Physical Modelling for Electronics Enclosures Using Rapid Prototyping

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Lecture – 34
Modularity

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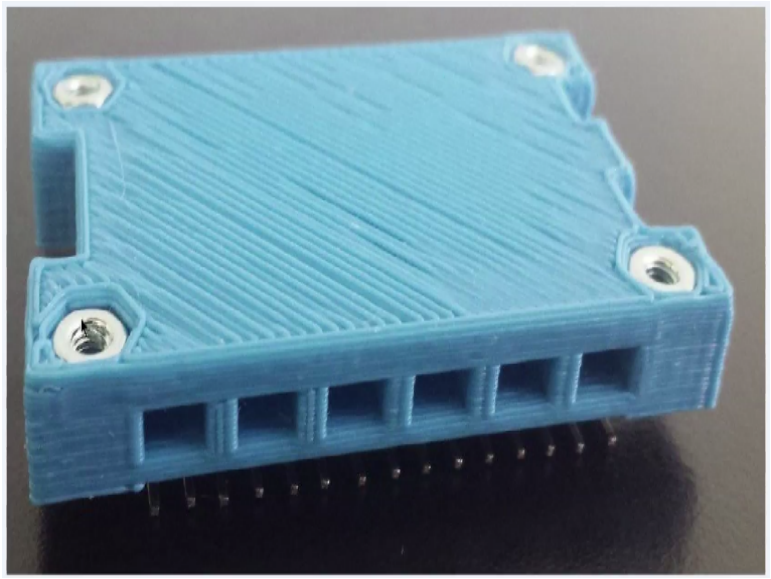

Polyester resin. You can have this glue which is used here. functionally this is very, very good and they have tried to take the best advantage of little bit of detailing which he has learnt obviously he is a person who is I am very extremely happy to see that somebody has made this. It looks not great, but for me it looks authentic.

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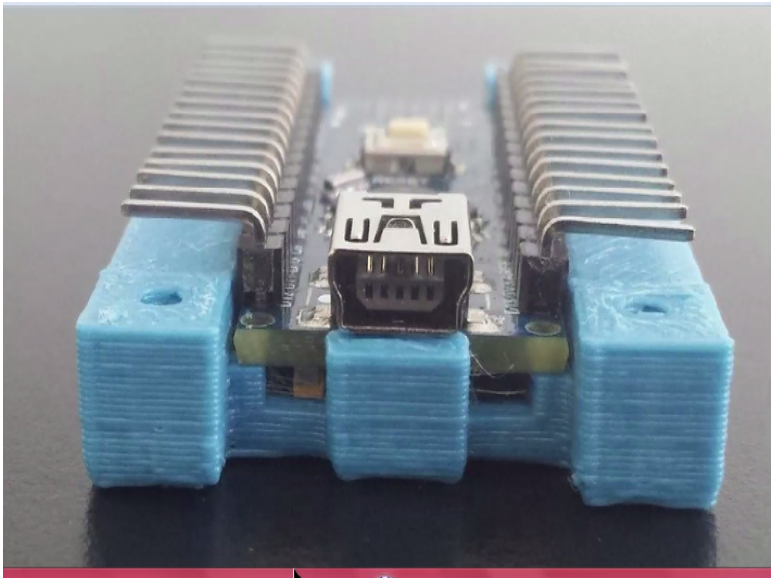

You see here, this is life, I enjoy it a lot, now you see here if you have to put another cover all these things have been brought here on the outside possible for me to put a cover and then I can still access these things and so far the objects that have been shown are probably made in a very high-class machine or alternatively they have been machined again because of this, this finish appeared good in those things.

Even this there is nothing wrong in it after the thing is printed you can always take a paint emery here over this part is called a 0 emery, but otherwise 350 grit emery is available. You put a little water and gently you can emery these things out and things look absolutely fine which is from the outside. Now I will go to the next picture.

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While this part of it is very interesting so far I have only spoken to you about technical things. You can look for it on your own thing. It is some best friends this thing interlocking a keychain calls it so I do not know the same person has both the key chains or it is 2 people and the magic is this if you see this small step here this goes and interlocks here. First you put it here and then tap it over and the whole things stays in place.

To me it is a nice cute novelty and not impossible to finish these things a very easy to finish these items. Means you can take sand them down a little and may be you can even use spray paint depending on the type of material this is you try on a sample and see that it does not melt I am impressed by it.

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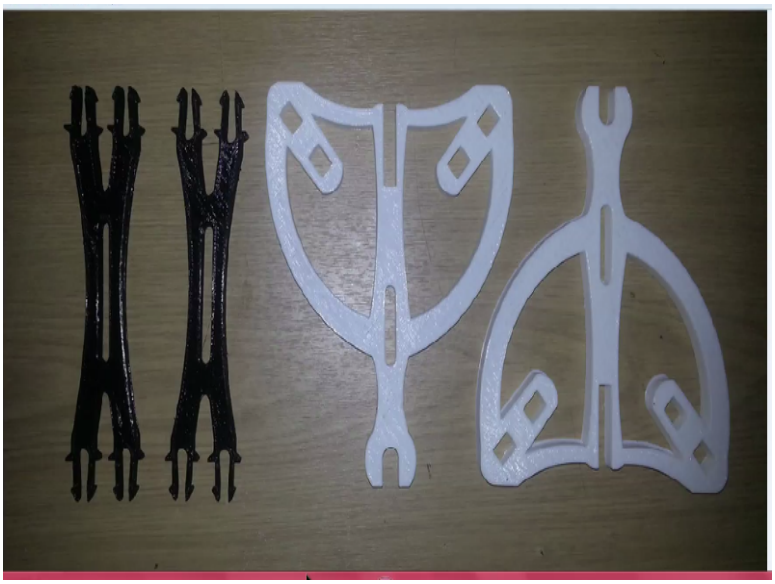

This is an ultimate thread we can have a robot which builds itself so these are parts required for a 3D printing machine made by a 3D printing machine nothing you see the subsequent slides will show you what the item can be.

