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Axon 2 Installation Guide

Recommended Minimum System Requirements

1. The following minimum system requirements are recommended for Axon 2:
   - 3D accelerated graphics chipset
   - 128MB dedicated (non-shared) graphics memory
   - DirectX 9.0
   - Dual core processor
   - 2GB RAM
   - Windows 7 / Windows Vista / Windows XP

2. Axon 2 can be obtained from the Technical Resources Downloads section

3. Run the installer. If prompted follow the link to download Microsoft .NET Framework, then install it. The Microsoft .NET Framework is required to run Axon 2.

4. Follow the installer wizard steps.

5. When the Python installer is shown, follow the steps and install to the default location of C:\Python27. Python is required for the Skeinforge application which Axon 2 utilises.
6. Run Axon 2 either from the shortcut on the desktop or the Windows Start menu.

Multi Material Builds

Axon 2 includes a feature for printing parts in multiple materials. At its simplest, printing a part in multiple materials allows the use of different colours for regions of the part. In taking the concept a step further, materials can be developed for extrusion in BfB printers so their mechanical properties can be exploited. E.g. conductivity for electrical connections or flexibility for hinges etc.

In order to use the multi material printing feature, three STL files need to be generated in CAD software:

1. Combined part STL file. This is used to generate the raft and any support material toolpath.
2. Part material A STL file. This is used to generate the toolpath for the extruder containing material A.
3. Part material B STL file. This is used to generate the toolpath for the extruder containing material B.

In order to obtain the STL files for material A and material B, one approach is to use the CAD software to:

1. Remove the regions of the model that are to be printed in material B
2. Export the remaining regions to an STL file and include “material A” in the filename
3. Use the CAD software undo feature to restore the previously removed regions
4. Remove the regions of the model to be printed in material A
5. Export an STL file and include “material B” in the name
6. Load the three STL files into Axon using the “Open Multi Material” button and inspect the geometry to ensure the STL files for material A and B are correctly positioned

The following screen shot shows an example multi material geometry loaded into Axon 2:
Click the Build button to show the build settings dialogue. A limitation in early versions of Axon 2 means that the raft and support material must be set to the material configured in extruder 2. The material loaded in each extruder can be set by clicking the Printer Configuration button. Allocate the materials in extruders 1 to 3 as they are physically loaded in your printer. Click ok to return to the build settings dialogue.

Ensure the three materials are all allocated, one material for each purpose i.e. raft and support, material A and material B.

Click Build to begin the build progress.

The following screen shot shows the example multi material geometry after it has been built. The toolpath of each extruder is shown in a different colour:

On the Home tab, click the Save Build File button and select where you wish to save the BFB file.
## Customer technical resources

Welcome to technical resources. Here you will find everything you need to use your BFB product:

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<thead>
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<th>Actions</th>
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<td>Printer setup and operations manual</td>
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<tr>
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<td>[Data sheets]</td>
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<td>BFB-3000 BFB-3000 Plus</td>
<td>Printer setup and operations manual</td>
</tr>
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<td></td>
<td>How to print</td>
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<td>Troubleshoot a problem</td>
</tr>
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</tr>
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<td>RapMan 3.2 3D Printer Kit</td>
<td>Assemblies manuals</td>
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<td></td>
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<td>Maintenance operations</td>
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<tr>
<td>RapMan 3.1 3D Printer Kit</td>
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<td>Downloads</td>
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</tr>
<tr>
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<td>Troubleshoot a problem</td>
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<tr>
<td></td>
<td>Data sheets</td>
</tr>
<tr>
<td></td>
<td>RapMan 3 travel case</td>
</tr>
</tbody>
</table>
3D scanning options

Systems tested so far...

- **123D Catch** - take multiple photographs around the subject using a standard digital camera, then upload to generate a 3D mesh.
- **ReconstructMe** - wave the Microsoft Kinect around the object to generate a real-time 3D mesh.
Comparison

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<th>ReconstructMe</th>
</tr>
</thead>
<tbody>
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<td>Required hardware</td>
<td>Digital camera</td>
<td>Microsoft Kinect (for Windows)</td>
</tr>
<tr>
<td></td>
<td>PC</td>
<td>PC + compatible graphics card</td>
</tr>
<tr>
<td>Software setup</td>
<td>Single install</td>
<td>Multiple driver install</td>
</tr>
<tr>
<td>Software cost</td>
<td>£0</td>
<td>£0</td>
</tr>
<tr>
<td>Software interface</td>
<td>Excellent</td>
<td>Poor</td>
</tr>
<tr>
<td>Typical hardware cost</td>
<td>£0 (uses standard digital camera)</td>
<td>£200 for Kinect + compatible graphics card (needed)</td>
</tr>
<tr>
<td>Real-time scanning</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Portability</td>
<td>Excellent (only digital camera)</td>
<td>Medium (requires movement of Kinect and PC)</td>
</tr>
<tr>
<td>Final mesh quality</td>
<td>Medium</td>
<td>Medium (but higher is possible if graphics card is compatible with hi res mode)</td>
</tr>
<tr>
<td>Mesh range</td>
<td>Far (as far as the photographer can move around the subject)</td>
<td>Typically close range (the Kinect must be in close proximity to the subject)</td>
</tr>
</tbody>
</table>

Recommendation

123D Catch will yield good results and is worth trying first as it is free and easy to implement. It has the advantages of portability, zero costs and the ability to scan large objects and sceneries. However, time between scans (for uploading photos and processing) may not suit. This is where the Kinect excels with its real-time scanning - this is impressive, and the time-to-STL is extremely fast, but it comes at a price: the price of a Kinect and a compatible graphics card which may need to be bought in specifically. Certainly check your graphics card before committing to this option - ReconstructMe has a compatibility matrix on their site.

3D Touch How to print

To use your 3D Touch printer you will need to:

- know how to operate the printer.
- know how to use Axon (the print processing software).

Printer operation

The operations manual will guide you, step by step, through the essential setup procedures for your printer. Files are included for you to make your first print. Click on the image below to enter the operations manual for the 3D Touch.

Axon

Axon is the name of our print processing software! It enables you to convert your 3D models into print files for your BFB printer. This manual shows you how to use Axon, and provides useful information on design for printing. Click on the image below to enter the manual for Axon.
3D Touch Maintenance operations

Print calibration

- For a multi-extruder printer, to calibrate the XY offset between extruders please click here.
- To print a raft print check file click here.

Mechanical maintenance

![Warning]

In the event of a problem with your print, you may need to carry out a specific maintenance procedure. Only commit to these procedures on recommendation from the FAQ or your distributor. Failure to do so may void your warranty. Maintenance procedures may require tools outside the range supplied with the machine. Procedures may require specific skills (e.g., soldering). For soldering operations, observe all appropriate health and safety precautions. Please read the procedure fully and assess whether it is possible to fully execute the procedure before starting.

- How to install the Nozzle wiping system upgrade (click here)
- How to install the V7 bed (click here)
- How to replace a hot-end (click here) Note: your hot-end may have come with a nozzle levelling jig, see below for instructions on how to use this.
- How to set up the nozzle levelling jig (click here)
- How to level your nozzles (click here)
- How to set the extruder motor pulleys to the correct height (click here)
- How to change an X-limit switch (click here)
- How to check the Y Pulley (click here)
- How to change the Y motor/tighten the Y pulley (click here)
- How to remove the main controller electronics module (click here)

3D Touch upgrades or part replacement

How to order a part replacement

We stock a full range of parts for the printers we make.

In all correspondence, please include:

- photographs of the parts in question
- product type
- serial number of the machine (click here to learn how to find your serial number)

The more information you can provide, the quicker we will be able to handle your request.

- If you need to replace a part which is still within its 12 month warranty, please raise a ticket through our support page.
- If you need to replace a part that is outside warranty, please contact sales at sales@bitsfrombytes.com

Upgrade documentation
### Axon 2 help

Please click here to enter the Axon 2 manual.

### BFB-3000 (Plus) upgrades or part replacement

#### How to order a part replacement

We stock a full range of parts for the printers we make.

In all correspondence, please include:

- photographs of the parts in question
- product type
- serial number of the machine (click here to learn how to find your serial number)

The more information you can provide, the quicker we will be able to handle your request.

- If you need to replace a part which is still within its 12 month warranty, please raise a ticket through our support page.
- If you need to replace a part that is outside warranty, please contact sales at sales@bitsfrombytes.com

#### Documentation

Please refer to the BFB-3000 Maintenance operations page.

### BFB-3000 How to upgrade the bed from clear acrylic to black composite

#### Summary

This document describes how upgrade the bed of a BFB-3000, from clear acrylic to black composite (also, at the end of this document is a note on how to install the old clear acrylic bed from a black composite bed configuration if needed).

**Note:** the black composite bed has it’s z-magnet embedded in the construction. Unlike the clear acrylic bed, the magnet is hidden from view. Installation of new firmware (detailed at the end of this document) will alert printer to the magnet’s new, hidden location.

- Summary
- Identify the clear acrylic bed
- Remove the acrylic plates
- Swap the rear two bed mounts to the inside of the frame
- Install bed bolts
- Install the bed
- Adjust the z-limit switch
- Install the latest firmware
- Calibrate the bed.

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
<th>Link to documentation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extruder upgrade</td>
<td>Installation of additional extruder</td>
<td>Right click here, and select “Save As...” to download a PDF of the 3D Touch extruder upgrade manual.</td>
</tr>
</tbody>
</table>
Identify the clear acrylic bed

The image below identifies the acrylic bed. It comprises of two plastic sheets of acrylic.

Remove the acrylic plates

Using a 3mm hex driver, unscrew the three bed bolts completely (identified below).

