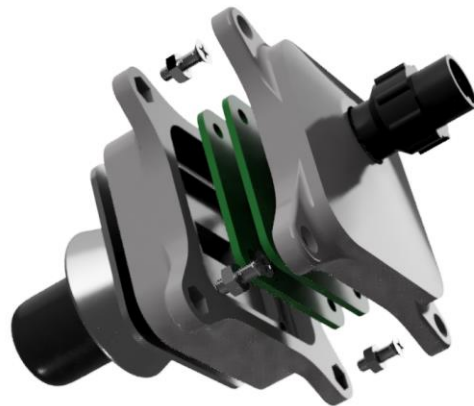


3D Printable Electronics Casings – Customer Case Studies



SELECT 3D

Engineering Consultancy & 3D Printing

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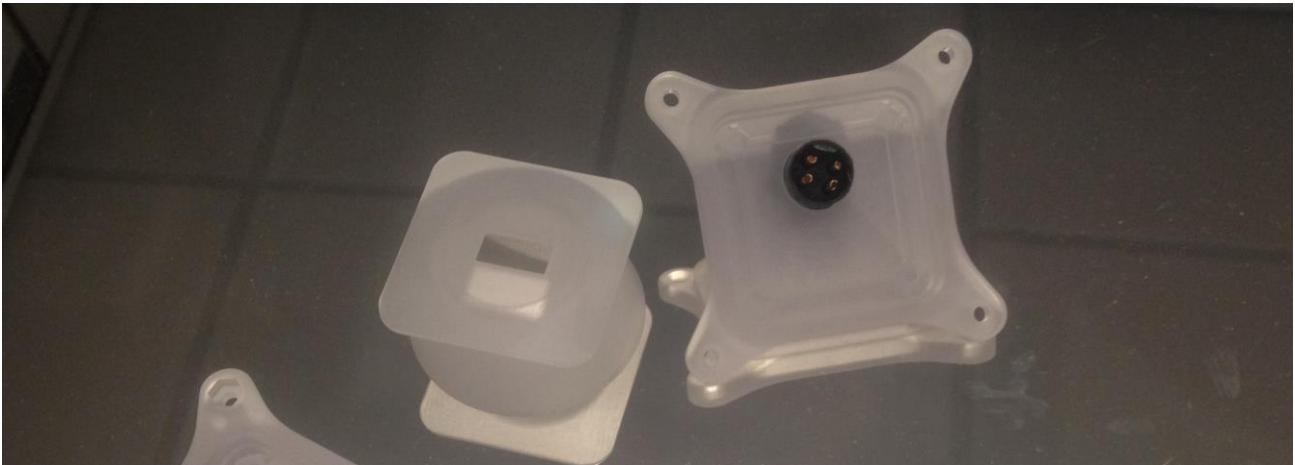
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Electronics Casings

Executive Summary

High-quality and aesthetically-pleasing enclosures, housings and casings for a much lower cost – how 3D printing is opening the door to new levels of efficiency and innovation in prototypes, low-volume production and replacement parts.



No longer a technology of the future, 3D printing is changing the way we think about products, supply chains and business models. In the world of enclosures, housings and casings its precision and responsiveness, coupled with a high-quality finish in a range of materials, is opening the door to new levels of efficiency, innovation and lower costs, including hidden costs such as down time while replacement components are shipped from overseas.

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“3D printing offers almost limitless possibilities for developing new products as well as manufacturing parts and prototypes,” says Anuja Rao, founder and managing director of Select 3D. “It can save time and money, produce aesthetically-pleasing casings and, in some cases, create end products beyond the scope of traditional processes.”

It can also transform the way we market, promote and distribute products and supplies.

“We work collaboratively with our clients to help them understand the strategic impact of 3D printing and make the most of its wide-ranging potential,” says Rao.