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Does it give a clue? Exactly this is a trunnion which will hold something here if you put 2 trunnions we can push something alternatively you can clamp something. It is a general purpose trunnion which is fully 3D printed most likely these holes either they have printed it or afterwards it has been added here.

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This is a feed spool for your 3D printing machine so I am happy and you see other details after inserting that you can actually drop this spool here and then you can lock it here and that is the advantage of it normally sometimes a manufacturer gives something which is convenient for you for them to load so you can always buy these things in bulk, these may be just a transfer device and then gently wind it a smaller quantity at a smaller thing, but then if you see here all these details have been made by this people.

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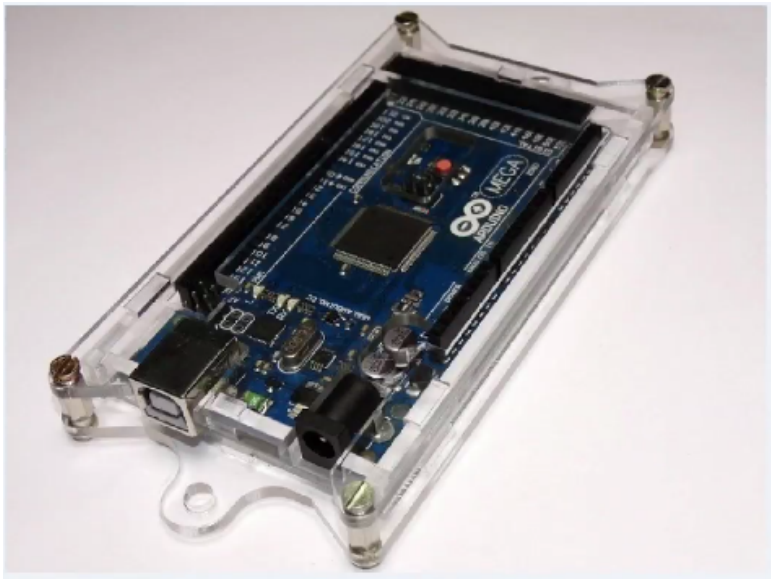

This is cute. Multipurpose this you have seen small flange like thing here, small flange like thing here, small flange like thing here why am I showing this obviously laser cut parts because the same rules apply even for your printed parts. You obviously need to do something to clamp them.

One of the earliest objects I told you is that you know the sides can be part of. This alternatively if you have a file you can print it and then you see this cute thing.

They have provided a flange here and on the other side also you have a flange here so you can fix it somewhere, you can fix it board or at home if you one of the hackers you want to use ad for switching on the lights or leaving messages or doing some home automation you can always fix the whole PCP wherever you want and fully completely modules are available for very, very low price.

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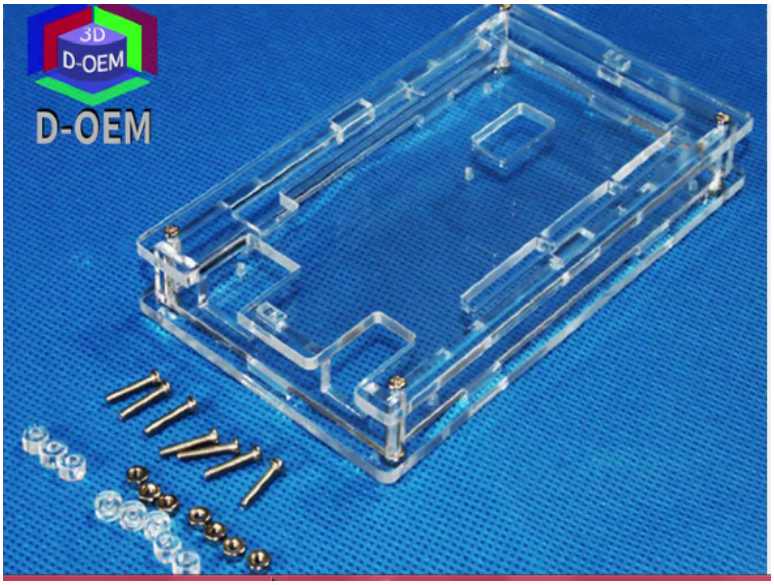

Very interesting, slowly if you see I really cannot get rid of these nuts and screws and these are probably spacers for holding the printed circuit board here somewhere I have opening here if you see here, can you see here there is an opening here, there is an opening here, opening here, and opening here so the thing is may be 1 or 2 are extra about 6 or so are common so you need to put it and then after that you can use this screws and hold the printed circuit board in place.

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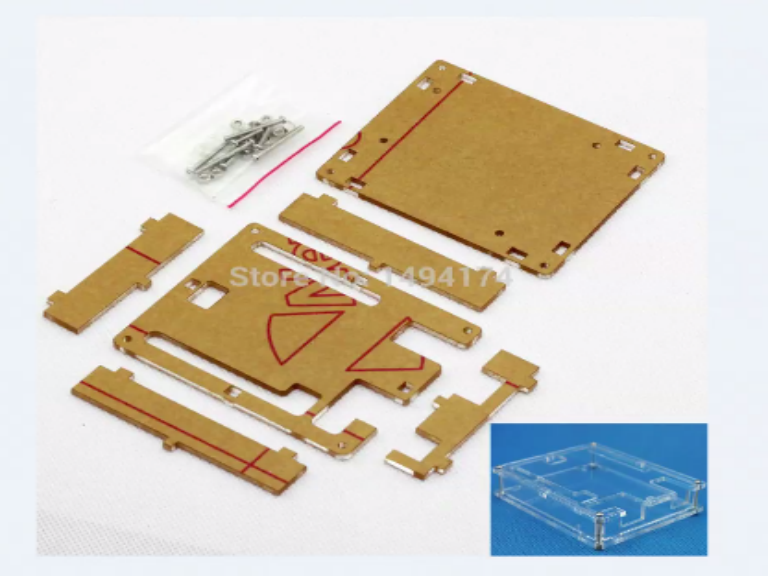

I do not know if I have already shown you now you see that this is the detail which is both the file is available and the parts are available. In case you want to start much easier for you to what you call order this, get this box made, then you can optimize it the way you wanted.

