



Advisory Circular

DRAFT 5.7 – 6/16/04

**Subject: RTCA, INC., DOCUMENT
RTCA/DO-254**

Date: XXXXXX

AC No: 20-XXX

Initiated By: AIR-100

Change

1. PURPOSE. This advisory circular (AC) is for manufacturers of aircraft products or appliances incorporating custom micro-coded components, such as Application Specific Integrated Circuits (ASIC), Programmable Logic Devices (PLD), Field Programmable Gate Arrays (FPGA), or similar electronic components in the design of their aircraft systems and equipment. This AC provides a means (but not the only means) to gain Federal Aviation Administration (FAA) approval by showing that your equipment design is appropriate to its intended function and satisfies airworthiness requirements when these types of electronic components are implemented.

2. WHY USE RTCA/DO-254? Following the guidance and procedures outlined in RTCA/DO-254, *Design Assurance Guidance For Airborne Electronic Hardware*, dated April 19, 2000, assures that the hardware design performs its intended functions in its specified environment, and meets airworthiness requirements. RTCA/DO-254 distinguishes between complex and simple electronic hardware; recognizes five levels of failure effects ranging from catastrophic to no effect; and provides guidance for each hardware design assurance level. Although the guidance in RTCA/DO-254 is applicable to five categories of hardware items (e.g., Line Replaceable Units (LRUs), Circuit Board Assemblies, etc.), this AC recognizes the guidance in RTCA/DO-254 as applying specifically to custom micro-coded components (e.g., ASICs, PLDs, and FPGAs), rather than LRUs and other types of electronic hardware items described in RTCA/DO-254.

3. WHO CAN USE RTCA/DO-254?

Applicants for:

- Type Certificates (TC),
- Supplemental Type Certificates (STC),
- Amended Type Certificates (ATC),
- Amended Supplemental Type Certifications (ASTC),
- Technical Standard Order (TSO) Authorizations, and

- Parts Manufacturer Approvals (PMA),

for their products or appliances (systems and equipment) incorporating custom micro-coded components, can use RTCA/DO-254 to secure FAA approval of these types of electronic components.

NOTE: RTCA/DO-254 may be used for the design assurance of custom developed microprocessors. The FAA recognizes that the design life cycle data for Commercial-Off-The-Shelf (COTS) microprocessors may not be available to the applicant in order to meet the objectives of RTCA/DO-254. Therefore, applicants must discuss with the FAA their approach to assure COTS microprocessors perform their intended functions and meet airworthiness requirements. The FAA plans to develop evaluation criteria for COTS microprocessors for publication in future guidance.

4. FUTURE CHANGES OR REVISIONS. The FAA may revise this or other ACs, or publish policy changes to clarify the use of RTCA/DO-254 for a specific 14 CFR part application (such as part 21, 23, 25, 27, 29, and 33). For example, a revision of AC 23.1309 may cover the relationship between the product's or appliance's (systems and equipment) criticality level and the appropriate "hardware design assurance level" contained in RTCA/DO-254. Those changes or revisions will take precedence over this AC.

5. RELATED DOCUMENTS.

a. Code of Federal Regulations. Title 14 of the Code of Federal Regulations (14 CFR) parts 21, 23, 25, 27, 29, and 33.

b. RTCA, Inc. Document RTCA/DO-254. Copies of RTCA/DO-254, *Design Assurance Guidance For Airborne Electronic Hardware*, dated April 19, 2000, can be purchased from RTCA, Inc., 1828 L Street, NW, Suite 805, Washington, D.C. 20036; or online at <http://www.rtca.org/>.

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