AFINIA

H800 3D Printer

Congratulations, you and your Afinia H800 will make great things together

"The Afinia H800 is an exemplary printer that sets new standards in safety and HD print quality"

USER'S MANUAL

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1 SAY HELLO TO THE AFINIA H800

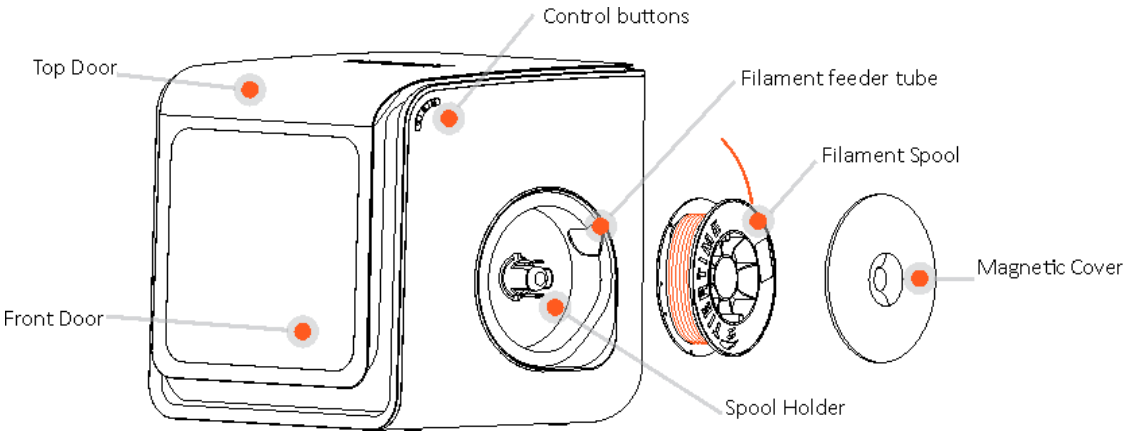
Take a look around.

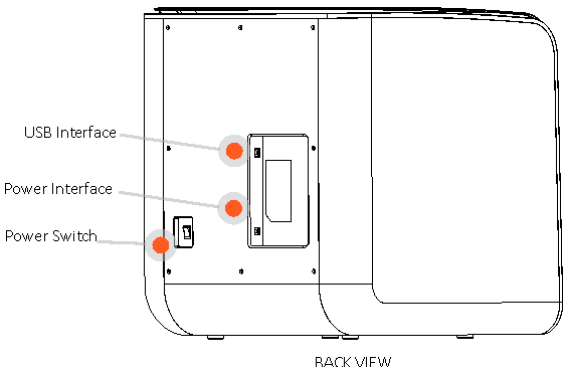
The Afinia H800 was designed specifically for educators and professionals looking for fast, hassle-free 3D printing with exceptional quality. The Afinia H800 boasts a host of features, from Smart Support, user-friendly software and automatic leveling, to paper-thin layer HD resolution with a heated build platform. Everything about this printer is geared towards creating high standard professional 3D models.

Print a working bearing in one hit, make a part for a dishwasher or just unleash your creativity and bring your designs to life with your new Afinia H800.

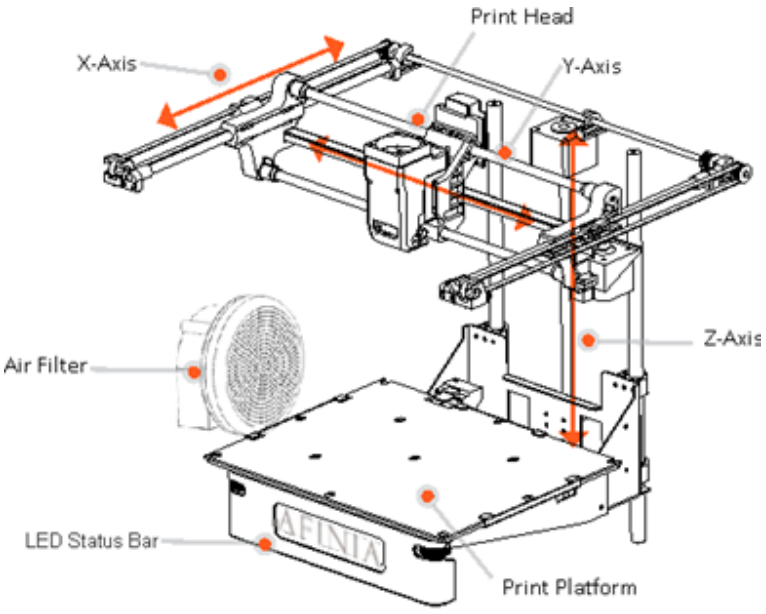
1.1 Afinia H800 at a glance

The Afinia H800 with HEPA filter is packed with advanced technologies in a remarkably stylish and robust design.