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This I have told you already how the amount of the things that are available on the. I thought I will show you all these small parts here can you see this.

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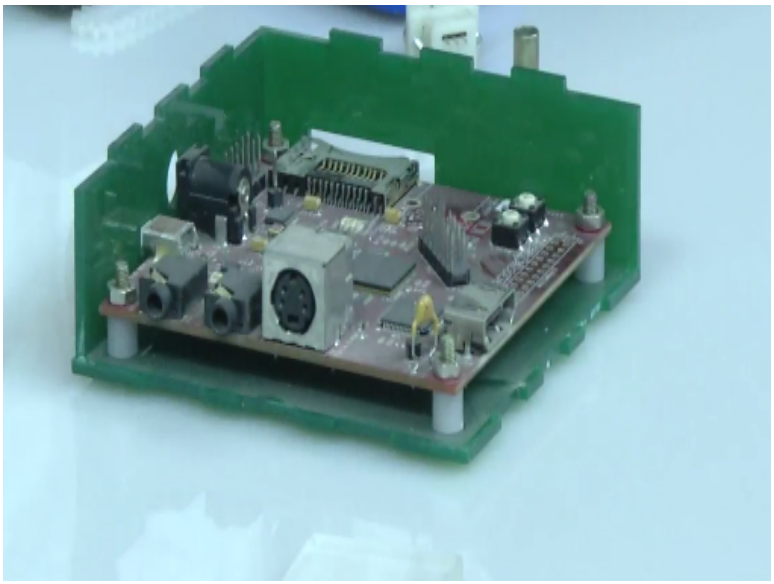

This is the one which I just showed you. In this case they have fixed this corner intentionally so that and then you see here I have a fastener that is fixed here and if I turn it over looks ugly, but does have a purpose and in this case, it prevents the surface from getting scratched when you keep it somewhere so you can even have decorative things. Now if I push it aside see this which I have shown you already.

These are polycarbonate what you call some supports actually it was used to hold a monitor in place. Now I can use this for riveting it to a surface like this. Then neatly my mobile can sit in it without any problem. I will take it out and I will introduce you to a smaller and smaller parts. See here they look a little small actually too small. After working with it slowly you will notice that this is a switch holder seen this here it is the place for the switch to sit inside.

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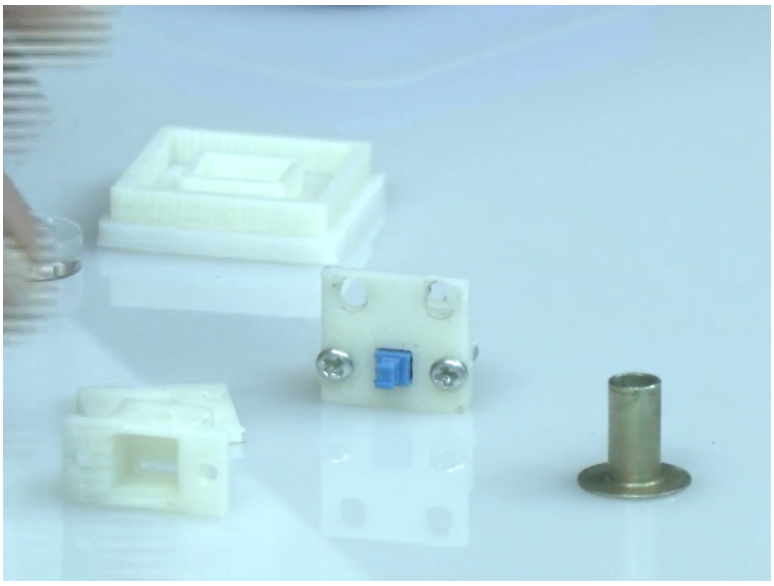

And this is actually how the switch is sitting inside can you see the switch and this one and this are generically same you see generically they are the same. If you see at the back of it and you see the back of it obviously that same element can sit here also. If you see these faces and all that can see the same element can sit comfortably in this except here the flange has been put on 1 edge. This has been put balanced on both the directions.

Depending on our function if you make this detailing adding this flanges is relatively easy follow and most critically is this may or may not be made out of the same thing. Now if you examine carefully probably somebody has printed this object separately. You have seen this, this is the base and the base has been printed and then there is a small cavity in which that thing has been pushed.

Now if you see this is actually something which has been done like this very interesting thing is it not? Now it is a matter of time or a matter of convenience for me to play around with these things depending on if I have a proper fastener and if I have proper device. It is very much possible for me to create all these things miniature things and printing.

