Application Requirement

Reflow Samtec™ connectors with leaded and lead free solder materials using a FINEPLACER® hot air rework system. The maximum allowed component temperature, T_{max} (peak) = 260°C. The maximum allowable temperature, T_{max} (peak), for leaded and un-leaded solders are 220°C and 250°C respectively.

Process Description

a) Desoldering

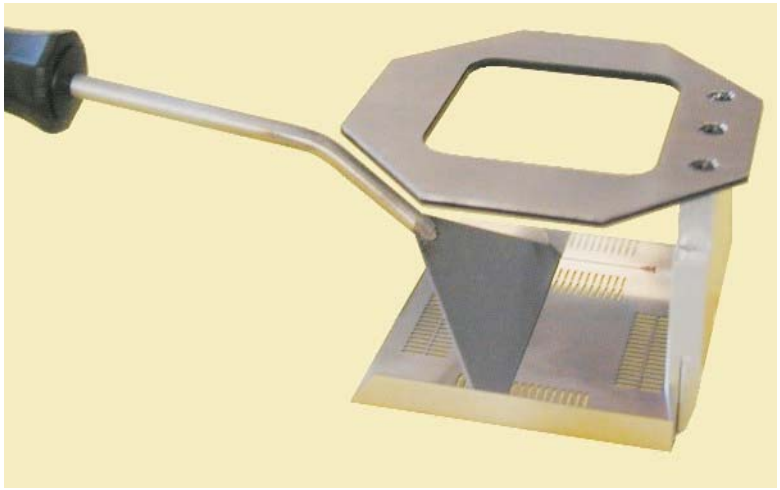
After alignment of nozzle to connector, the board is pre-heated to the 'start' temperature. This is a critical element to avoid board warpage and to shorten the de-soldering/soldering process time. Subsequently, the pre-programmed reflow profile takes over, controlling top heat and bottom heat as well as gas flow rates. The connector is freed from the board by a combination of vacuum and a clamping mechanism. Employing inert gas within the profile prevents solder escaping within the connector pins.

b) Soldering

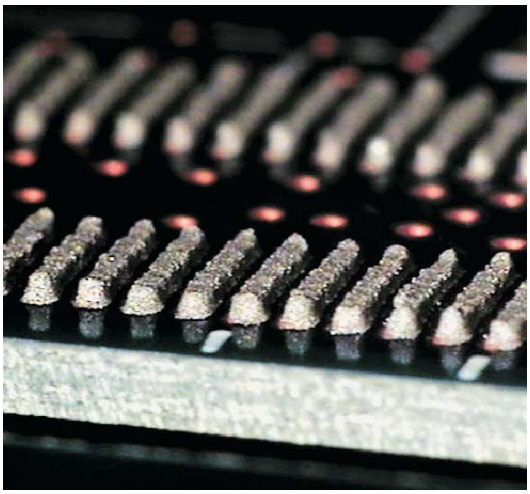
Essentially the reverse of the above process, using a modified profile based on the de-soldering process file. A precise cooling ramp is used to facilitate good intermetallic connections.

c) Additional Working Steps

After desoldering, the residual solder can be removed from the pin-holes and pad area using the Residual Solder Removal Module. Fresh solder paste can be printed using a stencil inserted into the reflow arm of the system and aligned to the pad pattern of the PCB. Paste is printed and inspected on the system prior to reflow. Optional flux dipping is available if the new connector is to be replaced within existing residual solder on the pads.

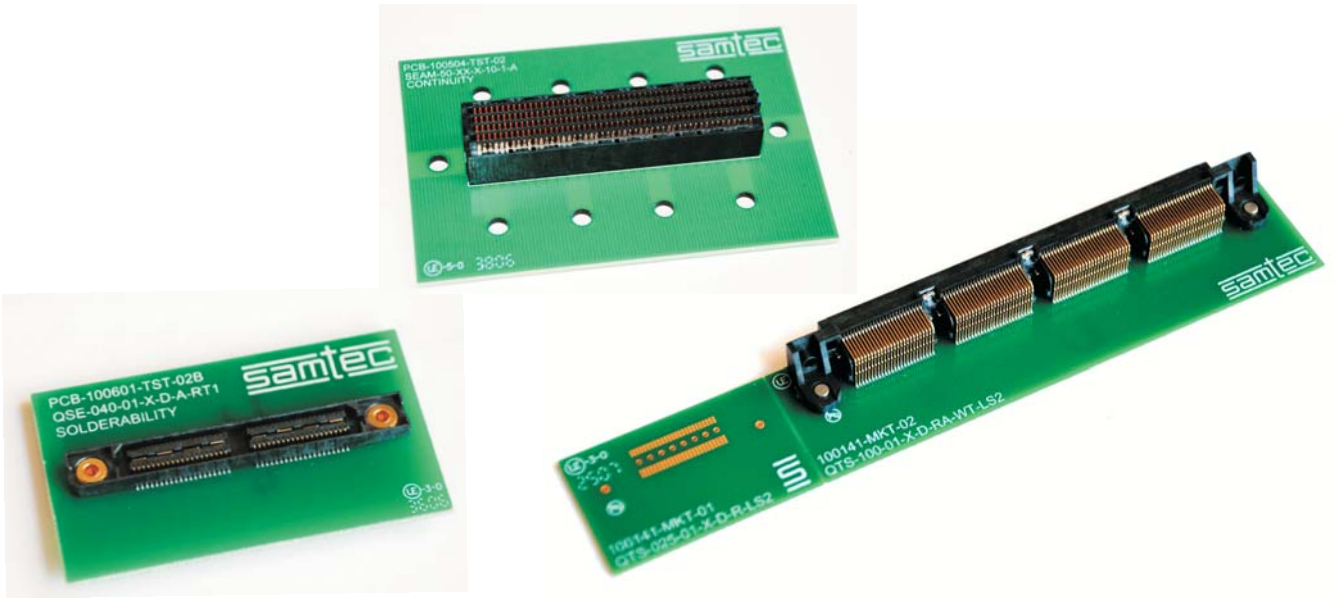


Paste Printing Head with Squeegee



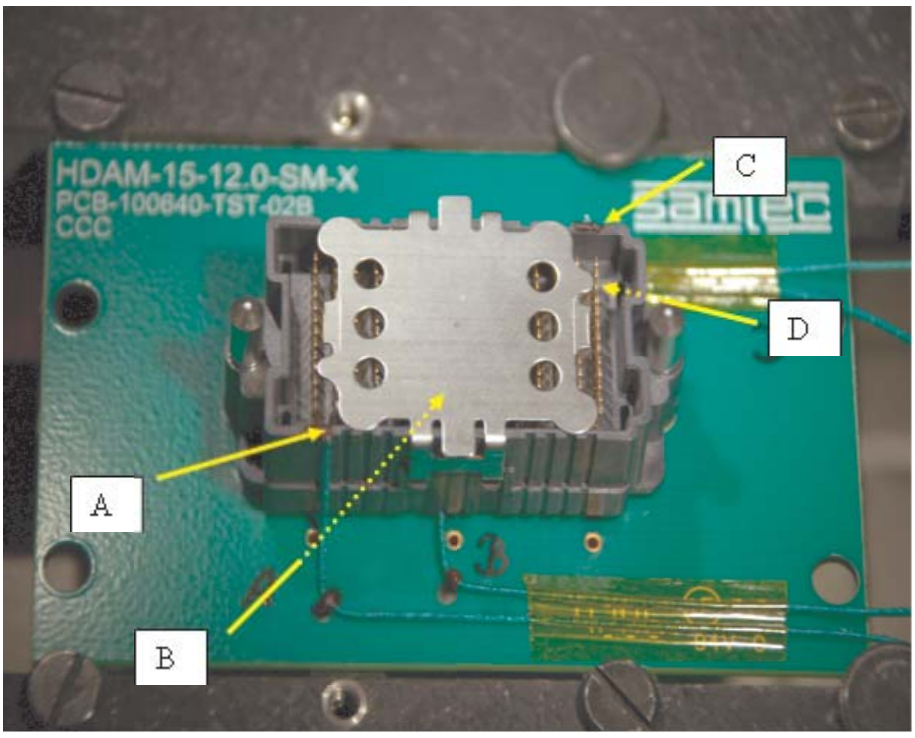
Paste Printing Result

Technical Note
Connector Rework



Component type	Leaded Material	Lead-free Material	Nozzle Number
QSE-040-01-X-D-A-RT1	YES	YES	LK-20 42 62
SEAM-50-XX-X-10-1-A	YES	YES	LK-20 42 59
QTS-100-01-X-D-RA-WT-LS2	YES	YES	LK-20 42 61
HDAF-15-XX.X-SM-X	YES	YES	LK-20 42 60
...			
(other connectors on request)			

