



IPC-1791
2018 - August

Trusted Electronic Designer,
Fabricator and Assembler
Requirements

Supersedes
IPC-1071B - April 2016
IPC-1072 - December 2015

An international standard developed by IPC

Association Connecting Electronics Industries



The Principles of Standardization

In May 1995 the IPC's Technical Activities Executive Committee (TAEC) adopted Principles of Standardization as a guiding principle of IPC's standardization efforts.

Standards Should:

- Show relationship to Design for Manufacturability (DFM) and Design for the Environment (DFE)
- Minimize time to market
- Contain simple (simplified) language
- Just include spec information
- Focus on end product performance
- Include a feedback system on use and problems for future improvement

Standards Should Not:

- Inhibit innovation
- Increase time-to-market
- Keep people out
- Increase cycle time
- Tell you how to make something
- Contain anything that cannot be defended with data

Notice

IPC Standards and Publications are designed to serve the public interest through eliminating misunderstandings between manufacturers and purchasers, facilitating interchangeability and improvement of products, and assisting the purchaser in selecting and obtaining with minimum delay the proper product for his particular need. Existence of such Standards and Publications shall not in any respect preclude any member or nonmember of IPC from manufacturing or selling products not conforming to such Standards and Publication, nor shall the existence of such Standards and Publications preclude their voluntary use by those other than IPC members, whether the standard is to be used either domestically or internationally.

Recommended Standards and Publications are adopted by IPC without regard to whether their adoption may involve patents on articles, materials, or processes. By such action, IPC does not assume any liability to any patent owner, nor do they assume any obligation whatever to parties adopting the Recommended Standard or Publication. Users are also wholly responsible for protecting themselves against all claims of liabilities for patent infringement.

IPC Position Statement on Specification Revision Change

It is the position of IPC's Technical Activities Executive Committee that the use and implementation of IPC publications is voluntary and is part of a relationship entered into by customer and supplier. When an IPC publication is updated and a new revision is published, it is the opinion of the TAEC that the use of the new revision as part of an existing relationship is not automatic unless required by the contract. The TAEC recommends the use of the latest revision. Adopted October 6, 1998

Why is there a charge for this document?

Your purchase of this document contributes to the ongoing development of new and updated industry standards and publications. Standards allow manufacturers, customers, and suppliers to understand one another better. Standards allow manufacturers greater efficiencies when they can set up their processes to meet industry standards, allowing them to offer their customers lower costs.

IPC spends hundreds of thousands of dollars annually to support IPC's volunteers in the standards and publications development process. There are many rounds of drafts sent out for review and the committees spend hundreds of hours in review and development. IPC's staff attends and participates in committee activities, typesets and circulates document drafts, and follows all necessary procedures to qualify for ANSI approval.

IPC's membership dues have been kept low to allow as many companies as possible to participate. Therefore, the standards and publications revenue is necessary to complement dues revenue. The price schedule offers a 50% discount to IPC members. If your company buys IPC standards and publications, why not take advantage of this and the many other benefits of IPC membership as well? For more information on membership in IPC, please visit www.ipc.org or call 847/597-2809.

Thank you for your continued support.



IPC-1791

Trusted Electronic Designer, Fabricator and Assembler Requirements

Developed by the Trusted Supplier Task Group (2-19b) of the Electronic Product Data Description Committee (2-10) of IPC

Supersedes:

IPC-1071B - April 2016
IPC-1071A - August 2014
IPC-1071 - December 2010
IPC-1072-AM1 - March 2017
IPC-1072 - December 2015

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

Contact:

IPC
3000 Lakeside Drive, Suite 105N
Bannockburn, Illinois
60015-1249
Tel 847 615.7100
Fax 847 615.7105

This Page Intentionally Left Blank

Acknowledgment

Any document involving a complex technology draws material from a vast number of sources across many continents. While the principal members of the Trusted Supplier Task Group (2-19b) of the Electronic Product Data Description Committee (2-10) 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 IPC extend their gratitude.

