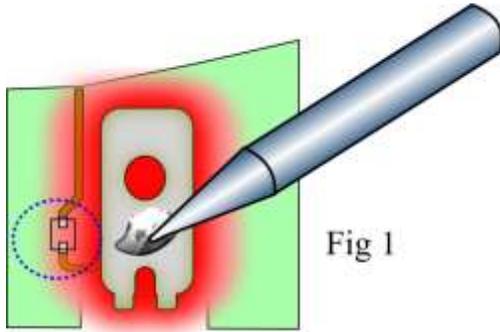


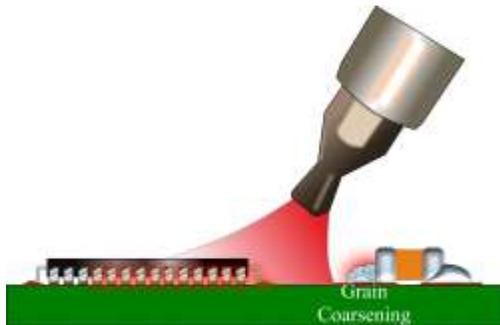
## Dynamic EMS Discusses – The Case of the Missing Components

By Gordon McAlpine, Production Manager, Dynamic EMS

### Hot shortness



Hot shortness, commonly referred to as partial reflow, is where a connection has been heated close to melt temperatures causing grain boundary *weakening*.



*The component affected was within the heat affected zone (HAZ).*

*This can leave the component connection significantly weakened by partial reflow.*

*The component will be left vulnerable to handling damage*

Any devices in close proximity to soldering heat will be impacted by HAZ (termed the Heat Affected Zone), and when heat comes within 2/3 of the melt temperature of the solder alloy, grain boundary weakening occurs making the solder more compliant and significantly weaker.

Hot gas pencils can be the worst offenders for partial reflow, the heat affected zone from hot gas can cover several millimetres around the central heat source, heating adjacent components.

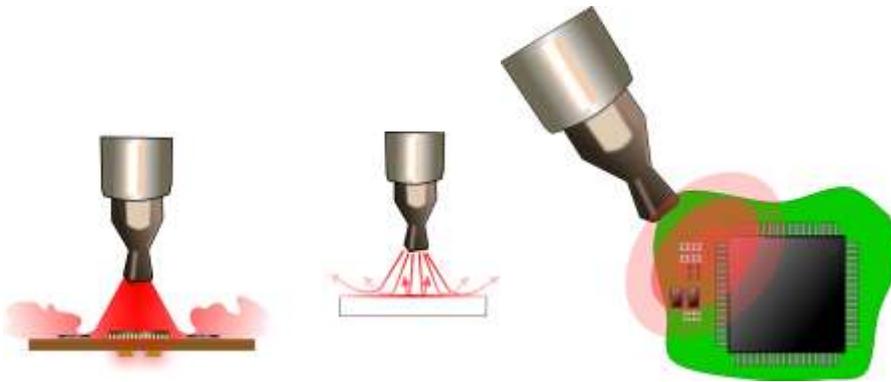
Difficult to solder components can have extended dwell times which can impact components on the underside of the board as well as topside.

There is no easy answer from an assembly point of view, where we encounter such difficult parts we always recommend that during the PCBA design, the engineer avoids placing components on the underside or too close to the difficult component.

We had a difficult situation where a battery terminal had to be hand fitted and soldered after reflow, there was a 0201 diode close by, with one trace connected to the terminal and the pads and component running adjacent to the battery terminal area to be soldered (see Fig.1). To make things a bit more complicated, the device was bottom terminated, it's easy to see that the reflowed solder of the diode was compromised by the HAZ, which made this component easy to knock off the board.

We presented several solutions to the client:

- There is lots of real estate to move the device out of the heat affected zones
- Use a low melting indium solder
- Use other soldering methods:
  - Solder the 0201 diode after hand soldering the terminal



### Unrestrained

- Resistance soldering
- Pre heat the board prior to soldering
- Conductive glue

We are currently working through the various options with the client with the intention of relaying the PCB to reduce the HAZ impact.

### About Dynamic EMS

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From design to distribution, we enable our customers to be more competitive by bringing innovative solutions to market faster, with a commitment to quality in everything we do. Dynamic EMS – Your Product Solutions Architect.

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