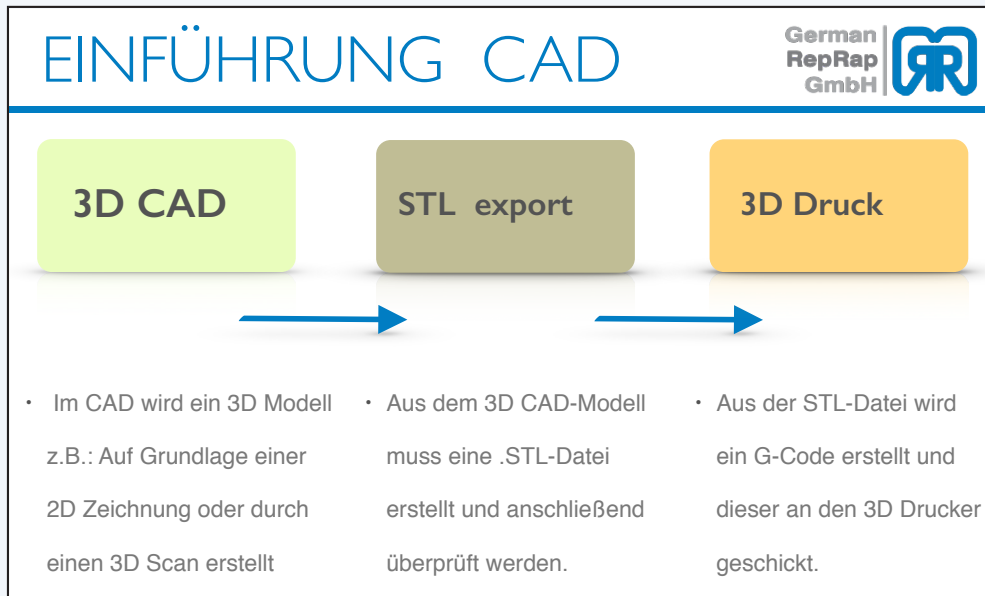
Individual work steps

4.1 Simplify 3D

Simplify3D™ Software contains everything you need to begin making parts on your new 3D printer. Import and manipulate geometry, repair models, generate G-Code instructions, verify toolpaths, manually control your machine, and print parts all from the same program!

4.2   Features

- One integrated software suite contains everything you need to print high quality parts
- Customizable settings and advanced processes put the controls into your hands
- Support for dual-extruders, multi-part printing and even multiple processes within one part

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4.3 Quick Start Guide

System requirement

- mindestens Intel Pentium 4
- mindestens 2GB Arbeitsspeicher
- mindestens Windows XP
- OS X 10.6 oder neuer
- Ubuntu Linux 12.10 oder neuer
- OpenGL 2.0 oder neuer
- Dauerhafte Internetverbindung zur Installation und Betrieb der Software

Installing Simplify3D™ Software

After buying your Simplify3D license you receive a code so you can create an account on:

https://www.simplify3d.com/redeem/

In the next step you receive and email for the verification of your account. After that you can manage your license online and download software packages.

Please check your spam-folder if you haven't reveived any email.

Windows

Unzip and double-click the .exe file to install. You may need to right-click and choose Run as administrator depending on your permissions and trust settings. The Windows installation requires Microsoft Visual C++ 2010 Redistributable, which should be automatically detected and installed if necessary.

Mac OS X 10.6.8+

Unzip and double-click the .app bundle to install. Enter your administrator password and follow the on-screen prompts.

Linux

The Linux installer comes with both 32 and 64-bit options. After choosing the appropriate version for your operating system, unzip the file and launch the .run installation package. It is recommended to launch this program as super-user by openingTerminal cd'ing to the directory where you unzipped the file, and then typing:

sudo ./Simplify3D*installer.run

and entering the administrator password.

Launching the Software

The installer will guide you through the installation steps. The last step is a prompt to open and launch your Simplify3D™ Software for the first time.
The software must be activated through an Internet conn
ection after installation. You can deactivate a specific machine at any time by going to Help > Deactivate Product.

The configuration Assistant

When you open Simplify3D™ for the first time, you will be greeted by the Configuration Assistant. Select your printer from the numerous printers listed in the drop down menu and the Assistant will automatically configure all of your settings.

If you want to access the Configuration Assistant after installation to change your settings to a different printer, it can be located in the horizontal Menu Bar under Help > Configuration Assistant.

Configuration assistent

Import profiles manually

Furthermore our profiles are available directly to download.
To import the downloaded profile, follow these steps:

- Click on menu "File" "Import FFF-Profile" and choose the downloaded file.

- Open the FFF settings window and check if the profile is visible.
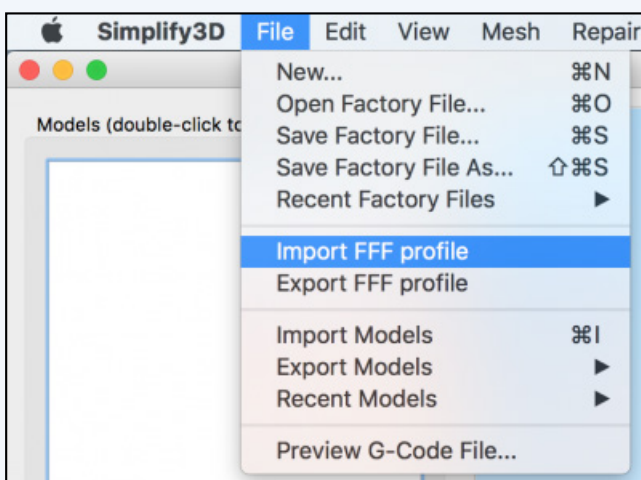
Import profile
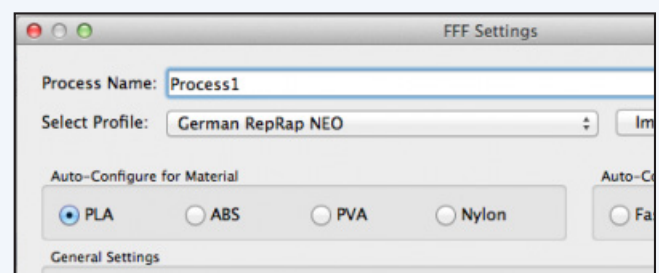
Select profile

4.4 The Interface Layout

1. Build Table -

This is the interactive 3D environment where you will be viewing and working with your 3D content before printing. This is the "main stage" and primary viewing area. The gray grid is scaled proportionally to the size of your build volume and is determined based on your printer selection with the Configuration Assistant. Use these mouse shortcuts for different views:

- Rotate View – Left-click and drag
- Pan View – Right-click and drag
- Zoom – Scrolling or gesture zoom (or Shift-left-click and drag up and down)

2. Menu Bar

- Primary navigation to all aspects of Simplify3D™ Software.

3. Models

- When you import 3D models, they are listed in this section above the buttons/commands that enable you to work with your models.

4. Processes

- The build operations to create your 3D print are listed here, along with buttons/commands enabling you to work with process functions.

5. Toolbar

- This toolbar contains quick access buttons for frequently used tools. You can move the toolbar anywhere you wish by clicking and dragging the top dotted line.

Interface Layout

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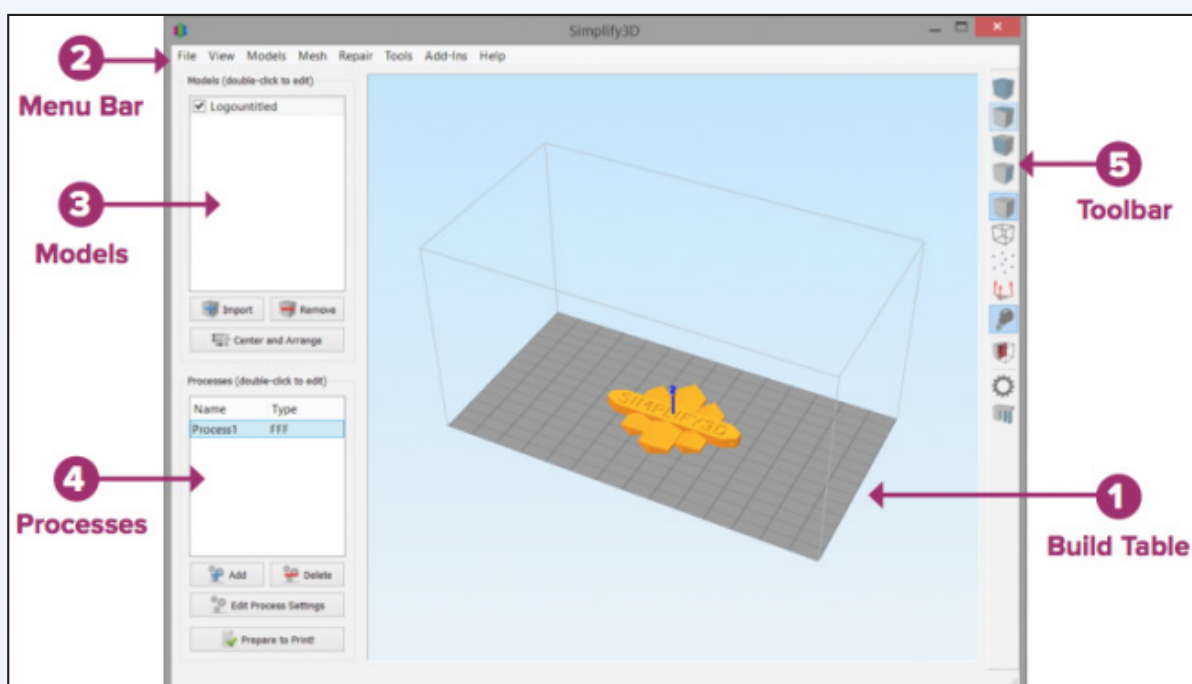
Toolbar

A. View
The first four buttons are preset viewing positions, allowing you to quickly change to the default, top, front, or side view.

B. Model Render
These tools control how you view the attributes of your 3D models. You can add a wireframe or a point cloud to your model, enable or disable the lighting and the solid rendering of the model, or display the surface normals of the model.

C. Cross Section Tool
The Cross Section tool gives you the ability to cut a model in half to look inside it. The tool allows you to cut your model from all three axes and can also be accessed in the Preview Mode.

D. Maschine Control Panel - Maschinensteuerung
Simplify3D™ Software can connect to virtually any printer through the Machine Control Panel (MCP). Another way to access the MCP is through the top menu bar under Tools > Machine Control Panel. The MCP allows you to view your extruder and build plate temperatures, preheat your nozzles, jog your machine's motors, and access the software-printer communication log.

