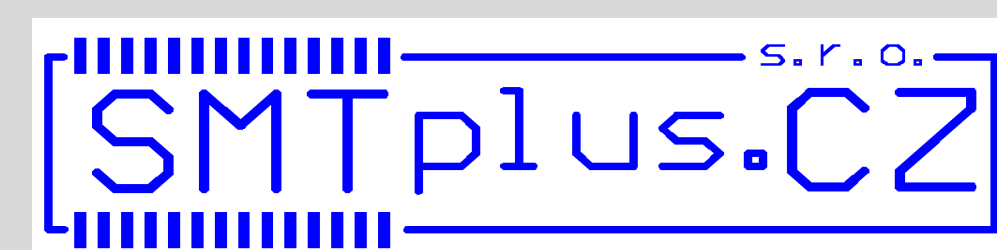


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USE OF MODERN ASSEMBLY TECHNIQUES AND MATERIALS IN ELECTRONIC INDUSTRY

Project sponsored by the Ministry of Industry and Trade,
Czech Republic (FR-TI1/072)



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The facts about the project

This project explores the solutions to mainly technological problems of solder interconnection of electronic modules with a mainboard. In particular, it examines modern electronic materials and new perspectives of interconnections. The project also looked at the solution of wettability and thermomechanical reliability of this connection. In order to keep the solutions close to the industry, the University of Technology cooperated with an assembly production company SMT plus. Time of the project: January 2009 to December 2012, total cost: 540 000 CZK.

Modern materials used

Low Temperature Cofired Ceramic (LTTC)

This composite material consists of ceramic, glass and other components. The glass is melted at temperature 800 °C and a compact material with ceramic electrical and mechanical properties is created. LTCC is delivered in sheets of varying thickness.

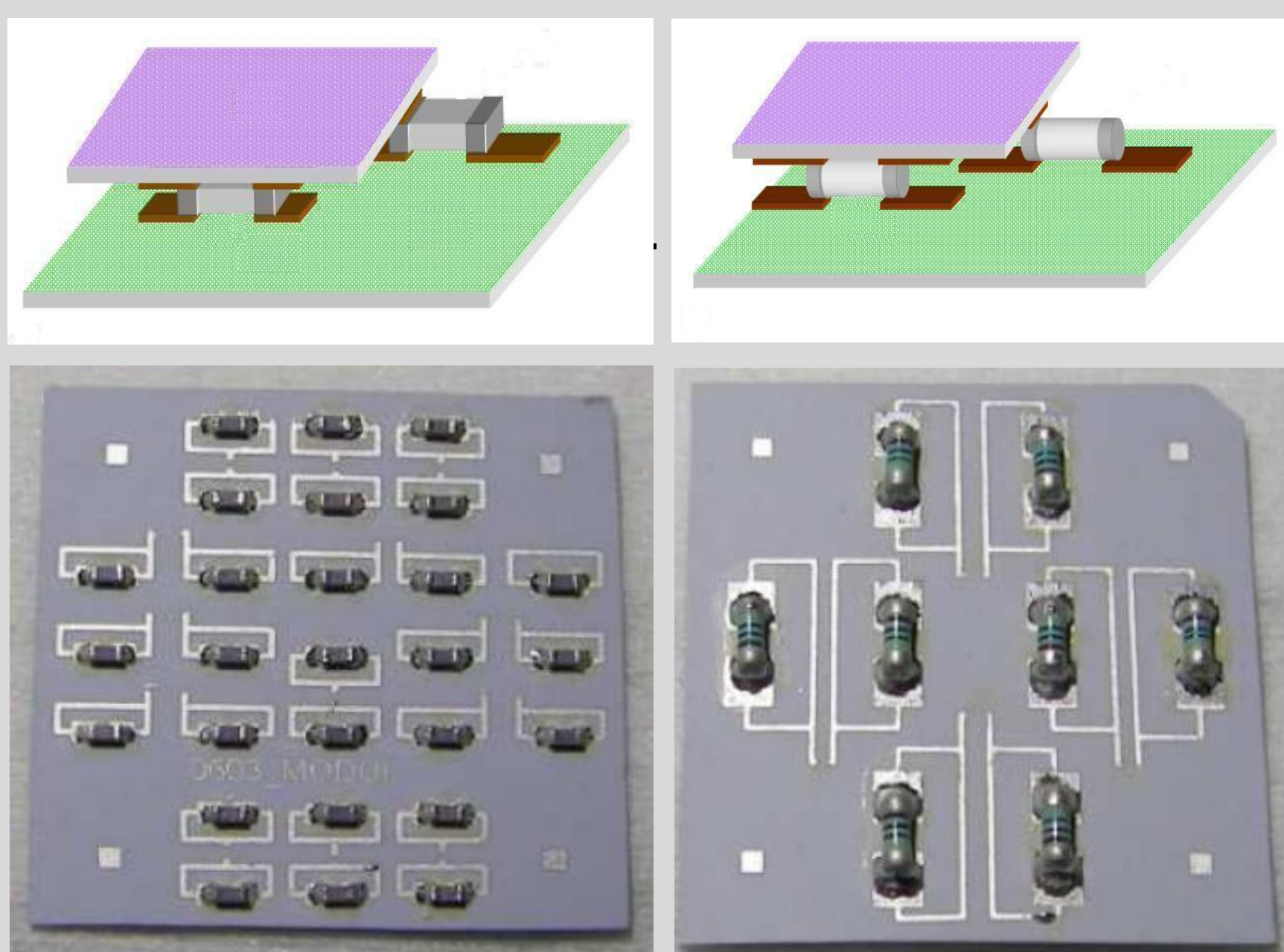
Lead Free Solder (LF)

