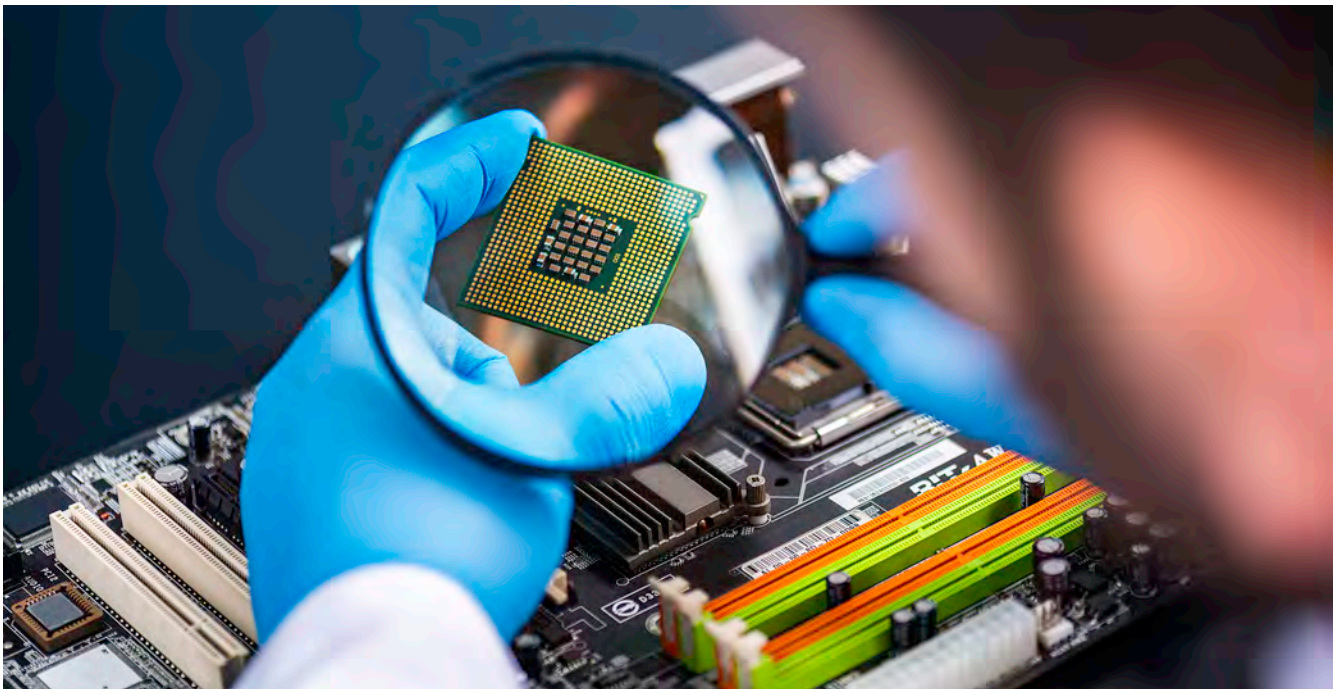
3 PCB Rework Issues

and How to Avoid Them by Design

When you manufacture on a production line, it's accepted that not every single item will pass quality checks. But what happens to those parts that don't pass?

Inexpensive parts made in high volume are likely to be scrapped and sent for disposal. But this is less likely for modern PCBs. By the time a completed PCB rolls off production, its value includes bare board cost, components, manufacturing, and assembly work.



With all that money already invested, it's worth spending a little more to fix these rejected PCBs. Also, if you are working a tight just-in-time manufacturing system, shortages could be your reason to rework. Finally, the environmentally conscious solution is to repair instead of dispose and remake.

Of course, you want to avoid spending more money than it takes to manufacture from scratch. So, the decision to rework may also depend on the type of failure and how easy it is to fix. We're going to look at 3 failures that cause rework, and how we can help you avoid them with clever design choices.

HARWiN

1 – Solder heat causes component failure

Some components are more sensitive to temperature than others. Devices like gas sensors are known to be at risk when exposed to soldering heat. Modern ICs are more resistant than their older versions, but it's still a risk if you have any being hand soldered with higher temperatures.

The easiest way to prevent damage from soldering heat? Don't solder the item! True, that's a bit of an unhelpful statement – but the technology enabling this has been available for many years. Of course, you'll need to consider costs. If it's cheap and easy to replace the board, or the components hardly ever fail, then direct soldering to the PCB is a valid choice.

