



# Microsoft Leverages Advanced 3D Printing for Xbox Controller Prototyping

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The improvements we see with the GrabCAD software, such as the ability to apply advanced color/opacity techniques directly in the software has made the Stratasys J850 an even more powerful tool for hardware development at Microsoft

**Mark Honschke**  
Additive Prototyping Lead, Microsoft



### Customer Profile

Located in Redmond, Washington—Building 87 or Microsoft’s Advanced Prototyping Center (APC) behind a door labeled with the periodic Carbon element (one of the basic elemental building blocks), is a 26,000 square foot prototyping facility, home to a team of highly passionate makers that act as the translator, between concept and reality for both Industrial Designers and Engineers. Utilizing a multitude of manufacturing and prototyping tools, the APC focuses on efficiently creating solutions and prototypes to answer business questions. Following the mantra of “Fail Fast” the APC is responsible for quickly generating confidence in development decisions for Microsoft’s designers, engineers, and partners. 3D printing plays an integral part in Microsoft’s “Fail Fast” development process and Stratasys PolyJet™ models are a part of our daily routine.

### Challenge

Since the first-generation, the ABXY buttons on the Xbox controller have been more than just functional keys for gaming. Their jewel-like appearance has been a visual delight for gamers that adds to the aesthetic appeal of the controller and makes it easier for gamers to identify and press. The first two generations of Xbox ABXY buttons were typically made up of two parts, the bottom-colored portion with the letter and a clear cap seamlessly built together in a process called over-molding. Subsequent generations increased the part count to three, a black base, a colored

letter, and the clear cap, with future generations of these buttons increasing part count and surface treatments. Prototyping of this multi-material injection mold process was a challenge from the beginning that was made even more complicated by the fact that although, at first glance all the buttons look similar, each button is a unique shape above and below the surface of the case top. The traditional methods used to prototype ABXY buttons were slow. First, each layer of the button assembly was fabricated individually and then molds of the individual parts and a mold of the fully assembled button would then be produced. This initial part of the process could take days and was only the first step to a finished button. Second, in a process called over-molding, copies of the bottom of the button are inserted into the assembly mold and a clear resin was cast over the base, creating the one-piece letter “under glass” design. This process would then need to be repeated for all four buttons. Early 3D printing helped to speed up fabrication of the master parts, but it did nothing to eliminate the slow mold making process.



### Solution

The introduction of multi-material 3D printing drastically changed the process for prototyping ABXY buttons. With the first generation two-material 3D printing process, where typically a clear resin coupled with white or black was used, meant you could print button prototypes that more closely resembled the final product in a shorter period than the traditional methods. First generation 3D printers gave designers the ability to iterate button shapes very quickly, but the dual material limitation meant shape changes were the only element that could be prototyped. The advancement to PolyJet™ full-color multi-material printing, as on the Stratasys J850™ Prime, was the advancement that truly opened the possibilities for fabricating complicated ABXY button prototypes. The Stratasys J850 Prime 3D printer allows us to change the shape and color of objects within the prototype's solid bodies in a single print. We can also add color variation and apply graphic textures to individual surfaces with even the smallest detail, and in the gaming world details matter.

### Business Impact

In the world of console gaming, controllers are the most important accessory for gamers. They are an extension of the gamer, not only in the digital worlds but also IRL. As such, gamers want controllers that work seamlessly with their hardware that also reflect their personality, style, and preferences. Controllers that bring the “wow” factor with new colors, graphics and button treatments are hot commodities in a crowded market. Utilizing PolyJet™ full color 3D printing technology on the J850 Prime has allowed Xbox designers to iterate design details effortlessly. The speed, accuracy and large range of colors on the Stratasys J850 Prime has opened new worlds of creative possibility.

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Stratasys's polyJet technology's color matching accuracy has reduced the time needed to prototype Xbox controller buttons, which has given us the capacity to explore more options, ensuring we produce an exciting array of products for the Xbox player community.

Erik Sijgers  
Model Maker, Microsoft





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