E. Support
The Manually Define Support tool provides the freedom to customize your support structure under or inside any part of a model.
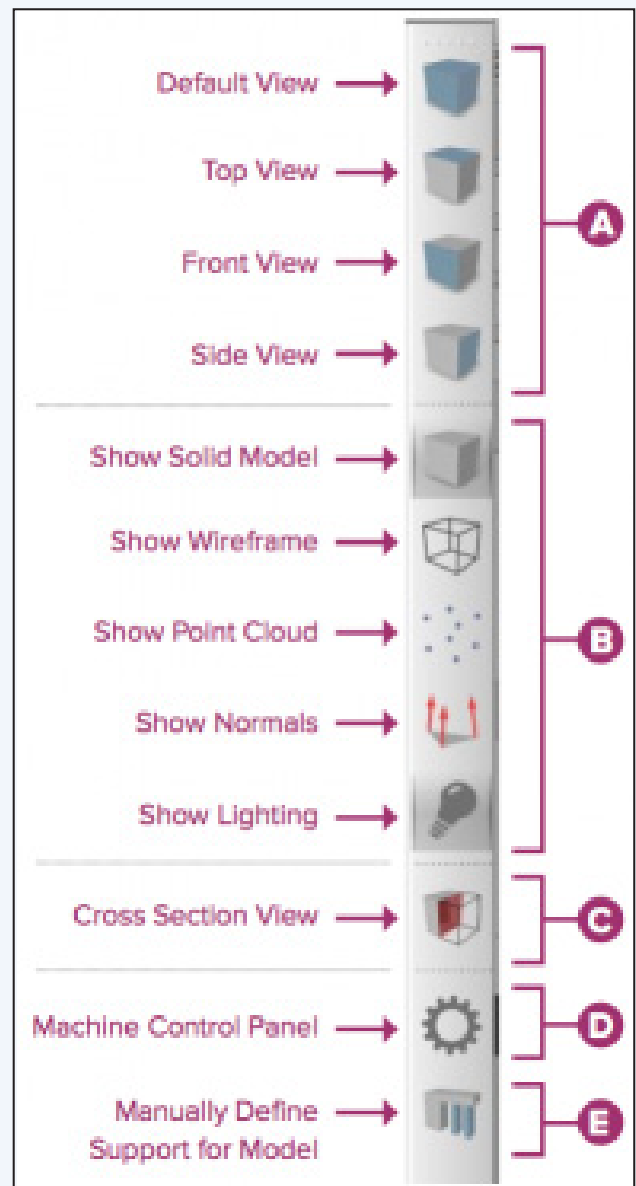
Toolbar Simplify3D

3D Printing Workflow

The first step in the 3D printing process is to import the model you want to build. Save the 3D model file on your computer or storage device as an .stl or .obj file.

Helpful mouse and keyboard shortcuts to move, scale, or rotate your model:

- Move Model – Ctrl-left-click and drag (or Command-left-click on Mac)
- Scale Model – Ctrl-right-click and drag up or down (or Command-right-click on Mac)
- Rotate Model – Alt-left-click and drag right or left (or Option-Left Click on Mac)

Advanced model settings:

Double click on any model (either in the Models list or on the Build Table) to bring up the Model Settings box. Enter numbers or use the up-down arrows to adjust the positioning, scaling, or rotation of your model. A helpful feature is that you can see your model change in real time on the Build Table.
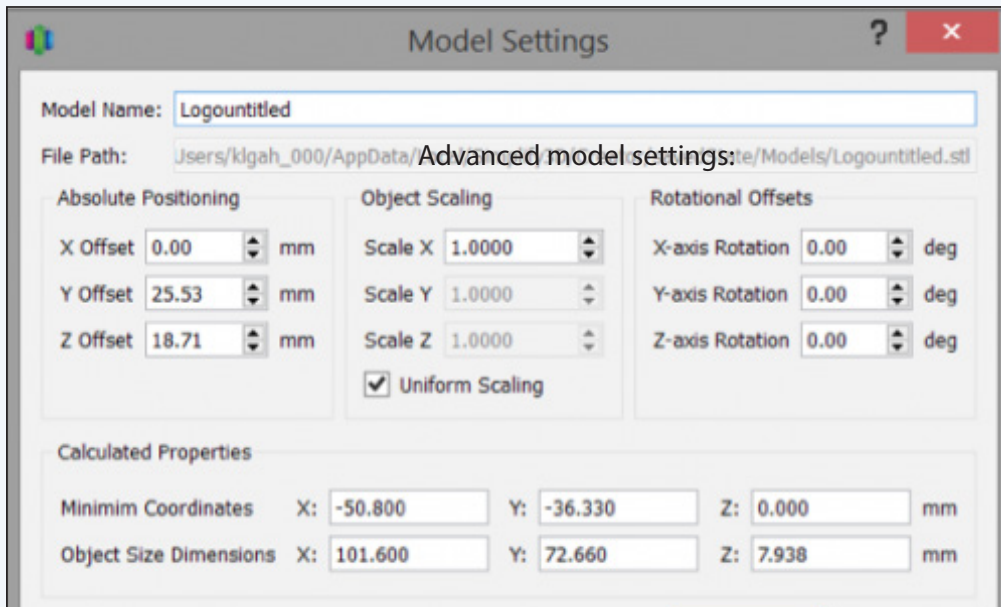
Modell settings

Settings and Processes for 3D Printing

In the first step of the workflow, you imported a model. The next step is to define a Process that specifies how your model will be constructed. A Process is a collection of settings including speed, size, support material, quality levels, etc. Some models are built with one process, while more complicated models may involve multiple processes throughout the build sequence.

The first Process will be configured automatically based on the printer selected in the Configuration Assistant. You're free to make any adjustments you desire, but it's a great starting point!

To make adjustments to your Process, double-click on the Process or click Edit Process Settings. This will open the FFF (Fused Filament Fabrication) Settings window.
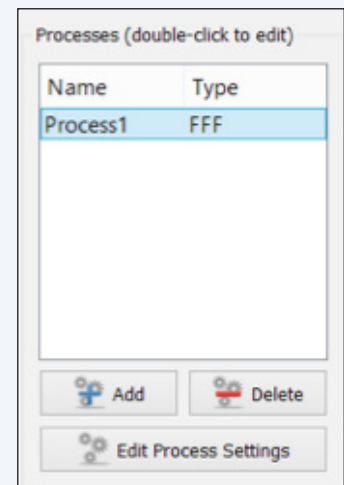
Processes

FFF settings

The FFF (Fused Filament Fabrication) Settings window contains all the Processes that specify how your model will be constructed:

- Select Profile – Allows you to choose a pre-configured printer profile.
- Auto-Configure for Material – Allows you to select the material you will be printing with.
- Auto-Configure for Print Quality – Allows you to select a pre-configured print quality.
- Infill Percentage – Changes the interior solidity of your 3D print. 0% is completely hollow and
- 100% is completely solid. A value in the range of 20-50% is a good place to start.
- Include Raft – Generates a raft structure underneath your part. Rafts are used to improve the
- bond to your build platform and may help reduce warping on large models.
- Generate Support – Turns on support material for your 3D print. Support structures are similar

Click Show Advanced at the bottom of the FFF Settings window to view additional options and settings that are available within Simplify3D™ Software.

> These advanced setting should be modified by advanced users only!
> We recommend visiting our Simplify 3D training to get familiar with the advanced setting.

Previewing G-Code Files

"Slicing" is the term used to describe the process of translating a digital model into line-by-line printer instructions called "G-code." The software slices the model into G-Code based on the variables you have selected in the FFF (Fused Filament Fabrication) Settings window.
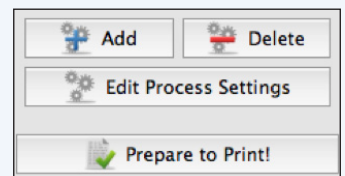
Prepare to print

After you have finalized your Process settings, click Prepare to Print! to trigger the preparation of G-Code. Simple models will be sliced in seconds, while complex models may take several minutes.
When your G-Code has been created, the software window will transition automatically to Preview Mode. The animated Preview Mode in the Simplify3D™ Software allows you to inspect all aspects of your print operation prior to execution. The software takes your generated G-Code and virtually displays line by line how your model will be constructed.

Play/Pause button animates the preview line by line.
Start and End Slider Bars allow you to move through the preview manually. (Hint: leave the Start button positioned at left and drag the End button to the right side to see the entire build).
The preview can be illustrated by Line or by Layer by clicking on either selection.

> Tip: A useful setting is to select Preview by Layer and also place a checkmark in Single Layer Only. Together, these selections will allow you to view a single layer at a time.
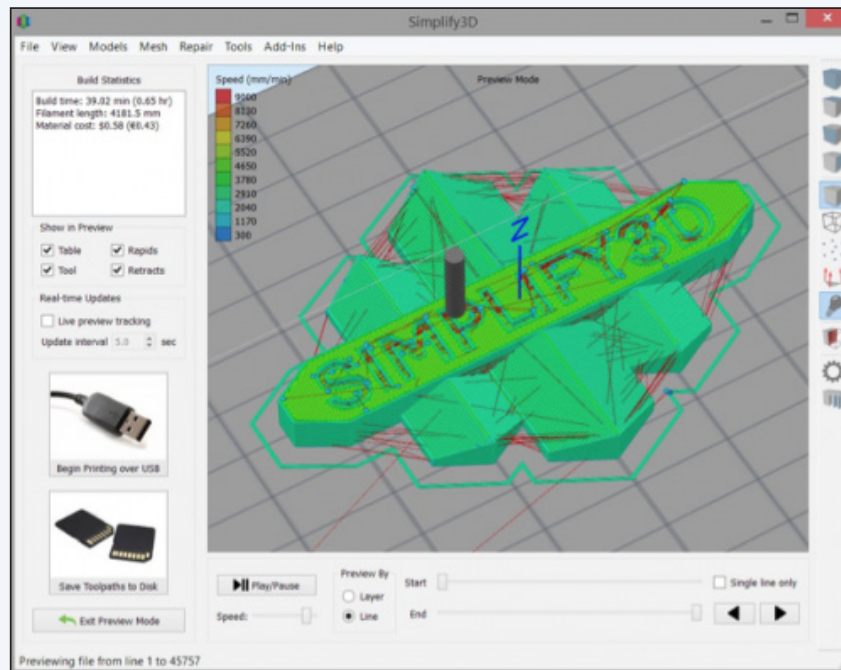
G-Code preview

Printing on Your Machine

When you are happy with the preview, there are two options to begin your print:

Begin Printing over USB
- If you are using a USB connection, you have the option to view the build sequence real-time on your monitor by selecting Live Preview Tracking. For additional information on USB communication, access the Machine Control Panel to view a broad range of information that is transmitted via USB.

Save Toolpaths to Disk
- This saves your print file to a user-defined location, such as a folder on your computer or an SD card.

Congratulations! You have now completed your first 3D print using Simplify3D™ Software. You'll soon be ready to explore other options and create many exciting models.

Resources within the software

You will learn so much about your printer by making your first part! Once you feel comfortable with the basics and are ready for more options, advanced settings can be found by clicking Show Advanced in the bottom left corner of the FFF Settings window. This reveals the all of the detailed settings that Simplify3D™ Software is implementing behind the scenes, as well as providing customization options for many settings you may want to adjust. If you want more information about any particular setting, hover the mouse cursor over that element to display a tooltip describing the functionality.
Simplify3D offers a lot of learning support:

> *Support*
>
> *Tutorials*
>
> *Video tutorials*
>
> *Print qualitiy und Troubleshooting*
>
> *Forum*

5. Repetier Server

Repertier-Server is an application for operating the X1000 3D printer and initiating 3D prints. You can access your printer from everywhere so it is possible to upload and manage G-Codes from remote. Here it is also possible to check the print progress of your objects and to send individual commands to the 3D printer. In addition to this it provides an easy way to upload firmware updates.

