# Liberty Electronics

Use Case – Epoxy Holding Fixture

## Customer Profile

Liberty Electronics, founded in 1985, is a leader in the design and manufacture of electronic wiring harnesses, cable assemblies, complete cabinet and panel assemblies, and electro-mechanical assemblies. The Military-Aerospace Business Unit based in Franklin, Pennsylvania, stays on the cutting edge of manufacturing by investing in 3D printing and prototyping.

## Challenge

Liberty Electronics relies on fixtures to assist in the manufacture of various electronic components. They need to be strong, ESD-capable (electro-static dissipative), and both heat and chemical resistant. One particular scenario required a fixture to precisely mount and secure a ceramic capacitor and temperature sensor component during a high temperature cure cycle of a structural epoxy. The fixture not only needed to withstand the high temperatures but also provide ESD protection to the electronic assembly. The fixture could be machined but would require post-processing for ESD compliance and lead time was longer than desired.

## Solution

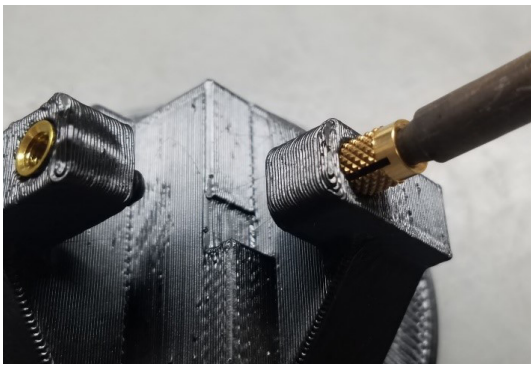
Instead of machining the fixture out of Aluminum 6061 and post processing for ESD properties, Liberty Electronics printed the fixture using PEKK-based Antero™ 840CN03 thermoplastic on their in-house Fortus 450mc™ 3D printer. Antero 840CN03 fulfilled all the requirements of strength, heat resistance and ESD capability, while offering the following benefits:

- Significantly reduced lead time
- Lower material costs
- Little to no post-processing due to the good surface finish
- ESD compliance

Additive manufacturing also allowed for the addition of metal inserts in post-production.

## Impact

In-house production of the fixture using FDM® additive manufacturing and Antero 840CN03 reduced lead time from two weeks to two days. This represents a time savings of 86% compared to outsourcing to have the part machined from 6061 aluminum. In-house production also resulted in a cost savings of 89%.



Threaded brass inserts are placed in the Antero 840CN03 fixture after printing to accommodate 8-32 machine screws.

**Material Cost Savings**

89%

**Lead Time Savings**

86%

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