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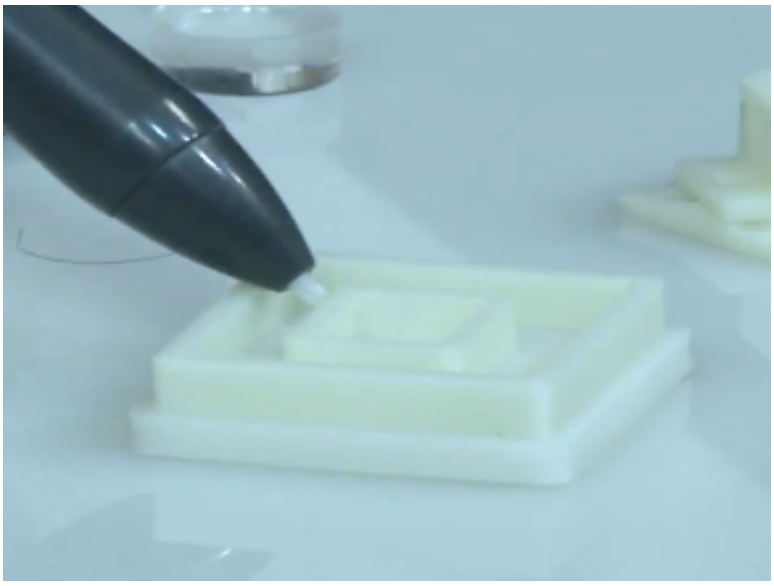

Now you see this. I am again once again I am not very sure what exactly it is. This one is the base on which this printing is being done. I am not sure whether it is part of actually it is a rejected job or the job itself making things like this is simple absolutely ridiculously simple.

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Now see this, this is an acrylic window. Absolute transparent and often we have things like infrared or ultraviolet or protection for the optics inside. Things like this are required. You can always provide a small space for your component and then push it inside and naturally everything sits very, very comfortably inside. It is actually very tiny. In this case it is a 10 mm diameter and actually it has been made.

It looks like it is 8 mm, 6 mm or 8 mm wide and pushing it into any of these things is relatively easy. I have a small opening here. Can you see? Very, very easy for me to make things like this. If I were to make something, I make an appropriate size, push it inside. Now I will remove this and you see.

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I am sure some of you at least would have seen these things. It is a small flange or rivet or I do not know hinge or anything. This could be part of this. It has a small rubber rubbing and then I do something and assemble it and eventually I have a fastening system which does everything else. These are available off the shelf. If you are going to the market and search for it obviously you can get a lot of these things without a slightest problem.

And in case some sealing and all is required. You always need an elastomer seal here. So usually it will come in a flat sheet and then you punch it and you do it. Now I will move this out. I will show you something else here.

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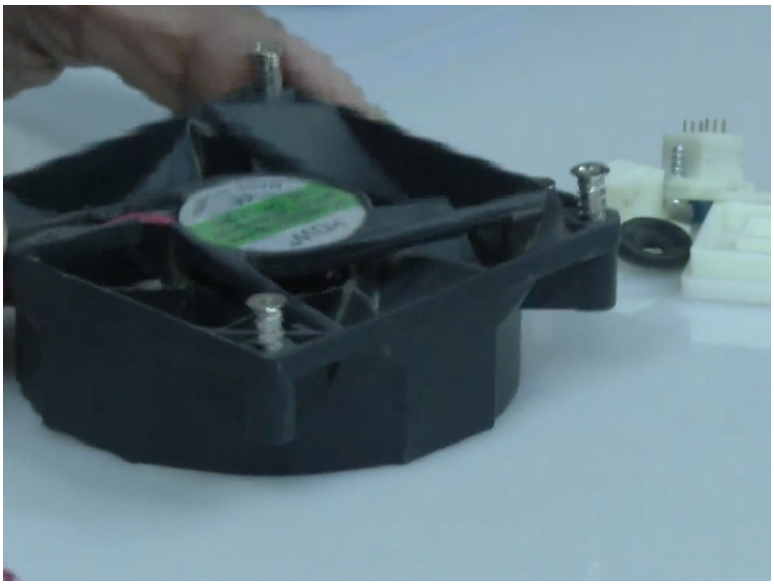

See this beautiful what you call fan looks cute, looks extremely nice, but then this is part of it. Now if you go down or check on any fastener catalogue you will get details about this including sizes or anything you can probably order it and build up your own repository of all these devices. These things go extremely well with our rapid prototyping. So and in fact if you have a necessity to have a cooling device let us say 2 fans in series and 2 fans in parallel it is very easy for you to build things like this may be remove this, this will come away.

If I do something it is possible for me to break it off and build in fact what looks like a turbine, I can have a 2 stage and 3 stage thing by which I can increase the pressure if I cascade these fans. In objects like this you have no choice but to do things directly by rapid prototyping and in this case you have a screw and something coming out. I can cascade them. This is a 12-volt fan. It is written here. If you read carefully this is a 12-volt fan.

So it is possible for me to cascade make it 24 volts or 36 volts or alternatively I can by playing around with this connections I can make it 12 volts, but something which takes around what you call 0.6 around 0.5 amp so if I have a 5 volt, 500 milliamp device I can make something which can easily cool from a your USB slots which I think I am very, very happy about it now I will come to something which I just wanted to show here.

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I am sure quite of a lot of few of you have seen this mints, not long ago things were made out of what are called almost generically tin. Actually it is not tin it is tin plated mild steel sheet. So if you are to make a box like that you see here long ago details were like this. They had made a hinge by forming one of this probably this has been formed, the outside one has been formed and I have a lip that is built all around here.

See this is all done in the what you call sit metal shovel old techniques are there and you see here the lip has been taken at this point if you see the lip has been taken in like this you see here and in this case the lip has been taken out. This is the one that gives tremendous rigidity when you are holding it. If you are to remove it, it becomes weak, a little like the aluminum coke cans you find here.

All the afficit drink cans next time you get a chance if you cut the can you will notice that it is extremely thin and it will crumple easily leave the top and bottom there. Now allow me to show something else.

