



ASSOCIATION CONNECTING
ELECTRONICS INDUSTRIES®

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Guidelines and Requirements for Electrical Testing of Unpopulated Printed Boards

Developed by the Electrical Continuity Testing Task Group (7-32c)
of the Automatic Inspection Technologies Subcommittee (7-32)
of the Product Assurance Committee (7-30) of IPC



Users of this standard are encouraged to participate in the
development of future revisions.

Contact:

IPC
2215 Sanders Road
Northbrook, Illinois
60062-6135
Tel 847 509.9700
Fax 847 509.9798

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Guidelines and Requirements for Electrical Testing of Unpopulated Printed Boards

1 SCOPE

This document is presented to assist in selecting the test analyzer, test parameters, test data, and fixturing required to perform electrical test(s) on all unpopulated printed boards without embedded components (i.e., resistors, capacitors, etc.).

The users must determine the test parameters and fixturing requirements to test for continuity (open), isolation (leakage/short), and other special characteristics (i.e., impedance, hipot, capacitance, current carrying capacity, etc.) that will satisfactorily evaluate the critical electrical characteristics of specific printed boards. The testing levels listed in this document define some of these parameters.

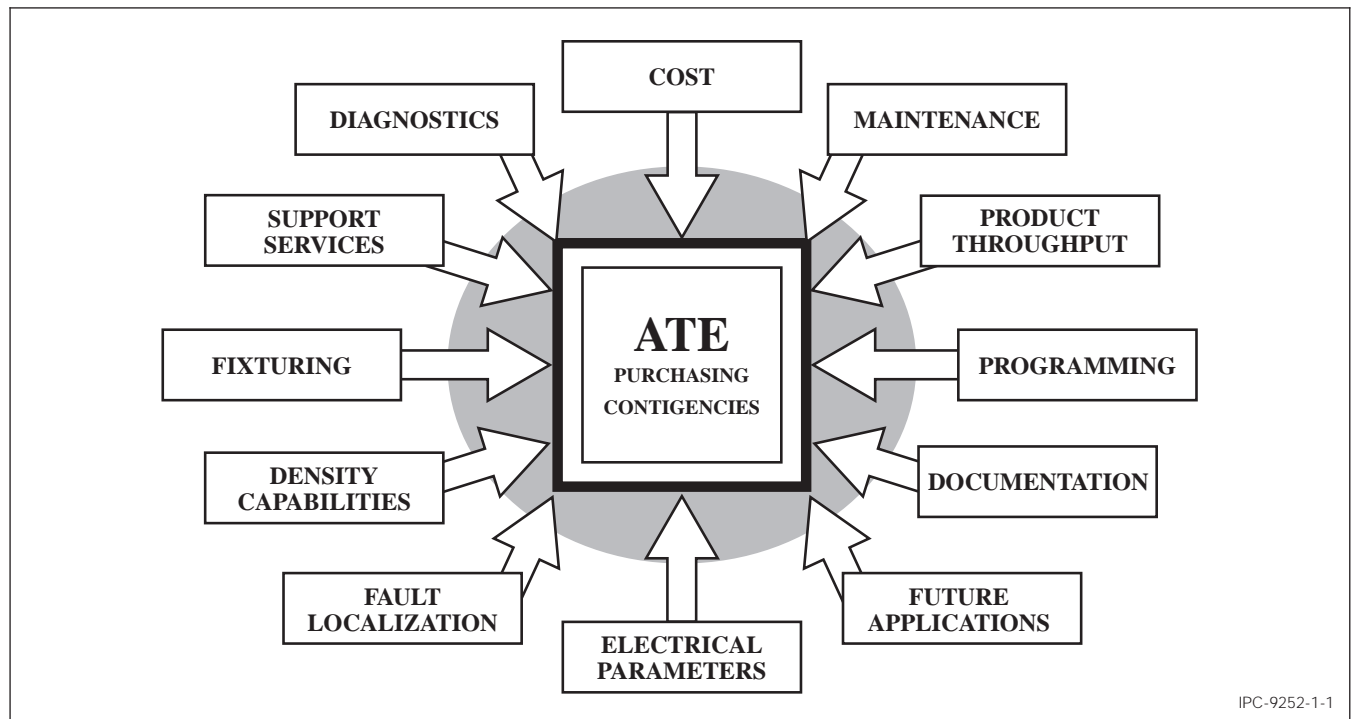
1.1 Purpose Electrical testing verifies that the printed networks on the boards are interconnected according to design requirements.

Electrical test does not ensure that the board can be assembled or that the board meets all of the customer's requirements. Many physical characteristics of the conductors (dimensional accuracy, solder mask, conductor geometry and nomenclature registration, presence of holes, etc.) can't be determined by electrical test. Other checks should be employed to confirm these characteristics.

1.2 Introduction Electrical testing of unpopulated printed boards ensures that the board conforms to the electrical design requirements. This specification defines different levels of test to achieve this purpose. The user and supplier will be responsible to define the testing level necessary for each individual part number.

Electrical testing requires both initial capital investments as well as ongoing recurrent costs. Initially, electrical testing requires an investment in properly trained personnel, hardware, and software. Higher levels of test require more resources and investment. Following this initial investment, handling, testing, performance diagnostics, and rework all affect the recurring cost of electrical tests. In selecting the appropriate test level, technology, equipment, and associated fixturing, a suitable compromise between productivity, features, and costs can be found.

The costs associated with electrical testing can vary dramatically, from a few cents for fixture test probes to hundreds of thousands of dollars. Costs alone, however, should never be the only criteria for selecting an automatic test equipment (ATE) system. As shown in Figure 1-1, many other important areas require consideration. For example, spacing and density may be of paramount importance to one user, while another may be concerned with testing



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Figure 1-1 ATE Selection Criteria