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Assembly and Joining Handbook

IPC-AJ-820 OUTLINE

The purpose of this Assembly and Joining Handbook is to provide practical and useful information regarding various approaches and techniques for the interconnection of electronic components. The table of contents is an indication of the variety of data included in this document.

1 SCOPE

This document provides guidelines and supporting information for manufacturing electronic assemblies. The intent is to explain the ''how-to'' and ''why'' information, and fundamentals for these processes.

Additional detailed information can be found in documents referenced within each individual section. Users are encouraged to use those referenced documents to better understand the applicable subject areas.

The words ''shall,'' ''must,'' etc., are used in various places within this handbook. However, nothing within this handbook is considered mandatory unless otherwise specified in the design or contract documentation. In event of a conflict between the content of this handbook and the requirements invoked by the design or contract documentation, the requirements of the design or contract documentation shall take precedence.

1.1 Assembly and Joining Technology Selection of appropriate assembly and joining techniques for electronic circuits should consider the requirements of the end product equipment and subassembly, including form, fit, function, cost effectiveness, performance, and marketability. Other factors include packaging density, assembly profile height, development time, development cost, circuit element factors, manufacturing costs, thermal considerations, reliability, and specific implementation details.

The assembly process steps differ according to the type of product being assembled, i.e., through-hole, surface mount, or mixed technology. They also vary according to manufacturer expertise, experience, and preference.

The selection of a particular method for mounting and terminating a component will also depend on the type of component (size, weight and shape), the equipment available for mounting and interconnecting, the connection method (e.g., soldering, welding, or crimping), the reliability and maintainability (ease of replacement) required, and of course, cost.

1.2 Through-Hole Technology The most significant advantage of through-hole mounting is compatibility with conventional mass soldering techniques, such as dip and wave soldering. One of the significant disadvantages is space. Through-hole parts usually take up a much larger footprint on the PWA than a similar surface mount component. They also require space on both sides of the board, as the leads protrude through to the opposite side.

1.3 Surface Mount Technology The most obvious benefits of surface mount technology (SMT) compared to older through-hole (THT) technology are increased circuit density and improved electrical performance. Less obvious benefits include lower process costs, higher product quality, reduced handling costs, and higher reliability.