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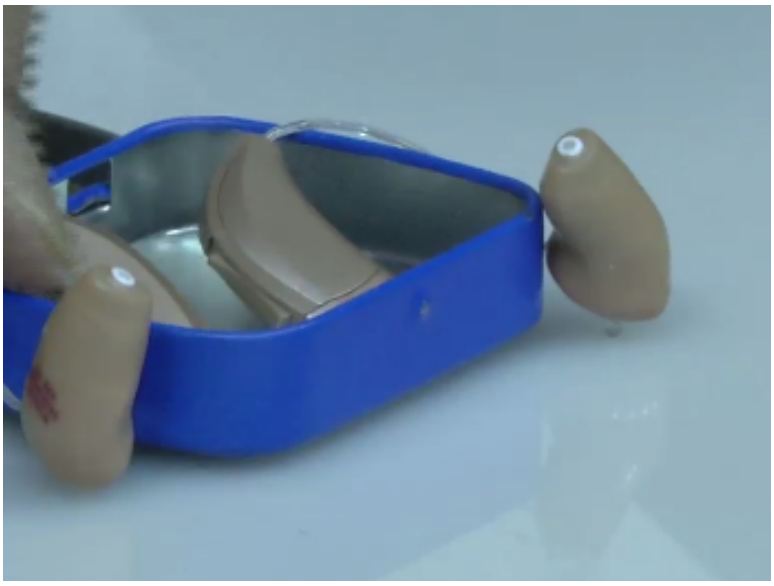

This is my hearing aid. This is a little modern hearing aid after studying so many other things people have come to this shape and the microphones are here. There are 2 microphones here and this one is the speaker element then this wire is there. Now in principle all this can be printed and right now it is molded. At least if you make an initial positive piece then using a lost wax method these things can be printed easily. Same thing with these things absolutely life is very convenient for people like me.

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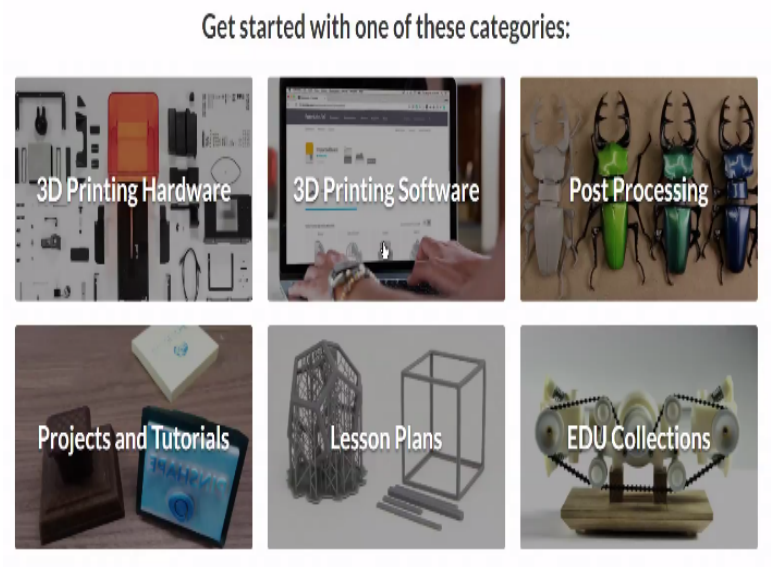

Now there are some things called 3D printing education stuff. This thing called pin shaped dot com gives you a full range of all these 3D printing facilities some of things what I have observed there I have read through like that several of these things for example you see here we have the

actual software which is there probably little bit of what you call sponsorship is involved, but then it is up to you and then they have also provided what is the hardware saying due by which one.

And then for the first timers obviously tutorials and plans will be the ones that are making the actual thing and then afterwards what do you do here. You see here a post processing. What do you get out of the machine is this and then they have added fantastic things to make them look authentic and then you see here how these things are.

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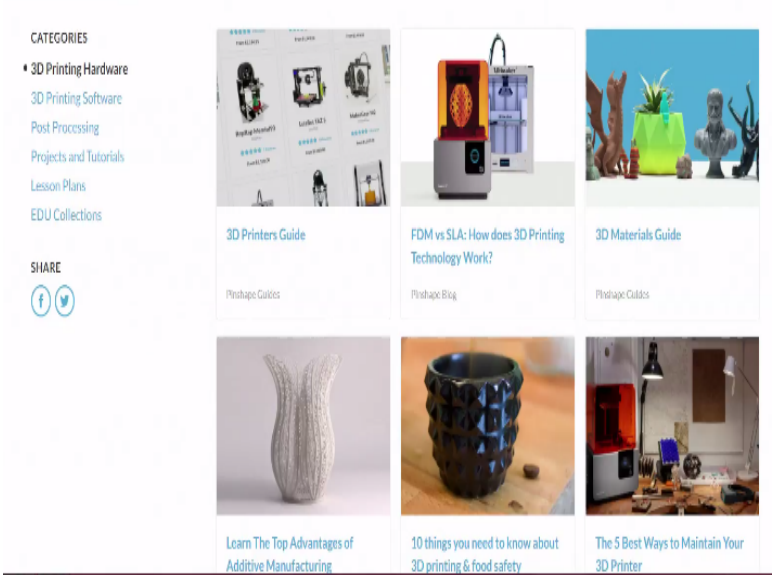

So for conveniences I have just opened one of the thing saying which are the various types of hardware which are available saying so we have SLA then this fuse deposit and then we have stuffed about food safety, how to set up the machine and then what actually goes inside and finally maintain your printer, additive manufacturing various advantages all these come under this so I suggest you look up various things, but I have found this a little attractive.