- Connection with LF solders
- a) SAC 205 and cheaper are preferred ($T_{\text{melt.}} = 216 \text{ °C}$)
- b) Sn100[®] solder ($T_{\text{melt.}} = 232 \text{ °C}$)

Modern principles solved in project

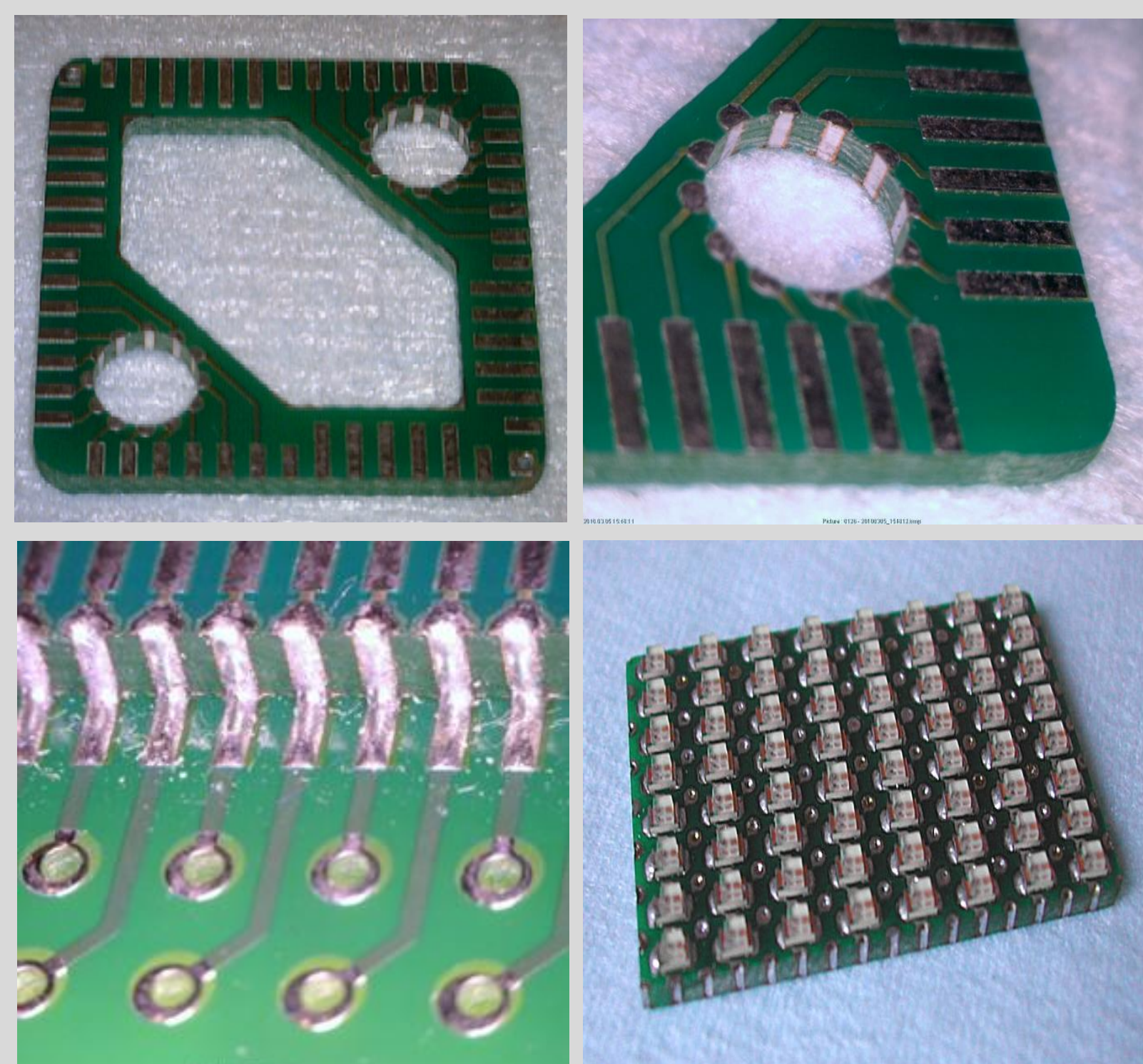
Connection With Component (CWC)

CWC is a new method of connecting electronic and microelectronic modules to a printed board, where traditional chip or cylindrical SMD components are being connected. This solution is a Czech industrial design number 2008-20682/19310.



