AES standard on interconnections - Grounding and EMC practices - Shields of connectors in audio equipment containing active circuitry

Users of this standard are encouraged to determine if they are using the latest printing incorporating all current amendments and editorial corrections. Information on the latest status, edition, and printing of a standard can be found at:
http://www.aes.org/standards

AUDIO ENGINEERING SOCIETY, INC.
551 Fifth Avenue, Room 1225, New York, NY 10176, US.
The AES Standards Committee is the organization responsible for the standards program of the Audio Engineering Society. It publishes technical standards, information documents and technical reports. Working groups and task groups with a fully international membership are engaged in writing standards covering fields that include topics of specific relevance to professional audio. Membership of any AES standards working group is open to all individuals who are materially and directly affected by the documents that may be issued under the scope of that working group.

Complete information, including working group scopes and project status is available at [http://www.aes.org/standards](http://www.aes.org/standards). Enquiries may be addressed to standards@aes.org

The AES Standards Committee is supported in part by those listed below who, as Standards Sustainers, make significant financial contribution to its operation.
 AES48-2019  
(Rev. AES48-2005)

AES standard on interconnections —  
Grounding and EMC practices —  
Shields of connectors in audio equipment containing active circuitry

Published by  
Audio Engineering Society, Inc.  
Copyright © 2005, 2019 by the Audio Engineering Society

Abstract
This standard specifies requirements for the termination, within audio equipment, of the shields of cables supporting interconnections with other equipment, taking into account measures commonly necessary for the preservation of EMC (electromagnetic compatibility) at both audio and radio frequencies.

An AES standard implies a consensus of those directly and materially affected by its scope and provisions and is intended as a guide to aid the manufacturer, the consumer, and the general public. The existence of an AES standard does not in any respect preclude anyone, whether or not he or she has approved the document, from manufacturing, marketing, purchasing, or using products, processes, or procedures not in agreement with the standard. Prior to approval, all parties were provided opportunities to comment or object to any provision. Attention is drawn to the possibility that some of the elements of this AES standard or information document may be the subject of patent rights. AES shall not be held responsible for identifying any or all such patents. Approval does not assume any liability to any patent owner, nor does it assume any obligation whatever to parties adopting the standards document. This document is subject to periodic review and users are cautioned to obtain the latest edition. Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Audio Engineering Society Inc., 551 Fifth Avenue, Room 1225, New York, NY 10176, US.

www.aes.org/standards standards@aes.org
Contents

Abstract ...........................................................................................................................................1

Contents ..........................................................................................................................................2

Foreword .........................................................................................................................................3

0 Introduction ................................................................................................................................4

1 Scope ...........................................................................................................................................4

2 Normative references ..................................................................................................................4

3 Definitions and abbreviations ....................................................................................................4

4 Connection of shields .................................................................................................................5

4.1 Connections to shielding enclosure ........................................................................................5

4.2 Unshielded connectors ...........................................................................................................6

4.3 Connections where no shielding enclosure exists .................................................................7

4.4 Connectors built into microphone cases .................................................................................8

4.5 Shield interruptions .................................................................................................................8

Annex A (Informative) - Examples of terminations that do not meet this standard .................9

A.1 Problem Example 1 ............................................................................................................9

A.2 Problem Example 2 .............................................................................................................9

A.3 Problem Example 3 .............................................................................................................10

A.4 Problem Example 4 .............................................................................................................11

Annex B - Bibliography ...............................................................................................................12
Foreword

This foreword is not part of the AES48-2005 AES standard on interconnections — Grounding and EMC practices — Shields of connectors in audio equipment containing active circuitry.

This document was developed under project AES-X13 by task group SC-05-05-A headed by J. Brown, and with the following members: J. Dow, S. Macatee, N. Muncy, B. Olson, D. Queen, R. Rayburn, J. Schmidt, B. Whitlock, J. Woodgate, and M. Yonge.

Bruce C. Olson, chair
Jim Brown, vice-chair
SC-05-05 Working Group on Grounding and EMC Practices
2004-09-24

Corrigendum 2005-05-12
Minor editorial corrections

Foreword to second edition, 2019

This revision includes changes to clarify the grounding of circuitry inside a device when EMI filters are employed.


Bruce C. Olson, chair
Jim Brown, vice-chair
SC-05-05 Working Group on Grounding and EMC Practices
2019-03-06

NOTE In AES standards documents, sentences containing the verb "shall" are requirements for compliance with the standard. Sentences containing the verb "should" are strong suggestions (recommendations). Sentences giving permission use the verb "may." Sentences expressing a possibility use the verb "can".
AES standard on interconnections —
Grounding and EMC practices —
Shields of connectors in audio
equipment containing active circuitry

0 Introduction
The shielding of audio equipment, cables, and microphones can be critical for electromagnetic
compatibility (EMC). The improper connection of these shields can cause common-impedance coupling in
equipment. From XL connector usage, where Pin 1 is standardized as the designated shield contact, this has
been identified as the “Pin 1 problem” (see Whitlock 1995 and AES14-1992).

1 Scope
This standard specifies requirements for the connections of the designated shield contact of connectors built
into audio equipment using active circuitry. These requirements are necessary for the preservation of
electromagnetic compatibility (EMC) at both audio and radio frequencies.

2 Normative references
There are no normative references

3 Definitions and abbreviations
3.1 Active (adjective, as applied to electronic circuitry)
Contains one or more circuit elements that are capable of detecting or demodulating an electrical signal.
Vacuum tubes (valves) and semiconductor devices are examples of active circuit elements.

3.2 Enclosure
All the walls which surround the live parts of electrical apparatus including doors, covers, cable entries,
rods, spindles, and shafts.

3.3 Shielding enclosure
Continuously conductive frame or enclosure housing electronic equipment, and whose potential is taken as
a reference.

3.4 Screen
Term sometimes used to mean the same as “shield”.

3.5 Equipment Ground
Also referred to as the Safety Ground.

3.6 “Star” Point
Also referred to as the Single Point reference.