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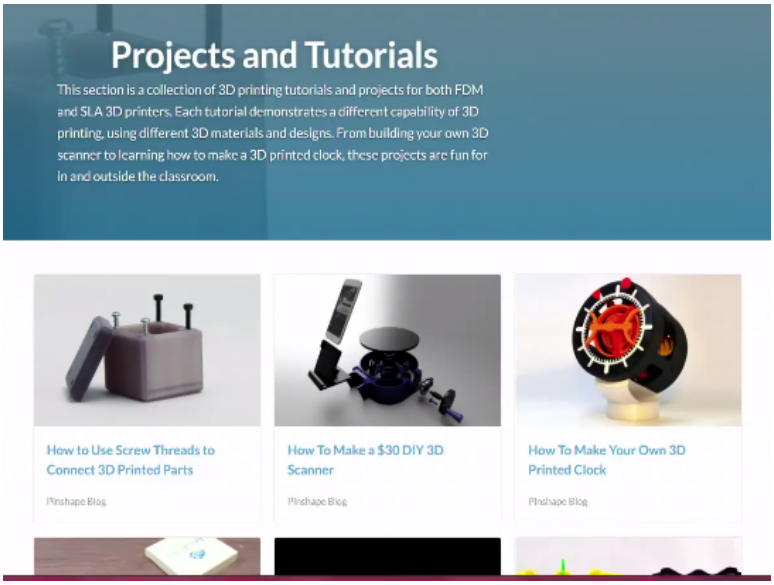

Projects and tutorials you see here we have huge collection of this projects and tutorials normally we being kids at heart. We are fascinated by small objects like this and while I can get away with it as an educator. I can do a bit of reverse engineering, but not the way of copying it. Let us say something breaks in your house important thing could be part of your dishwasher or some electrical device like that if you have the original if you can examine this carefully.

You can probably built something and it seems to work best with toys because toys break quickly and you can keep on building until you can make a new toy and you see here very interesting thing like a clock, scanner, and very, very important screw threads to connect 3D printed parts. Why do you require to connect 3D printed parts? because they are invariably if I showed you earlier invariably we have problems with built height then and direction of lay up this seem to make a lot of difference.

So you have several softwares also. I will try to get back into this. See I kept on talking you about slicing.

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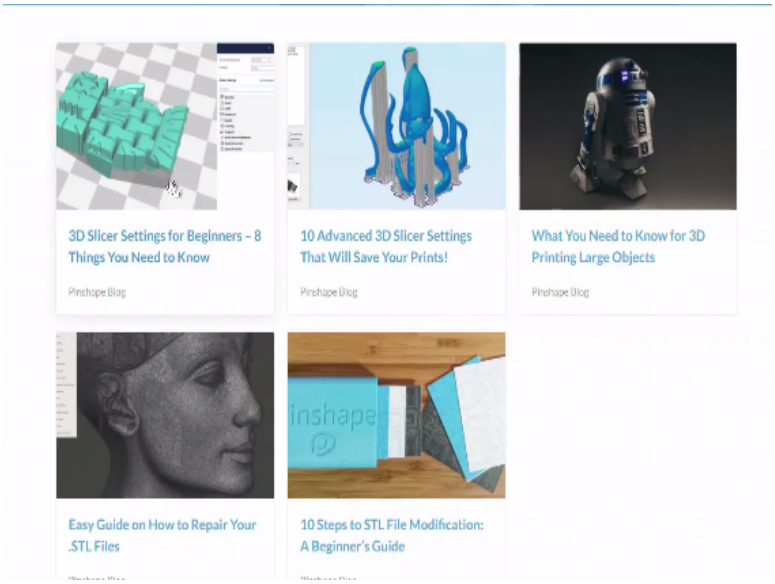

You see here how you need to know about it how to repair your lithography files.

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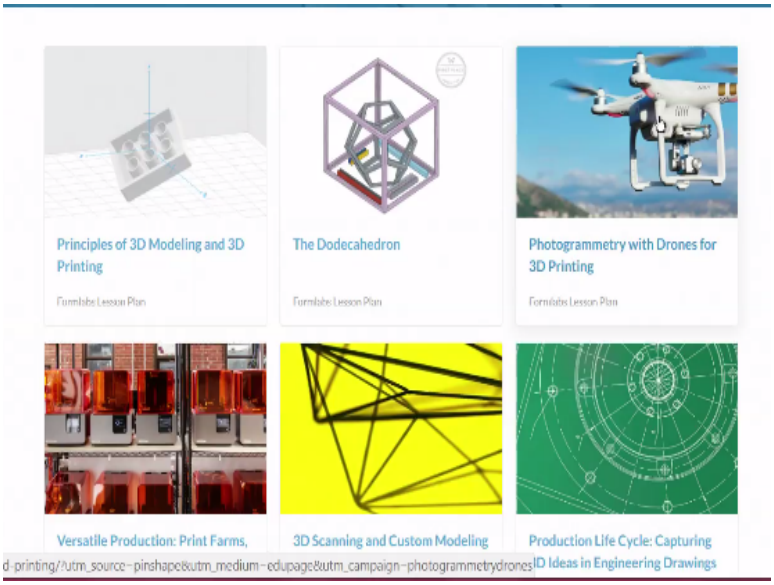

Lesson plans. You can use your what you call phantom and then go about snooping and then whatever your neighbour has you can make it yourself. You cannot probably it will not be the original, but you have made it yourself and how to build these things which is really amazing.

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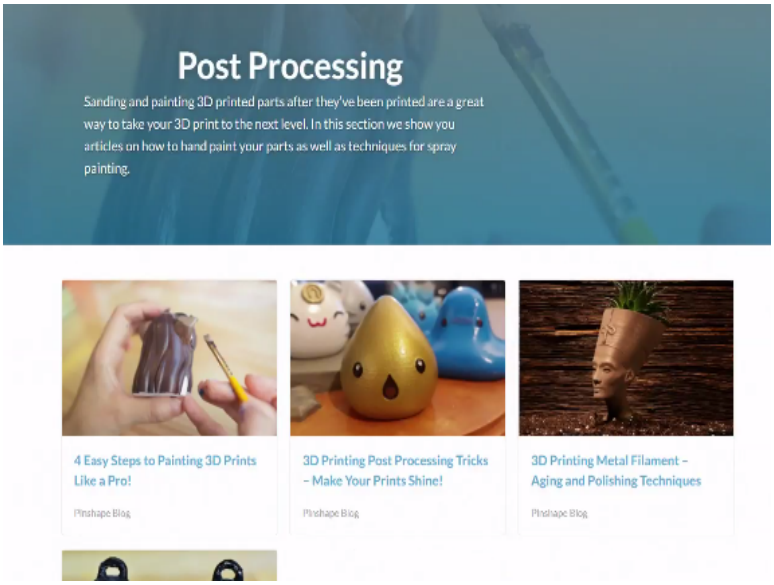