Remove the acrylic bed form the machine
Discard the bed bolts, but keep the springs.

Swap the rear two bed mounts to the inside of the frame

Using a 4mm hex driver, loosen the inside bolts and on the two rear bed mounts on the inside of the frame (rear right mount shown below).
Remove the bed mount and swap it over to the inside of the frame. Make sure that the recess is on the top side. Retighten the bolts from the outside of the frame to fasten the bed mount securely (rear right mount shown below).

Repeat for the rear left bed mount.

**Install bed bolts**

Load the three new bed bolts (M5 x 50 CSK, #400854) with new washers (M5 x 20, #400855) and previous bed springs as shown below.
Using a 3mm hex driver, screw in the three loaded bed bolts into the three bed mounts. Screw the washer down so that it is approximately 15mm above the top surface of the bed mount, as shown below.

**Install the bed**

Lift the bed into the machine as shown below.
Push the bed down so that all three bed bolt heads protrude through the keyholes.

Then, slide the bed forward and release so that the countersunk bed bolt heads sit neatly in the recess. Check all three bolt heads.
Adjust the z-limit switch

Slide the extruder carriage to the front of the machine.

Loosen the bolt on the back of the carriage which holds the z-limit switch.
Pull the reed switch down so that it protrudes 18 mm from the flat at the hole-exit. Retighten the bolt to secure the reed switch.

Install the latest firmware

You must be running firmware v4.1.0 or later. Click here to download this firmware. After installing, and turning on the printer for the first time, select the 'Black composite' bed option when prompted at startup.

Calibrate the bed.

Before first use you must carry out the usual bed calibration operations:

- Level the bed
- Reference the bed height to the extruder nozzles

Please refer to Section 6.7 and 6.8 of the latest BFB-3000 setup manual.

BFB-3000 and 3D Touch data sheets

General product specifications
Click here to see the specifications of the BFB-3000.
Click here to see the specifications of the 3D Touch.

Thank you for visiting Customer Technical Resources.

**BFB-3000 How to print**

To use your BFB-3000 you will need to:

- know how to operate the printer.
- know how to use Axon (the print processing software).

**Printer operation**

The operations manual will guide you, step by step, through the essential setup procedures for your printer. Files are included for you to make your first print. Click on the image below to access the operations manual for the BFB-3000.

**Axon**

Axon is the name of our print processing software! It enables you to convert your 3D models into print files for your BFB printer. This manual shows you how to use Axon, and provides useful information on design for printing. Click on the image below to enter the manual for Axon.

**BFB-3000 Maintenance operations**

In the event of a problem with your print, you may need to carry out a specific maintenance procedure. **Only commit to these procedures on recommendation from the FAQ or your distributor. Failure to do so may void your warranty.**

**Bed upgrade**

Click here for instructions on how to upgrade the BFB-3000 to the v2 (black composite) bed.

**Print calibration**

- For a multi-extruder printer, to calibrate the XY offset between extruders please click here.
To print a raft print check file [click here]. Note: Proceed as directed using the SD card instead of the USB memory stick.

Screen replacement

- [Click here] to see the screen replacement manual.

Mechanical maintenance

Maintenance procedures may require tools outside the range supplied with the machine. Procedures may require specific skills (e.g. soldering). For soldering operations, observe all appropriate health and safety precautions. Please read the procedure fully and assess whether it is possible to fully execute the procedure before starting.

- How to replace a hot-end:
  - For BFB-3000 Plus, [click here].
  - For BFB-3000, [click here].
- How to set the extruder motor pulleys to the correct height ([click here])
- How to tighten the screen LED screen on the PCB ([click here])
- How to change a Z-limit switch ([click here])
- How to check the Y Pulley ([click here])
- How to change the Y motor/ tighten the Y pulley ([click here])

BFB-3000 Plus 3D Printer features

The BFB-3000 Plus represents a host of mechanical improvements to the 3D printer:

- Top hat washer & new pressure bearing plate to improve customer interaction with the extruder.
- Added protection to the Y-axis micro switch to prevent accidental damage when moving the machine around.
- Filament reel turntables to reduce stress on the filament.
- Reinforced extruder motor plates to eliminate wear on the extruder drive belts.
- Bespoke belt pulleys to increase the efficiencies of the X and Y movements.
- Substantial work has been done in conjunction with our suppliers of PLA to improve the mechanical properties of the filament.
- Load spreading washers to prevent damage to the bed frame during transit.
- Nylon grub screws to prevent damage to the micro-switches during transit.

For customers who purchased the original BFB-3000 printer, a free upgrade kit is available (though these upgrades may have already been fitted depending on the serial number). Click on [this page] to find out if an upgrade is available for your 3D printer.

BFB-3000 Setup, install and configure

Unpacking

[Click here] to view the unpacking flow chart.

Setup, install and configure

The BFB-3000 either comes with a transparent acrylic print bed or a black composite print bed. Download the manual according to the type of print bed that comes with your machine. These will guide you through the necessary setup and installation procedures.
To download the manual right click here and select "Save As".
Applies to: BFB-3000

To download manual right click here and select "Save As".
Applies to: BFB-3000 & BFB-3000 Plus

BFB-3000 Troubleshoot a problem

Introduction

We are sorry to hear you are experiencing a problem with your BFB-3000. Here at technical, we aim to get you back up and running as quickly as possible.

We offer a lot of on-line resources in our self-help FAQ (below) because this is normally the fastest solution for the customer, and we run a support ticket system for problems which lie outside the FAQ (click here to raise a ticket). You may raise a support ticket at any time, however, this is unlikely to resolve the problem as fast as the self-help FAQ.

Identifying the problem area

Please identify your problem with the areas below, then click on the action link to show solutions relevant to this area.

<table>
<thead>
<tr>
<th>Problem area</th>
<th>Action</th>
</tr>
</thead>
<tbody>
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<td>STL file preparation</td>
<td>Goto FAQ...</td>
</tr>
<tr>
<td>PC Software</td>
<td>Goto FAQ...</td>
</tr>
<tr>
<td>BFB-3000 set-up</td>
<td>Goto FAQ...</td>
</tr>
<tr>
<td>Printer controls</td>
<td>Goto FAQ...</td>
</tr>
<tr>
<td>BFB-3000 mechanical issues</td>
<td>Goto FAQ...</td>
</tr>
<tr>
<td>Print quality</td>
<td>Goto FAQ...</td>
</tr>
<tr>
<td>Print failure</td>
<td>Goto FAQ...</td>
</tr>
<tr>
<td>Print removal &amp; post-processing</td>
<td>Goto FAQ...</td>
</tr>
</tbody>
</table>

Axon FAQ
Axon FAQ

Click on the questions below to skip to the relevant answer:

- What is Axon?
- Where can I get a copy of Axon?
- Is the software free to download and use?
- How do I use Axon?
- How do I get the latest updates?
- What is a Beta release?
- Problems installing Python

If you cannot find a question relevant to your problem, you can return to the FAQ area chooser to see if your problem is handled in a different area (by using the back button on your browser).

What is Axon?

Axon is the Bits from Bytes PC application software which facilitates the conversion your .STL file into a build file for a BFB 3D printer. The program requires some interaction with the user to setup:

- Model orientation
- Model position
- Model scale
- Build settings (material, fill pattern, layer thickness etc)

Where can I get a copy of Axon?

Visit our Archive downloads (software, profiles, firmware and print files) page.

Is the software free to download and use?

Yes.

How do I use Axon?

Please refer to the Axon 2 Help page.

How do I get the latest updates?

Please frequent our Archive downloads (software, profiles, firmware and print files) page, which will guide you through how to find your current version. Check the available downloads to see if you need to update.

What is a Beta release?

A beta release is a new version of a software program that has not yet been fully tested for bugs. Once a beta release is tested to satisfaction, it is released as the newest stable version of the software.

Problems installing Python

If you receive any errors during install pointing to Python, please refer to this page.

FAQ BFB-3000 mechanical issues

Click on the questions below to skip to the relevant answer:

- Extruder motor pulley belts are worn
- Other mechanical issues

If you cannot find a question relevant to your problem, return to the FAQ area chooser to see if your problem is handled in a different area (by using the back button on your browser)

Extruder motor pulley belts are worn

You may be eligible for a free upgrade. Please check our BFB-3000 (Plus) upgrades or part replacement page. Also, check the motor pulleys are set to the correct height. A procedure is provided under ‘Mechanical maintenance’ on our BFB-3000 Maintenance operations page.
Other mechanical issues
You may be eligible for a free upgrade. Please check our BFB-3000 (Plus) upgrades or part replacement page.

FAQ BFB-3000 setup
Click on the questions below to skip to the relevant answer:

- How much space do I need?
- What are the power requirements?
- How should I take the machine out of its box?
- How do I set the machine up?
- What materials should I use to build my model?

If you cannot find a question relevant to your problem, you can return to the FAQ area chooser to see if your problem is handled in a different area (by using the back button on your browser).

How much space do I need?
You will need a minimum desk space of 550 mm wide, 700 mm deep.

What are the power requirements?
Standard 110V-240V wall outlet (the same as what you would plug a PC into).

How should I take the machine out of its box?
Please see our BFB-3000 Setup, install and configure page.

How do I set the machine up?
Please see our BFB-3000 Setup, install and configure page.

What materials should I use to build my model?