Profile Test Description



Prepared sample with connected thermocouples (A/B/C/D)

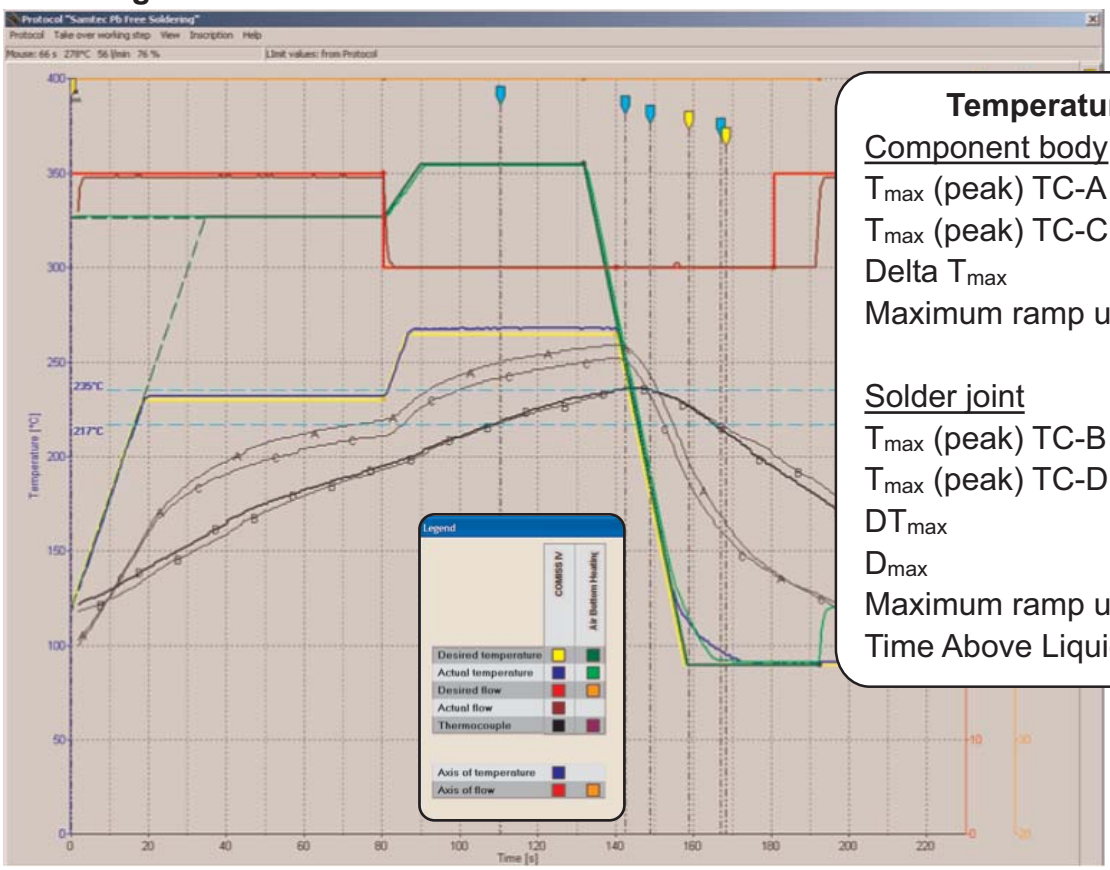
In order to verify the thermal profiles for leaded and lead-free solder materials and to make sure the processes comply with connector and PCB specifications, a Samtec connnector sample has been prepared with thermocouples and both thermal profiles have been performed.