So post processing which is the most important part. Nobody else tell you about it when something comes out of it, it comes like this and eventually we want the glitter and gloves you have to do this and same thing with all these object. How to shine painting 3D prints like a Pro I was talking to you about how to make the, a small torch light. We want to make a torch light obviously there is a reflector and you need to do something about it and how to make it look authentically old so can you make it look like ancient copper.

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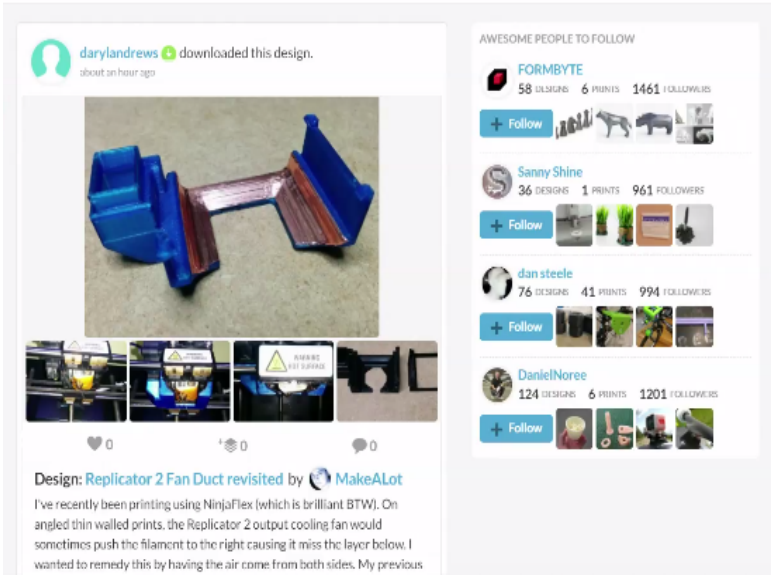

Obviously things have been what you call obviously the things like ducting all these things you have tremendous amount of what you call stuff.

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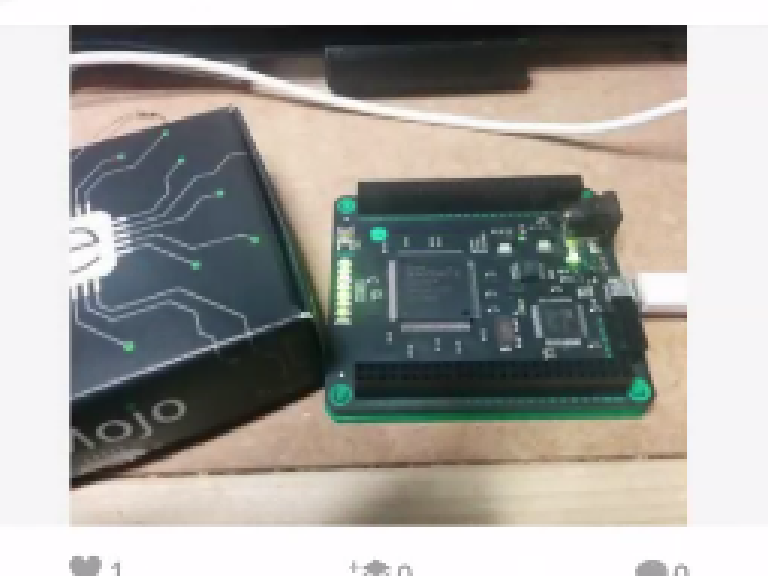

In one of those places small projections are there at the back what is the function of the projection now you see here. MojoFPGA development board so that wires on my bench don't short out the contacts on the back. Here is a link for anyone interested in the board. I do like the fact that the print matches the colour of the silk screen printing. Seen here it is a beauty. Somebody has made one small thing at the back.

So that you can move it around and unlikely I mean think that things will not get short circuited and all and the thing here is you will gain a lot if you register and you can join, joining is very easy and then you have certain advantages.

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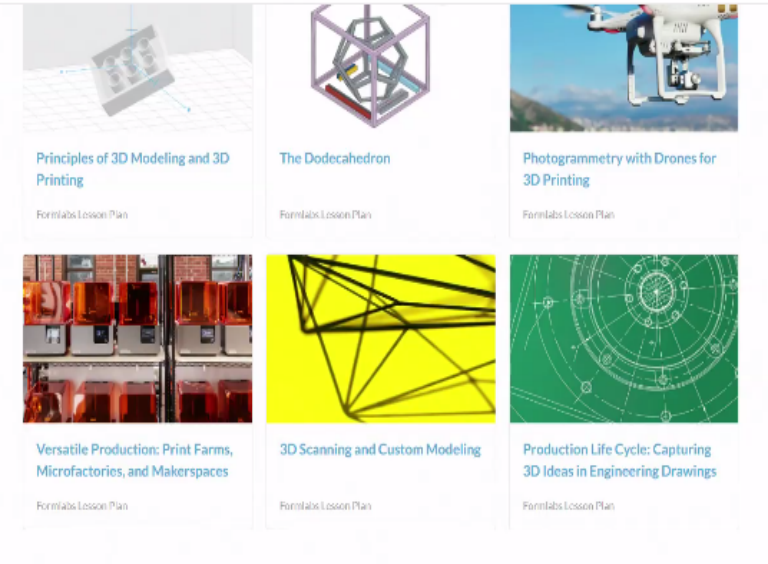

You can upload and download and share then 3D scanning and custom modeling so I will try to spend more time on this again. So at the left you if you see here all these things are there the categories we can go in detail and we have a large community including forums, there are some people are promoting these things, so I feel as they are watching it you should kindly go to this pin shape probably you need to join by giving various your various things.

