



## **AOR Frequently Asked Questions**

### **What does AOR stand for?**

Automated Optical Repair

### **What is the name of Orbotech's AOR system?**

PerFix™ (which stands for "Perfect Fix").

### **Is this the first automated repair solution in the PCB industry?**

Yes. Orbotech is very pleased to yet again pioneer a breakthrough production technology for the PCB industry. By automatically fixing short defects which frequently cannot be repaired manually, this solution will enable manufacturers to achieve major operational cost savings, particularly as the complexity of board designs continues to increase.

### **How does AOR help me to reduce scrap panel costs?**

With today's fine-line products, the success of manual repair of shorts is limited and in addition frequently damages the adjacent conductors and the laminate. With the precise repair capabilities of PerFix, you can save costs by significantly minimizing your scrapped panels and increasing your yield.

### **Can AOR make a big impact on operational cost savings for other applications besides advanced fine line production?**

Yes. AOR can have a major impact for a wide variety of other applications. For example, for prototyping of high value PCBs. For these products, if shorts can't be repaired (such as larger shorts or shorts in areas with odd conductor or pad geometries), they have to be scrapped. AOR can now make repairs possible for these expensive boards resulting in significant savings.

### **What are the main advantages of Orbotech's AOR solution?**

An automated solution that provides accurate, repeatable and reliable repair of shorts to overcome the limitations of manual repair.

## **How can Orbotech's AOR enable new opportunities for my operation?**

With PerFix, you can produce more advanced technologies with higher yields and greater cost-savings. This will enable you to expand your production opportunities.

- PerFix increases yields and profitability
- PerFix has an excellent success rate of short repairs on the most challenging PCBs (such as fine lines down to 35 µm and high layer count PCBs)
- PerFix optimizes QTA/FAI production by minimizing the need to produce spare PCBs

## **How does AOR impact the AOI room workflow?**

With PerFix, greater AOI operational efficiency can be achieved without changing the AOI room workflow. Panels are still transferred from the AOI system to the verification station. Only those panels requiring repair of shorts are then sent to PerFix. Data is automatically communicated between all of the systems via the network.

## **What is the line width technology supported by the PerFix AOR system?**

The system handles a wide range of technologies and applications down to 1.4mil (35µm)..

## **Why is PerFix AOR a better solution than manual repair?**

PerFix is an unmatched solution for cases where manual repair is not possible or where further damage to the panel results from manual repair. Unlike manual repair, PerFix provides fast, laser-based, accurate repair with no human error and without damaging the panel

## **What kind of shorts and shapes can the system repair?**

PerFix can repair any excess copper on a panel, including shorts, protrusions, copper splashes, excess copper causing minimum space violation, extra features, and others. Thus, PerFix can repair shorts in any shape of near non-linear lines, pads, P&G and more.

## **What is the mechanism that prevents the PerFix solution from damaging the laminate?**

Orbotech's CLR technology™ (Closed-Loop Repair), utilizes closed-loop cycles where each cycle removes a thin layer of the short height. The automated definition of a new ablation contour per cycle and the adjustment of the laser's energy and spot size ensure ablation of the copper only, without damaging the laminate.

## **What is Orbotech's Closed Loop Repair (CLR) Technology™?**

Orbotech's unique, patent-pending CLR technology uses an automatic closed-loop of iterative processes that consist of three parts: image acquisition, image processing and laser ablation. Together, they provide superior performance for highly accurate, repeatable and reliable results - any time, every time - which is not possible with manual repair.

## **How much copper is ablated in every cycle?**

The maximum thickness of the ablated copper in each ablation cycle is less than 5 µm and it can be tuned to 1 micron and below. The final result of the full repair process is a very small penetration into the laminate, which is by far lower than any manual repair.

**How does PerFix handle very thin shorts without damaging the laminate?**

The laser's spot size is small enough to handle micro-shorts; it can also be resized to match the processed contour. Even if during an ablation cycle of the thin copper the laminate is reached, the "so called" damage to the laminate is negligible due to the use of the low-power laser.

**What happens to the ablated copper?**

The ablated copper is absorbed from the panel by PerFix's suction sub-system.

**PerFix uses a laser. Is it safe to work with the system?**

Like all Orbotech machines, the AOR system is CE compliant. It refers to the operator's safety in terms of laser safety, electricity and ergonomics.

**How do I find out more information about this system?**

We would be happy to provide you with more information on how AOR can benefit your operation. Please contact us by completing the information request form on Orbotech's AOR webpage at: [www.orbotech.com](http://www.orbotech.com) or contact your local Orbotech representative.