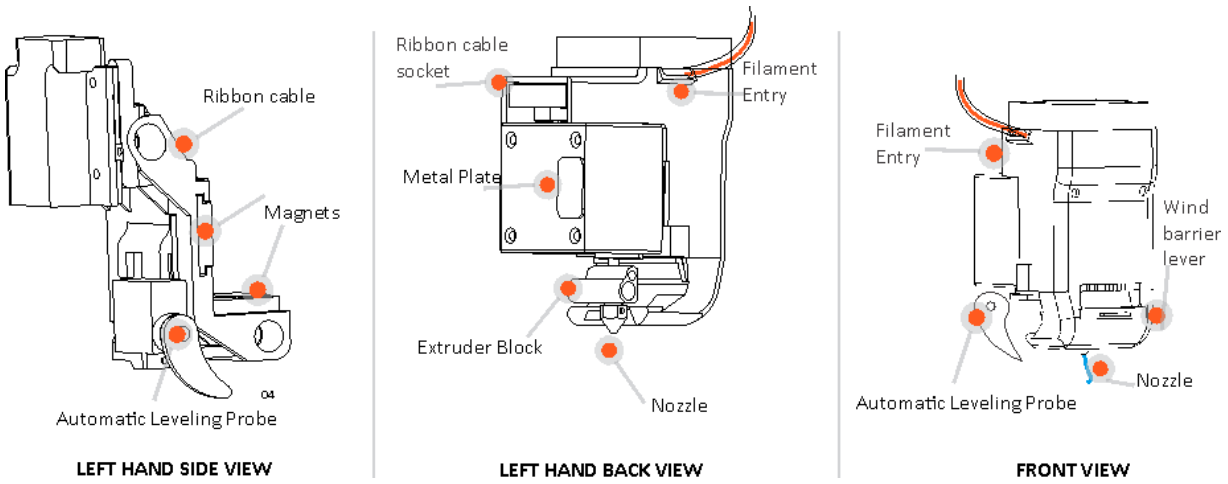


BACK VIEW



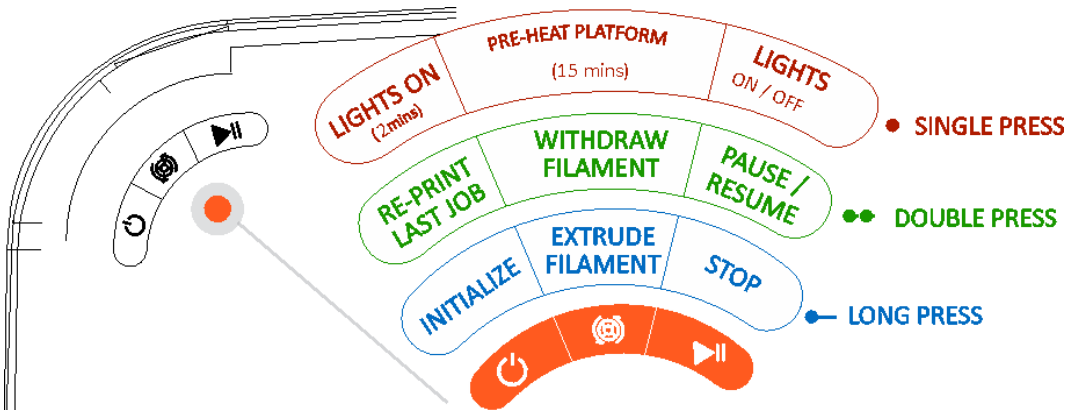
Internal View

1.2 Print Head and mounting



1.3 Touch Panel

You can do a lot with your Afinia H800 by using the Touch Panel, so it follows your every command. You also use the Afinia software to control the Afinia H800.



