AVIXA F502.01:2018

Rack Building for Audiovisual Systems
Abstract
This Standard defines the requirements for building an AV equipment rack and details the process and requirements for placing AV equipment and associated cabling in racks. AV equipment racks are defined as assembly of rack(s), mounting of AV equipment and accessories, cable management, and finishing. This Standard assumes that the AV system's design elements have been defined and properly documented prior to use.

Keywords
Audiovisual; AV rack; cable management; cable separation, cable strain relief; finishing; rack assembly; rack build; rack mounting

Disclaimer
The application of this Standard is strictly voluntary. AVIXA recommends its use but does not assume responsibility for misinterpretation or misapplication. AVIXA does not assume liability for disputes resulting from non-conformance to this Standard. Conformance does not imply certification of a system. Any reference to a specific product or service is not an endorsement by AVIXA. Inclusion is for informational purposes only.

Copyright
© 2018 by AVIXA™. This Standard may not be reproduced in whole or in part in any form for sale, promotion, or any commercial purpose, or any purpose not falling within the provisions of the U.S. Copyright Act of 1976, without prior written permission of the publisher. For permission, address a request to the Director of Standards, AVIXA.
Foreword

Audiovisual (AV) systems are used to create integrated experiences in virtually every environment around the globe. Most of these systems are housed in a rack specifically designed to hold AV equipment. This Standard details the requirements for integrating AV systems into racks. It provides a means for consistent assembly, mounting, cable management, and verification that the AV rack has been built to standard. This Standard is intended for international application; however, users are responsible for following applicable legal, regulatory, and other requirements that fall under the municipal, local, county, state, national, or international authority that has governance over the geographic location in which the system is being installed.

About AVIXA

AVIXA™ is the Audiovisual and Integrated Experience Association, producer of InfoComm trade shows around the world, co-owner of Integrated Systems Europe, and the international trade association representing the audiovisual industry. Established in 1939, AVIXA has more than 5,400 members, including manufacturers, systems integrators, dealers and distributors, consultants, programmers, rental and staging companies, technology managers, IT professionals, content producers, and multimedia professionals from more than 80 countries. AVIXA members create integrated AV experiences that deliver outcomes. AVIXA is a hub for professional collaboration, information, and community, and the leading resource for AV standards, certification, training, market intelligence and thought leadership.

AVIXA is an ANSI accredited Standards Development Organization (SDO). The work of preparing standards and guidelines is carried out through AVIXA Task Groups with oversight by the AVIXA Standards Steering Committee and governed by the AVIXA Board of Directors.

Suggestions for improvement of this document are welcome. They should be sent to standards@avixa.org.

At the time it approved this document, the Rack Building Task Group, responsible for the development of this Standard, had the following members:

**AVIXA Rack Building Task Group Members**

**Moderator:** Timothy Troast, Middle Atlantic

John Bailey, CTS-D, CTS-I, Whitlock

Jason Brameld, Torpedo Factory Group

Jay Franetovich, CTS, Middle Atlantic

Nick Pidgeon, CTS, Visualization Limited

Jason Rouzaire, CTS-D, CTS-I, Ideal Systems Asia Pacific

David Samura, International Criminal Courts
AVIXA Standards Steering Committee

Chair: Thomas Mullins, CTS, Affiliated Engineers, Inc.
Ben Boeshans, CTS-D, Idibri
Greg Bronson, CTS-D, DMC-E, Cornell University
Kristian Glahn, EnCollab
John Monitto, CTS, Meyer Sound
Richard Morrison, B.Eng (hons), CPEng, CTS, AECOM
Don Palmer, Administrative Office of the United States Courts
Jim Smith, CTS-D, Sound Control Technologies
Dick Tollberg, CTS-D, AVI-SPL Chicago
Pomona Valero, CTS, PMP, PITM Consulting

AVIXA Staff

Ann Brigida, CStd, CTS (Senior Director of Standards)
Michelle Streffon Truong, AStd, CTS (Standards Manager)
Loanna Overcash (Standards Developer)
Catalina Vallejos (Standards Resources Coordinator)
CONTENTS

0. DESIGN DECISIONS ....................................................................................................................... 7

1. SCOPE, PURPOSE, AND APPLICATION ..................................................................................... 8
   1.1. SCOPE ......................................................................................................................................... 8
   1.2. PURPOSE ..................................................................................................................................... 8
   1.3. APPLICATION ................................................................................................................................ 8
   1.4. EXCLUSIONS ................................................................................................................................. 8

