Association Connecting Electronics Industries

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Rework, Modification and Repair of Electronic Assemblies

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Rework, Modification and Repair of Electronic Assemblies

Developed by the Repairability Subcommittee (7-34) of the Product Assurance Committee (7-30) of IPC

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

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Acknowledgment

Any document involving a complex technology draws material from a vast number of sources. While the principal members of the IPC Repairability Subcommittee (7-34) of the Product Assurance Committee (7-30) are shown below, it is not possible to include all of those who assisted in the evolution of this standard. To each of them, the members of the IPC extend their gratitude.

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	NSWC Crane	Flextronics International

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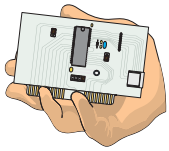
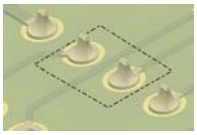
2.1	Handling Electronic Assemblies		N/A	N/A	N/A
2.2	Cleaning		N/A	N/A	N/A

Coating Removal

Procedure	Description	Illustration	Board Type	Skill Level	Level of Conformance
2.3.1	Coating Removal, Identification of Conformal Coating		R, F, W, C	Advanced	High
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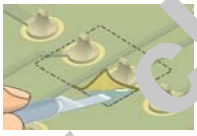
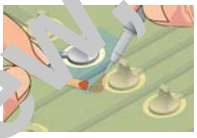
2.3.3	Coating Removal, Peeling Method		R, F, W, C	Advanced	High
2.3.4	Coating Removal, Thermal Method		R, F, W, C	Advanced	High
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General Information and Common Procedures

1 General

1.1 Scope This document covers procedures for repairing and reworking printed board assemblies. It is an aggregate of information collected, integrated and assembled by the Repairability Subcommittee (7-34) of the Product Assurance Committee of the IPC. This revision includes expanded coverage for lead free processes, and additional inspection guidelines for operations such as repair that may not have other published criteria.

This document does not limit the maximum number of rework, modification or repair actions to a Printed Circuit Assembly.

1.2 Purpose This document prescribes the procedural requirements, tools, materials and methods to be used in the modification, rework, repair, overhaul or restoration of electronic products. Although this document is based in large part on the Product Class definitions used in IPC documents such as J-STD-001 or IPC-A-610, this document should be considered applicable to any type of electronic equipment. When invoked by contract as the controlling document for the modification, rework, repair, overhaul or restoration of products, the requirements flowdown apply.

IPC has identified the most common equipment and process in order to make a specific repair or rework. It is possible that alternate equipment and processes can be used to make the same repair. If alternate equipment is used, it is up to the user to determine that the resultant assembly is good and undamaged.

1.2.1 Definition of Requirements This document is intended to be used as a guide and there are no specific requirements or criteria unless separately and specifically called out in a user's contractual or other documentation. When statements such as "must," "should" or "need to be" are used, they are stressing an important point. If these strong recommendations are not followed the end result may not be satisfactory and additional damage could be caused.

1.3 Background Today's electronic assemblies are more complex and smaller than ever before. Despite this, they can be successfully modified, reworked or repaired if the proper techniques are followed. This manual is designed to help users repair, rework and modify electronic assemblies with minimum impact on end use function or reliability. The procedures in this document have been obtained from assemblers, printed board manufacturers and users who recognize the need for documenting commonly used rework, repair and modification techniques. These techniques have, in general, been proven to be acceptable for the class of product indicated through testing and extended field functionality. Procedures contained herein were submitted for inclusion by commercial and military organizations too numerous to list individually. The Repairability Subcommittee has, where appropriate, revised procedures to reflect improvements.

1.4 Terms and Definitions Definitions marked with an * are from IPC-T-50 and apply to the use of this document.

PCA – Printed Circuit Assembly

**Rework* – the act of reprocessing noncomplying articles, through the use of original or equivalent processing, in a manner that assures full compliance of the article with applicable drawings or specifications.

**Modification* – the revision of the functional capability of a product in order to satisfy new acceptance criteria. Modifications are usually required to incorporate design changes which can be controlled by drawings, change orders, etc. Modifications should only be performed when specifically authorized and described in detail on controlled documentation.

**Repair* – the act of restoring the functional capability of a defective article in a manner that does not assure compliance of the article with applicable drawings or specifications.

1.4.1 Class of Product The user of the product is responsible for identifying the Class of Product. The procedure selected for action to be taken (modification, rework, repair, overhaul etc.) must be consistent with the Class identified by the user. The three Classes of Product are:

Class 1 – General Electronic Products
Includes products for applications where the major requirement is the function of the completed assembly.

Class 2 – Dedicated Service Electronic Products
Includes products where continued performance and extended life is required, and for which uninterrupted service is desired but not critical. Typically, the end use environment would not cause failures.

Class 3 – High Performance Electronic Products
Includes products where continued performance or performance-on-demand is critical. Equipment downtime cannot be tolerated, end-use environment may be uncommonly harsh, and the equipment must function where required, such as life support and other critical systems.