5.1 Web interface

The web interface provides full control of the X1000, no matter if you work via a computer, a tablet or even a smartphone.
To access the web interface, enter the following adress into your web browser:

- IPadress.of.your.3Dprinter:3344
- E.g: 192.168.100.1:3344

5.2 Dashboard

The dashboard represents the first overview page of the Repetier-Server. The following information for all your 3D printers are displayed here:
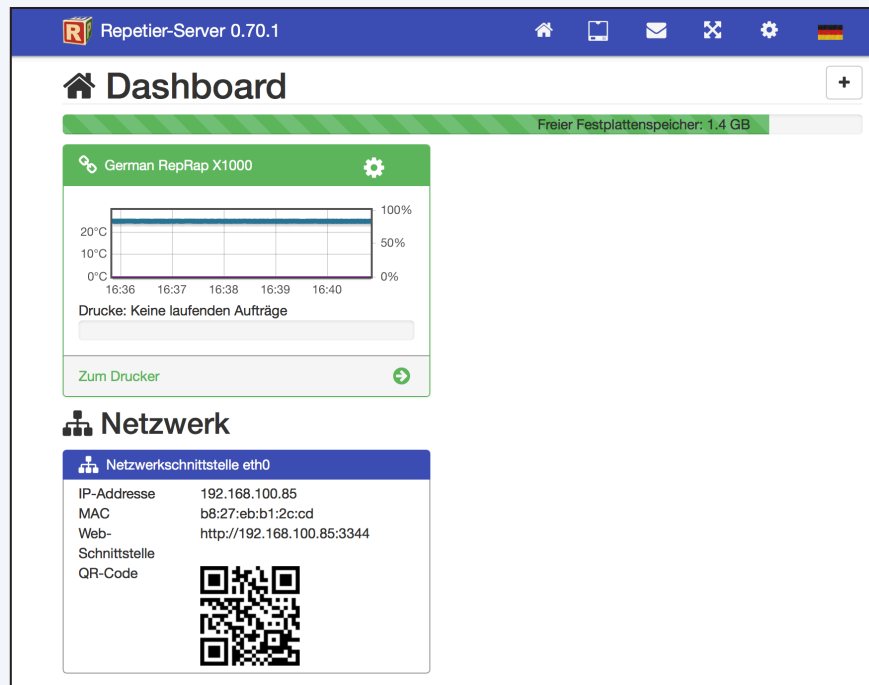
Dashboard . Repetier-Server

- The color of the printer name´s bar represents its connection status (green= online, red= offline, gray = deactivated, orange = connected without communication).
- Using the Cog symbol allows you to activate/deactivate or to delete the printer. You can also edit, exchange or download the printer settings.
- The temperature curve displays the current temperature of the extruder.
- Underneath the temperature curve you find the current print job and its progress.
- You can access the printer directly by clicking the button "zum Drucker".
- The green bar on top edge of the window shows the amount of free disc space on the Repetier-Server.
- In the bottom area under the heading of "Netzwerk" you can see the printer´s IP address and MAC address. There are also an URL and a QR code shown which you can use to connect another device to the 3D printer like a Smartphone or a tablet.

5.3 Device panel

To operate your 3D printer or to upload G-codes, click on the button "zum Drucker" on the dashboard. Here you have the option to upload G-codes to either print them directly or later. To do this use the functions "Direktdruck" and "G-code hochladen", respectively.
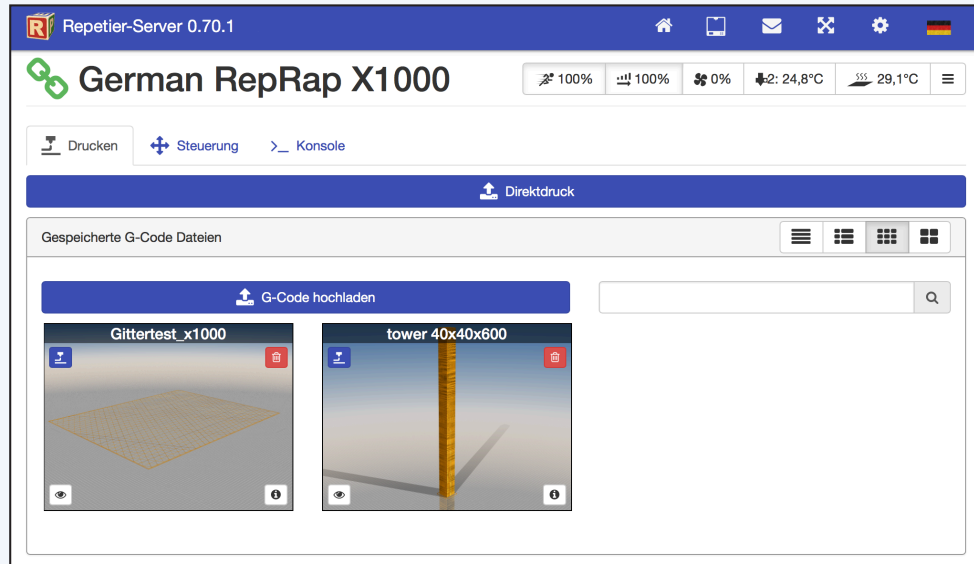
Device panel, Repetier-Server

Depending on your chosen view, you get different information displayed about your print jobs. Use the search mask to browse your G-code database for print jobs.
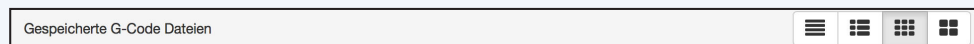
G-Code view, Repetier-Server

5.4 Device panel operation

You can use this menu item to manually operate your 3D printer. You can manually traverse the axis or regulate the heating bed.

The controls are separated into 3 categories:

- General working area
- Extruder and temperature curves
- Macros, to define your own commands
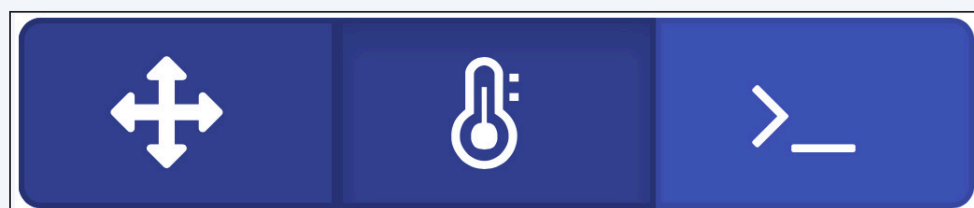
Categories, Repetier-Server
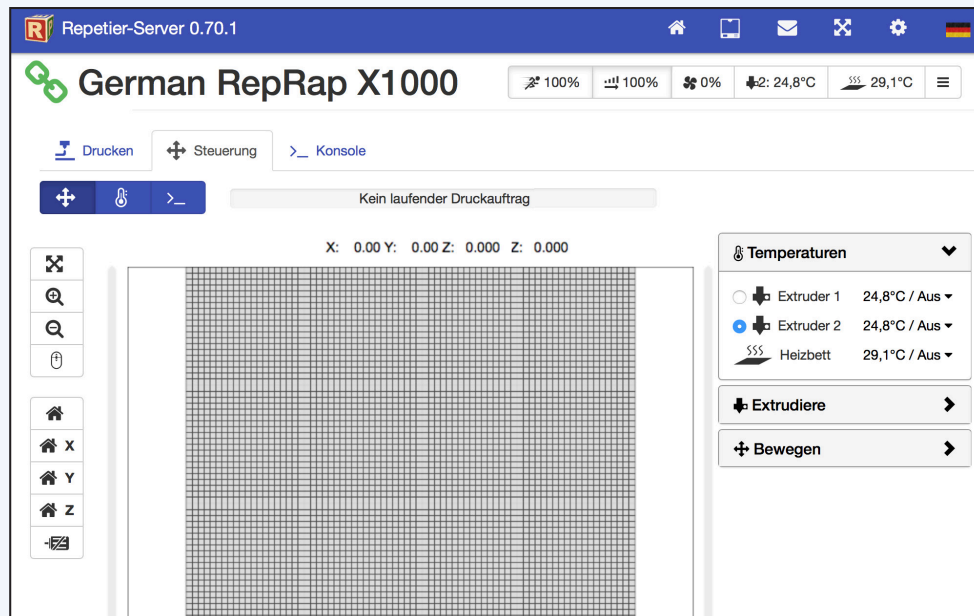
Manual control, Repetier-Server
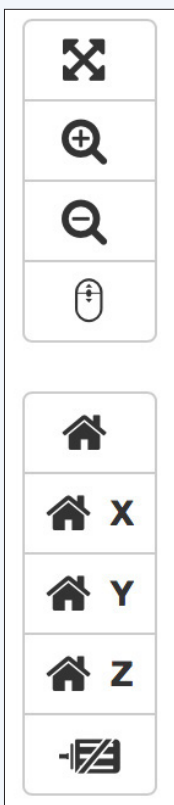
Left:

Use the upper buttons to navigate through the virtual print space. With the home symbols, you can move all or one specific axis to its machine zero. You can shut down the engines by pressing the lowest button.

Right:

On the right side, you can find the configuration options for the different heating elements of your 3d printer. Here you can heat up the corresponding extruder heads or the heating bed and have their temperatures displayed.

Under the tab "extrudiere" you can extrude filament or retract it from the tool head. These operations are defined by speed (mm/s) and the chosen distance (mm). This function is especially useful for filament change.

Under the tab "bewegen" you can manually traverse the printer`s axis.

This is either done by clicking on the corresponding arrow or via the slide controls, which are arranged around the virtual print bed, by pulling them to the required position.

Quick settings, Repetier-Server
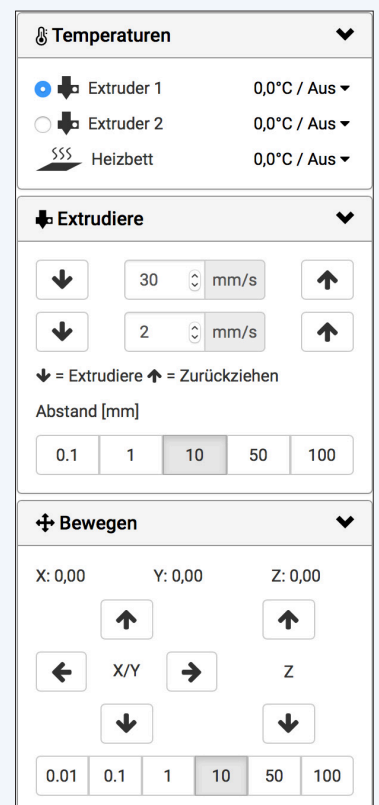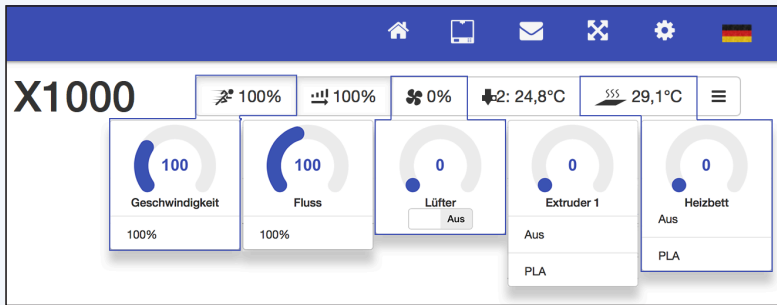
Use the toolbar to change the following parameters. The method to do this is always the same. You can either move the slider to the desired position or directly click on the desired value and change it manually.

- Speed: Here you can adjust the working speed of your 3D printer. You can speed the printing process up or slow it down. The used speed is calculated proportionally to the value which is stored in the G-Code (100% = original speed; 150% = 50% faster than saved in the G-Code). The flow of the extruder is automatically adjusted to the speed by the software, you don't have to tweak it manually.

- Flow: The amount of filament that is extruded is determined by the flow. If the application rate is too low, you can increase the output manually (in the past experience, 110% has shown good results). Ideally, your slicing software should contain the correct value for the necessary extrusion multiplier.

- Fan: Here you can activate and control a fan in the work space. If your G-Code already contains orders for the fan control it will over ride your manual configuration.