<table>
<thead>
<tr>
<th>Model XY footprint</th>
<th>Support material needed*</th>
<th>Recommended material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smaller than 100mm x 100mm footprint</td>
<td>No</td>
<td>ABS build material or PLA build material</td>
</tr>
<tr>
<td>Larger than 100mm x 100mm footprint</td>
<td>No</td>
<td>PLA build material</td>
</tr>
<tr>
<td>Smaller than 100mm x 100mm footprint</td>
<td>Yes*</td>
<td>PLA build material with ABS support material</td>
</tr>
<tr>
<td>Larger than 100mm x 100mm footprint</td>
<td>Yes*</td>
<td>Combinations will be available with Axon v2 (available end of May 2011)</td>
</tr>
</tbody>
</table>

* the model will only require support material if it has any overhanging features of over 60°.

FAQ Printer controls
Click on the questions below to skip to the relevant answer:

- How do I shut the machine down safely?
Why, sometimes, does the bootloader screen come up when I turn on the control box?
Sometimes the buttons are sticky. What can I do?
After pressing the power button and the screen lights up and shows the various options but I cannot select any options or move side to side with the arrows.

If you cannot find a question relevant to your problem, you can return to the FAQ area chooser to see if your problem is handled in a different area (by using the back button on your browser).

**How do I shut the machine down safely?**

You can turn the control box using the power toggle switch on the front of the unit at any time. After turning off, ensure that the extruder is free of either the bed or the model to ensure the extruder nozzle does not freeze in contact with anything.

**Why, sometimes, does the bootloader screen come up when I turn on the control box?**

Unfortunately some of the older machines can automatically enter the bootloader function, depending on the environment the printer is in. Simply cycle the power using the toggle switch at the front of the panel until the main function screen appears.

**Sometimes the buttons are sticky. What can I do?**

In the rare event that the BFB-3000 buttons are sticky, a light dab of light oil can help the button action.
In the case of the RapMan, ensure that all flashing is sufficiently removed from the buttons themselves.

**After pressing the power button and the screen lights up and shows the various options but I cannot select any options or move side to side with the arrows.**

Make sure that the 4-wire ribbon cable is properly connected from the touch screen to the PCB connector, as shown below:

![Image of touch screen and PCB connector]

**FAQ Print failure**

Click on the questions below to skip to the relevant answer:

- When printing, the layers on my model start to separate.
- When the printer finished, the model was only semi-complete and detached from the bed. Also, there was lots of plastic debris in the build area.
- When the printer finished, the model was only semi-complete but still stuck to the bed and there was no significant plastic debris in the build area.
- Temperature Error is displayed
If you cannot find a question relevant to your problem, you can return to the FAQ area chooser to see if your problem is handled in a different area (by using the back button on your browser).

**When printing, the layers on my model start to separate.**

The main cause of this is print warping, click here to learn more about how to solve this.

**When the printer finished, the model was only semi-complete and detached from the bed. Also, there was lots of plastic debris in the build area.**

This is a consequence of the first layer of the raft not sticking to the bed properly. In this state, if the model receives any force from the extruder it will become detached from the bed, printing the remaining build material into air and leaving lots of plastic debris in the build volume.

Please refer to Section 6.11 of this manual to ensure that your raft is as good as it can be.

Another cause can be part warping. If the print warps badly (i.e. lifts up from the bed) this can put the model in the way of the extruder, which in turn can knock the model off the bed, printing the remaining build material into air and leaving lots of plastic debris in the build volume. Click here to learn more about how to solve this.

**When the printer finished, the model was only semi-complete but still stuck to the bed and there was no significant plastic debris in the build area.**

This is the result of an extruder jam. It is likely that, as a consequence, your the filament will have ground out. If this happens, please refer to Section 9.5.4 of this manual to handle this situation.

There potential causes for an extruder jams are listed below:

<table>
<thead>
<tr>
<th>Potential cause</th>
<th>Action</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knotted filament reel</td>
<td>Trace the filament back to the reel. If the filament terminates in a knot at the reel, this will have stopped the filament from extruding.</td>
<td>Unload the extruder anr re-wrap the reel.</td>
</tr>
<tr>
<td>Pressure bearing too loose</td>
<td>Examine the pressure bearing. Is it too loose? If so this will have prevented the drive shaft from forcing the filament out through the extruder.</td>
<td>Tighten up pressure bearing correctly on re-loading. See Section 6.9.3 of this manual. Test fully before printing.</td>
</tr>
<tr>
<td>Pressure bearing too tight</td>
<td>Examine the pressure bearing. Is it too tight? If it is too tight, this will have caused the extruder to stall.</td>
<td>Tighten up pressure bearing correctly on re-loading. See Section 6.9.3 of this manual. Test fully before printing.</td>
</tr>
<tr>
<td>Incorrect extrusion temperature</td>
<td>Check the temperature was suitable for material loaded into the extruder (195°C for PLA, 260°C for ABS).</td>
<td>Set correct temperature in the BFB file by remaking a file through Axon, or manually editing existing G-code.</td>
</tr>
<tr>
<td>Extruder drive shaft worn</td>
<td>Examine the teeth on the extruder drive shaft. If they are significantly blunt, they will not bite into the shaft and drive the filament through the nozzle.</td>
<td>Contact distributor.</td>
</tr>
<tr>
<td>Blocked nozzle</td>
<td>Heat up the extruder nozzle and try to manually push filament through (you will need to take the pressure bearing off, and carefully push the filament down hard using pliers). Do this for 30 seconds. Examine the nozzle as you do this. Filament should purge. If it doesn't then the nozzle is probably blocked with debris.</td>
<td>Check out how to unblock a nozzle.</td>
</tr>
</tbody>
</table>

**Temperature Error is displayed**

In firmware V4.2.0 onwards, the temperature error detection functionality has been extended to detect and report different kinds of temperature error in order to capture more fault conditions; Thermistor short circuit detection; Intermittent thermistor connection detection; Additional thermistor resistance or heater fault detection. Detection of these fault conditions are reported as a number which indicates the type of error detected.

Note: the "x" variable below denotes the extruder number:
TEMPERATURE ERROR x1 is displayed if a short circuit on a hot end thermistor connection is detected.

TEMPERATURE ERROR x3 is displayed if an intermittent thermistor connection is detected e.g. if temperature readings instantly jump from 195°C to 25°C. On the BFB-3000 check the hot end connectors behind the extruder barrels are firmly connected. On the RapMan check the hot end wiring and connections.

TEMPERATURE ERROR x4 is displayed if the hot end does not appear to heat up fast enough. This may indicate that the thermistor circuit is faulty, or the heater is not functioning properly due to a wiring issue or fault in the heater.

Print warping

Reasons for warping

The 3D printing process uses heat to melt and deposit the plastic. As with all materials, the plastic contracts when it cools. This manifests itself as warping. The severity of warping is geometry and material dependent. Typically, a sharp corner will be more prone to warping than a large radius.

ABS typically suffers from warping and should not be used to print footprints over 100 mm x 100 mm.

PLA suffers virtually zero warping, and can be printed to the extents of the print bed.

Solutions to avoid warping

If your print is over 100mm x 100mm we suggest you use PLA.

Click here for a list of materials that you should use for your models, depending on its requirements.

FAQ Print quality

Click on the questions below to skip to the relevant answer:

- How do I remove any rogue bits of plastic from the model?
- My print has lots of strings of plastic between points
- My part won't print thin walls
- My part is warped along its base
- My part has a roughness on the walls
- My part is leaning when it shouldn't

If you cannot find a question relevant to your problem, you can return to the FAQ area chooser to see if your problem is handled in a different area (by using the back button on your browser).

How do I remove any rogue bits of plastic from the model?

Rogue plastic sections can sometimes be deposited on the model. This is normal. Please remove the plastic threads with a sharp craft knife. Always wear safety gloves when carrying out this procedure.

My print has lots of strings of plastic between points

If you get 'strings' on your model please remove the plastic threads with a sharp craft knife. Always wear safety gloves when carrying out this procedure.

Make sure are using the latest firmware and print profiles (go to our Archive downloads (software, profiles, firmware and print files) page). We frequently release firmware and print profiles which will immediately improve your print quality.

My part won't print thin walls

Make sure you are using the latest firmware and print profiles (go to our Archive downloads (software, profiles, firmware and print files) page).

When processing your STL in Axon, make sure a 'thin walls' profile is selected.

My part is warped along its base

The 3D printing process uses heat to melt and deposit the plastic. As with all materials, the plastic contracts when it cools. This manifests itself as warping. The severity of warping is geometry dependent. Typically, a sharp corner will be more prone to warping than a large radius.

ABS typically suffers from warping and should not be used to print footprints over 100 mm x 100 mm.

PLA suffers virtually zero warping, and can be printed to the extents of the print bed.
My part has a roughness on the walls

Some roughness will always be present on the outer surface, representing the layers used to build the model. This is normal.

My part is leaning when it shouldn't

This is known as shift and usually occurs when a belt or pulley is slipping. First of all we would recommend that you check the grub screws are tight on the relevant axis, if the print is shifting left to right or vice versa then check the x axis pulley grub screw. If your print is shifting front to back or vice versa then check the Y axis pulley grub screw.

We have 2 movie clips that will help you check whether you have a loose pulley and how to resolve the issue. They are in MP4 format and should work on all computers with a media player, you may need to right click on the link below, select 'save link as' and save it to you desktop or somewhere you can easily find it.

How to check the Y Pulley (click here)

How to change the Y motor/ tighten the Y pulley (click here)

FAQ Print removal and post-processing

Click on the questions below to skip to the relevant answer:

- How do I get the finished part off the print bed?
- I can't get the finished part off the bed
- The part has left marks on the bed, what can I do about it?
- How do I remove the raft from the model?
- Is it safe to paint the part when it is finished?
- How can I smooth the part when it is finished?

If you cannot find a question relevant to your problem, you can either return to the FAQ area chooser to see if your problem is handled in a different area (by using the back button on your browser).

