Bang and Olufsen

Creativity when there is freedom to explore and experiment.

"We chose Altium Designer because we need to produce prototypes rapidly and without fuss. The introduction of integrated database libraries allows us to do this. We can easily place up-to-date, pre-approved components straight onto the schematic. And the 3D visualization engine means we can fit our boards into their cases and reduce MCAD ECAD revisions to a single clearance checking procedure. It's features like these that allow us to complete designs quicker and with more confidence. For example, prototypes that once took a month to complete are now finished in half that time."

Bent Christensen
Senior Engineer,
Innovation and Prototyping,
Bang and Olufsen

Forget for one second you have a looming deadline, a list of hackneyed design specifications and pressure from management. Now, imagine you could finally do something different. That you could finally explore all your ideas and that you were encouraged to be creative. Now, imagine you actually worked in this place.

Sounds like a cliché? Well, if your work environment differs from the description above, then you will envy Bent Christensen, Senior Engineer of Innovation and Prototyping at Bang and Olufsen. He works in the company's 'ideas factory' making prototypes for Bang and Olufsen's next generation of audio, visual and mobile communications systems.

The reason they call it the 'ideas factory' is because this is where it all starts for most Bang and Olufsen electronic designs.

"The 'ideas factory' is where we have the ideas for future products and where we turn those ideas into prototypes. These prototypes could be for a television, a remote control, or a mobile phone. We design the interface, the electronics and the mechanicals that go in it and then test, analyse and see how the prototype looks, feels, works," comments Bent.

The trouble with paradise

Just like any job, there are particular challenges the designers must face working in the Bang and Olufsen 'ideas factory'. For Bent, it is dealing with all the options and eventual changes in each prototype. Every time he starts a new prototype, it is like staring at a blank canvas and the real test is to simply find the appropriate architecture for the board.

"We normally start with one idea, and then change to another because there was something we hadn't thought of. Then we keep making changes until we get it right. There are so many things that we need to consider when developing our prototypes," comments Bent.

You can never solve a problem on the level on which it was created

They say doing the same thing twice and expecting different results is the definition of insanity. That is why Bang & Olufsen doesn't just develop a new product; it develops entirely new concepts.

Anyone familiar with Bang and Olufsen will know that each product is designed to dictate the new fashion in audio equipment. Most people look in awe when they see these beautifully crafted structures. But when an electronics designer looks at the same product, it will be almost certain that they will wonder, 'how do you design around that case?'

Bent does deal with unique mechanical casings and this used to be a real challenge. This was until Altium introduced a 3D STEP file import function in Altium Designer. Since upgrading, Bent has saved on development time because he is able to view, in its final form, all his electronics inside its mechanical case.

"It's a quick way to design. It helps us to make sure that it fits into the design. It's just a good way to do it," comments Bent.

Using Altium Designer, Bent can also link to his external databases and even draw his footprints onto the schematic. "Integrated libraries make it easy to make your own unique components. You can simply draw the footprint and place it on the schematic as you like it - so that it fits precisely. You can have your own libraries, with your own components, with your own kind of styling. This is important to us. Our products are unique, so our electronics need to be also."

This whole process, where components need to be changed and redesigned, design media re-evaluated and trade-offs made, is completed with ease using Altium. The unified design environment means changes made in a single domain will be reflected throughout the entire design. So when the team has to change various

BANG & OLUFSEN

	Before Altium Designer	After Altium Designer
Time to layout PCBs	2 weeks – 1 month	2 days – 1 week
Design throughput (how many designs completed each month)	Less than 1 per month	2 designs per month

materials and designs, they don't have the usual re-formatting or revision problems that previously impeded development.

"One example is the touch screen for the Serenata mobile. There were so many changes with this design. We needed to explore so many new ideas. For example, we needed to consider power consumption and battery power. After several prototypes and trial and error, we finally completed the design and made the touch screen out of glass," comments Bent.

"We did this entire prototype design on Altium Designer. We were able to try out our ideas and make changes with ease. It also allowed us to work closely with the mechanical team using the real-time MCAD collaboration technology."

It's this combination of features that have seen Bang and Olufen's 'ideas factory' more than halve its development time and double its design throughput. And that's what today's design is all about – being able to explore concepts and freely innovate.

Customer information

Bang and Olufsen was founded in 1925 and since then has developed a reputation for its range of unique, high-quality audio, video and multimedia products. The company employs over 2,550 people across its offices and retail stores located in over 100 countries. For more information, visit **www.bang-olufsen.com**

Altium's solutions implemented in the high-end audio equipment industry

About Altium

Altium Limited (ASX:ALU) provides next-generation design solutions. These help break down the barriers to innovation, and help electronics designers easily harness the latest devices and technologies, to create their next generation of electronic products.

Altium's solutions are unique because they unify the separate processes of electronics design, all within a single electronics design environment, working off a single data model, which links all the aspects of electronics product design into one design process.

Founded in 1985, Altium has headquarters in Sydney, Australia, sales offices in the United States, Europe, Japan, China, and resellers in all other major markets. For more information, please visit **www.altium.com**

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