- Extruder: Here you can turn on your extruder and turn it off or control its temperature. In the register Druckereinstellungen/Extruder/Extruder you can predefine the temperatures that will be shown in the dropdown menu.

- Heated bed: Turn the heating bed on or switch it off and control its temperature. In the register Druckereinstellungen/Extruder/Extruder you can predefine the temperatures that will be shown in the dropdown menu.

As well as all the functions previously motioned here you also get to see temperature cures for all heating elements. This view is especially useful to exclude malfunctions of the heating elements.
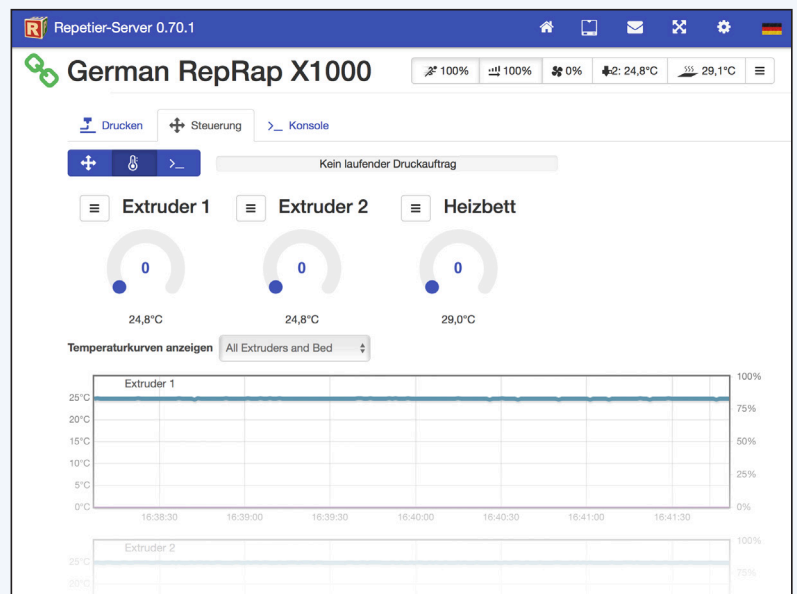
Extruder and temperature curves, Repetier-Server
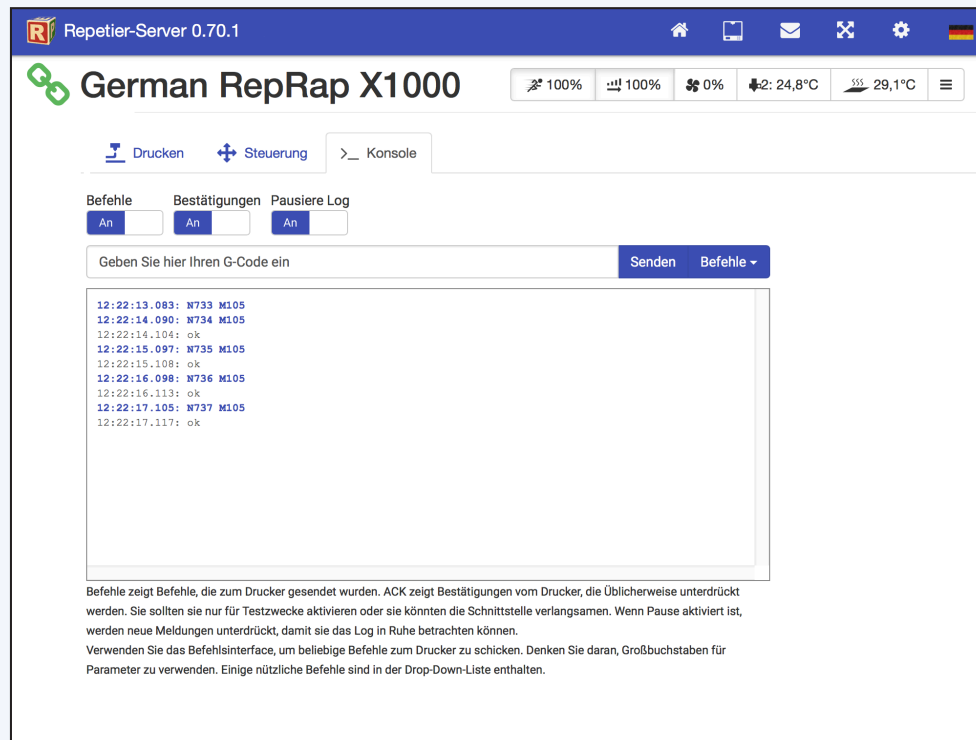
Console, Repetier-Server

Under the tab "Konsole" you can view logs of all orders and confirmations that are sent to the 3D printer. To do this just activate the corresponding switch.

> This tool is especially useful to find possible faults of the device. By activating pause new messages will be suppressed, so that you can read your desired text section in your leisure.

5.5 EEPROM

You can use the drop-down menu on the right side to reach the EEPROM settings. Here you can find important machine parameters like the size of the print bed.

Changed values will be highlighted in green until they are saved. Incorrectly registered values will be highlighted in red. Use the button "speichern" to adopt your changes.

> Please note:
>
> I the EEPROM arena you have direct access to the printer´s firmware, therefor care should be taken when changing values.
>
> You should generally only modify these settings after consulting the support.
>
> Incorrectly registered values can lead to a malfunctioning device or could even damage the 3D printer.
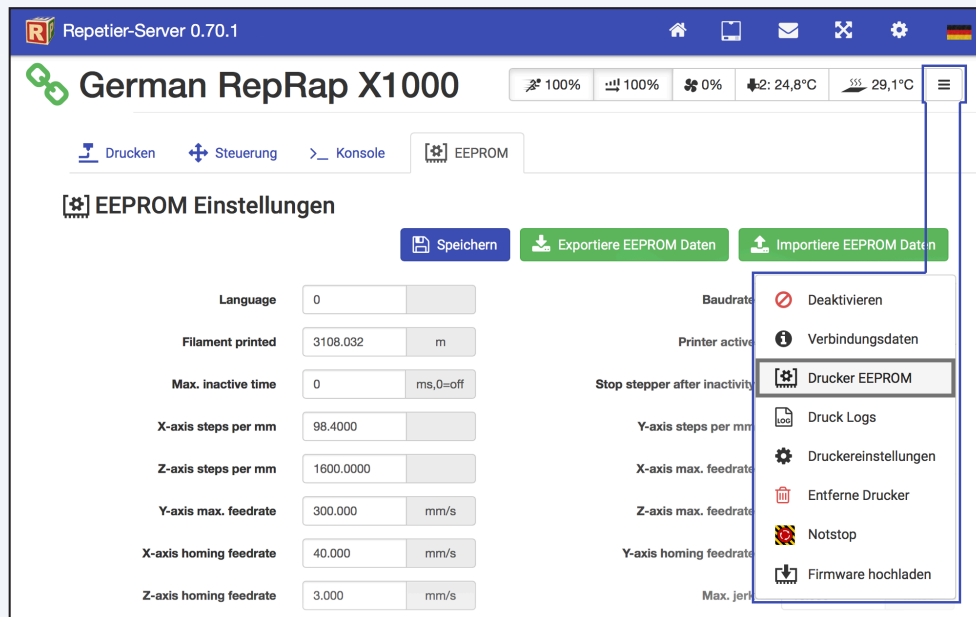
EEPROM , Repetier Server

Before changing values in EEPROM, create a backup of your existing files. Use the button "Exportiere EEPROM Daten" to save your settings as a .epr file. Following this, you must save the imported settings.

5.6 LOG-Files

Repetier-Server can record the communication with the 3D printer and provide a protocol of it as a text file. A maximum of 5 log files can be stored. From then on each further task will delete the oldest entry.

To record a 3D print you just must check the two boxes It is not possible to log already started print jobs. You must restart your 3D printer if you want to record a specific print job.
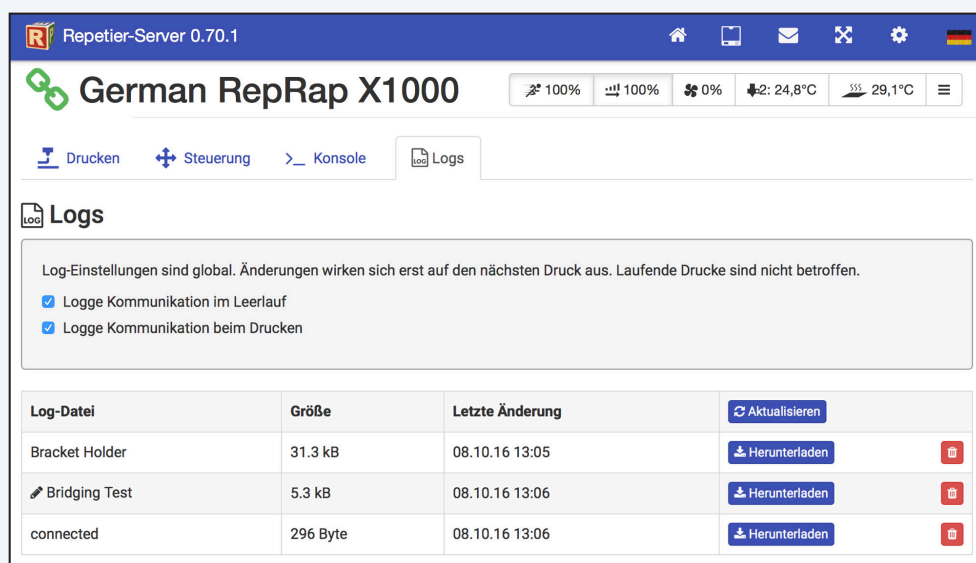
Log-files, Repetier-Server

5.7 Firmwareupdate

The easiest way to perform a firmware update is to use Repetier-Server. First you must download the firmware of your 3D printer as a HEX file and unzip it:

https://www.germanreprap.com/firmware/

X1000

Version	Drucker	Extruder	LCD	Heizbett	Download
3.1	X1000	DD3 Single	X	X	v3.1_x1000_1ex.zip
3.1 HEX	X1000	DD3 Single	X	X	HEX v3.1_x1000_1ex.zip
3.1	X1000	DD3 Dual	X	X	v3.1_x1000_2ex.zip
3.1 HEX	X1000	DD3 Dual	X	X	HEX v3.1_x1000_2ex.zip

Firmware download

Chose the printer you want to update from the Repetier-Server main window. Click on the 3 bars on the top right corner to open the advanced settings and click on "firmware hochladen":

- Tick the checkbox labeled as "detailierte Ausgabe"
- In older versions the checkbox is labeled as "gesprächige Augabe"
- Make sure that under "Durckerboard Art" the Arduino 2560 Borad is chosen
- Under "Firmware Abbild hochladen" you can select the path of the HEX file
- The upload and installation will then be executed
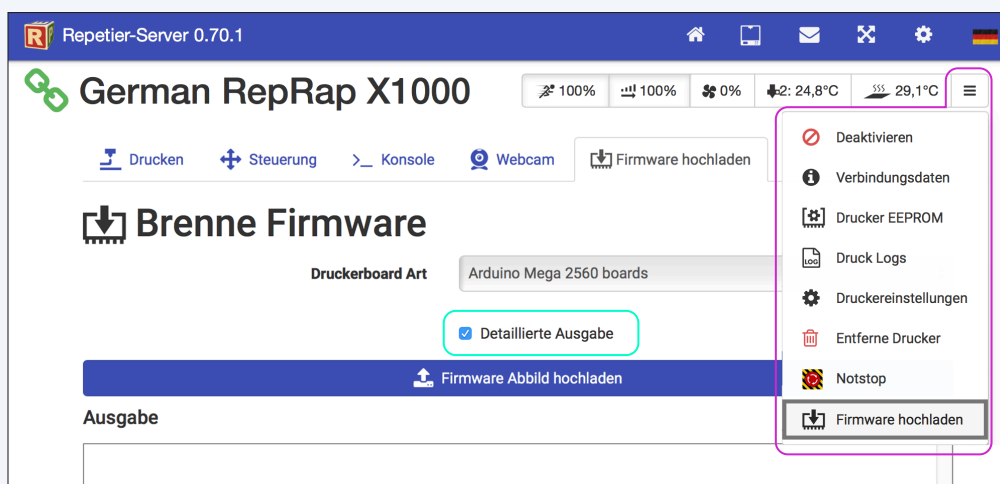
Firmware Upload X1000, Repetier-Server