2. NORMATIVE REFERENCES ........................................................................................................ 9

3. DEFINITIONS .................................................................................................................................... 9
   3.1. ACRONYMS .................................................................................................................................. 9
   3.2. DEFINITIONS ................................................................................................................................ 9

4. REQUIREMENTS ............................................................................................................................ 13
   4.1. ASSEMBLY .................................................................................................................................. 13
   4.2. MOUNTING ................................................................................................................................ 15
   4.3. CABLE MANAGEMENT .................................................................................................................. 21
   4.4. FINISHING .................................................................................................................................. 30

5. VERIFICATION ............................................................................................................................... 33

ANNEX A – DESIGN CONSIDERATIONS (INFORMATIVE) ........................................................... 36
   A.1 THERMAL MANAGEMENT ........................................................................................................... 36
   A.2 WEIGHT DISTRIBUTION ............................................................................................................... 36
   A.3 SECURITY .................................................................................................................................... 36

ANNEX B PROCESS MAP (INFORMATIVE) .................................................................................... 37

ANNEX C – REFERENCES (INFORMATIVE) .................................................................................... 38

TABLE OF FIGURES

Figure 1: Showing 2-point mounting .......................................................... 9
Figure 2: Showing 4-point mounting ..........................................................10
Figure 3: External cabling .......................................................... 11
Figure 4: Inter-rack cabling .......................................................... 11
Figure 5: Internal cabling .......................................................... 12
0. DESIGN DECISIONS

Planning for the use of this Standard should begin during the project design phase and implemented in conjunction with a fully-developed project documentation package.

This Standard does not cover design elements and assumes the AV system design has been documented prior to undertaking the rack building.

Design decisions that should be documented to achieve an agreed-upon outcome prior to building the rack include:

a) Fixed installation or mobile/portable rack – selection of the rack type;*
b) Environmental control of the installation location and resultant thermal management performance requirements of the rack;*
c) Security requirements;*
d) Accessibility of user-accessible AV equipment within the rack and ergonomics;
e) Overall layout of AV equipment within the rack (production of a rack elevation drawing) including thermal management and weight distribution consideration;*
f) Quantity of equipment racks (single/multiple rack installations);*
g) Entry/connection method for site cabling;*
h) Inter-connection method for cabling in multiple rack installations;*
i) Mains voltage power supply delivery arrangements;*
j) Earthing (grounding) and bonding requirements;*
k) Other environmental control factors, such as seismic considerations;
l) The intended final installation location of the rack (if applicable);
m) Spatial considerations and the relationship to the overall physical size of the rack, having regard to access requirements;
n) AV equipment to be housed and the relationship to the overall physical size of the rack; and

O) Acoustic sensitivity of the installation location and resultant acoustic performance requirements of the rack.*

NOTE: At a minimum, a design package provided to users of this Standard should include all items marked with an asterisk (*) above.
1. **SCOPE, PURPOSE, AND APPLICATION**

1.1. **Scope**

This Standard defines the requirements for building an AV equipment rack and details the process and requirements for placing AV equipment and associated cabling in racks.

It can be applied to:

   a) Systems built in to racks according to IEC 60297-3-100 (482.6 mm or 19 inches) requirements.

   b) Systems built in to ‘half rack’ or other sizes at the user’s discretion.

1.2. **Purpose**

This Standard covers the fundamental elements of building a reliable AV equipment rack regardless of location, including:

   a) Assembly of AV equipment racks, associated options, and accessories in single and multi-rack installations.

   b) Mounting and affixing of rack mount and non-rack mount AV equipment within the rack.

   c) Cable management including planning, lacing, location, and separation of signal and power cables for cable management entering and within racks.

   d) Final cleaning, labeling, and finishing of the AV rack build.

1.3. **Application**

This Standard applies to systems built in to racks that have been manufactured according to basic dimensions as outlined in IEC 60297-3-100 (486.2 mm or 19 inches). It may be applied to systems built in to ‘half-width racks’ or other sizes at the user’s discretion. It can be used by all parties affiliated with the building phase – consultants, systems engineers, manufacturers, technology support staff, end-users, and verification agencies – to support proper build of an AV equipment rack.

Prior to beginning the build of the rack, the user of this Standard should be supplied with a design that has considered, at a minimum, the elements outlined in Section 0, Design Decisions, above.

1.4. **Exclusions**

This Standard does not apply to:

   a) AV equipment installed outside of AV racks; and

   b) Racks that do not include AV equipment.