But where heat is causing higher failure rates, or the board cost is higher, it's time to consider PCB sockets. Instead of soldering to your device directly, you assemble a compatible socket or bank of sockets to the board. It's a tried and tested method for IC chips, but is also a great solution for sensors, relays, and other non-regular termination layouts (called oddform components).

IC Sockets and individual **throughboard sockets** are well established products, but sometimes their height above the PCB can be a problem. Also, it can be tricky to source reeled versions for your automated assembly.

Harwin can help with their **SMT socket collection**. The Sycamore Contact is a reliable 3-fingered contact compatible with a wide range of component tail dimensions. The above-board height is minimal, and the contacts are supplied in tape & reel as standard.

2 – Rework under EMC Shields

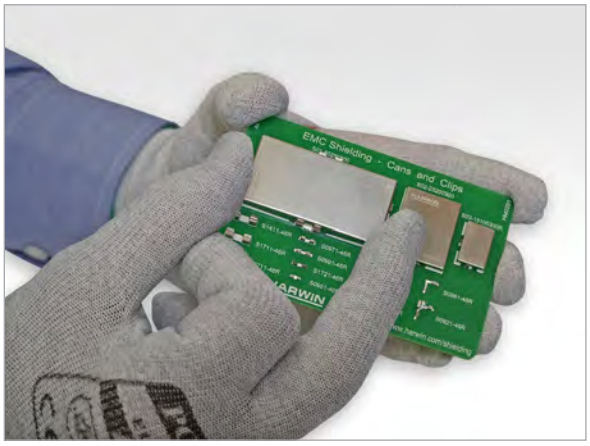
Board level shielding consists of a ground plane in the PCB, and a shield can mounted on top of the PCB. These two features combine to encase all EMI sensitive components within a **Faraday Cage**.

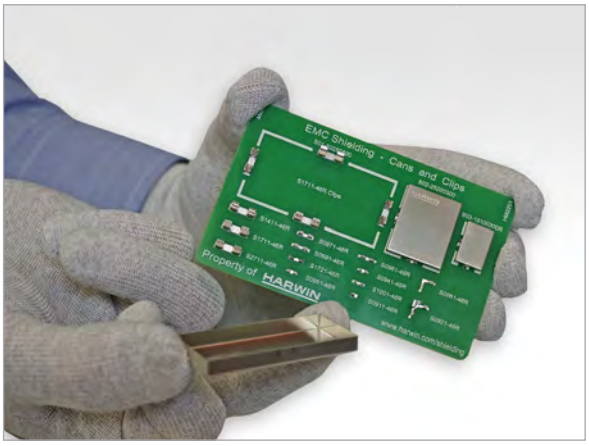
Many shield can designs require throughboard soldering in a SMT-dominated PCB. Assembly of these cans requires a second pass in the solder process (or worse, hand-soldering). If a problem develops under the can, then it must be de-soldered for re-work access. This adds time to the rework process, and increases the risk of damage or accidental de-soldering to other components.

You can avoid this at the design stage – choose a non-soldered can! **Harwin's EMC Shielding** uses a clip-in can system, making rework fast and simple. Here's how you use them:

1. Design a pattern of retaining clips around the edge of the can.
2. Place and solder the clips with other SMT components.
3. The cans are pressed into the clips and held securely, in a very fast secondary operation.

For rework access, it's easy to remove the cans by hand, do the necessary repairs, then replace the same can.





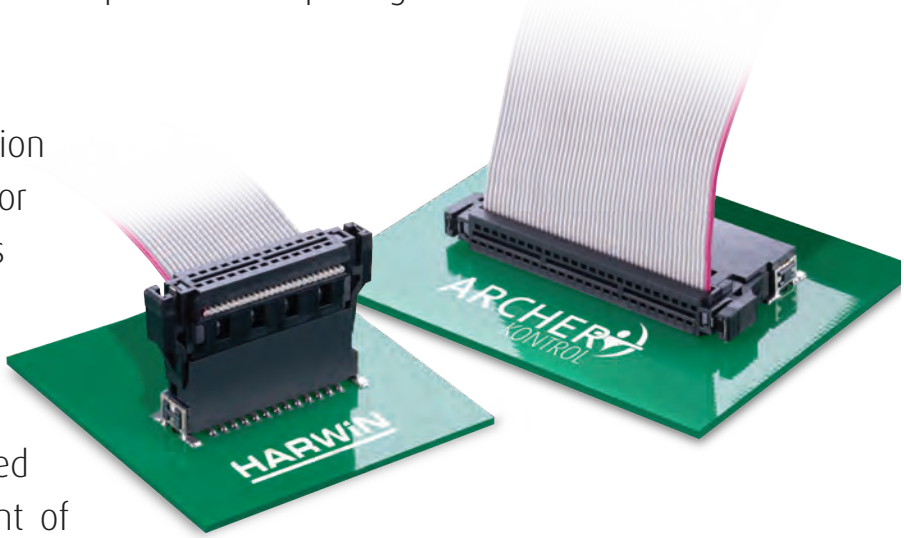
Not only is rework access made simple, but the initial assembly is also faster and less likely to cause rework.