And then eventually you can log in and keep what you call searching for this and you can get it while we are at it I will see whether I can look for some see if I go here in the very conventional way saying if I look for 3D print files you have this thing was one of my favourites. See somebody has made such things which to me I am fascinated by these things.

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Picnic glass stabilizer. it is easy to print, easy to built, and it is a novelty and in this case the whole thing is you know what you call printed in 1 go like this you can play around with it such that you can make it flat so if you can make a cross pattern and you make arrangement by which you can make it flat. You need to not print something like this. But the advantages these are all available. We can go download and in fact some of the people will help you because they are all there to help each other. I have done this.

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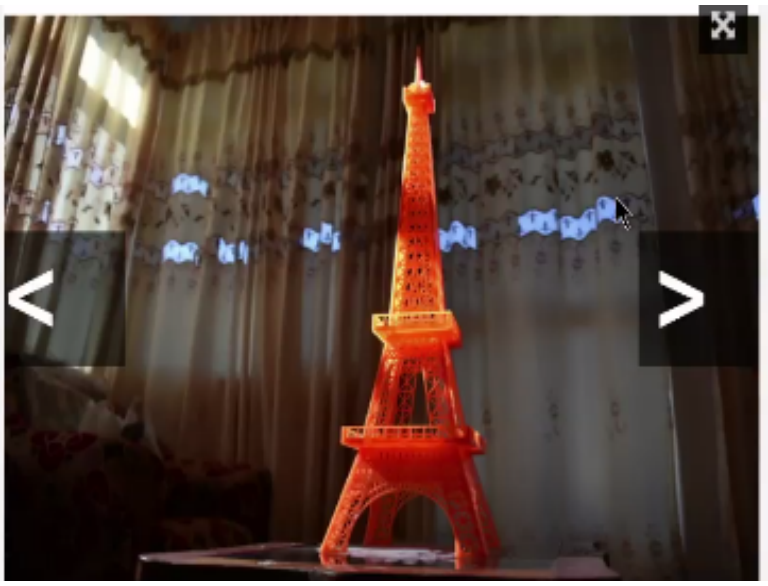

I have done this, but not a great deal because you can buy these things for nothing. You can buy this practically for nothing as things are being built.

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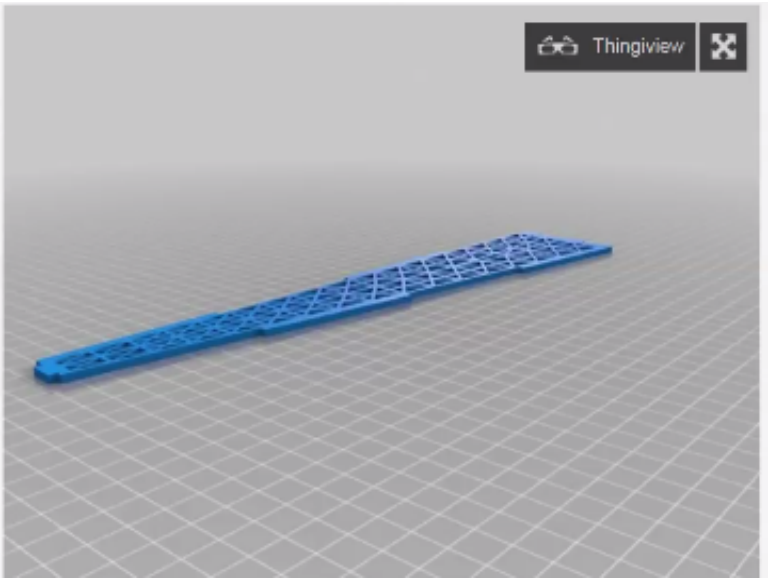

What I was telling you say what they have done they have printed the flat and in fact they have printed a base also to this end attached to all these things 1 to the other and these are the arches where you enter and eventually after all the arches and all have been what you call printed and all it is a matter of time very easily you can assemble these parts.

Probably there are several levels of I mean things here and this, the probably the top most part which goes and sits inside and you have Eiffel tower ready. So these are all available for you.

You can always go to their websites and I am sure this is a normal thing everybody likes making things for their Mom and especially a very young and I do not know I think I am sorry I have not made Mom; it is just written there. You see here this is a normal thing. You would have seen outside LAs that is Los Angeles thing, big love or thing which is mounted.

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Now you see or same thing which is slightly different here instead he has a Gimbal with a heart inside I am fascinated by thing. See her has a Gimbal with a fascinating. After printing it if you flick it if you flick it like this the heart stays and this thing rotates and looks as if it is supported in space. So these are fascinating things so if you go and all these things are available here. How it is printed and then eventually what all you can do with it.

These are the files this is actually a printed object. You can see here at the base something else is there. So now if I go back and you see I am sure you agree with this and I think I will stop the session saying probably 3D printing is exiting so far it was only technical, but then I will see at least 1 session I will try to spend on making this and I was very much fascinated by this.

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I do not know one of my children or family somebody got it and actually it is metal and why I brought it to show is it is hollow it is metal now the whole thing you can print it I am very much what you call I am imaged it these things and then if you can attach it to this and add all these things you can probably build intelligence into it what you call let me not lose my thing about it or you can build an electronic remote control.

I will not say cell phone jammer at least you know few things like switching on the lights and fans and all that you can create these objects without any problem. So thank you.