How do I get the finished part off the print bed?

Use the scaper tool. Slide it along the bed towards the model so that it strikes the bottom of the raft. A few strikes should be enough to remove the model (complete with its raft), though this varies depending on the geometry of the model. The bed must be totally clear of plastic debris before the next print.

I can't get the finished part off the bed

If the part is stubborn to come off the bed, it is much easier to deal with removal by taking the print surface out of the machine, and striking the raft from a downward angle.
If a part is very difficult to remove, persist with the scraper. Tough removal is because the nozzle was referenced at an incorrect height to the nozzle - i.e. it was too low when it started printing the first layer. Refer to the manual to ensure that the nozzle is correctly referenced before the next print.

The part has left marks on the bed, what can I do about it?

Leaving marks on the print bed is normal, and will not affect the quality of your next print.

How do I remove the raft from the model?

We recommend printing with dissimilar materials so that the part can be easily removed from its raft (e.g. PLA onto an ABS raft). If the same material is used for both model and raft, wear safety gloves and use a craft knife to cut the excess raft away from the model. Then sand the base of the model on a flat surface until the raft is suitably removed. If the raft is PLA, you will need to use ‘Wet and dry’ abrasive paper, with water. The water acts as a coolant, keeping the temperature of the PLA down during processing. If the PLA surface becomes too hot (greater than ~50°C) the material will become rubbery and difficult to remove.

Is it safe to paint the part when it is finished?

Yes. You may find a primer level helps the paint stick, and smoothes out the parts slightly.

How can I smooth the part when it is finished?

You can sand all plastic parts. This will make the part smoother, but may change the aesthetic properties, due to micro-fatiguing mechanics e.g. colour change.

Application of methyl ethyl ketone (MEK), either by dipping or lightly painting, will smooth the ABS layered surface. Appropriate safety precautions according to the manufacturer must be followed when using this chemical.

FAQ STLs

Click on the questions below to skip to the relevant answer:

- What is an STL file?
- Does my CAD software export STL files?
- What should my STL export parameters be?
- Why doesn't my STL file build in Axon (during building, the progress bars continue to scroll for hours)?
- How do I fix my STL file?
- How do I use STL files?
- Is there an STL file size limit?
- What are Magics and Netfabb?
- Do I need Magics or Netfabb to use the printer?
- Do we support Magics or Netfabb?
- Will using this either of these programs affect my warranty?

If you cannot find a question relevant to your problem, you can return to the FAQ area chooser to see if your problem is handled in a different area (by using the back button on your browser).
What is an STL file?

An STL file is a triangular mesh which represents your CAD model. It does not save the features used to create the model, instead it describes the final geometry of your CAD model. To learn more about STL files in general, click here.

Does my CAD software export STL files?

99% of CAD programs will export to STL files. Please refer to your CAD documentation (or simply explore your export options). At the time of writing, Google Sketchup does not export STL files directly. Two free STL solutions for Google Sketchup are hosted at guitar-list, and cerebral meltdown.

What should my STL export parameters be?

Export dialogues for STLs usually come with a set of options.

The two key variables are:

- **Accuracy/resolution**: This refers to the minimum size of the triangle in your STL file. We recommend 0.05 mm. If you require faster processing, you may wish to increase this value (e.g. to 0.1 mm), however triangular facets will become visible on your print for curved surfaces. If you require super-smooth curved surfaces, it may be beneficial to reduce this value (e.g. to 0.01 mm), however, processing time will significantly increase and it is unlikely that your printer will be able to fully represent this resolution.
- **Binary format (ASCII)** will simply put the data into a readable format, unnecessarily increasing the file size.

Why doesn't my STL file build in Axon (during building, the progress bars continue to scroll for hours)?

There are two possible causes:

- If your STL file is damaged, it will not process in Axon. Solid modelling CAD packages (e.g. SolidWorks) generally export good quality STL files. However, surface modellers generally have a harder time generating good quality STL files (e.g. Rhino, Google Sketchup) and can often generate damaged STL files. In this case you will have to fix your STL file (see below).
- If your STL file is very large it may also exceed the capacity of your computer and appear to hang. See below to read about STL file size.

How do I fix my STL file?

If your CAD program exports a damaged STL file, the file can be fixed using other 3rd party programs. Some are free to use, e.g. NetFabb Studio Basic

How do I use STL files?

You need to load you STL file into our software which will process the model file into a print file.

Is there an STL file size limit?

No, but the larger the STL file the longer it will take to process. Typical STL file sizes are ~10 Mb. File sizes over 200 Mb may take over an hour to process. You can reduce the file size by altering the STL export parameters, addressed in one of the previous questions.

What are Magics and Netfabb?

Magics and Netfabb is STL preparation software which can be useful for manipulating STL files (patternning copies, repairing files etc). In the work flow, these programs woudl typically be used after exporting your CAD model to STL, and before importing into Axon (the BFB software).

Do I need Magics or Netfabb to use the printer?

They are is not essential for printing on BFB printers, as most CAD packages have enough functionality to generate the STL file you need. These packages, however, may be useful if you need to do a lot of STL file preparation. They are also useful for repairing broken STL files if your CAD package cannot export reliable STL files (see "Why doesn't my STL work?").

Do we support Magics or Netfabb?

We do not offer support on either. For support with any third party software packages, please contact your supplier or the manufacturers directly.
Will using this either of these programs affect my warranty?

No.

How to identify your BFB product serial number

<table>
<thead>
<tr>
<th>Product</th>
<th>Serial number location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material reel</td>
<td>The serial number is printed on the cardboard side of the material reel.</td>
</tr>
<tr>
<td>RapMan</td>
<td>The serial number is stated on serial number sheet (A4) which was included in the box with the kit.</td>
</tr>
<tr>
<td>BFB-3000</td>
<td>The serial number is stated on the sticker on the inside of the back panel of the machine, to the lower right. The serial number is prefixed with “Serial #:&quot;</td>
</tr>
<tr>
<td>BFB-3000 Plus</td>
<td>The serial number is stated on the sticker on the inside of the back panel of the machine, to the lower right. The serial number is prefixed with “Serial #:&quot;</td>
</tr>
<tr>
<td>3D Touch</td>
<td>The serial number is stated on the sticker on the inside of the back panel of the machine, to the lower right. The serial number is prefixed with “Serial #:&quot;</td>
</tr>
</tbody>
</table>

Materials Data Safety Sheets

Use this page to download Material Safety Data Sheets (MSDS).

<table>
<thead>
<tr>
<th>MSDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poly Lactic Acid (PLA) MSDS</td>
</tr>
<tr>
<td>BFB:Poly Lactic Acid (PLA) Uses</td>
</tr>
<tr>
<td>Acrylonitrile Butadiene Styrene (ABS)</td>
</tr>
<tr>
<td>Low Density Poly Ethylene (LDPE)</td>
</tr>
<tr>
<td>High Density Poly Ethylene (HDPE)</td>
</tr>
<tr>
<td>Poly Propylene (PP)</td>
</tr>
<tr>
<td>Unplasticised Poly Vinyl Chloride (uPVC)</td>
</tr>
<tr>
<td>BFB:Acrylic Material Safety Data Sheet (MSDS)</td>
</tr>
</tbody>
</table>

Click on the file above you wish to download.

Material storage instructions

All polymers degrade with time, therefore it is good practice to follow these storage conditions:

- Do not unpack until filament is needed.
- Store at room temperature: 15-20 °C.
- Keep away from UV light (e.g. sunlight).
- If machine is to left unused for an extended period of time, repack filament with silica-gel sachet (if included) to maintain dryness.
- Use within 12 months of receipt.

In a bid to improve quality, we have put a conservative expiry date on the latest batches of material to ensure that it is used in its prime. As with all polymers, PLA will very slowly degrade over time (our suppliers estimate a life span of 20 years). We have to be conservative with the expiry date because we cannot always guarantee that the customer will follow the correct storage conditions. The material will still be usable after this time, if stored correctly.
RapMan 3.0, 3.1 & 3.2 Maintenance operations

These maintenance procedures should only be carried out on recommendation from the FAQ or your distributor. Maintenance procedures may require tools outside the range supplied with the machine. Procedures may require specific skills (e.g. soldering). For soldering operations, observe all appropriate health and safety precautions. Please read the procedure fully and assess whether it is possible to fully execute the procedure before starting.

General maintenance procedures:

- How to recalibrate your Z-axis [click here]. This is useful if your z axis is jamming.
- How to unblock a nozzle [click here].
- How to calibrate a double print head [click here].
- How to print a raft check [click here].

RapMan 3.0 and 3.1 only:

- How to replace a screen on the PCB [click here].
- How to tighten the screen fitting to the PCB [click here].

How to unblock a nozzle

How do I diagnose a blocked nozzle?

A blocked nozzle is easily diagnosed by attempting a manual purge. This involves pushing the filament through the nozzle with a pair of pliers while the nozzle is at temperature. If the nozzle is blocked the nozzle may purge for a few seconds, and then cease, despite continued downward pressure from the filament.

What is a blocked nozzle?

A blocked nozzle is a nozzle which cannot extrude because of a blockage at the orifice. This is usually caused by a foreign entity which has been dragged into the nozzle. If the entity is larger than the diameter of the orifice and has a higher melting point than the nozzle temperature, it will not purge and will subsequently prevent any flow of plastic through the nozzle.

How do I unblock the nozzle?

Correct method:

- Remove the nozzle from the extruder, but keep it wired in.
- Hold the nozzle on one of the stand offs with a pair of pliers, and bring the nozzle up to melting temperature.