A choice of materials

Sophisticated industrial 3D printers can handle materials ranging from simple plastics to metals and even realistic biological textures. For prototypes and printed circuit boards, Select 3D generally uses resin which has been UV cured for strength and stability. The company also prints in an electrically-safe Nylon 12 equivalent. Both are available in a range of colours, and Select 3D is one of very few companies printing in a full-colour plaster-like material. This is particularly useful for clients who want to develop an accurate colour or colour range for their products.

Select 3D also prints in metals including steel, aluminium and titanium but, as this is more expensive, metal is usually used for specific components – a heat sink in an electronics piece, for example, or a metal enclosure. A resin or nylon prototype will usually be created first to ensure a quality outcome.

Fit-for-purpose prototypes

Select 3D produces prototypes with the look, feel and capabilities of the real thing. Most clients opt for four or five prints in the initial run so they can hand them out to customers and stakeholders – physically holding a prototype in your hands is much more informative than simply seeing it on a screen.

Many electrical and electronics components are colour-coded for safety. At the prototype stage this gives an accurate picture of how the finished product will look – and, of course, it’s critical to get that right in a working part.



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Create, adapt, improve

At its best, 3D printing is an iterative process.

“You can make minor changes much faster than if you were using conventional methods,” says Rao. “We work closely with our clients to help them work through the process to achieve the highest quality outcome.”

Faster, more accurate prototyping can encourage higher rates of innovation. It’s so much easier and cheaper to create, adapt, customise and specialise and very bespoke low volumes can also be very useful when you’re fine-tuning your marketing concept.

There’s also potential to create an online 3D catalogue. These 3D models are very different from holograms in that, once they’re embedded into a website, they’re interactive on some 2D platforms such as Microsoft Office or PowerPoint. You can rotate them, look inside and magnify the smallest details.

Create new components

The digital file created for printing is a valuable asset in itself. It not only enables fast and flexible iteration it can be forwarded to any appropriate printer for low-volume production. A product or component can be produced on demand anywhere in the world, which could create a completely new channel for the distribution of products and spare parts that’s faster, much less expensive and, under suitable testing, more reliable.

3D printing could also provide a much faster and cheaper way to replace key components. Many Australian companies source their machinery overseas and, if you have to go back to the manufacturer for replacement parts, the process can be very costly and time consuming. If you have to shut down your own machine while you wait for a part to arrive you could lose revenue in the short term and suffer damage to reputation over the longer term. Being able to scan a part and print a replacement locally could keep your business running smoothly.

If you’re using older equipment, you could even replace obsolete parts rather than be forced to upgrade. And, as physical objects are stored digitally, you can modify your components whenever there’s an opportunity for improvement. A product created by 3D printing can also be produced in large volumes using traditional manufacturing processes.



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Own or outsource?

A 3D printer can be a good investment for companies with a specific and narrow range of requirements.

Different printers have very different capabilities, and they can be quite limited in scope. Not all printers support all materials and the range of sizes you can print will also vary. These limitations can be frustrating – it's one of the main reasons why many companies choose to outsource rather than invest in a 3D printer of their own.

Technology is advancing so rapidly that a major investment could quickly become obsolete.

“Our clients appreciate the fact that they have access to the most sophisticated solutions,” says Rao. “We also provide a high level of project governance to minimise risk and ensure quality results.”

3D printing has introduced challenges in terms of protecting intellectual property (IP). IP is a valuable asset – *the* most valuable in a growing number of organisations – and 3D printing has made it technically possible to copy almost any object, with or without permission.

“We're aware of the challenges and work with our clients to ensure that all appropriate steps are taken at the right time,” says Rao. “At Select 3D, the physical printing of objects is just one aspect of our service. We take a whole of business approach – our aim is to help our clients incorporate 3D printing into their business strategy and leverage the latest technology to gain a sustainable competitive edge.”

