

## 3D Printing



## A complete solution with reduced components and increased precision for more efficient 3D printing

### INDUSTRY - APPLICATION

Business Machines - Professional 3D Printing

### APPLICATION DETAILS

3D Systems ProJet® MJP 2500 series 3D printers using Haydon Kerk lead screws and actuators to drive the Z-axis build plate and the Y-axis that moves the printhead.

### CHALLENGE

3D Systems was looking to minimize backlash and increase positional accuracy in their newest ProJet® MJP series of 3D printers. Preliminary designs used multiple components from various suppliers.

### WHY HAYDON KERK PITTMAN

- Customer support for product development
- Quick turn around on prototype parts
- Precision lead screws
- Low friction coatings to improve efficiency, life, and eliminate lubrication
- Anti-backlash nut systems
- Integrated stepper motor solutions

### SOLUTION

3D Systems became interested in Kerk lead screws due to their high precision, long life, and brand history. The ProJet® MJP 2500 printers build 3D parts layer-by-layer. The Z-axis drive facilitates this by precisely moving the build plate vertically between image passes made by the Y-axis drive. The Y-axis drive precisely moves the printhead during construction of the layer. The performance of these drives is critical to the quality and precision of the printed parts. HKP was able to meet the accuracy and precision requirements with components that also met the product life and cost targets.

For their Y-axis or printhead drive, HKP recommended integrating the lead screw into the motor. The result was a more compact actuator that achieved the linear motion required with the fewest components. Moreover, the system utilizes the NTB series anti-backlash nut and Kerkote™ thread coating to reduce system backlash and eliminate lubrication of the drive. HKP was able to deliver a fully assembled and tested precision drive system that reduced assembly time and improved reliability.

Early into manufacturing, the customer also sought to improve the yield of the Z-axis drive assembly. Previously, multiple vendors were involved to manufacture the timing belt pulley, the leadscrew and then press the parts together. Difficulties in achieving tolerances for the press fit along with the custom fixturing required for the press operation were generating poor yields of the assembly. Haydon Kerk was able to procure the timing pulley and install it onto the screws. Controlling the complete process with a tested subassembly now generates a high yield, ready for final assembly.

### RESULTS

Integration of the Y-axis assembly reduced part count, cost, and space needed for the drive. Combining the Z-axis components improved yield and reliability. 3D Systems was able to successfully build and test their ProJet® MJP 2500 series 3D printers and meet their target product goals using Haydon Kerk actuators and screws. We continue to work together on new designs that form the next generation of 3D Systems products and continue to leverage our expertise in motion control, innovation, and support of our customer from product design to production.

PRECISE

ACCURATE

LONG LIFE

COST EFFECTIVE

*“Fast paced product development requires excellent sales, application, and prototype part support. Haydon Kerk delivered this during the ProJet MJP 2500 program. Furthermore, the drive components from Haydon Kerk have met the precision and reliability goals of the product.”*

Michael Jones, Principal Engineer,  
3D Systems