6. Tool heads and cosumables

6.1 Tool head wiring

- 1 : E0/T0 – extruder heater and thermistor
- 2 : Fan 4/24V fan to cool the hotends
- 3 : FIL 0
- 4 : FAN - adjustable cooling fan
- 5 : 24V - an empty 24V slot
- 6 : FIL1
- 7 : Fan 5 / 24V fan to cool the hotends
- 8 : E1 / T1 - extruderheater and thermistor
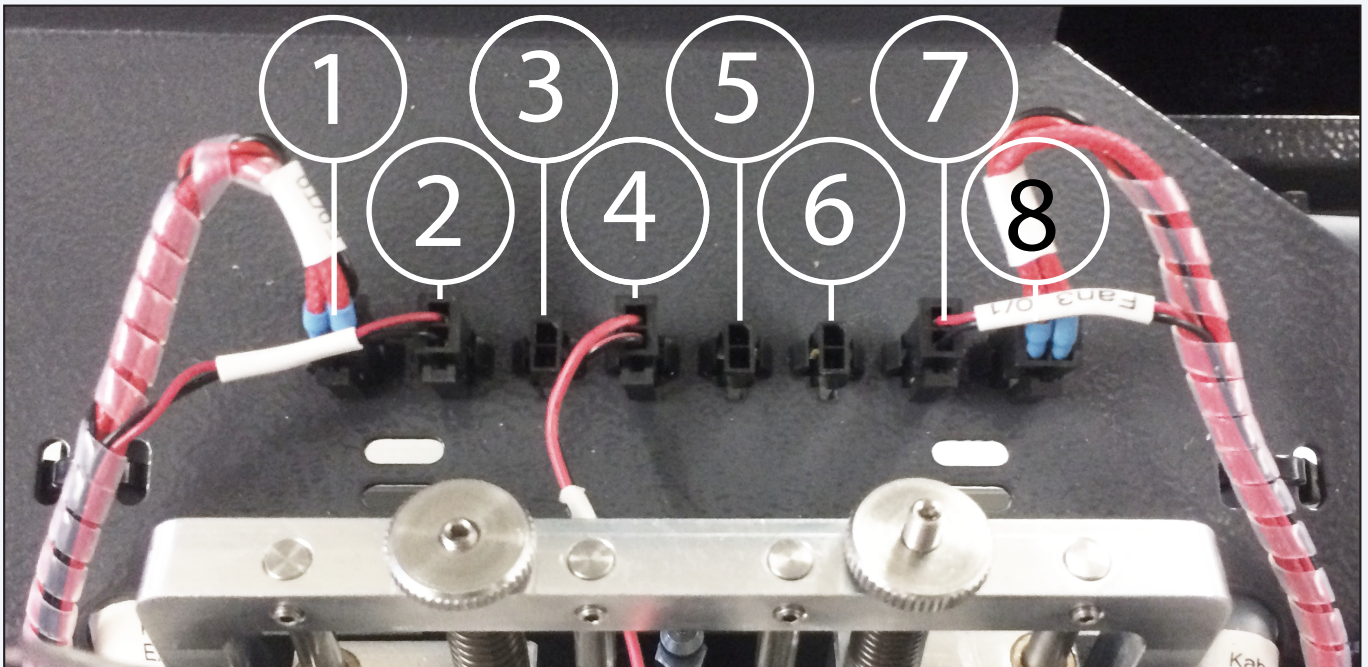
Wiring X1000, tool slides

6.2 How to set up the second extruder

Follow this illustrated guide to put the second extruder into operation:

If the X1000 is delivered with two extruders, the left/first extruder sits lower compared to the right/second extruder. This is intentional. We recommend for new users to make their first 3D printing experience with only one extruder.
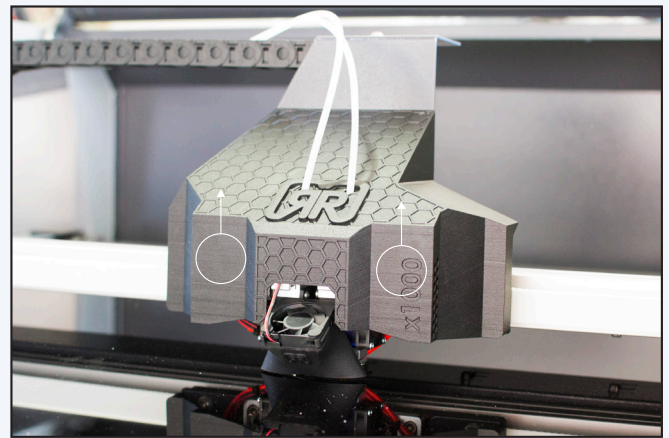
Cover removal

To put the second extruder into operation, the cover of the extruders must be removed first. Afterwards the second extruder can be lifted or lowered by using the knurled screw (highlighted in yellow).

Before you start setting up the second extruder please note that you must heat up both nozzles to the material specific temperature. Then you must remove the clamped filament from the extruder and clean up the hot end`s brass nozzle. You can use a brass brush for this.
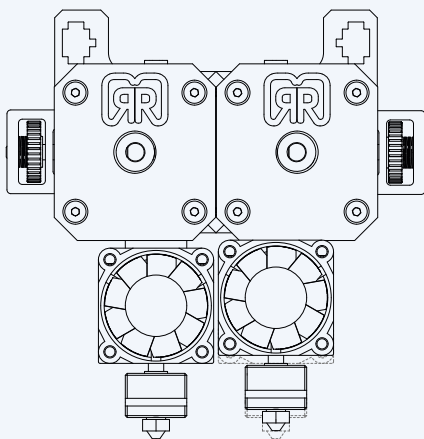
Left extruder for reference height
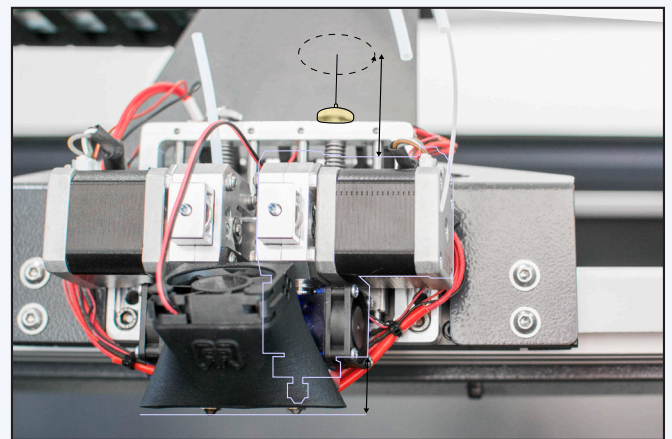
Adjusting extruder height

Even trace amounts of impurities could make it impossible to align both nozzles correctly. If you are having troubles with dripping filament allow the hotends to cool after removing the filament.

The left extruder is already set to working height and serves as a reference point for the calibration of the second/right extruder. Traverse the print bed to the "Home position" and measure the distance between the first extruder and the print bed with an appropriate tool like a dial gauge or a feeler gauge. Use the marked knurled screw in the picture to transfer the height to the second extruder.

6.3 How to replace the hot end and the extruder

Follow this illustrated guide to exchange a hot end or the entire extruder:
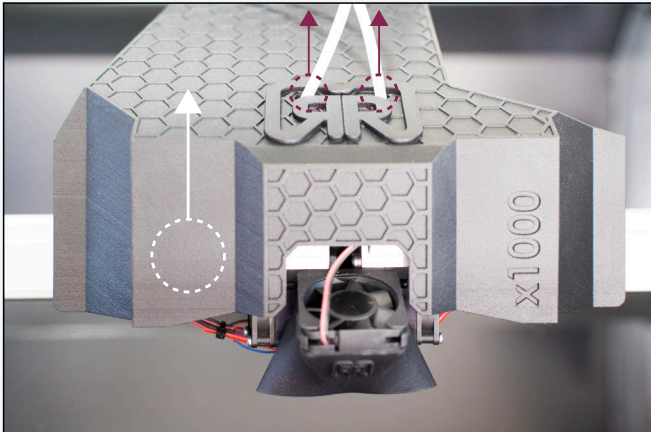
Remove cover

The X1000`s cover is magnetically attached First, pull out the color marked tubes of the black cladding and then lift the cladding up and off.
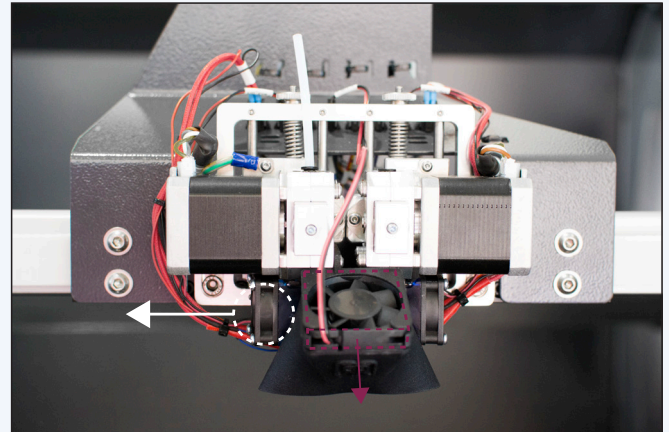
Remove fan

Then you take away the object fan (red) and the fan for the hot end cooling (white).

Caution!
Be careful when pulling off the hot end fan. It fits firmly on the heat sink.
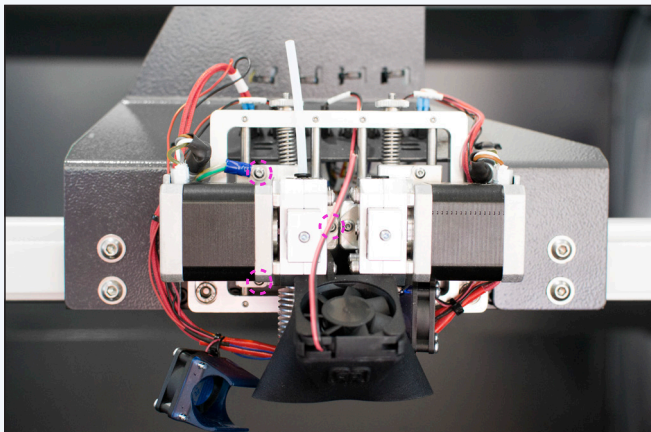
Remove marked screws

The extruder unit is mounted to the tool slide with 3 screws. Remove these screwes carefully.