ESSENTIAL WARNING: wear heat-proof gloves to prevent burning during nozzle handling.

- Using a ø3 mm drill bit, cautiously dig out the plastic inside the nozzle from the back of the nozzle. You may need to remove the PTFE tube from the nozzle. This will drag out any blocking entities. Do no turn the bit excessively inside the nozzle as this may damage the inner nozzle surfaces.

False method: Nozzles can be temporarily unblocked while the nozzle is still attached to the extruder by poking a drill bit of the same diameter up the orifice and into the nozzle. However, all does is temporarily dislodge the blocking entity, pushing it back up into the melt zone. Then, when the extruder is started again, the nozzle will purge briefly but the flow will move the entity back over the orifice, re-blocking the nozzle. Occasionally the user may be fortunate enough to re-orientate the entity in such a way that it can flow through the orifice, however, this is rare (requires a blocking entity of specific proportions) and entirely lucky (it is impossible to gauge manipulation of the entity).
How do I prevent my nozzle from blocking?

Blocked nozzles are rare, but when they do block it can be time-consuming to clear the blockage. Therefore, prevention is better than the cure. It is good practice to follow the procedures below:

- If swapping from a high melting point material to a low melting point material: run the new low-material at the previous material’s melting temperature for a short time. This will make sure the nozzle is completely purged of any old high-melting point material before running with the new, lower melting point material. Any material present with a higher melting point has the potential to freeze during operation and block the nozzle.
- Ensure you are running your machine in a clean environment. Make sure particulate contaminants (e.g. swarf, particles from the ceiling etc) are kept away from the extruder head and filament reel.
- Ensure filament is properly dressed before inserting down into the PTFE tube in the hot end (i.e. the end of the filament is properly rounded so as to eliminate a sharp which can cut a sliver of PTFE en-route which would form a blocking entity). See here for graphic instructions.

RapMan calibration notes

You will notice the calibration manual is for the BFB-3000 but the principles are pretty much the same.

Also, ensure that you are using the “Cal2PLA - G92 mod.bfb” file (downloaded from the previous page) which is different from the default BFB 3000 calibration file.

Put the file on your SD card and use with your printer as normal BUT you need to make a change to the settings before running. On the control box, please navigate to the following:

Settings > General Settings

You will see “Ignore G92” this needs to be changed to “No”:

- Use the Z buttons to select the option.
- Press X+ to save, or Escape to quit without saving.

Once you have completed the calibration, you need to turn the “Ignore G92” back to yes for your subsequent prints, as this is one of the remembered settings.

RapMan 3.0 How to print

To use your RapMan 3.0 you will need to:

- know how to operate the printer.
- know how to use Axon (the print processing software).

Printer operation

The operations manual will guide you, step by step, through the essential setup procedures for your printer. Files are included for you to make your first print. Click on the image below to enter the operations manual for the RapMan 3.0.
Axon

Axon is the name of our print processing software! It enables you to convert your 3D models into print files for your BFB printer. This manual shows you how to use Axon, and provides useful information on design for printing. Click on the image below to enter the manual for Axon.

RapMan 3.0 operations manual

Right click here to save a PDF of the original instructions manual: Operations Manual
Since the RapMan 3.0, we have released two versions of RapMan. It may be that you find the latest 3.2 operations manual a more user-friendly guide, despite minor variations.

RapMan 3.0 Setup

Unpacking

Before unpacking your RapMan kit, we recommend that you:

1. Secure a large work space (minimum 2 office desk's worth of bench space). The build will take a minimum of 2-3 days, so it is important that your build space will not be disturbed during this time.
2. Locate and read all introductory sections of the first build manual. Manuals are identified in the next section.

Setup

Instructions on how to build the RapMan have been broken down into several manuals. This section lists the order in which to use the different manuals for RapMan V3.0, and how best to use them.

Some of the manuals are to be viewed on-screen (as they contain 3D content), whilst others are to be printed. Whilst it is possible to view the "printed" manuals on-screen, we do recommend printing to make the build process easier - it eliminates a large amount of window swapping and scrolling.

Sections should be attempted in the order shown below:

Building the machine

1. Download the build manual for the frame: right click here and select "Save as..." to save this file to your computer. It is ~100Mb. For 3D
content in the manuals you will need Adobe 9 or later for the 3D content to work.
2. We also recommend that you become familiar with the following on-screen manuals: Animated Build Manual pdf and RapMan Build Manual Videos.

Building the extruders
2. If you have a pre-built hot end (BHE), please ignore the "Hot end manual". However, if you have a non-built hot end kit (NBHE), you will need to download and print: Hot end manual.
3. If you have a double extruder kit, go to RapMan 3.1 Double head upgrade manual.

RapMan 3.1 How to print

To use your RapMan 3.1 you will need to:

- know how to operate the printer.
- know how to use Axon (the print processing software).

Printer operation

The operations manual will guide you, step by step, through the essential setup procedures for your printer. Files are included for you to make your first print. Click on the image below to enter the operations manual for the RapMan 3.1.

Axon

Axon is the name of our print processing software! It enables you to convert your 3D models into print files for your BFB printer. This manual shows you how to use Axon, and provides useful information on design for printing. Click on the image below to enter the manual for Axon.

RapMan 3.1 operations manual
We recommend becoming familiar with the RapMan 3.1 interface by reading the notes below.

**RapMan 3.1 interface**

<table>
<thead>
<tr>
<th>Button</th>
<th>Screen Navigation</th>
<th>Manual move</th>
<th>Extruder control</th>
</tr>
</thead>
<tbody>
<tr>
<td>+Y</td>
<td>Up</td>
<td>Y+</td>
<td>Temperature +</td>
</tr>
<tr>
<td>-Y</td>
<td>Down</td>
<td>Y-</td>
<td>Temperature -</td>
</tr>
<tr>
<td>+X</td>
<td>Enter</td>
<td>X+</td>
<td>RPM +</td>
</tr>
<tr>
<td>-X</td>
<td></td>
<td>X-</td>
<td>RPM -</td>
</tr>
<tr>
<td>Esc</td>
<td>Escape</td>
<td>Escape</td>
<td>Escape</td>
</tr>
<tr>
<td>+Z</td>
<td>Up</td>
<td>Z+</td>
<td>Extruder selection up</td>
</tr>
<tr>
<td>-Z</td>
<td>Down</td>
<td>Z-</td>
<td>Extruder selection down</td>
</tr>
</tbody>
</table>

- **Esc**: Escape
- **USB port for firmware upgrade**: USB port for firmware upgrade
- **SD card slot for file transfer**: SD card slot for file transfer
RapMan 3.1 menu structure (firmware version 4.2.1)

Ensure that you have the latest firmware installed on your PCB. Functions presented at the top level are listed below. Use the Y+/Y- buttons to scroll and the X+ button to enter.

<table>
<thead>
<tr>
<th>RUN FILE</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXTRUDER MAPPING</td>
</tr>
<tr>
<td>MANUAL MOVE</td>
</tr>
<tr>
<td>EXTRUDER CONTROL</td>
</tr>
<tr>
<td>HOME TOOL HEAD</td>
</tr>
<tr>
<td>SETTINGS</td>
</tr>
</tbody>
</table>

Enter the settings menu to reveal more functions... settings functions are listed below:

<table>
<thead>
<tr>
<th>EXTRUDER OFFSETS</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEVEL BED</td>
</tr>
<tr>
<td>SET Z HEIGHT</td>
</tr>
<tr>
<td>SET BED TYPE</td>
</tr>
<tr>
<td>GENERAL SETTINGS</td>
</tr>
</tbody>
</table>

Manual

Please use the RapMan 3.2 Operations Manual. This will guide you through all the steps you need to get your RapMan 3.1 fully operational. Differences include:

- The RapMan 3.1 uses buttons instead of the touch screen used by the RapMan 3.2.
- The menu structure on the display is different, but the functions are identical.
- The RapMan 3.1 uses an SD card instead of USB stick.

RapMan 3.2 assemblies

First stop: building your printer! Choose from one of the following three options:

| RapMan 3.2 full assembly | Double head upgrade for RapMan 3.2 | RapMan 3.1 > 3.2 upgrade |
Just received your RapMan 3.2 kit? Click the image for instructions on how to assemble your 3D printer!

If you've already built your RapMan 3.2 and you want to know how to fit your double head upgrade, click the image.

RapMan 3.2 Double head upgrade manual

To fit your double head upgrade you will need to visit the sections of the RapMan 3.2 build manual identified in the table below. For all build
pages, follow the “Double head” sections first.

<table>
<thead>
<tr>
<th>Section</th>
<th>Brief description of work</th>
</tr>
</thead>
<tbody>
<tr>
<td>4d. Double head upgrade pack contents</td>
<td>Check kit contents.</td>
</tr>
<tr>
<td>8i. X carriage</td>
<td>Replace single head carriage with double head carriage.</td>
</tr>
<tr>
<td>10. Extruder assembly</td>
<td>Assemble the second extruder and fit it to the RapMan.</td>
</tr>
<tr>
<td>11. Control panel</td>
<td>Fit the second extruder PCB module and connect the second extruder wires</td>
</tr>
<tr>
<td>12. Double head calibration</td>
<td>Tune the mechanical positioning of your second extruder to make sure that it is level and calibrated.</td>
</tr>
</tbody>
</table>

Finally, you will need to upgrade the firmware on your PCB to work for a double head RapMan.

RapMan 3.2 How to print

To use your RapMan 3.2 you will need to:

- know how to operate the printer.
- know how to use Axon (the print processing software).

Printer operation

The operations manual will guide you, step by step, through the essential setup procedures for your printer. Files are included for you to make your first print. Click on the image below to enter the operations manual for the RapMan 3.2.