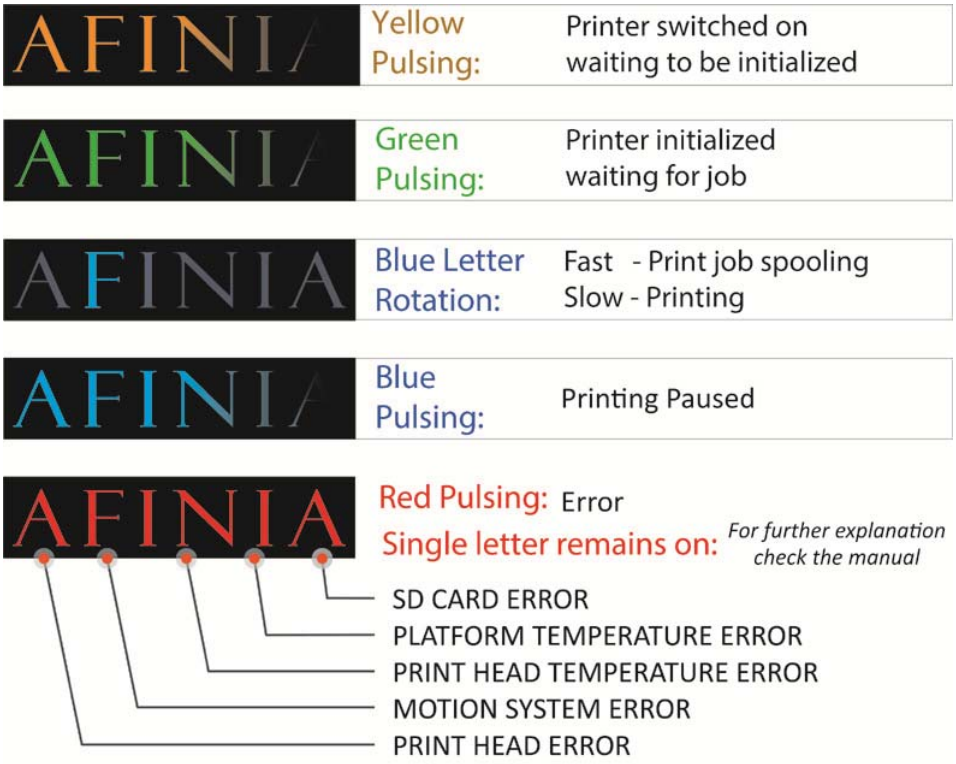
1.4 Status Display

On the front of the platform sit a row of blue LEDs above the words Afinia indicating either:

a.) The progress on reaching the platform target temperaturewhen pre-heating the platform

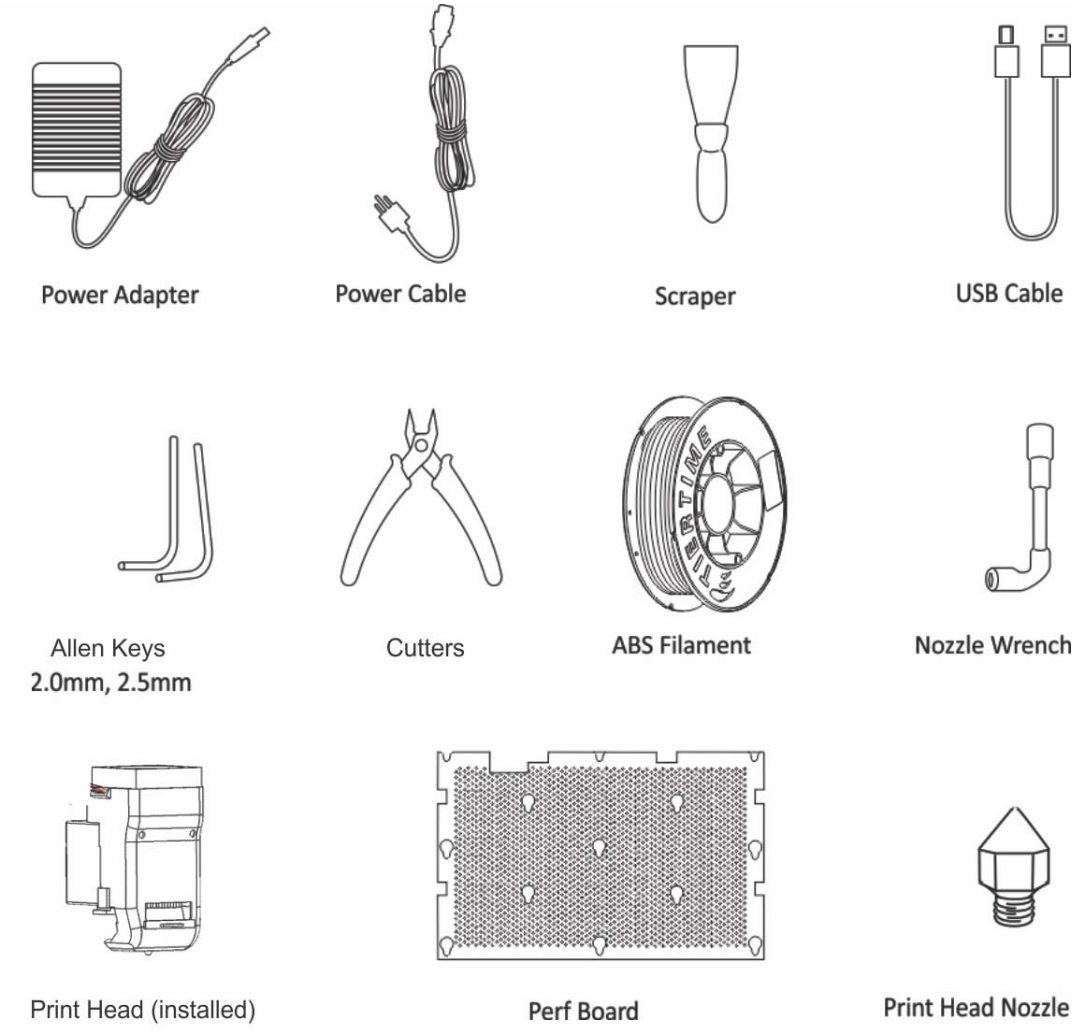
b.) The overall print progress during printing.

Located on the front of the platform is the heart beat of the Afinia H800, which indicates the state of the printer.



1.5 What's included

The Afinia H800 comes in an even bigger box filled with everything you need to kick start your desktop factory into action.