Caution: After removing the last screw, the Extruder is completely free. Take care that it does not fall on the glass plate!
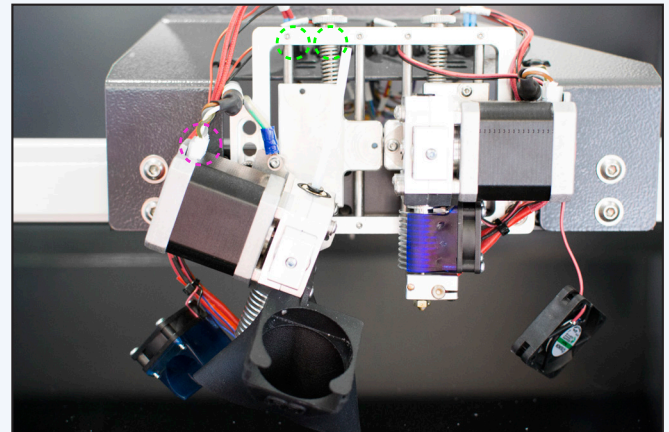
Removing cable ties

Disconnet all marked plugs that still connected the Extruder (pink). Also, unplug the wiring which runs from the hot end to the tool slide. (green)
Check the picture on the next site
For a detailed view of the wiring.
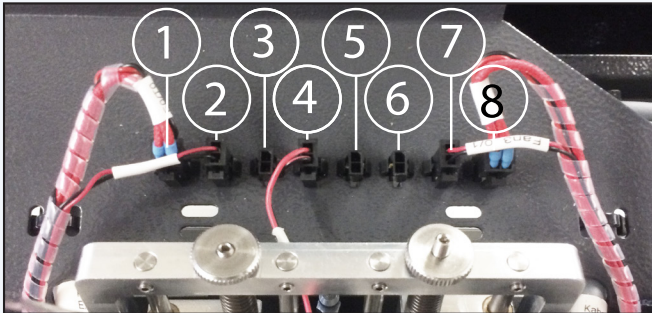
Tool slide wiring

For replacing the first extruder remove slots 1 and 2. For the second extruder remove slot 7 and 8.

Slot 4 powers the object fan
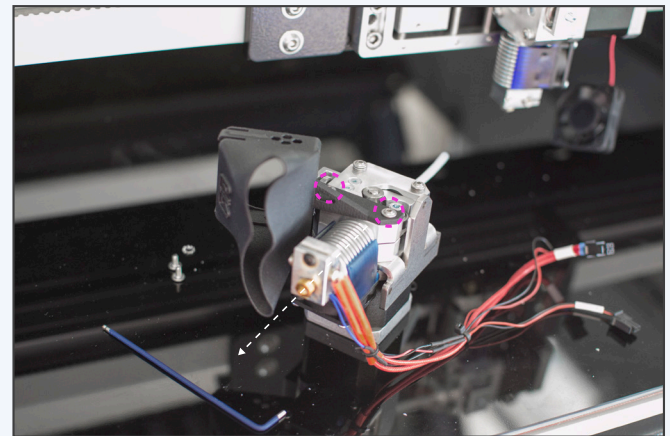
Removing the hot end

After all cables are pulled the extruder can be put on the glass Plate like shown in the picture

To replace the hot end you must first loosen the marked screws. The hot end then can be easily pulled out of the extruder unit.
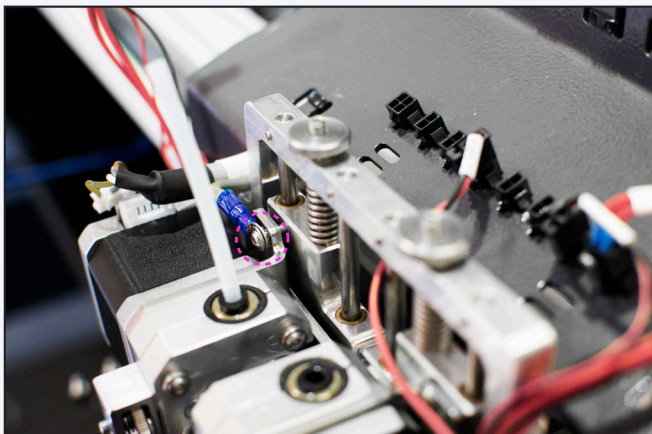
Detail: assembly

The assembly is done in the vice versa order.

Please ensure that serrated washer is installed between the grounding lung and the holder metal sheet.

6.4 How to change the filaments

when changing the filaments, two cases must be distinguished:
- Exchange the filaments in the idle state
- Exchange the filaments when the filament sensor has triggered

Exchange in the idle state

To insert filament into the extruder and to perform a filament exchange you must first heat the extruder to the material specific temperature. For your first 3D prints we recommend the use of PLA filament. This is a very easy to use, biocompatible plastic material.

For easy handling traverse the tool slide via the display to the following coordinates in the working mode (green):

    X: 500mm
    Y: 600mm

Then change to the working mode (red) and open the X1000`s maintenance cover. Turn on the extruder`s heating elements and wait until they reached the desired temperature.

- Green: Turn on the desired extruder on or off
- Brown: Chose the desired traversing distance
- Red: Let material extrude (filament will be pressed through the extruder)
- Violet: Performs a retract (Filament will be pushed out of the extruder)
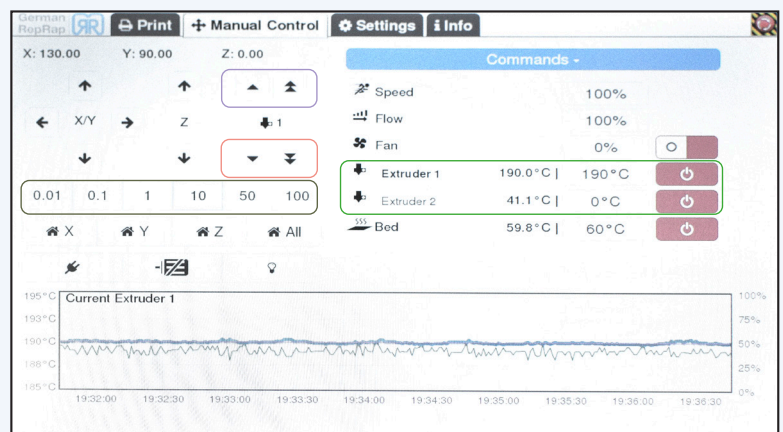
X1000 LCD Display, manual control

First, use the tab "manuelle Kontrolle" of the LCD display to extrude a small amount of filament (ca 20mm). Then you must push out at least 60mm filament with the "retract" order.
Thereby all of the old filament will be released from the extruder.

As the next step the cladding from the tool slide must be removed. It is fixed magnetically and can be removed by lifting it up and off. Now you must pull apart the hose for the guidance of the filament. Now you can pull out the old filament residues easily.

> When working with PLA filament please use a temperature of about 200° C. It is normal and sometimes inevitable that during the heating process filament will drip out of the nozzle.
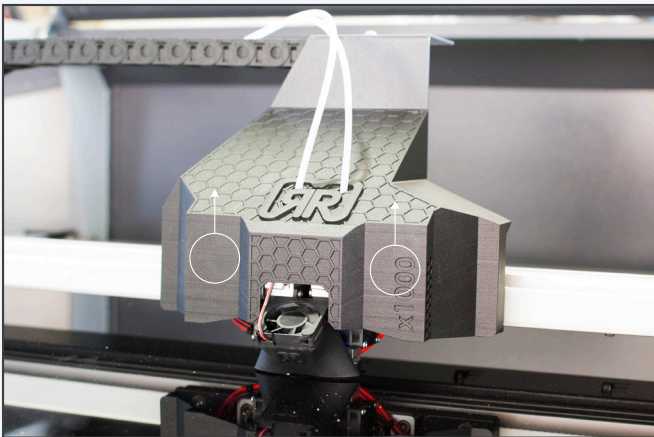
Removing the cladding
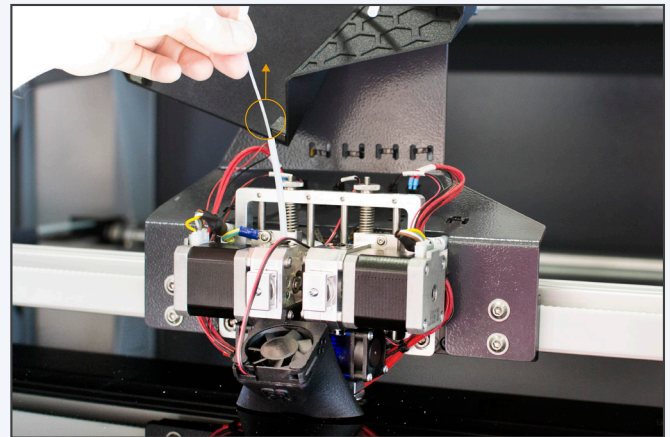
Pulling filament out of the extruder
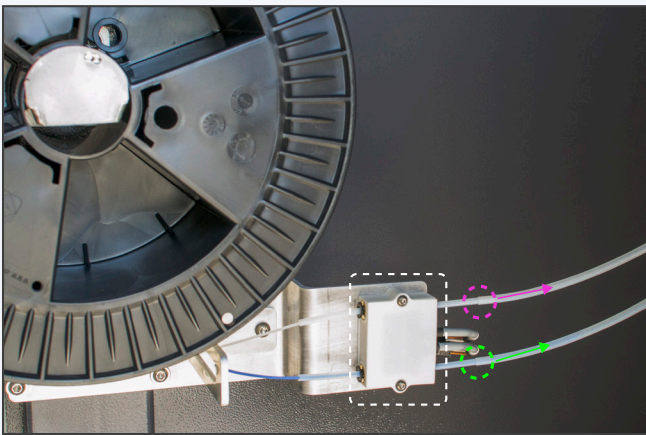
Filament monitoring X1000
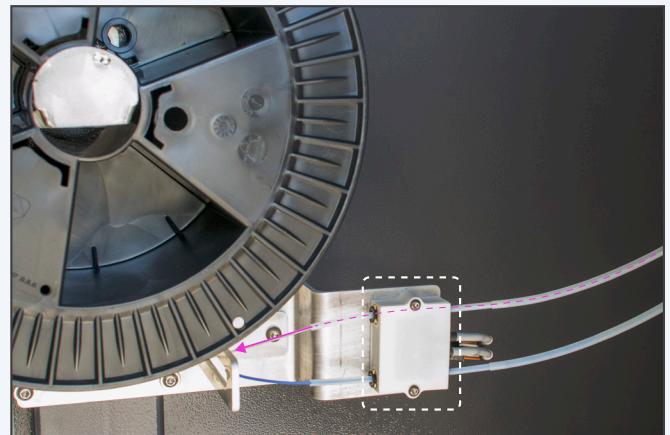
Removing the filament from extruder 1

Then open the material tray on the right side of the X1000. Here you can find the consumables as well as the filament monitoring. On the pictures above you can see the filament monitoring (white bordered). The feed for extruder 1 (EX0) is marked in pink, the feed for extruder 2 (EX1) is marked in green in the pictures above. Now pull the filament that need changing out of the guidance hose and coil it on the spool
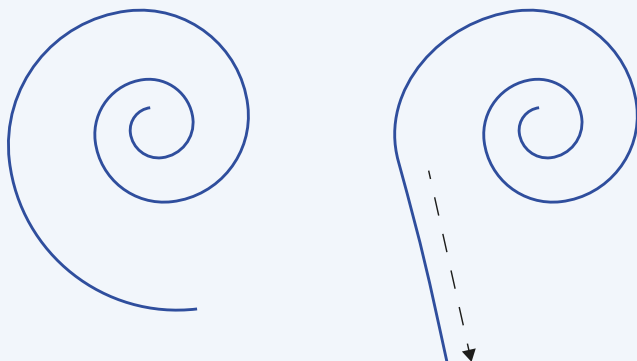
Tip:
It is easier to thread the filaments, when you smooth the tail and cut it off diagonally.

After removing the old filament successfully, you can mount the new filament spool and thread the filament through the sensor and the guidance hose until it appears at the tool head. Make certain that the extruder is already heated to the right temperature before you insert the filament into the extruder.
Insert the filament as far as possible into the DD3 extruder and hold it also in position in the meantime. Now you can, via the LCD display for example, let the extruder extract material until the new filament appears on the bottom end of the extruder.
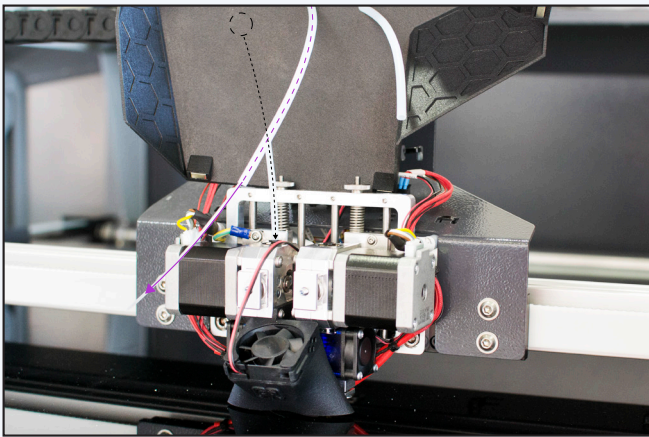
Threading filament X1000
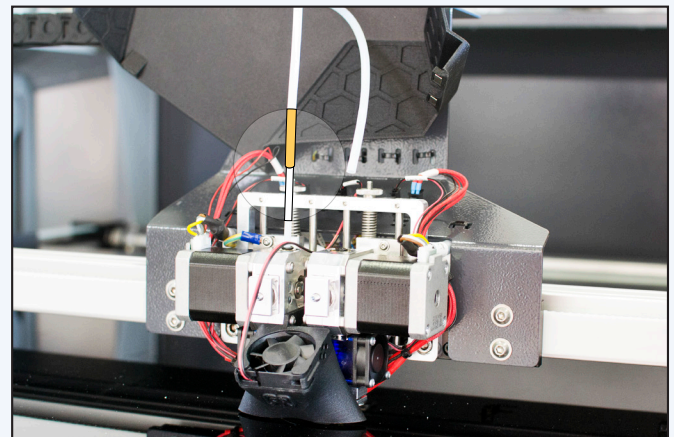
Assembling guidance hose

Please make sure that the hose for the material guidance is reassembled correctly, before positioning the cladding on the tool slide again

Exchange the filaments when the filament sensor has triggered

The filament monitoring checks in real time if the X1000 possesses enough material for processing. If the whole filament is used up during a print job, the device respond as follows:

- The heating bed will remain turned on to maintain the grip of the 3D object
- The tool head will turn off to, to prevent a clogging of the nozzle
- The tool slide will traverse to a parking position for a better handling
- The display will show the last set temperature with a negative sign. (e.g. -195°) This serves as a cache for the used temperature. After the filament change the extruder will heat up again to the saved temperature.

Please consult the previous chapter "Exchange in the idle state" before continuing.
The following procedure only differs slightly from the method described beforehand.
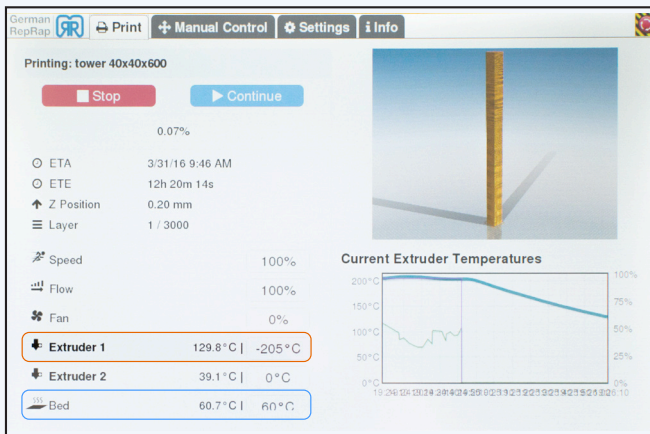
LCD display, triggered filament sensor
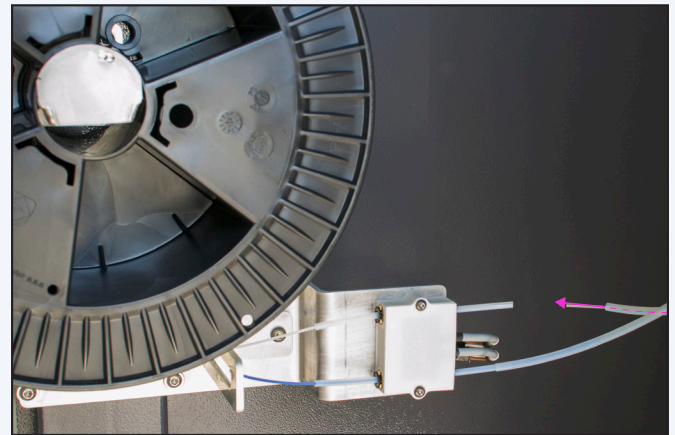
Removing filament, triggered filament sensor

To change the filament while monitoring is triggered use the following method:

- Turn off the heating bed manually and switch into standby mode (red)
- Open the material tray on the right side of the X1000 and remove the empty spool
- Mount the new spool and thread the filament only through the monitoring unit
- The extruder will then heat up to the saved temperature
- Wait until the temperature is reached and extrude about 20 mm filament
- Then use the order "retract" to pull about 60 mm filament out of the extruder
- This should release it completely from the extruder
- Remove the tool head cover of the extruder slide and pull apart the material guidance tube
- You are now able to completely pull out the old filament of the extruder and the guidance tube

At the material tray:
- Now that the guidance tube is unobstructed push the filament through the complete tube until you can handle it at the tool head.

At the tool head:
- Insert the filament as far as possible into the extruder and hold it also in position in the meantime
- Let the extruder extract material until the new filament appears on the bottom end of the extruder.
- Reassemble the tube for the material guidance and put on the cover on the tool slide again

Continue the 3D print:
- Close the maintenance hood and switch into work mode (green)
- Restart the heating bed
- Then press "Home X" and "Home Y"
- IMPORTANT: Perform this command twice to avoid misalignments in the 3D object
- Now you can press "Fortsetzen on the display to continue your 3D print"

General tips for the filament change:

If you want to change form PLA to PTAG filament, the nozzle must be heated up to the higher material specific temperature. There could else problems occur when changing the filaments.
ATTENTION: If you want to use different types of filaments consecutively, flush the nozzle thoroughly before using the next type of filament" Then let at least 500 mm material extrude to ensure that the nozzle will not get clogged.

Tip:
It is easier to thread the filaments, when you smooth the tail and cut it off diagonally.

Tip:
Make sure that the extruder is not heated up for too long when it does not transport filament, otherwise the hot end might clog

7. CO2 extinguishing system

7.1 General information

Even though the Co2 extinguishing system is an optional feature, we strongly recommend its purchase for all costumers. In a case of emergency only gas will be used for fire extinguishing so that the device is optimally protected.

We also recommend the installation of the CO2 warn system to be protected against unintentional triggering.

Please review the user guide of the manufacturer on the cycles for maintenance and inspection of the extinguishing system.

In case of activation the printer´s location must be immediately aerated. The X1000´s case is not hermetically sealed so that Co2 can escape the device!

German RepRap GmbH is a sales partner of ROTAREX FIRETEC. Please directly contact the manufacturer on questions regarding the extinguishing system.

During initial commissioning the CO2 extinguishing system will be set active by a technician.

7.2 7.2 Manual triggering

To trigger to CO2 extinguishing system manually pull the yellow safety bracket off the red lever on the right side rear corner. After pulling the lever the device will be disconnected from mains and the complete work space and sitch cabinet will be flooded with CO2. Unplug the X1000 thereafter.
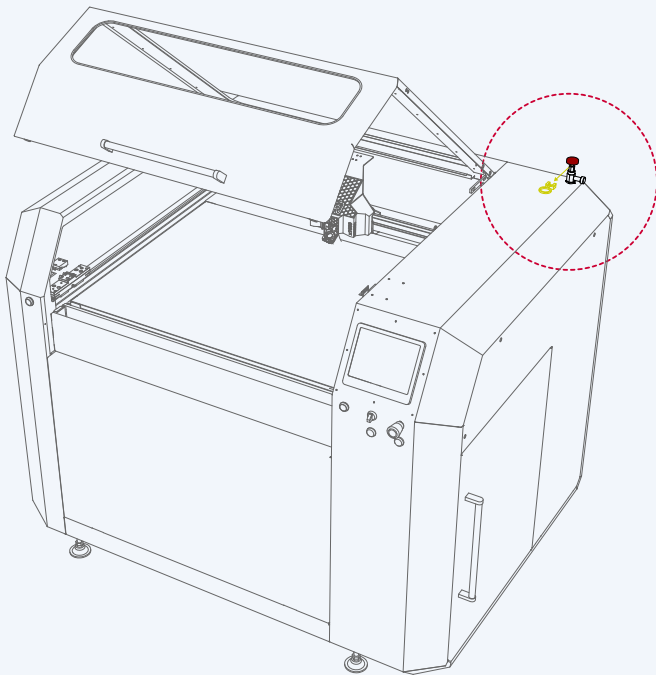
Only operate the device in the space- and room requirements stipulated by the manufacturer!

CO2 extinguishing system, manual triggering

7.3 Recommissioning after trigger

Please contact our *service partner* for your region to have this arranged.

8. Tipps & Tricks

8.1 How to determine the X1000s MAC address

The MAC address of your X1000 can be identified via the device´s LCD display.
To do this choose your 3D printer from the tab "settings". Then click on "Network". The IP address as well as the MAC address are displayed here.

You are also shown an URL that enables access to the X1000´s web interface. The also displayed QR code can be used to access the web interface via mobile device.
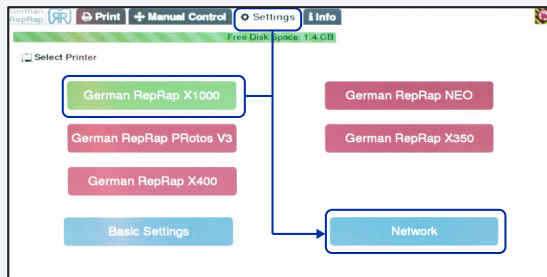
Identifying MAC address X1000

Network settings X1000

8.2 How to update Repetier-Server

To perform a Repetier-Server update please always use the SD card provided. In case of a fault of the SD card please use one with the exact same specifications. The new card must have at least the same storage space as the original one. The format must be FAT 16 or FAT 32.

The storage card (Micro-SD) and the corresponding adapter are located in the X1000´s switch cabinet which can be found on the back side of the printer (see picture below). To remove the card, press on it gently like shown in the picture.

Under Windows you can use the WIN 32 Disk Imager to load the image onto the SD card.

https://sourceforge.net/projects/win32diskimager/

After the installation just chose the image to write and which SD card to write to, the program will take care of the rest.aus. Den Rest erledigt das Programm selbstständig.

Attention!