Axon

Axon is the name of our print processing software! It enables you to convert your 3D models into print files for your BFB printer. This manual shows you how to use Axon, and provides useful information on design for printing. Click on the image below to enter the manual for Axon.

RapMan 3.2 operations manual
So you’ve built your printer? Congratulations! Now it’s time to unlock its potential with the endless possibilities of 3D printing. The on-line operations manual (which can be exported to PDF if you prefer) will teach you everything you need to know about your printer, leading you through to your first print. Essential topics include:

- An overview of the whole process
- Print materials and their uses
- Pre-print checks (how to set up your printer)
- Your first print

Click on the image below to access the operations manual:

![Image of people around a 3D printer]

RapMan data sheets

General product specifications

Click here to see the specifications of the RapMan 3.1.

Specific data sheets

- Thermistor Data Sheet
- Power Supply Data Sheet
- Stepper Motor Driver Data Sheet

Differences between RapMan 3.2 and 3.1

- Touch screen control panel.
- V3.4 electronics.
- No other changes.

RapMan part replacement

We stock a full range of parts for the printers we make.
In all correspondence, please include:

- photographs of the parts in question
- product type
- serial number of the machine (click here to learn how to find your serial number)

The more information you can provide, the quicker we will be able to handle your request.

- If you need to replace a part which is still within its 12 month warranty, please raise a ticket through our support page.
- If you need to replace a part that is outside warranty, please contact sales at sales@bitsfrombytes.com

RapMan Troubleshoot a problem

Introduction

We are sorry to hear you are experiencing a problem with your BFB-3000. Here at technical, we aim to get you back up and running as quickly as possible.

We offer a lot of on-line resources in our self-help FAQ (below) because this is normally the fastest solution for the customer, and we run a support ticket system for problems which lie outside the FAQ (click here to raise a ticket). You may raise a support ticket at any time, however, this is unlikely to resolve the problem as fast as the self-help FAQ.

Identifying the problem area

Please identify your problem with the areas below, then click on the action link to show solutions relevant to this area.

<table>
<thead>
<tr>
<th>Problem area</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>STL file preparation</td>
<td>Goto FAQ...</td>
</tr>
<tr>
<td>PC Software</td>
<td>Goto FAQ...</td>
</tr>
<tr>
<td>RapMan build</td>
<td>Goto FAQ...</td>
</tr>
<tr>
<td>Printer controls</td>
<td>Goto FAQ...</td>
</tr>
<tr>
<td>RapMan mechanical issues</td>
<td>Goto FAQ...</td>
</tr>
<tr>
<td>Print quality</td>
<td>Goto FAQ...</td>
</tr>
<tr>
<td>Print failure</td>
<td>Goto FAQ...</td>
</tr>
<tr>
<td>Print removal &amp; post-processing</td>
<td>Goto FAQ...</td>
</tr>
</tbody>
</table>

FAQ RapMan mechanical issues

UNDER CONSTRUCTION

This technical resources site is new, and we welcome any feedback you may have with respect to getting the right information to you efficiently. Please click here to email the webmaster. Please note, this account cannot directly resolve any technical issues you may have with your product - please contact your distributor if further support is needed.

Click on the questions below to skip to the relevant answer:

If you cannot find a question relevant to your problem, return to the FAQ area chooser to see if your problem is handled in a different area (by using the back button on your browser).
FAQ RapMan setup

UNDER CONSTRUCTION

This technical resources site is new, and we welcome any feedback you may have with respect to getting the right information to you efficiently. Please click here to email the webmaster. Please note, this account cannot directly resolve any technical issues you may have with your product - please contact your distributor if further support is needed.

Click on the questions below to skip to the relevant answer:

If you cannot find a question relevant to your problem, return to the FAQ area chooser to see if your problem is handled in a different area (by using the back button on your browser).

RapMan 3.1 assemblies

First stop: building your printer! Choose from one of the following three options:

<table>
<thead>
<tr>
<th>RapMan 3.1 full assembly</th>
<th>Double head upgrade for RapMan 3.1</th>
<th>RapMan 3.1 &gt; 3.2</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="RapMan 3.1 full assembly" /></td>
<td><img src="image2.png" alt="Double head upgrade for RapMan 3.1" /></td>
<td><img src="image3.png" alt="RapMan 3.1 &gt; 3.2" /></td>
</tr>
</tbody>
</table>

- Ready to build your RapMan 3.1? Click the image for full instructions.
- If you've already built your RapMan 3.1 and you want to know how to fit your double head upgrade, click the image.
- Want to know how to upgrade your RapMan from 3.1 to 3.2?

RapMan 3.1 Double head upgrade manual
To fit your double head upgrade you will need to visit the sections of the RapMan 3.1 build manual identified in the table below. For all build pages, follow the “Double head” sections first.

<table>
<thead>
<tr>
<th>Section</th>
<th>Brief description of work</th>
</tr>
</thead>
<tbody>
<tr>
<td>4d. Double head upgrade pack contents</td>
<td>Check kit contents.</td>
</tr>
<tr>
<td>8i. X carriage</td>
<td>Replace single head carriage with double head carriage.</td>
</tr>
<tr>
<td>10. Extruder assembly</td>
<td>Assemble second extruder and wire into the RapMan.</td>
</tr>
<tr>
<td>11. Double head calibration</td>
<td>Tune the mechanical positioning of your second extruder to make sure that it is level and calibrated.</td>
</tr>
</tbody>
</table>

Finally, you will need to upgrade the firmware on your PCB to work for a double head RapMan.

**RapMan 3.1 to 3.2 upgrade manual**
Machine upgrade

The table below describes the critical changes between the RapMan 3.1 and 3.2:

<table>
<thead>
<tr>
<th>Change</th>
<th>V3.1</th>
<th>V3.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control panel</td>
<td>Button interface/OLED screen</td>
<td>Touch screen control/display</td>
</tr>
<tr>
<td>Main Electronics</td>
<td>v3.3</td>
<td>v3.4</td>
</tr>
</tbody>
</table>

- Switches will not have to be replaced, but the customer should be aware of the colour change when wiring the control panel.

Kit contents

Check your kit for contents:
Removing the 3.1 control box

To fit the new control box, the old 3.1 control box will need to be completely removed. Detach the 3.1 control box from the frame and remove all parts:

Remove the PCB so that all is left are the wires. As each wire set is removed, make sure you group and label each set so that it is easy to identify and wire up when fitting the new PCB.
Preparing the 'Wire extension kit'

In the wire extension kit you will find different length wires of different colours. Cut each wire into 500mm lengths. The table below identifies how many lengths of each colour you should end up with:

<table>
<thead>
<tr>
<th>Wire colour</th>
<th>Total length of uncut wire (meters) included in the pack</th>
<th>Cut 500mm lengths from each wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orange</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Black</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Green</td>
<td>2.5</td>
<td>5</td>
</tr>
<tr>
<td>Blue</td>
<td>2.5</td>
<td>5</td>
</tr>
<tr>
<td>Yellow</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>White</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Purple</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Red</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Grey</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

In the wire extension kit, you will also find a length of heat-shrink insulation. Cut this into 30mm lengths.

Soldering the wire extensions

<table>
<thead>
<tr>
<th>Tools</th>
<th>Soldering iron is dangerous when hot. Make sure you are fully trained before use and safety gloves are worn.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soldering iron</td>
<td>Test each soldered connection for mechanical strength after each soldering operation.</td>
</tr>
</tbody>
</table>

Give every wire from the RapMan a wire extension of 500mm, taking care to match wire colours. Tin each wire end before soldering together.
Use the shank of the soldering iron to apply heatshrink insulation to each soldered junction for each extended wire. Make sure that each junction is fully insulated.

Fitting the control box

To upgrade your RapMan 3.1 to 3.2 you will need to visit the sections of the RapMan 3.2 build manual identified in the table below.

Note that the X & Y limit switch wire colours have been changed. RapMan 3.1 microswitch wires were X:White Y:Orange. RapMan 3.2 are X:Orange Y:White. The instructions linked below are for the RapMan 3.2. Therefore, you will need to remember that the wire colours for X and Y limit switches have swapped, and wire appropriately.

<table>
<thead>
<tr>
<th>Section</th>
<th>Brief description of work</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Section</th>
<th>Brief description of work</th>
</tr>
</thead>
</table>

Note: The table contains a warning about the change in wire colours for X and Y limit switches.
11. **Control panel**

Building and fitting the touch control panel.

Finally, you may need to **upgrade the firmware** on your PCB for the number of extruders you have on your RapMan.

You may also want to read the RapMan 3.2 Operations Manual.

---

**Downloads**

Welcome to the downloads page - it's all free! Choose from one of the following three options:

<table>
<thead>
<tr>
<th>PC Software: Axon</th>
<th>Firmware</th>
<th>Print files</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Axon Image" /></td>
<td><img src="image2" alt="Firmware Image" /></td>
<td><img src="image3" alt="Print Files Image" /></td>
</tr>
</tbody>
</table>

- Click the image to download our 3D model processing software. This program prepares your STLs into BFB files for printing.
- Having the latest firmware on your printer will give you the best printing performance. Click the image to check you're up to date.
- Fancy

---

**How to download online content**

To download on-line content, simply go to the manual you require. On the first page of the manual you will find a section called "off-line reading". This will detail how to export the content into a PDF.

---

**Download Axon**

Axon is the PC software which converts 3D STL files into printer build files.
Compatibility

The software is universal for all BFB products.

Computer specifications

This software is for PC only (not Mac or Linux).

