

NEW CONNECTION OF ELECTRONIC MODULES

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ABSTRACT: This article describes a new method of connecting electronic and microelectronic modules to a printed board. Classic chip or cylindrical SMD components are used to connect. The connection is formed with “green” LF solder SAC 305. We examined the possibility of use of assembly machines with optical control insertion.

Keywords: electronic and microelectronic modules, chip packages, cylindrical packages, LF solder, thermomechanical loading, assembly machine, lead free solder.

1 INTRODUCTION

Currently, electrical connection of electronic and microelectronic modules is usually formed on the main printed board with,

- solder balls
- solder or metal bumps
- special metal pins, needles, springs etc.[1]
- “edge” types of connection [1]

The connection of electronic and microelectronic modules with PCB board encounters problems with the final stress of connection. This is especially valid for large modules with basic layer materials with TCE other than main PCB board. It could be ceramic materials, mainly Alumina, LTCC, assembled on FR4 main PCB materials. The final stress in the connection also depends on the height of the connection.

Final reliability of the connection corresponds with the final stress. For details please see [2]. The new principle of connection of electronic modules was developed [3].

2 FORMING THE NEW CONNECTION

The principle of **Connection With cylindrical and chip Components (CWC)** is shown in figure 1. The board of microelectronic or electronic module **1** is connecting with the main board **2**. The connection is formed by the terminals of chip or cylindrical components. The components can be laid down along **4**, or transversely **3** to the edge of modules. The electrical connections can be made by soldering or conducting glue. Either two terminals or only one terminal are used for the connection, as showing the picture. The height of the

terminals defined the gap between the modulus and the PCB board. It allows assembly components on the bottom side of the module if necessary.

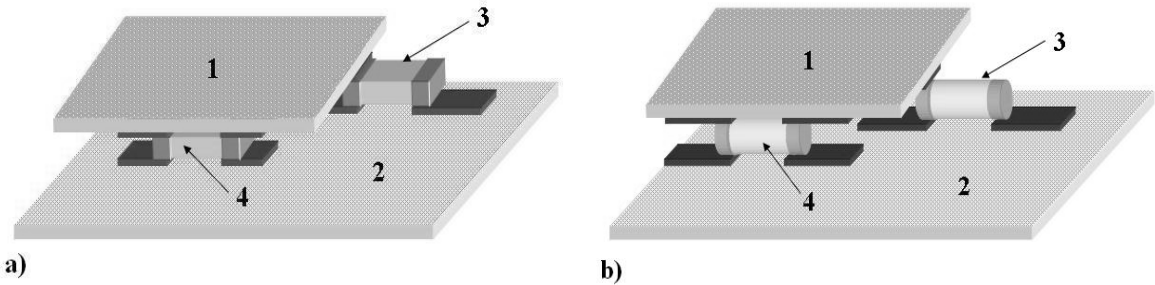


Figure 1: CWC connection a) chip components, b) cylindrical components.

3 EXPERIMENT

The possibilities of automatic assembly were examined. Simple electronic module on FR4 substrate was chosen for the experiment. The connection was formed with a chip and cylindrical components in 0805 and SOD80 package. The experimental technologic flow of assembly is presented below:

1. The LF solder paste was deposited on the finished electronic modules with screen printing. Modules were placed in special holder to enable application of solder paste on ten modules simultaneously. After this chip components were applied with assembly machine SAMSUNG CP45. All modules were reflowed in IR reflow oven.
2. The modules were assembled on the PCB board with SAMSUNG CP45. Standard technology procedure assembly in solder paste was used. For this purpose special holder for modules were used. Modules assembled on the PCB in the solder paste were reflowed.

Figure 2 displays module with assembly chip components as terminals.

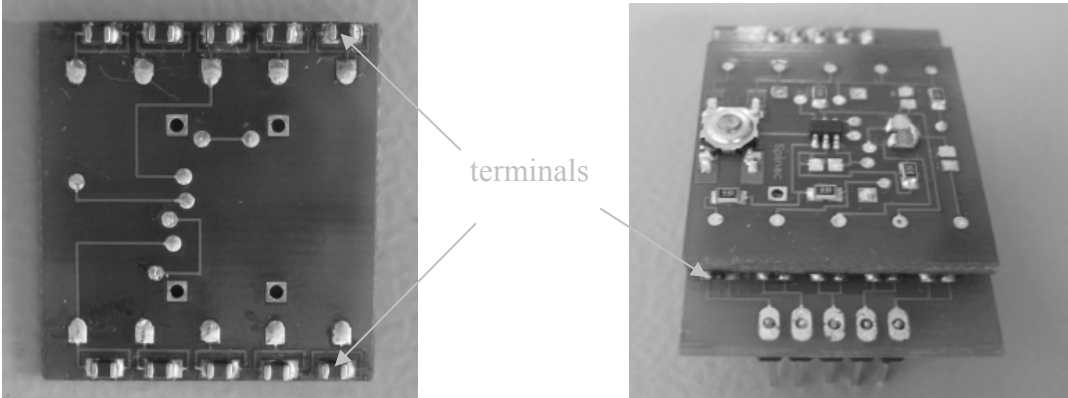


Figure 2: Module with assembly chip components as terminals

3 CONCLUSION

The technological research shows possibilities of utilization of this solution for industry. First experiments encountered problems with the assembly of modules. Automatic assembly machines SAMSUNG CP45 used optic inserting control. There were problems with optical identification of chip components as terminals for inserting machine. There were also difficulties with depositing solder paste on modules before inserting of components which are terminals. Upcoming research will focus on the optimal application of this solution in the industry. It will be also look into the examination of reliability of new connection of ceramic module layers Cfor with “green” lead free solders.

4 ACKNOWLEDMENT

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