The thermocouples were located as follows:

1. A/C are connected to upper side of body
2. B is connected to center of connector bottom
3. D is connected to corner lead at connector bottom

Technical Note
Connector Rework

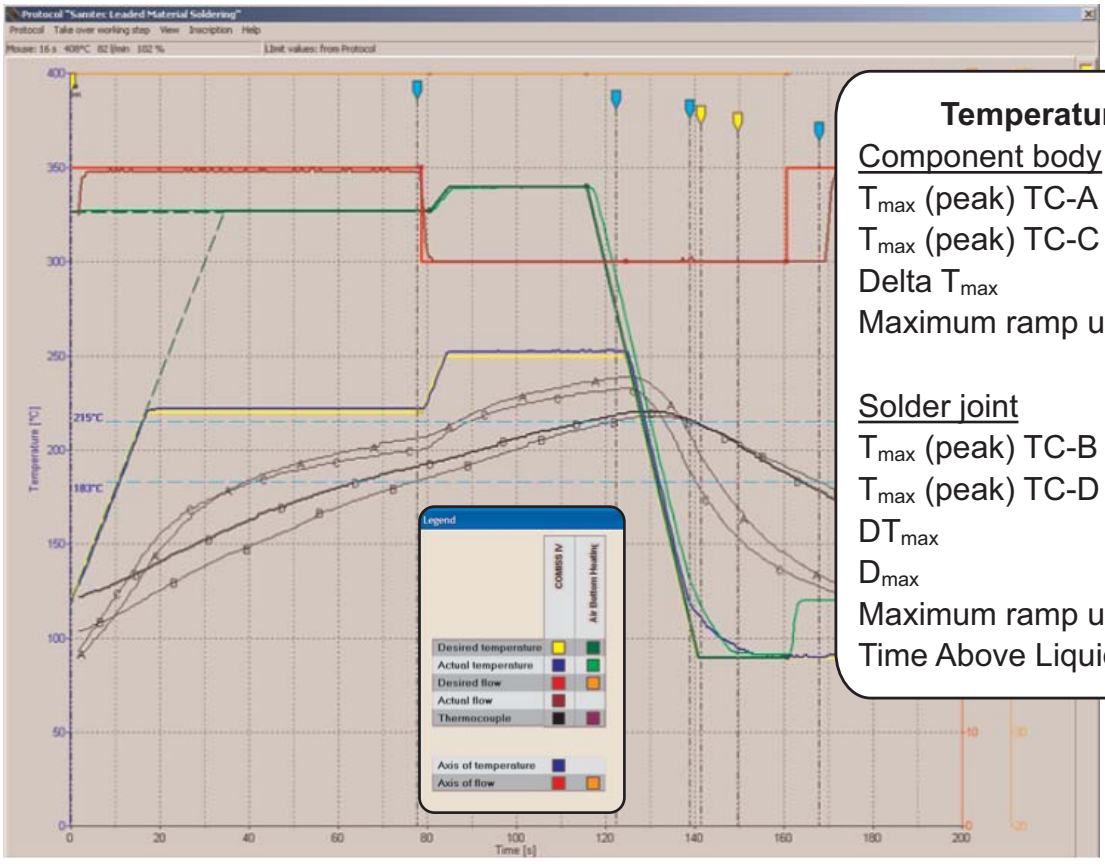
Soldering Profile for Lead-Free Material



Temperature Results

Component body	
T_{max} (peak) TC-A	257°C
T_{max} (peak) TC-C	252°C
Delta T_{max}	5°C
Maximum ramp up	6°C/s
Solder joint	
T_{max} (peak) TC-B	236°C
T_{max} (peak) TC-D	236°C
DT_{max}	+/- 0°C
D_{max}	5°C
Maximum ramp up	3°C/s
Time Above Liquidus	60s

Soldering Profile for Leaded Material



Temperature Results

Component body	
T_{max} (peak) TC-A	240°C
T_{max} (peak) TC-C	235°C
Delta T_{max}	5°C
Maximum ramp up	6°C/s
Solder joint	
T_{max} (peak) TC-B	217°C
T_{max} (peak) TC-D	219°C
DT_{max}	2°C
D_{max}	15°C
Maximum ramp up	3°C/s
Time Above Liquidus	85s

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