Download

<table>
<thead>
<tr>
<th>Date</th>
<th>Version</th>
<th>Printer Compatibility</th>
<th>Download link</th>
<th>Notes</th>
<th>User manual</th>
</tr>
</thead>
<tbody>
<tr>
<td>12th November 2012</td>
<td>3.0 alpha 3</td>
<td>3D TOUCH, RapMan 3.2</td>
<td>Download Axon</td>
<td>Prior to installation, uninstall previous versions of Axon 3 in Control Panel - Add/Remove Programs. Microsoft programming library update. Firmware V5.4.0 or newer required. Download firmware.</td>
<td>Refer to Axon 2 manual</td>
</tr>
<tr>
<td>24th October 2012</td>
<td>3.0 alpha 2</td>
<td>3D TOUCH, RapMan 3.2</td>
<td>Download Axon</td>
<td>Release notes Microsoft programming library update. Firmware V5.4.0 or newer required. Download firmware.</td>
<td>Refer to Axon 2 manual</td>
</tr>
<tr>
<td>19th October 2012</td>
<td>3.0 alpha 1</td>
<td>3D TOUCH, RapMan 3.2</td>
<td>Download Axon</td>
<td>Release notes Microsoft programming library update. Firmware V5.4.0 or newer required. Download firmware.</td>
<td>Refer to Axon 2 manual</td>
</tr>
<tr>
<td>10th September 2012</td>
<td>2.1.0</td>
<td>3D TOUCH, BFB-3000(plus) RapMan 3.2 3.1 3.0</td>
<td>Download Axon</td>
<td>Release notes</td>
<td>Axon 2 manual</td>
</tr>
<tr>
<td>16th March 2012</td>
<td>2.0.1</td>
<td>3D TOUCH, BFB-3000(plus) RapMan 3.2 3.1 3.0</td>
<td>Download Axon</td>
<td>Release notes</td>
<td>Axon 2 manual</td>
</tr>
<tr>
<td>19th November 2011</td>
<td>2.0 beta 2</td>
<td>3D TOUCH, BFB-3000(plus) RapMan 3.2 3.1 3.0</td>
<td>Download Axon</td>
<td>Release notes</td>
<td>Axon 2 manual</td>
</tr>
</tbody>
</table>
For Axon 2 installation instructions please see the 'User manual'.

**Axon Alpha Release**

Axon 2.0 Alpha 1.zip  
Axon 2.0 Alpha 2.zip

**Axon 2 Beta Releases**

Axon 2.0B1 Setup.msi

**Download firmware**

![Firmware PCB](image)

**What is firmware?**

Firmware is the software which lives on the printer, in the main PCB. It controls the machine, converting your BFB print files into physical models. We frequently release firmware updates to continually improve the performance of the machine. By installing the latest firmware on your machine, you are ensuring that your printer is generating the best prints possible.

**Which version of firmware am I running now?**

Visit [this page](#) to learn how to identify which firmware version you are running.
How do I upgrade the firmware?

Download the relevant firmware package in the following sections:

- For firmware versions 4.x.x please follow the "BFB Firmware Loader Instructions.pdf" document which is included in the firmware download ZIP file.
- For firmware versions 5.x.x please refer to [this page](#).

### 3D Touch / RapMan 3.2

<table>
<thead>
<tr>
<th>Date</th>
<th>Version</th>
<th>Download</th>
<th>Download</th>
</tr>
</thead>
<tbody>
<tr>
<td>13th December 2012</td>
<td>V5.4.2</td>
<td>3D TOUCH</td>
<td>RapMan 3.2</td>
</tr>
<tr>
<td>29th October 2012</td>
<td>V5.4.1</td>
<td>3D TOUCH</td>
<td>RapMan 3.2</td>
</tr>
<tr>
<td>19th October 2012</td>
<td>V5.4.0</td>
<td>3D TOUCH</td>
<td></td>
</tr>
<tr>
<td>17th February 2012</td>
<td>V5.3.1</td>
<td>3D TOUCH</td>
<td>RapMan 3.2</td>
</tr>
<tr>
<td>1st February 2012</td>
<td>V5.3.0</td>
<td>3D TOUCH</td>
<td>RapMan 3.2</td>
</tr>
<tr>
<td>2nd November 2011</td>
<td>V5.2.0</td>
<td>3D TOUCH</td>
<td>RapMan 3.2</td>
</tr>
<tr>
<td>5th October 2011</td>
<td>V5.1.0</td>
<td>3D TOUCH</td>
<td>n/a</td>
</tr>
</tbody>
</table>

### BFB-3000 (Plus) / RapMan 3.1

<table>
<thead>
<tr>
<th>Date</th>
<th>Version</th>
<th>Download</th>
<th>Download</th>
<th>BFB-3000 Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>23rd April 2012</td>
<td>V4.2.2</td>
<td>BFB-3000 (plus)</td>
<td>RapMan 3.1</td>
<td>All BFB-3000 serial numbers with or without screen replacement kit</td>
</tr>
<tr>
<td>12th September 2011</td>
<td>V4.2.1</td>
<td>BFB-3000 (Plus)</td>
<td>RapMan 3.1</td>
<td>All BFB-3000 serial numbers (quad or triple part cooling fans version)</td>
</tr>
<tr>
<td>5th August 2011</td>
<td>V4.2.0</td>
<td>BFB-3000 (Plus)</td>
<td>RapMan 3.1</td>
<td>All BFB-3000 serial numbers (quad or triple part cooling fans version)</td>
</tr>
<tr>
<td>31st March 2011</td>
<td>V4.1.1</td>
<td>BFB-3000</td>
<td>RapMan 3.1</td>
<td>BFB-3000 serial numbers less than S2034169 (quad part cooling fans version)</td>
</tr>
<tr>
<td>11th March 2011</td>
<td>V4.1.0</td>
<td>BFB-3000</td>
<td>RapMan 3.1</td>
<td>BFB-3000 serial numbers less than S2034169 (quad part cooling fans version)</td>
</tr>
<tr>
<td>14th October 2010</td>
<td>V4.1.0B2</td>
<td>BFB-3000</td>
<td>RapMan 3.1</td>
<td>BFB-3000 serial numbers less than S2034169 (quad part cooling fans version)</td>
</tr>
<tr>
<td>1st October 2010</td>
<td>V4.1.0B1</td>
<td>BFB-3000</td>
<td>RapMan 3.1</td>
<td>BFB-3000 serial numbers less than S2034169 (quad part cooling fans version)</td>
</tr>
<tr>
<td>6th August 2010</td>
<td>V4.0.2</td>
<td>BFB-3000</td>
<td>RapMan 3.1</td>
<td>BFB-3000 serial numbers less than S2034169 (quad part cooling fans version)</td>
</tr>
<tr>
<td>2nd August 2010</td>
<td>V4.0.1</td>
<td>BFB-3000</td>
<td>RapMan 3.1</td>
<td>BFB-3000 serial numbers less than S2034169 (quad part cooling fans version)</td>
</tr>
<tr>
<td>23rd July 2010</td>
<td>V4.0.0</td>
<td>BFB-3000</td>
<td>RapMan 3.1</td>
<td>BFB-3000 serial numbers less than S2034169 (quad part cooling fans version)</td>
</tr>
</tbody>
</table>

The firmware update PC application is included in each of the downloads above. It is also available as a standalone download.

### 3D Touch and RapMan 3.2 Firmware Update Instructions

...
The firmware for the 3D TOUCH and RapMan 3.2 printers is pre-installed within the microcontroller on the printer’s controller board. We are continually working to improve the firmware and will make new versions available on the website. You can download the updates and install them onto your printer using the BfB Firmware Loader Application. Any version of firmware can be loaded i.e. you are not restricted to loading newer versions only.

**BfB Firmware Loader Application**

To transfer the new application software to the printer you will need to run the BfB firmware loader application on your PC.

![BfB Firmware Loader Application](image)

**Installing PC Drivers**

When the printer is connected to a PC for the first time only, the following sequence should be followed in order to ensure that USB drivers are installed correctly. If a printer firmware update has previously been performed with your computer, skip to the below section “Updating Your Printer Firmware”.

1. Load the Firmware Loader Application on your computer
2. Turn the printer on
3. Connect the printer to your computer with a USB lead
4. Scroll to the far right of the printer menu to show the “UPDATE” icon
5. Press and hold the round function button then immediately tap the “UPDATE” icon once. Do not release the round function button until the USB bootloader screen shows. You need to tap the “UPDATE” icon within two seconds of pressing the function button otherwise the printer will switch off.
6. The printer display will state that it is in bootloader mode
7. Windows USB drivers should be installed and the Firmware Loader Application should state “Device connected” in the lower status area. If not, try closing the BFB Firmware Loader Application, remove the USB lead, re-open the BFB Firmware Loader Application, and reconnect the USB lead.

If it is not required to conserve existing printer settings through the firmware update (e.g. extruder offset calibration, Z height), the firmware update can be performed immediately by continuing from step 8 in the below section “Updating Your Printer Firmware”. After the firmware update the printer settings will revert to default thus requiring entry of extruder offset calibration and Z height values before you can print again.

To conserve existing printer settings through the firmware update (recommended), perform the following steps:

1. Turn the printer power off and remove the USB lead. (Although the printer is in bootloader mode, the printer memory has not yet been erased so powering off at this time will not result in a non-functional printer.)
Updating Your Printer Firmware

The printer contains user and calibration settings which are remembered when the power is switched off, however these settings are reverted to default when firmware is loaded. The firmware can save these settings to a USB memory stick during the update process so they can be restored into printer settings memory after the update, meaning calibration settings are not lost.