3 – Excessive force on solder joints

Is your connection subject to vibration, regular disconnection, or the occasional shock – or is there risk of twisting or straining the connection? These could happen at any time during the life of your product – from initial assembly to the end of its lifespan. All these conditions put undue strain on the solder joints fixing the connector to the PCB.

Failure could appear as either failed solder joints, or pads lifting off the PCBs. Repairing solder joints might be easier than lifted pads – but repairing either once in use will be very costly and time-consuming.

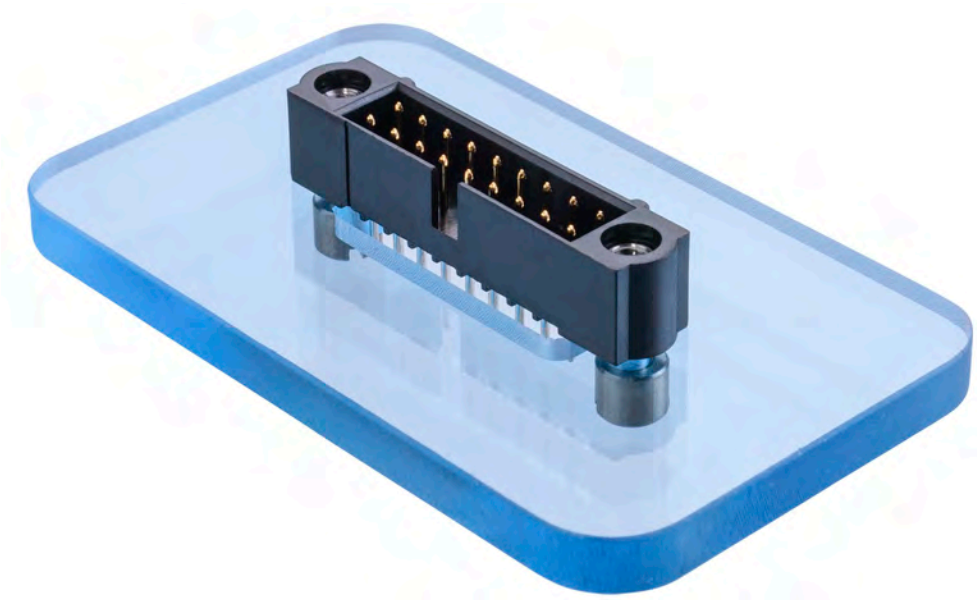
Instead, consider a prevention feature added to your connector design. Industrial connectors such as **Archer Kontrol** have additional SMT tabs on each end. These hold-down tabs increase the amount of surface area soldered to the PCB, increasing the amount of force required to lift the connector.



For higher strain situations, a high-reliability connector with board mount fixings gives maximum strain relief. The connector's mechanical connection makes separation from the PCB virtually impossible.

Harwin offers this option in a variety of hi-rel connector sizes:

- Gecko-SL – 2A signal connector on 1.25mm pitch
- Gecko-MT – 10A power contacts added to Gecko-SL
- Datamate J-Tek – 3A signal connector on 2mm pitch
- Datamate Mix-Tek – signal, 20/40A power and coax mixed connectors on 2 & 4mm pitch
- Kona – 60A power contact on 8.5mm pitch



To ensure that the threaded fixing does not vibrate loose, use the recommended torque in the applicable **Component Specification**.

Prevention is better than Cure

These solutions from Harwin's range are all designed to help you prevent any problems before they happen. By designing in smarter connection choices, time and expense can be saved in production, test, or end use (for maintenance, repair or upgrade).

If you'd like advice on the best choices and how to apply them to your design, our Experts are ready and waiting – book your one-to-one consultation today.