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- Guy Cardwell,
Engineering Director
HGM Automotive Electronics

3D PRINTING SOLUTIONS in the Automotive Electronics Industry

Industry Challenge

HGM Automotive Electronics develops and manufactures control systems that transform vehicles with manual transmission into automatic. From hotrods to hybrids to heavy trucking vehicles, HGM is a global leader designing custom aftermarket automotive electronics.

Automotive manufacturers typically produce parts in quantities ranging from 10,000 - millions at a time. Companies like HGM specialize in custom manufacturing in lower volumes. Custom development, from prototyping to testing, is essential and often as costly as what is required for much larger production runs. Precision and accuracy before production begins is paramount.

Guy Cardwell, Engineering Director at HGM, began the search for a 3D printer to increase the efficiency of their pre-production processes and safeguard financial risks associated with manufacturing prototypes. The MakerGear M2 first caught Cardwell’s attention because of its well-rated construction and record of reliability.

He says, “A stiffer frame, high quality components, and linear bearings mean good dimensional accuracy, so our CAD models match the final product.”

In addition, knowing his team could depend on the M2 to print production parts 24/7 was key in his decision to introduce MakerGear into their workflow.

Other key features, such as the wide range of nozzle temperatures which allow for printing in a wide variety of materials, and the fact that the printer is ready to print right out of the box, convinced him that the MakerGear M2 was the right printer for them.



MakerGear in the Mix

One way that HGM leverages their MakerGear 3D printer is to produce custom fixtures and tooling for each sub-assembly. This in turn reduces setup and testing time, as well as tooling costs. Because all components must be programmed and rigorously tested, HGM is able to reduce production time and costs without sacrificing its strict quality control standards.

Cardwell says, "With traditional, subtractive machining techniques, the fastest turnaround would be several days even with the best service, and would cost us \$500 - \$1000. With our MakerGear M2, each custom fixture takes about 2 hours and \$3 of material to produce." Cardwell goes on to say, "We've got a full machine shop; I could do all of this without 3D printing, it's just not cost effective. My time is important to me, and with 3D printing I can achieve immense time and cost savings by avoiding cutting plastic, placing the part in a vice, running expensive equipment, and tool changes."

And because they are able to 3D print built-to-spec samples to send to manufacturing partners, HGM is able to ensure that the first production run produces



Success through Innovation

Cardwell also believes his MakerGear M2 is stimulating innovation within his company. When there is less to lose by experimentation, it fosters new ideas and new successes. He says, "3D printing introduced an element of safety to my business in that it allows our team to pursue new opportunities without taking huge risks."

Ready to Run. Built to Last.

- MakerGear printers are crafted out of Powder Coated 11 gauge Stainless Steel, providing superior rigidity compared to acrylic or lighter gauge frames on the market.
- Linear rails and bearings on independent X and Y axes mean smooth, true linear motion for precise prints. All moving parts move with respect to precision CNC cast aluminum components.
- MakerGear printers are capable of printing in a broad range of materials including polycarbonate, nylon, flexibles, PET, HIPS, metal-filled composites, wood-filled composites, carbon-filled composites and many more.

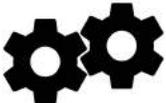


Meet MakerGear

Founded in 2009 in Beachwood, Ohio, MakerGear empowers thousands of users in all 50 states and more than 75 countries, ranging from Fortune 500 companies to small businesses, medical researchers, government agencies, and educators. The company recently opened a new R&D facility in Northeast Ohio and is committed to expanding the use of technology and manufacturing in the region.



MADE IN THE USA Our factory is located in Beachwood, Ohio where all of our machines are built and individually tested before shipping. Many of our components are manufactured within 25 miles of the factory including the fabricated steel frame and steel parts, machined cast aluminum alignment components, extruder parts and the wiring harness. Off the shelf components (motors, power supply, etc.) are sourced from domestic and foreign suppliers.



INDUSTRIAL PRECISION MakerGear products are tools, not toys. MakerGear printers are designed, engineered, manufactured, and inspected according to standards that ensure optimal performance for professionals and innovators— from designers, engineers, and architects to teachers and business owners, as well as hobbyists, DIY enthusiasts, and costume designers — in dozens of industrial applications.



REAL CUSTOMER SERVICE If you ever need to contact MakerGear for support, our team is staffed with the most knowledgeable and responsive MakerGear experts. We have an established record of providing prompt, friendly, and expedient technical support, by phone and email.



THRIVING COMMUNITY When you purchase a printer from MakerGear, you become part of the thriving MakerGear community - an enthusiastic, engaged, and helpful group of 3D printing experts — particularly designers, engineers, educators, and hobbyists. Whether you are 3D printing industrial parts, architectural models, DIY quad-copter drones, or your favorite cosplay props, the MakerGear Forum offers a wealth of guidance and information about 3D printing. Join our vibrant network of makers and professionals, and contribute to our ever-growing community in which designs, inspiration, and advice are freely shared.



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