2 ACRONYMS AND ABBREVIATIONS

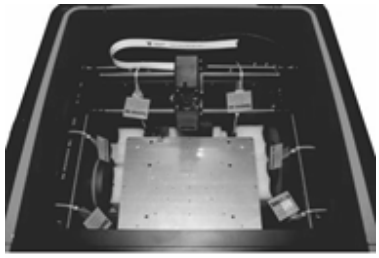
STL	STereoLithography is the common file format used for sharing and printing 3d files
Additive Fabrication	The technical term used for the more user-friendly term of 3D printing.
ABS	Acrylonitrile Butadiene Styrene. This is a lightweight thermoplastic with resistance to high heat and is the most common plastic used in 3d printing. A strong and generally easy material to print with, but printing large parts can warp.
PLA	Polylactic Acid is a biodegradable material derived from corn. Unlike ABS it warps less but support removal can be harder. A great material to obtain low cost steel parts by sending the PLA printed part to a foundry to use investment casting / lost wax casting.
Raft	The printer lays down a foundation before it starts print the model. The raft is used to anchor the model down onto and into the perfboard. During the printing of the raft, any unevenness in the leveling of the platform is correct during the raft.
Perfboard	A reusable and removal build platform that the model is printed onto. (included)
Shell	The external layers of the printed part, much like an egg shell.
Infill	The internal honeycomb structure that gives the part strength
Smart Support	The Afinia software automatically generates the required supports / scaffold to support any overhangs of the model during printing. Much like building a bridge over water and having scaffolding to support it.
MEM	Melted Extrusion Melting, the process of melting plastic and 3d printing. Much like a hot glue gun on steroids.
Wind Barrier	A small flap at the bottom of the print head that controls the air flow onto or away from the nozzle. Cool air blowing over the nozzle, cools the molten plastic quickly and can cause: weaker parts, better print quality and warping
Warping	When a part lifts away from the platform. Caused by the uneven cooling of the part during printing as the material shrinks back to its normal state. All materials expand when heated and shrink when cooled. Molten plastic as it is printed is in an expanded state, as the part cools it contracts. The larger the part the worse the effect and ABS is more prone to warping where PLA does not warp as much.
Air Printing	When the printer is moving and acting as if it is printing, but nothing is being extruded out of the nozzle. Check the trouble shooting section for help.

3 QUICK START

This step by step guide might seem long and drawn out, but we highly suggest you follow it to get started. The touch panel can be used to carry out many of the below functions, but if you are unfamiliar with the printer we highly recommend following the below guide to have a better understanding of the process.

STEP 1 - UNPACK

The foams can be removed without moving the platform.



Remove nylon tie wraps (labelled with "Remove me") from the smooth rods and print head.

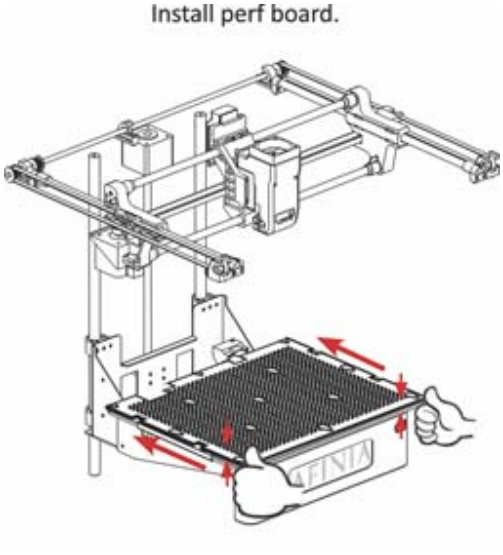
You'll need a friend in this step to help you remove the Afinia H800 from its box.

It's BIG!

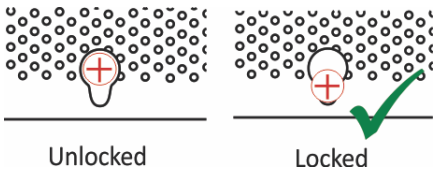
Lift it onto a table and then pull out the foam packaging and remove the cable ties that hold each axis in place.

> **TIP:** Ensure you have removed all the shipping cable ties and packaging material from the inside of the printer. Move the print head manually around to ensure it has free motion. The platform cannot be manually moved.

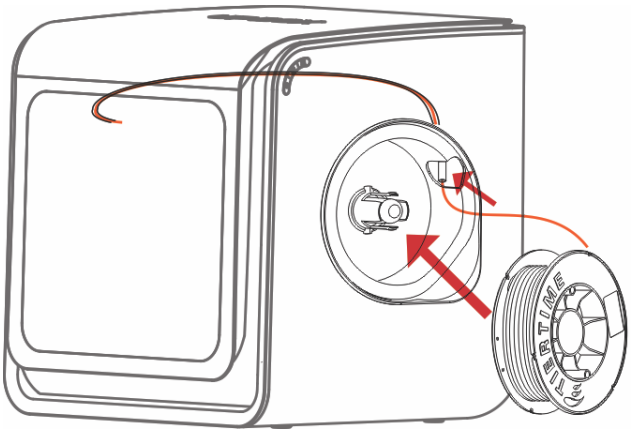
STEP 2 - PERFBOARD



Place the Perfboard onto the build plate and **lock** it into place with the locating holes, so the perfboard is completely flat against the metal plate.