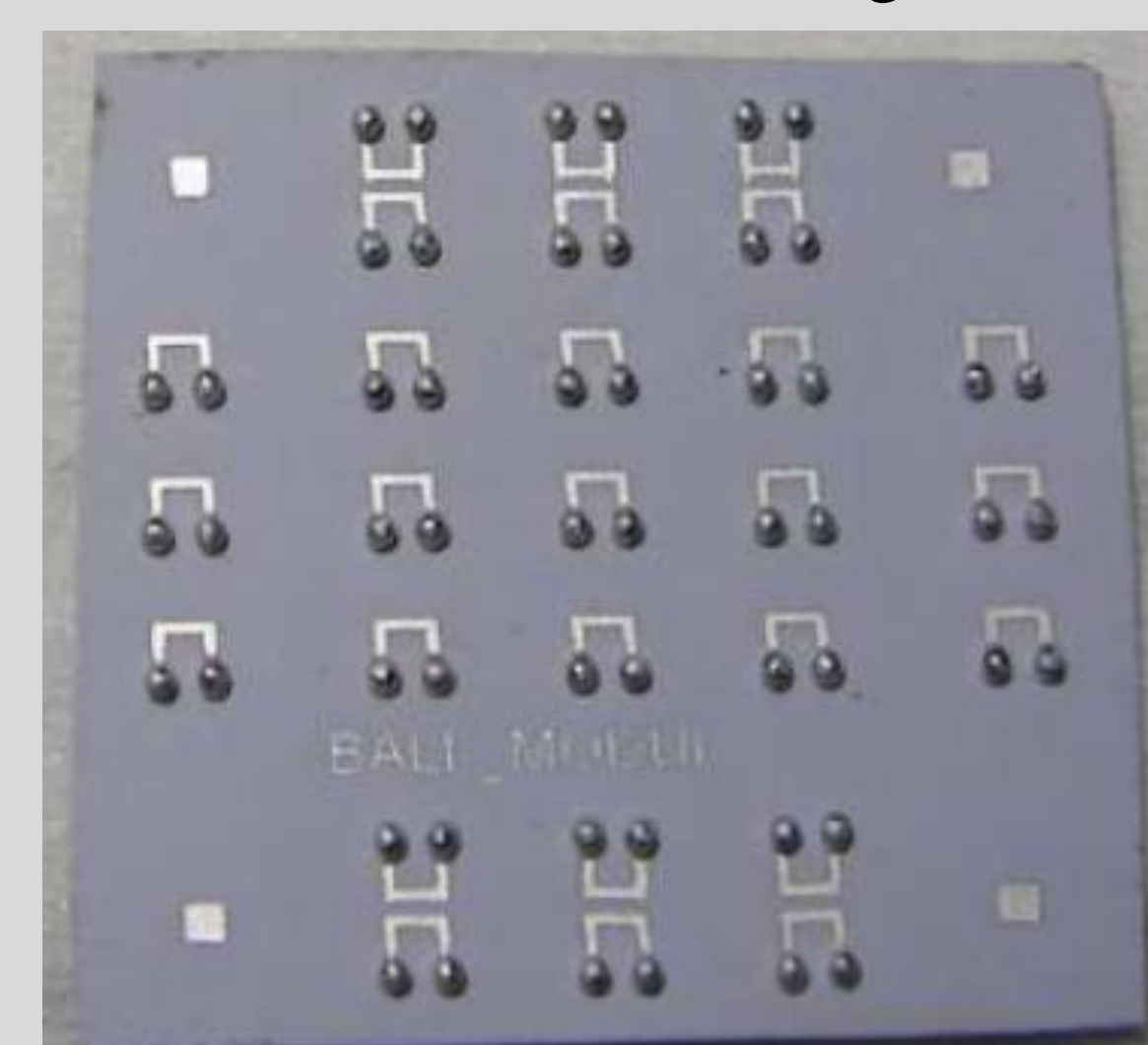
Modified Via Plated Hole (MVPH)

Edge electrical solder connection with modified solder fills up metal holes in classic printed board material.



Connection With Solder Balls

A traditional BGA connection realised on LTCC ceramic multi-layer structure was designed. Then we examined the inner and outer conductor connection with thick technology. This solution is a design solder connection with lower thermo-mechanical loading.



Reliability of solder connection

Defects after 4000 temperature cycles (0 – 100 °C, 15 min. dwell time, by IPC-SM-785 standard)

