Subject: 3D printers
Posted by ComesToLife on Tue, 04 Sep 2012 06:01:48 GMT
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Hi,

Can someone recommend some well priced 3D printers? what to look for when buying one? what price is right and what is too high?

Thanks

Subject: Re: 3D printers
Posted by 7777773 on Wed, 05 Sep 2012 19:54:01 GMT
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If I was buying a new printer today, it would be a Makergear M2. Beautiful machine, excellent print quality and good print speed.... Plus makergear is a wonderful company - and I don't just say that because they send me chocolate with every order. The M2 is similar to the Ultimaker in design, function, and ability, but is available fully assembled and the price is substantially cheaper if you're in the Americas.
The M2 and Ultimaker still have only one extruder though, so no water soluble support material is possible yet. You can print with same-material support, but removal takes a good deal more time and effort than dissolving support.
For ready made home kits the Makerbot Replicator is the only model that currently offers dual extruders, and they are great printers, but are more expensive and print much slower and at a lower resolution (with stock firmware and settings) than the single-extruder competitors above.

On the horizon (or available now if you're willing to work with cutting edge unproven designs) are home built powder and DLP printers, which are literally the same technologies used by commercial 3D Printing services.

On the cheaper end there are kits like the printrbot which sacrifice some speed and resolution for lower cost.

I recommend researching your options thoroughly. Home printers are now reaching higher print resolutions than commercial services offer, and are at what I consider to be resonable prices, but the technology is still young. Expect to tinker quite a bit as these printers need constant attention and are not yet completely hands-off devices. Once you find your optimum settings you can click Print and go to work, but getting to that point can take a while and changes in temperature or humidity may require you to tweak your settings all over again.

Subject: Re: 3D printers
Posted by ComesToLife on Sun, 09 Sep 2012 00:23:32 GMT
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What do u think about cube 3D? Cubify.com... its $1300...

Subject: Re: 3D printers
Posted by 7777773 on Sun, 09 Sep 2012 03:17:25 GMT
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I haven't seen once close up so I couldn't tell you how well they print.
They look nice... what the industry needs is more "appliance" looking printers like that, so the Average Joes feel comfortable buying them, which will help the industry to grow even faster.

I am curious about the "cartridges" they use for feed stock... the Cube is $50 for a cartridge, but they don't say how much plastic is in there or if the printer can use anything besides official cartridges. If that cartridge is a 1kg spool the price is about right though, and as long as there is no lockout in the printer to require Cube-specific filament it's a non issue anyway. The one thing home 3D printing doesn't need is its own version of the 2D printer ink price markup scheme.
The 5.5x5.5x5.5inch print volume is on the smaller side. If you don't need more it won't matter, and you could always split a larger model and glue the pieces together if you need something bigger... still, I like to have a bigger print surface for the occasional monster size project.

Love your avatar photo by the way. I uploaded a Cain model to thingiverse a while back:
http://www.thingiverse.com/thing:11843

Subject: Re: 3D printers
Posted by ComesToLife on Sun, 09 Sep 2012 19:18:53 GMT
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7777773 wrote on Sun, 09 September 2012 03:17

Love your avatar photo by the way. I uploaded a Cain model to thingiverse a while back:
http://www.thingiverse.com/thing:11843

I am surprised you recognized... and thanks. and by the way, my model is already split into printable parts(separated for assembly kit), but the company I made it for had it in the agreement that I don't re-sell or re-print it myself. having that said, they have not paid me full amount they promised, so potentially I could go around that clause. May need to see a lawyer about it, but....

Here is the render of my version: http://zoomzoom.deviantart.com/gallery/4477846#/doqcah
and Here is a random animation I did with it.
http://zoomzoom.deviantart.com/gallery/4477846#/d1qotrb

Subject: Re: 3D printers
Posted by ComesToLife on Sun, 09 Sep 2012 19:21:42 GMT
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does anybody got any examples of Makergear M2 prints? I actually prefer the bigger space as I got some ideas that area larger then 5.5" , but I also need accuracy and details... and I don't want to wait 2 months to get it

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Subject: Re: 3D printers
Posted by 7777773 on Mon, 10 Sep 2012 22:48:08 GMT
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Here's an M2 sample. Printed at the default setting 0.2mm (200 micron) layer height - this is approximately the same resolution that Shapeways uses for the WSF material. The sample is unfinished; like WSF you get a smoother resolution with some post-print polishing, and at this layer height print times aren't unbearably long.

I've seen people posting results of 1 micron layers, but have not seen this in person yet. I have seen Ultimaker prints reach 20 micron layers which is very very smooth. I suspect the "1 micron layers" claim was actually 10 microns (0.01mm) which is still very impressive... 1 micron layers would be nice but I don't think we're quite there yet. Maybe soon.

*** EDIT *** I should note that this would have been a "solid" model by shapeways standards, and would cost maybe $200 to print here. This particular print was specified to be hollow in the printing software. Well, technically it isn't 100% hollow, there is a small amount of infill for rigidity, but the actual STL is 100% solid and the actual print isn't. This is a feature of basically every home slicing application, but for some reason it is not yet available from any 3D print services. The actual cost in plastic to print this I would guess to be about a quarter, and maybe 2 dollars if It'd been printed 100% solid. While specifying a hollow model doesn't save much money, it will save you time so you can print more things.

File Attachments

1) IMG_9132.jpg, downloaded 275 times

Subject: Re: 3D printers
Posted by 7777773 on Mon, 10 Sep 2012 22:53:07 GMT
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And a second close-up. I apologize for large pics but it helps when looking at detail. If you the need original resolution photos let me know.

File Attachments

1) IMG_9133.jpg, downloaded 266 times

Subject: Re: 3D printers
Posted by ComesToLife on Mon, 10 Sep 2012 23:06:08 GMT
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hi. pictures are good. thanks a lot..
can you talk a bit about post-print polishing process... what goes into it and such... I am new to owning my own printer and therefore need as much info as possible. Is it necessary with all prints done by home made printers? I am assuming technology is overall the same...

Subject: Re: 3D printers
Posted by 7777773 on Mon, 10 Sep 2012 23:18:21 GMT
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Most people that need an ultra smooth finish run a fine sandpaper over the object to remove the 'grain'
Depending on your material, you can use a solvent to melt the outside smooth as well. ABS for example, can be smoothed by brushing a very small amount of acetone. Too much acetone will completely melt abs, so careful!
The print above is PLA - it's biodegradeable and smells like candy when it's printing (rather than the ABS smell of burning plastic) but it doesn't have an easy solvent so it would need sanding, but I'd rather run thinner layers and spend more time waiting for a print to finish than spend more time manually sanding.

Please do share your models (if you can). Your Robocain is incredible and blows mine away, and I'd really like to see your ED-209 printed as well.
If you want to see your models made real, post them to the Thingiverse... you'll see copies posted as soon as people can make them.

Subject: Re: 3D printers
Posted by ComesToLife on Tue, 11 Sep 2012 03:22:20 GMT
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like I said... its a legal issue. as soon as I resolve it, will figure out if it prints...

when it comes materials, I was under impression that home printers only use ABS...

Subject: Re: 3D printers
Posted by 7777773 on Tue, 11 Sep 2012 03:29:37 GMT
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Home printers can print any thermoplastic... provided the extruder can feed that plastic. ABS and PLA are the most commonly available spooled plastics, but PVA (water soluble) is showing up lately as well, and other plastics are perfectly printable. You'll need to adjust temperature settings to suit the plastic you use, but that's about the only change needed when you switch materials. Check out the filabot (http://filabot.com/) - it's a project to make your own plastic spools at home, converting whatever you give it into usable feedstock. It's not 100% ready, but they've had successful prints from recycled milk and soda bottles already.

Subject: Re: 3D printers
Posted by ComesToLife on Tue, 11 Sep 2012 09:36:01 GMT
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well. i had been researching and it looks like M series u are talking about IS the best offer when it comes to print envelope and the cost ratio. other brands are cheaper, same price or higher in cost, but offer less printing area. I decided not to go for the cube mainly due to the fact that it has limitations in size and the fact that they require you to buy their materials. that's dependency I don't want to have...