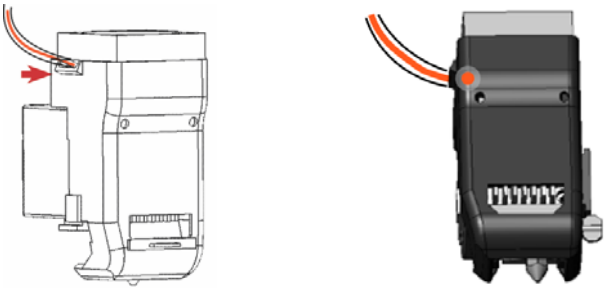
STEP 4 - LOAD FILAMENT



Remove the magnetic spool cover, then remove the spool of Afinia Premium ABS from its packaging.

TIP: Always keep tension on the filament. Never let go of the end of the filament, or it will coil under itself and possibly tangle itself.

Feed the end of the filament from the back of the spool into the feeder tube until the end of the filament appears out the other end.



Cut the end of the filament off, so it has a nice clean flat end.

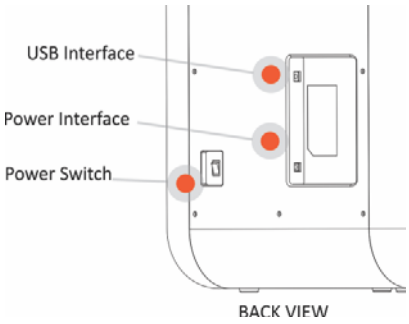
Insert the end of the filament into the left hand side of the print head and push it in all the way until it can't go in any further.

STEP 5 - INSTALLING SOFTWARE

Install the Afinia software and included drivers from the Installation Disc included with the Printer.

TIP: For detailed installation or help, refer to Software Installation in this manual.

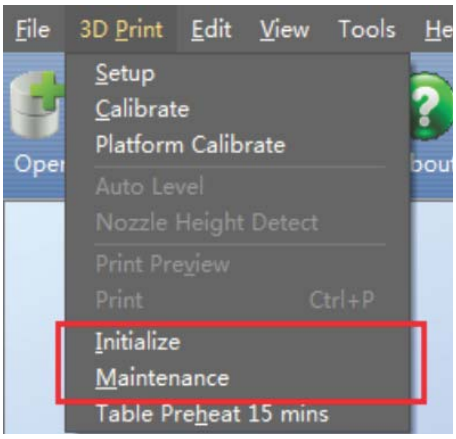
STEP 6 - POWER Afinia



At the back of the printer:
a) Plug in the supplied USB cable to both the printer and your computer.
b) Plug in the supplied power supply
c) Switch on!

The front display will pulse with an orange light to indicate the printer is ready to beinitialized.

STEP 7 - AFINIA SOFTWARE

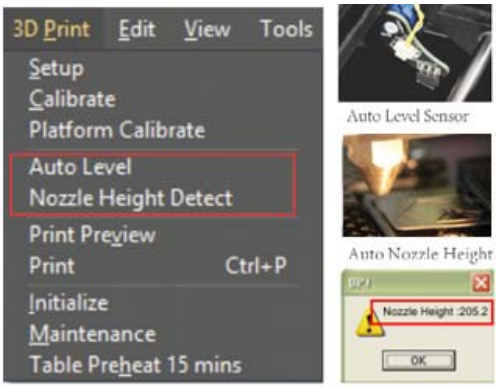


CUATION: Double check you have removed all the shipping cable ties and packaging material from the inside of the printer before you initialize the printer!

Start the Afinia 3D software and click **3D Print**. If the **Initialize** option is available, go ahead and click initialize.
If **Initialize** is unavailable, check that the Afinia drivers are correctly installed.

During initialization the printer finds its home position on each X,Y, and Z axis. Initialization is required every time the printer is switched on.

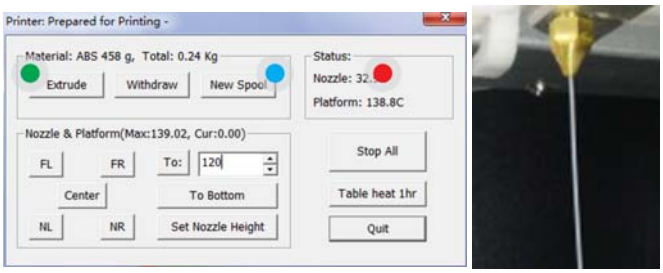
STEP 8 - AUTOMATIC CALIBRATION



The most important part of 3D printing is having a level platform and the correct distance between the nozzle and the platform. Click **Auto Level**,the head will check 9 points around the platform are level, and then it will set the platform/nozzle height.
You don't need to auto calibrate every time, only if you are having issues.

