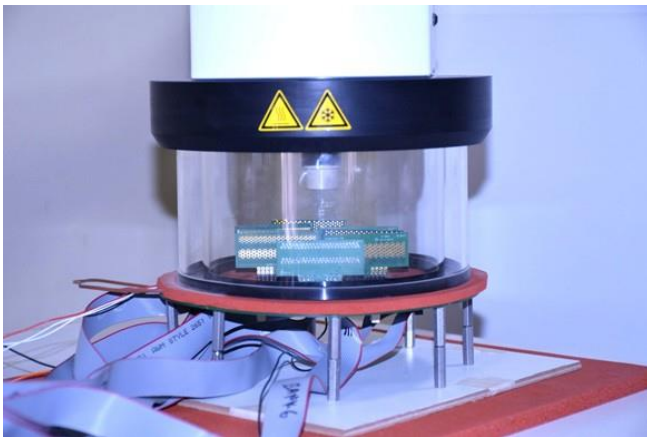
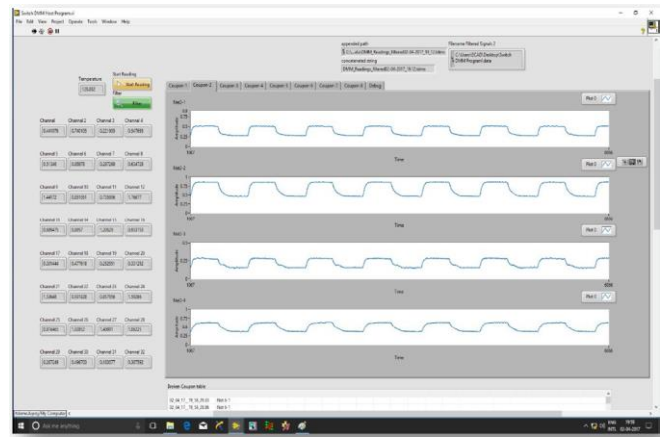


Highly Accelerated Thermal Shock (Hats) System for Assessment Of PCB Via Reliability

Space Applications Centre (SAC) has developed indigenous Highly Accelerated Thermal Shock (HATS) System for assessment of PCB via reliability. The system is realized by assembly and integration of thermal conditioning system, which is used to give thermal shock and preconditioning simulation, and specially designed instrumentation, which acquires and processes the 4-wire resistance measurement data in real time. The data acquisition and monitoring application is developed in-house. Another offline data processing application is also developed to process the data and find the peak resistance variation of all nets of each PCB coupon (total 32 nets).



HATS Test Setup



Front Panel of Software Application

Advantages:

- Indigenously developed system,
- Quick in testing of samples (within 3.5 days),
- Highly configurable and scalable system and test parameters,
- System design as per the requirements of IPC-9151D standard,
- Simple and easy to operate, no specialized training required,
- Testing cost and duration are significantly less than foreign test service providers

Systems Operations:

The via reliability assessment is done by subjecting the PCB samples (coupons) to a thermal shock from -40 °C to +145 °C and vice versa, within 120 sec and maintaining the samples at extreme temperatures for 180 sec. This forms a single thermal cycle. The cycle is repeated for 500 times. Each PCB coupon has electrical circuits (nets) which are comprised of vias and trace interconnects. The precision 4-wire resistance of the each circuit is monitored and logged throughout the test. The peak resistance of each net is determined for every thermal cycle and percentage variation of second peak onwards is calculated with respect to very first peak. As per the IPC protocol, a variation of more than 10%, observed any time during the test, is not acceptable and that particular sample is deemed as failed. There is also a provision to conduct assembly preconditioning before the test, where the samples are subjected to 6 cycles of reflow soldering profile, so that assembly stresses are captured by the samples and any serious degradation is subsequently detected by the HATS test.

Applications:

This test setup can be used for Batch Acceptance Tests for FM bare PCBs, Vendor Qualification, Material Qualification,

Incremental Qualification, VOQ (verification of qualification), project specific qualification requirements, Qualification of new PCB technologies like HDI, Rigid-flex and Hybrid PCBs etc.

Technology Transfer from ISRO

ISRO is willing to offer the knowhow of this technology to suitable entrepreneurs / industries in India. Capable manufacturing industries interested in acquiring this knowhow may write with details of their present activities, requirements and plans for implementation, infrastructure and technical expertise available with them, their own market assessment, if any, and plans for diversification to the address given below: