Internal Specification – Level I
Document Number: IS-005
Revision: 07
Effective Date: 04/18/2024
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Title: PCB SME

Printed Circuit Board Workmanship & Design Criteria

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PURPOSE & SCOPE

This Internal Specification authorizes the use of ANSI/IPC-A-600 Class 2, ANSI/J-STD-003, and the IPC-6010 Series for Printed Circuit Boards (PCB). This authorizes the IPC-2220 Series to be used as engineering guidelines only.

Authorize manufacturing changes to design as outlined. The changes are made to improve manufacturability and reliability and correct problematic features contained in legacy designs.

This Internal Specification is applicable to the L3Harris, Communication Systems-West (CS-W) Salt Lake City facilities.

INTERNAL SPECIFICATION

1. ANSI/IPC-A-600 (REQUIRED)

The acceptability criteria of Printed Circuit Boards (PCBs) are described in IPC-A-600, which provides a visual interpretation of target, acceptable, and nonconforming conditions. ANSI/IPC-A-600 is to be applied and used as the authorized standard for the acceptability of PCBs. The ANSI/IPC-A-600 standard may be used in its entirety as a stand-alone document, or as an integral part of the overall company workmanship standards. In either case, Class 2 acceptance criteria are to be followed as a baseline except where increased reliability considerations are required (e.g., solder mask, metal plating, and annular ring). These additional requirements are to be called out in the PCB design document.

2. ANSI/J-STD-003 (REQUIRED)

ANSI/J-STD-003 prescribes the recommended test methods for assessing the solderability of PCBs. This “J” standard is to be used in conjunction with the IPC-A-600 and the IPC-6010 specification series as necessary to assure the acceptability of PCBs.

3. IPC-6010 SERIES (REQUIRED)

The IPC-6010 specification series establishes quality and reliability assurance requirements for acquisition. This series is for the Manufacture and Procurement of PCBs. It is to be imposed, as necessary, during the acquisition aspects where suppliers/subcontractors build and provide PCBs certified to specific standards.

4. WS-019 (REQUIRED)

WS-019 is a Workmanship Standard for CS-W. This specification establishes and outlines the microsection, solder sample, plug & cap, vendor marking requirements, and acceptance criteria for all deliverable PCBs.

5. OBSELENCE AND REPLACEMENT OF STANDARDS

The following table authorizes the transition from obsolete standards to current standards:

FROM:	DESCRIPTION	TO:	DESCRIPTION
MIL-STD-454	Standard General Requirements for Electronic Equipment	**IPC-A-600**	Acceptability of Printed Boards
MIL-P-55110	General Specification for Rigid PCBs	**ANSI/J-STD-003**	Solderability Tests for Printed Boards
MIL-P-50884	General Specification Flex and Rigid-Flex PCBs	**IPC-6010 Series**	Family of Board Performance Requirements
		IPC-6011	Generic Performance Specification for Printed Boards
MIL-P-55110	General Specification for Rigid PCBs	IPC-6012	Qualification and Performance Specification for Rigid Printed Boards
		IPC-6013	Qualification and Performance Specification for Flexible/Rigid-Flexible Printed Boards
		IPC- 6015	Qualification and Performance Specification for Organic Multichip Module (MCM-L) Mounting and Interconnecting Structures
		IPC-6016	Qualification and Performance Specification for High Density Interconnect (HDI) Layers or Boards
		IPC-6017	Qualification and Performance Specification for Printed Boards Containing Embedded Passive Circuitry
		IPC-6018	Qualification and Performance Specification for High Frequency (Microwave) Printed Boards
MIL-STD-275	Design Specification for Rigid PCBs	**IPC-2220 Series**	Family of Design Documents
		IPC-2221	Generic Standard on Printed Board Design
		IPC-2222	Sectional Standard on Rigid Organic for PCBs
MIL-STD-2118	Design Specification for Flexible/Rigid-Flexible PCBs	IPC-2223	Sectional Design Standard for Flexible/Rigid-Flexible Printed Boards
		IPC-2224	Sectional Standard of Design of PWB for PC Cards
		IPC-2225	Sectional Design Standard for Organic Multichip Modules (MCM-L) and MCM-L Assemblies

Note: The IPC-2220 series are to be employed and/or implemented at the discretion of Engineering. They are to be considered and used as guidelines only and are not a specific requirement.

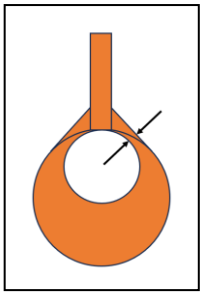
6. MANUFACTURING CHANGES

6.1. Unused Pads

- Rigid Board Designs: All unused pads are to be removed from the design.
- Rigid Flex, Stiffened Flex, and Pure Flex Designs: All unused pads are to be retained—if present in the design—or added—if not present in the design—at all plated through hole and via locations on all flexible substrates. All unused pads on rigid substrates are to be removed.

6.2. Pad-to-Trace Filleting

- Pad-to-trace filleting is to be applied at all pad-to-trace junctions.
- Only straight fillets are to be used. (no "keyhole" or "snowman" style fillets).
- Fillets shall not violate minimum conductor spacing requirements in the design.
- Fillets shall be applied to provide .001" to .003" web, assuming drill tangency to the pad edge at a point centered between the fillets.
- Some designs state that no additional fillets shall be added to the design. This document takes precedence over that restriction.
- Existing fillets shall be retained as defined in the design.



Fillet Web

6.3. Mouse Bite Holes Across Breakaway Tabs

- These holes compromise the strength of the tab to the point that they break during standard processing and handling.
- Any holes found across the breakaway tabs shall be removed from the design before manufacturing.
- No additional tab modifications shall be made.

6.4. Selective Solder Plate and Fuse Requirement

- When the solder plate is required to be fused after plating, the boards shall be manufactured and finished with the selective solder plate per design.
- The requirement to fuse the solder plating shall be omitted.

6.5. Plug and Cap Via Requirements

- Per this document, when invoked by design, the IPC-SM-840 specification shall be disregarded only in relation to plug and cap vias.

END OF DOCUMENT

DOCUMENT INFORMATION

Responsible Organization:	Quality
Function/Sub-function:	Hardware Quality Assurance
Governing Document:	Y-001, Quality Management System
Subordinate Document(s):	NA
Related Documents(s)	WS-019, Printed Circuit Board Workmanship Criteria ANSI/IPC-A-600, Acceptability of Printed Boards ANSI/J-STD-003, Solderability Tests for Printed Boards IPC-6010 Series, Family of Board Performance Requirements IPC-2220 Series, Family of Design Documents
Approval Requirements:	Document Control Administration Quality Representative (Director, Quality) Operations Representative (PCB SME) Engineering Representative (Manager, PCB Design) Manager, Configuration Management
Review Requirements:	DCMA

REVISION HISTORY SUMMARY

Revision #	Reason for update/revision	Date
New -03	Initial release through Rev. 03	Various
04	Put in a new format and review requested	10/18/2007
05	24-month review. Modified section 4 to add “vendor marking requirements”.	07/28/2010
06	36-month review. Modified approval requirements. No other changes were made.	9/25/2014
07	Clarified section 5 to focus on the obsolesce table rather than on one specification within it. Updated the obsolescence table to call out the IPC-6010 series and added the IPC-6017 section. Added section 6 to clarify our intent and requirements regarding existing designs. Updated to L3Harris format. Corrected grammatical errors and updated verbiage to use consistent terminology. Updated approval requirements to use current titles.	4/18/2024