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ASC Sunstone Case Study: Innovative Medical Pill Camera Production with Flex/Rigid-Flex PCB Introduction

Discover ASC Sunstone's commitment to close collaboration with their customers, showcasing how obstacles seamlessly transform into opportunities and long term solutions

USE CASE SUMMARY

Advancements in medical technology are driving the development of innovative solutions that enhance patient diagnosis and treatment. One such breakthrough is the medical pill camera—a miniature device designed to be ingested, revolutionizing diagnostic imaging. This whitepaper explores the challenges faced in manufacturing this cutting-edge device and details the successful implementation of a Flex/Rigid-Flex 4-layer PCB solution developed by ASC Sunstone to overcome production hurdles.

THE CHALLENGE

Our customer, a leader in medical device manufacturing, encountered significant production challenges while developing their medical pill camera, particularly during the soldering of Micro Ball Grid Array (BGA) components. These issues affected both the quality and reliability of the product, which is critical in the medical field where precision and dependability are paramount. Given the anticipated production volume of over 100,000 units annually, addressing these challenges swiftly and effectively was essential to ensure scalability and cost-efficiency.

THE PROBLEM: SOLDERING ISSUES

The primary obstacle involved recurring soldering defects related to the Micro BGA components on the medical pill camera's circuit board. These defects threatened the device's reliability, an unacceptable risk in medical applications. Our client needed a solution that would guarantee the structural integrity and functionality of the product at scale, while maintaining stringent medical device standards.

THE SOLUTION: FLEX/RIGID-FLEX PCB WITH VIA FILL AND COPPER-FILLED VIAS

ASC Sunstone's team of PCB experts proposed an innovative solution using a Flex/Rigid-Flex 4-layer PCB design. This approach involved integrating copper-filled vias with a via fill technique to optimize the assembly of Micro BGA components. The solution addressed both the soldering defects and the scalability needed for high-volume production.



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KEY STEPS IN THE IMPLEMENTATION PROCESS:

- 1: Via Fill Solution:** To enhance solderability and improve the structural integrity of the Micro BGA pads, we employed a via fill technique. By filling the vias with copper, we ensured robust electrical connections and minimized the risk of soldering defects, thus increasing the reliability of the connections.
- 2: Copper-Filled Vias:** Copper-filled vias with a diameter of 4 mils (0.004 inches) were incorporated into the PCB design, providing precise alignment for the Micro BGA components. This meticulous design change enabled more reliable soldering and ensured that each connection would withstand the rigors of high-volume production.
- 3: Qualification of Offshore Partner:** Recognizing the need for scalability, we collaborated with a qualified offshore manufacturing partner with the capabilities to handle high-volume production. Our partner's rigorous quality control processes ensured that every unit met the strict standards required for medical device manufacturing.

THE RESULTS" ZERO DEFECTS AND HIGH-VOLUME PRODUCTION

By implementing these solutions, ASC Sunstone helped the client achieve outstanding production outcomes. The results were transformative:

- Zero Defects:** The introduction of the via fill technique and copper-filled vias completely eliminated soldering issues. The result was a zero-reject manufacturing process, drastically improving both the quality and reliability of the product—vital metrics for a device used in medical diagnostics.
- Efficient High-Volume Production:** By partnering with an offshore manufacturer and scaling production to over 100,000 units annually, we helped our customer meet market demand while optimizing production costs. This seamless scalability ensured the timely delivery of high-quality medical pill cameras to healthcare providers around the world.



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CONCLUSION: ASC SUNSTONE'S EXPERTISE IN MEDICAL DEVICE PCB FABRICATION

This whitepaper study highlights the critical role that ASC Sunstone played in overcoming complex manufacturing challenges through tailored PCB solutions. By leveraging our expertise in Flex/Rigid-Flex PCB fabrication, we enabled the successful production of a groundbreaking medical device, ensuring high quality, reliability, and scalability.

The innovative solution we provided demonstrates our commitment to helping clients in the healthcare industry and beyond achieve their production goals. Whether you are developing advanced medical devices or other cutting-edge technologies, ASC Sunstone has the experience and capabilities to support your projects from design to high-volume manufacturing.

About Us

At ASC Sunstone, our mission is to partner with our customers to provide the ultimate PCB solution. With over 50 years of combined expertise, we deliver a full range of innovative, high-quality products—from ultra HDI to flex and rigid-flex PCBs—designed to meet the unique needs of industries like aerospace and defense. By focusing on Design for Manufacturability, we streamline the entire process, from concept to production, while leveraging advanced technology and unmatched customer support to ensure precision, reliability, and success in every project.

Industries We Serve

- ✓ Military
- ✓ Aerospace
- ✓ Medical
- ✓ Commercial
- ✓ Industrial
- ✓ Telecom

Certifications

- ✓ ISO 13485:2016
- ✓ AS9100:D
- ✓ IATF16949:2016
- ✓ ITAR Registered
- ✓ MIL-PRF-31032
- ✓ UL Certified