



## PCB and PCBA Requirements

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Triad RF Systems Proprietary

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# 1. Overview

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This document defines the common/default requirements and specifications for printed circuit boards (PCBs) and printed circuit boards assemblies (PCBAs).

## 2. Referenced Documents

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|----------------|---|
| SPEC_E21014    | Labeling Requirement (Triad RF Systems)   |
| IPC-6012       | Qualification and Performance Specification for Rigid Printed Boards  |
| IPC-4761       | Design Guide for Protection of Printed Board Via Structures   |
| IPC-A-600      | Acceptability of Printed Boards   |
| RoHS           | Restriction of Hazardous Substances in Electrical and Electronic Equipment Directive  |
| J-STD-001 (S)  | Requirements for Soldered Electrical and Electronic Assemblies <i>plus</i> Space and Military Applications Electronic Hardware Addendum           |
| IPC A-610      | Acceptability of Electronic Assemblies  |
| GEIA-STD-0006  | Requirements for Using Solder Dip to Replace the Finish on Electronic Piece Parts   |
| IEC TS 62647-4 | Process management for avionics – Aerospace and defence electronic systems containing lead-free solder – Part 4: Ball grid array (BGA) re-balling |

## 3. Printed Circuit Boards (PCBs)

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### 3.1 Order of Precedence (PCBs)

Where a conflict may arise, the following order of precedence shall apply:

1. PCB design files (DF\_)
2. PCB fabrication drawing (FAB\_)
3. This specification (SPEC\_E21017)
4. ODB++ design file or equivalent
5. Referenced industry standards, government documents and directives

## 3.2 Common Fabrication Drawing Notes (FAB\_)

The following notes shall apply unless otherwise specified in the fabrication drawing (FAB\_). Unique requirements not identified by this specification are also noted in the fabrication drawing.

- A FABRICATE/COMPLY TO:  
IPC-6012 CLASS 2  
IPC-4761  
IPC-A-600 CLASS 2
- B REGULATORY COMPLIANCE:  
NON-ROHS/ LEAD
- C SURFACE FINISH:  
ENIG
- D IMAGES ARE NOT TO SCALE.
- E LAYER STACK LEGEND, DIMENSIONS AND WEIGHTS:  
INDIVIDUAL LAYERS ARE POST-PROCESSED/FINISH.  
TOTAL PCB THICKNESS IS POST-PROCESSED/FINISH EXCLUDING MASK AND SILK.
- F DIMENSIONS ARE IN MILS (1/1000 IN).
- G TOLERANCES:  
BOARD THICKNESS..... THE HIGHER VALUE OF +/- 10% OR +/- 7 MILS  
BOARD OUTLINE AND CUT-OUTS.... +/- 5 MILS  
COPPER LAYER THICKNESS (OZ)... +/- 10%  
CONDUCTOR WIDTH..... +/- 10%
- H VIA FILL AND PLUGGING SHALL USE NONCONDUCTIVE EPOXY.  
TYPE 7 VIAS SHALL BE PLATED FLUSH TO CONNECTING METAL ON OUTER LAYERS.
- I SOLDER MASK COLOR SHALL BE GREEN.
- J SILKSCREEN COLOR SHALL BE WHITE.
- K SPECIFIC PCB REALIZATION:  
(AS-BUILT BOARD-STACK, MATERIAL, LAYER THICKNESSES, ETC.) SHALL BE AS IDENTIFIED IN THE FABRICATION DRAWING. MULTIPLE REALIZATIONS MAY BE SHOWN BASED ON PROCUREMENT HISTORY. IF NONE ARE PROVIDED OR AN ALTERNATE REALIZATION IS PROPOSED BY THE SUPPLIER, IT MAY BE ADDED TO THE FABRICATION DRAWING UPON APPROVAL, THROUGH THE QUOTING/PO PROCESS.

## **4. Printed Circuit Board Assemblies (PCBAs)**

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### **4.1 Order of Precedence (PCBAs)**

Where a conflict may arise, the following order of precedence shall apply:

1. PCBA assembly parts list (APL\_)
2. PCBA alternate items list (AIL\_)
3. PCBA design files (DF\_)
4. PCBA assembly drawing (AD\_)
5. This specification (SPEC\_E21017)
6. Labeling Requirement (SPEC\_E21014, Triad RF Systems)
7. Referenced industry standards, government documents and directives
8. Documentation related to the associated printed circuit board

Where a conflict may arise, the manufacturer part number (Manufacturer P/N) identified in the APL/AIL shall take precedence over the item description (Description).

Schematics, if provided, are non-variant. See assembly parts list (APL) and alternate Item list (AIL) for specific part number, value, and if populated.

PCBA test procedures (TP\_), if provided, verify portions of the PCBA such as component placement, value, and polarity. Unless otherwise indicated in the purchase order, these procedures are not a requirement, for use at the discretion of the supplier.

### **4.2 APL and AIL**

The assembly parts list (APL) is the primary list of components.

The alternate items list (AIL) identifies, by reference designator, approved alternate part numbers. The AIL may group reference designators differently than the APL to indicate specifically which parts or group of parts have alternates.

For any one purchase order and for each specific reference designator, the supplier shall not mix parts from the APL and AIL without Triad RF Systems approval.

### 4.3 Common Assembly Drawing Notes (AD\_)

The following notes shall apply unless otherwise specified in the assembly drawing (AD\_). Unique requirements not identified by this specification are also noted in the assembly drawing.

- A FABRICATE/COMPLY TO:  
J-STD-001 CLASS 3  
IPC-A-610 CLASS 3  
IPC-5703  
IPC-5704
- B REGULATORY COMPLIANCE:  
NON-ROHS
- C DEFAULT SOLDER TYPE:  
SN63PB37
- D FINAL PCBA SHALL BE CLEAN OF FLUX AND RESIDUE.
- E CM SHALL INSPECT B.O.M. GIVEN FOR PARTS WHICH ARE NOT SUITABLE FOR WASHDOWN CYCLES, THEN MODIFY ASSEMBLY PROCESS TO SUIT EACH ASSEMBLY.
- F PART SUBSTITUTION IS NOT ALLOWABLE UNLESS AUTHORIZED BY TRIAD RF SYSTEMS.
- G SOLDER-TINNED AND BGA PARTS SHALL BE TREATED TO MATCH THE SPECIFIED SOLDER. RE-TINNING AND RE-BALLING PER:  
GEIA-STD-0006  
IEC TS 62647-4
- H ASSEMBLY DRAWING IS NON-VARIANT. SEE ASSEMBLY PARTS LIST (APL) AND ALTERNATE ITEM LIST (AIL) FOR SPECIFIC PART NUMBER, VALUE, AND IF POPULATED/PLACED.
- I AFFIX SERIAL NUMBER LABEL WITHIN CORNER MARKS OR APPROXIMATELY WHERE SHOWN ON THE ASSEMBLY DRAWING. DO NOT POSITION OVER EXPOSED TRACES UNLESS SHOWN. SERIAL NUMBER LABEL SHALL BE PER SPEC\_E21014.
- J DOTS SHOWN IN TOP/BOTTOM VIEWS OF THE ASSEMBLY DRAWING INDICATE PIN 1.
- K IMAGES ARE NOT TO SCALE.
- L All components with gold leads must get pre-tinned with solder containing a minimum of 3% lead.