Select 3D – the details

Select 3D specialises in:

- 3D business strategy
- 3D engineering analysis and do-ability
- 3D printing
- 3D design and modelling

We create prototypes and functional end user products and parts for electrical and electronic housing, enclosures, casings and fittings along with full project management.



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We print full colour in UV cured resin, electrically-safe Nylon 12 equivalent and plaster-like material along with a range of metals. We can print in sizes ranging from 650mm x 750mm x 550mm to a build size of 800 mm x 600 mm x 400 mm depending on material and application.

Once the design work is complete, professional-grade printing should be completed within five to 10 days depending on capacity and the size of the build.

Case study – C-COR Broadband

A leading supplier of products and services to all major Australian telecommunications companies and multiple-system operators (MSOs), C-COR Broadband also has a growing contingent of high-profile clients throughout the Asia-Pacific region. The company's in-house engineers focus more on product evaluation than product development so, when a customer asked them to produce an insulating shroud to fit around a small broadband insulator, they included 3D printing in their list of options.

"A broadband insulator is a metal box about the size of a pack of cards but mounting lugs and tapering give it quite an intricate shape," says Senior Broadband Engineer Paul Moody. "As the casing needs to conform to these complex contours our first idea was to dip the isolator in liquid plastic. This did the job but it was hard to control the thickness of the plastic and the results were messy and unattractive."

They then commissioned Select 3D to scan the box and create a two-part shell prototype that could eventually be mass produced. The result was a neat, attractive casing with manufacturing tolerances of just 0.05cm.

"We were able to view the product electronically before going for a print," says Moody. "A dynamic graphic was embedded in the documentation so we could look at it from all angles, spin it around and magnify sections to confirm the size, shape and interior dimensions. As a result, the prototype fit perfectly first time. We were very happy with that."

Moody was also able to choose the colour and surface finish of the final print.

"It looked very professional, and that's a big help when management and other non-technical people want to see exactly what to expect in terms of our investment," says Moody.

He was also impressed with the speed of the process.



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“It was much faster than if we’d made a prototype by hand in the workshop,” he says. “It would also have been difficult for us to duplicate the internal structures so we would inevitably have wasted a lot of time and effort generating a number of different versions. Select 3D produced the initial idea for review in less than a week and it was very refreshing to have our feedback incorporated into the virtual view overnight.”

After seeing the results, the company considered investing in a 3D printer of its own.

“We did our research and realised that associated costs such as materials and staff training meant it wouldn’t be worthwhile,” says Moody. “We were also likely to need different printers for different jobs. For a business like ours, where you can’t predict the exact nature of each project and you don’t use the printer every day, outsourcing to the right company is an ideal solution.”

Case study – Successful Endeavours

Successful Endeavours is a product development company which focuses on the design of smart electronics products for manufacture in Australia.

“A sensor device we were developing needed an enclosure that was waterproof, mechanically robust and looked like a finished product,” says Managing Director Ray Keefe. “We provide prototypes for our clients to show their own customers and you can’t underestimate the benefit of having even a first pass prototype that looks like the real thing.”

Keefe was interested in seeing what the most advanced 3D printers can achieve.

“We have a 3D printer of our own but, typically, as with most lower-end models, you have to sand and paint the final print before it looks close to finished,” says Keefe. “Select 3D produced a high-quality set of parts that appeared to be fit for purpose and did exactly what we needed. They also looked exactly like the finished products.”

He was also keen to work with someone who could ensure that computer aided design would work for the 3D printing.

“For speed of delivery of new products in development it’s often a good move to select a supplier who can deliver the complete solution efficiently rather than just manage the process from the outside,” says Keefe.



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For the past 30 years Successful Endeavours has been making prototypes using everything from paper and glue to PLA and ABS.

“Now we have a new option on the table – a credible prototype with a high quality finish and good mechanical properties that’s ready to use without any post processing,” he says. “We were very impressed that, even though this was their first engagement with us, Select 3D delivered a perfect outcome.”

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