Never perform a Repetier-Server upgrade without consulting the support. Only use updates which were approved by us!
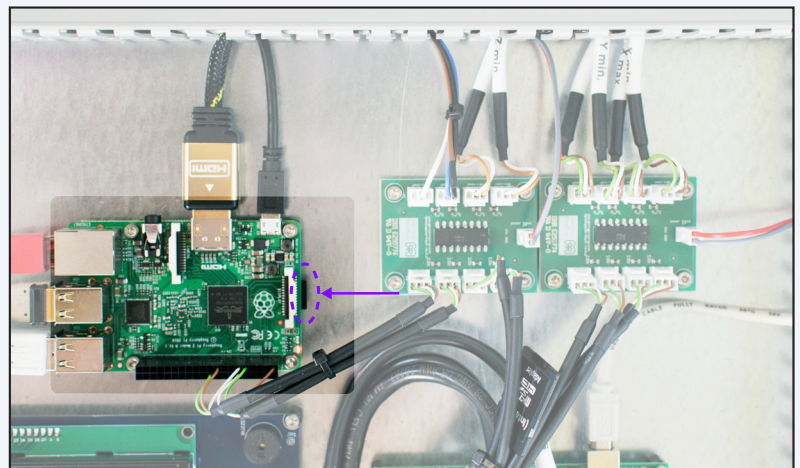
SD-Karte entfernen

8.3 PVA solution for enhanced adhesion

Drop an approximate 10 cm long piece of PVA into half a liter of warm water and wait until it is completely dissolved. Apply an thin layer of this solution on the heating bed with a fine brush. When the film is dried it improves the adhesion between printed object and print bed.

> For large objects this procedure is obligatory!

> Store the pre-made PVA solution in a sealed container so it can be used in the next print jobs. After the application, the brush should be put into cold water so it is immediately ready for the next use.

9. Download area

Here you can find all the files and documents that you need to operate your X1000.

https://www.germanreprap.com/firmware/#x1000

Simplify Profiles

CO2 based dual fire protection system

Saftey notes

Repetier-Server

Reptier-Server Image

10. Important notices

On the following pages, you will find important information and tips about the assembly, operation, installation site and connection of the device. Please read these instructions and tips carefully before you start operating the device.

Return shipment/ original package

Please keep the original packaging in case a return is necessary. Because of their design, 3D printers are highly sensitive to impact and are therefore sufficiently protected only when transported in the original packaging. When using improper shipping, the guarantee and liability claim for the device shall lapse.

Operation

During operations never cut off the power off the unit. This may result in data loss and damages to the software applications.

Miscellaneous

The information contained within this manual are current at the time of printing. We reserve the right, however, to make changes at any time and without notice. If there should be a new software available for your device that has consequences for this manual (like changes in the menus or functions), we will provide an updated version of the manual under http://german-reprap.com if we feel that it is necessary.

Toxic threat

Depending on the processed filaments an overheating of the material can pose a toxic threat. The recommended operating temperatures must be strictly complied with. You can find these information on the labels of the filaments or on our website at http://german-reprap.com.

Safety switch

The printer is equipped with a built-in thermal protector. It will be automatically switched off with an error message on overheating when reaching a specific temperature.

Maintenance

The printer must be maintained annually by trained staff. The technical protective equipment and all mechanical components must be checked for functionality. We also offer a maintenance service. Please send your inquiry to info@german-reprap.com

All work on the 230V mains may only be performed by a qualified electrical specialist. All relevant safety regulations must be complied with. The originator of improper installation will be liable for damage caused to property and personnel.
The use of the chemicals that are used to maintain and care the device must be complied with the applicable regulations appropriately.
Manufactures specifications must be observed unconditionally, as well as the use of recommended protective clothing and the compliance of dosage instructions. The originator of improper chemical usage will be liable for damage caused to property and personnel.

As part of your responsibility for your fellow human beings, please save this manual for eventual questions and give it in case of a resell to the new owner.

11. Safety notes

Power supply

Do not allow the power cord or plug to become damaged. Unplug the device immediately if the cord shows any sign of defect. Before recommissioning the printer, the power supply must be checked by a qualified electrician. Only use the provided power supply!

Cleaning

Unplug the device before you start cleaning. Use a dry cloth and clean the surface of the device only. The use of the chemicals that are used to maintain and care the device must be complied with the applicable regulations appropriately.

Manufactures specifications must be observed unconditionally, as well as the use of recommended protective clothing and the compliance of dosage instructions. The originator of improper chemical usage will be liable for damage caused to property and personnel.

Playing children

There is danger to life through an electric shock when touching the internal parts of the device!

Mains voltage

The device must only be operated under voltage of 230V. You can see this on the backside of the device and on the external power supply. All connections must be double checked before connecting the device to the mains and put into operations.

Humidity, solar radiation, heat, open flames

Protect the device from extreme humidity, dripping and splash water. Do not place any objects filled with liquid or with open fire like beverages or candles on the device. Do not install the device next to a radiator or in a humid room. Do not expose it to the direct sunlight or operate it in tropical climate.
Ventilation

Ventilation

Even though the heat arising in the device is sufficiently dissipated you should never install it in a shelf or a closet without enough ventilation. Do not block the device´s cooling vents and don't place any objects on it. To let the arisng heat dissipate easily you should leave a clearance of 20cm on the sides and 30cm behind the device if the chapters "assembly" and "commissioning" do not state otherwise.

Long absence, tempest, power plug reachability

To completely disconnect the device from the mains you must unplug the power supply. Therefore, the device should be installed next to an easy to reach wall outlet so it can be unplugged easily in case of emergency. In case of long term absence or tempest you should unplug the device as a precaution. We recommend this for all devices that are plugged to the printer, even via USB.

Installation site

Like every electronic device this printer generates heat. Even though the heat radiation meets the statutory requirements, sensible surfaces might be discolored over the time. Therefore, we recommend to install the printer on an even and sturdy surface. You should also care for a good reachability and an adequate working height.

Disposal

Electronic equipment may not be disposed in domestic waste. In accordance with directive 2002/96/EG of the European Parliament and the Council of 27th January 2003 about electric and electronic equipment it must be professionally disposed. At the end of its use please dispose this device at a public colleting point intended for this.

12. Legal disclaimers

Software modifications/ use of applications

Modifications to the printer´s software or the use of unauthorized applications not supplied by German RepRap GmbH will void the device´s warranty. Shipping costs as well as the repair cost caused by using unsupported software are billed to the customer.
Only use the software packages provided by German RepRap GmbH via download at their website at http://www.germanreprap.com.

German RepRap GmbH cannot be held liable for the loss of data on any external or internal storages. The device has been preinstalled with software and works as can be reasonably expected. It cannot be guaranteed that the software is error free. If it is possible to use the printer as designed an error in the software does not constitute a faulty device and hence provides no grounds to a warranty claim. The warranty only covers faults that would prevent the normal usage of the printer.

Limitations of the software caused by hardware faults, the environment the printer is being used in, operating errors or similar reasons are not considered software faults.

Contact

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Extract from the risk assessment

General cautiousness (6.3.2)

The power- , pneumatic- and control- , and data lines from and to the printer must be laid protected against damage. Substances that are on the ground must be picked up with a suitable device and disposed professionally.

Residual risk (6.3.3)

During electrical operation, certain parts inevitably carry lethal voltages. There are also circuits in the switch cabinet that carry dangerous voltages even when the main switch is turned off. If this danger note is not heeded, Death or severe injury and damage to the equipment can be the consequences! Therefore, the access to electronic devices, switch cabinets and power distributors is permitted only for specialists. Electronic devices, switch cabinets and power distributors carry the following warning label:

The specialists must be completely familiar with the content of this manual. When any work is carried out on electronic devices these five electro technical safety regulations must be followed (EN50110):

1. Disconnect
2. Prevent from being switched back on.
3. Determine unstressedness
4. Earth and short circuit, if possible
5. Insulating of adjacent live parts and elements

National security guidelines must be heeded and complied with!

It should also be noted that the safe and reliable operation of the device requires appropriate transportation, correct storage, installation and assembly and diligent handling and maintenance.

Noise (6.3.4)

The noise emission is below 70dB

Removing of products (6.3.5)

For removing heavy objects auxiliary equipment might be required

Potential hazard from the CO2 device (6.3.7)

Please observe the regulations of the manufacturer regarding the minimum space.

Risk of fire (6.3.10)

Operation only under supervision
Daily cleaning of the device and the workplace
Keep a fire extinguisher ready.
The servo drive of the axes can become very hot; these must be cleaned regularly.

Risk of burn (6.3.11)

Warning:
Risk of burn by the motors, the heated work area as well by the extruded material. Carry gloves if necessary.

Mechanical risks by the stepper motors (6.3.12)

Note: There is a risk of trapping and crushing when setting up the device!

Lid (6.3.13)

The wear and tear on the gas chamber can lead to uncontrolled movement. Daily visual and functionality tests are prerequisites for a safe operation.

Transport 7.1

The transport is carried out by German RepRap GmbH. The device can by moved by the assembled wheels.

Packed delivery:

Machine weight: 400 Kg
Local requirements for the delivery: forklift, lift truck when a transport via the assembled wheels is not possible.

- The transport route to the installations site must be of adequate dimensions. Doorways must be at least 5 cm wider and taller than the package including the transport vehicle.
- The weight of the package including its transporting vehicle must not exceed the maximum weight load capacity of the used transportation ground.
- The forklift must provide a lifting capacity of at least 150 Kg and a fork length of at least 1000mm
- A lift truck must provide the same properties. The travel path must be free from bumps and barriers.
- The transportation path to the installation site must be kept free form obstacles.
- Transportation via crane is not provided

Forklifts and lift trucks must be operated by trained personnel only. They must have a valid driving license for the specific device and must be informed about the dangers.

Before starting the work make sure that the assembly instructions and the manual have been read and understood.

You can attach the transport section of this manual to the package to exclude ambiguities.

Requirements regarding the installation room and the surface conditions

Rigid, flat and free of tilts

The choice of the installation site must take the weight of the device into account.

Repair, maintenance (7.4)

Tasks like maintenance measures and repair jobs must be performed by manufacturer´s trained personnel (Section 5.2.5). This tasks must not be performed by the customer.

Diese Tätigkeiten dürfen NICHT vom Kunden durchgeführt werden

Maintenance measures on machines and devices in areas of potential hazardous movement may not be performed until

1   The hazardous movement has stopped

and

2   the power supply is interrupted.

And

3   Unauthorized, erroneous or inadvertent operation to cause hazardous movement is prevented (locking the mains disconnecting device, separation of connectors, fixation of moving parts via brake, backstop, check valve or braces)

and

4.the possibility of dangerous movements caused by stored energy is excluded (via pressure release, locking, lowering, easing of tension)

and

5. physical, chemical and biological emission is ruled out.

The components necessary for troubleshooting must be set up outside the danger zone.

The EC Machinery Directive and the Machinery Ordinance define the security guidelines regarding maintenances of machines and devices. To ensure safety during maintenance work it advises the following

Maintenance work must be performed on shut down devices and machines.

Maintenance points must be located outside of danger zones.

There must be interfaces to connect diagnostic fault finding equipment.

Components, which must be changed frequently must be designed in a way that allows easy and safe montage and dismantling.

Machines and devices must be equipped with an Installation which allows a separation from any power supply. These installations must be clearly marked and be secured against unintentional activation.

After energy is cut off, it must be possible to dissipate any residual energy without risk.

Dismantling, putting out of order (7.5)

The device will be dismantled and decommissioned by the customer according to the instructions in the manual. The process must be described in the manual.

Disposal (7.6)

The incurred process waste must be separated into recyclable material and hazardous substances in accordance with local laws and practices.

The device itself must also be separated into recyclable material and hazardous substances in accordance with local laws and practices.