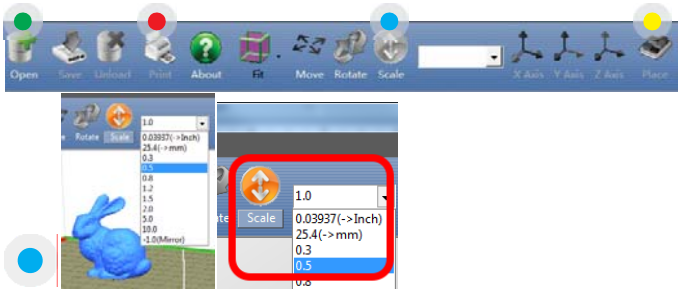
TIP: Ensure the end of the nozzle is clean and has no bit sticking out, otherwise this will give your auto-height a false reading.
Auto calibration can only be done when the temperature of the nozzle is below 80c

STEP 9 - EXTRUSION!



Click 3D Print and Maintenance then
- Click New Spool, select ABS, OK
- Click Extrude(*beep*)
- You'll start to notice the Nozzle temperature starts rising. Once it gets to 260c (*beep*) **push** the filament into the print head and you should start to see a thin string come out of the nozzle. Repeat from extrude if it doesn't.

STEP 10 - MY FIRST PRINT



Download the "My first print" Bunny from here http://www.3dprintingsystems.com/support

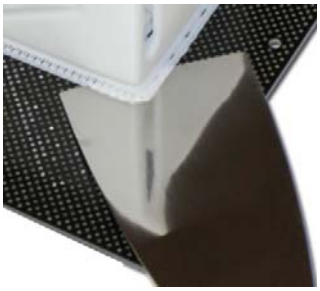
- Open the Bunny.STL file
- Click "Scale", select 0.5 and click "Scale"
- Click "Place" to centre the object
- Click "Print" and click "OK"

STEP 11 - PRINTING STARTS

It is very important to ensure that your first layer is squished out flat for good adhesion to the perfboard. If the nozzle is too far away then you'll just get a bunch of squiggles. Too close and you'll hear the print head clicking.

TIP: Any problems STOP the print job. Refer to troubleshooting section if you are having problems at this stage.

STEP 11 - PRINT COMPLETE - TADA!



The printer will (*beep*) when it is complete.

CAUTION HOT, USE GLOVES
Unlock and remove the perfboard from the printer.

CAUTION: USE GLOVES & GLASSES.
Use the scraper to remove the entire printed object from the perfboard. Then break away the support material. Scrape both sides of the perfboard smooth (don't worry about bits of plastic stuck in the holes)

4 AFINIA3D SOFTWARE INSTALLATION

4.1 Windows

Start the **setup.exe** file and install it to the specified directory (Default is “Program files/Afinia” or for 64bit computers "Program files x86/Afinia”). Refer to the trouble shooting section for further help.

Note: This install includes the Afinia software, the Afinia drivers, spare part files and firmware into your Program files/Afinia folder.

4.2 MAC

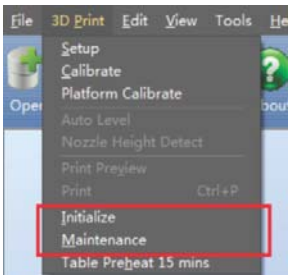
Run the **Afinia Mac Setup.pkg** file to install the software. Refer to the trouble shooting section for further help.

If you have any problems with the MAC software try:

1. Navigate to */Applications/Utilities/* and open **Disk Utility.**
2. Select the hard drive the software is installed on.
3. Click on the **Repair Disk Permissions** button.

5 INITIALIZE

Every time you switch on the printer or perform an emergency stop on a print you'll need to initialize the printer. Doing an initialization zeros each axis to the printers starting point. For example if the print head crashed into a model, the head could slip on the belt and you would then need to stop the print and initialize. This can be done using either the touch panel or Afinia software.

TOUCH PANEL	SOFTWARE
	 Click **3D Print** then **Initialize**.

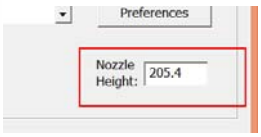
6 AUTO CALIBRATION

When a building is constructed, you must always have a level foundation. The same goes for 3d printing. Without a level platform to print onto or if the distance between the nozzle and platform are incorrect, problems will occur during printing, such as warping. Auto calibration does not need to be done every time you print, only when you start to have problems.

6.1 Auto Leveling

Before you perform the auto level procedure, ensure the perfboard is scrapped clean both sides and mounted flat and clipped onto the platform.
To level the platform click **3D Print** then **Auto Level**. The leveling probe will drop down (*located on the back left of the print head*) and will measure the difference at 9 points around the platform. These differences are recorded in **Platform Calibrate** menu.

6.2 Auto Height



To set the nozzle height using the auto feature, click **3D Print** then **Nozzle Height Detect**.

The Auto height only works with the supplied perf board. If you are using any other surface you will need to manually set the height. With the correct height, the first layer of plastic should be squished out flat to ensure good adhesion to the perfboard.

6.3 Manually Set Height

The Auto height only works with the supplied perfboard. If you are using any other surface you will need to manually set the height.