1. Load the Firmware Loader Application on your computer
2. Turn the printer on and insert a BFB branded USB memory stick
3. Scroll to the far right of the menu to show the “UPDATE” icon
4. To save the settings to the USB memory stick and invoke firmware update mode, press and hold the round function button then immediately tap the “UPDATE” icon once. Do not release the round function button until the USB bootloader screen shows. You need to tap the “UPDATE” icon within two seconds of pressing the function button otherwise the printer will switch off
5. Firmware V5.1.0 onwards will show a brief confirmation if the settings were successfully saved to the USB memory stick, the printer display will state that it is in bootloader mode.
6. Remove the USB memory stick and connect the printer to your computer with a USB lead
7. The Firmware Loader Application should state “Device connected” in the lower status area. If not, try closing the BFB Firmware Loader Application, remove the USB lead, re-open the BFB Firmware Loader Application, and reconnect the USB lead
8. Click the “Open Hex File” button and select the firmware.hex file downloaded from our website
9. Click the “Program/Verify” button to load the firmware
10. When the verify operation is complete, turn the printer power off and remove the USB lead. Do NOT use the “Reset Device” button shown on the Firmware Loader Application
11. Turn the printer power back on
12. Plug in the USB memory stick
13. Turn the printer on by holding the function button until the display lights up, shortly after a message should show to indicate that the printer settings were restored into the printer memory
14. The update and settings migration is complete, continue using the printer as normal

If there are any problems during the update and the printer does not function afterwards, the printer can be put into bootloader mode by following the steps below. The bootloader resides in a permanent area of memory that cannot be erased or corrupted during the firmware update process.

1. Turn the printer power off
2. Press and hold the round function button on the display panel
3. Turn the printer power on
4. The printer display should state that it is in bootloader mode

Identifying your firmware version

- BFB-3000 (Plus)/RapMan 3.1
- 3D Touch/RapMan 3.2

BFB-3000 (Plus)/RapMan 3.1

Turn your printer on. On the main menu, look at the top right of the screen. A ‘v’ number will be displayed. This is your version number.

3D Touch/RapMan 3.2

Turn your printer on. Scroll to the far right of the main menu. A ‘v’ number will be displayed in the bottom right corner. This is your version number.

Download print files

BFB Print files

The following files are free to download and print directly. They are already in the BFB format (so you don’t need to use Axon) and can be loaded directly onto your SD card or USB stick.
<table>
<thead>
<tr>
<th>Printer</th>
<th>File description</th>
<th>Download</th>
<th>Material in Extruder 1</th>
<th>Material in Extruder 2</th>
<th>Material in Extruder 3</th>
<th>Estimated build time (hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RapMan</td>
<td>Tessellating brick</td>
<td>Right click here then click “Save link as...”</td>
<td>PLA</td>
<td></td>
<td></td>
<td>1.25</td>
</tr>
<tr>
<td>BFB-3000</td>
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<tr>
<td>3D Touch</td>
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</tr>
<tr>
<td>RapMan</td>
<td>Walkie-talkie</td>
<td>Right click here then click “Save link as...”</td>
<td>PLA</td>
<td></td>
<td></td>
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<tr>
<td>BFB-3000</td>
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</tr>
<tr>
<td>RapMan</td>
<td>Propellor</td>
<td>Right click here then click “Save link as...”</td>
<td>PLA</td>
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<td></td>
<td>12 to 24 (Depending on size)</td>
</tr>
<tr>
<td>BFB-3000</td>
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<td>3D Touch</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>RapMan</td>
<td>Walt Disney’s head</td>
<td>Right click here then click “Save link as...”</td>
<td>PLA</td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>BFB-3000</td>
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<td>3D Touch</td>
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<tr>
<td>RapMan</td>
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<td>3D Touch</td>
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</tr>
<tr>
<td>BFB-3000</td>
<td>Cathedral</td>
<td>Click here</td>
<td>ABS</td>
<td>PLA</td>
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<tr>
<td>3D Touch</td>
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<td></td>
</tr>
<tr>
<td>BFB-3000</td>
<td>Paper Cup Holder</td>
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<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Tip: If you do not initially have the correct material type loaded into the extruder, rather than reloading materials you can use "Extruder Mapping" on the control box to swap the print heads. See this page for instructions on how to use extruder mapping (instructions are for the touch screen display, but the mapping function is also found on the main menu of all push-button control panels).

**BFB STL files**

To view and download some STL files which were designed for BFB printers click here. After downloading they will need processing with Axon.

**Print file - Cathedral**

**Cathedral Print files**

<table>
<thead>
<tr>
<th>Printer</th>
<th>File description</th>
<th>Download</th>
<th>Thumbnail</th>
<th>Material in Extruder 1</th>
<th>Material in Extruder 2</th>
<th>Material in Extruder 3</th>
<th>Estimated build time (hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BFB-3000</td>
<td>Towers (3 off included in print)</td>
<td>Click here</td>
<td>Click here</td>
<td>ABS</td>
<td>PLA</td>
<td></td>
<td>17</td>
</tr>
<tr>
<td>3D Touch</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Archive downloads (software, profiles, firmware and print files)**
Introduction

To get the best print quality, make sure you are equipped with our latest technology. All downloads are free:

- PC software (the program which imports your STL files). For more information about the software click here.
- Print profiles (the settings used by the PC software to process the STL file into a .BFB file).
- Printer firmware (the control software on the printer).

Click here to learn how to identify your current software, print profile and firmware versions. The headings below link to downloading the latest versions of each. However, if you require a previous (archive) version, please click here.

The final section offers some proven print files which you are welcome to try.

Axon PC Application

The PC software is universal for all BFB products. This software is for PC only. It does not work on a Mac, it does not work on Linux.

<table>
<thead>
<tr>
<th>Date</th>
<th>Version</th>
<th>Download</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>19th November 2011</td>
<td>2.0 beta 2</td>
<td>Axon</td>
<td>Release notes</td>
</tr>
<tr>
<td>25th May 2011</td>
<td>2.0 beta 1</td>
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<td>Release notes</td>
</tr>
<tr>
<td>13th July 2010</td>
<td>1.11</td>
<td>Axon</td>
<td>Manual</td>
</tr>
</tbody>
</table>

For Axon 2 installation instructions please see the Axon 2 Installation Guide.

Refer to the Axon 2 Help page for further information.

Axon V1.11 Print Profiles

Released: December 2010

Print profiles only need upgrading if you are running Axon V1. Click here to download the print profiles. Follow the PDF instructions included in the ZIP file.

Firmware

Click the links below to download the printer firmware for BFB-3000 and RapMan.

For firmware versions 4.x.x please follow the "BfB Firmware Loader Instructions.pdf" document which is included in the firmware download ZIP file.

For firmware versions 5.x.x please refer to 3D TOUCH and RapMan 3.2 Firmware Update Instructions.

3D TOUCH

<table>
<thead>
<tr>
<th>Date</th>
<th>Version</th>
<th>Download</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd November 2011</td>
<td>V5.2.0</td>
<td>3D TOUCH</td>
</tr>
<tr>
<td>5th October 2011</td>
<td>V5.1.0</td>
<td>3D TOUCH</td>
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</tbody>
</table>

BFB-3000 (Plus) / RapMan 3.1

<table>
<thead>
<tr>
<th>Date</th>
<th>Version</th>
<th>Download</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>12th September 2011</td>
<td>V4.2.1</td>
<td>BFB-3000 (Plus)</td>
<td>Rapman</td>
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<tr>
<td>5th August 2011</td>
<td>V4.2.0</td>
<td>BFB-3000 (Plus)</td>
<td>Rapman</td>
</tr>
<tr>
<td>Date</td>
<td>Version</td>
<td>Model</td>
<td>Description</td>
</tr>
<tr>
<td>------------------</td>
<td>---------</td>
<td>-----------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
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<td>31st March 2011</td>
<td>V4.1.1</td>
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<td>Rapman BFB-3000 serial numbers less than S2034169 (quad part cooling fans version)</td>
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<tr>
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<td>Rapman BFB-3000 serial numbers less than S2034169 (quad part cooling fans version)</td>
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<td>Rapman BFB-3000 serial numbers less than S2034169 (quad part cooling fans version)</td>
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<td>23rd July 2010</td>
<td>V4.0.0</td>
<td>BFB-3000</td>
<td>Rapman BFB-3000 serial numbers less than S2034169 (quad part cooling fans version)</td>
</tr>
</tbody>
</table>

The firmware update PC application is included in each of the downloads above. It is also available as a standalone download.

**Print files**

The following files are free to download and try. They are already in the BFB format and can be loaded directly onto your SD card.

<table>
<thead>
<tr>
<th>Printer</th>
<th>File description</th>
<th>Download</th>
<th>Material in Extruder 1</th>
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<td>RapMan BFB-3000</td>
<td>Propellor</td>
<td>Click here</td>
<td>PLA</td>
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<td>RapMan BFB-3000</td>
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<td>RapMan BFB-3000</td>
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<td>Click here</td>
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<td>0.75</td>
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Tip: If you do not initially have the correct material type loaded into the extruder, rather than reloading materials you can use "Extruder Mapping" on the control box to swap the print heads. See Section 9.4.2 (page 53) of this manual for more information on how to do this.

**Archive software, print profiles and firmware**

**Archive PC software**

There are currently no prior versions.

**Archive print profiles**

V1.0 profiles are included with the original Axon v1.11 (PC software) installation.

**Archive firmware**

See Release Notes for details. Bootloader file and instructions are included. "B" suffix indicates Beta release - bugs may be present for these
RapMan 3.2 Documentation

RapMan 3.2 documentation is now complete

Please go to the Technical Resources home page and check the links next to "RapMan 3.2".