Subject: Re: 3D printers
Posted by neuralfirings on Thu, 13 Sep 2012 03:08:22 GMT
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What's your experience been configuring the printer? Also, have you found the design limitations trying to deal with?

I've heard that home 3D printer configuration can be tough to deal with.

Subject: Re: 3D printers
Posted by 7777773 on Thu, 13 Sep 2012 18:59:12 GMT
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Most printer kits come with a default configuration nowadays so you should be able to start printing with those settings immediately, but there are a huge number of adjustments that can be made if you want to. If you build your own printer from scratch, you'll build your own config as well, but you can still start with a generic premade Reprap config and adjust it to your specific machine.

Here's a few of the big settings:

BED LEVELING
A level print bed is *critical* to a well sorted printer. A slightly off-level print surface will make an otherwise perfect printer look completely awful. This is the #1 thing you should pay attention to, especially on a new printer. A perfectly level print bed solves many problems. There are some in-software solutions for this in the pipeline, but for the moment it's been a manual check-and-adjust process. It isn't difficult (typically just a turn of a screw here or there) but is overlooked by a lot of new operators. Remember, your whole print will fail if your first layer doesn't have a good base to stand on.

TEMP
Temperature settings are always being tweaked, as the ambient temperature of the room you are printing in changes so should your print temp - you want the filament to flow smoothly out of the extruder and then solidify as soon as possible after it has been applied. Too cold and your layers don't stick and the job fails; too hot any you get droopy melty ugly prints. A number of printers are using fans to blow directly on the print, to help the plastic cool down immediately without droop - this is nice as it allows you to print hotter than you would be able to without the fan, which makes it easier to print gorgeous super high resolution models.

SPEED
The feed rate of your filament determines the speed of your print. Faster is nicer, but you will likely find that higher resolutions and faster speeds are tough to get at the same time. Newer firmwares with acceleration features are making faster print speeds a default function, but more speed is always attainable if you put the work into tweaking it just right.

LAYER HEIGHT
Default layer heights are getting thinner, and this is what determines your resolution. The M2 default layer height is pictured in the post above, with 0.2mm layers.
With some time and tweaking (and a bit copying the settings from others that have already improved their resolution) you can get 10 times that resolution, or more. Here's what people were getting out of the Ultimaker a year ago:
http://davedurant.wordpress.com/2011/10/12/ultimaker-faq-but

-what-about-the-quality-of-prints/
I particularly like the close-up comparing the print to his finger.... you can see how many layers per fingerprint groove there are, which really shows how smooth 0.02mm layers are. This was cutting-edge a year ago, and already it is attainable by pretty much anyone - if you're willing to invest the time to make it work. 20 micron layers aren't going to print fast, you'll be waiting for these to print for quite a while.

As I stated above, "1 micron" prints have been claimed recently... and even if they meant "10 micron" that's still twice the resolution of the print example above and 20 times the resolution of the example I posted a few days ago. See: http://www.twitch.tv/woofpickle/b/331418167
That's a Makergear M2, and the resolution - whether really 1 micron or 10 - is amazing, and more amazing is his feedrate isn't too slow despite the resolution. I'm eagerly waiting to see some finished prints with those settings up close.
In general, extremely high resolution prints require more than just a tweak to the layer setting... everything else gets more important when you're working with layers this tiny, and bed leveling is hundreds of times more vital.

I recommend you research everything thoroughly, as there's a lot to learn. Check out the Google Groups for RepRap, Makerbot, Ultimaker, Makergear, and any other printer you may be interested in. The devices are all very similar, and the people are all generally very helpful.

As for design limitations... I guess I don't know what you're asking for specifically. I'd like multi-extruder print heads to really take off so support material removal becomes as simple as "toss in bucket of water." Much faster print speeds would always be nice, and bigger print surfaces are always welcome.

Alternate designs for home printing are popping up out there as well. DLP printers are extraordinarily high resolution, but also expensive and very small in print area at the moment. Powder printers may take off soon, as they don't require support so overhang and support removal issues are removed completely.
I think the biggest problem with any printer at the moment is they still can't make me "Tea, Earl Grey, Hot".... Yet.

File Attachments

1) uyoda.jpg, downloaded 177 times