Click **3D Print** then **Maintenance**. Enter **200** in the **To:** box and click the**To:**button.Increase the value slowly to get the platform about 1mm away from the nozzle. Check each of the five positions using the five position buttons to see which part of the platform is the highest. Slowly increase the **To:**value until the nozzle is about 0.2mm from the platform at the highest point. Click the **Set Nozzle Height** button then check the other four positions to see that the gap between the nozzle and platform doesn't get smaller.

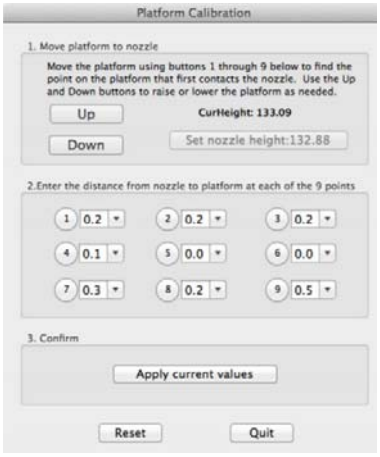
7 PLATFORM LEVELING

There are three different way to level the build platform

7.1 Automatic Leveling

This is the easiest method and if using this then you may not need to use the other two methods below. This stores the nine point calibration in the **Platform Calibrate** window. The platform doesn't physically level, the variance is measured by the platform calibration and when printing the raft this variance is accounted for. You might notice your raft is thicker on one side to the other.

7.2 Platform Calibrate (software)



The values in the image above indicate that the print surface is warped, with the center higher than both the front and back edges.

If you don't want to use the automatic leveling, you can also level the platform using the software.
Select **Platform Calibrate** from the 3D Print menu to open the manual utility. Click **Reset** as this will reset all previous values stored from the automatic calibration.
Move the platform up using the **Up Arrow** (PC) or **Up**button (Mac) until the platform is quite close to the nozzle. Then click buttons **1** through **9**to find the closest point to the nozzle. Once you find the number 1-9 that is closest to the nozzle, move the platform until it just touches the nozzle and then click **Set nozzle height**.

Next, click button **1** and select an option from the **drop down** menu to select how much the platform should move up. Do this until the platform just touches the nozzle.
Repeat for buttons **2-9**
Then double check that the gap distance between platform and nozzle is equal at each of the 9 points.
Once you are satisfied, then click **Apply current values** and quit.
If you need to perform this again, then click "Reset" to zero the current values.

7.3 Manual Leveling

Usually you don't need to physically level the platform, but if your platform is out of level by more than 1mm, you'll need to level it. An expert tip is to always have a physically level platform (gap between platform and nozzle is equal at all corners).

First select **Platform Calibrate** and **Reset** and then **Apply current values** and quit.

Click **Maintenance**, enter **200** in the **To:** box and click **To:**then increase the value get the platform about 1mm away from the nozzle. The platform should touch the nozzle at around 205 but this is different from machine to machine.

VIEW FROM UNDER THE PLATFORM

There are three thumb wheel screws, one on either side at the front of the platform and one underneath the platform. Start with the two front thumb wheels to adjust the front left and right height. Click **NL**to move the nozzle to the near left and compare it to the right by clicking **NR** near right and get the front left and right equally level.

Click the **FL**and **FR** buttons to check the back and under the underneath thumbwheel to align the back height.

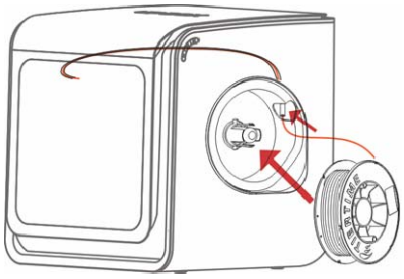
Once you've leveled the platform, run the Automatic Leveling. After it's complete, check the variances in the Platform Calibration.

Always check the nozzle height after manually leveling the platform.

Click **3D Print** then **Maintenance**. Enter **200** in the **To:** box and click the**To:**button.Increase the value slowly to get the platform about 1mm away from the nozzle. Check four corners and center using the five position buttons to see which part of the platform is the highest. Slowly increase the **To:**value until the nozzle is about 0.2mm from the platform at the highest point. Click the **Set Nozzle Height** button then check the other four positions to see that the gap between the nozzle and platform doesn't get smaller.

Leveling your actual printer on a table is not required; your printer can even print on its side and even upside down!

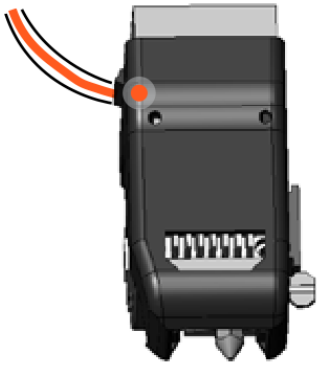
8 LOADING & UNLOADINGFILAMENT



You can either use the touch panel buttons to extrude or withdraw the filament from the print head.