Electronic Product Data Description Committee	Trusted Supplier Task Group	Technical Liaison of the IPC Board of Directors
Chair Gary J. Carter ThingWeaver Solutions, LLC	Chair Richard Snogren Bristlecone LLC	Bob Neves Microtek Laboratories
Vice Chair Michael Ford Aegis Software	Vice Chair Steve J. Vetter Naval Surface Warfare Center	
Trusted Supplier Task Group		
Anne Bennedsen, GDCA, Inc. Peter Bigelow, IMI Inc. Neil Bolding, MacDermid Enthone Electronics Solutions Scott Bowles, L3 Fuzing and Ordnance Systems Stephanie Brockway, DASD(SE) Marc Carter, SAIC Michael Collier, Teledyne Leeman Labs Dennis Dienst, TSI Inc Don Dupriest, Lockheed Martin Missiles & Fire Control Steven Dutton, Electrotek Corp. Michael Ford, Aegis Software Dennis Fritz, SAIC Aman Gahoonia, Defense Microelectronics Activity Hardeep Heer, FTG Circuits Bruce Hughes, U.S. Army Aviation & Missile Command Robert Irie, OSD AT&L MIBP	Douglas Jeffery, Electrotek Corp. Mark Kirkman, SAIC Suriyakan Kleitz, Schlumberger Well Services Tim Koczanski, Defense Logistics Agency Vijay Kumar, Lockheed Martin Missile & Fire Control Kevin Kusiak, Lockheed Martin Space Systems Company Meredith LaBeau, Calumet Electronics Corp. Jon Lloyd, Defense Microelectronics Activity William May, NSWC Crane Karen McConnell, Northrop Grumman Corporation Mark Mcmeen, STI Electronics, Inc. James Monarchio, TTM Technologies Thi Nguyen, Lockheed Martin Missile & Fire Control David Pentrack, Defense Microelectronics Activity	Ethan Plotkin, GDCA, Inc. Douglas Schueller, AbelConn, LLC Ray Shanahan, ODASD(SE) Cameron Shearon, Shearon-Consulting Lowell Sherman, DLA Land and Maritime Roger Smith, NSWC Crane Doug Sober, Essex Technologies Group Inc. Eric Spackey, AFFOA John Timler, SAIC Roger Tingler, Colonial Circuits Inc. Stephen Tisdale, Tisdale Environmental Consulting LLC Anaya Vardya, American Standard Circuits Inc. John Vaughan, Zentech Manufacturing Steve Vetter, NSWC Crane

This Page Intentionally Left Blank

Table of Contents

1	SCOPE	1	1.3.25	Procedure	3
1.1	Background	1	1.3.26	Product-Specific Special Case	4
1.1.1	Source Technology and Capability	1	1.3.27	Quality	4
1.1.2	Interpretation of “Shall”	1	1.3.28	Security	4
1.1.3	Interpretation of Requirements for the Purposes of this Standard	1	1.3.29	Supply Chain Risk Management (SCRM)	4
1.1.4	Benefits of Using Organizations Certified to this Standard	1	1.3.30	Trust	4
1.1.5	Additional Detail	1	1.3.31	Trusted Source or Trusted Supplier	4
1.2	Certification Types	1	2	APPLICABLE DOCUMENTS	4
1.2.1	Type 1 – Printed Board Design Organizations	2	2.1	IPC	4
1.2.2	Type 2 – Printed Board Fabrication Organizations	2	2.2	Joint Standards	4
1.2.3	Type 3 – Printed Board Assembly Organizations	2	2.3	Center for Development of Security Excellence	4
1.3	Terms and Definitions	2	2.4	National Institute of Standards and Technology (NIST)	4
1.3.1	Chain of Custody (ChoC)	2	2.5	SAE International	5
1.3.2	Confidentiality	2	2.6	U.S. Department of Defense (DoD)	5
1.3.3	Commercial and Government Entity (CAGE) Code	2	2.6.1	Directives and Instructions	5
1.3.4	Controlled Technical Information	2	2.6.2	Specifications	5
1.3.5	Controlled Unclassified Information (CUI)	2	2.7	U.S. House of Representatives Office of the Law Revision Council	5
1.3.6	Covered Contractor Information System	2	2.8	U.S. Office of the Federal Register – Code of Federal Regulations (CFR)	5
1.3.7	Covered Defense Information	2	3	REQUIREMENTS	5
1.3.8	Cyber Incident	2	3.1	Quality Requirements	5
1.3.9	Department of Defense (DoD) Prime Contractor	2	3.1.1	Type 1 – Printed Board Design Organization	5
1.3.10	Department of State Proforma for Permanent Export (DSP-5)	2	3.1.2	Type 2 – Printed Board Fabrication Organization	5
1.3.11	Deemed Export	2	3.1.3	Type 3 – Printed Board Assembly Organization	6
1.3.12	Export Administration Regulations (EAR)	2	3.2	Supply Chain Risk Management (SCRM) Policy	6
1.3.13	Federal Bureau of Investigation (FBI) Channeler	3	3.2.1	Commercial and Government Entity (CAGE) Code	7
1.3.14	Foreign Person	3	3.3	Security	7
1.3.15	Information Technology (IT)	3	3.3.1	Responsible Security Officer and Team	7
1.3.16	International Traffic in Arms Regulations (ITAR) Registered	3	3.3.2	Personnel Security Requirements	7
1.3.17	Organization	3	3.3.3	Publication Approval	8
1.3.18	Policy	3	3.3.4	Physical Protection	8
1.3.19	Printed Board Assembler	3	3.4	Chain of Custody (ChoC) for Type 1, 2 and 3 Organizations	9
1.3.20	Printed Board and Assembly Design	3	3.4.1	Traceability Records	9
1.3.21	Printed Board and Assembly Design Organization	3	3.4.2	Serialization and Identification	9
1.3.22	Printed Board Trusted Assembler	3	3.4.3	Sample Materials	9
1.3.23	Printed Board Trusted Design Organization	3			
1.3.24	Printed Board Trusted Fabricator	3			