TIPS: Always keep tension on your spool, otherwise your filament will become tangled.
Always **withdraw** your previous filament before loading new filament.
Click **New Spool** if changing between ABS or PLA

8.1 Loading / extrude filament

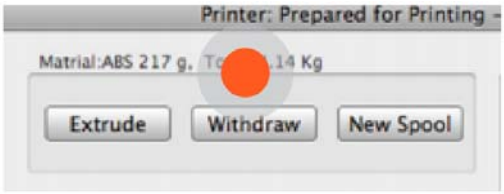


Cut the end of the new filament off so the filament has a clean edge to enter the print head.
Feed the filament through the feed tube until it comes out the other end.
There are two ways to extrude filament. Either **Long press the center button** on the touch panel OR using the software click **Maintenance** and click **Extrude**.
The nozzle will take a couple of minutes to reach the selected temperature (PLA = 200; ABS = 260); once at temperature (*beep*),gently feed the filament into the print head.You should feel the gear pulling the filament.
Refer to the trouble shooting guide if you have any problems.

TOUCH PANEL	SOFTWARE
	

8.2 Ejecting / withdraw filament

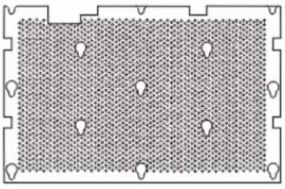
To withdraw the filament either **double press the center button** or via the maintenance screen and click **withdraw**. It will take a couple of minutes to reach temperature and you can watch progress in the maintenance window. Once ready you'll hear a "*beep*"

TOUCH PANEL	SOFTWARE
	

9 GENERAL MAINTENANCE

9.1 Caring for the Perfboard

TIPS: Never attempt to remove a printed model while the perfboard is loaded inside the printer.



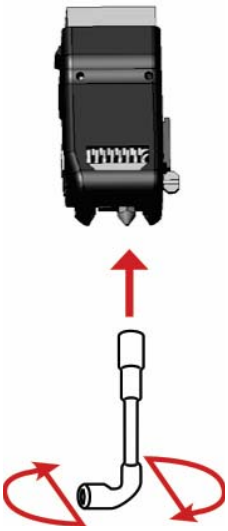
Perf Board

The perfboard is a hard wearing platform and can be used time and time again. You don't need to remove the plastic from the inside holes, as when heated these become sticky and help the model stuck down to the platform to reduce warping. Once a print has completed, using the gloves remove the perfboard and let it cool down. Then you can slightly flex the perfboard to attempt to release the printed model. To clean the perfboard vigorously scrape the left over plastic off, on both sides to prepare for the next print.

9.2 Cleaning the Nozzle

STOP! Always check that the drive gear is clean before attempting to clean the nozzle.

ALWAYS press **Withdraw** and wait until the nozzle is above 240°Cbefore unscrewing the nozzle (use the safety gloves!).Failing to follow this will damage your extruder and void your extruder block warranty.



It is recommended to replace your nozzle every 300 hours or 6 months. Either choose the cost of time involved or cost of replacement for cleaning.

For best results obtain the "Afinia Essentials" tool kit.

What you need:

- Small blow torch
- 0.4mm drill bit (yes it is very small!)
- Acetone
- Safety gloves, glasses and mask.
- Long handled pliers

Pay attention to the safety instructions included with Acetone as it is flammable.

-  Do a withdraw and once the nozzle is over 240c, using the 0.4mm drill bit, poke through the hole in the nozzle. Be careful not to break the drill bit inside the nozzle.
-  Soak the nozzle in acetone for 1hr (overnight is better)
-  Wear a mask as the fumes from burning the plastic inside the nozzle are poisonous. Turn on the blow torch and holding the nozzle with the pliers burn the nozzle for around 4 minutes to burn out the residue plastic.
- Cool the nozzle down in water

9.3 Cleaning the drive gear

11 .SAFETY CONSIDERATIONS

Warning Hot Surfaces! Never touch the print head, nozzle or print bed during operation, these will be too hot to handle and could result in burns or personal injury. Always use the included safety gloves when handling the head, nozzle, platform or printed parts.

Warning!Turn off the printer before
a) placing your hands inside the printer
b) before removing parts, cables or covers.
Ensure to tie back loose hair, loose clothing whilst the printer is in operation.

The Printer must be used in conjunction with the original manufacturer power supply, otherwise the machine could become damaged or even cause a fire hazard. Keep the power supply and printer away from moisture, water and out of high temperature environments. Failure to do so could result in risk of electric shock of fire.

It is recommended that you discharge any static charge from your body before touching the machine to prevent an interruption while printing and any potential damage to the printer. For best performance place an anti static computer mat on the floor in front of the printer.

The printer is designed to work properly at an ambient temperature of between 15°C and 30°C and humidity of between 20% and 50%; Operating outside these limits may result in decreased print quality of your models.

11.1 3.1 .

Legal Notice

The information in this document is subject to change without notice.

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Revision Sheet

Release No.	Date	Revision Description
Rev. 0	10/4/15	User's Manual Created
Rev. 1		
Rev. 2		

FCC ID: O26-H800

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment。

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.
-- Increase the separation between the equipment and receiver.
-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-- Consult the dealer or an experienced radio/TV technician for help.