3.4.4	Destruction of Scrap (In-Process or Finished Design Data, Layers and Panels, Subassemblies and Assemblies)	9
3.4.5	Repeat Orders	10
3.4.6	Shipping	10
3.4.7	Training	10
3.5	Additional Chain of Custody (ChoC) Requirements for Type 1 Organizations	10
APPENDIX A	Defense Background	11
APPENDIX B	Export Control Compliance	12
APPENDIX C	NIST SP 800-171 Security Framework Explanation	13
APPENDIX D	Acronym Index	14

Figures

Figure 3-1	Printed Board Design Schema	10
------------	-----------------------------------	----

Tables

Table 3-1	Supply Chain Risk Management (SCRM) Policy and/or Procedure Guidelines	6
Table 3-2	Supplier Assessment Procedure Requirements	7
Table C-1	NIST SP 800-171 Security Requirement Families	13

Trusted Electronic Designer, Fabricator and Assembler Requirements

1 SCOPE

This standard provides minimum requirements, policies and procedures for printed board design, fabrication and assembly organizations and/or companies to become trusted sources for markets requiring high levels of confidence in the integrity of delivered products. These trusted sources **shall** ensure quality, supply chain risk management (SCRM), security and chain of custody (ChoC).

Demonstration of the ability to meet and maintain the requirements of this standard as trusted design, fabrication or assembly organization benefits customers that provide end-products for markets desiring a high level of integrity assurance (e.g., commercial, industrial, military, aerospace, automotive and medical).

In the context of this standard, the terms trust and trusted are used to reflect a commitment to delivered product and process integrity assurance by printed board designers, fabricators and assemblers. The user should not confuse this certification with defense-microelectronics-specific “Trusted Supplier” accreditation administered by the Defense Microelectronics Activity (DMEA) Trusted Access Program Office. IPC-1791 certification does not include U.S. Department of Defense (DoD) facility clearance unless compelled by customer-specific requirements and pursued independent of this standard.

1.1 Background

1.1.1 Source Technology and Capability Design, fabrication and assembly organizations have different levels of capability in terms of technology, materials, product complexity, capacity and lead times. This standard assumes the customer has certified the capability of their chosen supplier.

1.1.2 Interpretation of “Shall” The imperative form of the verb “**shall**” is used throughout this standard whenever a requirement is intended to express a provision that is mandatory. Deviation from a “**shall**” requirement may be considered if sufficient data are supplied to justify the exception. To assist the reader, the word “**shall**” is presented in bold characters.

The words “should” and “may” are used whenever it is necessary to express nonmandatory provisions.

“Will” is used to express a declaration of purpose.

1.1.3 Interpretation of Requirements for the Purposes of this Standard This standard covers requirements for quality, SCRM, security and ChoC:

- Quality and performance requirements (e.g., IPC-2000 series, IPC-6000 series, IPC-A-600, IPC-A-610, MIL-PRF-31032, AS9100, National Aerospace and Defense Contractors Accreditation Program (Nadcap), etc.) **shall** be as defined in this standard for the type of organization.
- Requirements for SCRM **shall** be as defined in this standard for the type of organization.
- Security requirements **shall** be the same for all types of organizations.
- The requirements for ChoC **shall** be the same for all types of organizations.

1.1.4 Benefits of Using Organizations Certified to this Standard By using designers, printed board fabricators and printed board assemblers that have been certified to this standard, customers will be assured that their supplier(s):

- Maintains a quality system
- Maintains a SCRM system to ensure any threats related to disruption in supply are understood and managed
- Manages a security system to protect products and services from unauthorized access, particularly in support of export control
- Provides an ensured ChoC system for electronic and physical materials

1.1.5 Additional Detail See Appendix A for additional explanatory material.

1.2 Certification Types To ensure cost-effective use of trusted suppliers, this standard provides three types of certification (see 1.2.1 through 1.2.3). Certification types are based on the function of the organization.